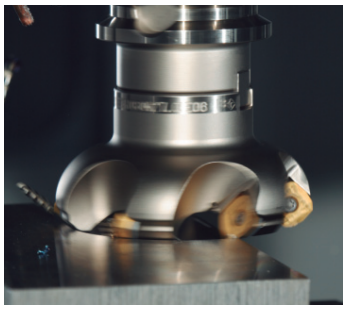
Tungaloy

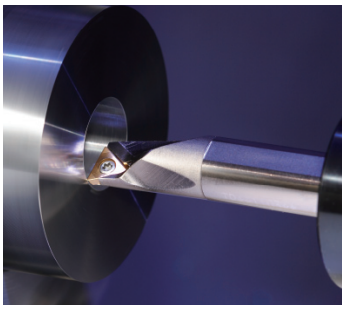
Keeping the Customer First

Tungaloy Catalogue TE0707-E2

2007

Cutting Tools





www.tungaloy-eu.com

State-of-the-Art Facilities

Head Office

Iwaki Plant

Established: 1989
Employee: 419
Land: 89277 m²
Building: 30831 m²

Manufactures cemented carbide, cutting tools (TAC® inserts, milling tools, micron drills etc.) and cemented carbide powder

Nirasaki Plant

Established: 1970
Employee: 109
Land: 41624 m²
Building: 7437 m²

Manufactures friction materials, wear-resistant tools and cutting tools (TAC® inserts)

Nagoya Plant

Established: 1961
Employee: 117
Land: 80831 m²
Building: 6814 m²

Manufactures cutting tools (drilling tools etc.), wear-resistant tools and machine parts

(Stand vom 1. Februar 2003)

Our three manufacturing plants in Japan, each devoted to a particular production item, are linked by an advanced logistics network that ensures a smooth flow through production, stocking, and physical distribution.

Engineering Sophistication: Our Iwaki Plant

Tungaloy's Iwaki plant achieves the highest levels of cleanliness, advanced automation, and safety. Computers perform centralized control of temperature, humidity, room air pressure, utilities, and other vital functions. The result is improved quality control standards for production processes, carefully adjusted to operating conditions.

CONTENTS

Guide to this Catalogue

- This catalogue shows the Cutting tools of Tungaloy Corporation. The products are classified as: TAC Inserts, TAC Toolholders, TAC Milling Cutters, Drills and Tools Materials. (please refer to the alphabetical index)
- Some product details are not listed due to limited space.
- For further information please refer to supplementary leaflets.
- All sizes are shown in metric system.
- As all products are constantly being improved and new technologies developed, the specifications and the range of products in this catalogue are subject to change without notice.

■ Stock symbols used in this catalogue

- ● Standard product in Europe
- R Standard product in Europe (only right side)
- △ Replaceable product
- ○ Standard product in Japan

The stock symbols in this catalogue are as of 01. April 2005 (including planned standard products).

■ Guide to order

- Tungaloy provide a wide variety of Cutting Tools in items and grades. Please confirm the Name of product, Catalogue No. and specifications.
- When you place us an order, please indicate Catalogue No., Grade and Quantity clearly.

  (Ex.) In case of Insert
  CNMG120408-TM T9015 10 pieces
- TAC tools are supplied without inserts.

Safety Notes

Tungaloy implements manufacturing of safety products.
Please pay attention to the following notes before using our products.

1. Hard Materials for Tools such as Cemented Tungsten Carbide, Coated Carbide, Cermet, Ceramics and Polycrystalline Compact, etc. (hereinafter called Hard-Materials) are generally very hard, but on the contrary brittle in their property. Therefore, during cutting operation, tools may be broken by shock of loading, rapid increase of cutting forces due to excessive tool wear or mishandling, then they may cause serious injury to the persons.

2. To prevent unforeseen injury to personal, safety equipment such as a safety shield, safety glasses and safety gloves etc. should always be used during cutting operations to protect from flying high tempered and sharp chips or broken pieces of cutting tools.

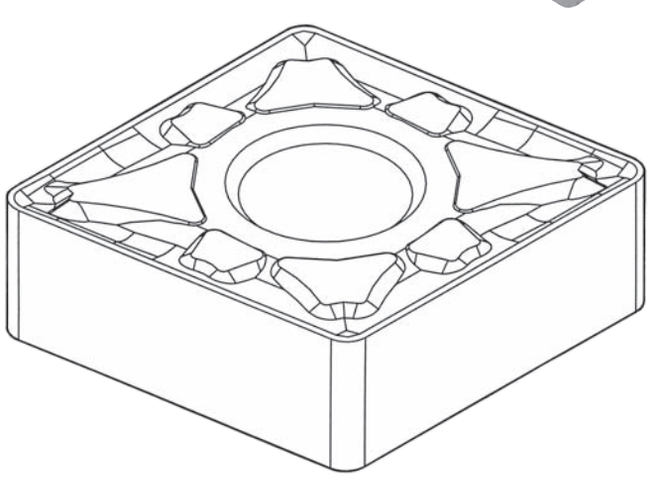
3. Cutting tools have sharp edges, so use safety gloves etc. in handling.

4. Sparks generated during cutting operations or high temperatures generated by broken tools and chips may cause to catch fire. Do not operate in dangerous places where catching fire is easy. A fire prevention is necessary when using water-insoluble cutting fluid.

5. Grinding of Hard-Materials produces injurious dust to the human body. To avoid adverse health effects, use adequate ventilation and wear protection masks.

6. Do not use for the purpose other than specified applications, otherwise it will cause breakage or damage of machines or tools.

TAC Inserts

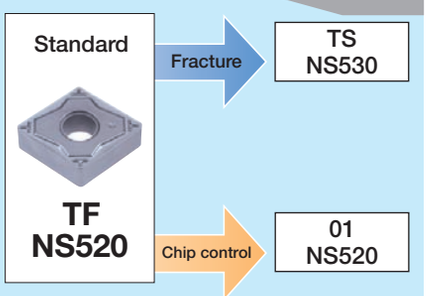


Selection System Negative Inserts

P Steels

Precision finishing [ap = ~ 0.5 mm]

Continuous



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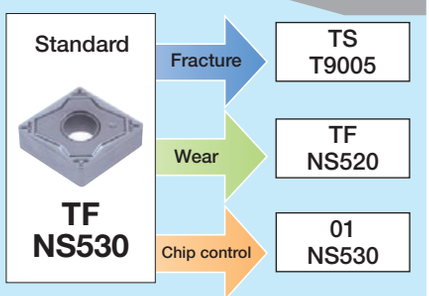
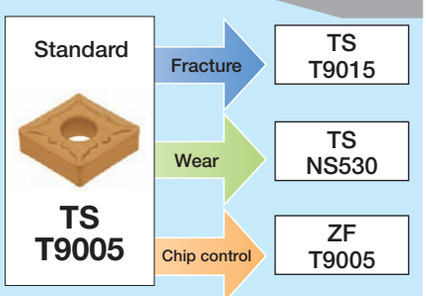


Finishing [ap = 0.3 ~ 1.5 mm]

Continuous



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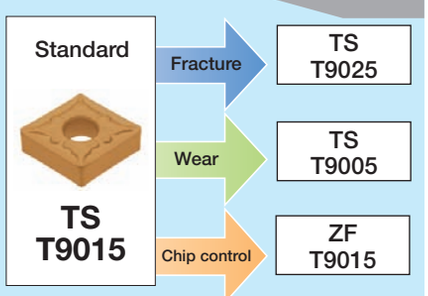

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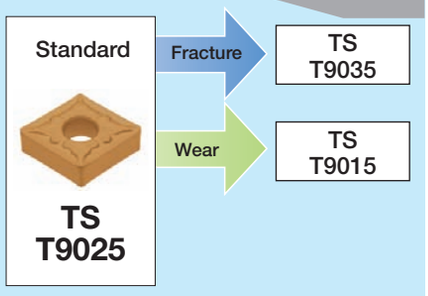

Medium cutting [ap = 1.0 ~ 5.0 mm]

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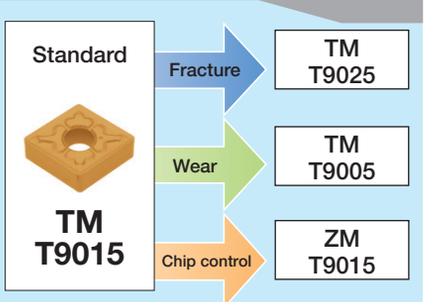

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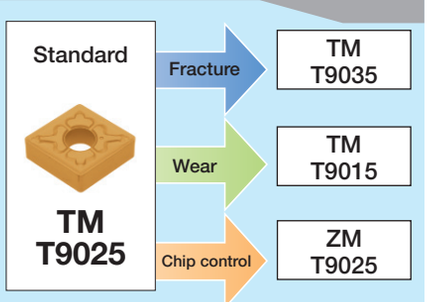

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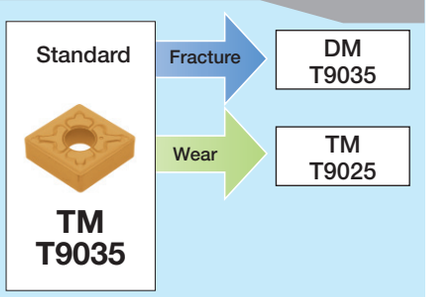
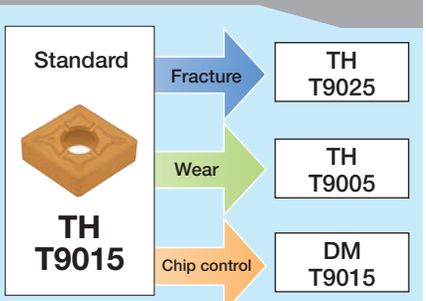


Medium to heavy cutting [ap = 3.0 ~ 6.0 mm]

Continuous



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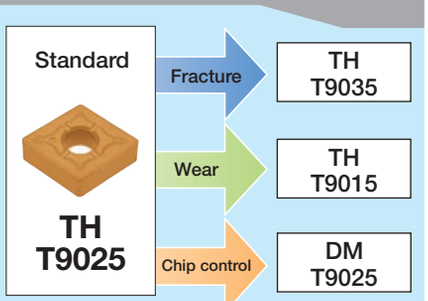

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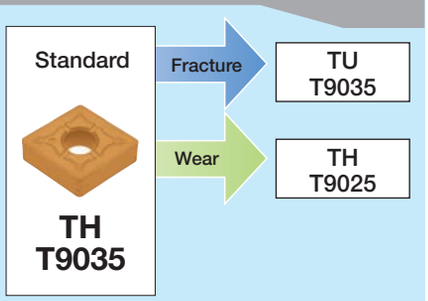

Stainless steels

Precision finishing [ap = ~ 0.5 mm]

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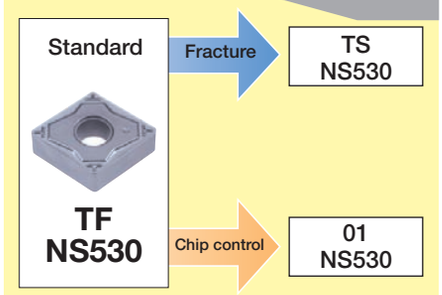

Finishing [ap = 0.5 ~ 3.0 mm]

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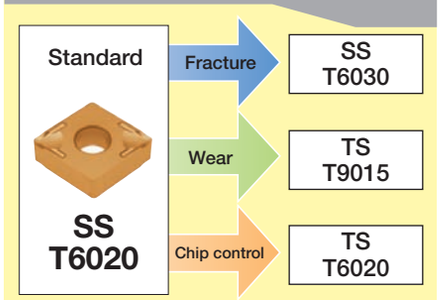

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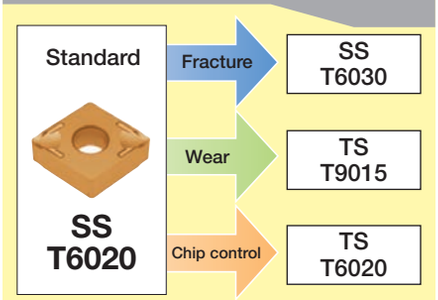

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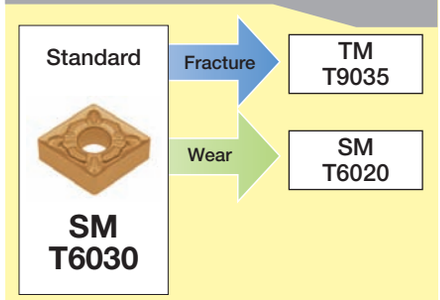
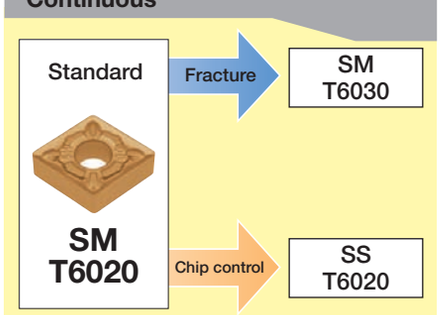


Medium cutting [ap = 1.0 ~ 4.0 mm]

Continuous



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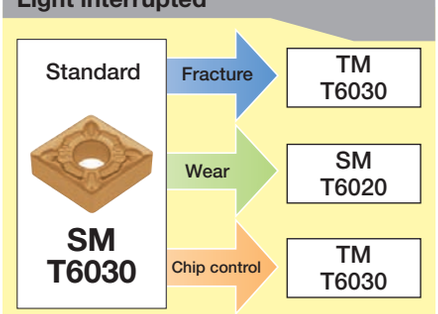

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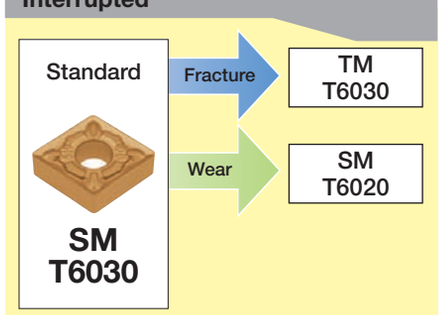


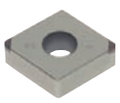
Selection System Negative Inserts

K Cast irons

Precision finishing [ap = ~ 0.5 mm]

Continuous

Standard → Fracture → QB Mini BX950

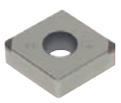


QB Mini BX930

Light interrupted

Standard → Fracture → – NS520

Standard → Wear → QB Mini BX930



QB Mini BX950

Finishing [ap = 0.5 ~ 2.0 mm]

Continuous

Standard → Wear → CF T5105

CF T5115

Light interrupted

Standard → Fracture → CM T5125

Standard → Wear → CF T5105

CF T5115

Interrupted

Standard → Fracture → CM T5125

CM T5115

Medium cutting [ap = 1.0 ~ 5.0 mm]

Continuous

Standard → Wear → CM T5105

CM T5115

Light interrupted

Standard → Fracture → CM T5125

Standard → Wear → CM T5105

CM T5115

Interrupted

Standard → Fracture → CH T5125

CM T5125

Medium to heavy cutting [ap = 3.0 ~ 6.0 mm]

Continuous

Standard → Wear → CH T5105

CH T5115

Light interrupted

Standard → Fracture → CM T5125

Standard → Wear → CH T5105

CH T5115

Interrupted

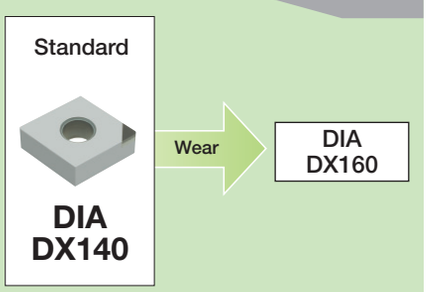
Standard → Fracture → – T5125

CH T5125

Non-ferrous metals

Precision finishing [ap = ~ 0.5 mm]

Continuous



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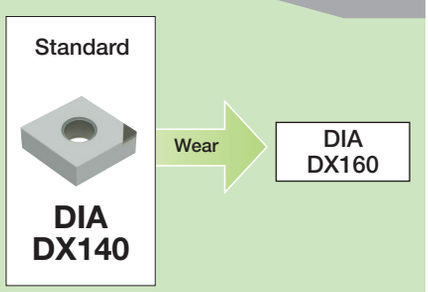
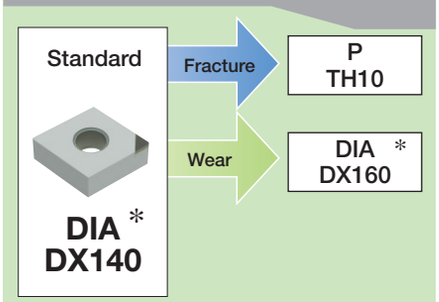


Finishing [ap = 0.5 ~ 2.0 mm]

Continuous



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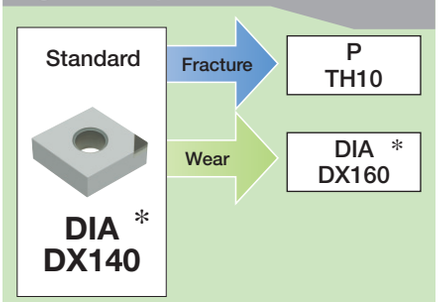
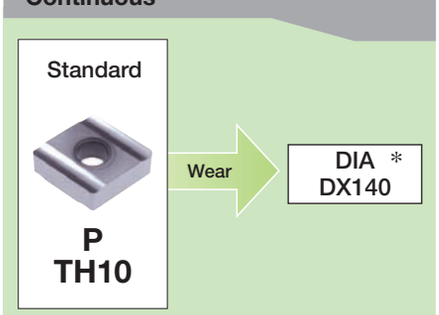


Interrupted

Medium cutting [ap = 1.0 ~ 4.0 mm]

Continuous



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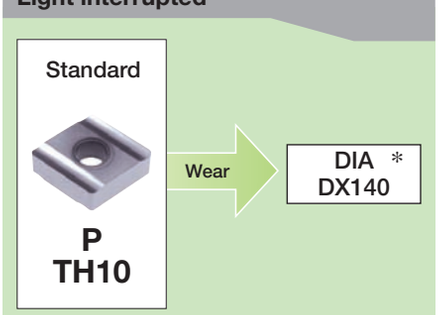

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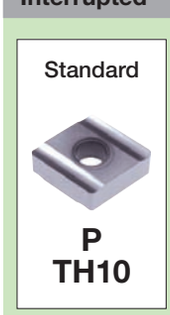


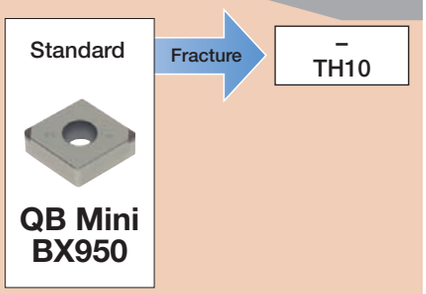
* When using T-DIA inserts, please keep ap ≤ 1.0 mm.

Selection System Negative Inserts

S Difficult-to-cut Materials

Precision finishing [ap = ~ 0.5 mm]

Continuous



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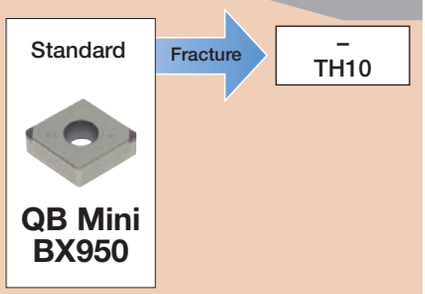
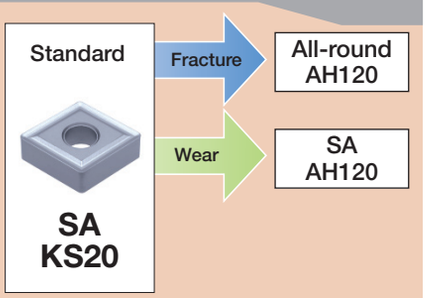


Finishing [ap = 0.5 ~ 2.0 mm]

Continuous



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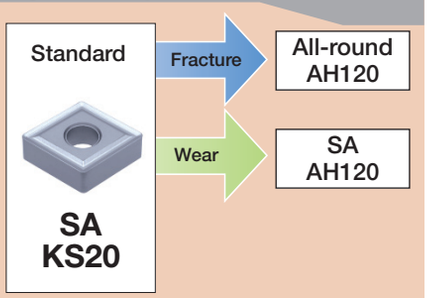

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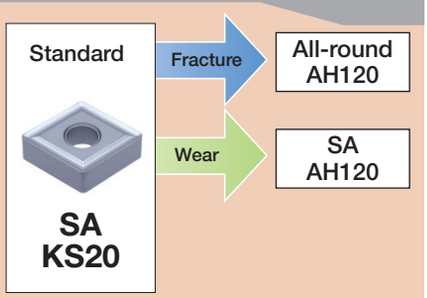
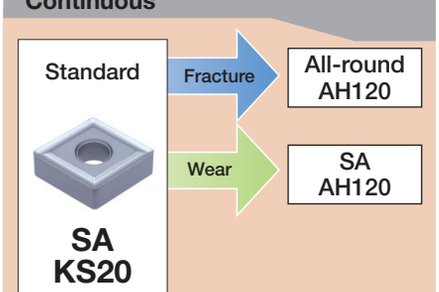


Medium cutting [ap = 1.0 ~ 4.0 mm]

Continuous



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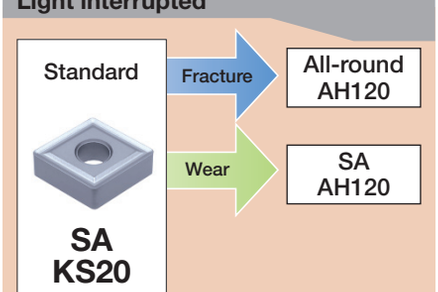

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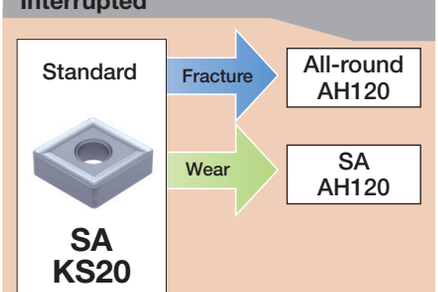
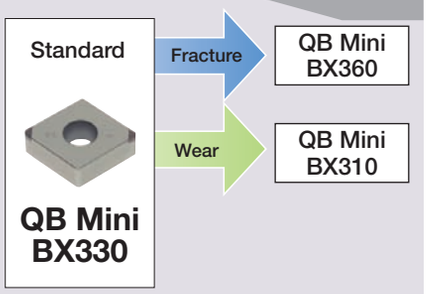


Hard materials

Precision finishing [ap = ~ 0.2 mm]

Continuous



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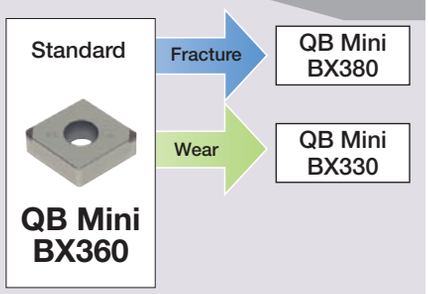
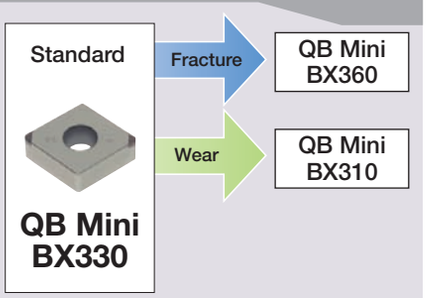


Finishing [ap = ~ 0.5 mm]

Continuous



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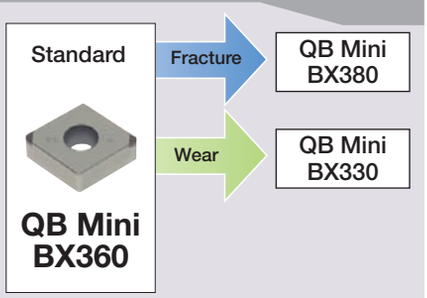

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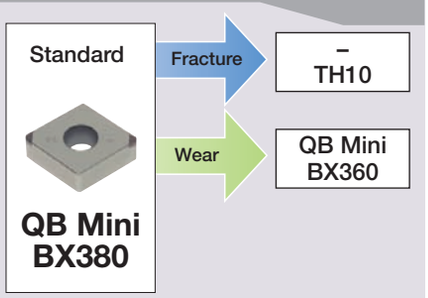


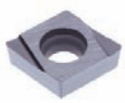
Selection System Positive Inserts

P Steels

Precision finishing [ap = ~ 0.5 mm]

Continuous

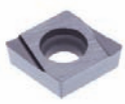
Standard



W□□
NS530

Light interrupted

Standard



W□□
NS530

Finishing [ap = 0.3 ~ 1.5 mm]

Continuous

Standard

PF
NS530

Fracture	PF T9015
Chip control	W□□ NS530

Light interrupted

Standard

PF
T9015

Fracture	PF T9025
Wear	PF NS530
Chip control	W□□ NS530

Interrupted

Standard

PF
T9025

Fracture	24 T9025
Wear	PF T9015

Finishing to Medium cutting [ap = 0.3 ~ 2.0 mm]

Continuous

Standard

PS
T9015

Fracture	PS T9025
Wear	PS NS530
Chip control	PF T9015

Light interrupted

Standard

PS
T9015

Fracture	PS T9025
Wear	PS NS530
Chip control	PF T9015

Interrupted

Standard

PS
T9025

Fracture	24 T9025
Wear	PS T9015

Medium cutting [ap = 1.0 ~ 5.0 mm]

Continuous

Standard

PM
T9015

Fracture	PM T9025
Wear	PM NS530
Chip control	PS T9015

Light interrupted

Standard

PM
T9015

Fracture	PM T9025
Wear	PM NS530
Chip control	PS T9015

Interrupted

Standard

PM
T9025

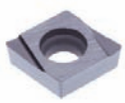
Fracture	24 T9025
Wear	PM T9015

M Stainless steels

Precision finishing [ap = ~ 0.5 mm]

Continuous

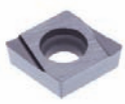
Standard



W□□
NS530

Light interrupted

Standard



W□□
NS530

Finishing [ap = 0.3 ~ 1.5 mm]

Continuous

Standard

PF
NS530

Fracture	PF T6020
Chip control	W□□ NS530

Light interrupted

Standard

PF
T6020

Fracture	PF T6030
Wear	PF NS530
Chip control	W□□ NS530

Interrupted

Standard

PF
T6030

Fracture	24 T6030
Wear	PF T6020

Finishing to Medium cutting [ap = 0.3 ~ 2.0 mm]

Continuous

Standard

PS
T6020

Fracture	PS T6030
Wear	PS NS530
Chip control	PF T6020

Light interrupted

Standard

PS
T6020

Fracture	PS T6030
Wear	PS NS530
Chip control	PF T6020

Interrupted

Standard

PS
T6030

Fracture	24 T6030
Wear	PS T6020

Medium cutting [ap = 1.0 ~ 5.0 mm]

Continuous

Standard

PM
T6020

Fracture	PM T6030
Wear	PM NS530
Chip control	PS T6020

Light interrupted

Standard

PM
T6020

Fracture	PM T6030
Wear	PM NS530
Chip control	PS T6020

Interrupted

Standard

PM
T6030

Fracture	24 T6030
Wear	PM T6020

Selection System Positive Inserts

Cast irons

Precision finishing [ap = ~ 0.5 mm]

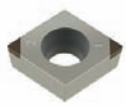
Continuous

Standard → Fracture → – TH10

QB Mini BX930

Light interrupted

Standard → Fracture → – TH10



QB Mini BX930

Finishing [ap = 0.5 ~ 2.0 mm]

Continuous

Standard → Fracture → – T5020

Standard → Wear → QB Mini BX930

– T5010

Light interrupted

Standard → Wear → – T5010

– T5020

Interrupted

Standard → Wear → – T5010

– T5020

Medium cutting [ap = 1.0 ~ 5.0 mm]

Continuous

Standard → Fracture → – T5020

– T5010

Light interrupted

Standard → Wear → – T5010

– T5020

Interrupted

Standard → Wear → – T5010

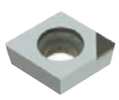
– T5020

Non-ferrous metals

Precision finishing [ap = ~ 0.5 mm]

Continuous

Standard

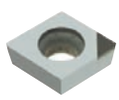


DIA DX140

Wear → DIA DX160

Light interrupted

Standard



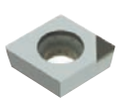
DIA DX140

Wear → DIA DX160

Finishing [ap = 0.5 ~ 2.0 mm]

Continuous

Standard



DIA ＊ DX140

Fracture → AL KS05F

Wear → DIA ＊ DX160

Chip control → W□□ TH10

Light interrupted

Standard

DIA ＊ DX140

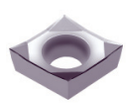
Fracture → AL KS05F

Wear → DIA ＊ DX160

Chip control → W□□ TH10

Interrupted

Standard



AL KS05F

Medium cutting [ap = 1.0 ~ 4.0 mm]

Continuous

Standard

AL KS05F

Wear → DIA ＊ DX140

Light interrupted

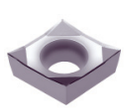
Standard

AL KS05F

Wear → DIA ＊ DX140

Interrupted

Standard



AL KS05F

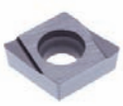
＊ When using T-DIA inserts, please keep ap ≤ 1.0 mm.

Selection System Positive Inserts

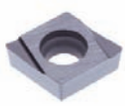
S Difficult-to-cut Materials

Precision finishing [ap = ~ 0.5 mm]

Continuous

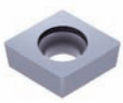
Standard

W□□
TH10

Light interrupted

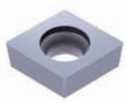
Standard

W□□
TH10

Finishing [ap = 0.5 ~ 2.0 mm]

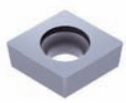
Continuous

Standard

–
TH10
Fracture → PS T6020

Light interrupted

Standard

–
TH10
Fracture → PS T6020

Interrupted

Standard

–
TH10
Fracture → PS T6020

H Hard materials

Precision finishing [ap = ~ 0.2 mm]

Continuous

Standard

QB Mini BX330
Fracture → QB Mini BX360
Wear → QB Mini BX310

Light interrupted

Standard

QB Mini BX360
Fracture → – TH10
Wear → QB Mini BX330

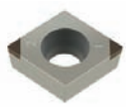
Finishing [ap = ~ 0.5 mm]

Continuous

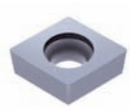
Standard

QB Mini BX330
Fracture → QB Mini BX360
Wear → QB Mini BX310

Light interrupted

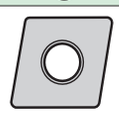
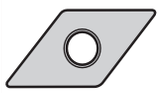
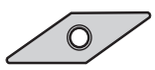
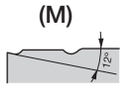
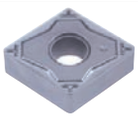
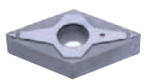
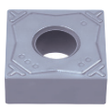
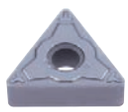
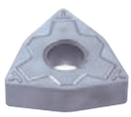
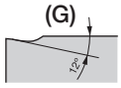
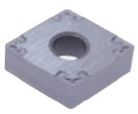
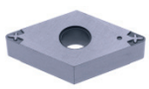
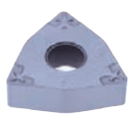
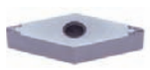
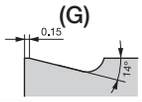
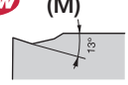
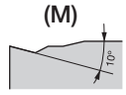
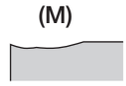
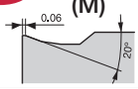
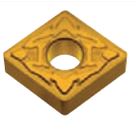
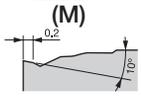
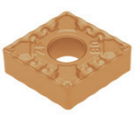
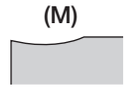
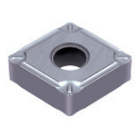
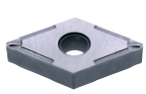
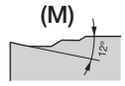
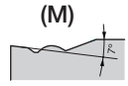
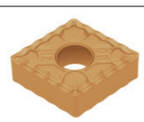
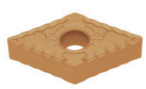
Standard

QB Mini BX360
Fracture → – TH10
Wear → QB Mini BX330

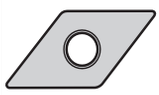
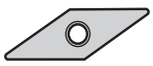
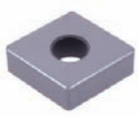
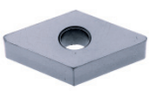
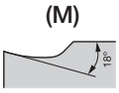
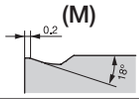
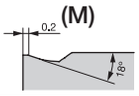
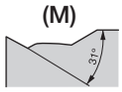
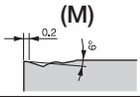
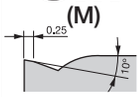
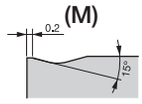
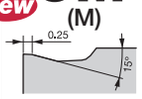
Interrupted

Standard

–
TH10
Wear → QB Mini BX360

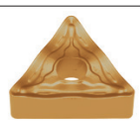
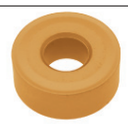
Appearance of Chipbreaker

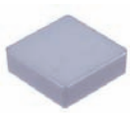
Negative inserts

Application	Chipbreaker	C	D	S	T	W	V	R
	Negative							
		80° Negative	55° Negative	90° Negative	60° Negative	80° Negative	35° Negative	Negative
Precision finishing	TF (M) 	 P. 44	 P. 52	 P. 61	 P. 70	 P. 78	 P. 83	
	01 (G) 	 P. 44	 P. 52	 P. 61	 P. 70	 P. 78	 P. 83	
	C (G) 				 P. 70			
Finishing	TSF (M) New 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81	 P. 87	
	TS (M) 	 P. 44	 P. 53	 P. 61	 P. 71	 P. 79	 P. 84	
	SS (M) 	 P. 44	 P. 54	 P. 62	 P. 71	 P. 79	 P. 84	
	CF (M) New 	 P. 44	 P. 53	 P. 61	 P. 71	 P. 79	 P. 84	
	ZF (M) 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81	 P. 87	
	11 (M) 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81	 P. 87	
	AFW (M) Wiper 	 P. 49				 P. 82		
Finishing to medium cutting	ZM (M) 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81	 P. 87	

Application	Chipbreaker	C	D	S	T	W	V	R
	Negative							
		80° Negative	55° Negative	90° Negative	60° Negative	80° Negative	35° Negative	Negative
Finishing to medium cutting	– (M)	 P. 44	 P. 52	 P. 61	 P. 70	 P. 79	 P. 83	
	– (G)	 P. 44	 P. 52	 P. 61	 P. 70	 P. 79	 P. 83	 P. 88
Finishing (low carbon steel)	17 (M) 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81		
High feed, small cutting depth	ASW (M) 	Wiper  P. 49				 P. 82		
	AS (M) 	 P. 48	 P. 57	 P. 65	 P. 74	 P. 81		
Boring	CB (M) 	 P. 49	 P. 58		 P. 75	 P. 82		
Medium cutting	TM (M) 	 P. 45	 P. 54	 P. 62	 P. 71	 P. 79	 P. 85	
	SM (M) 	 P. 45	 P. 54	 P. 62	 P. 71	 P. 80	 P. 85	
	All-round (M) 	 P. 46	 P. 55	 P. 63	 P. 72	 P. 80	 P. 85	
	New CM (M) 	 P. 45	 P. 54	 P. 62	 P. 71	 P. 79	 P. 85	

Application	Chipbreaker	C	D	S	T	W	V	R
	Negative	80° Negative	55° Negative	90° Negative	60° Negative	80° Negative	35° Negative	Negative
Medium cutting	P (G)	P. 45	P. 55	P. 63	P. 72			
	DM (M)	P. 49	P. 58	P. 66	P. 75	P. 82	P. 87	
	28 (M)	P. 49						
	37 (M)	P. 49	P. 58	P. 66	P. 75	P. 82		
	Parallel (G)		P. 55					
	SA (M)	P. 45	P. 54	P. 62	P. 72	P. 80		
	S (M)	P. 45	P. 55	P. 62	P. 72			
Roughing	New CH (M)	P. 46	P. 55	P. 63	P. 72	P. 80		
	TH (M)	P. 46	P. 55	P. 63	P. 72	P. 80		
Heavy cutting	TR (M)	P. 46		P. 63				

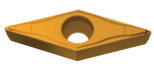
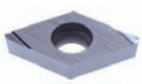
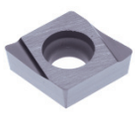
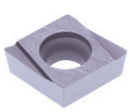
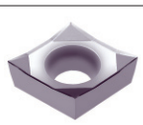
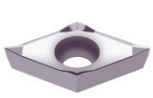
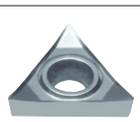
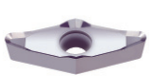
Application	Chipbreaker	C	D	S	T	W	V	R
	Negative	80° Negative	55° Negative	90° Negative	60° Negative	80° Negative	35° Negative	Negative
Heavy cutting	TU (M)	 P. 46		 P. 63				
	57 (M)	 P. 50	 P. 59	 P. 66	 P. 76	 P. 82		
	61 (M)							 P. 88
	65 (M)	 P. 50		 P. 67				

Application	Chipbreaker	C	D	S	T	R
	Negative	80° Negative	55° Negative	90° Negative	60° Negative	Negative
Finishing to medium cutting	– (G)	 P. 51	 P. 60	 P. 68	 P. 77	 P. 88
	– (M)	 P. 51		 P. 68	 P. 77	 P. 88

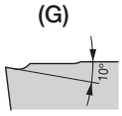
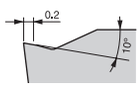
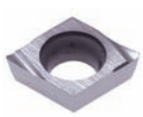
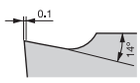
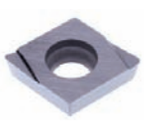
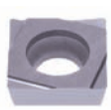
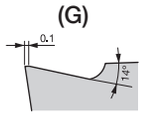
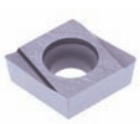
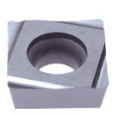
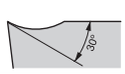
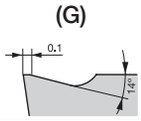
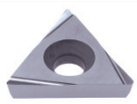
Application	Chipbreaker	KNMX
	Negative	55° Negative
Finishing	S1 (M)	 P. 89

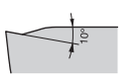
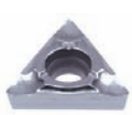
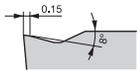
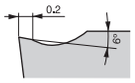
Appearance of Chipbreaker

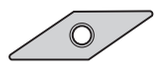
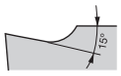
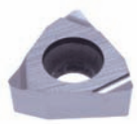
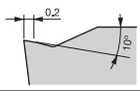
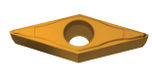
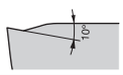
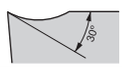
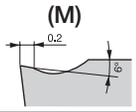
Positive Inserts

Application	Chipbreaker	C	D	S	T	V	R
	Positive 7°	80° Positive 7°	55° Positive 7°	90° Positive 7°	60° Positive 7°	35° Positive 7°	Positive 7°
Precision finishing	01 (G)	 P. 92	 P. 98		 P. 108		
Finishing	PF (M)	 P. 92	 P. 98	 P. 102		 P. 121	
	W10 (G)		 P. 98				
	W15 (G)	 P. 92	 P. 98				
	W20 (G)	 P. 92					
Finishing to medium cutting	PS (M)	 P. 92	 P. 98	 P. 102	 P. 108	 P. 121	
	SS (G)				 P. 108		
	– (M)	 P. 93	 P. 99				
	AL (G)	 P. 93	 P. 99		 P. 108	 P. 121	 P. 122
	RS (M)						 P. 122

Application	Chipbreaker	C	D	S	T	V	R
	Positive 7°	80° Positive 7°	55° Positive 7°	90° Positive 7°	60° Positive 7°	35° Positive 7°	Positive 7°
Finishing to medium cutting	– (G)	P. 93	P. 101				
	All-round (G)	P. 95	P. 101				
	Parallel (G) 23°	P. 96	P. 101				
Turning on small lathes	J08 (G) 30°				P. 109		
	J10 (G) 30°	P. 94	P. 100		P. 109		
Medium cutting	PM (M) 0.15 6°	P. 92	P. 98	P. 102	P. 108		
	24 (M) 0.2 6°	P. 93	P. 99	P. 102		P. 121	
Heavy cutting	61 (M) 0.15 20°						P. 122

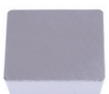
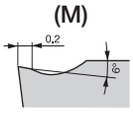
Application	Chipbreaker	C	S	T	E
	Positive 11°	80° Positive11°	90° Positive 11°	60° Positive 11°	75° Positive 11°
Precision finishing	01 (G) 			 P. 110	
Finishing	PF (M) 	 P. 96		 P. 112	
	W08 (G) 			 P. 110	 P. 123
	W15 (G) 	 P. 96	 P. 103	 P. 111	
	W20 (G) 	 P. 96	 P. 103		
	J08 (G) 				 P. 123
	R/L (G) 			 Former Tungaloy-standard hole P. 115	

Application	Chipbreaker	C	S	T
	Positive 11°			
		80° Positive 11°	90° Positive 11°	60° Positive 11°
Finishing to medium cutting	PS (M) 	 P. 96	 P. 103	 P. 112
	SS (G) 			 P. 113
	– (M) 	 P. 97	 P. 103	 P. 113
	23 (M) 			 P. 116
	– (G) 			 P. 115
Medium cutting	PM (M) 	 P. 96		 P. 112
	24 (M) 	 P. 97	 P. 103	 P. 114

Application	Chipbreaker	W	V
	Positive 5°		
		80° Positive 5°	35° Positive 5°
Finishing	W08 (G) 	 P. 119	
	W11 (G) 	 P. 119	
	PF (M) 		 P. 120
Finishing to medium cutting	PS (M) 		 P. 120
Turning on small lathes	J10 (G) 		 P. 120
Medium cutting	24 (M) 		 P. 120

Application	Chipb.	JXF□	JXB□	JXR□
	Positive			
		Positive	Positive	Positive
Small Lathes	–	Front-turning  P. 276	Back-turning  P. 277	Reverse-turning  P. 276

Application	Chipbreaker	JTB□	J10E□
	Positive		
		Positive	Positive
Backturning	–	 P. 278	 P. 278

Application	Chipbreaker	S	T	R
	Positive 11°			
		90° Positive 11°	60° Positive 11°	Positive 11°
Finishing	– (G) 	 P. 104		
Finishing to medium cutting	– (M) 	 P. 105	 P. 116	
	– (G) 		 P. 118	
	23 (M) 	 P. 105	 P. 116	
Medium cutting	24 (M) 		 P. 116	

Standard Cutting Conditions (Negative Inserts)

ISO	Work materials	Hardness (HB)	Operation		Chipbreaker type	Insert grades	Corner R	Cutting depth ap (mm)	Feed f (mm/rev)	Cutting speed Vc (m/min)
P	Low carbon steels · Alloy steels Ck10 15CrMo5 USt42 etc.	< 150	Precision finishing	continuous light interrupted	TF	**NS520** **NS530**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	320 - 390 - 450 130 - 230 - 320
			Finishing	continuous light interrupted interrupted	TS	**NS520** **NS530** **T9025**	0.8	0.3 - 1.0 - 1.5	0.08 - 0.15 - 0.2	320 - 390 - 450 130 - 230 - 320 130 - 230 - 320
			Medium cutting	continuous light interrupted interrupted	TM	**T9005** **T9015** **T9025**	0.8	1.0 - 3.0 - 5.0	0.2 - 0.3 - 0.5	320 - 390 - 450 130 - 230 - 320 130 - 230 - 320
			Roughing	continuous light interrupted interrupted	TH	**T9005** **T9015** **T9025**	1.2	3.0 - 4.0 - 6.0	0.3 - 0.4 - 0.6	230 - 260 - 320 230 - 260 - 320 130 - 200 - 220
			Heavy cutting	continuous interrupted	TU	**T9015** **T9025**	1.6	3.0 - 6.0 - 10.0	0.6 - 0.7 - 1.0	230 - 260 - 320 130 - 200 - 220
	Medium carbon steels · Alloy steels C45 42CrMo4 etc.	150~300	Precision finishing	continuous light interrupted	TF	**NS520** **NS530**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	250 - 310 - 370 100 - 180 - 250
			Finishing	continuous light interrupted interrupted	TS	**NS520** **NS530** **T9025**	0.8	0.3 - 1.0 - 1.5	0.08 - 0.15 - 0.2	250 - 310 - 370 100 - 180 - 250 100 - 180 - 250
			Medium cutting	continuous light interrupted interrupted	TM	**T9005** **T9015** **T9025**	0.8	1.0 - 3.0 - 5.0	0.2 - 0.3 - 0.5	220 - 310 - 370 120 - 220 - 310 120 - 220 - 310
			Roughing	continuous light interrupted interrupted	TH	**T9005** **T9015** **T9025**	1.2	3.0 - 4.0 - 6.0	0.3 - 0.4 - 0.6	220 - 250 - 310 100 - 160 - 220 100 - 160 - 220
			Heavy cutting	continuous interrupted	TU	**T9015** **T9025**	1.6	3.0 - 6.0 - 10.0	0.6 - 0.7 - 1.0	100 - 160 - 220 100 - 160 - 220
	High carbon steels · Alloy steels 40NiCrMo6 etc.	250~400	Precision finishing	continuous light interrupted	TF	**NS520** **NS530**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	70 - 170 - 280 50 - 110 - 230
			Finishing	continuous light interrupted interrupted	TS	**NS520** **NS530** **T9025**	0.8	0.3 - 1.0 - 1.5	0.08 - 0.15 - 0.2	70 - 170 - 280 50 - 110 - 170 50 - 110 - 170
			Medium cutting	continuous light interrupted interrupted	TM	**T9005** **T9015** **T9025**	0.8	1.0 - 3.0 - 5.0	0.2 - 0.3 - 0.5	110 - 170 - 230 80 - 110 - 200 80 - 110 - 200
			Roughing	continuous light interrupted interrupted	TH	**T9005** **T9015** **T9025**	1.2	3.0 - 4.0 - 6.0	0.3 - 0.4 - 0.6	90 - 110 - 170 70 - 110 - 150 70 - 110 - 150
			Heavy cutting	continuous interrupted	TU	**T9015** **T9025**	1.6	3.0 - 6.0 - 10.0	0.6 - 0.7 - 1.0	70 - 110 - 150 70 - 110 - 150
M	Stainless steels X5CrNi18-10 X3CrNiMo17-13-3 etc.	< 200	Precision finishing	continuous light interrupted	TF	**NS520** **NS530**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	100 - 120 - 220 80 - 100 - 180
			Finishing	continuous light interrupted interrupted	SS	**T6020** **T6020** **T6030**	0.8	0.5 - 1.0 - 3.0	0.08 - 0.15 - 0.2	150 - 220 - 260 120 - 180 - 200 100 - 150 - 180
			Medium cutting	continuous light interrupted interrupted	SM	**T6020** **T6030** **T6030**	0.8	1.0 - 3.0 - 5.0	0.2 - 0.3 - 0.5	150 - 220 - 260 120 - 180 - 200 100 - 150 - 180
			Heavy cutting	continuous light interrupted	TU	**T6030**	1.6	3.0 - 6.0 - 10.0	0.6 - 0.7 - 1.0	120 - 180 - 230 80 - 100 - 150

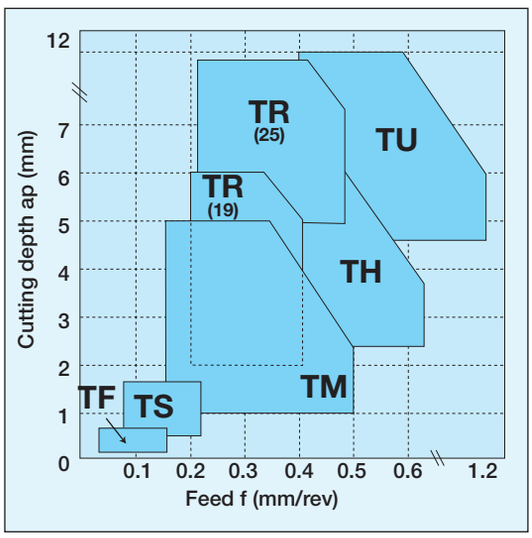
ISO	Work materials	Hardness (HB)	Operation		Chipbreaker type	Insert grades	Corner R	Cutting depth ap (mm)	Feed f (mm/rev)	Cutting speed Vc (m/min)
K	Grey cast irons GG25 etc.	200~250	Precision finishing	continuous light interrupted	(PCBN-mini)	**BX850** **BX850**	0.4	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	300 - 700 - 1200 300 - 500 - 800
			Finishing	continuous light interrupted	CM	**T5105** **T5115**	0.8	0.5 - 1.0 - 2.0	0.05 - 0.25 - 0.4	180 - 330 - 480 140 - 270 - 400
			Medium cutting	continuous light interrupted interrupted	CM	**T5105** **T5115** **T5125**	0.8	1.0 - 2.0 - 4.0	0.1 - 0.3 - 0.5	180-330-480 140-270-400 120-210-300
			Heavy cutting	continuous light interrupted interrupted	CH	**T5105** **T5115** **T5125**	1.2	3.0 - 4.0 - 6.0	0.1 - 0.35 - 0.6	180-330-480 140-270-400 120-210-300
	Ductile cast irons GGG40 etc.	150~250	Finishing	continuous light interrupted	CF	**T5105** **T5115**	0.8	0.5 - 1.0 - 2.0	0.05 - 0.25 - 0.4	180-290-400 140-255-370
			Medium cutting	interrupted continuous light interrupted	CM	**T5105** **T5115** **T5125**	0.8	1.0 - 2.0 - 4.0	0.1 - 0.3 - 0.5	180-290-400 140-255-370 120-180-250
			Heavy cutting	interrupted continuous continuous	CH	**T5105** **T5115** **T5125**	1.2	3.0 - 4.0 - 6.0	0.1 - 0.35 - 0.6	180-290-400 140-255-370 120-180-250
N	Aluminium alloys (Si < 12%)		Precision finishing	continuous light interrupted	PCD	**DX140** **DX140**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	500 - 800 - 2500 400 - 800 - 2000
			Finishing	continuous light interrupted interrupted	P	**TH10** **TH10** **TH10**	0.8	0.5 - 2.0 - 4.0	0.08 - 0.3 - 0.5	500 - 600 - 1000 400 - 500 - 700 200 - 300 - 500
	Aluminium alloys (Si > 12%)		Medium cutting	continuous light interrupted	PCD	**DX140** **DX140**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1- 0.15	400 - 600 - 800 400 - 500 - 600
			Roughing	continuous light interrupted	PCD	**DX140** **DX140**	0.8	0.3 - 0.5 - 1.0	0.08 - 0.15 - 0.25	400 - 600 - 800 400 - 500 - 600
			Heavy cutting	continuous light interrupted interrupted	P	**TH10** **TH10** **TH10**	0.8	0.5 - 2.0 - 4.0	0.08 - 0.3 - 0.5	100 - 200 - 300 100 - 150 - 200 100 - 150 - 200
	Copper and Copper alloys		Precision finishing	continuous light interrupted	PCD	**DX140** **DX140**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	500 - 1000 - 1500 400 - 800 - 1200
			Heavy cutting	continuous light interrupted interrupted	P	**TH10** **TH10** **TH10**	0.8	0.5 - 2.0 - 4.0	0.08 - 0.3 - 0.5	100 - 200 - 300 100 - 150 - 200 50 - 100 - 150
S	Ni-base alloys INCONEL718 etc.		Precision finishing	continuous light interrupted	01	**TH10** **TH10**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	10 - 30 - 50 10 - 20 - 30
			Finishing	continuous light interrupted	SA	**AH110** **AH120**	0.8	0.5 - 1.0 - 2.0	0.08 - 0.15 - 0.25	10 - 30 - 60 10 - 30 - 50
			Medium cutting	continuous light interrupted	SA	**AH110** **AH120**	0.8	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.5	10 - 30 - 60 10 - 30 - 50
	Titanium alloys Ti6Al4V etc.		Roughing	continuous light interrupted	01	**TH10** **TH10**	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	50 - 100 - 120 30 - 80 -100
			Heavy cutting	continuous light interrupted interrupted	SA	**KS20** **KS20** **KS20**	0.8	0.5 - 1.0 - 2.0	0.08 - 0.15 - 0.25	30 - 50 - 70 30 - 50 - 70 10 - 30 - 50
			Precision finishing	continuous light interrupted interrupted	SA	**KS20** **KS20** **KS20**	0.8	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.5	30 - 50 - 70 30 - 50 - 70 10 - 30 - 50
H	Hardened steels Pre-hardened steels		Precision finishing	continuous light interrupted interrupted interrupted	PCBN	**BX310** **BX330** **BX360** **BX380**	0.4	0.05 - 0.1 - 0.2	0.05 - 0.1 - 0.15	130 - 200 - 300 80 - 120 - 150 80 - 120 - 150 80 - 120 - 150
			Finishing	continuous light interrupted interrupted	–	**LX11** **TH10** **TH10**	0.8	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.10	50 - 100 - 150 20 - 30 - 40 10 - 15 - 20

Standard Cutting Conditions (Positive Inserts)

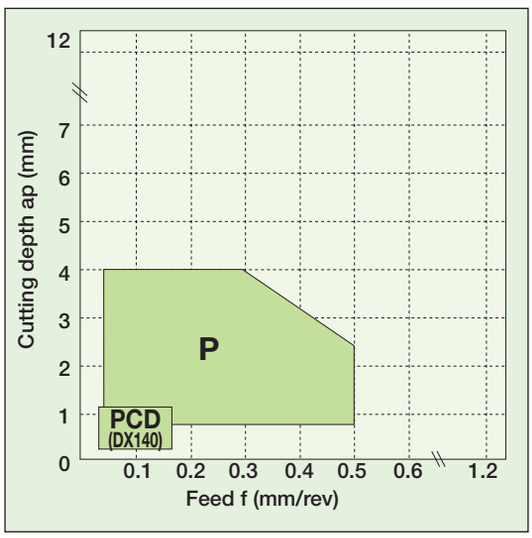
ISO	Work materials	Hardness (HB)	Operation		Chipbreaker type	Insert grades	Corner R	Cutting depth ap (mm)	Feed f (mm/rev)	Cutting speed Vc (m/min)
P	Low carbon steels · Alloy steels Ck10, 15CrMo5, USt42 etc.	> 150	Precision finishing	continuous light interrupted	01	NS520 NS530	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	250 - 3 00 - 350 100 - 180 - 250
			Finishing	continuous light interrupted interrupted	PF PS	NS530 T9015 T9025	0.4	0.3 - 1.0 - 1.5 0.3 - 1.0 - 1.5 0.3 - 1.0 - 2.0	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25 0.08 - 0.15 - 0.3	200 - 250 - 300 120 - 200 - 300 100 - 150 - 200
			Medium cutting	continuous light interrupted interrupted	PM	NS530 T9015 T9025	0.8	1.0 - 2.0 - 2.5	0.15 - 0.2 - 0.3	200 - 250 - 300 120 - 200 - 300 100 - 150 - 200
	Medium carbon steels · Alloy steels C45, 42CrMo4 etc.	150~300	Precision finishing	continuous light interrupted	01	NS520 NS530	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	200 - 250 - 300 80 - 150 - 200
			Finishing	continuous light interrupted interrupted	PF PS	NS530 T9015 T9025	0.4	0.3 - 1.0 - 1.5 0.3 - 1.0 - 1.5 0.3 - 1.0 - 2.0	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25 0.08 - 0.15 - 0.3	150 - 200 - 250 120 - 200 - 300 100 - 150 - 200
			Medium cutting	continuous light interrupted interrupted	PM	NS530 T9015 T9025	0.8	1.0 - 2.0 - 2.5	0.15 - 0.2 - 0.3	150 - 200 - 250 120 - 200 - 300 100 - 150 - 200
	High carbon steels · Alloy steels 40NiCrMo6 etc.	250~400	Precision finishing	continuous light interrupted	01	NS520 NS530	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	80 - 150 - 250 80 - 100 - 150
			Finishing	continuous light interrupted interrupted	PF PS	NS530 T9015 T9025	0.4	0.3 - 1.0 - 1.5 0.3 - 1.0 - 1.5 0.3 - 1.0 - 2.0	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25 0.08 - 0.15 - 0.3	80 - 150 - 200 120 - 200 - 300 100 - 150 - 200
			Medium cutting	continuous light interrupted interrupted	PM	NS530 T9015 T9025	0.8	1.0 - 2.0 - 2.5	0.15 - 0.2 - 0.3	100- 150 - 200 120 - 200 - 300 100 - 150 - 200
M	Stainless steels X5CrNi18-10, X3CrNiMo17-13-3 etc.	< 200	Precision finishing	continuous light interrupted	01	NS530 NS530	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	100 - 120 - 150 80 - 100 - 150
			Finishing	continuous light interrupted interrupted	PF PS	T6020 T6020 T6030	0.8	0.3 - 1.0 - 1.5 0.3 - 1.0 - 1.5 0.3 - 1.0 - 2.0	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25 0.08 - 0.15 - 0.3	150 - 220 - 260 120 - 180 - 200 100 - 150 - 180
			Medium cutting	continuous light interrupted interrupted	PM	T6020 T6030 T6030	0.8	1.0 - 2.0 - 2.5	0.15 - 0.2 - 0.3	150 - 220 - 260 120 - 180 - 200 100 - 150 - 180
K	Grey cast irons GG25 etc.	200~250	Precision finishing	continuous light interrupted	01	NS520 NS520	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	200 - 250 - 300 100 - 150 - 200
			Finishing to medium cutting	continuous light interrupted interrupted	–	T5010 T5020 T5020	0.8	0.05 - 1.0 - 3.0	0.03 - 0.1 - 0.3	150 - 300 - 600 150 - 300 - 400 100 - 150 - 300
	Ductile cast irons GGG40 etc.	150~250	Precision finishing	continuous light interrupted	01	NS520 NS520	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	100 - 200 - 300 100 - 150 - 200
			Finishing to medium cutting	continuous light interrupted interrupted	–	T5010 T5020 T5020	0.8	0.05 - 1.0 - 3.0	0.03 - 0.1 - 0.3	100 - 250 - 300 100 - 200 - 300 100 - 150 - 200
N	Aluminium alloys (Si < 12%)		Precision finishing	continuous light interrupted	PCD	DX140 DX140	0.2	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	500 - 800 - 2500 400 - 800 - 2000
			Precision finishing	continuous light interrupted	AL	KS05F KS05F	0.4	0.5 - 3.0 - 5.0	0.1 - 0.3 - 0.5	100 - 600 - 1200 100 - 500 - 900
	Aluminium alloys (Si 13%-17%)		Precision finishing	continuous light interrupted	PCD	DX140 DX140	0.2	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	400 - 600 - 800 400 - 500 - 600
			Precision finishing	continuous light interrupted	AL	KS05F KS05F	0.4	0.5 - 3.0 - 5.0	0.1 - 0.3 - 0.5	100 - 200 - 300 100 - 150 - 200
			Medium cutting	continuous light interrupted	AL	KS05F KS05F	0.4	0.5 - 3.0 - 5.0	0.1 - 0.3 - 0.5	100 - 200 - 300 100 - 150 - 200
S	Ni-base alloys INCONEL718 etc.		Precision finishing	continuous light interrupted	01	TH10 TH10	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	30 - 40 - 50 10 - 20 - 30
			Finishing	light interrupted interrupted	W□□	TH10 TH10	0.8	0.5 - 1.0 - 2.0	0.08 - 0.15 - 0.25	10 - 20 - 30 10 - 20 - 30
	Titanium alloys Ti6Al4V etc.		Precision finishing	continuous light interrupted	01	TH10 TH10	0.4	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15	50 - 100 - 120 30 - 80 - 100
			Finishing	continuous light interrupted interrupted	W□□	TH10 TH10 TH10	0.8	0.5 - 1.0 - 2.0	0.08 - 0.15 - 0.25	30 - 100 - 120 30 - 80 - 100 30 - 50 - 80
H	Hardened steels · Pre-hardened steels etc.	> HRC 45	Precision finishing	continuous light interrupted interrupted	PCBN	BX310 BX330 BX360	0.4	0.05 - 0.1 - 0.2	0.05 - 0.1 - 0.15	160 - 200 - 300 100 - 150 - 200 80 - 120 - 150
			Finishing	continuous light interrupted interrupted	–	LX11 TH10 TH10	0.8	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.10	50 - 100 - 150 20 - 30 - 40 10 - 15 - 20

Chipbreaker System for Turning (Negative Inserts)

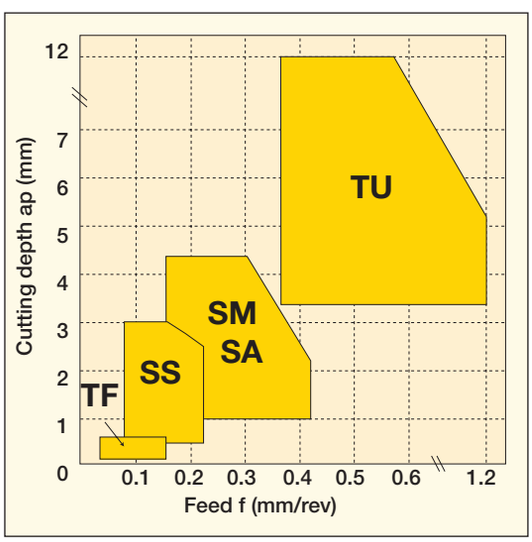
Low to high carbon steels and alloy steels



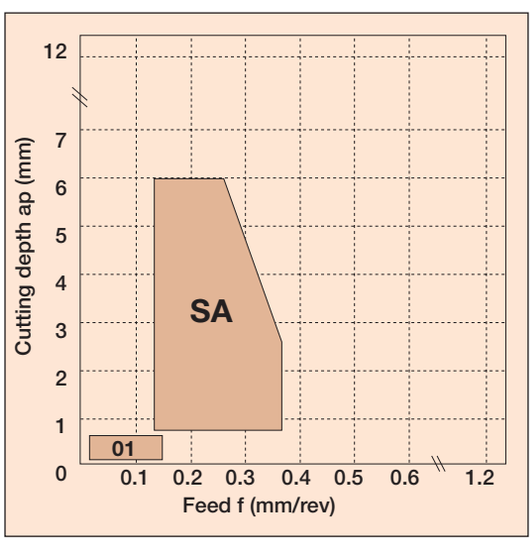
Non-ferrous metals



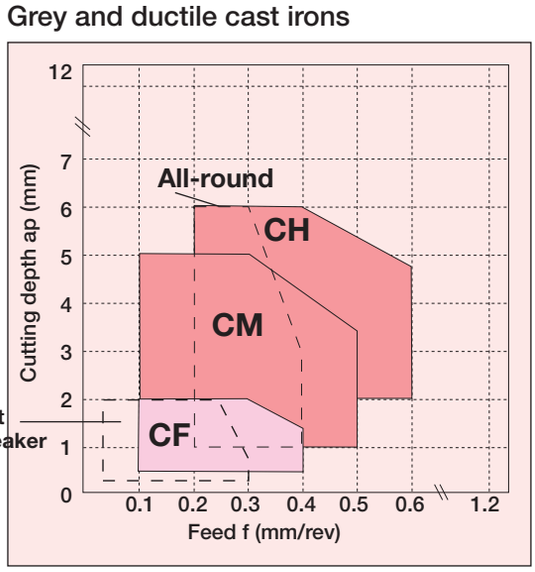
Stainless steels



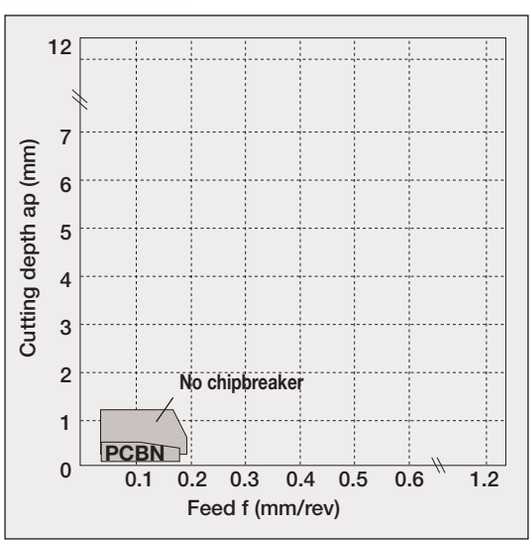
Difficult-to-cut materials



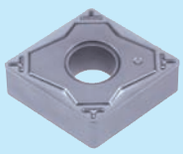
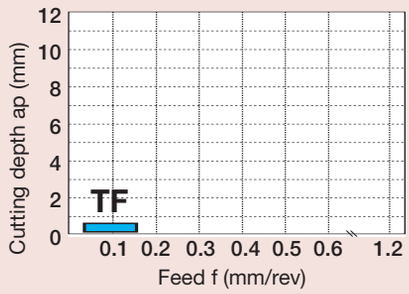
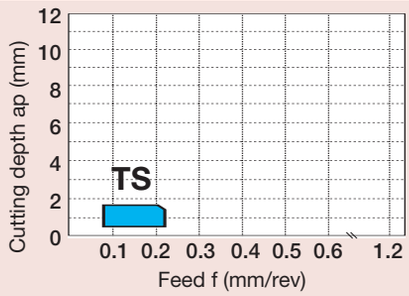
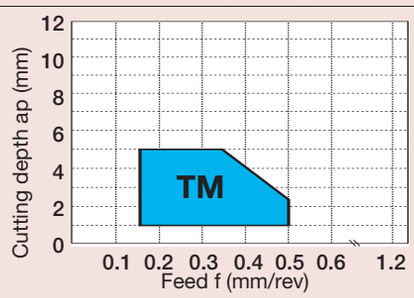
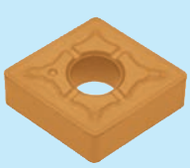
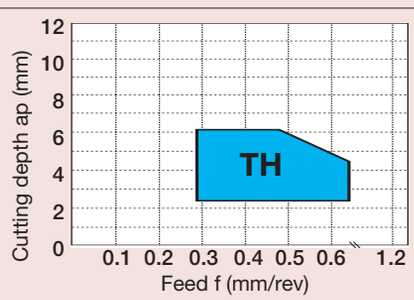
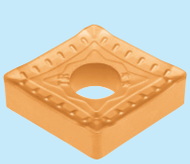
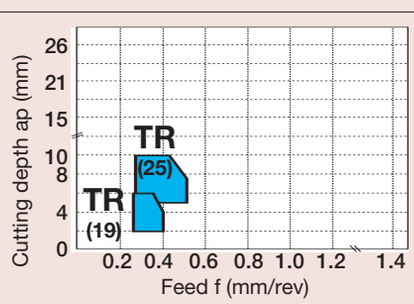
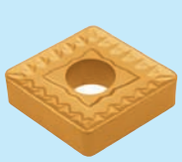
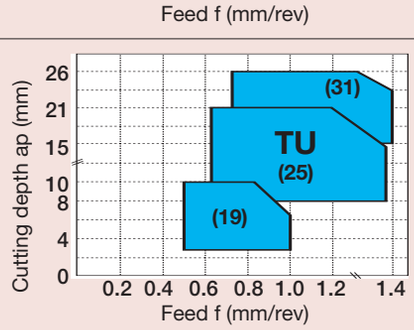
Grey and ductile cast irons

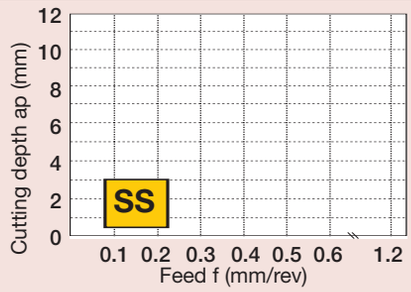
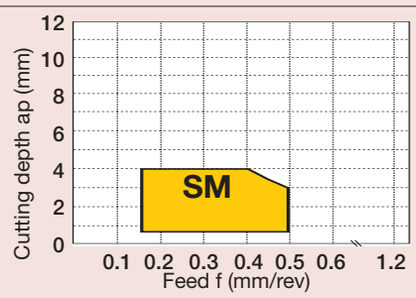
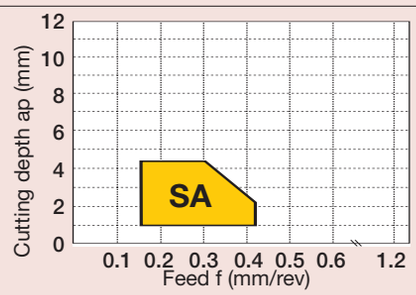
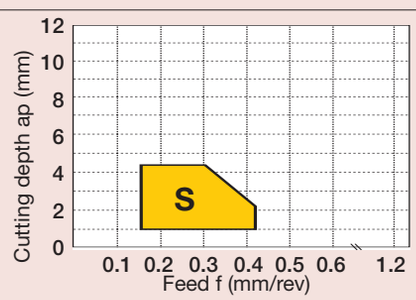


Hard materials

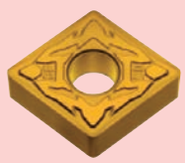
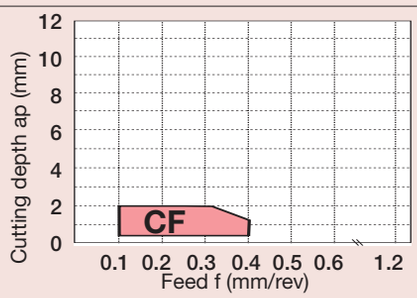
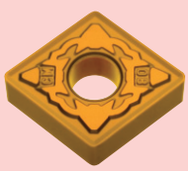
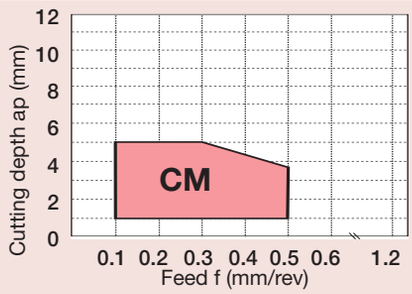
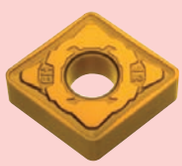
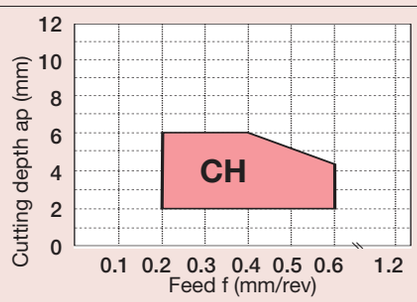
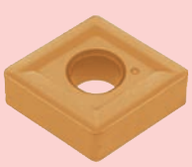
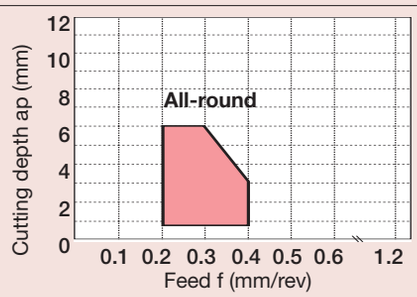
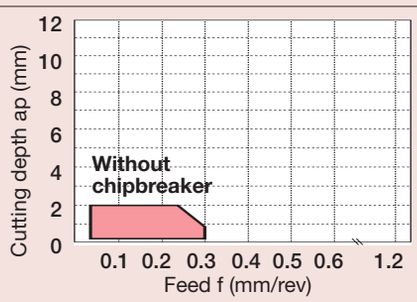
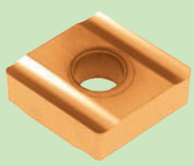
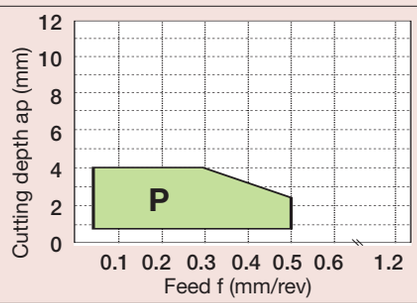


Basic Selection Chipbreaker (Negative Inserts)

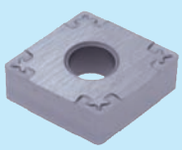
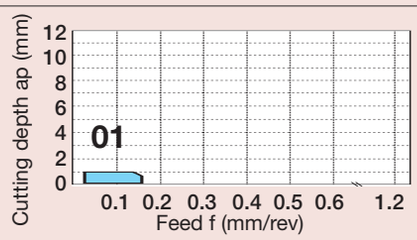
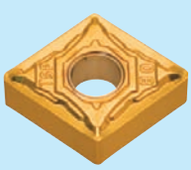
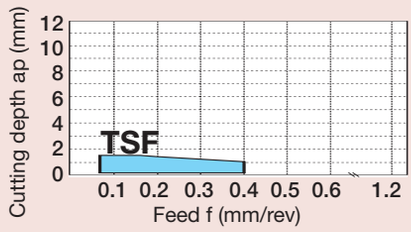
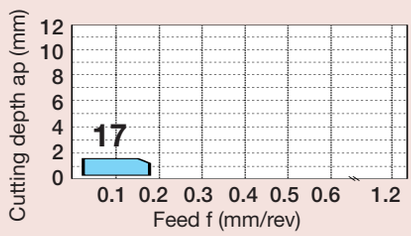
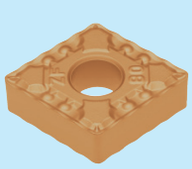
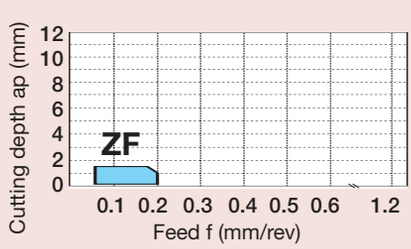
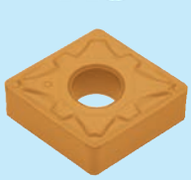
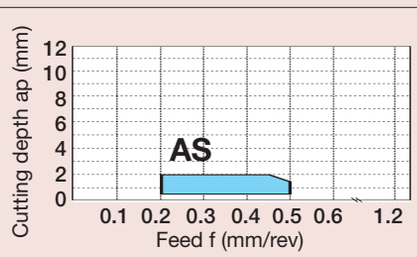
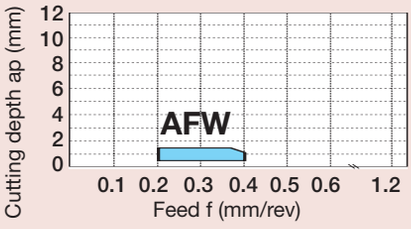
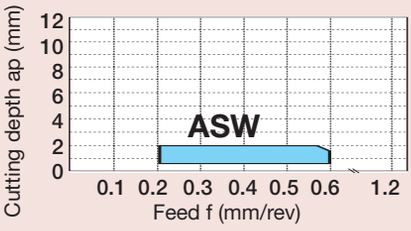
Appli.	Chipbreaker type	Features	Application range
Steels	**TF** 	**Precision finishing** The sharp cutting edge and raised projection near corner contribute to excellent chip control at very small cutting depths and low feeds. **Economical M-class tolerance and low cost.**	
	TS 	**Finishing** Provided with landless sharp cutting edges and large rake angle, this type is an all-round chipbreaker for general finishing. Designed to provide excellent performance in combination with cermet grades.	
	TM 	**Medium cutting** General purpose chipbreaker used for medium cutting. Unique chipbreaker geometry with sharp edges and large rake angle assures free cutting action in a wide range of cutting conditions.	
	TH 	**Roughing (double-sided)** Double-sided 3-dimensional chipbreaker with a wide land and broad groove used for medium to heavy cutting including interruption and unfavorable surface conditions. Also performs well in high feed machining.	
	TR 	**Heavy cutting (single-sided)** Single-sided, low-force chipbreaker used for a heavier cutting range than TH-type. Provides low-force cutting as well.	
	TU 	**Heavy cutting (single-sided)** Single-sided, strong cutting edge, for heavy interrupted cutting and rough skin.	

Appli.	Chipbreaker type	Features	Application range
Stainless steels	**SS** 	**Finishing to medium cutting** 3-dimensional chipbreaker with a large rake angle. Performs free-cutting action and most suitable for finishing of stainless steel and mild steel.	
	SM 	**Medium cutting** Provided with both freer cutting action and excellent chip control. Best suitable for machining stainless steels.	
	SA 	**Medium cutting** This chipbreaker is designed so as to reduce the contact-area between tool and chip, preventing the insert from raising temperature during cutting. Suitable for medium cutting of stainless steels as well as super alloys.	
	S 	**Medium cutting** Features sharp cutting edge and excellent chip control for high-efficiency machining.	

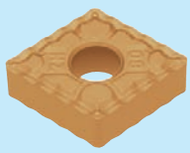
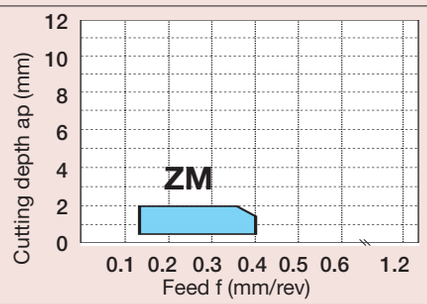
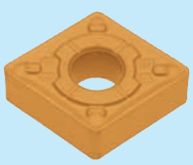
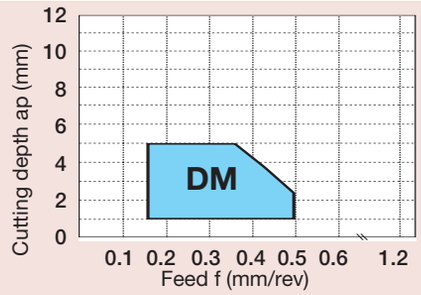
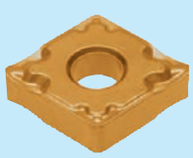
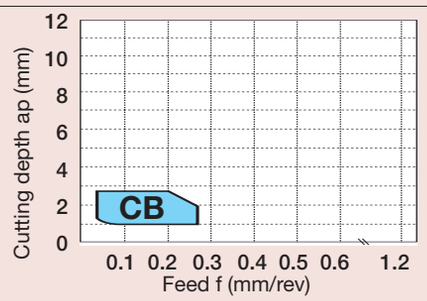
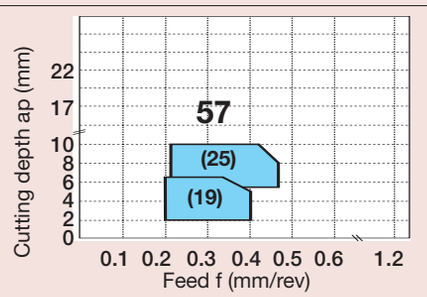
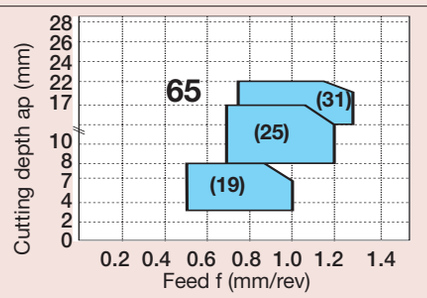
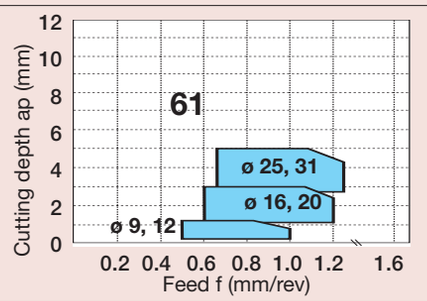
Basic Selection Chipbreaker (Negative Inserts)

Appli.	Chipbreaker type	Features	Application range
Cast irons	**CF** 	**Finishing** Low cutting-force chipbreaker for cast iron. Arc-shaped concave combined with a high rake (substantially 20° rake angle), allows for drastic reduction of cutting forces and suppresses deformation of thin walled components and burr occurrence.	
	CM 	**Medium cutting** First choice chipbreaker for cast iron. An allrounder applicable for a wide range of cutting conditions from continuous to interrupted machining with positive land and wide chip pocket.	
	CH 	**Roughing** Chipbreaker with reinforced cutting-edge for cast iron. Utilizing the land-support and negative-land design, features stable insert seating and high cutting-edge strength even for heavy cutting.	
	All-round 	**Medium cutting** Performs well in interrupted cutting of cast irons and steels. Highly reliable chipbreaker which excels in impact resistance.	
	Without chipbreaker 	**Finishing to medium cutting** Covers a wide range of applications from finishing to roughing of cast irons. Excels in cutting edge strength and stability.	
Non-ferrous metals	**P** 	**Finishing to medium cutting** Excels in sharpness of cutting edges and effectively used for machining non-ferrous metals such as aluminium alloys and copper alloys.	

Complementary Chipbreaker (Negative Inserts)

Appli.	Chipbreaker type	Features	Application range
Steels	**01** 	**Precision finishing** Double-sided, high-precision (ISO G-class) insert used for high-accuracy finishing. **Can machine to closer tolerance.**	
	TSF 	**Finishing** First choice chipbreaker for finishing steels. The dimple structure decreases the contact area between the insert surface and chips, resulting in significant reduction of heat occurrence.	
	17 	**Finishing of mild steels and low carbon steels** Is effectively used for machining mild steels and low-carbon steels where chip control is troublesome.	
	ZF 	**Finishing** Excellent chip control at low cutting depths and low feed rates.	
	AS 	**High feed, low cutting depth** Double-sided, 3-dimensional chipbreaker designed to be effective for machining at high-feed and small cutting depth. Provided with tough cutting edges, this type is best suitable for high-efficiency machining of near-net-shape forgings.	
	AFW (Wiper) 	**Finishing to medium cutting** Optimum chip control at low cutting depths and high feed rates. Excellent surface qualities through wiper-geometry.	
	ASW (Wiper) 	**Medium cutting, High feed, low cutting depth** Double-sided, 3-dimensional chipbreaker designed to be effective for machining at high-feed and small cutting depth. Provided with tough cutting edges, this type is best suitable for high-efficiency machining of near-net-shape forgings. **Wiper Type Chipbreaker**	

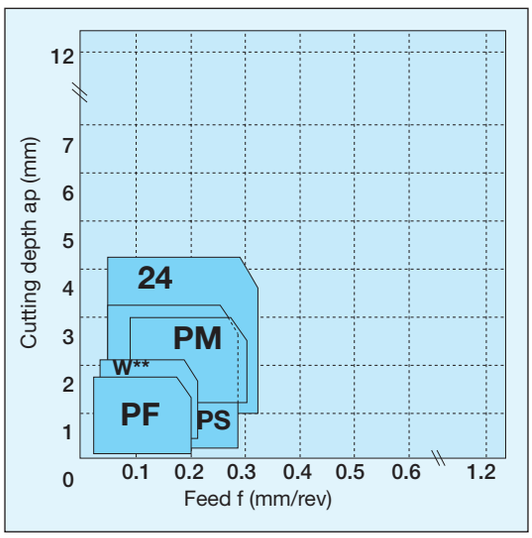
Complementary Chipbreaker (Negative Inserts)

Appli.	Chipbreaker type	Features	Application range
Steels	ZM 	**Medium cutting** Extremely stable cutting edges.	
	DM 	**Medium cutting to roughing** Impact resistant chipbreaker which features robust cutting edges and wide range of chip control.	
	CB 	**Medium cutting (Boring)** Double-sided, boring-use chipbreaker specially designed to have high edge strength contributes to more economical boring operations compared with conventional single-sided boring inserts.	
	57 	**Heavy cutting (single-sided)** Designed to reduce cutting forces and can perform well in heavy-duty machining on relatively low-powered machines.	
	65 	**Heavy cutting (single-sided)** Highly reliable and impact resistant chipbreaker designed to be used for high-volume metal removal on high-powered machines.	
Round	61 	**Roughing, small cutting depth** Designed to be used for high-feed, highly efficient profiling and copying.	

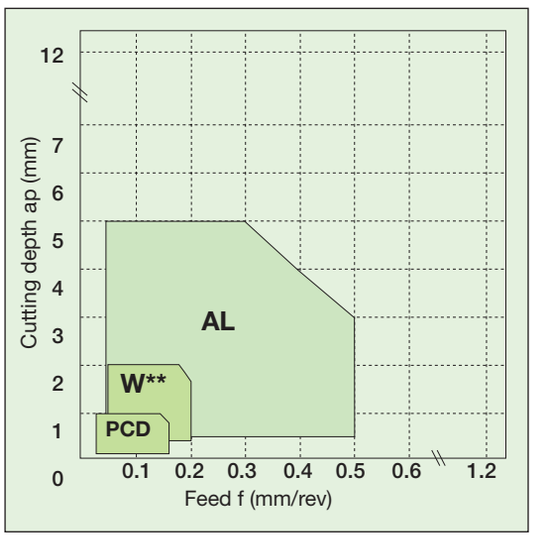
Note : Figure in parenthesis is symbol of cutting edge length.

Chipbreaker System for Turning (Positive Inserts)

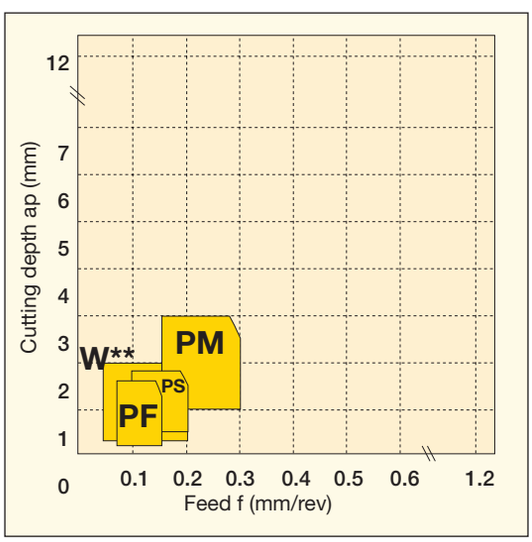
Low to high carbon steels and alloy steels



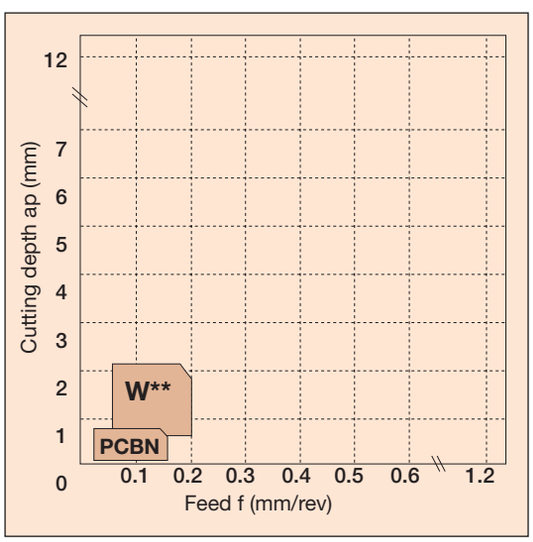
Aluminium alloys and other non-ferrous metals



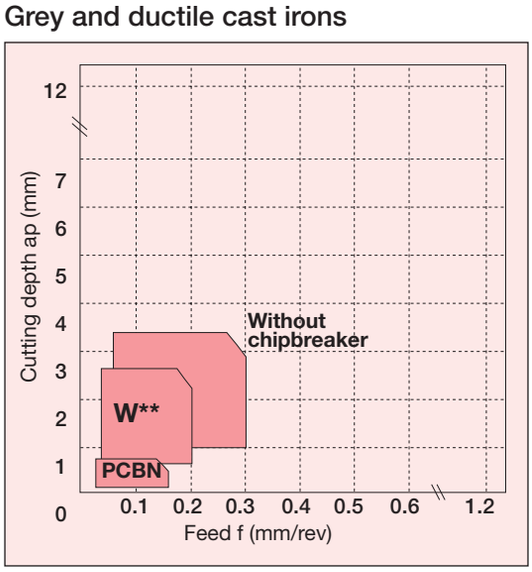
Stainless steels



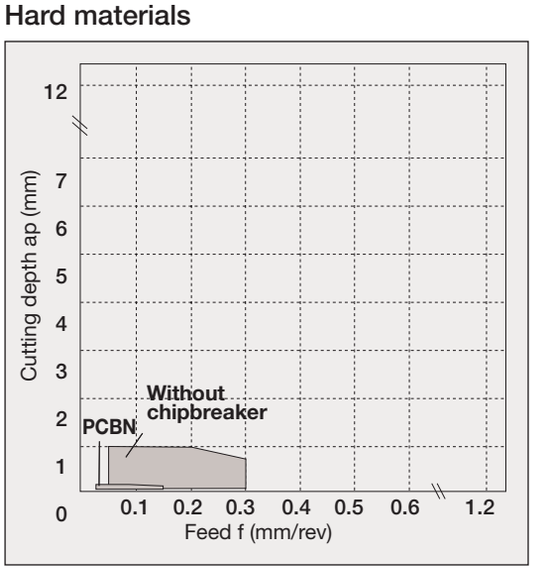
Difficult-to-cut materials



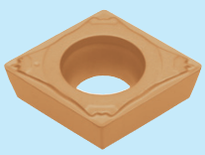
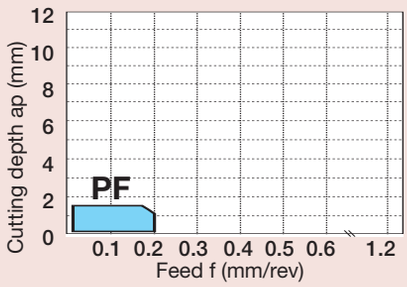
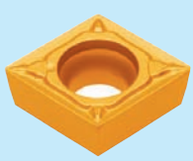
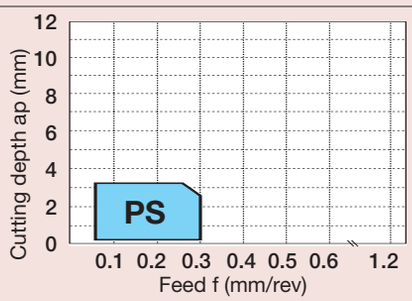
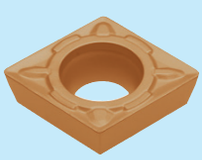
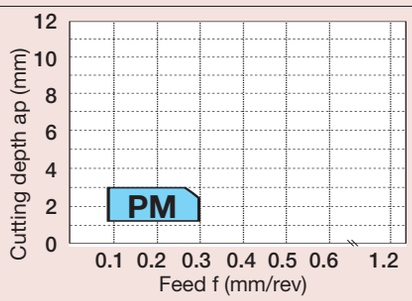
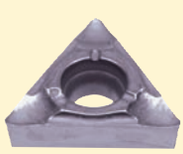
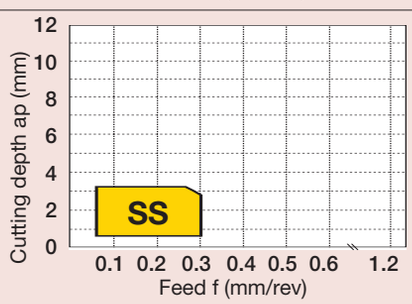
Grey and ductile cast irons

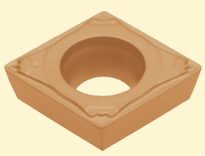
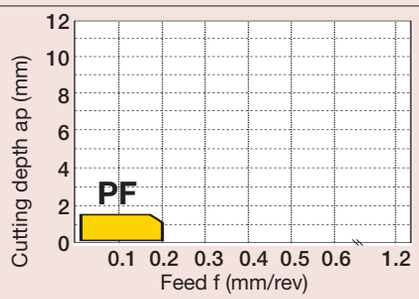
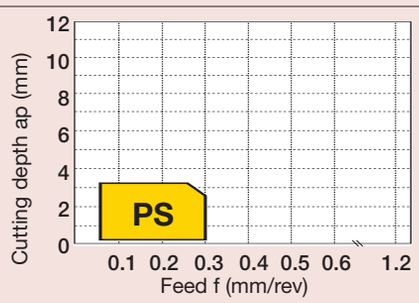
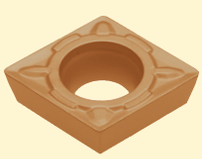
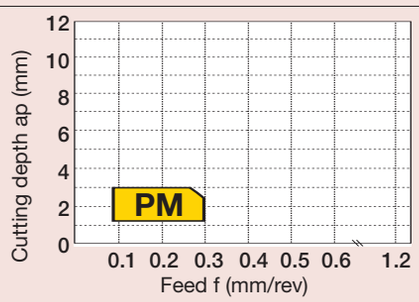
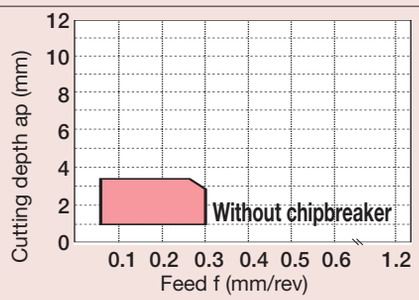
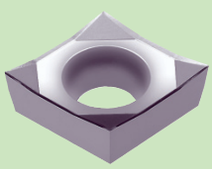
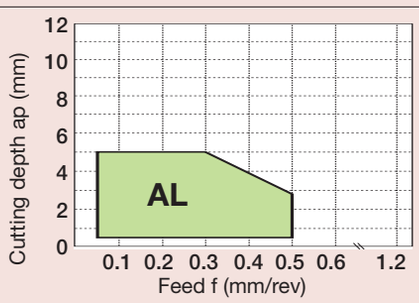


Hard materials

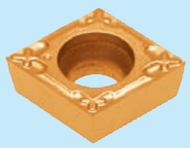
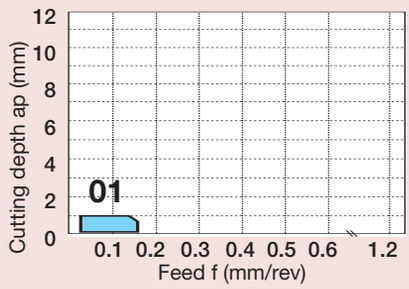
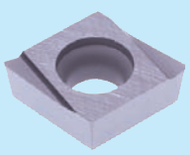
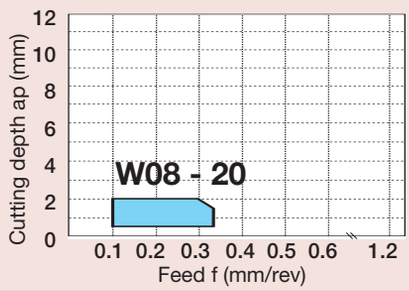
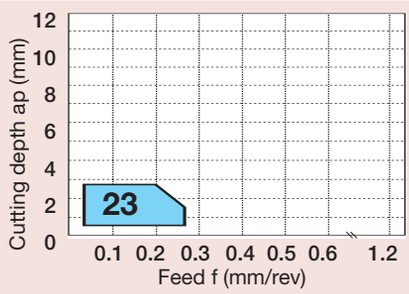
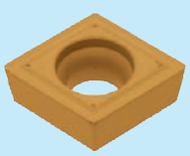
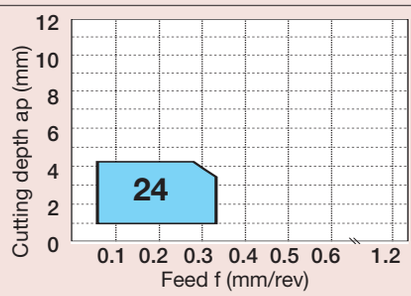
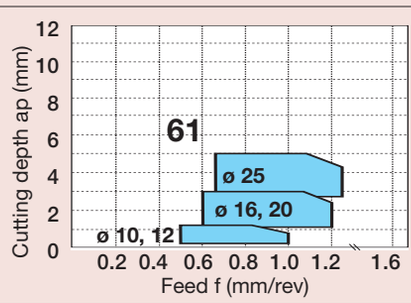
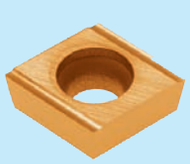
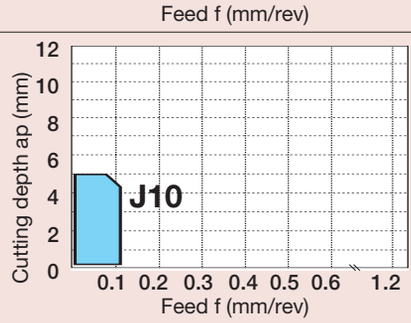


Basic Selection Chipbreaker (Positive Inserts)

Appli.	Chipbreaker type	Features	Application range
Steels	**PF** 	**Finishing** Chipbreaker for precision machining at low cutting depths. Optimal chip control due to pre-positioned chip-breaker element.	
	PS 	**Finishing to medium cutting** 3-dimensional chipbreaker designed to have excellent chip-control capability and low cutting forces in finishing to medium cutting. Low cost, M-class positive insert used for high-efficiency boring in a wide range of applications.	
	PM 	**Medium cutting** Chipbreaker for medium machining operations. Excellent chip control due to wide, positive chip flow zone.	
Stainless steels	**SS** 	**Finishing to medium cutting** 3-dimensional chipbreaker with a large rake angle and sharp cutting edges. Best suitable for finishing of stainless steel and mild steel where sharpness of cutting edge is required.	

Appli.	Chipbreaker type	Features	Application range
Stainless steels	**PF** 	**Finishing** Chipbreaker for precision machining at low cutting depths. Optimal chip control due to pre-positioned chip-breaker element.	
	PS 	**Finishing to medium cutting** 3-dimensional chipbreaker designed to have excellent chip-control capability and low cutting forces in finishing to medium cutting. Low cost, M-class positive insert used for high-efficiency boring in a wide range of applications.	
	PM 	**Medium cutting** Chipbreaker for medium machining operations. Excellent chip control due to wide, positive chip flow zone.	
Cast irons	**Without chipbreaker** 	**Finishing to medium cutting** Can cover a wide range of applications from finishing to roughing of cast irons. Excels in cutting edge strength.	
Non-ferrous metals	**AL** 	**Machining of aluminium and other non-ferrous metals** Extremely sharp cutting edges Polished surfaces Excellent chip forming at high cutting feeds Low power consumption	

Complementary Chipbreaker (Positive Inserts)

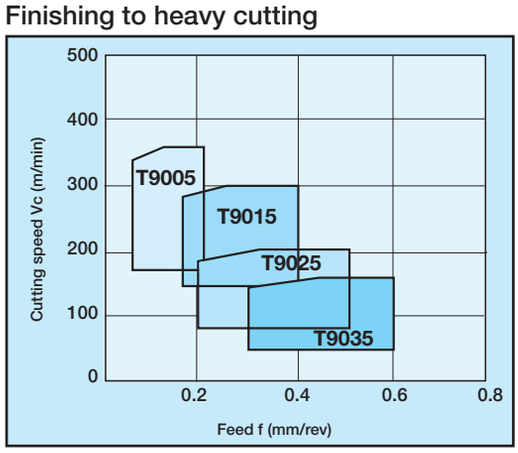
Appli.	Chipbreaker type	Features	Application range
Steels	**01** 	**Precision finishing** High-precision (ISO G-class), positive insert used for high-accuracy finishing. Can machine to closer tolerance.	
	W08~20 	**Finishing to medium cutting** Designed to control the direction of chip flow and used for precision-finish boring. Provides excellent chip evacuation which is important to attain a highly accurate bore.	
	23 	**Medium cutting** Provided with very tough cutting edges to achieve a reliable boring.	
	24 	**Medium cutting** General-purpose, all-round groove chipbreaker used for a wide range of applications. Performs well in medium to rough boring operations.	
Round	**61** 	**Roughing, small cutting depth** Designed to be used for high-feed, highly efficient profiling and copying.	
	J10 	**Finishing to medium cutting** Used for machining on small lathes. Precisely ground inserts allow excellent surface finish and longer tool life.	

Insert Grades for General Turning

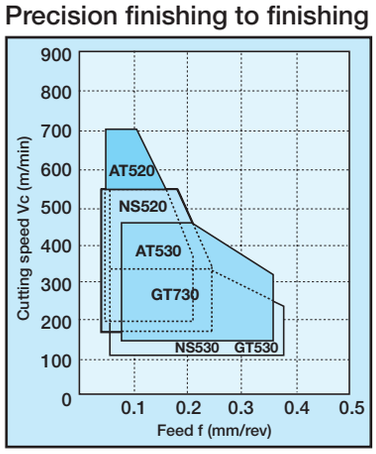
● Steel

ISO	Work condition	Basic selection		Complementary selection	
		Coated CVD	Cermet Unc.	Coated PVD	Cermet PVD
P01		T9005	NS520		AT520
P10		T9015	NS530		GT530
P20		T9025		GH730	GT730
P30		T9035		AH740	AT530
P40					

Finishing to heavy cutting



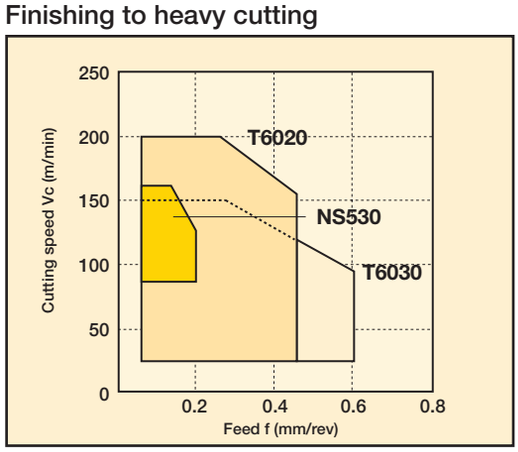
Precision finishing to finishing



● Stainless steels

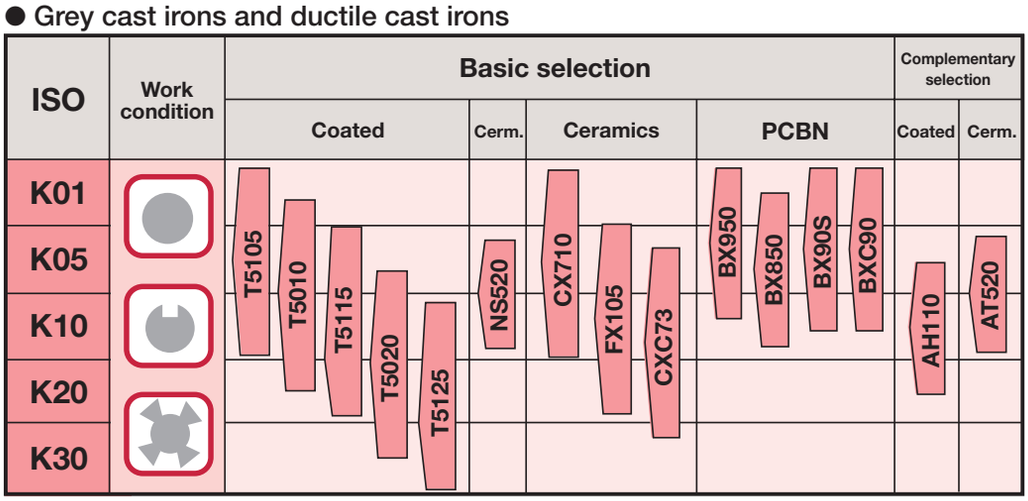
ISO	Work condition	Basic selection		Complementary selection	
		Coated CVD	Cermet Unc.	Coated PVD	Cermet PVD
M01		T6020	NS530	GH730	GT530
M10		T6030		GH330	GT730
M20					
M30					
M40					

Finishing to heavy cutting

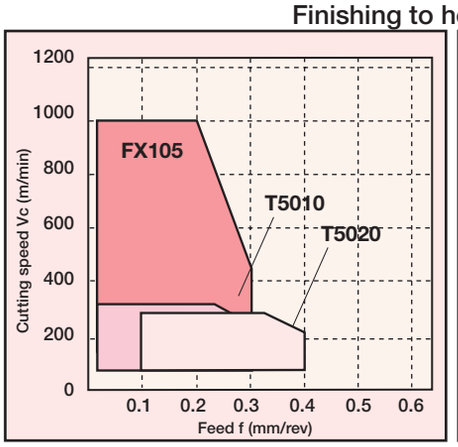


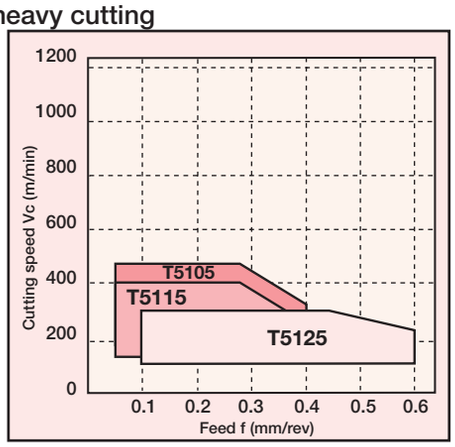
Insert Grades for General Turning

● Grey cast irons and ductile cast irons

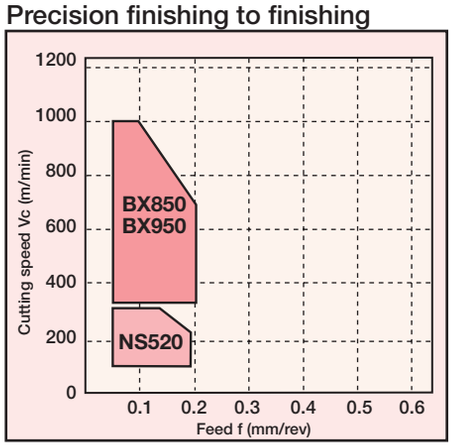


Finishing to heavy cutting

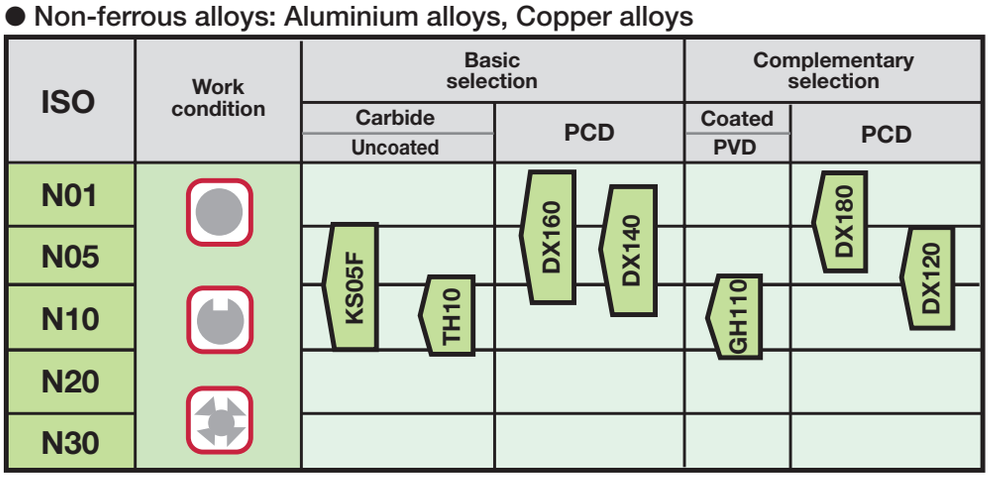




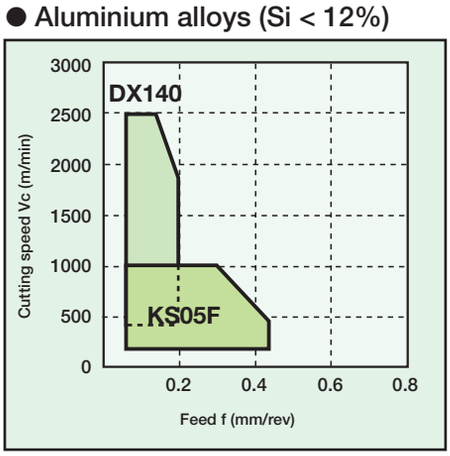
Precision finishing to finishing



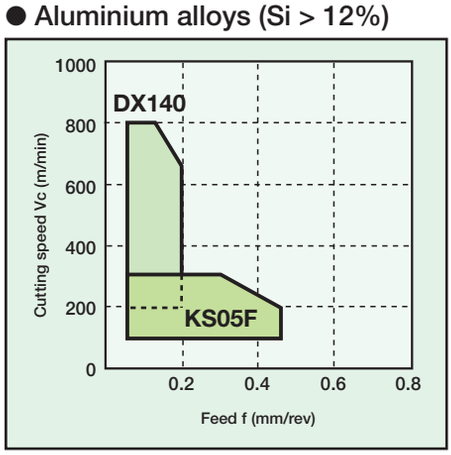
● Non-ferrous alloys: Aluminium alloys, Copper alloys



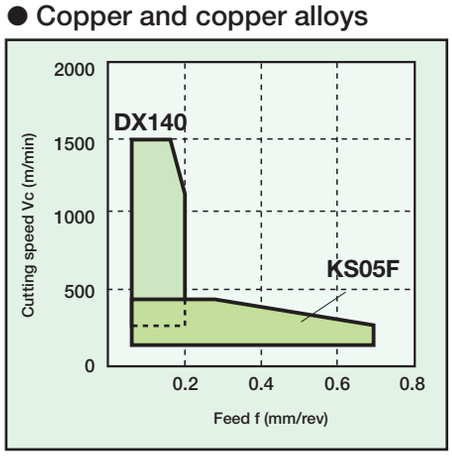
● Aluminium alloys (Si < 12%)



● Aluminium alloys (Si > 12%)



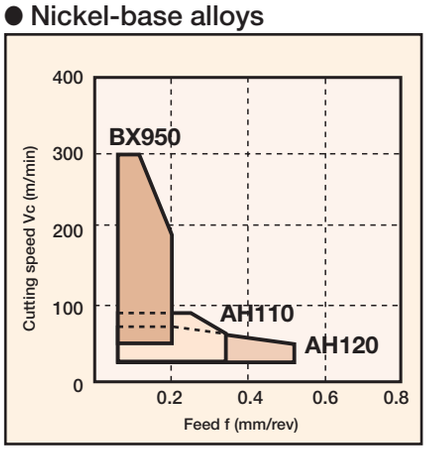
● Copper and copper alloys



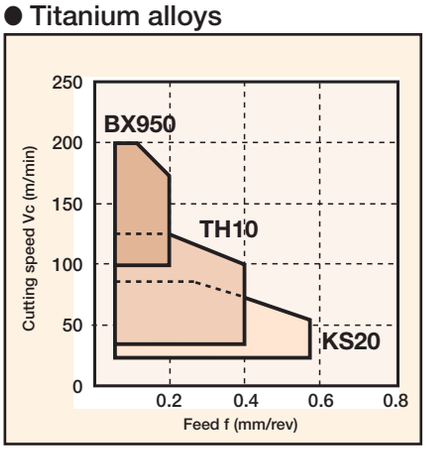
● Difficult-to-cut materials: Nickel-base alloys and Titanium alloys

ISO	Work condition	Basic selection		
		Coated PVD	Uncoated	PCBN
S01				BX950
S05		AH110	TH10	
S10		AH120	KS20	
S20				
S30				

● Nickel-base alloys



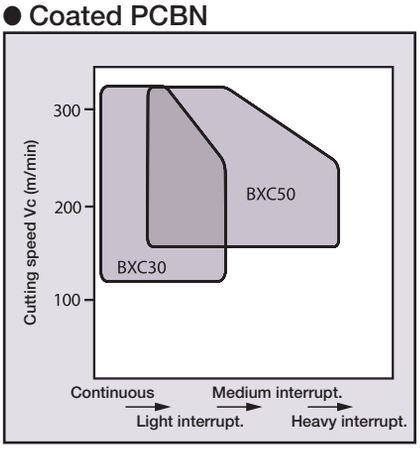
● Titanium alloys



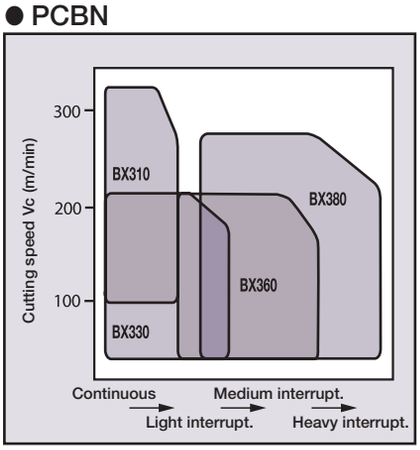
● Hard materials: Hardened steels

ISO	Work condition	Basic selection		
		Ceramics	PCBN	
		PVD	PVD	uncoated
H01		LX11	BXC50	BXC30
H05				BX310
H10				BX330
H20				BX360
H30				BX380

● Coated PCBN



● PCBN



Nomenclature for TAC Inserts

Symbol	Shape	Nose angle	Figure
O	Octagonal	135°	
H	Hexagonal	120°	
P	Pentagonal	108°	
S	Square	90°	
T	Triangular	60°	
C	Rhombic	80°	
D		55°	
E		75°	
F		50°	
M		86°	
V		35°	
W	Trigon	80°	
L	Rectangular	90°	
A	Parallelogram	85°	
B		82°	
K		55°	
R	Round	—	

① Shape

With respect to the nose angles of rhombic and parallelogram shaped inserts, use the smaller angle respectively.

Symbol	Relief angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Others

② Relief angle

Symbol (class)	Tolerance (mm)		
	Corner height (m)	Thickness (s)	I. C. dia. (d)
A	±0.005	±0.025	±0.025
F	±0.005	±0.025	±0.013
C	±0.013	±0.025	±0.025
H	±0.013	±0.025	±0.013
E	±0.025	±0.025	±0.025
G	±0.025	±0.13	±0.025
J	±0.005	±0.025	±0.05 ~ ±0.13
K	±0.013	±0.025	±0.05 ~ ±0.13
L	±0.025	±0.025	±0.05 ~ ±0.13
M	±0.08 ~ ±0.18	±0.13	±0.05 ~ ±0.13
N	±0.08 ~ ±0.18	±0.025	±0.05 ~ ±0.13
U	±0.13 ~ ±0.38	±0.13	±0.08 ~ ±0.25

③ Accuracy

[Example] ① **T** ② **N** ③ **M** ④ **G** ⑤ **16**

④ Groove and hole

Symbol	Hole	Shape of hole	Chipbreaker	Shape
N	Without	—	Without	
R			Single-sided	
F			Double-sided	
A	With	Cylindrical hole	Without	
M			Single-sided	
G			Double-sided	
W		Partly cylindrical hole, double-side 40° ~ 60°	Without	
T			Single-sided	
Q		Partly cylindrical hole, double-side 40° ~ 60° Counter sink	Without	
U			Double-sided	
B		Partly cylindrical hole, single-side 70° ~ 90° Counter sink	Without	
H			Single-sided	
C		Partly cylindrical hole, single-side 70° ~ 90° Counter sink	Without	
J			Double-sided	
X	—	—	—	

⑤ Cutting edge length

R		S		C		W		T		D		V		K		I. C. dia. (mm)
Symbol	Length	Symbol	Length	Symbol	Length	Symbol	Length	Symbol	Length	Symbol	Length	Symbol	Length	Symbol	Length	
		03	3.97	03	4.0			06	6.9	04	4.8					3.97
		04	4.76	04	4.8			08	8.2	05	5.8					4.76
05	5.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5.0
		05	5.56	05	5.6	03	3.8	09	9.6	06	6.8					5.56
06	6.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6.0
		06	6.35	06	6.5	04	4.3	11	11.0	07	7.8					6.35
		07	7.94	08	8.1	05	5.4	13	13.8	09	9.7					7.94
08	8.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8.0
09	9.525	09	9.525	09	9.7	06	6.5	16	16.5	11	11.6	16	16.6	16	19.7	9.525
10	10.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0
12	12.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12.0
12	12.7	12	12.7	12	12.9	08	8.7	22	22.0	15	15.5	22	22.1			12.70
15	15.875	15	15.875	16	16.1	10	10.9	27	27.5	19	19.4					15.875
16	16.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16.0
19	19.05	19	19.05	19	19.3	13	13.0	33	33.0	23	23.3					19.05
20	20.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0
		22	22.225	22	22.6			38	38.5	27	27.1					22.225
25	25.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	25.0
25	25.4	25	25.4	25	25.8			44	44.0	31	31.0					25.40
31	31.75	31	31.75	32	32.2			55	55.0	38	38.8					31.75
32	32.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	32.0

Note: For the insert shape "K", the rule for the relation between the symbol and dimension differs from those for other shapes.

● Detailed accuracy for J, K, L, M, N and U classes

For inserts with corner angle > 55°

(mm)

Inscribed circle	Tolerance on inscribed circle dia. (d)		Tolerance on corner height (m)		Insert shapes applied
	J K L M N	U	J K L M N	U	
6.35	±0.05	±0.08	±0.08	±0.13	H M O R P S T C, E, M
9.525					
12.70	±0.08	±0.13	±0.13	±0.20	
15.875	±0.10	±0.18	±0.15	±0.27	
19.05					
25.40	±0.13	±0.25	±0.18	±0.38	

For M-type inserts with corner angle > 55°

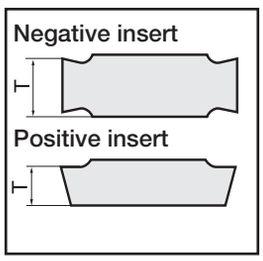
(mm)

Inscribed circle	Tolerance on inscribed circle dia. (d)	Tolerance on corner height (m)	Insert shapes applied
6.35	±0.05	±0.11	D
9.525			
12.70	±0.08	±0.15	
15.875	±0.10	±0.18	
19.05			

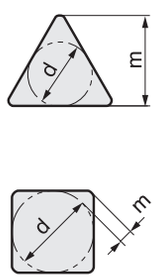
Note: The tolerance for shape V may be increased than above.

Note on insert thickness

Thickness of chipbreaker inserts is defined as "T" (height from the bottom face to the cutting edge) as shown in the figure right.



Inscribed circle (d)
Corner height (m)



Symbol	Thickness(mm)
01	1.59
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

Thickness

⑥ **Thickness**

⑥ **04** ⑦ **08** ⑧ **T** ⑨ **N** – ⑩ **TM**

(Optional symbol) (Optional symbol) (Supplementary symbol)

⑦ Corner radius

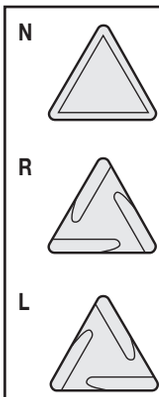
Symbol	Corner radius (mm)
00	0.03
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
28	2.8
32	3.2

⑧ Symbols of major cutting edge

Symbol	Condition of cutting edge	Shape
F	Sharp edge	
E	Honed rounded edge	
W · T	Honed chamfered edge	
S	Combination honed edge	

⑨ Hand of insert

Symbol	Hand
R	Right
L	Left
N	Neutral



⑩ Chipbreaker

Symbol	Applications	Symbol	Applications
TF	Precision Finishing	17	Finishing of alloy steels
TSF	Finishing	57	Heavy cutting
TS	Finishing	65	Heavy cutting
TM	Medium cutting	61	Roughing
TH	Roughing	AS	High-feed, small cutting depth
TR	Heavy cutting	AFW	Wiper
TU	Heavy cutting	ASW	Wiper
SS	Finishing to medium cutting	DM	Medium cutting to roughing
SM	Finishing to medium cutting	CB	Medium cutting (inside)
SA	Medium cutting	PF	Finishing
S	Medium cutting	PM	Medium cutting
CF	Finishing	W08, 10 15, 20	Finishing to medium cutting
CM	Medium cutting		
CH	Roughing		
All-round	Medium cutting		
P	Finishing to medium cutting		
01	Precision finishing		

Example: 57

1 to 5: Even cutting edge
6 to 8: Uneven cutting edge

Note regarding feed,
5 means 0.5 mm/rev

Insert Sizes and Hole Diameter

Insert shape	S						C				D				T					
	Negative		Positive				Negative		Positive		Negative		Positive		Negative		Positive			
Hole symbol	A.M.G		T.W		M.A		A.M.G		T.W		A.M.G		T.W		A.M.G		T.W		M.A	
I.C. dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)
3.97																				
4.37																			07	2.7
4.76																	08	2.7[2]2.2		
5																				
5.56									05	2.5							09	2.5	09	3.2
6																				
6.35									06	2.8			07	2.8	11	2.26	11	2.8[3]3.4	11	3
7.94			07	3.4													13	3.4		
8																				
9.525	09	3.18	09	4.4	09	4	09	3.18	09	4.4	11	3.18	11	4.4	16	3.81	16	4.4	16	4
10																				
12																				
12.7	12	5.16	12	5.5	12	5[1]5.5	12	5.16	12	5.5	15	5.16			22	5.16				
15.875	15	6.35					16	6.35	16	5.5										
16																				
19.05	19	7.93	19		19		19	7.93	19											
20																				
22.225																				
25	25	9.12	25		25		25	9.12	25											
31.75																				
32	32	8.8	32		32		32	8.8	32											

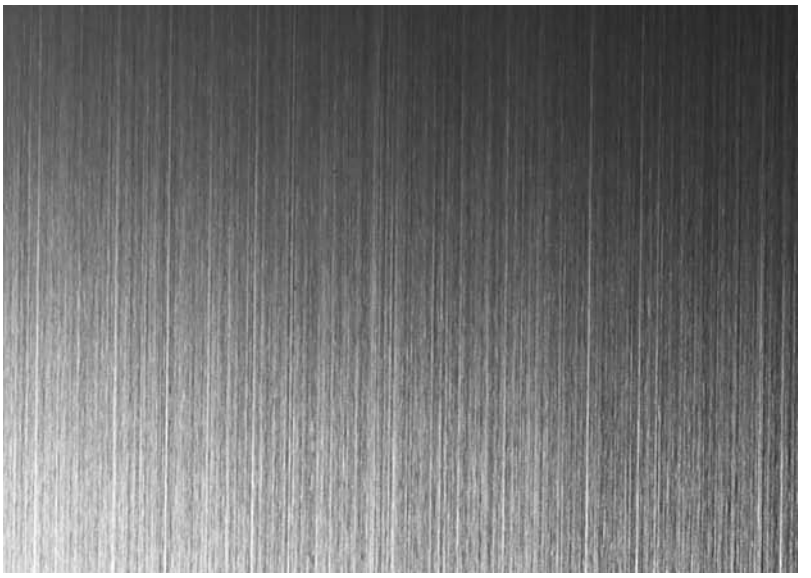
1) Thickness symbol: 04

2) Thickness symbol: 02

3) Thickness symbol: 03

Insert shape	V				W				R						E	
	Negative		Positive		Negative		Positive		Negative		Positive				Positive	
Hole symbol	A.M.G		T.W		A.M.G		T.W		A.M.G		T.W		M.A		A.M.G	
I.C. dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)	I.C. symbol	Hole dia (mm)
3.97							03	[4]2.3							04	2.3
4.37							06	[4]2.3								
4.76							08	[4]2.3								
5											05	2.5				
5.56																
6											06	2.8				
6.35																
7.94																
8							05	3.4			08	3.4				
9.525	16	3.18	16	4.4	06	3.81	06	3.9	09	3.81						
10											10	4	10	3.6		
12							08	4.4	12	5.16			12	4.2		
12.7			22	5.5	08	5.16										
15.875					10	6.35			15	6.43						
16													16	5.2		
19.05					13	7.93			19	7.93						
20													20	6.5		
22.225																
25									25	9.22			25	7.2		
31.75																
32									31	12.78						

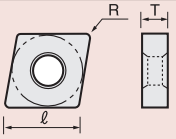
4) With hole and 5° relief angle (WB□□)



TAC Inserts
Turning
(Negative)

80° Rhombic (Basic Selection Chipbreaker with Hole)

CN□□ Negative



CNMG 12 04 04 - □□

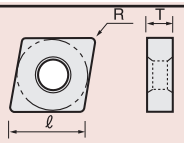
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Work materials	Cutting speed Vc (m/min): P	M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	Cermet NS520	NS530	Coated Cerm. AT520	AT530	GT530	Ceramics FX105	CX710	LX21	LX11	Un. TH10
Precision finishing	TF	CNMG120404-TF CNMG120408-TF	●	NS520 80-250-350	NS530 100-120-150															●	○								
			●	NS530 80-150-250																●	○								
			ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																										
	01	Insert Cat. No.		P																									
		CNGG090302-01 CNGG090304-01 CNGG090308-01	●	NS520 80-250-350																○	○								
			●	NS530 80-150-250																○	○								
		CNGG120402-01 CNGG120404-01 CNGG120408-01	ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																	●	●								
																				●	●								
																				○	○								
Finishing	CF	Insert Cat. No.		K																									
		CNMG120404-CF CNMG120408-CF CNMG120412-CF	●	T5105 180-330-480									●	●															
			●	T5115 140-270-400									●	●															
			✱	T5115 120-210-300									●	●															
			ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev																										
Finishing to medium cutting	—	Insert Cat. No.		K																									
		CNMA120404 CNMA120408 CNMA120412 CNMA120416	●	T5010 100-300-600	FX105 300-400-1000	○										●	●			○					●				○
						○										●	●			○					●				○
			●	T5010 100-250-500		○										●	●												
						○										●	●												
		CNMA160608 CNMA160612 CNMA160616	✱	T5020 100-150-300		○										●	●												
			ap = 0.5-3.0-5.0 mm f = 0.05-0.3-0.6 mm/rev			○										●	●												
						○										●	●												
	—	Insert Cat. No.		K	H																								
		CNGA120404 CNGA120404T01020 CNGA120404S01530 CNGA120408 CNGA120408T01020 CNGA120408S01530 CNGA120412 CNGA120412T01020 CNGA120412S01530 CNGA120416 CNGA120420	●	FX105 300-400-1000	LX11 50-100-150															○	○						○	●	
			●	FX105 300-400-500	LX11 50-100-150															○					●	●	○	●	
			LX11: ap = 0.05-0.3-0.5 mm LX11: f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm FX105: f = 0.05-0.2-0.3 mm/rev																										
																									●	●	○	●	
																									●	●		●	
																												○	
Finishing	TS	Insert Cat. No.		P	M																								
		CNMG120404-TS CNMG120408-TS CNMG120412-TS	●	NS520 80-250-350	GT530 120-140-180	●	●	●	○		○									●	●	●		●					
			●	NS530 80-150-250		●	●	●	○		○									●	●	●	●	●					
			✱	T9025 100-150-200		●	●	●	○											○	●			●					
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																										
Finishing to medium cutting	SS	Insert Cat. No.		M	S																								
		CNMG120404-SS CNMG120408-SS CNMG120412-SS	●	T6020 150-200-250	AH110 10-50-70					●	●	●						●	●										
			●	T6020 150-180-220	AH110 10-30-60					●	●	●						●	●										
			✱	T6030 50-100-150	AH120 10-30-50					●	●	●						●	●										
			ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev																										

80° Rhombic (Basic Selection Chipbreaker with Hole)

CN□□

Negative



CNMG 12 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

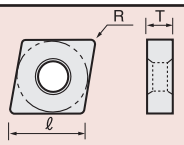
Application: Medium cutting

Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	S	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	AH110	AH120	GH110	Cer. NS530	Uncoat. TH10	Uncoat. KS20
TM	CNMG090304-TM CNMG090308-TM	●	T9005 100-250-400	AH120 10-40-60		●	●													
	CNMG120404-TM CNMG120408-TM CNMG120412-TM CNMG120416-TM	●	T9015 80-150-250	AH120 10-30-50	●	●	●	●		○						●				
		✕	T9025 50-100-150	AH120 10-30-50	●	●	●	●		○						●				
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev		●	●	●	●		○										
	CNMG160612-TM					○	○													
	CNMG190608-TM CNMG190612-TM				○ ○	○ ○	○ ○													
CM	Insert Cat. No.		K																	
	CNMG120404-CM CNMG120408-CM CNMG120412-CM	●	T5105 180-330-480									●	●	●						
		✕	T5125 120-210-300									●	●	●						
	CNMG160608-CM CNMG160612-CM		ap = 1.0-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev									●	●	●						
SM	Insert Cat. No.		M																	
	CNMG120404-SM CNMG120408-SM CNMG120412-SM	●	T6020 150-200-250						●	●										
		✕	T6030 50-100-150						●	●										
	CNMG160612-SM CNMG160616-SM CNMG190612-SM CNMG190616-SM		ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev						●	●										
SA	Insert Cat. No.		M	S																
	CNMG120404-SA CNMG120408-SA CNMG120412-SA	●	T6020 150-200-250	AH110 10-50-70					●	●					●	●				●
		✕	T6020 150-180-220	AH110 10-30-60					●	●					●	●				●
	CNMG190612-SA CNMG190616-SA	✕	T6030 50-100-150	AH120 10-30-50												●				●
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev													●				●
S	Insert Cat. No.		M																	
	CNMG120404R-S CNMG120404L-S CNMG120408R-S CNMG120408L-S	●	GH330 100-130-150				●	●			○							○		
		✕	GH330 50-80-100				●	●			○							○		
		✕	T6030 50-80-100				●	●			○							○		
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev				●	●			○							○		
P	Insert Cat. No.		N																	
	CNGG120404R-P CNGG120404L-P CNGG120408R-P CNGG120408L-P	●	GH110 50-600-1000														○	○		●
		✕	TH10 100-150-700														○	○		●
		✕	TH10 100-150-500														○			●
			ap = 0.5-2.0-4.0 mm f = 0.2-0.3-0.5 mm/rev														○			

80° Rhombic (Basic Selection Chipbreaker with Hole)

CN□□

Negative



CNMG 09 03 04 - □□

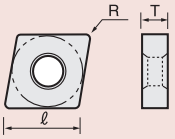
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Work materials	Cutting speed v_c (m/min): K	S	Stocked grades: Coated T9005	T9015	T9025	T9035			T6030	T5105	T5115	T5125	T5010	T5020	AH110	AH120	GH110	Cermet NS520	NS530	Un. TH10	PCD DX120
Medium cutting	All-round	CNMG090304 CNMG090308	●	T5010 100-300-600	AH110 10-50-70	○ ○	○ ○	○ ○														● ●		
		CNMG120404 CNMG120408 CNMG120412 CNMG120416	● ✖	T5010 100-250-500 T5020 100-150-300	AH110 10-30-60 AH120 10-30-50	○ ○ ○ ○	● ● ● ●	● ● ● ●	○ ○ ○ ○							● ● ● ●	● ● ● ●	○ ○ ○	○ ○ ○		○ ○ ○	○ ○ ○	○ ○ ○		
		CNMG160608 CNMG160612 CNMG160616		ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev		○ ○ ○	● ● ○	● ● ○	○ ○ ○							● ● ●	● ● ●							
		CNMG190608 CNMG190612 CNMG190616				○ ○ ○	● ● ○	● ● ○	○ ○ ○							● ●	● ●							
Roughing	TH	Insert Cat. No.		P																				
		CNMG120408-TH CNMG120412-TH CNMG120416-TH	●	T9005 100-250-400		●	●	●	●				○ ○ ○				●		●					
		CNMG160612-TH CNMG160616-TH	✖	T9025 50-100-150		●	●	●	●				○ ○				●							
		CNMG190612-TH CNMG190616-TH		ap = 3.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev		●	●	●	●				○ ○				●							
	CH	Insert Cat. No.		K																				
		CNMG120404-CH CNMG120408-CH CNMG120412-CH	●	T5105 180-330-480									● ● ●	● ● ●	● ● ●									
		CNMG160612-CH CNMG160616-CH	✖	T5125 120-210-300									● ●	● ●	● ●									
		CNMG190612-CH CNMG190616-CH		ap = 3.0-4.0-6.0 mm f = 0.1-0.35-0.6 mm/rev									● ●	● ●	● ●									
Heavy cutting	TR	Insert Cat. No.		P																				
	(Single-sided)	CNMM120408-TR CNMM120412-TR	●	T9015 100-200-350			● ●	● ●	● ●																
		CNMM160612-TR	●	T9015 100-200-350			●	●	●																
		CNMM190612-TR CNMM190616-TR	✖	T9025 80-150-250			● ●	● ●	● ●																
		CNMM250724-TR CNMM250924-TR		ap = 3.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev			● ●	● ●																
	TU	Insert Cat. No.		P																				
	(Single-sided)	CNMM190612-TU CNMM190616-TU	●	T9005 100-250-400		●	●	●	●			● ●												
		CNMM190624-TU	●	T9015 80-150-250		●	●	●	●															
		CNMM250724-TU CNMM250924-TU	✖	T9025 50-100-150		● ●	● ●	● ●	● ●															
				ap = 3-7-10 mm (19 Type), 8-13-21 mm (25 Type) f = 0.5-0.8-1.0 mm/rev (19 Type), 0.7-1.1-1.4 mm/rev (25 Type)																					
Precision finishing	PCD	Insert Cat. No.		N																				
		CNMM120402-DIA CNMM120404-DIA	●	DX120 500-1500-2500																				○ ○
			✖	DX120 300-1000-1800																				
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																				

80° Rhombic (Basic Selection Chipbreaker with Hole)

CN□□

Negative



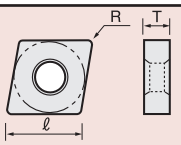
CNGA 12 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions Cutting speed v_c (m/min)		Stocked grades Coated										PCD & PCBN									
			Work materials	N	T9005	T9015	T9025	T9035							DX140	BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX930	BX950
Precision finishing	PCD																							
		CNGA120404-DIA	●	DX140 400-600-2500											○									
			▬	DX140 400-500-2000																				
			✖																					
			ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																					
	PCBN	Insert Cat. No.		K	H																			
		CNGA120402-QBN CNGA120404-QBN CNGA120408-QBN CNGA120412-QBN	●	BX850 100-500-1200	BX330 100-150-200													○						
			▬	BX850 100-400-800	BX360 80-120-150												●	●				○		
			✖		BX360 80-120-150												●	●				○		
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev														●	●				○		
	PCBN	Insert Cat. No.		K	H																			
	(QB-mini)	2QP-CNGA120404-L 2QP-CNGA120404-H 2QP-CNGA120404 T2QP-CNGA120404 2QP-CNGA120408-L 2QP-CNGA120408-H 2QP-CNGA120408 T2QP-CNGA120408 2QP-CNGA120412-L 2QP-CNGA120412-H 2QP-CNGA120412	●	BX930 100-500-1200	BX310 130-200-300												○			○	○				
			▬	BX930 100-400-800	BX330 80-120-150											●	●	●	●				○	○
			✖		BX360 80-120-150												○							
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev L = Small honing angle Wear resistance priority H = Large honing angle Impact resistance priority														○							
																	●	●	●	●			○	○
		2QP-CNMA120404W 2QP-CNMA120408W 2QP-CNMA120412W	T = 10 inserts packing unit W = Wiper														○ ○ ○							
	PCBN	Insert Cat. No.		H																				
	(QB-mini)	4QP-CNGA120404 4QP-CNGA120408 4QP-CNGA120412	●	BXC30 100-250-300																●	●			
			▬	BXC50 80-150-200																●	●			
		4QP-CNMA120404W 4QP-CNMA120408W 4QP-CNMA120412W	✖	BXC50 80-120-150																	○ ○ ○			
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																					

80° Rhombic (Complementary Chipbreaker with Hole)

CN□□ Negative



CNMG 12 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

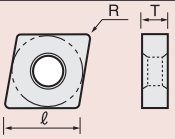
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)			Stocked grades — Coated									Cermet			Coated Cerm.				
			Work materials	P	M	T9005	T9015	T9025	T9035				T6020	T6030	GH330	NS520	NS530	NS730	AT520	AT530	GT720	GT730	GT530
Finishing	11	CNMG120404-11 CNMG120408-11 CNMG120412-11	●	NS520 80-250-350	NS530 100-120-150										○	● ● ●	● ● ●		● ●	● ●			● ●
			▤	NS530 80-150-250																			
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																				
Finishing of mild steel	17	Insert Cat. No.		P	M																		
		CNMG120404-17 CNMG120408-17 CNMG120412-17	●	NS520 80-200-300	NS530 100-120-150		○ ○	○ ○									● ● ○						
			▤	NS530 80-150-250																			
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																				
Finishing	TSF	Insert Cat. No.		P	M																		
		CNMG120404-TSF CNMG120408-TSF	●	GT730 150-200-300	GT730 120-140-180													○ ○			○ ○	● ●
			▤	GT730 100-180-250																			
			✱	GT730 80-150-200																			
			ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.4 mm/rev																				
	ZF	Insert Cat. No.		P	M																		
		CNMG120404-ZF CNMG120408-ZF CNMG120412-ZF	●	T9015 100-250-400	GT730 120-140-180		● ●	● ●										○ ○			○ ○	● ●
			▤	T9015 80-150-250			● ●	● ●															
			✱	T9025 50-100-150																			
			ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev																				
Finishing to medium cutting	ZM	Insert Cat. No.		P	M																		
		CNMG120408-ZM CNMG120412-ZM CNMG120416-ZM	●	T9015 100-250-400	GT730 120-140-180		● ●	● ●										○ ○			○	● ●
			▤	T9015 80-150-250			● ●	● ●															
			✱	T9025 50-100-150																			
			ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev																				
Low cutting depth, high feed	AS	Insert Cat. No.		P																			
		CNMG120404-AS CNMG120408-AS CNMG120412-AS CNMG120416-AS	●	T9005 100-250-400	NS530 80-200-300	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●								● ● ●						
			▤	T9015 100-200-350																			
			✱	T9025 50-100-150		○	○	○	○														
		CNMG160612-AS CNMG160616-AS	ap = 0.5-1.0-2.0 mm f = 0.2-0.4-0.6 mm/rev			○ ○	○ ○	○ ○	○ ○														

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

80° Rhombic (Complementary Chipbreaker with Hole)

CN□□

Negative



CNMG 12 04 04 - □□

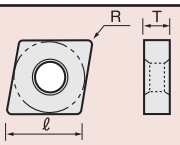
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)			Stocked grades — Coated													Cermet		C.C.
			Work materials	P		T9005	T9015	T9025	T9035							GH330	T5010	T5020	AH110	AH120	NS520	NS530	GT530
Low cutting depth, high feed	**AFW**	CNMG120404-AFW CNMG120408-AFW	●	T9005 100-250-400	NS530 80-200-300	●	●	●									●					●	
			●	T9015 100-200-350		●	●	●									●					●	
			✖	T9025 50-100-150																			
			ap = 0.5-1.0-1.5 mm f = 0.2-0.3-0.4 mm/rev																				
	ASW	Insert Cat. No.		P																			
		CNMG120408-ASW CNMG120412-ASW	●	T9005 100-250-400	NS530 80-200-300	●	●	●									●					●	
			●	T9015 100-200-350		●	●	●									●					●	
			✖	T9025 50-100-150																			
			ap = 0.5-1.0-2.0 mm f = 0.3-0.5-0.6 mm/rev																				
Medium cutting (internal)	**CB**	Insert Cat. No.		P	M																		
		CNMG090304-CB CNMG090308-CB	●	NS530 80-200-300	NS530 100-120-150		●															●	
			●	T9015 100-200-350			●															●	
			✖	T9015 100-200-350																			
			ap = 0.3-1.5-2.5 mm f = 0.1-0.15-0.25 mm/rev																				
Medium cutting	**37**	Insert Cat. No.		P																			
		CNMG120404-37 CNMG120408-37 CNMG120412-37	●	NS530 80-200-300			●	●														●	
			●	T9015 80-150-250			●	●								○						●	
			✖	T9025 50-100-150			●	●														●	
			ap = 1.0-2.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																				
Medium cutting to roughing	**DM**	Insert Cat. No.		P																			
		CNMG120404-DM CNMG120408-DM CNMG120412-DM CNMG120416-DM CNMG160612-DM	●	T9005 100-250-400		●	●	●	●														
			●	T9015 80-150-250		●	●	●	●														
			✖	T9025 50-100-150		●	●	●	●														
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev																				
Medium cutting	**28**	Insert Cat. No.		M	S																		
		CNMG120404-28 CNMG120408-28	●	GH330 80-120-150	AH120 10-40-70											●				●			
			●	GH330 50-80-100	AH120 10-30-60											●				●			
			✖																				
			ap = 1.0-2.0-3.0 mm f = 0.1-0.2-0.3 mm/rev																				

80° Rhombic (Complementary Chipbreaker with Hole)

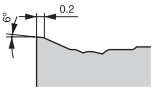
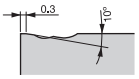
CN□□

Negative



CNMM 12 04 08 - □□

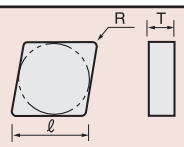
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)	Work materials	P	Stocked grades: Coated	T9005	T9015	T9025	T9035								T6020	T6030	GH330	T5010	T5020	AH110	AH120	GH110
Heavy cutting	57 (Single-sided)  	CNMM120404-57		●	T9015 80-150-250			●	●																
		CNMM120408-57		●	T9015 80-150-250			●	●																
		CNMM120412-57		●	T9015 80-150-250			●	●																
		CNMM160608-57		✱	T9025 50-100-150			●	●																
		CNMM160612-57	ap = 2.0-5.0-8.0 mm f = 0.4-0.6-0.8 mm/rev					●	●																
		CNMM160616-57						●	●																
		CNMM190612-57						●	●																
		CNMM190616-57						●	●																
		CNMM190624-57						●	●																
	65 (Single-sided)  	Insert Cat. No.			P																				
		CNMM120408-65		●					○																
		CNMM120412-65							○																
		CNMM160608-65		●	T9015 80-150-250				○																
		CNMM160612-65		✱	T9025 50-100-150				●																
		CNMM160616-65	ap = 3-5-8 mm (12-19 Type) ap = 8-12-17 mm (25 Type) f = 0.5-0.8-1.0 mm/rev (12-19 Type) f = 0.8-1.0-1.2 mm/rev (25 Type)						●																
		CNMM190612-65						●	●																
		CNMM190616-65						●	●																
		CNMM190624-65						●	●																
		CNMM250924-65						●	●																

80° Rhombic (Basic Selection Chipbreaker without Hole)

CN□□

Negative



CNGN 12 04 04 - □□

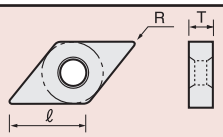
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	K	H	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	Ceramics CX710	FX105	LX21	LX11	PCBN BX310	BX330	BX360	BX90S	BXC90
Finishing to roughing	**Ceramics**	CNGN120404	●	FX105 300-400-1000	LX11 50-100-150										●					
		CNGN120408	●	FX105 300-400-500	LX11 50-100-150								●		●					
		CNGN120412	●										●		●					
		CNGN120416	●										●	○	●					
		CNGN120420	●									●	●							
		CNGN120708	●										●		●					
		CNGN120712	●									●	●		●					
		CNGN120716	●									●	●		●					
		CNGN120720	●												○					
		LX11: ap = 0.05-0.3-0.5 mm, f = 0.05-0.08-0.1 mm/rev; FX105: ap = 0.5-1.0-2.0 mm, f = 0.05-0.2-0.3 mm/rev																		
Medium cutting to roughing	**PCBN**	Insert Cat. No.		K																
		S-CNGN090308	●	BXC90 300-700-1500																○
		S-CNGN090312	●	BXC90 300-700-1000																○
		S-CNGN120408	●	BXC90 300-500-800																○
		S-CNGN120412	●																	○
		ap = 0.05-0.3-3.0 mm, f = 0.05-0.2-0.4 mm/rev																		
Finishing to roughing	**Ceramics**	Insert Cat. No.		K																
		CNGX120708	●	FX105 300-400-1000									●							
		CNGX120712	●	FX105 300-400-500									●							
		CNGX120716	●									●	●							
		ap = 0.5-1.0-2.0 mm, f = 0.05-0.2-0.3 mm/rev																		
Precision finishing	**PCBN**	Insert Cat. No.		H																
		CNGN090404-QBN	●															○		
		CNGN090408-QBN	●	BX360 80-120-150														○		
				BX360 80-120-150																
		ap = 0.05-0.3-0.5 mm, f = 0.05-0.1-0.15 mm/rev																		
Finishing to roughing	**Ceramics**	Insert Cat. No.		K																
		CNMN090308	●	FX105 300-400-1000															○	
		CNMN090312	●	FX105 300-400-500															○	
		CNMN120408	●										●						○	
		CNMN120412	●										●						○	
		CNMN120712	●										●							
		ap = 0.5-1.0-2.0 mm, f = 0.05-0.2-0.3 mm/rev																		

55° Rhombic (Basic Selection Chipbreaker with Hole)

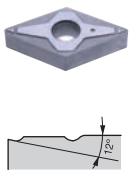
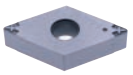
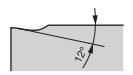
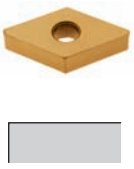
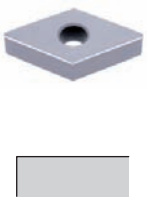
DN□□

Negative



DNMG 15 04 04 - □□

Cutting edge length (ℓ) — Thickness (T) — Corner radius (R) — Chipbreaker type

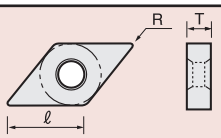
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	P	M	Stocked grades: Coated T9005	T9015	T9025	T9035				T5010	T5020	Cermet NS520	NS530	Co. Cerm. AT520	AT530	Un. TH10	Ceramics FX105	CX710	LX21	LX11
Precision finishing	**TF**	DNMG150404-TF DNMG150408-TF	●	NS520 80-250-350	NS530 100-120-150										●	○							
		DNMG150604-TF DNMG150608-TF	●	NS530 80-150-250											●	○							
			✱																				
			ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																				
	01	Insert Cat. No.		P																			
		DNGG110402-01 DNGG110404-01 DNGG110408-01	●	NS520 80-250-350											○	○							
			●	NS530 80-150-250											○	○							
			✱												○	○							
		DNGG150402-01 DNGG150404-01 DNGG150408-01	ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev												●	●			○				
															●	●			○				
															○	○			○				
		DNGG150602-01 DNGG150604-01 DNGG150608-01													●	●							
															●	●							
Finishing to medium cutting	—	Insert Cat. No.		K																			
		DNMA150404 DNMA150408 DNMA150412	●	T5010 100-300-600		○							○	○	○				○				
			●	T5010 100-250-500		○							○	○	○				○				
			✱	T5020 100-150-300		○							○	○									
		DNMA150604 DNMA150608 DNMA150612	ap = 0.05-3.0-5.0 mm f = 0.03-0.3-0.6 mm/rev										●	●									
													●	●									
	Ceramics	Insert Cat. No.		K	H																		
		DNGA150404 DNGA150408	●	FX105 300-400-1000	LX11 50-100-150										○				○			○	●
															○				○	○		○	●
		DNGA150412	●	FX105 300-400-500	LX11 50-100-150															●		○	●
		DNGA150416	✱																	●			
		DNGA150604 DNGA150604T01020 DNGA150604T01525 DNGA150604S01530 DNGA150608 DNGA150608T01020 DNGA150608S01530 DNGA150612 DNGA150616 DNGA150620	LX11: ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm f = 0.05-0.2-0.3 mm/rev																				●
																				●			●
																							●
																							●
																				●			●
																							●
																							●
																				●			●
																				●			●
																							○

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

55° Rhombic (Basic Selection Chipbreaker with Hole)

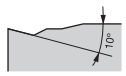
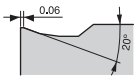
DN□□

Negative



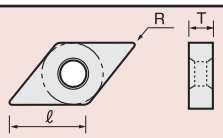
DNMG 15 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	P	M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	T5105	T5115	T5125	GH330	Cermet NS520	NS530	Co. Cermet AT520	AT530	GT530
Finishing	TS	DNMG150404-TS	●	NS520 80-250-350	NS530 100-120-150	○	○	○	○			○					○	○		
		DNMG150408-TS	●			○	●	○	○			○					●	○		●
		DNMG150412-TS	●	NS530 80-150-250		○	○	○	○							○	●	○		
		DNMG150604-TS	■	T9025 100-150-200		●	●	●	○							●	●	●		●
		DNMG150608-TS		ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev		●	●	●	○							●	●	●		●
		DNMG150612-TS				●	●	●	○							○	●			
	CF	Insert Cat. No.		K																
		DNMG150404-CF	●	T5105 180-330-480								●	●							
		DNMG150408-CF	●									●	●							
		DNMG150412-CF	●	T5115 180-270-400								●	●							
		DNMG150604-CF	■	T5115 180-200-240								●	●							
		DNMG150608-CF		ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev								●	●							
		DNMG150612-CF										●	●							

55° Rhombic (Basic Selection Chipbreaker with Hole)

DN□□ Negative



DNMG 15 04 02 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

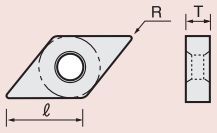
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	M	S	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	Cer. NS530
Finishing to medium cutting	**SS**	DNMG150404-SS DNMG150408-SS DNMG150412-SS	●	T6020 150-200-250	AH110 10-50-70					○ ○ ○	○ ○ ○	● ○								
			●	T6020 150-180-220	AH110 10-30-60					○ ○	○ ○									
		DNMG150604-SS DNMG150608-SS DNMG150612-SS	✱	T6030 50-100-150	AH120 10-30-50					○ ○ ○	○ ○ ○	● ●						● ● ●	● ● ●	● ●
			ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev																	
Medium cutting	**TM**	Insert Cat. No.		P	S															
		DNMG110404-TM DNMG110408-TM	●	T9005 100-250-400	AH120 10-40-60		● ●	● ●												
		DNMG150404-TM DNMG150408-TM DNMG150412-TM DNMG150416-TM	●	T9015 80-150-250	AH120 10-30-50	○ ○ ○	○ ● ○ ○	○ ● ○ ○	○ ○ ○		○ ○ ○									
			✱	T9025 50-100-150	AH120 10-30-50															
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev																	
		DNMG150604-TM DNMG150608-TM DNMG150612-TM DNMG150616-TM				● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●		○ ○ ○								● ● ●	
	CM	Insert Cat. No.		K																
		DNMG150404-CM DNMG150408-CM DNMG150412-CM	●	T5105 180-330-480									● ● ●	● ● ●	● ● ●					
			●	T5115 140-270-400																
		DNMG150604-CM DNMG150608-CM DNMG150612-CM	✱	T5125 120-210-300									● ● ●	● ● ●	● ● ●					
			ap = 1.0-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev																	
	SM	Insert Cat. No.		M																
		DNMG110404-SM DNMG110408-SM DNMG110412-SM	●	T6020 150-200-250						● ● ●	● ● ●									
			●	T6020 150-180-220																
		DNMG150404-SM DNMG150408-SM DNMG150412-SM	✱	T6030 50-100-150						○ ○ ○	○ ○ ○									
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																	
		DNMG150604-SM DNMG150608-SM DNMG150612-SM					● ●	● ●		● ● ●	● ● ●									
	SA	Insert Cat. No.		M	S															
		DNMG150404-SA DNMG150408-SA DNMG150412-SA	●	T6020 150-200-250	AH110 10-50-70															
			●	T6020 150-180-220	AH110 10-30-60															
		DNMG150604-SA DNMG150608-SA DNMG150612-SA	✱	T6030 50-100-150	AH120 50-100-150					● ● ●	● ● ●							● ● ●	● ● ●	
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																	

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

55° Rhombic (Basic Selection Chipbreaker with Hole)

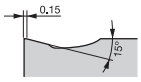
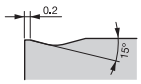
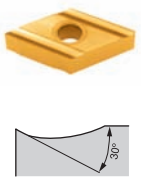
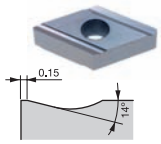
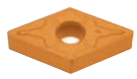
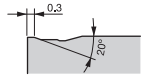
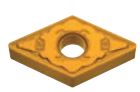
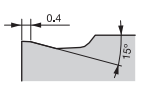
DN□□

Negative



DNMG 15 04 04 - □□

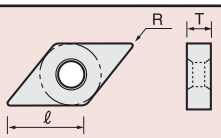
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)		Stocked grades — Coated														Cermet		Un.
			Work materials	M	T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020		AH110	AH120	GH110	NS520	NS530	TH10
Medium cutting	**S**																						
		DNMG150404R-S DNMG150404L-S DNMG150408R-S DNMG150408L-S	●	GH330 100-130-150			○	○		○	○										○	
			●	GH330 50-80-100			○	○		○	○										○	
			✱	T6030 50-80-100			○	○		○	○										○	
		DNMG150604R-S DNMG150604L-S DNMG150608R-S DNMG150608L-S	ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev				●	●		○	●											
	All-round	Insert Cat. No.		K	S																		
		DNMG110404 DNMG110408	●	T5010 100-300-600	AH110 10-50-70	○	○	○							○	○					●	
			●	T5010 100-250-500	AH110 10-30-60	○	○	○	○						○	○		○	○		○	○
		DNMG150404 DNMG150408 DNMG150412 DNMG150416	✱	T5020 300-400-500	AH120 10-30-50	○	○	○	○						○	○		○	○		○	○
			ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev			○	○	○	○						○	○		○	○		○	○
		DNMG150604 DNMG150608 DNMG150612 DNMG150616				○	●	●	○						●	●					○	○
						○	●	●	○						●	●					○	○
						○	●	●	○						●	●					○	○
						○	○	○	○						○	○						
	P	Insert Cat. No.		N																			
		DNGG150402R-P DNGG150402L-P DNGG150404R-P DNGG150404L-P DNGG150408R-P DNGG150408L-P	●	GH110 50-600-1000															○			●
			●	TH10 100-150-700															○			●
			✱	TH10 100-150-500															○			●
			ap = 0.5-2.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																○			●
	R/L	Insert Cat. No.		P																			
		DNGG150404L DNGG150408L	●	NS530 80-200-300																		●	
			●	NS530 80-150-250																		●	
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																			
Roughing	**TH**	Insert Cat. No.		P																			
		DNMG150408-TH DNMG150412-TH DNMG150416-TH	●	T9005 100-250-400		○	○	○	○		○												
			●	T9015 80-150-250		○	○	○	○		○												
			✱	T9025 50-100-150		○	○	○	○		○					●		●				
		DNMG150608-TH DNMG150612-TH DNMG150616-TH	ap = 3.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev			●	●	●	●		○					●		●				
						●	●	●	●		○					●		●				
						●	●	●	●													
	CH	Insert Cat. No.		K																			
		DNMG150404-CH DNMG150408-CH DNMG150412-CH	●	T5105 180-330-480								●	●	●								
			●	T5115 140-270-400								●	●	●								
			✱	T5125 120-210-300								●	●	●								
		DNMG150604-CH DNMG150608-CH DNMG150612-CH	ap = 3.0-4.0-6.0 mm f = 0.1-0.35-0.6 mm/rev									●	●	●								
												●	●	●								
												●	●	●								

55° Rhombic (Basic Selection Chipbreaker with Hole)

DN□□

Negative



DNMG 15 04 02 - □□

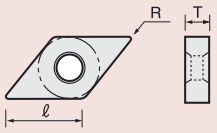
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)			Stocked grades: Coated							Stocked grades: PCD & PCBN									
			Work materials	N		T9005	T9015	T9025	T9035		T5020	AH120	DX120	DX140	DX160	BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX930	BX950
Precision finishing	PCD	DNMM150402-DIA DNMM150404-DIA	●	DX120 500-1500-2500									○											
			▰	DX120 300-1000-1800									○											
			ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																					
	PCD	Insert Cat. No.		N																				
		DNGA150404-DIA DNGA150408-DIA	●	DX140 400-600-2500										○ ○	○									
			▰	DX160 400-500-2000																				
			ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																					
	PCBN	Insert Cat. No.		K	H																			
		DNGA150402-QBN DNGA150404-QBN DNGA150408-QBN DNGA150412-QBN	●	BX850 100-500-1200	BX330 100-150-200													●				○		
			▰	BX850 100-400-800	BX360 80-120-150													○				○		
																		○				○		
		DNGA150602-QBN DNGA150604-QBN DNGA150608-QBN DNGA150612-QBN	✕		BX360 80-120-150												●	●						
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev														●	●						
																	●	●						
	PCBN	Insert Cat. No.		K	H																			
	(QB-mini)	2QP-DNGA150404-L 2QP-DNGA150404-H 2QP-DNGA150404 2QP-DNGA150408-L 2QP-DNGA150408-H 2QP-DNGA150408 2QP-DNGA150412-L 2QP-DNGA150412-H 2QP-DNGA150412	●	BX930 100-500-1200	BX310 130-200-300													○						
			▰	BX930 100-400-800	BX330 80-120-150													○	○				○	○
			✕		BX360 80-120-150												●	●	●	●					
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															○						
																	●	●	●	●			○	○
			L = Small honing angle Wear resistance priority															○						
																		○	○	○				
																	○	○	○	○			○	○
		2QP-DNGA150604 2QP-DNGA150608 2QP-DNGA150612	H = Large honing angle Impact resistance priority														●	●	●	●				
																	●	●	●	●				
																	●	●	●	●				
	PCBN	Insert Cat. No.		H																				
	(QB-mini)	4QP-DNGA150404 4QP-DNGA150408 4QP-DNGA150412	●	BXC30 100-250-300																●	●			
			▰	BXC50 80-150-200																●	●			
																				●	●			
		4QP-DNGA150604 4QP-DNGA150608 4QP-DNGA150612	✕	BXC50 80-120-150																●	●			
			ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																	●	●			
																				●	●			

55° Rhombic (Complementary Chipbreaker with Hole)

DN□□

Negative



DNMG 11 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

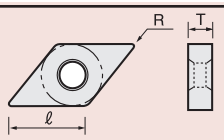
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	P	M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T5010	Cermet NS730	NS520	NS530	Coated Cermet AT520	AT530	GT720	GT730	GT530	Un. T H 1 0
Finishing	11																			
		DNMG110404-11	●	NS520 80-250-350	NS530 100-120-150								●	●		●			●	
		DNMG110408-11											●	●		●			●	
		DNMG150404-11	●	NS530 80-150-250										○						○
		DNMG150408-11												○						
		DNMG150604-11	ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev										●	●	●	●			●	
		DNMG150608-11											●	●	●	●			●	
		DNMG150612-11											●	●					●	
Finishing of mild steel	17	Insert Cat. No.		P	M															
		DNMG150604-17	●	NS530 80-200-300	NS530 100-120-150									●						
		DNMG150608-17												●						
		DNMG150612-17	ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																	
Finishing	TSF	Insert Cat. No.		P	M															
		DNMG150404-TSF	●	GT730 150-200-300	GT730 120-140-180							○					○	○		
		DNMG150408-TSF										○					○	○		
		DNMG150604-TSF	●	GT730 100-180-250													○	●		
		DNMG150608-TSF																●		
			ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.4 mm/rev																	
	ZF	Insert Cat. No.		P	M															
		DNMG150404-ZF	●	T9015 100-250-400	GT730 120-140-180		○	○				○					○	○		
		DNMG150408-ZF					○	○				○					○	○		
		DNMG150412-ZF	●	T9015 80-150-250			○	○												
		DNMG150604-ZF	✱	T9025 50-100-150			●	●										●		
		DNMG150608-ZF					●	●										●		
		DNMG150612-ZF	ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev				●	●												
Finishing to medium cutting	ZM	Insert Cat. No.		P	M															
		DNMG150408-ZM	●	T9015 100-250-400	GT730 120-140-180		○	○				○					○	○		
		DNMG150412-ZM					○	○				○						○		
		DNMG150416-ZM	●	T9015 80-150-250			○	○												
		DNMG150608-ZM	✱	T9025 50-100-150			●	●										●		
		DNMG150612-ZM					●	●										●		
		DNMG150616-ZM	ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev				●	●												
Low cutting depth, high feed	AS	Insert Cat. No.		P																
		DNMG150404-AS	●	T9005 100-250-400	NS530 80-200-300	○	○	○	○					○						
		DNMG150408-AS				○	○	○	○					○						
		DNMG150412-AS	●	T9015 80-150-250		○	○	○	○					○						
		DNMG150604-AS	✱	T9025 50-100-150		●	●	●	●					●						
		DNMG150608-AS				●	●	●	●					●						
		DNMG150612-AS	ap = 0.5-1.0-2.0 mm f = 0.2-0.4-0.6 mm/rev			●	●	●	●					○						
		DNMG150616-AS																		

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

55° Rhombic (Complementary Chipbreaker with Hole)

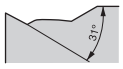
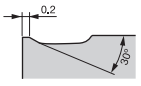
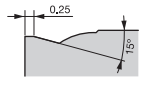
DN□□

Negative



DNMG 15 04 04 - □□

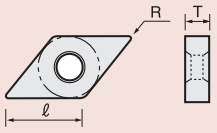
Cutting edge length (ℓ) | Thickness (T) | Corner radius (R) | Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated														Cermet	
			Work materials	P	M	T9005	T9015	T9025	T9035							T6020	T6030	GH330	T5010	T5020	AH110	NS520	NS530
Medium cutting (internal)	**CB**	DNMG110404-CB DNMG110408-CB	●	NS530 80-200-300	NS530 100-120-150		●																●
			●	T9015 80-150-250			●																●
			✱	T9015 80-150-250																			
			ap = 0.3-1.5-2.5 mm f = 0.1-0.15-0.25 mm/rev																				
Medium cutting	**37**	Insert Cat. No.		P																			
		DNMG150404-37 DNMG150408-37 DNMG150412-37	●	NS530 80-200-300			○																○
			●	T9015 100-150-250			○											○						○
			✱	T9025 50-100-150			○																○
		DNMG150604-37 DNMG150608-37 DNMG150612-37					●	●															●
			ap = 1.0-2.0-4.0 mm f = 0.2-0.3-0.4 mm/rev				●	●															●
							●	●															
Medium cutting to roughing	**DM**	Insert Cat. No.		P																			
		DNMG150404-DM DNMG150408-DM DNMG150412-DM DNMG150416-DM	●	T9005 100-250-400		○	○	○	○														
			●	T9015 80-150-250		○	○	○	○														
			✱	T9025 50-100-150		○	○	○	○														
		DNMG150604-DM DNMG150608-DM DNMG150612-DM DNMG150616-DM				●	●	●	●														
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.45 mm/rev			●	●	●	●														
						●	●	●	●														
						●	●	●	●														

55° Rhombic (Complementary Chipbreaker with Hole)

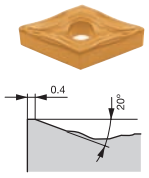
DN□□

Negative



DNMM 15 04 04 - □□

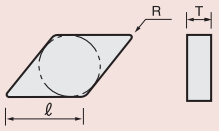
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions / Cutting speed v_c (m/min)		Stocked grades: Coated																
			Work materials	P	T9005	T9015	T9025	T9035							T6020	T6030	GH330	T5010	T5020	AH110	AH120	GH110
Heavy cutting	57	DNMM150408-57	●	T9015 80-150-250		○	○														
	(Single-sided)	DNMM150412-57				○	○														
		DNMM150608-57	●	T9015 80-150-250		●	●														
		DNMM150612-57	✱	T9025 50-100-150		●	●														
		DNMM150616-57	ap = 2.0-5.0-8.0 mm f = 0.4-0.6-0.8 mm/rev																		

55° Rhombic (Basic Selection Chipbreaker without Hole)

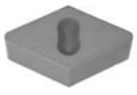
DN□□

Negative



DNGN 15 04 04 - □□

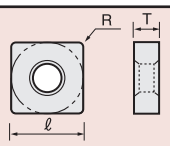
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated													Ceramics		
			Work materials	K	H	T9005	T9015	T9025	T9035							T6020	T6030	GH330	T5010	T5020	CX710	FX105	LX11
Finishing to roughing	**Ceramics**	DNGN120712	●	FX105 300-400-1000	LX11 50-100-150																		
		DNGN150404	●	FX105 300-400-500	LX11 50-100-150																		○
		DNGN150408																					○
		DNGN150412	✱																			●	○
		DNGN150416	LX11: ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm f = 0.05-0.2-0.3 mm/rev																		○	
		DNGN150708																				●	●
		DNGN150712																				●	●
		DNGN150716																				●	●
	Ceramics	Insert Cat. No.		K																			
		DNGX120712	●	FX105 300-400-1000																		●	
		DNGX150708	●	FX105 300-400-500																			
		DNGX150712																				●	
		DNGX150716	✱																				
			ap = 0.5-1.0-2.0 mm f = 0.05-0.2-0.3 mm/rev																				

90° Square (Basic Selection Chipbreaker with Hole)

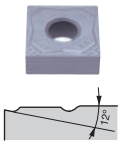
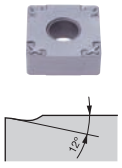
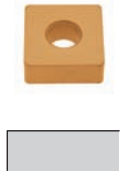
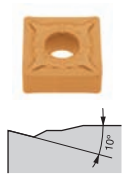
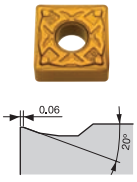
SN□□

Negative



SNMG 12 04 04 - □□

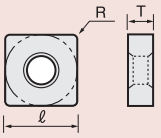
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min) — Work materials	P	M	Stocked grades — Coated: T9005	T9015	T9025	T9035		T6020	T5105	T5115	T5125	T5010	T5020	Cermet: NS520	NS530	C.C.: GT530	Un.: TH10	Ceramics: CX710	FX105	LX21	LX11
Precision finishing	**TF**																							
		SNMG120404-TF SNMG120408-TF	●	NS520 80-250-350	NS530 100-120-150												● ●	○ ○						
			●	NS530 80-150-250																				
			ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																					
	01	Insert Cat. No.		P																				
		SNGG090302-01 SNGG090304-01 SNGG090308-01	●	NS520 80-250-350													○ ○ ○	○ ○ ○						
			●	NS530 80-150-250																				
		SNGG120402-01 SNGG120404-01 SNGG120408-01	ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev														○ ○ ○	○ ○ ○						
Finishing to medium cutting	**—**	Insert Cat. No.		K																				
		SNMA090308	●	T5010 100-300-600	FX105 300-400-1000															○				
		SNMA120404 SNMA120408 SNMA120412 SNMA120416	●	T5010 100-250-500		○ ○									● ●	● ●	○ ○			○		●		
			✕	T5020 100-150-300		○									●	●	○			○		●		
			ap = 0.05-3.0-5.0 mm f = 0.03-0.3-0.6 mm/rev												●	●								
		SNMA190612 SNMA190616													●	●								
	—	Insert Cat. No.		K	H																			
		SNGA090304	●	FX105 300-400-1000	LX11 50-100-150															○				●
		SNGA120404 SNGA120408 SNGA120412 SNGA120416	●	FX105 300-400-500	LX11 50-100-150												○ ○	○		○ ○ ○		● ● ●	○	● ● ●
			LX11: ap = 0.05-0.3-0.5 mm LX11: f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm FX105: f = 0.05-0.2-0.3 mm/rev																					
Finishing	**TS**	Insert Cat. No.		P	M																			
		SNMG120404-TS SNMG120408-TS SNMG120412-TS	●	NS520 80-250-350	NS530 100-120-150	● ●	● ●	● ●	○ ○								● ●	● ●	○ ●					
			●	NS530 80-150-250		●	●	●	○								●	○						
			✕	T9025 50-100-150																				
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																					
	CF	Insert Cat. No.		K																				
		SNMG120408-CF SNMG120412-CF	●	T5105 180-330-480								● ●	● ●											
			●	T5115 140-270-400																				
			✕	T5115 120-210-300																				
			ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev																					

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

90° Square (Basic Selection Chipbreaker with Hole)

SN□□ — Negative



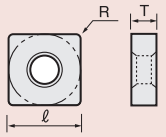
SNMG 12 04 04 - □□
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) M	S	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	Un. K S20	Cer. NS530
Finishing to medium cutting	**SS**	SNMG120404-SS SNMG120408-SS SNMG120412-SS	●	T6020 150-200-250	AH110 10-50-70					●	●	●						●	●		
			●	T6020 150-180-220	AH110 10-30-60					●	●	●						●	●		
			✕	T6030 50-100-150	AH120 10-30-50					●	●							●	●		
				ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev																	
Medium cutting	**TM**	Insert Cat. No.		P	S																
		SNMG090304-TM SNMG090308-TM	●	T9005 100-250-400	AH120 10-40-60		●	●													
							●	●													
		SNMG120404-TM SNMG120408-TM SNMG120412-TM SNMG120416-TM	●	T9015 80-150-250	AH120 10-30-50	●	●	●	●		○								●		
			●			●	●	●	●		○								●		
			✕	T9025 50-100-150	AH120 10-30-50	●	●	●	●		○								●		
			●			●	●	●	●		○										
				ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev																	
		SNMG150608-TM SNMG150612-TM					○														
							○														
		SNMG190608-TM SNMG190612-TM					○														
							○														
	CM	Insert Cat. No.		K																	
		SNMG120408-CM SNMG120412-CM	●	T5105 180-330-480									●	●	●						
			●	T5115 140-270-400									●	●	●						
			✕	T5125 120-210-300																	
				ap = 1.0-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev																	
	SM	Insert Cat. No.		M																	
		SNMG120408-SM SNMG120412-SM	●	T6020 150-200-250						●	○										
			●	T6020 150-180-220						●	○										
			✕	T6030 50-100-150																	
				ap = 0.5-2.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																	
	SA	Insert Cat. No.		M	S																
		SNMG120404-SA SNMG120408-SA SNMG120412-SA	●	T6020 150-200-250	AH110 10-50-70					●	●							●	●		
			●	T6020 150-180-220	AH110 10-30-60					●	●							●	●	●	
		SNMG190612-SA SNMG190616-SA	✕	T6030 50-100-150	AH120 10-30-50														●	●	
				ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																	
	S	Insert Cat. No.		M																	
		SNMG120404R-S SNMG120404L-S SNMG120408R-S SNMG120408L-S SNMG120412R-S SNMG120412L-S	●	GH330 100-130-150				●	●		○										○
								●	●		○										○
			●	GH330 50-80-100				●	●		○	●									○
			✕	T6030 50-80-100				●	●		○	●									○
				ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev				●	●												

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square (Basic Selection Chipbreaker with Hole)

SN□□ — Negative



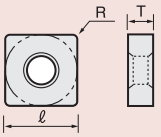
SNMG 09 03 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	K	S	Stocked grades: Coated T9005	T9015	T9025	T9035			T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	GH110	Cermet NS520	NS530	Un. TH10
Medium cutting	All-round	SNMG090304 SNMG090308	●	T5010 100-300-600	AH110 10-50-70	○ ○	○ ○	○ ○															● ●	○ ○
		SNMG120404 SNMG120408 SNMG120412 SNMG120416 SNMG120420	●	T5010 100-250-500	AH110 10-30-60	○ ○ ○ ○ ○	● ● ● ● ○	● ● ● ● ○	○ ○ ○ ○ ○								● ● ● ●	● ● ● ●	○ ○ ○	○ ○ ○		○ ○ ○	○ ○ ○	○ ○ ○
			✱	T5020 100-150-300	AH120 10-30-50													○						
				ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev																				
		SNMG150612 SNMG150616				○ ○	○ ○	○ ○	○ ○															
		SNMG190612 SNMG190616				○ ○	○ ○	● ●	○ ○								○	○ ○						
		SNMG250724				○	○	○	○								○	○						
	P	Insert Cat. No.		N																				
		SNGG090304R-P SNGG090304L-P SNGG090308R-P SNGG090308L-P	●	GH110 50-600-1000																	○ ○ ○			○ ○ ○ ○
				TH10 100-150-700									○										○	
			✱	TH10 100-150-500																	○ ○ ○ ○			● ● ● ●
		SNGG120404R-P SNGG120404L-P SNGG120408R-P SNGG120408L-P		ap = 0.5-2.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																				
Roughing	TH	Insert Cat. No.		P																				
		SNMG120408-TH SNMG120412-TH	●	T9005 100-250-400		● ●	● ●	● ●	● ●			○ ○						● ●						
		SNMG150612-TH SNMG150616-TH	●	T9015 80-150-250		● ●	● ●	● ●	● ●			○ ○												
		SNMG190612-TH SNMG190616-TH	✱	T9025 50-100-150		● ●	● ●	● ●	● ●			○ ○												
				ap = 3.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev																				
	CH	Insert Cat. No.		K																				
		SNMG120408-CH SNMG120412-CH SNMG120416-CH	●	T5105 180-330-480										● ●	● ●	● ●								
			●	T5115 140-270-400										● ●	● ●	● ●								
			✱	T5125 120-210-300																				
				ap = 3.0-4.0-6.0 mm f = 0.1-0.35-0.6 mm/rev																				
Heavy cutting	TU	Insert Cat. No.		P																				
	(Single-sided)	SNMM190612-TU SNMM190616-TU SNMM190624-TU	●	T9005 100-250-400		● ●	● ●	● ●	● ●			● ●												
		SNMM250724-TU SNMM250924-TU	●	T9015 80-150-250		● ●	● ●	● ●	● ●															
			✱	T9025 50-100-150		● ○	● ○	● ●	●															
		SNMM310924-TU		ap = 3-5-8 mm (12-19 Type) ap = 8-12-17 mm (25 Type) f = 0.5-0.8-1.0 mm/rev (12-19 Type) f = 0.8-1.0-1.2 mm/rev (25 Type)		○	○	○	○															
	TR	Insert Cat. No.		P																				
	(Single-sided)	SNMM190612-TR SNMM190616-TR SNMM190624-TR	●	T9015 80-150-250			● ●	● ●	● ●															
		SNMM250724-TR SNMM250924-TR	●	T9015 80-150-250			● ●	● ●																
			✱	T9025 50-100-150			● ●	● ●																
				ap = 2-5-8 mm (19 Type) ap = 5-10-17 mm (25 Type) f = 0.4-0.6-0.8 mm/rev (19 Type) f = 0.6-0.8-1.2 mm/rev (25 Type)																				

90° Square (Basic Selection Chipbreaker with Hole)

SN□□ Negative



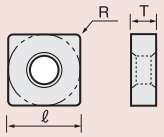
SNGA 12 04 04 - □□
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions Cutting speed v_c (m/min) Work materials		Stocked grades Coated								PCD & PCBN									
					T9005	T9015	T9025	T9035					DX140	DX160	BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX930	BX950
Precision finishing	PCD			N																			
		SNGA120404-DIA SNGA120408-DIA	●	DX140 400-600-2500									○	○									
			●	DX140 400-500-2000									○	○									
			✱																				
		ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																					
	PCBN	Insert Cat. No.		K	H																		
		SNGA120402-QBN SNGA120404-QBN SNGA120408-QBN SNGA120412-QBN	●	BX850 100-500-1200	BX330 100-150-200												○						
			●	BX850 100-400-800	BX360 80-120-150											●	●				○		
			✱		BX360 80-120-150											●	●				○		
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																			○		
	PCBN	Insert Cat. No.		K	H																		
	(QB-mini) 	2QP-SNGA120404-L 2QP-SNGA120404-H 2QP-SNGA120404 2QP-SNGA120408-L 2QP-SNGA120408-H 2QP-SNGA120408 2QP-SNGA120412-L 2QP-SNGA120412-H 2QP-SNGA120412	●	BX930 100-500-1200	BX310 130-200-300												○						
			●	BX930 100-400-800	BX330 80-120-150												○	○					
			✱		BX360 80-120-150										●	●	●	●			○	○	
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev L = Small honing angle Wear resistance priority H = Large honing angle Impact resistance priority														○							
																○	○						
															●	●	●	●			○	○	
	PCBN	Insert Cat. No.		H																			
	(QB-mini) 	4QP-SNGA120404 4QP-SNGA120408 4QP-SNGA120412	●	BXC30 100-250-300															●	●			
			●	BXC50 80-150-200															●	●			
			✱	BXC50 80-120-150															●	●			
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																					

90° Square (Complementary Chipbreaker with Hole)

SN□□

Negative



SNMG 12 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

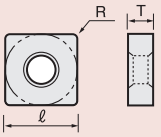
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)			Stocked grades — Coated													Cermet			C.C.	
			Work materials	P	M	T9005	T9015	T9025	T9035				T6020	T6030	GH330	T5010	T5020	AH110	AH120	NS730	NS520	NS530	GT720	GT730
Finishing	**11**	SNMG120404-11 SNMG120408-11 SNMG120412-11	●	NS520 80-250-350	NS530 100-120-150																●	●		
			●	NS530 80-150-250																	●	●		
			✱																			○		
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																					
Finishing of mild steel	**17**	Insert Cat. No.		P	M																			
		SNMG120404-17 SNMG120408-17	●	NS530 80-200-300	NS530 100-120-150		○	○														●		
			●	NS530 80-150-250			○	○														●		
			✱																					
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																					
Finishing	**TSF**	Insert Cat. No.		P	M																			
		SNMG120404-TSF SNMG120408-TSF	●	GT730 150-200-300	GT730 120-140-180															○				●
			●	GT730 100-180-250																				●
			✱	GT730 80-150-200																				
			ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.4 mm/rev																					
	ZF	Insert Cat. No.		P																				
		SNMG120404-ZF SNMG120408-ZF SNMG120412-ZF	●	T9015 100-250-400			●	●												○				
			●	T9015 80-150-250			●	●												○				
			✱	T9025 50-100-150			●	●																
			ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev																					
Finishing to medium cutting	**ZM**	Insert Cat. No.		P																				
		SNMG120408-ZM SNMG120412-ZM SNMG120416-ZM	●	T9015 100-250-400			●	●												○				
			●	T9015 80-150-250			●	●												○				
			✱	T9025 50-100-150			●	●																
			ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev																					
Low cutting depth, high feed	**AS**			P																				
		SNMG120404-AS SNMG120408-AS SNMG120412-AS	●	T9005 100-250-400		○	○	○														●		
			●	T9015 80-150-250		○	●	●	○													●		
			✱	T9025 50-100-150		○	●	●	○													●		
			ap = 0.5-1.0-2.0 mm f = 0.2-0.3-0.4 mm/rev																					

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square (Complementary Chipbreaker with Hole)

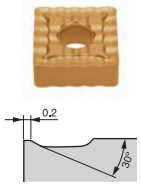
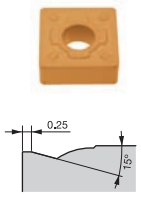
SN□□

Negative



SNMM 12 04 04 - □□

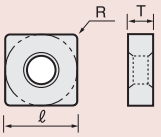
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	P	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5010	T5020	AH110	AH120	Cerm. NS520	NS530
Medium cutting	**37**	SNMG120404-37	●	NS530 80-200-300		●	●	●									○
		SNMG120408-37	●	T9015 80-150-250		●	●	●			○						○
		SNMG120412-37	✱	T9025 50-100-150		●	●	●									
			ap = 1.0-2.0-4.0 mm f = 0.2-0.3-0.4 mm/rev														
Medium cutting to roughing	**DM**	Insert Cat. No.		P													
		SNMG120404-DM	●	T9005 100-250-400	●	●	●	●									
		SNMG120408-DM	●	T9015 80-150-250	●	●	●	●									
		SNMG120412-DM	✱	T9025 50-100-150	●	●	●	●									
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev														
Heavy cutting	**57**	Insert Cat. No.		P													
	(Single-sided)	SNMM120408-57	●	T9015 80-150-250		●	●	●									
		SNMM120412-57				●	●	●									
		SNMM150608-57	●	T9015 80-150-250		●	●	●									
		SNMM150612-57				●	●	●									
		SNMM150616-57	✱	T9025 50-100-150		●	●	●									
		SNMM190612-57				●	●	●									
		SNMM190616-57				●	●	●									
		SNMM190624-57				●	●	●									
		SNMM250724-57	ap = 2.0-5.0-8.0 mm f = 0.4-0.6-0.8 mm/rev			●	●	●									

90° Square (Complementary Chipbreaker with Hole)

SN□□

Negative

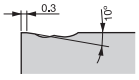


SNMM 12 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated																Cer.
			Work materials	P																
					T9005	T9015	T9025	T9035								T6020	T6030	GH330	T5010	T5020	AH110	AH120	NS520
Heavy cutting	65	SNMM120408-65	●				●																
		SNMM120412-65	●	T9015 80-150-250			●																
		SNMM190612-65	✱	T9025 50-100-150		●	●																
		SNMM190616-65				●	●																
		SNMM190624-65				●	●																
		SNMM250724-65				●	●																
		SNMM250732-65					●																
		SNMM250924-65					●																
		SNMM310916-65					●																
		SNMM310924-65					●																

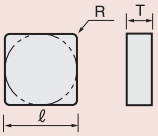
ap = 3-5-8 mm (12-19 Type)
ap = 8-12-17 mm (25 Type)
f = 0.5-0.8-1.0 mm/rev (12-19 Type)
f = 0.8-1.0-1.2 mm/rev (25 Type)



90° Square (Basic Selection Chipbreaker without Hole)

SN □□

Negative



SNGN 09 03 08 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

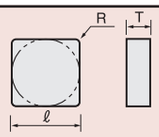
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	K	H	Stocked grades: Coated T9005	T9015	T9025	T9035				T6020	T6030	Ceramics CX710	FX105	LX21	LX11	PCBN BX310	BX330	BX360	BX90S	BXC90
Finishing to roughing	Ceramics	SNGN090308	●	FX105 300-400-1000	LX11 50-100-150												○	●					
		SNGN120304	●	FX105 300-400-500	LX11 50-100-150													○					
		SNGN120312																○					
		SNGN120404																●					
		SNGN120408														●	○	●					
		SNGN120412													●	●	○	●					
		SNGN120416													●	●	○	●					
		SNGN120420														●	○						
		SNGN120424														●							
		SNGN120708														●		●					
		SNGN120712													●	●		●					
		SNGN120716														●		●					
		SNGN120720																○					
	LX11: ap = 0.05-0.3-0.5 mm, f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm, f = 0.05-0.2-0.3 mm/rev																						
Medium cutting to roughing	PCBN	Insert Cat. No.		K																			
		S-SNGN090308	●	BXC90 300-700-1500																			○
		S-SNGN090312																					○
		S-SNGN120308	●	BXC90 300-700-1000																			○
		S-SNGN120312																					○
		S-SNGN120408		BXC90 300-500-800																			○
		S-SNGN120412																					○
	ap = 0.05-0.3-3.0 mm, f = 0.05-0.2-0.4 mm/rev																						
Finishing to roughing	Ceramics	Insert Cat. No.		K																			
		SNGX120708	●	FX105 300-400-1000												●							
		SNGX120712	●	FX105 300-400-500												●							
		SNGX120716													●	●							
	ap = 0.5-1.0-2.0 mm, f = 0.05-0.2-0.3 mm/rev																						
Medium cutting to roughing	PCBN	Insert Cat. No.		K																			
		SNMN090308	●	BX90S 300-700-1500																		○	
		SNMN090312																				○	
		SNMN120308	●	BX90S 300-700-1000																		○	
		SNMN120312																				○	
		SNMN120408		BX90S 300-500-800																		○	
		SNMN120412																				○	
	ap = 0.05-0.3-3.0 mm, f = 0.05-0.2-0.4 mm/rev																						

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

90° Square (Basic Selection Chipbreaker without Hole)

SN□□

Negative



SNGN 12 04 08 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)			Stocked grades: Coated									Stocked grades: PCD & PCBN								
			Work materials	K	H	T9005	T9015	T9025	T9035						DX120	DX140	DX160	BX310	BX330	BX360	BX380	BX850	BX950
Precision finishing	PCBN	SNGN120402-QBN	●	BX850 100-500-1200	BX360 100-150-200															○			
		SNGN120404-QBN	●	BX850 100-400-800	BX360 80-120-150															○		○	
		SNGN120408-QBN	●		BX360 80-120-150															○		○	
		SNGN120412-QBN	●		BX360 80-120-150															○		○	

ap = 0.05-0.3-0.5 mm
f = 0.05-0.1-0.15 mm/rev

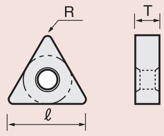
Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

TAC Inserts (Negative Inserts)

60° Triangular (Basic Selection Chipbreaker with Hole)

TN ▢▢

Negative



TNMG 16 04 04 - ▢▢
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Standard cutting conditions – Cutting speed v_c (m/min)

Application	Chipbreaker type	Insert Cat. No.	Work materials	P	M
Precision finishing	TF	TNMG160404-TF, TNMG160408-TF, TNMG160412-TF	Steel	NS520 80-250-350	NS530 100-120-150
			Stainless steel	NS530 80-150-250	
			ap = 0.05-0.3-0.5 mm; f = 0.03-0.1-0.15 mm/rev		
Precision finishing	01	TNGG110302-01 … TNGG160412-01	Steel	NS520 80-250-350	
			Stainless steel	NS530 80-150-250	
			Cast iron		
			ap = 0.05-0.3-0.5 mm; f = 0.03-0.1-0.15 mm/rev		
Finishing	C	TNGG160400R-C … TNGG160408L-C	Steel	NS520 80-250-350	
			Stainless steel	NS530 80-150-250	
			Cast iron		
			ap = 0.05-0.3-0.5 mm; f = 0.03-0.1-0.15 mm/rev		

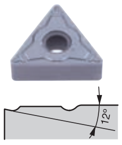
Application	Chipbreaker type	Insert Cat. No.	Work materials	K	K
Finishing to medium cutting	—	TNMA160404 … TNMA220416	Steel	T5010 100-300-600	FX105 300-400-1000
			Stainless steel	T5010 100-250-500	
			Cast iron	T5020 100-150-300	
			ap = 0.05-3.0-5.0 mm; f = 0.03-0.3-0.6 mm/rev		

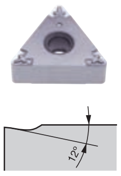
Application	Chipbreaker type	Insert Cat. No.	Work materials	K	H
Finishing to medium cutting	Ceramics	TNGA110304 … TNGA220408	Steel	FX105 300-400-1000	LX11 50-100-150
			Stainless steel	FX105 300-400-500	LX11 50-100-150
			Cast iron		
			LX11: ap = 0.05-0.3-0.5 mm; f = 0.05-0.08-0.1 mm/rev. FX105: ap = 0.5-1.0-2.0 mm; f = 0.05-0.2-0.3 mm/rev		

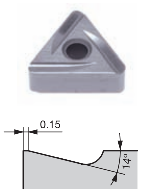
Stocked grades

Coated: T9005, T9015, T9025, T9035, GH330, T5010, T5020; Cermet: GH110, NS520, NS530; C.C.: GT530; Un.: TH10; Ceramics: CX710, FX105, LX21, LX11

Application	Chipbreaker type	Insert Cat. No.	T9005	T9015	T9025	T9035	GH330	T5010	T5020	GH110	NS520	NS530	GT530	TH10	CX710	FX105	LX21	LX11
Precision finishing	TF	TNMG160404-TF									●	○		○				
		TNMG160408-TF									●	●						
		TNMG160412-TF									○							
	01	TNGG110302-01									○	○						
		TNGG110304-01									○	○						
		TNGG110308-01									○	○						
		TNGG160402-01								○	●	●		○				
		TNGG160404-01								○	●	●		○				
		TNGG160408-01								○	○	○						
		TNGG160412-01									○	○						
Finishing	C	TNGG160400R-C										○						
		TNGG160400L-C										○						
		TNGG160402R-C										●	○	○				
		TNGG160402L-C										●	○					
		TNGG160404R-C					○			○	○	●	○	○				
		TNGG160404L-C					○			○		●	○	○				
		TNGG160408R-C					○			○	○	○	○	○				
		TNGG160408L-C					○			○		●	○	○				
Finishing to medium cutting	—	TNMA160404	○					●	●		○			○				
		TNMA160408	○					●	●		○			●		●		
		TNMA160412	○					●	●							●		
		TNMA160416	○					●	●									
		TNMA160420	○					○	○									
		TNMA220404	○					○	○									
		TNMA220408	○					●	●									
		TNMA220412	○					●	●									
		TNMA220416	○					●	●									
	Ceramics	TNGA110304									○			○				
		TNGA110308									○			○				
		TNGA160304												○				
		TNGA160308												○				
		TNGA160404								○	○	○		○			○	●
		TNGA160404T01020																●
		TNGA160404S01530																●
		TNGA160408								○	○			○	●	●	○	●
		TNGA160408T01020																●
		TNGA160408S01530																●
		TNGA160412									○			○	●	●	○	●
		TNGA160416												○		●		●
		TNGA220408												○				



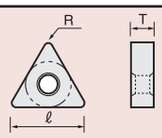




60° Triangular (Basic Selection Chipbreaker with Hole)

TN □□

Negative



TNMG 16 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

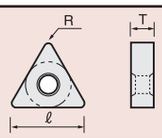
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min) — Work materials	P	M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	Cermet NS520	NS530	Co. Cerm. AT520	GT530
Finishing	**TS**	TNMG160404-TS TNMG160408-TS TNMG160412-TS	●	NS520 80-250-350	GT530 120-140-180	●	●	●	○		○									●	●	●	●
			●	NS530 80-150-250		●	●	●	○		○									●	●	●	●
			✕	T9025 100-150-200		●	●	●	○													●	●
			ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																				
	CF	Insert Cat. No.		K																			
		TNMG160404-CF TNMG160408-CF	●	T5105 180-330-480									●	●									
			●	T5115 180-270-400									●	●									
			✕	T5115 180-200-240																			
			ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev																				
Finishing to medium cutting	**SS**	Insert Cat. No.		M	S																		
		TNMG160404-SS TNMG160408-SS TNMG160412-SS	●	T6020 150-200-250	AH110 10-50-70					●	●	●						●	●		●		
			●	T6020 150-180-220	AH110 10-30-60					●	●	●						●	●				
		TNMG220404-SS TNMG220408-SS TNMG220412-SS	✕	T6030 50-100-150	AH120 10-30-50					●	●	●											
			ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev							●	●	●											
Medium cutting	**TM**	Insert Cat. No.		P	S																		
		TNMG110304-TM TNMG110308-TM	●	T9005 100-250-400	AH120 10-40-60		●	●															
							●	●															
		TNMG160404-TM TNMG160408-TM TNMG160412-TM	●	T9015 80-150-250	AH120 10-30-50	●	●	●	●		○								●				
			✕	T9025 50-100-150	AH120 10-30-50	●	●	●	●		○								●				
		TNMG220404-TM TNMG220408-TM TNMG220412-TM TNMG220416-TM	ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev			●	●	●	●		○												
							●	●			○												
							●	●															
	CM	Insert Cat. No.		K																			
		TNMG160408-CM TNMG160408-CM TNMG160412-CM	●	T5105 180-330-480									●	●	●								
			●	T5115 140-270-400									●	●	●								
		TNMG220408-CM TNMG220412-CM	✕	T5125 120-210-300									●	●	●								
			ap = 1.0-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev										●	●	●								
	SM	Insert Cat. No.		M																			
		TNMG160404-SM TNMG160408-SM TNMG160412-SM	●	T6020 150-200-250						●	●												
			●	T6020 150-180-220			●	●		●	●												
			✕	T6030 50-100-150						●	●												
			ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																				

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular (Basic Selection Chipbreaker with Hole)

TN □□

Negative



TNMG 16 04 04 - □□

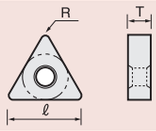
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)		Coated												Cermet		Un.	PCD
				M	S	T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	GH110	NS520	NS530	TH10	DX120
Medium cutting	SA																							
		TNMG160404-SA TNMG160408-SA TNMG160412-SA	●	T6020 150-200-250	AH110 10-50-70					● ●	● ●							● ●	● ●					
			●	T6020 150-180-220	AH110 10-30-60					● ●	● ●							● ●	● ●					
		TNMG220408-SA TNMG220412-SA	✕	T6030 50-100-150	AH120 10-30-50					○ ○	○								●					
		ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																						
	S	Insert Cat. No.		M																				
		TNMG160404R-S TNMG160404L-S TNMG160408R-S TNMG160408L-S	●	GH330 100-130-150				● ●	● ●		○ ○	● ●										● ●		
			●	GH330 50-80-100				● ●	● ●		○ ○	● ●										● ●		
		TNMG220404R-S TNMG220404L-S TNMG220408R-S TNMG220408L-S	✕	T6030 50-80-100				● ●	● ●	○ ○	○ ○	○ ○										○ ○		
		ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev																						
	All-round	Insert Cat. No.		K	S																			
		TNMG110304 TNMG110308	●	T5010 100-300-600	AH110 10-50-70	○ ○	○ ○	○ ○								○ ○	○ ○					● ●	○ ○	
		TNMG160304 TNMG160308	●	T5010 100-250-500	AH110 10-30-60																	○ ○	○ ○	
		TNMG160404 TNMG160408 TNMG160412 TNMG160416 TNMG160420	✕	T5020 100-150-300	AH120 10-30-50	○ ○ ○ ○ ○	● ● ● ○ ○	● ● ● ○ ○	○ ○ ○ ○ ○							● ● ● ○	● ● ● ○	○ ○ ○	○ ○ ○		○ ○ ○	○ ○ ○	○ ○ ○		
		ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev																						
		TNMG220408 TNMG220412 TNMG220416				○ ○ ○	● ● ○	● ● ○	○ ○ ○							● ● ●	● ● ●						○ ○ ○	
	P	Insert Cat. No.		N																				
		TNGG160402R-P TNGG160402L-P TNGG160404R-P TNGG160404L-P TNGG160408R-P TNGG160408L-P	●	GH110 50-600-1000								○ ○								○ ○		● ●	● ●		
			●	TH10 100-150-700								○ ○								○ ○		● ●	● ●		
			✕	TH10 100-150-500								○ ○								○ ○		○ ○	● ●		
		ap = 0.5-2.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																						
Roughing	TH	Insert Cat. No.		P																				
		TNMG220408-TH TNMG220412-TH	●	T9005 100-250-400		○ ○	● ●	● ●	○ ○		○ ○													
			●	T9015 80-150-250																				
			✕	T9025 50-100-150																				
		ap = 2.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev																						
	CH	Insert Cat. No.		K																				
		TNMG160404-CH TNMG160408-CH TNMG160412-CH	●	T5105 180-330-480									● ● ●	● ● ●	● ● ●									
			●	T5115 140-270-400									● ● ●	● ● ●	● ● ●									
		TNMG220408-CH TNMG220412-CH TNMG220416-CH	✕	T5125 120-210-300									● ● ●	● ● ●	● ● ●									
		ap = 3.0-4.0-6.0 mm f = 0.1-0.35-0.6 mm/rev																						
Precision finishing	PCD	Insert Cat. No.		N																				
		TNMM160402-DIA TNMM160404-DIA	●	DX120 500-1500-2500																				○ ○
			●	DX120 300-1000-1800																				
		ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																						

60° Triangular (Basic Selection Chipbreaker with Hole)

TN □□

Negative



TNGA 16 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application: Precision finishing

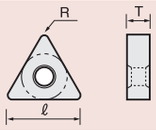
Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)			Stocked grades: Coated								Stocked grades: PCD & PCBN									
		Work materials	N		T9005	T9015	T9025	T9035					DX140	DX160	BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX930	BX950
PCD																							
	TNGA160404-DIA TNGA160408-DIA	●	DX140 400-600-2500										○	○									
		●	DX140 400-500-2000										○	○									
		✕																					
		ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																					
PCBN	**Insert Cat. No.**		**K**	**H**																			
	TNGA160402-QBN TNGA160404-QBN TNGA160408-QBN TNGA160412-QBN	●	BX850 100-500-1200	BX330 100-150-200													○				○		
		●	BX850 100-400-800	BX360 80-120-150												●	●				○		
		✕		BX360 80-120-150												●	●				○		
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																					
PCBN	**Insert Cat. No.**		**K**	**H**																			
(QB-mini) 	3QP-TNGA160404-L 3QP-TNGA160404-H 3QP-TNGA160404 T3QP-TNGA160404 3QP-TNGA160408-L 3QP-TNGA160408-H 3QP-TNGA160408 T3QP-TNGA160408 3QP-TNGA160412-L 3QP-TNGA160412-H 3QP-TNGA160412	●	BX930 100-500-1200	BX310 130-200-300												○							
		●	BX930 100-400-800	BX330 80-120-150													○	○					
		✕		BX360 80-120-150											●	●	●	●				○	○
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev L = Small honing angle Wear resistance priority H = Large honing angle Impact resistance priority T = 10 inserts packing unit																					
PCBN	**Insert Cat. No.**		**H**																				
(QB-mini) 	6QP-TNGA160404 6QP-TNGA160408 6QP-TNGA160412	●	BXC30 100-250-300																●	●			
		●	BXC50 80-150-200																●	●			
		✕	BXC50 80-120-150																●	●			
		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																					

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular (Complementary Chipbreaker with Hole)

TN □□

Negative



TNMG 11 03 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

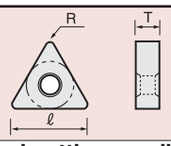
Application	Chipbreaker type	Insert Cat. No.	Work materials	P	M	T9005	T9015	T9025	T9035	GH330	T5010	NS730	NS520	NS530	AT520	AT530	GT720	GT730	GT530	TH10
			Standard cutting conditions	**Cutting speed v_c (m/min)**		**Stocked grades**														
						Coated						**Cermet**			**Coat. Cermet**					**Un.**
Finishing	**11**	TNMG110304-11 TNMG110308-11	●	NS520 80-250-350	NS530 100-120-150									● ●						
		TNMG160402-11 TNMG160404-11 TNMG160408-11 TNMG160412-11	●	NS530 80-150-250						○			● ● ● ●	● ● ● ○	● ● ●	● ● ●			● ●	○ ○
		TNMG220404-11 TNMG220408-11		ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.20 mm/rev										● ●						
Finishing of mild steel	**17**	Insert Cat. No.		P	M															
		TNMG160404-17 TNMG160408-17 TNMG160412-17	●	NS530 80-200-300	NS530 100-120-150															
			●	NS530 80-150-250			○ ○	○ ○		○				● ●						
				ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																
Finishing	**TSF**	Insert Cat. No.		P	M															
		TNMG160402-TSF TNMG160404-TSF TNMG160408-TSF TNMG160412-TSF	●	GT730 150-200-300	GT730 120-140-180							○ ○ ○ ○					○ ○ ○	● ● ●		
			●	GT730 100-180-250																
			✕	GT730 80-150-200																
				ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.40 mm/rev																
	ZF	Insert Cat. No.		P																
		TNMG160404-ZF TNMG160408-ZF TNMG160412-ZF	●	T9015 100-250-400			● ●	● ●				○ ○					○ ○	● ●		
			●	T9015 80-150-250			● ●	● ●												
			✕	T9025 50-100-150																
				ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev																
Finishing to medium cutting	**ZM**	Insert Cat. No.		P																
		TNMG160404-ZM TNMG160408-ZM TNMG160412-ZM	●	T9015 100-250-400			● ●	● ●				○ ○					○ ○	○ ○		
			●	T9015 80-150-250			● ●	● ●				○								
		TNMG220408-ZM TNMG220412-ZM	✕	T9025 50-100-150			● ●	● ●				○ ○								
				ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev																
Low cutting depth, high feed	**AS**	Insert Cat. No.		P																
		TNMG160404-AS TNMG160408-AS TNMG160412-AS	●	T9005 100-250-400	NS530 80-200-300	○ ●	● ●	● ●	○ ●					● ●						
			●	T9015 80-150-250		●	●	●	●					●						
			✕	T9025 50-100-150																
				ap = 0.5-1.0-2.0 mm f = 0.2-0.4-0.6 mm/rev																

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular (Complementary Chipbreaker with Hole)

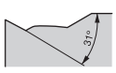
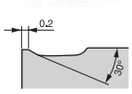
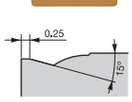
TN □□

Negative



TNMG 11 03 04 - □□

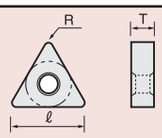
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	Standard cutting conditions: Cutting speed v_c (m/min) M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5010	T5020	AH110	AH120	Ce. NS530
Medium cutting (internal)	CB	TNMG110304-CB	●	NS530 80-200-300	NS530 100-120-150		●										●
		TNMG110308-CB	●	T9015 80-150-250			●										●
			✱	T9015 80-150-250													
				ap = 0.3-1.5-2.5 mm f = 0.1-0.15-0.25 mm/rev													
Medium cutting	37	Insert Cat. No.		P													
		TNMG160404-37	●	NS530 80-200-300			●	●				○					●
		TNMG160408-37	●	T9015 80-150-250			●	●				○					●
		TNMG160412-37	✱	T9025 50-100-150			●	●									○
		TNMG220404-37					●	●									
		TNMG220408-37					●	●									
		TNMG220412-37		ap = 1.0-2.0-4.0 mm f = 0.2-0.3-0.4 mm/rev			●	●									
Medium cutting to roughing	DM	Insert Cat. No.		P													
		TNMG160404-DM	●	T9005 100-250-400		●	●	●	●								
		TNMG160408-DM	●	T9015 80-150-250		●	●	●	●								
		TNMG160412-DM	✱	T9025 50-100-150		○	○	○	○								
		TNMG220408-DM				○	○	○	○								
		TNMG220412-DM					○	○	○								
		TNMG220416-DM		ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev			○	○	○								

60° Triangular (Complementary Chipbreaker with Hole)

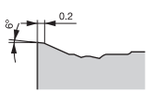
TN□□

Negative



TNMM 16 04 08 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

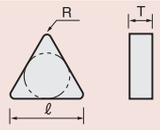
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated												Cermet		C.C.
			Work materials	P	T9005	T9015	T9025	T9035							T6020	T6030	GH330	T5010	T5020	NS520	NS530	GT530
Heavy cutting	57	TNMM160408-57	●	T9015 80-150-250		●	●	●														
		TNMM160412-57	●	T9015 80-150-250		●	●	●														
		TNMM220408-57	✱	T9025 50-100-150		●	●	●														
		TNMM220412-57	ap = 2.0-5.0-8.0 mm f = 0.4-0.6-0.8 mm/rev																			

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular (Basic Selection Chipbreaker without Hole)

TN □□

Negative



TNGN 16 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

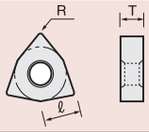
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) K	H	Stocked grades: Coated T9005	T9015	T9025	T9035	Ceramics CX710	FX105	LX21	LX11	PCBN BX310	BX330	BX360	BX380	BX90S	BXC90	BX850	BX950
Finishing to roughing	Ceramics	TNGN160404	●	FX105 300-400-1000	LX11 50-100-150							○	●								
		TNGN160408	●	FX105 300-400-500	LX11 50-100-150							○	●								
		TNGN160412	●							●	●	○	●								
		TNGN160416	●								●		○								
		TNGN160420		LX11: ap = 0.05-0.3-0.5 mm LX11: f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm FX105: f = 0.05-0.2-0.3 mm/rev							●										
		TNGN160708											●								
		TNGN160712											●								
Precision finishing	PCBN	Insert Cat. No.		K	H																
		TNGN160402-QBN	●	BX850 100-500-1200	BX330 100-150-200											○					
		TNGN160404-QBN	●	BX850 100-400-800	BX360 80-120-150										●	●				○	
		TNGN160408-QBN	●												●	●				○	
		TNGN160412-QBN	●		BX360 80-120-150										●	●				○	
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																	
	PCBN	Insert Cat. No.		K																	
		S-TNGN110308	●	BXC90 300-700-1500															○		
		S-TNGN110312	●	BXC90 300-700-1000															○		
		S-TNGN160408	●																○		
		S-TNGN160412	●	BXC90 300-500-800															○		
				ap = 0.05-0.3-3.0 mm f = 0.05-0.2-0.4 mm/rev																	
	PCBN	Insert Cat. No.		K																	
		TNMN110308	●	BX90S 300-700-1500														○			
		TNMN110312	●	BX90S 300-700-1000														○			
		TNMN160408	●															○			
		TNMN160412	●	BX90S 300-500-800														○			
				ap = 0.05-0.3-3.0 mm f = 0.05-0.2-0.4 mm/rev																	

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Trigon (Basic Selection Chipbreaker with Hole)

WN□□

Negative



WNMG 08 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

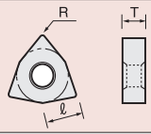
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5010	AH110	AH120	Cermet NS520	NS530
Precision finishing	TF	WNMG080404-TF WNMG080408-TF	●	NS520 80-250-350	NS530 100-120-150											●	○
			●	NS530 80-150-250												●	○
			✕														
				ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev													
	01	Insert Cat. No.		P													
		WNGG060402-01	●	NS520 80-250-350													○
		WNGG060404-01	●	NS530 80-150-250													○
		WNGG080402-01	✕													●	●
		WNGG080404-01														●	●
		WNGG080408-01		ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev												○	○

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

80° Trigon (Basic Selection Chipbreaker with Hole)

WN□□

Negative



WNMG 08 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

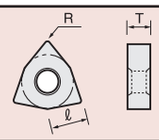
Application	Chipbreaker type	Insert Cat. No.	Work materials	K	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	Cermet NS520	NS530	C.Cerm. AT520	GT530	Un. TH10	Ce. LX11
Finishing to medium cutting	—	WNMA080404 WNMA080408 WNMA080412 WNMA080416	●	T5010 100-300-600		○										●	●			○				○	
			●	T5010 100-250-500		○										●	●			○				○	
			✕	T5020 100-150-300		○										●	●			○				○	
					ap = 0.05-3.0-5.0 mm f = 0.03-0.3-0.6 mm/rev																				
	Ceramics	Insert Cat. No.		H																					
		WNGA080404 WNGA080408 WNGA080412	●	LX11 50-100-150																					●
			●	LX11 50-100-150																					●
					ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev																					
Finishing	TS	Insert Cat. No.		P	M																				
		WNMG080404-TS WNMG080408-TS WNMG080412-TS	●	NS520 80-250-350	GT530 120-140-180	●	●	●	○		○									●	●	●	●		
			●	NS530 80-150-250		●	●	●	○		○									●	●				
			✕	T9025 100-180-250		●	●	●	○											●					
					ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																				
	CF	Insert Cat. No.		K																					
		WNMG080404-CF WNMG080408-CF WNMG080412-CF	●	T5105 180-330-480									●	●											
			●	T5115 180-270-400									●	●											
			✕	T5115 180-200-240									●	●											
					ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev																				
Finishing to medium cutting	SS	Insert Cat. No.		M	S																				
		WNMG080404-SS WNMG080408-SS WNMG080412-SS	●	T6020 150-200-250	AH110 10-50-70					●	●	●						●	●						
			●	T6020 150-180-220	AH110 10-30-60					●	●							●	●						
			✕	T6030 50-100-150	AH120 10-30-50																				
					ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev																				
Medium cutting	TM	Insert Cat. No.		P	S																				
		WNMG060404-TM WNMG060408-TM WNMG060412-TM	●	T9005 100-250-400	AH120 10-40-60	●	●	●	●										●						
			●	T9015 80-150-250	AH120 10-30-50	●	●	●	●										●						
		WNMG080404-TM WNMG080408-TM WNMG080412-TM WNMG080416-TM	✕	T9025 50-100-150	AH120 10-30-50	●	●	●	●		○								●						
					ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev	●	●	●	●		○								●						
	CM	Insert Cat. No.		K																					
		WNMG080408-CM WNMG080412-CM	●	T5105 180-330-480									●	●	●										
			●	T5115 140-270-400									●	●	●										
			✕	T5125 120-210-300																					
					ap = 1.0-2.0-4.0 mm f = 0.1-3.0-0.5 mm/rev																				

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Trigon (Basic Selection Chipbreaker with Hole)

WN□□

Negative



WNMG 08 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Standard cutting conditions — Cutting speed Vc (m/min)

Stocked grades — Coated: T9005, T9015, T9025, T9035, T6020, T6030, T5105, T5115, T5125, T5010, T5020, AH110, AH120 — Cerm.: NS520, NS530 — Unc.: KS20, TH10 — PCBN: BX310, BX330, BX360, BX380, BXC50, BXC30, BX930, BX950

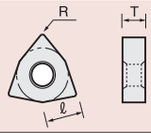
Application	Chipbreaker type	Insert Cat. No.	Work materials	M	S	Coated	Cerm.	Unc.	PCBN
Medium cutting	SM	WNMG060404-SM WNMG060408-SM WNMG060412-SM	●	T6020 150-200-250		●● ●● ●●			
			●	T6020 150-180-220		●● ●● ●●			
		WNMG080404-SM WNMG080408-SM WNMG080412-SM	✕	T6030 50-100-150		●● ●● ●●			
				ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.5 mm/rev		●● ●● ●●			
	SA	Insert Cat. No.		M	S				
		WNMG080408-SA WNMG080412-SA	●	T6020 150-200-250	AH110 10-50-70	●● ●●		KS20 ● ●	
			●	T6020 150-180-220	AH110 10-30-60	●● ●●		KS20 ● ●	
			✕	T6030 50-100-150	AH120 10-30-50	●● ●●		KS20 ● ●	
				ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.4 mm/rev					
	All-round	Insert Cat. No.		K					
		WNMG060404 WNMG060408	●	T5010 100-300-600		○ ○ ○ ○ ○ ○		TH10 ○	
			●	T5010 100-250-500		○ ● ● ○ ○ ● ● ○	NS520 ○ ○ NS530 ○ ○	TH10 ○ ○	
		WNMG080404 WNMG080408 WNMG080412 WNMG080416	✕	T5020 100-150-300		○ ● ● ○ ○ ● ● ○	NS520 ○ ○ NS530 ○ ○	TH10 ○ ○	
				ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev		○ ○ ○ ○			
Roughing		Insert Cat. No.		K					
		WNMG080408-CH WNMG080412-CH	●	T5105 180-330-480		●● ●●			
			●	T5115 140-270-400		●● ●●			
			✕	T5125 120-210-300		●● ●●			
				ap = 3.0-4.0-6.0 mm f = 0.1-0.35-0.6 mm/rev					
	TH	Insert Cat. No.		P					
		WNMG080408-TH WNMG080412-TH WNMG080416-TH	●	T9005 100-250-400		●●●● ●●●● ●●●●			
			●	T9015 80-150-250		○ ○			
		WNMG100612-TH WNMG100616-TH	✕	T9025 50-100-150		○ ● ○ ●			
				ap = 3.0-4.0-6.0 mm f = 0.3-0.4-0.6 mm/rev					
Precision finishing	PCBN	Insert Cat. No.		H					
		3QP-WNGA080408	●	BX310 130-200-300					○ ○ ○ ○ ○ ○
			●	BX330 80-120-150					
			✕	BX360 80-120-150					
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev					
	PCBN	Insert Cat. No.		H					
		6QP-WNGA080408	●	BXC30 100-250-300					● ●
			●	BXC50 80-150-200					
			✕	BXC50 80-120-150					
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev					

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Trigon (Complementary Chipbreaker with Hole)

WN□□

Negative



WNMG 08 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

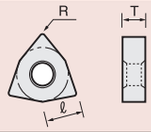
Application	Chipbreaker type	Insert Cat. No.	Work materials	P	M	Standard cutting conditions: Cutting speed v_c (m/min)	T9005	T9015	T9025	T9035	T6020	T6030	GH330	NS730	NS520	NS530	AT520	AT530	GT720	GT730	GT530
							Stocked grades: Coated							Cermet			Co. Cerm.				
Finishing	**11**	WNMG080404-11 WNMG080408-11 WNMG080412-11	●	NS520 80-250-350	NS530 100-120-150	ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev									● ●	● ●	● ●	● ●			
			●	NS530 80-150-250																	
Finishing of mild steel	**17**	WNMG080404-17 WNMG080408-17	●	NS530 80-200-300	NS530 100-120-150	ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev		○ ○	○ ○							● ●					
			●	NS530 80-150-250																	
Finishing	**TSF**	WNMG080404-TSF WNMG080408-TSF	●	GT730 150-200-300	GT730 120-140-180	ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.40 mm/rev								○ ○					○	● ●	
			●	GT730 100-180-250																	
			✕	GT730 80-150-200																	
	ZF	WNMG060404-ZF WNMG060408-ZF WNMG080404-ZF WNMG080408-ZF WNMG080412-ZF	●	T9015 100-250-400	GT730 120-140-180	ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev		● ●	● ●												
			●	T9015 80-150-250				● ●	● ●					○ ○					○ ○	● ●	
			✕	T9025 50-100-150				● ●	● ●												
Finishing to medium cutting	**ZM**	WNMG060408-ZM WNMG060412-ZM WNMG080408-ZM WNMG080412-ZM WNMG080416-ZM	●	T9015 100-250-400	GT730 120-140-180	ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev		● ●	● ●												
			●	T9015 80-150-250				● ●	● ●							○ ○			○	●	
			✕	T9025 50-100-150				● ●	● ●												
Low cutting depth, high feed	**AS**	WNMG080404-AS WNMG080408-AS WNMG080412-AS WNMG080416-AS	●	T9005 100-250-400	NS530 80-200-300	ap = 0.5-1.0-2.0 mm f = 0.2-0.4-0.6 mm/rev	● ●	● ●	● ●	● ●						● ●					
			●	T9015 80-150-250			●	●	●	●						●					
			✕	T9025 50-100-150																	

Chipbreaker selection P. 27 ~ 32 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Trigon (Complementary Chipbreaker with Hole)

WN□□

Negative



WNMG 08 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

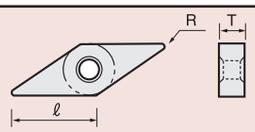
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)	Work materials	P	Stocked grades: Coated T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5010	T5020	Cermet NS520	NS530
Low cutting depth, high feed	AFW	WNMG060404-AFW WNMG060408-AFW WNMG080404-AFW WNMG080408-AFW		●	T9005 100-250-400	NS530 80-200-300	●	●	●					●			●
				●	T9015 100-200-350		●	●	●					●			●
				✱	T9025 50-100-150		●	●	●					●			●
			ap = 0.5-1.0-1.5 mm f = 0.2-0.3-0.4 mm/rev														
	ASW	WNMG060408-ASW WNMG060412-ASW WNMG080408-ASW WNMG080412-ASW		●	T9005 100-250-400	NS530 80-200-300	●	●	●					●			●
				●	T9015 100-200-350		●	●	●					●			●
				✱	T9025 50-100-150		●	●	●					●			●
			ap = 0.5-1.0-2.0 mm f = 0.3-0.5-0.6 mm/rev														
Medium cutting (internal)	CB	WNMG060404-CB WNMG060408-CB		●	NS530 80-200-300			●								●
				●	T9025 80-150-220			●								●
				✱	T9025 50-100-150											
			ap = 0.3-1.5-2.5 mm f = 0.1-0.15-0.25 mm/rev														
Medium cutting	37	WNMG080404-37 WNMG080408-37 WNMG080412-37		●	NS530 80-200-300			●	●							●
				●	T9015 80-150-250			●	●			○				●
				✱	T9025 50-100-150			●	●							○
			ap = 1.0-2.0-4.0 mm f = 0.2-0.3-0.4 mm/rev														
Medium cutting to roughing	DM	WNMG080404-DM WNMG080408-DM WNMG080412-DM		●	T9005 100-250-400		●	●	●	●							
				●	T9015 80-150-250		●	●	●	●							
				✱	T9025 50-100-150		●	●	●	●							
			ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev														
Heavy cutting	57	WNMM080408-57 WNMM080412-57		●	T9005 100-250-400			●	●							
				●	T9015 80-150-250			●	●							
		WNMM100612-57 WNMM100616-57		✱	T9025 50-100-150			○	○							
								○	○							
		WNMM130616-57 WNMM130624-57	ap = 2.0-5.0-8.0 mm f = 0.4-0.6-0.8 mm/rev					○	○							
								○	○							

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic (Basic Selection Chipbreaker with Hole)

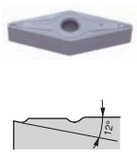
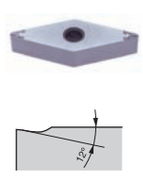
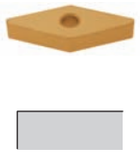
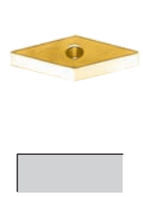
VN □□

Negative



VNMG 16 04 04 - □□

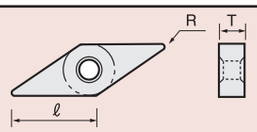
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions Cutting speed v_c (m/min)			Stocked grades Coated												Cermet		Un.	Cer.
			Work materials	P	M	T9005	T9015	T9025	T9035								T6020	T5010	T5020	GH110	NS520	NS530	TH10	LX11
Precision finishing	**TF**																							
		VNMG160404-TF VNMG160408-TF	●	NS520 80-250-350	NS530 100-120-150																● ●	○ ○		
			◔	NS530 80-150-250																				
			✂																					
			ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																					
	01	Insert Cat. No.		P																				
		VNGG160402-01 VNGG160404-01 VNGG160408-01	●	NS520 80-250-350																○	● ● ○	● ● ○	○ ○	
			◔	NS530 80-150-250																				
			✂																					
			ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev																					
Finishing to medium cutting	—	Insert Cat. No.		K																				
		VNMA160402 VNMA160404 VNMA160408	●	T5010 100-300-600		○												●	●		○		○	
			◔	T5010 100-250-500		○												●	●		○		○	
			✂	T5020 100-150-300																				
			ap = 0.05-3.0-5.0 mm f = 0.03-0.3-0.6 mm/rev																					
	Ceramics	Insert Cat. No.		H																				
		VNGA160404 VNGA160408 VNGA160408T01020 VNGA160408T01525 VNGA160408S01530	●	LX11 50-100-150																				●
			◔	LX11 50-100-150																				●
			✂																					●
			ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev																					●

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic (Basic Selection Chipbreaker with Hole)

VN □□ Negative



VNMG 16 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

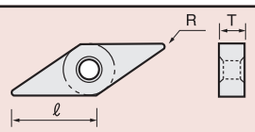
Application	Chipbreaker type	Insert Cat. No.	Work materials	P	M	T9005	T9015	T9025	T9035	T6020	T6030	T5105	T5115	T5125	GH330	AH110	AH120	NS520	NS530	AT520	GT530
				Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated												Cermet		C.Cerm.	
Finishing	TS	VNMG160404-TS VNMG160408-TS VNMG160412-TS	●	NS520 80-250-350	GT530 120-140-180	●	●	●	○									●	●	●	●
			●	NS530 80-150-250		●	●	●	○									●	●	●	●
			✕	T9025 100-180-250		●	●	●	○									●	●		
				ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																	
	CF	Insert Cat. No.		K																	
		VNMG160404-CF VNMG160408-CF	●	T5105 180-330-480								●	●								
			●	T5115 180-270-400								●	●								
			✕	T5115 180-200-240																	
				ap = 0.5-1.0-2.0 mm f = 0.05-0.25-0.4 mm/rev																	
Finishing to medium cutting	SS	Insert Cat. No.		M	S																
		VNMG160404-SS VNMG160408-SS VNMG160412-SS	●	T6020 150-200-250	AH110 10-50-70					●	●				●	●	●		●		
			●	T6020 150-180-220	AH110 10-30-60					●	●				●	●	●		●		
			✕	T6030 50-100-150	AH120 10-30-50					●	●				○		●				
				ap = 0.5-1.0-3.0 mm f = 0.08-0.15-0.2 mm/rev																	

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic (Basic Selection Chipbreaker with Hole)

VN □□

Negative



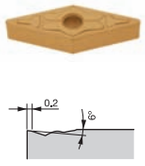
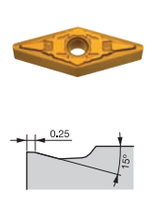
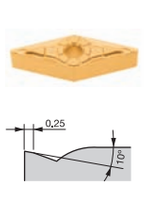
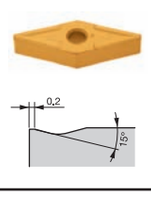
VNMG 16 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application: Medium cutting

Standard cutting conditions — Cutting speed v_c (m/min)

Stocked grades — Coated: T9005, T9015, T9025, T9035, T6020, T6030, GH330, T5105, T5115, T5125, T5010, T5020, AH110, AH120 — Cer.: NS530 — Un.: TH10

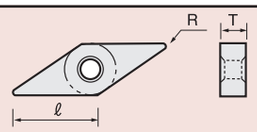
Chipbreaker type	Insert Cat. No.	Work materials	P	T9005	T9015	T9025	T9035	T6020	T6030	GH330	T5105	T5115	T5125	T5010	T5020	AH110	AH120	NS530	TH10
TM																			
	VNMG160404-TM VNMG160408-TM VNMG160412-TM	●	T9005 100-250-400	●	●	●	●		○										
		●	T9015 80-150-250	●	●	●	●		○										
		✖	T9025 50-100-150	●	●	●	●		○										
		ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev																	
CM	Insert Cat. No.		K																
	VNMG160408-CM VNMG160412-CM	●	T5105 180-330-480								●	●	●						
		●	T5115 140-270-400								●	●	●						
		✖	T5125 120-210-300																
		ap = 1.0-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev																	
SM	Insert Cat. No.		M																
	VNMG160408-SM	●	T6020 150-200-250					●	●										
		●	T6020 150-180-220					●	●										
		✖	T6030 50-100-150					●	●										
		ap = 1.0-3.0-4.0 mm f = 0.2-0.3-0.5 mm/rev																	
All-round	Insert Cat. No.		K																
	VNMG160404 VNMG160408 VNMG160412	●	T5010 100-300-600	○	○	○	○							●	●	○	○	●	○
		●	T5010 100-250-500	○	○	○	○							●	●	○	○	○	○
		✖	T5020 100-150-300	○	○	○	○							●	●			○	
		ap = 1.0-3.0-6.0 mm f = 0.2-0.3-0.4 mm/rev																	

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic (Basic Selection Chipbreaker with Hole)

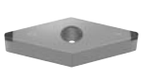
VN □□

Negative



VNGA 16 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

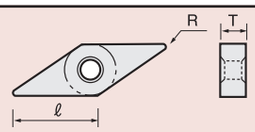
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated								Stocked grades: PCD & PCBN									
				N		T9005	T9015	T9025	T9035			T6020	T6030	DX120	BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX930	BX950
Precision finishing	PCD																						
	(QB-mini) 	VNMM160402-DIA VNMM160404-DIA VNMM160408-DIA	●	DX120 500-1500-2500										○									
			▲	DX120 300-1000-1800										○									
			■											○									
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																			
	PCBN	Insert Cat. No.		K	H																		
	(QB-mini) 	2QP-VNGA160404-L 2QP-VNGA160404-H 2QP-VNGA160404 2QP-VNGA160408-L 2QP-VNGA160408-H 2QP-VNGA160408	●	BX930 100-500-1200	BX310 130-200-300											○							
			▲	BX930 100-400-800	BX330 80-120-150												○	○					
			■		BX360 80-120-150										●	●	●	●				○	○
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev L = Small honing angle H = Large honing angle												○							
																	○	○					
															●	●	●	●				○	○
	PCBN	Insert Cat. No.		H																			
	(QB-mini) 	4QP-VNGA160404 4QP-VNGA160408	●	BXC30 130-250-300															●	●			
			▲	BXC50 80-150-200															●	●			
			■	BXC50 80-120-150																			
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																			

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic (Complementary Selection Chipbreaker with Hole)

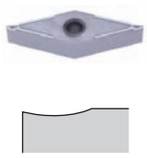
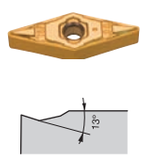
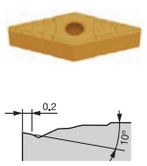
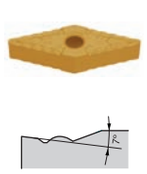
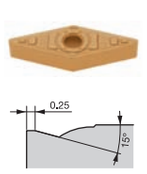
VN □□

Negative



VNMG 16 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

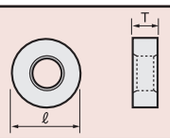
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9005	T9015	T9025	T9035			T6020	GH330	T5010	T5020	Cermet NS730	NS520	NS530	Coated Cermet AT520	AT530	GT720	GT730	GT530	Un. TH10
Finishing	11																							
		VNMG160404-11 VNMG160408-11 VNMG160412-11	●	NS520 80-250-350	NS530 100-120-150								○				●	●		●	●		●	○
			◐	NS530 80-150-250													●	●		●	●		●		
			✱														●	●							
				ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev																					
Finishing	TSF	Insert Cat. No.		P	M																				
		VNMG160402-TSF VNMG160404-TSF VNMG160408-TSF	●	GT730 150-200-300	GT730 120-140-180											○						●		
			◐	GT730 100-180-250												○					○	●		
			✱	GT730 80-150-200												○					○	●		
				ap = 0.2-1.0-1.5 mm f = 0.08-0.15-0.4 mm/rev																					
	ZF	Insert Cat. No.		P	M																				
		VNMG160404-ZF VNMG160408-ZF VNMG160412-ZF	●	T9015 100-250-400	GT730 120-140-180		●	●								○					○	●		
			◐	T9015 80-150-250			●	●								○					○	●		
			✱	T9025 50-100-150			●	●																	
				ap = 0.2-0.7-1.5 mm f = 0.07-0.1-0.2 mm/rev																					
Finishing to medium cutting	ZM	Insert Cat. No.		P	M																				
		VNMG160408-ZM VNMG160412-ZM	●	T9015 100-250-400	GT730 120-140-180		●	●								○					○	●		
			◐	T9015 80-150-250			●	●								○								
			✱	T9025 50-100-150																					
				ap = 0.7-1.5-2.0 mm f = 0.15-0.3-0.4 mm/rev																					
Medium cutting to roughing	DM	Insert Cat. No.		P																					
		VNMG160404-DM VNMG160408-DM VNMG160412-DM	●	T9005 100-250-400		●	●	●	●																
			◐	T9015 80-150-250		●	●	●	●																
			✱	T9025 50-100-150		●	●	●	●																
				ap = 1.0-3.0-5.0 mm f = 0.2-0.3-0.5 mm/rev																					

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

Round (Basic Selection Chipbreaker)

RN□□

Negative



RNGA 12 04 00 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

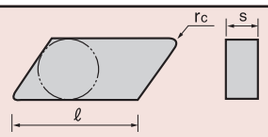
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated												Un.	Ceramics		PCBN	
			Work materials	H	T9005	T9015	T9025	T9035					T6020	GH330	T5010	T5020	AH110	AH120	TH10	FX105	LX11	BXC90	BX90S
Finishing	Ceramics	RNGA120400	●	LX11 50-100-150																	●		
			◔	LX11 50-100-150																			
			✕																				
			ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev																				
Heavy cutting	61	Insert Cat. No.		P																			
		RNMG090300-61	●		○	●	●	○															
		RNMG120400-61	◔	T9015 80-130-200	○	●	●	○								○			○				
		RNMG150600-61			○	○	○	○															
		RNMG190600-61	✕	T9025 50-100-150	○	○	○	○															
		RNMG250900-61				○	○	○															
		RNMG310900-61	ap = 0.5-1.0-2.0 (9, 12), 1.5-2.0-3.0 (16, 20), 3.0-4.0-5.0 mm (25, 31) f = 0.6-0.8-1.9 (9, 12), 0.6-0.8-1.2 (16, 20) 0.7-1.0-1.2 mm/rev				○	○	○															
Finishing to roughing	Ceramics	Insert Cat. No.		K	H																		
		RNGN120400	●	FX105 300-400-1000	LX11 50-100-150															●	●		
		RNGN120700	◔	FX105 300-400-500	LX11 50-100-150															●	●		
			✕																				
			LX11: ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev FX105: ap = 0.5-1.0-2.0 mm f = 0.05-0.2-0.3 mm/rev																				
	PCBN	Insert Cat. No.		K																			
		S-RNGN090300	●	BXC90 300-700-1500																		○	
		S-RNGN120400	◔	BXC90 300-700-1000																		○	
			✕	BXC90 300-500-800																			
			ap = 0.05-0.3-3.0 mm f = 0.05-0.2-0.4 mm/rev																				
	PCBN	Insert Cat. No.		K																			
		RNMN090300	●	BX90S 300-700-1500																			○
		RNMN120400	◔	BX90S 300-700-1000																			○
			✕	BX90S 300-500-800																			
			ap = 0.05-0.3-3.0 mm f = 0.05-0.2-0.4 mm/rev																				

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

Parallelogram (Basic Selection Chipbreaker)

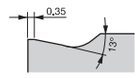
KNMX

Negative



KNMX 16 04 05 - □□

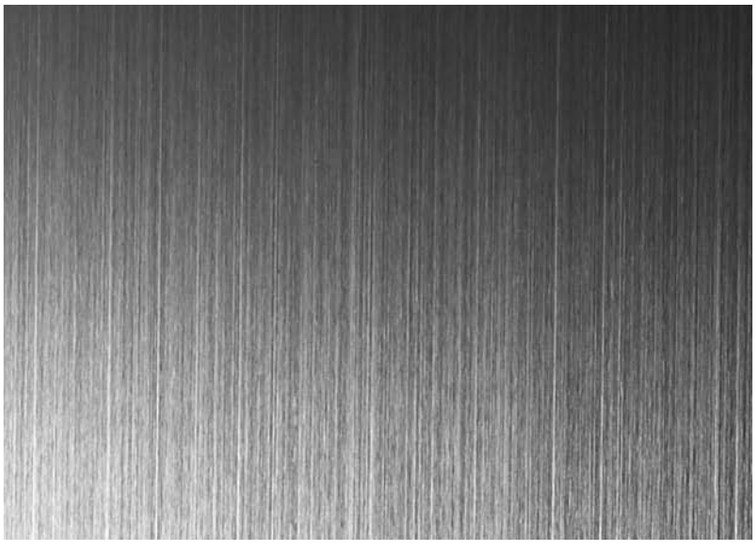
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions Cutting speed v_c (m/min)		Stocked grades Coated												Ceramics		
			Work materials	M	T9005	T9015	T9025	T9035						T6020	GH330	T5010	T5020	AH110	AH120	CX710	FX105	LX11
Finishing	S1	KNMX160405R-S1 KNMX160405L-S1	●	GH330 100-130-150											○							
			●	GH330 50-80-100											○							
			●	GH330 50-80-100																		

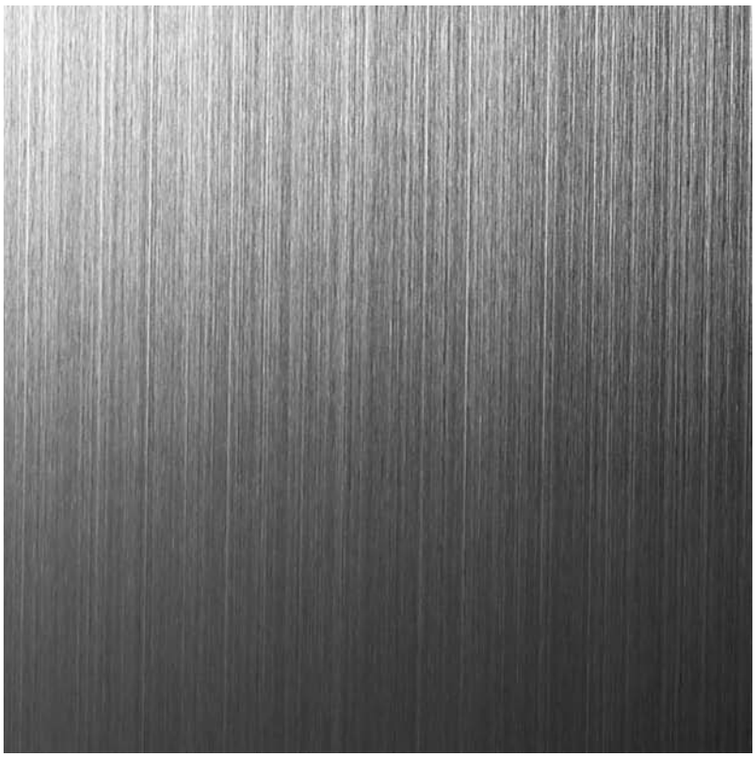
ap = 0.5-1.5-2.5 mm
f = 0.1-0.25-0.4 mm/rev

Chipbreaker selection P. 27 ~ 32 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

MEMO



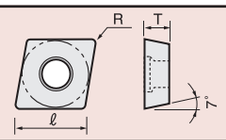
TAC Inserts Turning (Positive)



80° Rhombic · 7° Positive with Hole

CC□□

Positive



CCGT 06 02 02 - □□

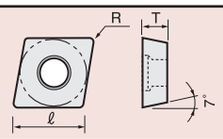
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	T9015	T9025	GH730	T6020	T6030	GH330	J740	T5020	GH110	NS730	NS520	NS530	AT520	AT530	GT730	GT530	J530	TH10
				Stocked grades: Coated											Cermet			Coated Cerm.					Un.
Finishing to medium cutting	**W15** (Ground-in type)	CCGT060200R-W15	●	NS530 80-200-300	NS530 100-120-150												●						○
		CCGT060200L-W15															●						○
		CCGT060202R-W15	●	NS530 80-150-250	GH330 50-80-100												●						○
		CCGT060202L-W15	✕		GH330 50-80-100						●			●			●				○		○
		CCGT060204R-W15		ap = 0.05-0.5-2.0 mm							○						●						○
		CCGT060204L-W15		f = 0.03-0.1-0.2 mm/rev							●			●			●				○		●
		CCGT060208L-W15																			○		
	W20 (Ground-in type)	Insert Cat. No.		P	M																		
		CCGT09T302R-W20	●	NS530 80-200-300	NS530 100-120-150												●						○
		CCGT09T302L-W20												●			●				○		○
		CCGT09T304R-W20	●	NS530 80-150-250	GH330 50-80-100												●						
		CCGT09T304L-W20	✕		GH330 50-80-100						○			●			●				○		○
		CCGT09T308R-W20		ap = 0.05-0.5-2.0 mm													●						
		CCGT09T308L-W20		f = 0.03-0.1-0.2 mm/rev													●				○		
Precision finishing	**01**	Insert Cat. No.		P	M																		
		CCGT060202-01	●	J530 60-200-300	J530 100-120-150							●										●	
		CCGT09T302-01	●	J740 10-30-60	J740 10-30-60							●										●	
			✕	J740 10-30-60	J740 10-30-60																		
				ap = 0.05-0.3-0.5 mm																			
				f = 0.01-0.03-0.1 mm/rev																			
Finishing	**PF**	Insert Cat. No.		P	M																		
		CCMT060202-PF	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●			○			
		CCMT060204-PF				●	●	○	●	●					○		●			○			
		CCMT060208-PF	●	T9015 80-150-250	T6020 150-180-220	●	●		●	●					○		●			○			
		CCMT09T302-PF	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●						
		CCMT09T304-PF		ap = 0.3-0.8-1.5 mm		●	●	○	●	●					○		●			○			
		CCMT09T308-PF		f = 0.05-0.12-0.25 mm/rev		●	●		●	●					○		●			○			
Finishing to medium cutting	**PS**	Insert Cat. No.		P	M																		
		CCMT060202-PS	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●		●	○			
		CCMT060204-PS				●	●	○	●	●					○	●	●		●	○			
		CCMT060208-PS	●	T9015 80-150-250	T6020 150-180-220	●	●	○	●	●					○	●	●		○	○			
		CCMT09T302-PS	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●	●	●	○			
		CCMT09T304-PS		ap = 0.3-1.0-2.0 mm		●	●	○	●	●					○	●	●	●	●	●	○		
		CCMT09T308-PS		f = 0.08-0.15-0.3 mm/rev		●	●	○	●	●					○	●	●	●	●	○			
Medium cutting	**PM**	Insert Cat. No.		P	M																		
		CCMT060204-PM	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●			○			
		CCMT060208-PM				●	●	○	●	●					○		●			○			
		CCMT09T304-PM	●	T9015 80-150-250	T6020 150-180-220	●	●	○	●	●					○		●			○			
		CCMT09T308-PM	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●			○			
		CCMT09T312-PM		ap = 1.0-1.5-2.5 mm		●	●		●	●							●						
				f = 0.15-0.2-0.3 mm/rev																			

80° Rhombic · 7° Positive with Hole

CC□□

Positive



CCGT 06 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

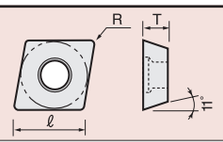
Application	Chipbreaker type	Insert Cat. No.	Work materials	K	T9005	T9015	T9025	T6020	T5010	T5020	NS530	AT530	GT530	KS05F	DX120	DX140	DX160	BX310	BX330	BX360	BX930
				Standard cutting conditions · Cutting speed v_c (m/min)	Coated						Cer.	C.Cerm.		Un.	PCD & PCBN						
Finishing to medium cutting	—	CCMW060204	●	T5010 100-300-600	○				●	●											
		CCMW060208			○				●	●											
		CCMW09T304	◗	T5010 100-250-500	○				●	●											
		CCMW09T308	✖	T5020 100-150-300	○				●	●											
				ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev																	
Aluminium	AL	Insert Cat. No.		N																	
		CCGT060202-AL	●	KS05F 100-600-1000										●							
		CCGT060204-AL												●							
		CCGT09T302-AL	◗	KS05F 100-500-800										●							
		CCGT09T304-AL												●							
		CCGT09T308-AL	✖	KS05F 100-300-500										●							
		CCGT120402-AL		ap = 0.5-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev										●							
		CCGT120404-AL												●							
		CCGT120408-AL												●							
Medium cutting	24	Insert Cat. No.		P																	
		CCMT060202-24	●	NS530 60-200-300		●	●				●	●									
		CCMT060204-24				●	●				●	●									
		CCMT060208-24	◗	T9015 80-150-250		●	●				●										
		CCMT09T302-24				●	●				●	●	●								
		CCMT09T304-24	✖	T9025 50-100-150		●	●				●	●	●								
		CCMT09T308-24		ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev		●	●				●	●									
		CCMT120408-24				●	●				●										
Precision finishing	PCD	Insert Cat. No.		N																	
		CCMT060202-DIA	●	DX120 500-1500-2500											○						
		CCMT060204-DIA													○						
		CCMT09T302-DIA	◗	DX120 300-1000-1800											○						
		CCMT09T304-DIA	✖												○						
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																	
	PCD	Insert Cat. No.		N																	
		CCGW060200-DIA	●	DX140 400-600-2500												○					
		CCGW060202-DIA														○					
		CCGW060204-DIA	◗	DX140 400-500-2000												○					
		CCGW09T302-DIA	✖													○					
		CCGW09T304-DIA		ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev												○	○				
		CCGW09T308-DIA														○	○				

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Rhombic · 7° Positive with Hole

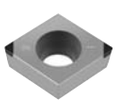
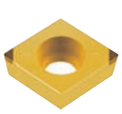
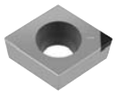
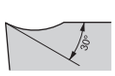
CC□□

Positive



CCGT 06 02 02 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

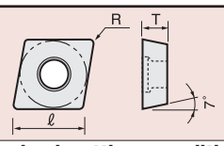
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) H	T9015	T9025	J740	NS520	NS530	AT530	GT530	J530	TH10	BXC30	BX310	BX330	BX360	BX930	BX950
					Stocked grades: Coated				Cermet	Coat. Cerm.			Un.	PCBN					
Precision finishing	PCBN																		
	(QB-mini) 	2QP-CCMW060202	●	BX310 130-200-300											●	●			
		2QP-CCMW060204													●	●	●	○	○
		2QP-CCMW09T304	◗	BX330 80-120-150											●	●	●	○	○
		2QP-CCMW09T308	✖	BX360 80-120-150											●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
	PCBN	Insert Cat. No.		H															
		2QP-CCMW060202	●	BXC30 130-250-300										●					
		2QP-CCMW060204												●					
		2QP-CCMW09T304	◗	BXC30 130-200-250										●					
		2QP-CCMW09T308	✖	BXC30 130-200-250										●					
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
	PCBN	Insert Cat. No.		H															
	(QB-mini) 	Q-CCMW060202	●	BX310 130-200-300											●	●			
		Q-CCMW060204													●	●	●		
		Q-CCMW09T302	◗	BX330 80-120-150											●	●			
		Q-CCMW09T304	✖												●	●	●		
		Q-CCMW09T308													●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
Finishing to medium cutting	J10	Insert Cat. No.		P / M															
		CCGT060200FR-J10	●	NS530 80-120-150 / NS530 60-100-120			●		●				○						
		CCGT060200FL-J10	◗	J740 10-30-60 / J740 10-30-60			●		●				○						
		CCGT060201FR-J10	✖	J740 10-30-60 / J740 10-30-60			●		●				○						
		CCGT060201FL-J10					●		●				○						
		CCGT060202FR-J10		ap = 0.1-0.5-5.0 mm f = 0.01-0.03-0.1 mm/rev			●		●				○						
		CCGT060202FL-J10					●		●				○						
		CCGT09T300FR-J10					●		●				○						
		CCGT09T300FL-J10					●		●				○						
		CCGT09T301FR-J10					●		●				○						
		CCGT09T301FL-J10					●		●				○						
		CCGT09T302FR-J10					●		●				○						
		CCGT09T302FL-J10					●		●				○						

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

80° Rhombic · 7° Positive with Hole

CC□□

Positive



CCGT 06 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

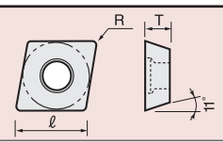
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions — Cutting speed v_c (m/min) P	Standard cutting conditions — Cutting speed v_c (m/min) M	Stocked grades — Coated: T9015	T9025	T6020	T6030	GH330	T5010	T5020	AH110	AH120	Cermet: NS520	NS530	C.C.: GT530	Un.: TH10
Medium cutting	All-round	CCGT060200 CCGT060202 CCGT060204	●	NS530 80-200-300	NS530 100-120-150											● ● ●		
			●	NS530 80-150-250														
		CCGT09T302 CCGT09T304 CCGT09T308	✕													● ● ●		
				ap = 1.0-1.5-2.0 mm f = 0.03-0.1-0.2 mm/rev														
Finishing to medium cutting	R/L	Insert Cat. No.		N	S													
		CCGT060200R CCGT060200L CCGT060202R CCGT060202L CCGT060204R CCGT060204L	●	TH10 100-200-1000	TH10 10-20-30													○
			●	TH10 100-150-700	TH10 10-20-30													○
			✕	TH10 100-150-500	TH10 10-20-30													●
				ap = 1.0-1.5-2.0 f = 0.03-0.1-0.2 mm/rev														○
		CCGT09T302R CCGT09T302L CCGT09T304R CCGT09T304L																○ ○ ○ ○

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

80° Rhombic · 11° Positive with Hole

CP□□

Positive



CPGT 06 02 02 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Standard cutting conditions — Cutting speed v_c (m/min)

Stocked grades — Coated: T9015, T9025, T6020, T6030, GH330, T5010, T5020, AH110, AH120; Cermet: NS730, NS520, NS530; C.Cerm.: GT730, AT520, AT530

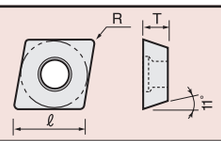
Application	Chipbreaker type	Insert Cat. No.	Work materials	P	M
Finishing to medium cutting	**W15**	CPGT050202R-W15 CPGT050202L-W15 CPGT050204R-W15 CPGT050204L-W15 CPGT060200R-W15 CPGT060200L-W15 CPGT060202R-W15 CPGT060202L-W15 CPGT060204R-W15 CPGT060204L-W15	●	**NS530** 80-200-300	**NS530** 100-120-150
			●	**NS530** 100-150-250	
			✕		
			ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev		
	W20	Insert Cat. No.		P	M
		CPGT090302R-W20 CPGT090302L-W20 CPGT090304R-W20 CPGT090304L-W20	●	**NS530** 80-200-300	**NS530** 100-120-150
			●	**NS530** 100-150-250	
			✕		
			ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev		
Finishing	**PF**	Insert Cat. No.		P	M
		CPMT090302-PF CPMT090304-PF CPMT090308-PF	●	**NS530** 60-200-300	**T6020** 150-200-250
			●	**T9015** 80-150-250	**T6020** 150-180-220
			✕	**T9025** 50-100-150	**T6030** 50-100-150
			ap = 0.3-0.8-1.5 mm f = 0.08-0.12-0.25 mm/rev		
Finishing to medium cutting	**PS**	Insert Cat. No.		P	M
		CPMT060202-PS CPMT060204-PS CPMT090304-PS CPMT090308-PS	●	**NS530** 60-200-300	**T6020** 150-200-250
			●	**T9015** 80-150-250	**T6020** 150-180-220
			✕	**T9025** 50-100-150	**T6030** 50-100-150
			ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev		
Medium cutting	**PM**	Insert Cat. No.		P	M
		CPMT090304-PM CPMT090308-PM	●	**NS530** 60-200-300	**T6020** 150-200-250
			●	**T9015** 80-150-250	**T6020** 150-180-220
			✕	**T9025** 50-100-150	**T6030** 50-100-150
			ap = 1.0-1.5-2.5 mm f = 0.15-0.2-0.3 mm/rev		

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

80° Rhombic · 11° Positive with Hole

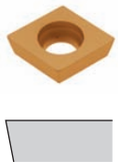
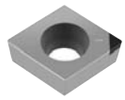
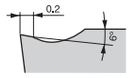
CP□□

Positive



CPGT 06 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

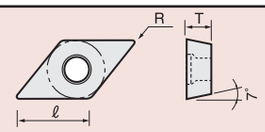
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Coated: T9005	T9015	T9025	T6020	T6030	T5010	T5020	AH110	AH120	Cermet: NS520	NS530	PCBN: BX310	BX330	BX360
	—			K														
Finishing to medium cutting		CPMW090302	●	T5010 100-300-600	○					○	○				○			
		CPMW090304	●	T5010 100-250-500	○					○	○				○			
		CPMW090308	✖	T5020 100-150-300	○					○	○				○			
				ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev														
	PCBN	Insert Cat. No.		H														
Precision finishing	(QB-mini) 	Q-CPMW060202	●	BX310 130-200-300												●	●	
		Q-CPMW060204	●	BX330 80-120-150												●	●	●
		Q-CPMW090302	✖	BX360 80-120-150												●	●	
		Q-CPMW090304														●	●	●
		Q-CPMW090308		ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev												●	●	●
Medium cutting	24	Insert Cat. No.		P														
		CPMT060204-24	●	NS530 60-200-300			●								●			
		CPMT090302-24	●	T9015 80-150-250		●	●								●			
		CPMT090304-24	●	T9015 80-150-250		●	●								●			
		CPMT090308-24	✖	T9025 50-100-150		●	●								●			
		CPMT120408-24		ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev		○	○								●			
		CPMT120412-24				○	○								●			
		CPMT160508-24				○	○								○			
		CPMT160512-24				○	○								○			
		CPMT160516-24				○	○											

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

55° Rhombic · 7° Positive with Hole

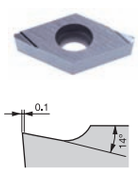
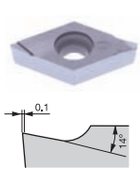
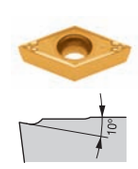
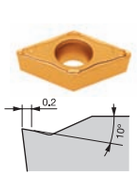
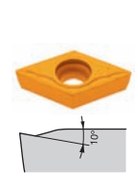
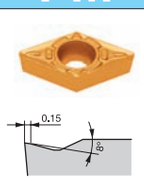
DC□□

Positive



DCGT 07 02 02 - □□

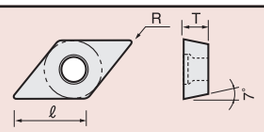
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9015	T9025	GH730	T6020	T6030	GH330	J740	T5010	T5020	Cermet NS730	NS520	NS530	Coated Cerm. AT520	AT530	GT730	GT530	Un. J530	TH10
Finishing to medium cutting	**W10**																						
		DCGT070200R-W10	●	NS530 80-200-300	NS530 100-120-150												●						○
		DCGT070200L-W10															●						○
		DCGT070202R-W10	●	NS530 80-150-250	GH330 50-80-100												●						○
		DCGT070202L-W10															●				○		
		DCGT070204R-W10	✕		GH330 50-80-100						○						●						○
		DCGT070204L-W10		ap = 0.05-0.5-2.0 mm							○						●				○		○
		DCGT070208L-W10		f = 0.03-0.1-0.2 mm/rev																	○		
	W15	Insert Cat. No.		P	M																		
		DCGT11T302R-W15	●	NS530 80-200-300	NS530 100-120-150												●						○
		DCGT11T302L-W15															●				○		
		DCGT11T304R-W15	●	NS530 80-150-250	GH330 50-80-100												●						
		DCGT11T304L-W15									○						●				○		○
		DCGT11T308R-W15	✕		GH330 50-80-100												●						○
		DCGT11T308L-W15		ap = 0.05-0.5-2.0 mm													●				○		○
				f = 0.03-0.1-0.2 mm/rev																			
Precision finishing	**01**	Insert Cat. No.		P	M																		
		DCGT070202-01	●	J530 60-200-300	J530 100-120-150							●										●	
		DCGT11T302-01										●										●	
			●	J740 10-30-60	J740 10-30-60																		
			✕	J740 10-30-60	J740 10-30-60																		
				ap = 0.05-0.3-0.5 mm																			
				f = 0.01-0.03-0.1 mm/rev																			
Finishing	**PF**	Insert Cat. No.		P	M																		
		DCMT070202-PF	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●			○			
		DCMT070204-PF				●	●	○	●	●					○		●			○			
		DCMT070208-PF	●	T9015 80-150-250	T6020 150-180-220	●	●		●	●					○		●			○			
		DCMT11T302-PF	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●			○			
		DCMT11T304-PF		ap = 0.3-0.8-1.5 mm		●	●	○	●	●					○		●			○			
		DCMT11T308-PF		f = 0.05-0.12-0.25 mm/rev		●	●		●	●					○		●			○			
Finishing to medium cutting	**PS**	Insert Cat. No.		P	M																		
		DCMT070202-PS	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●	●	●	○			
		DCMT070204-PS				●	●	○	●	●					○	●	●		●	○			
		DCMT070208-PS	●	T9015 80-150-250	T6020 150-180-220	●	●	○	●	●					○	●	●		○	○			
		DCMT11T302-PS	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●		●	○			
		DCMT11T304-PS		ap = 0.3-1.0-2.0 mm		●	●	○	●	●					○	●	●	●	●	○			
		DCMT11T308-PS		f = 0.08-0.15-0.3 mm/rev		●	●	○	●	●					○	●	●	●	●	○			
Medium cutting	**PM**	Insert Cat. No.		P	M																		
		DCMT070204-PM	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●			○			
		DCMT070208-PM				●	●	○	●	●					○		●			○			
		DCMT11T304-PM	●	T9015 80-150-250	T6020 150-180-220	●	●	○	●	●					○		●			○			
		DCMT11T308-PM	✕	T9025 50-100-150	T6030 50-100-150	●	●	○	●	●					○		●			○			
		DCMT11T312-PM		ap = 1.0-1.5-2.5 mm		●	●		●	●							●						
				f = 0.15-0.2-0.3 mm/rev																			

55° Rhombic · 7° Positive with Hole

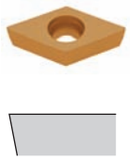
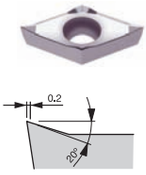
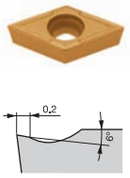
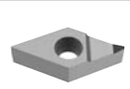
DC□□

Positive



DCMW 07 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

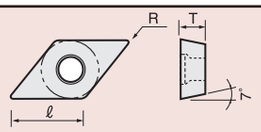
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Coated: T9005	T9015	T9025	T5010	T5020	Cermet: NS520	NS530	Coated Cermet: AT520	AT530	GT530	Un.: KS05F	PCD & PCBN: DX120	DX140	BX310	BX330	BX360	BX930
Finishing to medium cutting	—	DCMW070204	●	K: T5010 100-300-600	○			●	●												
		DCMW070208	●	K: T5010 100-300-600	○			●	●												
		DCMW11T304	✖	K: T5020 100-250-500	○			●	●												
		DCMW11T308	✖	K: T5020 100-150-300	○			●	●												
				ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev																	
Aluminium	AL	Insert Cat. No.		N																	
		DCGT070202-AL	●	KS05F 100-600-1000											●						
		DCGT070204-AL	●	KS05F 100-600-1000											●						
		DCGT11T302-AL	✖	KS05F 100-500-800											●						
		DCGT11T304-AL	✖	KS05F 100-500-800											●						
		DCGT11T308-AL	✖	KS05F 100-300-500											●						
				ap = 0.5-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev																	
Medium cutting	24	Insert Cat. No.		P																	
		DCMT070202-24	●	NS530 60-200-300		●	●			●	●		●								
		DCMT070204-24	●	NS530 60-200-300		●	●			●	●		●								
		DCMT070208-24	●	T9015 80-150-250		●	●				●										
		DCMT11T302-24	✖	T9025 50-100-150		●	●			●	●		●								
		DCMT11T304-24	✖	T9025 50-100-150		●	●			●	●	●	●								
		DCMT11T308-24	✖	T9025 50-100-150		●	●			●	○	●	●								
				ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev																	
Precision finishing	PCD	Insert Cat. No.		N																	
		DCMT070202-DIA	●	DX120 500-1500-2500												○					
		DCMT070204-DIA	●	DX120 500-1500-2500												○					
		DCMT11T302-DIA	✖	DX120 300-1000-1800												○					
		DCMT11T304-DIA	✖													○					
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																	
	PCD	Insert Cat. No.		N																	
		DCGW070200-DIA	●	DX140 400-600-2500														○			
		DCGW070202-DIA	●	DX140 400-600-2500														○			
		DCGW070204-DIA	●	DX140 400-500-2000														○			
		DCGW11T302-DIA	✖															○			
		DCGW11T304-DIA	✖															○			
		DCGW11T308-DIA	✖															○			
				ap = 0.05-0.1-0.3 mm f = 0.05-0.1-0.3 mm/rev																	

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

55° Rhombic · 7° Positive with Hole

DC□□

Positive



DCGT 07 02 00 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Standard cutting conditions — Cutting speed v_c (m/min)

Stocked grades — Coated: T9015, T9025, J740 · Cermet: NS520, NS530 · C. Cerm.: AT520, AT530, GT530 · Un.: TH10 · PCBN: BXC30, BX310, BX330, BX360, BX930, BX950

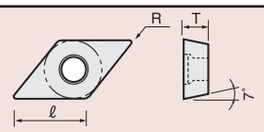
Application	Chipbreaker type	Insert Cat. No.	Work materials	H	T9015	T9025	J740	NS520	NS530	AT520	AT530	GT530	TH10	BXC30	BX310	BX330	BX360	BX930	BX950
Precision finishing	PCBN																		
	(QB-mini)	2QP-DCMW070202	●	BX310 130-200-300											●	●			
		2QP-DCMW070204													●	●	●	○	○
		2QP-DCMW11T302	●	BX330 80-120-150											●	●	●		
		2QP-DCMW11T304													●	●	●	○	○
		2QP-DCMW11T308	✕	BX360 80-120-150											●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
	PCBN	Insert Cat. No.		H															
		2QP-DCMW070202	●	BXC30 130-250-300										●					
		2QP-DCMW070204												●					
		2QP-DCMW11T302	●	BXC30 130-200-250										●					
		2QP-DCMW11T304												●					
		2QP-DCMW11T308	✕											●					
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
	PCBN	Insert Cat. No.		H															
	(QB-mini)	Q-DCMW070202	●	BX310 130-200-300											●	●			
		Q-DCMW070204													●	●	●		
		Q-DCMW11T302	●	BX330 80-120-150											●	●	●		
		Q-DCMW11T304													●	●	●		
		Q-DCMW11T308	✕	BX360 80-120-150											●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															
Finishing to medium cutting	J10	Insert Cat. No.		P / M															
		DCGT070200FR-J10	●	NS530 80-120-150 / NS530 60-100-120				●		●				○					
		DCGT070200FL-J10						●		●				○					
		DCGT070201FR-J10	●	J740 10-30-60 / J740 10-30-60				●		●				○					
		DCGT070201FL-J10						●		●				○					
		DCGT070202FR-J10	✕	J740 10-30-60 / J740 10-30-60				●		●				○					
		DCGT070202FL-J10						●		●				○					
		DCGT11T300FR-J10		ap = 0.1-0.5-5.0 mm f = 0.01-0.03-0.1 mm/rev				●		●				○					
		DCGT11T300FL-J10						●		●				○					
		DCGT11T301FR-J10						●		●				○					
		DCGT11T301FL-J10						●		●				○					
		DCGT11T302FR-J10						●		●				○					
		DCGT11T302FL-J10						●		●				○					

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

55° Rhombic · 7° Positive with Hole

DC□□

Positive



DCGT 07 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

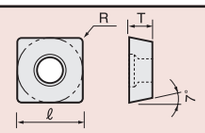
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions — Cutting speed v_c (m/min) P	M	Stocked grades — Coated T9015	T9025				T6020	T6030	GH330	T5010	T5020	AH110	AH120	GH110	Cermet NS520	NS530	C.C. AT530	Un. TH10
Medium cutting	All-round	DCGT070200 DCGT070202 DCGT070204	●	NS530 80-200-300	NS530 100-120-150															●		
			●	NS530 80-150-250																●		
		DCGT11T302 DCGT11T304 DCGT11T308	✕																	●		
				ap = 1.0-1.5-2.0 mm f = 0.03-0.1-0.2 mm/rev																●		
Finishing to medium cutting	—	Insert Cat. No.		K																		
		DCGW070202 DCGW070204	●	TH10 50-100-150														○				●
			●	TH10 30-100-150																		●
		DCGW11T302 DCGW11T304	✕	TH10 30-50-80																		●
				ap = 0.05-0.3-3.0 mm f = 0.03-0.08-0.3 mm/rev																		●
	R/L	Insert Cat. No.		N	S																	
		DCGT070200R DCGT070200L DCGT070202R DCGT070202L DCGT070204R DCGT070204L	●	TH10 100-200-1000	TH10 10-20-30																	●
			●	TH10 100-150-700	TH10 10-20-30																	●
			✕	TH10 100-150-500	TH10 10-20-30																	●
				ap = 80-150-250 f = 0.03-0.1-0.2 mm/rev																		●
		DCGT11T302R DCGT11T302L DCGT11T304R DCGT11T304L DCGT11T308R DCGT11T308L																				●

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square · 7° Positive with Hole

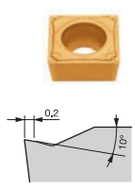
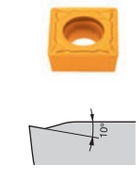
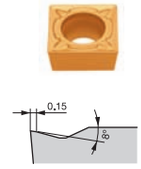
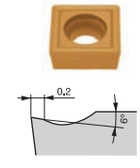
SC□□

Positive



SCMT 07 02 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

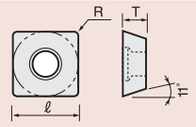
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	Standard cutting conditions: Cutting speed v_c (m/min) M	Stocked grades: Coated T9015	T9025	T6020	T6030	GH330	T5010	T5020	AH110	AH120	Cermet NS730	NS520	NS530	C.Cerm. GT730	AT520	AT530
Finishing	**PF**																			
		SCMT09T304-PF SCMT09T308-PF	●	**NS530** 60-200-300	**T6020** 150-200-250	● ●	● ●	○ ○		● ●										
			●	**T9015** 80-150-250	**T6020** 150-180-220	● ●	● ●	○ ○		● ●										
			✕	**T9025** 50-100-150	**T6030** 50-100-150															
				ap = 0.3-0.8-1.5 mm f = 0.05-0.12-0.25 mm/rev																
Finishing to medium cutting	**PS**	Insert Cat. No.		P	M															
		SCMT09T304-PS SCMT09T308-PS	●	**NS530** 60-200-300	**T6020** 150-200-250	● ●	● ●	● ●		● ●					○ ○	● ●	● ●	○ ○		○ ○
		SCMT120404-PS SCMT120408-PS	●	**T9015** 80-150-250	**T6020** 150-180-220	● ●	● ●	● ●		● ●					○ ○	● ●	● ●	○ ○		○ ○
			✕	**T9025** 50-100-150	**T6030** 50-100-150															
				ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev																
Medium cutting	**PM**	Insert Cat. No.		P	M															
		SCMT09T304-PM SCMT09T308-PM	●	**NS530** 60-200-300	**T6020** 150-200-250	● ●	● ●	● ●		● ●					○ ○		● ●			
		SCMT120408-PM SCMT120412-PM	●	**T9015** 80-150-250	**T6020** 150-180-220	● ●	● ●	● ●		● ●					○ ○		● ●			
			✕	**T9025** 50-100-150	**T6030** 50-100-150															
				ap = 1.0-1.5-2.5 mm f = 0.15-0.2-0.3 mm/rev																
	24	Insert Cat. No.		P																
		SCMT070204-24	●	**NS530** 60-200-300		● ●											○			
		SCMT09T302-24 SCMT09T304-24 SCMT09T308-24	●	**T9015** 80-150-250		● ●											●			
			✕	**T9025** 50-100-150		● ●											●			
		SCMT120404-24 SCMT120408-24		ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev		● ●											● ●			

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

90° Square · 11° Positive with Hole

SP□□

Positive



SPMW 09 03 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

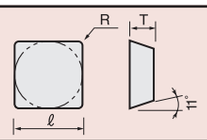
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated T9015	T9025		T6020	T6030	GH330	T5010	T5020	AH110	AH120	Cermet NS730	NS520	NS530	C.Cerm. GT730	AT520	AT530	Un. TH10
Finishing to medium cutting	—	SPMW090304 SPMW090308 SPMW120404 SPMW120408	●	K: T5010 100-300-600							●	●									
			●	K: T5010 100-250-500							●	●									
			✕	K: T5020 100-150-300							●	●									
				ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev																	
Finishing to medium cutting	PS	Insert Cat. No.		P / M																	
		SPMT090304-PS SPMT090308-PS SPMT120404-PS SPMT120408-PS	●	P: NS530 60-200-300 / M: T6020 150-200-250	○	○		○	○						○		○	○		○	
			●	P: T9015 80-150-250 / M: T6020 150-180-220	○	○		○	○						○		○	○		○	
			✕	P: T9025 50-100-150 / M: T6030 50-100-150	○	○		○	○						○		○	○		○	
				ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev																	
Medium cutting	24	Insert Cat. No.		P																	
		SPMT090304-24 SPMT090308-24 SPMT120404-24 SPMT120408-24	●	P: NS530 60-200-300	○	○											●				
			●	P: T9015 80-150-250	○	○											●				
			✕	P: T9025 50-100-150	○	○											●				
				ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev	●	●											●				
Finishing to medium cutting	W15	Insert Cat. No.		P / M																	
		SPGT090302R-W15 SPGT090302L-W15 SPGT090304R-W15 SPGT090304L-W15 SPGT090308R-W15 SPGT090308L-W15	●	P: NS530 80-200-300 / M: NS530 100-120-150													●				
			●	P: NS530 80-150-250													●				
			✕														●				○
				ap = 0.3-1.0-1.5 mm f = 0.08-0.15-0.2 mm/rev													●				○
																					○
Finishing to medium cutting	W20	Insert Cat. No.		P / M																	
		SPGT120404R-W20 SPGT120404L-W20 SPGT120408R-W20 SPGT120408L-W20	●	P: NS530 80-200-300 / M: NS530 100-120-150													●				
			●	P: NS530 80-150-250													●				
			✕														●				
				ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev													●				

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square · 11° Positive without Hole

SP □□

Positive



SPGN 09 03 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

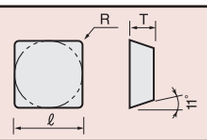
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated												Cermet		Un.	Cer.
			Work materials	H	T9015	T9025					T6020	T6030	GH330	T5010	T5020	AH110	AH120	NS520	NS530	TH10	LX11
Finishing	Ceramics	SPGN090304	●	LX11 50-100-150																○	●
		SPGN090308																		○	●
		SPGN120302	◕	LX11 50-100-150																	
		SPGN120304																		○	●
		SPGN120308	✖																	○	●
		SPGN120312	ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev															○			○
		SPGN120408																		○	

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square · 11° Positive without Hole

SP □□

Positive



SPMR 09 03 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

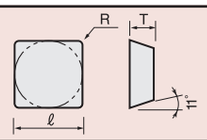
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Coated: T9015	T9025					T6020	T6030	GH330	T5010	T5020	Cermet: NS520	NS530	NS740	TH10	Uncoated: UX30	TX25
Finishing to medium cutting	23		P																		
		SPMR090304-23	●	NS530 60-200-300	●	●											●				
		SPMR090308-23	●		●	●											○				
		SPMR120304-23	●	T9015 80-150-250	●	●											●				
		SPMR120308-23	●		●	●											●				
		SPMR120312-23	●	T9025 50-100-150	●	●											●				
				ap = 0.03-1.0-2.0 mm f = 0.08-0.2-0.3 mm/rev																	
	—	Insert Cat. No.		K																	
		SPMN090304	●	T5010 100-300-600										●	●					●	
		SPMN090308	●											●	●					●	
		SPMN120304	●	T5010 100-250-500										●	●				●	●	●
		SPMN120308	●											●	●		○	●	●	●	
		SPMN120312	●	T5020 100-150-300										●	●			●	○	●	
		SPMN120408	●											●	●				○	●	
		SPMN120412	●											●	●					●	
		SPMN150412	●	ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev																●	
		SPMN190412	●																	●	

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

90° Square · 11° Positive without Hole

SP □□

Positive



SPGN 09 03 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

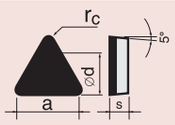
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	T9015	T9025	T6020	T6030	GH330	T5010	T5020	AH110	DX140	DX160	BX310	BX330	BX360	BX930
Precision finishing	PCD			N	Coated								PCD & PCBN					
		SPGN090304-DIA SPGN090308-DIA SPGN120302-DIA SPGN120304-DIA SPGN120308-DIA	●	DX160 400-600-2500										○				
			◒	DX140 400-500-2000									○					
			✕										○	○				
													○	○				
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev														
	PCBN	Insert Cat. No.		H														
		SPGN090304-QBN SPGN090308-QBN SPGN090312-QBN	●														○	
			◒	BX360 80-120-150													○	
		SPGN120308-QBN SPGN120312-QBN	✕	BX360 80-120-150													○	
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev													○	
	PCBN	Insert Cat. No.		H														
		Q-SPGN090304 Q-SPGN090308	●	BX330 80-150-200												●	●	
			◒	BX330 80-120-150												●	●	
		Q-SPGN120304 Q-SPGN120308	✕	BX360 80-120-150												●	●	
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev												●	●	
	PCBN	Insert Cat. No.		H														
		2QP-SPMN090304 2QP-SPMN090308	●	BX330 80-150-200												○	○	○
			◒	BX330 80-120-150												○	○	○
			✕	BX360 80-120-150														
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev														

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular · 5° Positive without Hole

TBGN

Positive



TBGN 06 01 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated												Cermet		PCBN		
					T9015	T9025	GH730			T6020	T6030	GH330	J740	T5010	T5020	AH110	NS520	NS530	BX310	BX330	BX360
Precision finishing	PCBN	TBGN060104-15-QBN TBGN060108-15-QBN	H																		
			●	**BX330** 80-150-200																●	●
			●	**BX330** 80-120-150																●	●
			✖	**BX360** 80-120-150																	

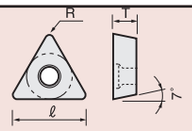
ap = 0.05-0.3-0.5 mm
f = 0.05-0.1-0.15 mm/rev

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular · 7° Positive with Hole

TC □□

Positive



TCMT 09 02 02 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

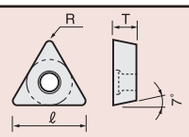
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9015	T9025	GH730	T6020	T6030	GH330	J740	T5010	T5020	Cermet NS730	NS520	NS530	Coated Cermet AT520	AT530	GT730	GT530	J530	Unc. TH10	KS05F
Precision finishing	01	TCGT090202-01	●	NS530 80-200-300	NS530 100-120-150											○	○				○			
		TCGT090204-01														○	○				○		○	
		TCGT110202-01	●	NS530 80-150-250								●				○	●				○	●		
		TCGT110204-01														○	○				○		○	
		TCGT110208-01		ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev												○	○							
		TCGT16T304-01														○	○				○		○	
		TCGT16T308-01														○	○						○	
Finishing to medium cutting	PS	Insert Cat. No.		P	M																			
		TCMT110202-PS	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●		○			○	●	●		●	○				
		TCMT110204-PS				●	●	○	●	●		○			○	●	●		●	○				
		TCMT110208-PS	●	T9015 80-150-250	T6020 150-180-220	●	●	○							○	●	●		●	○				
		TCMT16T304-PS	●	T9025 50-100-150	T6030 50-100-150	●	●		●	●		○			○	●	●		●	○				
		TCMT16T308-PS		ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev		●	●		●	●		○			○	●	●		●	○				
Medium cutting	PM	Insert Cat. No.		P	M																			
		TCMT110204-PM	●	NS530 60-200-300	T6020 150-200-250	●	●	○	●	●					○		●		○					
		TCMT110208-PM				●	●	○	●	●					○		●		○					
		TCMT16T304-PM	●	T9015 80-150-250	T6020 150-180-220	●	●	○	●	●					○		●		○					
		TCMT16T308-PM	●	T9025 50-100-150	T6030 50-100-150	●	●		●	●					○		●		○					
		TCMT16T312-PM		ap = 1.0-1.5-2.5 mm f = 0.15-0.2-0.3 mm/rev		●	●		●	●							●		○					
Finishing to medium cutting	SS	Insert Cat. No.		P	M																			
		TCGT110202-SS	●	NS530 80-200-300	NS530 100-120-150												●							
		TCGT110204-SS															●							
		TCGT110208-SS	●	NS530 80-150-250													○							
		TCGT16T304-SS															●							
		TCGT16T308-SS		ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev													○							
Aluminium	AL	Insert Cat. No.		N																				
		TCGT110202-AL	●	KS05F 100-600-1000																				●
		TCGT110204-AL																						●
		TCGT16T302-AL	●	KS05F 100-500-800																				●
		TCGT16T304-AL		KS05F 100-300-500																				●
		TCGT16T308-AL		ap = 0.5-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev																				●

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular · 7° Positive with Hole

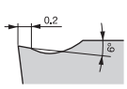
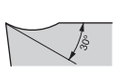
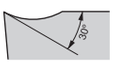
TC □□

Positive



TCGT 08 02 00 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

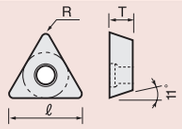
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)		Stocked grades — Coated										Cermet		C. Cerm.			Unc.	PCD
			Work materials	P	T9015	T9025			J740	T5010	T5020	AH110	AH120		NS520	NS530	AT520	AT530	GT530	TH10	DX120
Medium cutting	24																				
		TCMT090202-24	●	NS530 60-200-300	●	●										●					
		TCMT090204-24			●	●										●		●			
		TCMT110202-24	◗	T9015 80-150-250	●	●									●	●					
		TCMT110204-24	✕	T9025 50-100-150	●	●									●	●		●			
		TCMT110208-24	ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev		●	●										●		●			
		TCMT130304-24														●					
		TCMT130308-24														●					
		TCMT16T304-24			●	●									●	●		●			
		TCMT16T308-24			●	●									●	●		●			
Precision finishing	PCD	Insert Cat. No.		N																	
		TCMT080202-DIA	●	DX120 500-1500-2500																	○
		TCMT080204-DIA																			○
		TCMT110202-DIA	◗	DX120 300-1000-1800																	○
		TCMT110204-DIA																			○
		TCMT110302-DIA	✕																		○
		TCMT110304-DIA	ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																		○
Finishing to medium cutting	J08	Insert Cat. No.		P	M																
		TCGT080200FR-J08	●	NS530 60-200-300	NS530 100-120-150				●							●				○	
		TCGT080200FL-J08							●							●				○	
		TCGT080201FR-J08	◗	J740 10-30-60	J740 10-30-60				●							●				○	
		TCGT080201FL-J08	✕	J740 10-30-60	J740 10-30-60				●							●				○	
		TCGT080202FR-J08	ap = 1.0-2.0-5.0 mm f = 0.01-0.03-0.1 mm/rev						●							●				○	
		TCGT080202FL-J08							●							●				○	
	J10	Insert Cat. No.		P	M																
		TCGT110200FR-J10	●	NS530 60-200-300	NS530 100-120-150				●							●				○	
		TCGT110200FL-J10							●							●				○	
		TCGT110201FR-J10	◗	J740 10-30-60	J740 10-30-60				●							●				○	
		TCGT110201FL-J10	✕	J740 10-30-60	J740 10-30-60				●							●				○	
		TCGT110202FR-J10	ap = 1.0-2.0-5.0 mm f = 0.01-0.03-0.1 mm/rev						●							●				○	
		TCGT110202FL-J10							●							●				○	
		TCGT110300FR-J10							○							○				○	
		TCGT110300FL-J10							○							○				○	
		TCGT110301FR-J10							○							○				○	
		TCGT110301FL-J10							○							○				○	
		TCGT110302FR-J10							○							○				○	
		TCGT110302FL-J10							○							○				○	

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular · 11° Positive with Hole

TP □□

Positive



TPGT 09 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

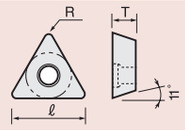
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9015	T9025			T6020	T6030	GH330	T5010	T5020	AH110	AH120	GH110	Cermet NS520	NS530	C.Cerm. AT530	GT530	Unc. TH10
Precision finishing	01	TPGT090202-01	●	NS520 80-250-350	NS530 100-120-150													○	○		○	
		TPGT090204-01																○	○		○	○
		TPGT110202-01	◕	NS530 80-150-250														○	○		○	
		TPGT110204-01																○	○		○	○
		TPGT110208-01	✖															○	○			
		TPGT130302-01	ap = 0.05-0.3-0.5 mm																○			
		TPGT130304-01	f = 0.03-0.1-0.15 mm/rev															○	○		○	○
		TPGT130308-01																○	○			
		TPGT16T304-01																○	○		○	○
		TPGT16T308-01																○	○			
Finishing to medium cutting	W08	Insert Cat. No.		P	M																	
		TPGT080200L-W08	●	GT530 80-200-300	NS530 100-120-150														○		○	
		TPGT080202L-W08	◕	NS530 80-150-250													○		●		○	○
		TPGT080204L-W08	✖														○		●		○	○
			ap = 0.05-0.5-2.0 mm																			
			f = 0.03-0.1-0.2 mm/rev																			

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular · 11° Positive with Hole

TP □□

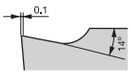
Positive



TPGT 09 02 02 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)			Stocked grades: Coated										Cermet		C. Cerm.			Unc.	
			Work materials	P	M	T9015	T9025					T6020	T6030	GH330	GH110	NS520	NS530	AT520	AT530	GT530	TH10	UX30
Finishing to medium cutting	W15	TPGT090202R-W15	●	NS530 80-200-300	NS530 100-120-150												●					
		TPGT090202L-W15	●	NS530 80-150-250													●			○	○	
		TPGT090204R-W15															●					
		TPGT090204L-W15	✕											○	○		●			○	○	○
		TPGT110202R-W15	ap = 0.05-0.3-0.5 mm f = 0.03-0.1-0.15 mm/rev														●					
		TPGT110202L-W15															●			○	○	
		TPGT110204R-W15															●					
		TPGT110204L-W15												○	●		●			○	○	○
		TPGT110208R-W15															○					
		TPGT110208L-W15															●					○
		TPGT110302R-W15															●					
		TPGT110302L-W15															●					
		TPGT110304R-W15															●					
		TPGT110304L-W15															●					
		TPGT110304L-6MP(*)															●					
		TPGT110308L-W15															●					
		TPGT130302R-W15															●					
		TPGT130302L-W15															●			○	○	
		TPGT130304R-W15													○		●					
		TPGT130304L-W15												○	○		●			○	○	○
		TPGT130308R-W15															●					
		TPGT130308L-W15															●				○	
		TPGT16T302R-W15															●					
		TPGT16T302L-W15															●			○	○	
		TPGT16T304R-W15															●				○	
		TPGT16T304L-W15												○	○		●			○	○	○
		TPGT16T308R-W15															●					
		TPGT16T308L-W15															●				○	○



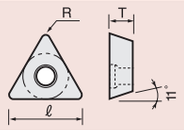
(*) -6MP: The diameter fixing hole of the insert is 2.8 mm (non ISO standard).
The chipbreaker type is the same as -W15.

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular · 11° Positive with Hole

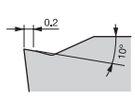
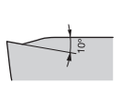
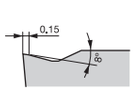
TP □□

Positive



TPGT 09 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

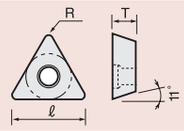
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)			Stocked grades — Coated									Cermet			C. Cerm.			
			Work materials	P	M	T9015	T9025	GH730		T6020	T6030	GH330	T5010	T5020	GH110	NS730	NS520	NS530	AT520	AT530	GT730	GT530
Finishing	**PF**																					
		TPMT110204-PF	●	NS530 60-200-300	T6020 150-200-250	●	●	○		●	●					○		●			○	
		TPMT110208-PF				●	●			●	●					○		●			○	
		TPMT110302-PF	●	T9015 80-150-250	T6020 150-180-220	○	○	○		○	○					○		○				
		TPMT110304-PF	✱	T9025 50-100-150	T6030 50-100-150	○	○	○		○	○					○		○			○	
		TPMT130304-PF	ap = 0.3-0.8-1.5 mm f = 0.05-0.12-0.25 mm/rev			●	●			●	●					○		●			○	
		TPMT130308-PF				●	●			●	●					○		●				
		TPMT16T304-PF				●	●			●	●					○		●			○	
		TPMT16T308-PF				●	●			●	●					○		●				
Finishing to medium cutting	**PS**	Insert Cat. No.		P	M																	
		TPMT090202-PS	●	NS530 60-200-300	T6020 150-200-250	●	●	○		●	●					○		●		●	○	
		TPMT090204-PS				●	●	○		●	●					○		●		○	○	
		TPMT090208-PS	●	T9015 80-150-250	T6020 150-180-220	●	●	○		●	●					○		●		○	○	
		TPMT110202-PS	✱	T9025 50-100-150	T6030 50-100-150	●	●	○		●	●					○		●		●	○	
		TPMT110204-PS	ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev			●	●	○		●	●					○		●		●	○	
		TPMT110208-PS				●	●	○		●	●					○		●		●	○	
		TPMT110304-PS				○	○	○		○	○					○		○		○	○	
		TPMT110308-PS				○	○	○		○	○					○		○		○	○	
		TPMT130302-PS				●	●									○		●		●	○	
		TPMT130304-PS				●	●			●	●					○		●		●	○	
		TPMT130308-PS				●	●			●	●					○		●		●	○	
		TPMT16T304-PS				●	●			●	●					○		●		○	○	
		TPMT16T308-PS				●	●			●	●					○		●		○	○	
Medium cutting	**PM**	Insert Cat. No.		P	M																	
		TPMT110204-PM	●	NS530 60-200-300	T6020 150-200-250	●	●	○		●	●					○		●			○	
		TPMT110208-PM				●	●	○		●	●					○		●			○	
		TPMT110304-PM	●	T9015 80-150-250	T6020 150-180-220	○	○	○		○	○					○		○			○	
		TPMT110308-PM	✱	T9025 50-100-150	T6030 50-100-150	○	○	○		○	○					○		○				
		TPMT130304-PM	ap = 1.0-1.5-2.5 mm f = 0.15-0.2-0.3 mm/rev			●	●			●	●					○		●			○	
		TPMT130308-PM				●	●			●	●					○		●			○	
		TPMT16T304-PM				●	●			●	●					○		●			○	
		TPMT16T308-PM				●	●			●	●					○		●				
		TPMT16T312-PM				●	●			●	●							●				

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular · 11° Positive with Hole

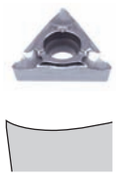
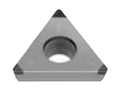
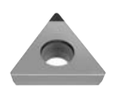
TP □□

Positive



TPGT 11 02 02 - □□

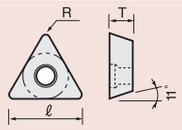
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated								Cermet		PCBN					
				P	M	T9005	T9015	T9025	T6020	T6030	GH330	T5010	T5020	NS520	NS530	BX310	BX330	BX360	BXC30	BX930	BX950
Finishing to medium cutting	SS	TPGT110202-SS TPGT110204-SS TPGT110208-SS	●	NS530 60-200-300	NS530 100-120-150						● ●				● ● ○						
		TPGT130302-SS TPGT130304-SS TPGT130308-SS	◖	NS530 80-150-250	GH330 50-80-100						●				● ● ○						
		TPGT16T304-SS TPGT16T308-SS	✕		GH330 50-80-100						●				● ○						
				ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev																	
	—	Insert Cat. No.		K																	
		TPMW110204 TPMW110208	●	T5010 100-300-600		○ ○						● ●	● ●								
		TPMW130304 TPMW130308	◖	T5010 100-250-500		○ ○						● ●	● ●								
		TPMW16T304 TPMW16T308	✕	T5020 100-150-300		○ ○						● ●	● ●								
				ap = 0.3-1.0-3.0 mm f = 0.03-0.15-0.3 mm/rev																	
Precision finishing	PCBN	Insert Cat. No.		H																	
	(QB-mini) 	3QP-TPMW080204 3QP-TPMW090202 3QP-TPMW090204	●	BX310 130-200-300												○ ○	○ ○ ○	○ ○ ○		○ ○	
		3QP-TPMW110202 3QP-TPMW110204	◖	BX330 80-120-150												○ ○	○ ○	○ ○		○ ○	
		3QP-TPMW110302 3QP-TPMW110304 3QP-TPMW110308	✕	BX360 80-120-150												○ ○ ○	○ ○ ○	○ ○ ○		○ ○ ○	○ ○ ○
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																	
		3QP-TPMW130302 3QP-TPMW130304														○ ○	○ ○	○ ○		○ ○	○ ○
		3QP-TPMW16T304 3QP-TPMW16T308														○ ○	○	○		○	○
		3QP-TPMW160404 3QP-TPMW160408														○ ○	○ ○	○ ○		○ ○	
	PCBN	Insert Cat. No.		H																	
		3QP-TPMW080204 3QP-TPMW090204	●	BXC30 130-250-300															● ●		
		3QP-TPMW110202 3QP-TPMW110204	◖	BXC30 130-200-250															● ●		
		3QP-TPMW110302 3QP-TPMW110304 3QP-TPMW110308	✕																● ● ●		
		3QP-TPMW130302 3QP-TPMW130304																	● ●		
		3QP-TPMW160404 3QP-TPMW160408																	● ●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																	
		3QP-TPMW16T304																	●		
	PCBN	Insert Cat. No.		H																	
	(QB-mini) 	Q-TPMW080204 Q-TPMW090202 Q-TPMW090204	●	BX310 130-200-300													○ ○				
		Q-TPMW110202 Q-TPMW110204 Q-TPMW110208	◖	BX330 80-120-150												● ● ●	● ● ●	 ● ●			
		Q-TPMW110304 Q-TPMW110308	✕	BX360 80-120-150												● ●	● ●	● ●			
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																	
		Q-TPMW130302 Q-TPMW130304 Q-TPMW130308														● ● ●	● ● ●	 ● ●			
		Q-TPMW16T304															○				
		Q-TPMW160404 Q-TPMW160408														● ●	● ●	● ●			

60° Triangular · 11° Positive with Hole

TP □□

Positive



TPGA 09 02 02 - □□

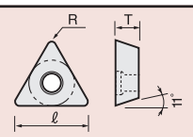
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	P	Coated							C.	PCD & PCBN							
					T9015	T9025					T6020	T6030	NS530	DX120	DX140	DX160	BX310	BX330	BX360	BX380	BX930
Standard cutting conditions · **Cutting speed v_c (m/min)**																					
Medium cutting	24	TPMT090202-24 TPMT090204-24 TPMT110204-24 TPMT110208-24 TPMT130304-24 TPMT130308-24 TPMT16T304-24 TPMT16T308-24	●	NS530 60-200-300	● ●	● ●							● ●								
			●	T9015 80-150-250	● ●	● ●							● ●								
			✕	T9025 50-100-150	● ●	● ●							● ●								
				ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev	● ●	● ●							● ●								
Precision finishing	PCD	Insert Cat. No.		N																	
		TPGA090202-DIA TPGA090204-DIA TPGA110202-DIA TPGA110204-DIA TPGA110302-DIA TPGA110304-DIA TPGA110308-DIA TPGA160302-DIA TPGA160304-DIA TPGA160308-DIA	●	DX160 400-600-2500										○ ○							
			●	DX140 400-500-2000										○ ○							
			✕											○ ○							
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev										○ ○							
	PCD	Insert Cat. No.		N																	
		TPGW090202-DIA TPGW090204-DIA TPGW110202-DIA TPGW110204-DIA TPGW130302-DIA TPGW130304-DIA TPGW16T302-DIA TPGW16T304-DIA TPGW16T308-DIA	●	DX160 400-600-2500										○	○ ○						
			●	DX140 400-500-2000										○	○ ○						
			✕											○	○ ○	○					
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev											○ ○ ○						
	PCBN	Insert Cat. No.		H																	
		TPGA090202-QBN TPGA090204-QBN TPGA110202-QBN TPGA110204-QBN TPGA110302-QBN TPGA110304-QBN TPGA160302-QBN TPGA160304-QBN TPGA160308-QBN	●																○ ○		
			●	BX360 80-120-150															○ ○		
			✕	BX360 80-120-150															○ ○		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															○ ○ ○		
	PCBN	Insert Cat. No.		H																	
		TPGW090202-QBN TPGW090204-QBN TPGW110202-QBN TPGW110204-QBN TPGW130302-QBN TPGW130304-QBN TPGW16T302-QBN TPGW16T304-QBN TPGW16T308-QBN	●																○ ○		
			●	BX360 80-120-150															○ ○		
			✕	BX360 80-120-150															○ ○		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															○ ○ ○		

60° Triangular · 11° Positive with Hole

TP □□

Positive

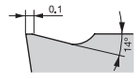


TPGM 09 02 02 - □□

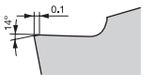
Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions — Cutting speed v_c (m/min)			Stocked grades — Coated										Cermet		C. Cerm.			Unc.
			Work materials	P	M	T9015	T9025				T6020	T6030	GH330	T5010	T5020	GH110	NS520	NS530	AT520	AT530	GT530	TH10
Finishing to medium cutting	R/L	TPGM070102R	●	NS530 60-200-300	NS530 100-120-150													●				
		TPGM070102L	●	NS530 80-150-250														●				○
		TPGM070104R																●				
		TPGM070104L																●				○
		TPGM090202R	ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev															●				
		TPGM090202L																●				
		TPGM090204R																●				
		TPGM090204L																●				
		TPGM110202R																●				
		TPGM110202L																●				
		TPGM110204R																●				
		TPGM110204L																●				
		TPGM110302R																●				
		TPGM110302L																●				
		TPGM110302L-2																				○
		TPGM110304R																●				
		TPGM110304L																●				
		TPGM110304L-2																				○
		TPGM160302R																●				
		TPGM160302L																●				
		TPGM160304R																●				
		TPGM160304L																●				
		TPGM160304L-2																				○
		TPGM160308R																				
		TPGM160308L																				
	—	Insert Cat. No.		K																		
		TPGW090202	●	TH10 50-100-200																		○
		TPGW090204																				○
		TPGW110202	●	TH10 30-100-150																		○
		TPGW110204														○						○
		TPGW110304	ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev																			○
		TPGW110304-6MP(*)																				●
		TPGW130304																				○
		TPGW16T304														○						○
		TPGW16T308																				○

TPGM******R/L



TPGM******R/L-2



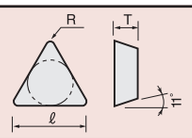
(*) -6MP: The diameter fixing hole of the insert is 2.8 mm (non ISO standard).

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular · 11° Positive without Hole

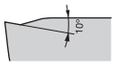
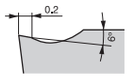
TP □□

Positive



TPMR 09 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

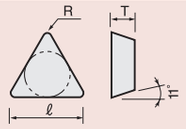
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated T9015	T9025	T6020	T6030	GH330	T5010	T5020	AH110	Cermet NS520	NS530	C.c. GT730	Unc. TH10	UX30
Finishing to medium cutting	PS			P													
	 	TPMR110304-PS	●	T9025 120-180-250		●									○		
		TPMR110308-PS				●									○		
		TPMR160304-PS	●	T9025 120-180-250		●									○		
		TPMR160308-PS				●									○		
			✕	T9025 120-180-250													
				ap = 0.3-0.9-1.5 mm f = 0.05-0.15-0.25 mm/rev													
	23	Insert Cat. No.		P													
	 	TPMR090202-23	●	NS530 60-200-300		●								○			
		TPMR090204-23				●								●			
		TPMR110304-23	●	T9015 80-150-250	●	●								●		○	
		TPMR110308-23			●	●								●		○	
		TPMR160304-23	✕	T9025 50-100-150	●	●								●		○	
		TPMR160308-23			●	●								●		○	
		TPMR160312-23			●	●								○			
				ap = 0.5-1.0-2.0 mm f = 0.08-0.2-0.3 mm/rev													
Medium cutting	24	Insert Cat. No.		P													
	 	TPMR090202-24	●	NS530 60-200-300		●								○			
		TPMR090204-24				●								●			
		TPMR110304-24	●	T9015 80-150-250	●	●								●			
		TPMR110308-24			●	●								●			
		TPMR160304-24	✕	T9025 50-100-150	●	●								●			
		TPMR160308-24			●	●								●			
				ap = 0,5-1.5-3.0 mm f = 0.08-0.2-0.3 mm/rev													
	—	Insert Cat. No.		K													
	 	TPMN110304	●	T5010 100-300-600						●	●			●		●	●
		TPMN110308								●	●						●
		TPMN160304	●	T5010 100-250-500						●	●			●		●	●
		TPMN160308								●	●					●	●
		TPMN160312	✕	T5020 100-150-300						●	●						●
		TPMN220408		ap = 0.3-1.0-2.0 mm f = 0.03-0.15-0.3 mm/rev													●
		TPMN220412															●

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

60° Triangular · 11° Positive without Hole

TP □□

Positive



TPGN 09 02 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

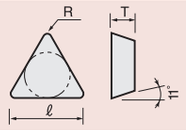
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	T9015	T9025	T6020	T6030	GH330	T5010	T5020	DX120	DX140	DX160	BX330	BX360	BX930	BX950
Precision finishing	**PCD**			**N**	Coated							PCD & PCBN						
		TPGN090204-DIA	●	DX160 400-600-2500									○					
		TPGN110304-DIA	●	DX140 400-500-2000									○					
		TPGN110308-DIA	●	DX140 400-500-2000									○	○				
		TPGN160302-DIA	✕										○					
		TPGN160304-DIA	✕	ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev								○	○	○				
		TPGN160308-DIA	✕										○					
	PCBN	Insert Cat. No.		**H**														
		TPGN110304-QBN	●													○		
		TPGN110308-QBN	●	BX360 80-120-150												○		
		TPGN160304-QBN	✕	BX360 80-120-150												○		
		TPGN160308-QBN	✕	ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev												○		
	PCBN	Insert Cat. No.		**H**														
	(QB-mini)	3QP-TPMN110302	●	BX330 80-150-200											○	○	○	○
		3QP-TPMN110304	●	BX330 80-120-150											○	○	○	○
		3QP-TPMN110308	●	BX330 80-120-150											○	○	○	○
		3QP-TPMN160304	✕	BX360 80-120-150											○	○	○	○
		3QP-TPMN160308	✕	ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev											○	○	○	○
	PCBN	Insert Cat. No.		**H**														
	(QB-mini)	Q-TPGN110304	●	BX330 80-150-200											●	●		
		Q-TPGN110308	●	BX330 80-150-200											●	●		
		Q-TPGN160304	●	BX330 80-120-150											●	●		
		Q-TPGN160308	✕	BX360 80-120-150											●	●		
			✕	ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev											●	●		

Chipbreaker selection P. 33 ~ 36 · Grade selection P. 37 ~ 39 · Insert hole diameter P. 42 · Reference guide

60° Triangular · 11° Positive without Hole

TP □□

Positive



TPGN 11 03 02 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

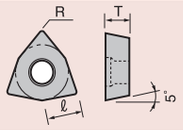
Application	Chipbreaker type	Insert Cat. No.	Standard cutting conditions: Cutting speed v_c (m/min)		Stocked grades: Coated								Cermet		C. Cerm.			Un.	Ceramics	
			Work materials	H	T9015	T9025		T6020	T6030	GH330	T5010	T5020	GH110	NS520	NS530	AT520	AT530	GT530	TH10	LX21	LX11
Finishing	Ceramics	TPGN110302	●	LX11 50-100-150															○		
		TPGN110304											○						○	○	●
		TPGN110304T01020	●	LX11 50-100-150																	●
		TPGN110308																	○		●
		TPGN160302		ap = 0.05-0.3-0.5 mm f = 0.05-0.08-0.1 mm/rev															○		
		TPGN160304											○		○				○		●
		TPGN160304T01020																			●
		TPGN160308											○		○				○		●
		TPGN160308T01020																			●
		TPGN160312																			●
		TPGN220404																	○		

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

80° Trigon · 5° Positive with Hole

WB□□

Positive

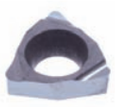


WBGT 03 01 00 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

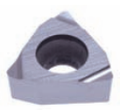
Application: Finishing to medium cutting

W08



Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	N	Coated: T9015	T9025	T6020	T6030	GH330	T5010	T5020	GH110	Cermet: NS520	NS530	Co. Cerm.: AT520	GT530	Un.: TH10
W08	WBGT030100L-W08	●	NS530 80-200-300	GH110 100-200-1000										●			○
	WBGT030102L-W08	●	NS530 80-150-250	TH10 100-150-700								●		●			●
	WBGT030104L-W08	✕										●		●			○
			ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev														

W11



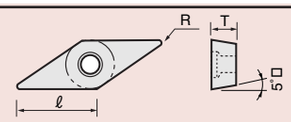
Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	N	Coated: T9015	T9025	T6020	T6030	GH330	T5010	T5020	GH110	Cermet: NS520	NS530	Co. Cerm.: AT520	GT530	Un.: TH10
W11	Insert Cat. No.		P	N													
	WBGT060102L-W11	●	NS530 80-200-300	GH110 100-200-1000								●		●			●
	WBGT060104L-W11													●			
	WBGT080202L-W11	●	NS530 80-150-250	TH10 100-150-700								●		●			●
	WBGT080204L-W11	✕												●			
			ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev														

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic · 5° Positive with Hole

VB □□

Positive



VBMT 16 04 04 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

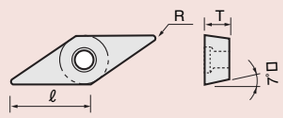
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	M	Stocked grades: Coated T9015	T9025	T6020	T6030	GH330	J740	T5010	T5020	Cermet NS520	NS530	C. Cerm. AT520	AT530	Un. TH10	PCBN BX310	BX330	BX360	BXC30	BX930
Finishing to medium cutting	PF	VBMT110302-PF VBMT110304-PF VBMT110308-PF	●	T9015 150-250-400	T6020 100-150-200	●	●	●	●														
			●	T9015 150-220-300	T6030 100-150-200	●	●	●	●														
			✕	T9025 120-180-250		●	●	●	●														
		VBMT160404-PF VBMT160408-PF				●	●	●	●														
				ap = 0.3-0.9-1.5 mm f = 0.05-0.15-0.25 mm/rev																			
	PS	Insert Cat. No.		P	M																		
		VBMT110302-PS VBMT110304-PS VBMT110308-PS	●	NS530 60-200-300	T6020 150-200-250	●	●	●	●						●		○						
			●	T9015 80-150-250	T6020 150-180-220	●	●	○	○						●		○						
		VBMT160404-PS VBMT160408-PS	✕	T9025 50-100-150	T6030 50-100-150	●	●	●	●						●	●	●						
				ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev																			
Medium cutting	24	Insert Cat. No.		P																			
		VBMT160404-24 VBMT160408-24	●	NS530 60-200-300		●	●							●	●	●	●						
			●	T9015 80-150-250		●	●							●	●	●	●						
			✕	T9025 50-100-150																			
				ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev																			
	J10	Insert Cat. No.		P	M																		
		VBGT110300FR-J10 VBGT110300FL-J10 VBGT110301FR-J10 VBGT110301FL-J10 VBGT110302FR-J10 VBGT110302FL-J10 VBGT110304FR-J10 VBGT110304FL-J10	●	NS530 60-200-300	NS530 100-120-150					●					●			○					
			●	J740 10-30-60	J740 10-30-60					●					●			○					
			✕	J740 10-30-60	J740 10-30-60					●					●			○					
				ap = 1.0-1.0-5.0 mm f = 0.01-0.03-0.1 mm/rev						●					●			○					
Precision finishing	PCBN	Insert Cat. No.		H																			
		2QP-VBMW110304 2QP-VBMW110308	●	BX310 130-200-300															○	○	○		○
																			○	○	○		○
		2QP-VBMW160404 2QP-VBMW160408	●	BX330 80-120-150															●	●	●		
			✕	BX360 80-120-150															●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																			
	PCBN	Insert Cat. No.		H																			
		2QP-VBMW110304 2QP-VBMW110308	●	BXC30 130-250-300																		●	
			●	BXC30 130-200-250																		●	
		2QP-VBMW160404 2QP-VBMW160408	✕																			●	
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																			
	PCBN	Insert Cat. No.		H																			
		Q-VBMW110204 Q-VBMW110208	●	BX310 130-200-300															●	●			
																			●	●			
		Q-VBMW110304 Q-VBMW110308	●	BX330 80-120-150																			
			✕	BX360 80-120-150															●	●	●		
		Q-VBMW160404 Q-VBMW160408																	●	●	●		
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev																			

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

35° Rhombic · 7° Positive with Hole

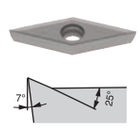
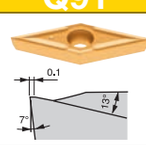
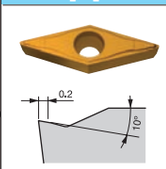
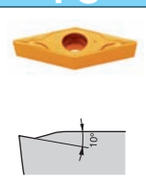
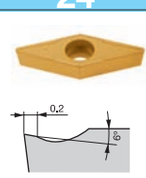
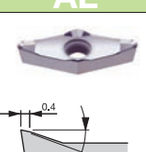
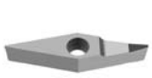
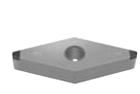
VC □□

Positive



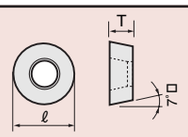
VCMT 16 04 04 - □□

Cutting edge length (ℓ) · Thickness (T) · Corner radius (R) · Chipbreaker type

Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	T9015	T9025		T6020	T6030	GH330	NS520	NS530	AT520	AT530	GT530	TH10	KS05F	DX120	BX330	BX360	BX930
				N	Coated						Cermet		Co. Cerm.			Unc.	PCD & PCBN				
Finishing to medium cutting	Q90																				
		VCGT130302-Q90 VCGT130304-Q90	●	TH10 100-200-1000												●					
			●	TH10 100-150-700												●					
				ap = 0.5-3.0 mm f = 0.1-0.5 mm/rev																	
	Q91	Insert Cat. No.		**M**																	
		VCGT130302-Q91 VCGT130304-Q91	●	T6020 150-200-250				●													
			●	T6020 150-180-220				●													
				ap = 0.5-2.0 mm f = 0.1-0.25 mm/rev																	
Finishing to medium cutting	PF	Insert Cat. No.		**P** **M**																	
		VCMT080202-PF VCMT080204-PF VCMT160404-PF VCMT160408-PF	●	T9015 150-250-400 T6020 100-150-200	● ●			● ●													
			●	T9015 15-220-300 T6030 100-150-200	● ●			● ●													
			✖	T9025 120-180-250	● ●			● ●													
				ap = 0.3-0.9-1.5 mm f = 0.05-0.15-0.25 mm/rev																	
	PS	Insert Cat. No.		**P** **M**																	
		VCMT110302-PS VCMT110304-PS VCMT110308-PS VCMT160404-PS VCMT160408-PS	●	NS530 60-200-300 T6020 150-200-250	○ ○			● ●				●		●							
			●	T9015 80-150-250 T6020 150-180-220	○ ○			● ●				●		○							
			✖	T9025 50-100-150 T6030 50-100-150	○ ○			○ ○				○		○							
				ap = 0.3-1.0-2.0 mm f = 0.08-0.15-0.3 mm/rev	● ●			● ●				●		●							
Medium cutting	24	Insert Cat. No.		**P**																	
		VCMT160404-24 VCMT160408-24	●	NS530 60-200-300	● ●						●	●	●	●	●						
			●	T9015 80-150-250	● ●						●	●	●	●							
			✖	T9025 50-100-150																	
				ap = 1.0-1.5-3.0 mm f = 0.08-0.15-0.3 mm/rev																	
Aluminium	AL	Insert Cat. No.		**N**																	
		VCGT160404-AL VCGT160408-AL VCGT160412-AL	●	KS05F 100-600-1000													●				
			●	KS05F 100-500-800													●				
			✖	KS05F 100-300-500													●				
		VCGT220520-AL VCGT220530-AL		ap = 0.5-2.0-4.0 mm f = 0.1-0.3-0.5 mm/rev													●				
Precision finishing	PCD	Insert Cat. No.		**N**																	
		VCMT160402-DIA VCMT160404-DIA	●	DX120 500-1500-2500														○			
			●	DX120 300-1000-1800														○			
				ap = 0.05-0.5-1.0 mm f = 0.05-0.1-0.15 mm/rev																	
	PCBN	Insert Cat. No.		**H**																	
		2QP-VCMW160404	●	BX330 80-150-200															○	○	○
			●	BX330 80-120-150															○	○	○
			✖	BX360 80-120-150															○	○	○
				ap = 0.05-0.3-0.5 mm f = 0.05-0.1-0.15 mm/rev															○	○	○

Round · 7° Positive

RC□□ Positive



RCMT 06 02 M0 - □□
Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

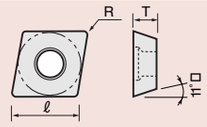
Application	Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min)	Stocked grades: Coated T9015	T9025	T6020	T6030	GH330	T5010	T5020	AH110	AH120	Cermet NS520	NS530	C. Cerm. AT520	AT530	Unc. TH10	KS05F	C. LX11
Medium cutting	RS	RCMT10T3M0-RS	●	P: T9015 100-250-400	○	○														
		RCMT1204M0-RS	●		○	○														
		RCMT1606M0-RS	●	P: T9015 80-150-250	○	○														
		RCMT2006M0-RS	✕	P: T9025 50-100-150	○	○														
		RCMT2507M0-RS			○	○														
				ap = 0.5-1.0-2.0 mm (ø 10, 12) ap = 1.5-2.0-3.0 mm (ø 16, 20) ap = 3.0-4.0-5.0 mm (ø 25) f = 0.5-0.8-1.0 mm/rev (ø 10, 12) f = 0.6-0.9-1.2 mm/rev (ø 16, 20) f = 0.7-1.0-1.2 mm/rev (ø 25)															
Aluminium	AL	Insert Cat. No.		N																
		RCGT0602M0-AL	●	KS05F 100-600-1000															●	
		RCGT0803M0-AL	●	KS05F 100-500-800															●	
		RCGT1003M0-AL	✕	KS05F 100-300-500															●	
				ap = 0.5-1.0-2.0 mm f = 0.1-0.3-0.5 mm/rev																
Heavy cutting	61	Insert Cat. No.		P / K																
		RCMT0502M0-61	●	NS530 80-200-300 / T5010 100-300-600	○	●					●				○			○		
		RCMT0602M0-61	●	NS530 80-150-250 / T5010 100-250-500	○	●					●				○			○		
		RCMT0803M0-61	✕	T9025 50-100-150 / T5020 100-150-300	○	●					●				○			○		
				ap = 0.3-0.5-1.0 mm f = 0.3-0.5-0.8 mm/rev																
	61	Insert Cat. No.		P / K																
		RCMM1003M0-61	●	T9015 80-150-250 / T5010 100-300-600	○	●					●				○			○		
		RCMM1204M0-61	●	T9025 80-120-200 / T5010 100-250-500	○	●					●				○			○		
		RCMM1606M0-61	●		○	●					●							○		
		RCMM2006M0-61	✕	T9025 50-100-150 / T5020 100-150-300	○	●												○		
		RCMM2507M0-61			○	●														
				ap = 0.5-1.0-2.0 (ø 10, 12) 1.5-2.0-3.0 mm (ø 16, 20, 25) f = 0.5-0.8-1.0 (ø 10, 12) 0.6-0.9-1.2 mm/rev (ø 16, 20, 25)															
Finishing	Ceramics	Insert Cat. No.		H																
		RCGX090800	●	LX11 50-100-150																●
		RCGX120800	●	LX11 50-100-150																●
			✕																	
				ap = 0.5-1.0-2.0 mm f = 0.05-0.08-0.1 mm/rev																

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

75° Rhombic · 11° Positive with Hole

EPGT

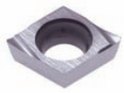
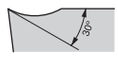
Positive



EPGT 04 01 00 - □□

Cutting edge length (ℓ) / Thickness (T) / Corner radius (R) / Chipbreaker type

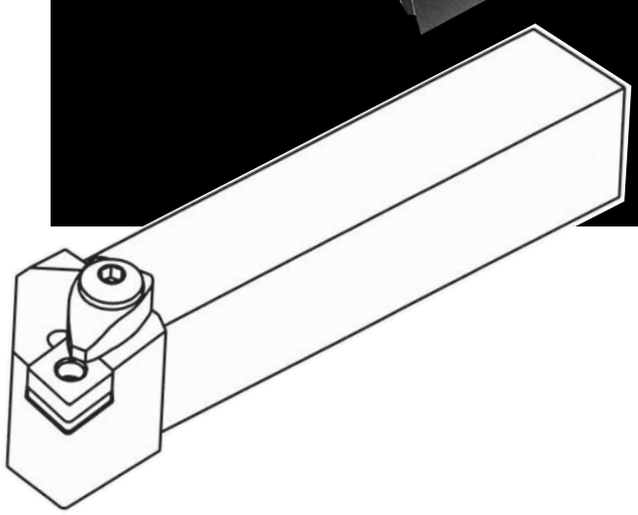
Application: Finishing to medium cutting

Chipbreaker type	Insert Cat. No.	Work materials	Standard cutting conditions: Cutting speed v_c (m/min) P	N	Coated: T9015	T9025	T6020	T6030	GH330	J740	T5010	T5020	Cer.: GH110	NS530	C. Cerm.: AT520	AT530	GT530	Un.: TH10
W08	EPGT040100R-W08	●	**NS530** 60-200-300	**NS530** 100-120-150										●				
	EPGT040100L-W08	●	**NS530** 80-150-250										●	●				○
	EPGT040102R-W08	●											●	●			○	○
	EPGT040102L-W08	✕											●	●				●
	EPGT040104R-W08		ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev										●	●				
	EPGT040104L-W08												●	●			○	●
J08	Insert Cat. No.		M															
	EPGT040100L-J08	●	**J740** 10-30-60							●								
	EPGT040102L-J08	●	**J740** 10-30-60							●								
	EPGT040104L-J08	✕	**J740** 10-30-60							●								
			ap = 0.05-0.5-2.0 mm f = 0.03-0.1-0.2 mm/rev															

Chipbreaker selection P. 33 ~ 36 | Grade selection P. 37 ~ 39 | Insert hole diameter P. 42 | Reference guide

MEMO

TAC Toolholder

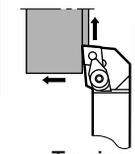
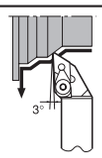
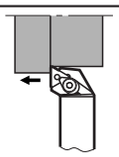
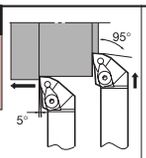


List of TAC Toolholder by Operation

■ Negative rake type

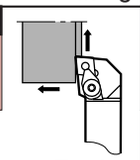
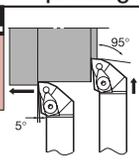
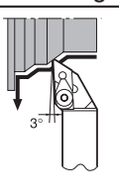
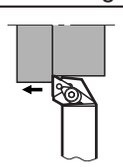
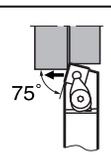
A

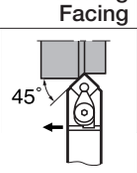
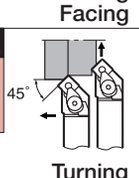
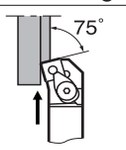
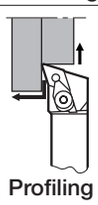
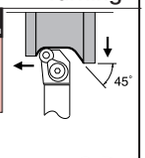
(P. 134)

ACLNR/L	ADJNR/L	ATGNR/L	AWLNR/L	
□2020 □2525	□2020 □2525	□2020 □2525	□2020 □2525	
CN□□	DN□□	TN□□	WN□□	
 Turning Facing	 External profiling	 Turning	 Turning Facing	

D

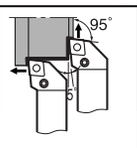
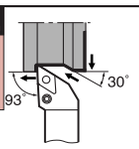
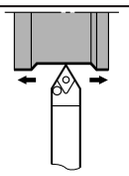
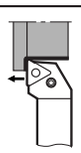
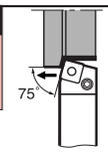
(P. 136)

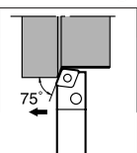
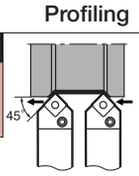
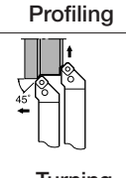
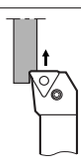
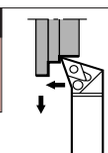
DCLNR/L	DWLNR/L	DDJNR/L	DTGNR/L	DSBNR/L
□2020, □3232 □2525, □4040 □3225	□2020 □2525 □3225	□2020 □2525 □3225	□2020 □2525	□2020, □3232 □2525, □4040 □3225
CN□□	WN□□	DN□□	TN□□	SN□□
 Turning Facing	 Turning Facing	 Profiling	 Turning	 Turning

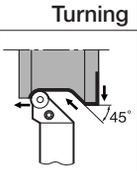
DSDNN	DSSNR/L	DSKNR/L	DDQNR/L	DRGNR/L
2020 2525	□2020 □2525	□2020 □2525	□2020 □2525 □3225	□2025
SN□□	SN□□	SN□□	DN□□	RN□□
 Turning Chamfering	 Turning Facing Chamfering	 Facing	 Profiling	 O.D. Profiling

P

(P. 142)

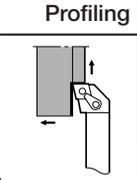
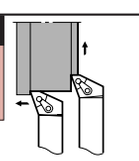
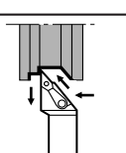
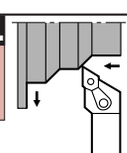
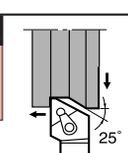
PCLNR/L	PDJNR/L	PDPNN	PTGNR/L	PSBNR/L
□1616, □2020 □2525, □3225 □3232, □4040	□1616, □2020 □2520, □2525 □3235	2525	□1616, □2020 □2525, □3232 □4040	□1616, □2020 □2525, □3232 □4040, □5050
CN□□	DN□□	DN□□	TN□□	SN□□
 Turning Facing	 Profiling	 Profiling	 Turning	 Turning

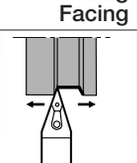
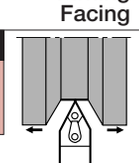
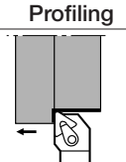
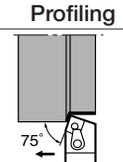
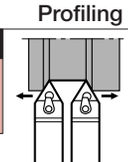
PCBNR/L	PSDNN	PSSNR/L	PTFNR/L	PDQNR/L
□2525	1616 2020 2525	□1616, □2020 □2525, □3225 □3232	□1616, □2020 □2525, □3225 □3232	□2525
CN□□	SN□□	SN□□	TN□□	DN□□
 Turning	 Turning Chamfering	 Turning Facing Chamfering	 Facing	 Profiling

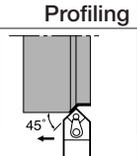
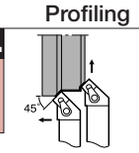
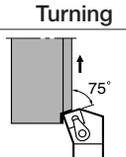
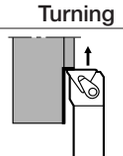
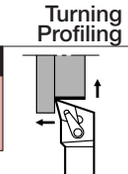
PRGNR/L
□2020 □2525
RNMG
 Profiling

M

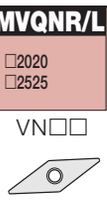
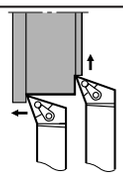
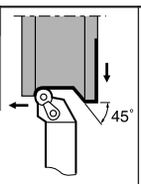
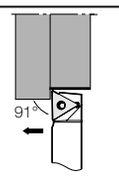
(P. 148)

MCLNR/L	MWLNR/L	MVJNR/L	MDJNR/L	MTJNR/L
□2020, □2525 □3225, □3232	□2020, □2525 □3225, □3232	□2020, □2525 □3225, □3232	□1616, □2020 □2525, □3225 □3232	□2020 □2525
CN□□	WNM□	VN□□	DN□□	TN□□
 Turning Facing	 Turning Facing	 Profiling	 Profiling	 Profiling

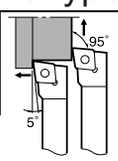
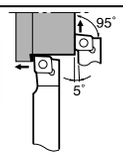
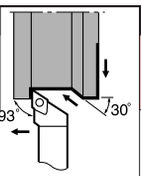
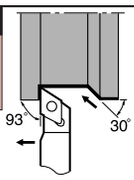
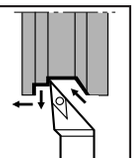
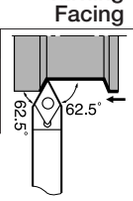
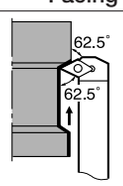
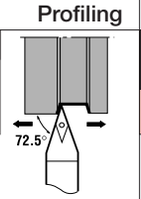
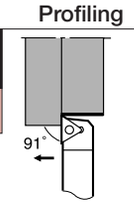
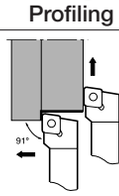
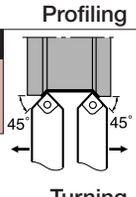
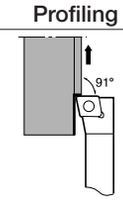
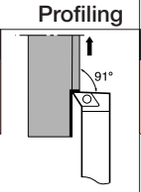
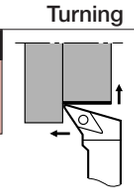
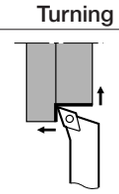
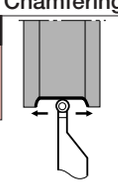
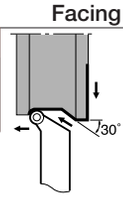
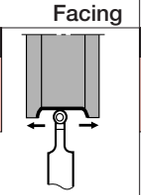
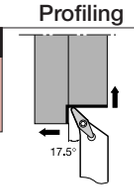
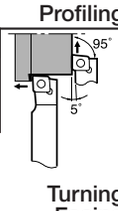
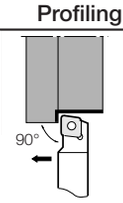
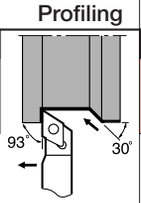
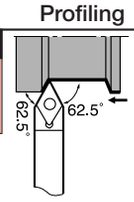
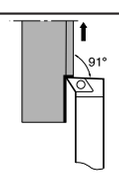
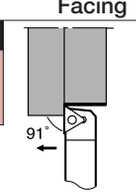
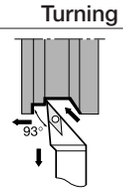
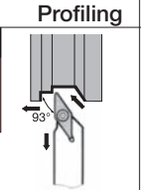
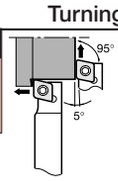
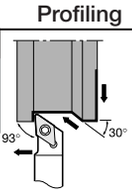
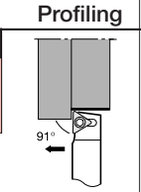
MVVNN	MDPNN	MTGNR/L	MSBNR/L	MTENN
2020, 2525 3225	1616, 2020 2525, 3225 3232	□2020 □2525	□2020 □2525	2020 2525
VN□□	DN□□	TN□□	SN□□	TN□□
 Profiling	 Profiling	 Turning	 Turning	 Turning Profiling

MSDNN	MSSNR/L	MSKNR/L	MTFNR/L	MDQNR/L
2020 2525	□2020 □2525	□2020 □2525	□1616, □2020	□1616, □2020 □2525, □3225 □3232
SN□□	SN□□	SN□□	TN□□	DN□□
 Turning Chamfering	 Turning Facing Chamfering	 Facing	 Facing	 Profiling

■ Negative rake type

M (P. 151)	**MVQNR/L** □2020 □2525 VN□□	 Profiling	**MTQNR/L** □2020 □2525 TN□□	 Profiling	**MRGNR/L** □2020 □2525 PN□□	 Profiling		**JT** (P.274)	**JTTAN R/L** □1216 □1616 TN□□	 Turning		

■ Positive rake type

S (P. 160)	**SCLCR/L** □1212, □1616 □2020 CC□□	 Turning Facing	**SCL2CR/L** □1010, □1212 CCGT	 Turning Facing	**SDJCR/L** □1212, □1616 □2020, □2525 DCGT	 Profiling	**SDJ2CR/L** □1010, □1212 DCGT	 Profiling	**SVJCR/L** □1616, □2020 □2525 VC□□	 Profiling		
	SDNCN 1010, 1212 1616, 2020 DC□□	 Profiling	**SDN3CR/L** □1212, □1616 DCGT	 Profiling	**SVVCN** 2020, 2525 VC□□	 Profiling	**STACR/L STAPR/L** □0808, □1010 □1212, □1616 TC□□ TPGA/M	 Turning	**SCGCR/L** □1212, □1616 CCGT	 Turning		
	SSDCN 1010, 1212 1616 SC□□	 Turning Chamfering	**SCFCR/L** □1212, □1616 CCGT	 Facing	**SDFCR/L** □1212, □1616 DCGT	 Facing	**SVQCR/L** □2020, □2525 VC□□	 Profiling	**SDQCR/L** □2020, □2525 DCG□	 Profiling		
	SRACR/L □1010, □1212 □1616, □2020 □2525 RCMT	 Profiling	**SRGCR/L** □1212, □1616 RCMT	 Profiling	**SRDCN** 2020, 2525 RCGT	 Profiling	**SVHCR/L** □2525 VC□□	 Profiling				
J (P. 272)	**JSCL2CR/L** □1010, □1212 CCGT	 Turning Facing	**JSCACR/L** □0808, □1010 □1212 CC□□	 Turning	**JSDJ2CR/L** □1010, □1212 DCGT	 Profiling	**JSDNCN** 1010, 1212 1616 DCGT	 Profiling	**JSDFCR/L** □1212, □1616 DCGT	 Facing		
	JSTACR/L □0808, □1010 □1212, □1616 TCGT	 Turning	**JSVJBR/L** □1010, □1212 □1616 VB□□	 Profiling	**JSVJ2BR/L** □1010, □1212 □1616 VB□□	 Profiling						
JT (P. 271)	**JTCL2CR/L** □0810, □1010 □1212, □1616 CC□□	 Turning Facing	**JTDJ2CR/L** □0810, □1010 □1212, □1616 DC□□	 External profiling	**JTTACR/L** □0810, □1010 □1212, □1616 TC□□	 Turning						

List of TAC Toolholder by Edge Style

Application		Turning Facing	Profiling				Turning			
Cutting edgestyle / Rake angle / Type		95° L	93° J	63° N	72.5° V	62.5° P	90° A	91° G	75° B	
A Double clamping	Negative	ACLNR/L (P. 134) AWLNR/L (P. 134)	ADJNR/L (P. 135)					ATGNR/L (P. 135)		
D "One -Double" type	Negative	DCLNR/L (P. 136) DWLNR/L (P. 136)	DDJNR/L (P. 137)					DTGNR/L (P. 140)	DSBNR/L (P. 138)	
P Lever-lock type	Negative	PCLNR/L (P. 142)	PDJNR/L (P. 143)			PDPNN (P. 143)		PTGNR/L (P. 146)	PSBNR/L (P. 144) PCBNR/L (P. 142)	
	Positive									
M Multi-clamp type	Negative	MCLNR/L (P. 148) MWLNR/L (P. 148)	MVJNR/L (P. 150) MDJNR/L (P. 149) MTJNR/L (P. 154)		MVVNN (P. 151)	MDPNN (P. 149)		MTGNR/L (P. 154)	MSBNR/L (P. 152)	
S Screw-on type	Positive	SCLCR/L (P. 160) SCL2CR/L (P. 160)	SDJCR/L (P. 162) SDJ2CR/L (P. 162) SVJCR/L (P. 165)	SDNCN (P. 163) SDN3CR/L (P. 163)	SVVCN (P. 165)		STACR/L STAPR/L (P.167)	SCGCR/L (P. 161)		
J Screw-on type	Positive	JSCL2CR/L (P. 272)	JSDJ2CR/L (P. 272) JSVJBR/L (P. 273) JSVJ2BR/L (P. 273)	JSDNCN (P. 273)			JSTACR/L (P. 272) JSCACR/L (P. 274)			
JT Side-clamping type	Positive	JTCL2CR/L (P. 271)	JTDJ2CR/L (P. 271)				JTTACR/L (P. 271)			
	Negative						JTTANR/L (P. 274)			

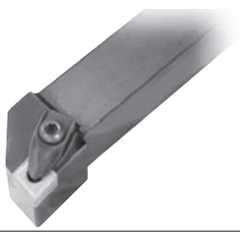
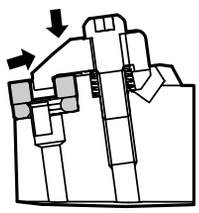
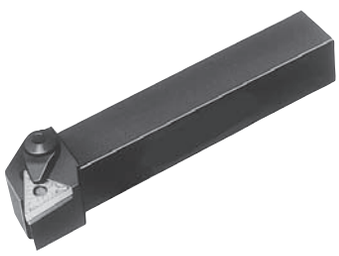
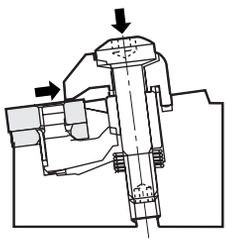
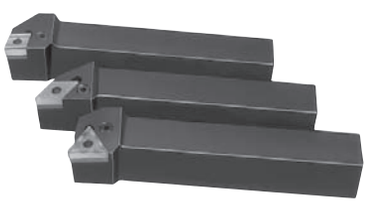
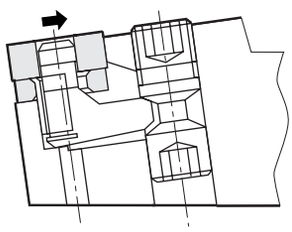
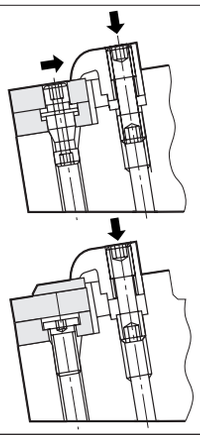
	Turning Chamfering		Turning Facing Chamfering	Facing			Profiling		Profiling
	60° E	45° D	45° S	75° K	90° F	90° C	100° X	45° Q* H*	
		DSDNN (P. 138)	DSSNR/L (P. 139)	DSKNR/L (P. 139)	DTFNR/L (P. 140)			DDQNR/L (P. 137)	DRGNR/L (P. 141)
		PSDNN (P. 145)	PSSNR/L (P. 145)		PTFNR/L (P. 146)			PDQNR/L (P. 144)	PRGNR/L (P. 147)
									PRGCR/L (P. 147) PRDCN (P. 147)
	MTENN (P. 155)	MSDNN (P. 152)	MSSNR/L (P. 153)	MSKNR/L (P. 153)	MTFNR/L (P. 155)			MDQNR/L (P. 150) MVQNR/L (P. 151) MTQNR/L (P. 156)	MRGNR/L (P. 156)
		SSDCN SSDPN (P. 167)			SCFCR/L (P. 161) SDFCR/L (P. 164)			SVQCR/L (P. 166) SDQCR/L (P. 164) SVHCR/L (P. 166)	SRACR/L (P. 168) SRGCR/L (P. 168) SRDCN (P. 169)
					JSDFCR/L (P. 274)				

Note: *Q and H styles are Tungaloy standard

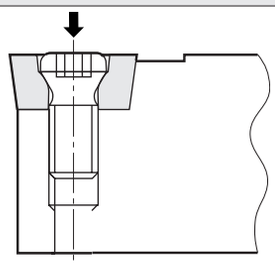
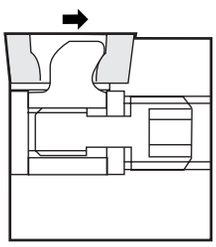
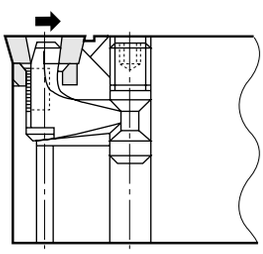
Clamping Mechanisms and Features

■ Negative rake type

General purpose

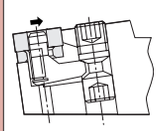
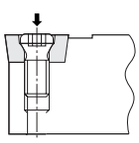
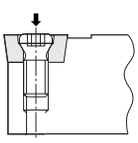
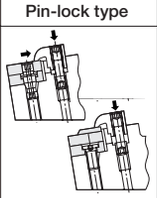
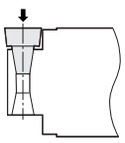
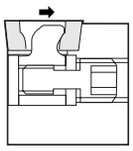
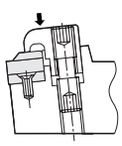
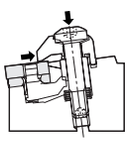
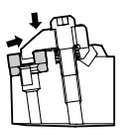
Type	Appearance	Clamping mechanism	Features	Page
A Clamp-on type			● Newly designed, clamp-on type TAC toolholder. When clamping, the action of the unique "clamp" allows accurate indexing and positive clamping. ● Less number of parts, easy handling, and good design to prevent the entry of powdery chips.	134
D "One-Double" type (combination clamping)			● Easy and reliable clamping through a one-action, double-clamping operation. The single action of tightening the clamp screw results in a double action via the clamp and lever that securely fasten the insert into position. ● Strong and positive clamping forces. ● Unsurpassed stability at the cutting point.	136
P Lever-lock type			● General purpose toolholder having lever lock type insert holding mechanism. ● High indexing accuracy due to a 2 face restraining mechanism and exhibits excellent performance with NC lathe and special purpose machines. ● A wide range of inserts available such as square, triangle, round, rhombic,etc.	142
M Multi-clamp type			● Insert holding mechanism is combination of lock-pin type and clamp-on type. ● Can select a proper clamping method simply by changing the combination of parts. ● Clamping force of the insert is very strong, excelling in copy-turning and interrupted cutting with high reliability. ● Toolholder specifically for use with a ceramic insert are also available. ● A wide range of styles and sizes of toolholder and inserts are available.	148

■ Positive rake type

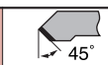
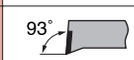
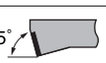
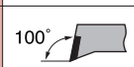
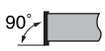
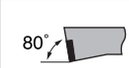
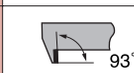
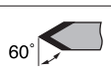
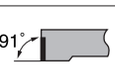
	Type	Appearance	Clamping mechanism	Features	Page
General purpose	**S** **J** Screw-on type			● Available in small to medium shank sizes and abundant cutting-edge styles. ● The smaller shank size toolholder are best suitable for CNC automatics and other small lathes and larger sizes are usable for general purpose lathes. ● Secure insert fastening by highly durable Torx screw.	160 272
	JT Back clamping type			● Good operability for indexing the insert in limited space such as on gang-tooling type lathes. ● Good handling allows wrenching the clamping screw from back side of the toolholder. ● Available shank height: 8, 10, 12 and 16 mm.	271
	P Pin-lock type			● Positive rake round insert is clamped through lever lock type clamping mechanism with high indexing, accuracy. ● Used for external, face, profile cutting and high feed is possible with excellent surface finish. ● Insert diameters:⌀10, 12, 16, 20, 25 mm	142

Nomenclature for TAC Toolholder

① Clamping system

P	 Pin-lock type	S	 Screw-on type	J	 Screw-on type
M	 Multi-clamp type	T	 Taper-lock type	JT	 Side Clamping type
C	 Clamp-on type	D	 "One-Double" type	A	 Clamp-on type

③ Cutting edge style

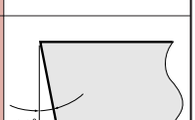
Symbol	Shape	Offset					
A		Without	G		With	S	 With
						V	 Without
			J		With	U	 With
B		Without	K		With	X*	 With
C		Without	L		With	Y	 With
D		Without	N		Without	Z	 With
E		Without	P*		Without		
F		With	Q*		With		

①		②	③	④	⑤
D	W		L	N	R
P	C		L	N	R

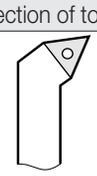
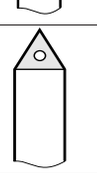
② Insert shape

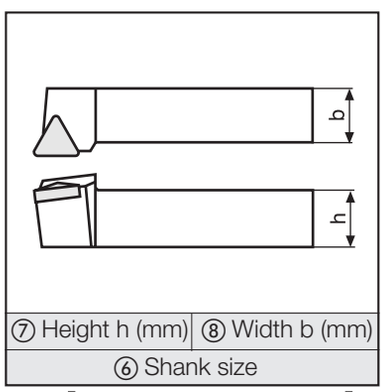
C	80° Rhombic
D	55° Rhombic
K	55° Parallelogram
R	Round
S	Square
T	Triangular
V	35° Rhombic
W	Trigon

④ Relief angle of insert

C	
B	
N	
P	

⑤ Direction of tool

L	
N	
R	



⑦ Height h (mm)	⑧ Width b (mm)
⑥ Shank size	

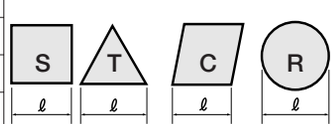
F	80
H	100
K	125
M	150
P	170
Q	180
R	200
S	250
T	300
U	350

⑨ Holder length (mm)

⑦	⑧	⑨		⑩	⑪
25	25	K	08		C
32	25	P	4		

⑩ Insert size

Symbol	I.C. (mm)
3	9.525
4	12.70
5	15.875
6	19.05
8	25.40



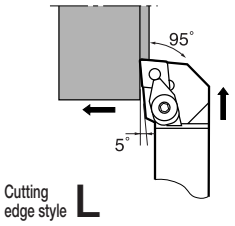
⑪ Application

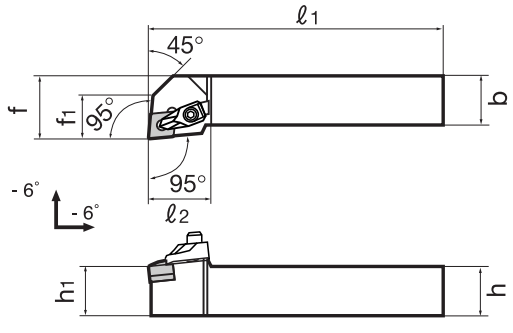
Applied to M-type	
C	Ceramic TAC inserts

A-type — Negative rake • "Double Clamping" tools

Turning•Facing

ACLN R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

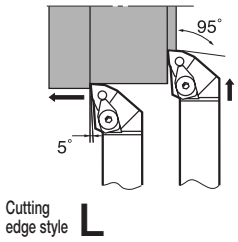
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(12)	(12)	(12)	

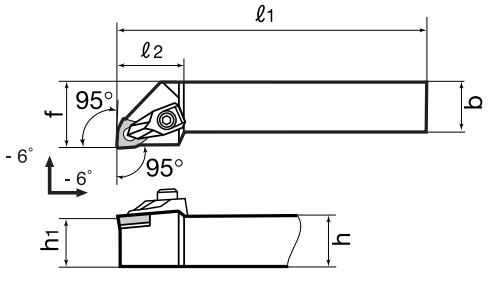
For details see pp. 44 - 50

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Spring	Clamp	Clamping screw	Wrench
ACLNR/L2020K12	●	●	CN□□1204□□ -57, -TR, -TU type chipbreaker cannot be used	0.8	20	20	125	30	20	25	18	LSC42	LSP4	BP-9	ACP4	ACS4	P-4
ACLNR/L2525M12	●	●			25	25	150	30	25	32	18						

Turning•Facing

AWLN R/L





Right hand (R) shown

● Basic-choice chipbreaker

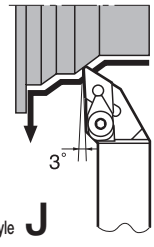
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(08)	(08)	(08)	(08)

Appl.	Medium cutting	Medium cutting	Medium cutting	
Type	SM	CM	All-round	
Shape	(08)	(08)	(08)	

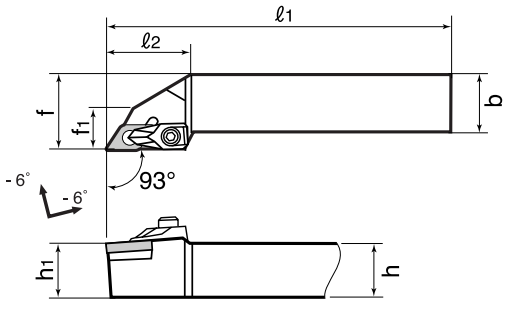
For details see pp. 78 - 82

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Spring	Clamp	Clamping screw	Wrench
AWLNR/L2020K08	●	●	WN□□0804□□ -57 type chipbreaker cannot be used	0.8	20	20	125	31	20	25	-	LSW42	LSP4	BP-9	ACP4	ACS4	P-4
AWLNR/L2525M08	●	●			25	25	150	31	25	32	-						

External Profiling
ADJN R/L



Cutting edge style **J**



Right hand (R) shown

● Basic-choice chipbreaker

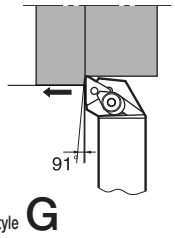
Appl.		Finishing	Medium cutting	Roughing
Type		TS	TM	TH
Shape		(1506)	(1506)	(1506)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1506)	(1506)	(1506)	

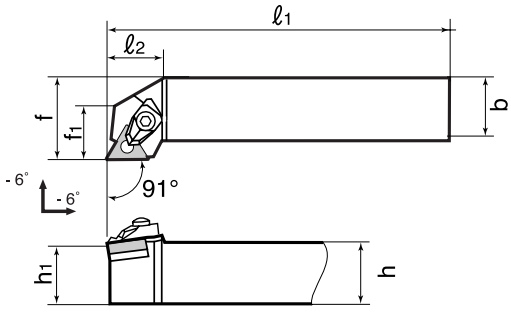
For details see pp. 52 - 59

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Spring	Clamp	Clamping screw	Wrench
ADJNR/L2020K1506	●	●	DN□□1506□□ -57, -TU type chipbreaker cannot be used	0.8	20	25	125	37.5	20	25	19	LSD42	LSP4	BP-9	ACP4	ACS4	P-4
ADJNR/L2525M1506	●	●			25	25	150	37.5	25	32	19						

Turning
ATGN R/L



Cutting edge style **G**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	
Type	TF	TS	TM	
Shape	(16)	(16)	(16)	

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(16)	(16)	(16)	

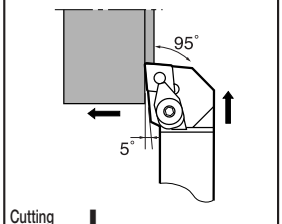
For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Spring	Clamp	Clamping screw	Wrench
ATGNR/L2020K16	●	●	TN□□1604□□ -57 type chipbreaker cannot be used	0.8	20	20	125	21	20	25	16	LST317	LSP3	BP-7	ACP3	ACS3	P-3
ATGNR/L2525M16	●	●			25	25	150	21	25	32	21						

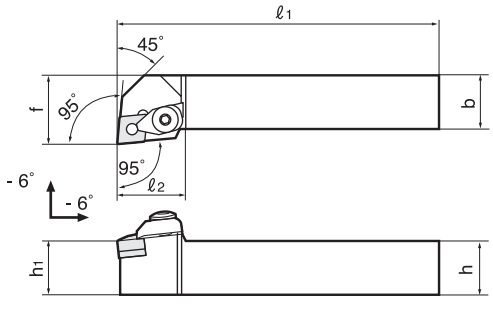
D-type — Negative rake • "One-Double" tools

Turning•Facing

DCLN R/L



Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12, 16, 19)

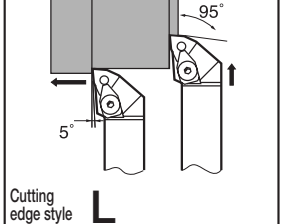
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(12, 16, 19)	(12, 16)	(12)	

For details see pp. 44 - 50

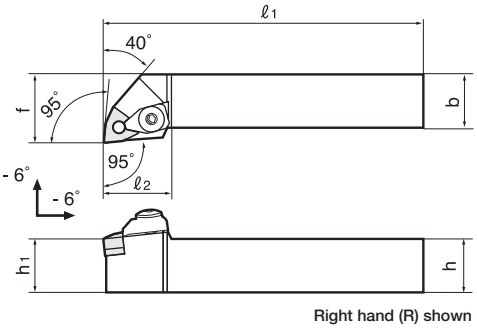
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DCLNR/L2020K12	●	●	CN□□1204□□ -57, -TU, -TR type chipbreaker cannot be used	0.8	20	20	125	30	20	25	–	LSC42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DCLNR/L2525M12	●	●			25	25	150	30	25	32	–								
DCLNR/L3225P12	●	●			32	25	170	30	32	32	–								P-4
DCLNR/L3225P16			CN□□1606□□ -57, -65, -TU, -TR type chipbreaker cannot be used	1.2	32	25	170	40	32	32	–	ELSC53	LSP6C	DLCL54	DCPM-54	DLCS54	DPIS54	BP-13	P-4
DCLNR/L3232P16					32	32	170	40	32	40	–								
DCLNR/L3232P19			CN□□1906□□ -57, -65, -TU, -TR type chipbreaker cannot be used		32	32	170	45.5	32	40	25	ELSC63	LSP6	DLCL64	DCPM-64	DLCS64	DPIS64	BP-15	P-5
DCLNR/L4040R19					40	40	200	45.5	40	50	25								

Turning•Facing

DWLN R/L



Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

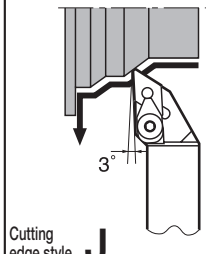
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(08)	(08)	(06, 08)	(08)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	All-round	PCBN/PCD
Shape	(06, 08)	(08)	(06, 08)	(08)

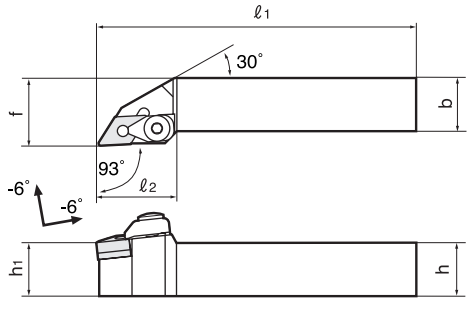
For details see pp. 78 - 82

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DWLN R/L2020K06	●	●	WN□□0604□□	0.8	20	20	125	25.5	20	25	-	LSW312	LSP3	LCL33	DCPM-33	DLCS-33	DPIS33	BP-9	P-2.5
DWLN R/L2525M06	●	●			25	25	150	31	25	32	-								P-3
DWLN R/L2020K08	●	●	WN□□0804□□ -57 type chipbreaker cannot be used		20	20	125	31	20	25	-	LSW42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DWLN R/L2525M08	●	●			25	25	150	31	25	32	-								P-4
DWLN R/L3225P08	●	●			32	25	170	30	32	32	-								

Profiling
DDJN R/L



Cutting edge style **J**



Right hand (R) shown

● Basic-choice chipbreaker

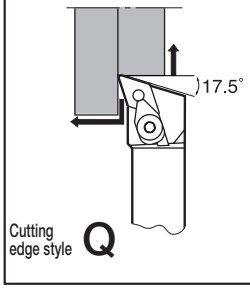
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(1504, 06)	(1504, 06)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1504, 06)	(1504, 06)	(1504, 06)	

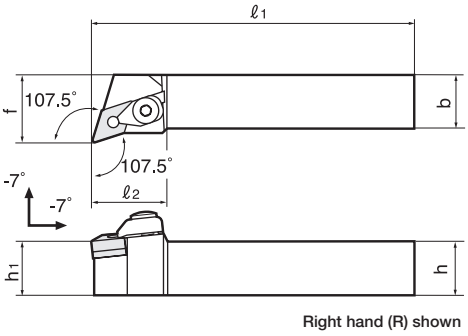
For details see pp. 52 - 59

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DDJNR/L2020K15	●	●	DN□□1504□□	0.8	20	20	125	40	20	25	-	LSD42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DDJNR/L2525M15	●	●			25	25	150	40	25	32	-								
DDJNR/L3225P15	●	●			32	25	170	30	32	32	-								
DDJNR/L2020K1506	●	●	DN□□1506□□		20	20	125	40	20	25	-						DPIS44		P-4
DDJNR/L2525M1506	●	●			25	25	150	40	25	32	-								
DDJNR/L3225P1506	●	●			32	25	170	38	32	32	-								

Profiling
DDQN R/L



Cutting edge style **Q**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(1504, 06)	(1504, 06)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1504, 06)	(1504, 06)	(1504, 06)	

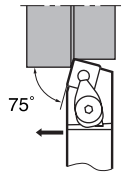
For details see pp. 52 - 59

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DDQNR/L2020K15	●	●	DN□□1504□□ -57, -TU type chipbreaker cannot be used	0.8	20	20	125	35	20	25	-	LSD42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DDQNR/L2525M15	●	●			25	25	150	35	25	32	-								
DDQNR/L3225P15	●	●			32	25	170	35	32	32	-								
DDQNR/L2020K1506	●	●	DN□□1506□□ -57, -TU type chipbreaker cannot be used		20	20	125	35	20	25	-						DPIS44		P-4
DDQNR/L2525M1506	●	●			25	25	150	35	25	32	-								
DDQNR/L3225P1506	●	●			32	25	170	35	32	32	-								

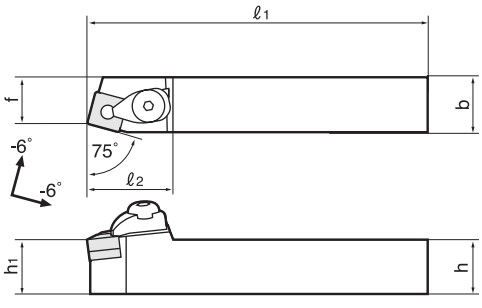
D-type — Negative rake • "One-Double" tools

Turning

DSBN R/L



Cutting edge style **B**



Right hand (R) shown

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12, 15, 19)

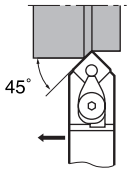
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(12)	(12)	(12)	

For details see pp. 61- 67

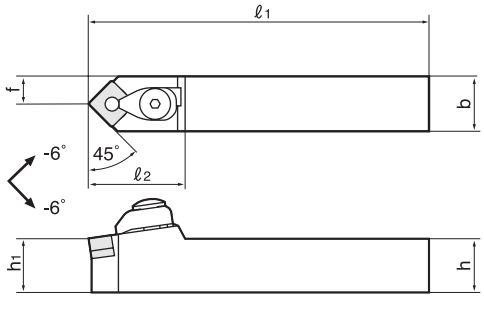
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DSBNR/L2020K12	●	●	SN□□1204□□ -57, -65 type chipbreaker cannot be used	0.8	20	20	125	35	20	17	-	LSS42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DSBNR/L2525M12	●	●			25	25	150	35	25	22	-								P-4
DSBNR/L3225P15			SN□□1506□□ -57, type chipbreaker cannot be used	1.2	32	25	170	42.5	32	22	-	ELSS53	LSP6C	DLCL54	DCPM-54	DLCS54	DPIS54	BP-13	P-4
DSBNR/L3232P15					32	32	170	42.5	32	27	-								
DSBNR/L3232P19	●	●	SN□□1906□□ -57, -65, -TU, -TR type chipbreaker cannot be used		32	32	170	47.5	32	27	-	ELSS63	LSP6	DLCL64	DCPM-64	DLCS64	DPIS64	BP-15	P-5
DSBNR/L4040R19					40	40	200	47.5	40	35	-								

Turning•Chamfering

DSDNN



Cutting edge style **D**



● Basic-choice chipbreaker

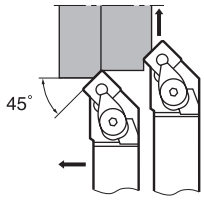
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(12)	(12)	(12)	

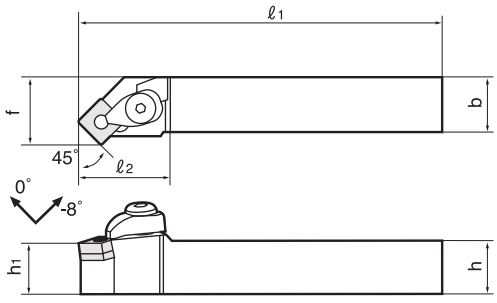
For details see pp. 61 - 67

Cat. No.	Stock	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DSDNN2020K12	●	SN□□1204□□	0.8	20	20	125	36	20	10	-	LSS42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DSDNN2525M12	●	-57, -65 type chipbreaker cannot be used		25	25	150	36	25	12.5	-								P-4

Turning•Facing•Chamfering
DSSN R/L



Cutting edge style **S**



Right hand (R) shown

● Basic-choice chipbreaker

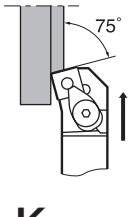
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	 (12)	 (12)	 (12)	 (12)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	 (12)	 (12)	 (12)	

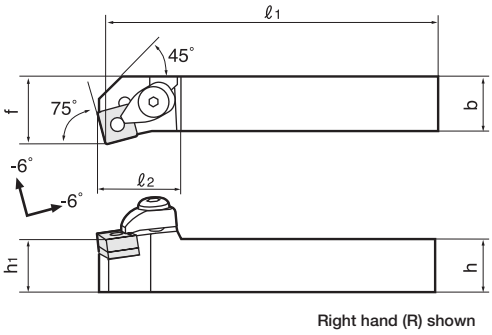
For details see pp. 61 - 67

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DSSNR/L2020K12	●	○	SN□□1204□□	0.8	20	20	125	34.3	20	25	-	LSS42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DSSNR/L2525M12	●	○	-57, -65 type chipbreaker cannot be used		25	25	150	34.3	25	32	-								P-4

Facing
DSKN R/L



Cutting edge style **K**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	 (12)	 (12)	 (12)	 (12)

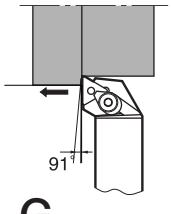
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	 (12)	 (12)	 (12)	

For details see pp. 61 - 67

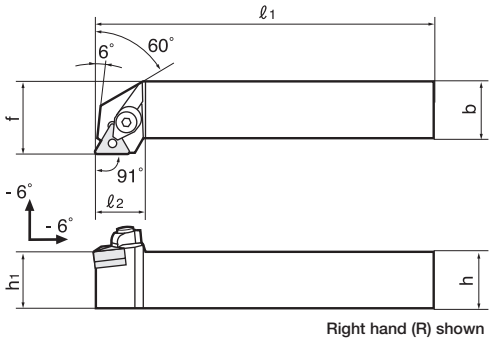
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DSKNR/L2020K12	○	○	SN□□1204□□	0.8	20	20	125	31	20	25	-	LSS42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3
DSKNR/L2525M12	●	●	-57, -65 type chipbreaker cannot be used		25	25	150	31	25	32	-								P-4

D-type — Negative rake • "One-Double" tools

Turning
DTGN R/L



Cutting edge style **G**



Right hand (R) shown

● Basic-choice chipbreaker

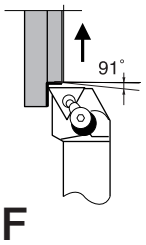
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(16)	(16, 22)	(16)	

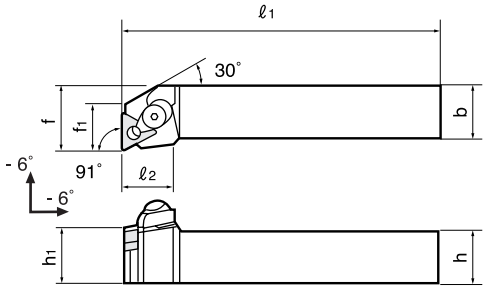
For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DTGN R/L2020K16	●	●	TN□□1604□□ -57 type chipbreaker cannot be used	0.8	20	20	125	21	20	25	-	LST317	LSP3	LCL33	DCPM-33	DLCS33	DPIS33	BP-9	P-3
DTGN R/L2525M16	●	●			25	25	150	21	25	32	-								P-2.5
DTGN R/L2525M22	●	●	TN□□2204□□ -57 type chipbreaker cannot be used		25	25	150	28	25	32	-	LST42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3 P-4

Facing
DTFN R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(16, 22)

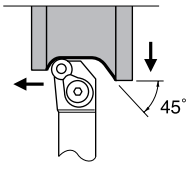
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(16)	(16, 22)	(16)	

For details see pp. 70 - 76

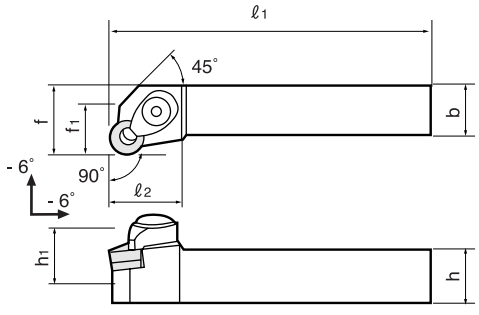
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DTFN R/L2020K16	○	○	TN□□1604□□ -57 type chipbreaker cannot be used	0.8	20	20	125	21	20	25	18.5	LST317	LSP3	LCL33	DCPM-33	DLCS33	DPIS33	BP-9	P-2.5
DTFN R/L2525M16	○	○			25	25	150	21	25	32	20								P-3
DTFN R/L2525M22	○	○	TN□□2204□□ -57 type chipbreaker cannot be used		25	25	150	28	25	32	24	LST42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3 P-4

O. D. Profiling

DRGN R/L



Cutting edge style **G**



Right hand (R) shown

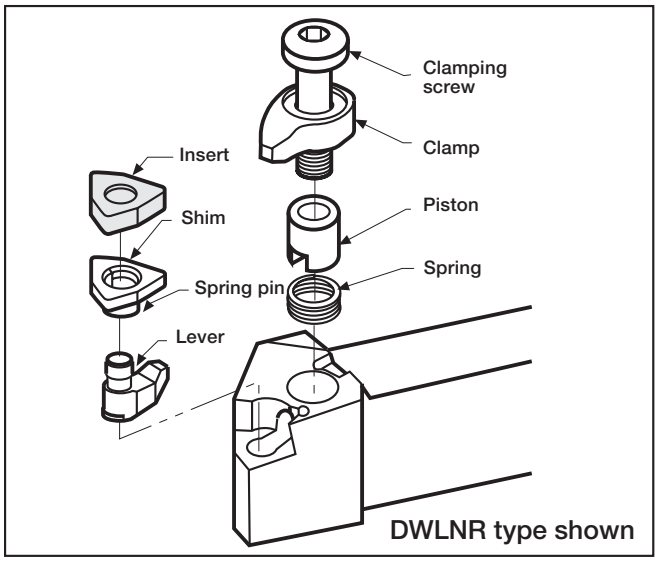
● Basic-choice chipbreaker

Appl.		Heavy cutting		
Type	–	61		
Shape	 (12)	 (12)		

Appl.				
Type				
Shape				

For details see p. 88

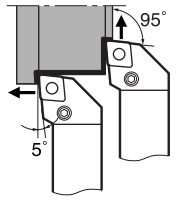
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamp	Clamping screw	Piston	Spring	Wrench
DRGN R/L2525M12	●	○	RN□□120400	–	25	25	150	28	25	32	18	LSR42	LSP4	DLCL43	DCPM-43	DLCS43	DPIS43	BP-10	P-3 P-4



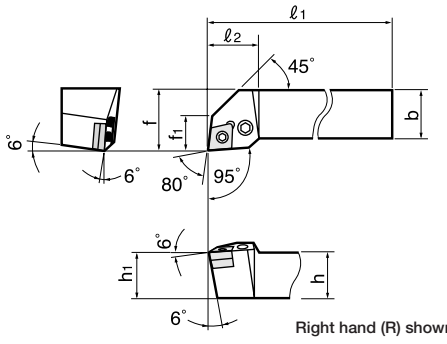
P-type — Negative rake • Pin-lock type

Turning•Facing

PCLN R/L



Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(09, 12)	(12, 16, 19)

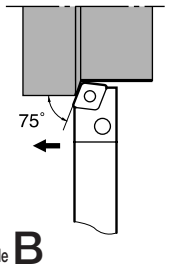
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	TU	SM	CM	PCBN/PCD
Shape	(12, 19)	(12, 16, 19)	(12, 16)	(12)

For details see pp. 44 - 50

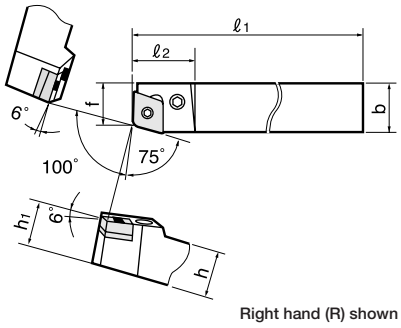
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PCLNR/L1616H09			CN□□0903□□	0.8	16	16	100	20	16	20	15	ELSC32	LSP3L	LCL33	LCS3	P-2.5
PCLNR/L2020K09	●				20	20	125	20	20	25	15					
PCLNR/L2525M09					25	25	150	20	25	32	15					
PCLNR/L1616H12E	●	●	CN□□1204□□		16	16	100	26	16	20	–	ELSC42	LSP4S	LCL43M	LCS4	P-3
PCLNR/L2020K12E	●	●			20	20	125	28	20	25	18					
PCLNR/L2525M12E	●	●			25	25	150	28	25	32	18					
PCLNR/L3225P12E	●	●			32	25	170	28	32	32	18					
PCLNR/L3232P19E	●	●	CN□□1906□□	1.2	32	32	170	40	32	40	25	ELSC63	LSP6	LCL6	LCS6	P-4
PCLNR/L4040R19E					40	40	200	40	40	50	25					
PCLNR/L2525M16E	●	●	CN□□1606□□		25	25	150	31	25	25	–	ELSC53	LSP6C	LCL5	LCS5	P-3
PCLNR/L3225P16E		●			32	25	150	31	32	32	–					
PCLNR/L3232P16E	●				32	32	170	31	32	40	–					

Turning

PCBN R/L



Cutting edge style **B**



Right hand (R) shown

● Basic-choice chipbreaker

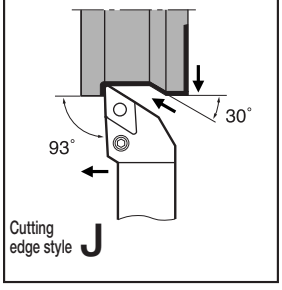
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12, 16, 19)

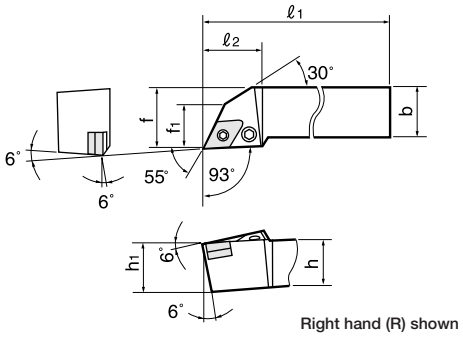
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	TU	SM	CM	PCBN/PCD
Shape	(12, 19)	(12, 16, 19)	(12, 16)	(12)

For details see pp. 44 - 50

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PCBNR/L2020K12E	●	●	CN□□1204□□	0.8	20	20	125	28	20	17	–	ELSC42	LSP4S	LCL43M	LCS4	P-3
PCBNR/L2525M12E	●	●			25	25	150	28	25	22	–					
PCBNR/L2525M16E	●		CN□□1606□□	1.2	25	25	150	35	25	22	–	ELSC53	LSP6C	LCL5	LCS5CA	P-3
PCBNR/L3225P16E					32	25	170	35	32	22	–					
PCBNR/L3232P16E					32	32	170	35	32	27	–					
PCBNR/L3232P19E	●		CN□□1906□□		32	32	170	40	32	27	–	ELSC63	LSP6	LCL6	LCS6	P-4

Profiling
PDJN R/L





Right hand (R) shown

● Basic-choice chipbreaker

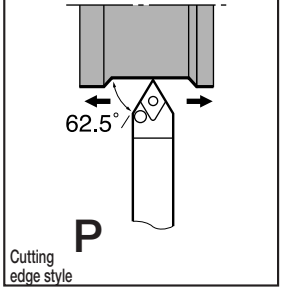
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(11, 1504, 06)	(1504, 06)

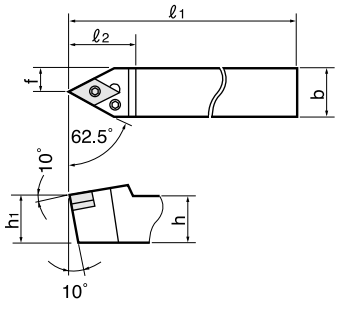
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1504, 06)	(1504, 06)	(1504, 06)	

For details see pp. 52 - 59

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PDJNR/L1616H11	●	●	DN□□1104□□	0.8	16	16	100	27	16	20	15	ELSD32	LSP3	LCL33L	LCS3	P-2.5
PDJNR/L2020K11	●	●			20	20	125	27	20	25	15					
PDJNR/L2525M11	●	○			25	25	150	27	25	32	15					
PDJNR/L2020K43E	●	●	DN□□1504□□		20	20	125	32	20	25	19	ELSD42	LSP4S	LCL44	ELCS4	P-3
PDJNR/L2525M43E	●	●			25	20	150	32	25	25	19					
PDJNR/L2020K15E	●	●	DN□□1506□□	1.2	20	20	125	32	20	25	–	ELSD42	LSP4S	LCL44	ELC4S	P-3
PDJNR/L2525M15E	●	●			25	25	150	32	25	32	–					
PDJNR/L3225P15E	●	●			32	25	170	32	32	34	–					
PDJNR/L3232P15E	●	●			32	32	170	32	32	40	–					

Profiling
PDPNN





● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1506)	(1506)	(1506)	(1506)

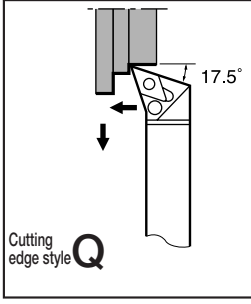
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1506)	(1506)	(1506)	

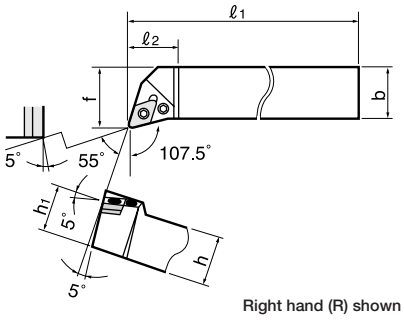
For details see pp. 52 - 59

Cat. No.	Stock	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PDPNN2525M15E	●	DN□□1506□□	1.2	25	25	150	36	25	12.5	–	ELSD42	LSP4S	LCL44	ELCS4	P-3
PDPNN3225P15E	●			32	25	170	36	32	12.5	–					

P-type — Negative rake • Pin-lock type

Profiling
PDQN R/L





Right hand (R) shown

● Basic-choice chipbreaker

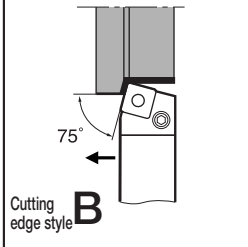
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(1504, 06)	(1504, 06)

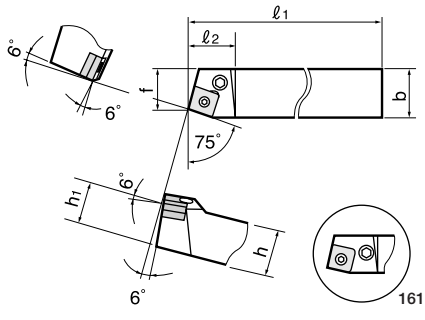
Appl.	Medium cutting	Medium cutting	Precision finishing	
Type	SM	CM	PCBN/PCD	
Shape	(1504, 06)	(1504, 06)	(1504, 06)	

For details see pp. 52 - 59

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PDQNR/L2020K43E			DN□□1504□□	0.8	20	20	125	32	20	25	–	ELSD42	LSP4S	LCL44	ELCS4	P-3
PDQNR/L2525M43E					25	25	150	32	25	32	–					
PDQNR/L3225P43E					32	25	170	32	32	32	–					
PDQNR/L3232P43E					32	32	170	32	32	40	–					
PDQNR/L2020K15E	●	●	DN□□1506□□	1.2	20	20	125	32	20	25	–	ELSD42	LSP4S	LCL44	ELCS4	P-3
PDQNR/L2525M15E	●	●			25	25	150	32	25	32	–					
PDQNR/L3225P15E					32	25	170	32	32	32	–					
PDQNR/L3232P15E					32	32	170	32	32	40	–					

Turning
PSBN R/L





1616H09E type

Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(09, 12)	(12, 15, 19)

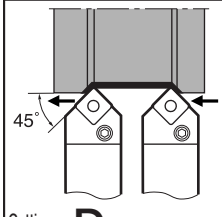
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	TU	SM	CM	PCBN/PCD
Shape	(19, 25)	(12)	(12)	(12)

For details see pp. 61 - 67

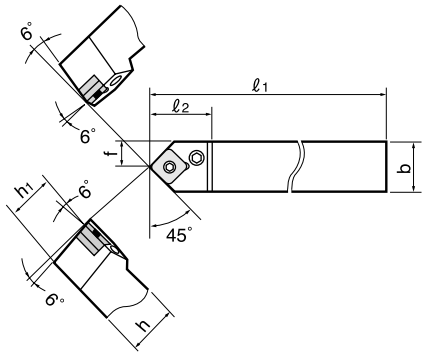
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PSBNR/L1616H09E			SN□□0903□□	0.8	16	16	100	22	16	13	–	ELSS32	LSP3L	LCL33	LCS3	P-2.5
PSBNR/L2020K12E	●	●	SN□□1204□□		20	20	125	28	20	17	–	ELSS42	LSP4S	LCL43M	LCS4	P-3
PSBNR/L2525M12E	●	●			25	25	150	24	25	22	–					
PSBNR/L3225P12E	●	●			32	25	170	28	32	22	–					
PSBNR/L2525M15E	●	●	SN□□1506□□	1.2	25	25	150	35	25	22	–	ELSS53	LSP5	LCL5	LCS5CA	P-3
PSBNR/L3225P15E					32	25	170	35	32	22	–					
PSBNR/L3232P15E					32	32	170	35	32	27	–					
PSBNR/L3232P19E	●	●	SN□□1906□□		32	32	170	40	32	27	–	ELSS63	LSP6	LCL6	LCS6	P-4
PSBNR/L4040R19E					40	40	200	40	40	35	–					
PSBNR/L5050T25E			SN□□2507□□	2.4	50	50	300	48	50	43	–	ELSS84	LSP8	LCL8	LCS8	P-5

Turning•Chamfering

PSDNN



Cutting edge style **D**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(09, 12)	(12, 15)

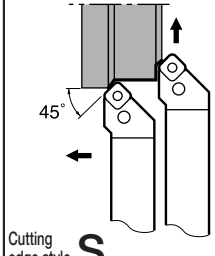
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	65	SM	CM	PCBN/PCD
Shape	(12)	(12)	(12)	(12)

For details see pp. 61 - 67

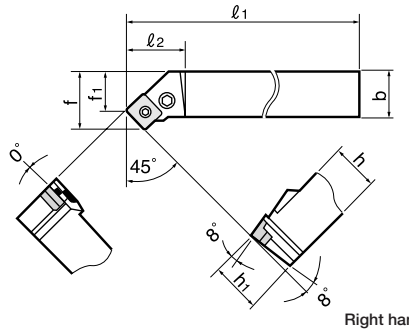
Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm)							Shim	Spring pin	Lever	Clamping screw	Wrench
				h	b	ℓ1	ℓ2	h1	f	f1					
PSDNN1616H09E		SN□□0903□□	0.8	16	16	100	22	16	8.0	–	ELSS32	LSP3L	LCL33	LCS3	P-2.5
PSDNN2020K12E	●	SN□□1204□□		20	20	125	30	20	10.3	–	ELSS42	LSP4S	LCL43M	LCS4	P-3
PSDNN2525M12E	●			25	25	150	30	25	12.8	–					
PSDNN3225P12E	●			32	25	170	30	32	12.8	–					
PSDNN3232P15E		SN□□1506□□	1.2	32	32	170	–	32	–	–	ELSS53	LSP5	LCL5	LCS5CA	P-3

Turning•Facing•Chamfering

PSSN R/L



Cutting edge style **S**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(09, 12)	(12, 15, 19)

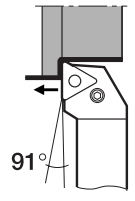
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	65	SM	CM	PCBN/PCD
Shape	(19)	(12)	(12)	(12)

For details see pp. 61 - 67

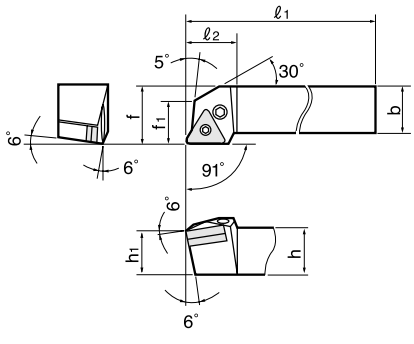
Cat. No.	Stock		Insert	Std. Corner R	Dimensions (mm)							Shim	Spring pin	Lever	Clamping screw	Wrench
	R	L			h	b	ℓ1	ℓ2	h1	f	f1					
PSSNR/L1616H09E	●		SN□□0903□□	0.8	16	16	100	22	16	20	13.9	ELSS32	LSP3L	LCL33	LCS3	P-2.5
PSSNR/L2020K12E	●	●	SN□□1204□□		20	20	125	30	20	25	16.7	ELSS42	LSP4S	LCL43M	LCS4	P-3
PSSNR/L2525M12E	●	●			25	25	150	30	25	32	23.7					
PSSNR/L3225P12E	●	●			32	25	170	30	32	32	23.7					
PSSNR/L2525M15E	●	●	SN□□1506□□	1.2	25	25	150	35	25	32	–	ELSS53	LSP5	LCL5	LCS5CA	P-3
PSSNR/L3225P15E					32	25	170	35	32	32	–					
PSSNR/L3232P15E					32	32	170	35	32	40	–					
PSSNR/L3232P19E	●		SN□□1906□□		32	32	170	40	32	40	27.8	ELSS63	LSP6	LCL6	LCS6	P-4
PSSNR/L4040R19E					40	40	200	40	40	50	32.5					

P-type — Negative rake • Pin-lock type

Turning
PTGN R/L



Cutting edge style **G**



Right hand (R) shown

● Basic-choice chipbreaker

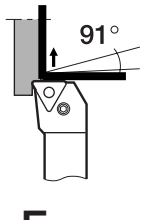
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	57	SM	CM	PCBN/PCD
Shape	(16, 22)	(16)	(16, 22)	(16)

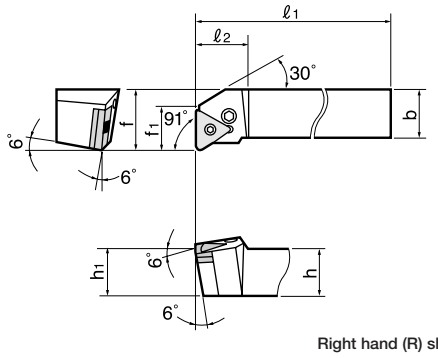
For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PTGNR/L1616H16E	●	●	TN□□1604□□	0.8	16	16	100	22	16	20	16	ELST317	LSP3	LCL33	LCS3	P-2.5
PTGNR/L2020K16E	●	●			20	20	125	22	20	25	16					
PTGNR/L2525M16E	●	●			25	25	150	22	25	32	21					
PTGNR/L3225P16E					32	25	170	22	32	32	21					
PTGNR/L2525M22E	●	●	TN□□2204□□		25	25	150	28	25	32	24	ELST42	LSP4S	LCL43M	LCS3	P-3
PTGNR/L3225P22E	●	●			32	25	170	28	32	32	24					
PTGNR/L3232P22E	●				32	32	170	28	32	40	28					
PTGNR/L3232P27E			TN□□2706□□	1.2	32	32	170	35	32	40	30	ELST53	LSP6C	LCL54	LCS5	P-3

Facing
PTFN R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

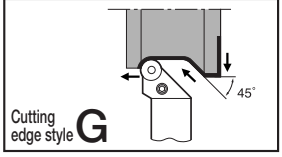
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

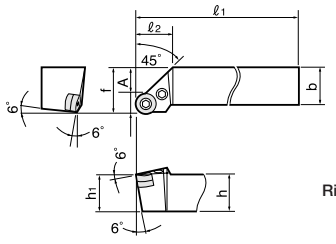
Appl.	Heavy cutting	Medium cutting	Medium cutting	Precision finishing
Type	57	SM	CM	PCBN/PCD
Shape	(16, 22)	(16)	(16, 22)	(16)

For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PTFNR/L1616H16E	●	●	TN□□1604□□	0.8	16	16	100	22	16	20	18	ELST317	LSP3	LCL33	LCS3	P-2.5
PTFNR/L2020K16E	●	●			20	20	125	22	20	25	17.5					
PTFNR/L2525M16E	●	●			25	25	150	22	25	32	20					
PTFNR/L3225P16E	●	●			32	25	170	22	32	32	20					
PTFNR/L2525M22E	●	●	TN□□2204□□		25	25	150	28	25	32	24	ELST42	LSP4S	LCL43M	LCS3	P-3
PTFNR/L3225P22E	●	●			32	25	170	28	32	32	24					
PTFNR/L3232P27E			TN□□2706□□	1.2	32	32	170	31	32	40	30	LST53	LSP5	LCL5	LCS5	P-3
PTFNR/L4040P27E					40	40	200	31	40	50	30					

Profiling PRGN R/L





Right hand (R) shown

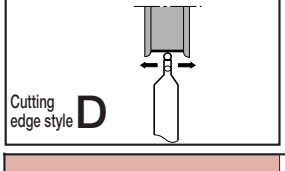
● Basic-choice chipbreaker

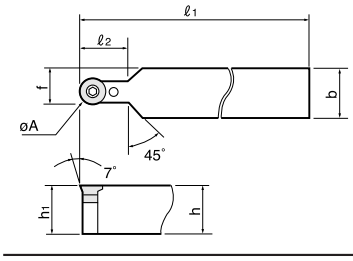
Appl.	Heavy cutting			
Type	61			
Shape	(12)			

For details see p. 88

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	A	Shim	Spring pin	Lever	Clamping screw	Wrench
PRGNR/L2020K09E	●	●	RNMG090300-61	–	20	20	125	19	20	25	(9.52)	ELSR32	LSP3L	LCL33	LCS3	P-2.5
PRGNR/L2525M09E	●	●			25	25	150	25	25	32	(9.52)					
PRGNR/L2525M12E	●	●	RNMG120400-61		25	25	150	25	25	32	(12.7)	ELSR42	LSP4S	LCL43M	LCS4	P-3

Profiling PRDCN





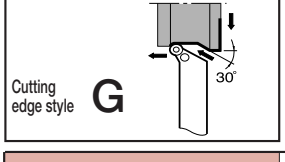
● Basic-choice chipbreaker

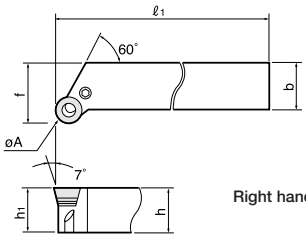
Appl.	Heavy cutting			
Type	61			
Shape	(10, 12, 16, 20, 25)			

For details see p. 122

Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PRDCN2020K10E	●	RCMM1003M0-61	–	20	20	125	22	20	15.0	10	ELSR32C	LSP3L	LCL3C	ELCS2	P-2
PRDCN2525M10E	●			25	25	150	22	25	17.5	10					
PRDCN2525M12E	●	RCMM1204M0-61		25	25	150	24	25	18.5	12	ELSR42C	LSP3	LCL4C	LCS3	P-2.5
PRDCN3225P12E				32	25	170	24	32	18.5	12					
PRDCN3225P16E	●	RCMM1606M0-61		32	25	170	28	32	20.5	16	ELSR53C	LSP4	LCL5C	ELCS3	P-2.5
PRDCN3232P20E	●	RCMM2006M0-61		32	32	170	32	32	26.0	20	ELSR63C	LSP6C	LCL6C	LCS5	P-3
PRDCN4040R25E		RCMM2507M0-61		40	40	200	42	40	32.5	25	ELSR84C	LSP6	LCL8C	LCS8C	P-4

Profiling PRGC R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Heavy cutting			
Type	61			
Shape	(10, 12, 16, 20, 25)			

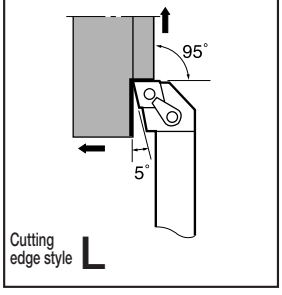
For details see p. 122

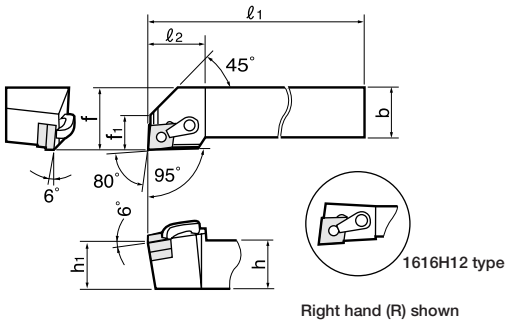
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Spring pin	Lever	Clamping screw	Wrench
PRGCR/L2020K10E	●		RCMM1003M0-61	–	20	20	125	–	20	25	10	ELSR32C	LSP3L	LCL3C	ELCS2	P-2
PRGCR/L2525M10E	●				25	25	150	–	25	32	10					
PRGCR/L2020K12E			RCMM1204M0-61		20	20	150	–	20	25		ELSR42C	LSP3	LCL4C	LCS3	P-2.5
PRGCR/L2525M12E	●	●			25	25	150	–	25	32	12					
PRGCR/L3225P12E					32	25	170	–	32	32						
PRGCR/L2525M16E			RCMM1606M0-61		25	25	150	–	25	32	16	ELSR53C	LSP4	LCL5C	ELCS3	P-2.5
PRGCR/L3225P16E	●	●			32	25	170	–	32	32	16					
PRGCR/L3232P20E	●		RCMM2006M0-61		32	32	170	–	32	40	20	ELSR63C	LSP6C	LCL6C	LCS5	P-3
PRGCR/L4040S25E			RCMM2507M0-61		40	40	250	–	40	50	25	ELSR84C	LSP6	LCL8C	LCS8C	P-4

M-type — Negative rake • Multi-clamp type

Turning•Facing

MCLN R/L





● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12, 16, 19)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	TU	SM	CM	Ceramics
Shape	(12, 19)	(12, 16, 19)	(12)	(1204, 07)

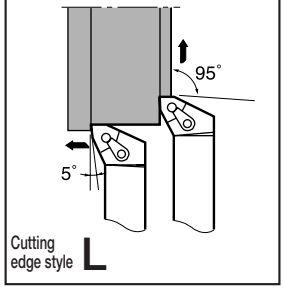
For details see pp. 44 - 50

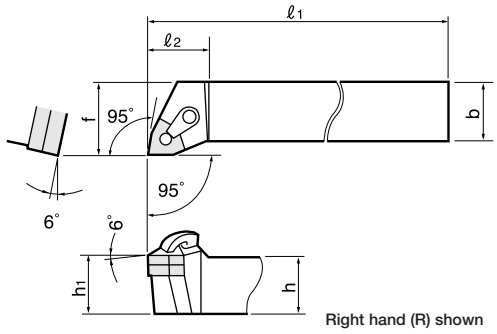
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MCLNR/L1616H12	●		CN□□1204□□	0.8	16	16	100	30	16	20	–	MSC-432	MLP46	–	MCPM-21	MCS625-3	–	P-2.5F	P-3
MCLNR/L2020K12	●	●			20	20	125	30	20	25	18								
MCLNR/L2525M12	●	●			25	25	150	30	25	32	18								
MCLNR/L3225P12					32	25	170	30	32	32	18			(MSP6.3)			(CBC-4MN)		
MCLNR/L2020K12C			CN□□1207□□		20	20	125	32	20	25	18	MSC-432	–	MSP6.3	MCPM-21	MCS625-3	CBC-4MN	P-2.5F	P-3
MCLNR/L2525M12C	●	●	(CN□□1206□□)		25	25	150	32	25	32	18								
MCLNR/L3225P12C	●				32	25	170	32	32	32	18	(MSC-442)	(MLP46L)						
MCLNR/L2525M16			CN□□1606□□	1.2	25	25	150	35	25	32	22	MSC-533	MLP58	–	MCPM-12	MCS828-4	–	P-3	P-4
MCLNR/L3225P16			(CN□□1604□□)		32	25	170	35	32	32	22								
MCLNR/L3232P16					32	32	170	35	32	40	22	(MSC-543)							
MCLNR/L3232P19			CN□□1906□□		32	32	170	38	32	40	30	MSC-634	MLP68	–	MCPM-12	MCS828-4	–	P-4	P-4
MCLNR/L4040R19					40	40	200	38	40	50	30								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Turning•Facing

MWLN R/L





● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(08)	(08)	(08)	(08, 10)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(08, 10, 13)	(08)	(08)	(08)

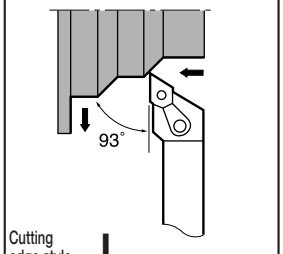
For details see pp. 78 - 82

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MWLNR/L2020K08	●	●	WNM□□0804□□	0.8	20	20	125	25	20	25	–	MSW-432	MLP46	–	MCPM-6	MCS 520-2.5	–	–	P-2.5
MWLNR/L2525M08	●	●			25	25	150	25	25	32	–								
MWLNR/L3225P08					32	25	170	25	32	32	–								
MWLNR/L2525M10	△	△	WNM□□1006□□	1.2	25	25	150	30	25	32	–	MSW-533	MLP58	–	MCPM-21	MCS625-3	–	P-3	P-3
MWLNR/L3225P10					32	25	170	30	32	32	–								
MWLNR/L3232P10	△				32	32	170	30	32	40	–								
MWLNR/L4040R10					40	40	200	30	40	50	–								
MWLNR/L3232P13			WNM□□1306□□		32	32	170	38	32	40	–	MSW-633	MLP68	–	MCPM-12	MCS828-4	–	P-4	P-4
MWLNR/L4040R13					40	40	200	38	40	50	–								

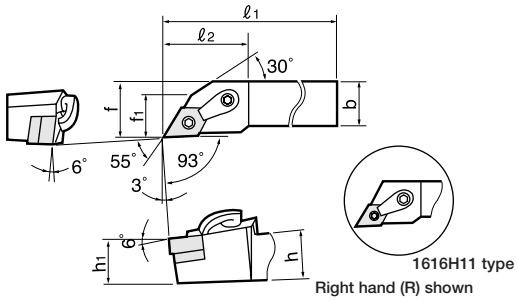
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Reference guide — Parts for M-type P. 157 ~ 159

Profiling
MDJN R/L



Cutting edge style **J**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(11, 1504, 06)	(1504, 06)

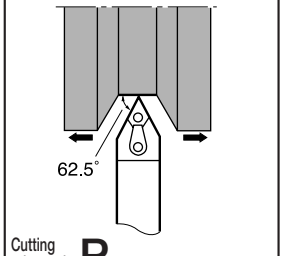
Appl.	Medium cutting	Medium cutting		Precision finishing
Type	SM	CM	Ceramics	PCBN/PCD
Shape	(1504, 06)	(1504, 06)	(1504, 07)	(1504, 06)

For details see pp. 52 - 59

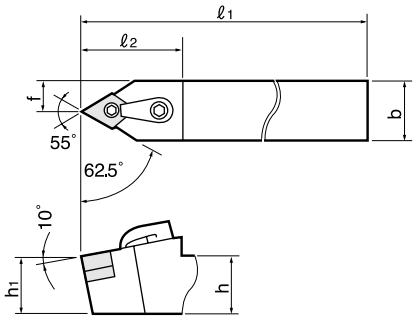
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MDJNR/L1616H11	●	●	DN□□1104□□	0.8	16	16	100	30	16	20	–	MSD-322	MLP34L	–	MCPM-20	MCS620-3	–	P-2F	P-3
MDJNR/L2020K15	●	●	DN□□1506□□ (DN□□1504□□)	0.8	20	20	125	38	20	25	19	MSD-432 (MSD-442)	MLP46L	– (MSP6.3)	MCPM-22	MCS625-3	– (CBD-4MR/L)	P-2.5F	P-3
MDJNR/L2525M15	●	●			25	25	150	38	25	32	19								
MDJNR/L3225P15					32	25	170	38	32	32	19								
MDJNR/L3232P15					32	32	170	38	32	40	19								
MDJNR/L2020K15C	●	●	DN□□1507□□ (DN□□1506□□)		20	20	125	38	20	25	19	MSD-432 (MSD-442)	– (MLP46L)	MSP6.3	MCPM-22	MCS625-3	CBD-4M R/L	P-2.5F	P-3
MDJNR/L2525M15C	●	●			25	25	150	38	25	32	19								
MDJNR/L3225P15C					32	25	170	38	32	32	19								
MDJNR/L3232P15C					32	32	170	38	32	40	19								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Profiling
MDPNN



Cutting edge style **P**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(1504)	(1504, 06)	(11, 1504, 06)	(1504, 06)

Appl.	Medium cutting	Medium cutting		Precision finishing
Type	SM	CM	Ceramics	PCBN/PCD
Shape	(1504, 06)	(1504, 06)	(1504)	(1504, 06)

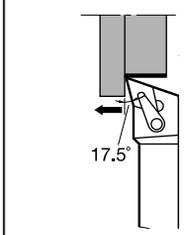
For details see pp. 52 - 59

Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MDPNN1616H11	△	DN□□1104□□	0.8	16	16	100	35	16	8	–	MSD-322	MLP34L	–	MCPM-20	MCS620-3	–	P-2F	P-3
MDPNN2020K15	●	DN□□1506□□ (DN□□1504□□)		20	20	125	45	20	10	–	MSD-432 (MSD-442)	MLP46L	– (MSP-6.3)	MCPM-22	MCS625-3	– (CBD-4MN)	P-2.5F	P-3
MDPNN2525M15	●			25	25	150	45	25	125	–								
MDPNN3225P15	●			32	25	170	45	32	125	–								
MDPNN3232P15	△			32	32	170	45	32	16	–								

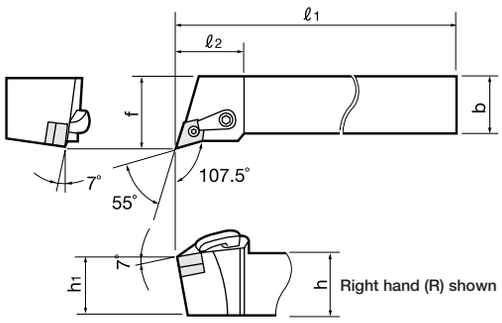
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

M-type ___ Negative rake • Multi-clamp type

Profiling
MDQN R/L

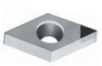


Cutting edge style **Q**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	 (1504)	 (1504, 06)	 (11, 1504, 06)	 (1504, 06)

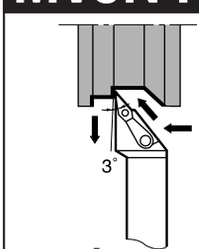
Appl.	Medium cutting	Medium cutting		Precision finishing
Type	SM	CM	Ceramics	PCBN/PCD
Shape	 (1504, 06)	 (1504, 06)	 (1504)	 (1504, 06)

For details see pp. 52 - 59

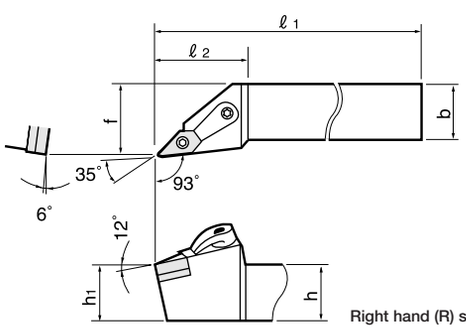
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MDQNR/L1616H11			DN□□1104□□	0.8	16	16	100	30	16	20	–	MSD-322	MLP34L	–	MCPM-20	MCS620-3	–	P-2F	P-3
MDQNR/L2020K15	●	●			20	20	125	38	20	25	–								
MDQNR/L2525M15	●	△	DN□□1506□□		25	25	150	38	25	32	–	MSD-432	MLP46L	–	MCPM-22	MCS625-3	–	P-2.5F	P-3
MDQNR/L3225P15					32	25	170	38	32	32	–								
MDQNR/L3232P15	△		(DN□□1504□□)		32	32	170	38	32	40	–	(MSD-442)		(MSP-6.3)			(CBD-4MR/L)		

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Profiling
MVJN R/L



Cutting edge style **J**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Medium cutting
Type	TF	TS	TM	CM
Shape	 (16)	 (16)	 (16)	 (16)

Appl.	Precision finishing	Medium cutting		
Type	PCBN	SM		
Shape	 (16)	 (16)		

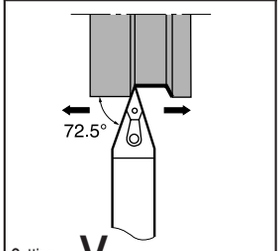
For details see pp. 83 - 87

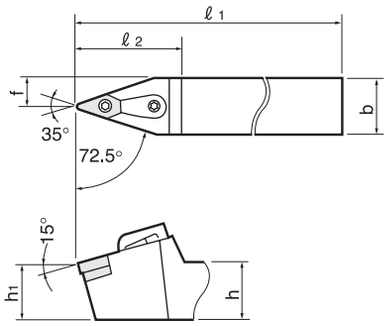
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MVJNR/L2020K16	●	●			20	20	125	42	20	25	–								
MVJNR/L2525M16	●	●			25	25	150	42	25	32	–								
			VN□□1604□□	0.8								MSV-322	MLP34L	–	MCPM-22	MCS625-3	–	P-2F	P-3
MVJNR/L3225P16	●	●			32	25	170	42	32	32	–								
MVJNR/L3232P16	●	●			32	32	170	42	32	40	–								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Reference guide — Parts for M-type P. 157 ~ 159

Profiling
MVVNN





● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Medium cutting
Type	TF	TS	TM	CM
Shape	(16)	(16)	(16)	(16)

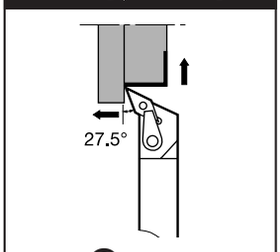
Appl.	Precision finishing	Medium cutting		
Type	PCBN	SM		
Shape	(16)	(16)		

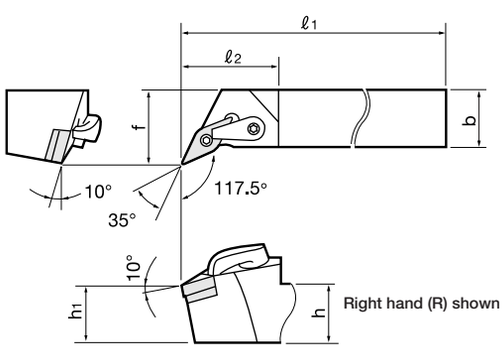
For details see pp. 83 - 87

Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm)							Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
				h	b	ℓ1	ℓ	h1	f	f1								
MVVNN2020K16	●	VN□□1604□□	0.8	20	20	125	48	20	10	–	MSV-322	MLP34L	–	MCPM-30	MCS828-4	–	P-2F	P-4
MVVNN2525M16	●			25	25	150	48	25	12.5	–								
MVVNN3225P16				32	25	170	48	32	12.5	–								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Profiling
MVQN R/L





● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Medium cutting
Type	TF	TS	TM	CM
Shape	(16)	(16)	(16)	(16)

Appl.	Precision finishing	Medium cutting		
Type	PCBN	SM		
Shape	(16)	(16)		

For details see pp. 83 - 87

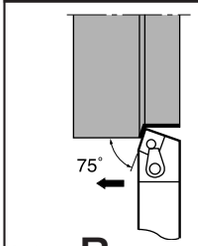
Cat. No.	Stock		Insert	Std. Corner R	Dimensions (mm)							Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
	R	L			h	b	ℓ1	ℓ	h1	f	f1								
MVQNR/L2020K16	●	●	VN□□1604□□	0.8	20	20	125	40	20	25	–	MSV-322	MLP34L	–	MCPM-22	MCS625-3	–	P-2F	P-3
MVQNR/L2525M16	●	●			25	25	150	40	25	32	–								
MVQNR/L3225P16	●	●			32	25	170	40	32	32	–								
MVQNR/L3232P16	●				32	32	170	40	32	40	–								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

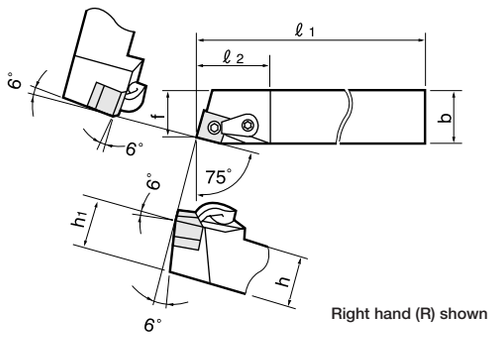
M-type ___ Negative rake • Multi-clamp type

Turning

MSBN R/L



Cutting edge style **B**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape				
	(12)	(12)	(12)	(12)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	65	SM	CM	Ceramics
Shape				
	(12)	(12)	(12)	(1204, 07)

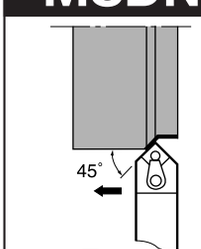
For details see pp. 61- 67

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MSBNR/L2020K12	△	△	SN□□1204□□	0.8	20	20	125	33.5	20	17	–	MSS-432	MLP46	– (MSP-6.3)	MCPM-21	MCS625-3	– (CBS-4M)	P-2.5F	P-3
MSBNR/L2525M12	●	●			25	25	150	33.5	25	22	–								
MSBNR/L2020K12C			SN□□1207□□		20	20	125	33.5	20	17	–	MSS-432	–	MSP-6.3	MCPM-21	MCS625-3	CBS-4M	P-2.5F	P-3
MSBNR/L2525M12C	●	●	(SN□□1206□□)		25	25	150	33.5	25	22	–	(MSS-442)	(MLP46L)						

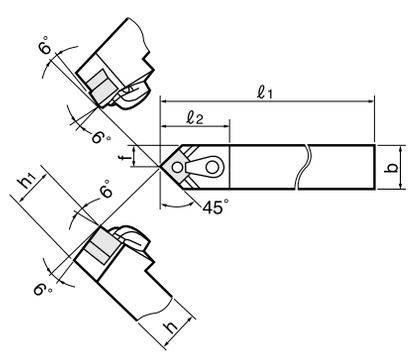
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Turning•Chamfering

MSDNN



Cutting edge style **D**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape				
	(12)	(12)	(12)	(12)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	65	SM	CM	Ceramics
Shape				
	(12)	(12)	(12)	(1204, 07)

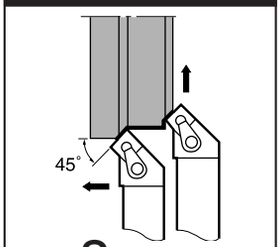
For details see pp. 61 - 67

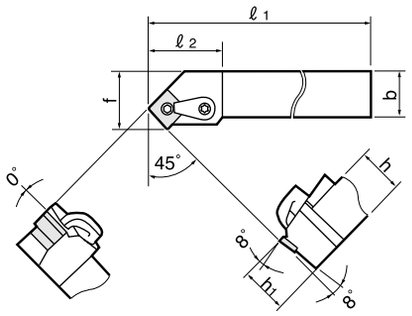
Cat. No.	Stock	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MSDNN2020K12	△	SN□□1204□□	0.8	20	20	125	34	20	10.0	–	MSS-432	MLP46	– (MSP-6.3)	MCPM-21	MCS625-3	– (CBS-4MN)	P-2.5F	P-3
MSDNN2525M12	●			25	25	150	34	25	12.5	–								
MSDNN2020K12C		SN□□1207□□		20	20	125	34	20	10.0	–	MSS-432	–	MSP-6.3	MCPM-21	MCS625-3	CBS-4MN	P-2.5F	P-3
MSDNN2525M12C		(SN□□1206□□)		25	25	150	34	25	12.5	–	(MSS-442)	(MLP46L)						

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Reference guide | Parts for M-type P. 157 ~ 159

Turning•Facing•Chamfering
MSSN R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

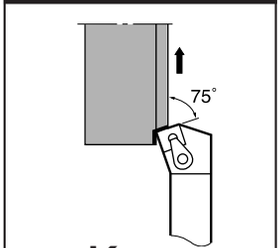
Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	65	SM	CM	Ceramics
Shape	(12)	(12)	(12)	(1204, 07)

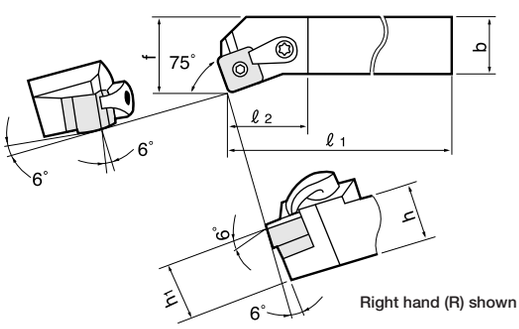
For details see pp. 61 - 67

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MSSNR/L2020K12	●		SN□□1204□□	0.8	20	20	133	34	20	25	–	MSS-432	MLP46	–	MCPM-21	MCS625-3	–	P-2.5F	P-3
MSSNR/L2525M12	●	●			25	25	158	34	25	32	–			(MSP-6.3)			(CBS-4M)		
MSSNR/L2020K12C			SN□□1207□□		20	20	133	34	20	25	–	MSS-432	–	MSP-6.3	MCPM-21	MCS625-3	CBS-4M	P-2.5F	P-3
MSSNR/L2525M12C	●		(SN□□1206□□)		25	25	158	34	25	32	–	(MSS-442)	(MLP46L)						

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Facing
MSKN R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	65	SM	CM	Ceramics
Shape	(12)	(12)	(12)	(1204, 07)

For details see pp. 61 - 67

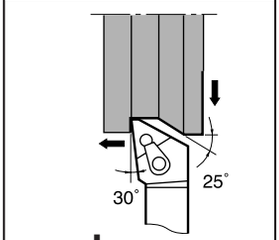
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MSKNR/L2020K12			SN□□1204□□	0.8	20	20	125	29	20	25	–	MSS-432	MLP46	–	MCPM-21	MCS625-3	–	P-2.5F	P-3
MSKNR/L2525M12					25	25	150	29	25	32	–			(MSP-6.3)			(CBS-4M)		
MSKNR/L2020K12C			SN□□1207□□		20	20	125	29	20	25	–	MSS-432	–	MSP-6.3	MCPM-21	MCS625-3	CBS-4M	P-2.5F	P-3
MSKNR/L2525M12C			(SN□□1206□□)		25	25	150	29	25	32	–	(MSS-442)	(MLP46L)						

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

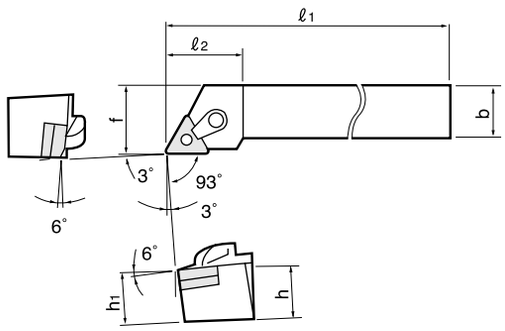
M-type ___ Negative rake • Multi-clamp type

Profiling

MTJN R/L



Cutting edge style **J**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(16, 22)	(16)	(16, 22)	(1604, 22)

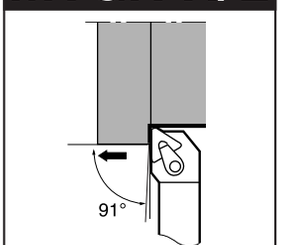
For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MTJNR/L2020K16	●	●			20	20	125	28	20	25	–								
MTJNR/L2525M16	●	●	TN□□1604□□		25	25	150	28	25	32	–	MST-322	MLP-34L	–	MCPM-21	MCS625-3	–	P-2F	P-3
MTJNR/L3225P16			(TN□□1603□□)	0.8	32	25	170	28	32	32	–	(MST-332)							
MTJNR/L2525M22					25	25	150	32	25	32	–								
MTJNR/L3225P22			TN□□2204□□		32	25	170	32	32	40	–	MST-432	MLP-46	–	MCPM-9	MCS828-4	–	P-2.5F	P-4
MTJNR/L3232P22					32	32	170	32	32	40	–			(MSP-6.3)			(CBT-4M)		

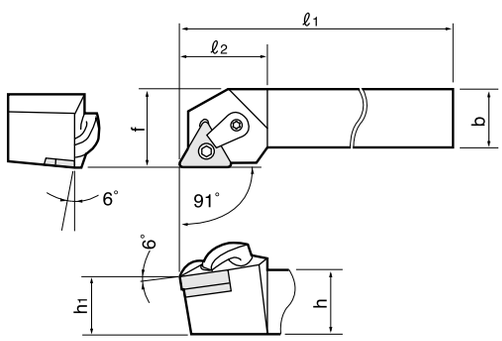
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Turning

MTGN R/L



Cutting edge style **G**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(16, 22)	(16)	(16, 22)	(1604, 22)

For details see pp. 70 - 76

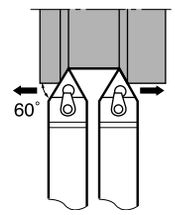
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MTGNR/L1616H16	●		TN□□1604□□		16	16	100	28	16	20	–	MST-322	MLP-34L	–	MCPM-20	MCS620-3	–	P-2F	P-3
MTGNR/L2020K16	△	△			20	20	125	28	20	25	–				MCPM-21	MCS625-3			
MTGNR/L2525M16	●	●	(TN□□1603□□)		25	25	150	28	25	32	–	(MST-332)		(MSP-5)			(CBT-4M)		
MTGNR/L2020K16C			TN□□1607□□	0.8	20	20	125	28	20	25	–	MST-322	–	MCP-5	MCPM-21	MCS625-3	CBT-3M	P-2F	P-3
MTGNR/L2525M16C	●	●			25	25	150	28	25	32	–								
MTGNR/L2525M22	△	△			25	25	150	32	25	32	–								
MTGNR/L3225P22			TN□□2204□□		32	25	170	32	32	32	–	MST-432	MLP-46	–	MCPM-9	MCS828-4	–	P-2.5F	P-4
MTGNR/L3232P22	△				32	32	170	32	32	40	–			(MSP-6.3)			(CBT-4M)		
MTGNR/L2525M27					25	25	150	38	25	32	–								
MTGNR/L3232P27			TN□□2706□□		32	32	170	38	32	40	–	MST-533	MLP-58	–	MCPM-12	MCS828-4	–	P-3	P-4
MTGNR/L4040R27				1.2	40	40	200	38	40	50	–								
MTGNR/L3232P33			TN□□3307□□		32	32	170	40	32	40	–	MST-644	MCP68L	–	MCPM-30	MCS825-4	–	P-3	P-4
MTGNR/L4040R33					40	40	200	40	40	50	–								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

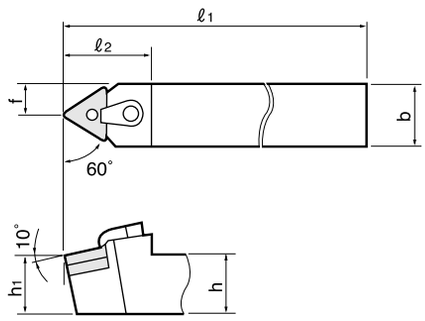
Reference guide — Parts for M-type P. 157 ~ 159

Turning•Profiling

MTENN



Cutting edge style **E**



● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(16, 22)	(16)	(16, 22)	(16, 22)

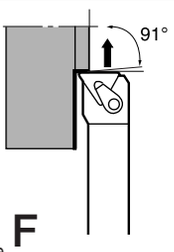
For details see pp. 70 - 76

Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm)							Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
				h	b	ℓ1	ℓ	h1	f	f1								
MTENN2020K16	●			20	20	125	–	20	10	–								
MTENN2525M16	△	TN□□1604□□		25	25	150	–	25	12.5	–	MST-322	MLP34L	–	MCPM-21	MCS625-3	–	P-2F	P-3
MTENN3225P16				32	25	170	–	32	12.5	–								
MTENN2525M22			0.8	25	25	150	–	25	12.5	–								
MTENN3225P22	△	TN□□2204□□		32	25	170	–	32	12.5	–	MST-432	MLP46	–	MCPM-9	MCS828-4	–	P-2.5F	P-4
MTENN3232P22				32	32	170	–	32	16	–								

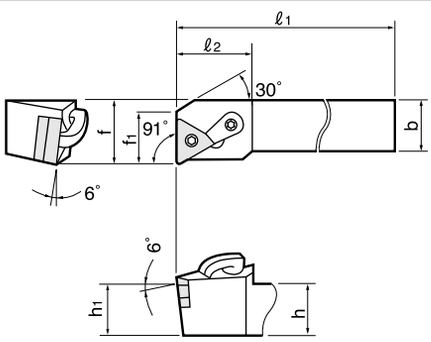
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Facing

MTFN R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(16, 22)	(16)	(16, 22)	(1604, 22)

For details see pp. 70 - 76

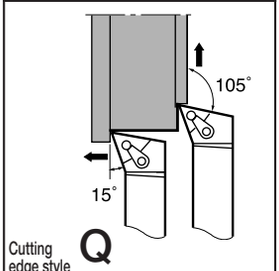
Cat. No.	Stock		Insert	Std. Corner R	Dimensions (mm)							Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
	R	L			h	b	ℓ1	ℓ	h1	f	f1								
MTFNR/L1616H16					16	16	100	24.5	16	20	18				MCPM-20	MCS620-3			
MTFNR/L2020K16			TN□□1604□□		20	20	125	24.5	20	25	18	MST-322	MLP34L	–			–	P-2F	P-3
MTFNR/L2525M16			(TN□□1603□□)		25	25	150	24.5	25	32	18	(MST-332)		(MSP-5)	MCPM-21	MCS625-3	(CBT-3M)		
MTFNR/L2020K16C			TN□□1607□□	0.8	20	20	125	28	20	25	18	MST-322	–	MCP-5	MCPM-21	MCS625-3	CBT-3M	(P-2F)	P-3
MTFNR/L2525M16C					25	25	150	28	25	32	18								
MTFNR/L2525M22			TN□□2204□□		25	25	150	32	25	32	24	MST-432	MLP46	–	MCPM-9	MCS828-4	–	P-2.5F	P-4
MTFNR/L3225P22					32	25	170	32	32	24	24			(MSP-6.3)			(CBT-4M)		
MTFNR/L3232P27			TN□□2706□□	1.2	32	32	170	31	32	40	30	MST-533	MLP58	–	MCPM-12	MCS828-4	–	P-3F	P-4
MTFNR/L4040R27					40	40	200	31	40	50	30								

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

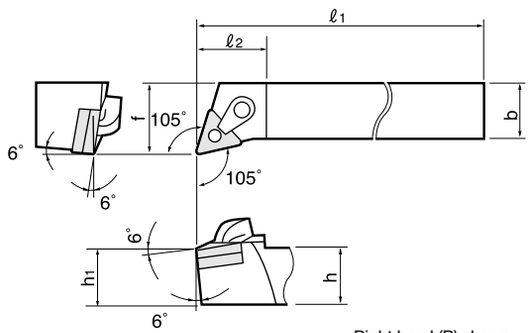
M-type ___ Negative rake • Multi-clamp type

Profiling

MTQN R/L



Cutting edge style **Q**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16, 22)	(22)

Appl.	Heavy cutting	Medium cutting	Medium cutting	
Type	57	SM	CM	Ceramics
Shape	(16, 22)	(16)	(16, 22)	(16, 22)

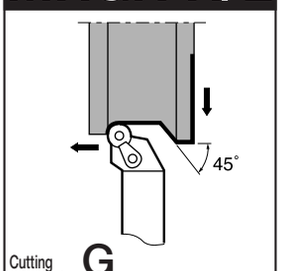
For details see pp. 70 - 76

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MTQNR/L2020K16	△		TN□□1604□□	0.8	20	20	125	–	20	25	–	MST-322	MLP34L	–	MCPM-21	MCS625-3	–	P-2F	P-3
MTQNR/L2525M16					25	25	150	–	25	32	–								
MTQNR/L3225P16					32	25	170	–	32	32	–								
MTQNR/L2525M22					25	25	150	–	25	32	–								
MTQNR/L3225P22	△		TN□□2204□□		32	25	170	–	32	32	–	MST-432	MLP46	–	MCPM-9	MCS828-4	–	P-2.5F	P-4
MTQNR/L3232P22	△				32	32	170	–	32	40	–								

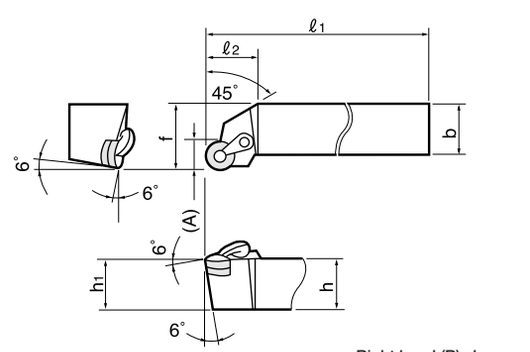
Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Profiling

MRGN R/L



Cutting edge style **G**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Heavy cutting			
Type	61	Ceramics		
Shape	(12)	(1204, 07)		

Appl.				
Type				
Shape				

For details see p. 88

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ	h1	f	f1	Shim	Lock pin	Shim screw	Clamp	Clamping screw	Breaker piece	Lock pin wrench	Wrench
MRGNR/L2020K12			RN□□1204□□	–	20	20	125	28	20	25	(12)	MSR-43	MLP46	–	MCPM-21	MCS625-3	–	P-2.5F	P-3
MRGNR/L2525M12	●				25	25	150	28	25	32	(12)			(MSP-6.3)			(CBR-4MN)		
MRGNR/L2020K12C			RN□□1207□□		20	20	125	28	20	25	(12)	MSR-43	–	MSP-6.3	MCPM-21	MCS625-3	CBR-4MN	P-2.5F	P-3
MRGNR/L2525M12C			(RN□□1206□□)		25	25	150	28	25	32	(12)	(MSR-44)	(MLP46L)						

Note : Parts in parenthesis are optional parts. For part assembly see p. 157.

Reference guide — Parts for M-type P. 157 ~ 159

■ Part combinations of M-type toolholder

The M-type toolholder can be used in several ways. You may purchase the optional parts separately according to the Parts List. When you use ceramic inserts, be sure to use the specified lock pin wrench and chipbreaker piece.

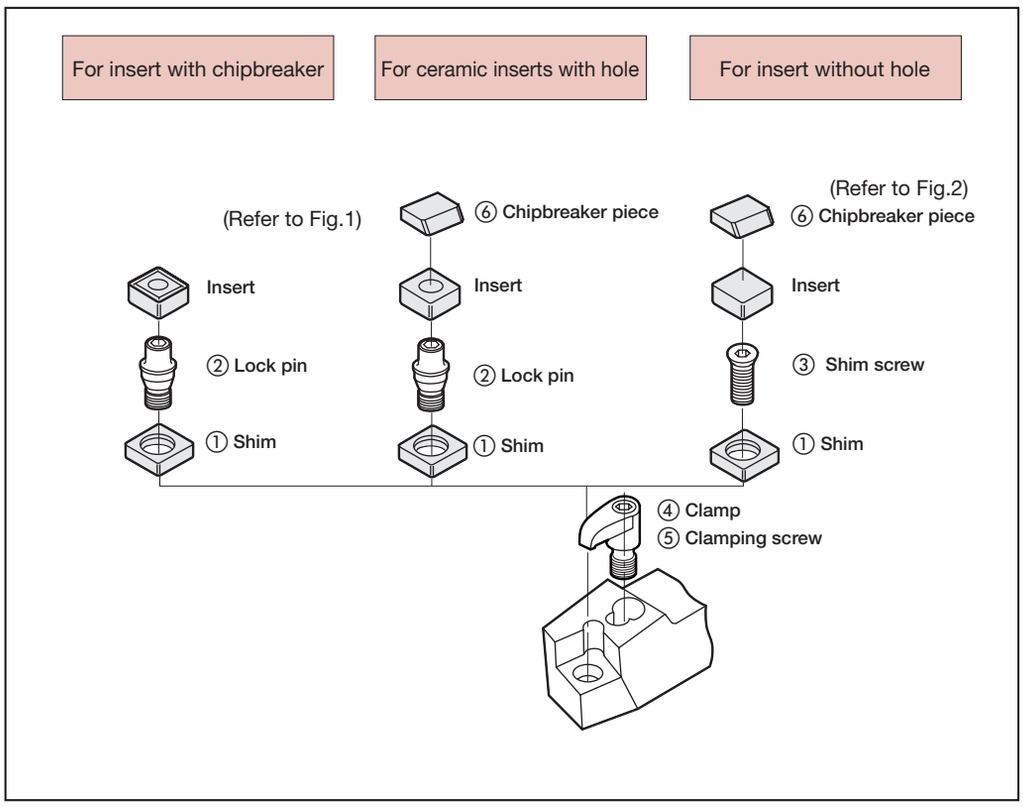


Fig. 1

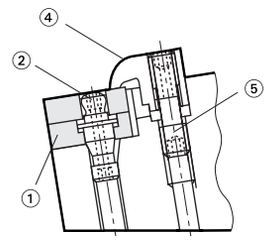
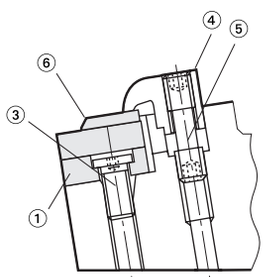


Fig. 2



● For use of the inserts shown in the shaded cells, the optional parts shown in the shaded cells are needed. You may purchase them separately.
1) Used for 1616H16 2) Used for MSDNN 3) Used for MDJNR/L 4) Used for MVVNN

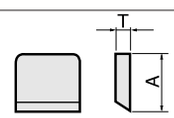
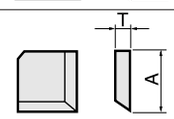
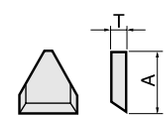
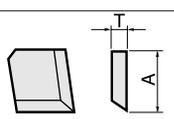
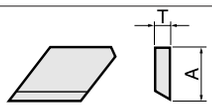
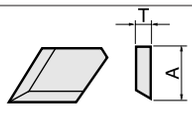
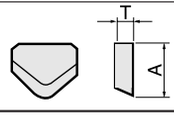
Toolholder Cat.No.		Insert Cat. No.	With or Without hole	① Shim	② Lock pin	③ Shim screw	④ Clamp	⑤ Clamping screw	⑥ Chipbreaker piece	⑦ Lock pin wrench	⑧ Wrench
MSBNR/L MSDNN MSKNR/L MSSNR/L	2020K12 2525M12	SN□□1204□□		MSS-432	MLP46	–	MCPM-21	MCS625-3	CBS-4M *2) CBS-4MN	P-2.5F	P-3
		SN□□1204□□			–	MSP-6.3				(P-2.5F)	P-3
	2020K12C 2525M12C	SN□□1207□□		MSS-432	–	MSP-6.3	MCPM-21	MCS625-3	CBS-4M *2) CBS-4MN	P-2.5F	P-3
		SN□□1206□□		MSS-442	MLP46L	–					
MTFNR/L MTGNR/L MTJNR/L MTQNR/L MTENN	1616H16 2020K16 2525M16 3225P16	TN□□1604□□		MST-322	MLP34L	–	*1) MCPM-20 MCPM-21	*1) MCS620-3 MCS625-3	CBT-3M	P-2F	P-3
		TN□□1604□□			–	MSP-5					
		TN□□1603□□		MST-332	MLP34L	–	*1) MCPM-20 MCPM-21	*1) MCS620-3 MCS625-3	CBT-3M	P-2F	P-3
		TN□□1603□□			–	MSP-5					
	2020K16C 2525M16C	TN□□1607□□		MST-322	–	MSP-5	MCPM-21	MCS625-3	CBT-3M	(P-2F)	P-3
	2525M22 3225P22 3232P22	TN□□2204□□		MST-432	MLP46	–	MCPM-9	MCS828-4	CBT-4M	P-2.5F	P-4
		TN□□2204□□			–	MSP-6.3					
	2525M27 3225P27 4040R27	TN□□2706□□		MST-533	MLP58	–	MCPM-12	MCS828-4	–	P-3	P-4
	3232P33 4040R33	TN□□3307□□		MST-644	MLP68L	–	MCPM-30	MCS825-4	–	P-3	P-4
MCLNR/L	1616H12 2020K12 2525M12 3225P12	CN□□1204□□		MSC-432	MLP46	–	MCPM-21	MCS625-3	CBC-4MN	P-2.5F	P-3
		CN□□1204□□			–	MSP-6.3					
	2020K12C 2525 3225P12C	CN□□1207□□		MSC-432	–	MSP-6.3	MCPM-12	MCS625-3	CBC-4MN	P-2.5F	P-3
		CN□□1206□□		MSC-442	MLP46L	–					
	2525M16 3225P16 3232P16	CN□□1606□□		MSC-533	MLP58	–	MCPM-12	MCS828-4	–	P-3	P-4
		CN□□1604□□		MSC-543							
	3232P19 4040R19	CN□□1906□□		MSD-634	MLP68	–	MCPM-12	MCS828-4	–	P-4	P-4
MDJNR/L MDPNN MDQNR/L	1616H11	DN□□1104□□		MSD-322	MLP34L	–	MCPM-20	MCS620-3	–	P-2F	P-3
	2020K15 2525M15 3225P15 3232P15	DN□□1506□□		MSD-432	MLP46L	–	MCPM-22	MCS625-3	*3) CBD-4MR/L CBD-4MN	P-2.5F	P-3
		DN□□1504□□		MSD-442		–					
		DN□□1504□□		MSD-442	–	MSP-6.3					
	2020K15C 2525M15C 3225P15C 3232P15C	DN□□1507□□		MSD-432	–	MSP-6.3	MCPM-22	MCS625-3	CBD-4MR/L *3) CBD-4MN	P-2.5F	P-3
		DN□□1506□□		MSD-442	MLP46L	–					

Toolholder Cat. No.		Insert		① Shim	② Lock pin	③ Shim screw	④ Clamp	⑤ Clamping screw	⑥ Chipbreaker piece	⑦ Lock pin wrench	⑧ Wrench
		Cat. No.	With or Without hole								
MVJNR/L MVVNN MVQNR/L	2020K16 2525M16 3225P16 3232P16	VN□□1604□□		MSV-332	MLP34L	–	MCPM-22 *4) MCPM-30	MCS625-3 *4) MCS828-4	–	P-2F	P-3 *4) P-4
MRGNR/L	2020K12 2525M12	RN□□1204□□		MSR-43	MLP46	–	MCPM-21	MCS625-3	CBR-4MN	P-2.5F	P-3
		RN□□1204□□			–	MSP-6.3					
	2020K12C 2525M12C	RN□□1207□□		MSR-43	–	MSP-6.3	MCPM-21	MCS625-3	CBR-4MN	P-2.5F	P-3
		RN□□1206□□		MSR-44	MLP46L	–					
MWLNR/L	2020K08 2525M08 3225P08	WNM□□0804□□		MSW-432	MLP46	–	MCPM-6	MCS520-2.5	–	P-2.5	P-2.5
	2525M10 3225P10 3232P10 4040R10	WNM□□1006□□		MSW-533	MLP58	–	MCPM-21	MCS625-3	–	P-3	P-3
	3232P13 4040R13	WNM□□1306□□		MSW-633	MLP68	–	MCPM-12	MCS828-4	–	P-4	P-4

Note : The shims are made of Tungaloy grade D30, and the chipbreaker pieces are of TX30.

■ List of Chipbreaker Pieces

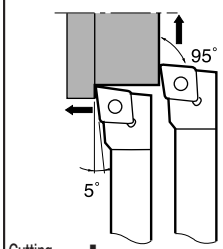
In addition to the standard chipbreaker pieces, optional chipbreaker pieces are available separately.
You may purchase the proper piece that is suitable for your cutting condition.

Shape	Chipbreaker piece Cat. No.	Inserts used	Dimensions (mm) A	Dimensions (mm) T	Chipbreaker width when assembled
	CBS-4S	 SN□□1204□□ SN□□1207□□	11.6	2.5	1.5
	CBS-4M		10.6		2.5
	CBS-4L		9.1		4.0
	CBS-4SN	 SN□□1204□□ SN□□1207□□	11.5	2.5	1.5
	CBS-4MN		10.5		2.5
	CBS-4LN		9.0		4.0
	CBT-3S	 TN□□1604□□ TN□□1607□□	12.1	2.5	1.5
	CBT-3M		11.1		2.5
	CBT-3L		10.1		3.5
	CBT-4S	 TN□□2204□□	16.9	2.5	1.5
	CBT-4M		15.9		2.5
	CBT-4L		14.4		3.5
	CBC-4SN	 CN□□1204□□ CN□□1207□□	11.5	2.5	1.5
	CBC-4MN		10.5		2.5
	CBC-4LN		9.5		3.5
	CBD-4SR/L	 DN□□1504□□ DN□□1506□□ DN□□1507□□	11.5	2.5	1.5
	CBD-4MR/L		10.5		2.5
	CBD-4LR/L		9.5		3.5
	CBD-4SN	 DN□□1506□□	11.5	2.5	1.5
	CBD-4MN		10.5		2.5
	CBD-4LN		9.5		3.5
	CBR-4SN	 RN□□1204□□ RN□□1206□□ RN□□1207□□	11.9	2.5	1.5
	CBR-4MN		10.9		2.5

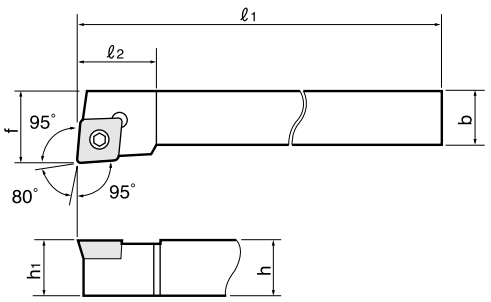
S-type —Positive rake • Screw-on type

Turning•Facing

SCLC R/L

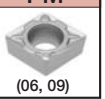


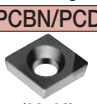
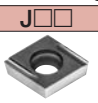
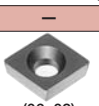
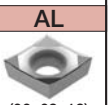
Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape				
	(06, 09)	(06, 09)	(06, 09)	(06, 09)

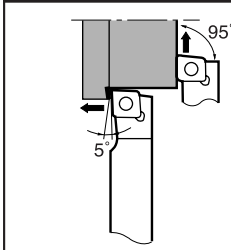
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape				
	(06, 09)	(06, 09)	(06, 09)	(06, 09, 12)

For details see pp. 92 - 95

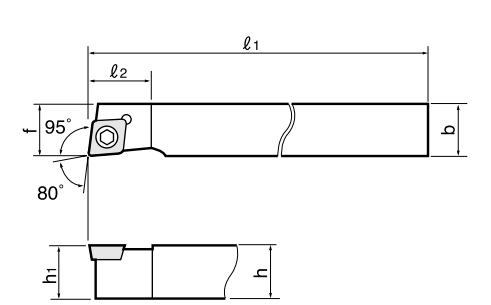
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SCLCR/L1212H			CC□□0602□□	0.4	12	12	100	12	12	16	–	CSTB-2.5	T-8F	–	–	–
SCLCR/L1616H			CC□□09T3□□	0.8	16	16	100	16	16	20	–	CSTB-4	T-15F	–	–	–
SCLCR/L1616H09	●	●			16	16	100	16	16	20	–	CSTB-3.5L	T-15F	SSC32	DTS5-3.5	P-3.5
SCLCR/L2020K12	○	○	CC□□1204□□		20	20	125	20	20	25	–	CSTB-4F	T-15F	SSC4T3	DTS6-4	P-4

Turning•Facing

SCL2C R/L

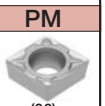


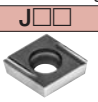
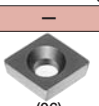
Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape				
	(06)	(06)	(06)	(06)

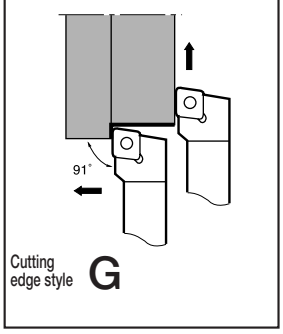
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape				
	(06)	(06)	(06)	(06)

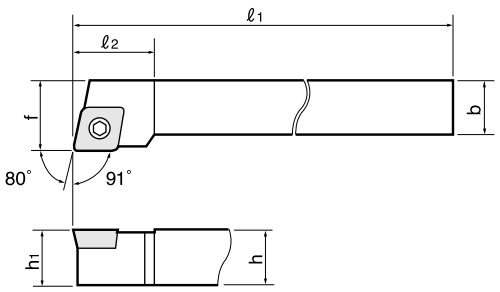
For details see pp. 92 - 95

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SCL2CR/L1010H			CC□□0602□□	0.4	10	10	100	12	10	10	–	CSTB-2.5	T-8F	–	–	–
SCL2CR/L1010K06					10	10	125	12	10	10	–					
SCL2CR/L1212H					12	12	100	12	12	12	–					
SCL2CR/L1212K06					12	12	125	12	12	12	–					

Note: Replaceable item JSCL2CR/L p. 272

Turning
SCGC R/L





Right hand (R) shown

● Basic-choice chipbreaker

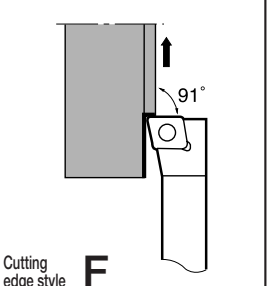
Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(06, 09)	(06, 09)	(06, 09)	(06, 09)

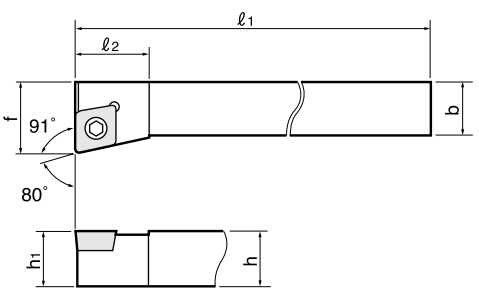
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(06, 09)	(06, 09)	(06, 09)	(06, 09)

For details see pp. 92 - 95

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SCGCR/L1212H			CC□□0602□□	0.4	12	12	100	12	12	16	–	CSTB-2.5	T-8F	–	–	–
SCGCR/L1616H			CC□□09T3□□	0.8	16	16	100	16	16	20	–	CSTB-4	T-15F	–	–	–

Facing
SCFC R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(06, 09)	(06, 09)	(06, 09)	(06, 09)

Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(06, 09)	(06, 09)	(06, 09)	(06, 09)

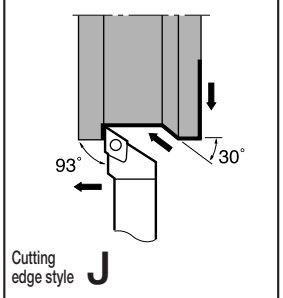
For details see pp. 92 - 95

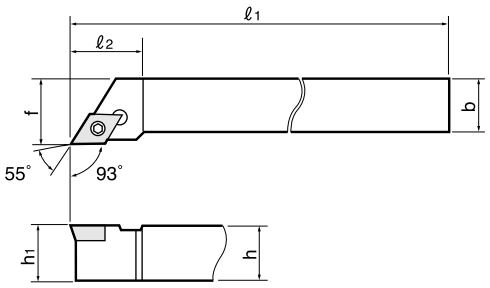
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SCFCR/L1212H			CC□□0602□□	0.4	12	12	100	16	12	16	–	CSTB-2.5	T-8F	–	–	–
SCFCR/L1616H			CC□□09T3□□	0.8	16	16	100	16	16	20	–	CSTB-4	T-15F	–	–	–

S-type — Positive rake • Screw-on type

Profiling

SDJC R/L

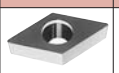




Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape				
	(07, 11)	(07, 11)	(07, 11)	(07, 11)

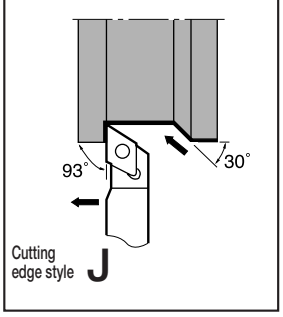
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape				
	(07, 11)	(07, 11)	(07, 11)	(07, 11)

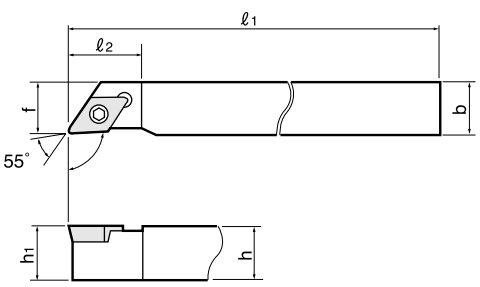
For details see pp. 98 - 101

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDJCR/L1212H			DC□□0702□□	0.4	12	12	100	14	12	16	–	CSTB-2.5	T-8F	–	–	–
SDJCR/L1616H			DC□□11T3□□	0.8	16	16	100	18	16	20	–	CSTB-4	T-15F	–	–	–
SDJCR/L1616H11	●	●			16	16	100	20	16	20	–	CSTB-3.5L	T-15F	SSD32	DTS5-3.5	P-3.5
SDJCR/L2020K11	●	●			20	20	125	20.5	20	25	–					
SDJCR/L2525M11	●	●			25	25	150	21.5	25	32	–					

Profiling

SDJ2C R/L

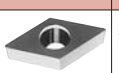




Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape				
	(07)	(07)	(07)	(07)

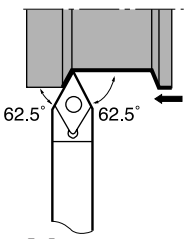
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape				
	(07)	(07)	(07)	(07)

For details see pp. 98 - 101

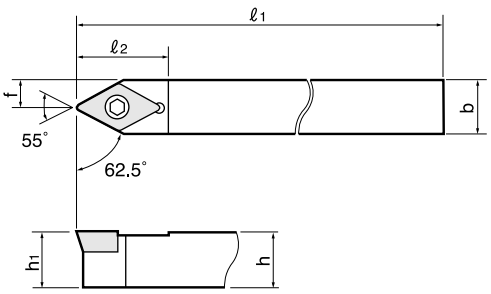
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDJ2CR/L1010H			DC□□0702□□	0.4	10	10	100	14	10	10	–	CSTB-2.5	T-8F	–	–	–
SDJ2CR/L1010K07					10	10	125	14	10	10	–					
SDJ2CR/L1212H					12	12	100	14	12	12	–					
SDJ2CR/L1212K07					12	12	125	14	12	12	–					

Replaceable item JSDJ2CR/L p. 272

Profiling
SDNCN



Cutting edge style **N**



● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

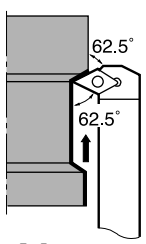
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

For details see pp. 98 - 101

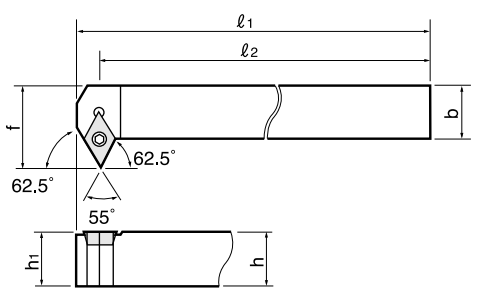
Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDNCN1010H		DC□□0702□□	0.4	10	10	100	14	10	5	–	CSTB-2.5	T-8F	–	–	–
SDNCN1010K07				10	10	125	14	10	5	–					
SDNCN1212H				12	12	100	14	12	6	–					
SDNCN1212K07				12	12	125	14	12	6	–					
SDNCN1616H		DC□□11T3□□	0.8	16	16	100	21	16	8	–	CSTB-4	T-15F	–	–	–
SDNCN1616H11	○			16	16	100	21	16	8	–	CSTB-3.5L	T-15F	SSD32	DTS5-3.5	P-3.5
SDNCN2020K11	○			20	20	125	21	20	10	–					
SDNCN2525M11	○			25	25	150	21	25	12.5	–					

Replaceable item JSDNCN p. 273

Profiling
SDN3C R/L



Cutting edge style **N**



Right hand (R) shown

● Basic-choice chipbreaker

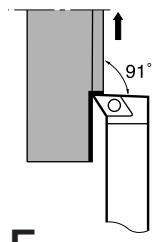
Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

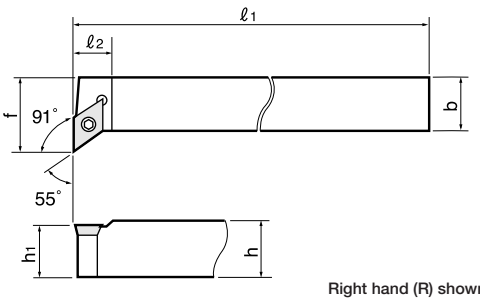
For details see pp. 98 - 101

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDN3CR/L1212H			DC□□0702□□	0.4	12	12	100	105	12	18	–	CSTB-2.5	T-8F	–	–	–
SDN3CR/L1616H			DC□□11T3□□	0.8	16	16	100	107	16	25	–	CSTB-4	T-15F	–	–	–

Facing
SDFC R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

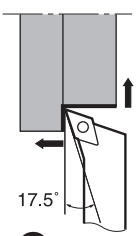
Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

For details see pp. 98 - 101

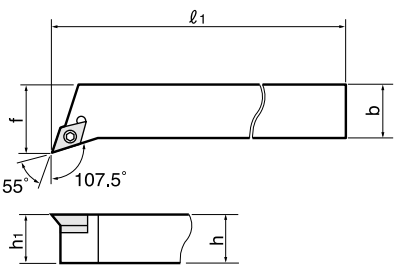
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDFCR/L1212H			DC□□0702□□	0.4	12	12	100	8	12	16	–	CSTB-2.5	T-8F	–	–	–
SDFCR/L1616H			DC□□11T3□□	0.8	16	16	100	10.5	16	22	–	CSTB-4	T-15F	–	–	–

Replaceable item JSDFCR/L p. 274

Profiling
SDQC R/L



Cutting edge style **Q**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(11)	(11)	(11)	(11)

Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J□□	–	AL
Shape	(11)	(11)	(11)	(11)

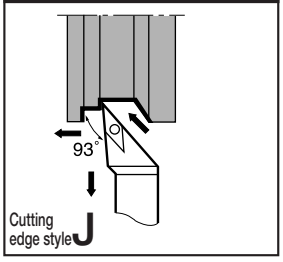
For details see pp. 98 - 101

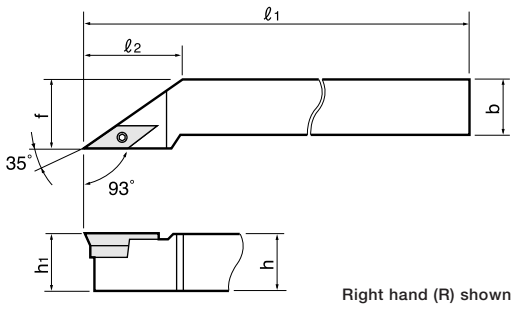
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SDQCR/L2020K11	●	●	DC□□11T3□□	0.8	20	20	125	–	20	25	–	CSTB-3.5L	T-15F	SSD32	DTS5-3.5	P-3.5
SDQCR/L2525M11	○				25	25	150	–	25	32	–					

S-type — Positive rake • Screw-on type

Profiling

SVJC R/L





Right hand (R) shown

● Basic-choice chipbreaker

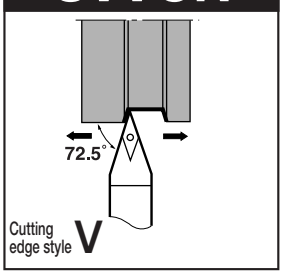
Appl.	Finishing to medium cutting	Medium cutting	Aluminium	Finishing
Type	PS	24	AL	PF
Shape				
	(16)	(16)	(16)	(16)

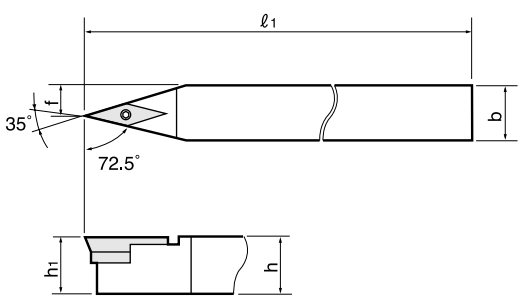
For details see p. 121

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SVJCR/L 1616H16	●	●	VC□□1604□□	0.8	16	16	100	40	16	20	–	CSTB-3.5L	T-15F	SSV32	DTS5-3.5	P-3.5
SVJCR/L 2020K16	●	●			20	20	125	40	20	25	–					
SVJCR/L 2525M16	●	●			25	25	150	40	25	32	–					
SVJCR/L 3225P16					32	25	170	40	32	32	–					

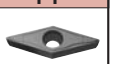
Profiling

SVVCN





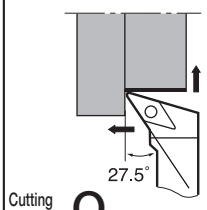
● Basic-choice chipbreaker

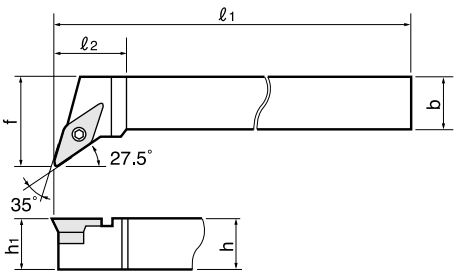
Appl.	Finishing to medium cutting	Medium cutting	Aluminium	Finishing
Type	PS	24	AL	PF
Shape				
	(16)	(16)	(16)	(16)

For details see p. 121

Cat. No.	Stock	Insert	Std. Corner R	h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SVVCN 2020K16	●	VC□□1604□□	0.8	20	20	125	–	20	10	–	CSTB-3.5L	T-15F	SSV32	DTS5-3.5	P-3.5
SVVCN 2525M16	●			25	25	150	–	25	12.5	–					
SVVCN 3225P16				32	25	170	–	32	12.5	–					

Profiling
SVQC R/L





Right hand (R) shown

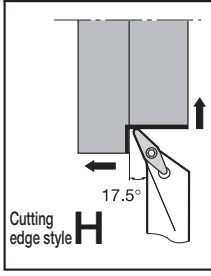
● Basic-choice chipbreaker

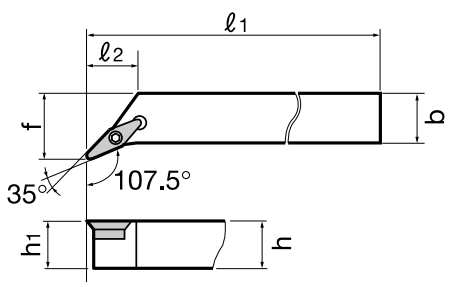
Appl.	Finishing to medium cutting	Medium cutting	Aluminium	Finishing
Type	PS	24	AL	PF
Shape	(16)	(16)	(16)	(16)

For details see p. 121

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SVQCR/L 2020K16	○	○	VC□□1604□□	0.8	20	20	125	35	20	27	–	CSTB-3.5L	T-15F	SSV32	DTS5-3.5	P-3.5
SVQCR/L 2525M16	○	○			25	25	150	35	25	32	–					
SVQCR/L 3225P16					32	25	170	35	32	32	–					

Profiling
SVHC R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Aluminium			
Type	AL			
Shape	(22)			

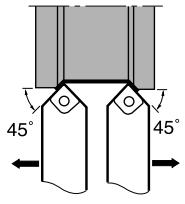
For details see p. 121

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SVHCR/L 2525M22	●	●	VCG□2205□□	0.8	25	25	150	33.8	25	32	–	CSTB-4.5L110P	T-15F	SSV42	DTS6-4.5	P-4.5

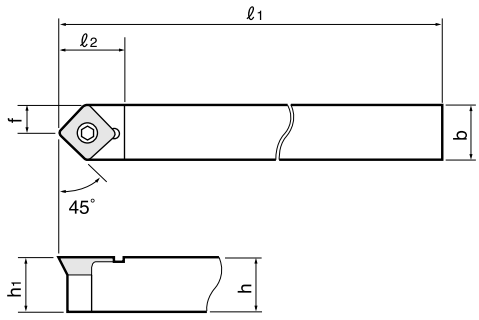
S-type — Positive rake • Screw-on type

Turning • Chamfering

SSDCN



Cutting edge style **D**



● Basic-choice chipbreaker

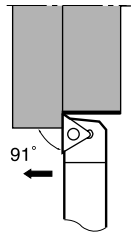
Appl.	Finishing	Finishing to medium cutting	Medium cutting	Finishing to medium cutting
Type	PF	PS	PM	24
Shape	(09)	(09)	(09)	(07)

For details see p. 102

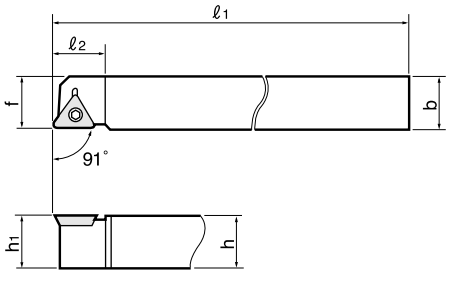
Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SSDCN 1010H07		SC□□0702□□	0.4	10	10	100	12	10	5	–	CSTB-3	T-9F	–	–	–
SSDCN 1010K07	●			10	10	125	12	10	5	–					
SSDCN 1212H09		SC□□09T3□□	0.8	12	12	100	12	12	6	–	CSTB-4	T-15F	–	–	–
SSDCN 1212K09	●			12	12	125	12	12	6	–					
SSDCN 1616H09	●			16	16	100	15	16	8	–	CSTB-3.5L	T-15F	SSS-32	DTS5-3.5	P-3.5

Turning

STAC R/L
STAP R/L



Cutting edge style **A**



Right hand (R) shown

● Basic-choice chipbreaker

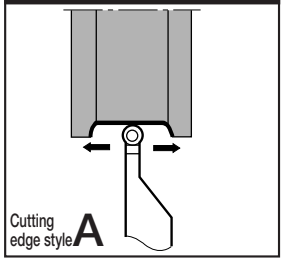
Appl.	Precision Finishing	Finishing to medium cutting	Medium cutting	Precision Finishing
Type	01	PS	PM	J□□
Shape	(09, 11, 16)	(11, 16)	(11, 16)	(1102)

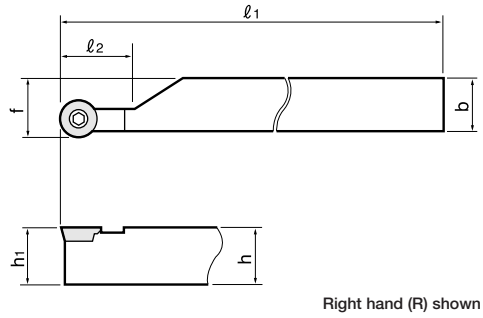
Appl.	Aluminium			
Type	AL			
Shape	(11, 16)			

For details see pp. 108- 109

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
STACR/L 0808H			TC□□0801□□	0.2	8	8	100	10.5	8	8	–	CSTB-2.2	T-7F	–	–	–
STACR/L 1010H					10	10	100	10.5	10	10	–					
STACR/L 1212H					12	12	100	10.5	12	12	–					
STACR/L 0808H09			TC□□0902□□		8	8	100	10.5	8	8	–					
STACR/L 0808K09	●	●			8	8	125	10.5	8	8	–					
STACR/L 1010H09	●				10	10	100	10.5	10	10	–					
STACR/L 1010K09					10	10	125	10.5	10	10	–					
STACR/L 1212H11	●	●	TC□□1102□□	0.4	12	12	100	10.5	12	12	–	CSTB-2.5	T-8F	–	–	–
STACR/L 1212K11	●	●			12	12	125	10.5	12	12	–					
STACR/L 1616H16	●		TC□□16T3□□	0.8	16	16	100	22.5	16	16	–	CSTB-3.5L	T-15F	SST32	DTS5-3.5	P-3.5
STAPR/L 1616H			TPGA/M1103□□	0.4	16	16	100	13	16	16	–	CSTA-N02L	T-8F	–	–	–

Profiling
SRAC R/L





Right hand (R) shown

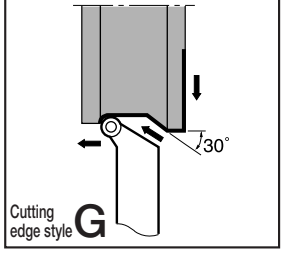
● Basic-choice chipbreaker

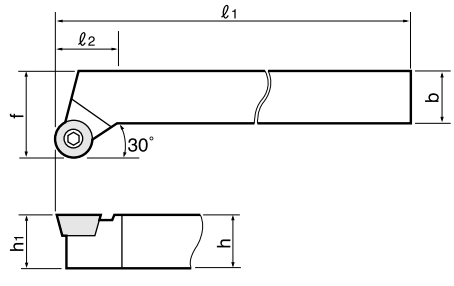
Appl.	Heavy cutting	Aluminium		
Type	61	AL		
Shape	 (05, 06, 08)	 (06, 08)		

For details see p. 122

Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SRACR/L 1010H05	○		RCMT0502M0-61	2.5	10	10	100	10	10	10.3	–	CSTB-2.2R	T-7F	–	–	–
SRACR/L 1212H05	○	○			12	12	100	10	12	12.3	–					
SRACR/L 1616H05	○				16	16	100	10	16	16.3	–					
SRACR/L 2020K05	●	●			20	20	125	10	20	20.3	–					
SRACR/L 2525M05	○	○			25	25	150	10	25	25.3	–					
SRACR/L 1212H06	○	○	RC□T0602M0□□	3.0	12	12	100	12	12	12.4	–	CSTB-2.5	T-8F	–	–	–
SRACR/L 1616H06	○	○			16	16	100	12	16	16.4	–					
SRACR/L 2020K06	●	●			20	20	125	12	20	20.4	–					
SRACR/L 2525M06	○	○			25	25	150	12	25	25.4	–					
SRACR/L 1616H08	○	○	RC□T0803M0□□	4.0	16	16	100	16	16	16.5	–	CSTB-3	T-9F	–		–
SRACR/L 2020K08	●	●			20	20	125	16	20	20.5	–					
SRACR/L 2525M08	●	●			25	25	150	16	25	25.5	–					

Profiling
SRGC R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Heavy cutting	Aluminium		
Type	61	AL		
Shape	 (05, 06, 08)	 (06, 08, 10)		

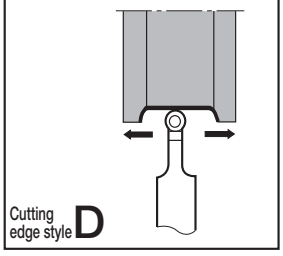
For details see p. 122

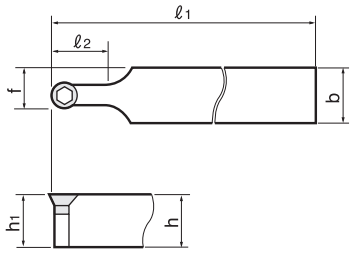
Cat. No.	Stock R	Stock L	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SRGCR/L 1212H05			RCMT0502M0-61	–	12	12	100	8	12	16	–	CSTB-2.2R	T-7F	–	–	–
SRGCR/L 1616H05					16	16	100	8	16	20	–					
SRGCR/L 2020K05	●				20	20	125	8	20	25	–					
SRGCR/L 2525M05					25	25	150	8	25	32	–					
SRGCR/L 1212H06			RC□T0602M0□□	–	12	12	100	10	12	16	–	CSTB-2.5	T-8F	–	–	–
SRGCR/L 1616H06					16	16	100	10	16	20	–					
SRGCR/L 2020K06					20	20	125	10	20	24	–					
SRGCR/L 2525M06	●	●			25	25	150	10	25	29	–					
SRGCR/L 1616H08			RC□T0803M0□□	–	16	16	100	14.5	16	22	–	CSTB-3	T-7F	–	–	–
SRGCR/L 2020K08					20	20	125	14.5	20	26	–					
SRGCR/L 2525M08	●	●			25	25	150	14.5	25	31	–					
SRGCR/L 2020K10			RC□T1003M0□□	–	20	20	120	13.5	25	25	–	CSTB-3.5L	T-15F	SSR32	DTS5-3.5	P-3.5
SRGCR/L 2525M10					25	25	150	17.0	25	32	–					

S-type — Positive rake • Screw-on type

Profiling

SRDCN





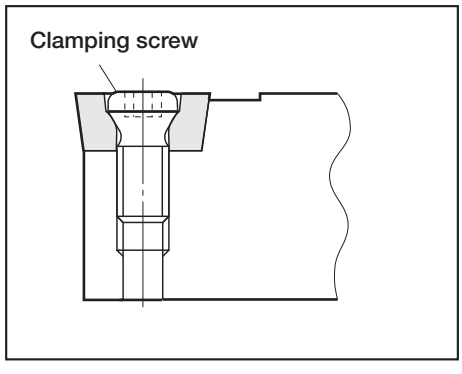
● Basic-choice chipbreaker

Appl.	Heavy cutting	Aluminium		
Type	61	AL		
Shape	 (06, 08)	 (06, 08)		

For details see p. 122

Cat. No.	Stock	Insert	Std. Corner R	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping screw	Wrench	Shim	Shim screw	Wrench
SRDCN 2020K06	●	RC□T0602M0□□	3.0	20	20	125	12	20	13	–	CSTB-2.5	T-8F	-	-	-
SRDCN 2525M06	●			25	25	150	12	25	15.5	–					
SRDCN 2020K08	●	RC□T0803M0□□	4.0	20	20	125	16	20	14	–	CSTB-3	T-9F	-	-	-
SRDCN 2525M08	●			25	25	150	16	25	16.5	–					

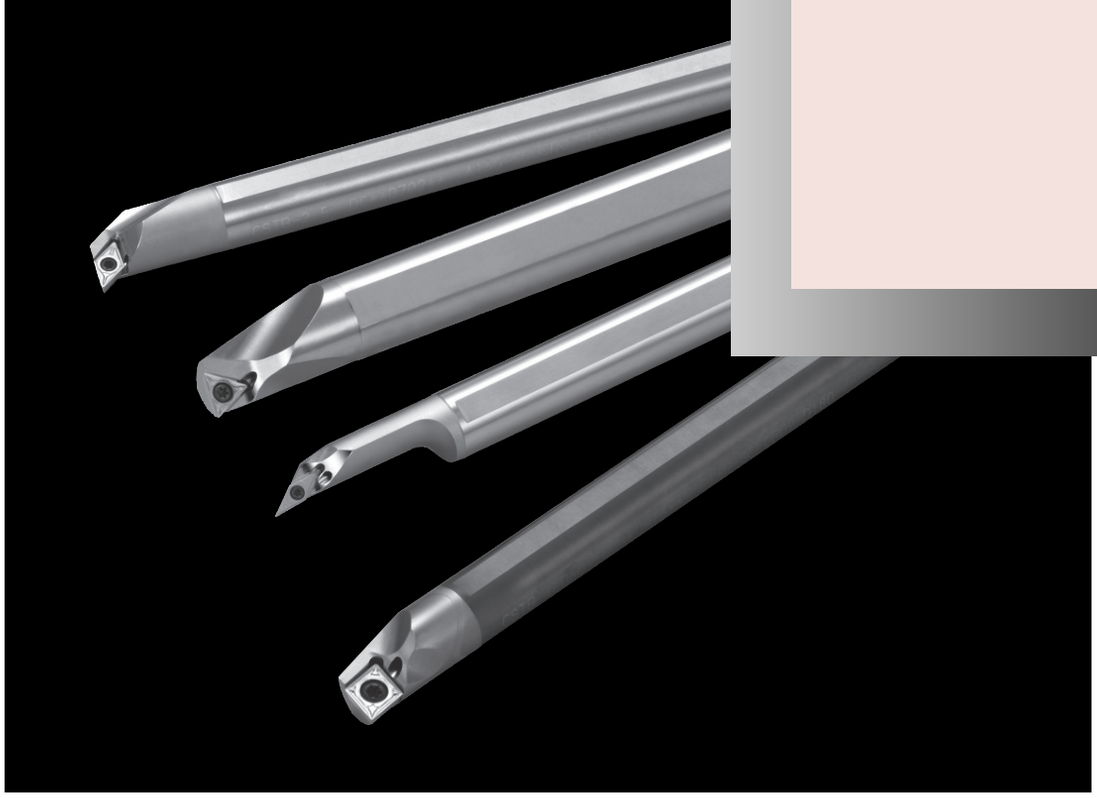
● Part assembly



MEMO

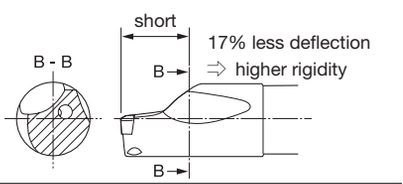
TAC Boring Toolholder

345

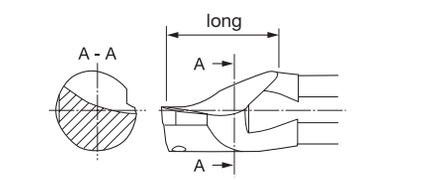


*…precision in detail.

Rigidity and precision



Tungaloy Stream Jet Bars



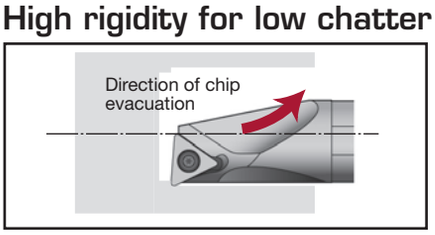
Conventional boring bar

Easy and optimal positioning of insert

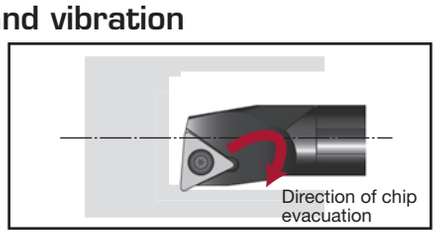
The **Tungaloy Stream Jet Bars** possess a larger material cross section in the area of the insert seat. Cutting forces are easily absorbed and compared to conventional boring bars, only minimal protrusion develops. The result is more than clearly evident:

Low vibration and improved dimensional workpiece accuracy

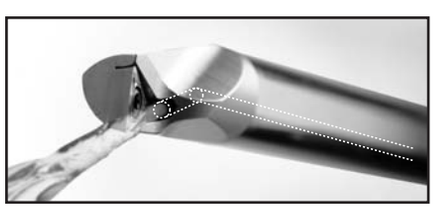
High rigidity for low chatter and vibration



Large chip pocket for excellent chip evacuation



Conventional boring bar with conventional chip flute design



Tungaloy Stream Jet Bars with optimised flute design for process stable chip evacuation

Coolant directed precisely on cutting edge

Applications and Min. Bore Diameters by Toolholder type

■ Positive rake type (Conformed to ISO)

Type	Style	Min. bore diameter (mm) 5 10 20 30 40 50		Page
S	SWUBR	ø6~ø7	Steel	181
		ø6~ø7	Carbide	
	STUPR/L	ø8~ø34	Steel	179
		ø8~ø27	Carbide	
	SEXPR/L	ø5,5~ø7	Steel	181
		ø5,5~ø7	Carbide	
	SCLCR/L	ø10~ø27	Steel	180
		ø10~ø27	Carbide	
	SCLPR/L	ø12~ø27	Steel	180
		ø12~ø18	Carbide	
	SSKPR/L	ø20~ø31	Steel	185
	SDUCR/L	ø13~ø32	Steel	182
		ø14~ø27	Carbide	
	SDQCR/L	ø13~ø30	Steel	182
		ø13~ø25	Carbide	
	SVUBR/L	ø20~ø32	Steel	183
		ø24.5~ø34	Carbide	
	SVUCR/L	ø16~ø32	Steel	183
		ø18~ø32	Carbide	
	SVQBR/L	ø17~ø30.5	Steel	184
		ø17~ø30.5	Carbide	
	SVQCR/L	ø13.5	Steel	184
		ø13.5	Carbide	
	SDZCR/L	ø14~ø25	Steel	183
		ø18~ø22	Carbide	
	SVZCR/L	ø16	Steel	185
	SVZBR/L	ø20~ø40	Steel	184
	SVJCR/L	ø16~ø20	Steel	185
	SVJBR/L	ø25~ø30	Steel	185

Type	Style	Min. bore diameter (mm) 5 10 20 30 40 50		Page
C	CTFPR/L	ø16~ø40	Steel	187
		ø10~ø32	Carbide	
	CSKPR/L	ø20~ø40	Steel	187
		ø20	Carbide	

■ Negative rake type

Type	Style	Min. bore diameter (mm) 15 20 30 40 50 60		Page
P	PCLNR/L	Steel	ø20~ø63	189
	PDUNR/L	Steel	ø25~ø63	189
	PTFNR/L	Steel	ø40~ø63	191
	PTUNR/L	Steel	ø20~ø32	191
	PSKNR/L	Steel	ø40~ø63	190
	PDZNR/L	Steel	ø40~ø60	190
M	MCLNR/L	Steel	ø32	192
	MWLNR/L	Steel	ø32~ø70	192
	MDUNR/L	Steel	ø32	193
	MTFNR/L	Steel	ø32	194
	MSKNR/L	Steel	ø32	193

Note: Shank material

: Steel shank

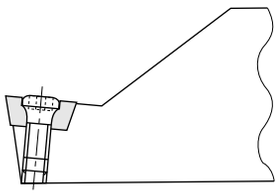
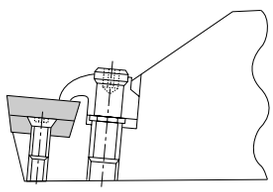
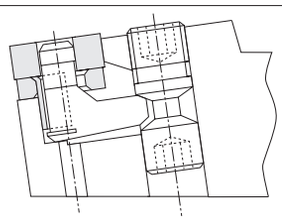
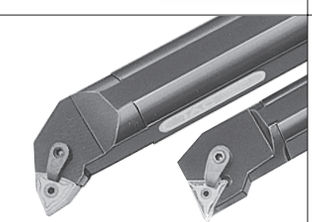
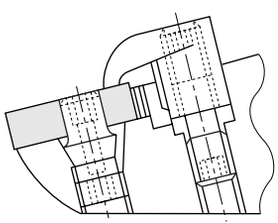
: Carbide shank

Types and Applications

Type	Specifications: Shank	Rigidity	Oil hole	Rake angle	L 95°	X 100°	U 93°	Q 45°	F 90°	U 93°	K 75°	Z 93°	J 93°
S Screw on	Steel	3	○	Positive	**SCLCR/L** (P.180)	**SEXPR/L** (P.181)	**SDUCR/L** (P.182)	**SDQCR/L** (P.182)	**STFPR/L** (P.185)	**STUPR/L** (P.179)	**SSKPR/L** (P.184)	**SDZCR/L** (P.183)	**SVJCR/L** (P.185) **SVJBR/L** (P.185)
	Carbide	1	○				**SVUCR/L** (P.183)	**SVQCR/L** (P.184)		**SWUBR/L** (P.181)			
C Clamp-on	Steel	3		Positive					**CTFPR/L** (P.187)		**CSKPR/L** (P.187)		
	Carbide	1											
P Pin-lock	Steel	3		Negative	**PCLNR/L** (P.189)		**PDUNR/L** (P.189)		**PTFNR/L** (P.191)	**PTUNR/L** (P.191)	**PSKNR/L** (P.190)	**PDZNR/L** (P.190)	
M Multi-clamp	Steel	3		Negative	**MCLNR/L** (P.192) **MWLNR/L** (P.192)		**MDUNR/L** (P.193)		**MTFNR/L** (P.194)		**MSKNR/L** (P.193)		

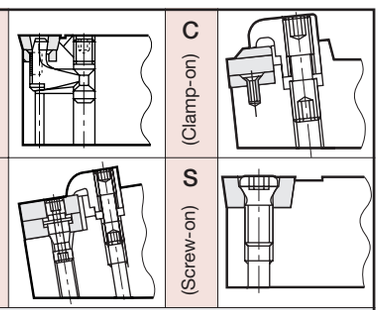
Note: Rigidity 1: excellent 2: good 3: fair

Clamping Mechanism and Features

Type	Appearance	Clamping mechanism	Features	Page
S Screw-on type			● Simple mechanism with a few parts. ● Smart shape having no protrusions such as screw heads or clams at holder head. ● Minimum bore diameter: ø5.5 mm. ● Free cutting action due to positive rake. ● Cemented carbide shank is available for suppressing chatter vibration.	179
C Clamp-on type			● Clamp-on type insert locking mechanism assures secure holding and accurate indexing. ● Without-hole insert provides stronger cutting-edge strength than S-type tools and can withstand heavier cutting conditions. ● Used for medium to large diameter boring. Minimum bore diameter is ø16 mm.	187
P Lever-lock type			● Negative rake, lever-lock type, round shank boring bars. ● As insert is positively held into two-wall pocket, excels in indexing accuracy. ● Minimum bore diameter: ø40 mm.	189
M Multi-clamp type			● Combination of lock-pin and top clamp provides positive insert holding and superior indexing accuracy. ● Suitable for medium to large diameter boring. ● Minimum bore diameter: Ø32 mm	192

Nomenclature of TAC Boring Toolholder

P	(Lever-lock)	C	(Clamp-on)
M	(Multi-clamp)	S	(Screw-on)



① Clamping mechanism

P	80° Rhombic
D	55° Rhombic
K	55° Parallelogram
R	Round
S	Square
T	Triangular
V	35° Rhombic
W	Trigon

② Insert shape

Example

⑨	⑧	⑦		①	②
S	25	R	–	M	S

⑨ Bar composition

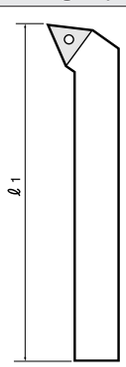
S	Steel shank
C	Carbide shank with steel head
A	Steel shank with oil hole
E	Carbide shank with steel head and oil hole

⑧ Bar diameter

The diameter of the bar is shown in mm.

⑦ Toolholder length (mm)

F	80
H	100
K	125
M	150
P	170
Q	180
R	200
S	250
T	300
U	350



③ Cutting edge style

Symbol	Style	Offset	Symbol	Style	Offset	Symbol	Style	Offset
A	90°	Without	G	91° / 91°	With	S	45°	With
B	75°	Without	J	93°	With	V	72.5°	Without
C	90°	Without	K	75°	With	U	93°	With
D	45°	Without	L	95° / 95°	With	X *	100°	With
E	60°	Without	N	63°	Without	Y	80°	With
F	91°	With	P *	62.5°	Without	Z	93°	Without
			Q *	45°	With			

Note
* mark: Tungaloy standard
No mark: ISO standard

④ Relief angle of insert

C	7°
B	5°
N	0°
P	11°

③	④	⑤	⑥	⑩	⑪
K	N	R	12	C	– D120

⑤ Hand of tool

L	Left hand
R	Right hand

⑥ Insert size

Symbol	I.C. (mm)
3	9.525
4	12.70
5	15.875
6	19.05
8	25.40

For M, S and C types which conform to ISO:

S T C R

ℓ ℓ ℓ ℓ

⑩ Oil hole

C	With oil hole

⑪ Min. bore diameter ø

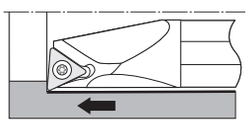
Stream Jet Bars	
140	ø 14.0 mm

Stream Jet Bars

S-Type (Positive·Screw-on type)

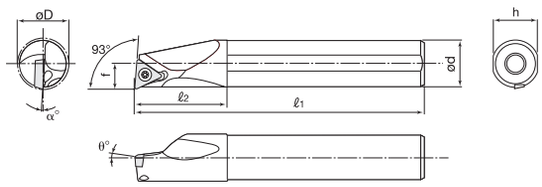
Stop boring

STUP R/L



Cutting edge style **U**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing to medium cutting	Finishing	Finishing to medium cutting
Type	01	W□□	PF	PS
Shape	(09, 11, 13, 16)	(09, 11, 13, 16)	(11, 13, 16)	(09, 11, 13, 16)

Appl.	Medium cutting	Finishing to medium cutting	Precision finishing	Finishing to medium cutting
Type	PM	SS	PCBN	–
Shape	(11, 13, 16)	(11, 13, 16)	(09, 11, 13, 16)	(07, 09, 11, 13, 16)

Appl.	Medium cutting	Precision finishing		
Type	24	PCBN		
Shape	(9, 11, 13, 16)	(9, 11, 13, 16)		

For details see pp. 110 - 115

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A08H-STUPR/L07-D080	●	●	TPGM0701□□	8	0.4	8	4	100	19.5	7.5	–	-10°	+5	CSTB-2.2L038	T-7F
	A08H-STUPR/L09-D100	●	●	TP□□0902□□	10			5.5		16			-8°			
	A10K-STUPR/L1102-D120	●	●	TP□□1102□□	12		10	6.5	125	20	9		-6°		CSTB2.5S	T-8F
	A10K-STUPR/L1103-D120	○	○	TP□□1103□□									-10°		CSTB-3L050	T-9F
	A12M-STUPR/L1102-D140	●	●	TP□□1102□□	14		12	7	150	24	11		-4°		CSTB-2.5B	T-8F
	A12M-STUPR/L1103-D140	○	○	TP□□1103□□									-6°		CSTB3L050	T-9F
	A16Q-STUPR/L1103-D180	○	○		18		16	9	180	32	15		-4°		CSTB-3S	
	A16Q-STUPR/L13-D180	●	●	TP□□1303□□									-3°			
	A20R-STUPR/L1103-D220	●	●	TP□□1103□□	22		20	11	200	36	18		-2°			
	A20R-STUPR/L13-D220	●	●	TP□□1303□□											CSTB-3	
	A25S-STUPR/L16-D270	●	●	TP□□16T3□□	27		25	13.5	250	45	23		-1°		CSTB-4M	T-15F
	A32T-STUPR/L16-D340	●	●		34	0.8	32	17	300	50	30		0°			
Carbide	E08K-STUPR/L07-D080	●	●	TPGM0701□□	8	0.4	8	4	125	44.5	7.5	–	-10°	+5	CSTB-2.2L038	T-7F
	E08G-STUPR/L07-D080	●							90							
	E08K-STUPR/L09-D100	●	●	TP□□0902□□	10			5.5	125	22	7		-8°			
	E08G-STUPR/L09-D100	●							90							
	E10M-STUPR/L1102-D120	●	●	TP□□1102□□	12		10	6.5	150	25	9		-6°		CSTB2.5S	T-8F
	E10H-STUPR/L1102-D120	●							100							
	E10M-STUPR/L1103-D120	○	○	TP□□1103□□					150				-10°		CSTB-3L050	T-9F
	E12Q-STUPR/L1102-D140	●	●	TP□□1102□□	14		12	7	180	27	11		-4°		CSTB-2.5B	T-8F
	E12J-STUPR/L1102 -D140	●							110							
	E12Q-STUPR/L1103-D140	○	○	TP□□1103□□					180				-6°		CSTB-3L050	T-9F
	E16R-STUPR/L1103-D180	○	○		18		16	9	200	32	15		-4°		CSTB-3S	
	E16R-STUPR/L13-D180	●	●	TP□□1303□□									-3°			
	E16L-STUPR/L13-D180	●							130							
	E20S-STUPR/L1103-D220	○		TP□□1103□□	22		20	11	250	36	18		-2°			
	E20S-STUPR/L13-D220	●		TP□□1303□□											CSTB-3	
	E25T-STUPR/L16-D270	●		TP□□16T3□□	27	0.8	25	13.5	300	45	23		-1°		CSTB-4m	T-15F

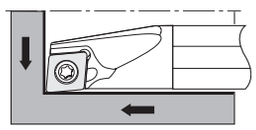
Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Reference guide → Sleeves P. 188

S-Type (Positive·Screw-on type)

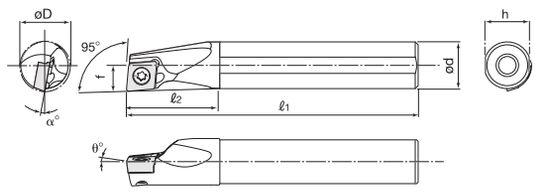
Boring·Facing

SCLC R/L



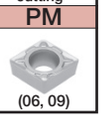
Cutting edge style **L**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)

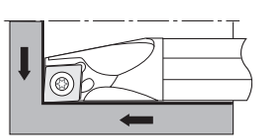
Appl.	Precision finishing	Finishing to medium cutting		Aluminium
Type	PCBN/PCD	–	24	AL
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)

For details see pp. 92 - 95

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A08H-SCLCR/L06-D100	●	●	CC□□0602□□	10	0.4	8	5.5	100	16	7.5	–	-13°	0°	CSTB-2.5S	T-8F
	A10K-SCLCR/L06-D120	●	●		12		10	6	125	20	9		-10°			
	A12M-SCLCR/L06-D140	●	●		14		12	7	150	24	11		-8°			
	A16Q-SCLCR/L09-D180	●	●	CC□□09T3□□	18	0.8	16	9	180	32	15		-10°		CSTB-4S	T-15F
	A20R-SCLCR/L09-D220	●	●		22		20	11	200		18		-8°			
	A25S-SCLCR/L09-D270	●	●		27		25	13.5	250	45	23		-6°			
Carbide	E08K-SCLCR/L06-D100	●	●	CC□□0602□□	10	0.4	8	5.5	125/90	22	7.5	–	-13°	0°	CSTB2.5S	T-8F
	E08G-SCLCR/L06-D100	●														
	E10M-SCLCR/L06-D120	●	●		12		10	6	150	25	9		-10°			
	E12Q-SCLCR/L06-D140	●	●		14		12	7	180	27	11		-8°			
	E16R-SCLCR/L09-D180	●	●	CC□□09T3□□	18	0.8	16	9	200	32	15		-10°		CSTB-4L060	T-15F
	E20S-SCLCR/L09-D220	●			22		20	11	250	36	18		-8°		CSTB-4S	
	E25T-SCLCR/L09-D270	●			27		25	13.5	300	45	23		-6°			

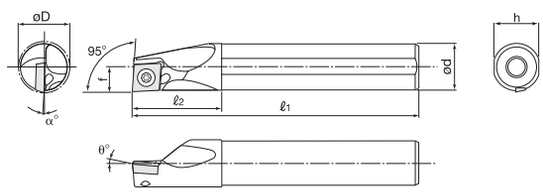
Boring·Facing

SCLP R/L



Cutting edge style **L**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	 (09)	 (09)	 (06, 08, 09)	 (09)

Appl.	Precision finishing	Finishing to medium cutting	Finishing to medium cutting	
Type	PCBN	–	24	
Shape	 (06, 09)	 (09)	 (06, 08, 09)	

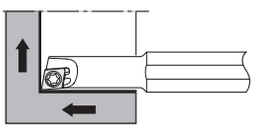
For details see pp. 92 - 95

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Carbide	A10K-SCLPR/L08-D120	○	○	CP□□0802□□	12	0.4	10	6	125	20	9	–	-5°	+5°	CSTB-3L042	T-9F
	A12M-SCLPR/L08-D140	○	○		14		12	7	150	24	11		-4°		CSTB-3L050	T-15F
	A16Q-SCLPR/L09-D180	○	○	CP□□0903□□	18	0.8	16	9	180	32	15		-3.5°		CSTB-4L060	
	A20R-SCLCR/L09-D220	○	○		22		20	11	200	36	18		-2°			
	A25S-SCLPR/L09-D270	○	○		27		25	3.5	250	45	23		-1°			
Steel	E10M-SCLPR/L08-D120	○	○	CP□□0802□□	12	0.4	10	6	150	25	9	–	-5°	+5°	CSTB-3L042	T-9F
	E10H-SCLPR/L08-D120	○														
	E12Q-SCLPR/L08-D140	○	○		14		12	7	180	27	11		-4°		CSTB-3L050	
	E16R-SCLPR/L09-D180	○	○	CP□□0903□□	18	0.8	16	9	200	32	15		-3.5°		CSTB-3L060	T-15F

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

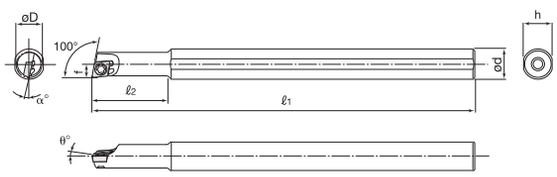
Reference guide → Sleeves P. 188

Boring·Facing
SEXP R/L



Cutting edge style **X**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

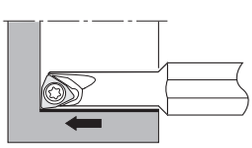
Appl.	Finishing to medium cutting	Finishing	
Type	W□□	J08	DIA
Shape	 (04)	 (04)	 (04)

For details see p. 123

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A08H-SEXPR/L04-D055	●	●	EP□□0401□□	5.5	0.4	8	2.75	100	16	7.5	–	-12°	0°	CSTB-2	T-6F
	A08H-SEXPR/L04-D070	●	●		7			3.6		20						
Carbide	E08K-SEXPR/L04-D055	●	●	EP□□0401□□	5.5	0.4	8	2.75	125	28	7.5	–	-12°	0°	CSTB-2	T-6F
	E08K-SEXPR/L04-D070	●	●		7			3.6		40						

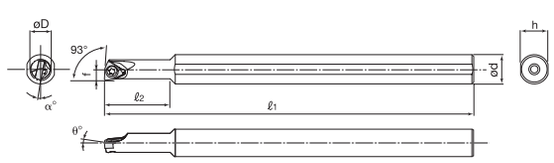
Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Boring·Facing
SWUB R/L



Cutting edge style **U**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting			
Type	W□□			
Shape	 (03)			

For details see p. 119

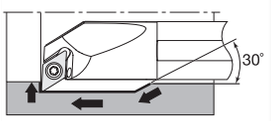
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A08H-SWUBR/L03-D060	●		WB□□0301□□	6	0.4	8	3.1	100	18	7.5	–	-12°	0°	CSTB-2	T-6F
	A08H-SWUBR/L03-D070	●			7			3.6		20						
Carbide	E08K-SWUBR/L03-D060	●		WB□□0301□□	6	0.4	8	3.1	125	30	7.5	–	-12°	0°	CSTB-2	T-6F
	E08K-SWUBR/L03-D070	●			7			3.6		40						

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.
● Clamping screw for left hand: CSTB-2ZI.

S-Type (Positive·Screw-on type)

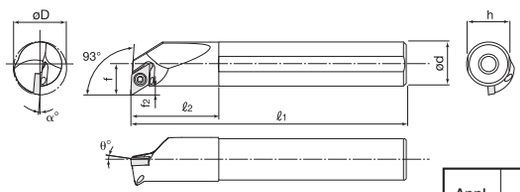
Boring·Profiling

SDUC R/L



Cutting edge style **U**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

Appl.	Precision finishing		Medium cutting	Finishing to medium cutting	Aluminium
Type	01	PCBN/PCD	24	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)	(07, 11)

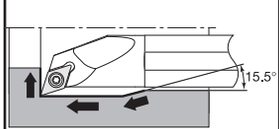
For details see pp. 98 - 101

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ_1	ℓ_2	h	f_2	α°	θ	Clamping screw	Wrench
Steel	A10K-SDUCR/L07-D130	●	●	DC□□0702□□	13	0.4	10	7	125	20	9	2	-10°	0°	CSTB-2.5S	T-8F
	A12M-SDUCR/L07-D160	●	●		16		12	9.3	150	24	11	3.3	-6°			
	A16Q-SDUCR/L07-D200	●	●		20		16	11.3	180	32	15		-5°		CSTB-2.5	
	A20R-SDUCR/L11-D270	●	●	DC□□11T3□□	27	0.8	20	16.1	200	36	18	6.1			CSTB-4S	T-15F
	A25S-SDUCR/L11-D320	●	●		32		25	18.6	250	45	23		-4°			
Carbide	E10M-SDUCR/L07-D130	●	●	DC□□0702□□	13	0.4	10	7	150	25	9	2	-10°	0°	CSTB-2.5S	T-8F
	E12Q-SDUCR/L07-D160	●	●		16		12	9.3	180	27	11	3.3	-6°			
	E16R-SDUCR/L07-D200	●	●		20		16	11.3	200	32	15		-5°		CSTB-2.5	
	E20S-SDUCR/L11-D270	●		DC□□11T3□□	27	0.8	20	16.1	250	36	18	6.1			CSTB-4S	T-15F

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

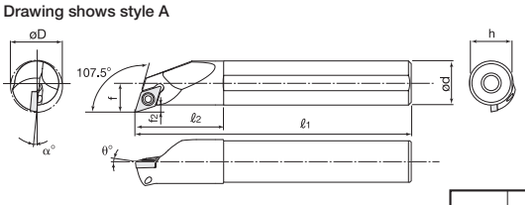
Boring·Profiling

SDQC R/L



Cutting edge style **Q**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

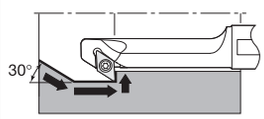
Appl.	Precision finishing		Medium cutting	Finishing to medium cutting	Aluminium
Type	01	PCBN/PCD	24	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)	(07, 11)

For details see pp. 98 - 101

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ_1	ℓ_2	h	f_2	α°	θ	Clamping screw	Wrench
Steel	A10K-SDQCR/L07-D130	●	●	DC□□0702□□	13	0.4	10	7.6	125	20	9	2.6	-8°	0°	CSTB-2.5	T-8F
	A12M-SDQCR/L07-D160	●	●		16		12	8.6	150	24	11		-6°			
	A16Q-SDQCR/L07-D200	●	●		20		16	10.6	180	32	15		-5°			
	A20R-SDQCR/L11-D250	●	●	DC□□11T3□□	25	0.8	20	13.7	200	36	18	3.7	-7°		CSTB-4S	T-15F
	A25S-SDQCR/L11-D300	●	●		30		25	16.2	250	45	23		-4°			
Carbide	E10M-SDQCR/L07-D130	●	●	DC□□0702□□	13	0.4	10	7.6	150	25	9	2.6	-8°	0°	CSTB-2.5	T-8F
	E12Q-SDQCR/L07-D160	●	●		16		12	8.6	180	27	11		-6°			
	E16R-SDQCR/L07-D200	●	●		20		16	10.6	200	32	15		-5°			
	E20S-SDQCR/L11-D250	●	●	DC□□11T3□□	25	0.8	20	13.7	250	36	18	3.7	-7°		CSTB-4	T-15F

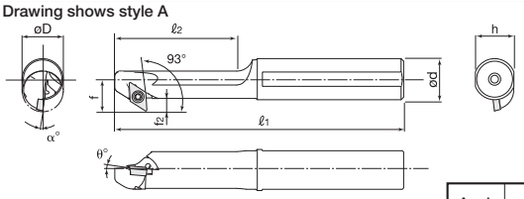
Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Retract boring
SDZC R/L



Cutting edge style **Z**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

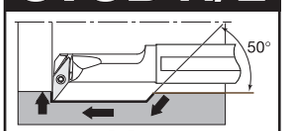
Appl.	Finishing to medium cutting	Finishing	Finishing to medium cutting	Medium cutting
Type	W□□	PF	PS	PM
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)

Appl.	Precision finishing		Medium cutting	Finishing to medium cutting	Aluminium
Type	01	PCBN/PCD	24	–	AL
Shape	(07, 11)	(07, 11)	(07, 11)	(07, 11)	(07, 11)

For details see pp. 98 - 101

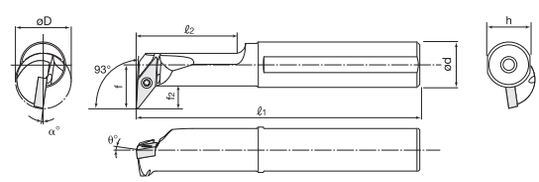
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A12M-SDZCR/L07-D140	●	●	DC□□0702□□	14	0.4	12	10.5	150	30	11	4.5	-9°	0°	CSTB-2.5	T-8F
	A16Q-SDZCR/L07-D160	●	●		16		16	12.5	180	35	15		-8°			
	A20R-SDZCR/L11-D200	●	●	DC□□11T3□□	20	0.8	20	15.5	200	40	18	5.5			CSTB-4S	T-15F
	A25S-SDZCR/L11-D250	●	●		25		25	18	250	50	23		-6°			
Carbide	E12Q-SDZCR/L07-D180	●	●	DC□□0702□□	18	0.4	12	10.5	180	27	11	4.5	-8°	0°	CSTB-2.5	T-8F
	E16R-SDZCR/L07-D220	●	●		22		16	12.5	200	32	15		-6°			

Boring·Profiling
SVUB R/L



Cutting edge style **U**

Drawing shows style A



Right hand (R) shown

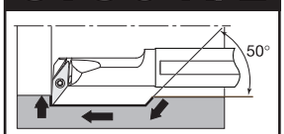
● Basic-choice chipbreaker

Appl.	Finishing to medium cutting		Medium cutting	
Type	PF	PS	24	
Shape	(11,16)	(11,16)	(16)	

For details see pp. 120

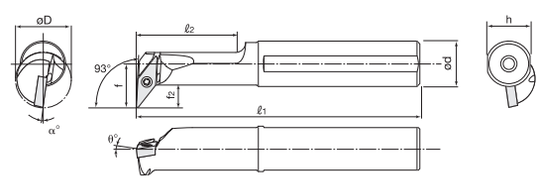
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A16Q-SVUBR/L11-D200	●	●	VB□□1103□□	20	0.4	16	15.5	180	35	15	8	-8°	0°	CSTB-2.5	T-8F
	A20R-SVUBR/L11-D250	●	●		25		20	17.5	200	40	19		-7°			
	A25S-SVUBR/L16-D320	●	●	VB□□1604□□	32	0.8	25	20.5	250	50	23	8.5	-6°		CSTB-3.5	T-15F
Carbide	E16R-SVUBR/L11-D245	●	●	VB□□1103□□	24.5	0.4	16	16	200	32	15	8	-8°	0°	CSTB-2.5	T-8F
	E20S-SVUBR/L11-D285	●	●		28.5		20	18	250	36	19		-7°			
	E25T-SVUBR/L16-D340	●	●	VB□□1604□□	34	0.8	25	21	300	45	23	8.5	-6°		CSTB-3.5	T-15F

Boring·Profiling
SVUC R/L



Cutting edge style **U**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting		Medium cutting	Aluminium
Type	PF	PS	24	AL
Shape	(8, 16)	(16)	(16)	(16)

Appl.	Precision finishing			
Type	PCBN/PCD			
Shape	(16)			

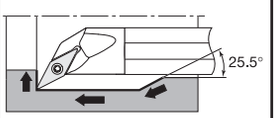
For details see pp. 121

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A12M-SVUCR/L08-D160	●	●	VC□□0802□□	16	0.4	12	11	150	30	11	5.5	-8°	0°	CSTB-2L	T-6F
	A25S-SVUCR/L16-D320	●	●	VC□□1604□□	32	0.8	25	19	250	45	23	6.5	-5°		CSTB-3.5	T-15F
	A32T-SVUCR/L16-D400				40		32	22	300	50	30	6	-3°		CSTB-3.5L	
	A40U-SVUCR/L16-D500				50		40	27	350	60	37	7	-1°			
Carbide	E12Q-SVUCR/L08-D180	●	●	VC□□0802□□	18	0.4	12	11.5	180	27	11	5.5	-8°	0°	CSTB-2L	T-6F
	E25T-SVUCR/L16-D320	●	●	VC□□1604□□	32	0.8	25	19	300	45	23	6.5	-5°		CSTB-3.5	T-15F

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

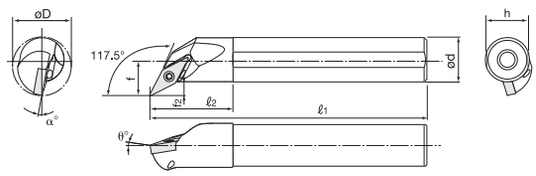
S-Type (Positive·Screw-on type)

Boring·Profiling SVQB R/L



Cutting edge style **Q**

Drawing shows style A



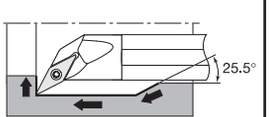
Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting		Medium cutting	
Type	PF	PS	24	
Shape	(11,16)	(11,16)	(16)	

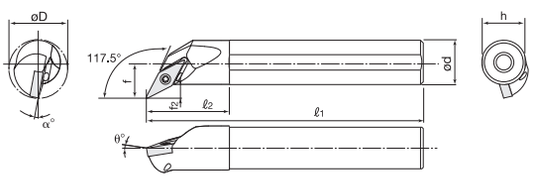
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ_1	ℓ_2	h	f_2	α°	θ	Clamping screw	Wrench
Steel	A12M-SVQBR/L11-D170	●	●	VB□□1103□□	17	0.4	12	10.5	150	24	11	4.5	-10°	-5°	CSTB-2.5	T-8F
Steel	A16Q-SVQBR/L11-D215	●	●		21.5		16	13	180	30	15	5	-8°			
Steel	A20R-SVQBR/L11-D255	●	●		25.5		20	15	200	36	18		-6°			
Steel	A25S-SVQBR/L16-D305	●	●	VB□□1604□□	30.5	0.8	25	17.5	250	45	23		-8°		CSTB-3.5	T-15F
Carbide	E12Q-SVQBR/L11-D170	●	●	VB□□1103□□	17	0.4	12	10.5	180	27	11	4.5	-10°	-5°	CSTB-2.5	T-8F
Carbide	E16R-SVQBR/L11-D215	●	●		21.5		16	13	200	32	15	5	-8°			
Carbide	E20S-SVQBR/L11-D255	●	●		25.5		20	15	250	36	18		-6°			
Carbide	E25T-SVQBR/L16-D305	●	●	VB□□1604□□	30.5	0.8	25	17.5	300	45	23		-8°		CSTB-3.5	T-15F

Boring·Profiling SVQC R/L



Cutting edge style **Q**

Drawing shows style A



Right hand (R) shown

● Basic-choice chipbreaker

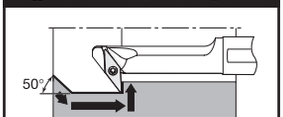
Appl.	Finishing to medium cutting		Medium cutting	Aluminium
Type	PF	PS	24	AL
Shape	(08, 16)	(16)	(16)	(16)

Appl.	Precision finishing
Type	PCBN/PCD
Shape	(16)

For details see pp. 121

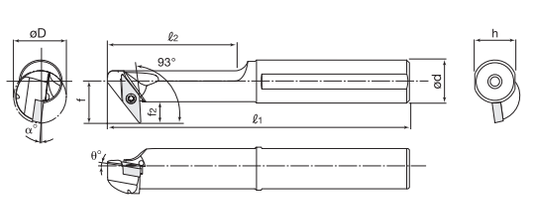
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ_1	ℓ_2	h	f_2	α°	θ	Clamping screw	Wrench
Steel	A10K-SVQCR/L08-D135	●	●	VC□□0802□□	13.5	0.4	10	8	125	20	9	3	-8°	-5°	CSTB-2L	T-6F
Steel	A25S-SVQCR/L16-D320			VC□□1604□□	32	0.8	25	17	250	45		4.5	-5°			
Steel	A32T-SVQCR/L16-D400				40		32	22	300	50	23	6	-3°	-0°	CSTB-3.5	T-15F
Steel	A40U-SVQCR/L16-D500				50		40	27	350	60		7	-1°			
Carbide	E10M-SVQCR/L08-D135	●	●	VC□□0802□□	13.5	0.4	10	8	150	25	9	3	-8°	-5°	CSTB-2L	T-6F

Retract boring SVZB R/L



Cutting edge style **Z**

Drawing shows style A



Right hand (R) shown

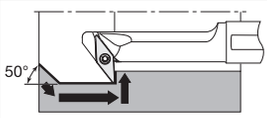
● Basic-choice chipbreaker

Appl.	Finishing to medium cutting		Medium cutting	
Type	PF	PS	24	
Shape	(11,16)	(11,16)	(16)	

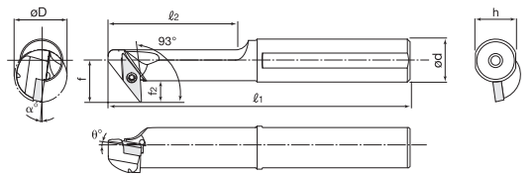
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ_1	ℓ_2	h	f_2	α°	θ	Clamping screw	Wrench
Steel	A16Q-SVZBR/L11-D200	●	●	VB□□1103□□	20	0.4	16	15.5	180	35	15	8	-8°	-0°	CSTB-2.5	T-8F
Steel	A20R-SVZBR/L11-D250	●	●		25		20	17.5	200	40	18		-7°			
Steel	A25S-SVZBR/L16-D320	●	●	VB□□1604□□	32	0.8	25	24	250	50	23	12	-6°		CSTB-3.5	T-15F
Steel	A32T-SVZBR/L16-D400	●	●		40		32	27.5	300	72	30		-5°		CSTB-3.5L	

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Retract boring
SVZC R/L



Cutting edge style **Z**



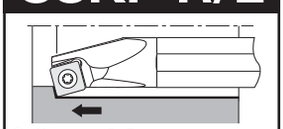
Right hand (R) shown

● Basic-choice chipbreaker

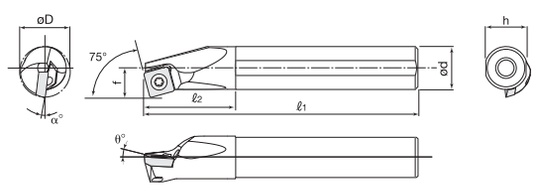
Appl.	Finishing to medium cutting		
Type	PF		
Shape	(08)		

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A12M-SVZCR/L08-D160	●	●	VC□□0802□□	16	0.4	12	11	150	30	11	5.5	-8°	0°	CSTB-2L	T-6F

Through boring
SSKP R/L



Cutting edge style **K**



Right hand (R) shown

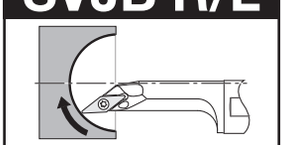
● Basic-choice chipbreaker

Appl.	Finishing to medium cutting	Medium cutting	Finishing	
Type	PS	24	W15	
Shape	(09, 12)	(09, 12)	(09)	

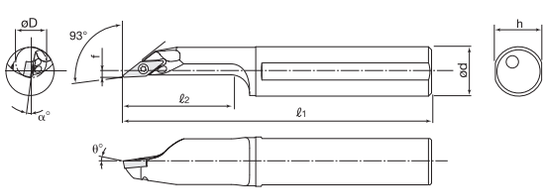
For details see p. 103

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A16Q-SSKPR/L09-D200	●		SP□□0903□□	20	0.8	16	11	180	32	15	–	-6°	5°	CSTB-4L060	T-15F
	A20R-SSKPR/L09-D240	●			24		20	13	200	36	18		-2°			
	A25S-SSKPR/L12-D310	●		SP□□1204□□	31		25	17	250	45	23				CSTB-5S	T-20F

Boring·Profiling
SVJB R/L



Cutting edge style **J**



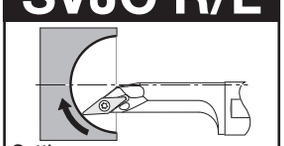
Right hand (R) shown

● Basic-choice chipbreaker

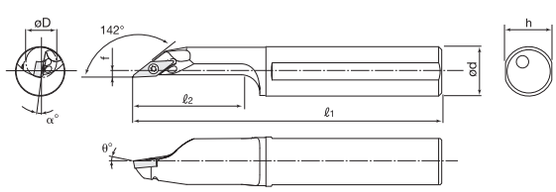
Appl.	Finishing to medium cutting		
Type	PF	PS	
Shape	(11)	(11)	

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A20R-SVJBR/L11-D250	●	●	VB□□1103□□	25	0.4	20	2	200	40	18	–	-5°	-5°	CSTB-2.5	T-8F
	A25S-SVJBR/L11-D300	●	●		30		25	3.5	250	50	23					

Boring·Profiling
SVJC R/L



Cutting edge style **J**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Finishing to medium cutting		
Type	PF		
Shape	(08)		

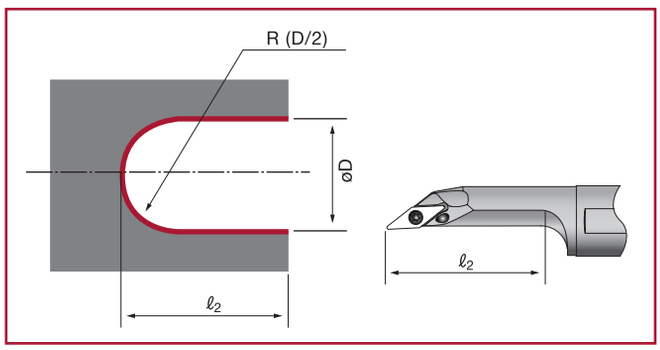
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	f2	α°	θ	Clamping screw	Wrench
Steel	A12M-SVJCR/L08-D160	●	●	VC□□0802□□	16	0.4	12	2	150	28	11	–	-5°	-5°	CSTB-2L	T-6F
	A16Q-SVJCR/L08-D200	●	●		20		16	2	180	35	15					

Notes: ● The hole of insert conform to ISO standard.
● When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

SVJC(B) R/L

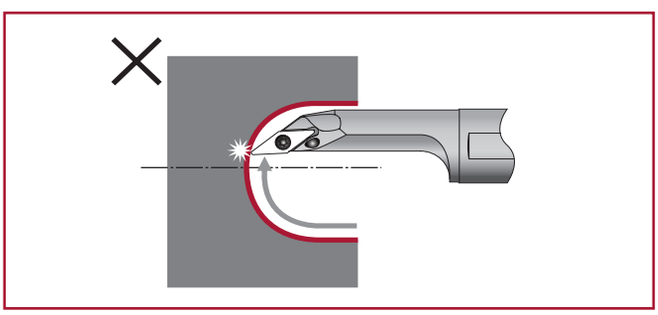
General machining information

The minimum machinable radius "R" of the internal sphere is ½ of the minimum bore diameter
Minimum bore diameter is shown in right drawing.
Maximum bore depth ℓ_2 remains unchanged.

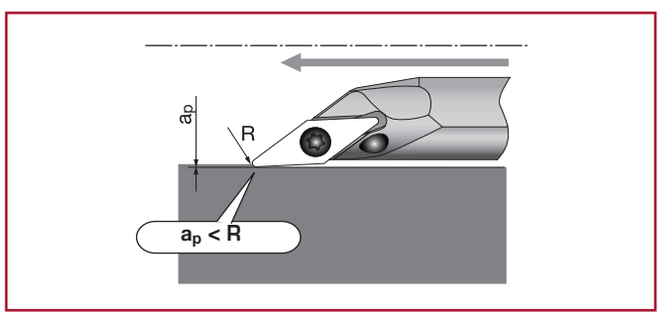


Cautionary points

To avoid insert breakage the tool point should not overrun the bore center.

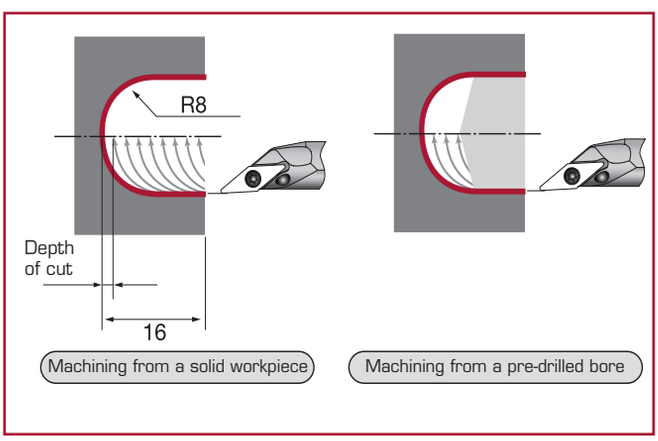


To avoid burr, the depth of cut should be within the corner radius.

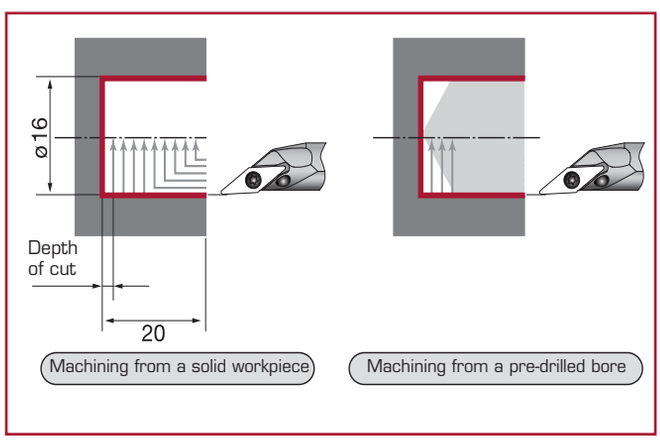


Machining examples

Work material	: Ck45
Boring bar	: **A12M-SVJCR08-D160**
Insert	: **VCMT080204-PF**
Grade	: **NS730**
Cutting speed	: ~ 100 m/min
No of revs.	: n = 3000 min^{-1} constant
Depth of cut	: a_p = 0.5mm
Feed rate	: f = 0.1 mm/rev

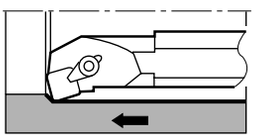


Work material	: Ck45
Boring bar	: **A12M-SVJCR08-D160**
Insert	: **VCMT080204-PF**
Grade	: **T9015**
Cutting speed	: ~ 100 m/min
No of revs.	: n = 3000 min^{-1} constant
Depth of cut	: a_p = 0.5 mm
Feed rate	: f = 0.1 mm/rev (Only for plunging: 0.05 mm/rev)

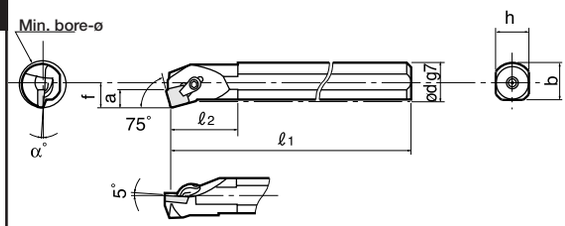


C-Type (Positive·Screw-on type)

Through boring
CSKP R/L



Cutting edge style **K**



Right hand (R) shown

● Basic-choice chipbreaker

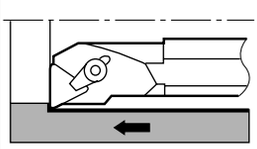
Appl.	Medium cutting	Precision finishing	Finishing to medium cutting
Type	23	PCBN/PCD	—
Shape	 (09, 12)	 (09, 12)	 (09, 12)

For details see pp. 104 - 106

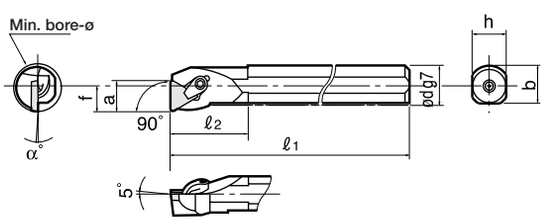
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Parts: Clamping set	Wrench	Shim	Shim screw
Carbide	C16R-CSKPR/L09	○		SP□□0903□□	20	0.8	16	11	200	–	14	–	4°	8.2	CSG-5S	P-2.5	–	–
Steel	S16Q-CSKPR/L09	○			20		16	11	180	30	14	15	4°	8.2	CSG-5S	P-2.5	–	–
	S20R-CSKPR/L09	○	○		25		20	13	200	40	18	18.5	2°	8.2	CSG-5	P-2.5	–	–
	S25S-CSKPR/L12	○		SP□□1203□□	32		25	17	250	45	23	22.5	0°	11.3	CSG-6	P-3	–	–
	S32T-CSKPR/L12				40		32	22	300	50	30	29.5	0°	11.3	CSG-6	P-3	PAS-42	SM3×0.5×6

Note: When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Stop boring
CTFP R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Medium cutting	Precision finishing	Finishing to medium cutting
Type	24	PCBN/PCD	—
Shape	 (11, 16)	 (11, 16)	 (11, 16)

For details see pp. 116 - 118

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Parts: Clamping set	Wrench	Shim	Shim screw
Carbide	C12Q-CTFPR/L11	●	○	TP□□1103□□	16	0.4	12	9	180	–	11	–	6°	10	CSW-00	P-2.5	–	–
	C16R-CTFPR/L11	○	○		20		16	11	200	–	15	–	4°	10	CSG-5S	P-2.5	–	–
Steel	S12M-CTFPR/L11	●	●		16		12	9	150	25	11	11.5	6°	10	CSW-00	P-2.5	–	–
	S16Q-CTFPR/L11	●	●		20		16	11	180	30	14	15	4°	10	CSG-5S	P-2.5	–	–
	S20R-CTFPR/L16	●	●	TP□□1603□□	25	0.8	20	13	200	40	18	18.5	2°	14.5	CSG-6S	P-3	–	–
	S25S-CTFPR/L16	●	○		32		25	17	250	45	23	22.5	0°	14.5	CSG-6	P-3	–	–
	S32T-CTFPR/L16	○	○		40		32	22	300	50	30	29.5	0°	14.5	CSG-6	P-3	PAT-32	SM3×0.5×6

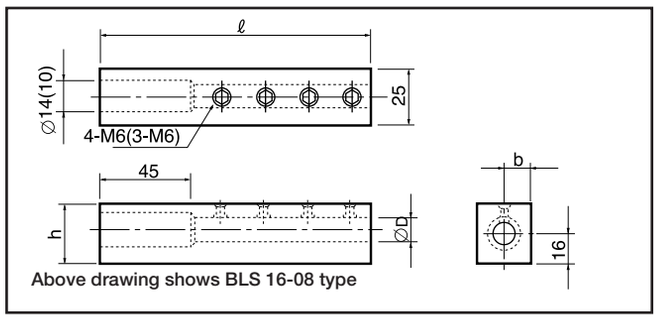
Note: When using right or left hand insert, right hand holder use left hand insert and left hand holder use right hand insert.

Sleeves

(For S-type and C-type boring bars having shank dias. of 8, 10, 12 and 16 mm)

BLS (Square shank)

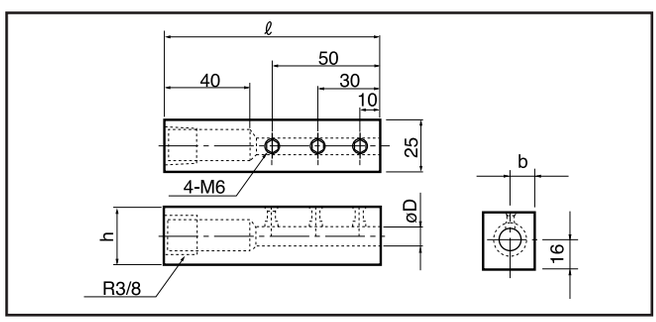
Cat. No.	Stock	Applicable shank dia. øD (mm)	Dimensions (mm)		
			ℓ	h	b
BLS16-08	○	8	125	28	12.5
BLS16-10	○	10	125	28	12.5
BLS16-12	○	12	125	28	12.5



Above drawing shows BLS 16-08 type

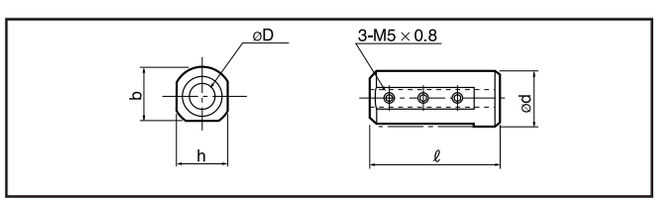
BLS-C (Square shank)

Cat. No.	Stock	Applicable shank dia. ØD(mm)	Dimensions (mm)		
			ℓ	h	b
BLS16-08C	○	8	100	28	12.5
BLS16-10C	○	10	100	28	12.5
BLS16-12C	○	12	100	28	12.5



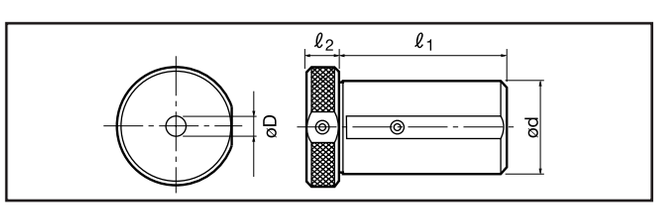
BLM (Round shank)

Cat. No.	Stock	Applicable shank dia. ØD(mm)	Dimensions (mm)			
			Ød	ℓ	b	h
BLM20-08	○	8	20	100	19	18
BLM25-08C	○	8	25	55	24	23
BLM25-10C	○	10	25	55	24	23
BLM25-12C	○	12	25	55	24	23



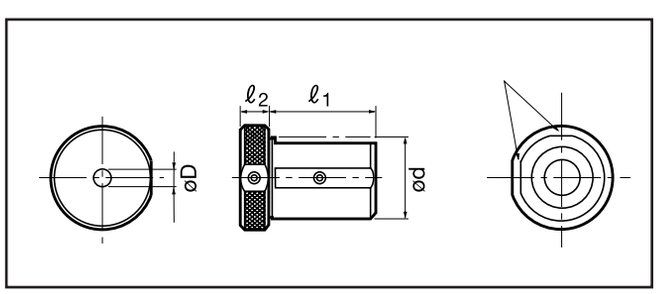
BLC (Standard type)

Cat. No.	Stock	Applicable shank dia. ØD(mm)	Dimensions (mm)		
			Ød	ℓ 1	ℓ 2
BLC40-08	○	8	40	73	13
BLC40-10	○	10			
BLC40-12	○	12			
BLC40-16	○	16			



BLC (Short type)

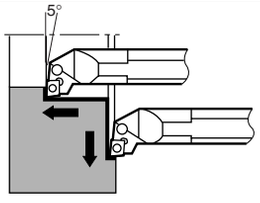
Cat. No.	Stock	Applicable shank dia. ØD(mm)	Dimensions (mm)		
			Ød	ℓ 1	ℓ 2
BLC32-8C	○	8	45	20	32
BLC32-10C	○	10			
BLC32-12C	○	12			
BLC40-8C	○	8	55	13	40
BLC40-10C	○	10			
BLC40-12C	○	12			
BLC40-16C	○	16			



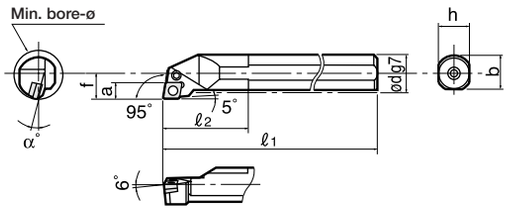
● Standard stock in Europe ○ Standard stock in Japan

P-Type (Negative·Pin-lock type)

Boring·Facing
PCLN R/L



Cutting edge style **L**



Right hand (R) shown

● Basic-choice chipbreaker

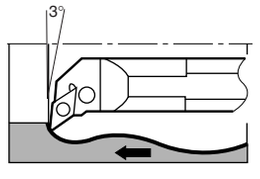
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape				
	(12)	(12)	(09, 12)	(12)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	CB	PCBN/PCD
Shape				
	(12)	(12)	(09)	(12)

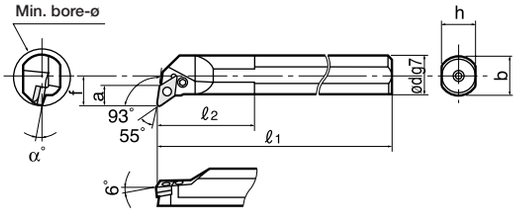
For details see pp. 44 - 50

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S16M-PCLNR/L09	●	●	CN□□0903□□	20	0.8	16	11	150	30	15	15.5	14°	9.525	–	LCL32N	LCS22A	–	P-2F
	S20Q-PCLNR/L09	●	●		25		20	13	180	35	18	19	12°	9.525					
	S25R-PCLNR/L09	●	●		32		25	17	200	40	23	24	11°	9.525					
	S32S-PCLNR/L12E	●	●	CN□□1204□□	40		32	22	250	50	30	29.5	11°	12.5	ELSC42	LCL43S	LCS4CA	LSP4S	P-3
	S40T-PCLNR/L12E	●	●		50		40	27	300	55	37	37.5	10°	12.5		LCL43M	LCS4		
	S50U-PCLNR/L12E	●			63		50	35	350	65	47	47.5	8°	12.5					

Internal profiling
PDUN R/L



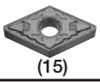
Cutting edge style **U**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape				
	(15)	(15)	(11, 15)	(15)

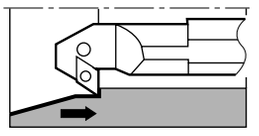
Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	CB	PCBN/PCD
Shape				
	(15)	(15)	(11)	(15)

For details see pp. 52 - 59

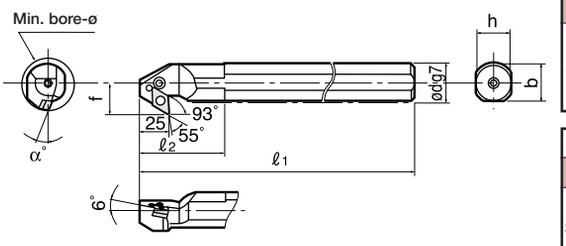
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S20Q-PDUNR/L11	●	●	DN□□1104□□	25	0.8	20	13	180	35	18	19	14°		–	LCL33NL	LCS22A	–	P-2F
	S25R-PDUNR/L11	●	●		32		25	17	200	40	23	24	12°		ELSD317B R/L	LCL33L	LCS3	LSP3	P-2.5
	S32S-PDUNR/L15E	●	●	DN□□1504□□	40		32	22	250	50	30	29.5	13°	14.5	ELSD42	LCL43S	LCS4CA	LSP4S	P-3
	S40T-PDUNR/L15E	●	●	DN□□1506□□	50		40	27	300	55	37	37.5	10°	14.5		LCL44	ELCS4		
	S50U-PDUNR/L15E				63		50	35	350	65	47	47.5	8°	14.5					

P-Type (Negative·Pin-lock type)

Boring·Profiling
PDZN R/L



Cutting edge style **Z**



Right hand (R) shown

● Basic-choice chipbreaker

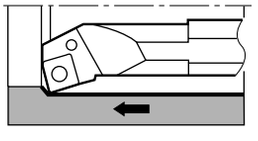
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(15)	(15)	(15)	(15)

Appl.	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	PCBN/PCD
Shape	(15)	(15)	(15)

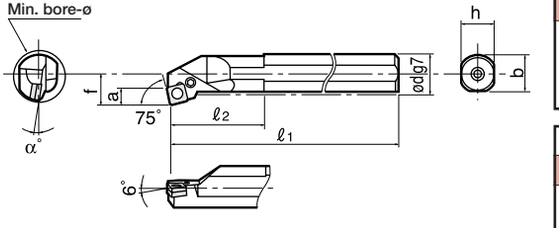
For details see pp. 52 - 59

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S32S-PDZNR/L15E			DN□□1504□□	40	0.8	32	22	250	55	30	29.5	13°	ELSD42	LCL43S	LCS4CA	LSP4S	P-3
	S40T-PDZNR/L15E				50		40	27	300	60	37	37.5	10°		LCL44	ELCS4		
	S50U-PDZNR/L15E				60		50	35	350	65	47	47.5	8°					

Through boring
PSKN R/L



Cutting edge style **K**



Right hand (R) shown

● Basic-choice chipbreaker

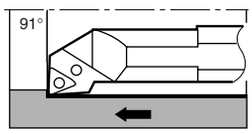
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	(12)	(12)	(12)	(12)

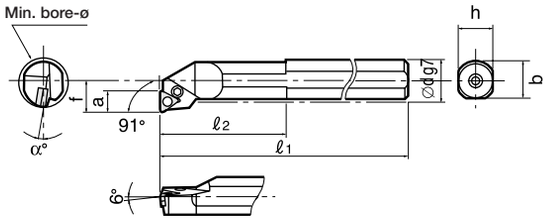
For details see pp. 61 - 67

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S32S-PSKNR/L12E	●		SN□□1204□□	40	0.8	32	22	250	55	30	29.5	10°	11	ELSS42	LCL43S	LCS4CA	LSP4S	P-3
	S40T-PSKNR/L12E	●			50		40	27	300	60	37	37.5	10°	11		LCL43M	LCS4		
	S50U-PSKNR/L12E				60		50	35	350	65	47	47.5	8°	11					

Stop boring
PTFN R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

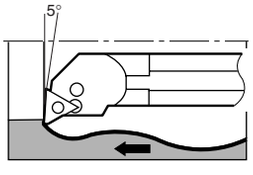
Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16)	(16)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	(16)	(16)	(16)	(16)

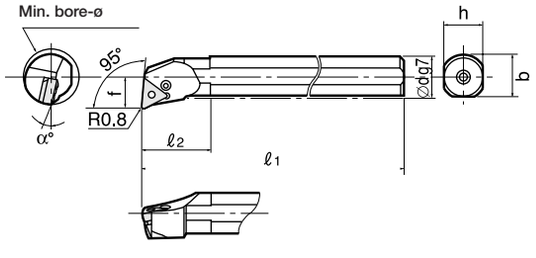
For details see pp. 70 - 76

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S32S-PTFNR/L16E	●		TN□□1604□□	40	0.8	32	22	250	50	30	29.5	10°	14.5	ELST317	LCL33	LCS3	LSP3	P-2.5
	S40T-PTFNR/L16E				50		40	27	300	55	37	37.5	10°	14.5					
	S50U-PTFNR/L16E				60		50	35	350	65	47	47.5	8°	14.5					

Internal profiling
PTUN R/L



Cutting edge style **U**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Medium cutting
Type	TF	TS	TM	CB
Shape	(16)	(16)	(11, 16)	(11, 16)

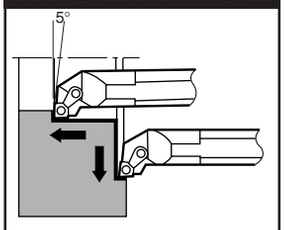
Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	(16)	(16)	(16)	(16)

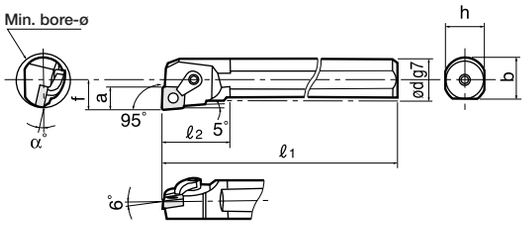
For details see pp. 70 - 76

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	Shim	Lever	Clamping screw	Spring	Wrench
Steel	S16M-PTUNR/L11	●	●	TN□□1103□□	20	0.4	16	11	150	30	15	15.5	14°	–	LCL22N	LCS22A	–	P-2F
	S20Q-PTUNR/L11	●	●		25		20	13	180	35	18	19	12°					
	S25R-PTUNR/L16	●	●	TN□□1604□□	32	0.8	25	17	200	40	23	24	12°	ELST317B R/L	LCL33	LCS3	LSP3	P-2.5

M-Type (Negative·Multi-clamp type)

Boring-Facing MCLN R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(12)	(12)	(12)	(12)

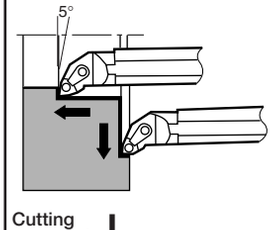
Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	(12)	(12)	(12)	(12)

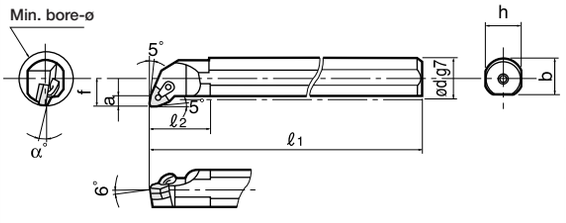
For details see pp. 44 - 50

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Lock pin	Clamp	Clamping screw	Shim	Lock pin wrench	Wrench
Steel	S25R-MCLNR/L12	●	●	CN□□1204□□	32	0.8	25	17	200	40	23	22.5	12°	12.5	MLP44	MCL-6* MCPM-21	MCS620-3	—	P-2.5F	P-3

Note:* marked part is former Cat. No. Former and present Cat. Nos. are compatible

Boring-Facing MWLN R/L





Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(08)	(08)	(08)	(08)

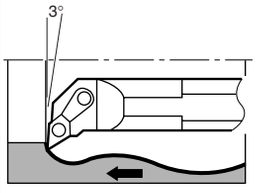
Appl.	Medium cutting	Medium cutting	Medium cutting	
Type	SM	CM	All-round type	
Shape	(08)	(08)	(08)	

For details see pages 78 - 82

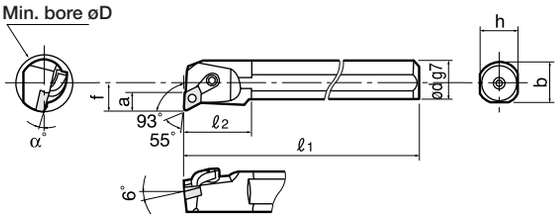
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Lock pin	Clamp	Clamping screw	Shim	Lock pin wrench	Wrench
Steel	S25R-MWLNR/L08	●	●	WN□□0804□□	32	0.8	25	17	200	40	23	22.5	12°	7.5	MLP44	MCL-5M*	MCS520-2.5	—	P-2.5F	P-2.5
	S32S-MWLNR/L08	●	●		44		32	22	250	50	30	29.5	10°	7.5	MLP46	MCPM-6		MSW -432BR/L		
	S40T-MWLNR/L08	●			54		40	27	300	60	37	37.5	10°	7.5						
	S50U-MWLNR/L08				70		50	35	350	75	47	47.5	10°	7.5						

Note:* marked part is former Cat. No. Former and present Cat. Nos. are compatible

Stop boring
MDUN R/L



Cutting edge style **U**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Medium cutting	Medium cutting	Medium cutting	
Type	TM	All-round type	CB	
Shape	 (11)	 (11)	 (11)	

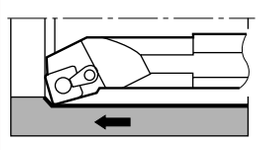
Appl.				
Type				
Shape				

For details see pp. 52 - 59

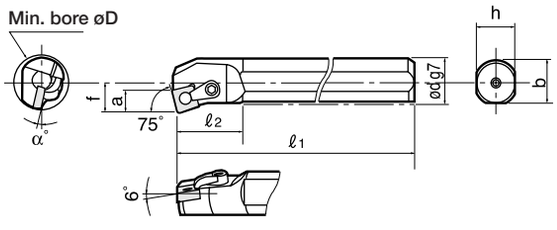
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Lock pin	Clamp	Clamping screw	Shim	Lock pin wrench	Wrench
Steel	S25R-MDUNR/L11	●	●	DN□□1104□□	32	0.8	25	17	200	40	23	22.5	12°	10.5	MLP33L	MCL-6* MCPM-20	MCS620-3	—	P-2F	P-3

Note:* marked part is former Cat. No. Former and present Cat. Nos. are compatible

Through boring
MSKN R/L



Cutting edge style **K**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	 (12)	 (12)	 (12)	 (12)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	 (12)	 (12)	 (12)	 (12)

For details see pp. 61 - 69

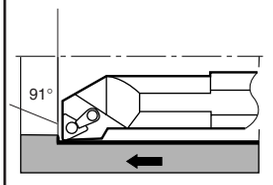
Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Lock pin	Clamp	Clamping screw	Shim	Lock pin wrench	Wrench
Steel	S25R-MSKNR/L12			SN□□1204□□	32	0.8	25	17	200	40	23	22.5	12°	11	MLP44	MCL-6* MCPM-21	MCS620-3	—	P-2.5F	P-3

Note:* marked part is former Cat, No. Former and present Cat. Nos. are compatible

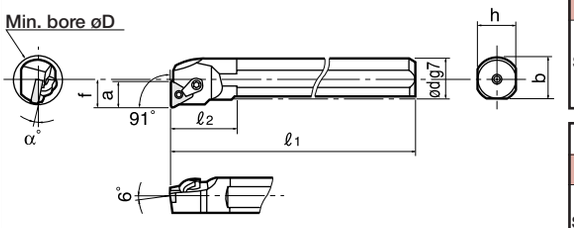
M-Type (Negative·Multi-clamp type)

Stop boring

MTFN R/L



Cutting edge style **F**



Right hand (R) shown

● Basic-choice chipbreaker

Appl.	Precision finishing	Finishing	Medium cutting	Roughing
Type	TF	TS	TM	TH
Shape	(16)	(16)	(16)	(16)

Appl.	Medium cutting	Medium cutting	Medium cutting	Precision finishing
Type	SM	CM	P	PCBN/PCD
Shape	(16)	(16)	(16)	(16)

For details see pp. 70 - 76

Shank material	Cat. No.	Stock R	Stock L	Insert	Min. bore dia. øD	Std. Nose R	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	α°	a	Lock pin	Clamp	Clamping screw	Shim	Lock pin wrench	Wrench
Steel	S25R-MTFNR/L16	●	●	TN□□1604□□	32	0.8	25	17	200	40	23	22.5	12°	14.5	MLP33L	MCL-5M* MCPM-6	MCS520-2.5	–	P-2F	P-2.5

Note:* marked part is former Cat, No. Former and present Cat. Nos. are compatible

Top-Borer Tools

■ Features

- Indexable insert jig boring tools usable for commercially available adjustable boring heads.
- Minimum bore diameter is ø5.5 mm.
- Available in three types of SEXP, SWUB and STUP.

■ Applications by type

SEXP 	● Minimum bore diameter: ø5.5 mm ● A 75° rhombic insert is used. Stable insert holding assures precision boring.
SWUB 	● Available in two sizes of minimum bore diameters of ø7 mm and ø8 mm. ● Uses an economical trigon insert.
STUP 	● Available in five sizes of minimum bore diameters of ø10, ø12, ø14, ø16 and ø18 mm. ● Many standard items make them applicable for a wide range of applications.

■ Nomenclature for Top-Borer Tools

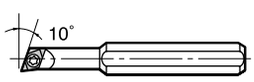
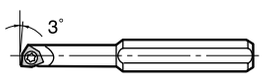
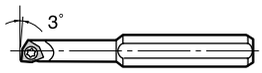
Symbol	Material
S	Steel
C	Carbide
① Shank material	

Symbol	(mm)
055	ø5.5
07	ø7
08	ø8
10	ø10
③ Min. bore diameter	

Symbol	Insert type
04	EPGT0401□□
03	WBGT0301□□
08	TPGT0802□□
11	TPGT1102□□
⑥ Applicable insert	

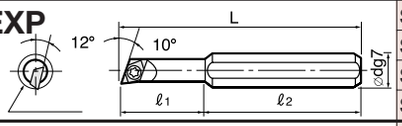
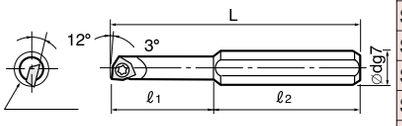
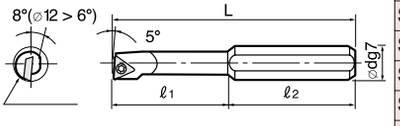
①	②	③		④	⑤	⑥
S	08	055	-	SEXP	R	04

② Shank size	
Symbol	Shank diameter (mm)
08	⌀8
10	⌀10
12	⌀12
16	⌀16

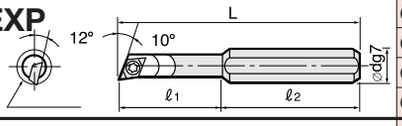
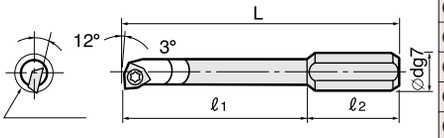
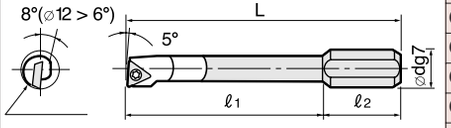
④ Tool shape	
Symbol	Shape
SEXP	
SWUB	
STUP	

⑤ Hand of tool	
Symbol	Hand
R	Right hand
L	Left hand

■ Steel shank

Shape (Right hand (R) shown)	Cat. No.	Stock R	Stock L	Inserts	Min. bore dia. øD(mm)	Std. corner R	Dimensions (mm) ød	L	ℓ1	ℓ2	Parts Clamping screw	Parts Wrench
SEXP 	**S08055-SEXPR/L04**	●		EPGT0401□□	5.5	0.4	8	45	19	26	CSTB-2	T-6F
	S10055-SEXPR/L04	●			5.5		10	51	19	32		
	S12055-SEXPR/L04	●			5.5		12	51	19	32		
	S16055-SEXPR/L04				5.5		16	54	19	35		
SWUB 	**S0807-SWUBR03**			WBGT0301□□	7	0.4	8	50	24	26	CSTB-2	T-6F
	S1007-SWUBR03				7		10	56	24	32		
	S1207-SWUBR03	●			7		12	56	24	32		
	S1607-SWUBR03				7		16	59	24	35		
	S0808-SWUBR03	○			8		8	54	28	26		
	S1008-SWUBR03	●			8		10	60	28	32		
	S1208-SWUBR03				8		12	60	28	32		
	S1608-SWUBR03				8		16	63	28	35		
STUP 	**S0810-STUPR/L08**			TPGT0802□□	10	0.4	8	61	—	—	CSTB2 L040	T-6F
	S1010-STUPR/L08				10		10	67	35	32		
	S1210-STUPR/L08				10		12	67	35	32		
	S1610-STUPR/L08				10		16	70	35	35		
	S1012-STUPR/L08				12		10	74	—	—	CSTB-2L	
	S1212-STUPR/L08				12		12	74	42	32		
	S1612-STUPR/L08				12		16	77	42	35		
	S1212-STUPR/L11			TPGT1102□□	12		12	74	42	32	CSTB-2.5	T-8F
	S1614-STUPR/L08			TPGT0802□□	14		16	84	49	35	CSTB-2L	T-6F
	S1214-STUPR/L11			TPGT1102□□	14		12	81	—	—	CSTB-2.5	T-8F
	S1616-STUPR/L08			TPGT0802□□	16		16	91	56	35	CSTB-2L	T-6F
	S1618-STUPR/L11			TPGT1102□□	18		16	98	—	—	CSTB-2.5	T-8F

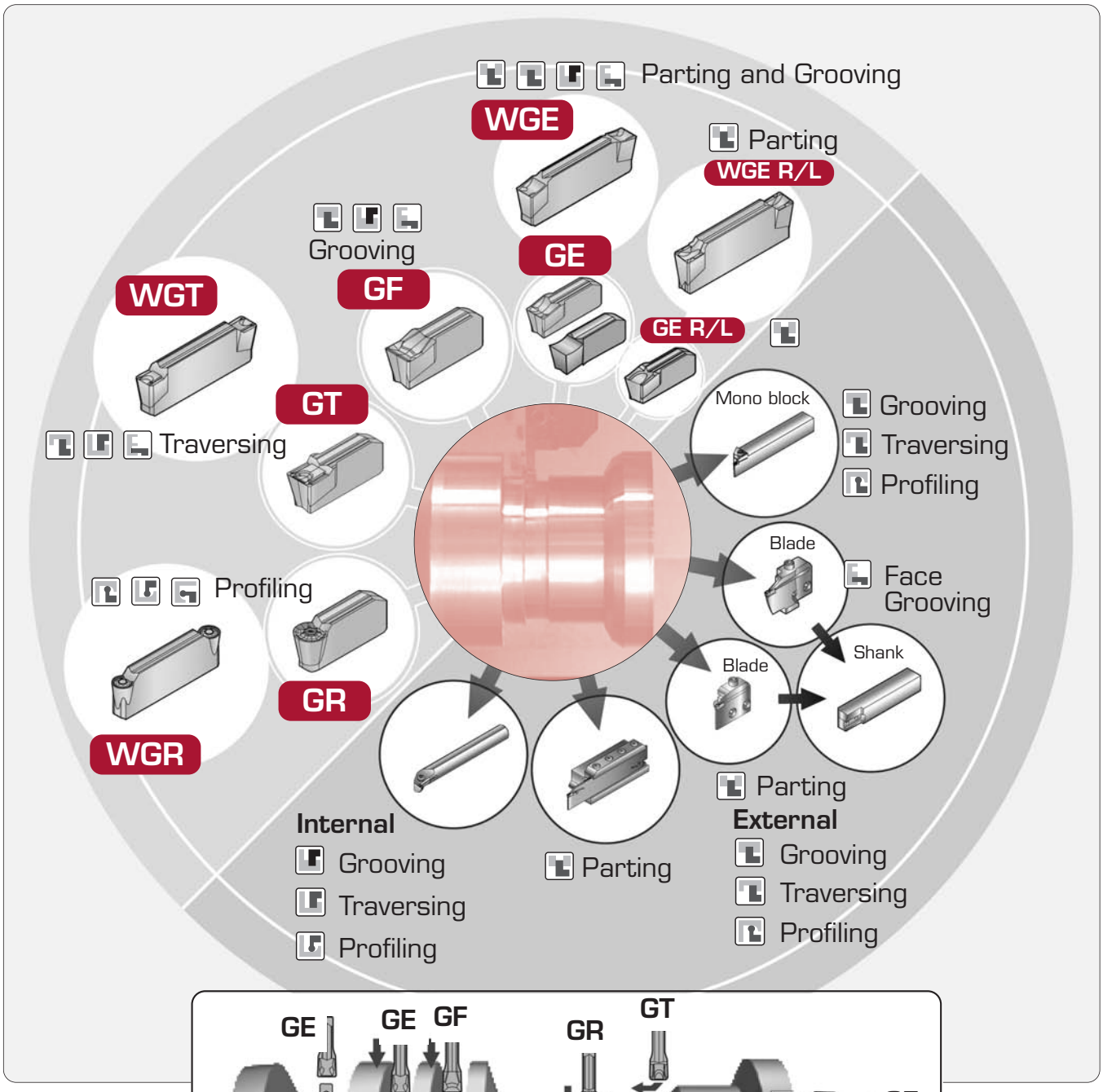
■ Carbide shank

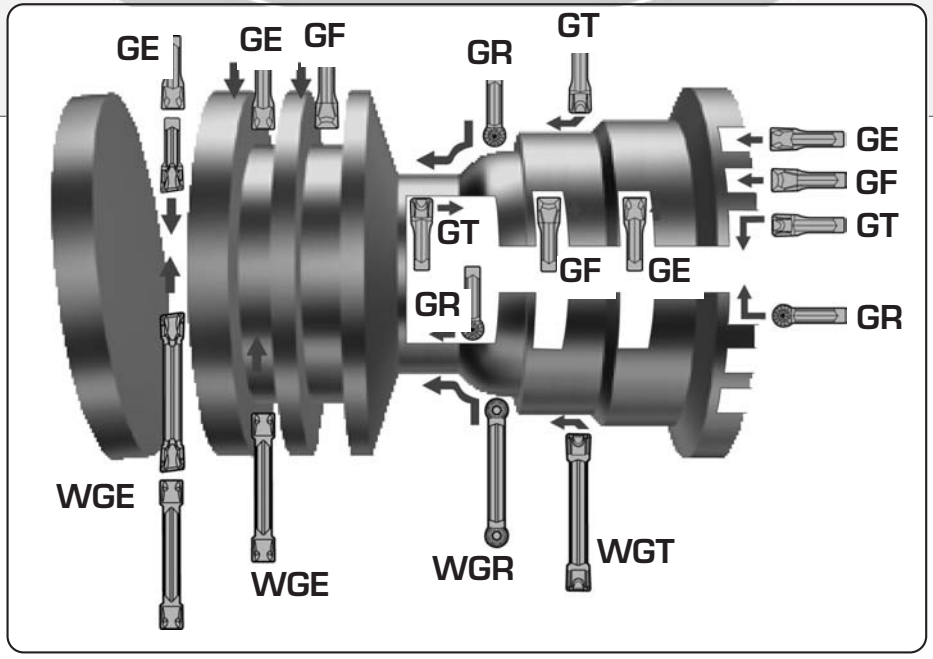
Shape (Right hand (R) shown)	Cat. No.	Stock R	Stock L	Inserts	Min. bore dia. øD(mm)	Std. corner R	Dimensions (mm) ød	L	ℓ1	ℓ2	Parts Clamping screw	Parts Wrench
SEXP 	**C08055-SEXPR/L04**			EPGT0401□□	5.5	0.4	8	56	30	26	CSTB-2	T-6F
	C10055-SEXPR/L04	○			5.5		10	62	30	32		
	C12055-SEXPR/L04	○			5.5		12	62	30	32		
	C16055-SEXPR/L04	○			5.5		16	64	30	34		
SWUB 	**C0807-SWUBR03**			WBGT0301□□	7	0.4	8	64	38	34	CSTB-2	T-6F
	C1007-SWUBR03				7		10	70	38	40		
	C1207-SWUBR03				7		12	70	38	40		
	C1607-SWUBR03				7		16	73	38	43		
	C0808-SWUBR03				8		8	70	44	26		
	C1008-SWUBR03	○			8		10	76	44	32		
	C1208-SWUBR03	○			8		12	76	44	32		
	C1608-SWUBR03	○			8		16	79	44	35		
STUP 	**C0810-STUPR/L08**			TPGT0802□□	10	0.4	8	81	—	—	CSTB2 L040	T-6F
	C1010-STUPR/L08	○			10		10	87	55	32		
	C1210-STUPR/L08				10		12	87	55	32		
	C1610-STUPR/L08				10		16	90	55	35		
	C1012-STUPR/L08				12		10	98	—	—	CSTB-2L	
	C1212-STUPR/L08				12		12	98	66	33		
	C1612-STUPR/L08				12		16	101	66	35		
	C1212-STUPR/L11			TPGT1102□□	12		12	98	66	32	CSTB-2.5	T-8F
	C1614-STUPR/L08			TPGT0802□□	14		16	119	84	35	CSTB-2L	T-6F
	C1214-STUPR/L11			TPGT1102□□	14		12	109	84	25	CSTB-2.5	T-8F
	C1616-STUPR/L08			TPGT0802□□	16		16	123	88	35	CSTB-2L	T-6F
	C1618-STUPR/L11			TPGT1102□□	18		16	134	—	—	CSTB-2.5	T-8F

Notes: ● When using a ground-in chipbreaker insert, right hand (R) holders use a left hand (L) insert.
● Left hand (L) holder use a right hand (R) insert.

TAC Parting & Grooving Tools

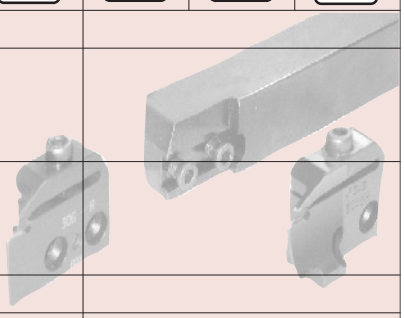
Concept


Parting and Grooving
WGE
Parting
WGE R/L
Grooving
GE
GF
WGT
GE R/L
GT
Traversing
Mono block
Grooving
Traversing
Profiling
Blade
Face
Grooving
Shank
Blade
Profiling
GR
WGR
Parting
Internal
Grooving
Traversing
Profiling
Parting
External
Grooving
Traversing
Profiling


GE
GE
GF
GR
GT
GE
GF
GT
GT
GF
GE
GR
GR
WGE
WGE
WGR
WGT

Applications

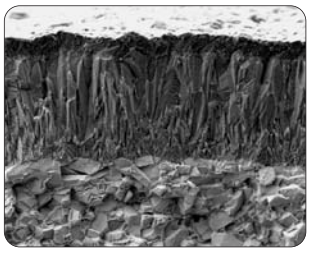
Applications		Parting	Grooving			Traversing			Profiling		
			External	Internal	Facing	External	Internal	Facing	External	Internal	Facing
Inserts type	Grooving width (mm)										
WGE**	2	●	●								
	3										
GE**	4	●		●							
	5										
WGE**R/L	3										
	4	●									
GE**R/L	5										
GE**-AL	2	●	●								
	3										
	4	●		●							
GF**	3										
	4			●							
	5										
WGT**	3										
	4						●				
GT**	5										
WGR**	R1.5										
	R2.0										
GR**	R2.5								●		



Grade

T9025 (P20; MT-CVD)

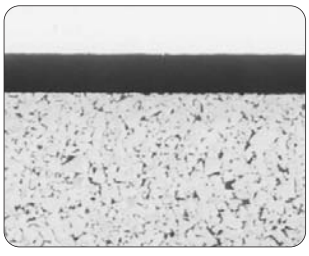
P K



- Wear resistant grade
- High speed cutting
- For steels and cast irons
- Best suited for grooving and external grooving

GH730 (P30 - P40; PVD)

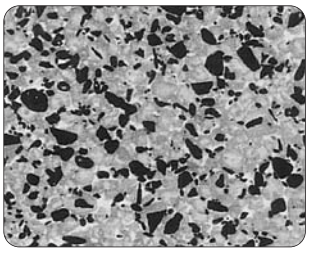
P M



- Break and wear resistant grade
- Low and medium cutting speed
- For steels and stainless steels
- Best suited for parting

NS530 (Cermet)

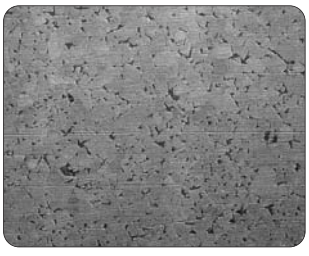
P K



- Extremely wear resistant grade
- High speed cutting
- For steels and cast irons
- Extremely smooth surface quality
- Best suited for grooving and traversing

KS05F (Carbide)

N



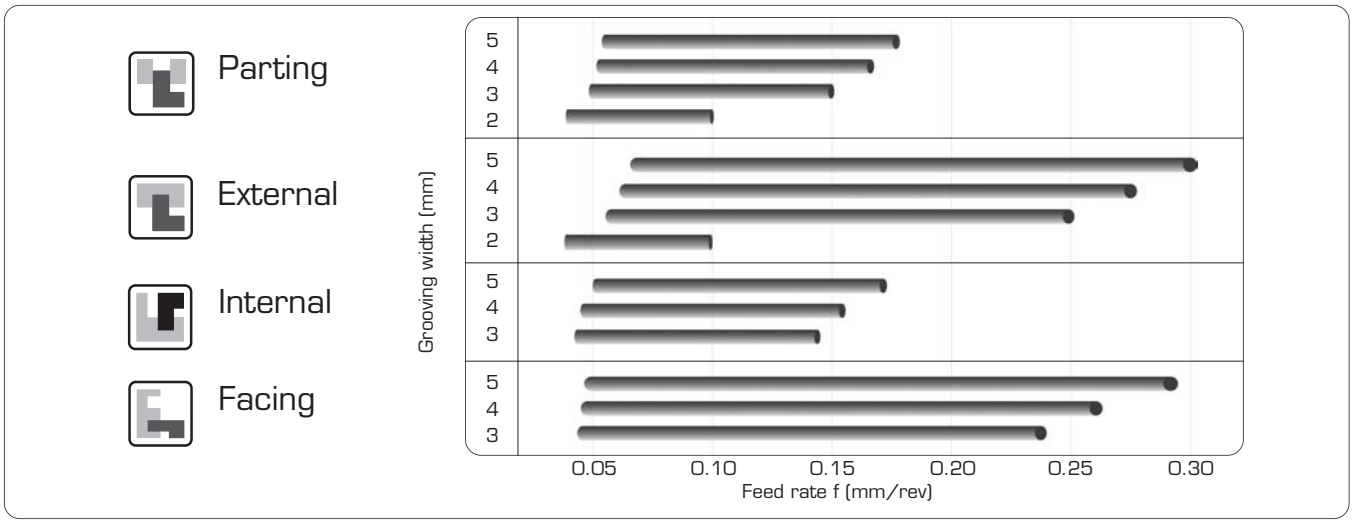
- For aluminium alloys and non-ferrous metals
- Micro grain carbide
- For extremely sharp cutting edges

Grade selection

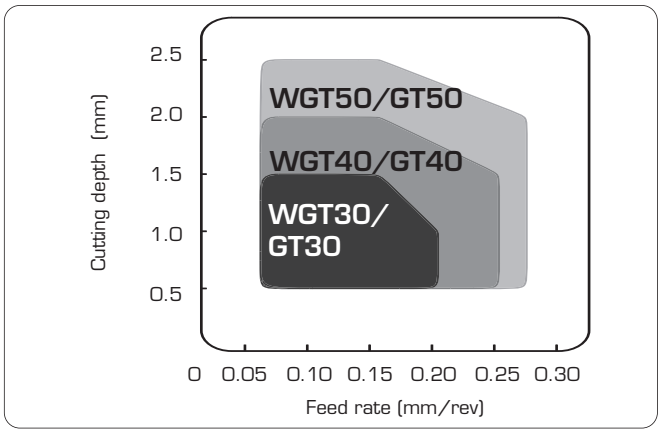
Work materials		Cutting speed Vc (m/min) 0 100 200 300
P	• Low carbon steels Ck10, St42 etc.	T9025, GH730, NS530
P	• Alloy steels C45, 42CrMo4 etc.	T9025, GH730, NS530
P	• High carbon steels 40NiCrMo6 etc.	T9025, GH730, NS530
M	• Stainless steels X5CrNi18-10 etc.	T9025, GH730
K	• Cast irons GG25, GGG40 etc.	T9025, GH730
N	• Aluminium alloys • Non-ferrous metals	KS05F

Standard cutting parameter

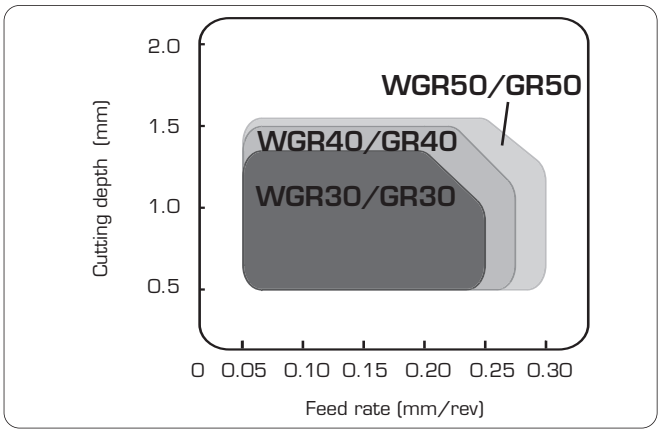
Parting and grooving with WGE/GE, GF type



Traversing with WGT/GT type



Profiling with WGR/GR type

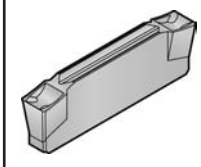
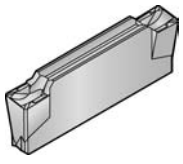
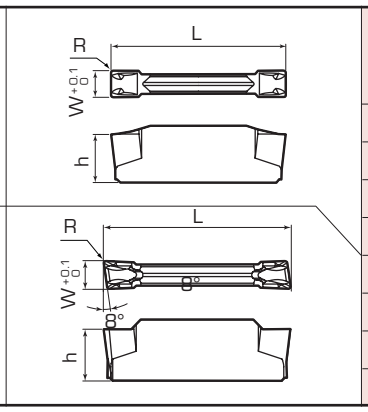


Inserts

Parting and Grooving

WGE 2-corner type

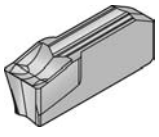
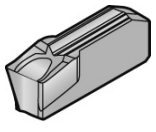
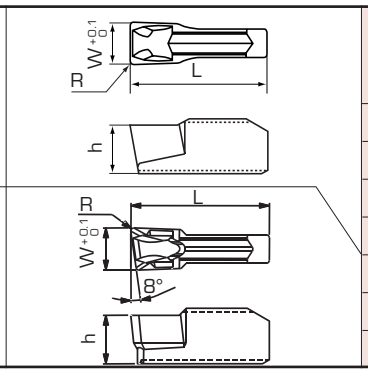
● Standard stock in Europe

Cat. No.	Dimensions (mm)				Grade	
	W	L	h	R	Coated	
					T9025	GH730
WGE20	2	20	4.7	0.2	●	●
WGE30	3	20	5.5		●	●
WGE40	4	25	5.7		●	●
WGE50	5	25	5.9		●	●
WGE20R/L	2	20	4.7		●	●
WGE30R/L	3	20	5.5		●	●
WGE40R/L	4	25	5.7		●	●
WGE50R/L	5	25	5.9		●	●

WGE**R/L : only for parting
Right hand (R) shown

GE 1-corner type

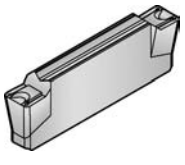
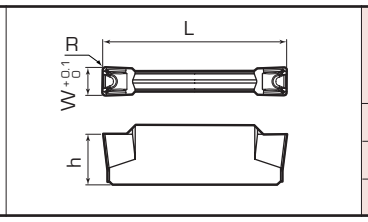
Cat. No.	Dimensions (mm)				Grade		
	W	L	h	R	Coated		Cermet
					T9025	GH730	NS530
GE20	2	10	3.5	0.2	●	●	●
GE30	3	10	3.5		●	●	●
GE40	4	10	4.0		●	●	●
GE50	5	12	4.5		●	●	●
GE30R/L	3	10	3.5		●	●	
GE40R/L	4	10	4.0		●	●	
GE50R/L	5	12	4.5		●	●	

GE**R/L : only for parting
Right hand (R) shown

Traversing

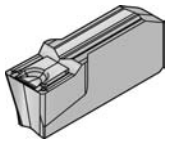
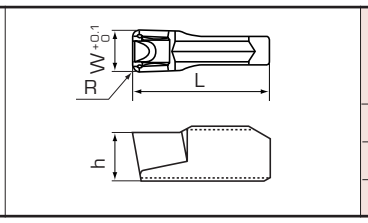
WGT 2-corner type

● Standard stock in Europe

Cat. No.	Dimensions (mm)				Grade	
	W	L	h	R	Coated	
					T9025	GH730
WGT30	3	20	5.5	0.4	●	●
WGT40	4	25	5.7		●	●
WGT50	5	25	5.9		●	●

GT 1-corner type

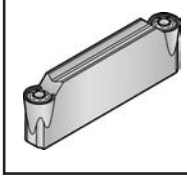



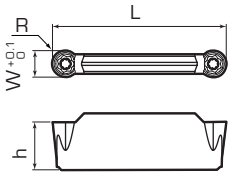
Cat. No.	Dimensions (mm)				Grade		
	W	L	h	R	Coated		Cermet
					T9025	GH730	NS530
GT30	3	10	3.5	0.4	●	●	●
GT40	4	10	4.0		●	●	●
GT50	5	12	4.5		●	●	●

Profiling

WGR 2-corner type

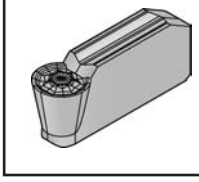
• Standard stock in Europe

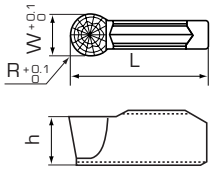




Cat. No.	Dimensions (mm)				Grade	
	W	L	h	R	Coated	
					T9025	GH730
WGR30	3	20	5.5	1.5	●	●
WGR40	4	25	5.7	2.0	●	●
WGR50	5	25	5.9	2.5	●	●

GR 1-corner type



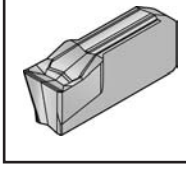


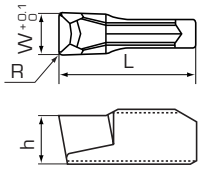
Cat. No.	Dimensions (mm)				Grade		
	W	L	h	R	Coated		Cermet
					T9025	GH730	NS530
GR30	3	10	3.5	1.5	●	●	●
GR40	4	10	4.0	2.0	●	●	●
GR50	5	12	4.5	2.5	●	●	●

Grooving and Facing

GF

• Standard stock in Europe



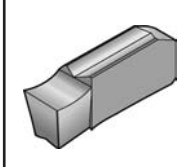


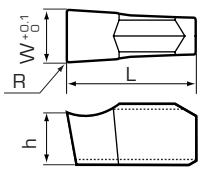
Cat. No.	Dimensions (mm)				Grade		
	W	L	h	R	Coated		Cermet
					T9025	GH730	NS530
GF30	3	10	3.5	0.2	●	●	●
GF40	4	10	4.0		●	●	●
GF50	5	12	4.5		●	●	●

Parting and Grooving - Aluminium

GE-AL

❍ Standard stock in Japan





Cat. No.	Dimensions (mm)				Grade
	W	L	h	R	Carbide
					KS05F
GE20-AL	2	10	3.5	0.2	❍
GE30-AL	3	10	3.5		❍
GE40-AL	4	10	4.0		❍

Feed f (mm/rev) = 0.03 - 0.10

Toolholder

Parting and External operations

CGWS R/L

● Standard stock in Europe

Monoblock for 2-corner inserts

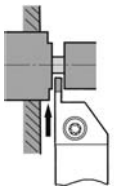


Fig. 1

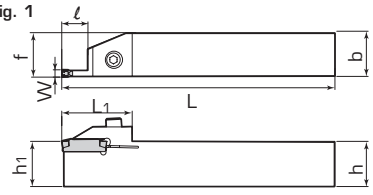
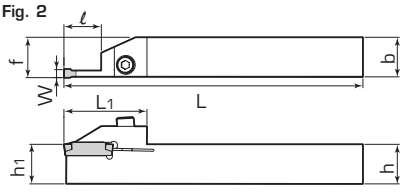


Fig. 2



Grooving width W (mm)	Grooving depth (mm)	Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) b	h	h1	f	L	L1	ℓ	Screw	Wrench	Fig.
2	15	CGWSR/L1616-W20-L	●	●	WGE20	16	16	16	16.2	125	37	16.5	CHHM5-18	P-4	2
		CGWSR/L2020-W20-L	●	●	WGE20R/L	20	20	20	20.2	150					
		CGWSR/L2525-W20-L	●	●		25	25	25	25.2						
3	12	CGWSR/L1616-W30	●	●	WG*30	16	16	16	16.4	125	34	13.5			1
		CGWSR/L2020-W30	●	●		20	20	20	20.4	150					
		CGWSR/L2525-W30	●	●		25	25	25	25.4						
	16.5	CGWSR/L1616-W30-L	●	●	WGE30R/L	16	16	16	16.4	125	37	20.5			2
		CGWSR/L2020-W30-L	●	●		20	20	20	20.4	150					
		CGWSR/L2525-W30-L	●	●		25	25	25	25.4						
4	13	CGWSR/L2020-W40	●	●	WG*40	20	20	20	20.4	150	39	14.5			1
		CGWSR/L2525-W40	●	●		25	25	25	25.4						
	21	CGWSR/L2020-W40-L	●	●	WGE40R/L	20	20	20	20.4		42	25.5			2
		CGWSR/L2525-W40-L	●	●		25	25	25	25.4						
5	13	CGWSR/L2020-W50	●	●	WG*50	20	20	20	20.4	150	39	14.5			1
		CGWSR/L2525-W50	●	●		25	25	25	25.4						
	21	CGWSR/L2020-W50-L	●	●	WGE50R/L	20	20	20	20.4		42	25.5			2
		CGWSR/L2525-W50-L	●	●		25	25	25	25.4						

WGE**R/L: only for parting
Inserts: P. 201 ~ 202

CGSS R/L

● Standard stock in Europe

Monoblock for 1-corner inserts

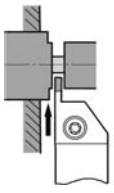


Fig. 1

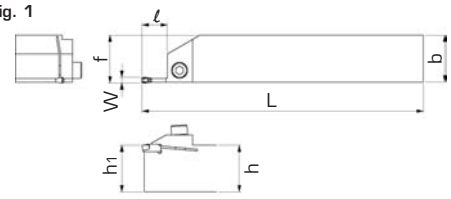
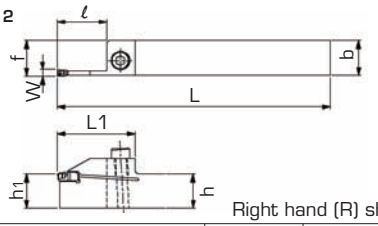


Fig. 2



Right hand (R) shown

Grooving width W (mm)	Grooving depth (mm)	Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) b	h	h1	f	L	L1	ℓ	Screw	Wrench	Fig.
2	16	CGSSR/L1616-20	●	●	GE20	16	16	16	16.2	125	-	17.0	CHHM5-18	P-4	1
		CGSSR/L2020-20	●	●		20	20	20	20.2	150					
		CGSSR/L2525-20	●	●		25	25	25	25.2						
3	12	CGSSR/L1616-30	●	●	G*30 GE30R/L	16	16	16	16.5	125	-	13.5			1
		CGSSR/L2020-30	●	●		20	20	20	20.5	150					
		CGSSR/L2525-30	●	●		25	25	25	25.5						
	22	CGSSR/L1616-30D	●	●		16	16	16	16.5	125	36.2	23.0			2
		CGSSR/L2020-30D	●	●		20	20	20	20.5	150					
		CGSSR/L2525-30D	●	●		25	25	25	25.5						
4	12	CGSSR/L1616-40			G*40 GE40R/L	16	16	16	16.6	125	-	13.5			1
		CGSSR/L2020-40	●	●		20	20	20	20.6	150					
		CGSSR/L2525-40	●	●		25	25	25	25.6						
	25	CGSSR/L1616-40D				16	16	16	16.6	125	39.5	26.0			2
		CGSSR/L2020-40D	●	●		20	20	20	20.6	150					
		CGSSR/L2525-40D	●	●		25	25	25	25.6						
5	12	CGSSR/L1616-50			G*50 GE50R/L	16	16	16	16.7	125	-	13.5			1
		CGSSR/L2020-50	●	●		20	20	20	20.7	150					
		CGSSR/L2525-50	●	●		25	25	25	25.7						
	25	CGSSR/L1616-50D				16	16	16	16.7	125	39.5	26.0			2
		CGSSR/L2020-50D	●	●		20	20	20	20.7	150					
		CGSSR/L2525-50D	●	●		25	25	25	25.7						

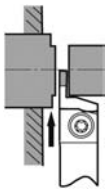
GE**R/L: only for parting
Inserts: P. 201 ~ 202

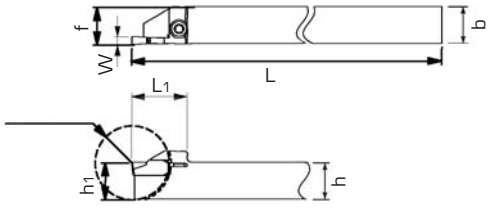
Parting and External grooving

JCGSS R/L

● Standard stock in Europe

J-type holder





Right hand (R) shown

Grooving width W (mm)	Max. Parting Ø (mm)	Cat. No.	Stock	Insert	Dimensions (mm) b	h	h1	f	L	L1	Screw	Wrench
2	20	JCGSSR/L1010-20	●	GE20	10	10	10	10.2	125	15	CSTB-3	T-9F
	25	JCGSSR/L1212-20	●		12	12	12	12.2	125	19		
	32	JCGSSR/L1616-20	●		16	16	16	16.2	125	22.5		

Inserts: P. 201 ~ 202

Parting and External operations

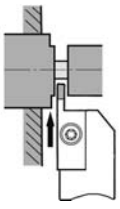
Replacement parts for:
CGWS R/L
CGWT R/L

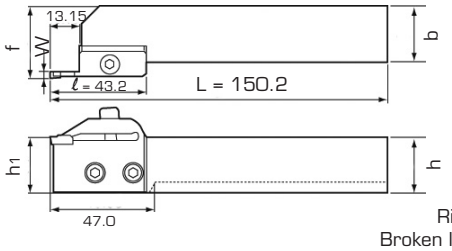
Replacement parts		
Screw	Screw for blade	Wrench
		
CHHM5-18	CSHB-6	P-4

CGWS R/L

● Standard stock in Europe
GE**R/L: only for parting

Vertical type





Right holder, right blade shown
Broken line shows shank size 20 mm

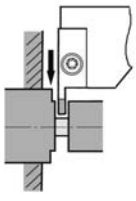
Grooving width W (mm)	Grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) b	h	h1	f	Parts Holder	Stock R	Stock L	Blade	Stock R	Stock L
2	12	CGWSR/L2020-20GR/L	●	●	GE20	20	20	20	26.8	CGWSR/L2020	●	●	20GR/L	●	●
		CGWSR/L2525-20GR/L	●	●		25	25	25	31.8	CGWSR/L2525	●	●		●	●
3	12	CGWSR/L2020-30GR/L	●	●	G*30	20	20	20	27.0	CGWSR/L2020	●	●	30GR/L	●	●
		CGWSR/L2525-30GR/L	●	●	GE30R/L	25	25	25	32.0	CGWSR/L2525	●	●		●	●
4	12	CGWSR/L2020-40GR/L	●	●	G*40	20	20	20	27.1	CGWSR/L2020	●	●	40GR/L	●	●
		CGWSR/L2525-40GR/L	●	●	GE40R/L	25	25	25	32.1	CGWSR/L2525	●	●		●	●
5	12	CGWSR/L2020-50GR/L	●		G*50	20	20	20	27.2	CGWSR/L2020	●	●	50GR/L	●	●
		CGWSR/L2525-50GR/L	●		GE50R/L	25	25	25	32.2	CGWSR/L2525	●	●		●	●

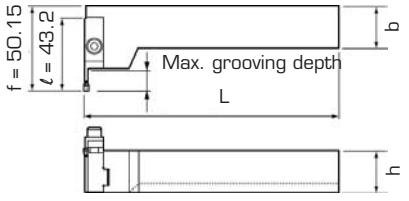
Inserts: P. 201 ~ 202

CGWT R/L

GE**R/L: only for parting

Horizontal type





Right holder, left blade shown
Broken line shows shank size 20 mm

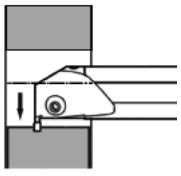
Grooving width W (mm)	Grooving depth (mm)	Holder set	Stock R	Stock L	Inserts	Dimensions (mm) b	h	L	Parts Holder	Stock R	Stock L	Blade	Stock R	Stock L
3	12	CGWTR/L2020-30GL/R			G*30	20	20	150.3	CGWTR/L2020	●	●	30GL/R	●	●
		CGWTR/L2525-30GL/R			GE30R/L	25	25		CGWTR/L2525	●	●		●	●
4	12	CGWTR/L2020-40GL/R			G*40	20	20	150.4	CGWTR/L2020	●	●	40GL/R	●	●
		CGWTR/L2525-40GL/R			GE40R/L	25	25		CGWTR/L2525	●	●		●	●
5	12	CGWTR/L2020-50GL/R			G*50	20	20	150.5	CGWTR/L2020	●	●	50GL/R	●	●
		CGWTR/L2525-50GL/R			GE50R/L	25	25		CGWTR/L2525	●	●		●	●

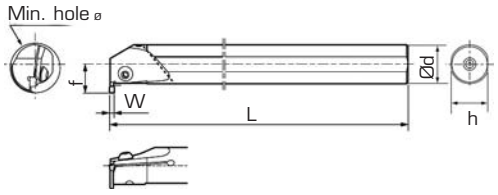
Inserts: P. 201 ~ 202

Internal operations

S***-CGT R/L

• Standard stock in Europe





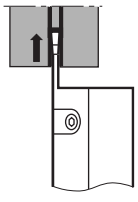
Right hand (R) shown

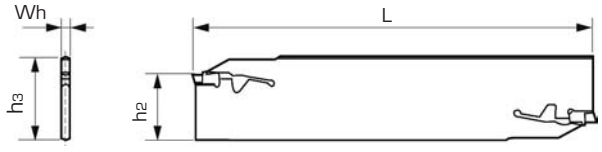
Grooving width W (mm)	Min. hole Ø (mm)	Grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) Ød	f	L	h	Screw	Wrench
3	Ø 25	3.5	S20Q-CGTR/L30	●	●	G*30	20	14.5	180	18	BHM5-14	P-3
	Ø 32	5	S25R-CGTR/L30	●	●		25	18.5	200	23		
4	Ø 32	5	S25R-CGTR/L40	●	●	G*40	25	18.5	200	23		
	Ø 40	5	S32S-CGTR/L40	●	●		32	23.0	250	30		
5	Ø 32	6	S25R-CGTR/L50	●	●	G*50	25	18.5	200	23		
	Ø 40	6	S32S-CGTR/L50	●	●		32	23.0	250	30		

Inserts: P. 201 ~ 202

Parting

CCH**-**

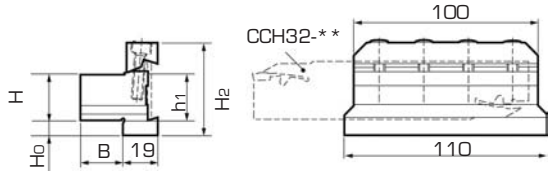




Grooving width (mm)	Cat. No. Blade	Stock	Inserts	Max. Parting Ø (mm)	Dimensions (mm) Wh	h2	h3	L	Wrench for inserts
3	CCH26-30	●	GE30 (R/L)	70	2.2	21.40	24.86	110	CTL-2
4	CCH26-40	●	GE40 (R/L)	70	3.2	21.26	24.59	110	
5	CCH26-50	●	GE50 (R/L)	70	4.2	21.13	24.32	110	
3	CCH32-30	●	GE30 (R/L)	100	2.2	24.60	31.31	150	
4	CCH32-40	●	GE40 (R/L)	100	3.2	24.47	31.04	150	
5	CCH32-50	●	GE50 (R/L)	120	4.2	24.33	30.77	150	

Inserts: P. 201 ~ 202

CCBS**-32



Cat. No. Block	Stock	Blade	Dimensions (mm) h1	B	H	Ho	H2	Wedge	Screw	Wrench
CCBS20-32	●	CCH32-**	20.2	19	20	13	49.9	CC-32	CM6X25	P-5
CCBS25-32	●		25.2	23	25	8	49.9			
CCBS32-32	●		32.2	23	32	5	53.9			

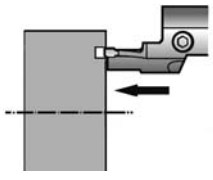
Facing

*Screw...
CGWSR****-**S****R
CGWSR****-**D****R

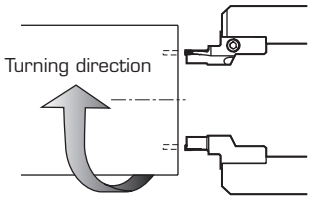
Replacement parts			
Screw		Screw for blade	Wrench
			
S	CHHM5-18	CSHB-6	P-4
D	CM5X0.8X16		

CGWS R/L

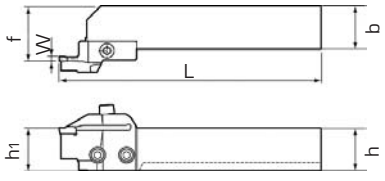
Vertical type



CGWSR****-*******R

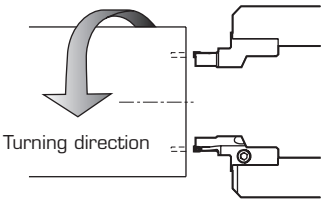


Right hand (R)
Right holder, right blade shown



Right holder, right blade shown
Broken line shows shank size 20 mm

CGWSL****-*******L



Left hand (L)
Left holder, left blade shown

Grooving width W (mm)	Groove-Ø (mm)	Grooving depth (mm)	Holder set	Stock R	Stock L	Inserts	Dimensions (mm) b	h	h1	f	L	Parts Cat. No. Holder	Stock R	Stock L	Cat. No. Blade	Stock R	Stock L
3	30-40	10	CGWSR/L2020-30S3040R/L			G*30	20	20	20	27	152.5	CGWSR/L2020	●	●	30S3040R/L	●	●
	40-50		CGWSR/L2020-30S4050R/L												30S4050R/L	●	●
	50-65		CGWSR/L2020-30S5065R/L												30S5065R/L	●	●
	65-90		CGWSR/L2020-30S6590R/L												30S6590R/L	●	●
	90-150		CGWSR/L2020-30S90150R/L												30S90150R/L	●	●
	150-500		CGWSR/L2020-30S150500R/L												30S150500R/L	●	●
	30-40		CGWSR/L2525-30S3040R/L			G*30	25	25	25	32	152.5	CGWSR/L2525	●	●	30S3040R/L	●	●
	40-50		CGWSR/L2525-30S4050R/L												30S4050R/L	●	●
	50-65		CGWSR/L2525-30S5065R/L												30S5065R/L	●	●
	65-90		CGWSR/L2525-30S6590R/L												30S6590R/L	●	●
	90-150		CGWSR/L2525-30S90150R/L												30S90150R/L	●	●
	150-500		CGWSR/L2525-30S150500R/L												30S150500R/L	●	●
4	35-45	14	CGWSR/L2020-40S3545R/L			G*40	20	20	20	27	152.5	CGWSR/L2020	●	●	40S3545R/L	●	●
	45-55		CGWSR/L2020-40S4555R/L												40S4555R/L	●	●
	55-80		CGWSR/L2020-40S5580R/L												40S5580R/L	●	●
	80-140		CGWSR/L2020-40S80140R/L												40S80140R/L	●	●
	140-500		CGWSR/L2020-40S140500R/L												40S140500R/L	●	●

Inserts: P. 201 ~ 202

● Standard stock in Europe

Grooving width W (mm)	Groove-Ø (mm)	Grooving depth (mm)	Holder set	Stock R	Stock L	Inserts	Dimensions (mm) b	h	h1	f	L	Parts Cat. No. Holder	Stock R	Stock L	Cat. No. Blade	Stock R	Stock L
4	35-45	14	CGWSR/L2525-40S3545R/L			G*40	25	25	25	32	152.5	CGWSR/L2525	●	●	40S3545R/L	●	●
	45-55		CGWSR/L2525-40S4555R/L												40S4555R/L	●	●
	55-80		CGWSR/L2525-40S5580R/L												40S5580R/L	●	●
	80-140		CGWSR/L2525-40S80140R/L												40S80140R/L	●	●
	140-500		CGWSR/L2525-40S140500R/L												40S140500R/L	●	●
4	35-45	22	CGWSR/L2020-40D3545R/L			G*40	20	20	20	27	160.5	CGWSR/L2020	●	●	40D3545R/L	●	●
	45-55		CGWSR/L2020-40D4555R/L												40D4555R/L	●	●
	55-80		CGWSR/L2020-40D5580R/L												40D5580R/L	●	●
	80-140		CGWSR/L2020-40D80140R/L												40D80140R/L	●	●
	140-500		CGWSR/L2020-40D140500R/L												40D140500R/L	●	●
	35-45		CGWSR/L2525-40D3545R/L			G*40	25	25	25	32	160.5	CGWSR/L2525	●	●	40D3545R/L	●	●
	45-55		CGWSR/L2525-40D4555R/L												40D4555R/L	●	●
	55-80		CGWSR/L2525-40D5580R/L												40D5580R/L	●	●
	80-140		CGWSR/L2525-40D80140R/L												40D80140R/L	●	●
	140-500		CGWSR/L2525-40D140500R/L												40D140500R/L	●	●
5	35-45	14	CGWSR/L2020-50S3545R/L			G*50	20	20	20	27	152.5	CGWSR/L2020	●	●	50S3545R/L	●	●
	45-55		CGWSR/L2020-50S4555R/L												50S4555R/L	●	●
	55-75		CGWSR/L2020-50S5575R/L												50S5575R/L	●	●
	75-130		CGWSR/L2020-50S75130R/L												50S75130R/L	●	●
	130-500		CGWSR/L2020-50S130500R/L												50S130500R/L	●	●
	35-45		CGWSR/L2525-50S3545R/L			G*50	25	25	25	32	152.5	CGWSR/L2525	●	●	50S3545R/L	●	●
	45-55		CGWSR/L2525-50S4555R/L												50S4555R/L	●	●
	55-75		CGWSR/L2525-50S5575R/L												50S5575R/L	●	●
	75-130		CGWSR/L2525-50S75130R/L												50S75130R/L	●	●
	130-500		CGWSR/L2525-50S130500R/L												50S130500R/L	●	●
5	35-45	22	CGWSR/L2020-50D3545R/L			G*50	20	20	20	27	160.5	CGWSR/L2020	●	●	50D3545R/L	●	●
	45-55		CGWSR/L2020-50D4555R/L												50D4555R/L	●	●
	55-75		CGWSR/L2020-50D5575R/L												50D5575R/L	●	●
	75-130		CGWSR/L2020-50D75130R/L												50D75130R/L	●	●
	130-500		CGWSR/L2020-50D130500R/L												50D130500R/L	●	●
	35-45		CGWSR/L2525-50D3545R/L			G*50	25	25	25	32	160.5	CGWSR/L2525	●	●	50D3545R/L	●	●
	45-55		CGWSR/L2525-50D4555R/L												50D4555R/L	●	●
	55-75		CGWSR/L2525-50D5575R/L												50D5575R/L	●	●
	75-130		CGWSR/L2525-50D75130R/L												50D75130R/L	●	●
	130-500		CGWSR/L2525-50D130500R/L												50D130500R/L	●	●

Inserts: P. 201 ~ 202

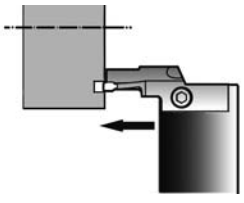
Facing

*Screw...
CGWTR****-**S****L
CGWTR****-**D****L

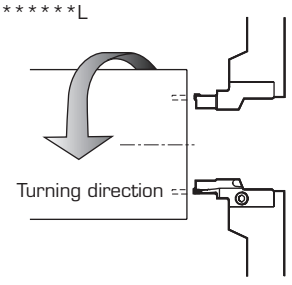
Replacement parts			
Screw		Screw for blade	Wrench
			
S	CHHM5-18	CSHB-6	P-4
D	CM5X0.8X16		

CGWT R/L

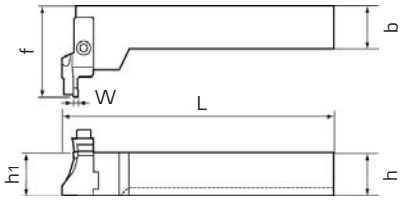
Horizontal type



CGWTR****-*******L

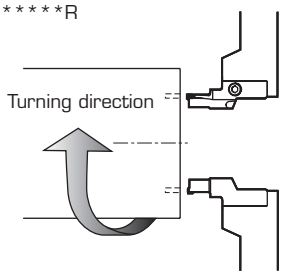


Right hand (R)
Right holder, left blade shown



Right holder, left blade shown
Broken line shows shank size 20 mm

CGWTL****-*******R



Left hand (L)
Left holder, right blade shown

Grooving width W (mm)	Groove-Ø (mm)	Grooving depth (mm)	Holder set	Stock R	Stock L	Inserts	Dimensions (mm) b	h	h1	f	L	Parts Cat. No. Holder	Stock R	Stock L	Cat. No. Blade	Stock R	Stock L
3	30-40	10	CGWTR/L2020-30S3040L/R			G*30	20	20	20	52.5	150	CGWTR/L2020	●	●	30S3040L/R	●	●
	40-50		CGWTR/L2020-30S4050L/R												30S4050L/R	●	●
	50-65		CGWTR/L2020-30S5065L/R												30S5065L/R	●	●
	65-90		CGWTR/L2020-30S6590L/R												30S6590L/R	●	●
	90-150		CGWTR/L2020-30S90150L/R												30S90150L/R	●	●
	150-500		CGWTR/L2020-30S150500L/R												30S150500L/R	●	●
	30-40		CGWTR/L2525-30S3040L/R			G*30	25	25	25	52.5	150	CGWTR/L2525	●	●	30S3040L/R	●	●
	40-50		CGWTR/L2525-30S4050L/R												30S4050L/R	●	●
	50-65		CGWTR/L2525-30S5065L/R												30S5065L/R	●	●
	65-90		CGWTR/L2525-30S6590L/R												30S6590L/R	●	●
	90-150		CGWTR/L2525-30S90150L/R												30S90150L/R	●	●
	150-500		CGWTR/L2525-30S150500L/R												30S150500L/R	●	●
4	35-45	14	CGWTR/L2020-40S3545L/R			G*40	20	20	20	52.5	150	CGWTR/L2020	●	●	40S3545L/R	●	●
	45-55		CGWTR/L2020-40S4555L/R												40S4555L/R	●	●
	55-80		CGWTR/L2020-40S5580RL/R												40S5580L/R	●	●
	80-140		CGWTR/L2020-40S80140L/R												40S80140L/R	●	●
	140-500		CGWTR/L2020-40S140500L/R												40S140500L/R	●	●

Inserts: P. 201 ~ 202

● Standard stock in Europe

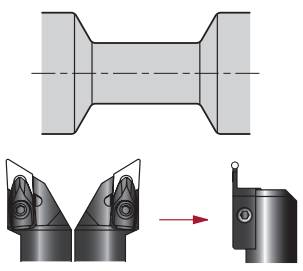
Grooving width W (mm)	Groove-Ø (mm)	Grooving depth (mm)	Holder set	Stock R	Stock L	Inserts	Dimensions (mm) b	h	h1	f	L	Parts Cat. No. Holder	Stock R	Stock L	Cat. No. Blade	Stock R	Stock L
4	35-45	14	CGWTR/L2525-40S3545L/R			G*40	25	25	25	52.5	150	CGWTR/L2525	●	●	40S3545L/R	●	●
	45-55		CGWTR/L2525-40S4555L/R												40S4555L/R	●	●
	55-80		CGWTR/L2525-40S5580L/R												40S5580L/R	●	●
	80-140		CGWTR/L2525-40S80140L/R												40S80140L/R	●	●
	140-500		CGWTR/L2525-40S140500L/R												40S140500L/R	●	●
	35-45		CGWTR/L2020-40D3545L/R			G*40	20	20	20	60.5	150	CGWTR/L2020	●	●	40D3545L/R	●	●
	45-55		CGWTR/L2020-40D4555L/R												40D4555L/R	●	●
	55-80		CGWTR/L2020-40D5580L/R												40D5580L/R	●	●
	80-140		CGWTR/L2020-40D80140L/R												40D80140L/R	●	●
	140-500		CGWTR/L2020-40D140500L/R												40D140500L/R	●	●
4	35-45	22	CGWTR/L2525-40D3545L/R			G*40	25	25	25	60.5	150	CGWTR/L2525	●	●	40D3545L/R	●	●
	45-55		CGWTR/L2525-40D4555L/R												40D4555L/R	●	●
	55-80		CGWTR/L2525-40D5580L/R												40D5580L/R	●	●
	80-140		CGWTR/L2525-40D80140L/R												40D80140L/R	●	●
	140-500		CGWTR/L2525-40D140500L/R												40D140500L/R	●	●
5	35-45	14	CGWTR/L2020-50S3545L/R			G*50	20	20	20	52.5	150	CGWTR/L2020	●	●	50S3545L/R	●	●
	45-55		CGWTR/L2020-50S4555L/R												50S4555L/R	●	●
	55-75		CGWTR/L2020-50S5575L/R												50S5575L/R	●	●
	75-130		CGWTR/L2020-50S75130L/R												50S75130L/R	●	●
	130-500		CGWTR/L2020-50S130500L/R												50S130500L/R	●	●
	35-45		CGWTR/L2525-50S3545L/R			G*50	25	25	25	52.5	150	CGWTR/L2525	●	●	50S3545L/R	●	●
	45-55		CGWTR/L2525-50S4555L/R												50S4555L/R	●	●
	55-75		CGWTR/L2525-50S5575L/R												50S5575L/R	●	●
	75-130		CGWTR/L2525-50S75130L/R												50S75130L/R	●	●
	130-500		CGWTR/L2525-50S130500L/R												50S130500L/R	●	●
	35-45		CGWTR/L2020-50D3545L/R			G*50	20	20	20	60.5	150	CGWTR/L2020	●	●	50D3545L/R	●	●
	45-55		CGWTR/L2020-50D4555L/R												50D4555L/R	●	●
	55-75		CGWTR/L2020-50D5575L/R												50D5575L/R	●	●
	75-130		CGWTR/L2020-50D75130L/R												50D75130L/R	●	●
	130-500		CGWTR/L2020-50D130500L/R												50D130500L/R	●	●
5	35-45	22	CGWTR/L2525-50D3545L/R			G*50	25	25	25	60.5	150	CGWTR/L2525	●	●	50D3545L/R	●	●
	45-55		CGWTR/L2525-50D4555L/R												50D4555L/R	●	●
	55-75		CGWTR/L2525-50D5575L/R												50D5575L/R	●	●
	75-130		CGWTR/L2525-50D75130L/R												50D75130L/R	●	●
	130-500		CGWTR/L2525-50D130500L/R												50D130500L/R	●	●

Inserts: P. 201 ~ 202

Application detail

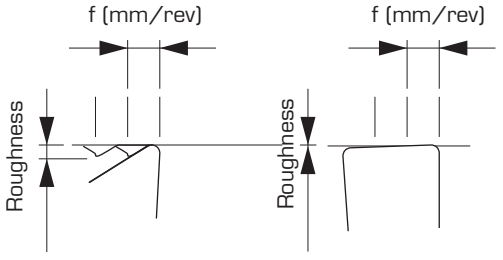
An example of tool integration in Traverse feed machining

Previously, this operation has been carried out by using two external profiling tools, one left and one right hand. By switching to My-T series tooling, the number of tools required could be reduced to only one tool (GT type for traverse feeding or GR type for profiling).



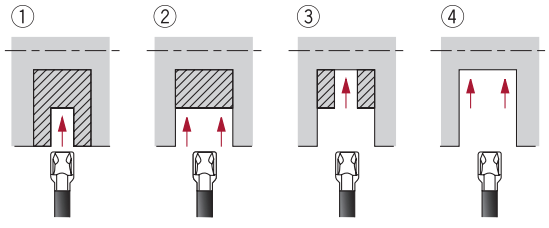
Comparison of surface roughness (conventional tool vs. GT insert)

because the tip of GT-type insert slightly tilts during machining and acts like a wiper cutting edge, it can produce a better surface finish than when using a conventional insert.



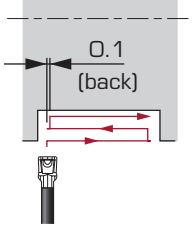
Method of deep grooving

When deep grooving, the procedures shown at right are recommended.



Machining of various grooves

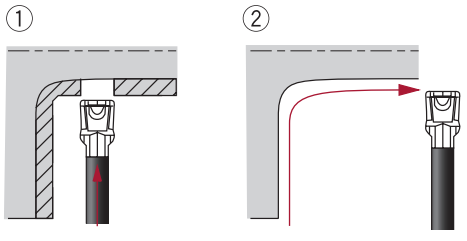
When machining a constricted portion of a cylindrical workpiece, choose the suitable method depending on the width and depth of the groove to be machined.



shallow / wide groove

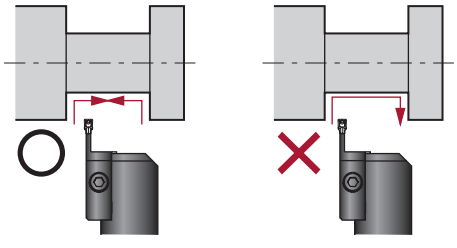
Chamfering and rounding-off at bottom corner of groove

When chamfering or rounding-off at the bottom corner of a groove, the procedures shown in the figure at the right are recommended.



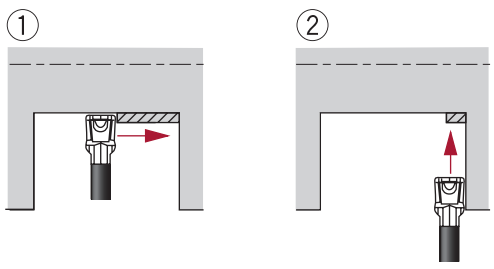
Method of finishing double-sided walls

When finishing both sides of a groove by using GT-type inserts, retract feed mode should be avoided. You should machine both side walls by plunging and then machine the bottom of the groove by traversing the tool.



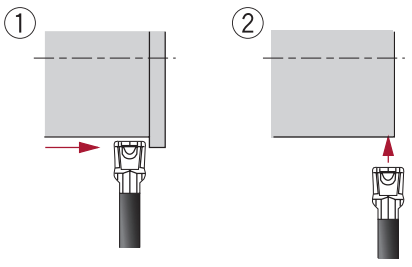
Machining method of groove bottom close to a shoulder

When machining the bottom surface of a groove by traverse feeding, chip recutting can occur close to the wall. Stop the feed short of the wall (remaining width less than front edge width of insert), and then remove the remaining stock by plunging.



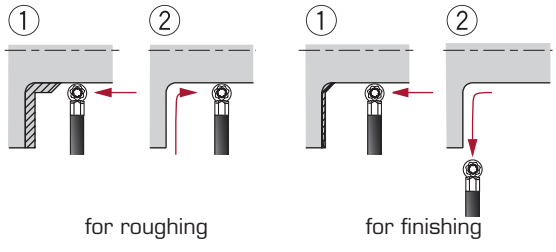
Comparison of surface roughness

When machining the outer diameter of a workpiece by traverse feeding, a ring like material can be produced as shown in the figure at right. In this case, stop the feed short of the work end. (Remaining width to be less than the front edge width of insert) andd then remove the remaining stock by plunging.



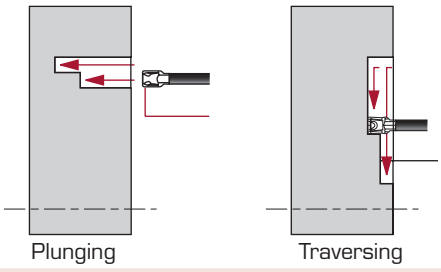
Method of machining with full radius insert

When machining a groove wall by using a full-radius insert, plunge cut is recommended for roughing and retract feeding is possible for finishing. Cutting depth should be smaller than 5 % of insert radius.



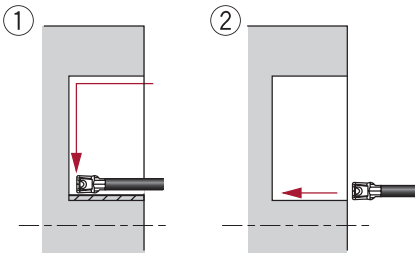
Method of widening groove width of face groove

When widening the width of a face groove, choose the blade to fit to the largest diameter, and then enlarge the width inward.



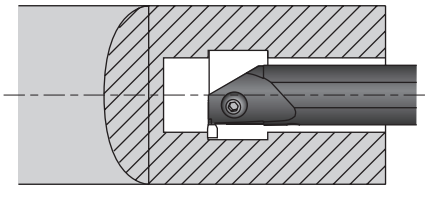
Method of face profiling

When profiling a face groove, the tool should be fed from outer diameter towards the centre. The inner wall of the groove should be machined by plunging.

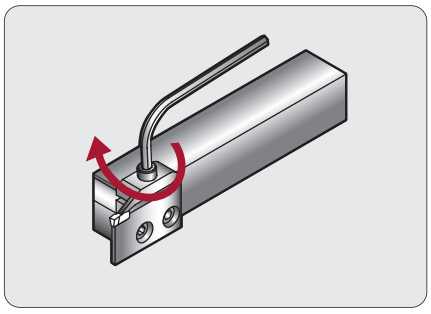


Method of widening groove width of internal groove

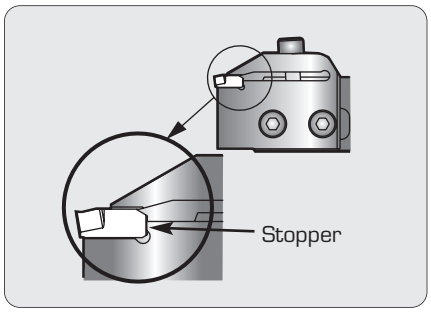
When widening the groove width of an internal groove, the method used should be basically the same as that of external grooving.



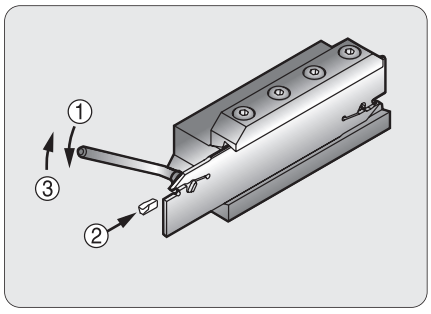
Cautionary point in use



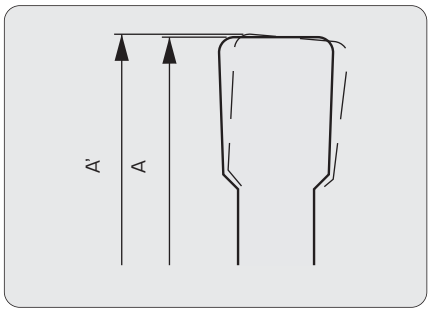
Recommended tightening torque of the clamp screw is 4 to 5 Nm.



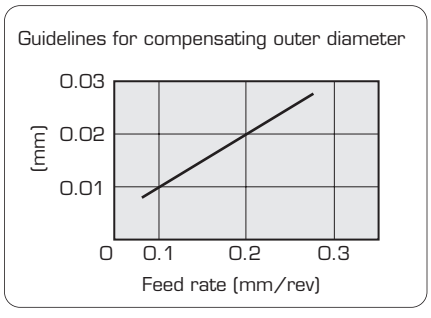
Place insert by hand into the pocket until rear stop.

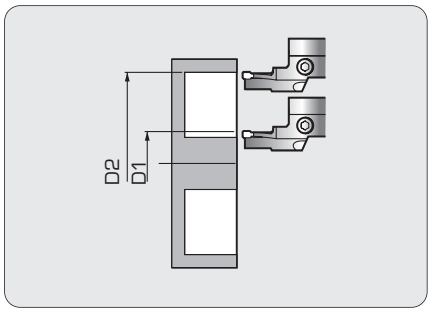


1. Place wrench into the specified hole of the blade and push it down.
2. Place insert by hand into the pocket until rear stop.
3. Push wrench upward until insert is firmly clamped.



In traverse feed machining, the tip of the tool can be elastically deformed. At extreme cutting conditions, the diameter of the workpiece may exceed programmed dimensions. Dimensional compensation of the outer diameter as shown in the right diagram have to be taken into consideration when programming (example: medium carbon steel).





When face grooving, the blade diameter should match the machinable diameter of the workpiece. The applicable blades are shown in this brochure. In the left figure, D2 shows the machinable maximum diameter and D1 the machinable minimum diameter. This limitation only applies to grooving operations.

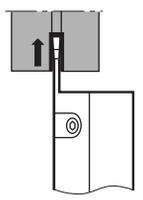
Troubleshooting

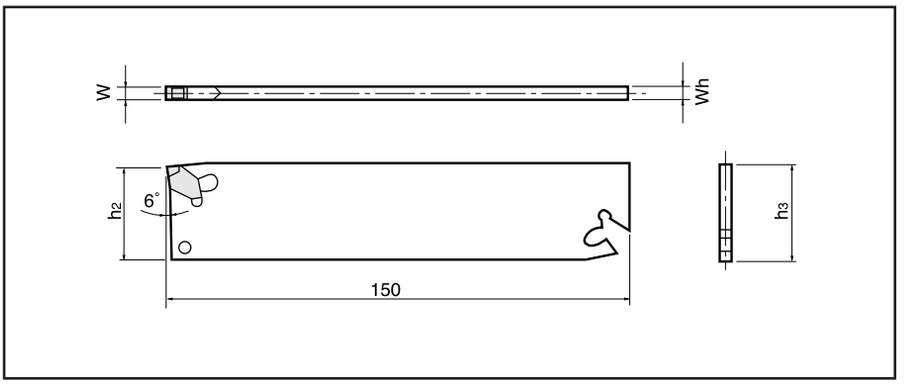
Trouble / **Counter measures**	Stringy chips (Grooving)	Stringy chips (Turning)	Chatter	Poor surface finish	Out of tolerance	Excessive insert wear	Insert breakage
Increase feed rate	●	●	●				
Reduce feed rate				●		●	●
Increase cutting depth		●					
Reduce cutting depth			●	●		●	●
Increase cutting speed				●			
Reduce cutting speed	●	●	●		●	●	●
Use Cermet grade				●			
Use coated grade							●
Use step feed	●						
Use coolant				●		●	
Check compensation for tool deformation					●		
Check tool failure				●	●		
Choose optimum chipbeaker	●	●	●	●	●	●	●
Shorten tool overhang			●				
Use both cutting edges equally						●	●

CTH-type Toolholder

Parting

CTH

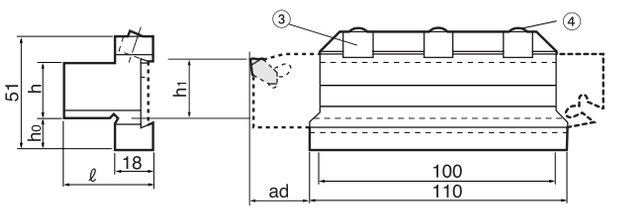




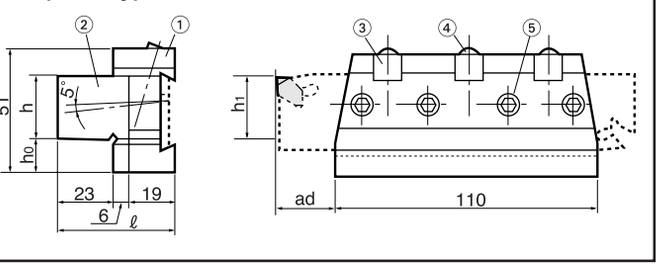
Grooving width W (mm)	Cat. No. Blade	Stock	Insert	Tool overhang ad (mm)	Dimensions (mm)		
					Wh	h_2	h_3
3	**CTH32-3**	●	**CT□3□**	Max. 50	2.2	30.27	32.24
4	**CTH32-4**	●	**CT□4□**		3.2	30.13	31.97
5	**CTH32-5**	●	**CT□5□**		4.2	30.00	31.70
6	**CTH32-6**	●	**CT□6□**		5.2	29.87	31.44

■ Tool blocks

One-piece type CTBN



Two-piece type CTBS



Cat. No. Block	Stock	Blades	Tool overhang ad (mm)	Dimensions (mm)			
				h_1	ℓ	h	h_0
CTBN20-32	●	**CTH32-3** **CTH32-4** **CTH32-5** **CTH32-6**	Max. 50	20.2	38	20	19.56
CTBN25-32	●			25.2	38	25	14.56
CTBN32-32	●			32.2	43	32	7.56
CTBS20-32				20.2	48	20	19.36
CTBS25-32				25.2	48	25	14.36
CTBS32-32				32.2	48	32	7.36

■ Replacement parts

Cat. No. Block	Cat. No.					
	① Main body	② Base	③ Wedge	④ Wedge clamping screw	⑤ Hex. socket head screw	Wrench
CTBN20-32 **CTBN25-32** **CTBN32-32**	—	—	CTW-2	NDS-8S	—	P-4
CTBS20-32 **CTBS25-32** **CTBS32-32**	CTB-32	CB-20 CB-25 CB-32	CTW-2	DS-8	M5×15	P-4

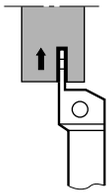
● Insert extractor: CTL-2

Reference guide | Applicable inserts P. 216

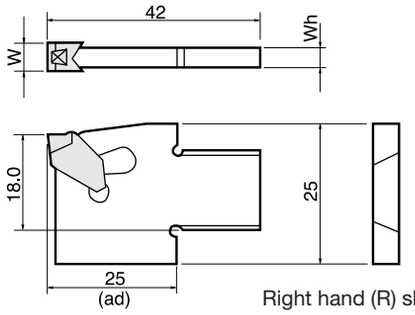
CTS-type Toolholder (Blade type)

Parting

CTS R/L



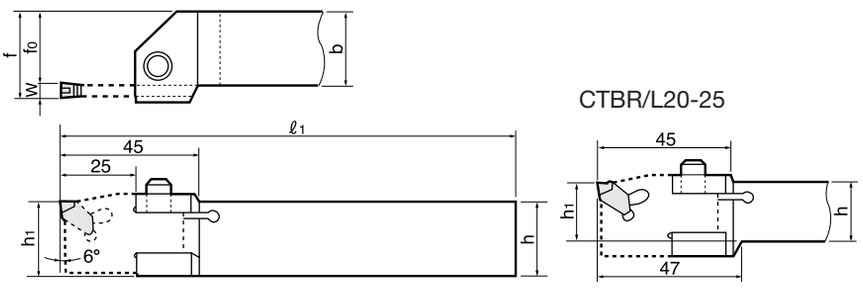
● Blade



Right hand (R) shown

Dimensions (mm)		Cat. No. Blade	Stock		Inserts	Tool overhang ad (mm)
W	Wh		R	L		
3	2.2	**CTSR/L25-3**			**CT□3□**	Max. 25
4	3.2	**CTSR/L25-4**			**CT□4□**	
5	4.2	**CTSR/L25-5**			**CT□5□**	
6	5.2	**CTSR/L25-6**			**CT□6□**	

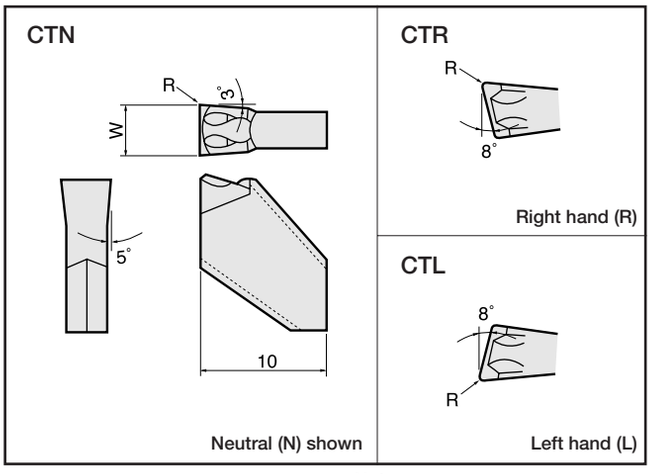
■ Toolholder

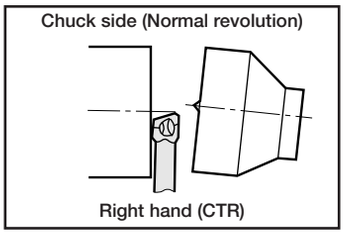


Right hand (R) shown

Grooving width W (mm)	Cat. No. Toolholder	Stock		Blade	Tool overhang ad (mm)	Dimensions (mm)						Parts	
		R	L			h_1	h	b	ℓ_1	fo	f	Clamping Screw	Wrench
3 4	**CTBR/L20-25**			**CTSR/L25-3** **CTSR/L25-4**	Max. 25	20.2	20	20	150	19.6	22.6 23.6	M6×20	P-5
3 4 5 6	**CTBR/L25-25**			**CTSR/L25-3** **CTSR/L25-4** **CTSR/L25-5** **CTSR/L25-6**		25.2	25	25	150	24.6	27.6 28.6 29.6 30.6	M6×20	P-5

Inserts for Parting (CTH · CTS · SCTH-type)





Notes:
- Right hand and left hand inserts are effective to minimize burr generation when workpiece is parting.
- CT□□K type inserts with less pre-honed edges are suitable for grooving and parting of cast irons and light alloys.

Dimensions (mm)		Cat. No.	Grade								
			Coated			Uncoated					
			T313W			TX40			TH10		
W±0.2	R		N	R	L	N	R	L	N	R	L
3	0.2	CTN3 CTN3K CTR/L3 CTR/L3K	●	●	●	●	●		●	●	●
4	0.2	CTN4 CTN4K CTR/L4 CTR/L4K	●	●	●	●	○	○	●	●	●
5	0.3	CTN5 CTN5K CTR/L5 CTR/L5K	●	●		●	○		●		
6	0.3	CTN6 CTN6K CTR/L6 CTR/L6K	●			●			●		

■ Standard cutting conditions

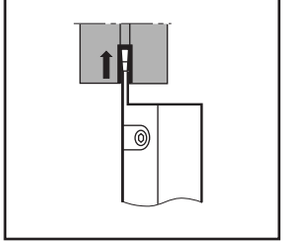
Operation	Work materials	Cutting speed Vc (m/min)	Feed f (mm/rev)					
			CTN3	CTN4	CTN5	CTN6	CTR/L□	CT□□K
Grooving	Low carbon steels	100~150	0.08~0.25	0.08~0.25	0.08~0.25	0.08~0.3	—	—
	Medium carbon steels		0.08~0.25	0.08~0.3	0.08~0.3	0.08~0.3	—	—
	Cast irons · Light alloys	100~200	—	—	—	—	—	0.1~0.3
Parting	Low carbon steels	100~150	0.08~0.2	0.08~0.2	0.08~0.2	0.08~0.2	0.08~0.15	—
	Medium carbon steels		0.08~0.2	0.08~0.2	0.08~0.2	0.08~0.2	0.08~0.15	—
	Cast irons · Light alloys	100~200	—	—	—	—		0.1~0.3

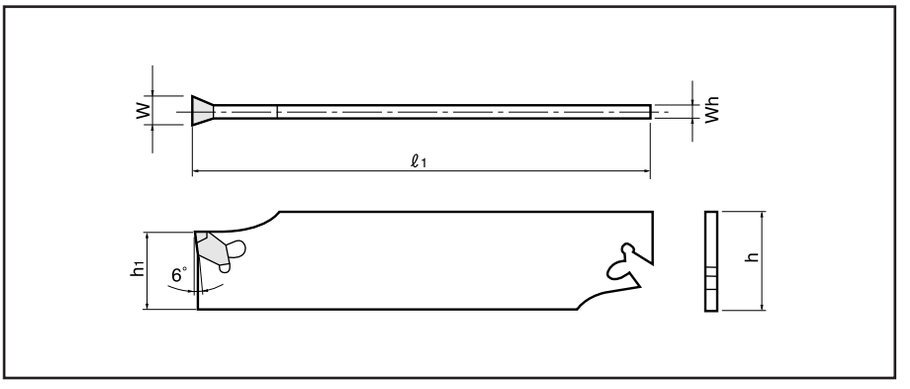
Note: When using CTS type (blade type) toolholder, reduce the values given in the table by 20%.

SCTH-type Toolholder

Parting

SCTH





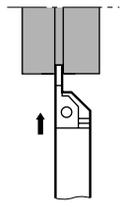
Cat. No.	Stock	Dimensions (mm)					Cat. No. Block		Inserts
		W	h1	Wh	h	ℓ1			
SCTH26-3	●	3	21.16	2.2	25.35	110	SGTBR/L25-6,	SGTBN16-5	CT□3□
SCTH26-4	●	4	21.05	3.2	25.14		SGTBN19-5,	SGTBU20-5	CT□4□
SCTH32-3	●	3	24.80	2.2	31.41	150	SGTBN19-6,	SGTBN25-6	CT□3□
SCTH32-4	●	4	24.66	3.2	31.14		SGTBN32-6,	SGTBU20-6	CT□4□
SCTH32-5	●	5	24.53	4.2	30.87		SGTBU25-6,	SGTBU32-6	CT□5□
SCTH32-6	●	6	24.39	5.2	30.61		SGTBU32-25-6,	SGTBK32-9	CT□6□

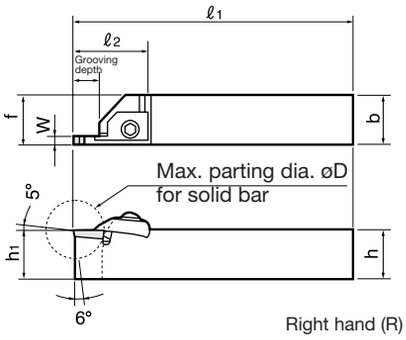
Note: Please take care that these blades are compatible only with the tool blocks shown in the above table.

CTW-type Toolholder

Parting and grooving

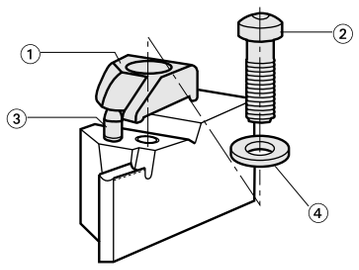
CTW R/L





Right hand (R) shown

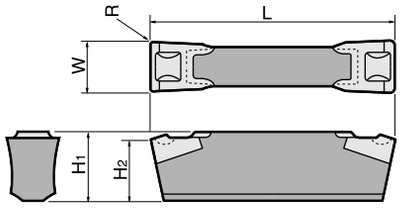
■ Replacement parts



Grooving width W(mm)	Grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) øD	h_1	b	h	ℓ_1	ℓ_2	f	Parts ① Clamp	② Clamping screw	③ Clamping pusher	④ Washer	Wrench
3	14	CTWR/L2020-3	●	●	CTD3	32	20	20	20	150	41	20.25	CTC-3R/L	CTS-M6	BP-360	CDW6	P-4
		CTWR/L2525-3	●	●		32	25	25	25			25.25					
4		CTWR/L2020-4	●	●	CTD4	32	20	20	20	150	41	20.25	CTC-4R/L				
		CTWR/L2525-4	●	●		32	25	25	25			25.25					
5	20	CTWR/L2525-5	●	●	CTD5	42	25	25	25	150	46	25.25	CTC-5R/L				

■ Inserts

CTD



Insert Cat. No.	Grade Coated T370	Grade Coated GH340	Dimensions (mm) W±0.1	L	H_1	H_2	R
CTD3	●	●	3.0	20	4.3	4	0.2
CTD4	●	●	4.0	20	5.3	5	0.2
CTD5	●	●	5.0	25	6.3	6	0.2

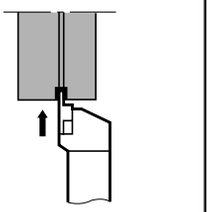
■ Standard cutting conditions

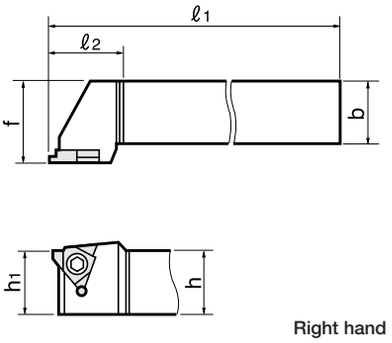
Operation	Work materials	Cutting speed Vc (m/min)	Feed f (mm/rev) CTD3	CTD4	CTD5
Grooving	Low carbon steels	100 ~ 150	0.08 ~ 0.25	0.08 ~ 0.25	0.08 ~ 0.25
	Medium carbon steels		0.08 ~ 0.25	0.08 ~ 0.30	0.08 ~ 0.30
Parting			0.08 ~ 0.15		

SGT-type Toolholder

External grooving

SGT R/L

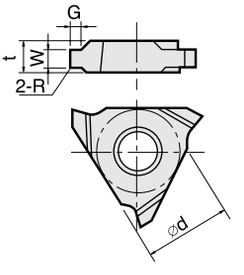




Right hand (R) shown

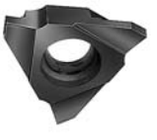
Application		Cat. No.	Stock		Inserts	Dimensions (mm)						Parts	
Lock-ring	O-ring		R	L		h_1	b	h	ℓ_1	ℓ_2	f	Clamping screw	Wrench
JIS C-type retaining rings for shaft, normal sizes: 10 - 82 JIS E-type retaining rings for shallow grooves, normal sizes: 10 - 24 JIS Uniform section C-type for shaft, normal sizes: 20 - 80	—	SGTR/L1616-3	○		GLR/L3□□□	16	16	16	100		20	CSTB-4	T-15F
		SGTR/L2020-3	●	●		20	20	20	125	20	25		
		SGTR/L2525-3	●	●		25	25	25	100		32		
JIS C-type retaining rings for shaft, normal sizes: 10 - 125 JIS E-type retaining rings for shallow grooves, normal sizes: 10 - 24 JIS Uniform section C-type for shaft, normal sizes: 20 - 200	External grooves for JIS O-ring for static and dynamic use, normal sizes: P3 - P22 and G25 - G145.	SGTR/L2020-4	●	●	GLR/L4□□□	20	20	20	125		25		
		SGTR/L2525-4	●	●	GOR/L4□□□	25	25	25	150	30	32	CSTB-5	T-20F
		SGTR/L3232-4				32	32	32	170		40		

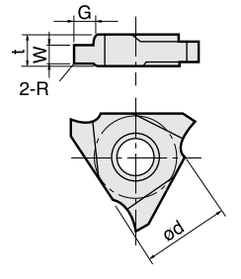
GOR/L (O-ring)



Right hand (R) shown

GLR/L (Lock-ring)





Right hand (R) shown

● GOR/L (For O-ring grooves)

Dimensions (mm)			Inserts	Stocked grades						Dimensions (mm)	
				Cermet				Uncoated			
				NS530				UX30			
$W^{+0.1}_{+0.05}$	G	R		R	L			R	L	ød	t
2.5	1.5	0.4	GOR/L4190	●				○		12.7	4.76
3.2	2.0	0.4	GOR/L4240	●				●			
4.1	2.5	0.4	GOR/L4310	●				●			

● GLR/L (For lock-ring grooves)

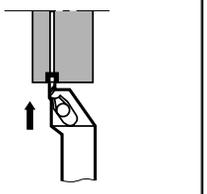
Dimensions (mm)			Inserts	Stocked grades						Dimensions (mm)	
				Cermet				Uncoated			
				NS530				UX30			
$W^{+0.1}_{+0.05}$	G	R		R	L			R	L	ød	t
1.15	1.5	0.1	GLR/L3115	●	●			●	●	9.525	3.18
1.35	1.5		GLR/L3135	●	●			●			
1.65	2.0		GLR/L3165	●				●	●		
1.75	2.0		GLR/L3175	●				●	●		
1.90	2.5		GLR/L3190					●	●		
1.95	2.5		GLR/L3195	●	●			●	●		
2.20	3.0		GLR/L3220	●	●			●	○		
2.70	3.0		GLR/L3270	●				●	○		
1.15	1.5	0.1	GLR/L4115	●				●		12.70	4.76
1.35	1.5		GLR/L4135	●	●			●			
1.65	2.0		GLR/L4165	●				●			
1.75	2.0		GLR/L4175	●				●			
1.90	2.5		GLR/L4190	●	●			●			
1.95	2.5		GLR/L4195	●	●			●			
2.20	3.5		GLR/L4220	●	●			●	○		
2.70	3.5		GLR/L4270	●				●			
3.20	4.0		GLR/L4320	●	●			●	○		
4.20	4.0		GLR/L4420	●	●			●	○		

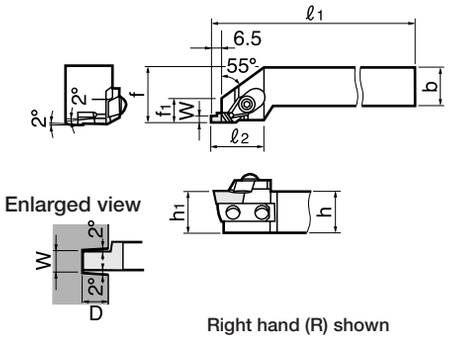
■ Standard cutting conditions

Grades	Cutting speed Vc (m/min)	Feed f (mm/rev)		
		W < 2 mm	W = 2 ~ 4 mm	W > 4 mm
NS530	80 ~ 200	0.05 ~ 0.1	0.08 ~ 0.20	0.08 ~ 0.25
UX30	60 ~ 150	0.05 ~ 0.1	0.08 ~ 0.20	0.08 ~ 0.25

GX-type Toolholder

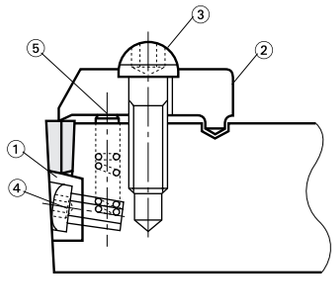
External grooving GX-R/LE





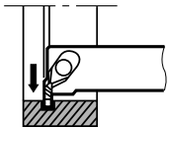
Right hand (R) shown

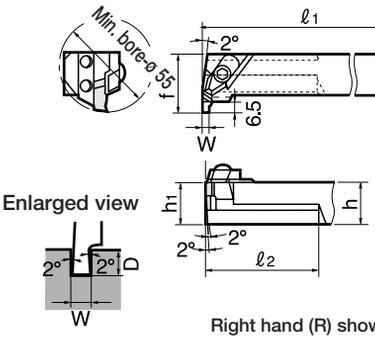
■ Replacement Parts



Max. grooving width (mm)	Max. grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h1	b	h	ℓ1	ℓ2	f	f1	Parts ① Shim	② Clamp	③ Clamping screw	④ Shim screw	⑤ Clamping pusher	Wrench
4.5	6.0	GX-2020R/LE	●	●	XGR/L63□□	20	20	20	125	35	25	15	SL-6R/L	CP81A	RT-1	BHM4-8	BP-3	P-4
		GX-2525R/LE	●	●		25	25	25	150	35	32	15	SL-1R/L					

Internal grooving GX-R/LI

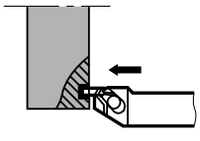


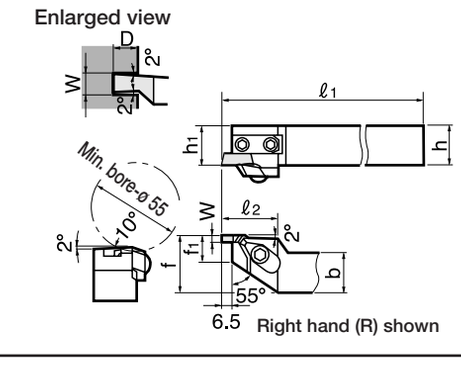


Right hand (R) shown

Min. bore diameter (mm)	Max. grooving width (mm)	Max. grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h1	b	h	ℓ1	ℓ2	f	f1	Parts ① Shim	② Clamp	③ Clamping screw	④ Shim screw	⑤ Clamping pusher	Wrench
Ø55	4.5	6.0	GX-2020R/LI			XGL/R63□□	20	20	20	160	60	35	–	SL-7R/L	CP81B	RT-1	BHM4-8	BP-0	P-4
			GX-2525R/LI	●	●		25	25	25	200	70	35	–	SL-2R/L			BHM3-8		

Face grooving GX-R/LF





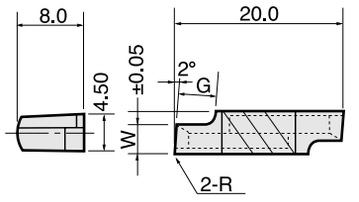
Right hand (R) shown

Min. bore diameter (mm)	Max. grooving width (mm)	Max. grooving depth (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h1	b	h	ℓ1	ℓ2	f	f1	Parts ① Shim	② Clamp	③ Clamping screw	④ Shim screw	⑤ Clamping pusher	Wrench
Ø55	4.5	6.0	GX-2020R/LF			XNL/R63□□	20	20	20	125	35	25	15	SL-8R/L	CP81A	RT-1	BHM4-8	BP-3	P-4
			GX-2525R/LF	●	●		25	25	25	150	35	32	15	SL-3R/L					

Reference guide Inserts P. 220

■ Inserts

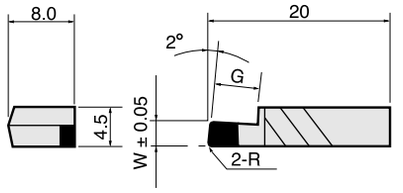
● XGR/L (For external and internal)



Right hand (R) shown

Dimensions (mm)				Cat. No.	Stocked grades									
					Cermet				Uncoated					
					NS530				TH10		UX30		TX10S	
W±0.05	Grooving depth	G	R		R	L			R	L	R	L	R	L
1.0	1.5	1.8	0	XGR/L6310S										
1.0	1.5	1.8	0.2	XGR/L6310-02	●	●			●	●				
1.5	2.3	2.5	0	XGR/L6315S										
1.5	2.3	2.5	0.2	XGR/L6315-02	●	●			●	●				
2.0	3.0	3.2	0	XGR/L6320S										
2.0	3.0	3.2	0.2	XGR/L6320-02	●	●			●	●				
2.5	3.8	3.9	0	XGR/L6325S										
2.5	3.8	3.9	0.2	XGR/L6325-02	●	●			●	●				
3.0	4.5	4.6	0	XGR/L6330S										
3.0	4.5	4.6	0.2	XGR/L6330-02	●	●			●	●				
3.5	5.3	5.4	0	XGR/L6335S										
3.5	5.3	5.4	0.2	XGR/L6335-02	●	●			●	●				
4.0	6.0	6.1	0	XGR/L6340S										
4.0	6.0	6.1	0.2	XGR/L6340-02	●	●			●	●				
4.5	6.0	6.1	0	XGR/L6345S										
4.5	6.0	6.1	0.2	XGR/L6345-02	●	●			●	●				

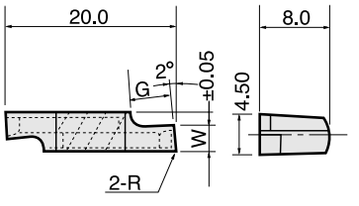
● XGR/L-QBN (For external and internal)



Right hand (R) shown

Dimensions (mm)				Cat. No.	PCBN	
					BX360	
W±0.05	Grooving depth	G	R		R	L
1.0	1.5	2.5		XGR/L6310S-QBN		
1.5	2.3	2.5		XGR/L6315S-QBN	○	
2.0	3.0	3.2		XGR/L6320S-QBN	○	
2.5	3.8	3.9	0.2	XGR/L6325S-QBN	○	
3.0	4.5	4.6		XGR/L6330S-QBN	○	
3.5	5.3	5.4		XGR/L6335S-QBN	○	
4.0	6.0	6.1		XGR/L6340S-QBN	○	
4.5	6.0	6.1		XGR/L6345S-QBN	○	

● XNR/L (For facing)



Left hand (L) shown

Dimensions (mm)				Cat. No.	Stocked grades									
					Cermet				Uncoated					
					NS530				TH10		UX30		TX10S	
W±0.05	Grooving depth	G	R		R	L			R	L			R	L
1.0	1.5	1.8	0	XNR/L6310S										
1.0	1.5	1.8	0.2	XNR/L6310-02	●	●								
1.5	2.3	2.5	0	XNR/L6315S										
1.5	2.3	2.5	0.2	XNR/L6315-02	●	●								
2.0	3.0	3.2	0	XNR/L6320S										
2.0	3.0	3.2	0.2	XNR/L6320-02	●	●								
2.5	3.8	3.9	0	XNR/L6325S										
2.5	3.8	3.9	0.2	XNR/L6325-02	●	●								
3.0	4.5	4.6	0	XNR/L6330S										
3.0	4.5	4.6	0.2	XNR/L6330-02	●	●								
3.5	5.3	5.4	0	XNR/L6335S										
3.5	5.3	5.4	0.2	XNR/L6335-02	●	●								
4.0	6.0	6.1	0	XNR/L6340S										
4.0	6.0	6.1	0.2	XNR/L6340-02	●	●								
4.5	6.0	6.1	0	XNR/L6345S										
4.5	6.0	6.1	0.2	XNR/L6345-02	●	●								

■ Standard cutting conditions (External & internal grooving)

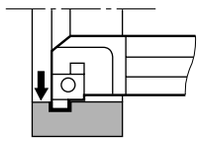
Work materials	Grades	Cutting speed Vc (m/min)	Feed f (mm/rev)		
			W < 2 mm	W = 2 ~ 4 mm	W > 4 mm
Carbon steels	**NS530**	80 ~ 200	0.05 ~ 0.1	0.08 ~ 0.2	0.08 ~ 0.25
	TX10S	60 ~ 150	0.05 ~ 0.1	0.08 ~ 0.2	0.08 ~ 0.25
	UX30	60 ~ 150			
Cast irons · Light alloys	**TH10**	60 ~ 150	0.05 ~ 0.1	0.08 ~ 0.2	0.08 ~ 0.25

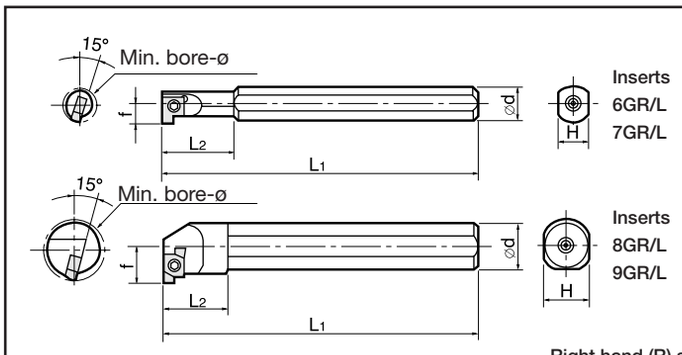
Note: When using internal and face grooving toolholder, right hand toolholder use a left hand insert and left hand toolholder use a right hand insert.

SNG · CNG-type Toolholder

Internal grooving
SNG R/L

Screw-on type



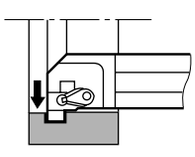


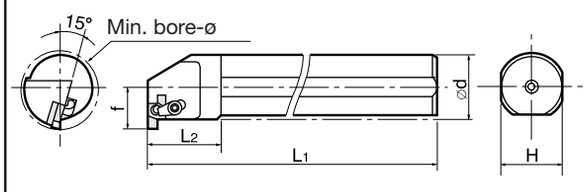
Right hand (R) shown

Max. grooving width (mm)	Min. bore dia. ØD (mm)	Max. grooving depth (mm)	Shank material	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	L_1	L_2	H	Parts Clamping screw	Wrench
2.0	8	1.5	Steel	SNGR/L08H06	●	●	6GR/L□□□	8	4.7	100	18	7	CSTB-2L040	T-6F
	10			SNGR/L08H07	●	●	7GR/L□□□	8	5.8	100	23	7	CSTB-2.2S	T-7F
	12			SNGR/L10K07	●	●		10	6.8	125	29	9		
3.5	14	2.0		SNGR/L10K08	●	●	8GR/L□□□	10	7.6	125	15	9	CSTB-2.2	
	16			SNGR/L12M08	●	●		12	8.6	150	18	11		
3.5	20	3.0		SNGR/L16Q09	●	●	9GR/L□□□	16	11.6	180	20	15	CSTB-2.5L080	T-8F
	24			SNGR/L20R09	●	●		20	13.6	200	25	18		
2.0	8	1.5	Carbide	SNGR/L08K06SC	●	●	6GR/L□□□	8	4.7	125	28	7	CSTB-2L040	T-6F
	10			SNGR/L08K07SC	●	●	7GR/L□□□	8	5.8	125	35	7	CSTB-2.2S	T-7F
	12			SNGR/L10M07SC	●	●		10	6.8	150	45	9		
3.5	14	3.0		SNGR/L10M08SC	●	●	8GR/L□□□	10	7.6	150	–	9	CSTB-2.2	
	16			SNGR/L12Q08SC	●	●		12	8.6	180	–	11		
	20			SNGR/L16R09SC	●	●	9GR/L□□□	16	11.6	200	–	15	CSTB-2.5L080	T-8F

Internal grooving
CNG R/L

Clamp-on type





Right hand (R) shown

Max. grooving width (mm)	Min. bore dia. ØD (mm)	Max. grooving depth (mm)	Shank material	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	L_1	L_2	H	Parts Clamp	Shim	Shim screw	Wrench
5.0	32	5.0	Steel	CNGR/L25S15	●	○	15GR/L□□□	25	18.1	250	30	23	CSP22	SGSR/L151	DTS5-3.5	T-20F
	40			CNGR/L32T15	●	○		32	22.1	300	35	30				
	48			CNGR/L40U15	●	○		40	26.1	350	45	38				

● Optional parts for CNG type toolholder

When using as a screw-on type, use the following parts.

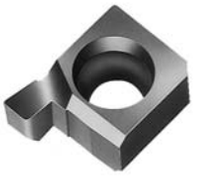
Insert Cat. No.	Insert fix. screw	Wrench
CNGR/L25S15 CNGR/L32T15 CNGR/L40U15	CSTB-3.5L	T-15F

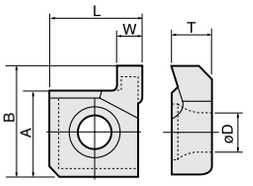
SNG · CNG-type Toolholder

■ Inserts

● One corner type

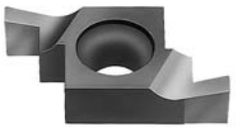
6GR/L□□□
7GR/L□□□

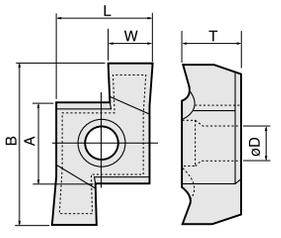




● Two corner type

8GR/L□□□
9GR/L□□□
15GR/L□□□





Right hand (R) shown

● Inserts for general purpose

Grooving width W±0.025 (mm)	Grooving depth (mm)	Cat. No.	Stocked grades								Dimensions (mm)				
			Cermet				Uncoated								
			NS530				TH10		UX30						
			R	L			R	L	R	L	A	B	T	øD	L
1.0	1.5	6GR/L100	●				●		●						
1.5	1.5	6GR/L150	●				●	●	●	●	4.76	6.44	2.34	2.3	5.56
2.0	1.5	6GR/L200	●	●			●	●	●	●					
1.0	1.5	7GR/L100	●				●		●						
1.5	1.5	7GR/L150	●				●		●		5.56	7.36	3.08	2.58	5.56
2.0	1.5	7GR/L200	●	●			●	●	●	●					
1.0	1.5	8GR/L100													
1.5	2.0	8GR/L150	●	●			●		●						
2.0	2.0	8GR/L200	●	●			●	●	●						
2.5	2.0	8GR/L250	●				●	●	●	●	5.56	10.16	3.87	2.58	6.15
3.0	2.0	8GR/L300	●	●			●	●	●	●					
3.5	2.0	8GR/L350	●	●			●		●						
1.0	1.5	9GR/L100													
1.5	2.0	9GR/L150	●	●			●		●	●					
2.0	3.0	9GR/L200	●	●			●	●	●	●					
2.5	3.0	9GR/L250	●	●			●		●	●	6.35	12.95	4.66	2.86	7.74
3.0	3.0	9GR/L300	●	●			●	●	●	●					
3.5	3.0	9GR/L350	●	●			●		●	●					
1.0	1.5	15GR/L100													
1.5	2.0	15GR/L150													
2.0	3.0	15GR/L200	●				●		●						
2.5	3.0	15GR/L250	●				●		●						
3.0	3.0	15GR/L300	●				●		●	○	9.2	20.80	5.1	4.8	10.8
3.5	3.0	15GR/L350	●	○			●		●						
4.0	4.0	15GR/L400	●				●		●						
4.5	4.0	15GR/L450	●	○			●	○	●						
5.0	5.0	15GR/L500	●	○			●		●						

● Inserts for lock-ring grooves

Grooving width W±0.025 (mm)	Grooving depth (mm)	Cat. No.	Stocked grades								Dimensions (mm)			
			Cermet				Uncoated							
			NS530				TH10		UX30					
			R	L			R	L	R	L	A	T	øD	L
1.15	1.5	6GR/L115									4.76	2.34	2.3	5.56
1.35	1.5	6GR/L135												
1.15	1.5	7GR/L115												
1.35	1.5	7GR/L135									5.56	3.08	2.58	5.56
1.75	1.5	7GR/L175												
1.35	1.5	8GR/L135												
1.75	1.5	8GR/L175									5.56	3.87	2.58	6.15
1.95	2.0	8GR/L195												
1.75	1.5	9GR/L175												
1.95	2.0	9GR/L195									6.35	4.66	2.86	7.74
2.20	2.0	9GR/L220												
2.70	2.5	9GR/L270												
1.75	1.5	15GR/L175												
1.95	2.0	15GR/L195												
2.20	2.0	15GR/L220									9.2	5.1	4.8	10.8
2.70	2.5	15GR/L270												
3.20	3.0	15GR/L320												
4.20	3.5	15GR/L420												

Notes: ● Inserts for lock-ring grooves are made to order.
● When using a ground-in chipbreaker insert, right hand (R) holder use right hand inserts, and left hand toolholder use left hand inserts.

● Standard cutting conditions

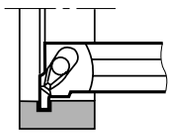
Work materials	Cutting speed Vc (m/min)	Feed f (mm/rev)
Medium carbon steels	40 ~ 150	0.05 ~ 0.15
Cast irons · Light alloys	60 ~ 200	0.05 ~ 0.15

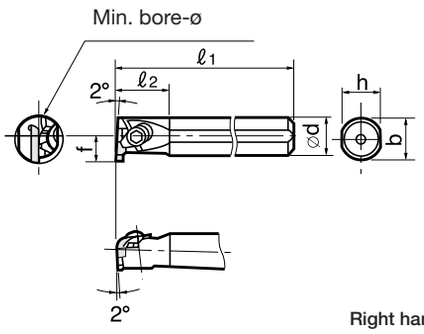
Note: ● Cutting conditions shown left are for guideline only.
● When grooving around the minimum bore diameter or with long reach conditions, reduce the conditions shown left by approximately 50%.
● To help chip evacuation, use water-soluble cutting fluid. The fluid should be applied sufficiently to the cutting point.
When using without cutting fluid, reduce both the cutting speeds and feeds shown left by 50% at least.

CGX-type Toolholder

Internal grooving

CGX R/L



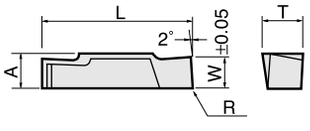


Right hand (R) shown

Max. grooving width (mm)	Min. bore dia. ØD (mm)	Max. grooving depth (mm)	Shank material	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	Parts Clamping set	Parts Wrench
3.0	20	3.0	Steel	CGXR/L0016	●	●	GIR/L52□□□	16	11.3	150	24	15	15.5	CSW-0	P-2.5T
	24			CGXR/L0020	●	●		20	13.3	180	30	18	19		
5.0	32	5.3		CGXR/L0025	●	●	GIR/L63□□□	25	18	200	38	23	24	CSW-2	P-4
	40			CGXR/L0032	●	●		32	23	250	48	30	31		
	48			CGXR/L0040	●	●		40	27	300	60	37	38.5		
3.0	20	3.0	Carbide	CGXR/L16SC	●	●	GIR/L52□□□	16	11.3	200	24	15	–	CSW-0	P-2.5T

■ Inserts

GIR/L



Right hand (R) shown

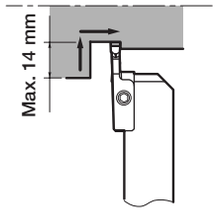
Grooving width W±0.05 (mm)	Grooving depth (mm)	Cat. No.	Stocked grades Cermet NS530 R	Cermet NS530 L	Uncoated TH10 R	Uncoated TH10 L	Dimensions (mm) A	T	L	R
1.0	1.5	GIR/L5210-02 GIR/L5210	●	●	●	●	3.5	4.5	1.5	0.2 0
1.5	2.3	GIR/L5215-02 GIR/L5215	●	●	●	●				0.2 0
2.0	3.0	GIR/L5220-02 GIR/L5220	●	●	●	●				0.2 0
2.5	3.0	GIR/L5225-02 GIR/L5225	●	●	●	●				0.2 0
3.0	3.0	GIR/L5230-02 GIR/L5230	●	●	●	●				0.2 0
1.0	1.5	GIR/L6310-02 GIR/L6310	●	●	●	●	5.5	6.5	24	0.2 0
1.5	2.3	GIR/L6315-02 GIR/L6315	●	●	●	●				0.2 0
2.0	3.0	GIR/L6320-02 GIR/L6320	●	●	●	●				0.2 0
2.5	3.8	GIR/L6325-02 GIR/L6325	●	●	●	●				0.2 0
3.0	4.5	GIR/L6330-02 GIR/L6330	●	●	●	●				0.2 0
3.5	5.3	GIR/L6335-02 GIR/L6335	●	●	●	●				0.2 0
4.0	5.3	GIR/L6340-02 GIR/L6340	●	●	●	●				0.2 0
4.5	5.3	GIR/L6345-02 GIR/L6345	●	●	●	●				0.2 0
5.0	5.3	GIR/L6350-02 GIR/L6350	●	●	●	●				0.2 0

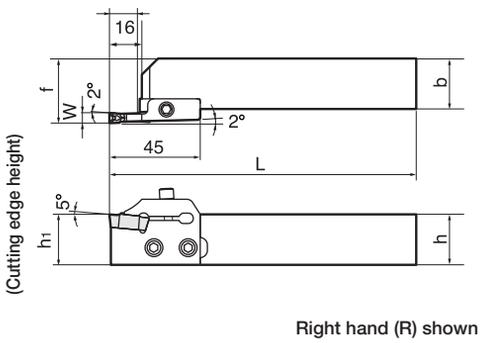
■ Standard cutting conditions (External & internal grooving)

Work materials	Grades	Cutting speed Vc (m/min)	Feed f (mm/rev) W < 2 mm	W = 2 ~ 4 mm	W > 4 mm
Carbon steels	**NS530**	80 ~ 150	0.05 ~ 0.1	0.08 ~ 0.15	0.08 ~ 0.2
Cast irons · Light alloys	**TH10**	60 ~ 150	0.05 ~ 0.1	0.08 ~ 0.15	0.08 ~ 0.2

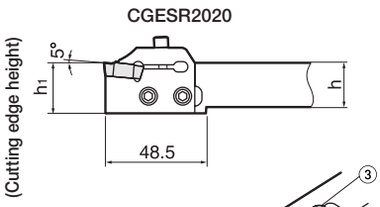
CGW-type Toolholder “Flex-Tool”

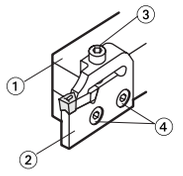
External grooving
CGWS R/L





Right hand (R) shown

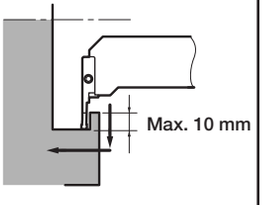


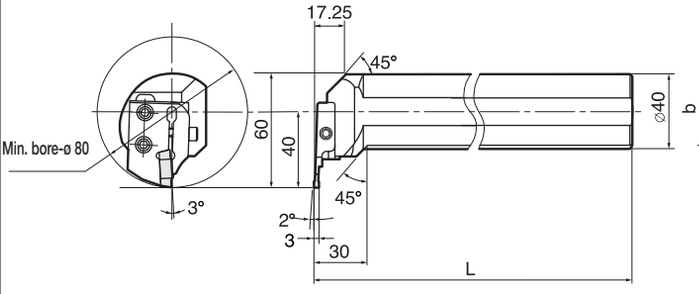


For external grooving

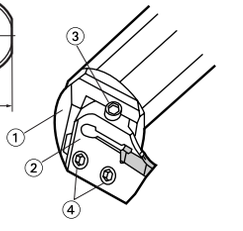
Grooving width (mm)	Grooving depth (mm)	Shank and blade ass'y Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h1	b	h	L	f	Parts ① Shank	② Blade	Clamping screw ③ for Insert	Clamping screw ④ for Blade	Wrench
3	10	CGWSR/L2020-FLR/L3GP	●	●	FLEX30R/L	20	20	20	152	27	CGWSR/L2020	FLR/L3GP	CHHM5-18	CSHB-6	P-4
4	12	CGWSR/L2020-FLR/L4GP	●	●	FLEX40R/L							FLR/L4GP			
5	14	CGWSR/L2020-FLR/L5GP	●	●	FLEX50R/L							FLR/L5GP			
3	10	CGWSR/L2525-FLR/L3GP	●	●	FLEX30R/L	25	25	25	152	27	CGWSR/L2525	FLR/L3GP			
4	12	CGWSR/L2525-FLR/L4GP	●	●	FLEX40R/L							FLR/L4GP			
5	14	CGWSR/L2525-FLR/L5GP	●	●	FLEX50R/L							FLR/L5GP			

Internal grooving
CGWT R/L





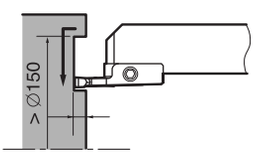
Right hand (R) shown

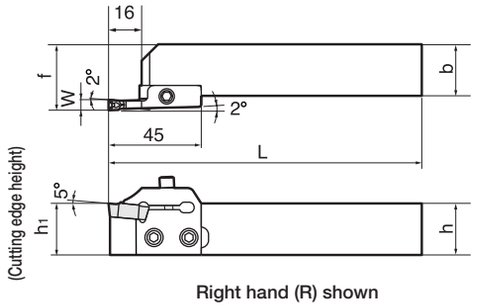


For internal grooving

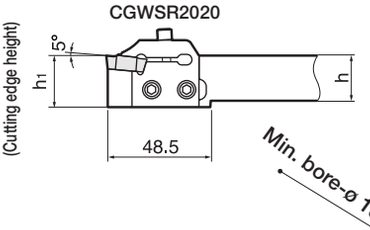
Grooving width (mm)	Min. bore dia. (mm)	Max. grooving depth (mm)	Shank and blade ass'y Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) h1	b	h	L	f	Parts ① Shank	② Blade	Clamping screw ③ for Insert	Clamping screw ④ for Blade	Wrench
3	ø80	10	CGWTR/L0040-FLL/R3NP	●	●	FLEX30L/R	–	37.5	37	180	–	CGWTR/L0040	FLL/R3NP	CHHM5-18	CSHB-6	P-4

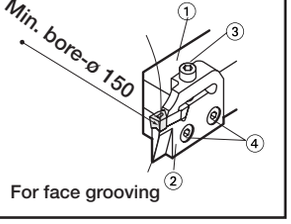
Face grooving
CGWS R/L





Right hand (R) shown

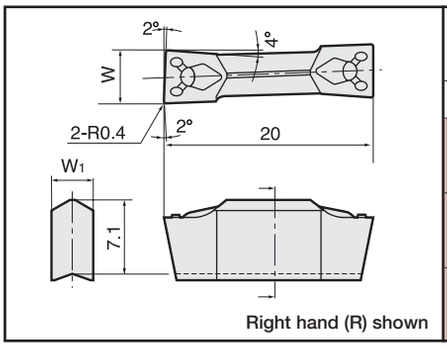




For face grooving

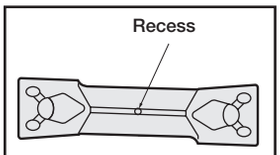
Grooving width (mm)	Min. bore dia. (mm)	Max. grooving depth (mm)	Shank and blade ass'y Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) h1	b	h	L	f	Parts ① Shank	② Blade	Clamping screw ③ for Insert	Clamping screw ④ for Blade	Wrench
5	ø150	6	CGWSR/L2020-FLR/L5TP	●	●	FLEX50R/L	20	20	20	152	27	CGWSR/L2020	FLR/L5TP	CHHM5-18	CSHB-6	P-4
			CGWSR/L2525-FLR/L5TP	●	●	FLEX50R/L	25	25	25	152	32	CGWSR/L2525				

■ Inserts



Right hand (R) shown

Dimensions (mm)				Insert Cat. No.	Stocked grades		
					Coated CVD	Cermet	Uncoated
W±0.05	R	W1	Hand		T9025	NS530	UX30
3	0.4	2.15	R	FLEX30R	●	●	
			L	FLEX30L	●	●	
4		3.10	R	FLEX40R	●	●	
			L	FLEX40L	●	●	
5		4.00	R	FLEX50R	●	●	○
			L	FLEX50L	●	●	○



Left hand inserts are identified with a recessed dot.

Notes: ● Final letter of Cat. Nos.: R = Right hand, L = Left hand
● Right hand blades use right hand insert.
Left hand blades use left hand insert.

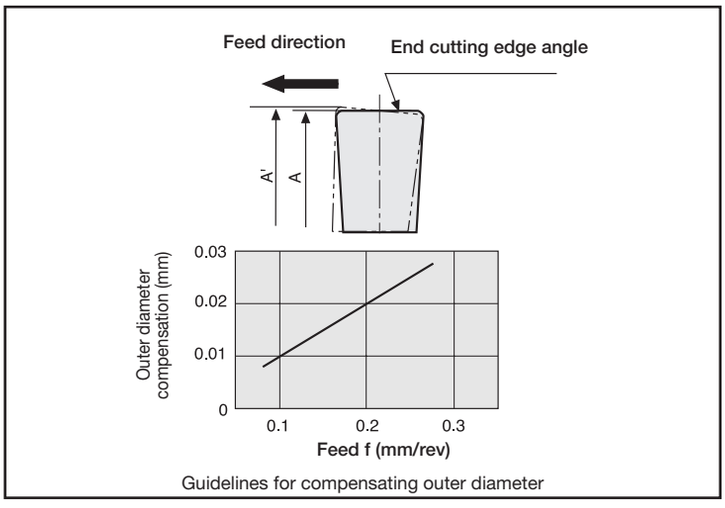
■ Standard cutting conditions

Insert grades	Inserts	Grooving		Lateral feed machining			Coolant
		Cutting speed Vc (m/min)	Feed f (mm/rev)	Cutting speed Vc (m/min)	Feed f (mm/rev)	Cutting depth ap (mm)	
T9025	FLEX30R/L	80 ~ 150	0.05 ~ 0.2	80 ~ 150	0.1 ~ 0.2	0.8 ~ 1.5	Necessary
	FLEX40R/L	80 ~ 150	0.05 ~ 0.25	80 ~ 150	0.1 ~ 0.2	0.8 ~ 2.0	
	FLEX50R/L	80 ~ 150	0.05 ~ 0.3	80 ~ 150	0.1 ~ 0.3	1.0 ~ 2.5	
NS530	FLEX30R/L	80 ~ 200	0.05 ~ 0.2	80 ~ 200	0.1 ~ 0.2	0.8 ~ 1.5	
	FLEX40R/L	80 ~ 200	0.05 ~ 0.25	80 ~ 200	0.1 ~ 0.2	0.8 ~ 2.0	
	FLEX50R/L	80 ~ 200	0.05 ~ 0.3	80 ~ 200	0.1 ~ 0.3	1.0 ~ 2.5	

Notes: ● The cutting conditions given above are based on cutting medium carbon steel (HB = 200).
● When the 20 mm - square shank tools are used, machining should be perfomed at approximately 80% of the values shown above.
● For face grooving, cutting depth and feed should be performed at approximately 70% of the values shown above.

■ Cautionary Notes

1. When facing, the operation should proceed from the OD toward the center in order to prevent tool breakage.
2. When performing OD machining, the toolpoint must be set at a right angle to the axial direction of the work.
3. When replacing an insert, the replacement should be made only after completely removing any chips or other foreign matter from the tool-clamping area on the holder by using compressed air etc.
4. Never tighten the insert-mounting screws when an insert has not been installed since doing so can deform the screws and prevent the future installation of an insert.
5. The inserts in Flex-Tools move upon the application of cutting force to form an end-cutting edge angle that suppresses chattering during OD-machining operations. For this reason, when performing OD cutting, the danger exists that the programmed dimensions for the work diameter will not be achieved if the machining conditions (cutting depth and feedrate) are set too high. If this is found to be the case, it is necessary to perform a compensation in the program by an amount that is equal to the amount of A-A' (the amount of OD compensation) that is shown in the drawing on the right (refer to the values for the amount of OD compensation that are given in the graph below the drawing.)



Guidelines for compensating outer diameter

MEMO

TAC Threading Tools

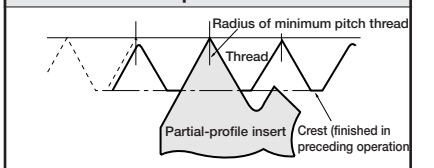
5678

Applications (ST-type)

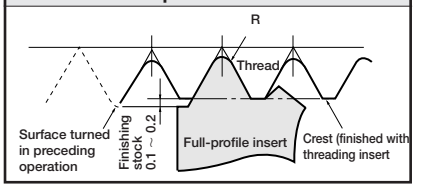
Thread type		External threading tools ST	Internal threading tools ST
Metric		0.5 ~ 6.0 mm	0.5 ~ 6.0 mm
Unified		24 ~ 8 TPI	24 ~ 8 TPI
Whitworth		28 ~ 8 TPI	19 ~ 8 TPI
Parallel pipe		28 ~ 8 TPI	19 ~ 8 TPI
Taper pipe		28, 19, 14, 11 TPI	19, 14, 11 TPI
30° trapezoidal		2.0 ~ 6.0 mm	2.0 ~ 5.0 mm
29° trapezoidal, ACME		8, 6, 5 TPI	8, 6, 5 TPI
American National pipe thread		18, 14, 11.5 TPI	14, 11.5, 8 TPI
Oil well pipe thread	Round		
	Buttress		

Note: mm: pitch, TPI: Threads per inch.

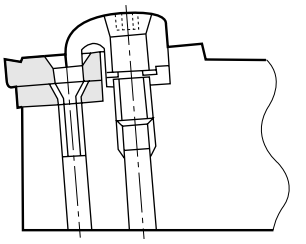
Partial-profile insert



Full-profile insert



Outline of TAC threading tools

Type	Appearance	Clamping mechanism	Features	Page
ST Clamp-on type Screw-on type			● With the unique combination of the clamp and the mouth shape of the insert hole, the insert is positively held with precision accuracy. ● Specially designed chipbreaker are formed on the insert, achieving free-flowing chip-control for internal and external threading. ● A variety of insert shapes and sizes are available from stock. ● Minimum machinable diameter for internal threading is ø 8 mm.	230 ~ 264

Nomenclature for ST-type TAC Inserts

(Example) **16** ① **N** ② **R** ③ **175** ④ **ISO** ⑤ – **B** ⑥

① Insert size	
Symbol	I.C. dia. (mm)
06	—
11	6.35
16	9.525
22	12.70
27	15.875

② External or internal	
Symbol	Use
E	External
N	Internal

③ Hand of insert	
Symbol	Hand
R	Right hand
L	Left hand

④ Pitch (No. of threads)

● **For full-profile inserts**

Metric thread : Pitch (mm)×10 or 100

Inch thread : No. of threads per inch (25.4mm)

(Examples)

05 : 0.5 mm pitch×10

175 : 1.75 mm pitch×100

14 : 14 threads per 25.4 mm

● **For partial-profile inserts**

A : 0.5 to 1.5 mm pitch
48 to 16 TPI

AG : 0.5 to 3.0 mm pitch
48 to 8 TPI

G : 1.75 to 3.0 mm pitch
14 to 8 TPI

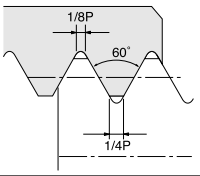
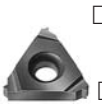
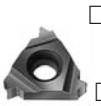
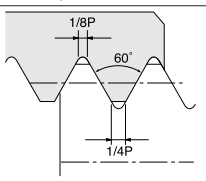
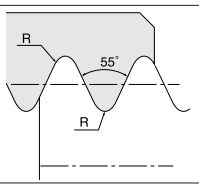
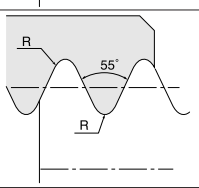
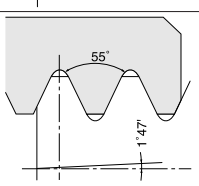
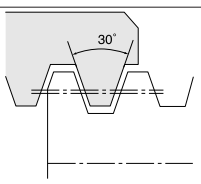
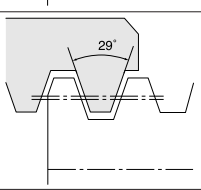
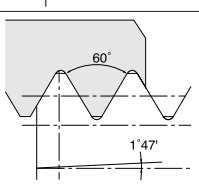
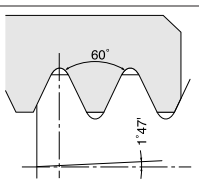
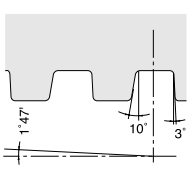
N : 3.5 to 5.0 mm pitch
7 to 5 TPI

Z : 4.0 to 6.0 mm pitch
6 to 4 TPI

⑤ Thread type	
● For full-profile inserts	
ISO	Metric
UN	Unified
W	Whitworth
PT	JIS taper pipe
TR	30° trapezoidal
ACME	29° trapezoidal
NPT	National pipe
RAPI	API round
BAPI	API buttress
● For partial-profile inserts	
55	55° thread angle
60	60° thread angle

⑥ Chipbreaker

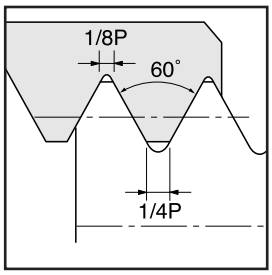
Thread Types and Applicable Inserts

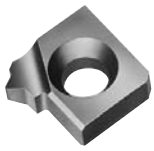
Thread type			Symbol		Applicable inserts	
			Symbol	Example	External thread	Internal thread
	Metric	Coarse	M	M8	 □□ER/L□□ISO (P. 234)	 □□NR/L□□ISO (P. 234)
		Fine		M8X1	□□ER/L□□60* (P. 232)	□□ER/L□□60* (P. 232)
	Unified	Coarse	UNC	3/8-16UNC	 □□ER/L□□UN (P. 235)	 □□NR/L□□UN (P. 235)
		Fine	UNF	No.8-36UNF	□□ER/L□□60* (P. 232)	□□ER/L□□60* (P. 232)
		Extra Fine	UNEF	1/4-32UNEF		
	Whitworth	Coarse	W	W3/4	 □□ER/L□□W (P. 237)	 □□NR/L□□W (P. 237)
		Fine		W50/7	□□ER/L□□55* (P. 233)	□□ER/L□□55* (P. 233)
	Parallel pipe	Internal thread	G	G1/2	 □□ER/L□□W (P. 237)	 □□NR/L□□W (P. 237)
			PF	PF7		
			Rp	Rp3/4	—	
			PS	PS7		
	JIS taper pipe	External thread	R	R3/4	 □□ER/L□□PT (P. 240)	—
		Internal thread	PT	PT7		 □□NR/L□□PT (P. 240)
			Rc	Rc3/4	—	
	30° trapezoidal		Tr	Tr10X2	 □□ER/L□□TR (P. 241)	 □□NR/L□□TR (P. 241)
			TM	TM10	—	—
	29° trapezoidal		TW	TW20	 □□ER/L□□ACME (P. 241)	 □□NR/L□□ACME (P. 241)
			ACME	3/8-12ACME		
	American National pipe		NPT	3/8-18NPT	 □□ER/L□□NPT (P. 240)	 □□NR/L□□NPT (P. 240)
	Oil well	Round	—	—	 □□ER/L□□RAPI (P. 242)	 □□NR/L□□RAPI (P. 242)
		Buttress	—	—	 □□ER/L□□BAPI (P. 242)	 □□NR/L□□BAPI (P. 242)

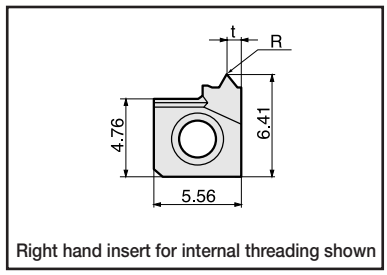
Note : *marked items are partial-profile inserts.

ST-Mini-type Inserts

■ ISO metric full-profile inserts for ST-Mini-type tools





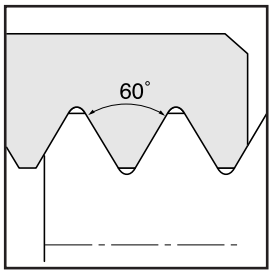


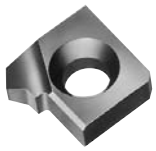
Right hand insert for internal threading shown

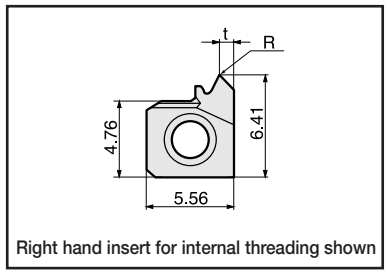
For internal threading

Insert size	Pitch	Number of threads	Hand of cut	Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet	Grades: Coated	d	t	ℓ_3	R	Applicable toolholder
6	0.5		R L	6NR05ISO 6NL05ISO	●	○				0.5		0.04	SNR/L0006K06SC-2
	0.75		R L	6NR075ISO 6NL075ISO	●	○						0.05	SNR/L0006K06SC-3
	1.0		R L	6NR10ISO 6NL10ISO	●	○				0.9		0.07	SNR/L0008K06SC-2
	1.25		R L	6NR125ISO 6NL125ISO	●	○						0.09	SNR/L0008K06SC-3
	1.5		R L	6NR15ISO 6NL15ISO	●	○						0.11	SNR/L0006H06-2
	1.75		R L	6NR175ISO 6NL175ISO	●	○						0.12	SNR/L0006H06-3
	2.0		R L	6NR20ISO 6NL20ISO	●	○						0.14	SNR/L0008H06-2
													SNR/L0008H06-3

■ 60° Partial-profile insert for ST-Mini-type tools







Right hand insert for internal threading shown

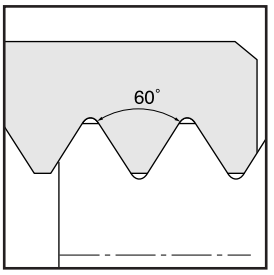
For internal threading

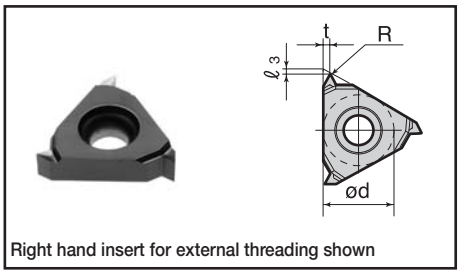
Insert size	Pitch	Number of threads	Hand of cut	Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet	Grades: Coated	d	t	ℓ_3	R	Applicable toolholder
6	0.5 ~1.5	48 ~16	R L	6NRA60 6NLA60	●	○			-	0.9	-	0.04	SNR/L0006K06SC-2 SNR/L0006K06SC-3 SNR/L0008K06SC-2 SNR/L0008K06SC-3 SNR/L0006H06-2 SNR/L0006H06-3 SNR/L0008H06-2 SNR/L0008H06-3

Thread types P. 230 | Reference guide | Technical reference P. 249 ~ 264

ST-type Inserts

■ 60° Partial-profile inserts with chipbreaker



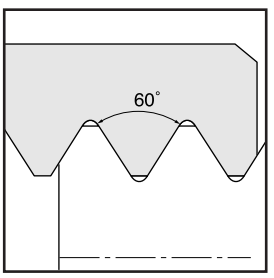


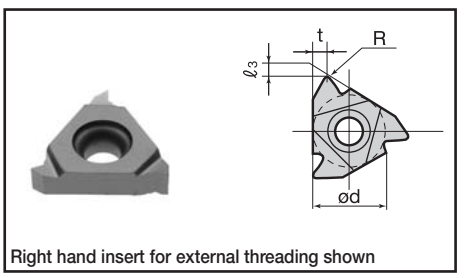
Right hand insert for external threading shown

Insert Size	Applicable toolholder	
	External	Internal
16	CER□□□□□16□□ B-SER□□□16 B-CER□□□16 BC-SER□□□16	SNR□□□□□16□ CNR□□□□□16□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated	Cermet	Coated: AH740	Dimensions (mm): ød	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated	Cermet	Coated	Dimensions (mm): ød	t	ℓ3	R
16	0.5 ~1.5	48 ~16	R	16ERA60-B			●	9.525	0.9	0.7	0.06	16NRA60-B				9.525	1.6	1.1	-
	1.75 ~3	14 ~8	R	16ERG60-B			●		1.6	1.2	0.22	16NRG60-B					1.6	1.2	-

■ 60° Partial-profile inserts





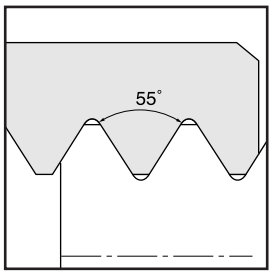
Right hand insert for external threading shown

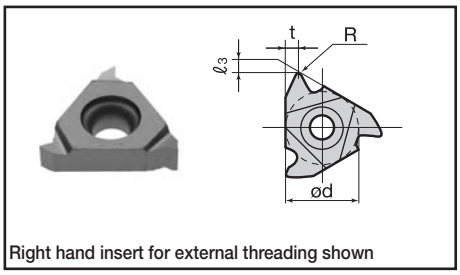
Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□
22	CER/L□□□□□22□□	SNR/L□□□□□22□□ CNR/L□□□□□22□
27	CER/L□□□□□27□□	CNR/L□□□□□27□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated TH10	UX30	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated TH10	UX30	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
11	0.5 ~1.5	48 ~16	R L										11NRA60 11NLA60	○ ○	○ ○	● ○	● ○	6.35	0.9	0.7	0.04
16	0.5 ~1.5	48 ~16	R L	16ERA60 16ELA60	○	●	● ○	● ○	9.525	0.9	0.7	0.06	16NRA60 16NLA60	○ ○	○ ○	● ○	● ○	9.525	1.6	1.1	0.04
	0.5 ~3.0	48 ~8	R L	16ERAG60 16ELAG60		●	●	●		1.6	1.1		16NRAG60 16NLAG60		●	●	●				
	1.75 ~3.0	14 ~8	R L	16ERG60 16ELG60	○	●	● ○	● ○		1.6	1.2	0.22	16NRG60 16NLG60	○ ○	●	● ○	● ○			1.2	0.12
22	3.5 ~5.0	7~5	R L	22ERN60 22ELN60	○	●	● ○	● ○	12.70	2.5	1.7	0.44	22NRN60 22NLN60	○	●	●	● ○	12.70	2.5	1.7	0.25
27	4~6	6~4	R L	27ERZ60 27ELZ60		○	○	○	15.875	3.2	2.2	0.28	27NRZ60 27NLZ60		○	○	○	15.875	3.2	2.2	0.28

Reference guide | ST toolholder P. 244 ~ 248 | Technical reference P. 249 ~ 264

■ 55° Partial-profile inserts





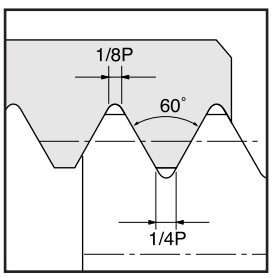
Right hand insert for external threading shown

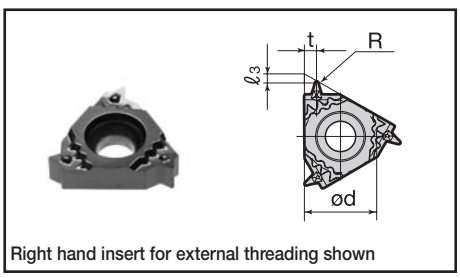
Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22	CER/L□□□□□22□□	CNR/L□□□□□22□□ TCNR□□□□□22 TSNR□□□□□22

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated TH10	Grades: Uncoated UX30	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R	Internal threading: Cat. No.	Grades: Uncoated TH10	Grades: Uncoated UX30	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R
11	0.5 ~1.5	48 ~16	R L										11NRA55 11NLA55	○	○	●	●	6.35	0.9	0.7	0.07
16	0.5 ~1.5	48 ~16	R L	16ERA55 16ELA55	○	○ ○	●	●	9.525	0.9	0.7	0.07	16NRA55 16NLA55	○	○ ○	●	●	9.525	1.6	1.1	0.07
	0.5 ~3.0	48 ~8	R L	16ERAG55 16ELAG55		●	●	●		1.6	1.1		16NRAG55 16NLAG55			●	●				
	1.75 ~3.0	14 ~8	R L	16ERG55 16ELG55	○	○ ○	●	●			1.2	0.25	16NRG55 16NLG55	○	○ ○	●	●			1.2	0.25
22	3.5 ~5.0	7~5	R L	22ERN55 22ELN55	○	●	●	●	12.70	2.5	1.7	0.50	22NRN55 22NLN55	○	○	●	●	12.70	2.5	1.7	0.50

B-type Threading Inserts

■ ISO metric full-profile inserts with chipbreaker





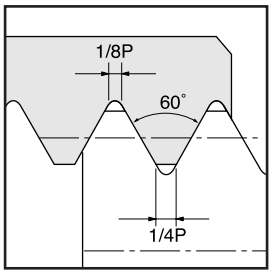
Right hand insert for external threading shown

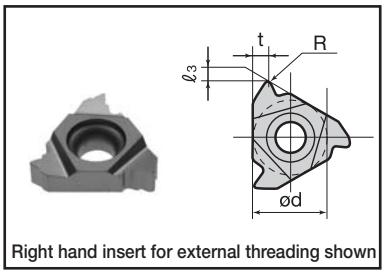
Insert Size	Applicable toolholder	
	External	Internal
11		SNR□□□□□11□ SNR□□□□□11SC
16	CER/L□□□□□16□□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR/L□□□□□16 TCNR/L□□□□□16

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Coated AH740	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ	Dimensions (mm): R	Internal threading: Cat. No.	Grades: Coated AH740	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ	Dimensions (mm): R
11	0.5									11NR05ISO-B	●	6.35	0.5	1.2	0.04
	0.75									11NR075ISO-B	●				0.05
	1.0									11NR10ISO-B	●		0.9	0.7	0.07
	1.25									11NR125ISO-B	●				0.09
	1.5									11NR150ISO-B	●				0.11
	1.75									11NR175ISO-B	●				0.12
	2.0									11NR20ISO-B	●				0.14
16	1.0		R	16ER10ISO-B	●	9.525	0.9	0.7	0.13	16NR10ISO-B	●	9.525	0.9	0.7	0.07
	1.25		R	16ER125ISO-B	●				0.16	16NR125ISO-B	●				0.09
	1.5		R	16ER15ISO-B	●				0.19	16NR15ISO-B	●				0.11
	1.75		R	16ER175ISO-B	●		1.6	1.2	0.22	16NR175ISO-B	●		1.6	1.2	0.12
	2.0		R	16ER20ISO-B	●				0.25	16NR20ISO-B	●				0.14
	2.5		R	16ER25ISO-B	●				0.31	16NR25ISO-B	●				0.18
	3.0		R	16ER30ISO-B	●				0.38	16NR30ISO-B	●				0.21

ST-type Inserts

■ ISO metric full-profile inserts





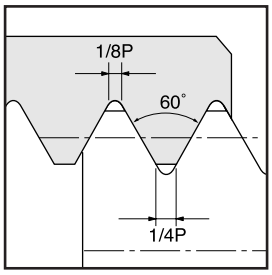
Right hand insert for external threading shown

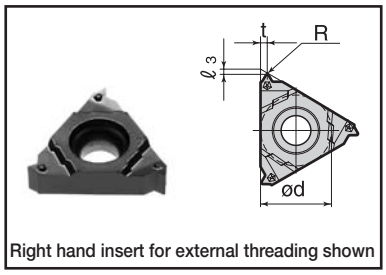
Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR/L□□□□□16 TCNR/L□□□□□16
22	CER/L□□□□□22□□	SNR/L□□□□□22□□ TSNR/L□□□□□22 CNR/L□□□□□22□ TCNR/L□□□□□22
27	CER/L□□□□□27□□	CNR/L□□□□□27□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
11	0.5		R L										11NR05ISO 11NL05ISO	○	○	●	●	6.35	0.5	1.2	0.04
	0.75		R L										11NR075ISO 11NL075ISO			●	●				0.05
	1.0		R L										11NR10ISO 11NL10ISO	○ ○	○	● ○	●		0.9	0.7	0.07
	1.25		R L										11NR125ISO 11NL125ISO	○		●	●				0.09
	1.5		R L										11NR15ISO 11NL15ISO	○ ○	○	● ○	●				0.11
	1.75		R L										11NR175ISO 11NL175ISO			●	●				0.12
	2.0		R L										11NR20ISO 11NL20ISO	○		●	●				0.14
16	0.5		R L	16ER05ISO 16EL05ISO	○	○	●	●	9.525	0.5	1.2	0.06	16NR05ISO 16NL05ISO	○				9.525	0.5	1.2	0.04
	0.75		R L	16ER075ISO 16EL075ISO	●	○	●	●				0.09	16NR075ISO 16NL075ISO				●				0.05
	1.0		R L	16ER10ISO 16EL10ISO	● ○	○	● ●	● ●		0.9	0.7	0.13	16NR10ISO 16NL10ISO	●	○	● ○	●		0.9	0.7	0.07
	1.25		R L	16ER125ISO 16EL125ISO	● ○		● ●	● ●				0.16	16NR125ISO 16NL125ISO	●		●	●				0.09
	1.5		R L	16ER15ISO 16EL15ISO	● ○	○	● ●	● ●				0.19	16NR15ISO 16NL15ISO	● ○	○	● ●	● ●				0.11
	1.75		R L	16ER175ISO 16EL175ISO	●		●	●		1.6	1.2	0.22	16NR175ISO 16NL175ISO			●	●		1.6	1.2	0.12
	2.0		R L	16ER20ISO 16EL20ISO	● ○	○	● ●	● ●				0.25	16NR20ISO 16NL20ISO	● ○	○	● ○	●				0.14
	2.5		R L	16ER25ISO 16EL25ISO	●	○	●	●				0.31	16NR25ISO 16NL25ISO	●	○	●	●				0.18
	3.0		R L	16ER30ISO 16EL30ISO	● ○	○	● ●	● ●				0.38	16NR30ISO 16NL30ISO	● ○	○	● ●	●				0.21
22	3.5		R L	22ER35ISO 22EL35ISO	●		○	●	12.70	2.5	1.7	0.44	22NR35ISO 22NL35ISO	●		●	●	12.70	2.5	1.7	0.25
	4.0		R L	22ER40ISO 22EL40ISO	●		○	●				0.50	22NR40ISO 22NL40ISO	●		●	●				0.28
	4.5		R L	22ER45ISO 22EL45ISO				●				0.56	22NR45ISO 22NL45ISO				●				0.32
	5.0		R L	22ER50ISO 22EL50ISO	○		○	●				0.63	22NR50ISO 22NL50ISO	○		●	●				0.35
27	5.5		R L	27ER55ISO 27EL55ISO					15.875	3.2	2.2	0.69	27NR55ISO 27NL55ISO					15.875	3.2	2.2	0.39
	6.0		R L	27ER60ISO 27EL60ISO	○			○				0.75	27NR60ISO 27NL60ISO	○			○				0.42

ST-type Inserts

■ Unified, full-profile inserts with chipbreaker





Right hand insert for external threading shown

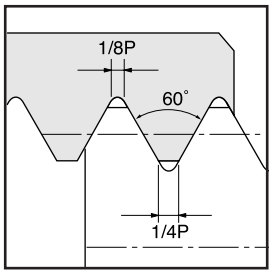
Insert Size	Applicable toolholder	
	External	Internal
16	CER□□□□□16□□ B-SER□□□16 B-CER□□□16 BC-SER□□□16	SNR□□□□□16□ TSNR□□□□□16 CNR□□□□□16□ TCNR□□□□□16

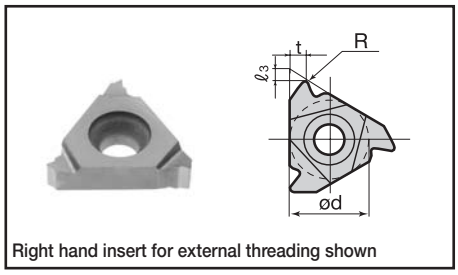
Insert size	Pitch (Ref.)	Number of threads	Hand of cut	External threading									Internal threading								
				Cat. No.	Grades					Dimensions (mm)				Cat. No.	Grades					Dimensions (mm)			
					Uncoated		Cermet		Coated						Uncoated		Cermet		Coated				
									AH740	ød	t	ℓ3	R						AH740	ød	t	ℓ3	R
16	(1.588)	16	R	16ER16UN-B					●	9.525	0.9	0.7	0.2	16NR16UN-B					●	9.525	0.9	0.7	0.11
	(2.117)	12	R	16ER12UN-B					●		1.6	1.2	0.27	16NR12UN-B					●		1.6	1.2	0.15

Reference guide | ST toolholder P. 244 ~ 248 | Technical reference P. 249 ~ 264

ST-type Inserts

■ Unified, full-profile inserts





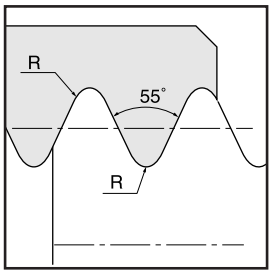
Right hand insert for external threading shown

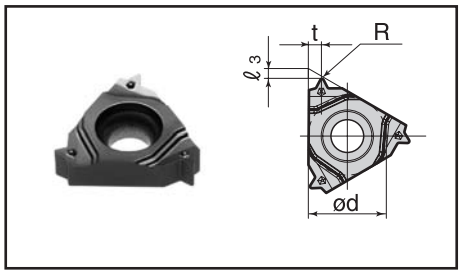
Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22	CER/L□□□□□22□□	SNR/L□□□□□22□□ CNR/L□□□□□22□
27	CER/L□□□□□27□□	CNR/L□□□□□27□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: UX30	TH10	NS530	T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: UX30	TH10	NS530	T313V	Dimensions (mm): d	t	ℓ3	R
11	(0.794)	32	R L										11NR32UN 11NL32UN					6.35	0.5	1.2	0.06
	(0.907)	28	R L										11NR28UN 11NL28UN								
	(1.058)	24	R L										11NR24UN 11NL24UN						0.9	0.7	0.07
	(1.270)	20	R L										11NR20UN 11NL20UN				●				0.09
	(1.411)	18	R L										11NR18UN 11NL18UN								0.10
	(1.588)	16	R L										11NR16UN 11NL16UN				●				0.11
	(1.814)	14	R L										11NR14UN 11NL14UN								0.13
16	(0.794)	32	R L	16ER32UN 16EL32UN				●	9.525	0.5	1.2	0.10	16NR32UN 16NL32UN					9.525	0.5	1.2	0.06
	(0.907)	28	R L	16ER28UN 16EL28UN				●				0.11	16NR28UN 16NL28UN								
	(1.058)	24	R L	16ER24UN 16EL24UN			●	●		0.9	0.7	0.13	16NR24UN 16NL24UN			○			0.9	0.7	0.07
	(1.270)	20	R L	16ER20UN 16EL20UN			●	●				0.16	16NR20UN 16NL20UN			○	●				0.09
	(1.411)	18	R L	16ER18UN 16EL18UN			●	●				0.18	16NR18UN 16NL18UN			○					0.10
		16	R L	16ER16UN 16EL16UN			●	●				0.20	16NR16UN 16NL16UN			○	●				0.11
	(1.814)	14	R L	16ER14UN 16EL14UN			●	○		1.6	1.2	0.23	16NR14UN 16NL14UN			○	○		1.6	1.2	0.13
	(1.954)	13	R L	16ER13UN 16EL13UN								0.24	16NR13UN 16NL13UN								0.14
	(2.117)	12	R L	16ER12UN 16EL12UN			○	●				0.27	16NR12UN 16NL12UN			○	●				0.15
	(2.309)	11	R L	16ER11UN 16EL11UN			●	●				0.29	16NR11UN 16NL11UN								0.16
	(2.540)	10	R L	16ER10UN 16EL10UN								0.32	16NR10UN 16NL10UN								0.18
	(2.822)	9	R L	16ER9UN 16EL9UN								0.35	16NR9UN 16NL9UN								0.20
	(3.175)	8	R L	16ER8UN 16EL8UN			●	●				0.40	16NR8UN 16NL8UN			○	○				0.22
22	(3.629)	7	R L	22ER7UN 22EL7UN					12.70	2.5	1.7	0.45	22NR7UN 22NL7UN					12.70	2.5	1.7	0.25
	(4.233)	6	R L	22ER6UN 22EL6UN								0.53	22NR6UN 22NL6UN								0.30
	(5.080)	5	R L	22ER5UN 22EL5UN								0.64	22NR5UN 22NL5UN								0.36
27	(5.644)	4.5	R L	27ER45UN 27EL45UN					15.875	3.2	2.2	0.71	27NR45UN 27NL45UN					15.875	3.2	2.2	0.40
	(6.350)	4	R L	27ER4UN 27EL4UN								0.79	27NR4UN 27NL4UN								0.45

ST-type Inserts

■ Whitworth, full-profile inserts with chipbreaker



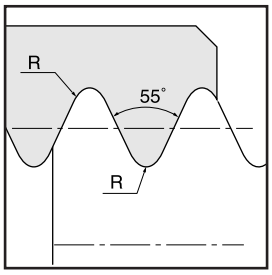


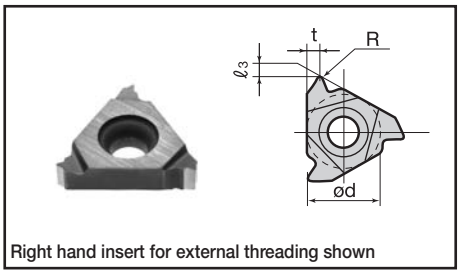
Insert Size	Applicable toolholder	
	External	Internal
16	CER□□□□□16□ B-SER□□□16 B-CER□□□16 BC-SER□□□16	SNR□□□□□16□ CNR□□□□□16□ TSNR□□□□□16 TCNR□□□□□16

Insert size	Pitch (Ref.)	Number of threads	Hand of cut	External threading									Internal threading								
				Cat. No.	Grades					Dimensions (mm)				Cat. No.	Grades					Dimensions (mm)			
					Uncoated		Cermet		Coated						Uncoated		Cermet		Coated				
									AH740	ød	t	ℓ3	R						AH740	ød	t	ℓ3	R
16	(1.814)	14	R	16ER14W-B					●	9.525	1.6	1.2	0.23	16NR14W-B					●	9.525	1.6	1.2	0.23
	(2.309)	11	R	16ER11W-B					●				0.29	16NR11W-B					●				0.29

ST-type Inserts

■ Whitworth, full-profile inserts





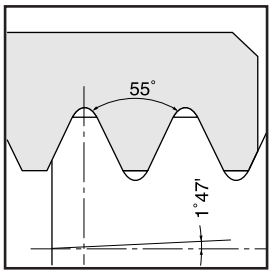
Right hand insert for external threading shown

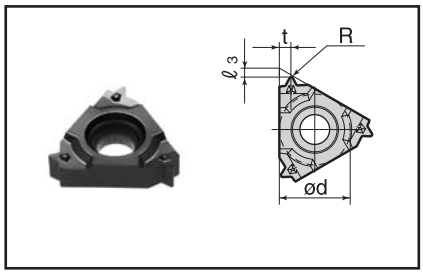
Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22	CER/L□□□□□22□	SNR/L□□□□□22□□ CNR/L□□□□□22□
27	CER/L□□□□□27□	CNR/L□□□□□27□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: UX30	TH10	NS530	T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: UX30	TH10	NS530	T313V	Dimensions (mm): d	t	ℓ3	R
					Uncoated		Cermet	Coated						Uncoated		Cermet	Coated				
11	(1.337)	19	R L										11NR19W 11NL19W	●	○	●	●	6.35	0.9	0.7	0.17
	(1.814)	14	R L										11NR14W 11NL14W	●	○	●	●				0.23
16	(0.907)	28	R L	16ER28W 16EL28W			●	●	9.525	0.9	0.7	0.11	16NR28W 16NL28W					9.525	0.8	0.7	0.11
	(0.970)	26	R L	16ER26W 16EL26W								0.12	16NR26W 16NL26W								0.12
	(1.270)	20	R L	16ER20W 16EL20W			●					0.16	16NR20W 16NL20W			○					0.16
	(1.337)	19	R L	16ER19W 16EL19W	●		●	●				0.17	16NR19W 16NL19W				●				0.17
	(1.411)	18	R L	16ER18W 16EL18W			○					0.18	16NR18W 16NL18W			○					0.18
	(1.588)	16	R L	16ER16W 16EL16W	○		●	●				0.20	16NR16W 16NL16W			○	●				0.20
	(1.814)	14	R L	16ER14W 16EL14W	●	○	●	●		1.6	1.2	0.23	16NR14W 16NL14W	●	○	○	●		1.6	1.2	0.23
	(2.117)	12	R L	16ER12W 16EL12W	○		●	●				0.27	16NR12W 16NL12W			○	●				0.27
	(2.309)	11	R L	16ER11W 16EL11W	●	○	●	●				0.29	16NR11W 16NL11W	●	○	○	●				0.29
	(2.540)	10	R L	16ER10W 16EL10W			○	●				0.32	16NR10W 16NL10W			○	●				0.32
	(2.822)	9	R L	16ER9W 16EL9W								0.36	16NR9W 16NL9W								0.35
	(3.175)	8	R L	16ER8W 16EL8W			○	●				0.40	16NR8W 16NL8W			○	●				0.40
22	(3.629)	7	R L	22ER7W 22EL7W					12.70	2.5	1.7	0.45	22NR7W 22NL7W				●	12.70	2.5	1.7	0.45
	(4.233)	6	R L	22ER6W 22EL6W								0.53	22NR6W 22NL6W								0.53
	(5.080)	5	R L	22ER5W 22EL5W								0.64	22NR5W 22NL5W								0.64
27	(5.644)	4.5	R L	27ER45W 27EL45W					15.875	3.2	2.2	0.71	27NR45W 27NL45W					15.875	3.2	2.2	0.71
	(6.350)	4	R L	27ER4W 27EL4W								0.79	27NR4W 27NL4W								0.79

ST-type Inserts

■ PT (JIS taper pipe thread), full-profile inserts with chipbreaker





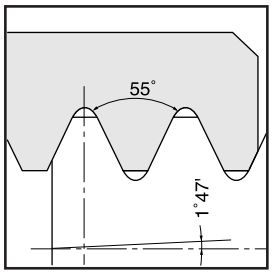
Insert Size	Applicable toolholder	
	External	Internal
16	CER□□□□□16□ B-SER□□□16 B-CER□□□16 BC-SER□□□16	SNR□□□□□16□ CNR□□□□□16□

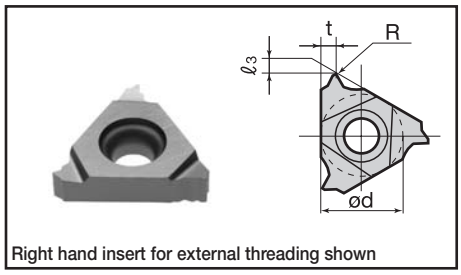
Insert size	Pitch (Ref.)	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated / Cermet / Coated AH740	Dimensions (mm): ød	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated / Cermet / Coated AH740	Dimensions (mm): ød	t	ℓ3	R
16	(1.814)	14	R	16ER14PT-B	○	9.525	1.6	1.2	0.16	16NR14PT-B	○	9.525	1.6	1.2	0.16
	(2.309)	11	R	16ER11PT-B	○				0.26	16NR11PT-B	○				0.26

Reference guide | ST toolholder P. 244 ~ 248 | Technical reference P. 249 ~ 264

ST-type Inserts

■ PT, full-profile inserts (JIS taper pipe thread)



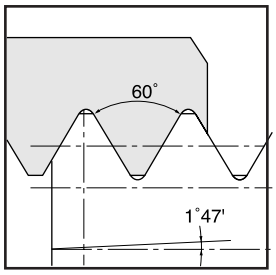


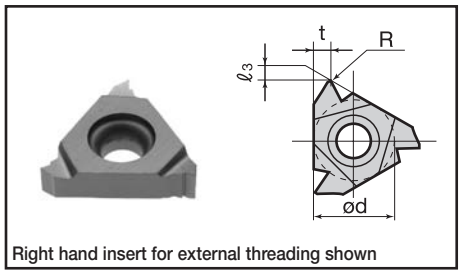
Right hand insert for external threading shown

Insert Size	Applicable toolholder	
	External	Internal
11		SNR/L□□□□□11□
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22		
27		

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
11	(1.337)	19	R L										11NR19PT 11NL19PT	○	○	○	○	6.35	0.9	0.7	0.14
	(1.814)	14	R L										11NR14PT 11NL14PT	○	○	○	○				0.16
16	(0.907)	28	R L	16ER28PT 16EL28PT	○		○	○	9.525	0.9	0.7	0.09									
	(1.337)	19	R L	16ER19PT 16EL19PT	○		○	○				0.14									
	(1.814)	14	R L	16ER14PT 16EL14PT	○		○	○		1.6	1.2	0.16	16NR14PT 16NL14PT	○	○	○	○	9.525	1.6	1.2	0.16
	(2.309)	11	R L	16ER11PT 16EL11PT	○		○	○				0.26	16NR11PT 16NL11PT	○	○	○	○				0.26

■ NPT, full-profile inserts





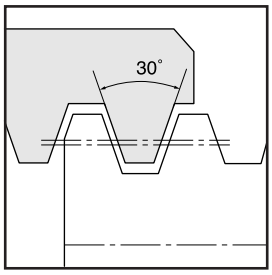
Right hand insert for external threading shown

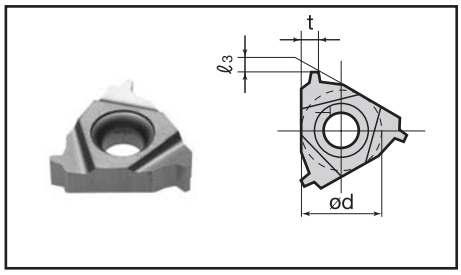
Insert Size	Applicable toolholder	
	External	Internal
11		
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□
22		
27		

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
16	(0.941)	27	R L	16ER27NPT 16EL27NPT					9.525	0.5	1.2	0.02	16NR27NPT 16NL27NPT					9.525	0.5	1.2	0.02
	(1.411)	18	R L	16ER18NPT 16EL18NPT	○		●	●		0.9	0.7	0.03	16NR18NPT 16NL18NPT						0.9	0.7	0.03
	(1.814)	14	R L	16ER14NPT 16EL14NPT	○		●	●		1.5	1.2	0.04	16NR14NPT 16NL14NPT	○	○	●	●		1.6	1.2	0.04
	(2.209)	11.5	R L	16ER115NPT 16EL115NPT	○		●	●				0.05	16NR115NPT 16NL115NPT	○	○	●	●				0.05
	(3.175)	8	R L	16ER8NPT 16EL8NPT						1.6		0.07	16NR8NPT 16NL8NPT	○	○						0.07

ST-type Inserts

■ 30° Trapezoidal (DIN103)

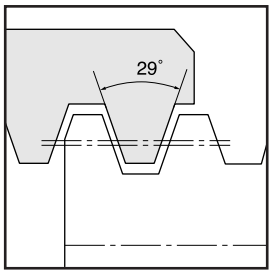


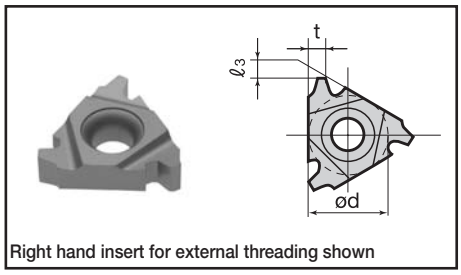


Insert Size	Applicable toolholder	
	External	Internal
11		
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22	CER/L□□□□□22□	CNR/L□□□□□22□ TSNR□□□□□22 TCNR□□□□□22
27	CER/L□□□□□27□	CNR/L□□□□□27□

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
16	1.5		R	16ER15TR					9.525	0.8	0.9	-	16NR15TR					9.525	0.8	0.9	-
			L	16EL15TR									16NL15TR								
	2.0		R	16ER20TR	●		●	●		1.6	1.3	-	16NR20TR			●	●		1.6	1.3	-
			L	16EL20TR									16NL20TR								
	3.0		R	16ER30TR	●		●	●				-	16NR30TR	○		●	●				-
			L	16EL30TR									16NL30TR								
22	4.0		R	22ER40TR	●		●	●	12.70	2.5	2.0	-	22NR40TR	○		●	●	12.70	2.5	2.0	-
			L	22EL40TR									22NL40TR								
	5.0		R	22ER50TR	○		●	●				-	22NR50TR	○		●	●				-
			L	22EL50TR									22NL50TR								
27	6.0		R	27ER60TR	○			○	15.875	3.2	2.5	-	27NR60TR					15.875	3.2	2.5	-
			L	27EL60TR									27NL60TR								

■ 29° Trapezoidal (ACME)





Right hand insert for external threading shown

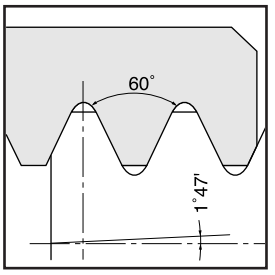
Insert Size	Applicable toolholder	
	External	Internal
11		
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□ TSNR□□□□□16 TCNR□□□□□16
22	CER/L□□□□□22□	CNR/L□□□□□22□ TSNR□□□□□22 TCNR□□□□□22
27	CER/L□□□□□27□	CNR/L□□□□□27□

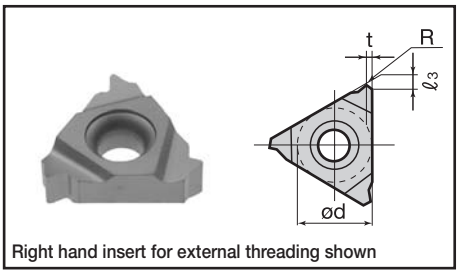
Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R	Internal threading: Cat. No.	Grades: Uncoated UX30	Uncoated TH10	Cermet NS530	Coated T313V	Dimensions (mm): d	t	ℓ3	R
16	(2.117)	12	R	16ER12ACME					9.525	1.6	1.3	-						9.525	1.6	1.3	-
			L	16EL12ACME																	
	(2.540)	10	R	16ER10ACME								-	16NR10ACME								-
			L	16EL10ACME									16NL10ACME								
	(3.175)	8	R	16ER8ACME	○			○				-	16NR8ACME	○			○				-
			L	16EL8ACME									16NL8ACME								
22	(4.233)	6	R	22ER6ACME	○			○	12.70	2.5	2.0	-	22NR6ACME				○	12.70		2.0	-
			L	22EL6ACME									22NL6ACME								
	(5.080)	5	R	22ER5ACME	○			○					22NR5ACME				○				
			L	22EL5ACME									22NL5ACME								
27	(6.350)	4	R	27ER4ACME					15.875	3.0	2.5	-	27NR4ACME					15.875	3.0	2.5	-
			L	27EL4ACME									27NL4ACME								

Reference guide | ST toolholder P. 244 ~ 248 | Technical reference P. 249 ~ 264

ST-type Inserts

■ Round



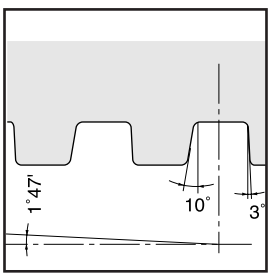


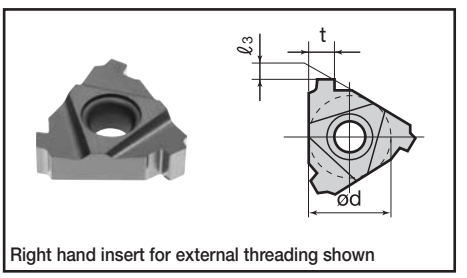
Right hand insert for external threading shown

Insert Size	Applicable toolholder	
	External	Internal
11		
16	CER/L□□□□□16□ B-SER/L□□□16 B-CER/L□□□16 BC-SER/L□□□16	SNR/L□□□□□16□ CNR/L□□□□□16□
22		
27		

Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R	Internal threading: Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R
16	2.54	10	R L	16ER10RAPI 16EL10RAPI					9.525	1.6	1.2	0.36	16NR10RAPI 16NL10RAPI				○	9.525	1.6	1.2	0.36
	3.175	8	R L	16ER8RAPI 16EL8RAPI								0.43	16NR8RAPI 16NL8RAPI				○				0.43

■ Buttress





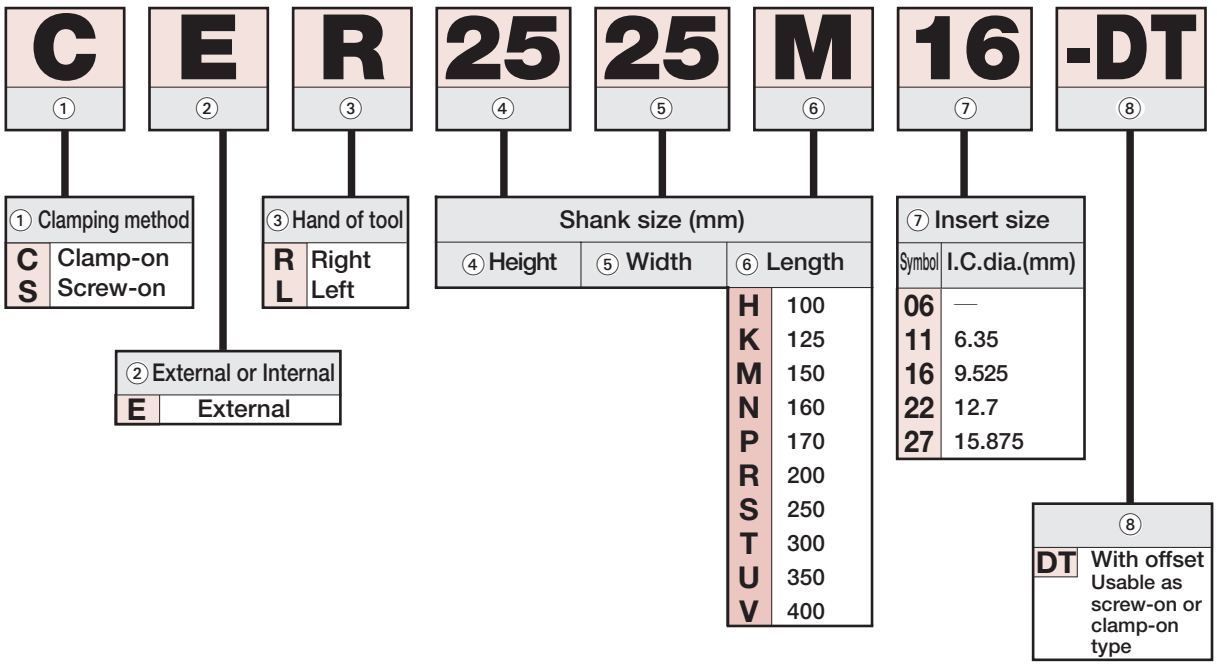
Right hand insert for external threading shown

Insert Size	Applicable toolholder	
	External	Internal
11		
16		
22	CER/L□□□□□22□	SNR/L□□□□□22□ CNR/L□□□□□22□
27		

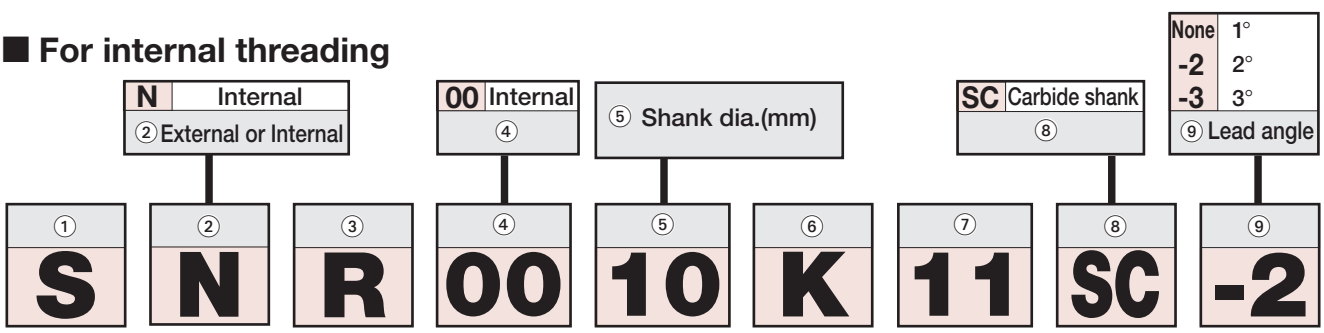
Insert size	Pitch	Number of threads	Hand of cut	External threading: Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R	Internal threading: Cat. No.	Grades: Uncoated UX30	Grades: Uncoated TH10	Grades: Cermet NS530	Grades: Coated T313V	Dimensions (mm): d	Dimensions (mm): t	Dimensions (mm): ℓ3	Dimensions (mm): R
22	5.08	5	R L	22ER5BAPI 22EL5BAPI					12.70	3.72	2.2	-	22NR5BAPI 22NL5BAPI					12.70	3.45	2.2	-

Nomenclature for ST-type Threading Toolholder

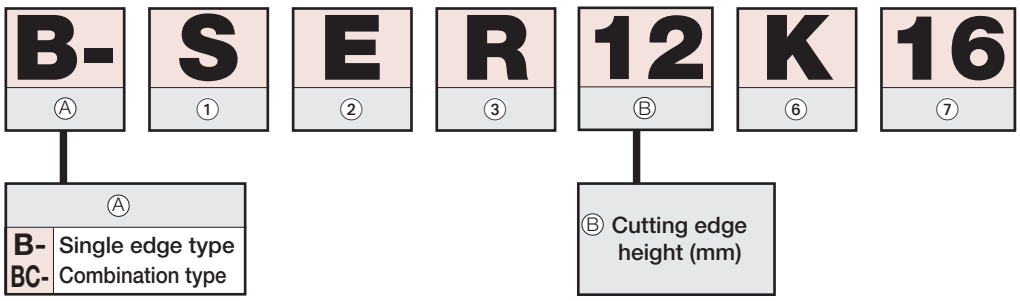
■ For external threading



■ For internal threading

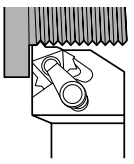


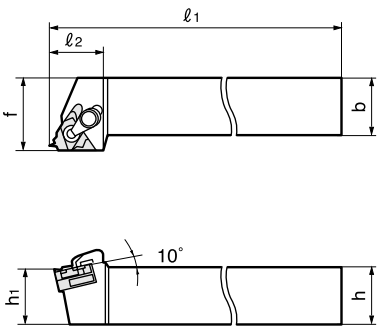
■ For gang tooling



ST-type Toolholder
(Clamp-on type)

External threading
CE R/L T





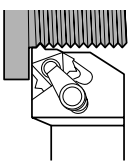
Right hand (R) shown

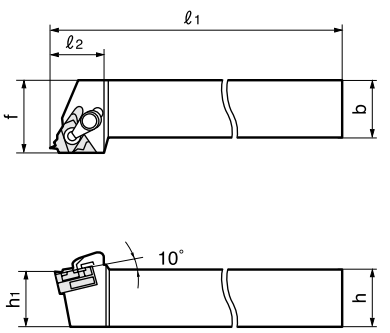
Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
CER/L1212H16T			16ER/L□□□□	12	12	100	22	12	16	—	CSP16	GXE16-1	GXN16-1	—	T-15F
CER/L1616H16T				16	16	100	22	16	20	—					
CER/L2020K16T				20	20	125	22	20	25	—					
CER/L2525M16T				25	25	150	25	25	32	—					
CER/L3232P16T	●			32	32	170	32	32	40	—					
CER/L2525M22T			22ER/L□□□□	25	25	150	28	25	32	—	CSP22	NXE22-1	NXN22-1	—	T-20F
CER/L3232P22T	●			32	32	170	32	32	40	—					
CER/L4040R22T				40	40	200	36	40	50	—					
CER/L2525M27T	○		27ER/L□□□□	25	25	150	34	25	32	—	CSP27	NXE27-1	NXN27-1	—	P-4
CER/L3232P27T	○			32	32	170	34	32	40	—					
CER/L4040R27T				40	40	200	40	40	50	—					

Notes:
- Clamping sets for CER/L type consist of a clamp and a clamping screw.
- Shim sets for CER/L type consist of a shim and a shim screw.
- Standard shims for CER/L type can be used for both the left hand and right-hand toolholder. Use either of the sides depending on the hand.

CE-type Toolholder
Dual clamping: Screw-on and clamp-on

External threading
CE R/L DT





Right hand (R) shown

Cat. No.	Stock R	Stock L	Insert	Dimensions (mm) h	b	ℓ1	ℓ2	h1	f	f1	Clamping-set	Shim	Shim screw	Clamping screw	Wrench
CER/L1212H16DT	●	○	16ER/L□□□□	12	12	100	22	12	16	—	CSP16	GX16-1DT	DTS5-3.5	CSTB-3.5ST	T-15F P-3.5
CER/L1616H16DT	●	○		16	16			16	20	—					
CER/L2020K16DT	●	○		20	20	125		20	25	—					
CER/L2525M16DT	●	○		25	25	150	25	25	32	—					
CER/L2525M22DT	●	○	22ER/L□□□□	25	25	150	28	25	32	—	CSP22	GX22-1DT	DTS6-4	CSTB-4ST	T-15F T-20F P-4

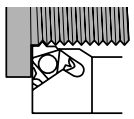
Note: Standard shim is used for both right and left hand toolholder.

Thread types P. 230 | Reference guide

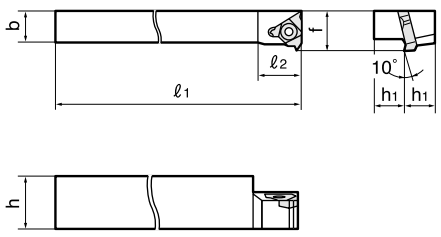
B-type Toolholder (For gang tooling)

External threading

B-SE R/L
B-CE R/L

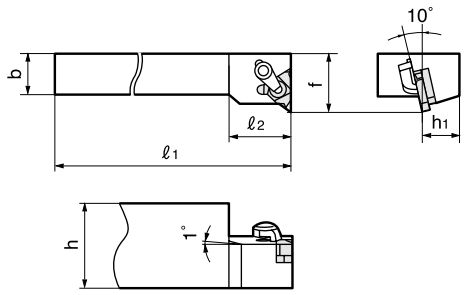


B-SER/L (Screw-on type)



Right hand (R) shown

B-CER/L (Clamp-on type)



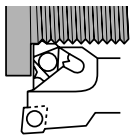
Right hand (R) shown

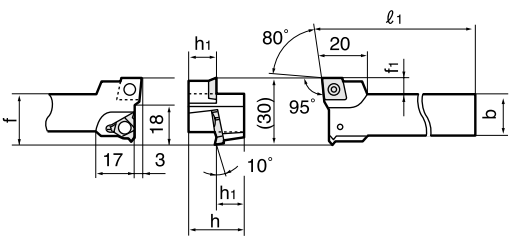
Cat. No.	Stock R	Stock L	Insert	h	b	ℓ1	ℓ2	h1	f	f1	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
B-SER/L10H16	○		16ER/L□□□□	20	10	100	15	10	16	—	—	—	—	CSTB-3.5	T-15F
B-SER/L12K16	○			24	12	125	18	12	18	—					
B-CER/L16M16	○	○		32	16	150	24	16	22	—	CSP16	GXE16-1	GXN16-1	—	

Screw-on type for gang tooling

External threading

BC-SE R/L





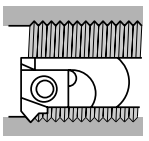
Right hand (R) shown

Cat. No.	Stock R	Stock L	Insert	h	b	ℓ1	ℓ2	h1	f	f1	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
BC-SER/L12K16	○		16ER/L□□□□ CC□T09T3□□	24	16	125	—	12	23	7	—	—	—	CSTB-3.5	T-15F
BC-SER/L16M16				32	20	150	—	16	25	5					

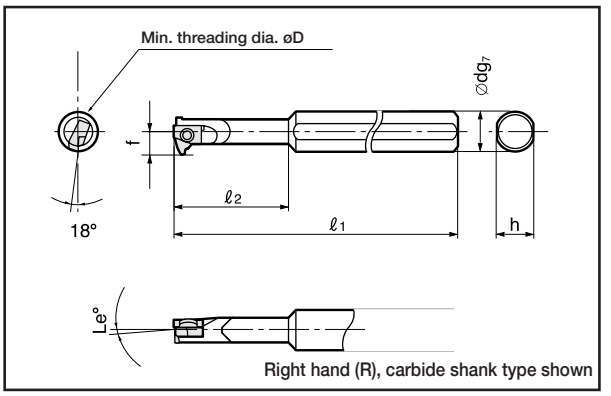
Carbide and steel shank, screw-on type

Internal threading

SN R/L



mini



Right hand (R), carbide shank type shown

Carbide shank

Cat. No.	Stock R	Stock L	Insert	Min. threading dia. ØD	Dimensions (mm) ød	f	ℓ1	ℓ2	h	Lead angle Le	Clamping-set —	Shim set R —	Shim set L —	Clamping screw	Wrench
SNR/L0006K06SC-2	●		6NR/L□□□□	8	8	4.7	125	30	7	2°	—	—	—	CSTB-2L040	T-6F
SNR/L0006K06SC-3	●			8	8	4.7	125	30	7	3°					
SNR/L0008K06SC-2	○			10	8	5.7	125	—	7	2°				CSTB-2L	
SNR/L0008K06SC-3	○			10	8	5.7	125	—	7	3°					

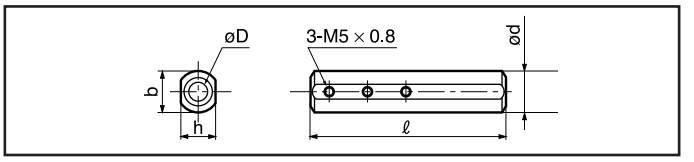
Steel shank

Cat. No.	Stock R	Stock L	Insert	Min. threading dia. ØD	Dimensions (mm) ød	f	ℓ1	ℓ2	h	Lead angle Le	Clamping-set —	Shim set R —	Shim set L —	Clamping screw	Wrench
SNR/L0006H06-2	●		6NR/L□□□□	8	8	4.7	100	18	7	2°	—	—	—	CSTB-2L040	T-6F
SNR/L0006H06-3	●			8	8	4.7	100	18	7	3°					
SNR/L0008H06-2	●			10	8	5.7	100	—	7	2°				CSTB-2L	
SNR/L0008H06-3	○			10	8	5.7	100	—	7	3°					

● Sleeves

BLM

Cat. No.	Stock	Dimensions (mm) ØD	Ød	ℓ	h	b
BLM20-08	●	8	20	100	18	19
BLM25-08C	●	8	25	55	23	24



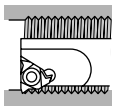
Note: When setting the toolholder on a tool post, direct clamping on the shank with bolts should be avoided. Placing the sleeve between the tool-holder and tool post is recommended for stable operation.

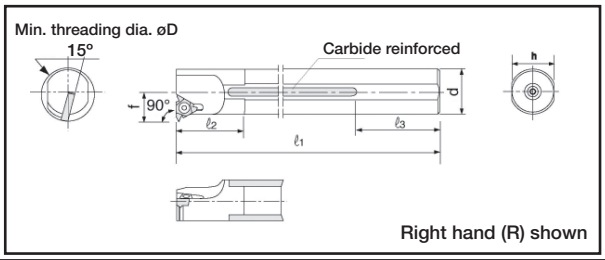
Thread types P. 230 | Reference guide

Screw-on type, “T-Bar”

Internal threading

TSN R/L



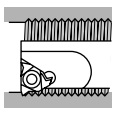


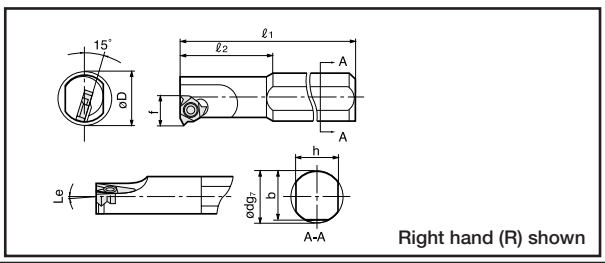
Cat. No.	Stock R	Stock L	Insert	Min. threading dia. øD	Dimensions (mm) ød	f	ℓ1	ℓ2	ℓ3	h	b	Lead angle Le	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
TSNR/L0016Q16	●		16NR/L□□□□	19	16	10.6	180	40	59	15	—	1°	—	—	—	CSTB-3.5	T-15F
TSNR/L0020R22	●		22NR/L□□□□	24	20	13.9	200	50	49	18						CSTB-4	

Screw-on type, steel shank

Internal threading

SN R/L



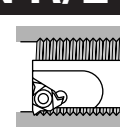


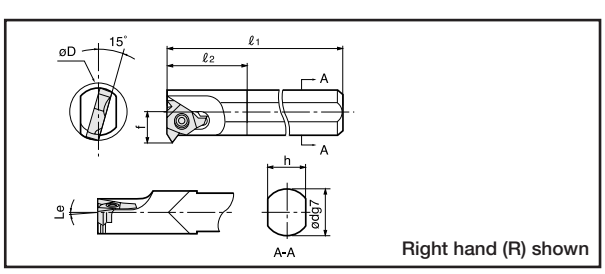
Cat. No.	Stock R	Stock L	Insert	Min. threading dia. øD	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	Lead angle Le	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
SNR/L0010K11	●	●	11NR/L□□□□	12	16	6.6	125	25	15	15	1°	—	—	—	CSTB-2.5	T-8F
SNR/L0010K11-2	●			12	16	6.6	125	25	15	15.5	2°					
SNR/L0010K11-3	●			12	16	6.6	125	25	15	15.5	3°					
SNR/L0013L11	●	●		15	16	8.2	140	32.5	15	15	1°					
SNR/L0013L11-2	○			15	16	8.2	140	32.5	15	15.5	2°					
SNR/L0013L11-3	○			15	16	8.2	140	32.5	15	15.5	3°					
SNR/L0016M16	●	●	16NR/L□□□□	19	16	10.6	150	40	15	15	1°	—	—	—	CSTB-3.5	T-15F
SNR/L0016M16-2	●			19	16	10.6	150	40	15	15.5	2°					
SNR/L0016M16-3	○			19	16	10.6	150	40	15	15.5	3°					
SNR/L0020Q22	●	●	22NR/L□□□□	24	20	13.9	180	50	18	18.5	1°	—	—	—	CSTB-4	
SNR/L0020Q22-2	○			24	20	13.9	180	50	18	19	2°					
SNR/L0020Q22-3	○			24	20	13.9	180	50	18	19	3°					

Screw-on type, carbide shank

Internal threading

SN R/L-SC





Cat. No.	Stock R	Stock L	Insert	Min. threading dia. øD	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	Lead angle Le	Clamping-set	Shim set R	Shim set L	Clamping screw	Wrench
SNR/L0010M11SC	●		11NR/L□□□□	13	10	7.4	150	17	9	—	1°	—	—	—	CSTB-2.5	T-8F
SNR/L0010M11SC-2	○			13	10	7.4	150	17	9	—	2°					
SNR/L0010M11SC-3	○			13	10	7.4	150	17	9	—	3°					
SNR/L0012P11SC	●			15	12	8.5	170	20	11	—	1°					
SNR/L0012P11SC-2	○			15	12	8.5	170	20	11	—	2°					
SNR/L0012P11SC-3	○			15	12	8.5	170	20	11	—	3°					
SNR/L0016R16SC	●	●	16NR/L□□□□	20	16	11.9	200	24	15	—	1°	—	—	—	CSTB-3.5	T-15F
SNR/L0016R16SC-2	○			20	16	11.9	200	24	15	—	2°					
SNR/L0016R16SC-3				20	16	11.9	200	24	15	—	3°					

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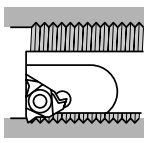
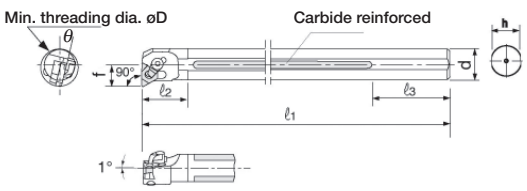
“T-Bar”, dual clamping methods of screw-on and clamp-on

Internal threading

TCN R/L





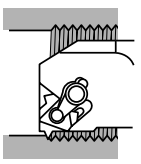
Right hand (R) shown

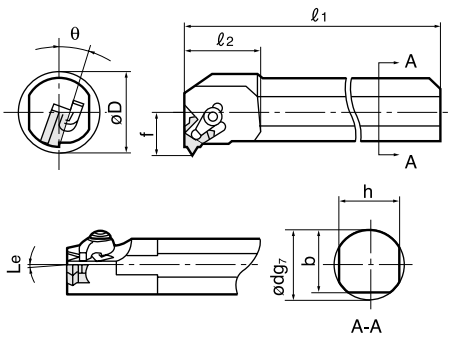
Cat. No.	Stock R	Stock L	Inserts	Min. threading dia. øD	Dimensions (mm) ød	f	ℓ1	ℓ2	ℓ3	h	b	θ	Lead angle Le	Clamping-set	Shim	Shim screw	Clamping screw	Wrench
TCNR/L0020R16DT	●		16NR/L□□□□	24	20	14	200	30	49	18	–	15°	1°	CSP16	GX16-1DT	DTS5-3.5	CSTB-3.5ST	T-15F
TCNR/L0025S16DT	●			29	25	16.5	250	38	64	23								P-3.5
TCNR/L0025S22DT	●		22NR/L□□□□	30	25	18.2	250	38	64	23				CSP22	GX22-1DT	DTS6-4	CSTB-4ST	T-15F T-20F P-4

Clamp-on type

Internal threading

CN R/L





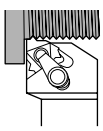
Right hand (R) shown

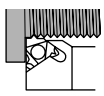
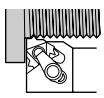
Cat. No.	Stock R	Stock L	Inserts	Min. bore dia. øD	Dimensions (mm) ød	f	ℓ1	ℓ2	h	b	θ	Lead angle Le	Clamping-set	Shim set R	Shim set L	Wrench
CNR/L0020P16	●	●	16NR/L□□□□	24	20	14.0	170	30	18	18.5	15°	1°	CSP16	GXN16-1	GXE16-1	T-15F
CNR/L0025R16	●	●		29	25	16.5	200	38	23	22.5		1°				
CNR/L0032S16	●	●		37	32	20.1	250	48	30	29.5		1°				
CNR/L0040T16				45	40	24.1	300	60	37	37.5		1°				
CNR/L0050U16				55	50	29.4	350	75	47	47.5		1°				
CNR/L0025R22	●	●	22NR/L□□□□	30	25	18.2	200	38	23	22.5	15°	1°	CSP22	NXN22-1	NXE22-1	T-20F
CNR/L0032S22	●	●		38	32	21.9	250	48	30	29.5		1°				
CNR/L0040T22				46	40	26.1	300	60	37	31.5		1°				
CNR/L0050U22				56	50	31.0	350	75	47	47.5		1°				
CNR/L0063V22				69	63	37.5	400	95	57	60.5		1°				
CNR/L0040T27	○		27NR/L□□□□	46	40	26.9	300	60	37	37.5	10°	1°	CSP27	NXN27-1	NXE27-1	P-4
CNR/L0050U27				56	50	31.9	350	75	37	47.5		1°				
CNR/L0063V27				70	63	38.7	400	95	57	60.5		1°				

Notes : ● Clamping-sets for CNR/L type toolholder consist of a clamp and a clamping screw.
● Shim sets for CNR/L type toolholder consist of a shim and a shim fixing screw.
● Standard shims for CNR/L type toolholder are commonly used for right- and left-hand toolholder. Use either top side or backside depending on the hand.

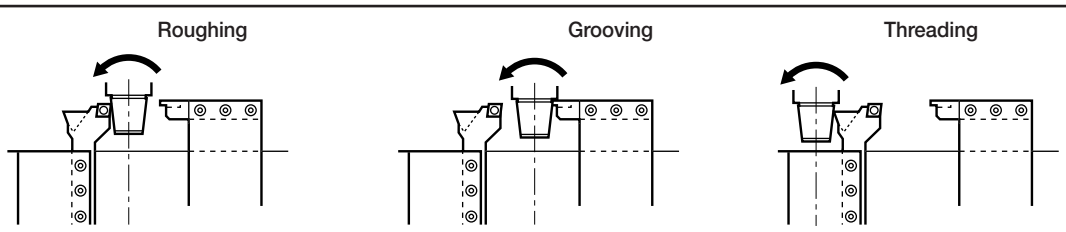
Thread types P. 230 | Reference guide

Selection of External Toolholder

Type	Cat. No.	Insert
CE Clamp-on type **CE-DT** (Dual clamping of screw-on and clamp-on)	CER/L1212H16T CER/L1616H16T CER/L2020K16T CER/L2525M16T CER/L3232P16T CER/L1212H16DT CER/L1616H16DT CER/L2020K16DT CER/L2525M16DT	16ER/L□□□□
	CER/L2525M22T CER/L3232P22T CER/L4040R22T CER/L2525M22DT	22ER/L□□□□
	CER/L2525M27T CER/L3232P27T CER/L4040R27T	27ER/L□□□□

Type	Cat. No.	Insert
B Screw-on type 	B-SER/L10H16 B-SER/L12K16	16ER/L□□□□
B Clamp-on type 	B-CER/L16M16	16ER/L□□□□
BC Screw-on type	BC-SER/L12K16 BC-SER/L16M16	16ER/L□□□□

● **Tooling examples of using BC-type toolholder**

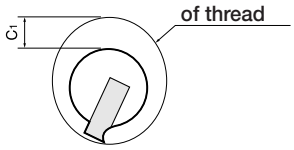
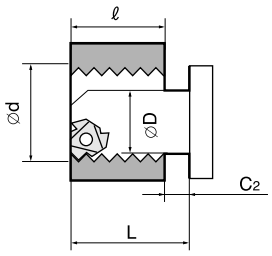


Selection of Internal Threading Toolholder

Relations between nominal sizes of threads and applicable toolholder and inserts are shown in the Tables on the following pages.

○ : Recommended
□ : Usable
2 : Recommended by changing of the shim
2 : Needs changing of the shim (Example: indicates that the shim must be changed to □□□□□ →2).
■ : Impossible

■ **Criteria for evaluation**

Clearance C_1			$C_1 \geq 3$ mm
Overhang ratio L/D		Steel shank	L/D ≤ 2
		Carbide shank	L/D ≤ 3

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts – Part 1

Metric coarse screw thread (ISO)

Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank																Carbide shank								"T-Bar"	
				Insert size	6NR				11NR				16NR		22NR					27NR			6NR				11NR		16NR		22NR	
				Holder Cat. No. / Insert Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11-2	SNR0010K11-3	SNR0013L11-2	SNR0013L11-3	SNR0016M16-2	SNR0016M16-3	SNR0020Q22-2	SNR0020Q22-3	CNR0025R22	CNR0032S22	(CNR0040T22)	CNR0040T27	(CNR0050U27)	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC-2	SNR0010M11SC-3	SNR0016R16SC-2	SNR0016R16SC-3	TCNR0025S22DT	(TCNR0032T22DT)
M10	1.5	9.03	3°02'	NR15ISO																										
M11	1.5	10.03	2°44'	NR15ISO																										
M12	1.75	10.86	2°56'	NR175ISO		○																○								
M14	2	12.7	2°52'	NR20ISO				○																○						
M16	2	14.7	2°29'	NR20ISO			○																	○						
M18	2.5	16.38	2°47'	NR25ISO						○																				
M20	2.5	18.38	2°29'	NR25ISO																										
M22	2.5	20.38	2°14'	NR25ISO																										
M24	3	22.05	2°29'	NR30ISO																										
M27	3	25.05	2°11'	NR30ISO									○															○		
M30	3.5	27.73	2°18'	NR35ISO																										
M33	3.5	30.73	2°05'	NR35ISO											○															
M36	4	33.4	2°11'	NR40ISO											○															
M39	4	36.4	2°00'	NR40ISO													②												②	
M42	4.5	39.08	2°06'	NR45ISO													②												②	
M45	4.5	42.08	1°57'	NR45ISO													②												②	
M48	5	44.75	2°02'	NR50ISO													2	②											2	②
M52	5	48.75	1°52'	NR50ISO													2	②											2	②
M56	5.5	52.43	1°55'	NR55ISO																										
M60	5.5	56.43	1°47'	NR55ISO																②										
M64	6	60.1	1°49'	NR60ISO																②										
M68	6	64.1	1°42'	NR60ISO																2	②									

② : Change the shim to NXN22-2

② : Change the shim to NXN27-2

② : Change the shim to GXN22-2DT

Metric fine screw thread (ISO)

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Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank										Carbide shank									
				Insert size	6NR				11NR						6NR				11NR					
				Holder Cat. No. / Insert Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0010K11-3	SNR0013L11	SNR0013L11-2	SNR0013L11-3	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0010M11SC-3	SNR0012P11SC	SNR0012P11SC-2	SNR0012P11SC-3
M9x0.75	0.75	8.51	1°36'	NR075ISO																				
M9x1	1	8.32	2°11'	NR10ISO																				
M10x0.75	0.75	9.51	1°26'	NR075ISO																				
M10x1	1	9.35	1°57'	NR10ISO	○										○									
M10x1.25	1.25	9.19	2°29'	NR125ISO																				
M11x0.75	0.75	10.51	1°18'	NR075ISO																				
M11x1	1	10.35	1°46'	NR10ISO	○										○									
M12x1	1	11.35	1°36'	NR10ISO			○										○							
M12x1.25	1.25	11.19	2°02'	NR125ISO	○										○									
M12x1.5	1.5	11.03	2°29'	NR15ISO	○										○									
M14x1	1	13.35	1°22'	NR10ISO																				
M14x1.25	1.25	13.19	1°44'	NR125ISO			○										○							
M14x1.5	1.5	13.03	2°06'	NR15ISO			○										○							
M15x1	1	14.35	1°16'	NR10ISO																				
M15x1.5	1.5	14.03	1°57'	NR15ISO			○										○							
M16x1	1	15.35	1°11'	NR10ISO					○															
M16x1.5	1.5	15.03	1°49'	NR15ISO			○										○							
M17x1	1	16.35	1°07'	NR10ISO					○										○					
M17x1.5	1.5	16.03	1°42'	NR15ISO						○							○							
M18x1	1	17.35	1°03'	NR10ISO					○										○					
M18x1.5	1.5	17.03	1°36'	NR15ISO						○										○				
M18x2	2	16.7	2°11'	NR20ISO						○										○				
M20x1	1	19.35	0°57'	NR10ISO								○											○	
M20x1.5	1.5	19.03	1°26'	NR15ISO								○											○	
M20x2	2	18.7	1°57'	NR20ISO						○														○

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts – Part 2

Metric fine screw thread (ISO)

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Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank												Carbide shank												"T-Bar"	
				Insert size	6NR				11NR					16NR				6NR				11NR					16NR				16NR	
				Holder Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0013L11-3	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0010M11SC-3	SNR0012P11SC	SNR0012P11SC-2	SNR0012P11SC-3	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
				Insert Cat. No.																											
M22x1	1	21.35	0°51'	NR10ISO					○															○							
M22x1.5	1.5	21.03	1°18'	NR15ISO					○															○							
M22x2	2	20.7	1°46'	NR20ISO																											
M24x1	1	23.35	0°47'	NR10ISO							○													○							
M24x1.5	1.5	23.03	1°11'	NR15ISO							○													○							
M24x2	2	22.07	1°39'	NR20ISO																											
M25x1	1	24.35	0°45'	NR10ISO							○													○							
M25x1.5	1.5	24.03	1°08'	NR15ISO							○													○							
M25x2	2	23.7	1°32'	NR20ISO																											
M26x1.5	1.5	25.03	1°06'	NR15ISO										○															○		
M27x1	1	26.35	0°42'	NR10ISO										○															○		
M27x1.5	1.5	26.03	1°03'	NR15ISO										○															○		
M27x2	2	25.7	1°25'	NR20ISO										○															○		
M28x1	1	27.35	0°40'	NR10ISO										○															○		
M28x1.5	1.5	27.03	1°01'	NR15ISO										○															○		
M28x2	2	26.7	1°22'	NR20ISO										○															○		
M30x1	1	29.35	0°37'	NR10ISO										○															○		
M30x1.5	1.5	29.03	0°57'	NR15ISO										○															○		
M30x2	2	28.7	1°16'	NR20ISO										○															○		
M30x3	3	28.05	1°57'	NR30ISO																											
M32x1.5	1.5	31.03	0°53'	NR15ISO										○			○													○	
M32x2	2	30.7	1°11'	NR20ISO										○			○													○	

Metric fine screw thread (ISO)

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Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank																Carbide shank									"T-Bar"			
				Insert size	6NR				11NR				16NR				22NR				6NR				11NR			16NR		16NR			22NR	
				Holder Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0016M16	SNR0016M16-2	CNR0020P16	CNR0025R16	CNR0032S16	SNR0020Q22	SNR0020Q22-2	CNR0025R22	CNR0032S22	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0012P11SC	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT	(TCNR0032T16DT)	TSNR0020R22	TCNR0025S22DT
				Insert Cat. No.																														
M33x1.5	1.5	32.03	0°51'	NR15ISO											○																○				
M33x2	2	31.7	1°09'	NR20ISO												○															○				
M33x3	3	31.05	1°46'	NR30ISO											2																2				
M35x1.5	1.5	34.03	0°48'	NR15ISO												○															○				
M36x1.5	1.5	35.03	0°47'	NR15ISO												○															○				
M36x2	2	34.7	1°03'	NR20ISO												○															○				
M36x3	3	34.05	1°36'	NR30ISO											2																2				
M38x1.5	1.5	37.03	0°44'	NR15ISO												○																○			
M39x1.5	1.5	38.03	0°43'	NR15ISO												○																○			
M39x2	2	38.7	0°58'	NR20ISO												○																○			
M39x3	3	37.05	1°29'	NR30ISO												○																○			
M40x1.5	1.5	39.03	0°42'	NR15ISO												○																○			
M40X2	2	37.8	0°57'	NR20ISO												○																○			
M40x3	3	38.05	1°26'	NR30ISO												○																○			
M42x1.5	1.5	41.03	0°40'	NR15ISO												○																○			
M42x2	2	40.7	0°54'	NR20ISO												○																○			
M42x3	3	40.05	1°22'	NR30ISO												○																○			
M42x4	4	39.4	1°51'	NR40ISO																2															2
M45x1.5	1.5	44.03	0°37'	NR15ISO													○															○	○		
M45x2	2	43.7	0°50'	NR20ISO													○															○	○		
M45x3	3	43.05	1°16'	NR30ISO													○															○	○		
M45x4	4	42.4	1°43'	NR40ISO																2															2
M48x1.5	1.5	47.03	0°35'	NR15ISO													○															○	○		
M48x2	2	46.7	0°47'	NR20ISO													○															○	○		
M48x3	3	46.05	1°11'	NR30ISO													○															○	○		
M48x4	4	45.4	1°36'	NR40ISO																	2														2

2 : Change the shim to GXN16-2

2 : Change the shim to NXN22-2

2 : Change the shim to GXN16-2DT

2 : Change the shim to GXN22-2DT

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts – Part 3

Metric fine screw thread (ISO)

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Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank																	Carbide shank									"T-Bar"				
				Insert size	6NR				11NR				16NR						22NR					6NR				11NR				16NR		16NR			22NR	
				Holder Cat. No. / Insert Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0016M16	SNR0016M16-2	CNR0020P16	CNR0025R16	CNR0032S16	(CNR0040T16)	(CNR0050U16)	SNR0020Q22	SNR0020Q22-2	CNR0025R22	CNR0032S22	(CNR0040T22)	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0012P11SC	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT	(TCNR0032T16DT)	TSNR0020R22	TCNR0025S22DT
M50x1.5	1.5	49.03	0°33'	NR15ISO												○																	○	○			
M50x2	2	48.7	0°45'	NR20ISO												○																	○	○			
M50x3	3	48.05	1°08'	NR30ISO												○																	○	○			
M52x1.5	1.5	51.03	0°32'	NR15ISO													○																○	○			
M52x2	2	50.7	0°43'	NR20ISO													○																○	○			
M52x3	3	50.05	1°06'	NR30ISO												○																	○	○			
M52x4	4	49.4	1°29'	NR40ISO																		○															
M55x1.5	1.5	54.03	0°30'	NR15ISO												○																	○	○			
M55x2	2	53.7	0°41'	NR20ISO													○																○	○			
M55x3	3	53.05	1°02'	NR30ISO													○																○	○			
M55x4	4	52.4	1°24'	NR40ISO																		○															
M56x1.5	1.5	55.03	0°30'	NR15ISO													○																○	○			
M56x2	2	54.7	0°40'	NR20ISO													○																○	○			
M56x3	3	54.05	1°01'	NR30ISO													○																○	○			
M56x4	4	53.4	1°22'	NR40ISO																		○															
M58x1.5	1.5	57.03	0°29'	NR15ISO													○																○	○			
M58x2	2	56.7	0°39'	NR20ISO													○																○	○			
M58x3	3	56.05	0°59'	NR30ISO													○																○	○			
M58x4	4	55.4	1°19'	NR40ISO																		○															
M60x1.5	1.5	59.03	0°28'	NR15ISO													○																○	○			
M60x2	2	58.7	0°37'	NR20ISO													○																○	○			
M60x3	3	58.05	0°57'	NR30ISO													○																○	○			
M60x4	4	57.4	1°16'	NR40ISO																		○															

Unified coarse screw thread (UNC)

Nominal size	TPI	Effective diameter	Lead angle	Shank	Steel shank																Carbide shank										"T-Bar"	
				Insert size	11NR						16NR			22NR					27NR			11NR						16NR			22NR	
				Holder Cat. No. / Insert Cat. No.	SNR0010K11	SNR0010K11-2	SNR0010K11-3	SNR0013L11	SNR0013L11-2	SNR0013L11-3	SNR0016M16	SNR0016M16-2	SNR0016M16-3	SNR0020Q22	SNR0020Q22-2	SNR0020Q22-3	CNR0025R22	CNR0032S22	(CNR0040T22)	CNR0040T27	(CNR0050U27)	(CNR0063V27)	SNR0010M11SC	SNR0010M11SC-2	SNR0010M11SC-3	SNR0012P11SC	SNR0012P11SC-2	SNR0012P11SC-3	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TCNR0025S22DT	(TCNR0032T22DT)
7/16-14UNC	14	9.93	3°20'	(NR14UN)																												
1/2-13UNC	13	11.43	3°07'	(NR13UN)																												
9/16-12UNC	12	12.91	2°59'	NR12UN																												
5/8-11UNC	11	14.38	2°56'	(NR11UN)																												
3/4-10UNC	10	17.4	2°40'	(NR10UN)																												
7/8-9UNC	9	20.39	2°31'	NR9UN																												
1-8UNC	8	23.34	2°29'	NR8UN							○																					
1 1/8-7UNC	7	26.22	2°31'	(NR7UN)																												
1 1/4-7UNC	7	29.39	2°15'	(NR7UN)											○																	
1 3/8-6UNC	6	32.17	2°24'	(NR6UN)											○																	
1 1/2-6UNC	6	35.35	2°11'	(NR6UN)											○																	
1 3/4-5UNC	5	41.15	2°15'	(NR5UN)											○		[2]														[2]	
2-4 1/2UNC	5	47.14	2°11'	(NR45UN)																												
2 1/4-4 1/2UNC	5	53.49	1°55'	(NR45UN)															[2]													
2 1/2-4UNC	4	59.38	1°57'	(NR4UN)															[2]													
2 3/4-4UNC	4	65.73	1°46'	(NR4UN)															2	[2]												
3-4UNC	4	72.08	1°36'	(NR4UN)															2	[2]												
3 1/4-4UNC	4	78.43	1°29'	(NR4UN)																	○											
3 1/2-4UNC	4	84.78	1°22'	(NR4UN)																	○											
3 3/4-4UNC	4	91.13	1°16'	(NR4UN)																	○											
4-4UNC	4	97.48	1°11'	(NR4UN)																	○											

[2] : Change the shim to NXN22-2

[2] : Change the shim to GXN22-2DT

[2] : Change the shim to NXN27-2

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts

Unified fine screw thread (UNF)

Nominal size	TPI	Effective diameter	Lead angle	Shank	Steel shank										Carbide shank								"T-Bar"		
				Insert size	6NR				11NR		16NR				6NR				11NR				16NR		16NR		
				Holder Cat. No. / Insert Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11-2	SNR0013L11-2	SNR0016M16	SNR0016M16-2	CNR0020P16	CNR0025R16	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0012P11SC	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
3/8-24UNF	24	8.84	2°11'	(NR24UN)																					
				NRA60																					
7/16-20UNF	20	10.29	2°15'	(NR20UN)																					
				NRA60	○										○										
1/2-20UNF	20	11.87	1°57'	(NR20UN)																					
				NRA60			○										○								
9/16-18UNF	18	13.37	1°55'	(NR18UN)																					
				NRA60			○										○								
5/8-18UNF	18	14.96	1°43'	(NR18UN)																					
				NRA60			○										○								
3/4-16UNF	16	18.02	1°36'	(NR16UN)					○											○					
7/8-14UNF	14	21.05	1°34'	NR14UN						○											○				
1-12UNF	12	24.03	1°36'	NR12UN								○										○			
1 1/8-12UNF	12	27.2	1°25'	NR12UN							○											○		○	
1 1/4-12UNF	12	30.38	1°16'	NR12UN									○									○			○
1 3/8-12UNF	12	33.55	1°09'	NR12UN										○								○			○
1 1/2-12UNF	12	36.73	1°03'	NR12UN										○								○			○

Whitworth coarse screw thread (W)

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank									Carbide shank			"T-Bar"	
					Insert size	16NR		22NR					27NR		16NR			22NR	
					Holder Cat. No. / Insert Cat. No.	SNR0016M16-2	SNR0016M16-3	SNR0020Q22-2	SNR0020Q22-3	CNR0025R22	CNR0032S22	(CNR0040T22)	CNR0040T27	(CNR0050U27)	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TCNR0025S22DT	(TCNR0032T22DT)
W7/16	14	1.81	9.95	3°19'	(NR14W)														
W1/2	12	2.12	11.35	3°24'	NR12W														
W9/16	12	2.12	12.93	2°59'	NR12W														
W5/8	11	2.31	14.4	2°55'	NR11W														
W3/4	10	2.54	17.42	2°39'	NR10W														
W7/8	9	2.82	20.42	2°31'	(NR9W)														
W1	8	3.18	23.37	2°29'	NR8W	○													
W1 1/8	7	3.63	26.25	2°31'	(NR7W)														
W1 1/4	7	3.63	29.43	2°15'	(NR7W)			○											
W1 3/8	6	4.23	32.21	2°24'	(NR6W)			○											
W1 1/2	6	4.23	35.39	2°11'	(NR6W)			○											
W1 5/8	5	5.08	38.02	2°26'	(NR5W)					②								②	
W1 3/4	5	5.08	41.2	2°15'	(NR5W)					②								②	
W1 7/8	4.5	5.64	44.01	2°20'	(NR45W)														
W2	4.5	5.64	47.19	2°11'	(NR45W)														
W2 1/4	4	6.35	53.08	2°11'	(NR4W)														
W2 1/2	4	6.35	59.43	1°57'	(NR4W)								②						

② : Change the shim to NXN22-2

② : Change the shim to NXN27-2

② : Change the shim to GXN22-2DT

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts

Whitworth fine screw thread (W) 1/2

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank												Carbide shank				"T-Bar"		
					Insert size	6NR				11NR				16NR					11NR		16NR		16NR		
					Holder Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	CNR0025R16	SNR0010M11SC-2	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
					Insert Cat. No.																			
W13	16	1.588	11.98	2°25'	(NR16W)																			
W13.5	16	1.588	12.48	2°19'	(NR16W)																			
W14	16	1.588	12.98	2°14'	(NR16W)																			
W14.5	16	1.588	13.48	2°09'	(NR16W)																			
W15	16	1.588	13.98	2°04'	(NR16W)																			
W16	14	1.814	14.84	2°14'	(NR14W)																			
W17	14	1.814	15.84	2°05'	(NR14W)					○														
W18	14	1.814	16.84	1°58'	(NR14W)					○								○						
W19	12	2.117	17.65	2°11'	NR12W																			
W20	12	2.117	18.65	2°04'	NR12W																			
W21	12	2.117	19.65	1°58'	NR12W																			
W22	12	2.117	20.65	1°52'	NR12W																			
W23	10	2.54	21.37	2°10'	NR10W																			
W24	10	2.54	22.37	2°04'	NR10W																			
W25	10	2.54	23.37	1°59'	NR10W										○									
W26	10	2.54	24.37	1°54'	NR10W										○						○			
W28	9	2.822	26.19	1°58'	(NR9W)										○						○			
W30	9	2.822	28.19	1°50'	(NR9W)										○						○			
W32	9	2.822	30.19	1°42'	(NR9W)												②						②	
W34	8	3.175	31.97	1°49'	NR8W												②						②	
W35	8	3.175	32.97	1°45'	NR8W												②						②	
W36	8	3.175	33.97	1°42'	NR8W												2	②					2	②
W38	8	3.175	35.97	1°37'	NR8W												2	②					2	②
W40	8	3.175	37.97	1°31'	NR8W												2	②					2	②
W42	8	3.175	39.97	1°27'	NR8W													○			○			○

② : Change the shim to GXN16-2

② : Change the shim to GXN16-2DT

Whitworth fine screw thread (W) 2/2

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank										"T-Bar"		
					Insert size	22NR							27NR			22NR		
					Holder Cat. No.	SNR0020Q22	SNR0020Q22-2	CNR0025R22	CNR0032S22	(CNR0040T22)	(CNR0050U22)	(CNR0063V22)	CNR0040T27	(CNR0050U27)	(CNR0063V27)	TSNR0020R22	TCNR0025S22DT	(TCNR0032T22DT)
					Insert Cat. No.													
W44	7	3.629	41.68	1°35'	(22NR7W)			②									②	
W45	7	3.629	42.68	1°33'	(22NR7W)			②									②	
W46	7	3.629	43.68	1°31'	(22NR7W)			②									②	
W48	7	3.629	45.68	1°27'	(22NR7W)				○									○
W50	7	3.629	47.68	1°23'	(22NR7W)				○									○
W52	7	3.629	49.68	1°20'	(22NR7W)				○									○
W55	6	4.233	52.29	1°29'	(22NR6W)				○									○
W58	6	4.233	55.29	1°24'	(22NR6W)					○								○
W60	6	4.233	57.29	1°21'	(22NR6W)					○								○
W62	6	4.233	59.29	1°18'	(22NR6W)					○								○
W65	6	4.233	62.29	1°14'	(22NR6W)					○								○
W68	6	4.233	65.29	1°11'	(22NR6W)						○							○
W70	6	4.233	67.29	1°09'	(22NR6W)						○							○
W72	6	4.233	69.29	1°07'	(22NR6W)						○							○
W75	5	5.08	71.75	1°17'	(22NR5W)						○							○
W78	5	5.08	74.75	1°14'	(22NR5W)						○							○
W80	5	5.08	76.75	1°12'	(22NR5W)						○							○
W82	5	5.08	78.75	1°11'	(22NR5W)							○						○
W85	5	5.08	81.75	1°08'	(22NR5W)							○						○
W88	5	5.08	84.75	1°06'	(22NR5W)							○						○
W90	5	5.08	86.75	1°04'	(22NR5W)							○						○
W92	5	5.08	88.75	1°03'	(22NR5W)							○						○
W95	5	5.08	91.75	1°01'	(22NR5W)							○						○
W98	5	5.08	94.75	0°59'	(22NR5W)							○						○
W100	5	5.08	96.75	0°57'	(22NR5W)							○						○
W105	5	5.08	101.75	0°55'	(22NR5W)							○						○
W110	4	6.35	105.93	0°52'	(27NR4W)										○			

② : Change the shim to NXN22-2

② : Change the shim to GXN22-2

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts

30° trapezoidal thread (TR) 1/2

Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank														Carbide shank			"T-Bar"						
				Insert size	16NR								22NR					27NR		16NR			16NR				22NR		
				Holder Cat. No. / Insert Cat. No.	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	CNR0025R16	CNR0032S16	(CNR0040T16)	(CNR0050U16)	SNR0020Q22	SNR0020Q22-2	SNR0020Q22-3	SNR0025R22	SNR0032S22	CNR0040T27	(CNR0050U27)	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT	(TCNR0032T16DT)	TSNR0020R22	TCNR0025S22DT	(TCNR0032T22DT)
TR22x3	3	20.5	2°40'	NR30TR																								
TR24x5	5	21.5	4°14'	NR50TR																								
TR24x3	3	22.5	2°26'	NR30TR																								
TR26x5	5	23.5	3°52'	NR50TR																								
TR26x3	3	24.5	2°14'	NR30TR		○																						
TR28x5	5	25.5	3°34'	NR50TR																								
TR28x3	3	26.5	2°04'	NR30TR																○								
TR30x6	6	27	4°03'	NR60TR																								
TR30x3	3	28.5	1°55'	NR30TR																○								
TR32x6	6	29	3°46'	NR60TR																								
TR32x3	3	30.5	1°48'	NR30TR				②															②					
TR34x6	6	31	3°32'	NR60TR																								
TR34x3	3	32.5	1°41'	NR30TR				②															②					
TR36x6	6	33	3°19'	NR60TR																								
TR36x3	3	34.5	1°35'	NR30TR				2	②														2	②				
TR38x3	3	36.5	1°30'	NR30TR				2	②														2	②				
TR40x3	3	38.5	1°25'	NR30TR					○											○				○				
TR42x3	3	40.5	1°21'	NR30TR					○											○				○				
TR44x3	3	42.5	1°17'	NR30TR						○										○					○			
TR46x3	3	44.5	1°14'	NR30TR						○										○					○			
TR48x3	3	46.5	1°11'	NR30TR						○										○					○			
TR50x3	3	48.5	1°08'	NR30TR						○										○					○			
TR52x3	3	50.5	1°05'	NR30TR							○									○					○			
TR55x3	3	53.5	1°01'	NR30TR							○									○					○			
TR60x3	3	58.5	0°56'	NR30TR							○									○					○			

② : Change the shim to GXN16-2 ←

② : Change the shim to GXN16-2DT ←

30° trapezoidal thread (TR) 2/2

Nominal size	Pitch	Effective diameter	Lead angle	Shank	Steel shank															Carbide shank			"T-Bar"						
				Insert size	16NR						22NR							27NR			16NR			16NR				22NR		
				Holder Cat. No. / Insert Cat. No.	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	CNR0025R16	CNR0032S16	SNR0020Q22	SNR0020Q22-2	SNR0020Q22-3	CNR0025R22	CNR0032S22	(CNR0040T22)	(CNR0050U22)	(CNR0063V22)	CNR0040T27	(CNR0050U27)	(CNR0063V27)	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT	(TCNR0032T16DT)	TSNR0020R22	TCNR0025S22DT	(TCNR0032T22DT)
TR65x4	4	63	1°09'	NR40TR													○													○
TR70x4	4	68	1°04'	NR40TR													○													○
TR75x4	4	73	1°00'	NR40TR													○													○
TR80x4	4	78	0°56'	NR40TR														○												○
TR85x4	4	83	0°53'	NR40TR														○												○
TR90x4	4	88	0°50'	NR40TR														○												○
TR95x4	4	93	0°47'	NR40TR														○												○
TR100x4	4	98	0°45'	NR40TR														○												○
TR105x4	4	103	0°42'	NR40TR														○												○
TR110x4	4	108	0°41'	NR40TR														○												○
TR115x6	6	112	0°59'	NR60TR																	○									
TR120x6	6	117	0°56'	NR60TR																	○									
TR125x6	6	122	0°54'	NR60TR																	○									
TR130x6	6	127	0°52'	NR60TR																	○									
TR135x6	6	132	0°50'	NR60TR																	○									
TR140x6	6	137	0°48'	NR60TR																	○									
TR145x6	6	142	0°46'	NR60TR																	○									
TR150x6	6	147	0°45'	NR60TR																	○									
TR155x6	6	152	0°43'	NR60TR																	○									
TR160x6	6	157	0°42'	NR60TR																	○									
TR165x6	6	162	0°41'	NR60TR																	○									
TR170x6	6	167	0°39'	NR60TR																	○									

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts

Parallel pipe thread (PF) This table is also applied to G, Rp, and PS type threads.

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank												Carbide shank								"T-Bar"		
					Insert size	6NR		11NR				16NR						6NR		11NR				16NR		16NR		
					Holder Cat. No.	SNR0006H06-2	SNR0008H06-2	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0016M16	SNR0016M16-2	CNR0020P16	CNR0025R16	CNR0032S16	(CNR0040T16)	(CNR0050U16)	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0012P11SC	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
					Insert Cat. No.																								
PF1/4	19	1.34	12.30	1°59'	NR19W		○													○									
PF3/8	19	1.34	15.81	1°33'	NR19W				○											○									
PF1/2	14	1.81	19.79	1°40'	NR14W						○														○				
PF5/8	14	1.81	21.75	1°31'	NR14W						○														○				
PF3/4	14	1.81	25.28	1°19'	NR14W							○														○		○		
PF7/8	14	1.81	29.04	1°08'	NR14W									○												○			○	
PF1	11	2.31	31.77	1°20'	NR11W									○												○			○	
PF1-1/8	11	2.31	36.42	1°09'	NR11W										○											○				○
PF1-1/4	11	2.31	40.43	1°02'	NR11W										○											○				○
PF1-1/2	11	2.31	46.32	0°55'	NR11W											○										○				
PF1-3/4	11	2.31	52.27	0°48'	NR11W												○									○				
PF2	11	2.31	58.14	0°43'	NR11W												○									○				
PF2-1/4	11	2.31	64.23	0°39'	NR11W													○								○				
PF2-1/2	11	2.31	73.71	0°34'	NR11W													○								○				
PF2-3/4	11	2.31	80.06	0°32'	NR11W													○								○				
PF3	11	2.31	86.41	0°29'	NR11W									0	0	0	0	▯											0	0
PF3-1/2	11	2.31	98.85	0°26'	NR11W									0	0	0	0	▯											0	0
PF4	11	2.31	111.55	0°23'	NR11W									0	0	0	0	▯											0	0
PF4-1/2	11	2.31	124.25	0°20'	NR11W									0	0	0	0	▯											0	0
PF5	11	2.31	136.95	0°18'	NR11W									0	0	0	0	▯											0	0
PF6	11	2.31	162.35	0°16'	NR11W									0	0	0	0	▯											0	0
PF7	11	2.31	187.75	0°13'	NR11W									0	0	0	0	▯											0	0
PF8	11	2.31	213.15	0°12'	NR11W									0	0	0	0	▯											0	0
PF9	11	2.31	238.55	0°11'	NR11W									0	0	0	0	▯											0	0
PF10	11	2.31	263.95	0°10'	NR11W									0	0	0	0	▯											0	0
PF12	11	2.31	314.75	0°08'	NR11W									0	0	0	0	▯											0	0

▯: Change the shim to GXN16-0DT ← ▯: Change the shim to GXN16-0DT ←

Taper pipe thread (PT) This table is also applied to Rc type pipe thread.

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank												Carbide shank								"T-Bar"		
					Insert size	6NR				11NR				16NR						6NR				11NR				16NR		
					Holder Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0010K11	SNR0010K11-2	SNR0013L11	SNR0013L11-2	SNR0016M16	SNR0016M16-2	CNR0020P16	CNR0025R16	CNR0032S16	(CNR0040T16)	(CNR0050U16)	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0010M11SC	SNR0010M11SC-2	SNR0012P11SC	SNR0012P11SC-2	SNR0016R16SC	SNR0016R16SC-2	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
					Insert Cat. No.																									
PT1/4	19	1.34	12.30	1°59'	NR19PT	○													○											
PT3/8	19	1.34	15.81	1°33'	NR19PT			○														○								
PT1/2	14	1.81	19.79	1°40'	NR14PT					○																○				
PT3/4	14	1.81	25.28	1°19'	NR14PT									○												○		○		
PT1	11	2.31	31.77	1°20'	NR11PT											○										○			○	
PT1 1/4	11	2.31	40.43	1°02'	NR11PT												○									○				○
PT1 1/2	11	2.31	46.32	0°55'	NR11PT													○								○				
PT2	11	2.31	58.14	0°43'	NR11PT														○							○				
PT2 1/2	11	2.31	73.71	0°34'	NR11PT															○						○				
PT3	11	2.31	86.41	0°29'	NR11PT											0	0	0	0	▯									0	0
PT3 1/2	11	2.31	98.85	0°26'	NR11PT											0	0	0	0	▯									0	0
PT4	11	2.31	111.55	0°23'	NR11PT											0	0	0	0	▯									0	0
PT5	11	2.31	136.95	0°18'	NR11PT											0	0	0	0	▯									0	0
PT6	11	2.31	162.35	0°16'	NR11PT											0	0	0	0	▯									0	0
PT7	11	2.31	187.75	0°13'	NR11PT											0	0	0	0	▯									0	0
PT8	11	2.31	213.15	0°12'	NR11PT											0	0	0	0	▯									0	0
PT9	11	2.31	238.55	0°11'	NR11PT											0	0	0	0	▯									0	0
PT10	11	2.31	263.95	0°10'	NR11PT											0	0	0	0	▯									0	0
PT12	11	2.31	314.75	0°08'	NR11PT											0	0	0	0	▯									0	0

▯ : Change the shim to GXN16-2 ← ▯: Change the shim to GXN16-2DT ←

Selection of Internal Toolholder — Relationship between thread sizes, toolholder and inserts

Taper pipe thread (NPT)

Nominal size	TPI	Pitch	Lead angle	Shank	Steel shank											Carbide shank							"T-Bar"		
				Insert size	6NR				16NR							6NR				16NR			16NR		
				Holder Cat. No. / Insert Cat. No.	SNR0006H06-2	SNR0006H06-3	SNR0008H06-2	SNR0008H06-3	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	CNR0025R16	CNR0032S16	(CNR0040T16)	(CNR0050U16)	SNR0006K06SC-2	SNR0006K06SC-3	SNR0008K06SC-2	SNR0008K06SC-3	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TSNR0016Q16	TCNR0020R16DT	TCNR0025S16DT
3/8NPT	18	1.41	1°37'	NR18NPT			○												○						
1/2NPT	14	1.81	1°40'	NR14NPT																					
3/4NPT	14	1.81	1°19'	NR14NPT					○												○			○		
1NPT	11.5	2.21	1°17'	NR115NPT					○			○									○				○	
1 1/4NPT	11.5	2.21	1°00'	NR115NPT					○					○							○					
1 1/2NPT	11.5	2.21	0°52'	NR115NPT					○					○							○					
2NPT	11.5	2.21	0°41'	NR115NPT					○						○						○					
2 1/2NPT	8	3.175	0°50'	NR8NPT					○						○						○					
3NPT	8	3.175	0°40'	NR8NPT					○						○						○					
3 1/2NPT	8	3.175	0°35'	NR8NPT					○						○						○					
4NPT	8	3.175	0°31'	NR8NPT					○						○						○					
5NPT	8	3.175	0°25'	NR8NPT								0	0	0	[0]	[0]									0	0
6NPT	8	3.175	0°21'	NR8NPT								0	0	0	[0]	[0]									0	0
8NPT	8	3.175	0°16'	NR8NPT								0	0	0	[0]	[0]									0	0
10NPT	8	3.175	0°13'	NR8NPT								0	0	0	[0]	[0]									0	0
12NPT	8	3.175	0°11'	NR8NPT								0	0	0	[0]	[0]									0	0
14NPT	8	3.175	0°10'	NR8NPT								0	0	0	[0]	[0]									0	0
16NPT	8	3.175	0°09'	NR8NPT								0	0	0	[0]	[0]									0	0
18NPT	8	3.175	0°08'	NR8NPT								0	0	0	[0]	[0]									0	0
20NPT	8	3.175	0°07'	NR8NPT								0	0	0	[0]	[0]									0	0
24NPT	8	3.175	0°06'	NR8NPT								0	0	0	[0]	[0]									0	0

[0] : Change the shim to GXN16-0 ← [0]: Change the shim to GXN16-0DT ←

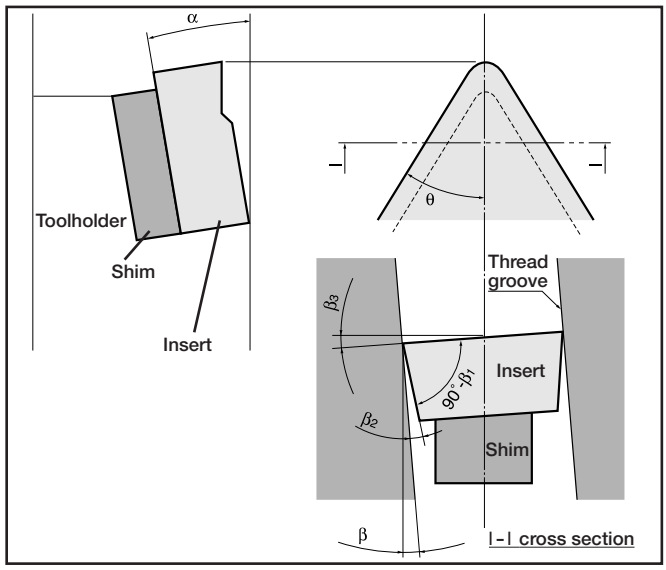
29° trapezoidal thread (ACME)

Nominal size	TPI	Pitch	Effective diameter	Lead angle	Shank	Steel shank												Carbide shank			"T-Bar"		
					Insert size	16NR						22NR					27NR		16NR			16NR		22NR
					Holder Cat. No. / Insert Cat. No.	SNR0016M16	SNR0016M16-2	SNR0016M16-3	CNR0020P16	CNR0025R16	CNR0032S16	SNR0020Q22	SNR0020Q22-2	SNR0020Q22-3	CNR0025R22	CNR0032S22	CNR0040T27	(CNR0050U27)	SNR0016R16SC	SNR0016R16SC-2	(SNR0016R16SC-3)	TSNR0016Q16	TCNR0020R16DT	TCNR0025S22DT
3/8	12	2.12	8.465	4°33'	NR12ACME																		
7/16	12	2.12	10.053	3°50'	NR12ACME																		
1/2	10	2.54	11.43	4°03'	NR10ACME																		
5/8	8	3.18	14.274	4°03'	NR8ACME																		
3/4	6	4.23	16.934	4°33'	NR6ACME																		
7/8	6	4.23	20.109	3°50'	NR6ACME																		
1	5	5.08	22.86	4°03'	NR5ACME																		
1-1/8	5	5.08	26.035	3°33'	NR5ACME																		
1-1/4	5	5.08	29.21	3°10'	NR5ACME																		
1-3/8	4	6.35	31.75	3°39'	NR4ACME																		
1-1/2	4	6.35	34.925	3°19'	NR4ACME																		
1-3/4	4	6.35	41.275	2°48'	NR4ACME																		
2	4	6.35	47.625	2°26'	NR4ACME																		

Because this thread standard is characterized with large pitch and small diameter (that is a large lead angle), the standard inserts and toolholder cannot be used for machining this thread type. The application is limited to outside of the standard.

Shim replacement method (Compensation for the lead angle and tool relief angle)

When the pitch is large or the screw diameter is small, the lead angle becomes large and the effective relief angle on the advance flank side β_2 becomes small. In particular, this will cause shorter life of the insert in the case of trapezoidal screw with small flank angle. It is ideal without any interference for the thread cutting tip to have the equal relief angle on both right and left. Replace the shim so that the rake face of insert faces the thread groove direction (that is, $\beta = \beta_3$).



■ Calculating the lead angle

The lead angle is calculated as follows:

$$\tan\beta = \ell / \pi d = nP/\pi d$$

β : Lead angle
ℓ : Lead
n : No. of threads
P : Pitch
d : Thread diameter

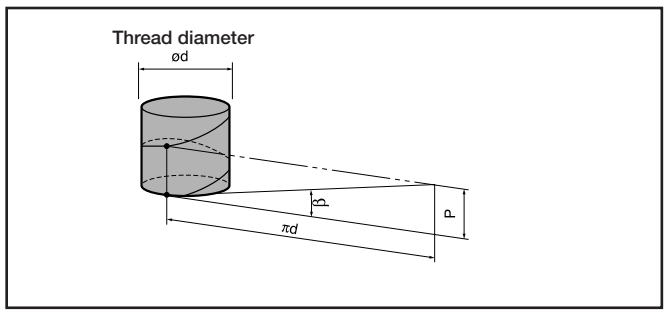
■ Calculating the relief angle

The relief angle β_1 is calculated as follows:

$$\tan\beta_1 = \tan\theta \cdot \tan\alpha$$

The α of a standard toolholder is 10° for external threading and 15° for internal threading.

Included angle 2θ	Half included angle θ	Relief angle β_1	
		External threading tool	Internal threading tool
60°	30°	5.8°	8.8°
55°	27.5°	5.2°	7.9°
30°	15°	2.7°	4.1°
29°	14.5°	2.6°	4.0°



Accordingly, the effective relief angle is calculated as follows:

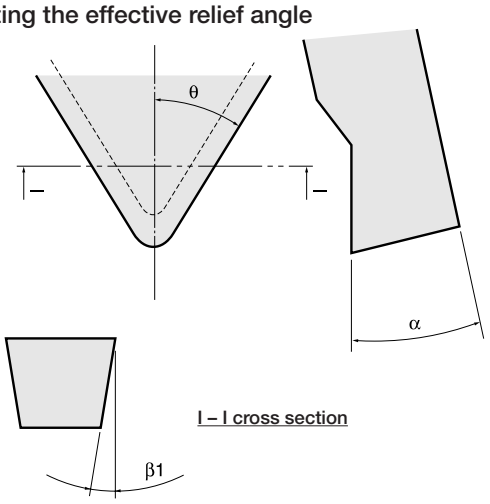
$$\beta_2 = \beta_1 + \beta_3 - \beta$$

β : Lead angle
β_2 : Effective relief angle
β_3 : Lead angle compensation value

In other words, $\beta_1 = \beta_2$ when the thread lead angle is equal to the compensation value. Namely, the relief angle of the tool itself is equal to the effective relief angle. If the wrong compensation value is used, $\beta_1 > \beta_2$. Namely, the effective relief angle becomes smaller. Therefore, carry out compensation of the lead angle so that the following range is obtained:

± 1° when the included angle is 60° and 55°
± 30° when the included angle is 30° and 29°

Calculating the effective relief angle



■ Type of shim

The Cat. No. of the shim and compensated lead angles are shown in the table.

Compensated lead angle	-2°	-1°	0°	1°	2°	3°	4°
Shim	□□□-98	□□□-99	□□□-0	□□□-1	□□□-2	□□□-3	□□□-4

Note: The last numeral of the shim Cat. No. is the compensated lead angle.

■ Toolholder and applicable shims

Screw-on /clamp-on dual toolholder

Toolholder Cat. No.	Shim	
	R	L
CER/L□□□□□16DT	GXE16-□DT	GXN16-□DT
CER/L□□□□□22DT	GXE22-□DT	GXN22-□DT
TCNR/L□□□□□16DT	GXN16-□DT	GXE16-□DT
TCNR/L□□□□□22DT	GXN22-□DT	GXE22-□DT

Note: Standard shim is GX □□-1DT. Other types are optional.

Clamp-on type toolholder

Toolholder Cat. No.	Shim	
	R	L
CER/L□□□□□16□	GXE16-□	GXN16-□
CER/L□□□□□22□	NXE22-□	NXN22-□
CER/L□□□□□27□	NXE27-□	NXN27-□
CNR/L□□□□□16□	GXN16-□	GXE16-□
CNR/L□□□□□22□	NXN22-□	NXE22-□
CNR/L□□□□□27□	NXN22-□	NXE27-□
B-CER/L□□□16	GXE16-□	GXN16-□

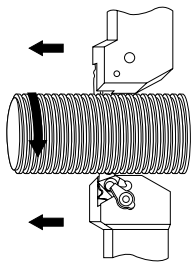
Note: Standard shims set before delivery are all indicated as □□□□□-1.

Reference guide | Shim selection standard P. 260

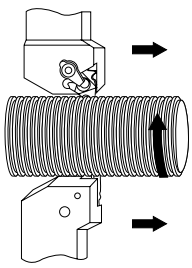
Threading Methods and Combinations

External threading

Right hand thread

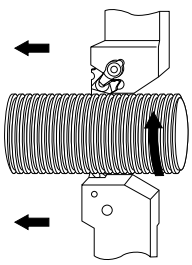


Work rotation	Regular
Feed direction	Toward chuck side
Hand of toolholder	Right
Hand of insert	Right
Standard shim	□XE□□-1
	GX□□-1DT

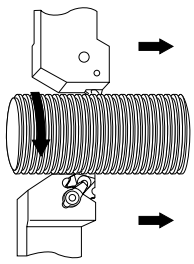


Work rotation	Reverse
Feed direction	Toward chuck side
Hand of toolholder	Right
Hand of insert	Right
Standard shim	□XE□□-1
	GX□□-1DT

Left hand thread



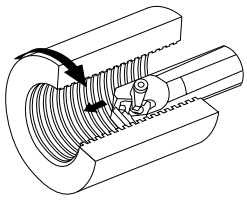
Work rotation	Reverse
Feed direction	Toward chuck side
Hand of toolholder	Left
Hand of insert	Left
Standard shim	□XN□□-1
	GX□□-1DT



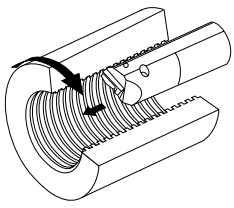
Work rotation	Regular
Feed direction	Toward chuck side
Hand of toolholder	Left
Hand of insert	Left
Standard shim	□XE□□-1
	GX□□-1DT

Internal threading

Right hand thread

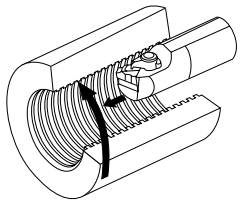


Work rotation	Regular
Feed direction	Toward chuck side
Hand of toolholder	Right
Hand of insert	Right
Standard shim	□XN□□-1
	GX□□-1DT

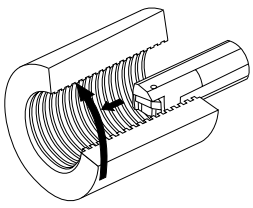


Work rotation	Regular
Feed direction	Toward chuck side
Hand of toolholder	Right
Hand of insert	Right
Standard shim	□XN□□-1
	GX□□-1DT

Left hand thread



Work rotation	Reverse
Feed direction	Toward chuck side
Hand of toolholder	Left
Hand of insert	Left
Standard shim	□XE□□-1
	GX□□-1DT



Work rotation	Reverse
Feed direction	Toward chuck side
Hand of toolholder	Left
Hand of insert	Left
Standard shim	□XE□□-1
	GX□□-1DT

Insert Grades and Standard Cutting Speed

Work materials	Hardness	Cutting speed Vc (m/min)				
		AH740	T313V	TH10	UX30	NS530
Carbon steels	< 200HB	80 ~ 150	100 ~ 200		80 ~ 120	150 ~ 180
	> 200HB	80 ~ 130	100 ~ 150		70 ~ 100	100 ~ 120
Stainless steels		50 ~ 100	70 ~ 130	30 ~ 50	70 ~ 100	70 ~ 100
Cast irons			70 ~ 150	70 ~ 90		
Non-ferrous metals				100 ~ 500		
Hard materials	HRC50 ~ 60			10 ~ 30		
Super alloys				10 ~ 40		

Recommended grade

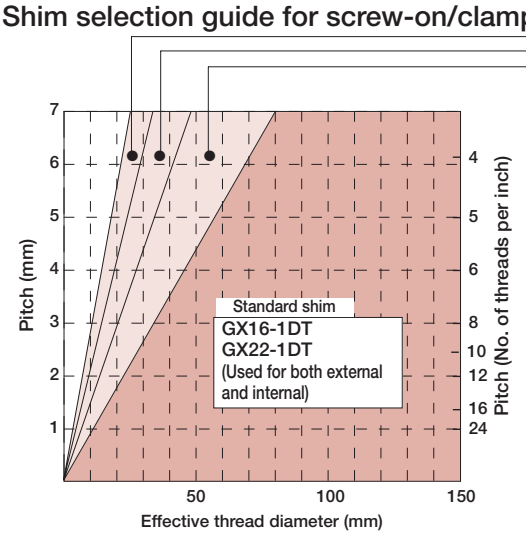
Guideline for infeed per pass and number of passes

● Determine the infeed per pass and number of passes while referring to the table and description below.

Pitch	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	4.5	5.0 ~
thread/inch	48	32	24	20	16	14	12	10	8	7	6	5.5	5 ~
No. of passes	4 ~ 6	4 ~ 7	4 ~ 8	5 ~ 9	6 ~ 10	7 ~ 12	7 ~ 12	8 ~ 14	10 ~ 16	11 ~ 18	11 ~ 18	11 ~ 19	12 ~ 24

- When using the full-profile insert, set the total infeed amount by taking the finish stock of 0.1 mm into account.
- Set the first infeed to 150 ~ 200% of nose R and do not allow it to exceed 0.5 mm.
- The infeed amount during the final pass must be 0.05 mm minimum. No zero cut to be made (extra-small infeed or zero cut for machining of the work hardened surface only will cause shortening of tool life).
- The partial-profile insert or inside diameter insert has small nose R. Reduce the infeed per pass and increase the no. of passes.
- Standard infeed per pass and no. of passes are shown on page 261 - 262 for each thread shape.

● Shim selection guide for screw-on/clamp-on dual ST-type tools

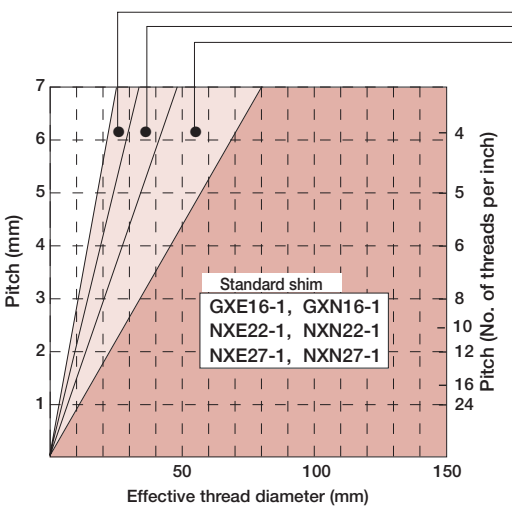


● Stock List of Exchangeable Shims

Grade: D30

	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock
$\beta_2 = 4°$	GXE16-4DT	●	GXN16-4DT	●	GXE22-4DT	●	GXN22-4DT	●
$\beta_2 = 3°$	GXE16-3DT	●	GXN16-3DT	●	GXE22-3DT	●	GXN22-3DT	●
$\beta_2 = 2°$	GXE16-2DT	●	GXN16-2DT	●	GXE22-2DT	●	GXN22-2DT	●
$\beta_2 = 1°$ Standard shim	GX16-1DT	●	GX16-1DT	●	GX22-1DT	●	GX22-1DT	●
$\beta_2 = 0°$	GXE16-0DT	●	GXN16-0DT	●	GXE22-0DT	●	GXN22-0DT	●
$\beta_2 = -1°$	GXE16-99DT	●	GXN16-99DT	●	GXE22-99DT	●	GXN22-99DT	●
$\beta_2 = -2°$	GXE16-98DT	●	GXN16-98DT	●	GXE22-98DT	●	GXN22-98DT	●
Applicable toolholder	CER--16DT TCNL--16DT		CEL--16DT TCNR--16TDT		CER--22DT TCNL--22DT		CEL--16DT TCNR--16TDT	

● Shim selection guide for clamp-on type ST-tools



● Stock List of Exchangeable Shims

Grade: D30

	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock	Cat. No.	Stock
$\beta_2 = 4°$	GXE16-4	●	GXN16-4	●	NXE22-4	●	NXN22-4	●	NXE27-4		NXN27-4	
$\beta_2 = 3°$	GXE16-3	●	GXN16-3	●	NXE22-3	●	NXN22-3	●	NXE27-3		NXN27-3	
$\beta_2 = 2°$	GXE16-2	●	GXN16-2	●	NXE22-2	●	NXN22-2	●	NXE27-2		NXN27-2	
$\beta_2 = 1°$ Standard shim	GXE16-1	●	GXN16-1	●	NXE22-1	●	NXN22-1	●	NXE27-1	●	NXN27-1	●
$\beta_2 = 0°$	GXE16-0	●	GXN16-0	●	NXE22-0	●	NXN22-0	●	NXE27-0		NXN27-0	
$\beta_2 = -1°$	GXE16-99	●	GXN16-99	●	NXE22-99	●	NXN22-99	●	NXE27-99		NXN27-99	
$\beta_2 = -2°$	GXE16-98	●	GXN16-98	●	NXE22-98	●	NXN22-98	●	NXE27-98		NXN27-98	
Applicable toolholder	CER--16T CNL--16 B-CER--16		CEL--16T CNR--16T B-CEL--16		CER--22T CNL--22		CEL--22T CNR--22		CER--27T CNL--27		CEL--27T CNR--27	

Cutting depth vs. Number of Passes

ISO metric full-profile inserts for external threading

Pitch		0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Height of thread		0.32	0.47	0.63	0.79	0.95	1.11	1.27	1.58	1.90	2.21	2.53	2.85	3.16	3.48	3.80
Total cutting depth		0.42	0.57	0.73	0.89	1.05	1.21	1.37	1.68	2.00	2.31	2.63	2.95	3.26	3.58	3.90
Nose R		0.06	0.09	0.13	0.16	0.19	0.22	0.25	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75
Number of passes	1	0.15	0.18	0.25	0.25	0.30	0.30	0.30	0.35	0.35	0.40	0.40	0.40	0.45	0.50	0.50
	2	0.12	0.12	0.20	0.20	0.25	0.25	0.25	0.30	0.30	0.35	0.35	0.35	0.35	0.35	0.40
	3	0.10	0.10	0.13	0.15	0.20	0.20	0.20	0.25	0.25	0.30	0.30	0.30	0.30	0.30	0.30
	4	0.05	0.10	0.10	0.14	0.15	0.16	0.20	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25
	5		0.05	0.05	0.10	0.10	0.15	0.15	0.20	0.20	0.20	0.20	0.25	0.25	0.25	0.25
	6				0.05	0.05	0.10	0.12	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20
	7						0.05	0.10	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20
	8							0.05	0.10	0.15	0.15	0.15	0.20	0.20	0.20	0.20
	9								0.05	0.10	0.15	0.15	0.15	0.20	0.20	0.20
	10									0.10	0.10	0.15	0.15	0.15	0.15	0.15
	11									0.05	0.10	0.10	0.15	0.15	0.15	0.15
	12										0.05	0.10	0.10	0.15	0.15	0.15
	13											0.10	0.10	0.10	0.15	0.15
	14											0.05	0.10	0.10	0.15	0.15
	15												0.10	0.10	0.10	0.10
	16												0.05	0.10	0.10	0.10
	17													0.10	0.10	0.10
	18													0.05	0.10	0.10
	19														0.10	0.10
	20														0.05	0.10
	21															0.10
	22															0.05
	23															
	24															

ISO metric full-profile inserts for internal threading

Pitch		0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00
Height of thread		0.29	0.43	0.58	0.72	0.87	1.01	1.16	1.44	1.74	2.03	2.32	2.61	2.90	3.19	3.48
Total cutting depth		0.39	0.53	0.68	0.82	0.97	1.11	1.26	1.54	1.84	2.13	2.42	2.71	3.00	3.29	3.58
Nose R		0.04	0.05	0.07	0.09	0.11	0.12	0.14	0.18	0.21	0.25	0.28	0.32	0.35	0.39	0.42
Number of passes	1	0.08	0.10	0.14	0.15	0.20	0.20	0.20	0.25	0.25	0.30	0.30	0.35	0.35	0.40	0.40
	2	0.07	0.09	0.13	0.13	0.16	0.18	0.18	0.22	0.22	0.25	0.25	0.25	0.25	0.25	0.25
	3	0.07	0.08	0.11	0.12	0.14	0.16	0.17	0.20	0.20	0.22	0.22	0.22	0.22	0.22	0.22
	4	0.06	0.08	0.10	0.11	0.12	0.14	0.16	0.18	0.18	0.20	0.20	0.20	0.20	0.20	0.20
	5	0.06	0.07	0.08	0.10	0.12	0.12	0.14	0.16	0.16	0.18	0.18	0.18	0.20	0.20	0.19
	6	0.05	0.06	0.07	0.09	0.10	0.10	0.12	0.14	0.15	0.16	0.18	0.18	0.18	0.18	0.18
	7		0.05	0.05	0.07	0.08	0.09	0.10	0.10	0.14	0.14	0.16	0.16	0.16	0.16	0.17
	8				0.05	0.05	0.07	0.08	0.10	0.13	0.13	0.14	0.14	0.14	0.14	0.16
	9						0.05	0.06	0.08	0.12	0.12	0.14	0.14	0.14	0.14	0.15
	10							0.05	0.06	0.10	0.11	0.12	0.12	0.13	0.13	0.14
	11								0.05	0.09	0.10	0.12	0.12	0.13	0.13	0.14
	12									0.07	0.10	0.10	0.12	0.12	0.13	0.13
	13									0.05	0.07	0.10	0.11	0.12	0.12	0.13
	14										0.05	0.09	0.10	0.12	0.12	0.13
	15											0.07	0.10	0.11	0.12	0.12
	16											0.05	0.09	0.10	0.12	0.12
	17												0.08	0.10	0.10	0.12
	18												0.05	0.10	0.10	0.12
	19													0.08	0.10	0.10
	20													0.05	0.10	0.10
	21														0.08	0.10
	22														0.05	0.10
	23															0.08
	24															0.05

Unified full-profile inserts

		External							Internal						
No. of threads		24	20	18	16	14	12	8	24	20	18	16	14	12	8
Height of thread		0.67	0.80	0.89	1.01	1.15	1.34	2.01	0.61	0.74	0.82	0.92	1.05	1.23	1.84
Total cuting depth		0.77	0.90	0.99	1.11	1.25	1.44	2.11	0.71	0.84	0.92	1.02	1.15	1.33	1.94
Nose R		0.13	0.16	0.18	0.20	0.23	0.27	0.40	0.07	0.09	0.10	0.11	0.13	0.15	0.22
Number of passes	1	0.25	0.25	0.28	0.30	0.30	0.30	0.35	0.20	0.20	0.20	0.20	0.25	0.25	0.30
	2	0.22	0.20	0.23	0.25	0.25	0.25	0.30	0.16	0.16	0.18	0.18	0.20	0.20	0.25
	3	0.15	0.16	0.18	0.18	0.23	0.21	0.25	0.12	0.13	0.15	0.16	0.18	0.18	0.22
	4	0.10	0.14	0.15	0.15	0.18	0.18	0.22	0.10	0.12	0.14	0.14	0.16	0.16	0.20
	5	0.05	0.10	0.10	0.10	0.14	0.15	0.20	0.08	0.10	0.10	0.11	0.13	0.13	0.18
	6		0.05	0.05	0.08	0.10	0.12	0.20	0.05	0.08	0.10	0.10	0.10	0.10	0.16
	7				0.05	0.05	0.10	0.16		0.05	0.05	0.08	0.08	0.10	0.14
	8						0.08	0.16				0.05	0.05	0.08	0.12
	9						0.05	0.12						0.08	0.12
	10							0.10						0.05	0.10
	11							0.05							0.10
	12														0.05
	13														
	14														

Whitworth full-profile inserts

		External									Internal								
No. of threads		20	19	18	16	14	12	11	10	8	20	19	18	16	14	12	11	10	8
Height of thread		0.83	0.88	0.92	1.04	1.19	1.39	1.51	1.66	2.08	0.83	0.88	0.92	1.04	1.19	1.39	1.51	1.66	2.08
Total cutting depth		0.93	0.98	1.02	1.14	1.29	1.49	1.61	1.76	2.18	0.93	0.98	1.02	1.14	1.29	1.49	1.61	1.76	2.18
Nose R		0.16	0.17	0.18	0.20	0.23	0.27	0.29	0.32	0.40	0.16	0.17	0.18	0.20	0.23	0.27	0.29	0.32	0.40
Number of passes	1	0.25	0.28	0.30	0.30	0.30	0.30	0.30	0.35	0.35	0.20	0.20	0.22	0.22	0.25	0.25	0.25	0.30	0.35
	2	0.20	0.22	0.24	0.25	0.25	0.25	0.25	0.30	0.30	0.18	0.18	0.18	0.18	0.21	0.21	0.21	0.25	0.30
	3	0.18	0.18	0.18	0.18	0.23	0.21	0.21	0.24	0.25	0.16	0.16	0.17	0.17	0.20	0.20	0.20	0.22	0.25
	4	0.15	0.15	0.15	0.14	0.20	0.18	0.18	0.20	0.23	0.14	0.16	0.16	0.16	0.18	0.18	0.18	0.20	0.22
	5	0.10	0.10	0.10	0.12	0.16	0.15	0.15	0.15	0.22	0.12	0.13	0.14	0.14	0.16	0.16	0.16	0.16	0.20
	6	0.05	0.05	0.05	0.10	0.10	0.14	0.14	0.14	0.20	0.08	0.10	0.10	0.12	0.14	0.14	0.14	0.14	0.18
	7				0.05	0.05	0.12	0.12	0.12	0.18	0.05	0.05	0.05	0.10	0.10	0.10	0.12	0.12	0.16
	8						0.10	0.12	0.12	0.16				0.05	0.05	0.10	0.10	0.12	0.14
	9						0.05	0.10	0.10	0.14						0.10	0.10	0.10	0.12
	10							0.05	0.05	0.10						0.05	0.10	0.10	0.11
	11									0.05							0.05	0.05	0.10
	12																		0.05
	13																		
	14																		
	15																		

30° Trapezoidal, full-profile inserts

		External					Internal				
Pitch		2.0	3.0	4.0	5.0	6.0	2.0	3.0	4.0	5.0	6.0
Height of thread		1.25	1.75	2.25	2.75	3.50	1.25	1.75	2.25	2.75	3.50
Total cutting depth		1.35	1.85	2.35	2.85	3.60	1.35	1.85	2.35	2.85	3.60
Nose R		0.12	0.12	0.12	0.12	0.25	0.12	0.12	0.12	0.12	0.25
Number of passes	1	0.25	0.25	0.30	0.30	0.30	0.20	0.22	0.25	0.25	0.25
	2	0.20	0.22	0.25	0.25	0.25	0.18	0.20	0.22	0.22	0.22
	3	0.20	0.20	0.22	0.20	0.23	0.18	0.18	0.20	0.20	0.21
	4	0.18	0.18	0.20	0.20	0.20	0.16	0.16	0.20	0.18	0.20
	5	0.15	0.17	0.18	0.18	0.18	0.15	0.16	0.18	0.18	0.18
	6	0.12	0.16	0.16	0.16	0.18	0.12	0.16	0.16	0.16	0.18
	7	0.10	0.14	0.15	0.16	0.16	0.10	0.14	0.16	0.16	0.16
	8	0.10	0.14	0.14	0.15	0.16	0.10	0.14	0.14	0.15	0.16
	9	0.05	0.12	0.14	0.14	0.16	0.10	0.12	0.14	0.14	0.16
	10		0.12	0.12	0.14	0.16	0.05	0.12	0.12	0.14	0.16
	11		0.10	0.12	0.14	0.16		0.10	0.12	0.14	0.16
	12		0.05	0.12	0.14	0.15		0.10	0.12	0.14	0.15
	13			0.10	0.12	0.15		0.05	0.10	0.12	0.15
	14			0.10	0.12	0.15			0.10	0.12	0.15
	15			0.05	0.12	0.14			0.10	0.12	0.14
	16				0.10	0.14			0.05	0.10	0.14
	17				0.10	0.12				0.10	0.12
	18				0.10	0.12				0.10	0.12
	19				0.05	0.12				0.10	0.12
	20					0.12				0.05	0.12
	21					0.10					0.10
	22					0.10					0.10
	23					0.05					0.10
	24										0.05
	25										
	26										

29° Trapezoidal, full-profile inserts

		External			Internal		
No. of threads		8	6	5	8	6	5
Height of thread		1.88	2.41	2.92	1.88	2.41	2.92
Total cutting depth		1.98	2.51	3.02	1.98	2.51	3.02
Nose R		0.15	0.15	0.15	0.15	0.15	0.15
Number of passes	1	0.25	0.25	0.25	0.22	0.22	0.22
	2	0.22	0.22	0.22	0.20	0.20	0.20
	3	0.20	0.20	0.20	0.18	0.18	0.18
	4	0.18	0.18	0.18	0.16	0.18	0.18
	5	0.16	0.17	0.18	0.16	0.16	0.16
	6	0.16	0.16	0.16	0.16	0.15	0.16
	7	0.16	0.16	0.16	0.15	0.15	0.15
	8	0.14	0.14	0.14	0.14	0.14	0.14
	9	0.14	0.14	0.14	0.14	0.14	0.14
	10	0.12	0.14	0.14	0.12	0.14	0.14
	11	0.10	0.14	0.14	0.10	0.14	0.14
	12	0.10	0.12	0.14	0.10	0.12	0.14
	13	0.05	0.12	0.12	0.10	0.12	0.12
	14		0.12	0.12	0.05	0.12	0.12
	15		0.10	0.12		0.10	0.12
	16		0.10	0.12		0.10	0.12
	17		0.05	0.12		0.10	0.12
	18			0.12		0.05	0.12
	19			0.10			0.10
	20			0.10			0.10
	21			0.05			0.10
	22						0.05
	23						
	24						
	25						
	26						

PT full-profile inserts

		External				Internal		
No. of threads		28	19	14	11	19	14	11
Height of thread		0.60	0.86	1.16	1.48	0.86	1.16	1.48
Total cutting depth		0.70	0.96	1.26	1.58	0.96	1.26	1.58
Nose R		0.13	0.18	0.25	0.32	0.18	0.25	0.32
Number of passes	1	0.25	0.28	0.30	0.30	0.22	0.25	0.25
	2	0.20	0.20	0.25	0.25	0.18	0.22	0.22
	3	0.10	0.18	0.20	0.22	0.16	0.18	0.18
	4	0.10	0.15	0.15	0.18	0.15	0.15	0.18
	5	0.05	0.10	0.11	0.15	0.10	0.11	0.15
	6		0.05	0.10	0.12	0.05	0.10	0.12
	7			0.10	0.11	0.05	0.10	0.11
	8			0.05	0.10		0.01	0.10
	9				0.10		0.05	0.10
	10				0.05			0.10
	11							0.05
	12							
	13							
	14							
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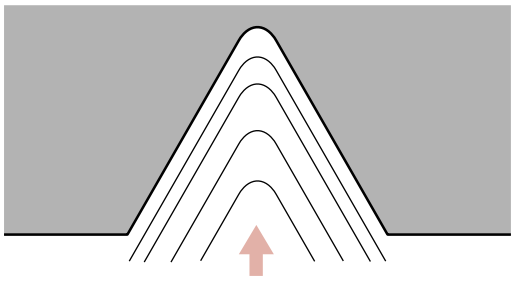
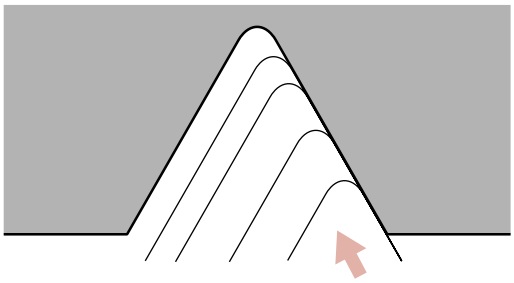
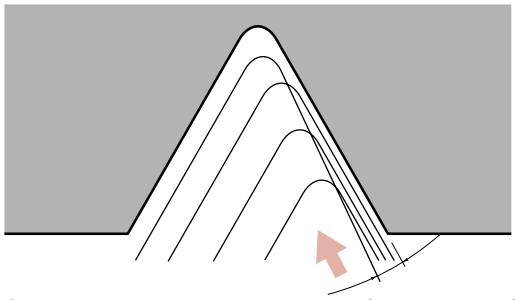
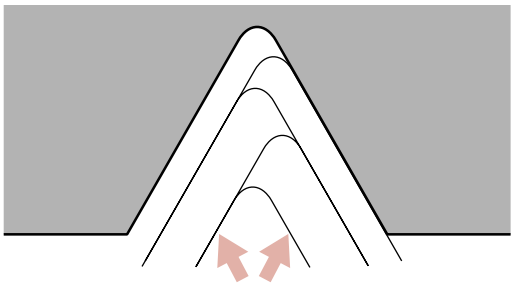
NPT full-profile inserts

		External				Internal		
No. of threads		18	14	11.5	8	14	11.5	8
Height of thread		1.14	1.47	1.79	2.58	1.47	1.79	2.58
Total cutting depth		1.24	1.57	1.89	2.68	1.57	1.89	2.68
Nose R		0.03	0.04	0.05	0.07	0.04	0.05	0.07
Number of passes	1	0.20	0.25	0.25	0.30	0.22	0.22	0.25
	2	0.18	0.22	0.22	0.25	0.20	0.20	0.20
	3	0.17	0.20	0.20	0.20	0.18	0.18	0.20
	4	0.16	0.18	0.18	0.20	0.18	0.18	0.20
	5	0.14	0.17	0.18	0.20	0.16	0.16	0.20
	6	0.12	0.16	0.17	0.20	0.14	0.16	0.20
	7	0.12	0.12	0.16	0.18	0.12	0.16	0.18
	8	0.10	0.12	0.14	0.18	0.12	0.14	0.18
	9	0.05	0.10	0.12	0.16	0.10	0.12	0.16
	10		0.05	0.12	0.16	0.10	0.12	0.16
	11			0.10	0.14	0.05	0.10	0.14
	12			0.05	0.14		0.10	0.14
	13				0.12		0.05	0.12
	14				0.10			0.10
	15				0.10			0.10
	16				0.05			0.10
	17							0.05
	18							
	19							
	20							
	21							
	22							
	23							
	24							
	25							
	26							

Infeed Method

Infeed method	Features
 Straight infeed (radial infeed)	● Most simple and usual method Suitable for the relatively small pitch threads of easily-machinable material ● Chip contact length on right and left is longer, causing chattering, with increased load on the nose end. ● When the half included angle is not symmetrical to right and left, infeeding in the direction of 1/2 of the included angle will ensure equal machining with right and left cutting edges.
 Single edge infeed (flank infeed)	● Suitable for the large pitch thread or easy to tear materials. Effectively prevents chattering. ● Chips are discharged in one direction only. Satisfactory chip handling. ● Edge on the right (with zero infeed) tends to be worn heavily.
 Corrected single-edge infeed (flank infeed)	● Suitable for the large pitch thread or easy to tear materials. Effectively prevents chattering. ● Chips are discharged in one direction only. Satisfactory chip handling. ● Edge on the right performs a certain cutting. Wear of this edge can thus be suppressed.
 Alternating flank infeed	● Suitable for the large pitch thread or easy to tear material. Effectively prevents chattering. ● Chips are discharged alternately in right and left directions, resulting possibly in entanglement. ● Right and left edges are used alternately, ensuring uniform wear and extending tool life.

Troubleshooting in Threading

Problem	Possible causes	Countermeasures
Excessive wear	● Cutting speed too high	● Reduce the cutting speed.
	● Incorrect carbide grade	● Change to a more wear resistant grade.
	● Too many number of passes	● Reduce the number of passes.
	● Too small depth of cut in finishing	● Increase the cutting depth to at least 0.05 mm or more in final finishing.
	● Poor coolant supply	● Supply sufficient coolant to the cutting point.
Uneven wear in the left and right flank faces	● Incorrect relief angles for the thread's lead angle	● Select a proper shim.
	● Use of flank infeed.	● Change to alternative flank infeed.
	● Half angles of the thread are asymmetrical.	● Coincide the infeed angle of the tool with a half angle of the thread.
Chipping	● Too low cutting speed	● Increase the cutting speed.
	● Too small honing width	● Increase the honing width.
Edge breakage	● Recutting chips	● Supply sufficient coolant to the cutting point.
	● Caused from the work shape	● Chamfer the portion from which the tool enters the cut and add a groove to the portion from which the tool leaves the cut. The chamfer and groove should be larger than the thread height.
	● Unstable holding of the workpiece and the tool	● Reinforce the holding and select a tougher insert grade.
Insert cracking	● Inconsistent coolant supply	● Use constant flood coolant to the cutting point.
	● Too high cutting speed	● Reduce the cutting speed.
	● Incorrect grade selection	● Change to a tougher grade.
Distinct plastic deformation	● Too large cutting depth per pass	● Reduce the cutting depth per pass.
	● Insufficient coolant supply	● Use flood coolant to the cutting point.
	● Too high cutting speed	● Reduce the cutting speed.
	● Incorrect grade selection	● Use a harder insert grade.
Poor surface finish	● Improper relief angle	● Select a proper shim.
	● Too low cutting speed	● Increase the cutting speed.
	● Too rapid tool wear	● Change to a more wear resistant grade.
Inaccurate thread form	● Inaccurate tool setting	● Check and correct the cutting edge height and tool inclination by using a dial gauge.
	● Insufficient thread height	● Check and correct the cutting depth.
	● Too rapid tool wear	● Change to a more wear resistant grade.

TAC J-Series Turning Toolholder for Small Lathes

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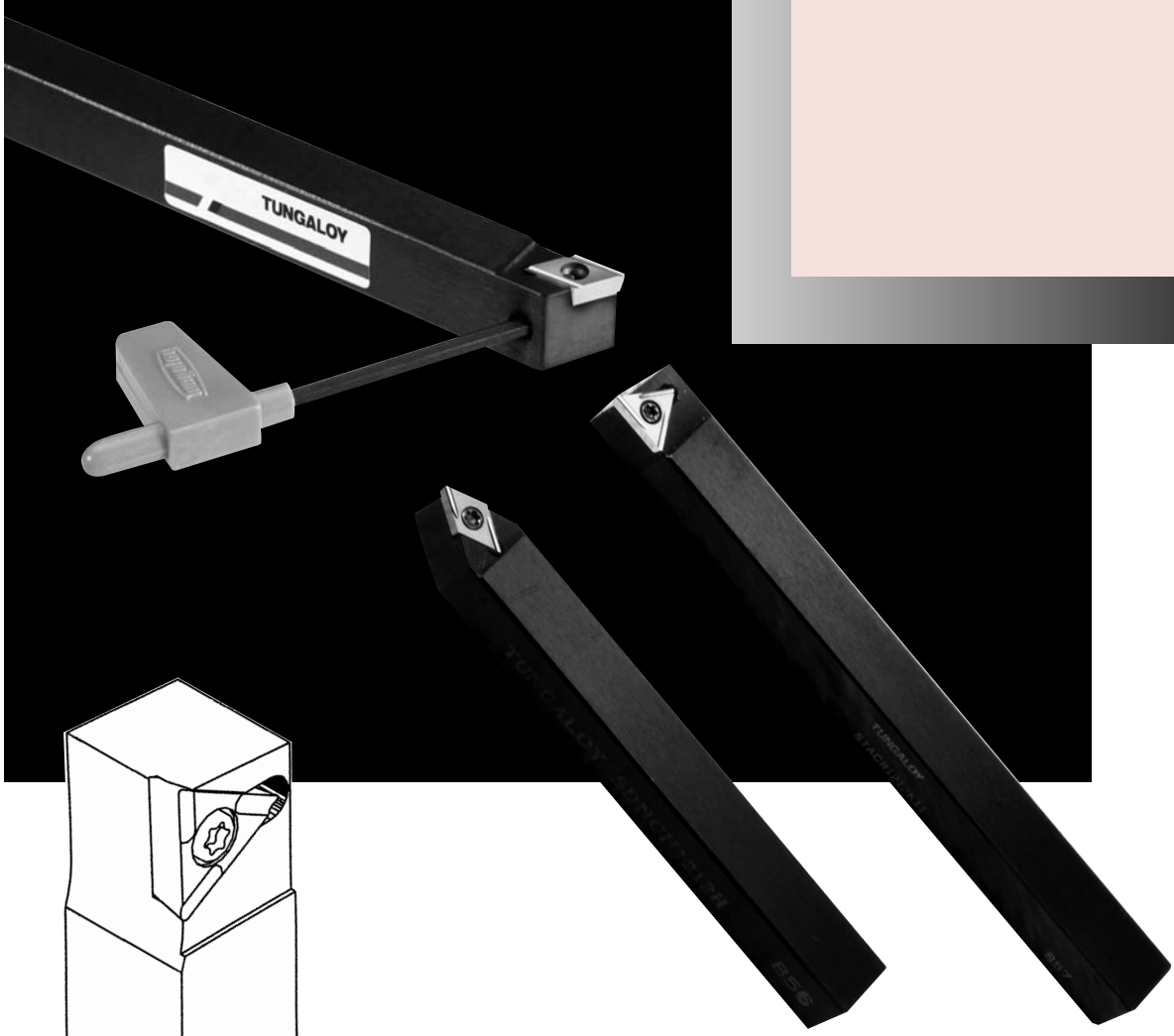
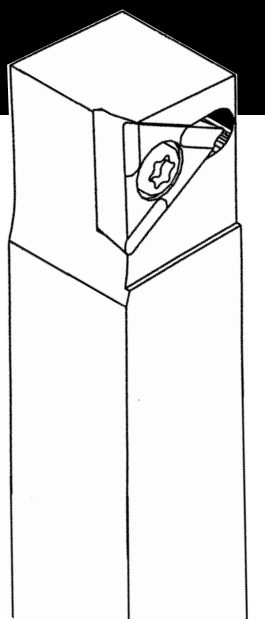
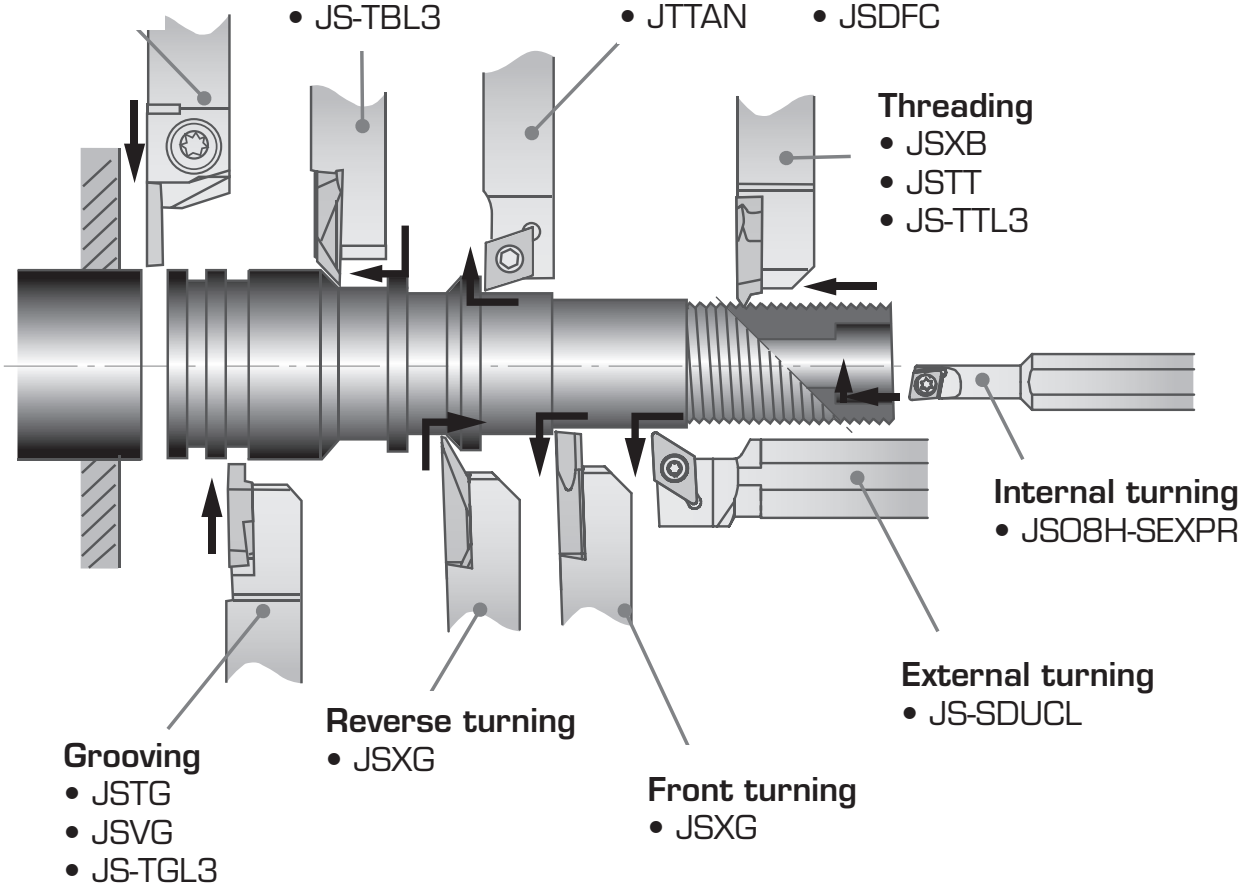




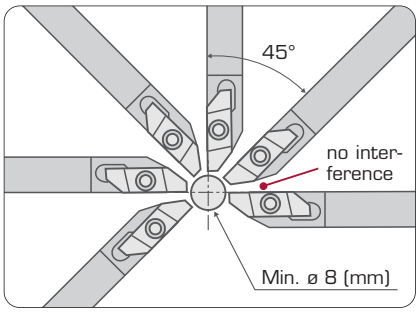
Applications

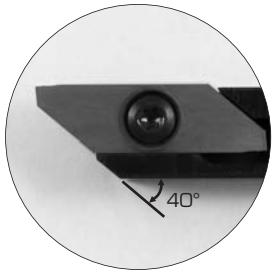


Grade (for J-series)

Grade		Features
T9025 (P)	CVD coated carbide	Universal grade for medium to roughing applications of steels in medium cutting speed range (P20 - P30)
NS530 (P M K)	Cermet	Wear resistant grade for general application with well balanced toughness
J740 (P M)	PVD coated fine grain carbide	Excellent sharp cutting edge Outstanding toughness and cutting edge stability for machining of steels and stainless steels
J530 (P M)	PVD coated Cermet	New „J-coat“ coating especially for small part machining Sharp cutting edge for superb surface quality Extremely wear-resistant and minimum edge build-up
TH10 (K N H S)	Uncoated carbide	Applicable for a wide range of work materials

-C type





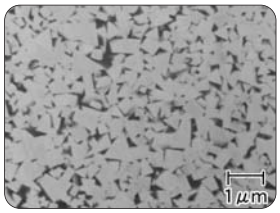
Specially suited for cam style small lathes

Multi-functional Applications:

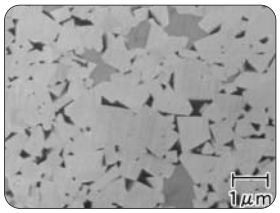
- External turning
- Facing
- Back turning
- Front and Reverse turning
- Grooving and Parting
- Threading

J740

PVD coated ultra fine grain substrate for extremly sharp cutting edges

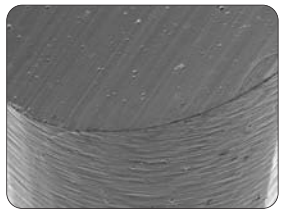


J740

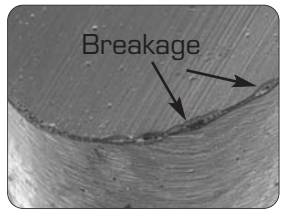


Conventional carbide

Design of cutting edge



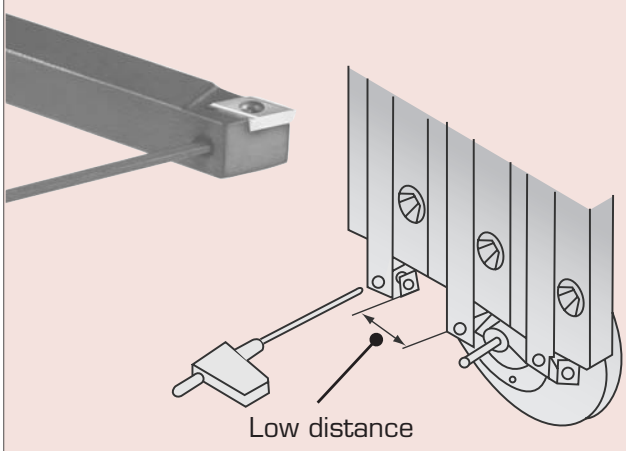
J740



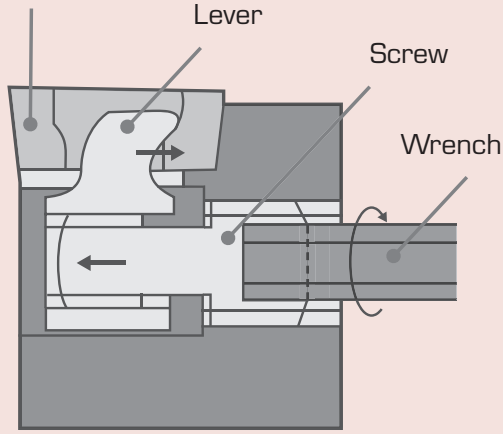
Conventional carbide

Toolholder with side-clamping

Innovative clamping system for stable clamping of the insert. Easy and quick changing of insert, as the toolholder does not have to be removed.



Insert

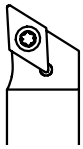
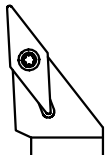
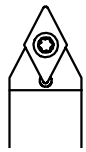
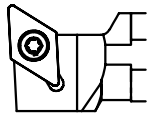


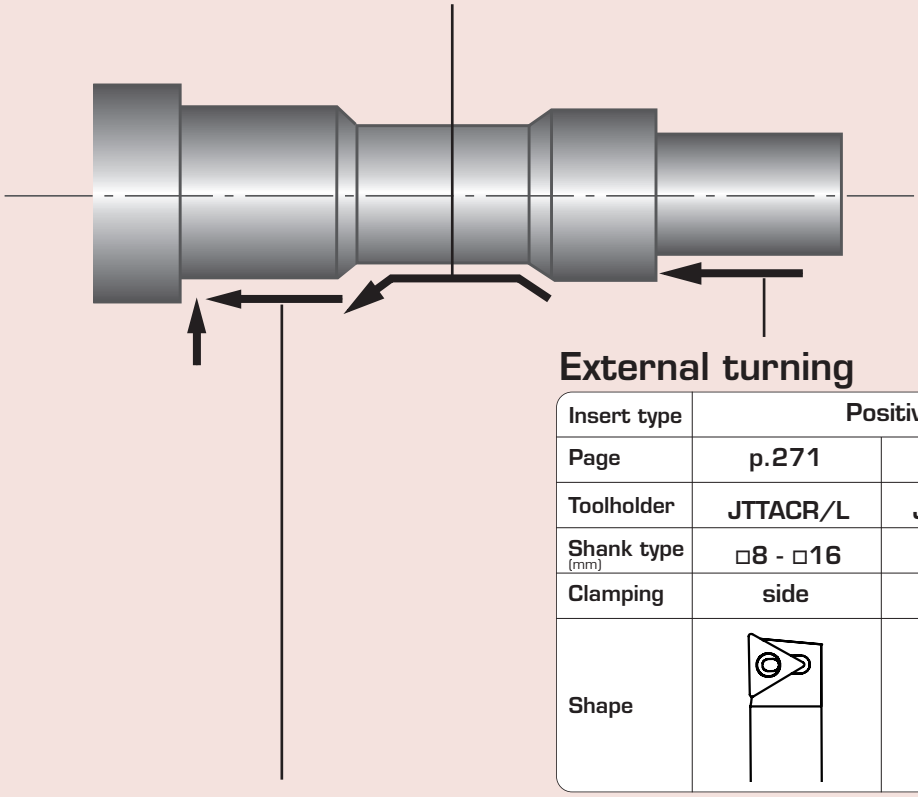
For negative inserts
- JTTAN type: p.274

For positive inserts
- JTDJ2C type: p.271
- JTCL2C type: p.271
- JTTAC type: p.271

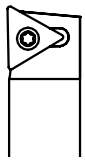
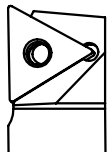
External turning

External turning & Profiling

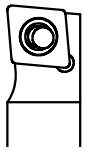
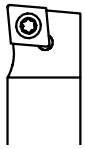
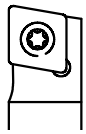
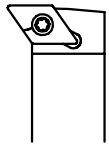
Insert type	Positive					
Page	p.271	p.272	p.273	p.273	p.273	p.283
Toolholder	JTDJ2CR/L	JSDJ2CR/L	JSVJBR/L	JSVJ2BR/L	JSDNCN	JS-SDUCL
Shank type (mm)	□8 - □16	□10 - □12	□10 - □16	□10 - □16	□8 - □16	ø19.05 - ø25.4
Clamping	side	screw-on	screw-on	screw-on	screw-on	screw-on
Shape						



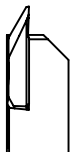
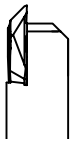
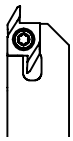
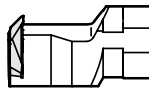
External turning

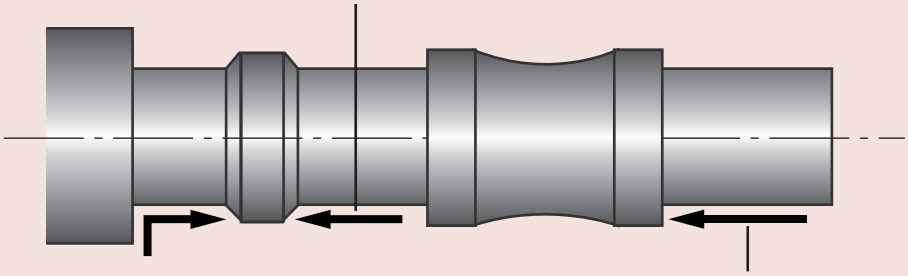
Insert type	Positive		Negative
Page	p.271	p.272	p.274
Toolholder	JTTACR/L	JSTACR/L	JTTANR/L
Shank type (mm)	□8 - □16	□8 - □16	□12 - □16
Clamping	side	screw-on	side
Shape			

External turning & Facing

Insert type	Positive			
Page	p.271	p.272	p.274	p.274
Toolholder	JTCL2CR/L	JSCL2CR/L	JSCACR/L	JSDFCR/L
Shank type (mm)	□8 - □16	□10 - □12	□8 - □12	□12 - □16
Clamping	side	screw-on	screw-on	screw-on
Shape				

Back turning

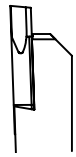
Page	p.277	p.278	p.278	p.283
Toolholder	JSXBR/L	JSTBR/L	JSEGR/L	JS-TBL3
Shank type (mm)	□10 - □25	□10 - □16	□10 - □16	ø19.05 - ø25.4
Max. ap (mm)	5.5	2.5	3.0	2.5
Shape				



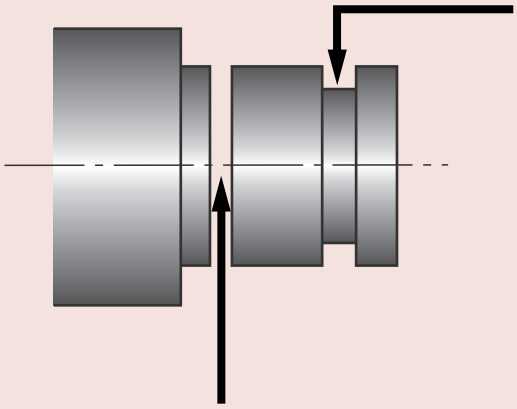
Reverse turning

Page	p.276
Toolholder	JSXGR/L
Shank type (mm)	□10 - □25
Max. ap (mm)	5.5
Shape	

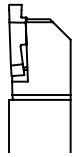
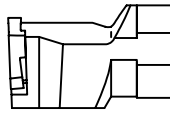
Front turning

Page	p.276
Toolholder	JSXGR/L
Shank type (mm)	□10 - □25
Max. ap (mm)	5.5
Shape	

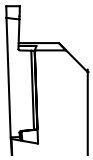
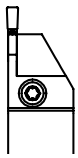
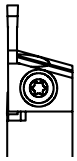
External grooving



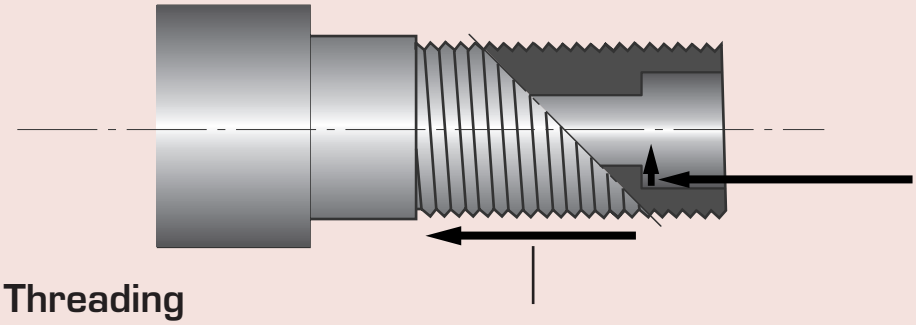
Grooving

Page	p.279	p.280	p.284
Toolholder	JSVGR/L	JSTGR/L	JS-TGL3
Shank type (mm)	□10 - □25	□10 - □16	ø19.05 - ø25.4
Grooving width (mm)	0.33 - 2.0	0.33 - 3.0	0.33 - 3.0
Max. grooving depth (mm)	0.7 - 5.5	0.7 - 2.6	0.7 - 2.6
Shape			

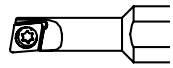
Parting

Page	p.276	p.280	p.281	p.281
Toolholder	JSXGR/L	JCGSSR/L	JCCWSR/L	JCGWSR/L
Shank type (mm)	□10 - □25	□10 - □16	□10 - □25	□10 - □16
Grooving width (mm)	0.7 - 2.0	2.0	2.0	2.0
Max. parting-ø (mm)	ø9 - 12	ø20 - 32	ø20	ø20
Shape				

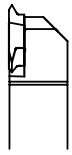
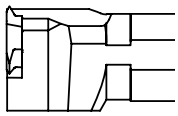
Threading and internal turning



Internal turning

Page	p.282
Toolholder	JS08H-SEXPR
Shank type (mm)	ø8.0
Min. bore-ø (mm)	ø5.5 - 7.0
Shape	

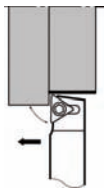
Threading

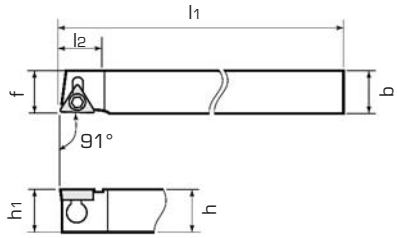
Page	p.282	p.277	p.284
Toolholder	JSTTR/L	JSXBR/L	JS-TTL3
Shank type (mm)	□10 - □16	□10 - □25	ø19.05 - ø25.4
Pitch (mm)	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
Shape			

Toolholder with side-clamping (positive)

● Standard stock in Europe ❍ Standard stock in Japan

External turning
JTTAC R/L





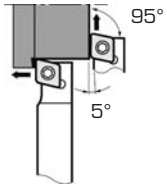
Right hand (R) shown

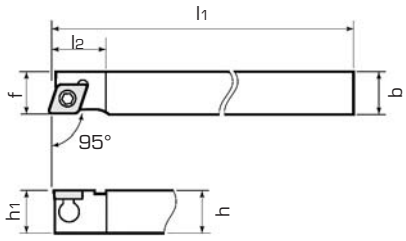
Appli-cation	Precision finishing	Finishing to medium cutting	Medium cutting	Finishing to medium cutting
Type	01	PS	PM	SS
Shape	 (11)	 (11)	 (11)	 (11)

Appli-cation	Finishing	Aluminium		
Type	J**	AL		
Shape	 (08, 11)	 (11)		

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Lever	Screw	Wrench
JTTACR/L0810K08	●	●	TC**0802**	8	10	125	10	8	10	JCP-1	JDS-3525	P-2F
JTTACR/L1010K08	●	●		10	10	125	10	10	10			
JTTACR/L1212M11	●	●	TC**1102**	12	12	150	12	12	12	JCP-2		
JTTACR/L1616M11	●	●		16	16	150	12	16	16			

External turning & Facing
JTCL2C R/L



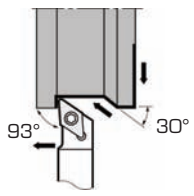


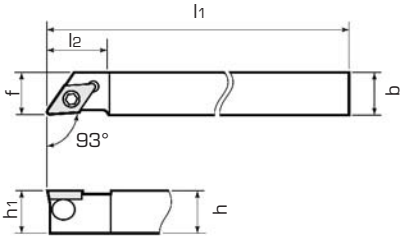
Right hand (R) shown

Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Lever	Screw	Wrench
JTCL2CR/L0810K06	●	●	CC**0602**	8	10	125	12	8	10	JCP-2	JDS-3525	P-2F
JTCL2CR/L1010K06	●	●		10	10	125	12	10	10			
JTCL2CR/L1212M09	●	●	CC**09T3**	12	12	150	16	12	12	JCP-3	JDS-5040	P-2.5F
JTCL2CR/L1616M09	●	●		16	16	150	16	16	16			

External turning & Profiling
JTDJ2C R/L





Right hand (R) shown

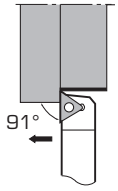
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

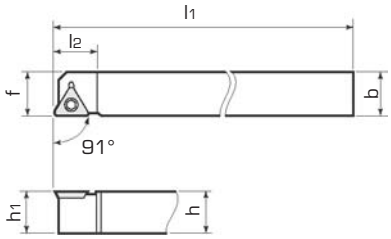
Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Lever	Screw	Wrench
JTDJ2CR/L0810K07	●	●	DC**0702**	8	10	125	14	8	10	JCP-2	JDS-3525	P-2F
JTDJ2CR/L1010K07	●	●		10	10	125	14	10	10			
JTDJ2CR/L1212M11	●	●	DC**11T3**	12	12	150	18	12	12	JCP-3	JDS-5040	P-2.5F
JTDJ2CR/L1616M11	●	●		16	16	150	18	16	16			

Toolholder with screw-on clamping (positive)

● Standard stock in Europe ❍ Standard stock in Japan

External turning
JSTAC R/L



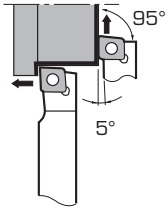


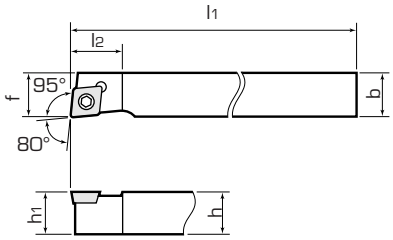
Right hand (R) shown

Appli-cation	Precision finishing	Finishing to medium cutting	Medium cutting	Finishing to medium cutting
Type	01	PS	PM	SS
Shape	 (11)	 (11)	 (11)	 (11)
Appli-cation	Finishing	Aluminium		
Type	J**	AL		
Shape	 (08, 11)	 (11)		

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSTACR/L0808K08	●	●	TC**0802**	8	8	125	10	8	8	CSTB-2L	T-6F	(T-6L)
JSTACR/L1010K08	●	●		10	10	125	10	10	10			
JSTACR/L1212K11	●	●	TC**1102**	12	12	125	12	12	12	CSTB-2.5	T-8F	(T-8L)
JSTACR/L1616H11	●	●		16	16	100	12	16	16			

External turning & Facing
JSCL2C R/L



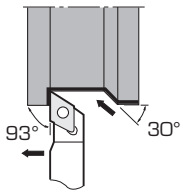


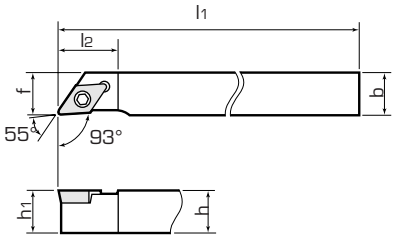
Right hand (R) shown

Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (06)	 (06)	 (06)	 (06)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (06)	 (06)	 (06)	 (06)	 (06)

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSCL2CR/L1010K06	●	●	CC**0602**	10	10	125	12	10	10	CSTB-2.5	T-8F	(T-8L)
JSCL2CR/L1212K06	●	●		12	12	125	12	12	12			

External turning & Profiling
JSDJ2C R/L





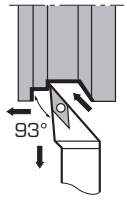
Right hand (R) shown

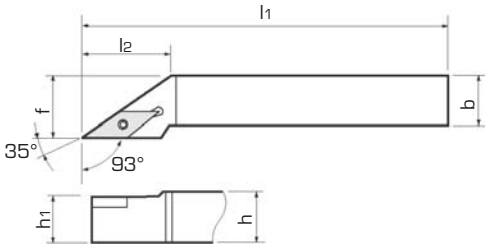
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (07)	 (07)	 (07)	 (07)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (07)	 (07)	 (07)	 (07)	 (07)

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSDJ2CR/L1010K07	●	●	DC**0702**	10	10	125	14	10	10	CSTB-2.5	T-8F	(T-8L)
JSDJ2CR/L1212K07	●	●		12	12	125	14	12	12			

● Standard stock in Europe ❍ Standard stock in Japan

External turning & Profiling
JSVJB R/L



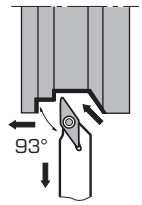


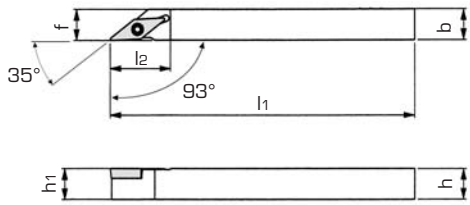
Right hand (R) shown

Appli-cation	Finishing to medium cutting	Finishing	Finishing	
Type	PS	J**	PF	
Shape	 (11)	 (11)	 (11)	

Cat. No.	Stock		Inserts	Dimensions (mm)						Clamping screw	Wrench	
	R	L		h	b	l1	l2	h1	f			 (optional)
JSVJBR/L1010H11	●	●	VB*T1103**	10	10	100	20	10	12	CSTB-2.5	T-8F	(T-8L)
JSVJBR/L1212H11	●	●		12	12	100	20	12	16			
JSVJBR/L1616H11	●	●		16	16	100	20	16	20			

External turning & Profiling
JSVJ2B R/L



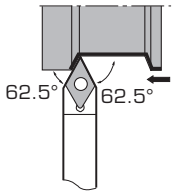


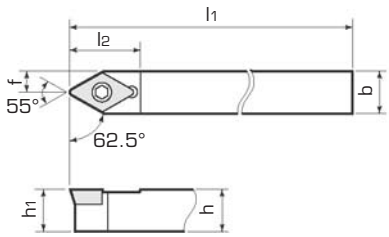
Right hand (R) shown

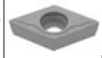
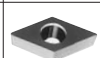
Appli-cation	Finishing to medium cutting	Finishing	Finishing	
Type	PS	J**	PF	
Shape	 (11)	 (11)	 (11)	

Cat. No.	Stock		Inserts	Dimensions (mm)						Clamping screw	Wrench	
	R	L		h	b	l1	l2	h1	f			 (optional)
JSVJ2BR/L1010H11	●	●	VB*T1103**	10	10	100	20	10	10	CSTB-2.5	T-8F	(T-8L)
JSVJ2BR/L1212H11	●	●		12	12	100	22	12	12			
JSVJ2BR/L1616H11	●	●		16	16	100	22	16	16			

External turning & Profiling
JSDNCN



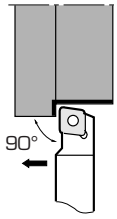


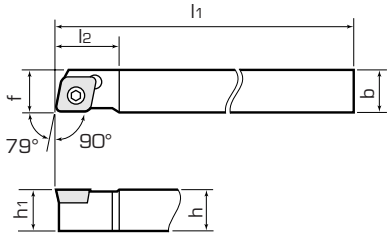
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

Cat. No.	Stock	Inserts	Dimensions (mm)						Clamping screw	Wrench	
			h	b	l1	l2	h1	f			 (optional)
JSDNCN1010K07	●	DC**0702**	10	10	125	14	10	5	CSTB-2.5	T-8F	(T-8L)
JSDNCN1212K07	●		12	12	125	14	12	6			
JSDNCN1616H11	●	DC**11T3**	16	16	100	21	16	8	CSTB-4SD		

● Standard stock in Europe ❍ Standard stock in Japan

External turning & Facing
JSCAC R/L



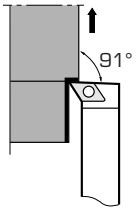


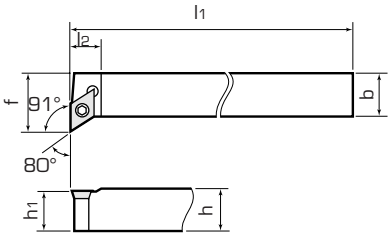
Right hand (R) shown

Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)	 (06, 09)

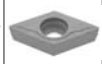
Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSCACR/L0808H06	●	●	CC**0602**	8	8	100	12	8	8	CSTB-2.5	T-8F	(T-8L)
JSCACR/L1010H06	●	●		10	10	100	12	10	10			
JSCACR/L1212H09	●	●	CC**09T3**	12	12	100	16	12	12	CSTB-4SD		

External turning & Facing
JSDFC R/L





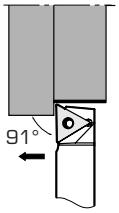
Right hand (R) shown

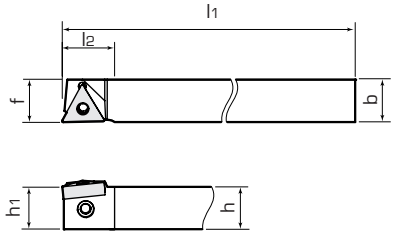
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	
Appli-cation	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSDFCR/L1212H07	●	●	DC**0702**	12	12	100	8	12	16	CSTB-2.5	T-8F	(T-8L)
JSDFCR/L1616H11	●	●	DC**11T3**	16	16	100	10.5	16	22	CSTB-4SD		

Toolholder with side-clamping (negative)

External turning
JTTAN R/L





Right hand (R) shown

Appli-cation	Precision finishing	Precision finishing	Medium cutting	Finishing
Type	01	C	P	TS
Shape	 (16)	 (16)	 (16)	 (16)
Appli-cation	Finishing			
Type	TSF			
Shape	 (16)			

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Lever	Screw	Wrench
JTTANR/L1216K16	●	●	TN**1604**	12	16	125	19.8	12	16	JCP-3N	JDS-5040	P-2.5F
JTTANR/L1616K16	●	●		16	16	125	19.8	16	16			

Cutting conditions (for J-series)

Work material	Application	Chipbreaker	Grade	Cutting depth ap (mm)	Feed f (mm/rev)	Cutting speed Vc (m/min)
P Steel	Precision finishing	01	**J740**	0.05 - 0.50	0.03 - 0.15	10 - 100
			J530			100 - 300
	Finishing	J	**NS530**	0.10 - 5.00	0.01 - 0.30	80 - 300
			J740			10 - 100
M Stainless steel	Precision finishing	01	**J740**	0.05 - 0.50	0.03 - 0.15	10 - 100
			J530			100 - 200
	Finishing	J	**NS530**	0.10 - 5.00	0.01 - 0.10	100 - 200
			J740			10 - 100
K Cast iron	Finishing	J	**TH10**			20 - 100
N Non-ferrous metals	Finishing	J	**TH10**			100 - 1000
S Diffcult-to-cut materials	Finishing	J	**TH10**			10 - 150
H Hardened steel	Finishing	J	**TH10**			10 - 60

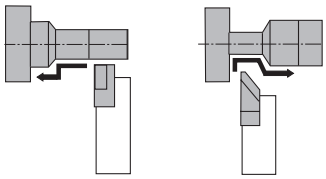
Cutting conditions (for basic grades and chipbreaker)

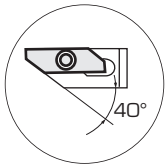
Work material	Grade					Cutting speed Vc (m/min)
	CVD	PVD	Cermet	Cerm. coated	Uncoated	
P Steel	**T9005**					100 - 400
	T9015					80 - 350
	T9025					80 - 300
	T9035					50 - 200
		GH730				50 - 150
				GT730		80 - 300
			NS530	**GT530**		80 - 300
M Stainless steel	**T6020**					100 - 200
	T6030					50 - 150
		GH730				50 - 120
				GT730		100 - 200
			NS530	**GT530**		100 - 200
K Cast iron		**GH110**				30 - 150
N Aluminium + Non-ferrous metals					**KS05F**	200 - 1500

Chipbreaker	Cutting depth ap (mm)	Feed f (mm/rev)
PF	0.3 - 1.5	0.05 - 0.25
PS	0.3 - 2.0	0.08 - 0.30
PM	0.5 - 3.0	0.15 - 0.30
C	0.5 - 3.0	0.10 - 0.30
TSF	0.3 - 1.5	0.08 - 0.40
TS	0.3 - 1.5	0.08 - 0.20
P	1.0 - 4.0	0.20 - 0.50
AL	0.5 - 4.0	0.10 - 0.50

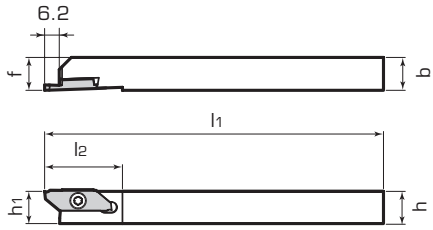
● Standard stock in Europe ❍ Standard stock in Japan

Front and Reverse turning
JSXG R/L





-C-type

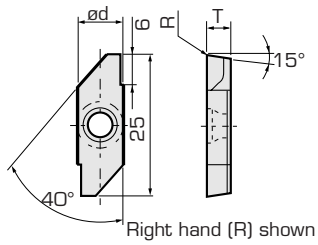


Right hand (R) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSXGR/L1010K8-C	●	●	JXFR/L8*** JXRR/L8*** JXGR/L8*** for Parting	10	10	125	29	10	9.9	CSTB-4SD	T-8F	(T-8L)
JSXGR/L1212K8-C	●	●		12	12	125	29	12	11.9			
JSXGR/L1616K8	●	●		16	16	125	29	16	15.9			
JSXGR/L2020K8	❍	❍		20	20	125	29	20	19.9			
JSXGR/L2525K8	❍	❍		25	25	125	29	25	24.9			

Note: C-type toolholders are marked

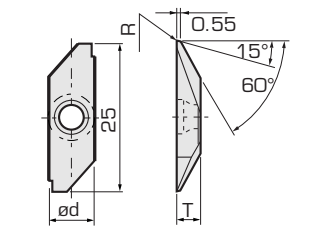
R: Reverse turning
F: Front turning
C: Parting (deep-grooving)



Right hand (R) shown

JXF-type inserts for front turning (sharp cutting edge)

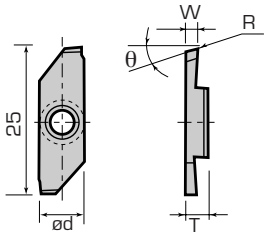
Cat. No.	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JXFR/L8000F	8	3.97	0.03	5.5	●		❍		❍	
JXFR/L8010F	8	3.97	0.10	5.5	●		❍		❍	



Right hand (R) shown

JXR-type inserts for reverse turning (sharp cutting edge)

Cat. No.	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JXRR/L8000F	8	3.97	0.03	5.5	●		❍		❍	
JXRR/L8010F	8	3.97	0.10	5.5	●		❍		❍	



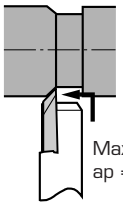
Right hand (R) shown

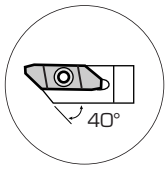
JXG-type inserts for parting (sharp cutting edge)

Cat. No.	Dimensions (mm) ød	T	W±0.025	θ	Max. grooving depth ap	R	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JXGR/L8070FA	8	3.97	0.7	15°	4.5	0	●	●	●	●	❍	❍
JXGR/L8100FA			1.0		6.0		●	●	●	●	❍	❍
JXGR/L8100FA45					4.5		●				❍	
JXGR/L8120FA			1.2									
JXGR/L8150FA			1.5		6.0		●	●	●	●	❍	❍
JXGR/L8150FA50					5.0		●				❍	
JXGR/L8180FA			1.8		6.0		●				❍	
JXGR/L8200FA			2.0				●	●	●	●	❍	❍

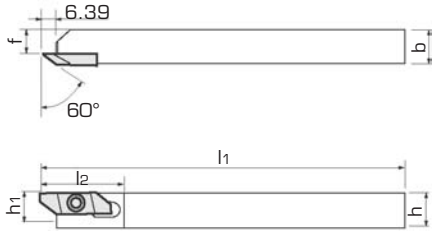
● Standard stock in Europe ❍ Standard stock in Japan

Back turning
JSXB R/L

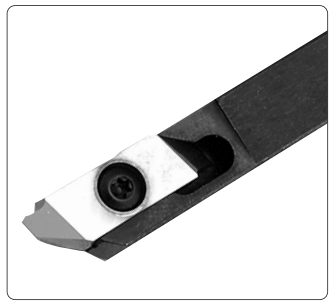




-C-type

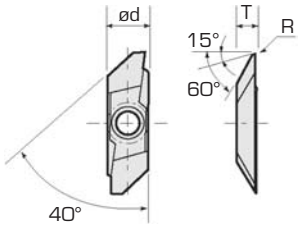


Right hand (R) shown



Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSXBR/L1010K8-C	●	●	JXBR/L8*** JXT*R/L for threading	10	10	125	29	10	5.7	CSTB-4SD	T-8F	(T-8L)
JSXBR/L1212K8-C	●	●		12	12	125	29	12	7.7			
JSXBR/L1616K8	●	●		16	16	125	29	16	11.7			
JSXBR/L2020K8	❍	❍		20	20	125	29	20	15.7			
JSXBR/L2525K8	❍	❍		25	25	125	29	25	20.7			

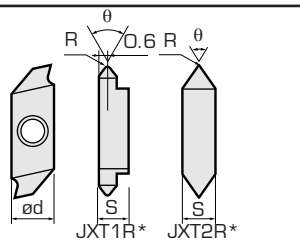
Note: C-type toolholder are marked B:Back turning T: Threading



Right hand (R) shown

JXB-type inserts for back turning

Cat. No.	Honing	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JXBR/L8000F	without	8	3.97	0.03	5.5	●	●	❍		❍	❍
JXBR/L8005F				0.05		●	●			❍	❍
JXBR/L8010F				0.10		●	●	❍		❍	❍
JXBR/L8015F				0.15		●	●			❍	❍
JXBR/L8005	with			0.05		❍	❍				
JXBR/L8010				0.10		❍	❍				
JXBR/L8015				0.15		❍	❍				



Right hand (R) shown

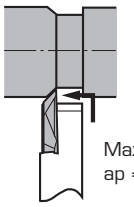
JXT-type inserts for threading (sharp cutting edge)

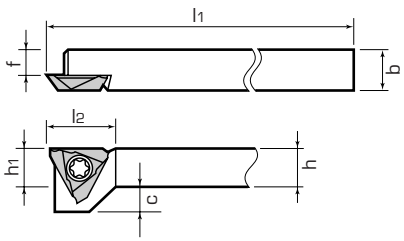
Cat. No.	Dimensions (mm) ød	S	R	θ	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JXT1R/L6000F	8	3.97	0.03	60°	●		❍		●	
JXT2R/L6000F	8	3.97	0.03	60°	●		❍		●	

Notes: for pitches of 0.5 to 1.0 mm
right toolholder with right insert,
left toolholder with left insert

● Standard stock in Europe ❍ Standard stock in Japan

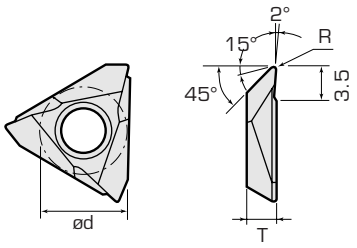
Back turning
JSTB R/L





Right hand (R) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	c	Clamping screw	Wrench	Wrench (optional)
JSTBR/L1010K3	●	●	JTBR/L3***	10	10	125	15	10	6	5	CSTB-4SD	T-8F	(T-8L)
JSTBR/L1212K3	●	●		12	12	125	15	12	8	3			
JSTBR/L1616K3	●	●		16	16	125	15	16	12	-			

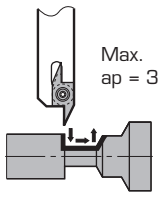


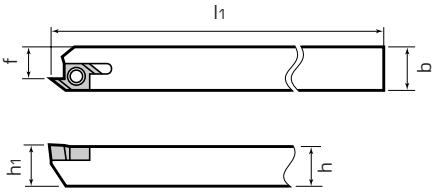
Right hand (R) shown

JTB-type inserts for back turning

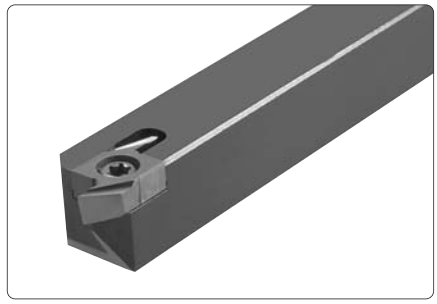
Cat. No.	Honing	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTBR/L3000F	without	9.438	3.18	0.03	2.5	●	●	●	●	❍	❍
JTBR/L3005F				0.05		●	●	●	●	❍	❍
JTBR/L3010F				0.10		●	●	●	●	❍	❍
JTBR/L3015F				0.15		❍					
JTBR/L3005	with			0.05		❍	❍				
JTBR/L3010				0.10		❍	❍				
JTBR/L3015				0.15							

Back turning
JSEG R/L

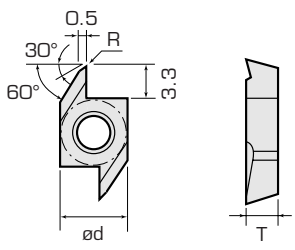




Right hand (R) shown



Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSEGR/L1010K10	●	●	J10ER/L***B*	10	10	125	-	10	7.5	CSTB-2.5	T-8F	(T-8L)
JSEGR/L1212K10	●	●		12	12	125	-	12	9.5			
JSEGR/L1616K10	●	●		16	16	125	-	16	13.5			



Right hand (R) shown

J10E-type inserts for back turning

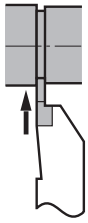
Cat. No.	Honing	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
J10ER/L005BF	without	6.35	3.18	0.05	3	●	●	●	●	❍	❍
J10ER/L010BF				0.10		●	●	●	●	❍	❍
J10ER/L015BF				0.15							
J10ER/L005B	with			0.05		❍	❍				
J10ER/L010B				0.10		❍	❍				
J10ER/L015B				0.15							

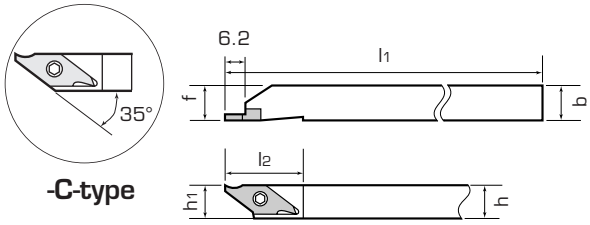
Parting: JSXG; see p. 276

● Standard stock in Europe ❍ Standard stock in Japan

Grooving

JSVG R/L





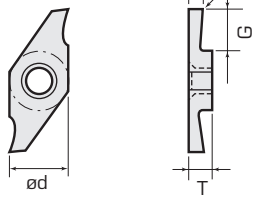
-C-type

Right hand (R) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Clamping screw	Wrench	Wrench (optional)
JSVGR/L1010K-C	●	●	JVGR/L***	10	10	125	23	10	10	CSTB-3S	T-9F	(T-9L)
JSVGR/L1212K-C	●	●		12	12	125	23	12	12			
JSVGR/L1616K	●	●		16	16	125	23	16	16			

Note: C-type toolholder are marked G: Grooving

JVG-type inserts for grooving (sharp cutting edge)



Right hand (R) shown

Cat. No.	Dimensions (mm) ød	T	W±0.025	G	Max. grooving depth ap	R	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JVGR/L033F	7.94	3.18	0.33	0.8	0.7	0	●		●		●	
JVGR/L050F			0.50	1.2	1.1		●		●		●	
JVGR/L075F			0.75	2.0	1.9		●		●		●	
JVGR/L095F			0.95				●		●		●	
JVGR/L100F			1.00	6.0	5.5		●		●	●	●	●
JVGR/L125F			1.25	5.5	5.0		●		●		●	
JVGR/L150F			1.50	6.0	5.5		●		●	●	●	●
JVGR/L200F			2.00				●		●		●	

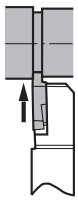
Cutting conditions for grooving (JSXG: p. 276 / JSVG: p. 279)

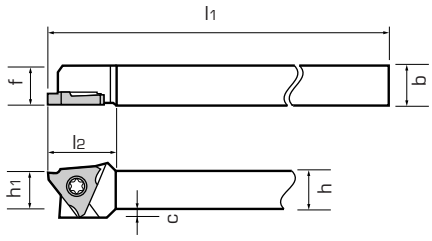
Work material	Grade	Feed f (mm/rev)	Cutting speed Vc (m/min)
(P) Steel	J740	0.01 - 0.05 - 0.1	10 - 50 - 100
(M) Stainless steel	NS530	0.01 - 0.05 - 0.1	50 - 80 - 150
	J530		
(N) Aluminium, Brass etc.	TH10	0.01 - 0.05 - 0.1	10 - 80 - 200
(S) Diffcult-to-cut materials Titanium alloys etc.	TH10	0.01 - 0.05 - 0.1	10 - 20 - 30

TAC Turning Toolholder for Small Lathes

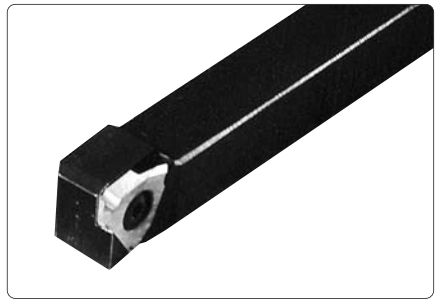
● Standard stock in Europe ❍ Standard stock in Japan

Grooving
JSTG R/L

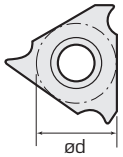


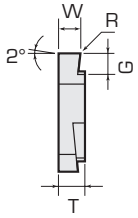


Right hand (R) shown



Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	c	Clamping screw	Wrench	Wrench (optional)
JSTGR/L1010K3	●	●	JTGR/L3***	10	10	125	18.5	10	10	2	CSTB-4SD	T-8F	(T-8L)
JSTGR/L1212K3	●	●		12	12	125	18.5	12	12	-			
JSTGR/L1616K3	●	●		16	16	125	18.5	16	16	-			



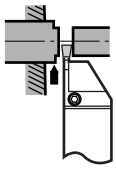


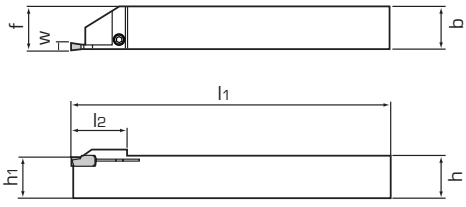
Right hand (R) shown

JTG-type inserts for grooving (sharp cutting edge)

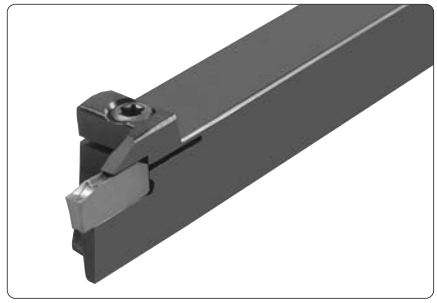
Cat. No.	Dimensions (mm) ød	T	W±0.025	G	Max. grooving depth ap	R	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTGR/L3033F	9.525	3.18	0.33	0.8	0.7	0.03	●	●	●	●	❍	❍
JTGR/L3050F			0.50	1.2	1.1		●	●	●	●	❍	❍
JTGR/L3075F			0.75	2.0	1.9		●	●	●	●	❍	❍
JTGR/L3095F			0.95				●	●	●	●	❍	❍
JTGR/L3100F			1.00	2.2	2.1	0.05	●	●	●	●	❍	❍
JTGR/L3125F			1.25				●	●	●	●	❍	❍
JTGR/L3145F			1.45				●	●	●	●	❍	❍
JTGR/L3150F			1.50				●	●	●	●	❍	❍
JTGR/L3175F			1.75				●	●	●	●	❍	❍
JTGR/L3200F			2.00	2.7	2.6		●	●	●	●	❍	❍
JTGR/L3250F			2.50				●	●	●	●	❍	❍

Parting & Grooving
JCGSS R/L

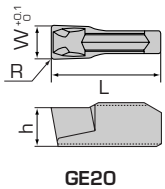




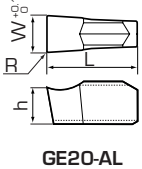
Right hand (R) shown



Groov-ing width w (mm)	Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Max. Parting øD	Clamping screw	Wrench
2	JCGSSR/L1010-20	●	●	GE20	10	10	125	15	10	10.2	ø20	CSTB-3	T-9F
	JCGSSR/L1212-20	●	●		12	12	125	19	12	12.2	ø25		
	JCGSSR/L1616-20	●	●		16	16	125	22.5	16	16.2	ø32		



GE20



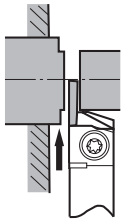
GE20-AL

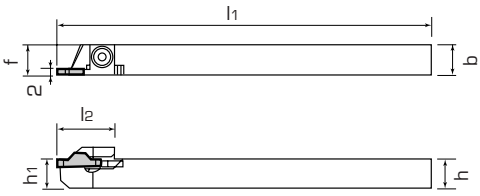
GE-type inserts for parting and grooving

Cat. No.	Dimensions (mm) W	L	h	R	Grade Coated T9025	Coated GH730	Cermet NS530	Carbide KS05F
GE20	2	10	3.5	0.2	●	●	●	
GE20-AL	2	10	3.5	0.2				❍

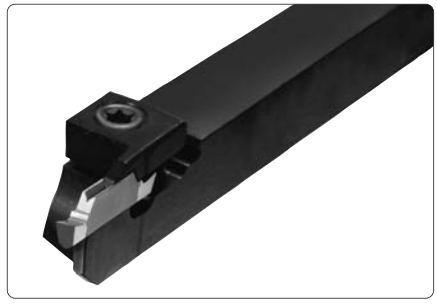
● Standard stock in Europe ❍ Standard stock in Japan

Parting
JCCWS R/L

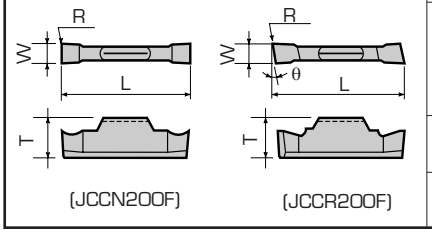




Right hand (R) shown



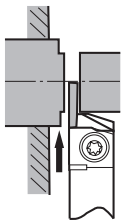
Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Max. parting-ø	Clamping screw	Wrench	Wrench (optional)
JCCWSR/L1010K2	●	●	JCC*200F	10	10	125	19	10	10	ø20	CSTB-4S	T-15F	(T-15L)
JCCWSR/L1212K2	●	●		12	12	125	19	12	12				
JCCWSR/L1616K2	●	●		16	16	125	19	16	16				
JCCWSR/L2020K2	❍	❍		20	20	125	19	20	20				
JCCWSR/L2525K2	❍	❍		25	25	125	19	25	25				

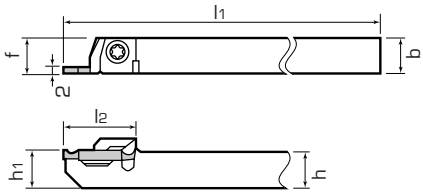


JCC-type inserts for parting (sharp cutting edge)

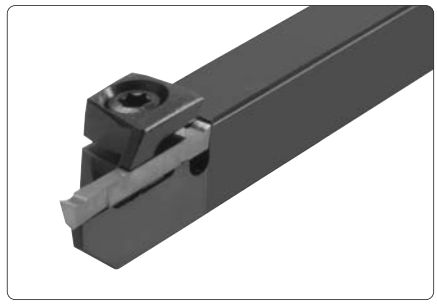
Cat. No.	Dimensions (mm) T	W	L	R	θ	Grade Coated J740 R	J740 L	J530 R	J530 L	Carbide TH10 R	TH10 L
JCCN200F	4.8	2	15	0	-	●		●		●	
JCCR/L200F					15°	●	●	●	●	●	●

Parting
JCGWS R/L

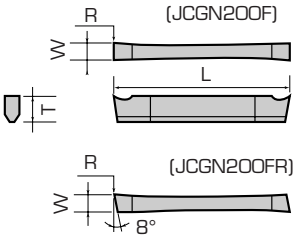




Right hand (R) shown



Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	Max. parting-ø	Clamping screw	Wrench	Wrench (optional)
JCGWSR/L1010K2			JCGN200*	10	10	125	20	10	10	ø20	CSTB-4S	T-15F	(T-15L)
JCGWSR/L1212K2				12	12	125	20	12	12				
JCGWSR/L1616K2				16	16	125	20	16	16				



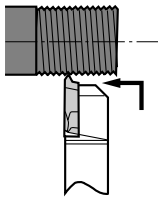
JCG-type inserts for parting (sharp cutting edge)

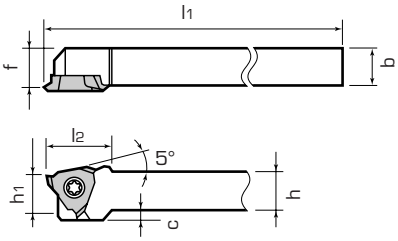
Cat. No.	Dimensions (mm) T	W	L	R	Grade Coated J740 R	J740 L	J530 R	J530 L	Carbide TH10 R	TH10 L
JCGN200F	3	2	20	0.05	●		●		●	
JCGN200FR/L					●	●	●	●	●	●

TAC Turning Toolholder for Small Lathes

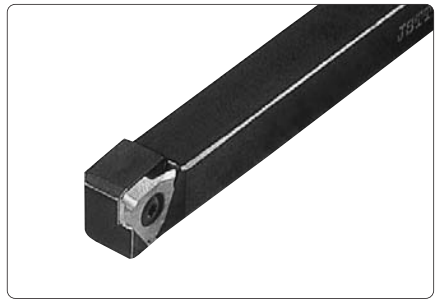
● Standard stock in Europe ❍ Standard stock in Japan

Threading
JSTT R/L

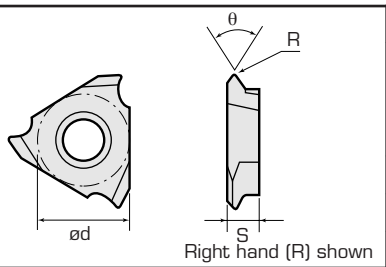




Right hand (R) shown



Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) h	b	l1	l2	h1	f	c	Clamping screw	Wrench	Wrench (optional)
JSTTR/L1010K3	●		JTTR/L3****	10	10	125	16.5	10	9.5	2	CSTB-4SD	T-8F	(T-8L)
JSTTR/L1212K3	●			12	12	125	16.5	12	11.5	-			
JSTTR/L1616K3	●			16	16	125	16.5	16	15.5	-			



Right hand (R) shown

JTT-type inserts for threading (sharp cutting edge)

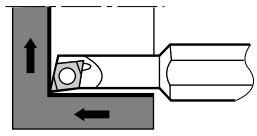
Cat. No.	Dimensions (mm) ød	S	R	θ	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTTR/L3005F	9.525	3.18	0.05	60°	●		●		●	
JTTR/L3010F			0.10		●		●		●	
JTTR/L3005F-55			0.05	55°	❍					

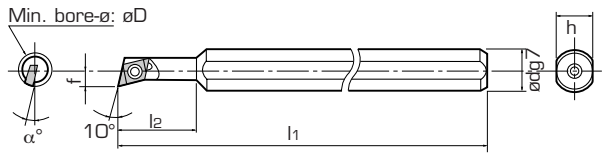
Note: for pitches of 0.5 to 1.0 mm

Threading: JSXB; see p. 277

Boring toolholder with screw-on clamping (positive)

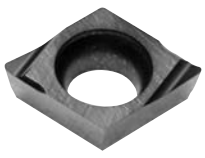
Internal turning & Facing
JS08H-SEXP R





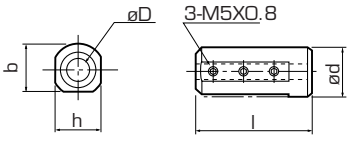
Right hand (R) shown

Cat. No.	Stock	Inserts	Min. bore-øD	Std. nose rc	Dimensions (mm) ød	f	l1	l2	h	α°	Clamping screw	Wrench
JS08H-SEXPR045	●	EP**0401**	5.5	0.4	8	2.75	100	16	7	12	CSTB-2	T-6F
JS08H-SEXPR047	●		7.0	0.4	8	3.6	100	20	7	12		



Inserts for internal turning and facing

Cat. No.	Dimensions (mm) Inner circle ø	Thickness	Hole-ø	Corner radius	Grade Coated carbide J740
EPGT040100L-J08	3.97	1.59	2.3	0.03	●
EPGT040102L-J08				0.2	●
EPGT040104L-J08				0.4	●

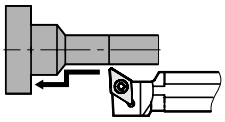


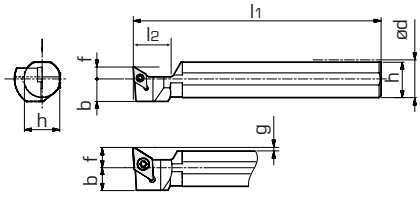
Sleeves

Cat. No.	Dimensions (mm) Shank-øD	ød	l	b	h	Stock
BLM19-08	8	19.05	100	18	18	●
BLM20-08		20	100	19	18	●
BLM22-08		22	125	21	21	●
BLM254-08		25.4	125	24	24	●

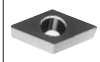
● Standard stock in Europe ❍ Standard stock in Japan

External turning & Profiling
JS-SDUCL



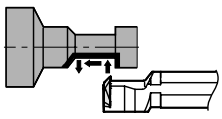


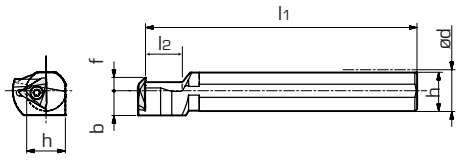
Left hand (L) shown

Application	Precision finishing	Finishing	Finishing to medium cutting	Medium cutting	
Type	01	PF	PS	PM	
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	
Application	Precision finishing	Finishing	Finishing to medium cutting	Finishing to medium cutting	Aluminium
Type	PCBN/PCD	J**	W**	-	AL
Shape	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

Cat. No.	Stock R	Stock L	Inserts	Min. bore-øD	Dimensions (mm) f	l1	l2	h	b	g	Clamping screw	Wrench
JS19K-SDUCL07		●	DC**0702**	19.05	6	125	20	18	11.5	-	CSTB-2.5	T-8F
JS20K-SDUCL07		●		20.00	6	125	20	19	11.5	-		
JS22K-SDUCL07		●		22.00	6	125	20	21	11.5	-		
JS19K-SDUCL11		●	DC**11T3**	19.05	10	125	20	18	11.5	1.525	CSTB-4SD	
JS20K-SDUCL11		●		20.00	10	125	20	19	11.5	1.000		
JS22K-SDUCL11		●		22.00	11	125	20	21	11.5	1.000		
JS25K-SDUCL11		●		25.40	12	125	20	24	12.7	0.700		

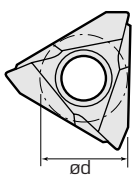
Back turning
JS-TBL3

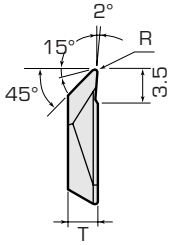




Left hand (L) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	l1	l2	h	b	Clamping screw	Wrench
JS19K-TBL3		●	JTBR30**	19.05	6	125	17	18	11.5	CSTB-4S	T-15F
JS20K-TBL3		●		20.00	6	125	17	19	11.5		
JS22K-TBL3		●		22.00	6	125	17	21	11.5		
JS25K-TBL3		●		25.40	10	125	17	24	12.7		





Right hand (R) shown

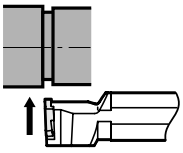
Note: right toolholder with left insert, left toolholder with right insert

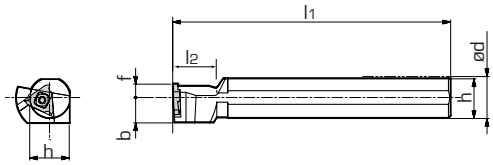
JTB-type inserts for back turning

Cat. No.	Honing	Dimensions (mm) ød	T	R	Max. cutting depth ap	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTBR/L3000F	without	9.438	3.18	0.03	2.5	●	●	●	●	❍	❍
JTBR/L3005F				0.05		●	●	●	●	❍	❍
JTBR/L3010F				0.10		●	●	●	●	❍	❍
JTBR/L3015F				0.15		❍					
JTBR/L3005	with			0.05		❍	❍				
JTBR/L3010				0.10		❍	❍				
JTBR/L3015				0.15							

● Standard stock in Europe ❍ Standard stock in Japan

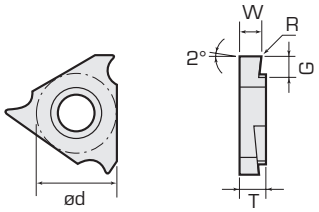
Grooving JS-TGL3





Left hand (L) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	l1	l2	h	b	Clamping screw	Wrench
JS19K-TGL3		●	JTGR3***	19.05	6	125	20	18	11.5	CSTB-4S	T-15F
JS20K-TGL3		●		20.00	6	125	20	19	11.5		
JS22K-TGL3		●		22.00	6	125	20	21	11.5		
JS25K-TGL3		●		25.40	10	125	20	24	12.7		



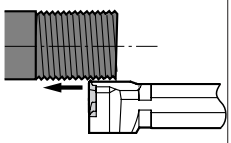
Right hand (R) shown

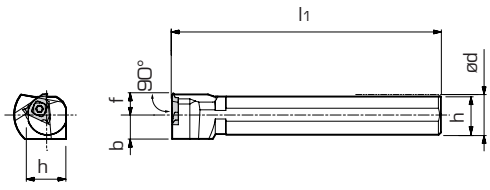
Note: right toolholder with left insert, left toolholder with right insert

JTG-type inserts for grooving (sharp cutting edge)

Cat. No.	ød	T	W±0.025	G	Max. grooving depth ap	R	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTGR/L3033F	9.525	3.18	0.33	0.8	0.7	0.03	●	●	●	●	❍	❍
JTGR/L3050F			0.50	1.2	1.1		●	●	●	●	❍	❍
JTGR/L3075F			0.75	2.0	1.9		●	●	●	●	❍	❍
JTGR/L3095F			0.95				●	●	●	●	❍	❍
JTGR/L3100F			1.00	2.2	2.1	0.05	●	●	●	●	❍	❍
JTGR/L3125F			1.25				●	●	●	●	❍	❍
JTGR/L3145F			1.45				●	●	●	●	❍	❍
JTGR/L3150F			1.50				●	●	●	●	❍	❍
JTGR/L3175F			1.75				●	●	●	●	❍	❍
JTGR/L3200F			2.00	2.7	2.6		●	●	●	●	❍	❍
JTGR/L3250F			2.50				●	●	●	●	❍	❍

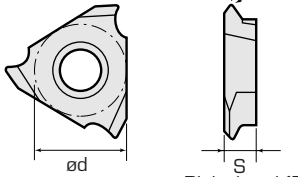
Threading JS-TTL3





Left hand (L) shown

Cat. No.	Stock R	Stock L	Inserts	Dimensions (mm) ød	f	l1	l2	h	b	Clamping screw	Wrench
JS19K-TTL3		●	JTTR30**	19.05	10	125	-	18	11.5	CSTB-4S	T-15F
JS20K-TTL3		●		20.00	10	125	-	19	11.5		
JS22K-TTL3		●		22.00	10	125	-	21	11.5		
JS25K-TTL3		●		25.40	10	125	-	24	12.7		



Right hand (R) shown

JTT-type inserts for threading (sharp cutting edge)

Cat. No.	ød	S	R	θ	Grade Coated J740 R	Coated J740 L	Cermet NS530 R	Cermet NS530 L	Carbide TH10 R	Carbide TH10 L
JTTR/L3005F	9.525	3.18	0.05	60°	●		●		●	
JTTR/L3010F			0.10		●		●		●	
JTTR/L3005F-55			0.05	55°	❍					

Notes: for pitches of 0.5 to 1.0 mm left toolholder with right insert

MEMO

MEMO

MEMO

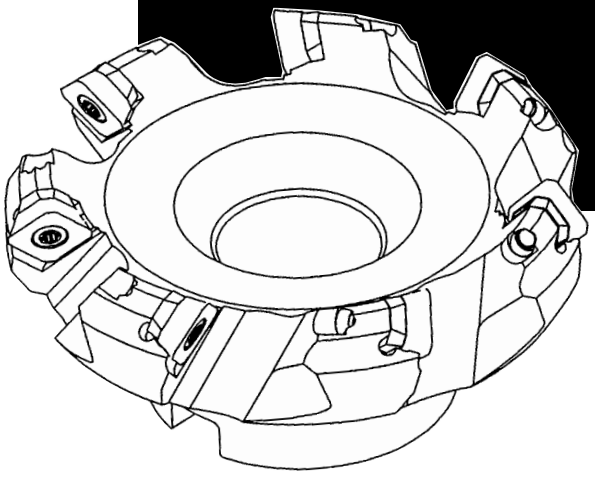
MEMO

TAC Mills

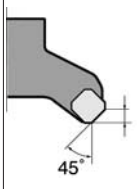
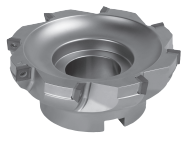
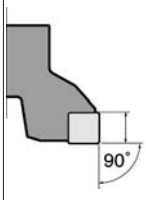
Selection Guides

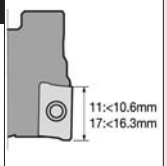
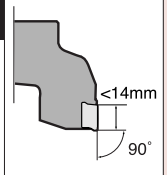
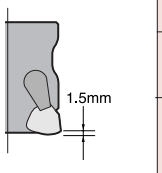
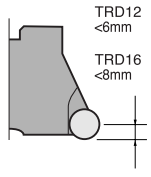
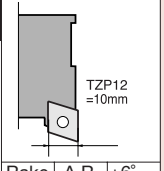
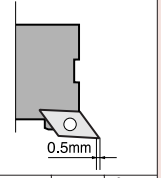
Specifications

7891



List of S Series TAC Mills (Screw-on clamping)

Operation	Work materials	Application	Type and shape	Cutting depth Corner angle Rake angle	Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) Effective dia.	Dimensions (mm) Outer dia.	Weight (kg)	Inserts	Page
Face milling	General steels, stainless steels, aluminium and cast irons	New! •Best suitable for low powered machines	**TAW13** 	 ap = see inserts Rake angle A.R. 17°~20° R.R. -16°~-11°	TAW13R050M22.0E04	●		4	50	63	0.4	SW**13T3AF** WWCW13T3**	310
					TAW13R063M22.0E05	●		5	63	76	0.6		
					TAW13R080M27.0E06	●		6	80	93	0.9		
					TAW13R100M32.0E07	●		7	100	113	1.3		
					TAW13R125M40.0E08	●		8	125	138	2.4		
					TAW13R160M40.0E10	●		10	160	173	4.5		
					TAW13R050M22.0E05	●		5	50	63	0.4		
					TAW13R063M22.0E06	●		6	63	76	0.6		
					TAW13R080M27.0E08	●		8	80	93	1.0		
					TAW13R100M32.0E10	●		10	100	113	1.4		
					TAW13R125M40.0E12	●		12	125	138	2.6		
					TAW13R160M40.0E16	●		16	160	173	4.6		
Square shoulder milling		•Best suitable for low powered machines	**TPW13** 	 ap = see inserts Rake angle A.R. 11.5° R.R. -13°~-10.5°	TPW13R050M22.0E04	●		4	50	50	0.3	SW*T1304PD**	320
					TPW13R063M22.0E05	●		5	63	63	0.4		
					TPW13R080M27.0E06	●		6	80	80	0.8		
					TPW13R100M32.0E07	●		7	100	100	1.1		
					TPW13R125M40.0E08	●		8	125	125	2.4		
					TPW13R050M22.0E05	●		5	50	50	0.3		
					TPW13R063M22.0E06	●		6	63	63	0.4		
					TPW13R080M27.0E08	●		8	80	80	0.8		
					TPW13R100M32.0E10	●		10	100	100	1.2		
					TPW13R125M40.0E12	●		12	125	125	2.2		

Operation	Work materials	Application	Type and shape	Cutting depth / Corner angle / Rake angle	Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) Effective dia.	Dimensions (mm) Outer dia.	Weight (kg)	Inserts	Page
Square shoulder milling	General steels and cast irons	•For high precision square shoulder milling	**TPS11 • 17** 	 Rake angle 11 A.R. +15.5°~+18° R.R. -10°~-6.5° 17 A.R. +14°~+17.5° R.R. -10°~-4°	TPS11040RB-E	●		6	40	40	0.2	ASMT11T3**PDPR-** ASMT1705**PDPR-**	325
					TPS11050RB-E	●		7	50	50	0.4		
					TPS11063RB-E	●		8	63	63	0.6		
					TPS17040RB-E	●		4	40	40	0.2		
					TPS17050RB-E	●		5	50	50	0.3		
					TPS17063RB-E	●		6	63	63	0.6		
		•For high-feed milling	**TPN14** 	 Rake angle A.R. +11°~+16° R.R. +9°~+14°	TPN14040R-E	●		4	40	40	0.2	ANMT1404PPPR-MJ ANMT1404PPPR-ML	327
					TPN14050R-E	●		5	50	50	0.3		
					TPN14063R-E	●		5	63	63	0.6		
					TPN14080R-E	●		6	80	80	1.1		
					TPN14100R-E	●		7	100	100	1.5		
					TPN14125R-E	●		8	125	125	2.9		
High-feed		•For super-high feed milling •Feed per tooth up to 3mm/t	**TXP 05•06•08** 	 Rake angle A.R. +5° R.R. -4°~-6°	TXP05063RB-E	●		6	63	63	0.8	WPM*O5H315ZPR-**	308
					TXP05080RB-E	●		7	80	80	1.8		
					TXP06063RB-E	●		4	63	63	0.72	WPM*O6X415ZPR-**	
					TXP06080RB-E	●		6	80	80	1.7		
					TXP08050R-E	●		3	50	50	0.48		
					TXP08052R-E	●		3	52	52	0.49		
					TXP08063R-E	●		4	63	63	0.74	WPMTO80615Z*R-**	
					TXP08066R-E	●		4	66	66	0.89		
					TXP08080R-E	●		5	80	80	1.78		
Universal		•For die engraving (Radius mill)	**TRD12•16** 	 Rake angle A.R. +10° R.R. -6°~0°	TRD12050R-E	●		4	50	50	0.4	RDMT1204ZDPN-MJ RDMW1204ZDSN	329
					TRD12052R-E	●		4	52	52	0.4		
					TRD12063R-E	●		4	63	63	0.59		
					TRD12066R-E	●		5	66	66	0.6		
					TRD12080R-E	●		5	80	80	1.1		
					TRD12100R-E	●		6	100	100	1.62		
					TRD16063R-E	●		3	63	63	0.48	RDMT1606ZDPN-MJ RDMW1606ZDSN	
					TRD16066R-E	●		4	66	66	0.68		
					TRD16080R-E	●		4	80	80	1.18		
					TRD16100R-E	●		5	100	100	1.38		
Flash Z-feed		•For die engraving (Z-feed cutter)	**TZP12** 	 Rake angle A.R. +6° R.R. -2°	TZP12050R-E	●		3	50		0.38	APMT120416PR-MJ	331
					TZP12063R-E	●		3	63		0.72		
					TZP12080R-E	●		4	80		1.51		
		•Precision finishing of vertical wall face	**TZF11** 	 Rake angle A.R. 0° R.R. 0°~+6°	TZF11050R-E	●		4	50		0.38	DPCW11T3ZFR	332
					TZF11063R-E	●		6	63		0.72		
					TZF11080R-E	●		7	80		1.51		

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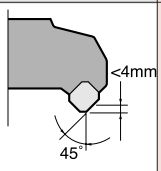
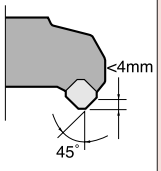
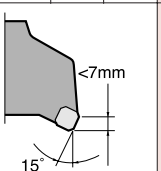
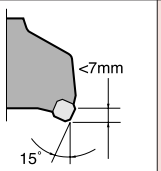
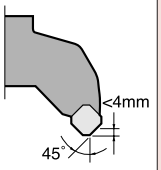
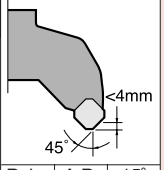
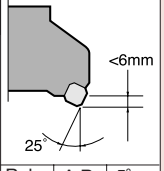
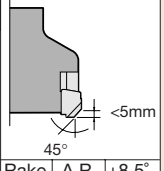
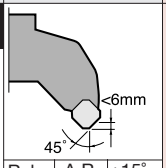
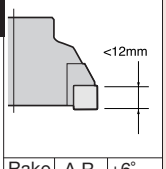
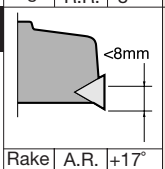
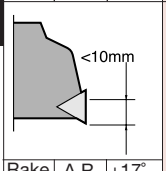
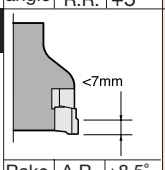
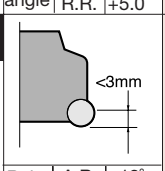
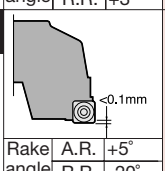
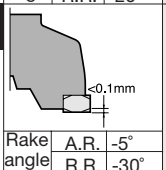
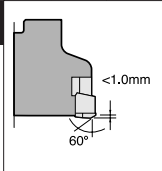
List of LS Series TAC Mills (Wedge-on clamping)

Operation	Work materials	Application	Type and shape	Cutting depth / Corner angle / Rake angle	Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) Effective dia.	Dimensions (mm) Outer dia.	Weight (kg)	Inserts	Page
Face milling (light to medium cutting)	General steels and cast irons	•Low cutting-force and vibration-free milling •Usable for various work materials	**TME4400I** 	 Rake angle A.R. +24° R.R. -8°~-6°	TME4403R/LIE	●		4	80	102	1.4	SE□N1203AG□N SE□N1203AG□N-T SEKR1203AGSR-MJ	312
					TME4404R/LIE	●		5	100	120	2.7		
					TME4405R/LIE	●		6	125	145	4.0		
					TME4406R/LIE	●		8	160	181	5.8		
					TME4408R/LIE			10	200	221	9.2		
					TME4410R/LIE			12	250	270	16.6		
					TME4412R/LIE			14	315	334	25.7		
		•Close pitch version of TME4400I •Low cutting-force and vibration-free milling •For high-feed milling of casings	**TME4400B** 	 Rake angle A.R. +24° R.R. -8°~-6°	TME4463R/LBE	●		5	63	87	1.0		
					TME4403R/LBE	●		6	80	102	1.4		
					TME4404R/LBE	●		7	100	120	2.8		
					TME4405R/LBE	●		9	120	145	4.1		
					TME4406R/LBE	●		12	160	181	5.9		
					TME4408R/LBE			15	200	221	9.2		
					TME4410R/LBE			19	250	270	16.6		
					TME4412R/LBE			23	315	334	25.7		
		•General purpose face mills •Best suitable for milling cast iron	**TGP4100IA** 	 Rake angle A.R. +7° R.R. +1°	TGP4103R/LIAE			5	80	89	1.3	SP□N42S□R/L SPKR42SSR-MJ	317
					TGP4104R/LIAE			6	100	108	2.4		
					TGP4105R/LIAE			8	125	132	3.6		
					TGP4106R/LIAE			8	160	167	5.9		
					TGP4108R/LIAE			10	200	206	8.7		
					TGP4110R/LIAE			12	250	256	15.2		
					TGP4112R/LIAE			14	315	321	24.1		
		•Close pitch version of TGP4100IA •Suitable for high-feed milling of cast-iron casings	**TGP4100BA** 	 Rake angle A.R. +7° R.R. +1°	TGP4104R/LBAE	●		8	100	108	2.4	WPAN42S□R/L□ (Wiper)	
					TGP4105R/LBAE	●		10	125	132	3.6		
					TGP4106R/LBAE	●		12	160	167	5.8		
					TGP4108R/LBAE			16	200	206	8.6		
					TGP4110R/LBAE			20	250	256	15.1		
					TGP4112R/LBAE			24	315	321	24.0		
					TGP4114R/LBAE			28	355	361	37.7		
					TGP4116R/LBAE			32	400	406	49.1		
		•General purpose face mills •Usable for various work materials	**TMD4400I** 	 Rake angle A.R. +15° R.R. -3°	TMD4403R/LIE	●		4	80	96	1.4	SD□42Z□N SDKR42ZSR-MJ SDMR42ZTN-MJ	314
					TMD4404R/LIE	●		5	100	115	2.5		
					TMD4405R/LIE	●		6	125	137	3.6		
					TMD4406R/LIE	●		8	160	173	5.6		
					TMD4408R/LIE			10	200	213	8.7		
					TMD4410R/LIE			12	250	263	16.3		
					TMD4412R/LIE			14	315	327	25.2		
		•Close pitch version of TMD4400I •Low cutting-force and vibration-free milling	**TMD4400B** 	 Rake angle A.R. +15° R.R. -3°	TMD4403R/L-BE	●		6	80	95	1.4		
					TMD4404R/L-BE	●		6	100	115	2.5		
					TMD4405R/L-BE	●		8	125	139	3.6		
		•The insert allows eight indexes •Most suitable for rough milling of cast irons	**TGN4200-A** 	 Rake angle A.R. -5° R.R. -5°	TGN4203R/L-AE	●		5	80	92	1.5	SN□N43Z□N SNMN1204□□TN	319
					TGN4204R/L-AE	●		6	100	112	2.4		
					TGN4205R/L-AE	●		8	125	136	3.9		
					TGN4206R/L-AE	●		10	160	171	6.1		
					TGN4208R/L-AE			12	200	211	9.0		
					TGN4210R/L-AE			14	250	261	15.6		
					TGN4212R/L-AE			14	315	326	24.7		
	Light alloys	•For very high-speed and high-precision milling of aluminium alloys	**DAD15** 	 Rake angle A.R. +8.5° R.R. +5.0°	DAD15080R/L-E			4	80	90	1.4	YDEN1505ADFR/L-D YDEN1505ADFR/L-WD	335
					DAD15100R/L-E			4	100	110	2.4		
					DAD15125R/L-E			6	125	135	3.6		
					DAD15160R/L-E			6	160	170	5.5		
					DAD15200R/L-E			8	200	210	8.9		
					DAD15250R/L-E			10	250	260	14.6		
					DAD15315R/L-E			12	315	325	24.0		

List of LS Series TAC Mills (Wedge-on clamping)

Operation	Work materials	Application	Type and shape	Cutting depth / Corner angle / Rake angle	Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) Effective dia.	Dimensions (mm) Outer dia.	Weight (kg)	Inserts	Page
Face milling (medium to heavy cutting)	General steels and cast irons	•Features low cutting forces and less vibration •Most suitable for large depth of cut	**TMD5400I** 	 Rake angle A.R. +15° R.R. -3°	TMD5404R/LIE	●		4	100	118	2.5	SD□N53Z□N SDKR53ZSR-MJ	316
					TMD5405R/LIE	●		5	125	142	3.7		
					TMD5406R/LIE	●		6	160	176	5.8		
					TMD5408R/LIE	●		6	160	176	5.8		
					TMD5410R/LIE	●		10	250	265	16.3		
					TMD5412R/LIE	●		12	315	330	25.2		
Square shoulder milling (light to medium cutting)		•For high-efficiency and economical milling •Available in various chipbreaker geometries	**TPP16** 	 Rake angle A.R. +6° R.R. -8°	TPP16080RIE	●		4	80	80	1.0	SPMR1605PPTR-ML SPMR1605PPTR-MJ SPMR1605PPTR-MH	322
					TPP16100RIE	●		5	100	100	1.8		
					TPP16125RIE	●		6	125	125	2.8		
					TPP16160RIE	●		8	160	160	4.6		
					TPP16200RIE	●		10	200	200	6.9		
					TPP16250RIE	●		12	250	250	13.2		
					TPP16315RIE	●		14	315	315	22.2		
	Various steels and light alloys	•Used for light alloys and difficult-to-cut materials	**TSE3000IA** 	 Rake angle A.R. +17° R.R. +5°	TSE3050R/LE	●		3	50	50	0.3	TE□N32Z□R/L TECN32ZFR-DIA	323
					TSE3063R/LE	●		3	63	63	0.5		
					TSE3003R/LIAE	●		4	80	80	1.0		
					TSE3004R/LIAE	●		6	100	100	2.0		
					TSE3005R/LIAE			6	125	125	3.1		
					TSE3006R/LIAE			8	160	160	5.2		
		•For large-depth milling of difficult-to-cut materials and light alloys	**TSE4000IA** 	 Rake angle A.R. +17° R.R. +5°	TSE4003R/LIAE	●		4	80	80	1.0	TE□N43Z□R/L TECN43ZFR-DIA	324
					TSE4004R/LIAE	●		6	100	100	1.9		
					TSE4005R/LIAE	●		6	125	125	2.9		
					TSE4006R/LIAE	●		8	160	160	4.9		
					TSE4008R/LIAE			10	200	200	7.4		
					TSE4010R/LIAE			12	250	250	13.8		
					TSE4012R/LIAE			14	315	315	22.1		
	Light alloys	•For very high-speed and high-precision milling of aluminium alloys	**DPD15** 	 Rake angle A.R. +8.5° R.R. +5.0°	DPD15080R/L-E			4	80	80	1.2	YDEN1505PDFR/L-D YDEN1505PDFR/L-WD	336
					DPD15100R/L-E			4	100	100	2.2		
					DPD15125R/L-E			6	125	125	3.6		
					DPD15160R/L-E			6	160	160	5.2		
					DPD15200R/L-E			8	200	200	8.2		
					DPD15250R/L-E			10	250	250	13.4		
					DPD15315R/L-E			14	315	315	22.5		
High-feed, small depth milling with round inserts	General steels・cast irons and difficult-to-cut materials	•Used for difficult-to-cut materials	**TRF6000I** 	 Rake angle A.R. +19° R.R. +3°	TRF6003R/LIE	●		4	80	100	1.4	RFEN2004ZF□N RFEN2004M0□N	328
					TRF6004R/LIE	●		5	100	120	2.5		
					TRF6005R/LIE	●		6	125	145	3.9		
					TRF6006R/LIE	●		8	160	180	5.8		
					TRF6008R/LIE			10	200	220	9.8		
					TRF6010R/LIE			12	250	270	17.3		
					TRF6012R/LIE			14	315	335	27.8		
Precision finishing	General steels and cast irons	•Precision finishing with adjusting mechanism	**SFP4000** 	 Rake angle A.R. +5° R.R. -20°	SFP4004R/LE	●		2	100	100	2.3	SPHA435FNW	333
					SFP4005R/LE	●		2	125	125	3.5		
					SFP4006R/LE	●		4	160	160	5.8		
					SFP4008R/LE			4	200	200	9.0		
					SFP4010R/LE			6	250	250			
					SFP4012R/LE			8	315	315			
			MS 	 Rake angle A.R. -5° R.R. -30°	MS04R/LE			2	100	105	3	SN□□56FTR/L	334
					MS05R/LE			2	125	130	4		
					MS06R/LE			4	160	165	5		
					MS08R/LE			4	200	205	8.5		
					MS10R/LE			4	250	255	14		
					MS12R/LE			4	315	305	23		
	Cast irons	•Used for high-speed, precision finishing of grey cast irons	**QPP15** 	 Rake angle A.R. -5.5° R.R. -3°	QPP15080R/L-E			4	80	80	1.1	YPEN1505PPTR/L-Q	337
					QPP15100R/L-E			6	100	100	2.1		
					QPP15125R/L-E			6	125	125	3.7		
					QPP15160R/L-E			8	160	160	5.3		
					QPP15200R/L-E			10	200	200	8.3		
					QPP15250R/L-E			12	250	250	13.5		
					QPP15315R/L-E			14	315	315	22.6		
					QPP15355R/L-E			16	355	355	33.4		
					QPP15400R/L-E			18	400	400	43.3		

TAC Side Cutter Series

Operations	Work materials	Application	Type and shape	Specifications: Effective dia. (mm)	Tool width W (mm)	No. of inserts	Stock	Inserts	Page
For parting and grooving	Various steels, cast irons and aluminium alloys	•For grooving and parting (Grooving width: < 8 mm)	SVN4000 	100	5	10	●	SNEN12T2ZTN SNEN12T2ZFN SNEN1233ZTN SNEN1233ZFN	338
					6				
					8	8	●		
				125	5	12	●		
					6				
					8				
				160	5	16	●		
					6				
					8				
				200	5	20	●		
					6				
					8				

List of TAC Milling Inserts — LS and S Series

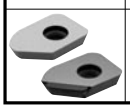
Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades: Co.CVD T3030	Co.CVD T1015	Coated PVD GH330	Coated PVD GH340	Coated PVD AH120	Coated PVD AH140	Coated PVD AH330	Coated PVD AH740	Cermet NS530	Cermet NS540	Cermet NS740	C.C. GT540	Uncoated TH10	Uncoated UX30	Uncoated KS05F	Uncoated KS20	Applicable TAC mills (pages)
	ANMT1404PPPR-MJ	ANMT1404PPPR-MJ	M	with	●	●	●		●		●		●								TPN14 (P. 327)
	ANMT1404PPPR-ML	ANMT1404PPPR-ML	M	with				●	●												
	APMT120416PR-MJ	APMT120416PR-MJ	M	with					●												TZP12 (P. 331)
	ASGT11T304PDFR-AJ	ASGT11T304PDFR-AJ	G	without															●		TPS11, 17 (P. 325)
	ASGT11T308PDFR-AJ	ASGT11T308PDFR-AJ																	●		
	ASGT170504PDFR-AJ	ASGT170504PDFR-AJ																	●		
	ASGT170508PDFR-AJ	ASGT170508PDFR-AJ																	●		
	ASMT11T304PDPR-MJ	ASMT11T304PDPR-MJ	M	with	●	●			●						●						TPS11, 17 (P. 325)
	ASMT11T308PDPR-MJ	ASMT11T308PDPR-MJ			●	●			●						●						
	ASMT11T312PDPR-MJ	ASMT11T312PDPR-MJ			●				●												
	ASMT11T316PDPR-MJ	ASMT11T316PDPR-MJ			●	●			●						●						
	ASMT11T320PDPR-MJ	ASMT11T320PDPR-MJ							●												
	ASMT11T330PDPR-MJ	ASMT11T330PDPR-MJ							●												
	ASMT170504PDPR-MJ	ASMT170504PDPR-MJ			●	●			●						●						
	ASMT170508PDPR-MJ	ASMT170508PDPR-MJ			●	●			●						●						
	ASMT170512PDPR-MJ	ASMT170512PDPR-MJ			●				●												
	ASMT170516PDPR-MJ	ASMT170516PDPR-MJ			●	●			●						●						
	ASMT170520PDPR-MJ	ASMT170520PDPR-MJ							●												
	ASMT170530PDPR-MJ	ASMT170530PDPR-MJ							●												
	ASMT170532PDPR-MJ	ASMT170532PDPR-MJ			●	●			●						●						
	ASMT11T304PDPR-MS	ASMT11T304PDPR-MS	M	with						●											TPS11, 17 (P. 325)
	ASMT170508PDPR-MS	ASMT170508PDPR-MS								●											

List of TAC Milling Inserts — LS and S Series

Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades																	Applicable TAC mills (pages)
					Co.CVD		Coated PVD						Cermet			C.C.	Uncoated					
					T3030	T1015	GH330	GH340	AH120	AH140	AH330	AH740	NS530	NS540	NS740	GT540	TH10	UX30	KS05F	KS20		
	DPCW11T3ZFR	DPCW11T3ZFR	C	without					●			●	●									TZF11 (P. 332)
	SWMT13T3AFPR-MJ	SWMT13T3AFPR-MJ	M	with	●	●			●	●					●							TAW13 (P. 310)
	SWMT13T3AFER-ML	SWMT13T3AFER-ML	M	with					●													
	SWMW13T3AFTR	SWMW13T3AFTR	M	with	●	●			●						●							
	SWMT13T3AFPR-HJ	SWMT13T3AFPR-HJ	M	with	●	●			●	●												
	SWMT13T3AFPR-MS	SWMT13T3AFPR-MS	M	with						●												
	SWGT13T3AFPR-MJ	SWGT13T3AFPR-MJ	G	with					●						●							
	SWGT13T3AFFR-AJ	SWGT13T3AFFR-AJ	G	without															●			
	SWMT1304PDPR-MJ	SWMT1304PDPR-MJ	M	with	●	●			●	●					●							TPW13 (P. 320)
	SWMT1304PDER-ML	SWMT1304PDER-ML	M	with					●													
	SWMT1304PDPR-MS	SWMT1304PDPR-MS	M	with						●												
	SWGT1304PDPR-MJ	SWGT1304PDPR-MJ	G	with					●						●							
	SWGT1304PDFR-AJ	SWGT1304PDFR-AJ	G	without															●			
	SDMT1204AFPN-MJ	SDMT1204AFPN-MJ	M	with	●	●	●		●	●	●											TAD
	SDMT1204AFPNE-MJ	SDMT1204AFPNE-MJ							●		●		●									
	SDMT1204AFTN-MJ	SDMT1204AFTN-MJ											●		○							
	SDGT1204AFTN-MJ	SDGT1204AFTN-MJ	G						●		●		●		○							
	SDMT1204AFPN-MS	SDMT1204AFPN-MS	M	with						●												
	SDMT1204AFPN-ML	SDMT1204AFPN-ML	M	with					●		●											
	SDGT1204AFFN-AJ	SDGT1204AFFN-AJ	G	without													●					
	SDMT1204PDSR-MJ	SDMT1204PDSR-MJ	M	with	●	●	●		●	●	●											TPD
	SDMT1204PDTR-MJ	SDMT1204PDTR-MJ											●		○							
	SDGT1204PDTR-MJ	SDGT1204PDTR-MJ	G						●		●		●		○							
	SDMT1204PDPR-MS	SDMT1204PDPR-MS	M	with						●												
	SDMT1204PDPR-ML	SDMT1204PDPR-ML	M	with					●		●											
	SDGT1204PDFR-AJ	SDGT1204PDFR-AJ	G	without													●					
	SDKN42ZTN	SDKN1203AETN-12	K	with		●	●		○	●	●			△	●	△		●				TMD (P. 314) (TGD4400-A) (TFD4400-A)
	SDKN42ZFN	SDKN1203AEFN-12		without													●			●		
	SDKN42ZTNCR	SDKN1203AETN-CR		with										△	○							
	SDKN42ZTN16	SDKN1203AETN-16	K	with	●																	TMD (P. 314) (TGD4400-A)

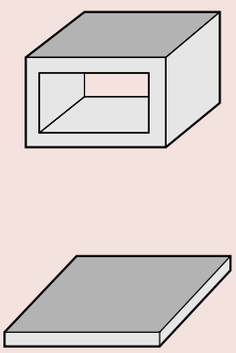
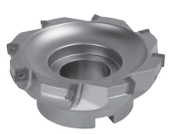
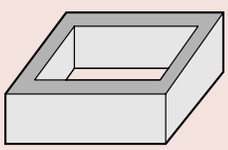
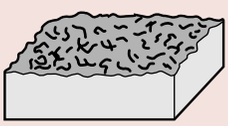
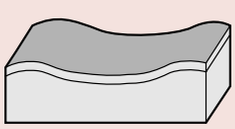
List of TAC Milling Inserts — LS and S Series

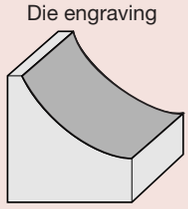
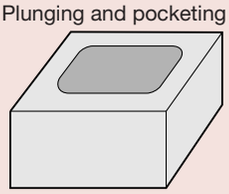
Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades: CVD co. T3030	CVD co. T1015	PVD coated GH330	PVD coated GH340	PVD coated AH120	PVD coated AH140	PVD coated AH330	Cermet NS530	Cermet NS540	Cermet NS740	Cermet X407	C. Cer. GT540	Uncoated TH10	Uncoated TU10	Uncoated UX30	Cera. FX105	DIA DX140	Applicable TAC mills (pages)
	SDMR1203AETN-MJ	SDMR1203AETN-MJ	M	with								△	△	●								TMD4400 (P. 314) TGD4400-A
	SDKR42ZSR-MJ	SDKR1203AESR-MJ	K	with	●	○	●		○		●											
	SDKR42ZPN-MS	SDKR1203AEPN-MS								●												
	SDCN42ZFN-DIA	SDCN1203AEFN-D	C	without																	○	——
	SDKN53ZTN	SDKN1504AETN	K	with		●	●		○	●	●		△	○					●			TMD5400I (P. 316)
	SDKN53ZTNCR	SDKN1504AETNCR		with										○								
	SDKN53ZFN	SDKN1504AEFN		without													●					
	SDKN53ZTN-16	SDKN1504AETN-16		with	●																	
	SDKR53ZSR-MJ	SDKR1504AESR-MJ	K	with	●		○				●											
	SECN1203AGFN	SECN1203AGFN	C	without													●					TME (P. 312)
	SEEN1203AGTN	SEEN1203AGTN	E	with		○	○		○	○			△	○					○			
	SEEN1203AGFN	SEEN1203AGFN		without													○					
	SEEN1203AGTNCR	SEEN1203AGTNCR		with	○				○	○	○											
	SEKN1203AGTN	SEKN1203AGTN	K	with	●		●		○	●	●		△	●		△			○			
	SEKN1203AGFN	SEKN1203AGFN		without													●					
	SEKN1203AGTN-T	SEKN1203AGTN-T	K	with	○	●	○				○		△	○					○			
	SEKN1203AGFN-T	SEKN1203AGFN-T		without													●					
	SEKR1203AGSR-MJ	SEKR1203AGSR-MJ	K	with	●		●		○		●											
	SEMR1203AFTN-MJ	SEMR1203AFTN-MJ	M	with								○	△	●								
	SEKN42AFTN	SEKN1203AFTN	K	with		●	●		○	●	●		△	●		△			●			——
	SEKN42AFFN	SEKN1203AFFN		without									△				●					
	SEKN42AFTN16	SEKN1203AFTN-16		with	●																	
	SEKR1203AFSR-MJ	SEKR1203AFSR-MJ	K	with	●	●	●				●											——
	SPKN42STR	SPKN1203EDTR	K	with	●	●	○		●	●	●		△	●					●	●		TGP (P. 317)
	SPKN42STL	SPKN1203EDTL		with									△	○					●			
	SPKN42SFR	SPKN1203EDFR		without													●					
	SPKN42SFL	SPKN1203EDFL		without													○					
	SPKR42SSR-MJ	SPKR1203EDSR-MJ	K	with	●	●	○				●											
	SPMR1605PPTR-MJ	SPMR1605PPTR-MJ	M	with	○	●	●												○			TPP16 (P. 322)
	SPMR1605PPTR-MH	SPMR1605PPTR-MH	M	with	●	●	●												○			
	SPMR1605PPPR-ML	SPMR1605PPPR-ML	M	with			●	●														
	SPGN120312TN	SPGN120312TN	G	with																●		TGP (P. 317)
	SPGN120412TN	SPGN120412TN	G	with																●		——
	SNKN43ZTN	SNKN1204ZNTN	K	with	○	○							△	○					○	●		TGN4200-A (P. 319)

Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades: C. CVD T3030	C. CVD T1015	Coated PVD GH110	Coated PVD GH330	Coated PVD AH120	Coated PVD AH140	Coated PVD AH330	Cermet NS540	Cermet NS740	Cermet N308	Cermet X407	Uncoated TH10	Uncoated TU10	Uncoated KS05F	Uncoated KS20	Uncoated UX30	Cer. FX105	DIA DX140	DIA DX160	PCBN BX950	Applicable TAC mills (pages)
	SNMN120408TN SNMN120412TN SNMN120416TN SNMN120420TN SNMN120424TN	SNMN120408TN SNMN120412TN SNMN120416TN SNMN120420TN SNMN120424TN	M	with																	● ● ● ● ●				TGN4200-A (P. 319)
	SNMN190412TN SNMN190416TN	SNMN190412TN SNMN190416TN	M	with																	● ●				——
	SNAA56FTR SNAG56FTR	SNAC1509PNTR SNAJ1509PNTR	A	with											●		●								MS (P. 334)
	SNEN12T2ZTN SNEN12T2ZFN	SNEN12T2ZTN SNEN12T2ZFN	E	with without							●					●				●					SVN4000 (P. 338)
	SNEN1233ZTN SNEN1233ZFN	SNEN1233ZTN SNEN1233ZFN	E	with without							●					●				●					
	TECN32ZFR	TECN1603PEFR	C	without												○			○						TSE3000IA (P. 323)
	TEEN32ZTR TEEN32ZFR	TEEN1603PETR TEEN1603PEFR	E	with without	●	●		●			●	△	●			●				●					
	TECN32ZFR-DIA	TECN1603PEFR-D	C	without																		○	○		
	TEKR1603PEPR-MS	TEKR1603PEPR-MS	K	with						●															
	TECN43ZFR	TECN2204PEFR	C	without											○										TSE4000IA (P. 324)
	TEEN43ZTR TEEN43ZFR	TEEN2204PETR TEEN2204PEFR	E	with without	●	●		●	○	●	●	△	●		●					●					
	TECN43ZFR-DIA	TECN2204PEFR-D	C	without																		○	○		
	TEKR2204PEPR-MS	TEKR2204PEPR-MS	K	with						●															
	TPKN32ZTR TPKN43ZTR	TPKN1603PPTR TPKN2204PPTR	K	with	● ●	○		○	○	●	● ●	△ △	● ●	○						● ●					——
	RFEN2004M0TN	RFEN2004M0TN	E	with					●									○		●					TRF6000I (P. 328)
	RFEN2004ZFTN	RFEN2004ZFTN	E	with					●									●		●					
	RDMT1204ZDPN-MJ RDMT1606ZDPN-MJ	RDMT1204ZDPN-MJ RDMT1606ZDPN-MJ	M	with	● ●				● ●	● ●	● ●														TRD (P. 329)
	RDMW1204ZDSN RDMW1606ZDSN	RDMW1204ZDSN RDMW1606ZDSN	M	with	● ●				● ●	● ●	● ●														
	SPHA435FNW	SPHB120420FN-W	H	without										●		●									SFP4000 (P. 333)
	YDEN1505ADFR-D YDEN1505ADFR-WD	YDEN1505ADFR-D YDEN1505ADFR-WD	E	without																		○ ○			DAD15 (P. 335)
	YDEN1505PDFR-D YDEN1505PDFR-WD	YDEN1505PDFR-D YDEN1505PDFR-WD	E	without																		● ●			DPD15 (P. 336)
	YPEN1505PPTR-Q	YPEN1505PPTR-Q	E	with																			●		QPP15 (P. 337)
	WFCN42ZFR-DIA	SFCX1203AFFR-WD	C	without																		○			Wiper THF4400IA
	WFCN53ZFR-DIA	SFCX1504AZFR-WD	C	without																		○			Wiper THF5400IA
	WDCN42ZFR-DIA	SDCX1203AEFR-WD	C	without																		○			Wiper TMD4400I (P. 314)
	WPAN42STR WPAN42SFR	SPAX1203EDTR-W SPAX1203EDFR-W	A	with without												●									Wiper TGD4100IA Wiper
	WPAN42STRS WPAN42SFRS	SPAX1203EDTR-WS SPAX1203EDFR-WS	A	with without												○									TGP4100BA (P. 317)
	WPMW05H315ZPR WPMT05H315ZPR-MH WPMT05H315ZPR-ML	WPMW05H315ZPR WPMT05H315ZPR-MH WPMT05H315ZPR-ML	M	with	● ● ●	●			● ● ●	● ● ●															
	WPMW06X415ZPR WPMT06X415ZPR-MH WPMT06X415ZPR-ML	WPMW06X415ZPR WPMT06X415ZPR-MH WPMT06X415ZPR-ML	M	with	● ● ●	●			● ● ●	● ● ●															TXP05-06-08 (P. 308)
	WPMT080615ZSR WPMT080615ZSR-MH WPMT080615ZPR-ML	WPMT080615ZSR WPMT080615ZSR-MH WPMT080615ZPR-ML	M	with	● ● ●	●			● ● ●	● ● ●															
	WWCW13T3AFER-WS WWCW13T3AFFR-WS WWCW13T3AFFR-WD	WWCW13T3AFER-WS WWCW13T3AFFR-WS WWCW13T3AFFR-WD	C	with without			●						●					●					●		TAW13 (P. 310)

Selection Guides for TAC Mills

■ Selecting from workpiece condition

Work condition	Applicable TAC MILLS
Having a tendency to cause chatter or warp 	**TAW13**  Corner angle: 45° (P. 310) **TME4400I**  Corner angle: 45° (P. 314) **TPW13**  Corner angle: 90° (P. 322) **TPP16**  Corner angle: 90° (P. 326) **TSE4000IA**  Corner angle: 90° (P. 328) **TPS11•17**  Corner angle: 90° (P. 329)
Thin-walled workpiece 	**TAW13**  **TME4400B**  Corner angle : 45° (P. 314)
Rough outer skin where cutting depth varies violently 	**TMD5400I**  Corner angle: 45° (P. 318) **TPP16**  Corner angle: 90° (P. 326)
Flame-cut surface 	**TMD5400I**  Corner angle: 45° (P. 318) **TPP16**  Corner angle: 90° (P. 326) For difficult-to-cut materials **TRF6000I**  Round insert type (P. 332)

Work condition	Applicable TAC MILLS		
Die engraving 	**TXP08**  (P. 308)	**TZP12**  (P. 335)	**TRD12•16**  Round insert type (P. 333)
Plunging and pocketing 	**TXP08**  (P. 308)	**TRD12**  (P. 333)	

Selection Guides for TAC Mills

■ Selecting from operation and work material

Face milling

Steel

Cutting depth:
ap = ~ 1.5 mm

TXP08

Corner angle: 45°
Cutting depth:
ap = ~ 5 mm

TAW

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

TME4400I

Corner angle: 45°
Cutting depth:
ap = ~ 6 mm

TMD5400I
(For large depth cutting)

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

TMD4400I

Stainless steel

Cutting depth:
ap = ~ 1.5 mm

TXP08

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

TAW

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

TME4400I

Corner angle: 45°
Cutting depth:
ap = ~ 6 mm

TMD5400I
(For large depth cutting)

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

TMD4400I

Cast irons

Corner angle: 45°
Cutting depth:
ap = ~ 5 mm

TAW

Corner angle: 15°
Cutting depth:
ap = ~ 7 mm

TGP4100IA

Corner angle: 45°
Cutting depth:
ap <= ~ 4 mm

TME4400I

Corner angle: 60°
Cutting depth:
ap = ~ 1.5 mm

QPP15
(High-speed and high-precision finishing of grey cast irons)

Aluminium alloys

Corner angle: 45°
Cutting depth:
ap = ~ 4 mm

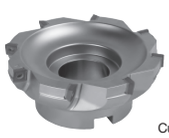
TAW

Corner angle: 45°
Cutting depth:
ap = ~ 5 mm

DAD15

Square shoulder milling

Steel



Corner angle: 90°
Cutting depth: ap = ~ 10 mm

TPW

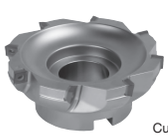
Corner angle: 90°
TPS11: Cutting depth: ap = ~ 11 mm
TPS17: Cutting depth: ap = ~ 16.3 mm

TPS11•17

Corner angle: 90°
Cutting depth: ap = ~ 12 mm

TPP16

Stainless steel



Corner angle: 90°
Cutting depth: ap = ~ 10 mm

TPW

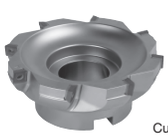
Corner angle: 90°
TPS11: Cutting depth: ap = ~ 11 mm
TPS17: Cutting depth: ap = ~ 16.3 mm

TPS11•17

Corner angle: 90°
Cutting depth: ap = ~ 12 mm

TPP16

Cast irons



Corner angle: 90°
Cutting depth: ap = ~ 10 mm

TPW

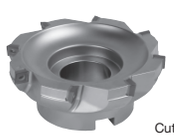
Corner angle: 90°
TPS11: Cutting depth: ap = ~ 11 mm
TPS17: Cutting depth: ap = ~ 16.3 mm

TPS11•17

Corner angle: 90°
Cutting depth: ap = ~12 mm

TPP16

Aluminium alloys



Corner angle: 90°
Cutting depth: ap = ~ 10 mm

TPW

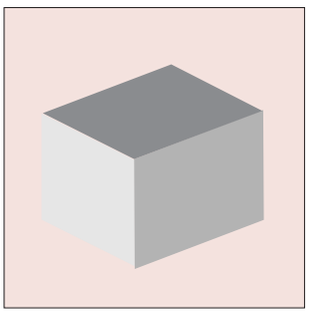
Corner angle: 90°
Cutting depth: ap = ~ 7 mm

DPD15

Selection Guides for TAC Mills

■ Selecting from operation and work material

Finish milling



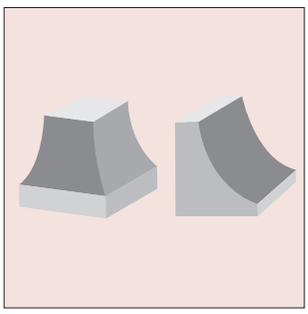
Cutting depth:
ap = ~ 0.1 mm

MS

Cutting depth:
ap = ~ 0.1 mm

SFP4000

Die engraving



Cutting depth:
ap = ~ 1.5 mm

TXP08

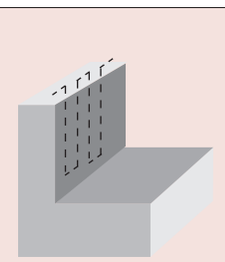
Cutting depth:
ap = ~ 10 mm

TZP12

Cutting depth:
TRD12
ap = ~ 6 mm
TRD16
ap = ~ 8 mm

TRD12•16

Finishing of vertical walls



Cutting depth:
ap = ~ 0.5 mm

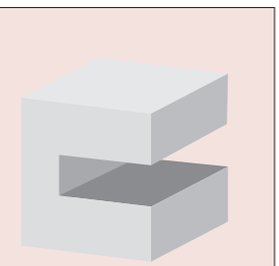
TZF11

Finishing of vertical wall face

Cutting depth:
ap = ~ 10 mm

TZP12

Slotting



SVN4000

Nomenclature for TAC Mills

NEW

Code	Description
T	Shell type
E	Endmill
H	TMS type

① Milling cutter type

Code	Description
P	0° (90°) ~ 10°
E	10° ~ 20°
D	30° ~ 40°
A	40° ~ 50°
R	for round insert
B	Ball endmill
X	for high feed
L	Long cutting edge
V	for difficult-to-cut materials
F	for finishing
C	for chamfering
Z	for Z-feed
G	for counterbore

② Relief angle / Applications

Code	Description
C	7°
P	11°
D	15°
E	20°
F	25°
N	90°
(W)	Special

③ Relief angle of insert

④ Cutting edge length (mm)

Code	Description
R	Right
L	Left

⑤ Cutting direction

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
T	P	W	13	R	050	M	22.0	E	04

for example

⑥ Effective cutter ø

Code	Description
050	ø50 mm
063	ø63 mm
080	ø80 mm
100	ø100 mm
125	ø125 mm
160	ø160 mm

⑦ System of unit

Code	Description
M	mm
U	inch

⑧ Mounting hole

Code	Description
22.0	ø22 mm
27.0	ø27 mm
32.0	ø32 mm
40.0	ø40 mm

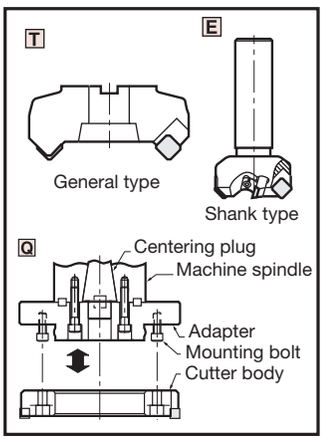
⑨ Mounting type

Code	Description
-	JIS
E	DIN
A	ANSI
-	Shank (cylinder)
W	Shank (weldon)
C	Shank (combination)

⑩ No. of inserts

Code	Description
04	4
05	5
06	6
07	7
08	8
10	10
12	12
16	16

Nomenclature for LS Series TAC Mills

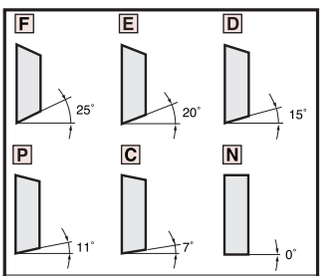


Symbol	Type
V	Vertical insert type
Q	Quick change type
E	Shank type
T	General type
S	Special type

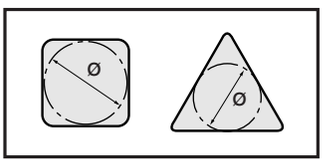
① Type

Symbol	Application, geometry etc.
M	For machining centers
F	For finishing
G	General purpose
S	For square shoulder milling
H	High-rake geometry
P	Negative axial, positive radial rake geometry
R	Use round inserts
U	For difficult-to-cut materials
C	For chamfering
L	Long edge type
T	For threading

② Application etc.



③ Relief angle of applicable insert



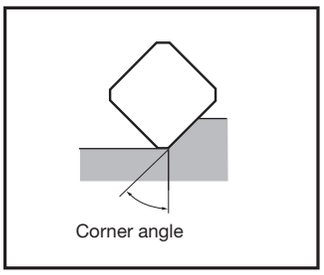
Symbol	I.C.(mm)
3	9.525
4	12.700
5	15.875
6	19.050
7	22.225
8	25.400
9	31.750

④ Size of applicable insert

Example

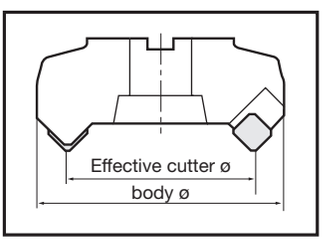
①	②	③	④	⑤	⑥	⑦	⑧
T	M	D	4	4	06	R	I

⑤ Corner angle	
Symbol	Corner angle
0	0° ~ 10°
1	10° ~ 20°
2	20° ~ 30°
3	30° ~ 40°
4	40° ~ 50°
5	50° ~ 60°
6	60° ~ 70°
7	70° ~ 80°

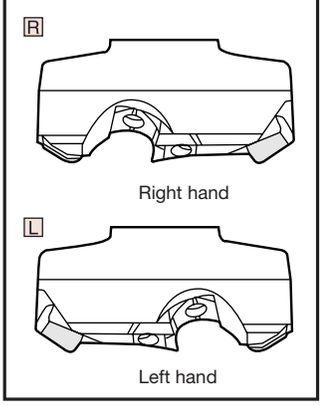


⑥ Effective cutter diameter	
Symbol	Effective diameter (mm)
50	50
63	63
03	80
04	100
05	125
06	160
08	200
10	250
12	315
14	355
16	400

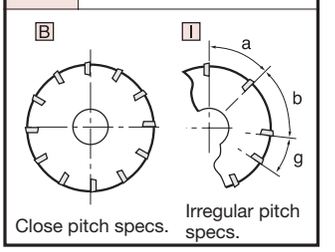
Note: For diameter of less than 80 mm, nominal dimensions (mm) of effective diameter are shown



⑦ Cutting direction

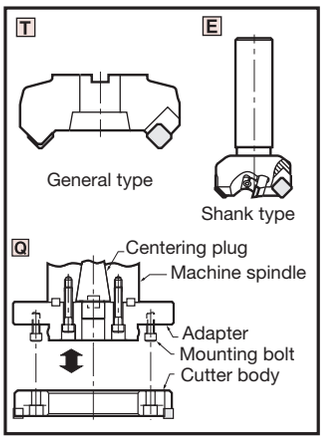


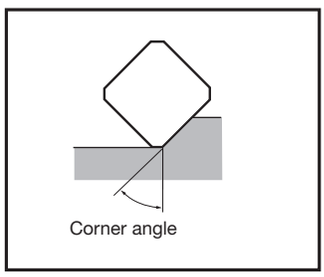
⑧ Additional feature	
B	Close pitch specs.
I	Irregular pitch specs.
A (-A)	Modified specs.
S	For distinguishing shank size



Note: The nomenclature system shown above is not applied to the following TAC mills.
S-series, DAD, DPD, QPP, MS cutter, TCB, TBN, TBF etc.

Nomenclature for S Series TAC Mills



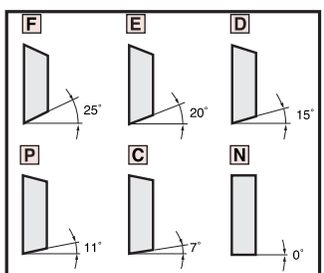


Symbol	Type
V	Vertical insert type
Q	Quick change type
E	Shank type
T	General type
S	Special type
D	PCD insert type
Q	PCBN insert type

① Type

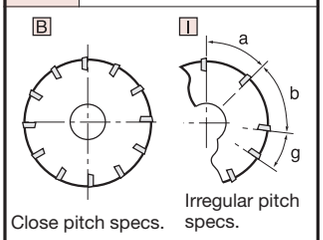
Symbol	Corner angle
P	0° ~ 10°
E	10° ~ 20°
D	30° ~ 40°
A	40° ~ 50°

② Corner angle



③ Relief angle of applicable insert

B	Close pitch specs.
I	Irregular pitch specs.
A (-A)	Modified specs.
S	For distinguishing shank size



④ Additional feature

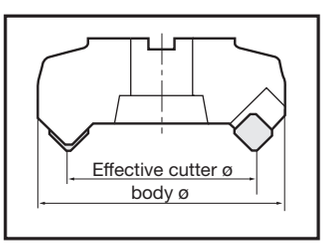
①	②	③	④	⑤	⑥	⑦
T	P	S	11	063	R	B

④ Cutting edge length (mm)

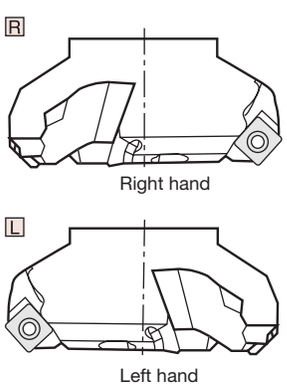
R		S		C		T		Inscribed circle dia.
Symbol	Size	Symbol	Size	Symbol	Size	Symbol	Size	
		06	6.35	06	6.5	11	11.0	6.35
		07	7.94	08	8.1	13	13.8	7.94
09	9.525	09	9.525	09	9.7	16	16.5	9.525
10	10.0	–	–	–	–	–	–	10.0
12	12.0	–	–	–	–	–	–	12.0
12	12.7	12	12.7	12	12.9	22	22.0	12.70
15	15.875	15	15.875	16	16.1	27	27.5	15.875
16	16.0	–	–	–	–	–	–	16.0
19	19.05	19	19.05	19	19.3	33	33.0	19.05
20	20.0	–	–	–	–	–	–	20.0
25	25.0	–	–	–	–	–	–	25.0
25	25.4	25	25.4	25	25.8	44	44.0	25.40
31	31.75	31	31.75	32	32.2	55	55.0	31.75

⑤ Effective cutter diameter

Symbol	Effective diameter (mm)
050	50
063	63
080	80
100	100
125	125
160	160
200	200
250	250
315	315
355	355
400	400



⑥ Cutting direction



Nomenclature for TAC Milling Inserts

Symbol	Shape	Included angle	Outlined figure
H	Hexagonal	120°	
S	Square	90°	
T	Triangular	60°	
C	Rhombic	80°	
E	Rhombic	75°	
L	Rectangular	90°	
A	Parallelogram	85°	
R	Round	–	
Y	Special	35°	
W	Wiper	–	

① Shape

Symbol	Relief angle
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Others
W	Special

② Relief angle

Inscribed circle dia.	Tolerance on inscribed circle (d)		Tolerance on corner height (m)	
	J, K, L, M, N (class)	U (class)	J, K, L, M, N (class)	U (class)
6.35	±0.05	±0.08	±0.08	±0.13
9.525				
12.70	±0.08	±0.13	±0.13	±0.20
15.875	±0.10	±0.18	±0.15	±0.27
19.05				
25.40	±0.13	±0.25	±0.18	±0.38

Symbol	Tolerance on Corner height	Tolerance on Thickness	Tolerance on Inscribed circle
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
H	±0.013	±0.025	±0.013
K	±0.013	±0.025	±0.05 ~ ±0.13
M	±0.08 ~ ±0.18	±0.13	±0.05 ~ ±0.13

③ Tolerance class (mm)

Example

	①	②	③	④	⑤
Inch	S	D	K	N	4
Metric	S	E	E	N	12

④ Insert type				
Symbol	Hole	Hole shape	Chip groove	Section shape
N	Without	–	Without	
R			On one side	
F			On both sides	
W	With	Partially cylindrical hole with 40° - 60° mouth on one side	Without	
T			On one side	
Q		Partially cylindrical hole with 40° - 60° mouth on both sides	Without	
U			On both sides	
B		Partially cylindrical hole with 70° - 90° mouth on one side	Without	
H			On one side	
C		Partially cylindrical hole with 70° - 90° mouth on both sides	Without	
J			On both sides	
X	–	–	–	

⑤ Cutting edge length (mm)								
R		S		C		T		Inscribed circle ø
Symbol	Size	Symbol	Size	Symbol	Size	Symbol	Size	
		06	6.35	06	6.5	11	11.0	6.35
		07	7.94	08	8.1	13	13.8	7.94
09	9.525	09	9.525	09	9.7	16	16.5	9.525
10	10.0	–	–	–	–	–	–	10.0
12	12.0	–	–	–	–	–	–	12.0
12	12.7	12	12.7	12	12.9	22	22.0	12.70
15	15.875	15	15.875	16	16.1	27	27.5	15.875
16	16.0	–	–	–	–	–	–	16.0
19	19.05	19	19.05	19	19.3	33	33.0	19.05
20	20.0	–	–	–	–	–	–	20.0
25	25.0	–	–	–	–	–	–	25.0
25	25.4	25	25.4	25	25.8	44	44.0	25.40
31	31.75	31	31.75	32	32.2	55	55.0	31.75

⑥ Thickness	
Symbol	(mm)
03	3.18
T3	3.97
04	4.76
06	6.35
07	7.94
09	9.52

Note on nomenclature for wiper inserts:
In inch system, symbol "W" is used for the insert shape. On the other hand, in metric system, the shape symbol is the same as for conventional inserts. And, the meaning of wiper is distinguished by placing a symbol such as W, WS, and WD in position 10.

Symbol	Chip groove	Hole
A	Without	With
F	On both sides	Without
G	On both sides	With
M	On one side	With
N	Without	Without
W	Without	Without

④ Insert type

Symbol		(mm)
Inch	3	9.525
	4	12.70
	5	15.875
	6	19.050

⑤ Inscribed circle

Symbol		(mm)
Inch	2	3.18
	3	4.76
	4	6.35
	6	9.52

⑥ Thickness

Symbol	Geometry (mm)
1	0.4 (0.397)
2	0.8 (0.794)
3	1.2 (1.191)
4	1.6 (1.588)
5	2.0 (1.984)
6	2.4 (2.381)
Symbol	Explanation
F	Special finishing edge (Example: MS cutter's insert)
H	Flat chamfer with 60° corner angle
S	Flat chamfer with 15° corner angle
Z	Flat chamfer with various corner angle.

⑦ Corner geometry

⑥	⑦	⑧	⑨	
2	Z	T	N	
03	AG	T	N	T
⑥	⑦	⑧	⑨	⑩

⑦ Corner geometry

Symbol	Corner radius R (mm)	Symbol	Corner angle	Approach angle	Symbol	Chamfer flat relief angle
04	0.4	A	45°	45°	A	3°
08	0.8	D	30°	60°	B	5°
12	1.2	E	15°	75°	C	7°
16	1.6	F	5°	85°	D	15°
20	2.0	P	0°	90°	E	20°
24	2.4	Z	Other angles		F	25°
					G	30°
					N	0°
					P	11°
					Z	Other angles

⑧ Cutting edge condition

Symbol	Condition	Shape
F	Sharp edge	
E	Round honing	
T	Chamfer honing	
S	Combination honing	
P	Combination round honing	

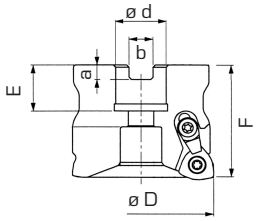
⑨ Hand of insert

Symbol	Hand
R	Right
L	Left
N	Neutral

⑩ Special feature

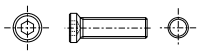
Symbol	Description
12	Chamfer flat width: 1.2 mm
16	Chamfer flat width: 1.6 mm
20	Chamfer flat width: 2.0 mm
24	Chamfer flat width: 2.4 mm
AC	Roughing insert with chip splitters
D	Sintered diamond tipped insert
T	Double-rake edge insert
W	Wiper insert (Multiple corner type)
WS	Wiper insert (Single corner type)
WD	Sintered diamond tipped wiper insert
MJ	Chipbreaker insert for general purpose
MH	Chipbreaker insert for high feed
ML	Chipbreaker insert for reduced cutting forces

TXP05/06/08 For super high feed (with small cutting depth)



Rake angle: A.R. +5° R.R. -4° ~ -6°
Max. cutting depth: 1.5 mm

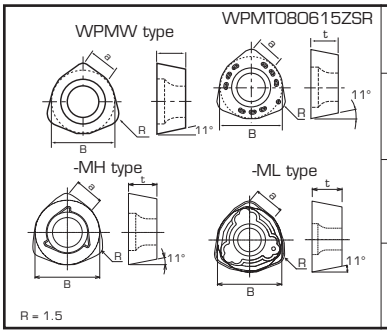
Centre bolt



Cat. No.	Stock	No. of inserts	Dimensions (mm)						Inserts	Replacement parts				Mounting details
			ø D	ø d	F	E	a	b		Clamping screw	Clamp-set	Wrench	Centre bolt	
NEW TXP05063RB-E	●	6	63	22	50	20	6.3	10.4	WPM*05H315ZPR-**	CSPB-3.5S	–	IP-150	CM10x30H	P. 339 Ⓐ
NEW TXP05080RB-E	●	7	80	27	63	22	7	12.4					CM12x30H	
NEW TXP06063RB-E	●	5	63	22	50	20	6.3	10.4	WPM*06X415ZPR-**	CSPB-4S	CSY-15		CM10x30H	
NEW TXP06080RB-E	●	6	80	27	63	22	7	12.4					CM12x30H	
TXP08050R-E	●	3	50	22	50	20	6.3	10.4	WPMT080615Z*R-**	CSTB-5	CSX20	T-20T	FSHM10-40	
TXP08052R-E	●		52											
TXP08063R-E	●	4	63										–	
TXP08066R-E	●		66	27		22	7.0	12.4						
TXP08080R-E	●	5	80		63									

Specifications: Inserts

● Standard stock in Europe



Cat. No.	Tolerance	Honing	Dimensions (mm)			Grade			
						PVD coated		CVD coated	
			a	t	B	AH120	AH140	T3030	T1015
WPMW05H315ZPR	M	with	5	3.50	7.94	●	●	●	●
WPMT05H315ZPR-MH						●	●		
WPMT05H315ZPR-ML						●	●	●	
WPMW06X415ZPR	M		6	4.20	9.525	●	●	●	●
WPMT06X415ZPR-MH						●	●		
WPMT06X415ZPR-ML						●	●	●	
WPMT080615ZSR	M		8	6.35	12.7	●	●	●	●
WPMT080615ZSR-MH						●	●		
WPMT080615ZPR-ML						●	●	●	

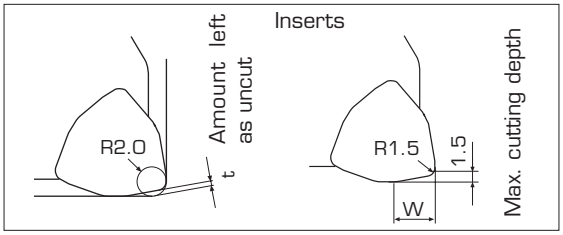
Cutting data

Work materials	Grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Recommended cutting conditions		
				ø 50, ø 52 t = 3	ø 63, ø 66 t = 4/5/6	ø 80 t = 5/6/7
Carbon steels Ck45 etc. < 300HB	T3030 (AH120)	150 - 250	0.5 - 2.0	Vc = 200 m/min, ft = 1.5 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t		
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	T3030 (AH120)	100 - 200	0.5 - 2.0	Vc = 150 m/min, ft = 1.5 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t		
Die steels X96CrMoV12 etc. < 300HB	AH120 (T3030)	80 - 150	0.5 - 1.0	Vc = 120 m/min, ft = 0.8 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.1 mm/t		
Stainless steels X5CrNi1810 etc. < 250HB	AH140	100 - 200	0.5 - 2.0	Vc = 150 m/min, ft = 1.5 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t		
Cast irons GG25 etc.	T1015	150 - 250	0.8 - 2.5	Vc = 200 m/min, ft = 2.0 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t		

*The recommended cutting parameter are merely a starting guideline and should be optimised according to individual machining requirements

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

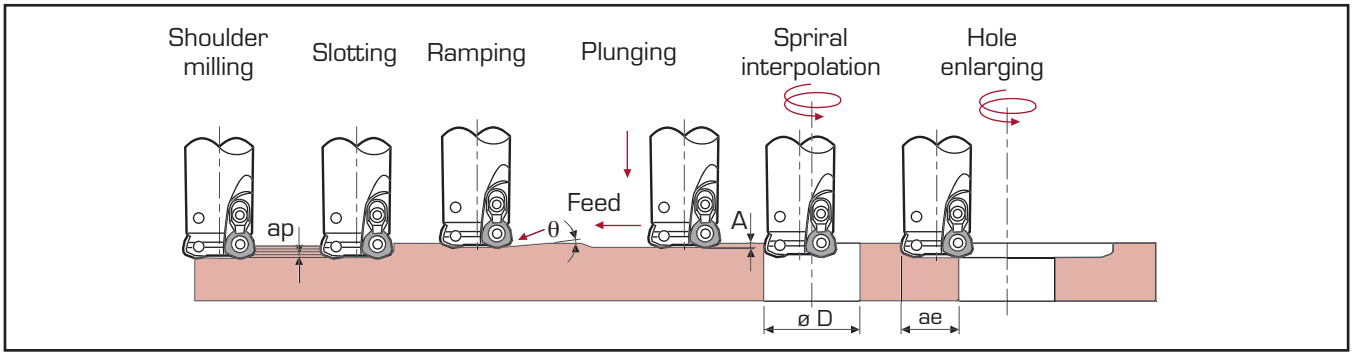
Tool geometry on programming



Milling type	W (mm)	t (mm)	R (mm)
TXP	5.7	0.7	2.0

When programming the machine path, a theoretical radius (R) and the residual amount (t) should be calculated.

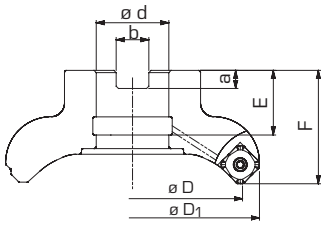
Application



Cat. No.	Tool ø (mm)	Max. cutting depth ap (mm)	Max. ramping angle (θ)	Max. plunging A (mm)	Min. machining ø D (mm)	Max. machining ø D (mm)	Max. cutting width for enlarging ae (mm)
NEW TXP05063RB-E	63	1.5	1°	0.5	116	123	59
NEW TXP05080RB-E	80		0° 30'		150	157	76
NEW TXP06063RB-E	63		1°	1.0	109	123	58
NEW TXP06080RB-E	80		0° 30'		143	157	75
TXP08050R-E	50		4°		72	97	44
TXP08052R-E	52				76	101	46
TXP08063R-E	63		2° 30'		98	123	57
TXP08066R-E	66				104	129	60
TXP08080R-E	80		1° 30'		132	157	74

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TAW13 45° face milling cutter



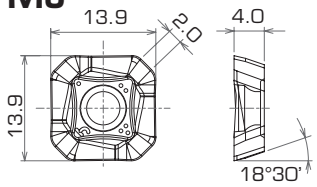
Rake angle: A.R. 17° ~ 20°
R.R. -16° ~ -11°

	Item code	Stock	No. of inserts	Dimensions (mm) ø D	ø D_1	ø d	F	E	a	b	Air hole	Centre bolt Item code	Centre bolt Fig.	Mounting details
Standard	TAW13R050M22.0E04	●	4	50	63	22	40	20	6.3	10.4	with	CM10X30H	1	P. 339 Ⓐ
	TAW13R063M22.0E05	●	5	63	76									
	TAW13R080M27.0E06	●	6	80	94	27	50	22	7	12.4	with	CM12X30H		
	TAW13R100M32.0E07	●	7	100	114	32		28.5	8	14.4	with	TMBA-M16H	2	P. 339 Ⓑ
	TAW13R125M40.0E08	●	8	125	139	40	63	32	9	16.4	with	TMBA-M20H		
	TAW13R160M40.0E10	●	10	160	174			29			without	-	-	P. 339 Ⓒ
Close	TAW13R050M22.0E05	●	5	50	63	22	40	20	6.3	10.4	with	CM10X30H	1	P. 339 Ⓐ
	TAW13R063M22.0E06	●	6	63	76									
	TAW13R080M27.0E08	●	8	80	94	27	50	22	7	12.4	with	CM12X30H		
	TAW13R100M32.0E10	●	10	100	114	32		28.5	8	14.4	with	TMBA-M16H	2	P. 339 Ⓑ
	TAW13R125M40.0E12	●	12	125	139	40	63	32	9	16.4	with	TMBA-M20H		
	TAW13R160M40.0E16	●	16	160	174			29			without	-	-	P. 339 Ⓒ

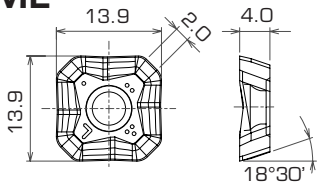
Specification: inserts for TAW milling cutter (45°)

● Standard stock in Europe

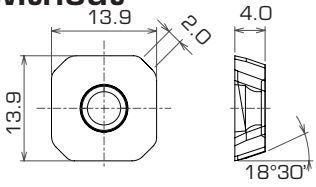
MJ



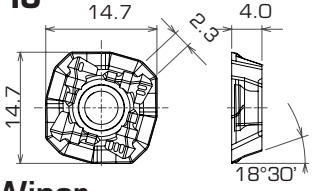
ML



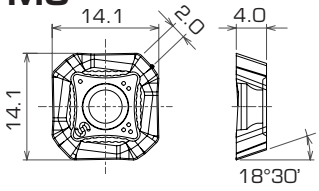
without



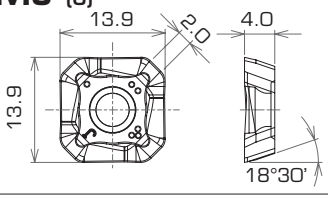
HJ



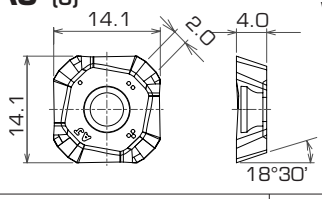
MS



MJ (G)

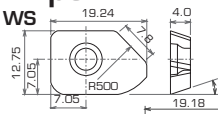


AJ (G)

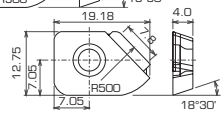


Wiper

WS

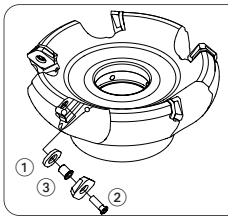


WD



Item code	Grades PVD coated AH120	PVD coated AH140	PVD coated GH110	CVD coated T3030	CVD coated T1015	Cermet NS740	Carbide KS05F	PCD DX140	Accuracy	Honing	Wiping flat	Max. ap
SWMT13T3AFPR-MJ	●	●		●	●	●			M	with	2.0	4.0
SWMT13T3AFER-ML	●											3.0
SWMW13T3AFTR	●			●	●	●						5.0
SWMT13T3AFPR-HJ	●	●		●	●						2.3	2.0
SWMT13T3AFPR-MS		●									2.0	4.0
SWGT13T3AFPR-MJ	●					●			G			
SWGT13T3AFFR-AJ							●			without		
NEW WWCW13T3AFER-WS			●			●			C	with	7.8	-
NEW WWCW13T3AFFR-WS							●			without		
NEW WWCW13T3AFFR-WD								●				

Replacement parts



Description	Item code
① Shim	FSSA1102
② Clamping screw for insert	CSPB-3.5
③ Clamping screw for shim	DTS5-3.5SS
Wrench	P-3.5
Wrench	IP-15D

Centre bolt

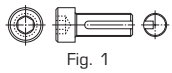


Fig. 1

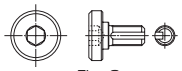


Fig. 2

Cutting conditions TAW (45°)

Roughing (Cutting depth: ap > 1.0 mm)

Work materals	Grade	Choice*	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)					
				MJ	ML	without	HJ	MS	AJ
Mild steel **Low alloyed steel** St37, etc. (< 180HB)	**AH120**	**I**	100 ~ 270	0.05 ~ 0.3	0.05 ~ 0.25	0.05 ~ 0.3	0.2 ~ 0.6	-	-
	T3030	**II**	150 ~ 300	0.05 ~ 0.3	-	0.05 ~ 0.3	0.2 ~ 0.6	-	-
	AH140	**III**	80 ~ 180	0.05 ~ 0.3	-	-	-	0.1 ~ 0.25	-
	NS740	**IV**	100 ~ 300	0.05 ~ 0.23	-	0.05 ~ 0.23	-	-	-
Carbon steel **Alloy steel** Ck45, 42CrMo4, etc. (< 300HB)	**AH120**	**I**	100 ~ 230	0.05 ~ 0.25	0.05 ~ 0.2	0.05 ~ 0.25	0.2 ~ 0.5	-	-
	T3030	**II**	150 ~ 280	0.05 ~ 0.25	-	0.05 ~ 0.25	0.2 ~ 0.5	-	-
	AH140	**III**	80 ~ 150	0.05 ~ 0.25	-	-	0.2 ~ 0.5	-	-
	NS740	**IV**	100 ~ 230	0.05 ~ 0.2	-	0.05 ~ 0.2	-	-	-
Die & Prehardened steel X96CrMoV12, etc. (< 30HRC)	**AH120**	**I**	100 ~ 180	0.05 ~ 0.2	0.05 ~ 0.15	0.05 ~ 0.2	0.2 ~ 0.4	-	-
	T3030	**II**	100 ~ 180	0.05 ~ 0.2	-	0.05 ~ 0.2	0.2 ~ 0.4	-	-
Stainless steel (< 250HB)	**AH140**	**I**	80 ~ 200	0.1 ~ 0.25	-	-	0.2 ~ 0.5	0.1 ~ 0.2	-
	AH120	**II**	150 ~ 250	0.1 ~ 0.25	0.1 ~ 0.2	0.1 ~ 0.25	0.2 ~ 0.5	-	-
Grey cast iron **Ductile cast iron**	**T1015**	**I**	100 ~ 250	0.05 ~ 0.25	-	0.05 ~ 0.25	0.2 ~ 0.6	-	-
	AH120	**III**	100 ~ 250	0.05 ~ 0.25	0.05 ~ 0.2	0.05 ~ 0.25	0.2 ~ 0.6	-	-
Aluminium alloys (Si: < 12 %)	**KS05F**	**I**	300 ~ 1000	-	-	-	-	-	0.05 ~ 0.2
Aluminium alloys (Si: > 13 %)	**KS05F**	**I**	80 ~ 300	-	-	-	-	-	0.05 ~ 0.2
Copper alloys	**KS05F**	**I**	200 ~ 500	-	-	-	-	-	0.05 ~ 0.2

Finishing (Cutting depth: ap < 1.0 mm)

Work materals	Grade	Choice*	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)					
				MJ	ML	without	HJ	MS	AJ
Mild steel **Low alloyed steel** St37, etc. (< 180HB)	**AH120**	**I**	100 ~ 270	0.05 ~ 0.25	0.05 ~ 0.2	0.05 ~ 0.25	0.2 ~ 0.6	-	-
	T3030	**II**	150 ~ 300	0.05 ~ 0.25	-	0.05 ~ 0.25	0.2 ~ 0.6	-	-
	AH140	**III**	80 ~ 180	0.05 ~ 0.25	-	-	-	0.05 ~ 0.2	-
	NS740	**IV**	100 ~ 300	0.05 ~ 0.2	-	0.05 ~ 0.2	-	-	-
Carbon steel **Alloy steel** Ck45, 42CrMo4, etc. (< 300HB)	**AH120**	**I**	100 ~ 230	0.05 ~ 0.2	0.05 ~ 0.15	0.05 ~ 0.2	0.2 ~ 0.5	-	-
	T3030	**II**	150 ~ 280	0.05 ~ 0.2	-	0.05 ~ 0.2	0.2 ~ 0.5	-	-
	AH140	**III**	80 ~ 150	0.05 ~ 0.2	-	-	0.2 ~ 0.5	-	-
	NS740	**IV**	100 ~ 230	0.05 ~ 0.18	-	0.05 ~ 0.18	-	-	-
Die & Prehardened steel X96CrMoV12, etc. (< 30HRC)	**AH120**	**I**	100 ~ 180	0.05 ~ 0.18	0.05 ~ 0.12	0.05 ~ 0.18	0.2 ~ 0.4	-	-
	T3030	**II**	100 ~ 180	0.05 ~ 0.18	-	0.05 ~ 0.18	0.2 ~ 0.4	-	-
Stainless steel (< 250HB)	**AH140**	**I**	80 ~ 200	0.1 ~ 0.2	-	-	0.2 ~ 0.5	0.1 ~ 0.18	-
	AH120	**II**	150 ~ 250	0.1 ~ 0.2	0.1 ~ 0.18	0.1 ~ 0.2	0.2 ~ 0.5	-	-
Grey cast iron **Ductile cast iron**	**T1015**	**I**	100 ~ 250	0.1 ~ 0.2	-	0.1 ~ 0.2	0.2 ~ 0.6	-	-
	AH120	**III**	100 ~ 250	0.1 ~ 0.2	0.05 ~ 0.18	0.1 ~ 0.2	0.2 ~ 0.6	-	-
Aluminium alloys (Si: < 12 %)	**KS05F**	**I**	300 ~ 1000	-	-	-	-	-	0.05 ~ 0.2
Aluminium alloys (Si: > 13 %)	**KS05F**	**I**	80 ~ 300	-	-	-	-	-	0.05 ~ 0.2
Copper alloys	**KS05F**	**I**	200 ~ 500	-	-	-	-	-	0.05 ~ 0.2

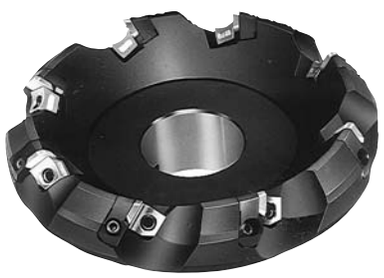
Choice*– I First – II Wear-resistance – III Toughness – IV Surface quality

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

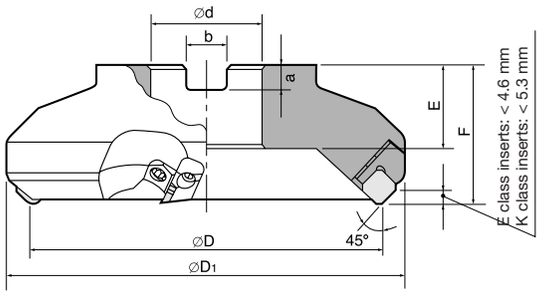
“Lightning Mill”

TME4400I

High-rake geometry for low cutting force
Irregular pitch design for chatter-free milling



Rake angle: A.R. +24˚ R.R. -8˚ ~ -6˚



Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TME4403R/LIE	●		4	80	101.5	27	26	50	7	12.4	1.43	
TME4404R/LIE	●		5	100	120.2	32	32	63	8	14.4	2.74	P. 339Ⓑ
TME4405R/LIE	●		6	125	145.2	40	32	63	9	16.4	4.04	
TME4406R/LIE	●		8	160	181.2	40	29	63	9	16.4	5.82	
TME4408R/LIE			10	200	220.5	60	38	63	14	25.7	9.18	P. 339Ⓒ
TME4410R/LIE			12	250	269.8	60	38	63	14	25.7	16.64	
TME4412R/LIE			14	315	334.4	60	38	63	14	25.7	25.72	P. 339Ⓓ

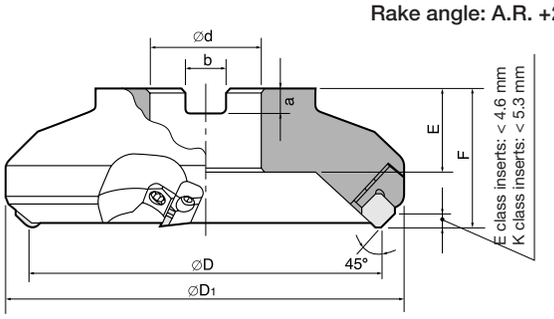
Note: Cutting edge height (F) is for when SEEN1203AG□N type inserts are used.

“Lightning Mill”

TME4400B

High-rake geometry for low cutting force
Close pitch design for high-feed milling

Rake angle: A.R. +24˚ R.R. -8˚ ~ -6˚



Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TME4463R/LBE	●		5	63	87.2	22	20	40	6.3	10.4	1.00	P. 339Ⓐ
TME4403R/LBE	●		6	80	101.5	27	26	50	7	12.4	1.43	
TME4404R/LBE	●		7	100	120.2	32	32	63	8	14.4	2.77	P. 339Ⓑ
TME4405R/LBE	●		9	125	145.2	40	32	63	9	16.4	4.06	
TME4406R/LBE	●		12	160	181.2	40	29	63	9	16.4	5.86	
TME4408R/LBE			15	200	220.5	60	38	63	14	25.7	9.24	P. 339Ⓒ
TME4410R/LBE			19	250	269.8	60	38	63	14	25.7	16.68	
TME4412R/LBE			23	315	334.4	60	38	63	14	25.7	25.71	P. 339Ⓓ

Note: Cutting edge height (F) is for when SEEN1203AG□N type inserts are used.

■ Inserts (Used for TME4400I/TME4400B)

SE□N1203AG□N (-T)

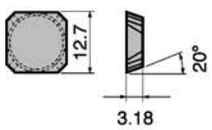
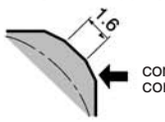


Fig. 1

Corner details **SEKN1203AG□N**



SEE/CN 1203AG□N

Fig. 3

SEE/CN 1203AGTNCR

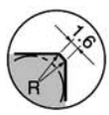
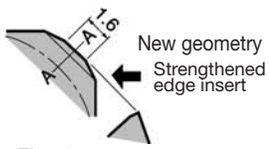


Fig. 4

SEKN1203AG□N-T



A-A section

SEKR1203AGSR-MJ
(With 3-dimensional chipbreaker)

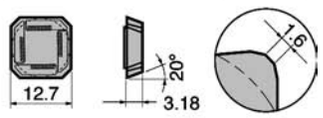


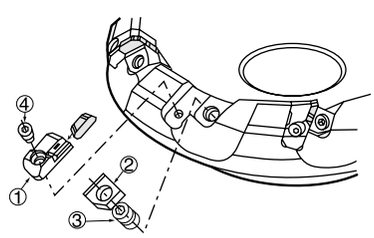
Fig. 5

Right hand (R) shown

Cat. No.	Accuracy	Honing	Grades												Figure
			CVD Coated		PVD Coated				Cermet			C. C.	Uncoated		
			T3030	T1015	AH120	AH140	AH330	GH330	NS740	NS530	NS540	GT540	TH10	UX30	
SECN1203AGFN	C	Without											●		2
SEEN1203AGTN	E	With		○	○	○		○	○		△			○	2
SEEN1203AGFN		Without											○		
SEEN1203AGTNCR		With	○		○	○	○								3
SEKN1203AGTN	K	With	●		○	●	●	●	●		△	●		○	1
SEKN1203AGFN		Without											●		
SEKN1203AGTNCR		With							○						
SEKN1203AGTN-T	K	With	○	●			○	○	○		△			○	4
SEKN1203AGFN-T		Without											●		
SEKR1203AGSR-MJ	K	With	●		○		●	●							5
SEMR1203AFTN-MJ	M	With							●	●	△				-

Note: • SE□N1230AG□N(conventional type) and SE□N1203AG□N1203AGN-T(strengthened type) inserts should not be used together with each other in the same cutter body.
• SE□N1230(42)AF□N type inserts should not be used in the TME4400 type body.
• SECN1230AGFN type is exclusively used for milling aluminium alloys and other non-ferrous light alloys. Its top flat face is ground to mirror-like finish.
• The strengthened type inserts have greater edge strength to prevent edge chipping.

■ Replacement parts



No.	Description	Parts Cat. No.		
		TME4463R/LBE	TME4403R/LI~4405R/LI TME4403R/LB~4405R/LB	TME4406R/LI~4412R/LI TME4406R/LB~4412R/LB
①	Locator	LE444R/L	LE444R/L	LE446R/L
②	Insert locking wedge	WT402R/L	WF444R/L	WF444R/L
③	Wedge fixing screw	DS-8	FDS-8S	FDS-8S
④	Locator fixing screw	M4 × 0.7 × 14	CM4 × 0.7 × 14	CM4 × 0.7 × 14
—	T-handle wrench	TP-4	TP-4	TP-4

■ Standard cutting conditions

Work materials	Insert grades	Roughing (Cutting depth: 1.5 ~ 4 mm)		Finishing (Cutting depth: 0.3 ~ 0.7 mm)	
		Vc (m/min)	ft (mm/t)	Vc (m/min)	ft (mm/t)
Mild steels (< 180 HB) St37 etc.	NS540 · NS740	150 ~ 250	0.10 ~ 0.20	150 ~ 250	0.10 ~ 0.25
	GH330 · AH120	150 ~ 200	0.10 ~ 0.25	150 ~ 250	0.10 ~ 0.28
	T3030	150 ~ 280	0.10 ~ 0.28	180 ~ 300	0.10 ~ 0.30
	AH330	150 ~ 300	0.10 ~ 0.25	150 ~ 350	0.10 ~ 0.25
	UX30 · AH140	100 ~ 180	0.10 ~ 0.28	130 ~ 200	0.10 ~ 0.30
Carbon steels Alloy steels (< 300 HB) Ck45, 42CrMo4 etc.	T3030	150 ~ 230	0.10 ~ 0.25	200 ~ 300	0.10 ~ 0.28
	NS540 · NS740	100 ~ 180	0.10 ~ 0.18	150 ~ 200	0.10 ~ 0.23
	GH330 · AH120	100 ~ 200	0.10 ~ 0.23	150 ~ 200	0.10 ~ 0.25
	AH330	150 ~ 250	0.10 ~ 0.25	200 ~ 320	0.10 ~ 0.25
	UX30	80 ~ 130	0.10 ~ 0.25	100 ~ 150	0.10 ~0.28
Stainless steels (< 250 HB)	AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
	AH120	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
	UX30	150 ~ 180	0.15 ~ 0.23	180 ~ 200	0.15 ~ 0.25
Die steels (< 30 HRC) X96CrMoV12 etc.	AH120 · GH330	100 ~ 150	0.10 ~ 0.15	100 ~ 150	0.10 ~ 0.20
	AH330	100 ~ 200	0.10 ~ 0.15	100 ~ 250	0.10 ~ 0.20
	UX30	80 ~ 130	0.10 ~ 0.15	80 ~ 130	0.10 ~ 0.20
Cast irons Ductile cast irons	T1015	100 ~ 200	0.10 ~ 0.20	100 ~ 200	0.10 ~ 0.25
	TH10 · UX30	80 ~ 130	0.10 ~ 0.20	80 ~ 130	0.10 ~ 0.25
Aluminium alloys (Si: < 12%)	TH10	200 ~ 1000	0.10 ~ 0.20	350 ~ 1000	0.10 ~ 0.30
Copper alloys	TH10	200 ~ 500	0.10 ~ 0.20	200 ~ 500	0.10 ~ 0.25

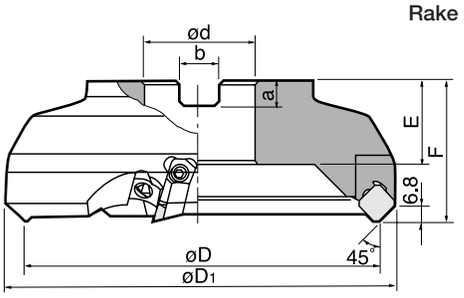
Note: Dry cutting is recommended for all materials except for aluminium alloys.

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TMD4400I High-performance and general purpose
Irregular pitch design for chatter-free milling

Rake angle: A.R. +15° R.R. -3°



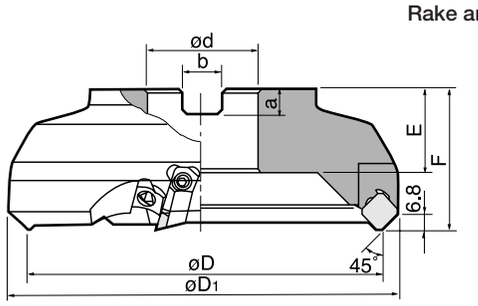
Max. cutting depth: 4 mm
Right hand (R) shown

Cat. No.	Stock		No. of inserts	Dimensions (mm)							Weight (kg)	Mounting details
	R	L		øD	øD1	ød	E	F	a	b		
TMD4403R/LIE	●		4	80	96	27	26	50	7	12.4	1.4	
TMD4404R/LIE	●		5	100	115	32	32	63	8	14.4	2.5	P. 339Ⓑ
TMD4405R/LIE	●		6	125	139	40	32	63	9	16.4	3.6	
TMD4406R/LIE	●		8	160	173	40	29	63	9	16.4	5.6	
TMD4408R/LIE			10	200	213	60	38	63	14	25.7	8.7	P. 339Ⓒ
TMD4410R/LIE			12	250	263	60	38	63	14	25.7	16.3	
TMD4412R/LIE			14	315	327	60	38	63	14	25.7	25.2	P. 339Ⓓ

Note: Cutting edge height (F) is for when SEEN1203AG□N type inserts are used.

TMD4400B High Feed Milling at Low Cutting Force with Less Vibration (Close pitch design)

Rake angle: A.R. +15° R.R. -3°



Max. cutting depth: 4 mm
Right hand (R) shown

Cat. No.	Stock		No. of inserts	Dimensions (mm)							Weight (kg)	Mounting details
	R	L		øD	øD1	ød	E	F	a	b		
TMD4403R/LBE	●		6	80	96	27	26	50	7	12.4	1.4	
TMD4404R/LBE	●		6	100	115	32	32	63	8	14.4	2.5	P. 339Ⓑ
TMD4405R/LBE	●		8	125	139	40	32	63	9	16.4	3.6	

Note: Cutting edge height (F) is for when SEEN1203AG□N type inserts are used.

■ Inserts

SDKN1203AE□N-12

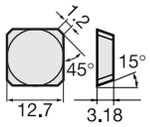


Fig. 1

SDKN1203AETN-16

Fig. 2

SDKN1203AETN-CR

Fig. 3

SDKR1203AESR-MJ

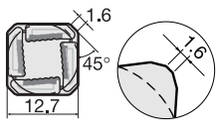


Fig. 4

SDKR1203AEPN-MS

Fig. 5

SDMR1203AETN-MJ

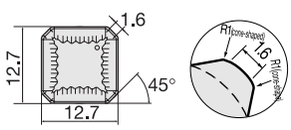
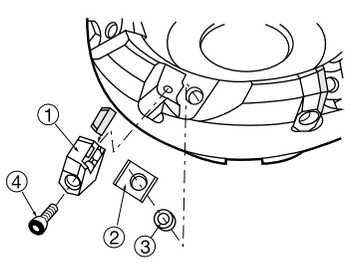


Fig. 6

Right hand (R) shown

Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Grades													Fig.
				CVD Coated		PVD Coated				Cermet		C. C.	Uncoated				
				T3030	T1015	AH120	AH140	AH330	GH330	NS740	NS540	GT540	TH10	UX30	KS20	TX30	
SDKN42ZTN	**SDKN1203AETN-12**	K	With		●	○	●	●	●	●	△	●		●		○	1
SDKN42ZFN	**SDKN1203AEFN-12**		Without										●		●		1
SDKN42ZTNCR	**SDKN1203AETN-CR**		With							○	△						3
SDKN42ZTN16	**SDKN1203AETN-16**		With	●													2
SDKR42ZSR-MJ	**SDKR1203AESR-MJ**	K	With	●	○	○		●	●								4
SDKR42ZPN-MS	**SDKR1203AEPN-MS**		With				●										5
SDMR1203AETN-MJ	**SDMR1203AETN-MJ**	M	With							●	△						6

■ Replacement parts



No.	Description	Parts Cat. No.
①	Locator	LD440R/L
②	Insert locking wedge	WP440R/L
③	Wedge fixing screw	FDS-8S
④	Locator fixing screw	CM4×0.7×14
—	T-handle wrench	TP-4

■ Standard cutting conditions

Work materials	Insert grades	Roughing (Cutting depth: 1.5~4 mm)		Finishing (Cutting depth: 0.3~0.7 mm)	
		Vc (m/min)	ft (mm/t)	Vc (m/min)	ft (mm/t)
Mild steels (< HB180) St37 etc.	NS540 · NS740	150 ~ 250	0.1 ~ 0.20	150 ~ 250	0.1 ~ 0.25
	AH330	150 ~ 400	0.1 ~ 0.25	150 ~ 400	0.1 ~ 0.28
	GH330 · AH120	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.28
	T3030	150 ~ 280	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
	UX30 · AH140	100 ~ 180	0.1 ~ 0.28	130 ~ 200	0.1 ~ 0.3
Carbon steels Alloy steels (< HB300) Ck45, 42CrM04 etc.	T3030	150 ~ 230	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
	NS540 · NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
	AH330	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
	GH330 · AH120	100 ~ 200	0.1 ~ 0.23	150 ~ 200	0.1 ~ 0.25
	UX30	80 ~ 130	0.1 ~ 0.25	100 ~ 150	0.1 ~ 0.28
Stainless steels (< 250 HB)	AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
	UX30	150 ~ 180	0.15 ~ 0.23	180 ~ 200	0.15 ~ 0.25
Die steels (< HRC30) X96CrMoV12 etc.	T3030 · GH330	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
	AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
	UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
Cast irons Ductile cast irons	T1015	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
	TH10 · UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25
Aluminium alloys (Si: < 12%)	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
Copper alloys	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

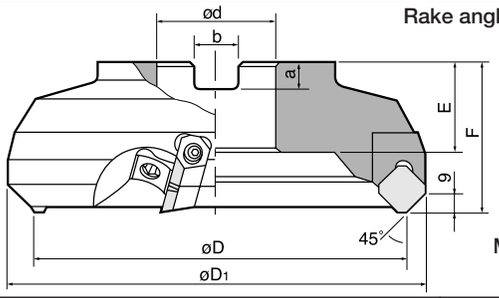
Note: Dry cutting is recommended for all materials expect for aluminium alloys.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TMD5400I

For face milling of steels and difficult-to-cut materials
Irregular pitch design for chatter-free milling



Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TMD5404R/LIE	●		4	100	118	32	32	63	8	14.4	2.5	P. 339Ⓑ
TMD5405R/LIE	●		6	125	142	40	32	63	9	16.4	3.7	
TMD5406R/LIE	●		6	160	176	40	29	63	9	16.4	5.8	P. 339Ⓒ
TMD5408R/LIE	●		8	200	216	60	38	63	14	25.7	9.0	
TMD5410R/LIE	●		10	250	265	60	38	63	14	25.7	16.3	
TMD5412R/LIE	●		12	315	330	60	38	63	14	25.7	25.2	P. 339Ⓓ

■ Inserts

SDKN1504AE□N

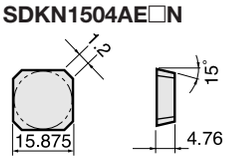


Fig. 1

Corner details
SDKN1504AETN-16

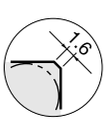


Fig. 2

SDKR1504AESR-MJ
(With 3-dimensional chipbreaker)

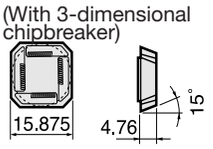
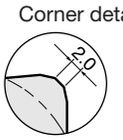


Fig. 3

Corner details



Right hand (R) shown

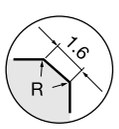
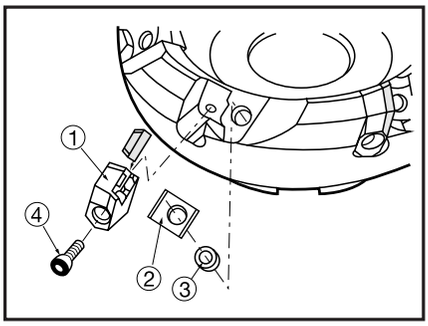


Fig. 4

Cat. No. (Inch system)	ISO Cat. No. (Metric system)	Accuracy	Honing	Grades CVD Coated T3030	CVD Coated T1015	PVD Coated AH120	PVD Coated AH140	PVD Coated AH330	PVD Coated GH330	Cermet NS740	Cermet NS540	Cermet N308	Uncoated TH10	Uncoated UX30	Uncoated TX25	Figure
SDKN53ZTN	SDKN1504AETN	K	With		●	○	●	●	●	○	△			●	○	1
SDKN53ZTNCR	SDKN1504AETNCR		With							○						4
SDKN53ZTN16	SDKN1504AETN-16		With	●												2
SDKN53ZFN	SDKN1504AEFN		Without										●			1
SDKR53ZSR-MJ	SDKR1504AESR-MJ	K	With	●				●	○							3

■ Replacement parts



No.	Description	Parts Cat. No.
①	Locator	LD540R/L
②	Insert locking wedge	WF500R/L
③	Wedge fixing screw	FDS-8S
④	Locator fixing screw	CM4×0.7×20
—	T-handle wrench	TP-4

■ Standard cutting conditions

Work materials	Insert grades	Roughing (Cutting depth: 1.5~6 mm) Vc (m/min)	Roughing (Cutting depth: 1.5~6 mm) ft (mm/t)	Finishing (Cutting depth: 0.3~0.7 mm) Vc (m/min)	Finishing (Cutting depth: 0.3~0.7 mm) ft (mm/t)
Mild steels (< 180 HB)	NS540 · NS740	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.3
	GH330 · AH120	150 ~ 250	0.1 ~ 0.35	150 ~ 250	0.1 ~ 0.35
	T3030	150 ~ 280	0.1 ~ 0.35	180 ~ 300	0.1 ~ 0.35
	UX30	100 ~ 180	0.1 ~ 0.35	130 ~ 200	0.1 ~ 0.35
Carbon steels Alloy steels (< 300 HB)	T3030	150 ~ 230	0.1 ~ 0.35	180 ~ 280	0.1 ~ 0.35
	NS540 · NS740	100 ~ 180	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
	GH330 · AH120	100 ~ 200	0.1 ~ 0.3	150 ~ 200	0.1 ~ 0.35
	UX30	80 ~ 130	0.1 ~ 0.3	100 ~ 150	0.1 ~ 0.35
Stainless steels (< 250 HB)	AH140	80 ~ 180	0.15 ~ 0.3	100 ~ 200	0.15 ~ 0.33
	UX30	150 ~ 180	0.15 ~ 0.3	180 ~ 200	0.15 ~ 0.3
Die steels (< 30 HRC)	T3030 · GH330	100 ~ 150	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.2
	UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.2
Cast irons	T1015	100 ~ 200	0.1 ~ 0.3	100 ~ 200	0.1 ~ 0.3
Ductile cast irons	TH10 · UX30	80 ~ 130	0.1 ~ 0.3	80 ~ 130	0.1 ~ 0.3
Aluminium alloys (Si: < 12%)	TH10	200 ~ 1000	0.05 ~ 0.3	350 ~ 1000	0.1 ~ 0.3
Copper alloys	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

Note: Dry cutting is recommended for all materials except for aluminium alloys.

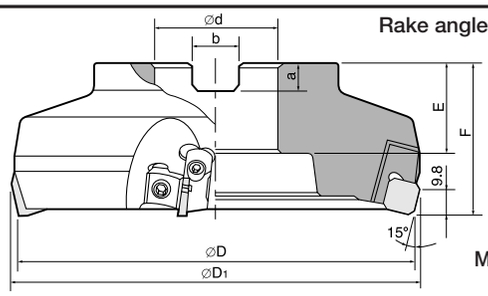
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

"Ceramic Milling"

TGP4100IA For face milling of steels and cast irons

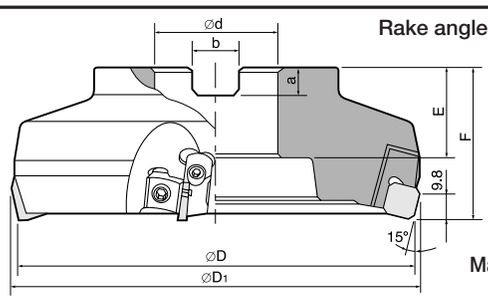
Irregular pitch design for chatter-free milling



Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TGP4103R/LIAE			5	80	89	27	22	50	7	12.4	1.3	P. 339Ⓐ
TGP4104R/LIAE			6	100	108	32	25	63	8	14.4	2.4	
TGP4105R/LIAE			8	125	132	40	32	63	9	16.4	3.6	P. 339Ⓑ
TGP4106R/LIAE			8	160	167	40	29	63	9	16.4	5.9	P. 339Ⓒ
TGP4108R/LIAE			10	200	206	60	38	63	14	25.7	8.7	
TGP4110R/LIAE			12	250	256	60	38	63	14	25.7	15.2	
TGP4112R/LIAE			14	315	321	60	38	63	14	25.7	24.1	P. 339Ⓓ

TGP4100BA For high-feed milling of cast irons

Close pitch design for high-feed milling of cast irons



Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TGP4104R/LBAE	●		8	100	108	32	25	63	8	14.4	2.4	P. 339Ⓐ
TGP4105R/LBAE	●		10	125	132	40	32	63	9	16.4	3.6	P. 339Ⓑ
TGP4106R/LBAE	●		12	160	167	40	29	63	9	16.4	5.8	P. 339Ⓒ
TGP4108R/LBAE			16	200	206	60	38	63	14	25.7	8.6	
TGP4110R/LBAE			20	250	256	60	38	63	14	25.7	15.1	
TGP4112R/LBAE			24	315	321	60	38	63	14	25.7	24.0	P. 339Ⓓ
TGP4114R/LBAE			28	355	361	60	38	80	14	25.7	37.7	
TGP4116R/LBAE			32	400	406	60	38	80	14	25.7	49.1	

■ Inserts (for TGP4100IA / TGP4100BA)

SP□N1203ED□R/L

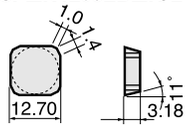


Fig. 1

SPGN120312TN
Corner details

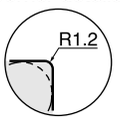


Fig. 2

SPKR1203EDSR-MJ
(With 3-dimensional chipbreaker)

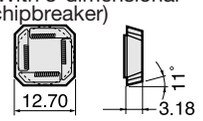
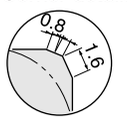


Fig. 3

Corner details



Wiper inserts
One-corner type

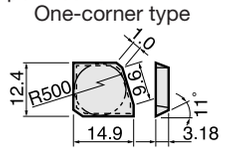


Fig. 4

Two-corner type

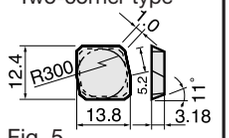
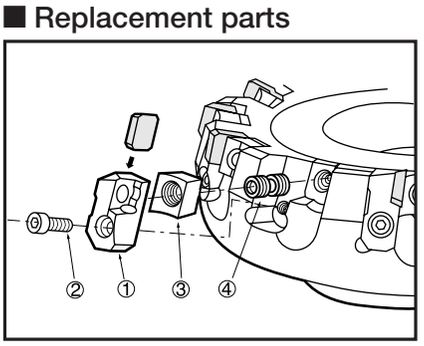


Fig. 5

Right hand (R) shown

Type	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Grades: CVD Coated T3030	CVD Coated T1015	PVD Coated GH330	PVD Coated AH120	PVD Coated AH140	PVD Coated AH330	Cermet NS740	Cermet NS540	Cermet N308	Uncoated TH10	Uncoated UX30	Ceramics FX105	Figure
Normal insert	**SPKN42STR**	**SPKN1203EDTR**	K	With	●	●	○	●	●	●	●	△	○		●	●	
	SPKN42STL	**SPKN1203EDTL**		With							○	△			●		1
	SPKN42SFR	**SPKN1203EDFR**		Without										●			
	SPKN42SFL	**SPKN1203EDFL**		Without										○			
	SPKR42SSR-MJ	**SPKR1203EDSR-MJ**	K	With	●	●	○			●							3
	SPGN120312TN	**SPGN120312TN**	G	With												●	2
Wiper	two-corner **WPAN42SFR**	**SPAX1203EDFR-W**	A	Without										●			5
	one-corner **WPAN42SFRS**	**SPAX1203EDFR-WS**		Without										○			4

■ Replacement parts



No.	Description	Parts Cat. No. TGP4103R/LIA·TGP4100BA	Parts Cat. No. TGP4104R/LIA~4112R/LIA
①	Locator	LP413R/L	LP413R/L
②	Locator fixing screw	CM4×0.7×14	CM4×0.7×14
③	Insert locking wedge	WF310R/L	WP440R/L
④	Wedge fixing screw	FDS-8S	FDS-8S
—	T-handle wrench	TP-4	TP-4

■ Standard cutting conditions

Work materials	Insert grades	Roughing (Cutting depth: 1.5~6 mm) Vc (m/min)	Roughing (Cutting depth: 1.5~6 mm) ft (mm/t)	Finishing (Cutting depth: 0.3~0.7 mm) Vc (m/min)	Finishing (Cutting depth: 0.3~0.7 mm) ft (mm/t)
Mild steels (< 180 HB)	NS540 · NS740	150 ~ 250	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.23
	GH330	150 ~ 250	0.1 ~ 0.23	150 ~ 250	0.1 ~ 0.25
	T3030	150 ~ 280	0.1 ~ 0.25	180 ~ 300	0.1 ~ 0.28
	UX30	100 ~ 180	0.1 ~ 0.25	130 ~ 200	0.1 ~ 0.28
Carbon steels Alloy steels (< 300 HB)	T3030	150 ~ 230	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
	NS540 · NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
	GH330	100 ~ 200	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.23
	UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
Carbon steels Alloy steels (< 300 HB)	T3030 · GH330	150 ~ 230	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
	NS540 · NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
	UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
Stainless steels (< 250 HB)	AH140	150 ~ 230	0.15 ~ 0.2	200 ~ 250	0.15 ~ 0.23
	UX30	150 ~ 180	0.15 ~ 0.2	180 ~ 200	0.15 ~ 0.23
Die steels (< 30 HRC)	T3030	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
	UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
Cast irons	FX105	200 ~ 500	0.1 ~ 0.35	200 ~ 600	0.1 ~ 0.4
Cast irons Ductile cast irons	T1015	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.23
	TH10 · UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.23

Note: Dry cutting is recommended for all materials.

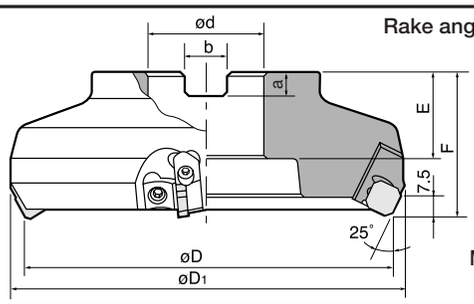
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

"Ceramic Milling"

TGN4200-A

Shock resistant and economical double-negative geometry
(Especially for cast iron)



Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TGN4203R/L-AE	●		5	80	92	27	22	50	7	12.4	1.5	P. 339Ⓐ
TGN4204R/L-AE	●		6	100	112	32	32	63	8	14.4	2.4	P. 339Ⓑ
TGN4205R/L-AE	●		8	125	136	40	32	63	9	16.4	3.9	
TGN4206R/L-AE	●		10	160	171	40	29	63	9	16.4	6.1	
TGN4208R/L-AE			12	200	211	60	38	63	14	25.7	9.0	P. 339Ⓒ
TGN4210R/L-AE			14	250	261	60	38	63	14	25.7	15.6	
TGN4212R/L-AE			14	315	326	60	38	63	14	25.7	24.7	P. 339Ⓓ

■ Inserts

SNKN1204ZNTN

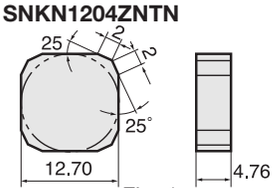


Fig. 1

SNMN1204□□TN
Corner details

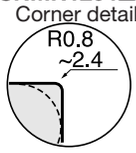
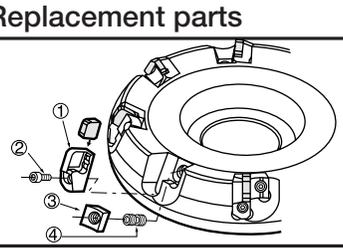


Fig. 2

Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Grades CVD Coated T3030	CVD Coated T1015	Cermet NS740	Cermet NS540	Uncoated TH10	Uncoated UX30	Uncoated TX20	Uncoated TX25	Ceramics FX105	Figure
SNKN43ZTN	SNKN1204ZNTN	K	With	○	○	○	△		○			●	1
SNMN120408TN	SNMN120408TN	M	With									●	2
SNMN120412TN	SNMN120412TN								○			●	
SNMN120416TN	SNMN120416TN											●	
SNMN120420TN	SNMN120420TN											●	
SNMN120424TN	SNMN120424TN											●	

■ Replacement parts



No.	Description	Parts Cat. No.
①	Locator	LN423R/L
②	Locator fixing screw	CM4×0.7×14
③	Insert locking wedge	WP440R/L
④	Wedge fixing screw	FDS-8S
—	T-handle wrench	TP-4

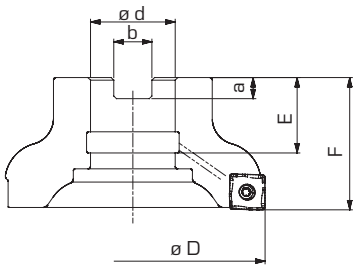
■ Standard cutting conditions

Work materials	Insert grades	Roughing (Cutting depth ap: 1.5~4 mm) Vc (m/min)	Roughing ft (mm/t)	Finishing (Cutting depth ap: 0.3~0.7 mm) Vc (m/min)	Finishing ft (mm/t)
Cast irons Ductile cast irons	TH10 · UX30	80 ~ 130	0.1 ~ 0.25	80 ~ 130	0.1 ~ 0.3
	T1015	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
	FX105	200 ~ 500	0.1 ~ 0.35	200 ~ 600	0.1 ~ 0.4
Mild steels Unhardened steels (< 180 HB)	T3030	150 ~ 230	0.1 ~ 0.3	180 ~ 250	0.1 ~ 0.3
	NS540 · NS740	100 ~ 200	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
	UX30	100 ~ 180	0.1 ~ 0.3	130 ~ 200	0.1 ~ 0.3
Carbon steels Alloy steels (< 300 HB)	T3030	130 ~ 200	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.3
	NS540 · NS740	100 ~ 180	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.25
	UX30	80 ~ 130	0.1 ~ 0.3	100 ~ 150	0.1 ~ 0.3

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TPW13 90° face milling cutter



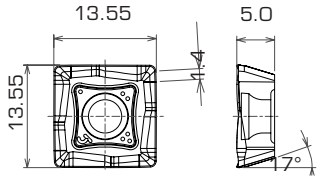
Rake angle: A.R. 11.5°
R.R. -13° ~ -10.5°

	Item code	Stock	No. of inserts	Dimensions (mm)						Air hole	Centre bolt		Mounting details
				ø D	ø d	F	E	a	b		Item code	Fig.	
Standard	TPW13R050M22.0E04	●	4	50	22	40	20	6.3	10.4	with	CM10X30H	1	P. 339 Ⓐ
Standard	TPW13R063M22.0E05	●	5	63									
Standard	TPW13R080M27.0E06	●	6	80	27	50	22	7	12.4	with	CM12X30H		
Standard	TPW13R100M32.0E07	●	7	100	32		28.5	8	14.4	with	TMBA-M16H	2	P. 339 Ⓑ
Standard	TPW13R125M40.0E08	●	8	125	40	63	32	9	16.4	with	TMBA-M20H		
Close	TPW13R050M22.0E05	●	5	50	22	40	20	6.3	10.4	with	CM10X30H	1	P. 339 Ⓐ
Close	TPW13R063M22.0E06	●	6	63									
Close	TPW13R080M27.0E08	●	8	80	27	50	22	7	12.4	with	CM12X30H		
Close	TPW13R100M32.0E10	●	10	100	32		28.5	8	14.4	with	TMBA-M16H	2	P. 339 Ⓑ
Close	TPW13R125M40.0E12	●	12	125	40	63	32	9	16.4	with	TMBA-M20H		

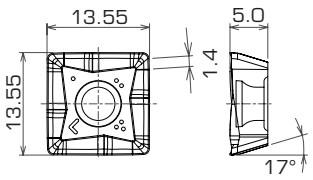
Specification: inserts for TPW milling cutter (90°)

● Standard stock in Europe

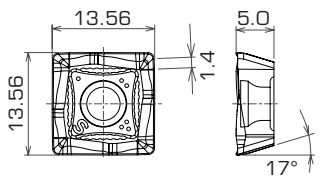
MJ



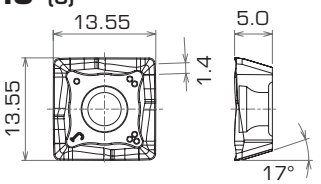
ML



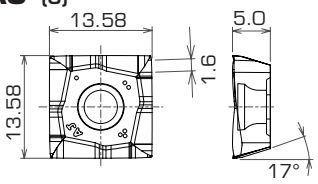
MS



MJ (G)



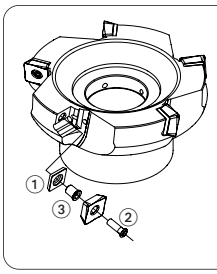
AJ (G)



Item code	Grades						Accuracy	Honing	Wiping flat	Corner radius	Max. ap
	PVD coated		CVD coated		Cermet	Carbide					
	AH120	AH140	T3030	T1015	NS740	KS05F					
SWMT1304PDPR-MJ	●	●	●	●	●		M	with	1.4	0.8	10.00
SWMT1304PDER-ML	●										
SWMT1304PDPR-MS		●									
SWGT1304PDPR-MJ	●				●		G				
SWGT1304PDFR-AJ						●		without	1.6	-	

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

Replacement parts



Description	Item code
① Shim	FSSP1102
② Clamping screw for insert	CSPB-3.5
③ Clamping screw for shim	DTS5-3.5SS
Wrench	P-3.5
Wrench	IP-15D

Centre bolt

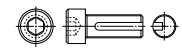


Fig. 1

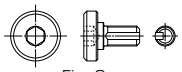


Fig. 2

Cutting conditions TPW (90°)

Roughing (Cutting depth: ap > 1.0 mm)

Work materals	Grade	Choice*	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)			
				MJ	ML	MS	AJ
Mild steel Low alloyed steel St37, etc. (< 180HB)	AH120	I	100 ~ 270	0.05 ~ 0.25	0.05 ~ 0.2	-	-
	T3030	II	150 ~ 300	0.05 ~ 0.25	-	-	-
	AH140	III	80 ~ 180	0.05 ~ 0.25	-	0.05 ~ 0.2	-
	NS740	IV	100 ~ 300	0.05 ~ 0.15	-	-	-
Carbon steel Alloy steel Ck45, 42CrMo4, etc. (< 300HB)	AH120	I	100 ~ 230	0.05 ~ 0.2	0.05 ~ 0.15	-	-
	T3030	II	150 ~ 280	0.05 ~ 0.2	-	-	-
	AH140	III	80 ~ 150	0.05 ~ 0.2	-	-	-
	NS740	IV	100 ~ 230	0.05 ~ 0.15	-	-	-
Die & Prehardened steel X96CrMoV12, etc. (< 30HRC)	AH120	I	100 ~ 180	0.05 ~ 0.15	0.05 ~ 0.12	-	-
	T3030	II	100 ~ 180	0.05 ~ 0.15	-	-	-
Stainless steel (< 250HB)	AH140	I	80 ~ 200	0.05 ~ 0.2	-	0.05 ~ 0.18	-
	AH120	II	150 ~ 250	0.05 ~ 0.2	0.05 ~ 0.15	-	-
Grey cast iron Ductile cast iron	T1015	I	100 ~ 250	0.05 ~ 0.2	-	-	-
	AH120	III	100 ~ 250	0.05 ~ 0.2	0.05 ~ 0.15	-	-
Aluminium alloys (Si: < 12 %)	KS05F	I	300 ~ 1000	-	-	-	0.05 ~ 0.2
Aluminium alloys (Si: > 13 %)	KS05F	I	80 ~ 300	-	-	-	0.05 ~ 0.2
Copper alloys	KS05F	I	200 ~ 500	-	-	-	0.05 ~ 0.2

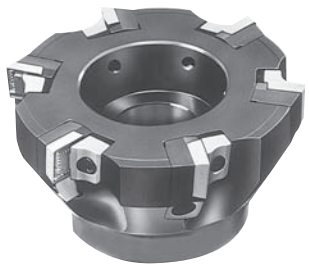
Finishing (Cutting depth: ap < 1.0 mm)

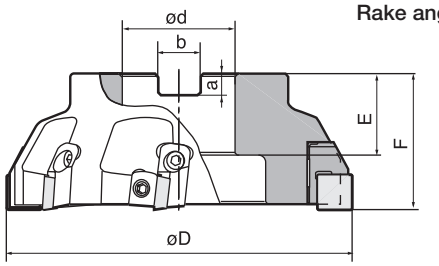
Work materals	Grade	Choice*	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)			
				MJ	ML	MS	AJ
Mild steel Low alloyed steel St37, etc. (< 180HB)	AH120	I	100 ~ 270	0.05 ~ 0.2	0.05 ~ 0.18	-	-
	T3030	II	150 ~ 300	0.05 ~ 0.2	-	-	-
	AH140	III	80 ~ 180	0.05 ~ 0.2	-	0.05 ~ 0.18	-
	NS740	IV	100 ~ 300	0.05 ~ 0.12	-	-	-
Carbon steel Alloy steel Ck45, 42CrMo4, etc. (< 300HB)	AH120	I	100 ~ 230	0.05 ~ 0.18	0.05 ~ 0.12	-	-
	T3030	II	150 ~ 280	0.05 ~ 0.18	-	-	-
	AH140	III	80 ~ 150	0.05 ~ 0.18	-	-	-
	NS740	IV	100 ~ 230	0.05 ~ 0.12	-	-	-
Die & Prehardened steel X96CrMoV12, etc. (< 30HRC)	AH120	I	100 ~ 180	0.05 ~ 0.12	0.05 ~ 0.1	-	-
	T3030	II	100 ~ 180	0.05 ~ 0.12	-	-	-
Stainless steel (< 250HB)	AH140	I	80 ~ 200	0.05 ~ 0.18	-	0.05 ~ 0.15	-
	AH120	II	150 ~ 250	0.05 ~ 0.18	0.05 ~ 0.12	-	-
Grey cast iron Ductile cast iron	T1015	I	100 ~ 250	0.05 ~ 0.18	-	-	-
	AH120	III	100 ~ 250	0.05 ~ 0.18	0.05 ~ 0.12	-	-
Aluminium alloys (Si: < 12 %)	KS05F	I	300 ~ 1000	-	-	-	0.05 ~ 0.2
Aluminium alloys (Si: > 13 %)	KS05F	I	80 ~ 300	-	-	-	0.05 ~ 0.2
Copper alloys	KS05F	I	200 ~ 500	-	-	-	0.05 ~ 0.2

Choice*
I First
II Wear-resistance
III Toughness
IV Surface quality

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TPP16 Highly reliable square shoulder mills





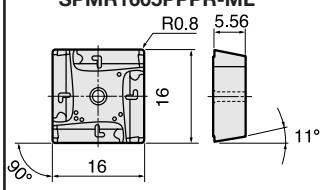
Rake angle: A.R. +6° R.R. -8°

Max. cutting depth: 12 mm
Right hand (R) shown

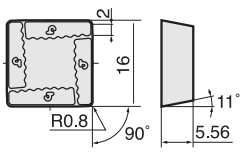
Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Mounting details
			øD	ød	E	F	a	b		
TPP16080RIE	●	4	80	27	26	50	7	12.4	1.0	
TPP16100RIE	●	5	100	32	32	63	8	14.4	1.8	P. 339Ⓑ
TPP16125RIE	●	6	125	40	32	63	9	16.4	2.8	
TPP16160RIE	●	8	160	40	29	63	9	16.4	4.6	
TPP16200RIE	●	10	200	60	38	63	14	25.7	6.9	P. 339Ⓒ
TPP16250RIE	●	12	250	60	38	63	14	25.7	13.0	
TPP16315RIE	●	14	315	60	38	63	14	25.7	22.2	P. 339Ⓓ

■ Inserts

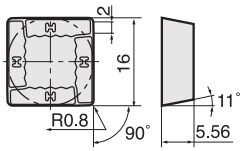
SPMR1605PPPR-ML



SPMR1605PPTR-MJ

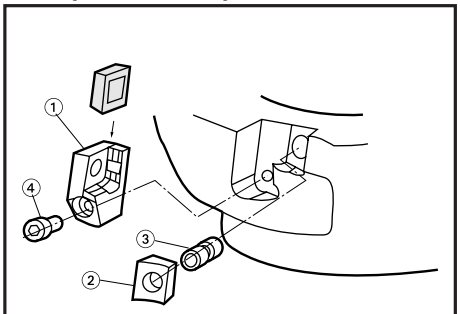


SPMR1605PPTR-MH



Cat. No.	Accuracy	Honing	Grades				
			PVD Coated		CVD Coated		Uncoated
			GH330	GH340	T3030	T1015	UX30
SPMR1605PPPR-ML	M	with	●	●			
SPMR1605PPTR-MJ			●		○	●	○
SPMR1605PPTR-MH			●		●	●	○

■ Replacement parts



No.	Description	Parts Cat. No.
①	Locator	LPP16R/L
②	Insert locking wedge	WPP16R/L
③	Wedge fixing screw	FDS-8S(FDS-8SS)
④	Locator fixing screw	CM5×0.8×12
—	T-handle wrench	TP-4

■ Standard cutting conditions

• For ML-chipbreaker inserts (Sharpness-priority)

Work materials	Insert grades	Roughing		Finishing	
		Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)
Mild steels (< 180 HB)	GH340	100 ~ 200	0.05 ~ 0.17	100 ~ 230	0.05 ~ 0.20
	GH330	130 ~ 230	0.05 ~ 0.17	150 ~ 250	0.05 ~ 0.20
	AH330	130 ~ 370	0.05 ~ 0.17	150 ~ 400	0.05 ~ 0.20
Stainless steels (< 250 HB)	GH340	100 ~ 170	0.05 ~ 0.12	100 ~ 200	0.05 ~ 0.15
	GH330	150 ~ 200	0.05 ~ 0.12	200 ~ 250	0.05 ~ 0.15
Carbon steels Alloy steels (< 250 HB)	GH340	100 ~ 170	0.05 ~ 0.12	100 ~ 200	0.05 ~ 0.15
	GH330	100 ~ 180	0.05 ~ 0.12	150 ~ 200	0.05 ~ 0.15
	AH330	100 ~ 300	0.05 ~ 0.12	150 ~ 320	0.05 ~ 0.15

• For MJ-chipbreaker inserts (General purpose)

Work materials	Insert grades	Roughing (Cutting depth ap > 1.5 mm)		Finishing (Cutting depth ap 0.3 ~ 0.7 mm)	
		Vc (m/min)	ft (mm/t)	Vc (m/min)	ft (mm/t)
Mild steels (< 180 HB)	GH330	100 ~ 230	0.10 ~ 0.25	130 ~ 250	0.10 ~ 0.30
	T3030	130 ~ 230	0.10 ~ 0.28	180 ~ 300	0.10 ~ 0.30
	UX30	100 ~ 180	0.10 ~ 0.25	130 ~ 200	0.10 ~ 0.30
Carbon steels Alloy steels (< 300 HB)	GH330	100 ~ 180	0.10 ~ 0.20	130 ~ 200	0.10 ~ 0.28
	T3030	130 ~ 180	0.10 ~ 0.25	180 ~ 280	0.10 ~ 0.28
	UX30	80 ~ 130	0.10 ~ 0.20	100 ~ 150	0.10 ~ 0.28
Die steels (< 30 HRC)	GH330	100 ~ 150	0.10 ~ 0.18	100 ~ 150	0.10 ~ 0.20
	T3030	100 ~ 150	0.10 ~ 0.18	100 ~ 150	0.10 ~ 0.20
	UX30	80 ~ 130	0.10 ~ 0.18	80 ~ 130	0.10 ~ 0.20
Cast irons Ductile cast irons	T1015	100 ~ 200	0.10 ~ 0.20	100 ~ 200	0.10 ~ 0.25
	UX30	80 ~ 130	0.10 ~ 0.20	80 ~ 130	0.10 ~ 0.25
Stainless steels (< 250 HB)	GH330	150 ~ 200	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
	T3030	150 ~ 200	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25

• For MH-chipbreaker inserts (Toughness-priority)

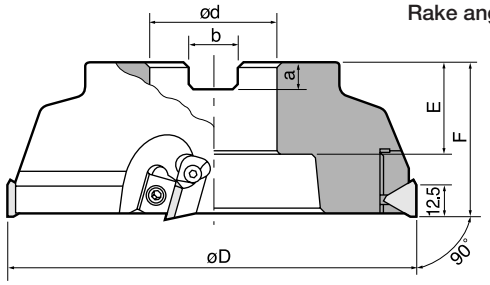
Work materials	Insert grades	Roughing (Cutting depth ap > 1.5 mm)		Finishing (Cutting depth ap 0.3 ~ 0.7 mm)	
		Vc (m/min)	ft (mm/t)	Vc (m/min)	ft (mm/t)
Mild steels (< 180 HB)	GH330	100 ~ 230	0.15 ~ 0.30	130 ~ 250	0.15 ~ 0.35
	T3030	130 ~ 230	0.15 ~ 0.33	180 ~ 300	0.15 ~ 0.38
	UX30	100 ~ 180	0.15 ~ 0.30	130 ~ 200	0.15 ~ 0.35
Carbon steels Alloy steels (< 300 HB)	GH330	100 ~ 180	0.15 ~ 0.24	130 ~ 200	0.15 ~ 0.35
	T3030	130 ~ 180	0.15 ~ 0.30	180 ~ 280	0.15 ~ 0.35
	UX30	80 ~ 130	0.15 ~ 0.24	100 ~ 150	0.15 ~ 0.35
Die steels (< 30 HRC)	GH330	100 ~ 150	0.15 ~ 0.22	100 ~ 150	0.15 ~ 0.28
	T3030	100 ~ 150	0.15 ~ 0.22	100 ~ 150	0.15 ~ 0.28
	UX30	80 ~ 130	0.15 ~ 0.22	80 ~ 130	0.15 ~ 0.28
Cast irons Ductile cast irons	T1015	100 ~ 200	0.15 ~ 0.24	100 ~ 200	0.15 ~ 0.30
	UX30	80 ~ 130	0.15 ~ 0.24	80 ~ 130	0.15 ~ 0.30

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Notes:
• As a rule, dry cutting (including air-blowing) is generally recommended.
• If a cutting fluid is used, the cutting speed should be set to the lower side of the values shown in the above table.
• When being used in square shoulder milling, climb milling is recommended.
• In square shoulder milling of stainless steel, when chips tend to be recut during cutting, change to up-milling mode.

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TSE3000IA Square shoulder milling of steels, stainless steels and aluminium alloys (Irregular pitch design)



Rake angle: A.R. +17° R.R. +5°

Max. cutting depth: 8 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	ød	E	F	a	b	Weight (kg)	Mounting details
TSE3050R/LE	●		3	50	22	20	40	6.3	10.4	0.3	P. 339Ⓐ
TSE3063R/LE	●		3	63	22	20	40	6.3	10.4	0.5	
TSE3003R/LIAE	●		4	80	27	26	50	7	12.4	1.0	
TSE3004R/LIAE	●		6	100	32	32	63	8	14.4	2.0	
TSE3005R/LIAE			6	125	40	32	63	9	16.4	3.1	P. 339Ⓑ
TSE3006R/LIAE			8	160	40	29	63	9	16.4	5.2	P. 339Ⓒ

■ Inserts (TSE3000IA)

TE□N1603PE□R/L

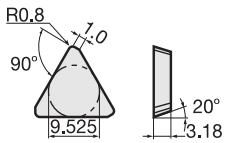


Fig. 1

TECN1603PEFR-D

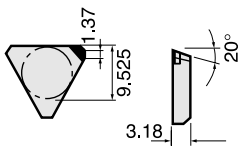


Fig. 2

TEKR1603PEPR-MS

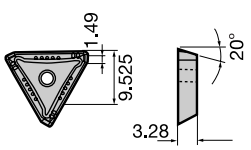
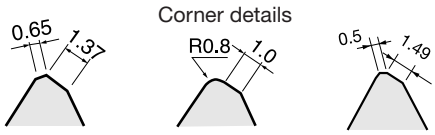


Fig. 3

Corner details



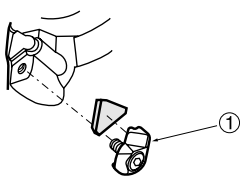
A B C

Right hand (R) shown

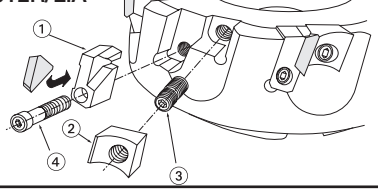
Cat. No. (Inch)	ISO Cat. No. (Metric)	Corner details	Accuracy	Honing	Grades CVD Coated T3030	CVD Coated T1015	PVD Coated AH140	PVD Coated GH330	PVD Coated AH330	Cermet NS740	Cermet NS540	Uncoated TH10	Uncoated UX30	PCD DX140	PCD DX160	Fig.
TECN32ZFR	TECN1603PEFR	A	C	Without								○	○			1
TECN32ZFR-DIA	TECN1603PEFR-D													○	○	2
TEEN32ZTR	TEEN1603PETR	B	E	With	●	●	●	●	●	●	△		●			1
TEEN32ZFR	TEEN1603PEFR	A		Without							●					
TEKR1603PEPR-MS	TEKR1603PEPR-MS	C	K	With			●									3

■ Replacement parts (Used for TSE3000IA · TSE4000IA)

TSE3050 ~ 0063R/L



TSE3003 ~ 3006R/LIA
TSE4003 ~ 4012R/LIA

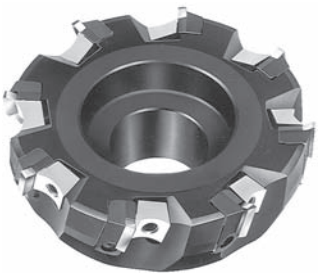


No.	Description	Parts Cat. No. TSE3050R/L~3063R/L
①	Clamp-set	CSL-4
–	Wrench	P-3

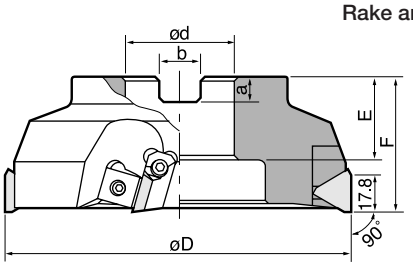
No.	Description	Parts Cat. No. TSE3003R/LIA~3006R/LIA	TSE4003R/LIA	TSE4004R/LIA	TSE4005R/LIA~4012R/LIA
①	Locator	LE303R/L	LE403R/L	LE403R/L	LE405R/L
②	Insert locking wedge	WF330R/L	WF330N	WF330N	WF500R
③	Wedge fixing screw	FDS-8S	FDS-8S	FDS-8S	FDS-8S
④	Locator fixing screw	CM4×0.7×12	CM4×0.7×14	CM4×0.7×14	CM4×0.7×14
—	T-handle wrench	TP-4	TP-4	TP-4	TP-4

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TSE4000IA Square shoulder milling of steels, stainless steels and aluminium alloys (Irregular pitch design)



Rake angle: A.R. +17° R.R. +5°



Max. cutting depth: 10 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	ød	E	F	a	b	Weight (kg)	Mounting details
TSE4003R/LIAE	●		4	80	27	26	50	7	12.4	1.0	P. 339Ⓐ
TSE4004R/LIAE	●		6	100	32	32	63	8	14.4	1.9	
TSE4005R/LIAE	●		6	125	40	32	63	9	16.4	2.9	P. 339Ⓑ
TSE4006R/LIAE	●		8	160	40	29	63	9	16.4	4.9	
TSE4008R/LIAE			10	200	60	38	63	14	25.7	7.4	P. 339Ⓒ
TSE4010R/LIAE			12	250	60	38	63	14	25.7	13.8	
TSE4012R/LIAE			14	315	60	38	63	14	25.7	22.1	P. 339Ⓓ

■ Inserts (TSE4000IA)

TE□N2204PE□R/L

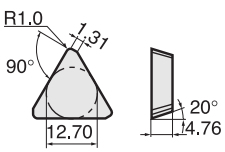


Fig. 1

TECN2204PEFR-D

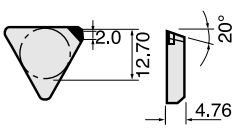


Fig. 2

TEKR2204PEPR-MS

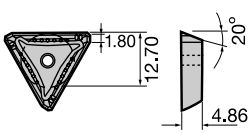
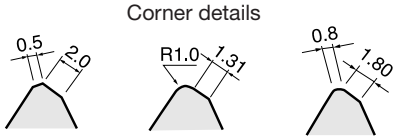


Fig. 3

Corner details



Right hand (R) shown

Cat. No. (Inch)	ISO Cat. No. (Metric)	Corner details	Accuracy	Honing	Grades CVD Coated T3030	CVD Coated T1015	PVD Coated AH120	PVD Coated AH140	PVD Coated GH330	PVD Coated AH330	Cermet NS740	Cermet NS540	Uncoated TH10	Uncoated TU40	Uncoated UX30	T-DIA DX140	T-DIA DX160	Fig.
TECN43ZFR	TECN2204PEFR	A	C	Without									○					1
TECN43ZFR-DIA	TECN2204PEFR-D															○	○	2
TEEN43ZTR	TEEN2204PETR	B	E	With	●	●	○	●	●	●	●	△			●			1
TEEN43ZFR	TEEN2204PEFR	A		Without									●					
TEKR2204PEPR-MS	TEKR2204PEPR-MS	C	K	With				●										3

■ Standard cutting conditions (TSE300IA · TSE4000IA)

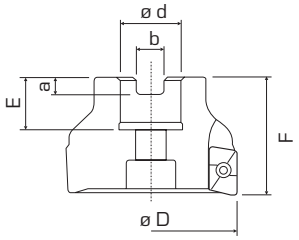
Work materials	Insert grades	Roughing (Cutting depth ap > 1.5 mm) Vc (m/min)	Roughing ft (mm/t)	Finishing (Cutting depth ap: 0.3~0.7 mm) Vc (m/min)	Finishing ft (mm/t)
Mild steels Unhardened steels (< 180 HB)	**AH330**	130 ~ 370	0.1 ~ 0.2	150 ~ 400	0.1 ~ 0.23
	GH330	130 ~ 230	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.23
	T3030	130 ~ 230	0.1 ~ 0.23	180 ~ 300	0.1 ~ 0.25
	NS740 · NS540	130 ~ 200	0.1 ~ 0.23	150 ~ 250	0.1 ~ 0.2
	UX30 · AH140	100 ~ 180	0.1 ~ 0.2	130 ~ 200	0.1 ~ 0.23
Carbon steels Alloy steels (< 300 HB)	**AH330**	100 ~ 300	0.1 ~ 0.18	150 ~ 320	0.1 ~ 0.2
	GH330 · AH120	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.2
	T3030	130 ~ 180	0.1 ~ 0.2	180 ~ 280	0.1 ~ 0.23
	NS740 · NS540	100 ~ 150	0.1 ~ 0.15	150 ~ 200	0.1 ~ 0.18
	UX30	80 ~ 130	0.1 ~ 0.18	100 ~ 150	0.1 ~ 0.2
Stainless steels (< 250 HB)	**AH140**	80 ~ 180	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
Die steels (< 30 HRC)	**AH330**	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
	T3030 · GH330	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
	UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
Cast irons Ductile cast irons	**T1015**	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
	TH10	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25
Aluminium alloys (Si < 12%)	**TH10**	200 ~ 1000	0.05 ~ 0.25	350 ~ 1000	0.1 ~ 0.25
	DX140	200 ~ 1000	0.05 ~ 0.15	350 ~ 1000	0.1 ~ 0.2
Copper alloys	**TH10**	200 ~ 500	0.1 ~ 0.15	200 ~ 500	0.1 ~ 0.2

Note: Dry cutting is recommended for all materials except for aluminium alloys.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

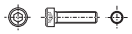
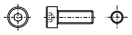
Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TPS11•17 High precision 90° milling cutter



Rake angle
TPS11: A.R. +15.5° ~ +18° R.R. -10° ~ -6.5°
TPS17: A.R. +14° ~ +17.5° R.R. -10° ~ -4°

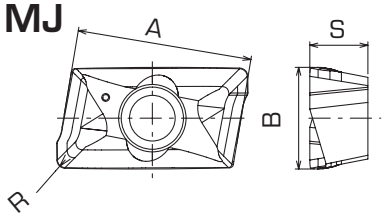
Max. cutting depth ap
TPS11: 10.6 mm
TPS17: 16.3 mm

Centre bolt
Fig.1 
Fig.2 
Fig.3 

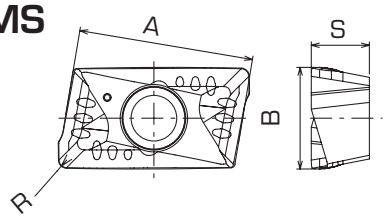
Cat. No.	Stock	No. of inserts	Dimensions (mm)						Inserts	Replacement parts				Mounting details
			ø D	ø d	F	E	a	b		Clamping screw	Wrench	Centre bolt		
TPS11040RB-E	●	6	40	16	40	19	5.6	8.4	AS*T11T3**PDPR-**	CSPB-2.5	IP-8D	CM8X30	Fig.1	-
TPS11050RB-E	●	7	50	22		20	6.3	10.4				CM10X30	Fig.2	P. 339 Ⓐ
TPS11063RB-E	●	8	63		45									
TPS17040RB-E	●	4	40	16	40	19	5.6	8.4	AS*T1705**PDPR-**	CSPB-4S	IP-15D	FSHM8-30	Fig.3	-
TPS17050RB-E	●	5	50	22		20	6.3	10.4				CM10X30	Fig.2	P. 339 Ⓐ
TPS17063RB-E	●	6	63		45									

Specifications: Inserts

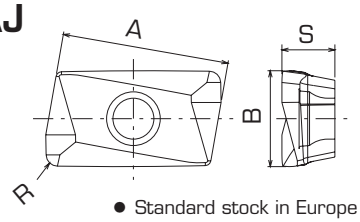
-MJ



-MS



-AJ



● Standard stock in Europe

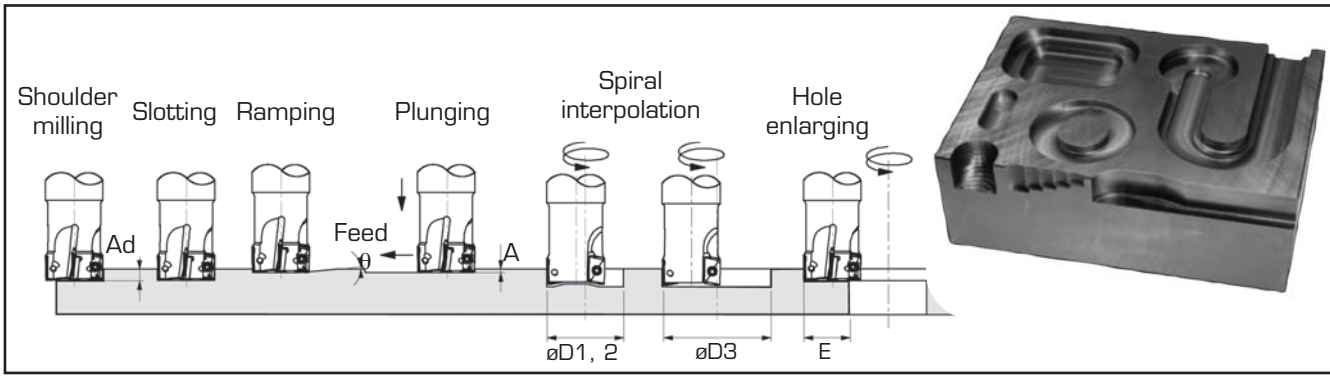
Item code	Grade						Accuracy	Honing	Dimensions (mm)			
	PVD		CVD		Cermet	Carbide			A	B	S	R
	AH120	AH140	T1015	T3030	NS740	KS05F						
ASMT11T304PDPR-MJ	●		●	●	●		M	with	11.6	6.7	3.7	0.4
ASMT11T304PDPR-MS		●										
ASGT11T304PDFR-AJ						●	G	without				
ASMT11T308PDPR-MJ	●		●	●	●		M	with				0.8
ASGT11T308PDFR-AJ						●	G	without				
ASMT11T312PDPR-MJ	●			●			M	with				1.2
ASMT11T316PDPR-MJ	●		●	●	●							1.6
ASMT11T320PDPR-MJ	●											2.0
ASMT11T330PDPR-MJ	●											3.0
ASMT170504PDPR-MJ	●		●	●	●		M	with	16.9	9.8	5.6	0.4
ASGT170504PDFR-AJ						●	G	without				
ASMT170508PDPR-MJ	●		●	●	●		M	with				0.8
ASMT170508PDPR-MS		●										
ASGT170508PDFR-AJ						●	G	without				
ASMT170512PDPR-MJ	●			●			M	with				1.2
ASMT170516PDPR-MJ	●		●	●	●							1.6
ASMT170520PDPR-MJ	●											2.0
ASMT170530PDPR-MJ	●											3.0
ASMT170532PDPR-MJ*	●		●	●	●							3.2

*Note: Inserts with corner radius R 3.2 are not recommended for spiral interpolation.

Cutting conditions

Work materials	Grade	Chip-breaker	Cutting-parameter	Tool diameter (mm)
				ø 40 - ø 63
Low alloy steels St42, C45E etc. < 250HB	**NS740**	**-MJ**	Vc (m/min)	100 - 150
			ft (mm/t)	0.05 - 0.15
	AH120	**-MJ**	Vc (m/min)	100 - 150
			ft (mm/t)	0.12 - 0.20
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**NS740**	**-MJ**	Vc (m/min)	80 - 120
			ft (mm/t)	0.05 - 0.10
	T3030	**-MJ**	Vc (m/min)	100 - 200
			ft (mm/t)	0.10 - 0.20
Die steels X96CrMoV12 etc. < 300HB	**T3030**	**-MJ**	Vc (m/min)	100 - 150
			ft (mm/t)	0.12 - 0.20
Stainless steels X8CrNiS18-9 etc. < 250HB	**AH140**	**-MS**	Vc (m/min)	100 - 200
			ft (mm/t)	0.12 - 0.20
Cast irons GG25 etc.	**T1015**	**-MJ**	Vc (m/min)	100 - 200
			ft (mm/t)	0.15 - 0.25
Aluminium alloy Si < 12 %	**KS05F**	**-AJ**	Vc (m/min)	300 - 1000
			ft (mm/t)	0.05 - 0.20
Aluminium alloy Si > 12 %	**KS05F**	**-AJ**	Vc (m/min)	100 - 200
			ft (mm/t)	0.05 - 0.20
Copper alloy	**KS05F**	**-AJ**	Vc (m/min)	200 - 500
			ft (mm/t)	0.05 - 0.20

Specifications



Cat. No.	Tool ø (mm)	Max. cutting depth Ad (mm)	Max. ramping angle (θ)	Max. plunging A (mm)	Min. machining øD1 (mm)	Max. machining øD2 (mm)	*Max. machining øD3 (mm)	Max. cutting width for enlarging E (mm)
TPS11040RB-E	40	10.6	1°	0.5	68	79	77 - 79	39.5
TPS11050RB-E	50		0° 42'		88	99	97 - 99	49.5
TPS11063RB-E	63		0° 30'		114	125	123 - 125	62.5
TPS17040RB-E	40	16.2	2° 30'	1.0	62	78	76 - 78	39.0
TPS17050RB-E	50	16.1	1° 30'		82	98	96 - 98	49.0
TPS17063RB-E	63	16.0	1°		108	124	122 - 124	62.0

* Plain bore hole bottom

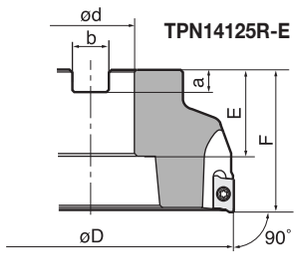
Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

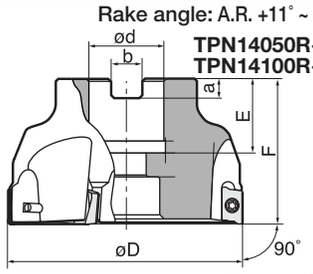
"Top-Feed Mill"

TPN14

For high-speed and high-feed square shoulder milling

Rake angle: A.R. +11° ~ +16° R.R. +9° ~ +14°

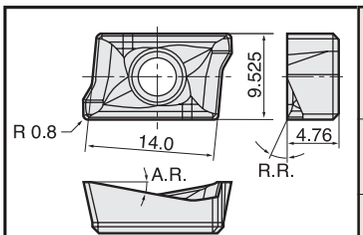




Max. cutting depth: 14 mm

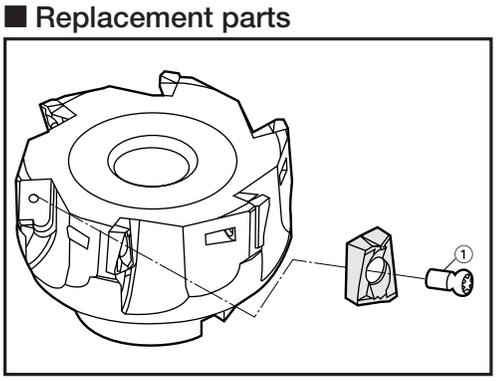
Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Mounting details
			øD	ød	E	F	a	b		
TPN14040R-E	●	4	40	16	18	40	5.6	8.2	0.2	P. 339Ⓐ
TPN14050R-E	●	5	50	22	20	40	6.3	10.4	0.4	
TPN14063R-E	●	5	63	22	20	40	6.3	10.4	0.7	
TPN14080R-E	●	6	80	27	22	50	7	12.4	1.2	
TPN14100R-E	●	7	100	32	32	63	8	14.4	2.1	P. 339Ⓑ
TPN14125R-E	●	8	125	40	32	63	9	16.4	3.2	

■ Inserts



Cat. No.	Accuracy	Honing	Grades							Rake angles		Application
			CVD Coated		PVD Coated				Cermet	I.A.R.	I.R.R.	
			T3030	T1015	AH120	AH330	GH330	GH340	NS530			
ANMT1404PPPR-MJ	M	With	●	●	●	●	●		●	11°	+20°	General purpose
ANMT1404PPPR-ML	M	With			●			●			+25°	Stainless steels, mild steels

■ Replacement parts



No.	Description	Parts Cat. No.
①	Insert fixing screw	CSTB-3
—	Wrench	T-9D

■ Standard cutting conditions

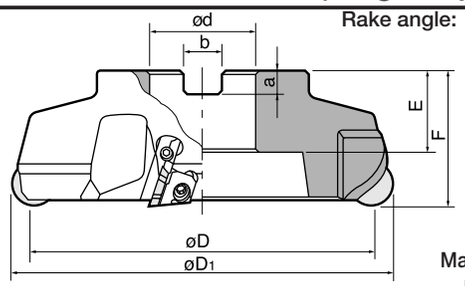
Work materials	Inserts		Cutting conditions	
	Chip-breaker	Grades	Vc (m/min)	ft (mm/tooth)
General steel (< 300HB) Ck50, 42CrMo4	MJ	**T3030**	100 ~ 250	0.10 ~ 0.20
Mild steel, Carbon steel USt42-2, Ck25	ML	**AH120**	100 ~ 200	0.12 ~ 0.20
Die steels (< 300HB) X155CrVMo12-1	MJ	**T3030**	80 ~ 200	0.10 ~ 0.20
Stainless steels (< 200HB) 1.4301, 1.4401	ML	**AH120**	100 ~ 200	0.10 ~ 0.20

Notes: • When using small diameter cutter (such as TPN14050R) or cutting at a large cutting depth or a large cutting width, the cutting speed and feeds should be set to the lower side of the values shown in the table.
• Dry cutting (including air-blowing) is generally recommended.
• TPN14 type TAC mills cannot be used for axial-feed cutting such as ramping, plunging and drilling.

• **No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)**
• **Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)**

TRF6000 I

For high-speed and high-feed milling of super alloys and stainless steels (Irregular pitch design)



Rake angle: A.R. +19° R.R. +3°

Max. cutting depth: 3 mm

Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
TRF6003R/LIE	●		4	80	100	27	26	50	7	12.4	1.4	P. 339Ⓑ
TRF6004R/LIE	●		5	100	120	32	32	63	8	14.4	2.5	
TRF6005R/LIE	●		6	125	145	40	32	63	9	16.4	3.9	
TRF6006R/LIE	●		8	160	180	40	29	63	9	16.4	5.8	P. 339Ⓒ
TRF6008R/LIE			10	200	220	60	38	63	14	25.7	9.8	
TRF6010R/LIE			12	250	270	60	38	63	14	25.7	17.3	
TRF6012R/LIE			14	315	335	60	38	63	14	25.7	27.8	P. 339Ⓓ

■ Inserts

RFEN2004ZFTN (With partially flattened flanks)

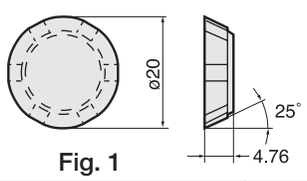


Fig. 1

RFEN2004M0TN

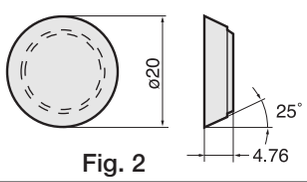
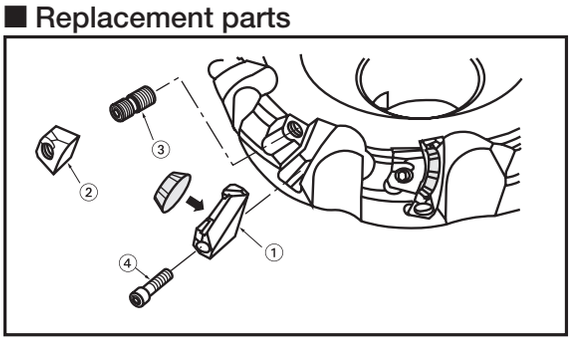


Fig. 2

Cat. No.	Type	Accuracy	Honing	Grades PVD Coated AH120				Grades Uncoated KS20	UX30			Figure
RFEN2004ZFTN	With flats	E	With	●				●	●			1
RFEN2004M0TN	Without flats	E	With	●				○	●			2

Note: RFEN2004M0TN type inserts should not be used for finishing requiring surface finish better than 12S.
RFEN2004ZFTN type inserts can be used for both finishing and roughing at cutting depth up to 3 mm.

■ Replacement parts



No.	Description	Parts Cat. No. TRF6003R/LI~TRF6006R/LI	Parts Cat. No. TRF6008R/LI~TRF6012R/LI
①	Locator	LF602R/L	LF602R/L
②	Insert locking wedge	WF603R/L	WF608R/L
③	Wedge fixing screw	FDS-8S	FDS-8S
④	Locator fixing screw	CM4×0.7×20	CM4×0.7×20
—	T-handle wrench	TP-4	TP-4

■ Standard cutting conditions

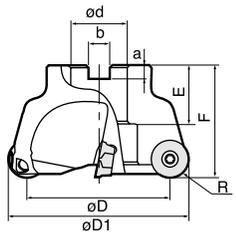
Work materials	Insert grades	Cutting depth ap: 1~3 mm Cutting speed Vc (m/min)	Cutting depth ap: 1~3 mm Feed per tooth ft (mm/t)	Cutting depth ap: 0.4~1 mm Cutting speed Vc (m/min)	Cutting depth ap: 0.4~1 mm Feed per tooth ft (mm/t)	Cutting fluid
Super alloys (Inconel etc)	**AH120**	20 ~ 40	0.1 ~ 0.15	20 ~ 60	0.2 ~ 0.4	Water insoluble type
Titanium alloys (Ti-6Al-4V etc)	**AH120**	40 ~ 60	0.15 ~ 0.35	40 ~ 70	0.2 ~ 0.5	Water soluble type or dry cutting
Stainless steels: Austenitic Ferritic (< HB300)	**UX30**	150 ~ 230	0.2 ~ 0.35	180 ~ 250	0.2 ~ 0.5	Dry cutting
Stainless steels: Precipitation hardening (< HRC35)	**UX30**	130 ~ 180	0.15 ~ 0.3	150 ~ 200	0.2 ~ 0.4	Dry cutting
Hard materials (HRC40-55)	**AH120**	20 ~ 50	0.05 ~ 0.1	20 ~ 50	0.05 ~ 0.2	Water insoluble type

Note: Cutting width should be within 60 to 70 % of effective cutter diameter.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TRD12•16 Complex curvature for Copy mills



Rake angle: A.R. +10° R.R. -6° ~ 0°

TRD12 - Max. cutting depth: 6 mm
TRD16 - Max. cutting depth: 8 mm

Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)								Weight (kg)	Mounting details
				R	øD	øD1	F	E	ød	a	b		
TRD12050R-E	●	RDMT1204ZDPN-MJ RDMW1204ZDSN	4	6	38	50	40	20	22	6.3	10.4	0.2	P. 339Ⓐ
TRD12052R-E	●		4		40	52		20		6.3	10.4	0.3	
TRD12063R-E	●		5		51	63		20		6.3	10.4	0.4	
TRD12066R-E	●		5		54	66		22		7	12.4	0.8	
TRD12080R-E	●		6		68	80	50	22	27	7	12.4	0.4	P. 339Ⓑ
TRD12100R-E	●		6		88	100		26	32	8	14.4	0.7	
TRD16063R-E	●	RDMT1606ZDPN-MJ RDMW1606ZDSN	4	8	47	63	40	20	22	6.3	10.4	1.1	P. 339Ⓐ
TRD16066R-E	●		4		50	66	50	22	27	7	12.4	2.4	
TRD16080R-E	●		5		64	80		22		7	12.4		
TRD16100R-E	●		6		84	100		26	32	8	14.4		P. 339Ⓑ

■ Inserts

Fig. 1

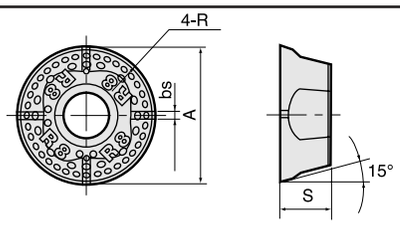
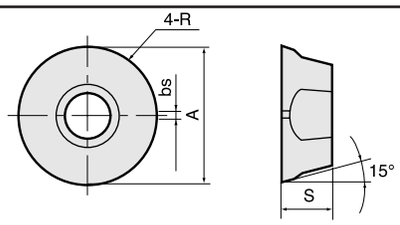


Fig. 2



Cat. No.	Accuracy	Honing	Figure	Grades				Dimensions (mm)			
				PVD Coated			CVD Coated				
				AH120	AH140	AH330	T3030	A	S	bs	R
RDMT1204ZDPN-MJ RDMW1204ZDSN	M	With	1	●	●	●	●	12.8	4.76	0.8	6
			2	●	●	●	●				
RDMT1606ZDPN-MJ RDMW1606ZDSN			1	●	●	●	●	16.8	6.35		8
			2	●	●	●	●				

■ Standard cutting conditions

Work material	Insert grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	
			TRD12	TRD16
Carbon steels < 300 HB	**T3030**	190 (140 ~ 240)	0.3 ~ 0.5	0.3 ~ 0.6
	AH120	170 (120 ~ 220)	0.3 ~ 0.5	0.3 ~ 0.6
	AH330	190 (140 ~ 240)	0.2 ~ 0.4	0.2 ~ 0.5
Alloy steels < 300 HB	**T3030**	170 (120 ~ 220)	0.2 ~ 0.45	0.2 ~ 0.5
	AH120	150 (100 ~ 200)	0.2 ~ 0.45	0.2 ~ 0.5
	AH330	170 (120 ~ 220)	0.15 ~ 0.35	0.15 ~ 0.4
Die steels < 300 HB	**T3030**	150 (100 ~ 200)	0.2 ~ 0.35	0.25 ~ 0.45
	AH120	130 (80 ~ 180)	0.2 ~ 0.35	0.25 ~ 0.45
	AH330	150 (100 ~ 200)	0.1 ~ 0.3	0.1 ~ 0.4
Cast irons	**AH120**	180 (120 ~ 240)	0.3 ~ 0.5	0.3 ~ 0.6
	AH330	200 (150 ~ 250)	0.2 ~ 0.4	0.2 ~ 0.5
Hardened steels, prehardened steels < 45 HRC	**AH120**	100 (60 ~ 140)	0.08 ~ 0.25	0.1 ~ 0.3
Stainless steel	**AH140**	150 (80 ~ 200)	0.2 ~ 0.5	0.2 ~ 0.6

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Note: When the cutting depth is smaller than 2 mm, use the higher limit of feed values shown above. And, when larger than 3 mm, use the lower limit of the feed values.

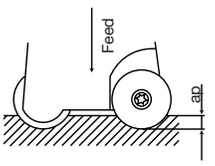
■ Replacement parts

Description	Parts Cat. No.	
	TRD12	TRD16
Clamping screw	CSTB-3.5	CSTB-5
Wrench	T-15D	T-20D

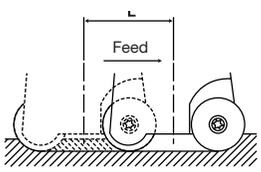
Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

■ Plunging + traverse feed milling

Plunging



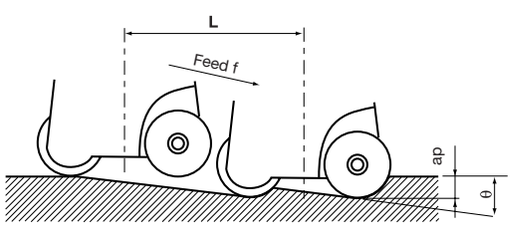
Traverse feed milling



Cat. No.	Max. plunging depth (ap) (mm)	Min. traverse to flatten the bottom surface L (mm)
TRD12050R-E **TRD12052R-E** **TRD12063R-E** **TRD12066R-E** **TRD12080R-E** **TRD12100R-E**	4	11
TRD16063R-E **TRD16066R-E** **TRD16080R-E** **TRD16100R-E**	5.5	15

Notes:
- In plunging, the maximum cutting depth is limited as shown in the above table.
- When plunging, set the Z-axis feed in a range of 0.05 to 0.1 mm/tooth.
- When plunging, use pick-feed every 1 mm (or smaller than 1 mm) to break chips.

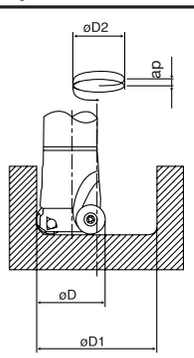
■ Ramping



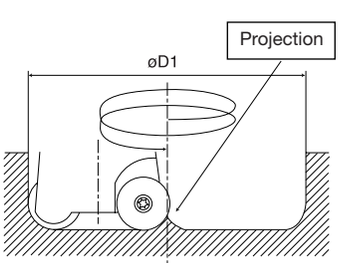
Cat. No.	Max. ramping angle (θ°)
TRD12050R-E	6
TRD12052R-E	5.5
TRD12063R-E	4
TRD12066R-E	4
TRD12080R-E	2.5
TRD12100R-E	1.5
TRD16063R-E	6
TRD16066R-E	6
TRD16080R-E	4
TRD16100R-E	3

Notes:
- tan θ = Cutting depth (ap) / Tool's traveling length (L)
- In ramping, the ramping angle (θ).

■ Spiral interpolation



Cat. No.	Min. machining ø (mm)		Max. machining ø (mm)		ap (mm)
	D1 (mm)	D2 (mm)	D1 (mm)	D2 (mm)	
TRD12050R-E	88	38	98	48	< 6
TRD12052R-E	92	40	102	50	
TRD12063R-E	114	51	124	61	
TRD12066R-E	120	54	130	64	
TRD12080R-E	148	68	158	78	
TRD12100R-E	188	88	198	98	
TRD16063R-E	110	47	124	61	< 8
TRD16066R-E	120	50	130	64	
TRD16080R-E	144	64	158	78	
TRD16100R-E	184	84	198	98	



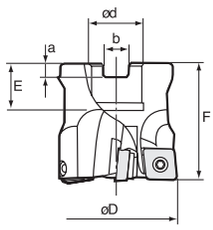
D : Tool diameter
D1 : Machining diameter
D2 : Tool-pass diameter
ap : Z-axis feed per one round of tool pass (Pitch of helical cycle)

- In helical feed drilling, the machinable hole diameter are limited by the tool diameter as shown in the above tables.
- When machining between the minimum and maximum machining diameter, a projection remains in the center of the bottom surface of the hole as shown in the figure on the left. Remove it by traverse feed milling.

TAC Mills

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TZP12 TAC "Flash Z-Feed Cutter"



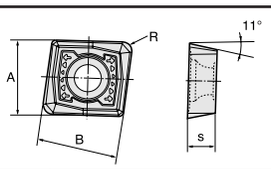
Rake angle: A.R. +6° R.R. -2°

Max. radial cutting depth: 10 mm

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Mounting details
			øD	ød	E	F	a	b		
TZP12050R-E	●	3	50	22	20	50	6.3	10.4	0.38	P. 339 Ⓐ
TZP12063R-E	●	3	63	22	20	50	6.3	10.4	0.72	
TZP12080R-E	●	4	80	27	26	63	7	12.4	1.51	

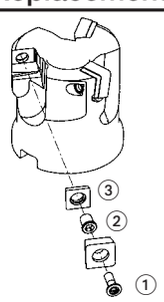
■ Inserts

APMT120416PR-MJ



Cat. No.	Accuracy	Honing	Grade	Dimensions (mm)				Eff. cutting edge length (mm)
			AH120	A	B	S	R	
APMT120416PR-MJ	M	With	●	12.7	13.5	4.76	1.6	10

■ Replacement parts



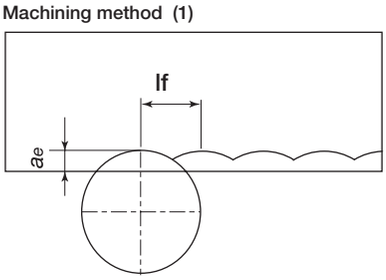
No.	Description	Parts Cat. No.
①	Clamping screws	CSTB-3.5T
②	Shim screw	DTS5-3.5
③	Shim	ZSA1102
—	Wrench	P-3.5
—	Wrench	T-20D

■ Standard cutting conditions

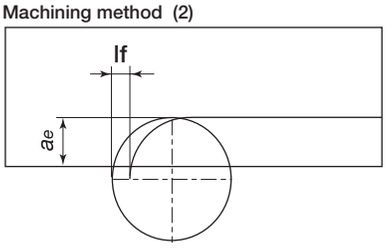
Work material	Insert grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)
Carbon steels Alloy steels	**AH120**	100 ~ 200	0.1 ~ 0.3
Die steels	**AH120**	100 ~ 200	0.1 ~ 0.3
Prehardened steels (< 45 HRC)	**AH120**	60 ~ 120	0.1 ~ 0.2
Cast irons	**AH120**	100 ~ 200	0.1 ~ 0.3

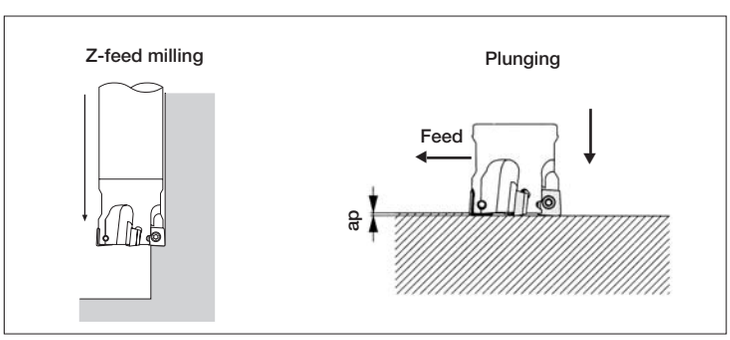
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Machining method (1)



Machining method (2)



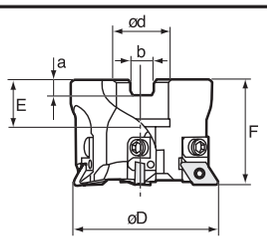


Machining method	Z-feed milling		Plunging
	Pick feed lf (mm)	Radial cutting depth ae (mm)	Cutting depth ap (mm)
(1)	Tool dia. øD/2	Max. 10 mm	~ 0.5
(2)	Max. 10 mm	Tool dia. øD/2	

Note: in Z-feed milling, select either of the machining method (1) or (2) and decide the cutting depth according to the application

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

TZF11 TAC "Z-Feed Cutters" for Finishing



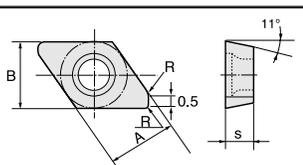
Rake angle: A.R. 0° R.R. -6° ~ 0°

Max. radial cutting depth: 0.5 mm

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Mounting details
			ØD	Ød	E	F	a	b		
TZF11050R-E	●	4	50	22	20	45	6.3	10.4	0.38	P. 339Ⓐ
TZF11063R-E	●	6	63	22	20	45	6.3	10.4	0.72	
TZF11080R-E	●	7	80	27	26	63	7	12.4	1.51	

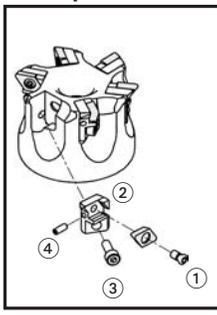
■ Inserts

DPCW11T3ZFR



Cat. No.	Accuracy	Honing	Grade			Dimensions (mm)			
			PVD Coated		Cermet				
			AH120	AH740	NS530	A	B	S	R
DPCW11T3ZFR	C	Without	●	●	●	9.525	9.525	3.97	1.0

■ Replacement parts



No.	Description	Parts Cat. No.
①	Clamping screws	CSTB-4S
②	Cartridge	SDUPR09CZ-11
③	Cartridge fixing screw	CM4X0.7X12
④	Cartridge adjusting screw	SSHM3-10
—	Wrench	T-15D
—	Hex. wrenches	P-1.5, P-3

■ Standard cutting conditions

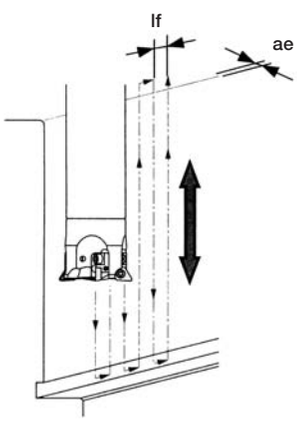
Work material	Insert grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)
Cast irons	**AH120**	300 (200 ~ 500)	0.15 (0.05 ~ 0.20)
Ductile cast irons	**AH120**	250 (150 ~ 350)	0.15 (0.05 ~ 0.20)
Carbon steels • alloy steels (< 300 HB)	**NS530**	300 (150 ~ 400)	0.15 (0.05 ~ 0.20)
	AH740	250 (150 ~ 350)	0.15 (0.05 ~ 0.20)
Prehardened steels, hard materials (40 - 55 HRC)	**AH120**	150 (100 ~ 200)	0.10 (0.05 ~ 0.15)

- **No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)**
- **Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)**

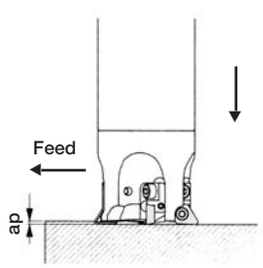
■ Cautionary points in use

- Use the cutter for finish milling of vertical wall surfaces requiring long tool-overhang of L/D > 6.
- Radial cutting edge run-out should be adjusted within 0.01 mm.
- In addition to Z-feed milling, TZF11 type cutter can be also used for traverse feed milling.

Z-feed milling



Plunging

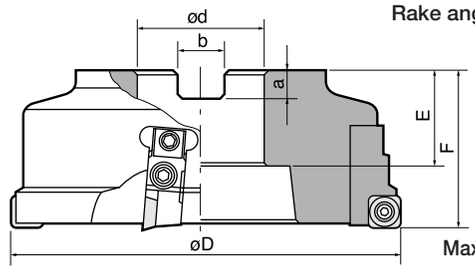


Z-feed milling		Plunging
Pick feed lf (mm)	Radial cutting depth ae (mm)	Cutting depth ap (mm)
0.5 ~ 1.0	~ 0.5	~ 0.5

- Dry cutting (including air blow) at a cutting depth up to 0.3 mm (allowable max. 0.5 mm) and a pick feed from 0.5 to 1.0 mm is recommended.
- TZF11 type cutter are not designed to adjust dynamic balance. Therefore, when the tool's overhang ratio (cutter diameter-to-length) exceeds 6 : 1, special care should be taken to the revolution speed. (At first, start the machining at 50 % of the speed shown in the table of the standard cutting conditions, and then gradually increase the speed while confirming safety.)
- To produce highly accurate surface finish, use the cutter on a machine with sufficient rigidity.

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

SFP4000 With cutting-edge adjusting mechanism for superior finishing



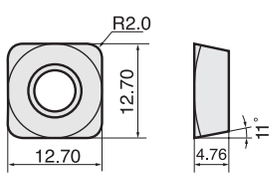
Rake angle: A.R. +5° R.R. -20°

Max. cutting depth: 0.1 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	ød	E	F	a	b	Weight (kg)	Mounting details
SFP4004R/LE	●		2	100	32	32	40	8	14.4	2.3	P. 339Ⓐ
SFP4005R/LE	●		2	125	40	32	40	9	16.4	3.5	P. 339Ⓑ
SFP4006R/LE	●		4	160	40	29	50	9	16.4	5.8	
SFP4008R/LE			4	200	60	38	63	14	25.7	9.0	P. 339Ⓒ
SFP4010R/LE			6	250	60	38	63	14	25.7		
SFP4012R/LE			8	315	60	38	63	14	25.7		P. 339Ⓓ

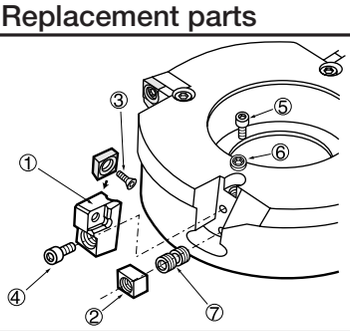
■ Inserts

SPHB120420FN-W



Cat. No.	ISO Cat. No.	Accuracy	Honing	Cermet N308	Uncoated TH10
SPHA435FNW	**SPHB120420FN-W**	H	Without	●	●

■ Replacement parts



No.	Description	Parts Cat. No.
①	Locator	LW400R/L
②	Locator adjusting wedge	FW-305
③	Insert fixing screw	CSTA-5S
④	Locator fixing screw	CM5×0.8×16
⑤	Hex. socket-head screw	CM5×0.8×8
⑥	Washer	(JIS) L5
⑦	Wedge-locking screw	FDS-8S
—	Spring washer	(JIS) 5S
—	T-handle wrench	TP-4
—	Wrench	T-15D

■ Standard cutting conditions

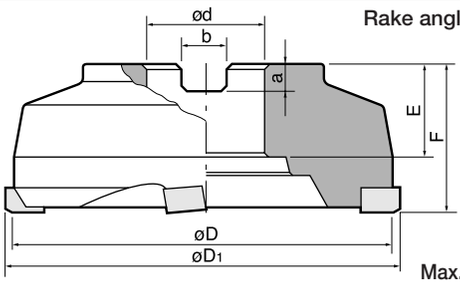
Work materials	Insert grades	Cutting speed Vc (m/min)	Feed rate f (mm/rev)	Cutting depth ap (mm)
Mild steels	**N308**	180 ~ 250	< 6	< 0.1
Carbon steels Alloy steels	**N308**	150 ~ 200	< 6	< 0.1
Stainless steels	**N308**	160 ~ 200	< 4	< 0.1
Cast irons	**TH10**	100 ~ 150	< 5	< 0.2
Non-ferrous metals	**TH10**	200 ~ 500	< 6	< 0.1

Note: Under above conditions, attainable surface roughness is 3 to 4 µm (Rmax) for steels and 6~12 µm (Rz) for cast irons.

- **No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)**
- **Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)**

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

MS For super precision finishing



Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
MS04RE			2	100	105	32	32	55	8	14.4	3	P. 339Ⓑ
MS05RE			2	125	130	40	32	60	9	16.4	4	
MS06RE			4	160	165	40	29	60	9	16.4	5	P. 339Ⓒ
MS08RE			4	200	205	60	38	60	14	25.7	8.5	
MS10RE			4	250	255	60	38	60	14	25.7	14	
MS12RE			4	300	305	60	38	60	14	25.7	23	P. 339Ⓓ

■ Inserts

SNAC1509PNTR

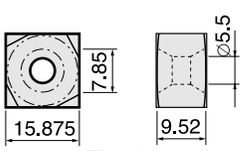


Fig. 1

SNAJ1509PNTR

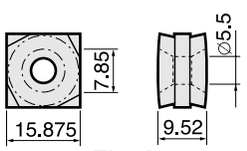


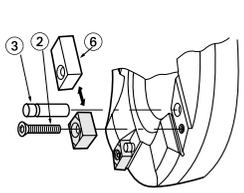
Fig. 2

Right hand (R) shown

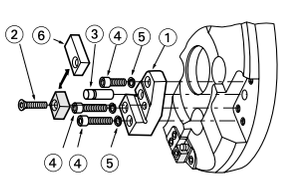
Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Cutting edge length (mm)	Grades Cermet X407	Grades Uncoated TU10	Figure
SNAA56FTR	**SNAC1509PNTR**	A	7.80	●		1
SNAG56FTR	**SNAJ1509PNTR**				●	2

■ Replacement parts

MS04R/L~MS06R/L



MS08R/L~MS12R/L



No.	Description	Parts Cat. No. MS04R	MS05R, MS06R	MS08R ~ MS12R
①	Locator	–	–	LMS56R
②	Screw	CST-5	CST-5	CST-5
③	Pin	SP-8	SP-8	SP-8
④	Locator fixing screw	–	–	CM6x25, CM6x16
⑤	Washer	–	–	VA6
⑥	Protector	PMS4R	PMS5R	PMS5R
—	Wrench	T-25D	T-25D	T-25D

■ Standard cutting conditions

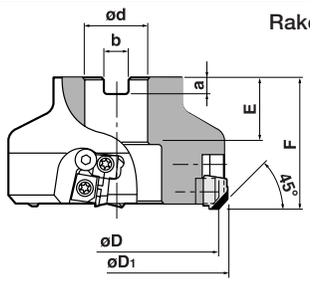
Work materials	Insert grades	Cutting speed Vc (m/min)	Feed f (mm/rev)	Cutting depth ap (mm)
Mild steels	**X407**	260 ~ 300	< 6	< 0.1
Carbon steels	**X407**	120 ~ 180	< 6	< 0.1
Alloy steels	**X407**	120 ~ 180	< 6	< 0.1
Die steels	**X407**	120 ~ 180	< 6	< 0.1
Cast irons	**TU10**	100 ~ 150	< 6	< 0.1

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

All-Diamond Tipped Mills

DAD15 For high-speed and high-precision face milling of aluminium alloys



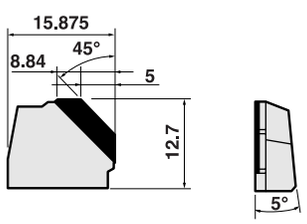
Rake angle: A.R. +8.5° R.R. +5.0°

Max. cutting depth: 5 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	F	E	a	b	Weight (kg)	Mounting details
DAD15080R/L-E			4	80	90	27	40	26	7	12.4	1.4	P. 339Ⓐ
DAD15100R/L-E			4	100	110	32	40	28.5	8	14.4	2.4	
DAD15125R/L-E			6	125	135	40	63	32	9	16.4	3.6	P. 339Ⓑ
DAD15160R/L-E			6	160	170	40	63	29	9	16.4	5.5	
DAD15200R/L-E			8	200	210	60	63	38	14	25.7	8.9	P. 339Ⓒ
DAD15250R/L-E			10	250	260	60	63	38	14	25.7	14.6	
DAD15315R/L-E			12	315	325	60	63	38	14	25.7	24.0	P. 339Ⓓ

■ Inserts

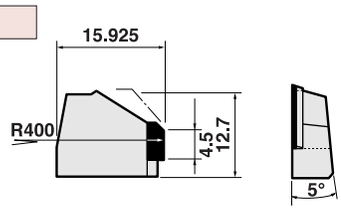
Roughing



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505ADFR-D	DX140 (PKD)	○
YDEN1505ADFL-D		

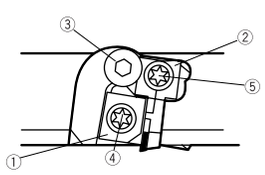
Wiper



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505ADFR-WD	DX140 (PKD)	○
YDEN1505ADFL-WD		

■ Replacement parts



Right hand (R) shown

No.	Description	Parts Cat. No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
⑥	Wrench	T-27T

■ Standard cutting conditions

Work materials	Insert grades	Cutter dia. ØD (mm)	80	100	125	160	200	250	315	355	400
Aluminium alloys (Si < 12%)	DX140 (T-DIA)	Max. cutting speed Vc (m/min)	4000								
		Max. revolution N (rpm)	16000	12700	10200	8000	6400	5100	4000	3600	3200
		Cutting depth ap (mm)	~ 5								
		Feed per tooth ft (mm/t)	0.05 ~ 0.28								
Aluminium alloys (Si > 13%)	DX140	Max. cutting speed Vc (m/min)	200 ~ 500								

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

■ Cautionary Points in Use

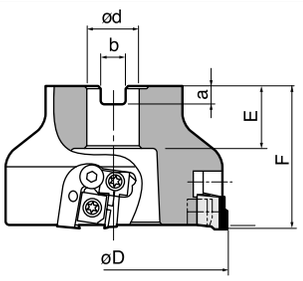
- To avoid a danger of unbalanced revolution, the TAC mill should not be used in a state of reduced number of inserts.
- Use the cutter within the maximum revolutions written on the cutter body.
- When using the cutter at lower cutting speed than 1500 m/min, the balance quality of the arbor and toolholder should be prepared within class G16.
- When installing the inserts, recommended clamping torque for the wedge fixing screw is 980 N・cm.

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

All-Diamond Tipped Mills

DPD15

For high-speed and high-precision square shoulder milling of aluminium alloys



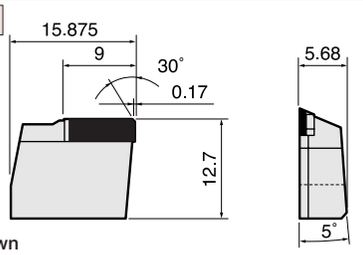
Rake angle: A.R. +8.5° R.R. +5.0°

Max. cutting depth: 7 mm
Right hand shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	ød	E	F	a	b	Weight (kg)	Mounting details
DPD15080R/L-E			4	80	27	26	40	7	12.4	1.2	P. 339Ⓐ
DPD15100R/L-E			4	100	32	28.5	40	8	14.4	2.2	
DPD15125R/L-E			6	125	40	32	63	9	16.4	3.6	P. 339Ⓑ
DPD15160R/L-E			6	160	40	29	63	9	16.4	5.2	
DPD15200R/L-E			8	200	60	38	63	14	25.7	8.2	P. 339Ⓒ
DPD15250R/L-E			10	250	60	38	63	14	25.7	13.4	
DPD15315R/L-E			12	315	60	38	63	14	25.7	22.5	P. 339Ⓓ

■ Inserts

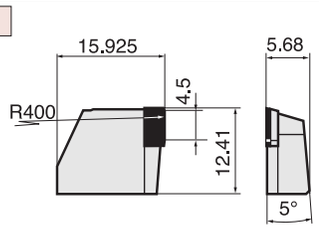
Roughing



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-D	DX140 (PKD)	●

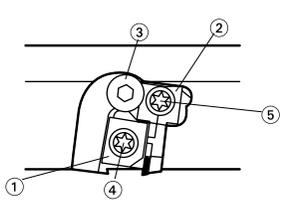
Wiper



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-WD	DX140 (PKD)	●

■ Replacement parts



Right hand shown

No.	Description	Parts Cat. No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
⑥	Wrench	T-27T

■ Standard cutting conditions

Work materials		Insert grade	Cutter dia. øD (mm)	80	100	125	160	200	250	315	355	400
Aluminium alloys	Si < 12%	DX140 (T-DIA)	Max. cutting speed Vc (m/min)	4000								
			Max. No. of revolutions n (rpm)	16000	12700	10200	8000	6400	5100	4000	3600	3200
			Cutting depth ap (mm)	~ 7								
			Feed per tooth ft (mm/t)	0.05 ~ 0.20								
	Si > 13%		Max. Vc (m/min)	200 ~ 500								

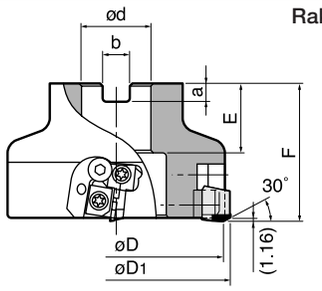
• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

All-CBN Tipped Mills

QPP15

High-speed and high-precision finishing of grey cast irons

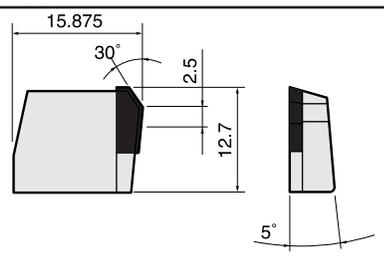


Rake angle: A.R. +5.5° R.R. -3°

Max. cutting depth: 1.0 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
QPP15080R/L-E			4	80	84	27	26	50	7	12.4	1.1	P. 339Ⓐ
QPP15100R/L-E			6	100	104	32	28.5	63	8	14.4	2.1	
QPP15125R/L-E			6	125	129	40	32	63	9	16.4	3.7	P. 339Ⓑ
QPP15160R/L-E			8	160	164	40	29	63	9	16.4	5.3	
QPP15200R/L-E			10	200	204	60	38	63	14	25.7	8.3	P. 339Ⓒ
QPP15250R/L-E			12	250	254	60	38	63	14	25.7	13.5	
QPP15315R/L-E			14	315	319	60	38	63	14	25.7	22.6	P. 339Ⓓ
QPP15355R/L-E			16	355	359	60	38	80	14	25.7	33.4	
QPP15400R/L-E			18	400	404	60	38	80	14	25.7	43.3	

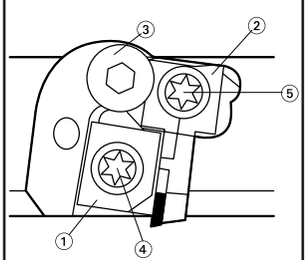
■ Inserts



Right hand (R) shown

Cat. No.	grade	Stock
YPEN1505PPTR-Q	BX950	●

■ Replacement parts



Right hand (R) shown

No.	Description	Parts Cat. No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
⑥	Wrench	T-27T

■ Standard cutting conditions

Work materials	Insert grade	Cutting speed Vc (m/min)	Feed ft (mm/t)	Cutting depth ap (mm)
Grey cast irons (GG25 ~ GG35)	BX950 (CBN)	350 ~ 2000	0.1 ~ 0.25	0.1 ~ 1.0

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm) Note: Dry cutting is recommended.
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features

1 Highly efficient and accurate machining capability

Rz ≤ 3.0 μm, Rmax ≤ 6.0 μm

2 Provided with adjusting mechanism for all the inserts

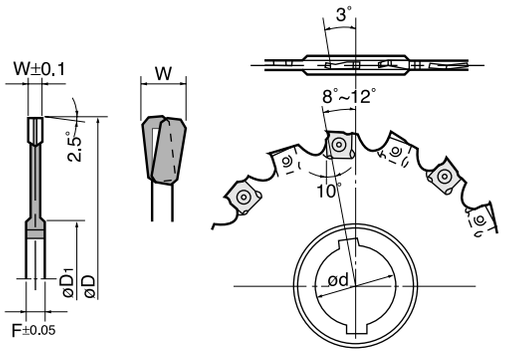
- Attainable axial runout: Within 5 μm
- Inserts are regrindable

3 Superior resistance to centrifugal force

Even when using at speeds as high as 2000 m/min, inserts are firmly locked and free from any movement or looseness.

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

SVN4000 Grooving and parting of steels, cast irons and aluminium alloys



Cat. No.	Stock M	Stock W	Inserts	No. of inserts	Cutter øD	Tool width W	No. of staggered lines	Mounting hole dia. ød M (Metric)	Mounting hole dia. ød W (Inch)	Boss øD1	Boss thick. F	Parts Screw	Parts Wrench
SVN4100-5M/W	●		SNEN12T2ZT/FN	10	100	5	2	32	31.75	48	8	CST-3.5S	T-9D
SVN4100-6M/W	●		SNEN1233ZT/FN			6					10	CST-3.5	
SVN4100-8M/W	●			8		8	4				12		
SVN4125-5M/W	●		SNEN12T2ZT/FN	12	125	5	2	32	31.75	48	8	CST-3.5S	
SVN4125-6M/W	●		SNEN1233ZT/FN			6					10	CST-3.5	
SVN4125-8M/W	●					8	4				12		
SVN4160-5M/W	●		SNEN12T2ZT/FN	16	160	5	2	40	38.1	58	8	CST-3.5S	
SVN4160-6M/W	●		SNEN1233ZT/FN			6					10	CST-3.5	
SVN4160-8M/W	●					8	4				12		
SVN4200-5M/W	●		SNEN12T2ZT/FN	20	200	5	2	40	38.1	68	8	CST-3.5S	
SVN4200-6M/W	●		SNEN1233ZT/FN			6					10	CST-3.5	
SVN4200-8M/W	●					8	4				12		

● **Notes on specifications of specials made to order**

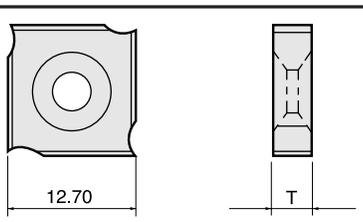
① The cutter widths (W) are available in a range from 5 ~ 8 mm.
② The maximum cutter diameter available is ø960 mm.
③ Special mounting specifications are also available on request.

● Nomenclature

SVN4□□□–□M/W
Cutter diameter
Tool width
Mounting hole spec.

■ Inserts

SNEN



ISO Cat. No.	Accuracy	T (mm)	Honing	Grades PVD Coated AH330	Grades Uncoated UX30	Grades Uncoated TH10
SNEN12T2ZTN SNEN12T2ZFN	E	2.78	With Without	●	●	●
SNEN1233ZTN SNEN1233ZFN		3.30	With Without	●	●	●

■ Standard cutting conditions

Work materials	Insert grades	Cutting speed Vc (m/min)
Carbon steels (< 300 HB)	**AH330**	100 ~ 200
	UX30	80 ~ 120
Die steels (< 300 HB)	**AH330**	60 ~ 120
	UX30	60 ~ 80
Cast irons	**TH10**	80 ~ 100
Aluminium alloys	**TH10**	600 ~ 1000

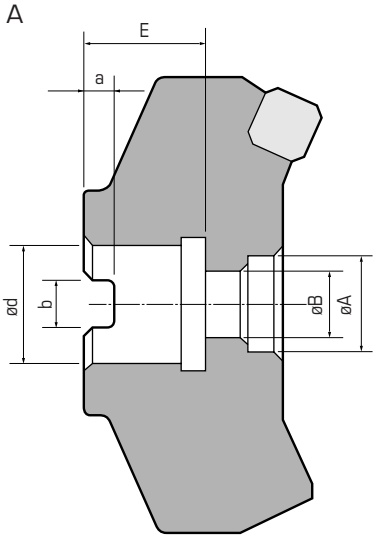
• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 298 ~ 302 | Reference guide | Technical data P. 476 ~ 479

Mounting Details of LS and S Series TAC Mills

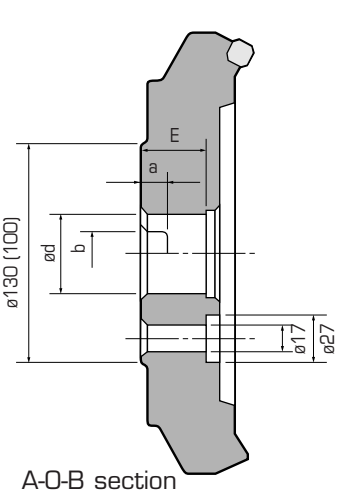
Cutter diameter (mm)	Fig.	Dimensions (mm)					
		øA	øB	ød	a	b	E
ø50, ø52, ø63, ø66	A	18	10	22	6.3	10.4	20
ø80	A	20	13.5	27	7	12.4	22
	B	38	–				26
ø100	A	27	17.5	32	8	14.4	25
	B	45	–				32
ø125	B	56	–	40	9	16.4	
ø160 (ø150)	C	–	–				29
ø200	C	–	–	60	14	25.7	38
ø250	C	–	–				
ø315 (ø300)	D	–	–				

A

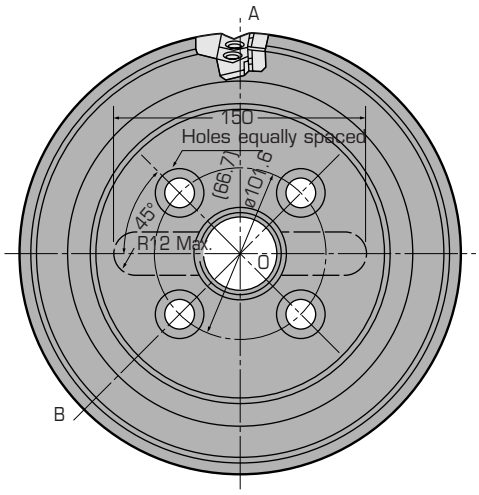


Note: Can be mounted with a commercially available hexagonal socket head

C

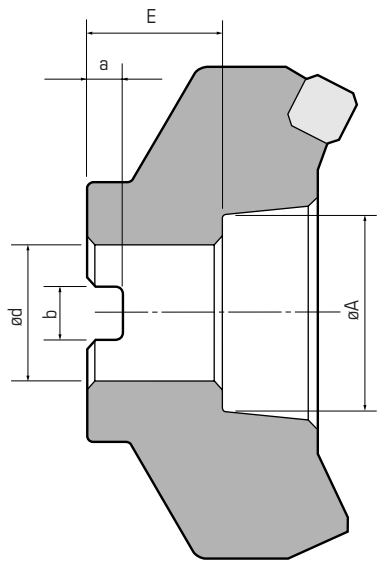


A-O-B section

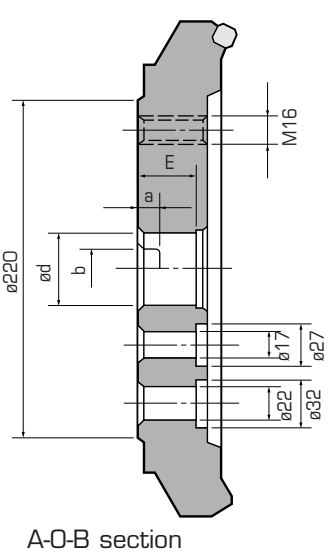


Note: In the ø200 cutters, the drive key way are opened through.
() are for cutters ø160 European type.

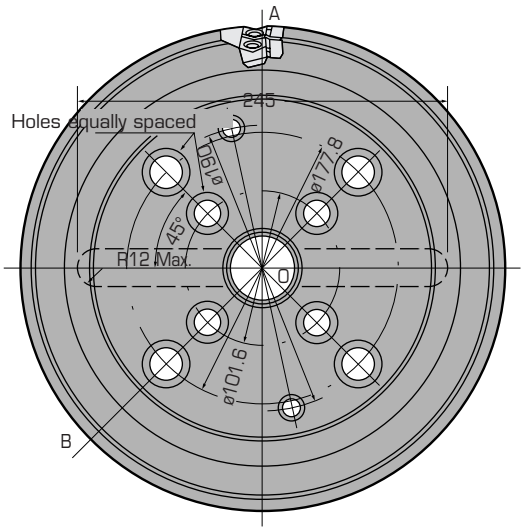
B



D

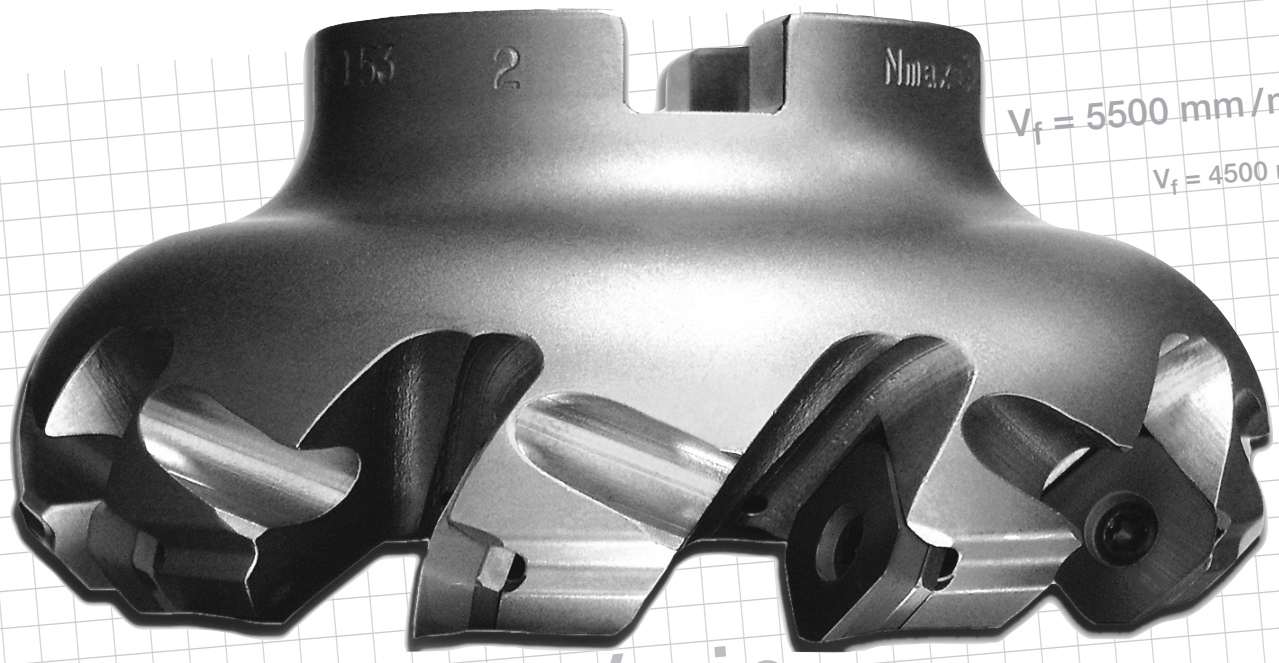


A-O-B section



Milling made “easy”

NEW



Our formula for high productivity:

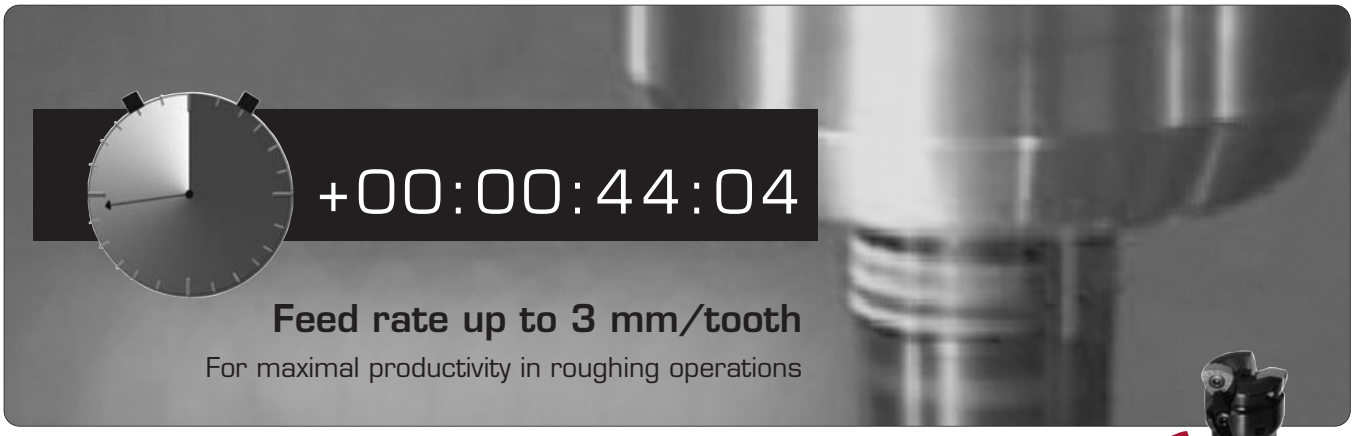
HJ = High feed milling

Features

With the **newly developed tool system for face and square shoulder milling** Tungaloy strikes out in a new direction in precision and design. This modern tool concept convinces in various application fields and enables **productive and flexible utilisation on all different machining centres.**

Due to two different versions (standard pitch and close pitch type) this tool system offers **optimal adaptation to a great variety of working materials**. All tools dispose of an inner coolant system directed precisely on each insert. Thanks to the highly positive rake angle and the application oriented chipbreaker, lowest cutting forces can be achieved. Thus especially the machining of unstable work pieces on low power machining centres becomes totally uncomplicated. The application of the HJ high feed geometry in the 45° TAW milling **cutter is revolutionary. Simply by changing the insert the face milling cutter turns into a high feed milling cutter.** This points out the complete potential of our new milling system as it realizes significantly shorter machining times.

Super “Quick motion” milling cutter



Benefits

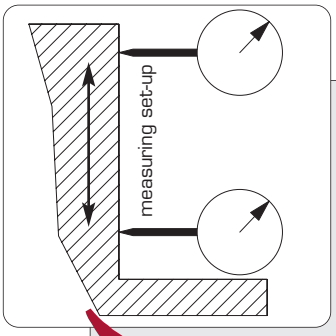
- Highly economic design with 3 cutting edges
- New chipbreaker geometries for optimum performance
- Stable double clamping system of the insert
- All EXP milling cutter with inne coolant
- Extremely quiet running at large cutting depths

Features

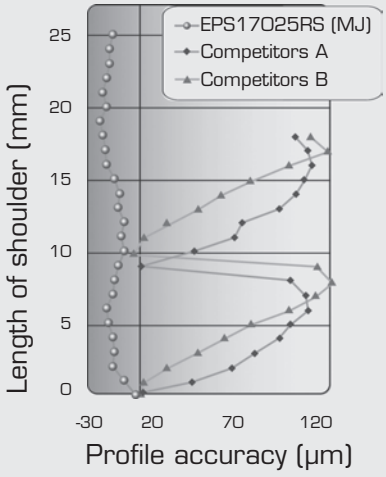
Modern machine tool centres allow for highly economic production by means of increased number of revolutions and higher table feed rates. So far, these cutting parameter have been applied for smooth milling rev. precision finishing. The innovative EXP & TXP milling cutter now optimize also the more time consuming roughing operation. The EXP & TXP milling cutter are suited for **feed rates > 3 mm/tooth** and thus lead to a substantial reduction in machining time.

With the EXP & TXP milling cutter, surface milling operations, ramping and cavity enlarging at maximum cutting depths of 1.5 mm are possible. Compared to conventional cutting parameter the machining time can be reduced by one half. The economic design of the insert with three cutting edges with chipbreaker reduces cutting forces and thus enables the use of the larger TXP milling cutter also on machines with low spindle speed.

High Precision 90° milling cutter



90° Square Shoulder



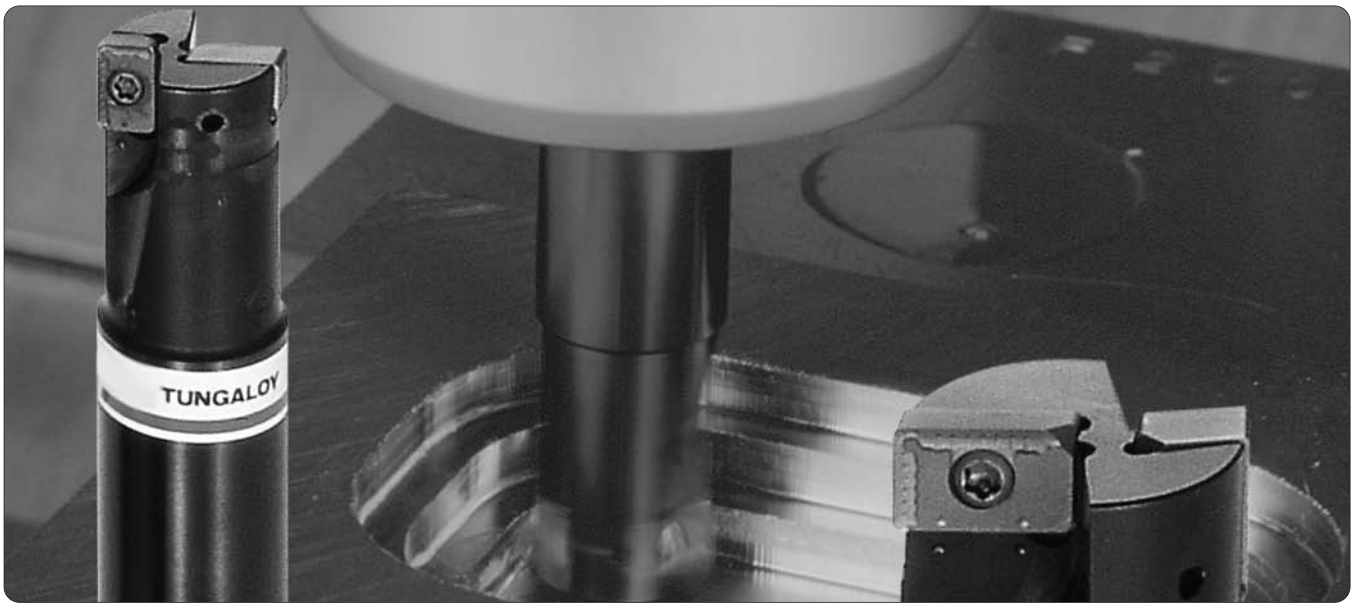
Cutter:	EPS17025RS (ø 25, t = 2)
Insert:	ASMT170508PDPR-MJ
Grade:	AH120
Work material:	C55
Cutting speed:	V_c = 150 m/min
Feed per tooth:	f_t = 0.1 mm
Axial cutting depth:	a_p = 2 x 14 mm
Cutting width:	a_e = 5 mm
Coolant:	without

Features

High precision and general purpose are the main characteristics of Tungaloy's latest innovative development. The new and modern **EPS & TPS generation of milling cutters** covers a multitude of different applications. The endmills, of which some are equipped with air hole, are best suited for square shoulder and slotting operations at only low cutting forces. The exact positioning of the insert combined with a positive chipbreaker and **a two-step rake angle enable the machining of a high precision 90° shoulder without any steps in the profile.** Further finishing operations with a solid carbide milling cutter thus become unnecessary.

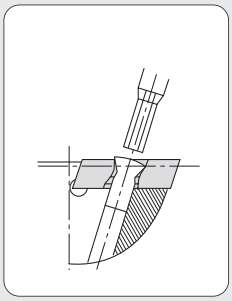
Multifunctional milling cutter

with centre cutting edge for plunge milling



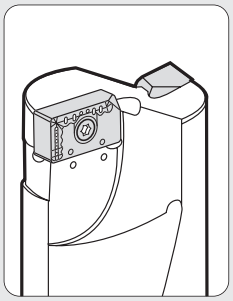
Benefits

Double clamping
Insert is fixed with clamp screw and form fit for highest stability. Optimal fixing through the inclination of the clamping screw



Unique
Special marks on inserts and cutter body for easy indexing

Air hole
Effecient coolant supply (cooling lubricant or compressed air)



Features

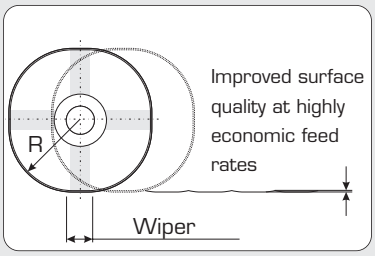
Modern machining processes demand for flexible application and highest productivity. Tungaloy set a sign and developed a new tool concept. The **multi-functional EVX endmill** is the result of an elaborate market analysis carried out amongst a carefully chosen and well balanced circle of end-users from the **Die and Mould industry, machine tool industry and fixture construction but also machine construction industry and repair shops**.

The innovative EVX endmill is a double cutting endmill with centre cutting edge best suited for a multitude of different applications. These are next to conventional milling operations as shoulder milling and slotting also **plunging operations** into the full material.

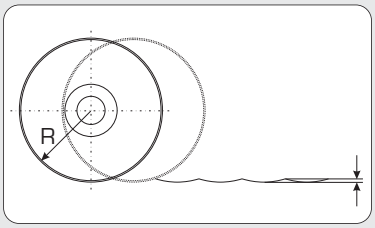
Especially the effective double clamping mechanism of the insert by clamp screw and form fit extraordinarily compensates cutting forces developing from different sources and directs these into the insert seat. The result is **higher stability** of the whole tool system and an optimised complete machining process.

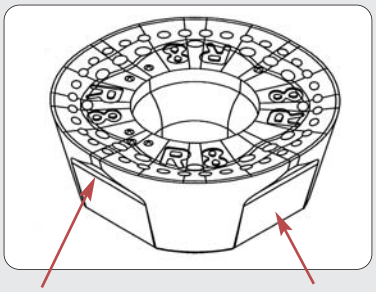
Multifunctional milling cutter with round insert

"Wiper effect" with RDMT/W...



Standard round insert





Features

The TRD12-16 is a **unique milling cutter** with round inserts for a great variety of applications in the automobile industry. The positive rake angle allows **for low vibration machining at large cutting depths and only minimal spindle load**.
Due to the indexing flat, the insert finds a stable seat and can easily be fixed and turned.
The new wiper effect at the round insert grants for excellent surface qualities at high feed rates, similar to turning operations.

MEMO

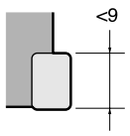
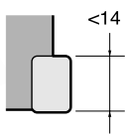
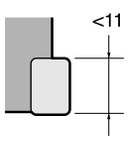
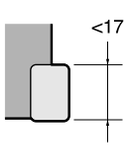
MEMO

MEMO

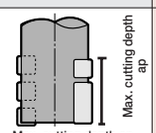
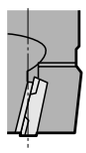
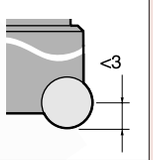
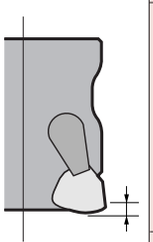
MEMO

TAC Endmills

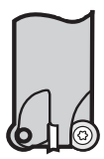
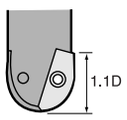
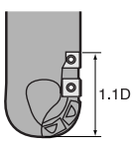
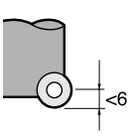
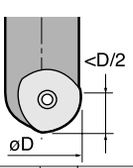
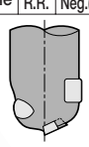
List of TAC Endmills

Operation	Work materials	Shape	Max. cutting depth ap (mm)	Cat. No.	Stock R	Stock L	No. of inserts	Cutter dia. (mm)	Features	Applicable inserts	Page
Square shoulder milling	Steel, Stainless steels and Cast irons	**EPN09** 	 Rake angle A.R. -4°~5° R.R. -28°~-11°	EPN09010R-E	●		1	10	• High-speed, high efficiency endmills featuring freer cutting action usable for a wide range of work materials from general steels to stainless steels. • Relatively close pitch design to achieve high-efficiency milling at high table feeds. • Specially designed 3-dimensional ML-type insert can reduce cutting forces and deliver unsurpassed performance in machining stainless steels. • Robust and highly rigid cutter body for stable machining	ANMT09T3PPPR-MJ ANMT09T3PPPR-ML	363
				EPN09012R-E	●		1	12			
				EPN09016R-E	●		2	16			
				EPN09020R-E	●		3	20			
				EPN09025R-E	●		4	25			
				EPN09032R-E	●		5	32			
		EPN14 	 Rake angle A.R. -2.5°~4° R.R. -17°~-10°	EPN14025R-E	●		2	25		ANMT1404PPPR-MJ ANMT1404PPPR-ML	
				EPN14032R-E	●		3	32			
				EPN14040R-E	●		4	40			
		EPS11•17 	 Rake angle A.R. 9°~14° R.R. -12°~-20°	EPS11012RS	●		1	12	• Square shoulder milling without step effect • 90° shoulder, with high precision profile accuracy • Positive rake angle for low cutting forces and excellent chip control • Milling cutter with air hole	ASMT11T3**PDPR-** ASGT11T3**PDFR-**	358
				EPS11016RS	●		2	16			
				EPS11018RS	●		2	18			
				EPS11020RS	●		2	20			
				EPS11025RS	●		3	25			
				EPS11032RS	●		3	32			
				EPS11020RSB	●		3	20			
				EPS11021RSB	●		3	21			
				EPS11025RSB	●		4	25			
				EPS11026RSB	●		4	26			
				EPS11032RSB	●		5	32			
				EPS11033RSB	●		5	33			
				EPS11012RL	●		1	12			
				EPS11016RL	●		2	16			
				EPS11018RL	●		2	18			
				EPS11020RL	●		2	20			
				EPS11021RL	●		2	21			
				EPS11025RL	●		2	25			
				EPS11026RL	●		2	26			
				EPS11032RL	●		2	32			
				EPS11033RL	●		2	33			
			 Rake angle A.R. 11°~12° R.R. -9°~-15°	EPS17025RS	●		2	25		ASMT1705**PDPR-** ASGT1705**PDFR-**	
				EPS17026RS	●		2	26			
				EPS17032RS	●		2	32			
				EPS17040RS	○		3	40			
				EPS17032RSB	●		3	32			
				EPS17033RSB	●		3	33			
				EPS17040RSB	○		4	40			
				EPS17025RL	●		2	25			
				EPS17026RL	●		2	26			
				EPS17032RL	●		2	32			

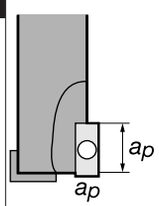
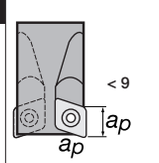
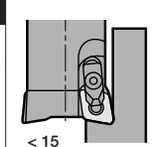
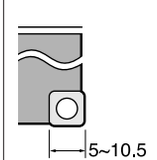
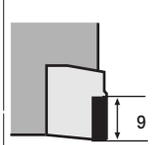
List of TAC Endmills

Operation	Work materials	Shape	Max. cutting depth ap (mm)	Cat. No.	Stock R	Stock L	No. of inserts	Cutter dia. (mm)	Features	Applicable inserts	Page
Square shoulder milling	Steel, Stainless steels and Cast irons	**ELP-A** 	 Max. cutting depth ap varies depending on the cutter diameter. Rake angle A.R. — R.R. —	ELP13025RA	●		2	25	• Usable for slotting as deep as a tool diameter • Two flute type • Highly rigid tool body	ADMT□□□□□□PR-MJ APMT□□□□□□PN-MJ	361
				ELP17032RA	●		2	32			
				ELP21040RAS40	●		2	40			
		EPE 	 Rake angle A.R. +12°~17° R.R. -10°~0°	EPE4020R-E	●		1	20	• Due to the circular-arc shaped peripheral edges, although high-rake geometry, these cutter can produce a precision square-shoulder and wall face. Attainable straightness: Within 5 µm/edge length Attainable perpendicularity: Within 20 µm/edge length • Economical M-class inserts are also available for roughing operations.	AEC/MW1403PE□R	362
				EPE4025R-E	●		2	25			
				EPE5030R-E	●		2	30			
				EPE5035R-E			2	35		AEC/MW16T3PE□R	
				EPE5040R-E	●		2	40			
				EPE6050R-E	●		3	50			
				EPE6063R-E	●		4	63		AEC/MW1804PE□R	
Face milling	Difficult-to-cut materials	**ERF6000** 	 Rake angle A.R. +19° R.R. +3°	ERF6050R-E	●		3	50	• Designed for efficient milling of super alloys, such as Inconel, titanium alloys as well as high-speed milling of stainless steels. • Specially designed round inserts with unique flattened flanks allow the cutter to be used for a wide range of applications from roughing to finishing.	RFEN2004ZFTN RFEN2004M0TN	365
				ERF6063R-E	●		4	63			
High-feed milling	Steel, Stainless steels and Cast irons	**EXP** 	 EXP05: < 1.0 EXP06: < 1.5 EXP08: < 1.5 Rake angle A.R. +5° R.R. -4°~ -6°	EXP05020RS	●		2	20	• Feed rate up to 3 mm/tooth • Highly economic design with 3 cutting edges • Stable double clamping system of the insert • All milling cutter with inner coolant • Extremely quiet running at large cutting depths	WPM*05H315ZPR-** WPM*06X415ZPR-** WPMT080615Z*R-**	366
				EXP05021RS	●		2	21			
				EXP06025RS	●		2	25			
				EXP06026RS	●		2	26			
				EXP06032RS	●		2	32			
				EXP06033RS	●		2	33			
				EXP06040RS	●		3	40			
				EXP08040RSA	●		2	40			
				EXP06032RSB	●		3	32			
				EXP06033RSB	●		3	33			
				EXP05020RL	●		2	20			
				EXP05021RL	●		2	21			
				EXP06025RL	●		2	25			
				EXP06026RL	●		2	26			
				EXP06032RL	●		2	32			
				EXP06033RL	●		2	33			
				EXP06040RL	●		3	40			
				EXP08040RLA	●		2	40			
				EXP06032RLB	●		3	32			
				EXP06033RLB	●		3	33			
				EXP05020RLL	●		2	20			
				EXP05021RLL	●		2	21			
				EXP06025RLL	●		2	25			
				EXP06026RLL	●		2	26			
				EXP06032RLL	●		2	32			
				EXP06033RLL	●		2	33			
				EXP06040RLL	●		3	40			
				EXP08040RLL	●		2	40			

List of TAC Endmills

Operation	Work-materials	Shape	Max. cutting depth ap (mm)	Cat. No.	Stock R	Stock L	No. of inserts	Cutter dia. (mm)	Features	Applicable inserts	Page
Die and mould	Steel and Cast irons	**HWD** 	 Rake angle A.R. 0° R.R. -3°	HWD05010R	●		2	10	• Carbide Reinforcement (rotation-symmetric brazed) • Anti-vibration (best performance at large overhang) • Fine metric thread (stable screw connection)	RDMW0501M0 RDMW0702M0 RDMW1003M0	368
				HWD05012R	●		3	12			
				HWD05015R	●		4	15			
				HWD05020R	●		5	20			
				HWD05025R	●		6	25			
				HWD07015R	●		3	15			
				HWD07020R	●		4	20			
				HWD07025R	●		5	25			
				HWD10020R	●		2	20			
				HWD10025R	●		3	25			
		EBP 	 Rake angle A.R. – R.R. –	EBP020SD-E	●		2	20	• Strong insert shape and improved clamping stability allow highly productive machining.	ZPET2004-MJ DCMW070204TN ZPET2505-MJ DCMW11T304TN ZPET3206-MJ DCMW11T304TN	370
				EBP025SD-E	●		2	25			
				EBP032SD-E	●		2	32			
				EBP020MDE-E	●		2+2	20			
				EBP025MDE-E	●		2+2	25			
				EBP032MDE-E	●		2+2	32			
				EBP020MME-E	●		2+2	20			
				EBP025MME-E	●		2+2	25			
				EBP032MME-E	●		2+2	32			
		EBD 	 Rake angle A.R. – R.R. –	EBD040SD-E	●		2	40	• The three dimensional curved cutting edge provides enough cut-ting edge strength even under severe conditions and reduces vibration during cutting.	ZDMT4005-MJ SCMT09T308-23 ZDMT5006-MJ SCMT120408-23	369
				EBD040MME-E	●		2	40			
				EBD050SDE-E	●		2	50			
				EBD050MME-E	●		2	50			
		ERD4000 	 Rake angle A.R. +5°~8° R.R. -2°~-3°	ERD4020R-E	●		1	20	• Used for rough curvature milling. • Used at small cutting depths and high feed rates.	RDCM1203□N RDMA1203□N	372
				ERD4032R-E	●		2	32			
				ERD4040R-E	●		3	40			
				ERD4050R-E	●		3	50			
		TBN1000 	 Rake angle A.R. Neg. R.R. Neg.(Pos.)	TBN1100S-E	●		1	10	• Simple-construction ball endmill. • Used for finishing to medium finishing.	ZNCA1002FN2 ZNCA1203FN ZNCA1603FN ZNCA2004FN ZNCA2505FN ZNCA3005FN ZNMM2004EN ZNMM2505EN ZNMM3005EN	373
				TBN1120S-E	●		1	12			
				TBN1160S-E	●		1	16			
				TBN1200S-E	●		1	20			
				TBN1250S-E	●		1	25			
				TBN1300S-E	●		1	30			
		TBF1000 	 Max. cutting depth ap varies depending on the cutter ø Rake angle A.R. Pos. R.R. Neg.	TBF1320S-E	●		1	32	• TAC ball endmill used for medium finishing to roughing. • 3 or 4 inserts de-signed to share the cut perform well-balanced and highly- efficient machining.	ZDKA0704T/FN ZDKA0804T/FN ZDKA1105T/FN ZDCA0704T/FN ZDCA0804T/FN ZDCA1105T/FN ZDCA1705T/FN	374
				TBF1400S-E	●		1	40			
				TBF1500S-E	●		1	50			
				TBF1600S-E	●		1	60			

List of TAC Endmills

Operation	Work-materials	Shape	Max. cutting depth ap (mm)	Cat. No.	Stock R	Stock L	No. of inserts	Cutter dia. (mm)	Features	Applicable inserts	Page
Multi-functional	Steel, Stainless steels and Cast irons	**EVX** 	 EVX08 < 7 EVX10 < 9 EVX12 < 11.5 EVX16 < 15 Rake angle A.R. +2°~+5°, R.R. -10°~-3.5°	EVX08016RSA-E	●		2	16	• Double-sided insert design. • The same shape inserts can be used for both peripheral and center cutting edges.	XXMU08T204PR-MJ XXMU10H308PR-MJ XXMU12X408PR-MJ XXMU16X508PR-MJ	375
				EVX10020RSA-E	●		2	20			
				EVX12025RSA-E	●		2	25			
				EVX16032RSA-E	●		2	32			
				EVX08016RLA-E	●		2	16			
				EVX10020RLA-E	●		2	20			
				EVX12025RLA-E	●		2	25			
				EVX16032RLA-E	●		2	32			
				EVX08016RLA	○		2	16			
				EVX10020RLA	○		2	20			
				EVX12025RLA	○		2	25			
				EVX16032RLA	○		2	32			
	Steel and Aluminium alloys	**ESD10** 	 Rake angle A.R. +8.5°~+10°, R.R. -10°~-5°	ESD10020RS-E	●		1	20	• Provided with freer cutting action, widely used for threedimensional roughing such as plunging, ramping and helical feed milling.	GDMT10H3PDPR-MJ	377
				ESD10025RS-E	●		2	25			
				ESD10032RS-E	●		2	32			
	Steel and Cast irons	**ESD5000** 	 Rake angle A.R. +5°, R.R. -5°	ESD5040RS-E	●		2	40	• By utilizing the helical interpolation function of CNC machines, the cutter can be used for high-efficiency deep pocket milling and large-diameter hole making. • Also applicable for a wide variety of milling operations including Z- feed milling.	EDKW53ZTR EDKW53ZFR	379
				ESD5040RL-E	●		2	40			
				ESD5050RS-E	●		2	50			
				ESD5050RL-E	●		2	50			
Counter milling		**TCB** 	 Rake angle A.R. Pos., R.R. Neg.	TCB-140	●		1	14	• TAC counter boring cutter. • Suitable for counter boring of seats for hexagonal socket head bolts. (Applicable bolt sizes: M8 ~ M30)	SPMP831DS	381
				TCB-175	●		2	17.5			
				TCB-200	●		2	20		SPMP042ERD	
				TCB-230	●		2	23			
				TCB-260	●		2	26			
				TCB-290	●		2	29		SPMM322ERD	
				TCB-320	●		2	32			
				TCB-350	●		2	35		SPMM432ERD	
				TCB-390	●		2	39			
				TCB-430			2	43			
				TCB-480			2	48			
Square shoulder milling (precision finishing)	Non-ferrous metals	**EDPD15** 	 Rake angle A.R. +7°, R.R. 0°	EDPD15050R/L			3	50	• All PCD tipped TAC endmills used for high-speed and high-accuracy milling of aluminium alloys and other non-ferrous metals.	YDEN1505PDFR/L-D YDEN1505PDFR/L-WD	382
				EDPD15063R/L			4	63			

List of TAC Milling Inserts (E Series)

Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades: CVD T3030	CVD T1015	PVD Coated GH330	PVD Coated GH340	PVD Coated AH330	PVD Coated AH120	PVD Coated AH140	Cermet NS530	Cermet NS540	Cermet NS740	Uncoated KS05F	Uncoated TH10	Uncoated UX30	Uncoated KS20	Uncoated TU40	Applicable TAC mills (pages)
	AECW1403PESR AECW16T3PESR AECW1804PESR AECW1804PEFR	AECW1403PESR AECW16T3PESR AECW1804PESR AECW1804PEFR	C	With Without			● ● ●			○ ○ ○			△ △ △	○ ○ ○		○	○ ○ ○			EPE (P. 362)
	AEMW1403PETR AEMW16T3PETR AEMW1804PETR AEMW1804PEFR	AEMW1403PETR AEMW16T3PETR AEMW1804PETR AEMW1804PEFR	M	With Without			● ● ●						△ △ △	○ ○ ○		○	○ ○ ○			
	ADMT130308PR-MJ ADMT17T308PR-MJ ADMT210408PR-MJ	ADMT130308PR-MJ ADMT17T308PR-MJ ADMT210408PR-MJ	M	With	○ ○ ○					● ● ●	○ ○ ○									ELP-A (P. 361)
	APMT070308PN-MJ APMT09T308PN-MJ APMT120408PN-MJ	APMT070308PN-MJ APMT09T308PN-MJ APMT120408PN-MJ	M	With	○ ○ ○		○ ○ ○			● ● ●	○ ○ ○									
	ASGT11T304PDFR-AJ ASGT11T308PDFR-AJ ASGT170504PDFR-AJ ASGT170508PDFR-AJ	ASGT11T304PDFR-AJ ASGT11T308PDFR-AJ ASGT170504PDFR-AJ ASGT170508PDFR-AJ	G	Without											● ● ● ●					EPS11•17 (P. 358)
	ASMT11T304PDPR-MJ ASMT11T308PDPR-MJ ASMT11T312PDPR-MJ ASMT11T316PDPR-MJ ASMT11T320PDPR-MJ ASMT11T330PDPR-MJ	ASMT11T304PDPR-MJ ASMT11T308PDPR-MJ ASMT11T312PDPR-MJ ASMT11T316PDPR-MJ ASMT11T320PDPR-MJ ASMT11T330PDPR-MJ	M	With	● ● ● ●	● ● ●				● ● ● ● ● ●				● ● ●						
	ASMT170504PDPR-MJ ASMT170508PDPR-MJ ASMT170512PDPR-MJ ASMT170516PDPR-MJ ASMT170520PDPR-MJ ASMT170530PDPR-MJ ASMT170532PDPR-MJ	ASMT170504PDPR-MJ ASMT170508PDPR-MJ ASMT170512PDPR-MJ ASMT170516PDPR-MJ ASMT170520PDPR-MJ ASMT170530PDPR-MJ ASMT170532PDPR-MJ	M	With	● ● ● ● ● ●	● ● ● ●				● ● ● ● ● ● ●				● ● ● ●						EPS11•17 (P. 358)
	ASMT11T304PDPR-MS ASMT170508PDPR-MS	ASMT11T304PDPR-MS ASMT170508PDPR-MS	M	With							● ●									
	ANMT09T3PPPR-MJ ANMT1404PPPR-MJ	ANMT09T3PPPR-MJ ANMT1404PPPR-MJ	M	With	● ●	● ●	● ●		● ●	● ●			● ●							EPN09•14 (P. 363)
	ANMT09T3PPPR-ML ANMT1404PPPR-ML	ANMT09T3PPPR-ML ANMT1404PPPR-ML						● ●		● ●										
	EDKW53ZTR	EDKW1504EDTR	K	With			○										●			ESD5000 (P. 379)
	GDMT10H3PDPR-MJ	GDMT10H3PDPR-MJ	M	With					●	●										ESD10 (P. 377)
	GDGT10H3PDFR-AJ	GDGT10H3PDFR-AJ	G	Without												○				
	RDCM1203TN RDCM1203FN	RDCM1203TN RDCM1203FN	C	With Without													●			ERD4000 (P. 372)
	RDMA1203TN RDMA1203FN	RDMA1203TN RDMA1203FN	M	With Without													●			
	RDMW0501M0 RDMW0702M0 RDMW1003M0	RDMW0501M0 RDMW0702M0 RDMW1003M0	M	With						● ● ●										HWD (P. 368)
	RFEN2004M0TN RFEN2004ZFTN	RFEN2004M0TN RFEN2004ZFTN	E	With			○ ○			● ●							● ●	○ ●	○ ○	ERF6000 (P. 365)
	SDMT1204AFPN-MJ SDMT1204AFPNE-MJ	SDMT1204AFPN-MJ SDMT1204AFPNE-MJ	M	With	●	●	●		● ●	● ●	●	● ●								EAD12
	SDMT1204AFTN-MJ SDGT1204AFTN-MJ	SDMT1204AFTN-MJ SDGT1204AFTN-MJ	M G	With					 ●	 ●		● ●	△ △	○ ○						
	SDMT1204AFPN-MS	SDMT1204AFPN-MS	M	With							●									
	SDMT1204AFPN-ML	SDMT1204AFPN-ML	M	With					●	●										
	SDGT1204AFFN-AJ	SDGT1204AFFN-AJ	G	Without												●				
	SDMT1204PDSR-MJ SDMT1204PDTR-MJ	SDMT1204PDSR-MJ SDMT1204PDTR-MJ	M	With	●	●	●		●	●		●								
	SDGT1204PDTR-MJ	SDGT1204PDTR-MJ	G	With					●	●		●								

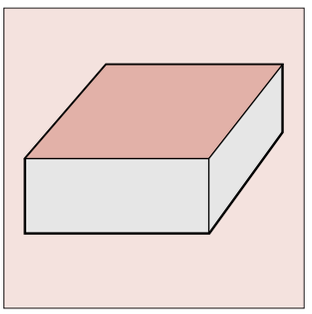
List of TAC Milling Inserts (E Series)

Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Accuracy	Honing	Stocked grades: Coated T3030	T1015	GH330	GH340	AH330	AH120	AH140	T313W	Cermet NS740	NS540	GT540	Uncoated TH10	UX30	TX25	TX30	PCD DX140	Applicable TAC mills (pages)
	SDMT1204PDPR-MS	SDMT1204PDPR-MS	K	With							●										EPD12
	SDMT1204PDPR-ML	SDMT1204PDPR-ML	K	With					●	●											
	SDGT1204PDFR-AJ	SDGT1204PDFR-AJ	M	Without												●					
	SEKN1203AFTN	SEKN1203AFTN	K	With		●	●		●	○	●		●	△	△		●				—
	SEKN42AFFN	SEKN1203AFFN		Without										△		●					
	SEKN42AFTN16	SEKN1203AFTN-16		With	●																
	SEKR42AFSR-MJ	SEKR1203AFSR-MJ	K	With	●	●	●		●												
	SPMP831DS	SPMT060204-DS	M	With								●									TCB (P. 381)
	SPMP042ERD	SPMP080308ER-D										●									
	SPMM322ERD	SPMT090308ER-D										●									
	SPMM432ERD	SPMT120408ER-D										●									
	XXMU08T204PR-MJ	XXMU08T204PR-MJ	M	With						●	●										EVX (P. 375)
	XXMU10H308PR-MJ	XXMU10H308PR-MJ								●	●										
	XXMU12X408PR-MJ	XXMU12X408PR-MJ								●	●										
	XXMU16X508PR-MJ	XXMU16X508PR-MJ								●	●										
	YDEN1505PDFR-D	YDEN1505PDFR-D	E	Without																●	EDPD (P. 382)
	YDEN1505PDFR-WD	YDEN1505PDFR-WD																		●	
	YPMT0902ZER	YPMT0902ZER	M	With			●										●				EVP1000
	YPMT1203ZER	YPMT1203ZER					●										●				
	YPMT15T3ZER	YPMT1503ZER					●										●				
	CPMW050208EN	CPMW050208EN	M	With			●										●				
	CPMW06T208EN	CPMW06T208EN					●										●				
	CPMT080308EN	CPMT080308EN					●										●				
	WPMW05H315ZPR	WPMW05H315ZPR	M	With	●	●				●	●										EXP05•06•08 (P. 366)
	WPMW06X415ZPR	WPMW06X415ZPR			●	●				●	●										
	WPMT05H315ZPR-MH	WPMT05H315ZPR-MH								●	●										
	WPMT05H315ZPR-ML	WPMT05H315ZPR-ML			●					●	●										
	WPMT06X415ZPR-MH	WPMT06X415ZPR-MH								●	●										
	WPMT06X415ZPR-ML	WPMT06X415ZPR-ML			●					●	●										
	WPMT080615ZSR	WPMT080615ZSR			●	●				●	●										
	WPMT080615ZSR-MH	WPMT080615ZSR-MH								●	●										
	WPMT080615ZSR-ML	WPMT080615ZSR-ML			●					●	●										
	ZDKA0704TN	ZDKA0704TN	K	With													●				TBF1000 (P. 374)
	ZDKA0804TN	ZDKA0804TN															●				
	ZDKA1105TN	ZDKA1105TN															●				
	ZDCA0704TN	ZDCA0704TN	C	With													○				
	ZDCA0804TN	ZDCA0804TN															○				
	ZDCA1105TN	ZDCA1105TN															○				
	ZDCA1705TN	ZDCA1705TN															●				
	BBS-32	BBS-32	C	With														●			TBN1000 (P. 373)
	ZNCA1002FN2	ZNCA1002FN2	C	Without												●	●				
	ZNCA1203FN	ZNCA1203FN	C	Without												●	●				
	ZNCA1603FN	ZNCA1603FN														●	●				
	ZNCA2004FN	ZNCA2004FN														●	●				
	ZNCA2505FN	ZNCA2505FN														●	●				
	ZNCA3005FN	ZNCA3005FN														●	●				
	ZNMM2004EN	ZNMM2004EN	M	With													●				EBD (P. 369)
	ZNMM2505EN	ZNMM2505EN															●				
	ZNMM3005EN	ZNMM3005EN															●				
	ZDMT4005-MJ	ZDMT4005-MJ	M	With						●											EBP (P. 370)
	ZDMT5006-MJ	ZDMT5006-MJ								●											
	SCMT09T308-23	SCMT09T308-23	M	With						●											
	SCMT120408-23	SCMT120408-23								●											
	ZPET2004-MJ	ZPET2004-MJ	E	With					●	●											
	ZPET2505-MJ	ZPET2505-MJ							●	●											
	ZPET3206-MJ	ZPET3206-MJ							●	●											
	DCMW070204TN	DCMW070204TN	M	With					●	●											
	DCMW11T304TN	DCMW11T304TN							●	●											

Selection Guides for TAC Endmills

■ Selecting from operation and work material

Face milling



TAC Endmills are listed in order of recommendation from top to bottom

Steels, Stainless steel and Cast irons

Rake angle: A.R. +5°
R.R. -4° ~ -6°

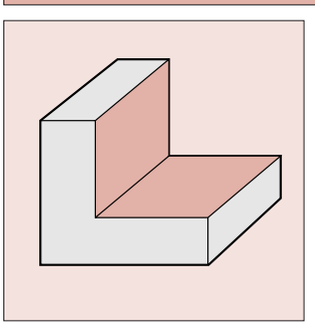
EXP05•06•08

Difficult-to-cut materials

Rake angle: A.R. +19°
R.R. +3°

ERF6000

Square shoulder milling



TAC Endmills are listed in order of recommendation from top to bottom

Steels and Stainless steel

Rake angle: A.R. 9° ~ 14°
R.R. -9° ~ -20°

**EPS11•17 +
-MJ, -MS**

Rake angle: A.R. -4° ~ +5°
R.R. -28° ~ -11°

**EPN09•14 +
-MJ, -ML**

Cast irons

Rake angle: A.R. 9° ~ 14°
R.R. -9° ~ -20°

**EPS11•17 +
-MJ**

Rake angle: A.R. -4° ~ +5°
R.R. -28° ~ -11°

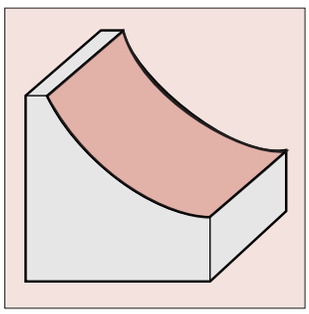
**EPN09•14 +
-MJ**

Aluminium alloys

Rake angle: A.R. -4° ~ +5°
R.R. -28° ~ -11°

**EPS +
-AJ**

High-feed milling

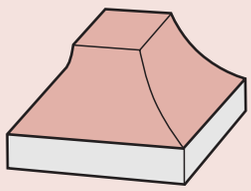


TAC Endmills are listed in order of recommendation from top to bottom

Rake angle: A.R. +5°
R.R. -4° ~ -6°

EXP05•06•08

Die and mould



TAC Endmills are listed in order of recommendation from top to bottom

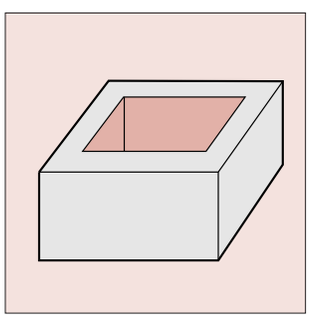
Rake angle: A.R. -
R.R. -

EBP

Rake angle: A.R. -
R.R. -

EBD

Multi-functional milling



TAC Endmills are listed in order of recommendation from top to bottom

Rake angle: A.R. +2° ~ 5°
R.R. -10° ~ -3.5°

EVX

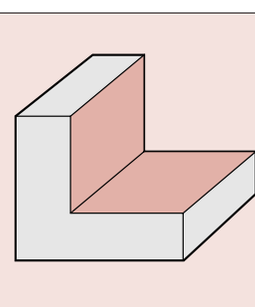
Rake angle: A.R. +8.5° ~ 10°
R.R. -10° ~ -5°

ESD10

Rake angle: A.R. +5°
R.R. -4° ~ -6°

EXP05•06•08

Square shoulder milling



TAC Endmills are listed in order of recommendation from top to bottom

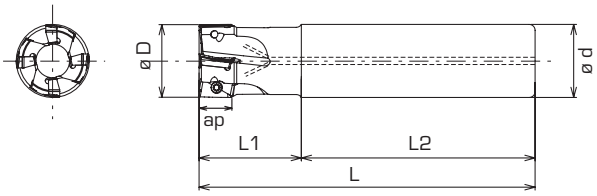
Rake angle: A.R. -
R.R. -

ELP-A

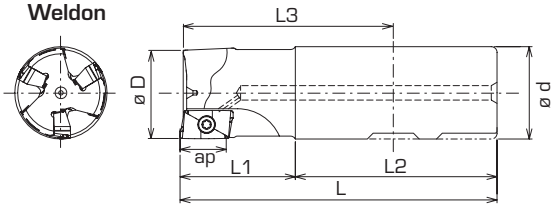
EPS11•17 High precision 90° endmills

Rake angle
EPS11: A.R. +9° ~ +17.5° R.R. -20° ~ -7°
EPS17: A.R. +11° ~ +17.5° R.R. +14.5° ~ -7°

Cylindrical



Weldon



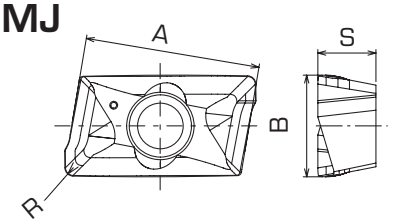
ASMT11T3** max. ap: 10.5 (mm)
ASMT1705** max. ap: 16.0 (mm)

	Cat. No.	Stock	No. of inserts	Dimensions (mm) ø D	L	L1	L2	L3	ø d	Inserts	Replacement parts: Clamping screw	Replacement parts: Wrench
Cylindrical - Standard	EPS11012RS	●	1	12	85	25	60	–	16	AS*T11T3**PDPR-**	CSPB-2.5S	IP-8D
	EPS11016RS	●	2	16								
	EPS11018RS	●		18								
	EPS11020RS	●		20	100	30	70	–	20			
	EPS11020RSB	●	3									
	EPS11021RSB	●		21								
	EPS11025RS	●		25	115	35	80	–	25		CSPB-2.5	
	EPS11025RSB	●	4									
	EPS11026RSB	●		26								
	EPS11032RS	●	3	32	120	40		–	32			
	EPS11032RSB	●	5									
	EPS11033RSB	●		33								
	EPS17025RS	●	2	25	115	35		–	25	AS*T1705**PDPR-**	CSPB-4S	IP-15D
	EPS17026RS	●		26								
	EPS17032RS	●		32	120	40		–	32			
	EPS17032RSB	●	3									
	EPS17033RSB	●		33								
Cylindrical - long	EPS11012RL	●	1	12	125	30	95	–	16	AS*T11T3**PDPR-**	CSPB-2.5S	IP-8D
	EPS11016RL	●	2	16	145	40	105					
	EPS11018RL	●		18								
	EPS11020RL	●		20	185	50	135	–	20			
	EPS11021RL	●		21								
	EPS11025RL	●		25	220	70	150	–	25		CSPB-2.5	
	EPS11026RL	●		26								
	EPS11032RL	●		32	255	80	175	–	32			
	EPS11033RL	●		33								
	EPS17025RL	●		25	220	70	150	–	25	AS*T1705**PDPR-**	CSPB-4S	IP-15D
	EPS17026RL	●		26								
	EPS17032RL	●		32	255	80	175	–	32			
Weldon	EPS11012RS-E	●	1	12	80	25	55	56	16	AS*T11T3**PDPR-**	CSPB-2.5S	IP-8D
	EPS11016RS-E	●	2	16	85		60					
	EPS11020RSB-E	●	3	20	90	30		65	20			
	EPS11025RSB-E	●	4	25	95	35		63	25		CSPB-2.5	
	EPS11032RSB-E	●	5	32	110	40	70	74	32			
	EPS17025RS-E	●	2	25	95	35	60	63	25	AS*T1705**PDPR-**	CSPB-4S	IP-15D
	EPS17032RSB-E	●	3	32	110	40	70	74	32			

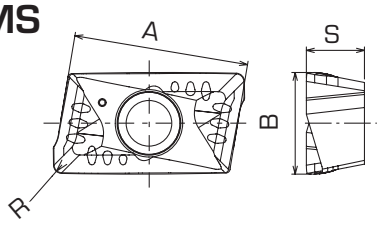
Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Specifications: Inserts

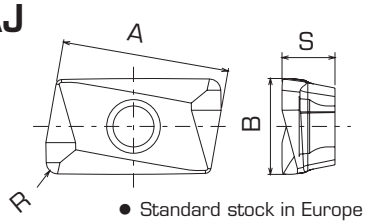
-MJ



-MS



-AJ



● Standard stock in Europe

Item code	Grade						Accuracy	Honing	Dimensions (mm)			
	PVD		CVD		Cermet	Carbide			A	B	S	R
	AH120	AH140	T1015	T3030	NS740	KS05F						
ASMT11T304PDPR-MJ	●		●	●	●		M	with	11.6	6.7	3.7	0.4
ASMT11T304PDPR-MS		●										
ASGT11T304PDFR-AJ						●	G	without				
ASMT11T308PDPR-MJ	●		●	●	●		M	with				0.8
ASGT11T308PDFR-AJ						●	G	without				
ASMT11T312PDPR-MJ	●			●			M	with				1.2
ASMT11T316PDPR-MJ	●		●	●	●							1.6
ASMT11T320PDPR-MJ	●											2.0
ASMT11T330PDPR-MJ	●											3.0
ASMT170504PDPR-MJ	●		●	●	●		M	with	16.9	9.8	5.6	0.4
ASGT170504PDFR-AJ						●	G	without				
ASMT170508PDPR-MJ	●		●	●	●		M	with				0.8
ASMT170508PDPR-MS		●										
ASGT170508PDFR-AJ						●	G	without				
ASMT170512PDPR-MJ	●			●			M	with				1.2
ASMT170516PDPR-MJ	●		●	●	●							1.6
ASMT170520PDPR-MJ	●											2.0
ASMT170530PDPR-MJ	●											3.0
ASMT170532PDPR-MJ*	●		●	●	●							3.2

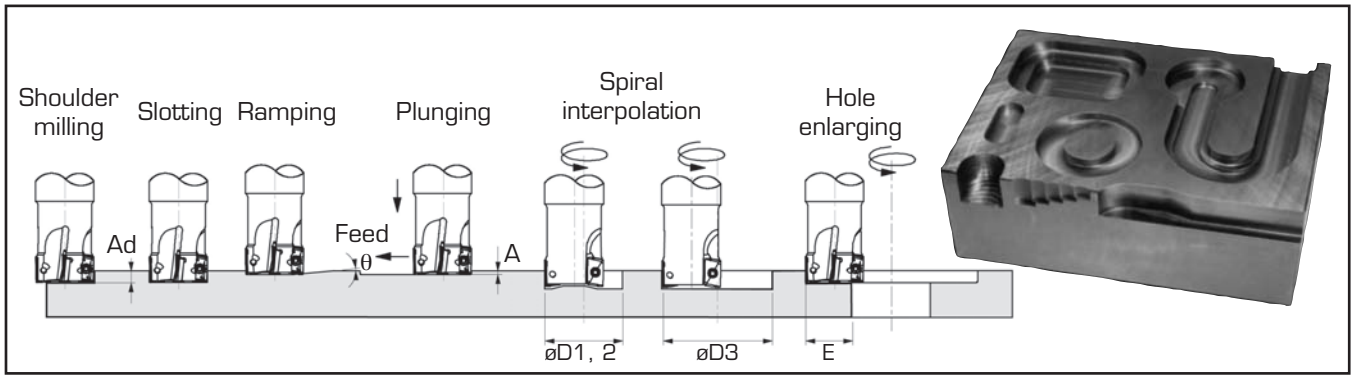
*Note: Inserts with corner radius R 3.2 are not recommended for spiral interpolation.

Cutting conditions

Work materials	Grade	Chip-breaker	Cutting-parameter	Tool diameter (mm)		
				ø 12	ø 16 - ø 21	ø 25 - ø 63
Low alloy steels St42, C45E etc. < 250HB	NS740	-MJ	Vc (m/min)	80 - 100	100 - 120	100 - 150
			ft (mm/t)	0.05 - 0.08	0.05 - 0.12	0.05 - 0.15
	AH120	-MJ	Vc (m/min)	80 - 100	100 - 150	100 - 150
			ft (mm/t)	0.05 - 0.10	0.12 - 0.20	0.12 - 0.20
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	NS740	-MJ	Vc (m/min)	80 - 100	80 - 100	80 - 120
			ft (mm/t)	0.05 - 0.08	0.05 - 0.08	0.05 - 0.10
	T3030	-MJ	Vc (m/min)	80 - 100	80 - 120	100 - 200
			ft (mm/t)	0.05 - 0.10	0.10 - 0.15	0.10 - 0.20
Die steels X96CrMoV12 etc. < 300HB	T3030	-MJ	Vc (m/min)	80 - 100	80 - 120	100 - 150
			ft (mm/t)	0.05 - 0.10	0.10 - 0.15	0.12 - 0.20
Stainless steels X8CrNiS18-9 etc. < 250HB	AH140	-MS	Vc (m/min)	80 - 100	100 - 150	100 - 200
			ft (mm/t)	0.05 - 0.10	0.12 - 0.15	0.12 - 0.20
Cast irons GG25 etc.	T1015	-MJ	Vc (m/min)	80 - 100	100 - 150	100 - 200
			ft (mm/t)	0.08 - 0.12	0.12 - 0.20	0.15 - 0.25
Aluminium alloy Si < 12 %	KS05F	-AJ	Vc (m/min)	300 - 1000		
			ft (mm/t)	0.05 - 0.20		
Aluminium alloy Si > 12 %	KS05F	-AJ	Vc (m/min)	100 - 200		
			ft (mm/t)	0.05 - 0.20		
Copper alloy	KS05F	-AJ	Vc (m/min)	200 - 500		
			ft (mm/t)	0.05 - 0.20		

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Applications

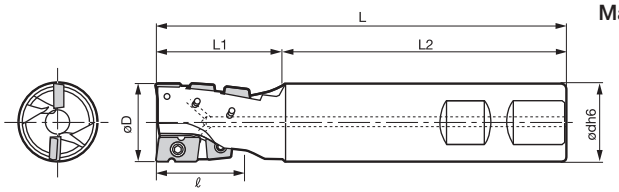


Cat. No.	Tool ø (mm)	Max. cutting depth Ad (mm)	Max. ramping angle (θ)	Max. plunging A (mm)	Min. machining øD1 (mm)	Max. machining øD2 (mm)	*Max. machining øD3 (mm)	Max. cutting width for enlarging E (mm)
EPS11012R**	12	11.0	6°	0.5	15	23	21 - 23	11.5
EPS11016R**	16	10.9	5°		20	31	29 - 31	15.5
EPS11018R**	18		4°		26	35	33 - 34	17.5
EPS11020R**	20		3°		28	39	37 - 39	19.5
EPS11021R**	21	10.8			30	41	39 - 41	20.5
EPS11025R**	25		2°		38	49	47 - 49	24.5
EPS11026R**	26				40	51	49 - 51	25.5
EPS11032R**	32	10.7	1° 30'		52	63	61 - 63	31.5
EPS11033R**	33				54	65	63 - 65	32.5
EPS17025R**	25	16.3	5°	1.0	32	48	46 - 48	24.0
EPS17026R**	26				34	51	49 - 51	25.0
EPS17032R**	32	16.2	3° 30'		46	62	60 - 62	31.0
EPS17033R**	33				48	65	63 - 65	32.0

* Plain bore hole bottom

ELP-A

For slotting with large cutting depth of steels and cast irons



Max. cutting depth:
ELP13: 28 mm
ELP17: 35 mm
ELP21: 44 mm

■ Specifications

Cat. No.	Stock	Inserts	Effective No. of inserts (No. of inserts)	Dimensions (mm)						Parts	
				øD	L	L_1	L_2	ød	ℓ	Clamping screw	Wrench
ELP13025RA	●	APMT070308PN-MJ ADMT130308PR-MJ	2 (5)	25	130	40	90	25	28	CSPB-2.5 CSPD-3	IP-8D IP-10D
ELP17032RA	●	APMT09T308PN-MJ ADMT17T308PR-MJ		32	140	50		32	35	CSPD-3 CSPB-4S	IP-10D IP-15D
ELP21040RAS40	●	APMT120408PN-MJ ADMT210408PR-MJ		40	150	60		40	44	CSPB-4 CSTB-5	IP-15D T-20D

■ Inserts

(Used for end cutting edge)

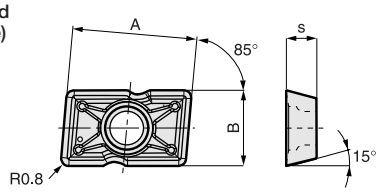


Fig. 1

(Used for both end and peripheral edges)

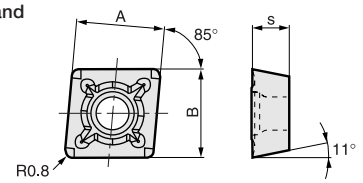


Fig. 2

Cat. No.	Accuracy	Honing	Grade			Dimensions (mm)			Fig.
			AH120	AH140	T3030	A	B	s	
ADMT130308PR-MJ	M	With	●	○	○	13.1	7.94	3.18	1
ADMT17T308PR-MJ			●	○	○	16.6	9.525	3.97	
ADMT210408PR-MJ			●	○	○	20.6	12.7	4.76	
APMT070308PN-MJ			●	○	○	7.94	7.94	3.18	2
APMT09T308PN-MJ			●	○	○	9.525	9.525	3.97	
APMT120408PN-MJ			●	○	○	12.7	12.7	4.76	

■ Standard cutting conditions

Work materials	Grade	Cutter diameter (mm)					
		ø25		ø32		ø40	
		Vc (m/min)	ft (mm/tooth)	Vc (m/min)	ft (mm/tooth)	Vc (m/min)	ft (mm/tooth)
Mild steels, Low carbon steels	T3030(AH120)	60 ~ 150	0.08 ~ 0.2	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3
High carbon steels, Alloy steels	T3030(AH120)	60 ~ 120		60 ~ 120		60 ~ 120	
Die steels	T3030(AH120)	60 ~ 100		60 ~ 100		60 ~ 100	
Stainless steels	AH140	70 ~ 120		70 ~ 120		70 ~ 120	
Cast irons	AH120	60 ~ 150		60 ~ 150		60 ~ 150	

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

- Vc: Cutting speed
- ft : Feed per tooth (Feed per revolution is ft x 2 as effective number of teeth is equal to two)

Notes:
- To get the best of the tool's performance, use of a high-accuracy, side-lock type toolholder or milling chuck which has a high gripping force is recommended.
- Excessive tool overhang from the toolholder should be avoided to prevent chatter.

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

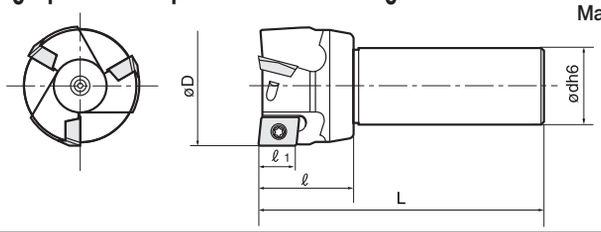
"Laser-Mill"

EPE

High-precision square shoulder milling

Rake angle: A.R. +12° ~ +17° R.R. -10° ~ 0°

Max. cutting depth:
EPE40: 12 mm
EPE50: 14 mm
EPE60: 16 mm



■ Specifications

● EPE4000

Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)					Clamping screw	Wrench
				øD	ød	ℓ1	ℓ	L		
EPE4020RE	●	AECW1403PES/FR	1	20	20	12	30	100	CSTB-3S	T-9D
EPE4025RE	●	AEMW1403PET/FR	2	25	25		35	115		

● EPE5000

Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)					Clamping screw	Wrench
				øD	ød	ℓ1	ℓ	L		
EPE5030RE	●	AECW16T3PES/FR AEMW16T3PET/FR	2	30	32	14	45	125	CSTB-4S	T-15D
EPE5035RE				35						
EPE5040RE	●			40						

● EPE6000

Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)					Clamping screw	Wrench
				øD	ød	ℓ1	ℓ	L		
EPE6050RE	●	AECW1804PES/FR	3	50	32	16	40	120	CSTB-4M	T-15D
EPE6063RE	●	AEMW1804PET/FR	4	63			45	125		

■ Inserts

AECW□□□□PES/FR
(With circular-arc shaped cutting edges)

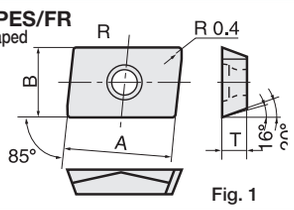


Fig. 1

AEMW□□□□PET/FR
Roughing

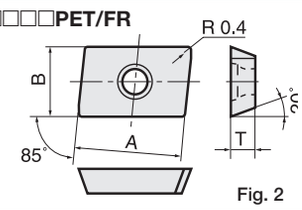
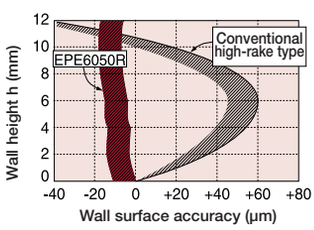


Fig. 2

Cat. No. (Metric)	Accuracy	Honing	PVD Coated GH330	PVD Coated AH120	Cermet NS740	Uncoated TH10	Uncoated UX30	A	B	T	R	Fig.	Application
AECW1403PESR	C	with	●	○	○		○	14	9	3.18	with	1	Steels, cast irons
AECW1403PEFR		without				○							Light alloys
AECW16T3PESR		with	●	○	○		○	16	12	3.97			Steels, cast irons
AECW16T3PEFR		without				○							Light alloys
AECW1804PESR		with	●	○	○		○	18		4.76			Steels, cast irons
AECW1804PEFR		without				○							Light alloys
AEMW1403PETR	M	with	●		○		○	14	8.9	3.18	without	2	Steels, cast irons
AEMW1403PEFR		without				○							Light alloys
AEMW16T3PETR		with	●		○		○	16	11.9	3.97			Steels, cast irons
AEMW16T3PEFR		without				○							Light alloys
AEMW1804PETR		with	●		○		○	18		4.76			Steels, cast irons
AEMW1804PEFR		without				○							Light alloys

• When high-precision wall straightness is not required, use AEMW□□□□PET/FR type inserts.

● Wall straightness



Work materials: Ck50 (210HB)
Cutting speed Vc: 100 m/min
Feed per tooth ft: 0.1 mm/t
Cutting depth ap: 14 mm
Cutting width ae: 10 mm
(AECW1804PESR used)

■ Standard cutting conditions

Work materials	Insert grades	Cutting speed Vc (m/min) ø20 ~ 35	Cutting speed Vc (m/min) ø40 ~ 63	Feed per tooth ft (mm/t)
Mild steels · Unhardened steels (< 180HB)	GH330, AH120	80 ~ 150	130 ~ 230	0.1 ~ 0.20
	NS740	100 ~ 150	130 ~ 180	0.1 ~ 0.15
	UX30	80 ~ 150	100 ~ 150	0.1 ~ 0.20
Carbon steels · Alloy steels (< 300HB)	GH330, AH120	80 ~ 100	100 ~ 200	0.1 ~ 0.20
	NS740	80 ~ 100	100 ~ 150	0.1 ~ 0.15
	UX30	80 ~ 100	80 ~ 120	0.1 ~ 0.20
Cast irons	TH10	80 ~ 100	80 ~ 100	0.1 ~ 0.15
Ductile cast irons	UX30	80 ~ 100	80 ~ 100	0.1 ~ 0.20

Work materials	Insert grades	Cutting speed Vc (m/min) ø20 ~ 35	Cutting speed Vc (m/min) ø40 ~ 63	Feed per tooth ft (mm/t)
Stainless steels (< 250HB)	GH330 AH120	100 ~ 120	120 ~ 150	0.1 ~ 0.20
Die steels (< 300HB)	AH120 NS740	80 ~ 100	100 ~ 120	0.1 ~ 0.15
Aluminium alloys (Si < 10%)	TH10	200 ~ 300	300 ~ 500	0.1 ~ 0.25

• Dry cutting is recommended except for aluminium alloys.

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

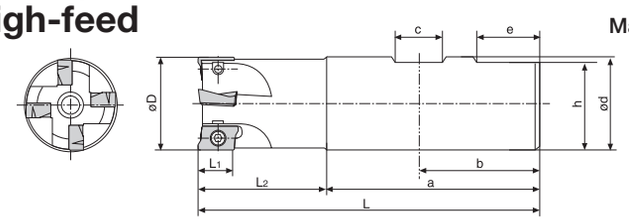
"Top- Feed Mill"

EPN 09.14

For high-speed and high-feed

Rake angle: EPN09: A.R. -4° ~ 5° R.R. -28° ~ -11°
EPN14: A.R. -2.5° ~ 4° R.R. -17° ~ -10°

Max. cutting depth:
EPN09: 9 mm
EPN14: 14 mm

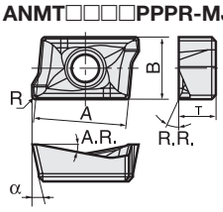


■ Specifications

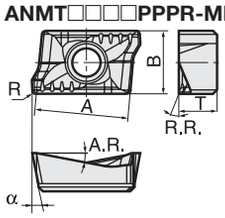
Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)										Clamping screw	Wrench
				øD	ød	L_1	L_2	L	a	b	c	e	h		
EPN09010R-E	●	ANMT09T3PPPR-**	1	10	16	9	25	80	55	24	10	-	14	CSTB-2.5S	T-8D
EPN09012R-E	●		1	12	16	9	25	80	55	24	10	-	14		
EPN09016R-E	●		2	16	16	9	25	85	60	24	10	-	14	CSTB-2.5	
EPN09020R-E	●		3	20	20	9	30	90	60	25	11	-	18		
EPN09025R-E	●		4	25	25	9	35	95	60	32	12	17	23		
EPN09032R-E	●		5	32	25	9	35	95	60	32	12	17	23		
EPN14025R-E	●	ANMT1404PPPR-**	2	25	25	14	35	95	60	32	12	17	23	CSTB-3	T-9D
EPN14032R-E	●		3	32	32	14	40	110	70	36	14	19	30		
EPN14040R-E	●		4	40	32	14	40	115	75	36	14	19	30		

■ Applicable inserts

ANMT□□□□PPPR-MJ



ANMT□□□□PPPR-ML



Cat. No.	Grade							Dimensions (mm)						Rake angle		Application
	PVD Coated				CVD Coated		Cermet									
	AH330	AH120	GH330	GH340	T3030	T1015	NS530	A	B	T	α	β	R	I.A.R	I.R.R	
ANMT09T3PPPR-MJ	●	●	●		●	●	●	9.525	6.5	3.97	+11°	0°	0.4	+11°	+20°	Steels Cast irons
ANMT1404PPPR-MJ	●	●	●		●	●	●	14.0	9.525	4.76	+11°	0°	0.8	+11°	+20°	
ANMT09T3PPPR-ML		●		●				9.525	6.5	3.97	+11°	0°	0.4	+11°	+25°	
ANMT1404PPPR-ML		●		●				14.0	9.525	4.76	+11°	0°	0.8	+11°	+25°	

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

■ Standard cutting conditions

Work materials	Insert	Cutting parameter	Cutter diameter (mm)			
			ø10 ~ ø12	ø16	ø20	ø25 ~
Carbon steel, alloy steel (< 300HB) Ck50, 42CrMo4	T3030 MJ	v_c (m/min) ft (mm/tooth)	60 ~ 100 0.05 ~ 0.1	80 ~ 120 0.1 ~ 0.15	100 ~ 200 0.1 ~ 0.2	100 ~ 200 0.1 ~ 0.2
Mild steel, low carbon steel (< 250HB) USt42-2, Ck25	AH120 ML		80 ~ 100 0.05 ~ 0.1	100 ~ 150 0.1 ~ 0.15	100 ~ 200 0.12 ~ 0.2	100 ~ 200 0.12 ~ 0.2
Die steels (< 300HB) X155CrVMo12-1	T3030 MJ		60 ~ 100 0.05 ~ 0.1	80 ~ 120 0.1 ~ 0.15	100 ~ 150 0.1 ~ 0.2	80 ~ 150 0.1 ~ 0.2
Stainless steels (< 250HB) 1.4301, 1.4401	AH120 ML		80 ~ 100 0.05 ~ 0.1	100 ~ 150 0.1 ~ 0.15	100 ~ 200 0.1 ~ 0.2	100 ~ 200 0.1 ~ 0.2
Grey and Ductile cast iron GG25	AH120 MJ		80 ~ 100 0.08 ~ 0.12	100 ~ 150 0.12 ~ 0.2	100 ~ 200 0.15 ~ 0.25	100 ~ 200 0.15 ~ 0.25

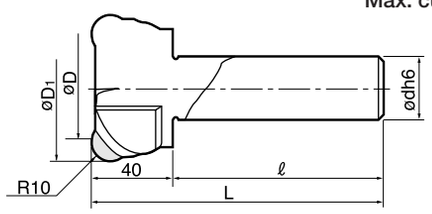
Notes:
- When machining general steels and die steels where the surface roughness is important, GH330 grade is recommended.
- When using the smaller side of the cutter diameter or cutting at a large cutting depth or a large cutting width, use the lower sides of "v_c" and "ft" values shown in the table.
- Dry cutting (including air-blowing) is generally recommended.
- EPN-type TAC endmills cannot be used for axial-feed cutting such as ramping, plungin, and drilling.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

ERF6000

For difficult-to-cut materials

Rake angle: A.R. +19° R.R. +3°
Max. cutting depth: 3 mm



■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)					Locator	Insert locking wedge	Wedge fixing screw	Locator fixing screw	T-handle wrench
			øD	øD1	ød	L	ℓ					
ERF6050RE	●	3	50	70	32	120	80	LF602R	WF602R	FDS-6Z	CM4×0.7×20	TP-3A
ERF6063RE	●	4	63	83								

■ Inserts

RFEN2004ZFTN
(With flattened flanks)

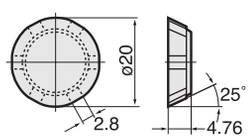


Fig. 1

RFEN2004M0TN

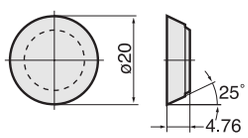


Fig. 2

Cat. No. (Metric)	Accuracy	Honing	Grade					Fig.	Application
			PVD Coated		Uncoated				
			AH120	GH330	KS20	UX30	TU40		
RFEN2004ZFTN	E	with	●	○	●	●	○	1	Medium finishing
RFEN2004M0TN	E	with	●	○	○	●	○	2	For roughing through boring

Notes : • RFEN2004M0TN type inserts should not be used for finishing requiring surface finish better than 12S.
• RFEN2004ZFTN type inserts can be used for both finishing and roughing at cutting depth up to 3 mm.

■ Standard cutting conditions

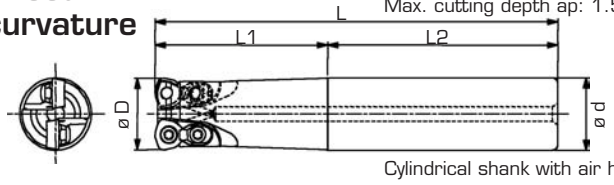
Work materials		Recommended insert grades	Cutting depth ap: 1 ~ 3 mm		Cutting depth ap: 0.4 ~ 1 mm		Cutting fluid
			Vc (m/min)	ft (mm/t)	Vc (m/min)	ft (mm/t)	
Super alloys Inconel, Hastelloy, etc.		AH120	20 ~ 40	0.1 ~ 0.15	20 ~ 60	0.2 ~ 0.4	Water insoluble type
Titanium alloys TiAl6V4 etc.		AH120	40 ~ 60	0.15 ~ 0.35	40 ~ 70	0.2 ~ 0.5	Water soluble type or dry cutting
Stainless steels	Austenitic Ferritic 1.4301, X6Cr17 (< 300HB)	UX30	150 ~ 230	0.2 ~ 0.35	180 ~ 250	0.2 ~ 0.5	Dry cutting
							Water soluble type
	Precipitation hardening X5CrNiCuNb17-4-4 (< 35HRC)	UX30	130 ~ 180	0.15 ~ 0.3	150 ~ 200	0.2 ~ 0.4	Dry cutting
							Water soluble type
Hard materials (40 ~ 50HRC)		AH120	20 ~ 50	0.05 ~ 0.1	20 ~ 50	0.05 ~ 0.2	Water insoluble type

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

EXP05•06•08 Super high feed milling of curvature

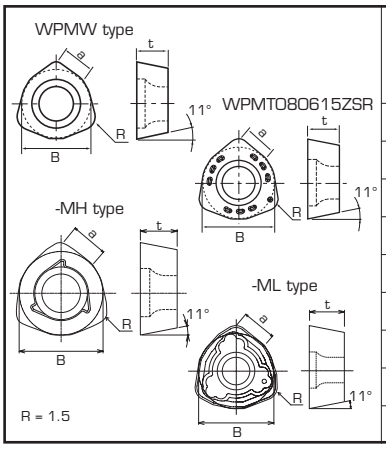
Rake angle: A.R. +5° R.R. -4° ~ -6°
Max. cutting depth ap: 1.5 mm



Cylindrical shank with air hole

	Cat. No.	Stock	No. of inserts	Dimensions (mm) ø D	ø d	L	L1	L2	Inserts	Replacement parts: Clamping screw	Clamp-set	Wrench
Standard	EXP05020RS	●	2	20	20	130	50	80	WPM*05H315ZPR-**	CSPB-3.5S	-	IP-15D
	EXP05021RS	●		21								
	EXP06025RS	●		25	25	140	60		WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RS	●		26								
	EXP06032RS	●		32	32	150	70					
	EXP06032RSB	●	3									
	EXP06033RS	●	2	33								
	EXP06033RSB	●	3									
	EXP06040RS	●		40			50	100				
	EXP08040RSA	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T
Long	EXP05020RL	●	2	20	20	180	100	80	WPM*05H315ZPR-**	CSPB-3.5S	-	IP-15D
	EXP05021RL	●		21								
	EXP06025RL	●		25	25	200	120		WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RL	●		26								
	EXP06032RL	●		32	32							
	EXP06032RLB	●	3									
	EXP06033RL	●	2	33								
	EXP06033RLB	●	3									
	EXP06040RL	●		40		250	50	200				
	EXP08040RLA	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T
Extra long	EXP05020RLL	●	2	20	20	250	130	120	WPM*05H315ZPR-**	CSPB-3.5S	-	IP-15D
	EXP05021RLL	●		21			50	200				
	EXP06025RLL	●		25	25	300	180	120	WPM*06X415ZPR-**	CSPB-4S	CSY-15	IP-15D
	EXP06026RLL	●		26			60	240				
	EXP06032RLL	●		32	32		180	120				
	EXP06033RLL	●		33			70	230				
	EXP06040RLL	●	3	40			50	250				
	EXP08040RLL	●	2						WPMT080615Z*R-**	CSTB-5	CSX20	T-20T

Specifications: Inserts



Cat. No.	Tolerance	Honing	Dimensions (mm) a	t	B	Grade: PVD coated AH120	PVD coated AH140	CVD coated T3030	CVD coated T1015
WPMW05H315ZPR	M	with	5	3.50	7.94	●	●	●	●
WPMT05H315ZPR-MH						●	●		
WPMT05H315ZPR-ML						●	●	●	
WPMW06X415ZPR			6	4.20	9.525	●	●	●	●
WPMT06X415ZPR-MH						●	●		
WPMT06X415ZPR-ML						●	●	●	
WPMT080615ZSR			8	6.35	12.7	●	●	●	●
WPMT080615ZSR-MH						●	●		
WPMT080615ZPR-ML						●	●	●	

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Cutting data

EXP 05 / 06 type

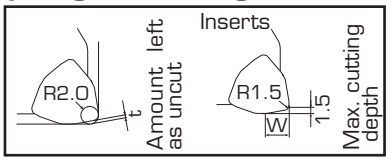
Work materials	Grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Recommended cutting conditions			
				ø 20, ø 21 t = 2	ø 25, ø 26 t = 2	ø 32, ø 33 t = 2 - 3	ø 40 t = 3
Carbon steels Ck45 etc. < 300HB	**T3030 (AH120)**	100 - 250	0.5 - 2.0	Vc = 150 m/min, ft = 0.8 mm/t	Vc = 150 m/min, ft = 1.0 mm/t		
				ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t			
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**T3030 (AH120)**	100 - 200	0.5 - 2.0	Vc = 130 m/min, ft = 0.8 mm/t	Vc = 130 m/min, ft = 1.0 mm/t		
				ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t			
Die steels X96CrMoV12 etc. < 300HB	**AH120 (T3030)**	80 - 150	0.5 - 1.0	Vc = 100 m/min, ft = 0.5 mm/t ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.1 mm/t			
Stainless steels X5CrNi1810 etc. < 250HB	**AH140**	100 - 200	0.5 - 2.0	Vc = 130 m/min, ft = 0.8 mm/t	Vc = 130 m/min, ft = 1.0 mm/t		
				ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t			
Cast irons GG25 etc.	**T1015**	100 - 250	0.8 - 2.5	Vc = 150 m/min, ft = 1.0 mm/t	Vc = 180 m/min, ft = 1.5 mm/t		
				ap = 1.0 mm, ae = 1.0 x D mm Z-axis plunging: ft = 0.2 mm/t			

EXP08 type

Work materials	Grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Recommended cutting conditions ø 40, t = 2
Carbon steels Ck45 etc. < 300HB	**T3030 (AH120)**	150 - 250	0.5 - 2.0	Vc = 180 m/min, ft = 1.0 mm/t ap = 1.0 mm, ae = 40 mm Z-axis plunging: ft = 0.2 mm/t
Alloy steels 42CrMo4, 16MnCr5 etc. < 300HB	**T3030 (AH120)**	100 - 200	0.5 - 2.0	Vc = 130 m/min, ft = 1.0 mm/t ap = 1.0 mm, ae = 40 mm Z-axis plunging: ft = 0.2 mm/t
Die steels X96CrMoV12 etc. < 300HB	**AH120 (T3030)**	80 - 150	0.5 - 1.0	Vc = 100 m/min, ft = 0.5 mm/t ap = 1.0 mm, ae = 40 mm Z-axis plunging: ft = 0.1 mm/t
Stainless steels X5CrNi1810 etc. < 250HB	**AH140**	100 - 200	0.5 - 2.0	Vc = 130 m/min, ft = 1.0 mm/t ap = 1.0 mm, ae = 40 mm Z-axis plunging: ft = 0.2 mm/t
Cast irons GG25 etc.	**T1015**	150 - 250	0.8 - 2.5	Vc = 180 m/min, ft = 1.5 mm/t ap = 1.0 mm, ae = 40 mm Z-axis plunging: ft = 0.2 mm/t

*The recommended cutting parameter are merely a starting guideline and should be optimised according to individual machining requirements

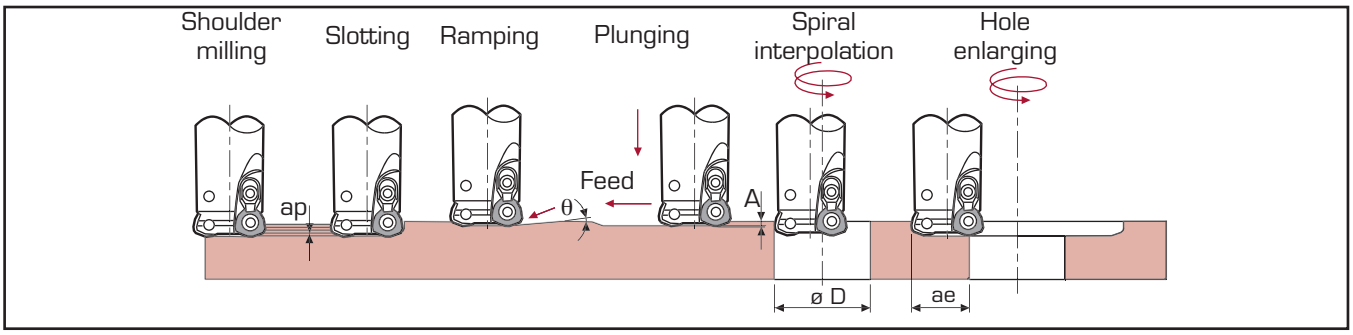
Tool geometry on programming



Milling type	W (mm)	t (mm)	R (mm)
EXP05	3.8	0.5	2.0
EXP06	4.3	0.7	2.5
EXP08	5.7	0.7	2.0

When programming the machine path, a theoretical radius (R) and the residual amount (t) should be calculated.

Application

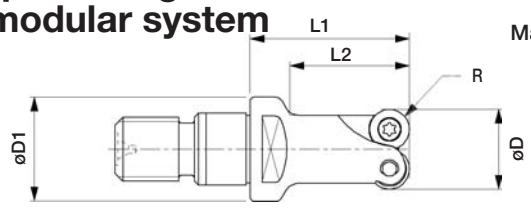


Cat. No.	Tool ø (mm)	Max. cutting depth ap (mm)	Max. ramping angle (θ)	Max. plunging A (mm)	Min. machining ø D (mm)	Max. machining ø D (mm)	Max. cutting width for enlarging ae (mm)
EXP05020RS/L/LL	20	1.5	3°	0.5	30	37	16
EXP05021RS/L/LL	21		2° 30'		32	39	17
EXP06025RS/L/LL	25		5°	1.0	33	47	20
EXP06026RS/L/LL	26		4° 30'		35	49	21
EXP06032RS/L/LL	32		3° 30'		47	61	27
EXP06033RS/L/LL	33		3°		49	63	28
EXP06040RS/L/LL	40		2°		63	77	35
EXP08040R/L/LL			6°		53		34

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

HWD•TMS

HWD-type cutting heads + T-BAR modular system

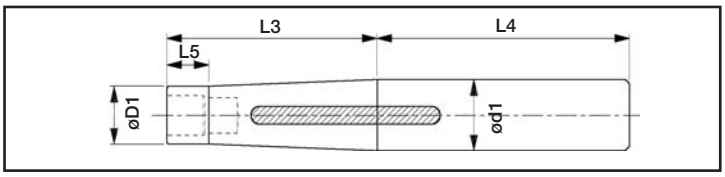


Max. cutting depth:
HWD05: 2.5 mm
HWD07: 3.5 mm
HWD10: 5.0 mm

■ Specifications

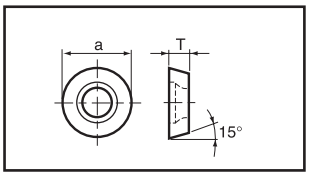
Insert ø	Cat. No.	Stock	No. of inserts	Dimensions (mm)				Thread	Inserts	Extensions	Screw
				øD	øD1	L1	L2				
5.0	HWD05010R	●	2	10	13	20	15	M8 x 1	RDMW0501M0	HD01520L110T	CSTD-1.8
	HWD05012R	●	3	12							
	HWD05015R	●	4	15			-				
	HWD05020R	●	5	20	18			M12 x 1.5		HD02025L150T	
	HWD05025R	●	6	25	23	25		M14 x 1.5		HD02532L170T	
7.0	HWD07015R	●	3	15	13	20		M8 x 1	RDMW0702M0	HD01520L110T	CSTB-2.5S
	HWD07020R	●	4	20	18			M12 x 1.5		HD02025L150T	
	HWD07025R	●	5	25	23	25		M14 x 1.5		HD02532L170T	
10.0	HWD10020R	●	2	20	18	20		M12 x 1.5	RDMW1003M0	HD02025L150T	CSTB-3.5H
	HWD10025R	●	3	25	23	25		M14 x 1.5		HD02532L170T	

■ T-Bar extension



Cat. No.	Dimensions (mm)				
	ød1	L3	L4	L5	øD1
HD01520L110T	20	50	60	10	13
HD02025L150T	25	70	80	20	18
HD02532L170T	32	90	80	20	23

■ Inserts



Cat. No.	Grade	Dimensions (mm)	
	AH120	a	T
RDMW0501M0	●	5.0	1.40
RDMW0702M0	●	7.0	2.38
RDMW1003M0	●	10.0	3.18

■ Standard cutting conditions

Work materials	Grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Cutting depth: ap (mm)		
				ø 10, 12	ø 15, 20	ø 25
Carbon steels < 300HB	AH120	200 ~ 500	0.15 ~ 0.45	~ 0.5	~ 0.7	~ 1.0
Alloy steels < 300 HB		120 ~ 350	0.15 ~ 0.35			
Die steels		100 ~ 300	0.10 ~ 0.30			
Hardened steels < 40HRC		70 ~ 200	0.10 ~ 0.25			
Cast irons		200 ~ 500	0.20 ~ 0.50			

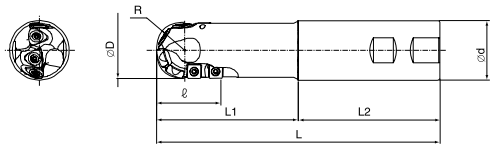
• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Ball Endmill

EBD

Medium to rough die engraving

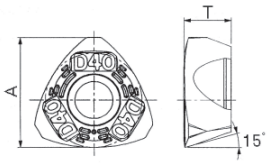


■ Specifications

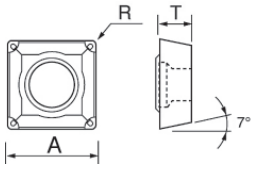
Cat. No.	Stock	No. of inserts	Dimensions (mm)							Inserts
			øD	L	L1	L2	L eff.	R	ød	
EBD040SDE-E	●	4 + 3	40	170	100	70	45	20	40	ZDMT4005-MJ
EBD040MME-E	●	4 + 3	40	170	120	109	45	20	MK4	SCMT09T308-23
EBD050SDE-E	●	4 + 3	50	229	100	70	59	25	40	ZDMT5006-MJ
EBD050MME-E	●	4 + 3	50	256	120	136	59	25	MK5	SCMT120408-23

■ Inserts

ZDMT
R-edge



SCMT
Peripheral edge



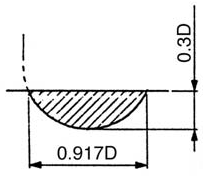
Cat. No.	Accuracy	Honing	Grade	Dimensions (mm)		
			AH120	A	T	R
ZDMT4005-MJ	M	with	●	13	5.5	
ZDMT5006-MJ	M	with	●	16.2	6.5	
SCMT09T308-23	M	with	●	9.525	3.97	0.8
SCMT120408-23	M	with	●	12.7	4.76	0.8

■ Replacement parts

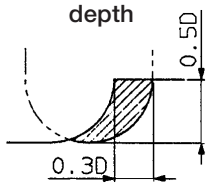
Cutter Cat. No.	Clamping screw	Wrench
EBD040___-E	CSTB-4M	T-15T
EBD050___-E	CSTB-5	T-20T

■ Machining types

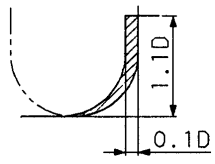
(1) Grooving



(2) Shouldering at shallow cutting depth



(3) Shouldering at deep cutting depth



Notes: • Cutting speeds shown in the left table are of the most outer diameter of the tool.
• When using the tool at the upper side of cutting depths shown in the table, use the lower side of the values shown in the table.
• When using MME-type cutters, the cutting speed and feed should be reduced to 60% ~ 80% of the values shown in the table.

■ Standard cutting conditions

Work materials	Grade	Machining type	Cutting speed Vc (m/min)	Table feed Vf (mm/min)	
				ø 40 mm	ø 50 mm
Carbon steels (< 300HB)	AH120	(1)	180 (150 ~ 210)	760 (610 ~ 910)	610 (460 ~ 760)
		(2)	200 (170 ~ 230)	1100 (900 ~ 1300)	880 (680 ~ 1080)
		(3)	160 (130 ~ 190)	570 (420 ~ 720)	460 (310 ~ 610)
Alloy steels (< 300HB)	AH120	(1)	160 (130 ~ 190)	680 (530 ~ 830)	550 (400 ~ 700)
		(2)	180 (150 ~ 210)	1000 (800 ~ 1200)	800 (800 ~ 1000)
		(3)	140 (110 ~ 170)	510 (360 ~ 660)	400 (250 ~ 550)
Die steels (< 300HB)	AH120	(1)	140 (110 ~ 170)	570 (420 ~ 720)	460 (310 ~ 610)
		(2)	160 (130 ~ 190)	860 (660 ~ 1060)	690 (490 ~ 890)
		(3)	120 (90 ~ 150)	410 (260 ~ 560)	330 (180 ~ 480)
Cast irons	AH120	(1)	200 (170 ~ 230)	950 (800 ~ 1000)	760 (610 ~ 910)
		(2)	220 (190 ~ 250)	1200 (900 ~ 1400)	1000 (700 ~ 1200)
		(3)	180 (150 ~ 210)	570 (420 ~ 720)	460 (310 ~ 610)
Hardened Prehardened steels (< 45 HRC)	AH120	(1)	90 (70 ~ 110)	250 (150 ~ 350)	200 (100 ~ 300)
		(2)	100 (80 ~ 120)	310 (160 ~ 460)	250 (100 ~ 400)
		(3)	60 (50 ~ 90)	190 (140 ~ 240)	150 (100 ~ 200)

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Ball Endmill

EBP

Medium to finish die engraving

Fig. 1

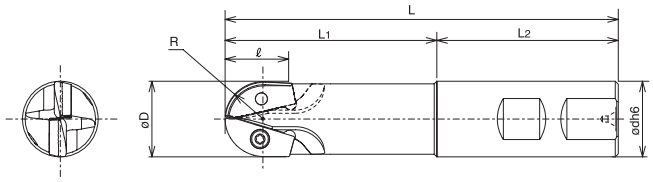


Fig. 2

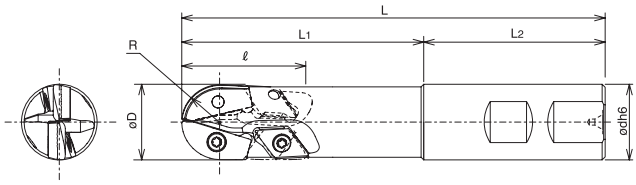
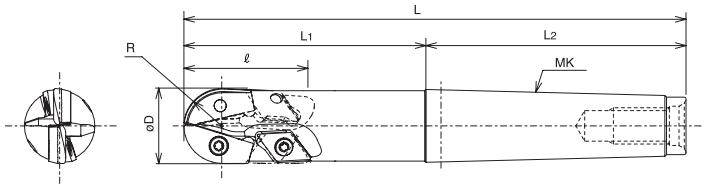


Fig. 3



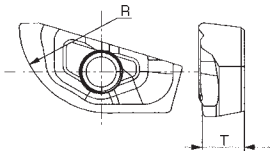
■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)								Fig.	Inserts	
			øD	L	L1	L2	ℓ	ød	R	MK			
EBP020SD-E	●	2	20	116	60	56	16	20	10	-	1	ZPET2004-MJ	—
EBP020MDE-E	●	2+2		126	70		29.5				2		DCMW070204TN
EBP020MME-E	●	2+2		139		69		-		MK2	3		
EBP025SD-E	●	2	25	130		60	21	25	12.5	-	1	ZPET2505-MJ	—
EBP025MDE-E	●	2+2		140	80		41				2		DCMW11T304TN
EBP025MME-E	●	2+2		166		86		-		MK3	3		
EBP032SD-E	●	2	32	140	100	60	25	32	16	-	1	ZPET3206-MJ	—
EBP032MDE-E	●	2+2		160			46				2		DCMW11T304TN
EBP032MME-E	●	2+2		209		109		-		MK4	3		

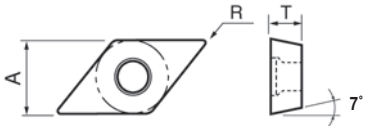
Note: SD-E Type: Single cutting edge, DIN shank
MD-E Type: Multiple cutting edge, DIN shank
MM-E Type: Multiple cutting edge, Morse Taper shank

■ Inserts

ZPET
R-edge



DCMW
Peripheral edge



Cat. No.	Accuracy	Honing	Grades		Dimensions (mm)		
			AH120	AH330	A	T	R
ZPET2004-MJ	E	With	●	●	-	4.5	10
ZPET2505-MJ			●	●		4.625	12.5
ZPET3206-MJ			●	●		6.75	16
DCMW070204TN	M		●	●	6.35	2.38	0.4
DCMW11T304TN			●	●	9.525	3.97	0.4

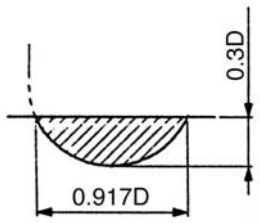
Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

■ Replacement parts

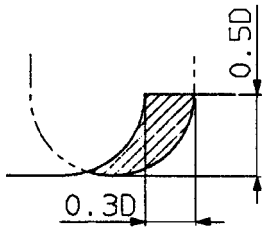
Cutter Cat. No.	for ZPET		for DCMW	
	Clamping screw	Wrench	Clamping screw	Wrench
EBP020SD-E	CSTD-3T	T-10D	—	—
EBP020MDE-E			CSTB-2.5S	T-8D
EBP020MME-E				
EBP025SD-E	CSTB-4S	T-15D	—	—
EBP025MDE-E			CSTB-4S	T-15D
EBP025MME-E				
EBP032SD-E	CSTB-5	T-20D	—	—
EBP032MDE-E			CSTB-4S	T-15D
EBP032MME-E				

■ Machining types

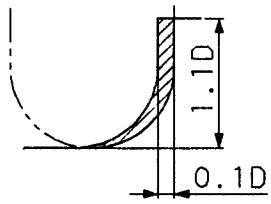
(1) Grooving



(2) Shouldering at shallow cutting depth



(3) Shouldering at deep cutting depth



Notes:
- Cutting speeds shown in the table are of the most outer diameter of the tool.
- When using the tool at the upper side of cutting depths shown in the table, use the lower side of the values shown in the table.
- When using MDE / MME type cutters, the cutting speed and feed should be reduced to 60 % ~ 80 % of the values shown in the table.

■ Standard cutting conditions

Work materials	Grades	Machining type	Cutting speed Vc (m/min)	Table feed Vf (mm/min)		
				ø 20 mm	ø 25 mm	ø 32 mm
Carbon steels (< 300HB)	AH120	(1)	200 (170 ~ 230)	760 (610 ~ 910)	610 (460 ~ 760)	510 (360 ~ 660)
		(2)	230 (200 ~ 260)	1100 (900 ~ 1300)	880 (680 ~ 1080)	730 (530 ~ 930)
		(3)	180 (150 ~ 200)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
Alloy steels (< 300HB)	AH120	(1)	180 (150 ~ 210)	680 (530 ~ 830)	550 (400 ~ 700)	450 (300 ~ 600)
		(2)	210 (180 ~ 240)	1000 (800 ~ 1200)	800 (800 ~ 1000)	670 (470 ~ 870)
		(3)	160 (130 ~ 180)	510 (360 ~ 660)	400 (250 ~ 550)	340 (190 ~ 490)
Die steels (< 300HB)	AH330	(1)	150 (120 ~ 180)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
		(2)	180 (150 ~ 210)	860 (660 ~ 1060)	690 (490 ~ 890)	570 (370 ~ 770)
		(3)	130 (100 ~ 150)	410 (460 ~ 560)	330 (180 ~ 480)	280 (130 ~ 430)
Cast irons	AH120	(1)	200 (170 ~ 230)	950 (800 ~ 1000)	760 (610 ~ 910)	640 (490 ~ 790)
		(2)	230 (200 ~ 260)	1200 (900 ~ 1400)	1000 (700 ~ 1200)	830 (830 ~ 1030)
		(3)	180 (150 ~ 200)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
Hardened Prehardened steels (< 45 HRC)	AH120	(1)	80 (60 ~ 100)	250 (150 ~ 350)	200 (100 ~ 300)	160 (100 ~ 260)
		(2)	100 (70 ~ 130)	310 (160 ~ 460)	250 (100 ~ 400)	210 (100 ~ 360)
		(3)	60 (40 ~ 80)	190 (140 ~ 240)	150 (100 ~ 200)	130 (80 ~ 180)

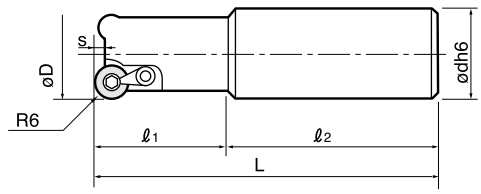
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

ERD4000

Rough profiling

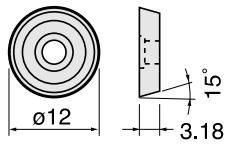
Rake angle: A.R. +5° ~ 8° R.R. -2° ~ -3°
Max. cutting depth: 6 mm



■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Clamping screw	Clamping set	Wrench
			øD	ød	ℓ 1	ℓ 2	S	L			
ERD4020RE	●	1	20	25	40	80	2.4	130	CSTB – 4S	CSW – 0T	T –15D
ERD4032RE	●	2	32	32	60		3	140			
ERD4040RE	●	3	40		65	90		155			
ERD4050RE	●		50		75		3.5	165			

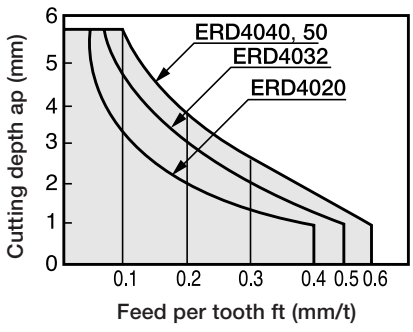
■ Inserts



RDCM

Cat. No. (Metric)	Accuracy	Honing	Grades		Chipbreaker	Application
			Uncoated			
			TH10	UX30		
RDCM1203TN RDCM1203FN	C	with without		●	with (Low cutting forces)	Steels Cast irons
RDMA1203TN RDMA1203FN	M	with without		●	without	

■ Recommended cutting conditions



Work materials	Grades	Cutting speed Vc (m/min)
Cast irons (< 300HB)	TH10	90 ~ 11
Carbon steels · Alloy steels (< 300HB)	UX30	100 ~ 120
Die steels (< 300HB)	UX30	70 ~ 90

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Ball Endmill

TBN1000

For medium finishing of dies

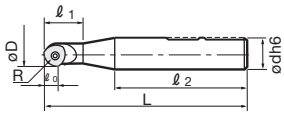


Fig. 1

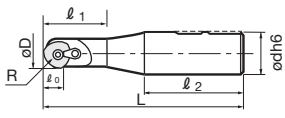


Fig. 2

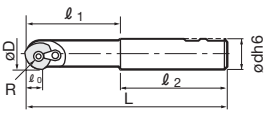


Fig. 3

■ Specifications

Cat. No.	Stock	Insert	Dimensions (mm)							Fig.	Clamping screw	Clamp	Clamping screw	Wrench
			øD	R	L	ℓ0	ℓ1	ℓ2	ød					
TBN1100SE	●	ZNCA1002FN2	10	5	90	5	15	60	16	1	CSTB–2.5B	–	–	T–8D
TBN1120SE	●	ZNCA1203FN	12	6	110	6	20	70	16		CSTB–3S			T–9D
TBN1160SE	●	ZNCA1603FN	16	8	130	8	25	85	20		CSTB–4S			T–15D
TBN1200SE	●	ZNCA2004FN ZNMM2004EN	20	10	160	10	35	100	25		CSTA–5S			T–15D
TBN1250SE	●	ZNCA2505FN ZNMM2505EN	25	12.5	175	12.5	45	100	32	2	CSTA–5S	CP536	DS–6T	T–15D
TBN1300SE	●	ZNCA3005FN ZNMM3005EN	30	15	190	15	90	100	32	3				

■ Inserts

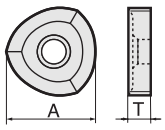


Fig. 1

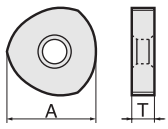


Fig. 2

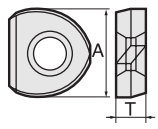


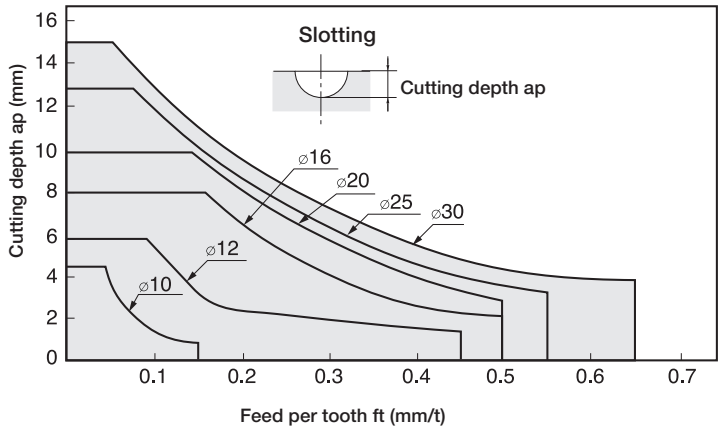
Fig. 3

Note: Type-B inserts, used for the cutter smaller than ø16 mm, are single-sided type.

Cat. No. (Metric system)	Accuracy	Grades Uncoated		Dimensions(mm)		No. of cutting edges per insert	Fig.	Application
		TH10	UX30	A	T			
ZNCA1002FN2	C	●	●	7.958	2.5	2	3	UX30 grade for steels TH10 grade for cast irons, light alloys
ZNCA1203FN		●	●	9.735	3.0	3	2	
ZNCA1603FN		●	●	12.772	3.5	3		
ZNCA2004FN		●	●	15.862	4.0	6		
ZNCA2505FN		●	●	19.826	5.0	6		
ZNCA3005FN		●	●	23.618	5.5	6		
ZNMM2004EN	M		●	15.862	4.0	3	1	
ZNMM2505EN			●	19.826	5.0	3		
ZNMM3005EN			●	23.618	5.5	3		

Note : M-class inserts are mainly used for medium finishing and C-class inserts are best suitable for finishing.

■ Guidelines for selecting cutting depth and feed



■ Standard cutting conditions for finishing

Work materials: Cast iron, carbon steels and alloy steels

Cat. No.	Grades	No. of rev. (rpm)	Pick feed If (mm)	Table-feed Vf (mm/min)
TBN1100SE	UX30 TH10	3200	0.3	480
TBN1120SE		2700	0.3	540
TBN1160SE		2000	0.5	650
TBN1200SE		1600	0.5	700
TBN1250SE		1300	0.5	580
TBN1300SE		1100	0.5	550

Note: For die steels, reduce the spindle speed to 80% and the feed to 75 - 85% respectively of the values shown above.

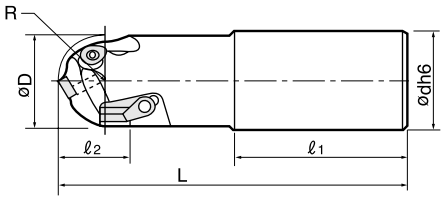
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Ball Endmill with Multiple Cutting Edges

TBF1000

Medium to rough profile milling of dies and moulds



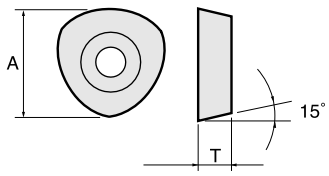
ℓ 2 = eff.

■ Specifications

Cat. No.	Stock	Inserts				Dimensions (mm)						Main insert Clamping screw	Clamp	Clamping screw	Wrench for main insert	Wrench for peripheral insert
		Main cutting edge	No. of inserts	Peripheral cutting edge	No. of inserts	D	R	L	ℓ 1	ℓ 2	d					
TBF1320SE	●	ZDK/CA0704TN	4	–	0	32	16	150	80	26	32	CSTB – 4	–	–	T – 15D	–
TBF1400SE	●	ZDK/CA0804TN	3	BBS–32	1	40	20	160	80	30	40	CSTA – 5S	CP536	DS – 6	T – 15D	P – 3
TBF1500SE	●	ZDK/CA1105TN	3			50	25	170	80	35	40	CST – 5S			T – 25D	
TBF1600SE	●		4			60	30	180	90	40	40					

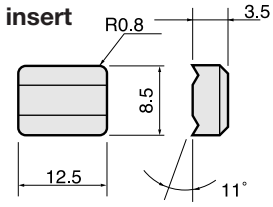
■ Inserts

Main insert



Cat. No.	Accuracy	Honing	Grades Uncoated TU40	Grades Uncoated UX30	Dimensions (mm) A	Dimensions (mm) T	Application
ZDKA0704TN	K	with		●	11.79	4.0	Steels Cast irons
ZDKA0804TN		with		●	12.90	4.76	
ZDKA1105TN		with	○	●	16.69	5.5	
ZDCA0704TN	C	with	○	○	11.79	4.0	
ZDCA0804TN		with	○		12.90	4.76	
ZDCA1105TN		with	○		16.69	5.5	
*ZDCA1705TN		with	●		16.63	5.5	

Peripheral insert



Cat. No.	Accuracy	Honing	Uncoated TX25	Application
BBS–32	C	–	●	Steels, cast irons

Note: * marked inserts are used for cutters of ø70 mm diameter or more.

■ Standard cutting conditions

Work materials	Grades	Cutting speed Vc (m/min)	Feed f (mm/rev)
Cast irons	UX30	130	< 0.3
Carbon steels	UX30	80 ~ 120	< 0.25
Die steels	UX30	70 ~ 80	< 0.15

Note: For Z-axis and ramp feed, reduce the feed to 1/2 times the values shows above. And use pick feed whenever possible.

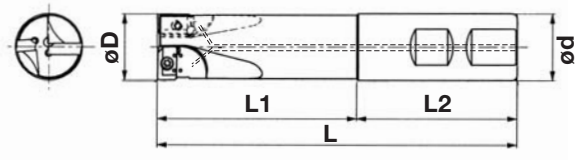
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

Endmill with center cutting edge

EVX

3-dimensional milling, drilling and cavity enlarging (with air hole)

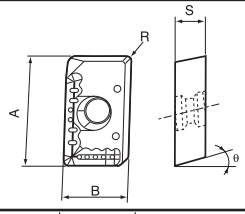


Rake angle:
A.R. 2° ~ 5°
R.R. -10° ~ -3.5°
Max. cutting depth:
see next page

■ Specifications

Type	Cat. No.	Stock	No. of inserts	Dimensions (mm)					Shank	Inserts
				øD	L	L1	L2	ød		
Standard	EVX08016RSA-E	●	2	16	85	30	55	16	Weldon	XXMU08T204PR-MJ
Long	EVX08016RLA-E	●			105	50	55			
Extra-long	EVX08016RLA	○			175	40	135		Cylindrical	
Standard	EVX10020RSA-E	●	2	20	90	30	60	20	Weldon	XXMU10H308PR-MJ
Long	EVX10020RLA-E	●			120	60	60			
Extra-long	EVX10020RLA	○			185	50	135		Cylindrical	
Standard	EVX12025RSA-E	●	2	25	100	40	60	25	Weldon	XXMU12X408PR-MJ
Long	EVX12025RLA-E	●			135	75	60			
Extra-long	EVX12025RLA	○			220	70	150		Cylindrical	
Standard	EVX16032RSA-E	●	2	32	110	50	60	25	Weldon	XXMU16X508PR-MJ
Long	EVX16032RLA-E	●			155	95	60			
Extra-long	EVX16032RLA	○			255	80	175	32	Cylindrical	

■ Applicable inserts



Inserts	Accuracy	Honing	Grade		Dimensions (mm)				
			AH120	AH140	A	B	S	R	θ
XXMU08T204PR-MJ	M	with	●	●	8.2	5.6	2.78	0.4	10°
XXMU10H308PR-MJ	M	with	●	●	10.6	6.8	3.50	0.8	11°
XXMU12X408PR-MJ	M	with	●	●	13.2	7.9	4.20	0.8	11°
XXMU16X508PR-MJ	M	with	●	●	16.8	11.1	5.00	0.8	11°

■ Replacement parts

Cat. No.	Clamping screw	Wrench
EVX08016RSA-E EVX08016RLA-E EVX08016RLA	CSPB-2.2	IP-7D
EVX10020RSA-E EVX10020RLA-E EVX10020RLA	CSPB-2.5	IP-8D
EVX12025RSA-E EVX12025RLA-E EVX12025RLA	CSPD-3	IP-10D
EVX16032RSA-E EVX16032RLA-E EVX16032RLA	CSPB-3.5	IP-15D

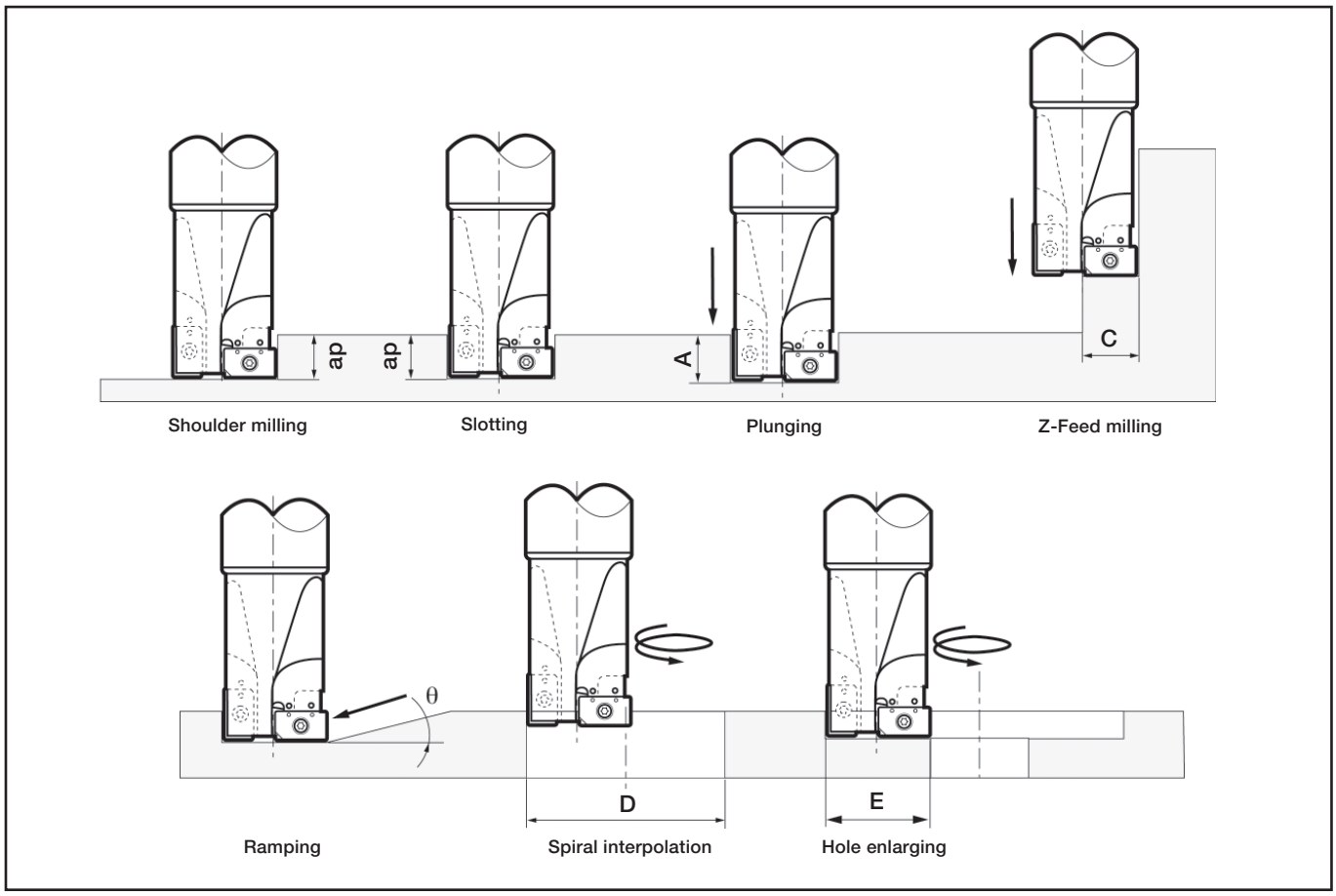
■ Standard cutting conditions

Work materials	Grade	EVX type (ø 16 - 20)			EVX type (ø 25 - 32)		
		Cutting speed Vc (m/min)	Feed rate ft (mm/tooth)		Cutting speed Vc (m/min)	Feed rate ft (mm/tooth)	
			Shouldering and slotting	Z-Feed		Shouldering and slotting	Z-Feed
Carbon steel (Ck50, etc.) (< 300HB)	AH120	100 ~ 180	0.05 ~ 0.20	0.03 ~ 0.08	120 ~ 200	0.08 ~ 0.25	0.05 ~ 0.10
Alloy steel (42CrMo4, etc.) (< 300HB)	AH120	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08	100 ~ 180	0.08 ~ 0.20	0.05 ~ 0.10
Die steel (X96CrMoV12, etc.) (< 300HB)	AH120	60 ~ 120	0.05 ~ 0.13	0.03 ~ 0.06	80 ~ 150	0.08 ~ 0.15	0.03 ~ 0.08
Cast iron (GG25 etc.)	AH120	100 ~ 180	0.05 ~ 0.25	0.03 ~ 0.10	120 ~ 200	0.08 ~ 0.25	0.05 ~ 0.10
Stainless steel X8CrNiS18-9 etc. (< 250HB)	AH140	70 ~ 140	0.05 ~ 0.15	0.03 ~ 0.08	90 ~ 160	0.08 ~ 0.20	0.03 ~ 0.08

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

■ Main applications



	Cat. No.	Tool ø (mm)	Max. cutting edge length (ap)	Max. depth (A)	Max. width (C)	Max. ramping angle (θ)	Min. hole machining diameter (D)	Max. hole machining diameter (D)	Max. cutting width for enlarging (E)
Standard/ long/extra	EVX08016RS/LA-E	16.0	7.0	8.0	8.0	90°	19.2	30.0	14.0
	EVX10020RS/LA-E	20.0	9.0	10.0	10.0		24.0	38.0	18.0
	EVX12025RS/LA-E	25.0	11.5	12.5	12.5		30.0	48.0	23.0
	EVX16032RS/LA-E	32.0	15.0	16.0	16.0		38.4	62.0	30.0

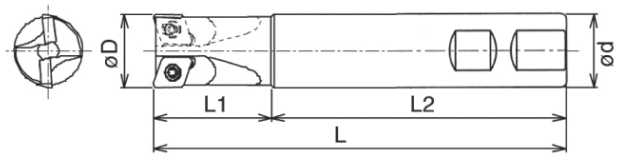
Notes:
• When using the long shank type (RL-E) endmills, cutting speed and feed should be reduced to 60 - 80 % of the values shown in the standard cutting conditions to prevent chatter.
• For grooving (B), partial plunging (C) and spiral interpolation (E) the lower values of the standard cutting conditions should be used.

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

ESD 10

3-dimensional milling such as plunging with small depth and ramping

Max. cutting depth: see next page

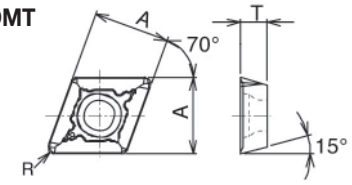


■ Specifications

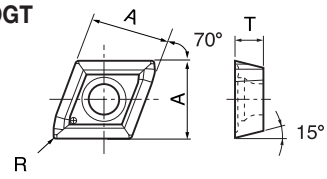
Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)					Clamping screw	Wrench
				øD	ød	L	L1	L2		
ESD10020RS-E	●	GDMT10H3PDPR-MJ GDGT10H3PDFR-AJ	1	20	20	80	30	50	CSTB-3.5H	T-15D
ESD10025RS-E	●		2	25	25	96	40	56		
ESD10032RS-E	●		2	32	32	110	50	60		

■ Inserts

GDMT



GDGT



Cat. No.	Accuracy	Honing	Grades				Dimensions (mm)		
			Uncoated		PVD Coated				
			TH10	UX30	AH120	AH330	A	T	R
GDMT10H3PDPR-MJ	M	with			●	●	10	3.5	0.8
GDGT10H3PDFR-AJ	G	without	○				10	3.5	0.4

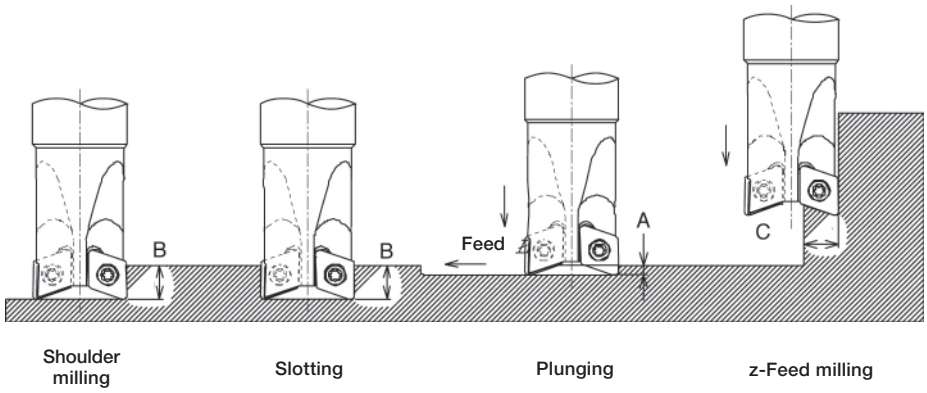
■ Standard cutting conditions

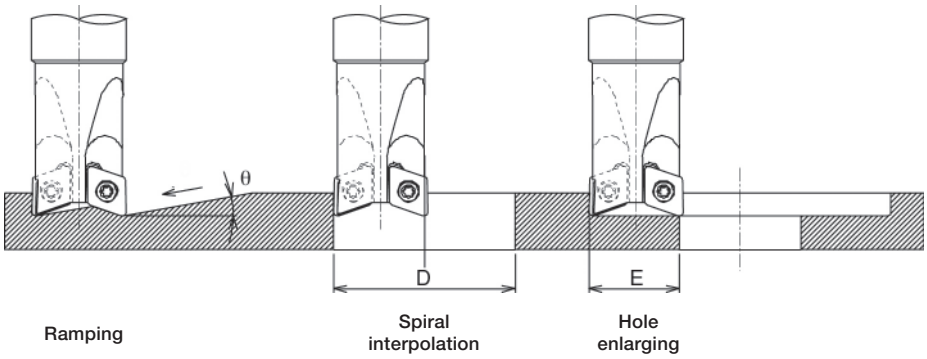
Work materials	Grades	ESD10 (ø20 - ø32)		
		Cutting speed Vc (m/min)	Feed rate ft (mm/tooth)	
			Shouldering and groove machining	Drilling
Carbon steel (Ck50, etc.) < 300HB	AH120	100 ~ 180	0.05 ~ 0.20	0.03 ~ 0.10
	AH330	120 ~ 230	0.05 ~ 0.15	0.03 ~ 0.08
Alloy steel (42CrMo4, etc.) < 300HB	AH120	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08
	AH330	120 ~ 230	0.05 ~ 0.13	0.03 ~ 0.06
Die steel (X96CrMoV12, etc.) < 300HB	AH120	60 ~ 120	0.05 ~ 0.13	0.03 ~ 0.06
	AH330	80 ~ 160	0.05 ~ 0.10	0.03 ~ 0.05
Cast iron (GG25, etc.)	AH120	100 ~ 180	0.05 ~ 0.25	0.03 ~ 0.10
	AH330	120 ~ 230	0.05 ~ 0.20	0.03 ~ 0.08

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

■ Main applications





Cat. No.	Tool ø (mm)	Max cutting edge length (B)	Max. plunging depth (A)	Max. cutting width z-Feed (C)	Max. ramping angle (θ)	Min. hole machining diameter (D)	Max. hole machining diameter (D)	Max. cutting width for enlarging (E)
ESD10020RS-E	20	9	2.5	8	10°	24	38	18
ESD10025RS-E	25	9	2.5	9	10°	32	48	23
ESD10032RS-E	32	9	2.5	9	6° 30’	46	62	30

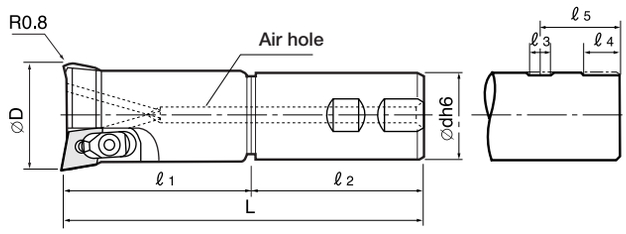
Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

SF Endmill

ESD5000

Large pocket milling

Max. cutting depth: see next page

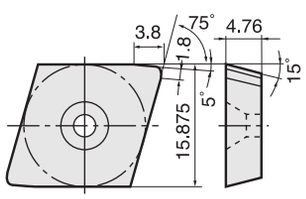


■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)								Clamp	Clamping screw	Wrench
			ØD	ℓ 1	ℓ 2	ℓ 3	ℓ 4	ℓ 5	L	ød			
ESD5040RSE	●	2	40	100	90	14	19	40	190	40	CP724	RT–1	P-4
ESD5040RLE	●	2	40	150	90	14	19	40	240	40			
ESD5050RSE	●	2	50	100	90	14	19	40	190	40			
ESD5050RLE	●	2	50	150	90	14	19	40	240	40			

Note: The final letter of each Cat. No. shows: S = Short type and L = Long type.

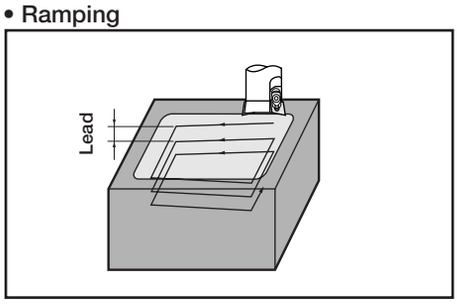
■ Inserts



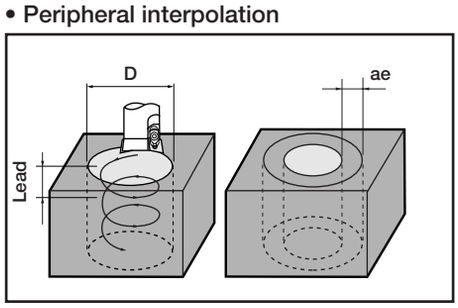
Cat. No. (Inch)	Cat. No. (Metric)	Accuracy	Honing	Grades		Application
				Coated GH330	Uncoated UX30	
EDKW53ZTR	EDKW1504EDTR	K	With	○	●	Steels, cast irons

■ Main applications

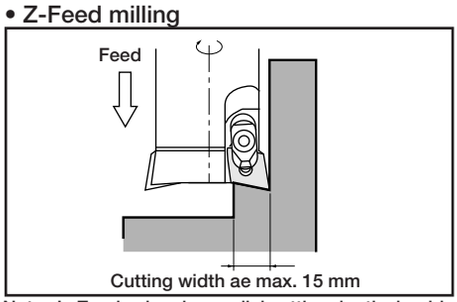
• Ramping



• Peripheral interpolation

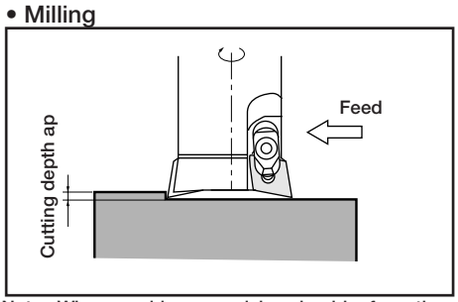


• Z-Feed milling



Note : In Z-axis plunging, radial cutting depth should be limited within 15 mm (when using short type).

• Milling



Note : When requiring a precision shoulder face, the axial cutting depth should be limited within 3 mm.

Features P. 350 ~ 353 | Reference guide | Technical data P. 476 ~ 479

■ Standard cutting conditions

• When milling high-carbon steels

Cutter type		Ramping and milling					Z-feed milling				
		Cutting speed Vc (m/min)		Feed ft (mm/tooth)	Lead or cutting depth ap (mm)	Ramping angle (θ°)	Cutting speed Vc (m/min)		Feed ft (mm/tooth)	Cutting depth ap (mm)	Cutting width ae (mm)
		UX30	GH330				UX30	GH330			
ESD5040R (ø40 mm)	S	80 ~ 100	100 ~ 140	0.15 ~ 0.25	~ 15	~ 1.5°	80 ~ 120	100 ~ 180	0.1 ~ 0.25	~ 15	~ 30
	L			0.10 ~ 0.15	~ 6	~ 1°				~ 10	
ESD5050R (ø50 mm)	S			0.10 ~ 0.25	~ 15	~ 1.5°				~ 15	~ 40
	L			0.10 ~ 0.15	~ 6	~ 1°				~ 10	

• When milling die steels and alloy steels

Above conditions can be generally applied to machining of these materials, but the cutting speeds should be reduced by 10 ~ 15 % from the values shown in the table.

● Cautionary points in use

- Because the ESD5000 type endmills are not provided with a center cutting edge, the cutter cannot be used for plunging.
- When chips tend to stay in cutting area, use an air blast to remove them.
  And, especially when pocketing a deep cavity, use of air blast through the air hole integrated in the shank is effective.
- When drilling a hole, use the helical interpolation function (G02, G03) of the CNC controller. The max. and min. machinable diameter are shown in the table below.
- Use of a side-lock type toolholder or milling chuck which has a high gripping force is recommended.
- When indexing or changing the insert, after removing all foreign matter in the insert pocket with use of an air blast, carefully mount the insert not so as to leave a gap between the insert and pocket face.

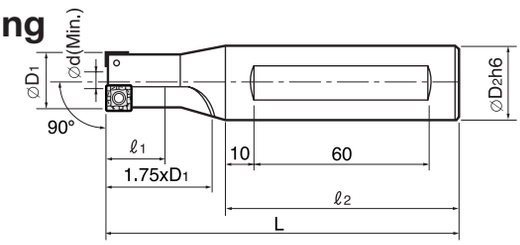
Cat. No.	Peripheral interpolation		Hole enlarging
	Min. bore ø (mm)	Max. bore ø (mm)	Max. cutting width ae (mm)
ESD5040RS/L	ø50	ø80	40
ESD5050RS/L	ø70	ø100	50

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Counter Milling Cutters

TCB

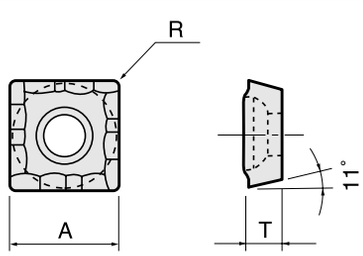
Counter milling



■ Specifications

Cat. No.	Stock	Inserts	No. of inserts	Dimensions (mm)						Applicable screw size	Clamping screw	Wrench
				øD1	øD2	ød	ℓ1	ℓ2	L			
TCB–140	●	SPMP831DS	1	14	25	4.0	14	80	117	M8	CSTB–2.2	T–7D
TCB–175	●		2	17.5		7.1	17.5		115	M10	CSTB–2.2S	
TCB–200	●	SPMP042ERD		20		8.2	20		120	M12	CSTA–NO3	T–9D
TCB–230	●			23		11.0	23		126	(M14)		
TCB–260	●			26	32	14.0	26		132	M16		
TCB–290	●	SPMM322ERD		29			29		138	(M18)	CSTA-NO5	
TCB–320	●			32		16.9	32		144	M20		
TCB–350	●	SPMM432ERD		35		14.0	35		150	(M22)	CSTA–4	T–15D
TCB–390	●			39		17.9	39		158	M24		
TCB–430				43	42	21.7	43	85	171	(M27)		
TCB–480				48		26.7	48		181	M30		

■ Inserts



Cat. No.	Accuracy	Grade	Dimensions (mm)		
		T313W	A	T	R
SPMP831DS	M	●	6.35	2.38	0.4
SPMP042ERD		●	7.938	3.18	0.8
SPMM322ERD		●	9.525		
SPMM432ERD		●	12.70	4.76	

Note: No dimples on SPMP831DS type inserts

■ Standard cutting conditions (for TCB-200)

Work materials	Grade	Cutting speed Vc (m/min)	Feed f (mm/rev)	Cutting fluid
Carbon steels	T313W	80 ~ 150	0.12 ~ 0.24	Water soluble type or dry cutting
Stainless steels · Mild steels	T313W	150 ~ 200	0.05 ~ 0.12	Water soluble type
Cast irons	T313W	70 ~ 130	0.20 ~ 0.4	Water soluble type or dry cutting

Notes : • For cutter under ø 20 mm diameter, be sure to use a cutting fluid and select lower cutting speeds than shown above.
• For TCB-140 type, reduce the feeds to 1/2 of the values shown in the table.

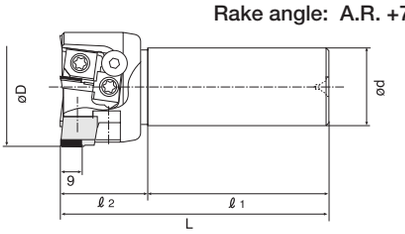
• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

All-diamond Tipped TAC Endmills

EDPD15

For high-speed and precision milling

Rake angle: A.R. +7° R.R. 0°

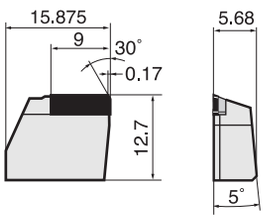


■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)					Insert locking wedge	Locator adjusting wedge	Screw for preventing wedge from flying out	Wedge fixing screw	Adjusting wedge fixing screw	Wrench
			øD	ød	ℓ 1	ℓ 2	L						
EDPD15050R/L		3	50	32.0	80	35	115	FW304R/L-D	FW325R/L-D	BHM611-GT	FDS-8SST	FDS-8SST	T-27
EDPD15063R/L		4	63										

■ Inserts

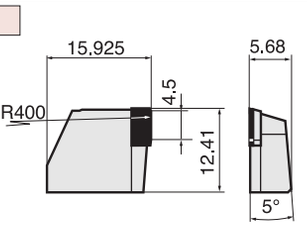
Roughing



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-D	DX140 (PCD)	●

Wiper



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-WD	DX140 (PCD)	●

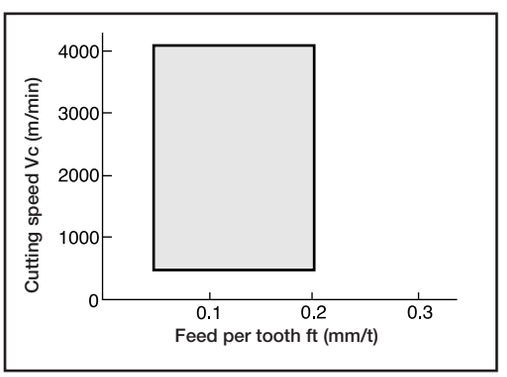
■ Standard cutting conditions

Cutter diameter (mm)	50	63
Cutting speed Vc (m/min)	500 ~ 3100	500 ~ 3900
Feed per tooth ft (mm/tooth)	0.05 ~ 0.2	
Cutting depth ap (mm)	~ 7	

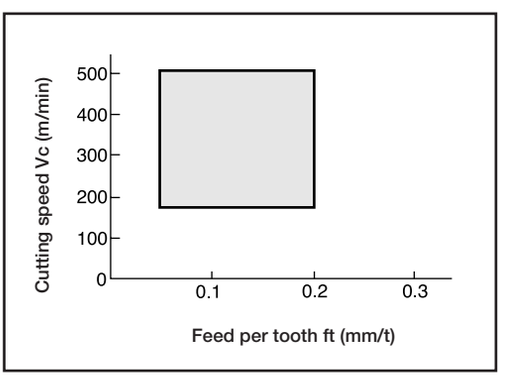
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

■ Guidelines for selecting cutting speed and feed

Aluminium alloys (Si < 12%) (Grade: DX140 (PCD))



Aluminium alloys (Si > 13%) (Grade: DX140 (PCD))



- ● Wet cutting is recommended.
- ● Dry cutting is also possible. But chip control and obtainable surface integrity are inferior to wet cutting.

MEMO

MEMO

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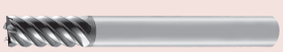
Solid Carbide Endmills

Features

P : Without chamfer

Application	Feature	Appearance	Cat. No.	Cutting edge	No. of flute	Mill dia. (mm)	Coated
General purpose (Steel, Cast iron etc.)	For steel, cast iron and hardened steel		SED2000F(-L)		2	ø1.0 ~ ø20.0	Flash
			SED4000F(-L)		4	ø2.0 ~ ø20.0	Flash
	For high-feed side and slot milling For steel, cast iron and difficult-to-cut materials		SEE4000F		4	ø4.0 ~ ø20.0	Flash
			SEE4000FP	P	4	ø4.0 ~ ø20.0	Flash
Hardened steel	With large helix angle for hardened steel		SEF4000F(-L)		4	ø3.0 ~ ø5.5	Flash
			SEF6000F(-L)		6	ø6.0 ~ ø20.0	Flash
Non-ferrous metals	Uncoated square endmills with sharp cuttng edges		SEE2000NA	P	2	ø1.0 ~ ø16.0	-
			SEE4000NA	P	4	ø3.0 ~ ø16.0	-
Die Engraving Ball nose endmills	Ball endmills for various materials		SBD2000FN (-NL, -LS)		2	ø1.0 ~ ø20.0	Flash

R : Roughing M : Medium F : Finishing

Work materials																	Application							Type	Page
Carbon steels, Alloy steels			Cast irons			Stainless steels			High Hardened steels more than HRC50		Heat resistant alloys		Light alloys		Copper, Carbon		Side milling	Slot milling	Plunging	Key- way	Taper	Copying	Thread milling		
R	M	F	R	M	F	R	M	F	M	F	M	F	M	F	M	F									
◎	◎	○	◎	◎	○			○									◎	◎	○					2 flutes for general machining	393
○	◎	◎	○	◎	◎			○									◎							4 flutes for general machining	394
◎	◎	◎	◎	◎	◎		◎	○			○	○					◎	◎	○					Multi-functional end mill with 4 flutes For 1xD slot milling	396
◎	◎	◎	◎	◎	◎		◎	○			○	○					◎	◎	○					Multi-functional sharp-edge type endmill with 4 flutes For slot milling < 0.2xD	396
		◎							○	◎		○					◎	×	×					Performs well in small cutting depth and high feed machining	399
		◎								◎		○					◎	×	×						
													◎	◎	◎	◎	◎	◎	○					Sharpness-priority type	397
													◎	◎	◎	◎	◎		○						
	◎	◎		○	◎		○	◎	○	◎	○	○						○				◎		Suitable cutting edge with both sharpness and strong edge	401

◎ : Best suitable ○ : Usable × : Unusable

Nomenclature

(Example) **S E D 2 080 -L**

① ② ③ ④ ⑤ ⑥

① Type

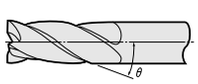
Symbol	Type
S	solid carbide 

② Shape

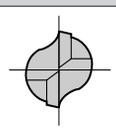
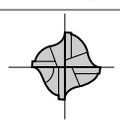
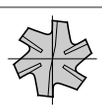
Symbol	Type
E	Square 
B	Ball nose 

③ Helix angle

Symbol	Type
D	θ ≈ **30°**
E	θ ≈ **45°**
F	θ ≥ **60°**



④ No. of flutes

Symbol	Type
2	 2 flutes
4	 4 flutes
6	 6 flutes

⑤ Mill dia.

⑥ Specification

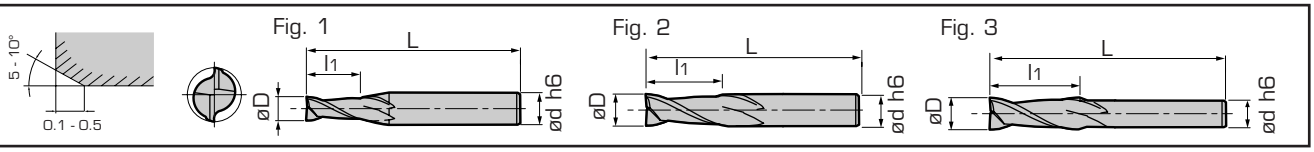
Symbol	Description
-L	Long flute
-NL	Long taper neck
-LS	Long
F	Flash coat
NA	For non-ferrous metals
FN	Toughness-priority (Flash coat)
FP	Without chamfer (Flash coat)

SED2000F / SED2000F-L / SED4000F / SED4000F-L

- (P) Steels
- (M) Stainless steels
- (K) Cast irons
- (H) Hardened steels

- 30° helix angle
- 2 and 4 flute
- Shoulder milling and slotting

øD (mm)	Tolerance (mm)
ø1.0 - ø2.9	0 -0.020
ø3.0 - ø6.0	-0.010 -0.030
ø6.5 - ø10.5	-0.010 -0.035
ø11.0 - ø16.0	-0.010 -0.040
ø17.0 - ø20.0	-0.015 -0.045



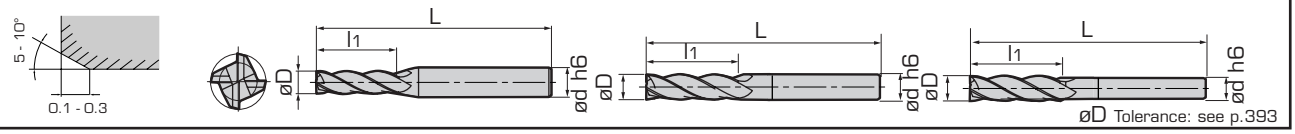
SED2000F (Standard)

● Standard stock in Europe ❍ Standard stock in Japan

Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SED2010F	●	2	1.0	2.5	40	4.0	1	SED2050F	●	2	5.0	13.0	50	6.0	1
SED2011F	❍		1.1					SED2055F	❍		5.5				
SED2012F	❍		1.2	3.0				SED2060F	●		6.0				2
SED2013F	❍		1.3					SED2065F	❍		6.5	16.0	60	8.0	1
SED2014F	❍		1.4					SED2070F	❍		7.0				
SED2015F	❍		1.5	4.0				SED2075F	❍		7.5	19.0			
SED2016F	❍		1.6					SED2080F	●		8.0				2
SED2017F	❍		1.7					SED2085F	❍		8.5		70	10.0	1
SED2018F	❍		1.8	5.0				SED2090F	❍		9.0				
SED2019F	❍		1.9					SED2095F	❍		9.5				
SED2020F	●		2.0	6.0				SED2100F	●		10.0	22.0			2
SED2021F	❍		2.1					SED2105F	❍		10.5		75	12.0	1
SED2022F	❍		2.2					SED2110F	❍		11.0				
SED2023F	❍		2.3					SED2115F	❍		11.5				
SED2024F	❍		2.4	8.0				SED2120F	●		12.0	26.0			2
SED2025F	❍		2.5					SED2125F	❍		12.5				3
SED2026F	❍		2.6					SED2130F	❍		13.0				
SED2027F	❍		2.7					SED2140F	❍		14.0				
SED2028F	❍		2.8					SED2150F	❍		15.0	30.0	80	16.0	1
SED2029F	❍		2.9					SED2160F	❍		16.0	32.0	90		2
SED2030F	●		3.0		45	6.0		SED2170F	❍		17.0				3
SED2035F	❍		3.5	10.0				SED2180F	❍		18.0				
SED2040F	●		4.0	11.0				SED2190F	❍		19.0		100	20.0	1
SED2045F	❍		4.5					SED2200F	❍		20.0	38.0			2

SED2000F-L (Long flute type)

Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SED2010F-L	❍	2	1.0	3.5	40	4.0	1	SED2090F-L	❍	2	9.0	25.0	90	10.0	1
SED2015F-L	❍		1.5	5.0				SED2095F-L	❍		9.5				
SED2020F-L	❍		2.0	8.0				SED2100F-L	❍		10.0	30.0			2
SED2025F-L	❍		2.5	10.0				SED2105F-L	❍		10.5			12.0	1
SED2030F-L	❍		3.0	12.0	50	6.0		SED2110F-L	❍		11.0				
SED2035F-L	❍		3.5	15.0				SED2115F-L	❍		11.5				
SED2040F-L	❍		4.0					SED2120F-L	❍		12.0				2
SED2045F-L	❍		4.5					SED2130F-L	❍		13.0	35.0			3
SED2050F-L	❍		5.0	20.0	60			SED2140F-L	❍		14.0	40.0	110	16.0	1
SED2055F-L	❍		5.5					SED2150F-L	❍		15.0				
SED2060F-L	❍		6.0				2	SED2160F-L	❍		16.0	50.0			2
SED2065F-L	❍		6.5	25.0	70	8.0	1	SED2170F-L	❍		17.0			20.0	1
SED2070F-L	❍		7.0					SED2180F-L	❍		18.0				
SED2075F-L	❍		7.5					SED2190F-L	❍		19.0	55.0			
SED2080F-L	❍		8.0				2	SED2200F-L	❍		20.0				2
SED2085F-L	❍		8.5		90	10.0	1								



øD Tolerance: see p.393

SED4000F (Standard)

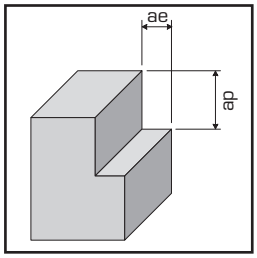
● Standard stock in Europe ❍ Standard stock in Japan

Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.
			øD	l1	L	ød					øD	l1	L	ød	
SED4020F	●	4	2.0	6.0	40	4.0	1	SED4095F	❍	4	9.5	19.0	70	10.0	1
SED4025F	❍		2.5	8.0				SED4100F	●		10.0	22.0			2
SED4030F	●		3.0		45	6.0		SED4105F	❍		10.5		75	12.0	1
SED4035F	❍		3.5	10.0				SED4110F	❍		11.0				
SED4040F	●		4.0	11.0				SED4115F	❍		11.5				
SED4045F	❍		4.5					SED4120F	●		12.0	26.0			2
SED4050F	●		5.0	13.0	50			SED4125F	❍		12.5				3
SED4055F	❍		5.5					SED4130F	❍		13.0				
SED4060F	●		6.0				2	SED4140F	❍		14.0				
SED4065F	❍		6.5	16.0	60	8.0	1	SED4150F	❍		15.0	30.0	80	16.0	1
SED4070F	❍		7.0					SED4160F	❍		16.0	32.0	90		2
SED4075F	❍		7.5					SED4170F	❍		17.0				3
SED4080F	●		8.0	19.0			2	SED4180F	❍		18.0				
SED4085F	❍		8.5		70	10.0	1	SED4190F	❍		19.0		100	20.0	1
SED4090F	❍		9.0					SED4200F	❍		20.0	38.0			2

SED4000F-L (Long flute type)

Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.
			øD	l1	L	ød					øD	l1	L	ød	
SED4030F-L	❍	4	3.0	12.0	50	6.0	1	SED4100F-L	❍	4	10.0	30.0	90	10.0	2
SED4035F-L	❍		3.5	15.0				SED4105F-L	❍		10.5			12.0	1
SED4040F-L	❍		4.0					SED4110F-L	❍		11.0				
SED4045F-L	❍		4.5					SED4115F-L	❍		11.5				
SED4050F-L	❍		5.0	20.0	60			SED4120F-L	❍		12.0				2
SED4055F-L	❍		5.5					SED4125F-L	❍		12.5				3
SED4060F-L	❍		6.0				2	SED4130F-L	❍		13.0	35.0			
SED4065F-L	❍		6.5	25.0	70	8.0	1	SED4140F-L	❍		14.0	40.0	110	16.0	1
SED4070F-L	❍		7.0					SED4150F-L	❍		15.0				
SED4075F-L	❍		7.5					SED4160F-L	❍		16.0	50.0			2
SED4080F-L	❍		8.0				2	SED4170F-L	❍		17.0			20.0	1
SED4085F-L	❍		8.5		90	10.0	1	SED4180F-L	❍		18.0				
SED4090F-L	❍		9.0					SED4190F-L	❍		19.0	55.0			
SED4095F-L	❍		9.5					SED4200F-L	❍		20.0				2

Cutting parameter

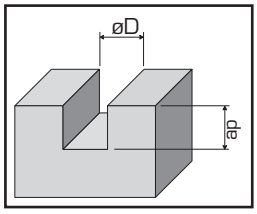


SED2000F / SED4000F

Shoulder milling ap ≤ 1.5D, ae ≤ 0.2D

Work materials	Carbon steels / Cast irons		Alloy steels / Tool steels		Stainless steels		Hardened steels	
Hardness	≤ 30HRC		≤ 40HRC		-		≤ 45HRC	
Vc (m/min)	70 - 100		30 - 60		30 - 60		20 - 40	
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	27070	350	14430	140	14430	140	9550	60
ø 2.0	13540		7170		7170		4780	
ø 3.0	9020	340	4780		4780		3190	
ø 4.0	6770		3580		3580		2390	
ø 5.0	5410		2870	180	2870		1910	65
ø 6.0	4510		2390		2390	150	1590	70
ø 8.0	3380		1790		1790	140	1190	65
ø 10.0	2710	350	1430		1430		960	
ø 12.0	2260	340	1190		1190	150	800	70
ø 16.0	1690		890		890	140	600	
ø 20.0	1350		710		710		470	

Note:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
The above cutting parameter are suited for 2-flute endmills (SED2000F).
For 4-flute endmills (SED4000F) feed rate should be 1.5 times higher at unchanged number of revolutions.
When using tools with long flutes the number of revolutions and feed rate should be reduced to 50%.



Slotting ap ≤ 0.5D (for D ≤ ø 3.0, ap ≤ 0.25D is recommended.)

Work materials	Carbon steels / Cast irons		Alloy steels / Tool steels		Stainless steels		Hardened steels	
Hardness	≤ 30HRC		≤ 40HRC		-		≤ 45HRC	
Vc (m/min)	35 - 50		15 - 30		15 - 30		10 - 20	
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	13540	170	7170	70	7170	70	4780	30
ø 2.0	6770		3580	65	3580		2390	
ø 3.0	4510		2390		2390	65	1590	
ø 4.0	3380	175	1790		1790	70	1190	
ø 5.0	2710	170	1430	90	1430		960	35
ø 6.0	2260		1190	85	1190		800	
ø 8.0	1690	175	900	90	900		600	
ø 10.0	1350	170	720	85	720	65	480	
ø 12.0	1130		600	80	600		400	
ø 16.0	850		440		440		300	
ø 20.0	680		360		360	70	230	

Note:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
The above cutting parameter are suited for 2-flute endmills (SED2000F).
For tools with 4 flutes (SED4000F) feed rate should be 75% of above data at unchanged number of revolutions.
Tools with long flutes are not suited for slotting.

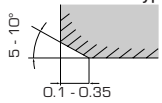
SEE4000F

- P Steels
- M Stainless steels
- K Cast irons
- S Heat resistant alloys

- 40° helix angle
- 4 flute
- Shoulder milling and slotting

øD (mm)	Tolerance (mm)
ø4.0 - ø6.0	-0.010 -0.030
ø7.0 - ø10.0	-0.010 -0.035
ø11.0 - ø16.0	-0.010 -0.040
ø17.0 - ø20.0	-0.015 -0.045

SEE4000F type



SEE4000FP type

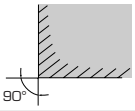


Fig. 1

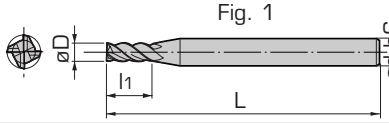
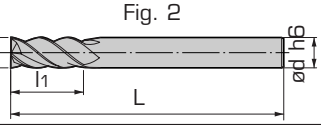


Fig. 2



SEE4000F (Standard)

● Standard stock in Europe ❍ Standard stock in Japan

Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SEE4040F	●	4	4.0	11.0	45	6.0	1	SEE4130F	●	4	13.0	26.0	75	16.0	1
SEE4050F	●		5.0	13.0	50			SEE4140F	●		14.0				
SEE4060F	●		6.0				2	SEE4150F	●		15.0	30.0	80		2
SEE4070F	●		7.0	16.0	60	8.0	1	SEE4160F	●		16.0	32	90		
SEE4080F	●		8.0	19.0	70		2	SEE4170F	●		17.0			20.0	1
SEE4090F	●		9.0	22.0		10.0	1	SEE4180F	●		18.0		100		
SEE4100F	●		10.0				2	SEE4190F	●		19.0				
SEE4110F	●		11.0		75	12.0	1	SEE4200F	●		20.0	38			2
SEE4120F	●		12.0	26.0			2								

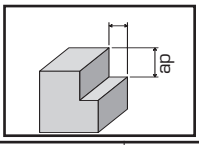
SEE4000FP

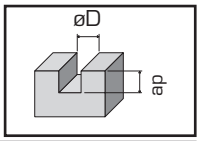
Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SEE4040FP	●	4	4.0	11.0	45	6.0	1	SEE4130FP	●	4	13.0	26.0	75	16.0	1
SEE4050FP	●		5.0	13.0	50			SEE4140FP	●		14.0				
SEE4060FP	●		6.0				2	SEE4150FP	●		15.0	30.0	80		2
SEE4070FP	●		7.0	16.0	60	8.0	1	SEE4160FP	●		16.0	32	90		
SEE4080FP	●		8.0	19.0	70		2	SEE4170FP	●		17.0			20.0	1
SEE4090FP	●		9.0	22.0		10.0	1	SEE4180FP	●		18.0		100		
SEE4100FP	●		10.0				2	SEE4190FP	●		19.0				
SEE4110FP	●		11.0		75	12.0	1	SEE4200FP	●		20.0	38			2
SEE4120FP	●		12.0	26.0			2								

Cutting parameter

SEE4000F

Shoulder milling and Slotting





Work materials	Carbon steels / Cast irons		Alloy steels / Prehardened steels		Stainless steels (e.g. X5CrNi18-10)		Heat resistant alloys (e.g. Inconel, Hastelloy)	
Hardness	≤ 30HRC		≤ 40HRC		-		≤ 45HRC	
Vc (m/min)	60 - 80		50 - 65		20 - 35		10 - 18	
Shoulder milling	ap ≤ 1.5D, ae ≤ 0.1D						ap ≤ 1.5D, ae ≤ 0.05D	
Slotting	ap ≤ 1.0D				ap ≤ 0.5D		ap ≤ 0.2D	
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 4.0	6300	760	5100	510	2700	210	1400	80
ø 5.0	5000	810	4100	520	2200	220	1100	
ø 6.0	4200	850	3400	540	1800	210	950	90
ø 7.0	3600	870	2900	710	1500	310	810	100
ø 8.0	3100	880	2500	720	1300	360	710	
ø 9.0	2800	910	2200	730	1200	370	630	
ø 10.0	2500		2000		1100	360	570	110
ø 11.0	2300	930	1800	660	1000	320	520	100
ø 12.0	2100	850	1700	620	920	300	470	
ø 13.0	1900	780	1500	570	850	270	440	90
ø 14.0	1800	720	1400	530	790	250	400	
ø 15.0	1600	670	1300	490	740	230	380	
ø 16.0	1500	700	1200	460	690	250	350	80
ø 17.0	1400	650		430	650	230	330	
ø 18.0		620	1100	410	610	220	310	
ø 19.0	1300	580	1000	390	580	210	300	70
ø 20.0	1200	560		370	550	200	280	

SEE4000FP

Shoulder milling and Slotting

Work materials	Carbon steels / Cast irons		Alloy steels / Prehardened steels		Stainless steels (e.g. X5CrNi18-10)	
Hardness	≤ 30HRC		≤ 40HRC		-	
Vc (m/min)	50 - 80		35 - 65		20 - 45	
Shoulder milling	ap ≤ 1.0D, ae ≤ 0.01D					
Slotting	ap ≤ 0.2D					
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 4.0	5500	440	4300	280	2700	160
ø 5.0	4400	350	3500		2200	
ø 6.0	3700	440	2900	350	1800	140
ø 7.0	3100		2500		1500	150
ø 8.0	2700		2100		1300	160
ø 9.0	2400		1900		1200	
ø 10.0	2200	400	1700	310	1100	150
ø 11.0	2000		1500		1000	160
ø 12.0	1800	370	1400	290	920	
ø 13.0	1700	340	1300	260	850	150
ø 14.0	1500	310	1200	250	790	140
ø 15.0	1400	290	1100	230	740	130
ø 16.0	1300	300	1000	210	690	
ø 17.0		280		200	650	
ø 18.0	1200	270	970	190	610	120
ø 19.0	1100	280	920	180	580	110
ø 20.0		260	870	170	550	

Note SEE4000F + SEE4000FP:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
When machining stainless steels and heat resistant alloys coolant (water soluble or water insoluble) should be used.
Tool overhang should be as small as possible. Number of revolutions and feed rate should be reduced to minimise vibrations.

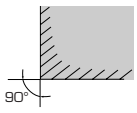
SEE2000NA / SEE4000NA

N Aluminium and nonferrous metals

- 47° helix angle
- 2 and 4 flute
- Extreme sharp cutting edge
- Shoulder milling and slotting

øD (mm)	Tolerance (mm)
ø1.0 - ø2.0	0 -0.030
ø3.0 - ø6.0	-0.010 -0.040
ø7.0 - ø10.0	-0.010 -0.045
ø11.0 - ø16.0	-0.010 -0.050

Fig. 1



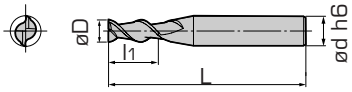


Fig. 2

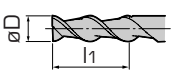


Fig. 3

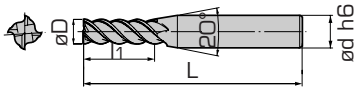
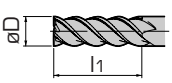


Fig. 4



SEE2000NA

● Standard stock in Europe ❍ Standard stock in Japan

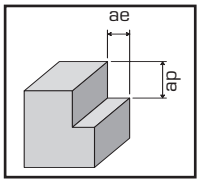
Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SEE2010NA	❍	2	1.0	3.0	40	4.0	1	SEE2090NA	❍	2	9.0	19.0	70	10.0	1
SEE2020NA	❍		2.0	6.0				SEE2100NA	❍		10.0	22.0			2
SEE2030NA	❍		3.0	8.0	45	6.0		SEE2110NA	❍		11.0		75	12.0	1
SEE2040NA	❍		4.0	11.0				SEE2120NA	❍		12.0	26.0			2
SEE2050NA	❍		5.0	13.0	50			SEE2130NA	❍		13.0		90	16.0	1
SEE2060NA	❍		6.0				2	SEE2140NA	❍		14.0				
SEE2070NA	❍		7.0	16.0	60	8.0	1	SEE2150NA	❍		15.0	30.0			
SEE2080NA	❍		8.0	19.0			2	SEE2160NA	❍		16.0	32.0			2

SEE4000NA

Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm) øD	l1	L	ød	Fig.
SEE4030NA	❍	4	3.0	10.0	45	6.0	3	SEE4100NA	❍	4	10.0	26.0	70	10.0	4
SEE4040NA	❍		4.0	13.0				SEE4110NA	❍		11.0		75	12.0	3
SEE4050NA	❍		5.0	15.0	50			SEE4120NA	❍		12.0	28.0			4
SEE4060NA	❍		6.0	16.0			4	SEE4130NA	❍		13.0	32.0	90	16.0	3
SEE4070NA	❍		7.0	20.0	60	8.0	3	SEE4140NA	❍		14.0				
SEE4080NA	❍		8.0	21.0			4	SEE4150NA	❍		15.0				
SEE4090NA	❍		9.0	24.0	70	10.0	3	SEE4160NA	❍		16.0				4

Cutting parameter

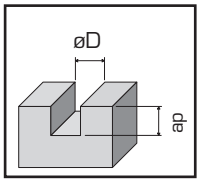
SEE2000NA / SEE4000NA



Shoulder milling

Work materials	Aluminium		Aluminium alloys (Si)		Aluminium alloys (Mg)		Aluminium alloys (Zn-Mg)		Copper alloys	
Vc (m/min)	250 - 300		30 - 50		75 - 125		200 - 250		30 - 60	
Shoulder milling	ap ≤ 1.5D, ae ≤ 0.2D								ap ≤ 1.5D, ae ≤ 0.1D	
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	47770	800	7960	200	19110	380	39810	400	14330	150
ø 2.0	43790	780	6370	160	15920	320	35830	360	7170	
ø 3.0	29190		4250	170	10620	330	23890	350	4780	
ø 4.0	21900	1000	3190	220	7960	440	17910	490	3580	
ø 5.0	17520	1010	2550	230	6370		14330	500	2870	
ø 6.0	14600	1000	2120		5310	450	11940	490	2390	170
ø 8.0	10950		1590	260	3980	520	8960	580	1790	
ø 10.0	8760	1190	1270		3190		7170		1430	
ø 12.0	7300		1060	290	2650	600	5970	680	1190	
ø 16.0	5470		800	280	1990		4480		900	

Note:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
The above cutting parameter are suited for 2-flute endmills (SEE2000NA).
For 4-flute endmills (SEE4000NA) feed rate should be 1.5 times higher at unchanged number of revolutions.



Slotting

Work materials	Aluminium		Aluminium alloys (Si)		Aluminium alloys (Mg)		Aluminium alloys (Zn-Mg)		Copper alloys	
Vc (m/min)	250 - 300		30 - 50		75 - 125		200 - 250		30 - 60	
Slotting	ap ≤ 1.0D								ap ≤ 0.5D	
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	47770	560	7960	140	19110	270	39810	280	14330	110
ø 2.0	43790	550	6370	110	15920	220	35830	250	7170	100
ø 3.0	29190		4250	120	10620	230	23890		4780	
ø 4.0	21900	680	3190	140	7960	310	17910	350	3580	
ø 5.0	17520	690	2550	150	6370		14330		2870	110
ø 6.0	14600	680	2120		5310	320	11940		2390	120
ø 8.0	10950		1590	170	3980	370	8960	410	1790	
ø 10.0	8760	820	1270		3190		7170		1430	
ø 12.0	7300		1060	200	2650	430	5970	480	1190	
ø 16.0	5470		800		1990	420	4480		900	

Note:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
The above cutting parameter are suited for 2-flute endmills (SEE2000NA).
For tools with 4 flutes (SEE400NA) ap should be ≤ 0.5D.

SEF4000F / SEF4000F-L / SEF6000F / SEF6000F-L

Hardened steels up to 70 HRC

- 45° helix angle
- 4 and 6 flute
- Shoulder milling

øD (mm)	Tolerance (mm)
ø3.0 - ø6.0	-0.010 -0.030
ø6.5 - ø10.5	-0.010 -0.035
ø11.0 - ø16.0	-0.010 -0.040
ø17.0 - ø20.0	-0.015 -0.045

Fig. 1

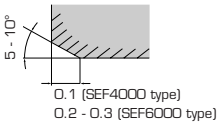


Fig. 2

SEF4000F / SEF6000F (Standard)

● Standard stock in Europe ❍ Standard stock in Japan

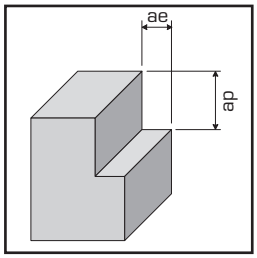
Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.
			øD	l1	L	ød					øD	l1	L	ød	
SEF4030F	●	4	3.0	10.0	60	6.0	1	SEF6100F	●	6	10.0	25.0	80	10.0	2
SEF4035F	●		3.5	12.0				SEF6105F	●		10.5	30.0	100	12.0	1
SEF4040F	●		4.0					SEF6110F	●		11.0				
SEF4045F	●		4.5	15.0				SEF6115F	●		11.5				
SEF4050F	●		5.0					SEF6120F	●		12.0				2
SEF4055F	●		5.5					SEF6130F	●		13.0	35.0	110	16.0	1
SEF6060F	●	6	6.0				2	SEF6140F	●		14.0				
SEF6065F	●		6.5	20.0	75	8.0	1	SEF6150F	●		15.0	40.0			
SEF6070F	●		7.0					SEF6160F	●		16.0				2
SEF6075F	●		7.5					SEF6170F	●		17.0			20.0	1
SEF6080F	●		8.0				2	SEF6180F	●		18.0				
SEF6085F	●		8.5	25.0	80	10.0	1	SEF6190F	●		19.0	45.0			
SEF6090F	●		9.0					SEF6200F	●		20.0				2
SEF6095F	●		9.5												

SEF4000F-L / SEF6000F-L (Long flute type)

Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)				Fig.
			øD	l1	L	ød					øD	l1	L	ød	
SEF4030F-L	●	4	3.0	15.0	60	6.0	1	SEF6120F-L	●	6	12.0	55.0	120	12.0	2
SEF4040F-L	●		4.0	20.0	65			SEF6130F-L	●		13.0		125	16.0	1
SEF4050F-L	●		5.0	25.0	70			SEF6140F-L	●		14.0				
SEF6060F-L	●	6	6.0				2	SEF6150F-L	●		15.0	65.0	135		
SEF6070F-L	●		7.0	35.0	90	8.0	1	SEF6160F-L	●		16.0				2
SEF6080F-L	●		8.0				2	SEF6170F-L	●		17.0		145	20.0	
SEF6090F-L	●		9.0	45.0	100	10.0	1	SEF6180F-L	●		18.0				1
SEF6100F-L	●		10.0				2	SEF6190F-L	●		19.0	75.0	155		
SEF6110F-L	●		11.0	55.0	120	12.0	1	SEF6200F-L	●		20.0				2

Cutting parameter

SEF4000F / SEF6000F



HSC Parameter

Work materials	Alloy steels / Prehardened steels		Hardened steels		Hardened steels	
Hardness	35 - 45HRC		45 - 55HRC		55 - 70HRC	
Vc (m/min)	200 - 250					
Shoulder milling	ap ≤ 1.5D, ae ≤ 0.05D		ap ≤ 1.5D, ae ≤ 0.01D			
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 3.0	23890	3830	23890	3380	23890	2880
ø 4.0	17910	4300	17910	3580	17910	2870
ø 5.0	14330	4570	14330	3450	14330	
ø 6.0	11940	7080	11940	4950	11940	4250
ø 8.0	8960	6990	8960	5370	8960	4300
ø 10.0	7170	6450	7170	5150	7170	
ø 12.0	5970	5750	5970	5030	5970	4130
ø 16.0	4480	4840	4480	4300	4480	4030
ø 20.0	3580	4300	3580	3850	3580	3580

Conventional Parameter

Work materials	Alloy steels / Prehardened steels		Hardened steels		Hardened steels	
Hardness	35 - 45HRC		45 - 55HRC		55 - 70HRC	
Vc (m/min)	80 - 100				60 - 80	
Shoulder milling	ap ≤ 1.5D, ae ≤ 0.1D		ap ≤ 1.5D, ae ≤ 0.05D			
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 3.0	9550	740	9550	570	7430	460
ø 4.0	7170	720	7170	580	5570	450
ø 5.0	5730	690	5730		4460	460
ø 6.0	4780	1160	4780	860	3720	670
ø 8.0	3580	1080	3580		2790	
ø 10.0	2870	1030	2870		2230	660
ø 12.0	2390	1020	2390	850	1860	670
ø 16.0	1790	900	1790	690	1390	580
ø 20.0	1430	810	1430	730	1120	530

Note:
Down cut is generally recommended.
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
Above cutting parameter are only suited for standard tools (SEF****F).
For tools with long flutes (SEF****F-L) ap = 3.0D at ae = 100 %, n = 50 % und Vf = 50 %.
Tool overhang should be as small as possible. Number of revolutions and feed rate should be reduced to minimise vibrations.

SBD2000FN / SBD2000FN-LS / SBD2000FN-NL

- Steels
- Stainless steels
- Cast irons
- Heat resistant alloys
- Hardened steels

- 15° helix angle (ø1.0 - ø3.0)
- 30° helix angle (ø4.0 - ø20.0)
- 2 flute
- Copy milling / 3D - milling

Fig. 1

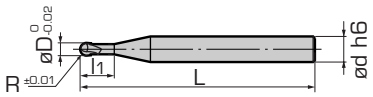


Fig. 2

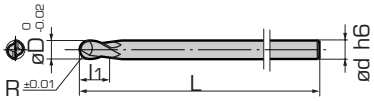


Fig. 3

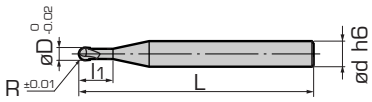


Fig. 4

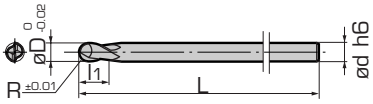


Fig. 5

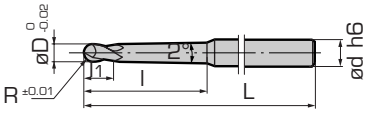
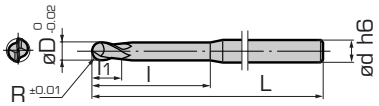


Fig. 6



SBD2000FN (Standard)

● Standard stock in Europe ❍ Standard stock in Japan

Cat. No.	Stock	No. of teeth	Dimensions (mm)					Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)					Fig.
			øD	R	l1	L	ød					øD	R	l1	L	ød	
SBD2010FN	●	2	1.0	0.5	1.5	50	4.0	1	SBD2070FN	●	2	7.0	3.5	11.0	90	8.0	1
SBD2015FN	●		1.5	0.75	2.5				SBD2080FN	●		8.0	4.0	12.0			2
SBD2020FN	●		2.0	1.0	3.0	60	6.0		SBD2100FN	●		10.0	5.0	15.0	100	10.0	
SBD2030FN	●		3.0	1.5	4.5				SBD2120FN	●		12.0	6.0	18.0	120	12.0	
SBD2040FN	●		4.0	2.0	6.0	70			SBD2160FN	●		16.0	8.0	24.0	125	16.0	
SBD2050FN	●		5.0	2.5	7.5	90			SBD2200FN	●		20.0	10.0	30.0	155	20.0	
SBD2060FN	●		6.0	3.0	9.0			2									

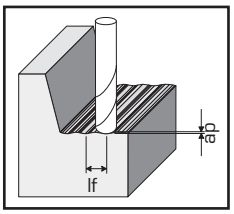
SBD2000FN-LS (Long type)

Cat. No.	Stock	No. of teeth	Dimensions (mm)					Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)					Fig.
			øD	R	l1	L	ød					øD	R	l1	L	ød	
SBD2010FN-LS	●	2	1.0	0.5	1.5	80	4.0	3	SBD2070FN-LS	●	2	7.0	3.5	11.0	180	8.0	3
SBD2015FN-LS	●		1.5	0.75	2.5				SBD2080FN-LS	●		8.0	4.0	12.0			4
SBD2020FN-LS	●		2.0	1.0	3.0	90	6.0		SBD2100FN-LS	●		10.0	5.0	15.0	200	10.0	
SBD2030FN-LS	●		3.0	1.5	4.5	100			SBD2120FN-LS	●		12.0	6.0	18.0	220	12.0	
SBD2040FN-LS	●		4.0	2.0	6.0				SBD2160FN-LS	●		16.0	8.0	24.0	250	16.0	
SBD2050FN-LS	●		5.0	2.5	7.5	125			SBD2200FN-LS	●		20.0	10.0	30.0	280	20.0	
SBD2060FN-LS	●		6.0	3.0	9.0	150		4									

SBD2000FN-NL (Long taper neck type)

Cat. No.	Stock	No. of teeth	Dimensions (mm)						Fig.	Cat. No.	Stock	No. of teeth	Dimensions (mm)						Fig.
			øD	R	l1	l	L	ød					øD	R	l1	l	L	ød	
SBD2030FN-NL	●	2	3.0	1.5	4.5	35.0	100	6.0	5	SBD2070FN-NL	●	2	7.0	3.5	11.0	45.0	125	10.0	5
SBD2040FN-NL	●		4.0	2.0	6.0					SBD2080FN-NL	●		8.0	4.0	12.0	55.0			
SBD2050FN-NL	●		5.0	2.5	7.5	40.0	115	8.0		SBD2100FN-NL	●		10.0	5.0	15.0	65.0	140	12.0	6
SBD2060FN-NL	●		6.0	3.0	9.0	45.0				SBD2120FN-NL	●		12.0	6.0	18.0	75.0	150	16.0	5

Cutting parameter



SBD2000FN

Copy milling (Roughing)

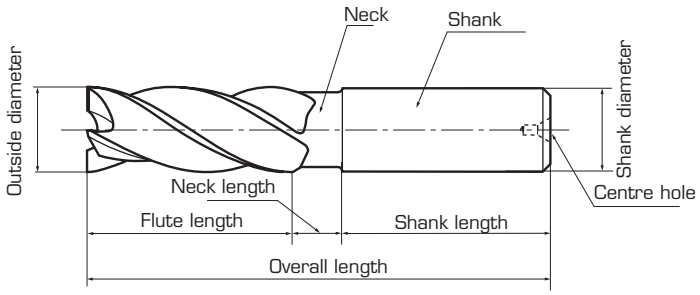
Work materials	Carbon steels / Cast irons		Alloy steels / Tool steels / Prehardened steels		Stainless steels		Hardened steels		Hardened steels		Heat resistant alloys (e.g. Inconel, Hastelloy)	
Hardness	≤ 30HRC		≤ 40HRC		-		45 - 55HRC		55 - 70HRC		≤ 45HRC	
Vc (m/min)	200 - 240		150 - 200				130 - 180		100 - 150		60 - 100	
Copy milling	ap ≤ 0.1D, lf ≤ 0.3D											
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	50000	4270	50000	2840	50000	2840	49360	2270	39810	1530	25480	520
ø 2.0	35030	2120	27870	1680	27870	1680	24680	1470	19900	1200	12740	400
ø 3.0	23360	1900	18580	1510	18580	1510	16450	1310	13270	1080	8490	350
ø 4.0	17520	1760	13930	1420	13930	1420	12340	1230	9950	1000	6370	340
ø 5.0	14010	1710	11150	1330	11150	1330	9870	1200	7960	920	5100	320
ø 6.0	11680	1670	9290	1270	9290	1270	8230	1110	6640	930	4250	300
ø 8.0	8760	1430	6970	1130	6970	1130	6170	980	4980	810	3190	260
ø 10.0	7010	1260	5570	990	5570	990	4940	900	3980	700	2550	240
ø 12.0	5840	1150	4640	910	4640	910	4110	830	3320	660	2120	220
ø 16.0	4380	960	3480	780	3480	780	3090	710	2490	560	1590	180
ø 20.0	3500	780	2790	630	2790	630	2470	550	1990	460	1270	140

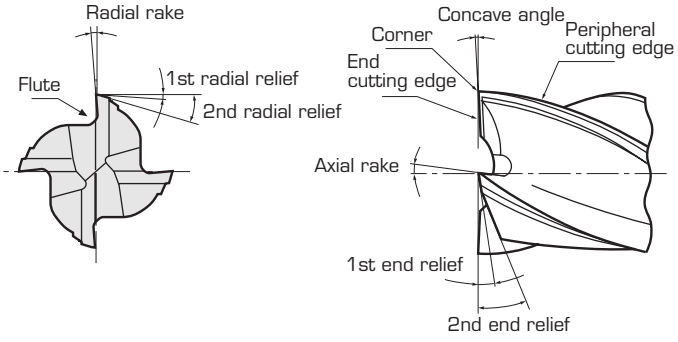
Copy milling (Finishing)

Work materials	Carbon steels / Cast irons		Alloy steels / Tool steels / Prehardened steels		Stainless steels		Hardened steels		Hardened steels		Heat resistant alloys (e.g. Inconel, Hastelloy)	
Hardness	≤ 30HRC		≤ 40HRC		-		45 - 55HRC		55 - 70HRC		≤ 45HRC	
Vc (m/min)	150 - 200		130 - 180				100 - 150		80 - 120		50 - 90	
Copy milling	ap ≤ 0.05D, lf ≤ 0.05D											
Conditions / D	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)	No. of revolutions n (rpm)	Feed rate Vf (mm/min)
ø 1.0	50000	2040	50000	1660	50000	1660	47770	1150	38220	970	28660	350
ø 2.0	31850	1300	28660	1140	28660	1140	23890	970	19110	760	14330	300
ø 3.0	21230	1180	19110	1050	19110	1050	15920	900	12740	690	9550	270
ø 4.0	15920	1120	14330	1010	14330	1010	11940	850	9550	650	7170	250
ø 5.0	12740	1000	11470	920	11470	920	9550	740	7640	620	5730	230
ø 6.0	10620	940	9550	840	9550	840	7960	720	6370	600	4780	210
ø 8.0	7960	900	7170	790	7170	790	5970	670	4780	550	3580	200
ø 10.0	6370	830	5730	750	5730	750	4780	600	3820	500	2870	180
ø 12.0	5310	770	4780	710	4780	710	3980	600	3190	500	2390	180
ø 16.0	3980	670	3580	620	3580	620	2990	550	2390	420	1790	150
ø 20.0	3190	550	2870	490	2870	490	2390	420	1910	320	1430	120

Note:
For easy chip flow, air-cooling rev. minimal quantity lubrication is recommended.
Above cutting parameter are only suited for standard tools (SBD****FN).
For tools with long flutes (SBD****FN-**) ap = 100 % at ae = 100 %, n = 50 % and Vf = 50 %.
When machining stainless steels and heat resistant alloys coolant (water soluble or water insoluble) should be used.
Tool overhang should be as small as possible. Number of revolutions and feed rate should be reduced to minimise vibrations.

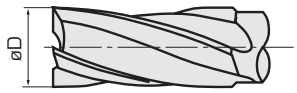
Part details



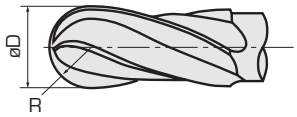


Types

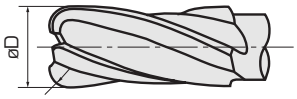
Square



Ball nose



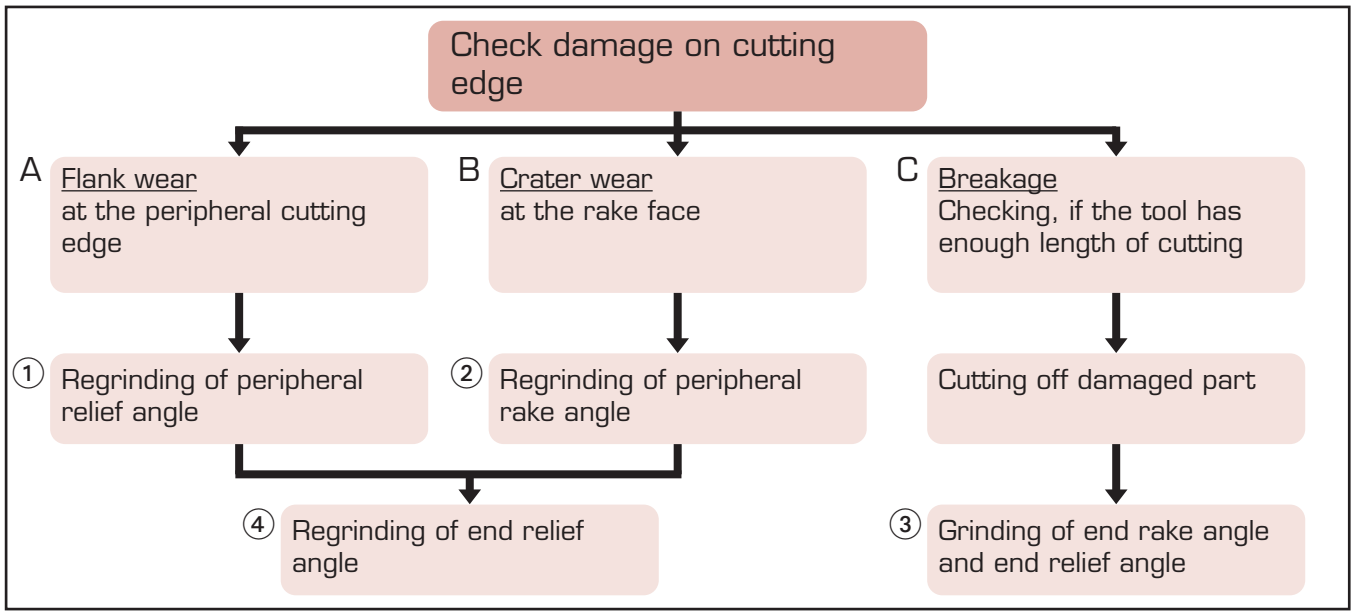
Radius



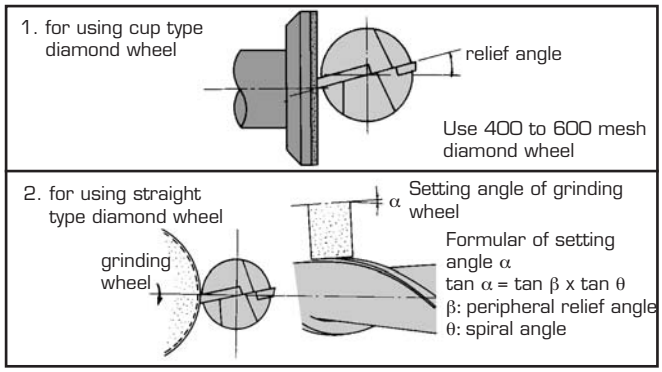
Taper

Ball nose with taper

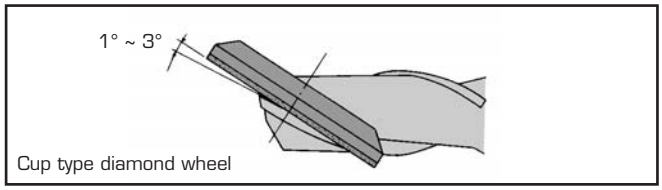
Regrinding procedures of solid carbide endmill



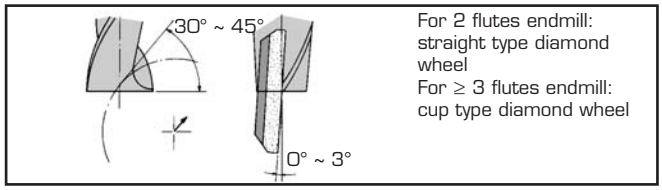
① Regrinding of peripheral relief angle



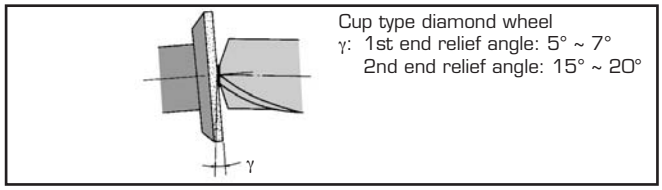
② Regrinding of peripheral rake angle



③ Regrinding of end rake angle (End gash)



④ Regrinding of end relief angle



Notice of regrinding

(1) If, after checking the damage of the cutting edge, the damage is as case "A" or "B" of the flow chart, the tool must be reground.
Too much damage of the cutting edge requires too big stock removal and thus reduces tool life.

(2) Please use diamond grinding wheel.

(3) Peripheral relief angle must be ground between 18° and 10°.
Relief angle of small diameter and for aluminium machining endmill must be big degree.

(4) First check if "C" in flow chart can be adapted for the case of coated endmill or not.
If procedure "C" can be adapted for regrinding, tool life after the grinding would be more improved than new one. The reason is still remaining of coated layer of cutting edge and shorter tool length will keep much higher rigidity of the tool than before regrinding.

(5) Please check run out of peripheral cutting edge, face cutting edge, with Vee block after regrinding.
The value of the run out must be controlled within 0.01 mm.

Notice for regrinding of ball nose endmill

- Regrinding of relief angle only is available. The dimension of nose radius will be smaller after grinding.
- Honing of cutting edge is necessary after regrinding.

MEMO

MEMO

MEMO

MEMO

Drilling Tools

10 11

List of Drilling Tools - Part 1 - For steels

Opera-tion	Tool name	Type	Appearance	Work materials: Carbon steels	Alloy steels	Mild steels	Stainless steels	L/D	Drill diameter range (mm)
General drilling	Spiral jet drills for steels	DSX		●	●	●	○	3,5,8	ø 3.0 – ø 20
	TAC drills	TDX		●	●	●	●	2,3 4,5	ø 12.5 – ø 54

0.4 1.0 2.0 3.0 5.0 10 15 20 30 50 100

● best suitable ○ usable

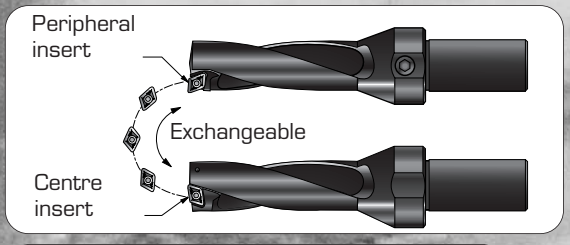
TDX highest productivity, maximum performance

Advantages/Applications

Wide product range
- 2, 3, 4 and 5xd for different bore hole depths
- 4 different high performance cutting grades
- 3 different chipbreaker geometries
- Wiper - technology
- Inserts with 4 cutting edges
- Suited for minimum quantity lubricating
- Eccentric sleeve

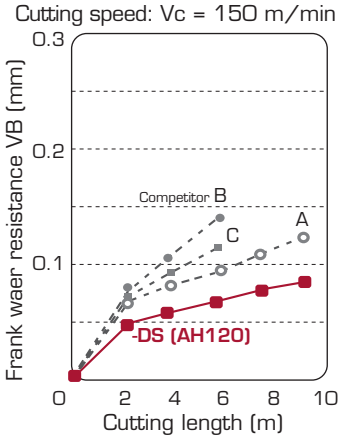
Low vibration and low noise drilling of most different cutting materials

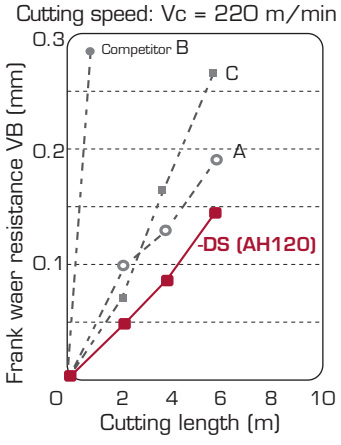
High cutting parameter, reduced machining time



Specially designed chip pocket helps effectively to remove chips produced by the centre cutting edge

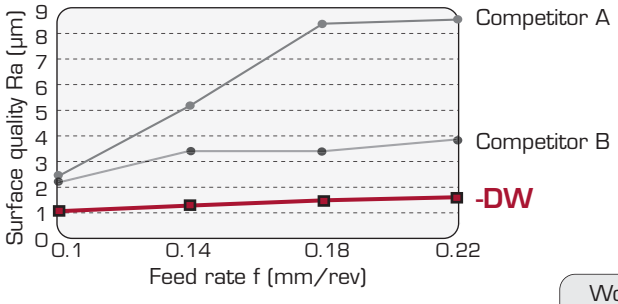
Comparison of tool life





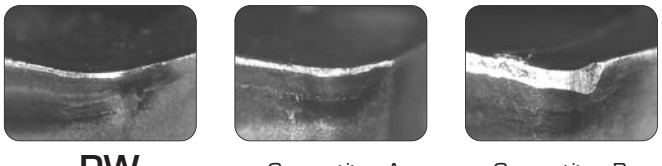
Work material:	Stainless steel (X5CrNi189)
Drill:	TDX ø19, L/D = 3
Insert:	-DS AH120
Machine:	Machining centre
Feed rate:	f = 0.08 mm/rev
Drilling depth:	25 mm (Counter hole)
Coolant:	Emulsion

Surface quality



Comparison of wear

Feed rate: f = 0.2 mm/rev Cutting length: 5.2 m



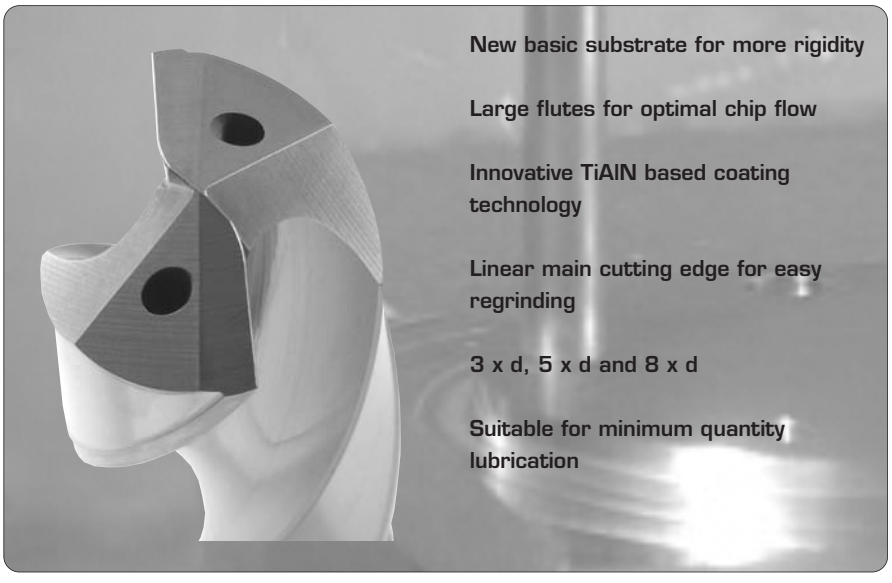
-DW | Competitor A | Competitor B

Work material:	Ck55	Machine:	Machining centre
Drill:	TDX ø22, L/D = 2	Coolant:	Emulsion
Cutting speed: Vc = 100 m/min			

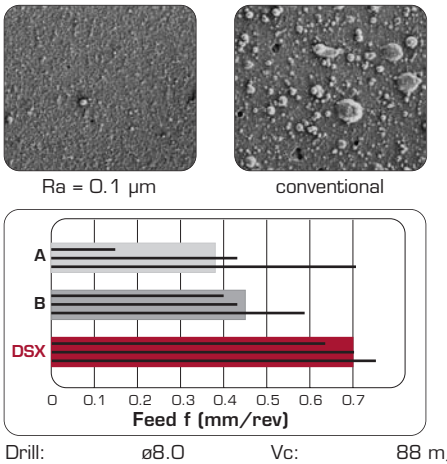
Type	Type of coolant supply	IT class	Attainable surface roughness (Rmax)	Features	Page
DSX	Internal	9 ~ 10	6.3 ~ 25	• Coated solid drills with spiral oil holes. • Excels in high-speed deep-hole drilling.	416
TDX	Internal	11 ~	12 ~	• Indexable-insert drills. • Four-corner insert design for economical drilling. • Excellent chip evacuation.	419

DSX Solid carbide drill

Highest precision in detail for process stable applications

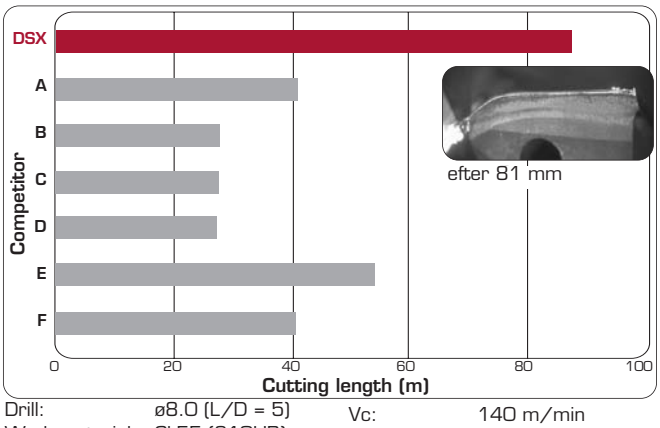


New “Flash coat” technology



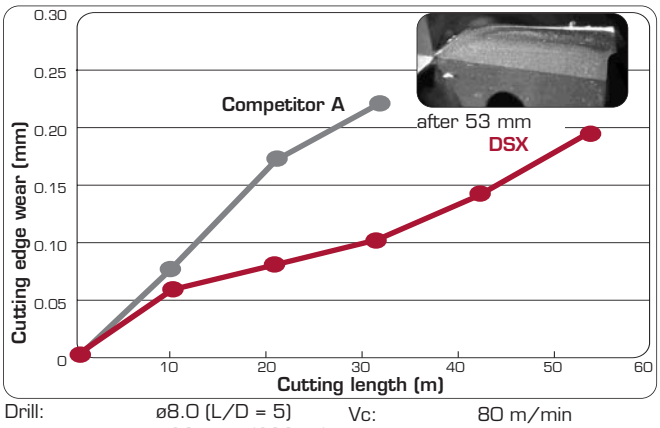
Drill:	ø8.0	Vc:	88 m/min
Work material:	Ck45 (235HB)	Drilling depth:	40 mm
Machine:	Horizontal machining centre	Coolant:	Emulsion

Tool life



Drill:	ø8.0 (L/D = 5)	Vc:	140 m/min
Work material:	Ck55 (210HB)	f:	0.3 mm/rev
Machine:	Vertical machining centre	Drilling depth:	40 mm
		Coolant:	Emulsion (20 bar)

Wear



Drill:	ø8.0 (L/D = 5)	Vc:	80 m/min
Work material:	42CrMo4 (230HB)	f:	0.2 mm/rev
Machine:	Vertical machining centre	Drilling depth:	40 mm
		Coolant:	Emulsion (20 bar)

Drilling Tool Selection Guide

■ For drilling steels

● Low to medium carbon steels (USt42-2, Ck45 ~ Ck55), alloy steels (15CrMo5 ~ 42CrMo4)

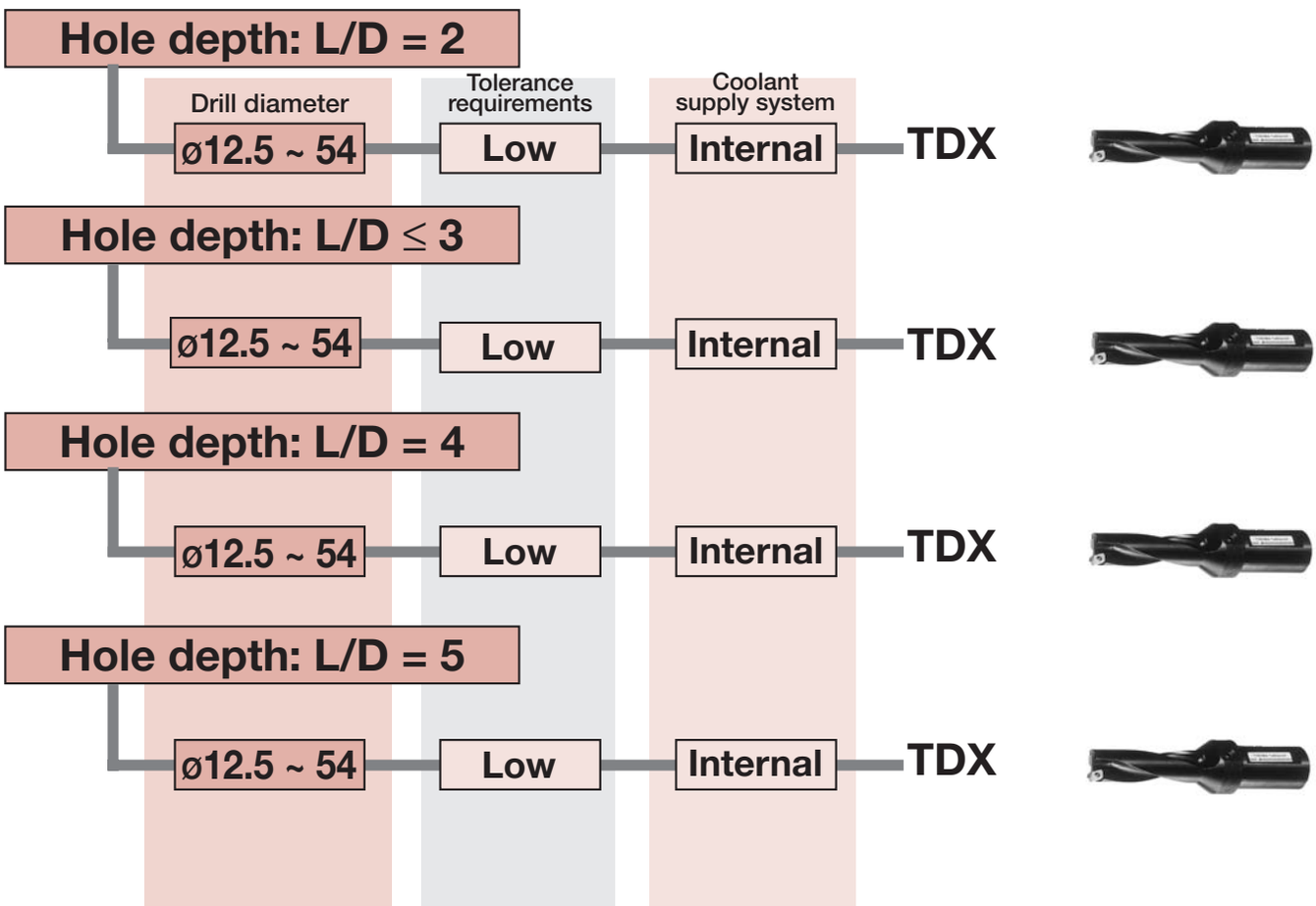
	Drill diameter	Tolerance requirements	Coolant supply system		
Hole depth: L/D = 2					
	ø12.5 ~ 54	Low	Internal	TDX	
Hole depth: L/D = 3					
	ø3 ~ 20	IT: 9 ~ 10	Internal	DSX	
	ø12.5 ~ 54	Low	Internal	TDX	
Hole depth: L/D = 4					
	ø12.5 ~ 54	Low	Internal	TDX	
Hole depth: L/D = 5					
	ø12.5 ~ 54	Low	Internal	TDX	
	ø3 ~ 20	IT: 9 ~ 10	Internal	DSX	
Hole depth: L/D = 8					
	ø3 ~ 20	IT: 9 ~ 10	Internal	DSX	

No. of revolutions n (rpm) = Cutting speed Vc (m/min) x 1000 ÷ 3.14 ÷ Drill ø (mm)
Table feed Vf (mm/min) = n (rpm) x Feed f (mm/rev)

Drilling Tool Selection Guide

■ For drilling cast irons and light alloys

● Grey cast irons (GG20 ~ GG35), ductile cast irons (GGG40 ~ GGG60), aluminium alloys



Drilling Tool Selection Guide

■ For drilling difficult-to-cut materials

- Hard materials: Hardened steels (X40CrMoV5-1), high-manganese steels, etc.
- Heat resisting alloys: Inconel 718 etc.
- Titanium alloys: Ti-6Al-4V etc.

Hole depth: L/D = 3, 5, 8

Drill diameter	Tolerance requirements	Coolant supply system	
ø3 ~ 20	IT: 9 ~ 10	Internal	DSX

■ Thread sizes and applicable drill diameter for pre-drilling before tapping

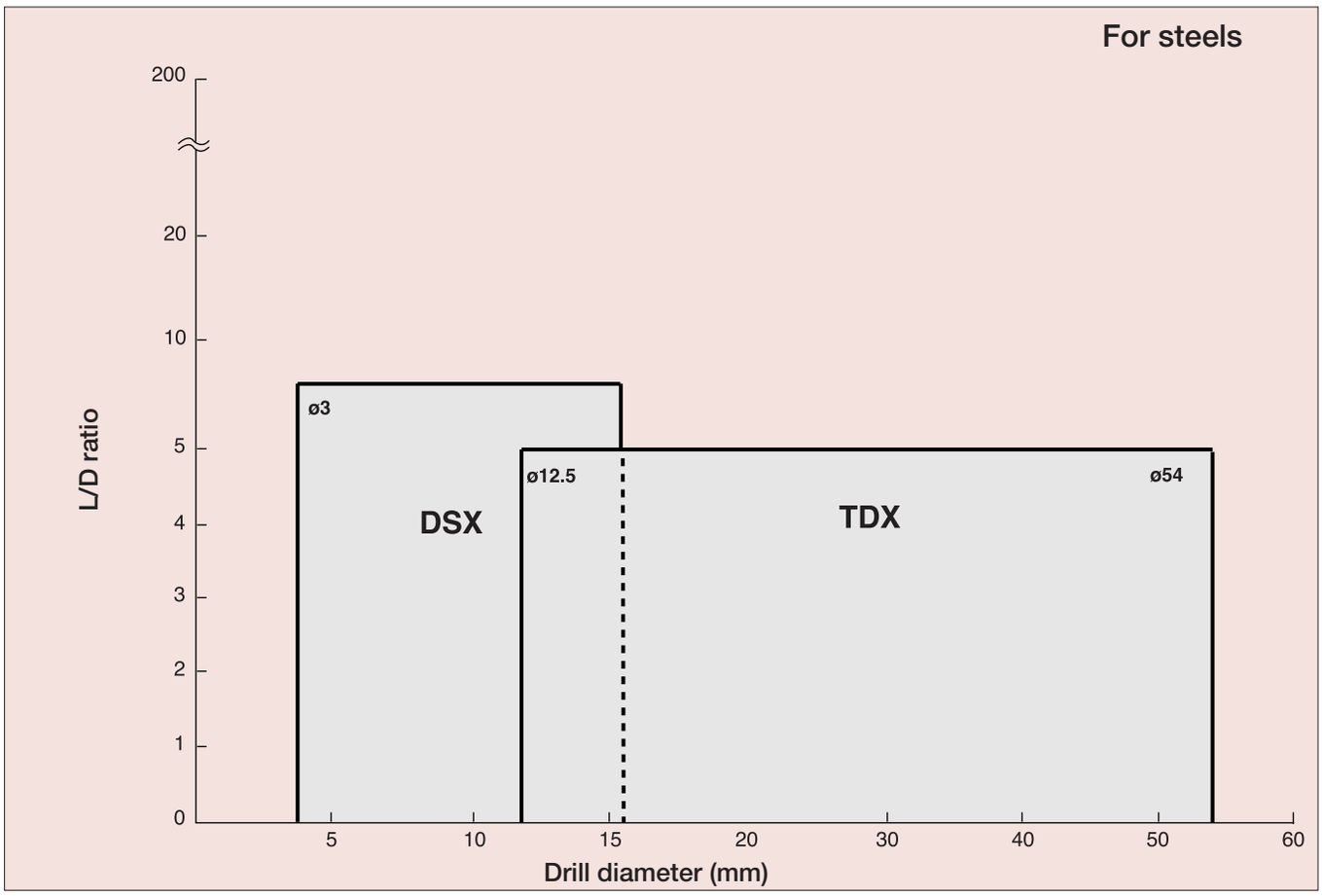
When using Spiral-Jet drills for pre-drilling of tapping holes, refer to the following table to select proper drill diameter.

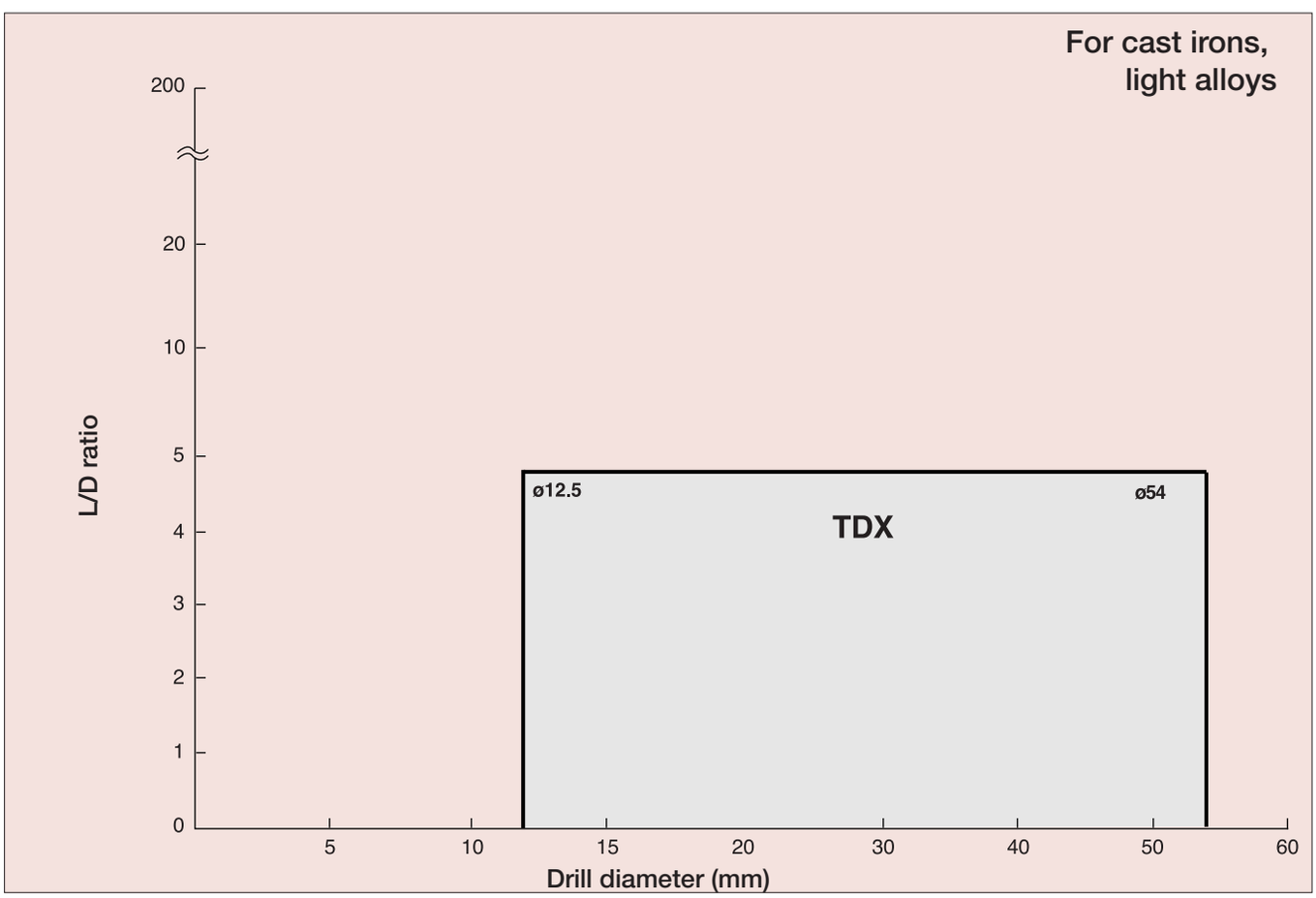
Metric coarse thread				
Nominal thread size	Inner diameter of second class thread (mm)		Applicable drill diameter for DSX types øD (mm)	Applicable drill diameter for HSS drills (mm)
	max.	min.		
M3×0.5	2.599	2.459	—	2.40
M3.5×0.6	3.010	2.850	—	2.80
M4×0.7	3.422	3.242	3.40	3.30
M4.5×0.75	3.878	3.688	3.80	3.70
M5×0.8	4.334	4.134	4.30	4.20
M6×1	5.153	4.917	5.10	5.00
M7×1	6.153	5.917	6.10	6.00
M8×1.25	6.912	6.647	6.80	6.70
M9×1.25	7.912	7.647	7.80	7.70

Metric coarse thread				
Nominal thread size	Inner diameter of second class thread (mm)		Applicable drill diameter for DSX types øD (mm)	Applicable drill diameter for HSS drills (mm)
	max.	min.		
M10×1.5	8.676	8.376	8.60	8.50
M11×1.5	9.676	9.376	9.60	9.50
M12×1.75	10.441	10.106	10.40	10.30
M14×2	12.210	11.835	12.10	12.00
M16×2	14.210	13.835	14.10	14.00
M18×2.5	15.744	15.294	15.50	15.40
M20×2.5	17.744	17.294	17.50	17.40
M22×2.5	19.744	19.294	19.50	19.40
M24×3	21.252	20.752	—	21.00

No. of revolutions n (rpm) = Cutting speed Vc (m/min) x 1000 ÷ 3.14 ÷ Drill ø (mm)
Table feed Vf (mm/min) = n (rpm) x Feed f (mm/rev)

Application Ranges of Drilling Tools



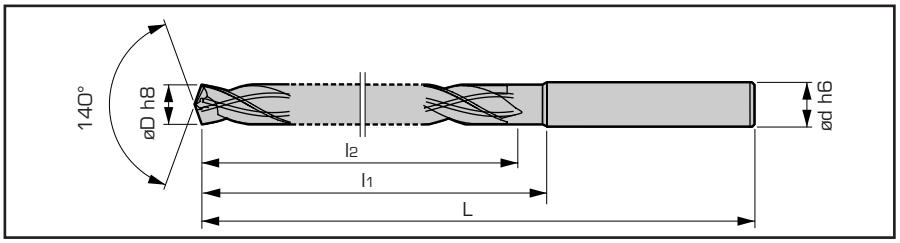


DSX — Giga Jet Drill

Specifications
Solid carbide, coated drills with spiral oil holes

● Standard stock in Europe
❍ Standard stock in Japan

Specification



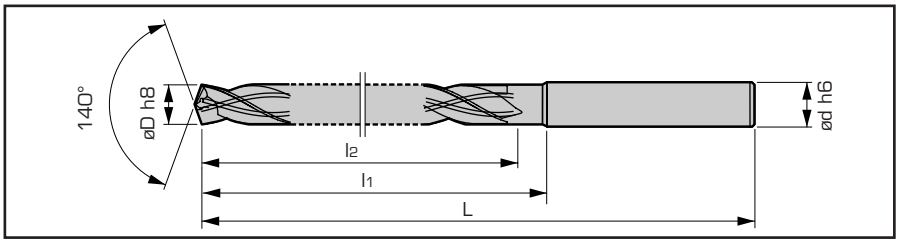
L/D = 3

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
3.0	DSX0300F03	●	3.0	68	20	15
3.1	DSX0310F03	●	4.0	71	23	18
3.2	DSX0320F03	●				
3.3	DSX0330F03	●				
3.4	DSX0340F03	●				
3.5	DSX0350F03	●				
3.6	DSX0360F03	●	4.0	73	25	20
3.7	DSX0370F03	●				
3.8	DSX0380F03	●				
3.9	DSX0390F03	●				
4.0	DSX0400F03	●				
4.1	DSX0410F03	●	5.0	78	28	23
4.2	DSX0420F03	●				
4.3	DSX0430F03	●				
4.4	DSX0440F03	●				
4.5	DSX0450F03	●				
4.6	DSX0460F03	●	5.0	80	30	25
4.7	DSX0470F03	●				
4.8	DSX0480F03	●				
4.9	DSX0490F03	●				
5.0	DSX0500F03	●				
5.1	DSX0510F03	●	6.0	82	30	28
5.2	DSX0520F03	●				
5.3	DSX0530F03	●				
5.4	DSX0540F03	●				
5.5	DSX0550F03	●				
5.6	DSX0560F03	●	6.0	82	30	30
5.7	DSX0570F03	●				
5.8	DSX0580F03	●				
5.9	DSX0590F03	●				
6.0	DSX0600F03	●				
6.1	DSX0610F03	●	7.0	86	33	33
6.2	DSX0620F03	●				
6.3	DSX0630F03	●				
6.4	DSX0640F03	●				
6.5	DSX0650F03	●				
6.6	DSX0660F03	●	7.0	88	35	35
6.7	DSX0670F03	●				
6.8	DSX0680F03	●				
6.9	DSX0690F03	●				
7.0	DSX0700F03	●				
7.1	DSX0710F03	●	8.0	92	38	38
7.2	DSX0720F03	●				
7.3	DSX0730F03	●				
7.4	DSX0740F03	●				
7.5	DSX0750F03	●				
7.6	DSX0760F03	●	8.0	94	40	40

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
7.7	DSX0770F03	●	8.0	94	40	40
7.8	DSX0780F03	●				
7.9	DSX0790F03	●				
8.0	DSX0800F03	●				
8.1	DSX0810F03	●	9.0	100	45	43
8.2	DSX0820F03	●				
8.3	DSX0830F03	●				
8.4	DSX0840F03	●				
8.5	DSX0850F03	●				
8.6	DSX0860F03	●	9.0	100	45	45
8.7	DSX0870F03	●				
8.8	DSX0880F03	●				
8.9	DSX0890F03	●				
9.0	DSX0900F03	●				
9.1	DSX0910F03	●	10.0	106	50	48
9.2	DSX0920F03	●				
9.3	DSX0930F03	●				
9.4	DSX0940F03	●				
9.5	DSX0950F03	●				
9.6	DSX0960F03	●	10.0	106	50	50
9.7	DSX0970F03	●				
9.8	DSX0980F03	●				
9.9	DSX0990F03	●				
10.0	DSX1000F03	●				
10.1	DSX1010F03	●	11.0	116	55	53
10.2	DSX1020F03	●				
10.3	DSX1030F03	●				
10.4	DSX1040F03	●				
10.5	DSX1050F03	●				
10.6	DSX1060F03	●	11.0	116	55	55
10.7	DSX1070F03	●				
10.8	DSX1080F03	●				
10.9	DSX1090F03	●				
11.0	DSX1100F03	●				
11.1	DSX1110F03	●	12.0	122	60	58
11.2	DSX1120F03	●				
11.3	DSX1130F03	●				
11.4	DSX1140F03	●				
11.5	DSX1150F03	●				
11.6	DSX1160F03	●	12.0	122	60	60
11.7	DSX1170F03	●				
11.8	DSX1180F03	●				
11.9	DSX1190F03	●				
12.0	DSX1200F03	●				
12.1	DSX1210F03	●	13.0	128	65	65
12.2	DSX1220F03	●				
12.3	DSX1230F03	●				

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
12.4	DSX1240F03	●	13.0	128	65	65
12.5	DSX1250F03	●				
12.6	DSX1260F03	●				
12.7	DSX1270F03	●				
12.8	DSX1280F03	●				
12.9	DSX1290F03	●				
13.0	DSX1300F03	●				
13.1	DSX1310F03	●	14.0	134	70	70
13.2	DSX1320F03	●				
13.3	DSX1330F03	●				
13.4	DSX1340F03	●				
13.5	DSX1350F03	●				
13.6	DSX1360F03	●				
13.7	DSX1370F03	●				
13.8	DSX1380F03	●				
13.9	DSX1390F03	●				
14.0	DSX1400F03	●				
14.1	DSX1410F03	●	15.0	140	75	75
14.2	DSX1420F03	●				
14.3	DSX1430F03	●				
14.4	DSX1440F03	●				
14.5	DSX1450F03	●				
14.6	DSX1460F03	●				
14.7	DSX1470F03	●				
14.8	DSX1480F03	●				
14.9	DSX1490F03	●				
15.0	DSX1500F03	●				
15.1	DSX1510F03	●	16.0	146	80	80
15.2	DSX1520F03	●				
15.3	DSX1530F03	●				
15.4	DSX1540F03	●				
15.5	DSX1550F03	●				
15.6	DSX1560F03	●				
15.7	DSX1570F03	●				
15.8	DSX1580F03	●				
15.9	DSX1590F03	●				
16.0	DSX1600F03	●				
16.5	DSX1650F03	●	17.0	152	85	85
17.0	DSX1700F03	●				
17.5	DSX1750F03	●	18.0	158	90	90
18.0	DSX1800F03	●				
18.5	DSX1850F03	●	19.0	164	95	95
19.0	DSX1900F03	●				
19.5	DSX1950F03	●	20.0	170	100	100
20.0	DSX2000F03	●				

● Standard stock in Europe
❍ Standard stock in Japan



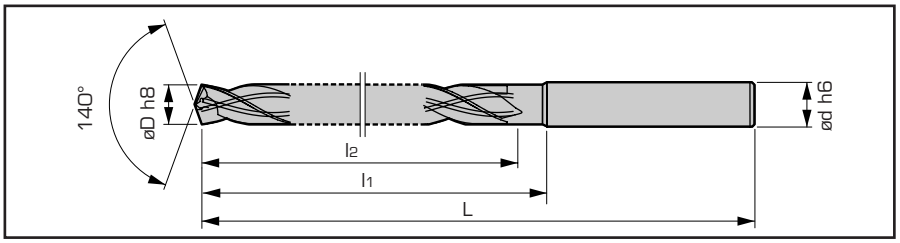
L/D = 5

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
3.0	DSX0300F05	●	3.0	77	29	24
3.1	DSX0310F05	●	4.0	81	33	28
3.2	DSX0320F05	●				
3.3	DSX0330F05	●				
3.4	DSX0340F05	●				
3.5	DSX0350F05	●				
3.6	DSX0360F05	●	4.0	85	37	32
3.7	DSX0370F05	●				
3.8	DSX0380F05	●				
3.9	DSX0390F05	●				
4.0	DSX0400F05	●				
4.1	DSX0410F05	●	5.0	91	41	36
4.2	DSX0420F05	●				
4.3	DSX0430F05	●				
4.4	DSX0440F05	●				
4.5	DSX0450F05	●				
4.6	DSX0460F05	●	5.0	94	44	40
4.7	DSX0470F05	●				
4.8	DSX0480F05	●				
4.9	DSX0490F05	●				
5.0	DSX0500F05	●				
5.1	DSX0510F05	●	6.0	96	44	44
5.2	DSX0520F05	●				
5.3	DSX0530F05	●				
5.4	DSX0540F05	●				
5.5	DSX0550F05	●				
5.6	DSX0560F05	●	6.0	100	48	48
5.7	DSX0570F05	●				
5.8	DSX0580F05	●				
5.9	DSX0590F05	●				
6.0	DSX0600F05	●				
6.1	DSX0610F05	●	7.0	105	52	52
6.2	DSX0620F05	●				
6.3	DSX0630F05	●				
6.4	DSX0640F05	●				
6.5	DSX0650F05	●				
6.6	DSX0660F05	●	7.0	109	56	56
6.7	DSX0670F05	●				
6.8	DSX0680F05	●				
6.9	DSX0690F05	●				
7.0	DSX0700F05	●				
7.1	DSX0710F05	●	8.0	114	60	60
7.2	DSX0720F05	●				
7.3	DSX0730F05	●				
7.4	DSX0740F05	●				
7.5	DSX0750F05	●				
7.6	DSX0760F05	●	8.0	118	64	64

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
7.7	DSX0770F05	●	8.0	118	64	64
7.8	DSX0780F05	●				
7.9	DSX0790F05	●				
8.0	DSX0800F05	●				
8.1	DSX0810F05	●	9.0	127	72	68
8.2	DSX0820F05	●				
8.3	DSX0830F05	●				
8.4	DSX0840F05	●				
8.5	DSX0850F05	●				
8.6	DSX0860F05	●	9.0	127	72	72
8.7	DSX0870F05	●				
8.8	DSX0880F05	●				
8.9	DSX0890F05	●				
9.0	DSX0900F05	●				
9.1	DSX0910F05	●	10.0	136	80	76
9.2	DSX0920F05	●				
9.3	DSX0930F05	●				
9.4	DSX0940F05	●				
9.5	DSX0950F05	●				
9.6	DSX0960F05	●	10.0	136	80	80
9.7	DSX0970F05	●				
9.8	DSX0980F05	●				
9.9	DSX0990F05	●				
10.0	DSX1000F05	●				
10.1	DSX1010F05	●	11.0	149	88	84
10.2	DSX1020F05	●				
10.3	DSX1030F05	●				
10.4	DSX1040F05	●				
10.5	DSX1050F05	●				
10.6	DSX1060F05	●	11.0	149	88	88
10.7	DSX1070F05	●				
10.8	DSX1080F05	●				
10.9	DSX1090F05	●				
11.0	DSX1100F05	●				
11.1	DSX1110F05	●	12.0	158	96	92
11.2	DSX1120F05	●				
11.3	DSX1130F05	●				
11.4	DSX1140F05	●				
11.5	DSX1150F05	●				
11.6	DSX1160F05	●	12.0	158	96	96
11.7	DSX1170F05	●				
11.8	DSX1180F05	●				
11.9	DSX1190F05	●				
12.0	DSX1200F05	●				
12.1	DSX1210F05	●	13.0	167	104	104
12.2	DSX1220F05	●				
12.3	DSX1230F05	●				

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
12.4	DSX1240F05	●	13.0	167	104	104
12.5	DSX1250F05	●				
12.6	DSX1260F05	●				
12.7	DSX1270F05	●				
12.8	DSX1280F05	●				
12.9	DSX1290F05	●				
13.0	DSX1300F05	●				
13.1	DSX1310F05	●	14.0	176	112	112
13.2	DSX1320F05	●				
13.3	DSX1330F05	●				
13.4	DSX1340F05	●				
13.5	DSX1350F05	●				
13.6	DSX1360F05	●				
13.7	DSX1370F05	●				
13.8	DSX1380F05	●				
13.9	DSX1390F05	●				
14.0	DSX1400F05	●				
14.1	DSX1410F05	●	15.0	185	120	120
14.2	DSX1420F05	●				
14.3	DSX1430F05	●				
14.4	DSX1440F05	●				
14.5	DSX1450F05	●				
14.6	DSX1460F05	●				
14.7	DSX1470F05	●				
14.8	DSX1480F05	●				
14.9	DSX1490F05	●				
15.0	DSX1500F05	●				
15.1	DSX1510F05	●	16.0	194	128	128
15.2	DSX1520F05	●				
15.3	DSX1530F05	●				
15.4	DSX1540F05	●				
15.5	DSX1550F05	●				
15.6	DSX1560F05	●				
15.7	DSX1570F05	●				
15.8	DSX1580F05	●				
15.9	DSX1590F05	●				
16.0	DSX1600F05	●				
16.5	DSX1650F05	●	17.0	203	136	136
17.0	DSX1700F05	●				
17.5	DSX1750F05	●	18.0	212	144	144
18.0	DSX1800F05	●				
18.5	DSX1850F05	●	19.0	221	152	152
19.0	DSX1900F05	●				
19.5	DSX1950F05	●	20.0	230	160	160
20.0	DSX2000F05	●				

● Standard stock in Europe
❍ Standard stock in Japan



L/D = 8

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
3.0	DSX0300F08	❍	3.0	86	38	33
3.5	DSX0350F08	❍	4.0	92	44	39
4.0	DSX0400F08	❍	4.0	97	49	44
4.5	DSX0450F08	❍	5.0	105	55	50
5.0	DSX0500F08	❍	5.0	110	60	55
5.5	DSX0550F08	❍	6.0	113	61	61
6.0	DSX0600F08	❍	6.0	118	66	66
6.5	DSX0650F08	❍	7.0	125	72	72
7.0	DSX0700F08	❍	7.0	130	77	77

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
7.5	DSX0750F08	❍	8.0	137	83	83
8.0	DSX0800F08	❍	8.0	142	88	88
8.5	DSX0850F08	❍	9.0	154	99	94
9.0	DSX0900F08	❍	9.0	154	99	99
9.5	DSX0950F08	❍	10.0	166	110	105
10.0	DSX1000F08	❍	10.0	166	110	110
10.5	DSX1050F08	❍	11.0	182	121	116
11.0	DSX1100F08	❍	11.0	182	121	121
11.5	DSX1150F08	❍	12.0	194	132	127

Drill øD	Cat. No.	Stock	Dimensions (mm)			
			ød	L	l1	l2
12.0	DSX1200F08	❍	12.0	194	132	132
12.5	DSX1250F08	❍	13.0	206	143	143
13.0	DSX1300F08	❍				
13.5	DSX1350F08	❍	14.0	218	154	154
14.0	DSX1400F08	❍				
14.5	DSX1450F08	❍	15.0	230	165	165
15.0	DSX1500F08	❍				
15.5	DSX1550F08	❍	16.0	242	176	176
16.0	DSX1600F08	❍				

Cutting conditions

Work material	Cutting speed Vc (m/min)				Feed f (mm/rev)			
	ø3.0 - ø6.0	ø6.0 - ø10.0	ø10.0 - ø16.0	ø16.0 - ø20.0	ø3.0 - ø6.0	ø6.0 - ø10.0	ø10.0 - ø16.0	ø16.0 - ø20.0
(P) **Mild steel, Low carbon steel** (< 200HB) USt.42-2, Ck25	70-120-140	80-130-160	90-160-190	90-160-190	0.15-0.20-0.25	0.20-0.30-0.35	0.25-0.30-0.35	0.30-0.40-0.45
(P) **Carbon steel, Alloy steel** (< 300HB) Ck45, 42CrMo4	50-100-130	70-120-160	80-140-170	80-140-170	0.15-0.20-0.25	0.20-0.30-0.35	0.25-0.30-0.35	0.25-0.35-0.40
(M) **Stainless steel** (ferritic-martensitic) X5CrNi18-10	30-60-70	50-80-100	50-90-120	50-100-120	0.10-0.15-0.20	0.10-0.20-0.25	0.15-0.25-0.35	0.15-0.25-0.35
(K) **Grey cast iron** GG25	80-110-140	100-140-160	100-160-180	100-160-180	0.15-0.25-0.35	0.20-0.35-0.40	0.25-0.40-0.45	0.25-0.45-0.50
(K) **Ductile cast iron** GGG70	70-100-140	80-120-150	80-140-170	80-140-170	0.15-0.25-0.35	0.20-0.30-0.40	0.25-0.35-0.45	0.25-0.35-0.45
(N) **Aluminium alloys**	80-130-160	100-160-180	100-170-190	100-180-200	0.15-0.25-0.35	0.20-0.30-0.45	0.25-0.40-0.60	0.35-0.60-0.90
(S) **Titanium alloys** TiAl6V3	25-40-60	30-60-80	30-60-80	30-70-90	0.02-0.05-0.08	0.05-0.10-0.15	0.10-0.15-0.20	0.10-0.15-0.25
(S) **Difficult-to-cut materials** Inconel	10-20-30	10-30-40	10-30-40	20-35-50	0.02-0.04-0.10	0.05-0.10-0.15	0.10-0.15-0.20	0.10-0.15-0.25
(H) **Hardened steel** (< 45HRC)	20-30-50	30-40-60	30-40-60	30-40-60	0.08-0.09-0.10	0.10-0.12-0.15	0.12-0.14-0.20	0.12-0.16-0.20

Regrinding Procedures

■ Regrinding method (applied to DSX)

Before regrinding: Check the cutting edge for damage and wear. If any large fracture is found, remove it with a silicon carbide wheel.

(1) Grinding the flank

DSX type for steels

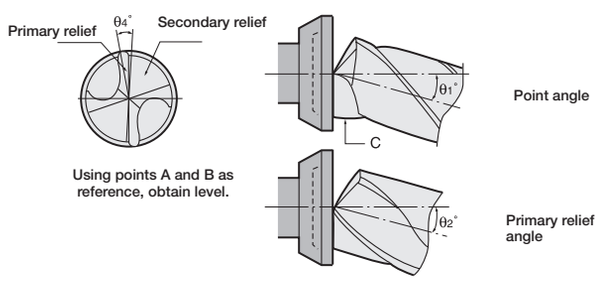


Fig. 1 Grinding relief angle

● Use a 280 to 400 grit diamond cup-type wheel of 100 to 200 mm in diameter.

(1) Grind the relief surface so that primary relief angle of θ2° can be formed as shown in Fig. 1. After grinding the other side likewise, do sparkout grinding so that the difference of the lip heights will be kept within 0.02 mm.

(2) In the case of DSX type for steels: Turn the drill by θ4° and secure it there. Then grind secondary relief surface so that secondary relief angle of θ3° can be formed while taking care to bring the ridge line formed between the primary and secondary relief surfaces to the drill center (values of θ1° to θ4° are shown in Table1).

Table 1

Drill type	θ1 (Point angle)	θ2 (Primary relief angle)	θ3 (Secondary relief angle)	θ4 (Rotating angle)
DSX	-20°	-7° ~ -10°	-24° ~ -26°	5°

(2) Thinning

- Use a 280 to 400 grit diamond straight-type wheel of 100 to 200 mm in diameter.
- Conduct thinning in the same manner as cross thinning (X-type).
- For DSX type drills, take care to leave the part of secondary relief by 0.05 to 0.1 mm as shown in Fig. 2.
- Values of β1 to β3 written in the Figures are given in the Table 2.

Table 2

Drill type	β1	β2	β3	R
DSX (Fig. 2)	140° ~ 145°	38° ~ 42°	108° ~ 112°	–

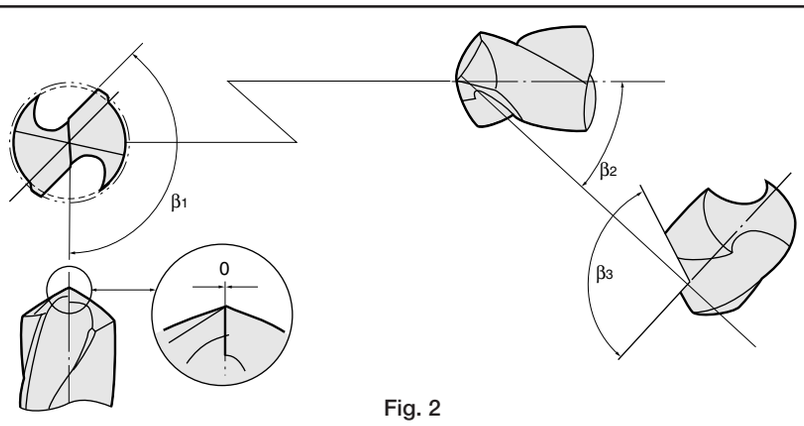


Fig. 2

(3) Honing

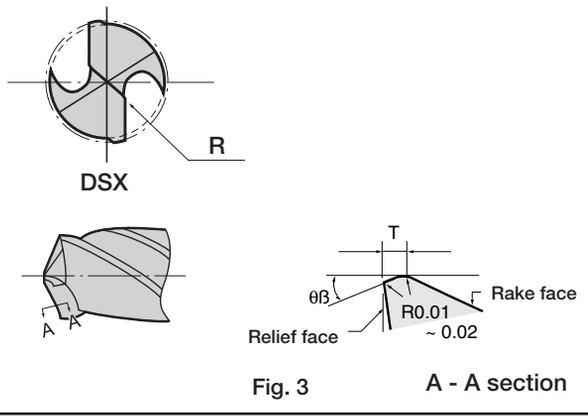


Fig. 3 A - A section

- The honing angle θ and width T should be varied depending on the drill type, diameter and work material. Recommended honing specifications are given in the Table below.
- Honing procedures (refer to Fig. 3)
- Round the R portion shown in Fig. 3 in large.
- Then roughly hone the cutting edge lines by using an electro-deposited diamond file of around 170 grit.
- Carry out finish honing by using a diamond hand stick of 400 to 600 grit.
- For DSX type drills, there is no need to hone the thinned portions.
- The honing width should be changed depending on the drill diameter. For smaller side of diameter, the width should be in smaller side of values given in the Table.

Honing specifications for DSX

Round the R portion in large

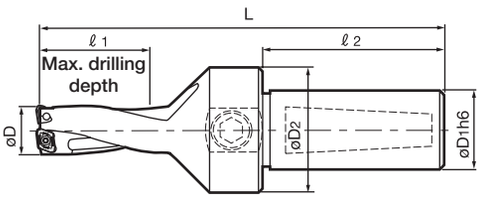
(mm)		~ ø6	ø6 ~ ø12	ø12 ~ ø20
Mild steels	θ °	-25°	-25°	-25°
	T	0.08 ~ 0.12	0.10 ~ 0.15	0.15 ~ 0.20
Hard steels	θ °	-25°	-25°	-25°
	T	0.05 ~ 0.10	0.08 ~ 0.12	0.10 ~ 0.15

After regrinding, check the following before use:

- The difference of the lip heights is kept within 0.02 mm.
- There is no damaged portion on the cutting edges left.
- Cutting edges are properly honed.
- No grinding burrs left.

For General Drilling of Steels, Cast Irons and Aluminium Alloys

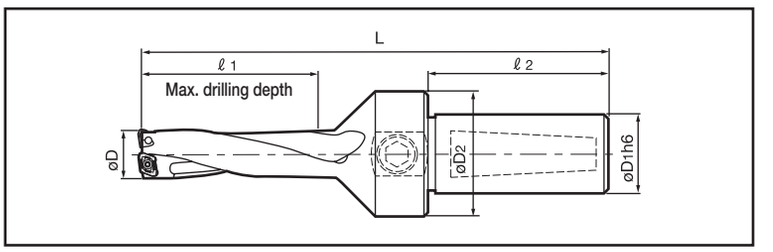
TDX | TAC drills | Specifications: Indexable insert drills with oil hole



■ **For L/D = 2 (Whistle notch type shank)**

Drill øD (mm)	Cat. No.	Stock	Dimensions (mm) øD1	øD2	ℓ1	ℓ2	L	Applicable insert	Max. Offset + (mm)	Clamp screw	Torx wrench	Hex. wrench	Plug screw
12.5	TDX125L025W20-2	●	20	32	25	40	89.5	XPMT040104R-**	0.8	CSTB-2	T-6D	P-5	1/8-28
13.0	TDX130L026W20-2	●			26		91.0		0.7				
13.5	TDX135L027W20-2	●			27		92.5		0.5				
14.0	TDX140L028W20-2	●			28		94.0		0.4				
14.5	TDX145L029W20-2	●			29		95.5		0.3				
15.0	TDX150L030W20-2	●			30		97.0	XPMT050204R-**	0.9	CSTB -2L040			
15.5	TDX155L031W20-2	●			31		98.5		0.8				
16.0	TDX160L032W20-2	●			32		100.0		0.6				
16.5	TDX165L033W20-2	●			33		101.5		0.5				
17.0	TDX170L034W20-2	●			34		103.0		0.4				
17.5	TDX175L035W25-2	●	25	37	35	50	117.5	XPMT06X308R-**	1.2	CSTB -2.2R	T-7D		
18.0	TDX180L036W25-2	●			36		119.0		1.1				
18.5	TDX185L037W25-2	●			37		120.5		0.9				
19.0	TDX190L038W25-2	●			38		122.0		0.8				
19.5	TDX195L039W25-2	●			39		123.5		0.7				
20.0	TDX200L040W25-2	●			40		125.0		0.5				
20.5	TDX205L041W25-2	●			41		126.5		0.4				
21.0	TDX210L042W25-2	●			42		128.0		0.3				
21.5	TDX215L043W25-2	●			43		129.5		0.2				
22.0	TDX220L044W25-2	●			44		131.0	XPMT07H308R-**	1.2	CSTB -2.5	T-8D		
22.5	TDX225L045W25-2	●			45		132.5		1.1				
23.0	TDX230L046W25-2	●			46		134.0		0.9				
23.5	TDX235L047W25-2	●			47		135.5		0.8				
24.0	TDX240L048W25-2	●			48		137.0		0.7				
24.5	TDX245L049W25-2	●			49		138.5		0.5				
25.0	TDX250L050W25-2	●			50		140.0		0.4				
25.5	TDX255L051W25-2	●			51		141.5		0.3				
26.0	TDX260L052W25-2	●			52		143.0		0.2				
27.0	TDX270L054W32-2	●	32	40	54	55	151.0	XPMT08T308R-**	1.5	CSTB-3	T-9D		
28.0	TDX280L056W32-2	●			56		154.0		1.2				
29.0	TDX290L058W32-2	●			58		157.0		1.0				
30.0	TDX300L060W32-2	●			60		160.0		0.7				
31.0	TDX310L062W32-2	●			62		163.0		0.4				
32.0	TDX320L064W32-2	●			64		166.0		0.2				
33.0	TDX330L066W40-2	●	40	50	66	65	182.0	XPMT110412R-**	2.3	CSTB-4	T-15D	P-6	PT1/4GN
34.0	TDX340L068W40-2	●			68		185.0		2.1				
35.0	TDX350L070W40-2	●			70		188.0		1.8				
36.0	TDX360L072W40-2	●			72		191.0		1.5				
37.0	TDX370L074W40-2	●			74		194.0		1.3				
38.0	TDX380L076W40-2	●			76		197.0		1.0				
39.0	TDX390L078W40-2	●			78		200.0		0.7				
40.0	TDX400L080W40-2	●			80		203.0		0.5				
41.0	TDX410L082W40-2	●			82		206.0		0.2				
42.0	TDX420L084W40-2	●		55	84		209.0	XPMT150512R-**	3.1	CSTB-5	T-20D		
43.0	TDX430L086W40-2	●			86		212.0		2.9				
44.0	TDX440L088W40-2	●			88		215.0		2.6				
45.0	TDX450L090W40-2	●			90		218.0		2.3				
46.0	TDX460L092W40-2	●			92		221.0		2.1				
47.0	TDX470L094W40-2	●			94		224.0		1.8				
48.0	TDX480L096W40-2	●			96		227.0		1.5				
49.0	TDX490L098W40-2	●			98		230.0		1.3				
50.0	TDX500L100W40-2	●			100		233.0		1.0				
51.0	TDX510L102W40-2	●			102		236.0		0.7				
52.0	TDX520L104W40-2	●			104		239.0		0.5				
53.0	TDX530L106W40-2	○			106		242.0		—				
54.0	TDX540L108W40-2	○			108		245.0		—				

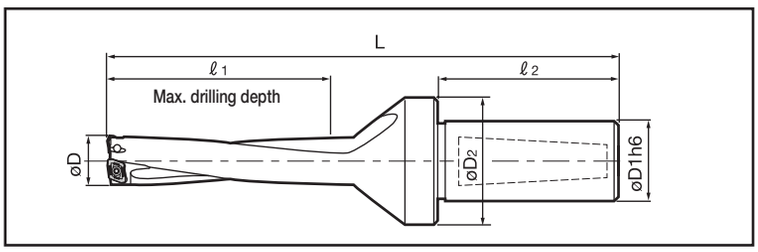
Note: L/D = Hole depth / Drill diameter



■ For L/D = 3 (Whistle notch type shank)

Drill øD (mm)	Cat. No.	Stock	Dimensions (mm)					Applicable insert	Max. Offset + (mm)	Clamp screw	Torx wrench	Hex. wrench	Plug screw
			øD1	øD2	ℓ1	ℓ2	L						
12.5	TDX125L038W20	●	20	32	37.5	40	102	XPMT040104R-**	0.8	CSTB-2	T-6D	P-5	1/8-28
13.0	TDX130L039W20	●			39.0		104		0.7				
13.5	TDX135L041W20	●			40.5		106		0.5				
14.0	TDX140L042W20	●			42.0		108		0.4				
14.5	TDX145L044W20	●			43.5		110		0.3				
15.0	TDX150L045W20	●			45.0		112	XPMT050204R-**	0.9	CSTB -2L040			
15.5	TDX155L047W20	●			46.5		114		0.8				
16.0	TDX160L048W20	●			48.0		116		0.6				
16.5	TDX165L050W20	●			49.5		118		0.5				
17.0	TDX170L051W20	●			51.0		120		0.4				
17.5	TDX175L053W25	●	25	37	52.5	50	135	XPMT06X308R-**	1.2	CSTB -2.2R	T-7D		
18.0	TDX180L054W25	●			54.0		137		1.1				
18.5	TDX185L056W25	●			55.5		139		0.9				
19.0	TDX190L057W25	●			57.0		141		0.8				
19.5	TDX195L059W25	●			58.5		143		0.7				
20.0	TDX200L060W25	●			60.0		145		0.5				
20.5	TDX205L062W25	●			61.5		147		0.4				
21.0	TDX210L063W25	●			63.0		149		0.3				
21.5	TDX215L065W25	●			64.5		151		0.2				
22.0	TDX220L066W25	●			66.0		153	XPMT07H308R-**	1.2	CSTB -2.5	T-8D		
22.5	TDX225L068W25	●			67.5		155		1.1				
23.0	TDX230L069W25	●			69.0		157		0.9				
23.5	TDX235L071W25	●			70.5		159		0.8				
24.0	TDX240L072W25	●			72.0		161		0.7				
24.5	TDX245L074W25	●			73.5		163		0.5				
25.0	TDX250L075W25	●			75.0		165		0.4				
25.5	TDX255L077W25	●			76.5		167		0.3				
26.0	TDX260L078W25	●			78.0		169		0.2				
27.0	TDX270L081W32	●	32	40	81.0	55	178	XPMT08T308R-**	1.5	CSTB-3	T-9D		
28.0	TDX280L084W32	●			84.0		182		1.2				
29.0	TDX290L087W32	●			87.0		186		1.0				
30.0	TDX300L090W32	●			90.0		190		0.7				
31.0	TDX310L093W32	●			93.0		194		0.4				
32.0	TDX320L096W32	●			96.0		198		0.2				
33.0	TDX330L099W40	●	40	50	99.0	65	215	XPMT110412R-**	2.3	CSTB-4	T-15D	P-6	PT1/4GN
34.0	TDX340L102W40	●			102.0		219		2.1				
35.0	TDX350L105W40	●			105.0		223		1.8				
36.0	TDX360L108W40	●			108.0		227		1.5				
37.0	TDX370L111W40	●			111.0		231		1.3				
38.0	TDX380L114W40	●			114.0		235		1.0				
39.0	TDX390L117W40	●			117.0		239		0.7				
40.0	TDX400L120W40	●			120.0		243		0.5				
41.0	TDX410L123W40	●			123.0		247		0.2				
42.0	TDX420L126W40	●		55	126.0		251	XPMT150512R-**	3.1	CSTB-5	T-20D		
43.0	TDX430L129W40	●			129.0		255		2.9				
44.0	TDX440L132W40	●			132.0		259		2.6				
45.0	TDX450L135W40	●			135.0		263		2.3				
46.0	TDX460L138W40	●			138.0		267		2.1				
47.0	TDX470L141W40	●			141.0		271		1.8				
48.0	TDX480L144W40	●			144.0		275		1.5				
49.0	TDX490L147W40	●			147.0		279		1.3				
50.0	TDX500L150W40	●			150.0		283		1.0				
51.0	TDX510L153W40	●			153.0		287		0.7				
52.0	TDX520L156W40	●			156.0		291		0.5				
53.0	TDX530L159W40	○			159.0		295		—				
54.0	TDX540L162W40	○			162.0		299		—				

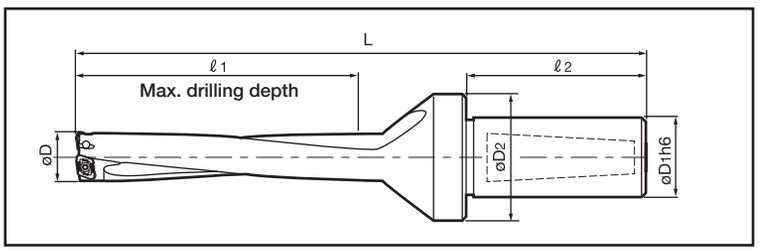
Note: L/D = Hole depth / Drill diameter



■ For L/D = 4 (Whistle notch type shank)

Drill øD (mm)	Cat. No.	Stock	Dimensions (mm)					Applicable insert	Max. Offset + (mm)	Clamp screw	Torx wrench	Hex. wrench	Plug screw
			øD1	øD2	ℓ1	ℓ2	L						
12.5	TDX125L050W20-4	●	20	32	50	40	113	XPMT040104R-**	0.8	CSTB-2	T-6D	—	—
13.0	TDX130L052W20-4	●			52		115		0.7				
13.5	TDX135L054W20-4	●			54		118		0.5				
14.0	TDX140L056W20-4	●			56		120		0.4				
14.5	TDX145L058W20-4	●			58		122		0.3				
15.0	TDX150L060W20-4	●			60		125	XPMT050204R-**	0.9	CSTB -2L040			
15.5	TDX155L062W20-4	●			62		127		0.8				
16.0	TDX160L064W20-4	●			64		129		0.6				
16.5	TDX165L066W20-4	●			66		132		0.5				
17.0	TDX170L068W20-4	●			68		134		0.4				
17.5	TDX175L070W25-4	●	25	37	70	50	148	XPMT06X308R-**	1.2	CSTB -2.2R	T-7D		
18.0	TDX180L072W25-4	●			72		150		1.1				
18.5	TDX185L074W25-4	●			74		152		0.9				
19.0	TDX190L076W25-4	●			76		154		0.8				
19.5	TDX195L078W25-4	●			78		157		0.7				
20.0	TDX200L080W25-4	●			80		160		0.5				
20.5	TDX205L082W25-4	●			82		162		0.4				
21.0	TDX210L084W25-4	●			84		164		0.3				
21.5	TDX215L086W25-4	●			86		166		0.2				
22.0	TDX220L088W25-4	●			88		169	XPMT07H308R-**	1.2	CSTB -2.5	T-8D		
22.5	TDX225L090W25-4	●			90		171		1.1				
23.0	TDX230L092W25-4	●			92		173		0.9				
23.5	TDX235L094W25-4	●			94		175		0.8				
24.0	TDX240L096W25-4	●			96		178		0.7				
24.5	TDX245L098W25-4	●			98		181		0.5				
25.0	TDX250L100W25-4	●			100		183		0.4				
25.5	TDX255L102W25-4	●			102		185		0.3				
26.0	TDX260L104W25-4	●			104		187		0.2				
27.0	TDX270L108W32-4	●	32	40	108	55	198	XPMT08T308R-**	1.5	CSTB-3	T-9D		
28.0	TDX280L112W32-4	●			112		203		1.2				
29.0	TDX290L116W32-4	●			116		208		1.0				
30.0	TDX300L120W32-4	●			120		213		0.7				
31.0	TDX310L124W32-4	●			124		217		0.4				
32.0	TDX320L128W32-4	●			128		222		0.2				
33.0	TDX330L132W40-4	●	40	50	132	65	238	XPMT110412R-**	2.3	CSTB-4	T-15D		
34.0	TDX340L136W40-4	●			136		243		2.1				
35.0	TDX350L140W40-4	●			140		248		1.8				
36.0	TDX360L144W40-4	●			144		252		1.5				
37.0	TDX370L148W40-4	●			148		258		1.3				
38.0	TDX380L152W40-4	●			152		262		1.0				
39.0	TDX390L156W40-4	●			156		267		0.7				
40.0	TDX400L160W40-4	●			160		272		0.5				
41.0	TDX410L164W40-4	●			164		277		0.2				
42.0	TDX420L168W40-4	●		55	168		282	XPMT150512R-**	3.1	CSTB-5	T-20D		
43.0	TDX430L172W40-4	●			172		287		2.9				
44.0	TDX440L176W40-4	●			176		292		2.6				
45.0	TDX450L180W40-4	●			180		296		2.3				
46.0	TDX460L184W40-4	●			184		302		2.1				
47.0	TDX470L188W40-4	●			188		306		1.8				
48.0	TDX480L192W40-4	●			192		311		1.5				
49.0	TDX490L196W40-4	●			196		316		1.3				
50.0	TDX500L200W40-4	●			200		320		1.0				
51.0	TDX510L204W40-4	●			204		325		0.7				
52.0	TDX520L208W40-4	●			208		330		0.5				
53.0	TDX530L212W40-4	○			212		335		—				
54.0	TDX540L216W40-4	○			216		339		—				

Note: L/D = Hole depth / Drill diameter



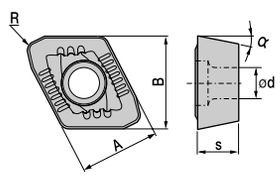
■ For L/D = 5 (Whistle notch type shank)

Drill øD (mm)	Cat. No.	Stock	Dimensions (mm)					Applicable insert	Max. Offset + (mm)	Clamp screw	Torx wrench	Hex. wrench	Plug screw
			øD1	øD2	ℓ1	ℓ2	L						
12.5	TDX125L063W20-5	○	20	32	62.5	40	125	XPMT040104R-**	0.8	CSTB-2	T-6D	—	—
13.0	TDX130L065W20-5	○			65.0		128		0.7				
13.5	TDX135L068W20-5	○			67.5		131		0.5				
14.0	TDX140L070W20-5	○			70.0		134		0.4				
14.5	TDX145L073W20-5	○			72.5		137		0.3				
15.0	TDX150L075W20-5	○			75.0		140	XPMT050204R-**	0.9	CSTB -2L040			
15.5	TDX155L078W20-5	○			77.5		143		0.8				
16.0	TDX160L080W20-5	○			80.0		145		0.6				
16.5	TDX165L083W20-5	○			82.5		149		0.5				
17.0	TDX170L085W20-5	○			85.0		151		0.4				
17.5	TDX175L088W25-5	○	25	37	87.5	50	165	XPMT06X308R-**	1.2	CSTB -2.2R	T-7D		
18.0	TDX180L090W25-5	○			90.0		168		1.1				
18.5	TDX185L093W25-5	○			92.5		171		0.9				
19.0	TDX190L095W25-5	○			95.0		173		0.8				
19.5	TDX195L098W25-5	○			97.5		176		0.7				
20.0	TDX200L100W25-5	○			100.0		180		0.5				
20.5	TDX205L103W25-5	○			102.5		182		0.4				
21.0	TDX210L105W25-5	○			105.0		185		0.3				
21.5	TDX215L108W25-5	○			107.5		188		0.2				
22.0	TDX220L110W25-5	○			110.0		191	XPMT07H308R-**	1.2	CSTB -2.5	T-8D		
22.5	TDX225L113W25-5	○			112.5		193		1.1				
23.0	TDX230L115W25-5	○			115.0		196		0.9				
23.5	TDX235L118W25-5	○			117.5		199		0.8				
24.0	TDX240L120W25-5	○			120.0		202		0.7				
24.5	TDX245L123W25-5	○			122.5		205		0.5				
25.0	TDX250L125W25-5	○			125.0		208		0.4				
25.5	TDX255L128W25-5	○			127.5		211		0.3				
26.0	TDX260L130W25-5	○			130.0		213		0.2				
27.0	TDX270L135W32-5	○	32	40	135.0	55	225	XPMT08T308R-**	1.5	CSTB-3	T-9D		
28.0	TDX280L140W32-5	○			140.0		231		1.2				
29.0	TDX290L145W32-5	○			145.0		237		1.0				
30.0	TDX300L150W32-5	○			150.0		243		0.7				
31.0	TDX310L155W32-5	○			155.0		248		0.4				
32.0	TDX320L160W32-5	○			160.0		254		0.2				
33.0	TDX330L165W40-5	○	40	50	165.0	65	271	XPMT110412R-**	2.3	CSTB-4	T-15D		
34.0	TDX340L170W40-5	○			170.0		277		2.1				
35.0	TDX350L175W40-5	○			175.0		283		1.8				
36.0	TDX360L180W40-5	○			180.0		288		1.5				
37.0	TDX370L185W40-5	○			185.0		295		1.3				
38.0	TDX380L190W40-5	○			190.0		300		1.0				
39.0	TDX390L195W40-5	○			195.0		306		0.7				
40.0	TDX400L200W40-5	○			200.0		312		0.5				
41.0	TDX410L205W40-5	○			205.0		318		0.2				
42.0	TDX420L210W40-5	○		55	210.0		324	XPMT150512R-**	3.1	CSTB-5	T-20D		
43.0	TDX430L215W40-5	○			215.0		330		2.9				
44.0	TDX440L220W40-5	○			220.0		336		2.6				
45.0	TDX450L225W40-5	○			225.0		341		2.3				
46.0	TDX460L230W40-5	○			230.0		348		2.1				
47.0	TDX470L235W40-5	○			235.0		353		1.8				
48.0	TDX480L240W40-5	○			240.0		359		1.5				
49.0	TDX490L245W40-5	○			245.0		365		1.3				
50.0	TDX500L250W40-5	○			250.0		370		1.0				
51.0	TDX510L255W40-5	○			255.0		376		0.7				
52.0	TDX520L260W40-5	○			260.0		382		0.5				
53.0	TDX530L265W40-5	○			265.0		388		—				
54.0	TDX540L270W40-5	○			270.0		393		—				

Note: L/D = Hole depth / Drill diameter

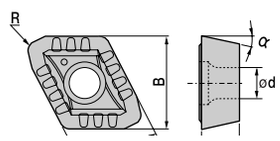
■ Inserts

-DJ Breaker



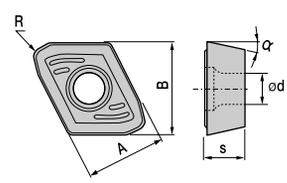
Cat No.	Grades			Dimensions (mm)						Applicable drill diameter
	AH740	T1015	T313W	A	B	s	ød	R	α	
XPMT040104R-DJ	●	●	●	4.3	4.5	1.59	2.3	0.4	11°	ø12.5 ~ ø14.5
XPMT050204R-DJ	●	●	●	5.2	5.4	2.38				ø15.0 ~ ø17.0
XPMT06X308R-DJ	●	●	●	6.0	7.0	3.00	2.5	0.8		ø17.5 ~ ø21.5
XPMT07H308R-DJ	●	●	●	7.0	8.2	3.60	2.8			ø22.0 ~ ø26.0
XPMT08T308R-DJ	●	●	●	8.5	9.9	3.97	3.4			ø26.5 ~ ø32.0
XPMT110412R-DJ	●	●	●	11.2	12.5	4.76	4.4	1.2		ø33.0 ~ ø41.0
XPMT150512R-DJ	●	●	●	15.0	16.1	5.56	5.5			ø42.0 ~ ø54.0

-DS Breaker



Cat No.	Grades	Dimensions (mm)						Applicable drill diameter
	AH120	A	B	s	ød	R	α	
XPMT040104R-DS	●	4.3	4.5	1.59	2.3	0.4	11°	ø12.5 ~ ø14.5
XPMT050204R-DS	●	5.2	5.4	2.38				ø15.0 ~ ø17.0
XPMT06X308R-DS	●	6.0	7.0	3.0	2.5	0.8		ø17.5 ~ ø21.5
XPMT07H308R-DS	●	7.0	8.2	3.6	2.8			ø22.0 ~ ø26.0
XPMT08T308R-DS	●	8.5	9.9	3.97	3.4			ø26.5 ~ ø32.0
XPMT110412R-DS	●	11.2	12.5	4.76	4.4	1.2		ø33.0 ~ ø41.0
XPMT150512R-DS	●	15.0	16.1	5.56	5.5			ø42.0 ~ ø54.0

-DW Breaker Wiper



Cat No.	Grades		Dimensions (mm)						Applicable drill diameter
	AH120	GH730	A	B	s	ød	R	α	
XPMT040104R-DW	●	●	4.3	4.5	1.59	2.3	0.4	11°	ø12.5 ~ ø14.5
XPMT050204R-DW	●	●	5.2	5.4	2.38				ø15.0 ~ ø17.0
XPMT06X308R-DW	●	●	6.0	7.0	3.0	2.5	0.8		ø17.5 ~ ø21.5
XPMT07H308R-DW	●	●	7.0	8.2	3.6	2.8			ø22.0 ~ ø26.0
XPMT08T308R-DW	●	●	8.5	9.9	3.97	3.4			ø26.5 ~ ø32.0
XPMT110412R-DW	●	●	11.2	12.5	4.76	4.4	1.2		ø33.0 ~ ø41.0
XPMT150512R-DW	●	●	15.0	16.1	5.56	5.5			ø42.0 ~ ø54.0

■ Standard cutting conditions

Work materials	Grade / Breaker				Cutting speed Vc (m/min)	L/D	Feed f (mm/rev)				
	AH120	AH740	T1015	GH730			ø12.5 ~ ø14.5	ø15.0 ~ ø17.0	ø17.5 ~ ø26.0	ø27.0 ~ ø32.0	ø33.0 ~ ø54.0
Carbon steels (C > 0.3) St37, C25E	-DS -DW				160 - 320	2D - 5D	0.02 - 0.06	0.02 - 0.06	0.04 - 0.10	0.04 - 0.10	0.04 - 0.10
Alloy steels (C > 0.3) C45, C55		-DJ		-DW	80 - 250	2D, 3D	0.04 - 0.10	0.04 - 0.12	0.06 - 0.13	0.06 - 0.15	0.08 - 0.18
						4D, 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.10	0.06 - 0.12	0.08 - 0.14
Mild steels 15CrMo5	-DS -DW				160 - 250	2D - 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.12	0.06 - 0.12	0.06 - 0.14
Alloy Steels 42CrMo4		-DJ		-DW	80 - 200	2D, 3D	0.04 - 0.10	0.04 - 0.12	0.06 - 0.13	0.06 - 0.15	0.08 - 0.18
						4D, 5D	0.04 - 0.08	0.04 - 0.08	0.06 - 0.10	0.06 - 0.12	0.08 - 0.14
Stainless steels (Austenitic type) X5CrNi18-10	-DS -DW				100 - 220	2D - 5D	0.02 - 0.08	0.02 - 0.08	0.04 - 0.10	0.04 - 0.12	0.04 - 0.12
Stainless steels (Ferric and Martensitic type) X3CrMnNiN18 8 7	-DS -DW				100 - 200	2D - 5D	0.02 - 0.08	0.02 - 0.08	0.04 - 0.10	0.04 - 0.12	0.04 - 0.12
Stainless steels Precipitation hardening type) X2CrNiMoN22 5 3	-DS -DW				80 - 120	2D - 5D	0.04 - 0.08	0.04 - 0.08	0.04 - 0.08	0.04 - 0.10	0.06 - 0.10
Grey cast iron GG25			-DJ	-DW	80 - 250	2D, 3D	0.06 - 0.12	0.06 - 0.12	0.06 - 0.15	0.06 - 0.18	0.08 - 0.20
						4D, 5D	0.06 - 0.10	0.06 - 0.10	0.06 - 0.12	0.06 - 0.14	0.08 - 0.16
Ductile cast iron GGG70			-DJ	-DW	80 - 200	2D, 3D	0.04 - 0.12	0.04 - 0.12	0.06 - 0.15	0.06 - 0.18	0.08 - 0.20
						4D, 5D	0.04 - 0.10	0.04 - 0.10	0.06 - 0.12	0.06 - 0.14	0.08 - 0.16
Aluminium alloys				-DW	200 - 400	2D, 3D	0.10 - 0.12	0.10 - 0.15	0.15 - 0.20	0.15 - 0.20	0.15 - 0.25
						4D, 5D	0.08 - 0.12	0.08 - 0.12	0.12 - 0.16	0.12 - 0.16	0.12 - 0.20

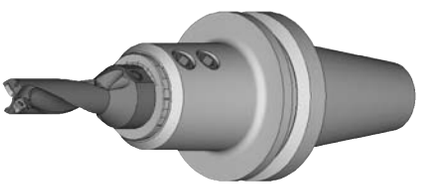
Notes:
- When using the -DW chipbreaker to achieve better surface qualities, cutting parameter as in above table should be used.
- When using the -DW chipbreaker to achieve higher productivity, feed rate should be multiplied by 1.5.
- For work materials of < 40 HRC, feed rate should be set to 50 %.
- For smaller drill dia, choose the lower recommended parameter.
- Water soluble coolant is recommended, cutting fluid should be supplied through the tool.
- A minimum fluid quantity of 7 l/min for 2 and 3xd rev. 10 l/min for 4 and 5xd is recommended.

No. of revolutions n (rpm) = Cutting speed Vc (m/min) x 1000 ÷ 3.14 ÷ Drill ø (mm)
Table feed Vf (mm/min) = n (rpm) x Feed f (mm/rev)

EZ Eccentric Sleeve

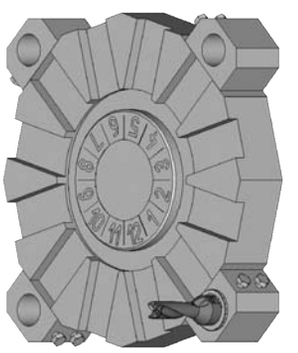
Hole diameter adjustment at the milling machine

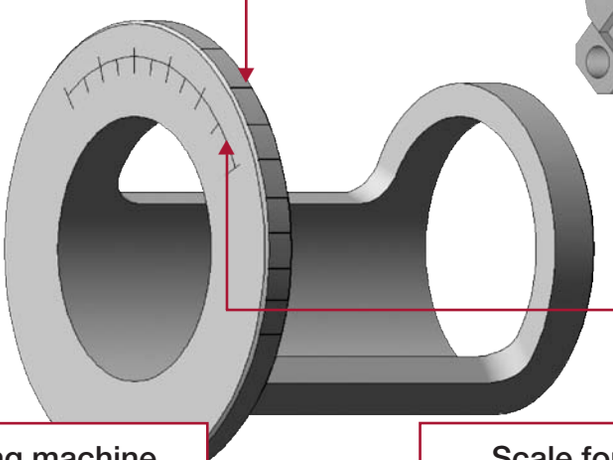
With the EZ sleeve, the hole size can be adjusted from **+0.6 mm larger to -0.2 mm smaller**



Centre-height adjustment at the turning lathe

With the EZ sleeve, the centre-height can be adjusted from **+0.3 mm to -0.2 mm**

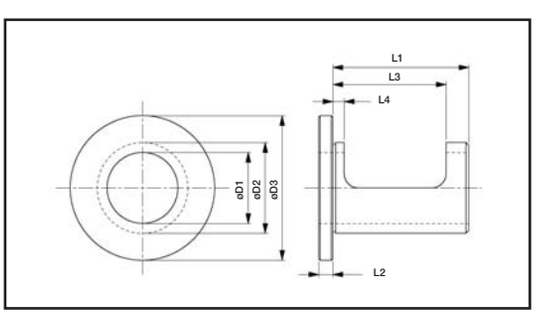




Scale for the milling machine

Scale for the turning lathe

■ Specifications



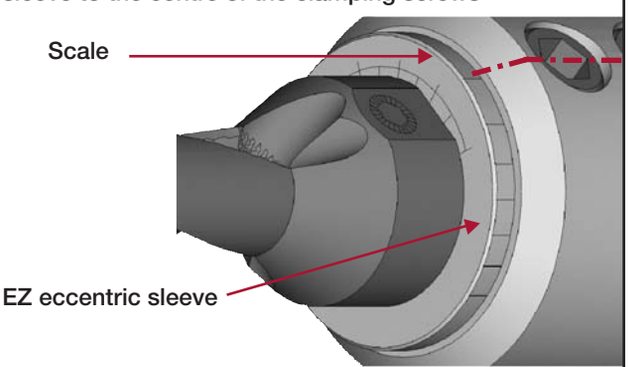
Cat. No.	Stock	Dimensions (mm)							Milling machine drill ø	Turning lathe Centre-height	Hex. wrench
		ø D1	ø D2	ø D3	L1	L2	L3	L4			
EZ2025L43	●	20	25	46	43	5	30	4	+0.4 ~ -0.2	+0.2 ~ -0.15	P-2.5
EZ2532L48	●	25	32	51	48	5	40	4	+0.4 ~ -0.2	+0.2 ~ -0.15	
EZ3240L53	●	32	40	54	53	5	45	4	+0.4 ~ -0.2	+0.2 ~ -0.15	
EZ4050L63	●	40	50	69	63	5	55	4	+0.6 ~ -0.2	+0.3 ~ -0.20	

*TDX ø D1 equal to EZ sleeve ø D1

■ Applications

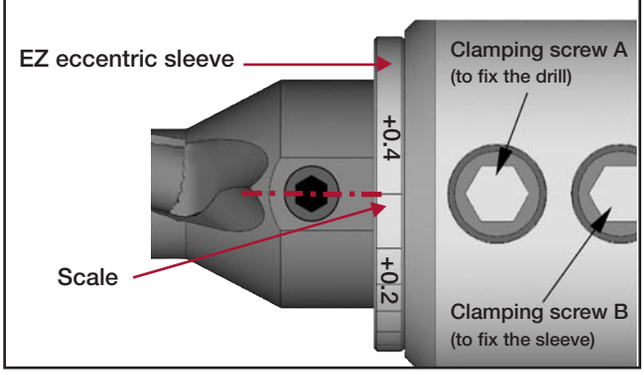
Hole diameter adjustment at the milling machine

1. Adjust the scale at the flange periphery of the EZ sleeve to the centre of the clamping screws



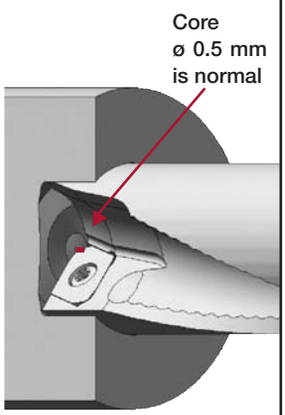
2. For a larger hole diameter, rotate the sleeve to the + direction; for a smaller hole diameter, rotate the sleeve to the - direction

The illustration shows the example of adjusting the hole diameter + 0.4 mm.

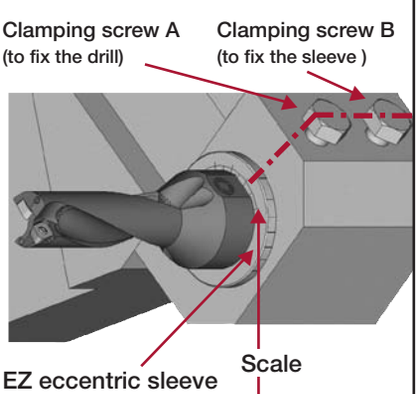


Centre-height adjustment at the turning lathe

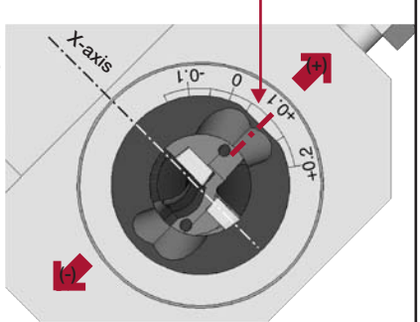
Most of the troubles at the turning lathe are based on the centre-height deviation. The centre-height is appropriate if the core of approximately 0.5 mm diameter remains at the centre of the end face.
Centre-height adjustment is necessary for the following cases:
- No core remaining
- Core diameter is more than 1 mm.



1. Set the drills so that the outer insert's face becomes parallel to the X-axis of the tool turret. Adjust the scale (for the lathe) at the flange face of the EZ sleeve to the centre of the clamping screws.



2. When no core remains, rotate the EZ sleeve to + direction; when core diameter is more than 1 mm, rotate to - direction.



3. When rotating the EZ sleeve, insert the wrench into the hole at the flange periphery and rotate the EZ sleeve. Screws A + B have to be loosened.

4. Secure the drill by screw A. Secure the EZ sleeve by lightly tightening screw B. Tighten screw B only lightly, otherwise EZ sleeve can be damaged!

Note:
Cannot be used for collect chuck holder.
Over L/D 4 or bigger adjustment, please reduce feed rate.
For smaller adjustment, the drill itself will interfere with the hole diameter. It is recommended that hole diameter should be adjusted to a larger diameter than the drill diameter.

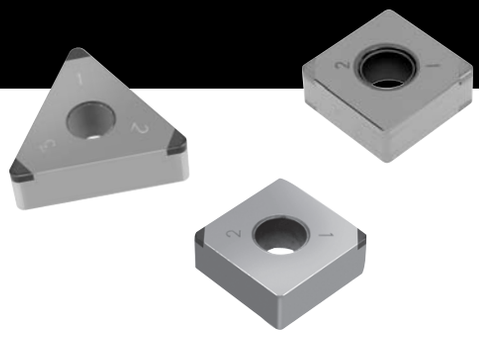
MEMO

MEMO

MEMO

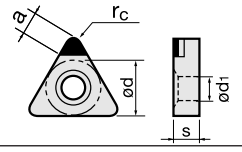
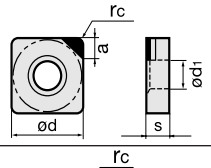
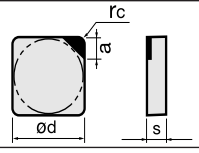
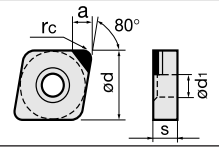
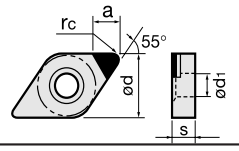
PCD and PCBN Tools

11

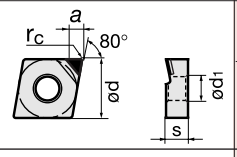
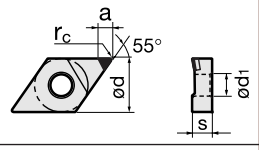
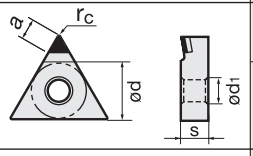
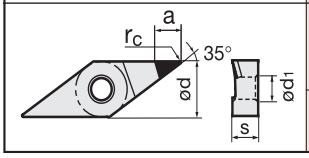


PCD inserts for Turning

■ Negative inserts

Shape	Cat. No.	Stocked grades (Sharpenability Better — Wear resistance Higher) DX120	DX140	DX160	Dimensions(mm) ød	s	r_c	a	Applicable toolholder
	TNGA160404-DIA		○	○	9.525	4.76	0.4	3.2	A, D, P, M, E, W
	TNGA160408-DIA		○	○			0.8	2.9	
	SNGA120404-DIA		○	○	12.7	4.76	0.4	3.6	A, D, P, M, E
	SNGA120408-DIA		○	○			0.8	3.6	
	SNGN090308-DIA				9.525	3.18	0.8	3.6	C
	SNGN120408-DIA				12.7	4.76			
	CNGA120404-DIA		○		12.7	4.76	0.4	3.5	A, D, P, M
	CNGA120408-DIA						0.8	3.4	
	DNGA150404-DIA		○	○	12.7	4.76	0.4	3.1	A, D, P, M
	DNGA150408-DIA		○				0.8	2.8	

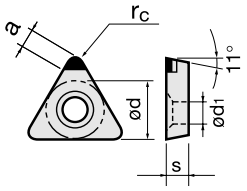
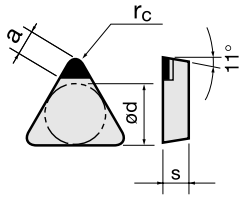
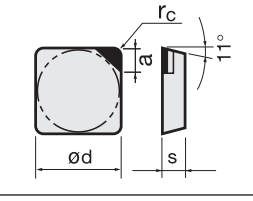
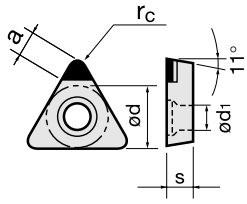
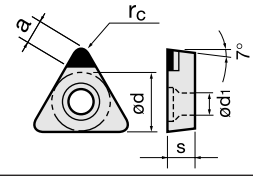
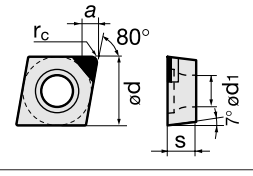
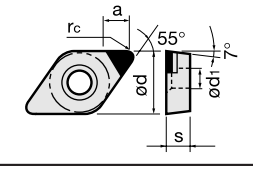
■ Negative inserts (with chipbreaker)

Shape	Cat. No.	Stocked grades (Sharpenability Better — Wear resistance Higher) DX120	DX140	DX160	Dimensions (mm) ød	s	r_c	a	Applicable toolholder
	CNMM120402-DIA	○			12.7	4.76	0.2	3.5	A, D, P, M
	CNMM120404-DIA	○					0.4	3.5	
	DNMM150402-DIA	○			12.7	4.76	0.2	3.3	A, D, P, M, E, W
	DNMM150404-DIA	○					0.4	3.1	
	TNMM160402-DIA	○			9.525	4.76	0.2	3.3	A, D, P, M
	TNMM160404-DIA	○					0.4	3.2	
	VNMM160402-DIA	○			9.525	4.76	0.2	4.8	M
	VNMM160404-DIA	○					0.4	4.4	
	VNMM160408-DIA	○					0.8	3.6	

● : Standard stock in Europe
○ : Standard stock in Japan

Cutting data P. 439 | Reference guide | Grades P. 464

■ Positive inserts

Shape	Cat. No.	Stocked grades (Sharpenability Better ← → Wear resistance Higher)			Dimensions (mm)				Applicable toolholder
		DX120	DX140	DX160	ød	s	r_c	a	
 (With Tungaloy standard hole)	TPGA090202-DIA		○		5.556	2.38	0.2	2.4	
	TPGA090204-DIA		○				0.4	2.2	
	TPGA110202-DIA		○		6.35		0.2	2.4	
	TPGA110204-DIA		○				0.4	2.2	
	TPGA110302-DIA		○		6.35	3.18	0.2	2.4	
	TPGA110304-DIA		○				0.4	2.2	
	TPGA110308-DIA		○				0.8	2.0	
	TPGA160302-DIA		○		9.525		0.2	3.3	
	TPGA160304-DIA		○				0.4	3.2	
	TPGA160308-DIA		○				0.8	2.9	
	TPGN090204-DIA		○		5.56	2.38	0.4	2.2	Boring toolholder C
	TPGN090208-DIA						0.8	2.0	
	TPGN110301-DIA				6.35	3.18	0.1	3.4	
	TPGN110302-DIA						0.2	3.3	
	TPGN110304-DIA		○				0.4	3.2	
	TPGN110308-DIA		○	○			0.8	2.9	
	TPGN160301-DIA				9.525	3.18	0.1	3.4	Boring toolholder C
	TPGN160302-DIA		○				0.2	3.3	
	TPGN160304-DIA	○	○	○			0.4	3.2	
	TPGN160308-DIA		○				0.8	2.9	
	TPGN160312-DIA						1.2	2.6	
	SPGN090302-DIA			○	9.525	3.18	0.2	3.6	Boring toolholder C
	SPGN090304-DIA						0.4	3.6	
	SPGN090308-DIA		○				0.8	3.6	
	SPGN120302-DIA		○		12.7	3.18	0.2	3.6	
	SPGN120304-DIA		○	○			0.4	3.6	
	SPGN120308-DIA		○	○			0.8	3.6	
	SPGN120312-DIA						1.2	3.6	
	TPGW080202-DIA		○		4.76	2.38	0.2	2.4	Boring toolholder S
	TPGW080204-DIA		○				0.4	2.3	
	TPGW090202-DIA	○	○		5.56	2.38	0.2	2.4	
	TPGW090204-DIA		○				0.4	2.2	
	TPGW110202-DIA	○	○		6.35	2.38	0.2	2.4	
	TPGW110204-DIA		○				0.4	2.2	
	TPGW130302-DIA	○	○		7.94	3.18	0.2	3.3	
	TPGW130304-DIA		○	○			0.4	3.2	
	TPGW16T302-DIA		○		9.525	3.97	0.2	3.3	
	TPGW16T304-DIA		○				0.4	3.2	
	TPGW16T308-DIA		○				0.8	2.9	
	TCGW110202-DIA				6.35	2.38	0.2	2.4	Boring toolholder S
	TCGW110204-DIA						0.4	2.2	
	TCGW16T302-DIA				9.525	3.97	0.2	3.3	
	TCGW16T304-DIA						0.4	3.2	
	TCGW16T308-DIA						0.8	2.9	
	CCGW060200-DIA		○		6.35	2.38	0.05	2.4	
	CCGW060202-DIA		○				0.2	2.4	
	CCGW060204-DIA		○				0.4	2.4	
	CCGW09T302-DIA		○		9.525	3.97	0.2	3.5	
	CCGW09T304-DIA		○	○			0.4	3.5	
	CCGW09T308-DIA		○	○			0.8	3.4	
	DCGW070200-DIA		○		6.35	2.38	0.05	2.4	Boring toolholder S
	DCGW070202-DIA	○	○				0.2	2.3	
	DCGW070204-DIA		○				0.4	2.1	
	DCGW11T302-DIA		○		9.525	3.97	0.2	3.2	
	DCGW11T304-DIA		○				0.4	3.0	
	DCGW11T308-DIA		○				0.8	2.7	

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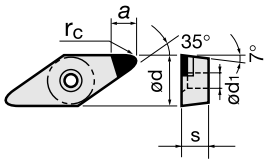
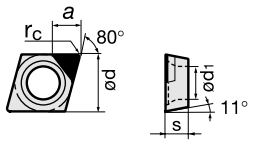
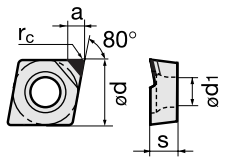
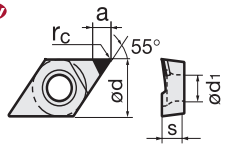
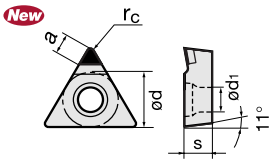
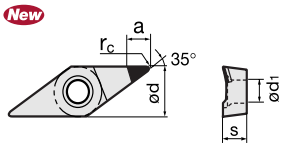
Shape	Cat. No.	Stocked grades (Sharpenability Better / Wear resistance Higher)			Dimensions (mm)				Applicable toolholder
		DX120	DX140	DX160	ød	s	r_c	a	
	VCGW160402-DIA		○		9.525	4.76	0.2	4.8	Boring toolholder S
	VCGW160404-DIA		○				0.4	4.4	
	VCGW160408-DIA						0.8	3.6	
	VCGW160412-DIA						1.2	2.7	
	VCGW220530-DIA				12.7	5.56	3.0	5.0	
	EPGW040102-DIA		○		3.97	1.59	0.2	1.6	Boring toolholder S TAC Boring Bar Tools, Round shank, Top-Borer Tools
	EPGW040104-DIA		○				0.4	1.6	

■ Positive inserts (with chipbreaker)

Shape	Cat. No.	Stocked grades (Sharpenability Better / Wear resistance Higher)			Dimensions (mm)				Applicable toolholder
		DX120	DX140	DX160	ød	s	r_c	a	
New 	CCMT060202-DIA	○			6.35	2.38	0.2	2.4	Boring toolholder S
	CCMT060204-DIA	○					0.4	2.4	
	CCMT09T302-DIA	○			9.525	3.97	0.2	2.4	
	CCMT09T304-DIA	○					0.4	2.4	
New 	DCMT070202-DIA	○			6.35	2.38	0.2	2.3	Boring toolholder S
	DCMT070204-DIA	○					0.4	2.1	
	DCMT11T302-DIA	○			9.525	3.97	0.2	3.2	
	DCMT11T304-DIA	○					0.4	3.0	
New 	TCMT080202-DIA	○			4.76	2.38	0.2	2.2	Boring toolholder S
	TCMT080204-DIA	○					0.4	2.0	
	TCMT110202-DIA	○			6.35	2.38	0.2	2.4	
	TCMT110204-DIA	○					0.4	2.2	
	TCMT110302-DIA	○			6.35	3.18	0.2	2.4	
	TCMT110304-DIA	○					0.4	2.2	
New 	VCMT160402-DIA	○			9.525	4.76	0.2	4.8	Boring toolholder S
	VCMT160404-DIA	○					0.4	4.4	

● : Standard stock in Europe
○ : Standard stock in Japan

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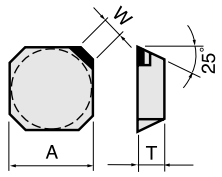
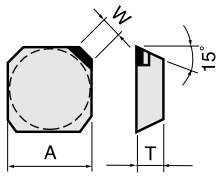
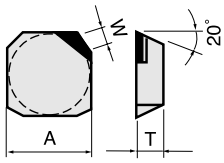
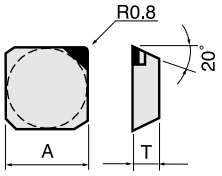
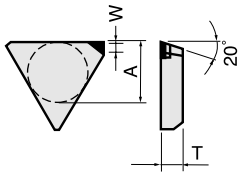
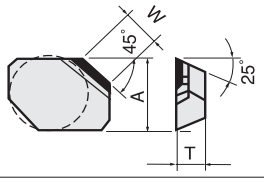
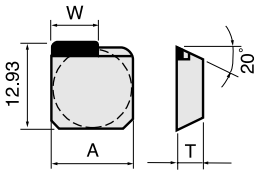
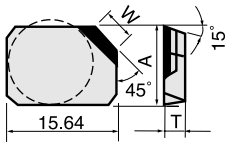
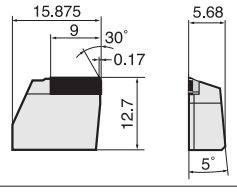
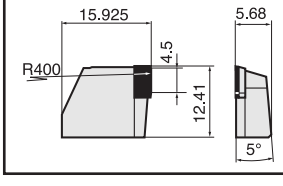
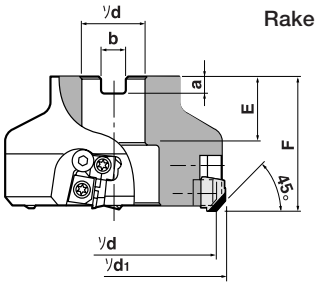
PCD inserts for Milling

Shape	Cat. No. (Inch)	ISO Cat. No. (Metric)	Stocked grades		Dimensions (mm)			Applicable TAC mills
			DX140	DX160	A	T	W	
	SFCN42ZFN-DIA	**SFCN1203AFFN-D**	○		12.70	3.18	2.0	THF4400IA
	SFCN53ZFN-DIA	**SFCN1504AFFN-D**	○		15.875	4.76	2.0	THF5400IA
	SDCN42ZFN-DIA	**SDCN1203AEFN-D**	○		12.70	3.18	1.2	TGD4400-A TMD4400I EGD4400 EMD4403RI-S32
	SECN42ZFR-DIA	**SECN1203ZEFN-D**	○	○	12.70	3.18	2.5	THF4400IA QHE4000
	SECN422FN-DIA	**SECN120308FN-D**	○		12.70	3.18	–	ECE4000
	TECN32ZFR-DIA	**TECN1603PEFR-D**	○	○	9.525	3.18	1.4	TSE3000IA ESE3000
	TECN43ZFR-DIA	**TECN2204PEFR-D**	○	○	12.70	4.76	2.0	TSE4000IA ESE4000
	WFCN42ZFR-DIA	**SFCX1203AFFR-WD**	○		12.20	3.18	6.8	THF4400IA (Wiper)
	WFCN53ZFR-DIA	**SFCX1504AFFR-WD**	○		15.20	4.76	7.6	THF5400IA (Wiper)
	WECN42ZFR-DIA	**SECX1203ZEFR-WD**	○		12.40	3.18	6	THE4400IA (Wiper) QHE4000
	WDCN42ZFR-DIA	**SDCX1203AFEFR-WD**	○		12.20	3.18	4.9	TMD4400I (Wiper) EGD4400 EMD4403RI-S32
	**YDEN1505PDFR-D**		●		12.70	–	5	DPD15 (for roughing) EDPD15 (for roughing)
	**YDEN1505PDFR-WD**		●		12.70	–	4.5	DPD15 (Wiper) EDPD15 (Wiper)

All-Diamond Tipped Mills

DAD15 For high-speed and high-precision face milling of aluminium alloys



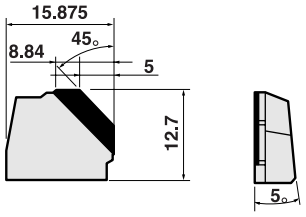
Rake angle: A.R. + 8.5° R.R. + 5.0°

Max. cutting depth: 5 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	F	E	a	b	Weight (kg)	Mounting details
DAD15080R/L-E			4	80	90	27	40	26	7	12.4	1.4	P. 339Ⓐ
DAD15100R/L-E			4	100	110	32	40	28.5	8	14.4	2.4	
DAD15125R/L-E			6	125	135	40	63	32	9	16.4	3.6	P. 339Ⓑ
DAD15160R/L-E			6	160	170	40	63	29	9	16.4	5.5	
DAD15200R/L-E			8	200	210	60	63	38	14	25.7	8.9	P. 339Ⓒ
DAD15250R/L-E			10	250	260	60	63	38	14	25.7	14.6	
DAD15315R/L-E			12	315	325	60	63	38	14	25.7	24.0	P. 339Ⓓ

■ Inserts

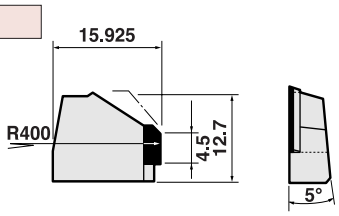
Roughing



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505ADFR-D	DX140	○
YDEN1505ADFL-D		

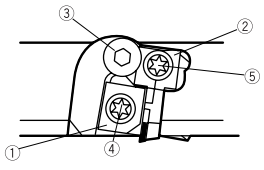
Wiper



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505ADFR-WD	DX140	○
YDEN1505ADFL-WD		

■ Replacement parts



Right hand (R) shown

No.	Description	Parts Cat. No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
⑥	Wrench	T-27T

■ Standard cutting conditions

Work materials	Grades	Cutter dia. ØD (mm)	80	100	125	160	200	250	315	355	400
Aluminium alloys Si < 12%	DX140 (T-DIA)	Max. cutting speed Vc (m/min)	4000								
		Max. number of revolutions n (rpm)	16000	12700	10200	8000	6400	5100	4000	3600	3200
		Cutting depth ap (mm)	~ 5								
		Feed per tooth ft (mm/t)	0.05 ~ 0.28								
Aluminium alloys Si > 13%	DX140	Max. cutting speed Vc (m/min)	200 ~ 500								

• No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
• Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

■ Cautionary Points in Use

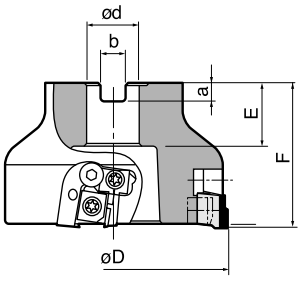
- To avoid danger of unbalanced revolution, the TAC mill should not be used in a state of reduced number of inserts.
- Use the cutter within the maximum revolutions written on the cutter body.
- When using the cutter at lower cutting speed than 1500 m/min, the balance quality of the arbor and toolholder should be prepared within class G16.
- When installing the inserts, recommended clamping torque for the wedge fixing screw is 980 N·cm.

Features P. 298 ~ 302 | Reference guide | Technical information P. 476 ~ 479

All-Diamond Tipped Mills

DPD15

For high-speed and high-precision square shoulder milling of aluminium alloys



Rake angle: A.R. + 8.5° R.R. + 5.0°

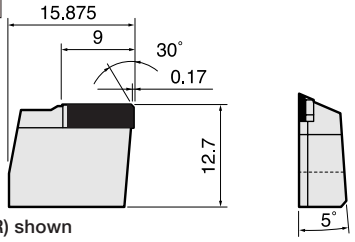
Max. cutting depth: 7 mm

Right hand (R) shown

Cat. No.	Stocked R	Stocked L	No. of inserts	Dimensions (mm) øD	d	E	F	a	b	Weight (kg)	Mounting details
DPD15080R/L-E			4	80	27	26	40	7	12.4	1.2	P. 339Ⓐ
DPD15100R/L-E			4	100	32	28.5	40	8	14.4	2.2	
DPD15125R/L-E			6	125	40	32	63	9	16.4	3.6	P. 339Ⓑ
DPD15160R/L-E			6	160	40	29	63	9	16.4	5.2	
DPD15200R/L-E			8	200	60	38	63	14	25.7	8.2	P. 339Ⓒ
DPD15250R/L-E			10	250	60	38	63	14	25.7	13.4	
DPD15315R/L-E			12	315	60	38	63	14	25.7	22.5	P. 339Ⓓ

■ Inserts

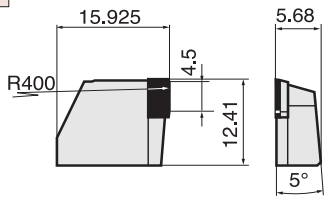
Roughing



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505PDFR-D	DX140	●

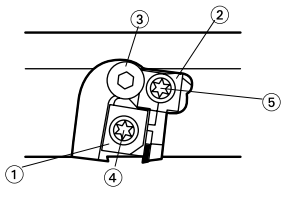
Wiper



Right hand (R) shown

Cat. No.	Grades	Stock
YDEN1505PDFR-WD	DX140	●

■ Replacement parts



Right hand (R) shown

No.	Description	Parts Cat. No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
⑥	Wrench	T-27T

■ Standard cutting conditions

Work materials		Grades	Cutter dia. øD (mm)	80	100	125	160	200	250	315	355	400
Aluminium alloys	Si < 12%	DX140 (T-DIA)	Max. cutting speed Vc (m/min)	4000								
			Max. No. of revolutions n (rpm)	16000	12700	10200	8000	6400	5100	4000	3600	3200
			Cutting depth ap (mm)	~ 7								
			Feed per tooth ft (mm/t)	0.05 ~ 0.20								
	Si > 13%		Max. cutting speed Vc (m/min)	200 ~ 500								

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

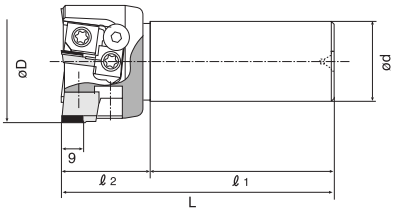
Features P. 298 ~ 302 | Reference guide | Technical information P. 476 ~ 479

All-diamond Tipped TAC Endmills

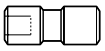
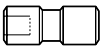
EDPD15

For high-speed and precision milling

Rake angle: A.R. +7° R.R. 0°

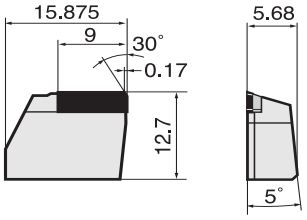


■ Specifications

Cat. No.	Stock	No. of inserts	Dimensions (mm)					Insert locking wedge	Locator adjusting wedge	Screw for preventing wedge from flying out	Wedge fixing screw	Adjusting wedge fixing screw	Wrench
			øD	ød	ℓ 1	ℓ 2	L						
EDPD15050R/L		3	50	32.0	80	35	115	FW304R/L-D	FW325R/L-D	BHM611-GT	FDS-8SST	FDS-8SST	T-27
EDPD15063R/L		4	63										

■ Inserts

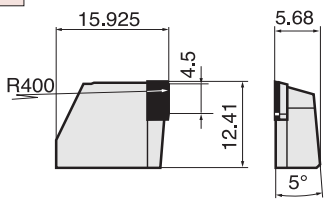
Roughing



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-D	DX140	●

Wiper



Right hand shown

Cat. No.	Standard grade	Stock
YDEN1505PDFR-WD	DX140	●

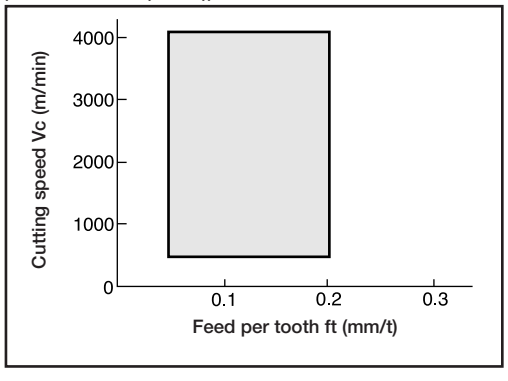
■ Standard cutting conditions

Cutter diameter (mm)	50	63
Cutting speed Vc (m/min)	500 ~ 3100	500 ~ 3900
Feed per tooth ft (mm/tooth)	0.05 ~ 0.2	
Cutting depth ap (mm)	~ 7	

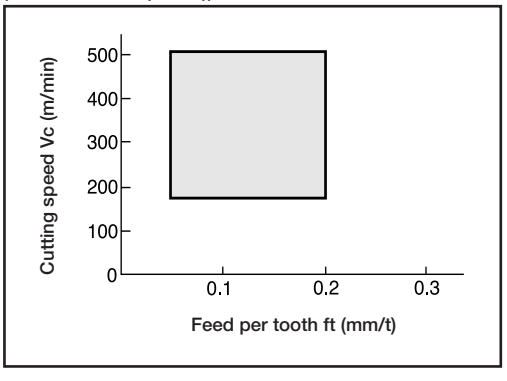
- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

■ Guidelines for selecting cutting speed and feed

Aluminium alloys (Si < 12%)
(Grade: DX140 (T-DIA))

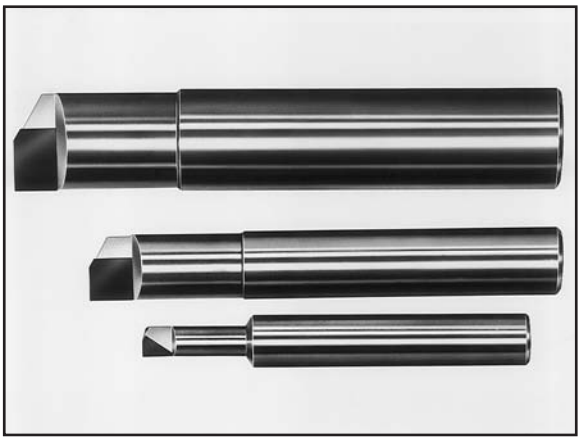


Aluminium alloys (Si > 13%)
(Grade: DX140 (T-DIA))



- Wet cutting is recommended.
- Dry cutting is also possible. But chip control and obtainable surface integrity are inferior to wet cutting.

DEB1000 (T-DIA Endmills)



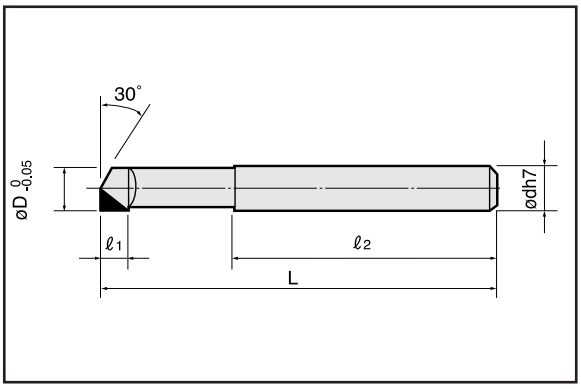
■ Features

- Provide superior wear resistance and longer tool life in machining non-ferrous metals and non-metals compared with carbide endmills.
- Less tendency to develop a built-up edge allows to produce excellent and accurate surface finish.
- The center cutting edge allows plunging.

■ Applications

- Aluminium alloys, copper alloys and other non-ferrous metals
- Non-metals such as glass-fiber plastics, epoxy resin, carbon, artificial marble and hard rubber.

■ Specifications



Cat. No.	Grade	Dimensions (mm)				
	DX140	øD	ød	ℓ 1	ℓ 2	L
DEB1040	○	4.0	6	3.5	32	45
DEB1050	○	5.0	6	3.5	35	50
DEB1060	○	6.0	6	3.5	35	55
DEB1070		7.0	8	5	37	55
DEB1080	○	8.0	8	5	37	55
DEB1090		9.0	10	5	40	60
DEB1100	○	10.0	10	5	40	60
DEB1110	○	11.0	12	5	45	65
DEB1120	○	12.0	12	5	45	65

■ Cutting conditions

For finishing ap ≤ 3D, ae = 0.1 mm

Work materials	Aluminium- und Copper alloys	
Vc (m/min)	120 ~ 180	
Parameter / Mill-ø (mm)	No. of revolutions n (min^{-1})	Table feed Vf (mm/min)
4	12000	120
5	9600	
6	8000	
8	6000	
10	4800	
12	4000	100

Set the protrusion length as short as possible. Reduce number of revolutions and table feed in order to prevent chattering when the protrusion length is long.
Use the machine with high rigidity.
Adjust the number of revolutions and the table feed according to the situation of use (cutting depth or machine rigidity etc.)

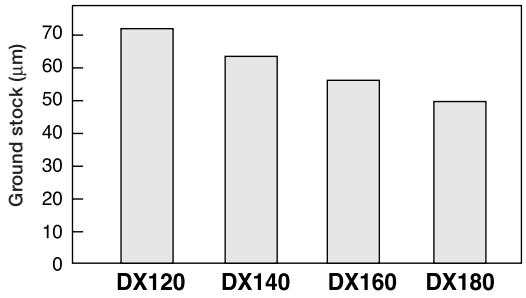
■ Practical examples

Work material	Aluminium alloy (AC4B-T6)	SiC-whisker reinforced aluminium alloy
Endmill	DEB1060 (ø6 mm)	DEB1100 (ø10 mm)
Cutting speed Vc (m/min)	68	113
Feed f (mm/t)	0.1 (360 mm/min)	0.05 (180 mm/min)
Cutting depth ap (mm)	2	1
Cutting width ae (mm)	3	6
Results	After machining for 20 min under above conditions, both the surface finish and accuracy of the work were good. Surface roughness of Rmax = 1.62 μm was attained.	After machining 12.6 m under above conditions, the flank wear was VB = 0.05 mm.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Grinding of T-DIA Tools

1. Comparison of grindability

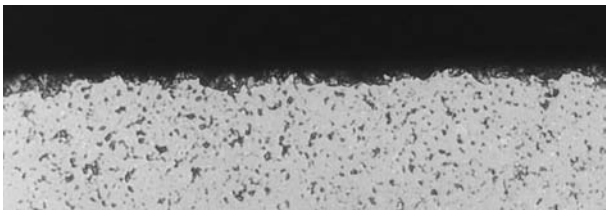


Grinding machine	Diamond tool grinder
Grinding wheel	Vitrified bond Cup-type diamond wheel #800/1000, ø150
Workpiece	Material: Four grades of T-DIA Ground surface area: 64 mm^2
No. of revolutions	1600 rpm
Grinding time	6 min

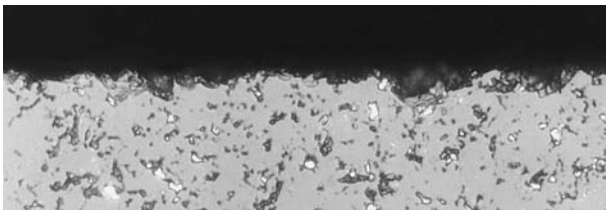
2. Comparison of obtainable edge sharpness for fine and coarse grained grades

(Magnification: 600x)

DX120



DX140



As the grain size is finer, the grindability and ground-edge sharpness are improved and burr-free and better surface is attainable.

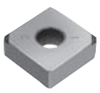
■ Standard regrinding method

T-DIA grades	DX160, DX140, DX120
Grinding machine	Highly rigid universal tool grinder
Grinding wheel Type Bond Grain size Concentration	 Diamond wheel Vitrified bond Rough grinding: #400 ~ #600 Finish grinding: Finer than #1000 100 ~ 125
Grinding conditions Grinding speed Oscillation cycle	 900 ~ 1200 m/min 30 ~ 60 cycle/min
Notes	● Generally, prehoning is not necessary. ● Cautious points • Use constant flood coolant. • A loaded or glazed wheel must not be used. • Always dress the wheel and keep fresh edges.

■ Excellent in hard machining up to 65 HRC

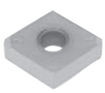
CBN in economic multi-cutting edge design

- Uncoated
- PVD coated
- Solid CBN

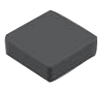


BX310 / BX330 / BX360 / BX380
Uncoated CBN
Extremly wear resistant up to robust, with economic multi-cutting edge design

BX90S
The robust Solid CBN grade for extreme roughing operations



BXC30 / BXC50
PVD coated CBN
For increased tool life and improved surface qualities



BXC90
Coated Solid CBN grade for extreme roughing operations

The specific features of the BX cutting grades provide for precision machining at extremly high cutting speeds (Vc > 300 m/min) for continuous up to interrupted cut

■ TAC inserts PCBN

Best suitable for finishing to roughing of cast irons and difficult-to-cut materials

Work material	Operation	Cutting depth ap (mm)	Cutting speed Vc (m/min)	Feed f (mm/rev)	Grade selection								
					BX310	BX330	BX360	BX380	BXC30	BXC50	BX850	BX950	BX480
Hardened steel 55 - 65 HRC	continuous cut	0.03 ~ 0.25	150 ~ 250	0.05 ~ 0.20	●	○			●	○			
	interrupted cut	0.03 ~ 0.25	150 ~ 200	0.05 ~ 0.20		○	●		○				
	heavy interrupted cut	0.03 ~ 0.25	120 ~ 180	0.05 ~ 0.20			○	○		●			
Grey cast iron GG25	continuous to interrupted cut	0.03 ~ 0.50	600 ~ 1200	0.05 ~ 0.30							○	●	
Sintermetals Sint D30 Sint D39	continuous to interrupted cut	0.03 ~ 0.50	150 ~ 400	0.05 ~ 0.30								○	●

Note: ● First choice ○ Second choice

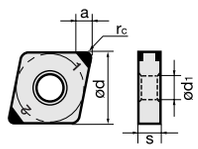
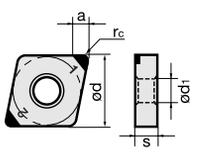
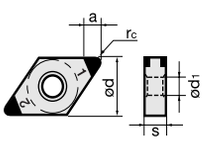
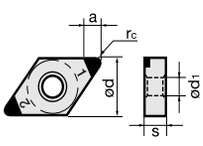
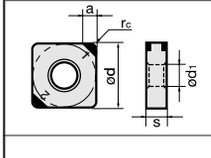
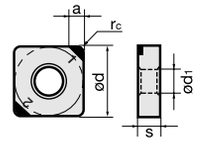
■ TAC inserts PCD

Best suitable for high-speed finishing of light alloys

Work materials	Operations	Cutting depth ap (mm)	Cutting speed Vc (m/min)	Feed f (mm/rev)	Grade selection			
					DX120	DX140	DX160	DX180
Aluminium alloys (Si < 12%)	Finishing	0.05 ~ 1.0	1000 ~ 2500	~ 0.2	○	●		
Aluminium alloys (Si 12 - 18%)		0.05 ~ 1.0	400 ~ 800	~ 0.2		○	●	○
Copper, brass		0.05 ~ 1.0	500 ~ 1500	~ 0.2	○	●		
Phosphor bronze		0.05 ~ 1.0	300 ~ 500	~ 0.2	○	●		
Carbon, graphite		0.05 ~ 1.0	300 ~ 500	~ 0.2		●	○	○
Fiber-reinforced plastics		0.05 ~ 1.0	500 ~ 1000	~ 0.1	●	○		
Plastics		0.05 ~ 0.5	500 ~ 1000	~ 0.05	●	○		
Cemented carbide (D40 ~ D50)		0.05 ~ 0.2	10 ~ 20	~ 0.05		○	○	●
Pre-sintered ceramics		0.05 ~ 0.2	100 ~ 150	~ 0.1			○	●

Note: ● First choice ○ Second choice

■ Negative inserts · Multi-corner type (Straight-lined one-wall recess for tip holding)

Shape	Cat. No.	Stocked grades									No. of cutting edges	Dimensions (mm)					Applicable TAC toolholder
		BXC30	BXC50	BX310	BX330	BX360	BX380	BX480	BX930	BX950		ød	s	ød1	rc	a	
	4QP-CNGA120404	●	●								4	12.7	4.76	5.16	0.4	2.3	A, D, P, M
	4QP-CNGA120408	●	●												0.8	2.2	
	4QP-CNGA120412	●	●												1.2	2.1	
	4QP-CNMA120404W		○												0.4	2.3	
	4QP-CNMA120408W		○												0.8	2.2	
	4QP-CNMA120412W		○												1.2	2.1	
	2QP-CNGA120404-L				○						2	12.7	4.76	5.16	0.4	2.3	A, D, P, M
	2QP-CNGA120404			●	●	●	●	○	○	●							
	T2QP-CNGA120404					○											
	2QP-CNGA120404-H					○	○										
	2QP-CNGA120408-L				○										0.8	2.2	
	2QP-CNGA120408			●	●	●	●	○	○	●							
	T2QP-CNGA120408					○											
	2QP-CNGA120408-H					○	○										
	2QP-CNGA120412-L				○										1.2	2.4	
	2QP-CNGA120412			●	●	●	●	○	○	●							
	2QP-CNGA120412-H					○	○										
	2QP-CNMA120404W				○										0.4	2.3	
	2QP-CNMA120408W				○										0.8	2.2	
	2QP-CNMA120412W				○										1.2	2.1	
	4QP-DNGA150404	●	●								4	12.7	4.76	5.16	0.4	2.5	A, D, P, M
	4QP-DNGA150408	●	●												0.8	2.1	
	4QP-DNGA150412	●	●												1.2	1.8	
	4QP-DNGA150604	●	●								4	12.7	6.35	5.16	0.4	2.5	
	4QP-DNGA150608	●	●												0.8	2.1	
	4QP-DNGA150612	●	●												1.2	1.8	
	2QP-DNGA150404-L				○						2	12.7	4.76	5.16	0.4	2.5	A, D, P, M
	2QP-DNGA150404			●	●	●	●	○	●	●							
	2QP-DNGA150404-H					○	○										
	2QP-DNGA150408-L				○										0.8	2.2	
	2QP-DNGA150408			●	●	●	●	○	●	●							
	2QP-DNGA150408-H					○	○										
	2QP-DNGA150412-L				○										1.2	2.0	
	2QP-DNGA150412			○	○	○	○	○	○	○							
	2QP-DNGA150412-H					○	○										
	2QP-DNGA150604			●	●	●	●		●	●	2	12.7	6.35	5.16	0.4	2.5	
	2QP-DNGA150608			●	●	●	●		●	●					0.8	2.2	
	2QP-DNGA150612			●	●	●	●		●	●					1.2	2.0	
	4QP-SNGA120404	●	●								4	12.7	4.76	5.16	0.4	2.4	A, D, P M, E Boring toolholder P, M
	4QP-SNGA120408	●	●												0.8	2.4	
	4QP-SNGA120412	●	●												1.2	2.4	
	2QP-SNGA120404-L				○						2	12.7	4.76	5.16	0.4	2.4	A, D, P M, E Boring toolholder P, M
	2QP-SNGA120404			●	●	●	●	○	●	●							
	2QP-SNGA120404-H					○	○										
	2QP-SNGA120408-L				○										0.8	2.4	
	2QP-SNGA120408			●	●	●	●	○	●	●							
	2QP-SNGA120408-H					○	○										
	2QP-SNGA120412-L				○										1.2	2.4	
	2QP-SNGA120412			●	●	●	●	○	●	●							
	2QP-SNGA120412-H				○	○											

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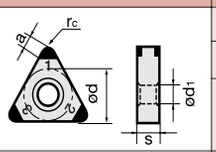
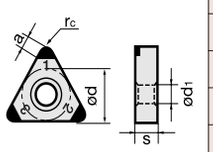
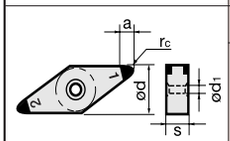
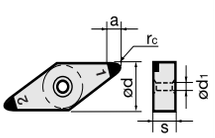
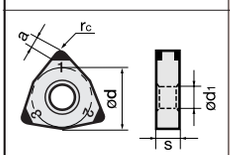
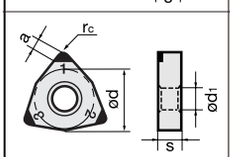
● : Standard stock in Europe ○ : Standard stock in Japan

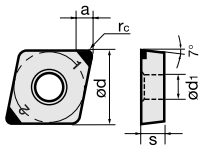
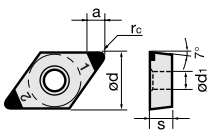
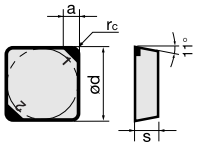
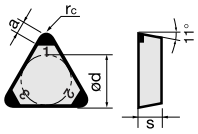
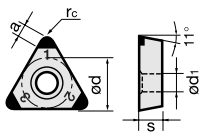
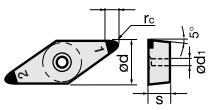
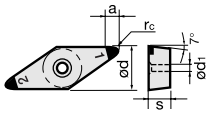
Shape	Cat. No.	Stocked grades									No. of cutting edges	Dimensions (mm)					Applicable TAC toolholder
		BXC30	BXC50	BX310	BX330	BX360	BX380	BX480	BX930	BX950		ød	s	ød1	rc	a	
	6QP-TNGA160404	●	●								6	9.525	4.76	3.81	0.4	2.2	A, D, P, M, E, W Boring toolholder M,P
	6QP-TNGA160408	●	●												0.8	1.9	
	6QP-TNGA160412	●	●												1.2	1.6	
	3QP-TNGA160404-L				○						3	9.525	4.76	3.81	0.4	2.2	A, D, P, M, E, W Boring toolholder M,P
	3QP-TNGA160404			●	●	●	●	○	●	●							
	T3QP-TNGA160404					○											
	3QP-TNGA160404-H					○	○										
	3QP-TNGA160408-L				○										0.8	2.0	
	3QP-TNGA160408			●	●	●	●	○	●	●							
	T3QP-TNGA160408					○											
	3QP-TNGA160408-H					○	○										
	3QP-TNGA160412-L				○										1.2	2.4	
	3QP-TNGA160412			●	●	●	●	○	●	●							
	3QP-TNGA160412-H					○	○										
	4QP-VNGA160404	●	●								4	9.525	4.76	3.81	0.4	3.1	M
	4QP-VNGA160408	●	●												0.8	2.2	
	2QP-VNGA160404-L				○						2	9.525	4.76	3.81	0.4	3.1	M
	2QP-VNGA160404			●	●	●	●	○	●	●							
	2QP-VNGA160404-H					○	○										
	2QP-VNGA160408-L			○											0.8	2.2	
	2QP-VNGA160408			●	●	●	●	○	●	●							
	2QP-VNGA160408-H					○	○										
	6QP-WNGA080408	●	●								6	12.7	4.76	5.16	0.8	2.2	A, D, M Boring toolholder P
	3QP-WNGA080408			○	○	○	○	○	○	○	3	12.7	4.76	5.16	0.8	2.2	A, D, M Boring toolholder P

● : Standard stock in Europe
○ : Standard stock in Japan

About catalog numbers of multi-corner type T-CBN inserts

1. The sign (-L or -H) at the end of catalog number shows the size of honing angle.
   - ● 2QP-CNGA120408-L ⟶ Small honing angle
     Wear resistance priority
   - ● 2QP-CNGA120408 ⟶ Standard honing angle
   - ● 2QP-CNGA120408-H ⟶ Large honing angle
     Impact resistance priority
2. T at the beginning of catalog number shows 10-inserts packing.
   Example: **T3QP-TNGA160408**

■ Positive inserts · Multi-corner type

Shape	Cat. No.	Stocked grades								No. of cutting edges	Dimensions (mm)					Applicable TAC toolholder
		BXC30	BX310	BX330	BX360	BX380	BX480	BX930	BX950		ød	s	ød1	r_c	a	
	2QP-CCMW060202	●	●	●						2	6.35	2.38	2.8	0.2	2.3	S
	2QP-CCMW060204	●	●	●	●			○	○					0.4	2.3	
	2QP-CCMW09T304	●	●	●	●			○	○		9.525	3.97	4.4	0.4	2.3	
	2QP-CCMW09T308	●	●	●	●									0.8	2.2	
	2QP-DCMW070202	●	●	●						2	6.35	2.38	2.8	0.2	2.7	S
	2QP-DCMW070204	●	●	●	●			○	○					0.4	2.5	
	2QP-DCMW11T302	●	●	●	●						9.525	3.97	4.4	0.2	2.7	
	2QP-DCMW11T304	●	●	●	●			○	○					0.4	2.5	
	2QP-DCMW11T308	●	●	●	●									0.8	2.1	
	2QP-SPMN090304			○	○			○		2	9.525	3.18	—	0.4	2.4	C Boring toolholder C
	2QP-SPMN090308			○	○			○						0.8	2.4	
	3QP-TPMN110302			○	○			○	○	3	6.35	3.18	—	0.2	2.3	C Boring toolholder C
	3QP-TPMN110304			○	○			○	○					0.4	2.2	
	3QP-TPMN110308			○	○			○	○					0.8	1.9	
	3QP-TPMN160304			○	○			○	○	3	9.525	3.18	—	0.4	2.2	
	3QP-TPMN160308			○	○			○	○					0.8	2.0	
	3QP-TPMW080204	●	●	●	●			●		3	4.76	2.38	2.3	0.4	2.2	Boring toolholder S
	3QP-TPMW090202			●	●			●		3	5.56	2.38	2.5	0.2	2.3	
	3QP-TPMW090204	●	●	●	●			●						0.4	2.2	
	3QP-TPMW110202	●	●	●	●			●		3	6.35	2.38	2.8	0.2	2.3	
	3QP-TPMW110204	●	●	●	●			●						0.4	2.2	
	3QP-TPMW110302	●	○	○	○			○	○	3	6.35	3.18	3.4	0.2	2.4	
	3QP-TPMW110304	●	●	●	●			●	●					0.4	2.2	
	3QP-TPMW110308	●	●	●	●			●	●					0.8	2.0	
	3QP-TPMW130302	●	●	●	●			●	●	3	7.94	3.18	3.4	0.2	2.4	
	3QP-TPMW130304	●	●	●	●			●	●					0.4	2.2	
	3QP-TPMW16T304	●	●	●	●			●	●	3	9.525	3.97	4.4	0.4	2.2	
	3QP-TPMW16T308		○											0.8	1.9	
	3QP-TPMW160404	●	●	●	●			●		3	9.525	4.76	4.4	0.4	2.2	
	3QP-TPMW160408	●	●	●	●			●						0.8	2.0	
	2QP-VBMW110304	●	○	○	○			○		2	6.35	3.18	2.8	0.4	3.1	S Boring toolholder S
	2QP-VBMW110308	●	○	○	○			○						0.8	2.2	
	2QP-VBMW160404	●	●	●	●					2	9.525	4.76	4.4	0.4	2.2	
	2QP-VBMW160408	●	●	●	●									0.8		
	2QP-VCMW160404			○	○			○		2	9.525	4.76	4.4	0.4	2.2	S Boring toolholder S

● : Standard stock in Europe
○ : Standard stock in Japan

■ Standard cutting conditions

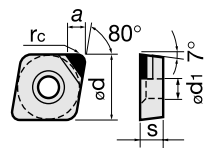
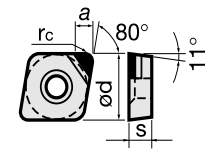
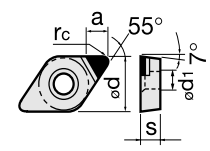
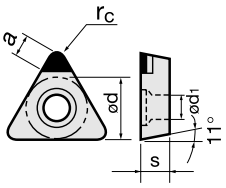
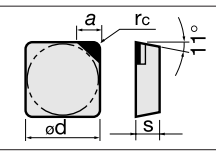
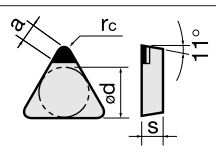
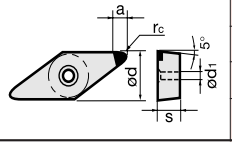
Grade	Work material and applications		Cutting speed Vc (m/min)	Feed f (mm/rev)	Cutting depth ap (mm)	Use of coolant
BX310	Hardened steels	High-speed continuous to light interrupted cutting	100 ~ 300	~ 0.2	~ 0.5	Possible
BXC30		Medium to high-speed, continuous to light interrupted cutting	50 ~ 200			
BX330		Medium to high-speed, light to heavy interrupted cutting				
BX360						
BX380		Medium to high-speed, heavy interrupted cutting				
BXC50		High-speed continuous to interrupted cutting	50 ~ 250			
BX450	Sintered metals	For gasoline engines (Plunging and traversing)	50 ~ 120	~ 0.2		
BX480		For diesel engines (Plunging and traversing)	30 ~ 80			
		Sintered metals for structure parts	100 ~ 280	~ 0.3		
BX850	Grey cast irons (Continuous to interrupted cutting)		300 ~ 1000	~ 0.3		
BX930			300 ~ 1200	~ 0.3		
	Ductile cast irons		100 ~ 500	~ 0.3		
	Roll steels		30 ~ 200	~ 0.5		
BX950	Difficult-to-cut materials (Nickel-based and titanium alloys)		70 ~ 300	~ 0.2		
	Grey cast irons (Light to heavy interrupted cutting)		300 ~ 1000	~ 0.3		
	VSR for diesel engines (Plunging and traversing)		30 ~ 80	~ 0.2		
	Sintered metals		70 ~ 200	~ 0.3		
	Thermal sprayed metals		30 ~ 230	~ 0.3		
	Roll steels		30 ~ 200	~ 0.5		

VSR : Valve seat ring

Notes in use:
1. For interrupted cutting, dry cutting is recommended.
2. QB-Mini inserts should be used for finishing at a cutting depth up to 0.5 mm.

● : Standard stock in Europe
○ : Standard stock in Japan

■ Positive inserts · Single-corner type

Type	Shape	Cat. No.	Stocked grades							No. of cutting edges	Dimensions (mm)					Applicable toolholder
			BX310	BX330	BX360	BX380	BX850	BX930	BX950		ød	s	ød1	rc	a	
One-Corner type		Q-CCMW060202	●	●						1	6.35	2.38	2.8	0.2	2.6	S
		Q-CCMW060204	●	●	●									0.4	2.5	
		Q-CCMW09T302	●	●						1	9.525	3.97	4.4	0.2	2.6	
		Q-CCMW09T304	●	●	●									0.4	2.5	
		Q-CCMW09T308	●	●	●									0.8	2.4	
		Q-CPMW060202	●	●						1	6.35	2.38	2.8	0.2	2.5	
		Q-CPMW060204	●	●	●									0.4	2.5	
		Q-CPMW090302	●	●						1	9.525	3.18	4.4	0.2	2.5	
		Q-CPMW090304	●	●	●									0.4	2.5	
		Q-CPMW090308	●	●	●									0.8	2.4	
		Q-DCMW070202	●	●						1	6.35	2.38	2.8	0.2	2.3	S
		Q-DCMW070204	●	●	●									0.4	2.1	
		Q-DCMW11T302	●	●	●					1	9.525	3.97	4.4	0.2	2.3	
		Q-DCMW11T304	●	●	●									0.4	2.1	
		Q-DCMW11T308	●	●	●									0.8	2.3	
		Q-TPMW080204		●						1	4.76	2.38	2.7	0.4	2.2	Boring toolholder S
		Q-TPMW090202		○						1	5.56	2.38	2.5	0.2	2.4	
		Q-TPMW090204		○										0.4	2.3	
		Q-TPMW110202	●	●						1	6.35	2.38	3.4	0.2	2.4	
		Q-TPMW110204	●	●	●									0.4	2.2	
		Q-TPMW110208	●	●	●									0.8	2.0	
		Q-TPMW110304	●	●	●					1	6.35	3.18	2.8	0.4	2.2	
		Q-TPMW110308	●	●	●									0.8	2.0	
		Q-TPMW130302	●	●						1	7.94	3.18	3.4	0.2	2.4	
		Q-TPMW130304	●	●	●									0.4	2.3	
		Q-TPMW130308	●	●	●									0.8	2.0	
		Q-TPMW16T304		○						1	9.525	3.97	4.4	0.4	2.3	
		Q-TPMW160404	●	●	●					1	9.525	4.76	4.4	0.4	2.3	
		Q-TPMW160408	●	●	●									0.8	2.0	
		Q-SPGN090304		●	●					1	9.525	3.18	—	0.4	2.8	C Boring toolholder C
		Q-SPGN090308		●	●									0.8	2.8	
		Q-SPGN120304		●	●					1	12.7	3.18	—	0.4	2.8	
		Q-SPGN120308		●	●									0.8	2.8	
		Q-TPGN110304		●	●					1	6.35	3.18	—	0.4	2.2	C Boring toolholder C
		Q-TPGN110308		●	●									0.8	2.2	
		Q-TPGN160304		●	●					1	9.525	3.18	—	0.4	2.3	
		Q-TPGN160308		●	●									0.8	2.0	
		Q-VBMW110204	●	●						1	11.2	2.38	2.8	0.4	3.1	
		Q-VBMW110208	●	●										0.8	2.2	
		Q-VBMW160404	●	●	●					1	9.525	4.76	4.4	0.4	2.6	
		Q-VBMW160408	●	●	●									0.8	2.2	

● : Standard stock in Europe
○ : Standard stock in Japan

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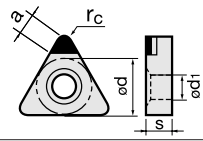
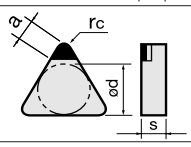
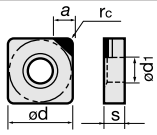
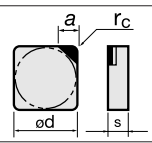
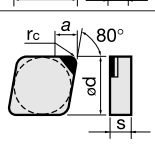
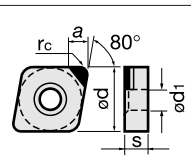
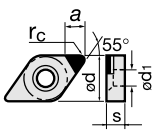
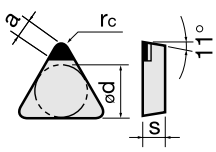
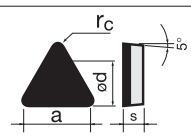
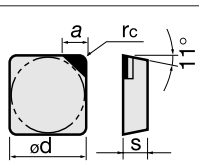
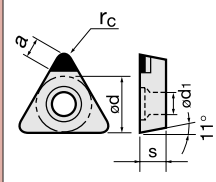
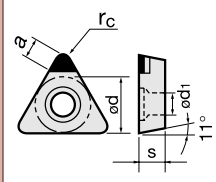
■ Big PCBN inlay

Type	Shape	Cat. No.	Stocked grades			Dimensions (mm)					Applicable toolholder
			BX330	BX360	BX850	ød	s	ød$_1$	r_c	a	
Negative Inserts		TNGA160402-QBN		○	○	9.525	4.76	3.81	0.2	4.4	A, D, P M, E, W Boring toolholder M, P
		TNGA160404-QBN	●	●	○			3.81	0.4	4.2	
		TNGA160408-QBN	●	●	○			3.81	0.8	4.0	
		TNGA160412-QBN	●	●	○			3.81	1.2	3.7	
		TNGN160402-QBN		○		9.525	4.76	—	0.2	4.4	M (Cutting edge style: F and G) C (Cutting edge style: F and G)
		TNGN160404-QBN	●	●	○			—	0.4	4.2	
		TNGN160408-QBN	●	●	○			—	0.8	4.0	
		TNGN160412-QBN	●	●	○			—	1.2	3.7	
		SNGA120402-QBN		○		12.7	4.76	5.16	0.2	4.1	A, D, P M, E Boring toolholder M, P
		SNGA120404-QBN	●	●	○			5.16	0.4	4.1	
		SNGA120408-QBN	●	●	○			5.16	0.8	4.1	
		SNGA120412-QBN	●	●	○			5.16	1.2	4.1	
		SNGN120402-QBN		○		12.7	4.76	—	0.2	4.1	C
		SNGN120404-QBN	●	●	○			—	0.4	4.1	
		SNGN120408-QBN	●	●	○			—	0.8	4.1	
		SNGN120412-QBN	●	●	○			—	1.2	4.1	
		CNGN090404-QBN		○		9.525	4.76	—	0.4	3.8	
		CNGN090408-QBN		○				—	0.8	3.8	
		CNGA120402-QBN		○		12.7	4.76	5.16	0.2	4.1	A, D, P, M
		CNGA120404-QBN	●	●	○			5.16	0.4	4.0	
		CNGA120408-QBN	●	●	○			5.16	0.8	3.9	
		CNGA120412-QBN	●	●	○			5.16	1.2	3.9	
		DNGA150402-QBN		●		12.7	4.76	5.16	0.2	4.3	A, D, P, M
		DNGA150404-QBN		○	○			5.16	0.4	4.1	
		DNGA150408-QBN		○	○			5.16	0.8	3.8	
		DNGA150412-QBN		○	○			5.16	1.2	3.4	
		DNGA150602-QBN				12.7	6.35	5.16	0.2	4.3	
		DNGA150604-QBN	●	●				5.16	0.4	4.1	
		DNGA150608-QBN	●	●				5.16	0.8	3.8	
		DNGA150612-QBN	●	●				5.16	1.2	3.4	
Positive Inserts		TPGN110304-QBN		○		6.35	3.18	—	0.4	3.7	C
		TPGN110308-QBN		○				—	0.8	3.5	
		TPGN160304-QBN		○		9.525		—	0.4	4.2	
		TPGN160308-QBN		○				—	0.8	4.0	
		TBGN060104-15-QBN	●	●		3.97	1.59	—	0.4	5.6	
		TBGN060108-15-QBN	●	●				—	0.8	5.2	
		SPGN090304-QBN		○		9.525	3.18	—	0.4	4.1	C Boring toolholder C
		SPGN090308-QBN		○				—	0.8	4.1	
		SPGN090312-QBN		○				—	1.2	4.1	
		SPGN120308-QBN		○		12.7		—	0.8	4.1	
		SPGN120312-QBN		○				—	1.2	4.1	

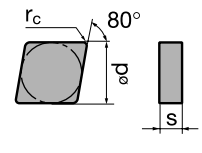
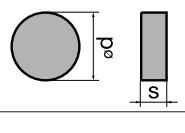
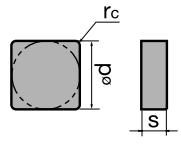
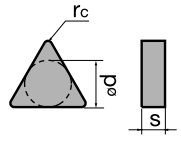
● : Standard stock in Europe
○ : Standard stock in Japan

Cutting data P. 443 | Reference guide | Grades P. 462

■ Big PCBN inlay

Type	Shape	Cat. No.	Stocked grades			Dimensions (mm)					Applicable toolholder
			BX330	BX360	BX850	ød	s	ød1	rc	a	
Positive Inserts	 (With Tungaloy standard hole)	TPGA090202-QBN		○		5.56	2.38	3.2	0.2	3.1	Mainly used for former positive rake TAC toolholder
		TPGA090204-QBN		○				3.2	0.4	2.9	
		TPGA110202-QBN		○		6.35		3.0	0.2	3.9	
		TPGA110204-QBN		○				3.0	0.4	3.7	
		TPGA110302-QBN		○			3.18	3.0	0.2	3.9	
		TPGA110304-QBN		○				3.0	0.4	3.7	
		TPGA160302-QBN		○		9.525		4.0	0.2	4.4	
		TPGA160304-QBN		○				4.0	0.4	4.2	
		TPGA160308-QBN		○				4.0	0.8	4.0	
Positive Inserts Boring (ISO standard hole)		TPGW090202-QBN		○		5.56	2.38	2.5	0.2	3.3	S-type TAC boring toolholder
		TPGW090204-QBN		○				2.5	0.4	3.2	
		TPGW110202-QBN		○		6.35		2.8	0.2	3.9	
		TPGW110204-QBN		○				2.8	0.4	3.7	
		TPGW130302-QBN		○		7.94	3.18	3.4	0.2	3.9	
		TPGW130304-QBN		○				3.4	0.4	3.7	
		TPGW16T302-QBN		○		9.525	3.97	4.4	0.2	4.4	
		TPGW16T304-QBN		○				4.4	0.4	4.2	
		TPGW16T308-QBN		○				4.4	0.8	4.0	

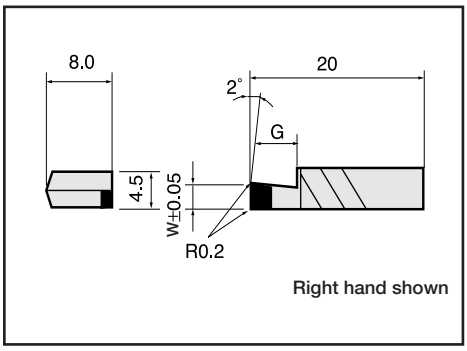
■ Solid PCBN

Type	Shape	Cat. No.	Accuracy	Stocked grades		Dimensions (mm)			Applicable toolholder
				BXC90	BX90S	ød	s	rc	
Negative inserts, Solid CBN		S-CNGN090308	G	○		9.525	3.18	0.8	
		S-CNGN090312		○				1.2	
		CNMN090308	M		○	9.525	3.18	0.8	
		CNMN090312			○			1.2	
		S-CNGN120408	G	○		12.7	4.76	0.8	
		S-CNGN120412		○				1.2	
		CNMN120408	M		○	12.7	4.76	0.8	
		CNMN120412			○			1.2	
		S-RNGN090300	G	○		9.525	3.18	—	
		RNMN090300	M		○				
		S-RNGN120400	G	○		12.7	4.76	—	
		RNMN120400	M		○				
		S-SNGN090308	G	○		9.525	3.18	0.8	
		S-SNGN090312		○				1.2	
		SNMN090308	M		○	9.525	3.18	0.8	
		SNMN090312			○			1.2	
		S-SNGN120308	G	○		12.7	3.18	0.8	
		S-SNGN120312		○				1.2	
		SNMN120308	M		○	12.7	3.18	0.8	
		SNMN120312			○			1.2	
		S-SNGN120408	G	○		12.7	4.76	0.8	
		S-SNGN120412		○				1.2	
		SNMN120408	M		○	12.7	4.76	0.8	
		SNMN120412			○			1.2	
		S-TNGN110308	G	○		6.35	3.18	0.8	
		S-TNGN110312		○				1.2	
		TNMN110308	M		○	6.35	3.18	0.8	
		TNMN110312			○			1.2	
		S-TNGN160408	G	○		9.525	4.76	0.8	
		S-TNGN160412		○				1.2	
		TNMN160408	M		○	9.525	4.76	0.8	
		TNMN160412			○			1.2	

Note: BX90S available with specific micro geometry.

● : Standard stock in Europe ○ : Standard stock in Japan

● For grooving



Cat. No.	Stocked BX360 R	Stocked BX360 L	Max. grooving depth D	Dimensions (mm) W	Dimensions (mm) G	Applicable toolholder
XGR/L6310S-QBN			1.5	1.0	2.5	GX-2020R/L□ GX-2525R/L□
XGR/L6315S-QBN	○		2.3	1.5	2.5	
XGR/L6320S-QBN	○		3.0	2.0	3.2	
XGR/L6325S-QBN	○		3.8	2.5	3.9	
XGR/L6330S-QBN	○		4.5	3.0	4.6	
XGR/L6335S-QBN	○		5.3	3.5	5.4	
XGR/L6340S-QBN	○		6.0	4.0	6.1	
XGR/L6345S-QBN	○		7.0	4.5	6.1	

Grinding of PCBN

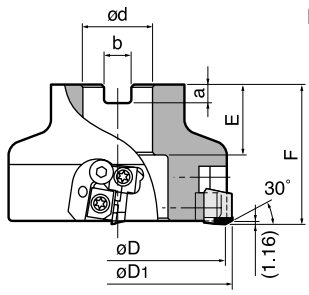
● Method of Regrinding

Grade PCBN	PCBN
Grinding machine	Universal tool grinder
Grinding wheel	
Type	Diamond wheel
Bond	Resinoid bond
Grain size	For roughing: #240 ~ #400
	For finishing: #600 or finer
Concentration	100 ~ 125
Grinding conditions	
Grinding speed	900 ~ 1200 m/min
Oscillation cycle	30 ~ 60 cycle/min
Notes	Method of prehoning Use a #1000, resinoid bond hand stick. Honing specifications: 0.1 mm X (-15° ~ -25°)
	● Cautionary points in grinding • Use flood coolant. • Use a sufficiently dressed wheel. • Do not use a glazed or loaded wheel.

All-CBN Tipped Mills

QPP15

High-speed and high-precision finishing of grey cast irons

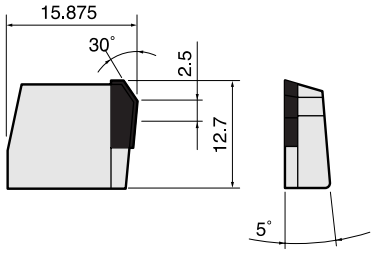


Rake angle: A.R. + 5.5° R.R. -3°

Max. cutting depth: 1.0 mm
Right hand (R) shown

Cat. No.	Stock R	Stock L	No. of inserts	Dimensions (mm) øD	øD1	ød	E	F	a	b	Weight (kg)	Mounting details
QPP15080R/L-E			4	80	84	27	26	50	7	12.4	1.1	P. 339Ⓐ
QPP15100R/L-E			6	100	104	32	28.5	63	8	14.4	2.1	
QPP15125R/L-E			6	125	129	40	32	63	9	16.4	3.7	P. 339Ⓑ
QPP15160R/L-E			8	160	164	40	29	63	9	16.4	5.3	
QPP15200R/L-E			10	200	204	60	38	63	14	25.7	8.3	P. 339Ⓒ
QPP15250R/L-E			12	250	254	60	38	63	14	25.7	13.5	
QPP15315R/L-E			14	315	319	60	38	63	14	25.7	22.6	P. 339Ⓓ
QPP15355R/L-E			16	355	359	60	38	80	14	25.7	33.4	
QPP15400R/L-E			18	400	404	60	38	80	14	25.7	43.3	

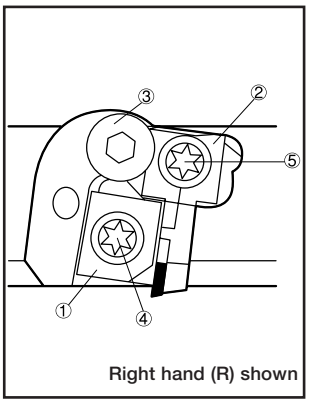
■ Inserts



Right hand (R) shown

Cat. No.	Grades	Stock
YPEN1505PPTR-Q	BX950	●

■ Replacement parts



Right hand (R) shown

No.	Description	Parts Cat No.
①	Insert locking wedge	FW304R/L-D
②	Locator adjusting wedge	FW325R/L-D
③	Screw for preventing wedge from flying out	BHM615-GT
④	Wedge fixing screw (for øD = 80)	FDS-8ST-18
	Wedge fixing screw (for øD > 80)	FDS-8ST
⑤	Adjusting wedge fixing screw	FDS-8ST-18
-	Wrench	T-27T

■ Standard cutting conditions

Work materials	Insert grade	Cutting speed Vc (m/min)	Feed per tooth ft (mm/t)	Cutting depth ap (mm)
Grey cast irons (GG25 ~ GG35)	BX950	350 ~ 2000	0.1 ~ 0.25	0.1 ~ 1.0

● Note: Dry cutting is recommended.

- No. of revolutions n (rpm) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Table feed Vf (mm/min) = n (rpm) × Feed per tooth ft (mm/t) × t (No. of inserts)

Features

1 Highly efficient and accurate machining capability

Rz ≤ 3.0 μm, Rmax ≤ 6.0 μm

2 Provided with adjusting mechanism for all the inserts

- Attainable axial runout: Within 5 μm
- Inserts are regrindable

3 Superior resistance to centrifugal force

Even when using at speeds as high as 2000 m/min, inserts are firmly locked and free from any movement or looseness.

MEMO

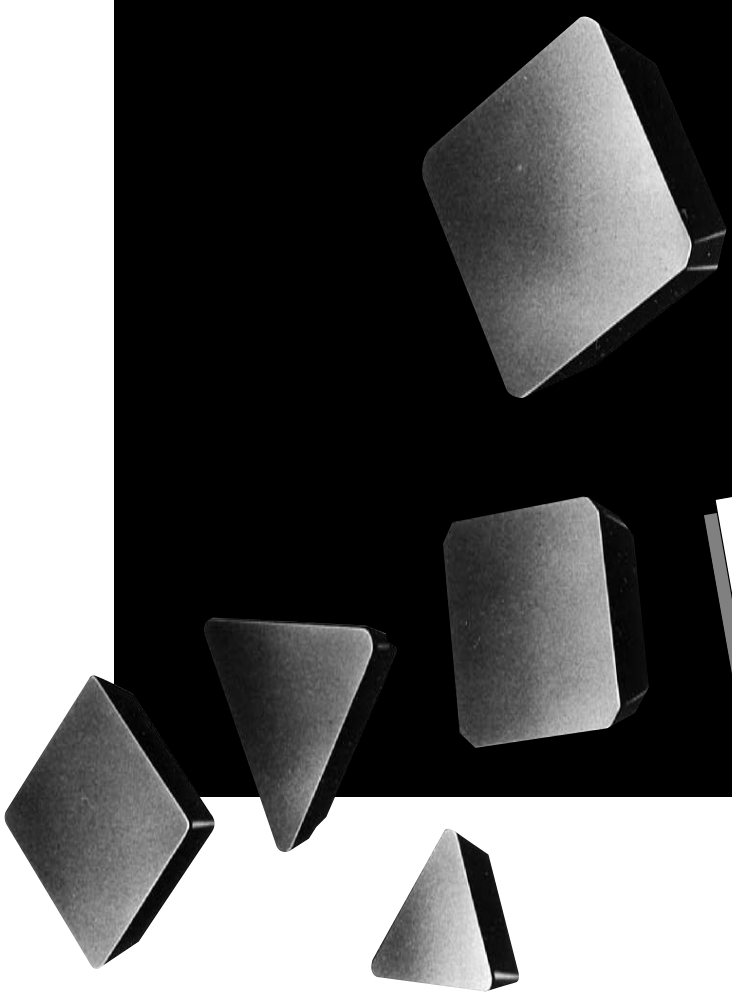
MEMO

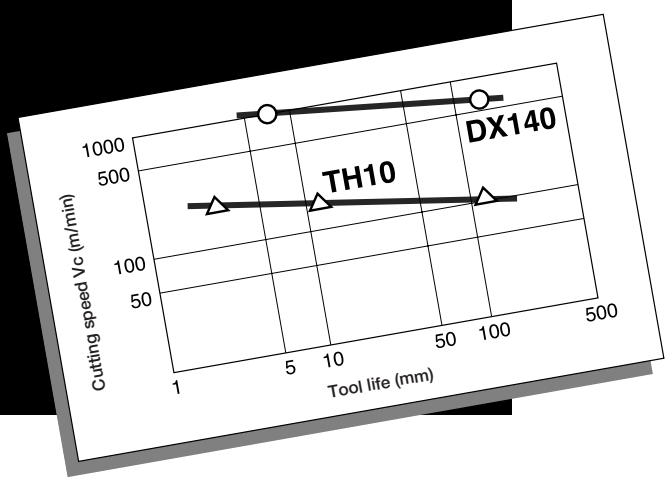
MEMO

MEMO

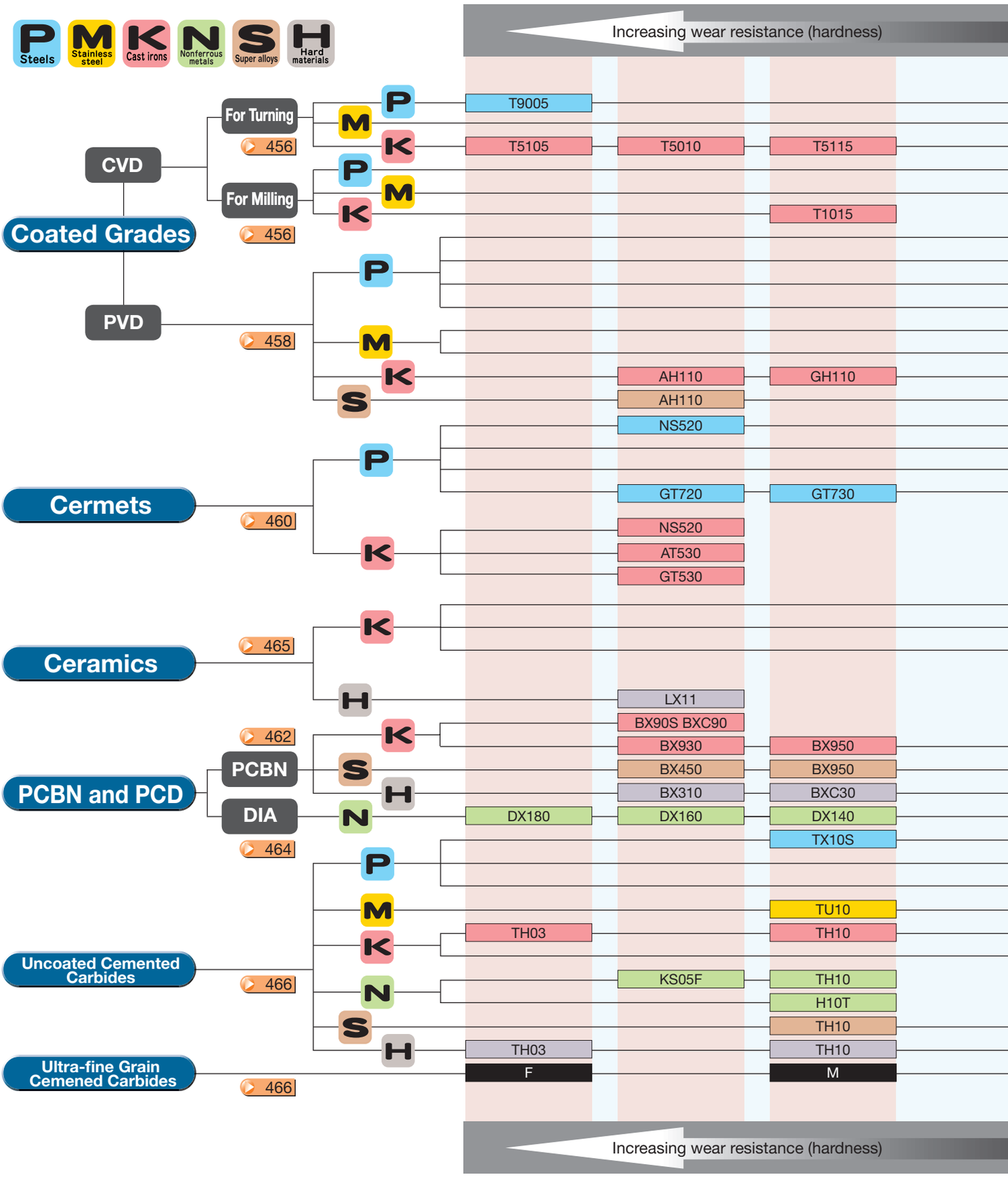
Grades and Technical Data

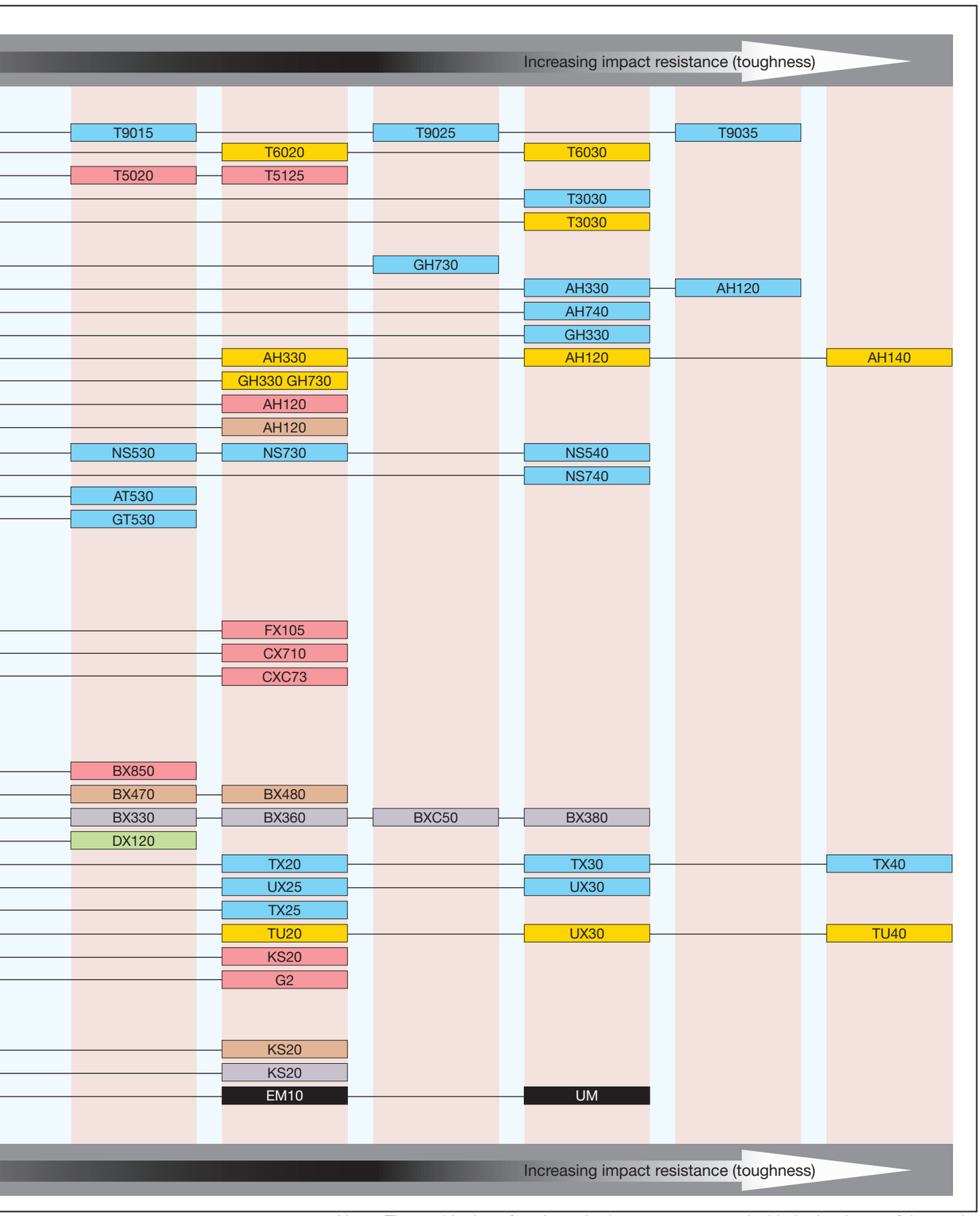
12





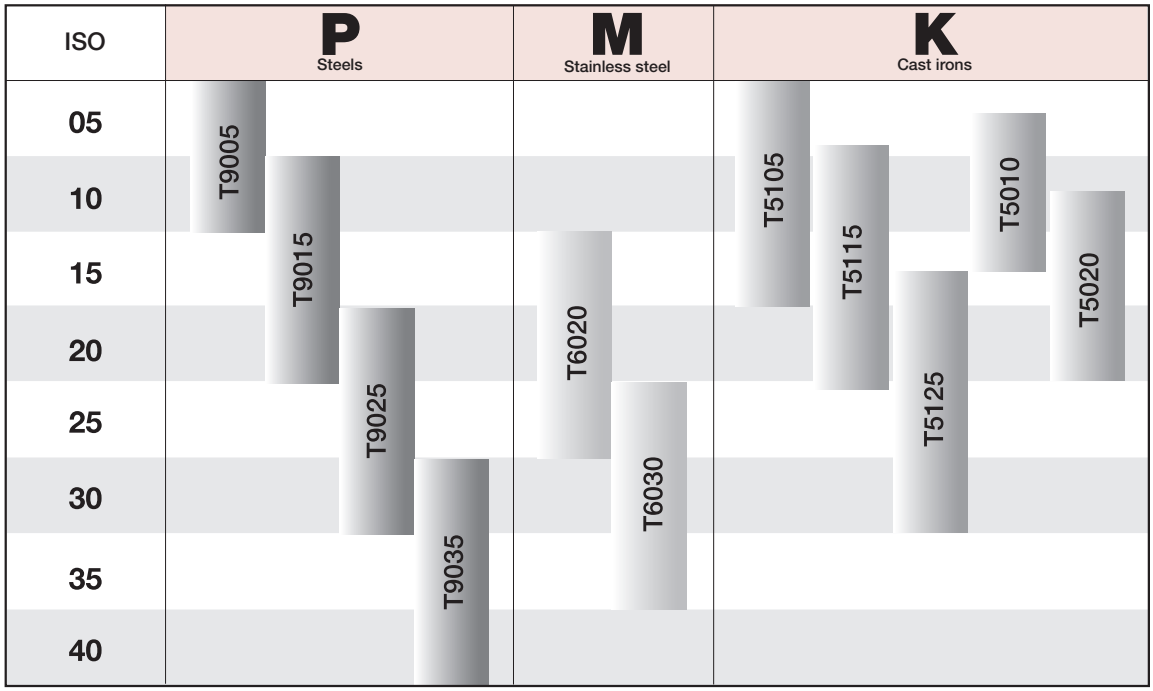
Grade Selection





Note : The positioning of each grade does not correspond with the hardness of the grade.

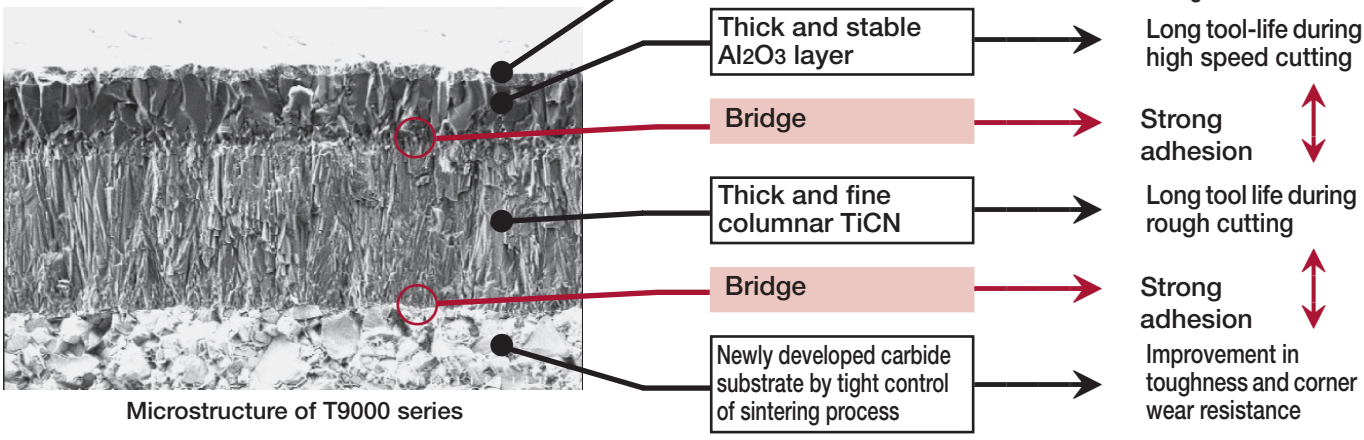
CVD (Chemical Vapor Deposition) Coated Grades for Turning



CVD coated carbide grades consist of a cemented carbide substrate over which TiC, TiN, or Al_2O_3, etc. are deposited to about 3 to 16 μm thick by means of a chemical vapor deposition method.
The coating layer is hard and superior in heat and oxidation resistance, and chemically stable. With these advantages, these coated grades ensure longer tool life and high-efficiency machining.

T9000 series

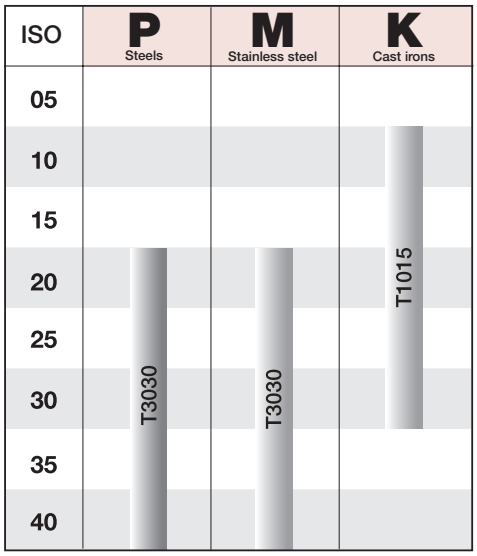
Our new Double-Bridge Technology enables thicker coatings to be applied while preventing the layers from peeling off.



Microstructure of T9000 series

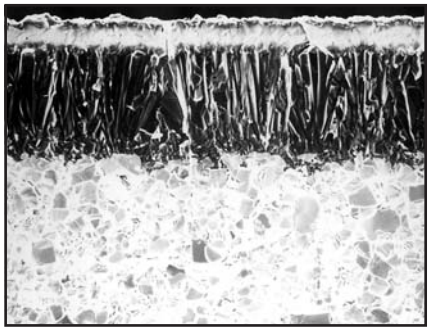
Application	Grade Application code	Substrate			Coating layer		Features
		Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Main composition	Thickness (μm)	
P Steels	T9005 P05 - P10	14.1	91.5	2.4	Fine columnar TiCN + Al_2O_3	16	•Realization of excellent adhesion by "Double-Bridge" effect. •T9005 shows excellent performance during high speed cutting. •T9015 shows good balance of wear resistance and impact resistance. •T9025 shows excellent impact resistance during light to medium interrupted cutting. •T9035 shows extremely high impact resistance during heavy interrupted cutting.
	T9015 P10 - P20	13.8	91.0	2.4		16	
	T9025 P20 - P30	13.7	90.0	2.5		14	
	T9035 P30 - P40	13.5	89.0	2.6		14	
M Stainless steel	T6020 M15 - M25	14.1	90.0	2.5	Special titanium compound (columnar)	6	T6000 series have improved notch wear resistance and chipping resistance by a combination of special substrates and extremely high coating adhesion. •T6020: Applicable for medium to high speed cutting and continuous to light interrupted cutting. •T6030: Applicable for low to medium speed cutting. Has extremely excellent impact resistance. For interrupted cutting.
	T6030 M25 - M35	14.6	89.0	2.6		6	
K Cast irons	T5105 K05 - K15	15.0	92.5	2.4	Fine columnar TiCN + Al_2O_3	16	The coating layer of T5100 features fine-grained and hard columnar crystals of Ti (C, N) and its wear resistance is drastically improved. Moreover, combined with the dedicated cemented carbide substrate, which has fine structure and high-strength, three grades of T5100 series has realized excellent cutting performance in a wide range of cast iron turning. •T5105: Excels in wear and deformation resistance in high-speed, continuos turning. •T5115: General purpose grade which achieves stable machining in a wide range of cutting conditions from continuous to interrupted cutting. •T5125: Espacially excels in heavily interrupted cutting. Very tough grade having high resistance to unpredicted breakage.
	T5115 K10 - K20	14.8	91.5	2.7		16	
	T5125 K15 - K30	14.0	90.5	2.8		16	
	T5010 K05 - K15	14.7	92.0	2.4	Columnar TiCN + Al_2O_3	16	T5000 series have improved adhesion and wear resistance. •T5010: For continuous to light interrupted cutting of cast irons and ductile cast irons. •T5020: For continuous to medium interrupted cutting of cast irons and ductile cast irons.
	T5020 K10 - K25	14.5	91.0	2.8		16	
	T313V —	14.5	90.5	2.3	Special titanium compound (columnar) + Al_2O_3	3	•Features specially engineered substrate with excellent resistance to impacts and plastic deformation and well controlled coating composition and layer thickness.

CVD (Chemical Vapor Deposition) Coated Carbide Grades for Milling



CVD coated carbide grades consist of a cemented carbide substrate over which TiC, TiN, or Al_2O_3, etc. are deposited to about 6 to 8 μm thick by means of a chemical vapor deposition method.

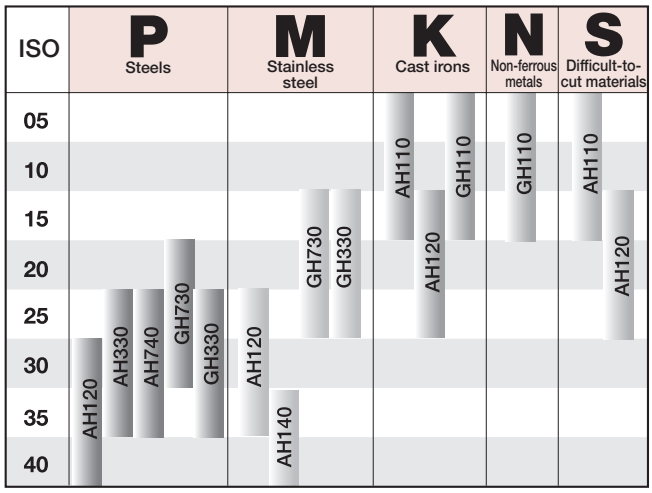
The coating layer is hard and superior in heat and oxidation resistance, and chemically stable. With these advantages, these coated grades ensure longer tool-life and appropriate for high-efficiency machining.



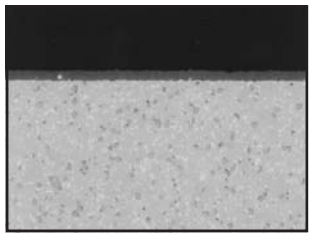
Microstructure of T1015 (SEM)

Application	Grade Application code	Substrate			Coating layer		Features
		Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Main composition	Thickness (μm)	
P Steels	T3030 P20 - P40	14.2	89.5	2.8	Columnar TiCN + Al_2O_3	6	•Realization of excellent adhesion by "Double Bridge" effect. •For milling of steels and stainless steels. •Shows good balance of wear resistance and impact resistance.
M Stainless steel	T3030 M20 - M40	14.2	89.5	2.8	Columnar TiCN + Al_2O_3	6	•Realization of excellent adhesion by "Double Bridge" effect. •For milling of steels and stainless steels. •Shows good balance of wear resistance and impact resistance.
K Cast irons	T1015 K10 - K30	14.9	91.5	2.7	Columnar TiCN + Al_2O_3	8	•Features special carbide substrate designed to have high resistance to impacts, thermal cracks and plastic deformation. •Excels in adhesion between coating and substrate.

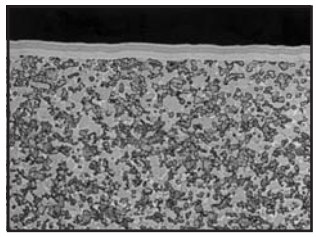
PVD (Physical Vapor Deposition) Coated Carbide Grades



PVD coated carbides consist of a cemented carbide substrate over which titanium compound such as TiN is covered to about 1 to 5 μm thick by means of a physical vapor deposition PVD) method. Because of the lower coating temperature, the substrate does not form any brittle harmful layer and can retain the original shape and dimension. The Ti(C,N,O) base coating is superior to TiN coating in wear resistance. And, (Ti,Al)N base coating has higher resistance to oxidation. Due to the excellent toughness of both coating and substrate, these grades are suitable for interrupted cutting. Their sharp cutting edge allows the grades to be used for cutting difficult-to-cut materials which tend to be work-hardened.



Microstructure of "Flash-Coat"

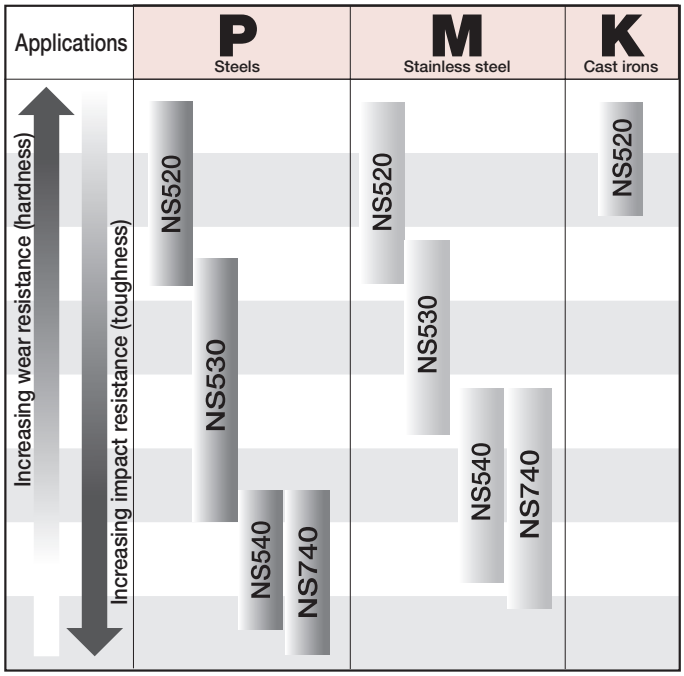


Microstructure of "Premium Coat"

Application	Grade Application code	Substrate			Coating layer		Features
		Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Main composition	Thickness (μm)	
P Steels	AH120 P30 - P40	14.5	90.8	2.8	(Ti,Al)N base	3	•Used for steels, cast irons, stainless steels and heat resisting alloys. •Substrate is K20 carbide. Excels in high-temperature strength.
	AH330 P25 - P35	12.6	91.1	2.3		3	•General purpose grade for steels. •Substrate is P30 carbide. Excels in high-temperature strength.
	AH740 P25 - P35	13.9	91.5	3.5		3	•General purpose grade for steels. •Excels in high temperature strength and chipping resistance.
	GH730 P20 - P30	14.4	91.5	3.0	Ti(C,N,O)base	3	•PVD coated ("Premium Coat") fine grain cemented carbides. •For grooving and parting at low speed.
	GH330 P25 - P35	12.6	91.1	2.3		3	•General purpose grade for steels and stainless steel. •Substrate is highly reliable P30 grade. Excels in wear resistance.
M Stainless steel	AH120 M25 - M35	14.5	90.8	2.8	(Ti,Al)N base	3	•For continous to medium interrupted cutting of stainless steels.
	AH140 M35 - M40	14.4	89.5	2.6		3	•For milling of stainless steels (at low speed).
	GH730 M15 - M25	14.4	91.5	3.0	Ti(C,N,O)base	3	•PVD coated ("Premium Coat") fine grain cemented carbides. •For grooving and parting at low speed.
	GH330 M15 - M25	12.6	91.1	2.3		3	•For continuous to medium interrupted cutting of stainless steels (at high speed).
K Cast irons	AH110 K05 - K15	14.7	92.0	2.4	(Ti,Al)N base	3	•Used for steels, cast irons, and heat resisting alloys. • For continuous to medium interrupted cutting of cast irons (at high speed).
	AH120 K15 - K25	14.5	90.8	2.8		3	•General grade for cast irons. For various cutting conditions
	GH110 K05 - K15	14.7	92.0	2.4	Ti(C,N,O)base	3	•For cast irons and non-ferrous metals. Excels wear resistance.
N Non-ferrous metals	GH110 N05 - N15	14.7	92.0	2.4	Ti(C,N,O)base	3	•For cast irons and non-ferrous metals. Excels wear resistance.
S Difficult-to-cut materials	AH110 S05 - S15	14.7	92.0	2.4	(Ti,Al)N base	3	•For cast irons and heat-resistant alloys. Especially excellent plastic deformation resistance.
	AH120 S15 - S25	14.5	90.8	2.8		3	•Excels to both plastic deformation and chipping resistance.
For small lathes	J740 —	13.9	91.5	3.5	TiN base	1	•For small lathes. Ultra-fine grain cemented carbides coated with TiN based compounds.

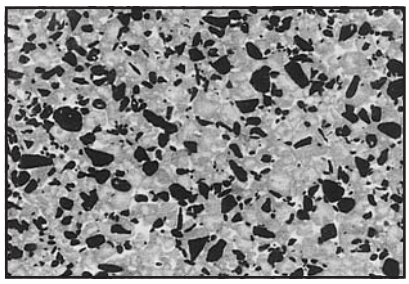
Cermet

■ Uncoated



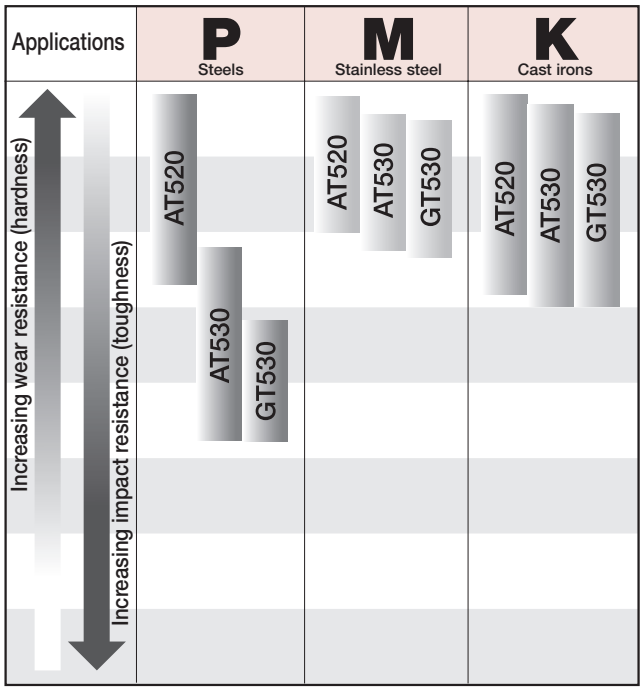
Cermet consists of a hard phase surrounded by binding phase as in the case of cemented carbides. The hard phase consists of mainly titanium carbide (TiC) and titanium nitride (TiN). These carbides and nitrides are superior in the strength and oxidation resistance at high temperature when compared with tungsten carbide (WC).

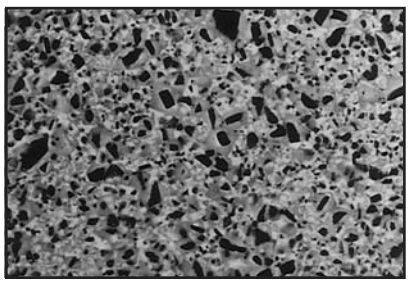
Furthermore, its little tendency to react with the work material ensures high crater resistance. Finally, cermet grades are applicable from high-speed cutting range to low-speed range and feature excellent surface roughness.



Microstructure of NS530 (SEM)

■ Coated





Microstructure of NS540 (SEM)

Cermet

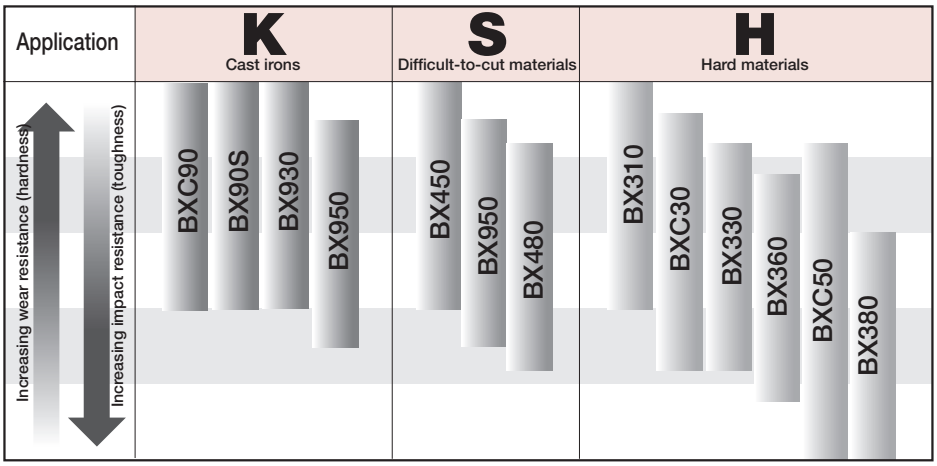
■ Uncoated

Application	Grade Application code	Substrate			Coating layer		Features
		Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Main composition	Thickness (μm)	
P Steels	NS520	6.6	92.1	1.7	–	–	• Used for high-speed, high-efficiency cutting of steels and cast irons. • Controlling the size of hard particles give this grade excellent wear and impact resistance.
	NS530	7.2	91.7	2.0	–	–	• General purpose grade for steels, cast irons and stainless steels. • Excels in both excellent wear resistance and toughness.
	NS730	6.8	92.0	2.2	–	–	• Priority on impact resistance • Superior resistance to thermal and mechanical fracture • Excels in cost performance
	NS540	7.0	92.0	2.0	–	–	• A highly tough cermet grade for general purpose. • Excels especially in thermal crack resistance and also provides both wear resistance and toughness.
	NS740	6.8	91.7	2.2	–	–	• High toughness grade for milling. • Excels especially in thermal crack resistance and also provides both wear resistance and excellent impact resistance.
	N308	6.9	91.8	1.7	–	–	• A general purpose grade provided with both excellent wear resistance and toughness. • For milling.
M Stainless steel	NS530	7.2	91.7	2.0	–	–	• General purpose grade for steels, cast irons and stainless steels. • Excels in both excellent wear resistance and toughness.
	NS730	6.8	92.0	2.2	–	–	• Priority on impact resistance • Superior resistance to thermal and mechanical fracture • Excels in cost performance
	NS540	7.0	92.0	2.0	–	–	• A highly tough cermet grade for general purpose. • Excels especially in thermal crack resistance and also provides both excellent wear resistance and toughness.
	NS740	6.8	91.7	2.2	–	–	• High toughness grade for milling. • Excels especially in thermal crack resistance and also provides both excellent wear resistance and excellent impact resistance.
	N308	6.9	91.8	1.7	–	–	• A general purpose grade provided with both excellent wear resistance and toughness. • For milling.
K Cast irons	NS520	6.6	92.1	1.7	–	–	• Used for high-speed, high-efficiency cutting of steels and cast irons. • Controlling the size of hard particles give this grade excellent wear and impact resistance.
	NS730	6.8	92.0	2.2	–	–	• Priority on impact resistance • Superior resistance to thermal and mechanical fracture • Excels in cost performance
	NS530	7.2	91.7	2.0	–	–	• General purpose grade for steels, cast irons and stainless steels. • Excels in both excellent wear resistance and toughness.

■ Coated

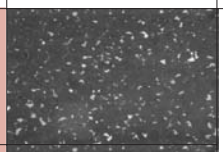
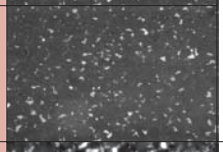
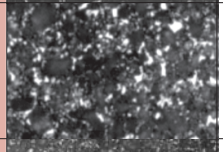
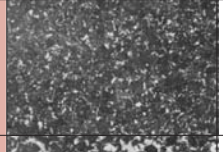
Application	Grade Application code	Substrate			Coating layer		Features
		Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Main composition	Thickness (μm)	
P Steels	AT520	6.6	92.1	1.7	(Ti,Al)N base	3	• PVD coated grade for high speed and finish cutting of steels. • Combination of cermet substrate with good wear resistance and coating layer with excellent heat resistance.
	AT530	7.2	91.7	2.0		3	• PVD coated grade for finish to medium cutting of steels. • Provided with plastic deformation resistant substrate and heat resistant coatings.
	GT520	6.6	92.1	1.7	Ti(C,N,O)base	3	• PVD coated grade for high speed and finish cutting of steels and cast irons. • Has improved wear resistance while maintaining excellent mechanical strength of the substrate.
	GT530	7.2	91.7	2.0		3	• PVD coated grade for finishing to medium cutting of steels and stainless steels. • Has improved wear resistance while maintaining excellent mechanical strength of the substrate.
	GT730	6.8	92.0	2.2	Ti(C,N,O)base	3	• PVD coated grade for finishing to medium cutting of steels and stainless steels. • Has improved wear resistance while maintaining excellent mechanical strength of the substrate.
M Stainless steel	GT530	7.2	91.7	2.0	Ti(C,N,O)base	3	• PVD coated grade for finishing to medium cutting of steels and stainless steels. • Increased wear resistance without lowering toughness of substrates.
	GT730	6.8	92.0	2.2	Ti(C,N,O)base	3	• PVD coated grade for finishing to medium cutting of steels and stainless steels. • Increased wear resistance without lowering toughness of substrates.
K Cast irons	GT520	6.6	92.1	1.7	Ti(C,N,O)base	3	• PVD coated grade for finishing to medium cutting of steels and cast irons. • Increased wear resistance without lowering toughness of substrates.
For small lathes	J530	7.2	91.5	2.0	TiN base	1	• For small lathes. • Cermets coated PVD-TiN based compounds.

Polycrystalline Cubic Boron Nitride Compacts (PCBN), T-CBN

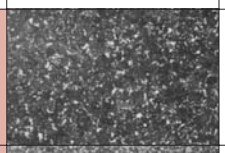
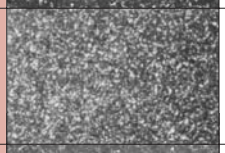
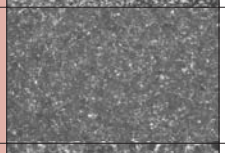
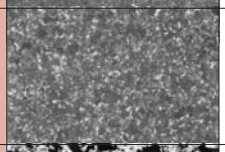
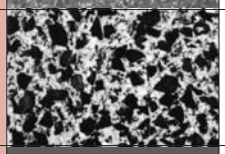
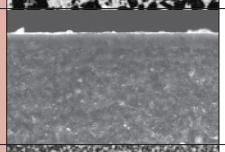
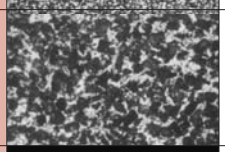
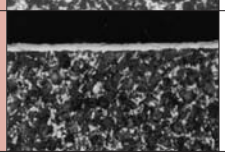
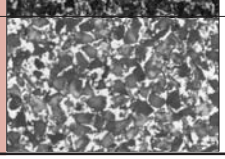


- This is a tool material, in which fine crystals of cubic boron nitride (the hardest material next to diamond) are tightly compacted and sintered on the cemented carbide base using special binder under high temperature and high pressure.
- The hardness is more than twice that of cemented carbide, with the hardness at high temperature exceeding that of cemented carbide.
- CBN has no tendency to react with ferrous materials (which is different from the case with diamond), and is thus suitable for high-speed cutting of cast iron, finishing of the hardened steel, cast iron, ferrous sintered metals (valve seat, etc.). Also, this material is suited for finishing of super heat resistant alloys.
- The use of CBN sintered material enables the finish surface accuracy (expected only through grinding up to now) simply by cutting.

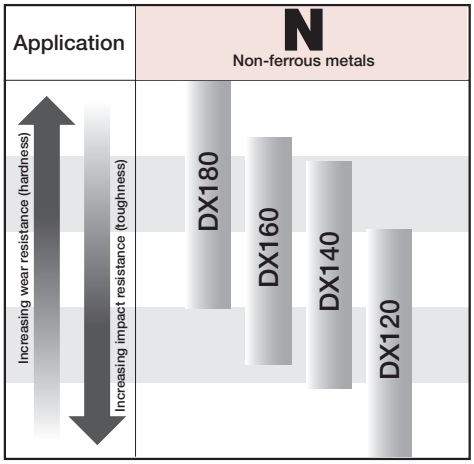
Polycrystalline Cubic Boron Nitride Compacts (PCBN), T-CBN

Application	Grade	Microstructure	Hardness (Hv)	Transverse rupture strength (GPa)	Coating layer		Features
					Main composition	Thickness (μm)	
K Cast irons	BX90S		3900-4100	1.80-1.90	–	–	• For high speed finishing to roughing of cast irons and rolled steels. • Solid CBN. • Higher heat conductivity.
	BXC90				(PVD)	1	• Coated solid CBN. • In addition to feature of BX90S, used corners are known at a glance.
	BX930		3000-3200	0.95-1.20	–	–	• Used for high-speed turning of grey and ductile cast irons. • Features moderate content of CBN sintered with special ceramic binder and excels in impact resistance.
	BX950		3900-4100	1.80-1.90	–	–	• Used for high-speed turning of heat resisting alloys, ferrous metals and cast irons and high-speed milling of cast irons. • Hardest T-CBN grade featuring high content of CBN sintered with cobalt based binder. • Provided with high transverse rupture strength comparable with cemented carbides.
	BX850		3300-3500	0.75-0.85	–	–	• Used for turning of grey cast irons. • Features moderate content of CBN sintered with special ceramic binder and excels in impact resistance.

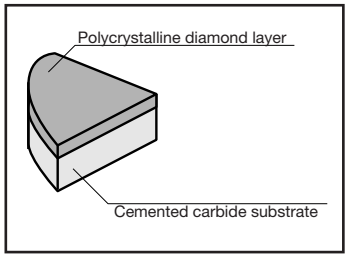
Polycrystalline Cubic Boron Nitride Compacts (PCBN), T-CBN

Application	Grade	Microstructure	Hardness (Hv)	Transverse rupture strength (GPa)	Coating layer		Features
					Main composition	Thickness (μm)	
S Difficult-to-cut materials	BX950		3900-4100	1.80-1.90	–	–	• Used for high-speed turning of heat resisting alloys, ferrous metals and cast irons and high-speed milling of cast irons. • Hardest T-CBN grade featuring high content of CBN sintered with cobalt based binder. • Provided with high transverse rupture strength comparable with cemented carbides.
	BX450		3100-3300	0.95-1.05	–	–	• Applicable for machining ferrous sintered metal (especially for valve seats). • Features fine grained CBN sintered with a special ceramic binder. • Excels in chipping resistance and finished surface roughness.
	BX470		4100-4300	1.90-2.10	–	–	• For ferrous sintered material. Extremely sharp cutting edge for excellent surface finish at minimum burr occurence.
H Hard materials	BX480		4100-4300	1.90-2.10	–	–	• For ferrous sintered material and hardened roll steels. It is highest of CBN contents and hardness in T-CBN grades.
	BX310		2700-2900	0.80-0.90	–	–	• Suitable for high-speed continuous turning of hardened steels and other hard materials with hardness of 54 to 65 HRC. • Features fine grained CBN sintered with a special ceramic binder and especially excels in wear resistance.
	BXC30		2800-3300	0.85-0.95	(PVD)	2	• Suitable for continuous to light interrupted turning of hardened steels and other materials with hardness of 54 to 65 HRC. • Features fine CBN grain sintered with special ceramic binder and smooth surface of newly developed PVD coated layer. Excels wear resistance and good surface roughness
	BX330		2800-3300	0.85-0.95	–	–	• Suitable for continuous to light interrupted turning of hardened steels and other hard materials with hardness of 54 to 65 HRC. • Features fine grained CBN sintered with a special ceramic binder and excels in wear resistance and surface roughness.
	BX360		3200-3400	1.00-1.10	(PVD)	–	• Used for light to heavy interrupted turning of hardened steels and other hard materials with hardness of 54 to 65 HRC. • Features fine to medium sized grain CBN sintered with a special ceramic binder and excels in impact resistance.
	BXC50		3500-3700	1.15-1.30	–	2	• Suitable for light interrupted to heavy interrupted turning of hardened steels and other hard materials with hardness of 54 to 65 HRC. • Features medium grain sized CBN sintered with a special binder. • T-CBN grade with special PVD coating layer.
	BX380		3500-3700	1.15-1.30	–	–	• Used for heavy interrupted turning of hardened steels and other hard materials with hardness of 54 to 65 HRC. • Features medium grained CBN sintered with a special ceramic binder and excels in impact resistance.

Polycrystalline Diamond Compact (PCD), T-DIA



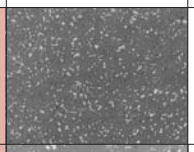
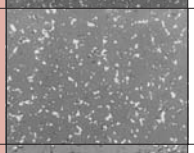
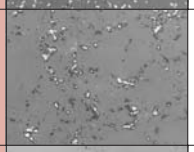
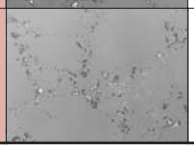
Diamond is the hardest known material on earth. This is an advanced diamond-based tool material, in which tiny diamond crystals are tightly sintered on the cemented carbide alloy base by means of a super high-pressure and -temperature process. When compared with the single-crystal diamond, the hardness is slightly lower, but PCD is uniform in structure. Additionally the heat resistance performance of single-crystal diamond can differ according to the crystal quality and orientation. PCD is therefore optimum for cutting of non-ferrous and non-metal materials.



Structure of T-DIA

■ Comparison of hardness

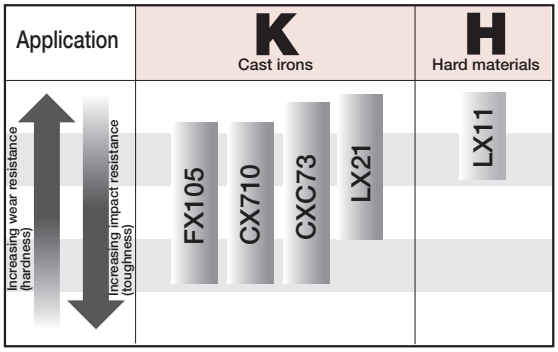
Tool material	Knoop hardness (Hk)
T-DIA	6000 ~ 9000
Natural diamond	8000 ~ 12000

Application	Grade	Microstructure	Diamond content Vol. %	Grain size (μm)	Hardness (Hv)	Strength (GPa)	Features
N Non-ferrous metals	DX120		88.0	4.5	9000	1.8	• For precision machining of non-ferrous metals and nonmetals where high-quality surface finish is required. • Features the finest grain structure in T-DIA series and excels in grindability and cutting edge sharpness.
	DX140		91.0	12.5	10000	1.7	• Used for machining of non-ferrous metals and nonmetals. • Composed of medium and fine grain diamond, provides moderate wear resistance and grindability.
	DX160		94.0	28	11000	1.6	• Can be used for machining half-sintered ceramics and cemented carbides, stones, and non-ferrous metals. • Mixed sintered compact composed of large and fine grain diamond. • Grindability is superior to that of DX180.
	DX180		96.5	45	12000	1.5	• Best suitable for turning half-sintered ceramics and cemented carbides. • Features the highest purity and large grain PCD with excellent wear resistance.

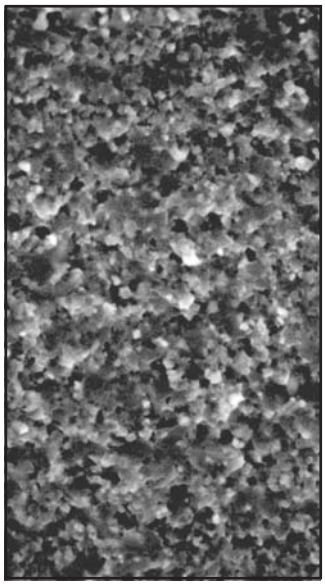
■ Regrinding method

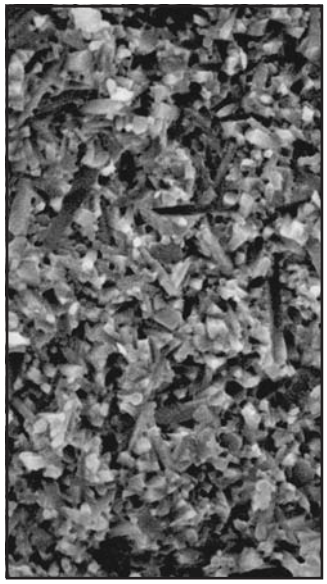
T-DIA Grade	DX180, DX160, DX140, DX120
Wheel	Diamond wheel
Bond	Vitrified bond
Grain size	Roughing: #400~600 Finishing: Finer than #1000
Concentration	100 ~ 125
Grinding speed	900 ~ 1200 m/min

Ceramics



Our ceramics consist of high-purity fine powder oxides, nitrides, and carbides sintered through normal pressure, gas pressure and HIP sintering. The fine and dense structure ensures superiority in wear resistance, adhesion resistance, oxidation resistance and heat resistance.
These grades enable high-speed cutting over a wide range from finishing to light cutting, offering high accuracy and high quality finished surfaces. Ceramics grades are classified into alumina-base and silicon-nitride-base groups, each selectable according to the application.

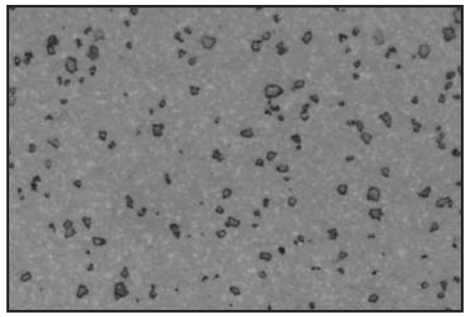

Microstructure of LX11 (SEM)


Microstructure of FX105 (SEM)

Application	Grade (Color)	Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Fracture Toughness K1c (MPa•m$^{1/2}$)	Modulus of elasticity (GPa)	Features
K Cast irons	FX105 Grey	3.24	93.0	1.3	6.1	290	• A silicon nitride based ceramics used for high speed cutting of cast irons. • Has superior strength, toughness and thermal characteristics compared with alumina-base ceramics.
	CX710 Grey	3.20	92.9	1.1	6.3	290	• Si_3N_4-based ceramics for high speed cutting of cast irons. • Higher of toughness and heat conductivity than FX105.
	LX21 Black	4.24	94.0	0.8	4.3	370	• Al_2O_3-based ceramics for continuous cutting of cast irons. • With adding titanium carbide to alumina, its toughness is improved while maintaining excellent wear resistance.
	CXC73 Gold	3.24	93.0	1.3	6.1	290	• CVD coated Si_3N_4 -based ceramics. • Excels good wear resistance and long tool life by thick and stable α-Al_2O_3 layer.
H Hard materials	LX11 Gold	4.35	94.0	0.9	4.3	400	• Al_2O_3-based ceramics used for continuous turning of ferrous hard materials. • Improved strength and toughness by fining down the crystallized particles of alumina and titanium carbonitride.

Uncoated Cemented Carbides (Tungaloy Cutting Tool Grades)

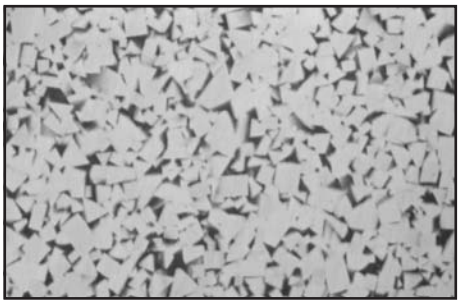
Cemented carbide, Tungaloy, is manufactured by sintering refractory carbide such as tungsten carbide (WC), titanium carbide (TiC), and tantulum carbide (TaC) powders with a binder metal like cobalt (Co). Our unique development and manufacturing technologies and stringent quality control ensure that Tungaloy has superior hardness (wear resistance) and strength (toughness) from room to high temperature range. Superiority in mechanical and thermal resistance when compared with the high-speed steel allows this alloy to be widely used in various cutting tools, wear and impact resistant tools and machine parts and civil-engineering or -mining tools.



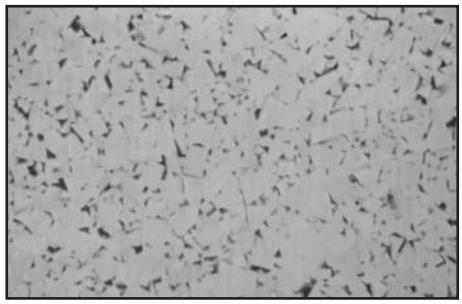
Microstructure of TH10

Application	ISO Application code	Tungaloy Grade	Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Compressive strength (GPa)	Modulus of elasticity (GPa)	Thermal expansion coefficient ($X10^{-6}/K$)	Thermal conductivity (W/m•K)
P Steels	P10	**TX10S**	10.5	91.8	1.9	4.5	500	6.4	18
	P20	**TX20**	11.8	91.5	2.1	4.7	520	5.8	35
	P20	**TX25**	11.8	91.5	2.2	4.7	540	5.7	38
	P20	**UX25**	12.3	90.9	2.5	4.9	530	5.8	34
	P30	**TX30**	12.6	90.8	2.3	4.9	560	5.8	48
	P30	**UX30**	12.6	91.1	2.3	4.9	490	5.8	38
	P40	**TX40**	12.7	89.9	2.4	4.6	520	5.5	52
M Stainless steel	M10	**TU10**	13.0	92.3	2.0	4.9	550	5.8	41
	M20	**TU20**	13.5	91.3	2.4	4.8	580	5.5	57
	M20	**UX25**	12.3	90.9	2.5	4.9	530	5.8	34
	M30	**UX30**	12.6	91.1	2.3	4.9	490	5.8	38
	M40	**TU40**	12.4	88.7	2.7	4.3	520	5.7	31
K Cast irons	K05	**TH03**	13.8	93.8	1.9	6.2	590	5.3	99
	K10	**TH10**	14.7	92.0	2.4	6.1	620	5.4	97
	K10	**G1F**	15.1	92.0	2.6	6.1	660	5.3	101
	K20	**G2F**	14.9	91.5	2.7	5.2	630	5.4	99
	K20	**G2**	15.0	90.8	2.7	5.2	640	5.4	99
	K20	**KS20**	14.5	90.8	2.8	6.1	620	5.4	96
	K30	**G3**	14.8	90.3	3.1	4.8	620	5.4	95
N Non-ferrous metals	N05	**KS05F**	15.0	93.0	2.9	5.9	640	5.4	90
	N10	**TH10**	14.7	92.0	2.4	6.1	620	5.4	97
S Super alloys	S10	**TH10**	14.7	92.0	2.4	6.1	620	5.4	97
	S20	**KS20**	14.5	90.8	2.8	6.1	620	5.4	96
H Hard materials	H05	**TH03**	13.8	93.8	1.9	6.2	590	5.3	99
	H10	**TH10**	14.7	92.0	2.4	6.1	620	5.4	97

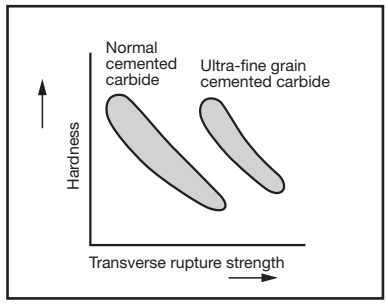
Ultra-fine Grain Cemented Carbides (Micro-Alloy)



Microstructure of EM10 (SEM) 1 μm



Microstructure of F (SEM) 1 μm



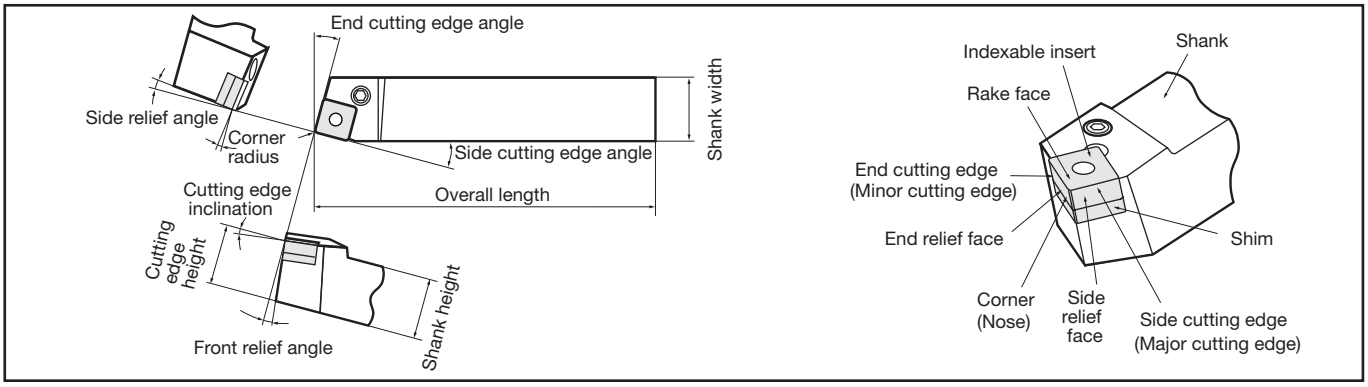
Mechanical properties of ultra-fine grain cemented carbide

Micro-Alloy is characterized by the WC hard phase (major component) which is extremely fine (average particle size 1 μm or less) when compared with normal cemented carbide alloys. This ensures higher strength (toughness) than the usual carbide alloy of the same hardness. Besides, this alloy demonstrates the high performance within the application range of high-speed steel tools. This is appropriate for the cutting tools when the workpiece is too small to achieve the high cutting speed or for a small-diameter end mill or drill.

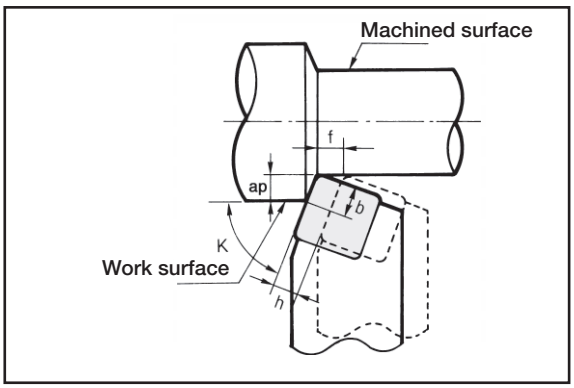
Grade	Specific gravity	Hardness (HRA)	Transverse rupture strength (GPa)	Compressive strength (GPa)	Modulus of elasticity (GPa)	Thermal expansion coefficient ($X10^{-6}/K$)	Thermal conductivity (W/m•K)	Features
F	14.9	93.4	2.5	6.9	640	5.4	85	• Hardest Micro-Alloy excels in wear resistance and cutting edge sharpen-ability. • Suitable for conditions of low speed, small cutting depth, and low feed. Mainly used for small tools such as for automatics.
M	14.5	92.5	2.8	6.4	580	5.6	74	• Used for conditions of low speeds, small to medium cutting depths, and low to medium feeds. • Tougher than F.
EM10	14.0	91.5	3.4	6.4	550	5.7	70	• Used for solid end mills and other milling cutters. • Provided with superior resistance to micro-chipping.
UM	13.9	90.9	3.5	5.8	520	5.8	67	• Toughest Micro-Alloy grade. • Excels in impact resistance. • Can withstand light impacts. Used for milling.

Turning Tools

■ Name of tool parts



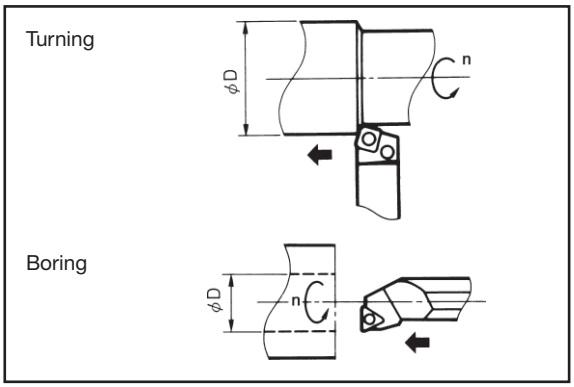
■ Relating angles between tool and workpiece



ap: Cutting depth (Distance between work surface and machined surface)
b: Length of cutting edge engaging in cutting.
K: Cutting edge angle (Angle to be made by cutting edge and work surface)
f: Feed per revolution
h: Thickness to be cut per revolution
Machined surface: Workpiece surface after having machined.
Work surface: Workpiece surface to be cut.

■ Calculation formulas for turning

● Cutting speed



When calculating cutting speed from number of revolutions:

$$Vc = \frac{D \times \pi \times n}{1000}$$

Vc : Cutting speed (m/min)
n : Number of revolutions (rpm)
D : Diameter of work piece (mm)
π : 3.14

Example:
$Vc = \frac{3.14 \times 150 \times 250}{1000} = 117$ m/min
Calculating the cutting speed when turning a 150 mm-diameter workpiece at 250 rpm

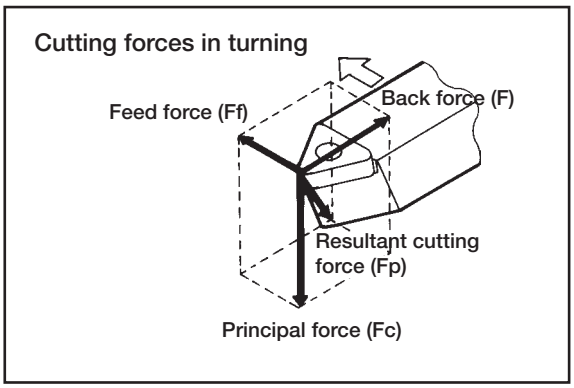
When calculating required number of revolutions from cutting speed:

$$n = \frac{1000 \times Vc}{\pi \times D}$$

● Cutting forces

(1) Finding from the diagram based on experimental data.

(2) In case determining by simplified equation:



$$Fc = ks \times ap \times f$$

Fc : Cutting force (kgf)(N)
ks : Specific cutting force MPa (N/mm²)
ap : Cutting depth (mm)
f : Feed (mm/rev)

Example:
Calculating the cutting force when cutting a high carbon steel (Ck55) at feed f = 0.2 (mm/rev) and cutting depth ap = 3 (mm)
Fc = 4500 x 3 x 0.2 = 2700N

Values of ks

Work materials	MPa (N/mm²)	kgf/mm²
Carbon steels	2500~4500	250~450
Alloy steels	2500~4500	250~450
Cast irons	1500~3500	150~300

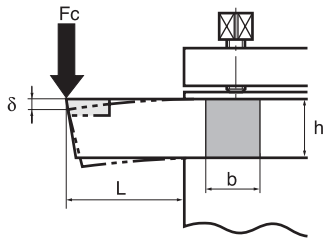
● Calculation of power consumption

$$Pc = \frac{Fc \times Vc}{60000 \times \eta}$$

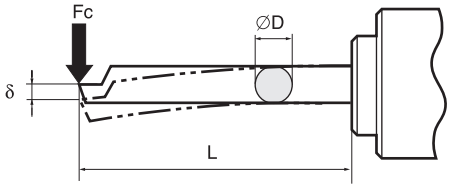
Pc: Power requirement (kw)
Fc: Cutting force (N)
Refer to previous page
V_c: Cutting speed (m/min)
η : Efficiency of machine (0.7 ~ 0.85)

● Bending stress and tool deflection

Square shank



Round shank



Bending stress

(1) Square shank

$$S = \frac{6 \times Fc \times L}{b \times h^2}$$

(2) Round shank

$$S = \frac{32 \times Fc \times L}{\pi \times D^3}$$

S : Bending stress in shank (MPa(N/mm²))
Fc: Cutting force (N)
L : Overhang length of tool (mm)
b : Width of shank (mm)
h : Height of shank (mm)
D : Diameter of shank (mm)
E : Modulus of elasticity of shank material (N/mm²)
δ : Bending (mm)
π : 3.14

Deflection of toolpoint (mm)

(1) Square shank

$$\delta = \frac{4 \times Fc \times L^3}{E \times b \times h^3}$$

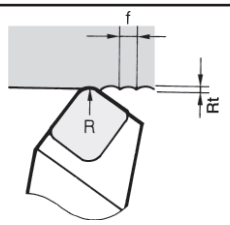
(2) Round shank

$$\delta = \frac{64 \times Fc \times L^3}{3 \times \pi \times E \times D^4}$$

(Ref.) Values of E

Material	MPa (N/mm²)	kgf/mm²
Steel	210000	21000
Cemented Carbide	560000-620000	56000-62000

● Theoretical surface finish



$$Rt = \frac{f^2}{8R} \times 1000$$

Rt: Surface finish (μm)
f : Feed (mm/rev)
R : Nose radius (mm)

● Tool Geometry

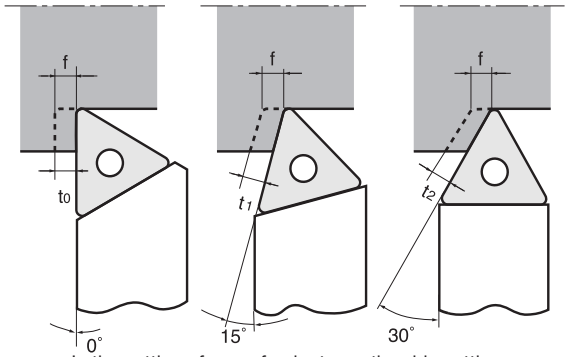
• Effects of tool geometry on cutting phenomena

Phenomena / Increasing	Flank wear	Crater wear	Edge strength	Cutting force	Surface finish	Chattering	Cutting temperature	Chip flow
Cutting edge inclination	–	Decrease	Lower	Radial force decrease	–	Less tendency	Lower	Effect on flow direction
Side rake angle	–	Decrease	Lower	Decrease	–	–	Lower	Effect on shape
Relief angle	Decrease	–	Lower	Decrease	–	Likely to occur	Lower	–
End cutting edge angle	Decrease	–	Lower	Radial force decrease	Roughen	Less tendency	Lower	–
Side cutting edge angle	Decrease	Decrease	Increase	Radial force increase	–	Likely to occur	Increase	Decrease thickness
Nose radius	Decrease to some level		Increase	Increase	Improve	Likely to occur	Increase	Effect on flow direction
Honing width	Increase	–	Increase	Increase	–	Likely to occur	Increase	–

● General recommendation for tool geometry

Angle	Operation	Angle
Cutting edge inclination	General turning (TAC tools)	-6° ~ +6°
	(Brazed tools)	0° ~ +6°
	Interrrupted turning	-6° ~ -3°
	Planing, shaping	-15° ~ -5°
Side cutting edge angle	General turning (TAC tools)	-6° ~ +5°
	(Brazed tools)	+6°
	Hard materials	-10° ~ 0°
	Soft materials	+15° ~ +30°
	Interrupted turning	-5° ~ -15°
Relief angle	General turning (TAC tools)	5° ~ 8°
	(Brazed tools)	6°
	Non-ferrous metals	7°
	Glass, ceramics	5°
	Wood	5° ~ 8°
End cutting edge angle		Variable
Side cutting edge angle		Variable

● Effect of side cutting edge angle



In the cutting of same feed rate, as the side cutting edge angle increases the chip thickness decreases.

$t_0 > t_1 > t_2$

● General recommendation for nose radius

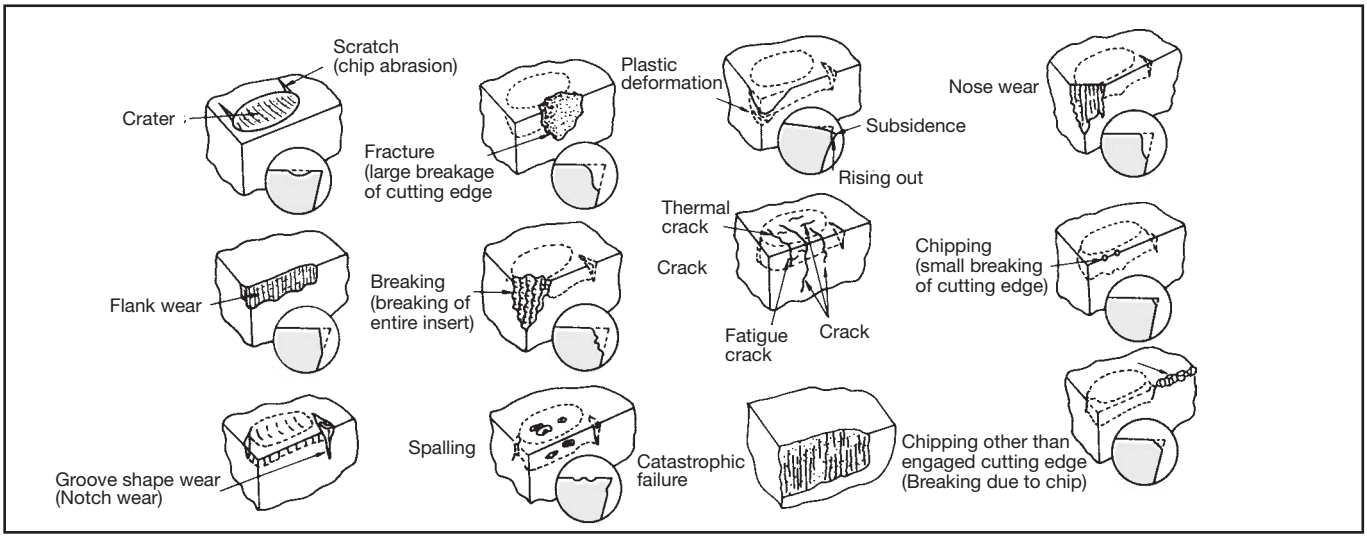
Guidelines	Work material / Cutting depth (mm)	Steels, aluminium alloys, copper alloys	Cast iron, non-metals
	~ 3	0.4	0.8
	4 ~ 9	0.8	1.6
	10 ~ 19	1.6	2.4
	20 ~	2.4	3.2
Formula (mm)		Cutting depth ap ÷ 8 = a Feed f x 2 = b Larger size of a a or b	Cutting depth ap ÷ 4 = a Feed f x 4 = b Larger size of a or b

● Honing

TAC indexable inserts of steel cutting grades are honed.
Honing specifications are shown in the following table.

Symbol	Edge condition	Shape
F	Sharp edge	
E	Round honing	
W•T	Chamfered honing	
S	Chamfered and round honing	

● Types of tool failure (respresentative)



Tool failure

Wear	Flank wear	A typical form of wear is mechanical wear (plowing). There is no effect of heat, rather it is a phenomenon of gradual scraping off by abrasion, resulting in a rough face as if scraped with a plow.
	Face wear Crater wear	The main cause of thermal wear is the cutting temperature. High temperature and temperature adhesion will diffuse with part of the cutting face.
	Nose wear	Mechanical or thermal wear occured on tool nose.
	Notch wear	Wear occurring at contact boundary (side cutting edge and end cutting edge) between the work material and tool.
Chipping		Small fractures on cutting edge, such as due to mechanical shock, thermal shock, chip welding and chip recutting.
Fracture		Large fracture on cutting edge.
Breaking		Complete damage to insert.
Breaking in two		Breaking of long tools such as drill and endmills.
Flaking	(Spalling)	Shell-like damage on rake face and flank.
Plastic deformation		Softening of the tool material due to rise in tip temperature, unable to withstand cutting force and cutting edge deformation by subsiding or building up.
Crack	Thermal crack	Occurs mainly on the rake face but also noted on flanks. Initially occurs at right angle to the cutting edge but as the number increases is generated in parallel direction and chips off in "U" shape.
	Fatigue crack	Cracks occurring parallel to the cutting edge as the result of repetitive mechanical stress being applied due to impact and cutting force accompanying interrupted cutting. In comparison with themal crack, occurs immediately adjacent to cutting edge.
Catastrophic failure		With the advancement of wear, complete loss occurs over a considerable part of the cutting cross section and cutting becomes impossible.

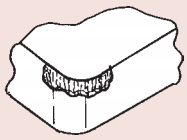
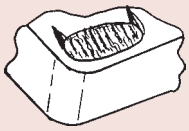
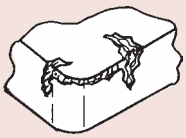
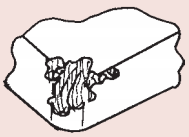
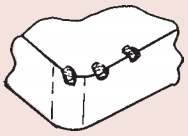
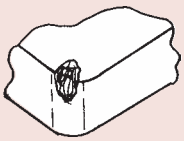
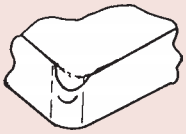
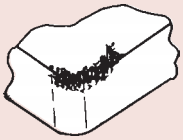
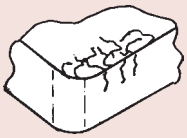
● Tool life criterion on JIS

Width of flank wear	0.2 mm	Precision light cutting, finishing of non-ferrous metal alloys, etc.
Width of flank wear	0.4 mm	Cutting of special steels
Width of flank wear	0.7 mm	Ordinary cutting of cast iron and steels
Width of flank wear	1 ~ 1.2 mm	Rough cutting of grey cast iron
Depth of crater		Normally 0.05 - 0.1 mm

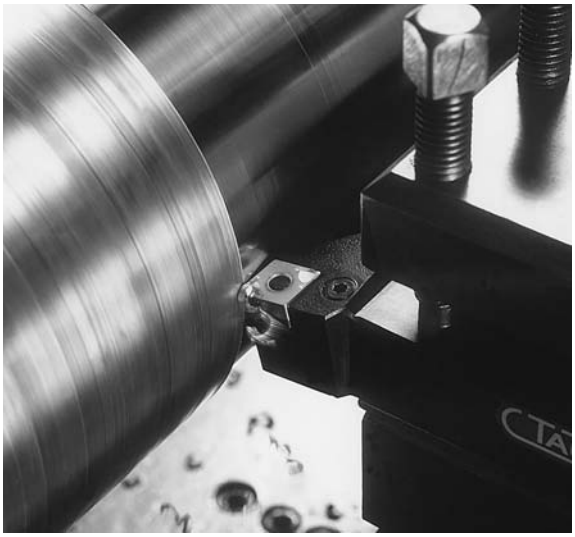
● Tool life criterion on ISO

Tool life criterion	Application
Catastrophic failure	High speed steel tools (VB can also be applied)
Flank wear width VB = 0.3 mm	Cemented carbide and ceramic tools displaying uniform flank wear
VB max = 0.5 mm	In case of uneven flank wear is caused
Depth of crater KT = 0.06 + 0.3 f (mm) (where f represents feed mm/rev)	Cemented carbide tools
Determination according to roughness 1, 1.6, 2.5, 4, 6.3, 10 µm Ra	In case roughness is essential

■ Troubleshooting for turning

Typical tool failure	Countermeasures		
	Tool grade	Cutting conditions	Tool geometry
Flank wear 	• Change to more wear resistant grades. P. M. K30 → 20 → 10	• Reduce cutting speed. • Change to appropriate feed.	• Increase relief angle. • Increase end cutting edge angle. • Increase corner radius. • Select free-cutting chipbreaker.
Crater wear 	• Change to more wear resistant grades. P. M. K30 → 20 → 10	• Reduce cutting speed. • Reduce feed.	• Increase rake angle. • Select an appropriate chipbreaker.
Notch wear 	• Change to more wear resistant grades. P. M. K30 → 20 → 10	• Reduce cutting speed. • Reduce feed.	• Increase rake angle. • Increase side cutting edge angle.
Fracture 	• Change to tougher grades. P. M. K10 → 20 → 30	• Reduce feed. • Reduce cutting depth.	• Reduce rake angle. • Select a chipbreaker with high edge strength. • Increase honing width. • Increase side cutting edge angle. • Select larger shank size.
Chipping 	• Change to tougher grades. P. M. K10 → 20 → 30	• Reduce feed. • Increase cutting speed.	• Reduce rake angle. • Select a chipbreaker with high edge strength. • Increase honing width. • Increase side cutting edge angle. • Select larger shank size.
Flaking 	• Change to tougher grades. P. M. K10 → 20 → 30	• Reduce feed. • Reduce cutting speed.	• Reduce rake angle. • Increase corner radius • Increase honing width.
Plastic deformation 	• Change to more wear resistant grade. P. M. K30 → 20 → 10	• Reduce cutting speed. • Reduce feed. • Reduce cutting depth. • Supply cutting fluid in adequate volume.	• Increase relief angle. • Increase rake angle. • Reduce corner radius. • Reduce side cutting edge angle. • Select a free-cutting chipbreaker.
Chip welding 	• Use a grade which has a low tendency to adhere to work material. Cemented carbide → Coated carbide or cermet	• Increase cutting speed. • Increase feed.	• Increase rake angle. • Select a free-cutting chipbreaker.
Thermal cracking 	• Change to more impact resistant grades. P. M. K10 → 20 → 30	• Reduce cutting speed. • Reduce feed. • Use a cutting fluid. • Supply cutting fluid in adequate volume.	• Increase rake angle. • Select a free-cutting chipbreaker.

Chip forming



■ Chip control performance

(1) Necessity

As machining is rationalized more and more, the necessity of controlling chips has also changed in details.
To ensure improvement of productivity and to reduce costs, controlling measures must be implemented to prevent following problems:

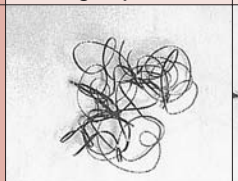
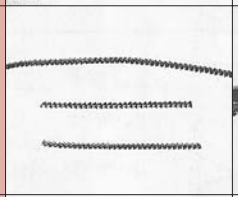
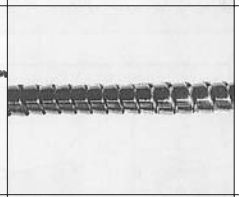
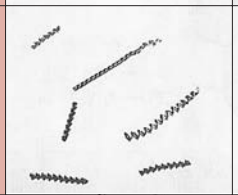
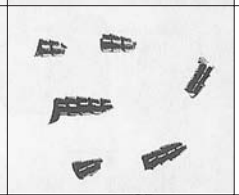
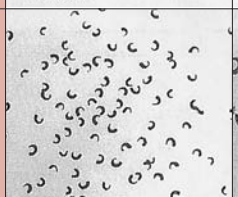
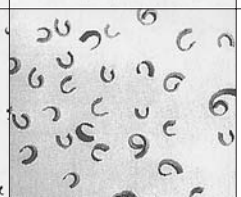
Problems:

- Scattering of chips
- Entangling of chips to the workpiece and tool
- Accumulation of chips around the tool

Troubles:

- Hindrance to unmanned and automatic operation
- Hindrance for multi-cutting edge tooling, higher speed, and higher efficiency operation
- Hindrance to the accuracy of machine tools
- Deterioration of product quality
- Trouble according the safety of operators
- Shorter tool life
- Lower operation rate

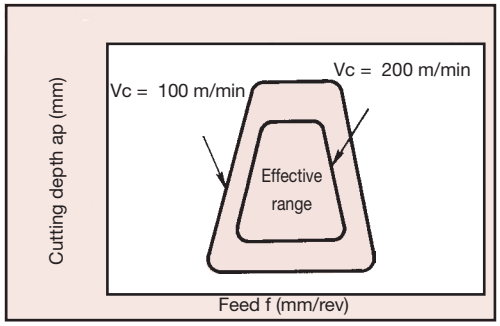
■ Chip shape classification and effects

Classification	Chip shape: Cutting depth: small	Chip shape: Cutting depth: large	Description of chip shape	Acceptability	Effect
Shape A			Chips irregularly entangled	Not acceptable	• Wrapping around the tool or workpiece or accumulation around the cutting point, hindering cutting • Possible damage to the machined surface
Shape B			Long continuous spiral chips $\ell > 50$ mm	Acceptable	• Bulky during transport in the automatic line • May be preferred when one operator handles one machine
Shape C			Short spiral chips $\ell < 50$ mm		• Smooth chip flow • Difficult to scatter • Favorable shape
Shape D			"C" or "9" shaped chips (Around one coiling)		• Favorable shape if not scattering • Not bulky and easy to transport
Shape E			Excessively broken chips. Thin pieces or connected in a form of wave as shown in the figure left	Not acceptable	• Readily scattering. If scattering is the only trouble, it may be acceptable because the chip cover, etc. may be used. • Tend to cause chatter, causing harms on the finished surface roughness or tool life.

■ Factors affecting chip control

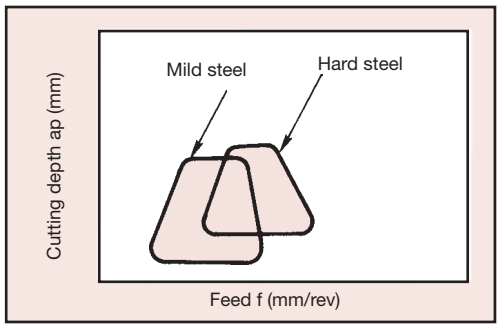
(1) Cutting condition
① Feed f
② Cutting depth ap
③ Cutting speed Vc

- Of these, feed has the greatest effect followed by cutting depth and cutting speed in order listed.
- Feed is proportionate to the thickness of chips.
- Cutting depth is proportionate to the width of chips.
- There are optimum values (effective range) in feed and cutting depth.
- Cutting speed is in inverse proportion to chip thickness. Effective range becomes narrow at high speed.



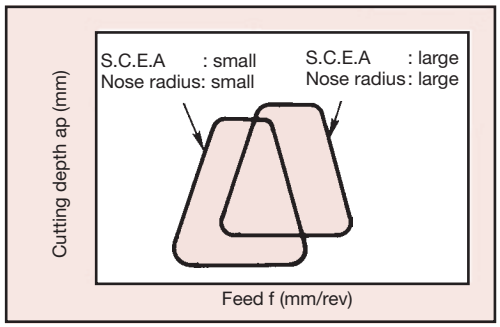
(2) Work material
① Alloy element
② Hardness
③ Heat treatment condition

- These are related to thickness of chips and ease of curling.
- Mild steel chips are thicker than those of hard steel.
- Hard steel chips liable to curl more than those of mild steel.
- Chips that do not curl are thin. As an exception, in case of mild steel even if thick, may not curl.



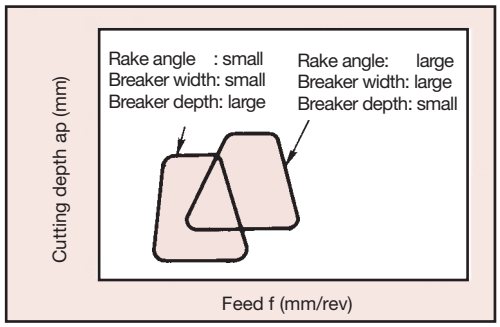
(3) Shape of tool
① Side cutting edge angle
② Nose radius

- Side cutting edge angle is relative to chip thickness and width
- Side cutting edge angle is preferably small.
- Nose radius is relative to thickness and width and the direction of flowing out.
- In finishing, small nose radius, while for rough cutting, large nose radius is better.



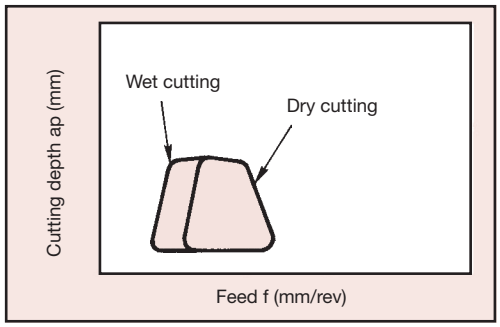
(4) Shape of chipbreaker
① Rake angle
② Chipbreaker width
③ Chipbreaker depth

- Rake angle is in inverse proportion to chip thickness.
- Depending on the work material, there is an optimum value.
- Chipbreaker width is selected proportionately to feed.
- Narrow at low feed and wide at high feed.
- Chipbreaker depth is to be selected so as to be inversely proportionate to feed.
- Deep at low feed and shallow at high feed.



(5) Cutting fluid

- Effective range is wider with wet cutting.
- Especially at low feed range is liable to curl.



■ Factors effecting chip control

Cutting conditions	• Increase feed (If chip packing occurs, reduce feed) • Increase cutting depth (When cutting at large cutting depth, reduce it) • Reduce cutting speed
Work material	• Use free-cutting steel • Increase a tendency to curl by heat treatment.
Tool geometry	• Reduce side cutting edge angle • Select smaller corner radius
Chipbreaker shape	• Reduce rake angle (For mild steels, increase it) • Reduce chipbreaker width (For chip packing, increase it) • Increase chipbreaker depth (For chip packing, reduce it)
Cutting fluid	• Wet cutting (especially at low feed)
Machine tool	• Use a chip cover • Use of a slant bed lathe • Use the tool upside down

■ Chipbreaker selection

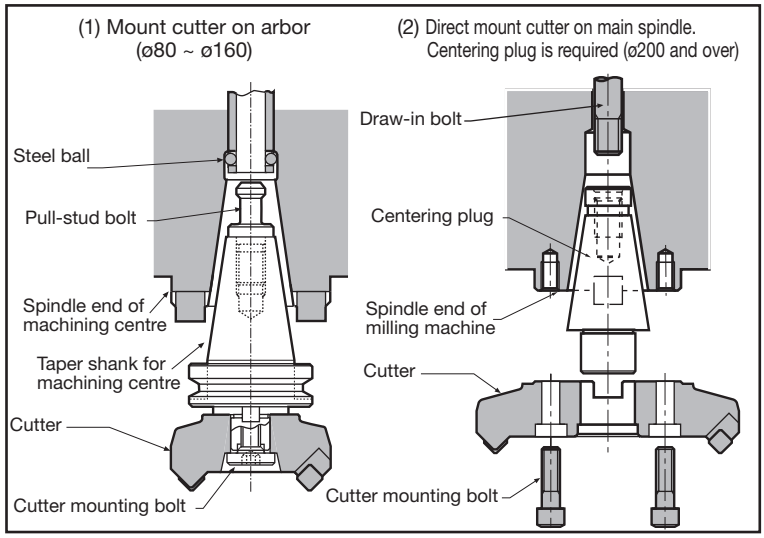
The most effective method among the factors listed above is a control with a chipbreaker.
For selecting a proper chipbreaker type for the operation, refer to the relating pages shown below.

TAC turning tools	• Chipbreaker selection guide: P. 27 ~ 36 • Chipbreaker comparison chart: P. 499 ~ 500

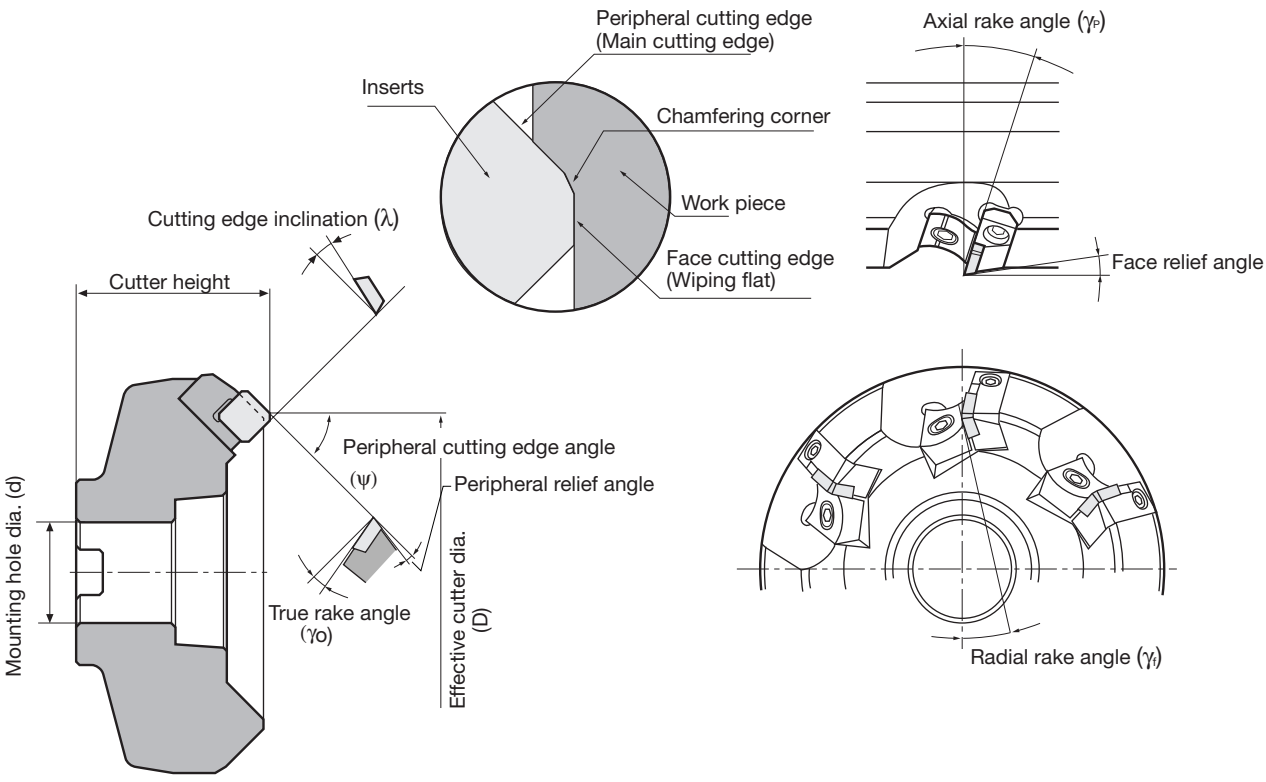
Milling Tools

■ Mounting face mill

- In mounting to end of the main spindle of the milling machine, there are two methods shown in figures at right.
- In case using at machining center, use exclusive arbor (BT shank···MAS standard) enabling ATC.
- Shank type TAC mill (E series), same as endmill, is mounted on the machine with a milling chuck available on the market.



■ Nomenclature for face milling cutter (Symbols conformed to JIS)



Relations of various rake angles are according to the following equations.

$\tan \gamma_o = \tan \gamma_f \cos \psi + \tan \gamma_p \sin \psi$

$\tan \lambda = \tan \lambda_p \cos \psi - \tan \gamma_f \sin \psi$

■ Cutter geometry and applications

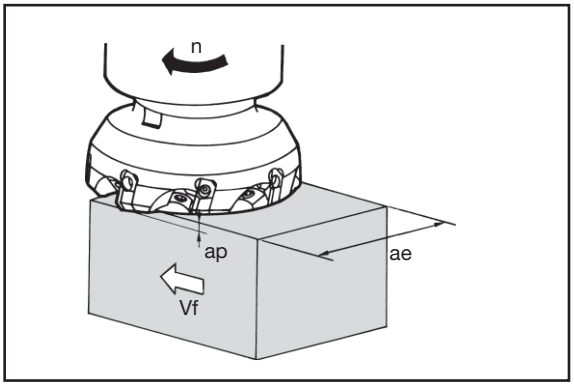
Work material		Rake angle combination and applicability			
		Negative-Negative	Negative-Positive		Positive-Positive
		Negative true rake angle	Negative true rake angle	Positive true rake angle	Positive true rake angle
Cast irons Ductile cast irons		◎	○	○	◎
Low to medium carbon steels		△	○	◎	◎
Special steels (< 400 HB)	Stainless steels	×	△	◎	○
	Heat resisting steels	×	△	◎	○
	Tool steels	△	△	◎	○
Aluminium alloys		×	×	○	◎
Copper and its alloys		×	△	○	◎
Titanium and its alloys		×	△	○	○

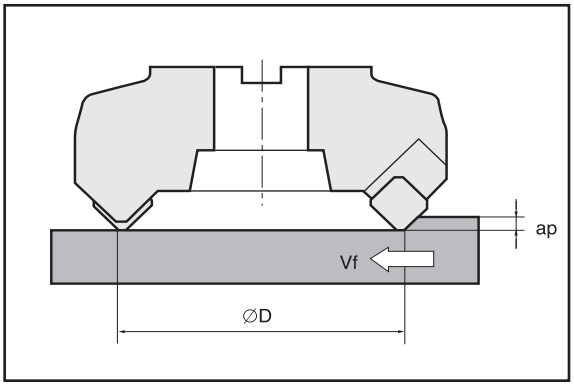
◎ : Excellent ○ : Good △ : Fair × : Not recommended

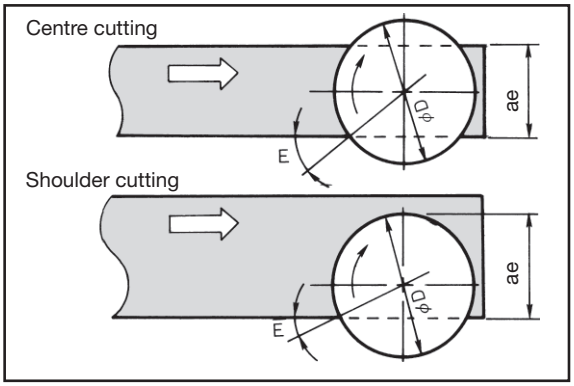
Type	Rake angle			Features	Typical examples of TAC mills
	γ_f	γ_p	γ_0		
Negative type (Negative-Negative)	–	–	–	• Usable cutting edges are doubled and economical	TGN4200-A
Negative-positive type	–	+	+	• Excellent chip removal	TME4400I TAD12
	–	+	–	• Higher cutting edge strength	TPN6400I (not shown in this catalogue)
Positive type (Positive-positive)	+	+	+	• Freer cutting action	TMD4100I

γ_f : Radial rake angle γ_p : Axial rake angle γ_0 : True rake angle

■ Cutting conditions







● Cutting speed

$$Vc = \frac{\pi \times D \times n}{1000} \text{ (m/min)}$$

Vc : Cutting speed (m/min)
D : Effective diameter (mm)
n : Number of revolutions (rpm)
π : 3.14

● Number of revolutions (Calculated from cutting speed)

$$n = \frac{1000 \times Vc}{\pi \times D} \text{ (rpm)}$$

● Feed speed and feed rate

Feed speed is relative speed of cutter and work material and in the normal milling machine, it is the table speed.

In milling, the feed per tooth is very important. The recommended cutting condition is expressed by Vc and ft and using the above equation calculate n and Vf and input in the machine.

$$Vf = ft \times t \times n \text{ (mm/min)}$$

Vf : Table feed (mm/min)
ft : Feed rate per tooth (mm/t)
t : No. of teeth of the cutter
n : Number of revolutions (rpm)

● Cutting depth

Determine by required allowance for machining and capacity of the machine. In case of TAC mill, there are cutting limits according to shape and size of the insert.

● Cutting width and engage angle

There is an appropriate engage angle depending on the cutter diameter, cutting position, work material, etc., and ordinarily the values in the table below are used as a guide.

Work material	Appropriate E	Cutter dia. and ae
Steel	0 ~ 20° (on small side for shoulder cutting)	ae = 2/3D
Cast iron	under 40°	ae = 4/5D

D : Cutter diameter (mm)
E : Engage angle (°)
ae : Cutting width (mm)

■ Roughness of finished surface

(1) Theoretical surface roughness

Theoretical roughness as shown in Fig. 1 is the same as for single point turning

● With corner R

$$Rt = \frac{ft^2}{8R} \times 1000$$

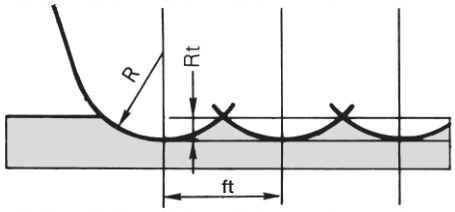
Rt : Theoretical roughness (μm)
ft : Feed per tooth (mm/t)
R : Corner radius (mm)
α : Corner angle
β : Face cutting edge angle

● Without corner R

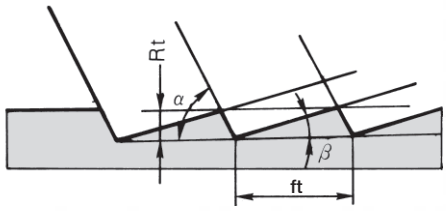
$$Rt = ft \left(\frac{\tan\alpha \cdot \tan\beta}{\tan\alpha + \tan\beta} \right) \times 1000$$

Fig. 1

● With corner R



● Without corner R

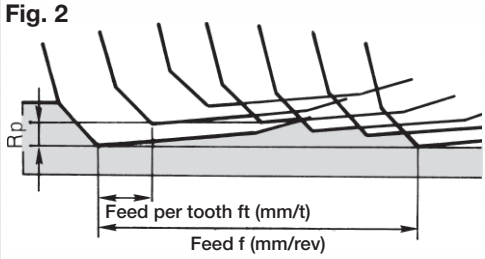


(2) Practical surface roughness

However, in case of practical milling, there are many teeth and naturally differences in levels of edges occur. The maximum difference is called “run out”.

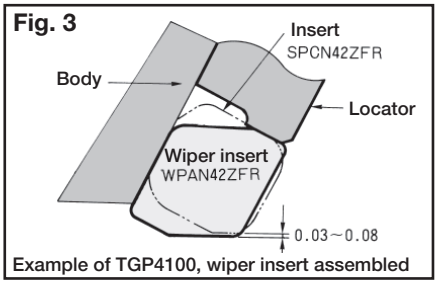
In the actual face milling, finished surface roughness, as shown in Fig. 2, is worse than the single point cutting. In case only one tooth is projecting, it will be similar to the single point shown in Fig. 1 but of a large value substituting f (mm/rev) for ft (mm/tooth).

Fig. 2



■ Improving surface roughness

Fig. 3



Example of TGP4100, wiper insert assembled

Preferably face run out to be minimized and low feed at high speed. Also, in order to attain good finished surface at high efficiency, there are the following methods:

(1) In case of ordinary TAC mill

Use wiper insert as shown in the figure at left.

(2) Use of TAC super finish mill for finishing

Cut with TAC mill exclusively for finishing such as MS cutters.

■ Calculating power requirement

$$Pc = \frac{ks \times ap \times ae \times Vf}{60 \times 1000 \times 1000} \text{ (kW)}$$

Pc : Net power requirement (kW)
ks : Specific cutting force MPa (N/mm^2)
(Refer to the Table below)
ap : Cutting depth (mm)
ae : Cutting width (mm)
Vf : Table feed (mm/min)

Because practical power requirements depend on the type of TAC mill (proportional to the true rake angle) and the motor efficiency of the machine used, the result calculated from the above formula should be considered as a rough guide.

● Values of specific cutting force (ks)

Work material	Tensile strength		Feed per tooth ft (mm/t)				
	MPa (N/mm^2)	{kgf/mm^2}	0.1	0.15	0.2	0.3	0.4
Mild steel USt42-2	520	52	2150	2000	1900	1750	1650
Carbon steel Ck55	770	77	1970	1860	1800	1760	1620
Cr-Mo steel	730	73	2450	2350	2200	1980	1710
Alloy tool steel 55NiCrMoV6	(352HB)	(352HB)	2030	2010	1810	1680	1590
Steel casting GS-45	520	52	2710	2530	2410	2240	2120
Grey cast iron GG25	(200HB)	(200HB)	1660	1450	1320	1150	1030
Aluminium silicon alloy	200	20	660	580	522	460	410
Brass	500	50	1090	960	877	760	680

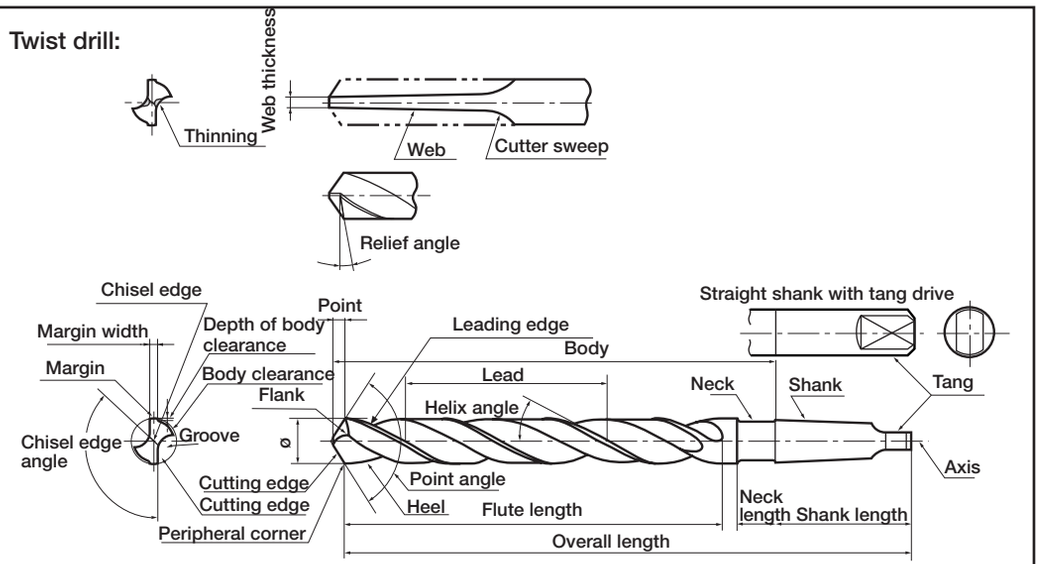
Note: Values in parenthesis show hardness.

■ Troubleshooting in milling

Trouble	Possible causes	Countermeasures
Rapid wear of cutting edge	• Improper insert grade selection (Insufficient wear resistance)	• P30 → P20 → cermet, coated grade (steel cutting) • K20 → K10 → coated grade (cast iron cutting)
	• Excessive cutting speed	• Select cutting speed suited for work material and insert grade
	• Inadequate feed	• Use standard cutting condition in catalog as guide
Rapid chipping of cutting edge	• Improper insert grade selection	• Cermet → P20, P30 (steel cutting), K10 → K20 (cast iron cutting)
	• Cutting hard material and unfavorable surface condition	• Decrease cutting speed • Use cutter with strong cutting edge
	• Excessive feed	• Select proper feed conditions as per recommendation in catalogue
	• Excessive pressure applied on cutting edge	• Proper selection of engaging angle
	• Machining difficult-to-cut material	• Use a negative-positive type cutter with large corner angle (Ex. TAW)
Fracturing	• Cracking due to thermal shock	• Select insert grade of stronger thermal shock resistance such as T3030 • Decrease cutting speed
	• Too thin insert against cutting force	• Change from 3.18 mm into 4.76 mm insert thickness
	• Continuous use of excessively worn insert	• Shorten replacement standard time of insert
	• Cutting hard material	• Use cutter of stronger tip • Use cutter of larger corner angle such as TMD
	• Obstruction to chip flow • Recutting of chips after chip welding	• Use cutter with good chip discharge properties such as TMD • Select insert grades difficult for chips to adhere Cemented carbides → cermets, coated grades • Use cutting fluid or air
	• Excessively slow cutting, too fine feed	• Select cutting speed and feed optimized for insert grade and work material
Excessive chip welding or build-up on cutting edge	• Cutting soft material such as aluminium, copper, mild steel	• Use cutter with large rake angle such as THF
	• Cutting stainless steel	• P30 → Cermet
	• Use of cutter with negative rake or too small rake angle	• Use cutter with large rake angle such as TAW
Rough finish	• Effect of built - up edge	• Increase cutting speed • Appropriate cutting depth (finish allowance) • Change insert grade, K grade→M grade→P grade→cermet For cast irons : P grade → coated grade → cermet For steels : K grade → coated grade
	• Effect of face cutting edge run-out	• Proper installing of inserts • Use insert of high dimensional accuracy Class K → class E
	• Continuous use of excessively worn insert	• Shorten replacement standard time of insert
	• Remarkable feed marks	• Feed per revolution to be set within flatland width • Use wiper insert type cutter such as TAW • Use cutter exclusively for finishing such as SFP4000
Chattering	• Unstable clamping of workpiece	• Check clamping method of workpiece
	• Cutting of welded construction of thin steel plate	• Adopt cutter of large rake angle and small corner angle such as TAW
	• Excessive cutting condition	• Re-examine allowable chip removal rate according to motor HP
	• Face milling of narrow width workpiece	• Use cutter of small cutter diameter and with many teeth
	• Too many simultaneous cutting teeth engagement	• Reduce No. of teeth or adopt irregular pitch cutter

Drilling Tools

■ Nomenclature for drills



Examples of thinning

S-type thinning

Combination of four facet point and cross thinning

■ Cutting forces and power requirement

(1) Twist drill

● Power requirement

$$Pc = K \cdot D^2 \cdot n\,(0.647 + 17.29f) \times 10^{-6}\,(kW)$$

● Thrust force

$$T = 570K \cdot D \cdot f^{0.85}\,(N)$$

● Torque

$$M = K \cdot D^2\,(0.630 + 16.84f)\,(N \cdot cm)$$

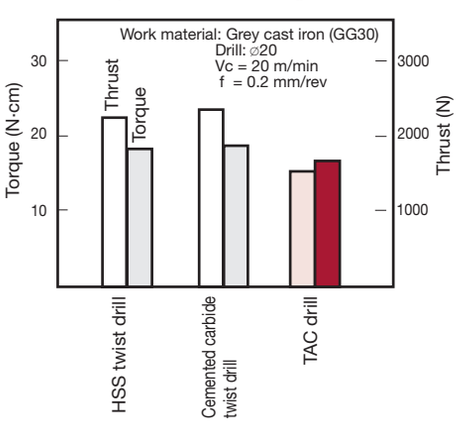
Pc : Power requirement (kw)
T : Thrust force (N)
M : Torque (N·cm)
D : Drill diameter (mm)
f : Feed (mm/rev)
n : No. of revolutions (rpm)
K : Material constant.... Refer to the Table at right

Material constant compensating for power requirement and thrust force

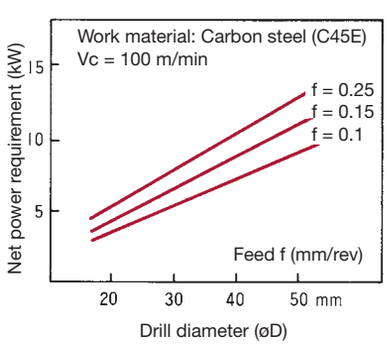
Work material	Tensile strength		Brinell hardness (HB)	Material constant (K)
	MPa (N/mm²)	{kgf/mm²}		
Cast iron	210	21	177	1.00
Cast iron	280	28	198	1.39
Cast iron	350	35	224	1.88
Aluminium	250	25	100	1.01
Low carbon steel (Ck22)	550	55	160	2.22
Free cutting steel (15S22)	620	62	183	1.42
Manganese steel (36Mn5)	630	63	197	1.45
Nickel chromium steel (36NiCr6)	690	69	174	2.02
4115 steel Cr0.5, Mo0.11, Mn0.8	630	63	167	1.62
Chromium molybdenum steel (25CrMo4)	770	77	229	2.10
Chromium molybdenum steel (42CrMo4)	940	94	269	2.41
Nickel chromium molybdenum steel	750	75	212	2.12
Nickel chromium molybdenum steel	1400	140	390	3.44
Chromium vanadium steel				
Cr0.6, Mn0.6, V0.12	580	58	174	2.08
Cr0.8, Mn0.8, V0.1	800	80	255	2.22

(2) TAC drill

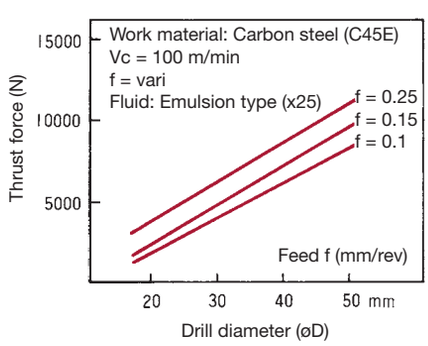
Comparison of cutting forces



Net power requirement for TAC drills



Thrust forces of TAC drills



■ Troubleshooting for the solid drill and soldering drill

Problem		Cause	Countermeasure
Abnormal wear	Relief surface	Inappropriate cutting speed	• Increase the cutting speed by 10% within standard conditions if abnormal wear is around the centre. • Lower the cutting speed by 10% within standard conditions if abnormal wear is on the periphery.
		Inappropriate cutting fluid	• Check the filter. • Use the cutting fluid superior in lubricity (increase the dilution rate).
	Margin	Inappropriate cutting speed	• Lower the cutting speed by 10%.
		Regrinding timing, insufficient reground amount	• Shorten the regrinding timing.
		Insufficient rigidity of the machine and workpiece	• Change the clamp method to the one with rigidity.
		Insufficient drill rigidity	• Use smallest possible overhang.
		Inappropriate cutting fluid	• Check the filter. • Use the cutting fluid superior in lubricity. (increase the dilution rate)
		Intermittent cutting when entering	• Avoid interruption at entry and exit. • Lower the feed rate by about 50% during entering into and leaving from the workpiece.
Chipping and fracture	Chisel section (centre of drill cutting edge)	Insufficient rigidity of the drill	• Reduce the drill overhang as much as possible. • Increase the feed at entry when the low speed feed is selected in standard cutting condition range. • Use a bushing or a centre drill.
		Insufficient rigidity of the machine and workpiece	• Change the clamp method to the one with rigidity.
		Inappropriate entry into the workpiece	• Avoid interruption at entry into the workpiece. • Lower the feed rate by 10% at entry.
		High workpiece hardness	• Lower the feed rate by 10%.
		Inappropriate honing	• Check if honing has been made to the centre of cutting edge.
	Peripheral cutting edge	Insufficient drill rigidity	• Lower the cutting speed by 10%. • Increase the feed at entry when the low speed feed is selected in standard cutting condition range.
		Inappropriate drill mounting accuracy	• Check the runout accuracy after drill installation (0.03 mm or less).
		Insufficient machinery and workpiece rigidity	• Change the clamp method to the one with rigidity. • Lower the feed during entering into and leaving from the workpiece.
		Inappropriate honing	• Check if honing has been made to the cutting edge periphery.
	Margin	Insufficient machine and workpiece rigidity	• Change the clamp method to the one with rigidity.
		Insufficient drill rigidity	• Use smallest possible overhang. • Use a bushing or centre drill.
		Regrinding timing and insufficient amount of reground stock	• Shorten the regrinding timing.
		Intermittent cutting when entering or exiting the cut.	• Avoid interruption at entry and exit. • Lower the feed rate by about 50% during entering into and leaving from the workpiece.
Breakage		Tendency to cause chipping or develop abnormal wear	• Check the failure mode condition before breakage and find out the wear and chip countermeasures.
		Chip packing in the drill flutes	• Review the cutting conditions. • For internal coolant supply, raise the supply pressure of cutting fluid. • Use drill pecking for deep holes.
		Insufficient machine output	• Review the cutting conditions. • Use the machine with high power.
Insufficient hole accuracy		Insufficient rigidity of the machinery and workpiece	• Change to the clamp method with rigidity
		Inappropriate drill installation accuracy	• Check the runout accuracy of drill mounting. (0.03 mm or less)
		Chip packing in the flutes.	• Review the cutting conditions. • Raise the cutting oil supply pressure. • Use peck-feed for deep holes.
		Inappropriate edge sharpening accuracy	• Check the edge shape accuracy.
Prolonged chips		Inappropriate cutting conditions	• Increase the feed rate by 10% within standard conditions.
		Inappropriate honing	• Provide the appropriate honing.
		Cutting edge with chipping or breakage	• Lower the cutting speed by 10%.

■ Troubleshooting for TAC drill

Problem			Cause	Countermeasure
Abnormal wear	Central cutting edge	Relief surface	Inappropriate cutting conditions	• Increase the cutting speed by 10% within standard conditions. • Lower the feed rate by 10%.
	Peripheral cutting edge	Relief surface	Inappropriate cutting conditions	• Increase the cutting speed by 10% within standard conditions. • When the feed rate is extremely low or high, set it up within standard conditions.
	Common	Relief surface	Varieties and supplying of cutting fluid	• Confirm that the cutting fluid flow is higher than 7 l/min. • The concentration of cutting fluid must be higher than 5%. • Use the cutting fluid superior in lubricity. • Change from external to internal cutting fluid supply.
			Vibration in drilling	• Change to the machine with higher torque. • Change to the clamp method with rigidity. • Change the drill setting method.
			Unsuitable for selection of grade	• Change the grade to T1015.
			Looseness of screws	• Tighten the screw.
		Crater	Cutting heat is too high	• Change from external to internal cutting fluid supply. • Increase the supply rate of the cutting fluid. (Higher than 10 l/min) • Lower the feed rate by 20% within standard conditions. • Lower the cutting speed by 20% within standard conditions.
			Excessive chip welding	• Lower the feed rate by 20% within standard conditions. • Lower the cutting speed by 20% within standard conditions.
		Chipbreaker	Chip packing	• Increase the cutting speed by 20% and lower the feed rate by 20 % within standard conditions. • Raise the fluid pressure. (for higher than 1.5 MPa)
Chipping and fracture	Central cutting edge	The rotation center of drill	The misalignment for workpiece rotation	• Set the misalignment to 0 ~ 0.2 mm.
			Large offset	• Check the manual and use the tool in the allowable offset range.
			No flatness of machined surface	• Flatten the entry surface in pre-machining. • Set the feed rate for lower than 0.05 mm/rev in rough surface area.
			High feed rate	• Lower the feed rate by 20 ~ 50% within standard conditions.
			Using a chipping corner	• Confirm the corner when exchanging inserts.
	Peripheral cutting edge	Peripheral corner area	Using inserts in excess of tool life	• Exchange the corner or the insert before the nose wear reaches 0.3 mm.
			No flatness of machined surface	• Flatten the entry surface in pre-machining. • Set the feed rate for lower than 0.05 mm/rev at rough surface area.
			The existence of interrupted area on the way of machining	• Set the feed rate for lower than 0.05 mm/rev in interrupted area.
			Using a chipping corner	• Confirm the corner when exchanging inserts.
	Common	The unused corner area and cutting edge	High hardness of workpiece	• Increase the cutting speed by 20% and lower the feed rate by 20% within standard conditions. • Raise the fluid pressure (for higher than 1.5 MPa).
			Chip packing	• Lower the feed rate by 20% within standard conditions.
			Machinery impact	• Change to the continuous feed in case of pick feeding.
		Contact boundary	Using inserts in excess of tool-life	• Exchange the corner or the insert before the nose wear reaches 0.3 mm.
			Vibration in drilling	• Change to the machine with higher rigidity. • Change to the clamp method with rigidity. • Change the drill setting method.
		Flaking	High hardness of workpiece	• Set the feed rate for lower than 0.05 mm/rev.
			Thermally impact	• Change from external to internal cutting fluid supply. • Lower the feed rate by 20% within standard conditions.
		Common	Unsuitable for selection of grade	• Change the grade to GH730.
			Looseness of screws	• Tighten the screw.

Problem		Cause	Countermeasure
Scratch marks on the tool	The tool periphery	The misalignment for workpiece rotation	• Set the misalignment to 0 ~ 0.2 mm.
		Offset machining in exceed of allowable range	• Use the tool in the allowable offset range.
		Offset direction reduced diameter of workpiece	• Set offset direction extended diameter of workpiece
		No flatness of the entry surface	• Flatten the entry surface in pre-machining. • Set the feed rate for lower than 0.05 mm/rev in rough surface area.
		Chipping of peripheral cutting edge	• Exchange the insert.
		Bend of workpiece	• Change to the clamp method with rigidity.
		High hardness of workpiece	• Increase the cutting speed by 20% and lower the feed rate by 20% within standard conditions. • Raise the fluid pressure (for higher than 1.5 MPa).
Inappropriate hole accuracy	Hole diameter	The misalignment for workpiece rotation	• Set the misalignment to 0 ~ 0.2 mm.
		Inappropriate offset contents	• Adjust offset contents.
		No flatness of the entry surface	• Flatten the entry surface in pre-machining. • Set the feed rate for lower than 0.05 mm/rev at rough surface area.
		Bend of workpiece	• Change to the clamp method with rigidity.
	Roughness	Varieties and supplying of cutting fluid	• The concentration of cutting fluid must be higher than 5 %. • Use the cutting fluid superior in lubricity. • Change to internal cutting fluid supply from external one.
		Inappropriate cutting conditions	• Increase the cutting speed by 20% within standard conditions. • Lower the feed rate by 20% within standard conditions.
	Common	Failures of inserts	• Exchange the insert.
		Chip packing	• Increase the cutting speed by 20 % and lower the feed rate by 20% within standard conditions. • Raise the fluid pressure. (for higher than 1.5 MPa)
		Looseness of screws	• Tighten the screw.
Chip control	Prolonged and twisted chips	Inappropriate cutting conditions	• Work within standard conditions. • Increase the cutting speed by 10% within standard conditions. • Increase the feed rate by 10% within standard conditions.
		Failures of inserts	• Exchange inserts.
		Machining by external fluid supply	• Change to internal cutting fluid supply from external one. • Work by step feed. • Insert the dwell for approximate 0.1 second before twisted of chips.
		Chips around the central cutting edge	• There is a tendency to shorten the chips when shifted higher speed and feed.
	Chip packing	Fluid supply	• Change to internal cutting fluid supply from external one. • Raise the fluid pressure. (for higher than 1.5 MPa)
		Inappropriate cutting conditions	• Increase the cutting speed by 20% and lower the feed rate by 20% within standard conditions. • Raise the fluid pressure. (for higher than 1.5 MPa)
	Common	Large failure of drill holder	• Exchange the drill holder.
		Looseness of screws	• Tighten the screw.
Others	Chatter	Inappropriate cutting conditions	• Lower the cutting speed by 20% within standard conditions. • Increase the feed rate by 10% within standard conditions.
		Large wear of inserts	• Exchange the insert.
		Vibration in drilling	• Change to the machine with higher torque rigidity. • Change to the clamp method with rigidity. • Change the drill setting method.
		Looseness of screws	• Tighten the screw.
	Machine stop	Cutting edge with chipping or breakage	• Use the range of number of revolutions suited machine spec. Lower the feed rate by 20 ~ 50%.
		Burned inserts	• Exchange inserts before the failure becomes larger. • Check that the fluid flows powerfully from the drill. • Lower the cutting speed and the feed rate by 20% within standard conditions.
	Large burr	Failures of inserts	• Exchange the insert.
		Inappropriate cutting conditions	• Lower the feed rate by 20 ~ 50% just before leaving from the workpiece.

Appendix

P		Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
		BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Steel	Carbon steel	4360 40 C		1311	A570.36	1.0038	RSt.37-2	E 24-2 Ne			STKM 12A;C
		030A04	1A	1325	1115	1.0038	GS-CK16	-	-	-	-
		4360 40 B		1312	A573-81 65	1.0116	St.37-3	E 24-U	Fe37-3		
		080M15	-	1350	1015	1.0401	C15	CC12	C15C16	F.111	-
		050A20	2C/2D	1450	1020	1.0402	C22	CC20	C20C21	F.112	-
		230M07	-	1912	1213	1.0715	9SMn28	S250	CF9SMn28	11SMn28	SUM22
		-	-	1914	12L13	1.0718	9SMnPb28	S250Pb	CF9SMnPb28	11SMnPb28	SUM22L
		-	-	-	-	1.0722	10SPb20	10PbF2	CF10SPb20	10SPb20	-
		240M07	1B	-	1215	1.0736	9SMn36	S 300	CF9SMn36	12SMn35	-
		-	-	1926	12L14	1.0737	9SMnPb36	S300Pb	CF9SMnPb36	12SMnP35	-
		080M15	32C	1370	1015	1.1141	Ck15	XC12	C16	C15K	S15C
		-	-	-	1025	1.1158	Ck25	-	-	-	S25C
		4360 55 E		2145	A572-60	1.8900	StE 380	-	FeE390KG		
		4360 55 E		2142	A572-60	-	17 MnV 6	NFA 35-501 E 36	-	-	
		060A35	-	1550	1035	1.0501	C35	CC35	C35	F.113	-
		080M46	-	1650	1045	1.0503	C45	CC45	C45	F.114	-
		212M36	8M	1957	1140	1.0726	35S20	35MF4	-	F210G	-
		150M36	15	-	1039	1.1157	40Mn4	35M5	-	-	-
		-	-	2120	1335	1.1167	36MN5	40M5	-	36Mn5	SMn438(H)
		150M28	14A	-	1330	1.1170	28Mn6	20M5	C28Mn	-	SCMn1
		060A35	-	1572	1035	1.1183	Cf35	XC38TS	C36	-	S35C
		080M46	-	1672	1045	1.1191	Ck45	XC42	C45	C45K	S45C
		060A52	-	1674	1050	1.1213	Cf53	XC48TS	C53	-	S50C
		070M55	-	1655	1055	1.0535	C55	-	C55	-	-
		080A62	43D	-	1060	1.0601	C60	CC55	C60	-	-
		070M55	-	-	1055	1.1203	Ck55	XC55	C50	C55K	S55C
		080A62	43D	1678	1060	1.1221	Ck60	XC60	C60	-	S58C
		060 A 96		1870	1095	1.1274	Ck 101	XC 100	-	F-5117	
		BW 1A		1880	W 1	1.1545	C 105 W1	Y105	C36KU	F-5118	SK 3
		BW2	-	2900	W210	1.1545	C105W1	Y120	C120KU	F.515	SUP4
	Low carbon steel	4360 43C		1412	A573-81	1.0144	St.44-2	E 28-3	-	-	SM 400A;B;C
		4360 50B		2132	-	1.0570	St.52-3	E36-3	Fe52BFN/Fe52CFN	-	SM490A;B;C;YA;YB
		150 M 19		2172	5120	1.0841	St.52-3	20 MC 5	Fe52	F-431	
		250A53	45	2085	9255	1.0904	55Si7	55S7	55Si8	56Si7	-
		-	-	-	9262	1.0961	60SiCr7	60SC7	60 SiCr8	60 SiCr8	-
		534A99	31	2258	52100	1.3505	100Cr6	100C6	100Cr6	F.131	SUJ2
		1501-240	-	2912	ASTM A204Gr.A	1.5415	15Mo3	15D3	16Mo3KW	16Mo3	_
		1503-245-420	-	-	4520	1.5423	16Mo5	-	16Mo5	16Mo5	_
		-	-	-	ASTM A350LF5	1.5622	14Ni6	16N6	14Ni6	15Ni6	-
		805M20	362	2506	8620	1.6523	21NiCrMo2	20NCD2	20NiCrMo2	20NiCrMo2	SNCM220(H)
		311-Type 7	-	-	8740	1.6546	40NiCrMo22	-	40NiCrMo2(KB)	40NiCrMo2	SNCM240
		820A16	-	-	-	1.6587	17CrNiMo6	18NCD6	-	14NiCrMo13	-
		523M15	-	-	5015	1.7015	15Cr3	12C3	-	-	SCr415(H)
		-	-	2245	5140	1.7045	42Cr4	-	-	42Cr4	SCr440
		527A60	48	-	5155	1.7176	55Cr3	55C3	-	-	SUP9(A)
		-	-	2216	-	1.7262	15CrMo5	12CD4	-	12CrMo4	SCM415(H)
		1501-620Gr27	-	-	ASTM A182 F11;F12	1.7335	13CrMo4 4	15CD3.5 15CD4.5	14CrMo4 5	14CrMo45	-
		1501-622	-	2218	ASTM A182	1.7380	10CrMo910	12CD9, 10	12CrMo9, 10	TU.H	-
		Gr.31;45	-		F.22			-		-	-
		1503-660-440	-	-	-	1.7715	14MoV6 3	-	-	13MoCrV6	-
		722 M 24		2240	-	1.8515	31 CeMo 12	30 CD12	30 CrMo12	F-1712	
		897M39	4OC	-	-	1.8523	39CrMoV13 9	-	36CrMoV12	-	-
		524A14	-	2092	L1	1.7039	34MoCrS4 G	-	105WCR 5	-	-
		605A32	-	2108	8620	1.5419	20MoCrS4	-	-	F520.S	-
		823M30	33	2512	-	1.7228	55NiCrMoV6G	-	653M31	-	-
		-	-	2127	-	1.7139	16MnCr5	-	-	-	-
		830 M 31		2534	-	-	31NiCrMo134	-	-	F-1270	
		-		2550	L6	1.2721	50NiCr13	55NCV6	-	F-528	
		640A35	111A	-	3135	1.5710	36NiCr6	35NC6	-	-	SNC236
		-	-	-	3415	1.5732	14NiCr10	14NC11	16NiCr11	15NiCr11	SNC415(H)
		655M13; A12	36A	-	3415;3310	1.5752	14NiCr14	12NC15	-	-	SNC815(H)
		-	-	2090	9255	1.0904	55Si7	55S7	-	-	-

P		Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
		BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Steel	Low carbon steel	816M40	110	-	9840	1.6511	36CrNiMo4	40NCD3	38NiCrMo4(KB)	35NiCrMo4	-
		817M40	24	2541	4340	1.6582	35CrNiMo6	35NCD6	35NiCrMo6(KB)	-	-
		530A32	18B	-	5132	1.7033	34Cr4	32C4	34Cr4(KB)	35Cr4	SCr430(H)
		530A40	18	-	5140	1.7035	41Cr4	42C4	41Cr4	42Cr4	SCr440(H)
		(527M20)	-	2511	5115	1.7131	16MnCr5	16MC5	16MnCr5	16MnCr5	-
		1717CDS110	-	2225	4130	1.7218	25CrMo4	25CD4	25CrMo4(KB)	55Cr3 AM26CrMo4	SCM420;SCM430
		708A37	19B	2234	4137;4135	1.7220	34CrMo4	35CD4	35CrMo4	34CrMo4	SCM432;SCCRM3
		708M40	19A	2244	4140;4142	1.7223	41CrMo4	42CD4TS	41CrMo4	42CrMo4	SCM 440
		708M40	19A	2244	4140	1.7225	42CrMo4	42CD4	42CrMo4	42CrMo4	SCM440(H)
		722M24	40B	2240	-	1.7361	32CrMo12	30CD12	32CrMo12	F.124.A	-
		735A50	47	2230	6150	1.8159	50CrV4	50CV4	50CrV4	51CrV4	SUP10
		905M39	41B	2940	-	1.8509	41CrAlMo7	40CAD6, 12	41CrAlMo7	41CrAlMo7	-
		BL3	-	-	L3	1.2067	100Cr6	Y100C6	-	100Cr6	-
		-	-	2140	-	1.2419	105WCr6	105WC13	10WCr6 107WCr5KU	105WCr5	SKS31 SKS2,SKS3
		-	-	-	L6	1.2713	55NiCrMoV6	55NCDV7	-	F.520.S	SKT4
	Alloy steel	1501-509;510	-	-	ASTM A353	1.5662	X8Ni9	-	X10Ni9	XBNi09	-
		-	-	-	2515	1.5680	12NI19	Z18N5	-	-	-
		832M13	36C	-	-	1.6657	14NiCrMo134	-	15NiCrMo13	14NiCrMo131	-
		BD3	-	-	D3	1.2080	X210Cr12	Z200C12	X210Cr13KU X250Cr12KU	X210Cr12	SKD1
				2314		1.2083					
		BH13	-	2242	H13	1.2344	X40CrMoV5 1	Z40CDV5	X35CrMoV05KU X40CrMoV511KU	X40CrMoV5	SKD61
		BA2	-	2260	A2	1.2363	X100CrMoV5 1	Z100CDV5	X100CrMoV51KU	X100CrMoV5	SKD12
		-	-	2312	-	1.2436	X210CrW12	-	X215CrW12 1KU	X210CrW12	SKD2
		BS1	-	2710	S1	1.2542	45WCrV7	-	45WCrV8KU	45WCrSi8	-
		BH21	-	-	H21	1.2581	X30WCrV9 3 X30WCrV9 3KU	Z30WCV9	X28W09KU X30WCrV9 3KU	X30WCrV9	SKD5
		-	-	2310	-	1.2601	X165CrMoV 12	-	X165CrMoW12KU	X160CrMoV12	-
		401S45	52	-	HW3	1.4718	X45GrSi93	Z45CS9	X45GrSi8	F322	SUH1
		4959BA2	-	2715	D3	1.3343	S6-5-2	Z40CSD10	15NiCrMo13	-	SUH3
		BM 2		2722	M 2	1.3343	S6/5/2	Z 85 WDCV	HS 6-5-2-2	F-5603.	SKH 51
		BM 35		2723	M 35	1.3243	S6/5/2/5	6-5-2-5	HS 6-5-2-5	F-5613	SKH 55
		-		2782	M 7	1.3348	S2/9/2	-	HS 2-9-2	F-5607	-
		-	-	2736	HNV3	1.2379	X210Cr12 G	-	-	-	-
	Steel Casting	-	-	2223	-	-	-	-			
		Z120M12	-	-	-	1.3401	G-X120Mn12	Z120M12	XG120Mn12	X120Mn12	SCMnH/1
		BW 10		2183		1.3401		2120 M12	GX120 Mn12	F-8251	SEMn H1

M		Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
		BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Stainless steel	Ferritic - Martensitic	403S17	-	2301	403	1.4000	X7Cr13	Z6C13	X6Cr13	F.3110	SUS403
						1.4001	X7Cr14	-	-	F.8401	-
		416 S 21		2380	416	1.4005	X12CrS13	Z11CF13	X12 CrS 13	F-3411	SUS 416
		430S15	960	2320	430	1.4016	X8Cr17	Z8C17	X8Cr17	F3113	SUS430
		410S21	56A	2302	410	1.4006	X10Cr13	Z10C14	X12Cr13	F.3401	SUS410
		430S17	60	2320	430	-	X8Cr17	Z8C17	X8Cr17	F.3113	SUS430
		420S45	56D	2304	-	1.4034	X46Cr13	Z40CM	X40Cr14	F.3405	SUS420J2
								Z38C13M			
		405S17	-	-	405	1.4002	-	Z8CA12	X6CrAl13	-	-
		420S37	-	2303	420	1.4021	-	Z20C13	X20Cr13	-	-
		431S29	57	2321	431	1.4057	X22CrNi17	Z15CNi6.02	X16CrNi16	F.3427	SUS431
		-	-	2383	430F	1.4104	X12CrMoS17	Z10CF17	X10CrS17	F.3117	SUS430F
		434S17	-	2325	434	1.4113	X6CrMo17	Z8CD17.01	X8CrMo17	-	SUS434
		425C11	-	2385	CA6-NM	1.4313	X5CrNi13 4	Z4CND13.4M	(G)X6CrNi304	-	SCS5
		403S17	-	-	405	1.4724	X10CrA113	Z10C13	X10CrA112	F.311	SUS405
		430S15	60	-	430	1.4742	X10CrA118	Z10CAS18	X8Cr17	F.3113	SUS430
		443S65	59	-	HNV6	1.4747	X80CrNiSi20	Z80CSN20.02	X80CrSiNi20	F.320B	SUH4
		-	-	2322	446	1.4762	X10CrA124	Z10CAS24	X16Cr26	-	SUH446
		349S54	-	-	EV8	1.4871	X53CrMnNiN21 9	Z52CMN21.09	X53CrMnNiN21 9	-	SUH35, SUH36
		_		2326	S44400	1.4521	X1CrMoTi18 2		-	-	-
		-		2317	-	1.4922	X20CrMoV12-1	-	X20CrMoNi 12 01	-	-
		-	-	-	630	1.4542/	-	Z7CNU17-04	-	-	-
						1.4548					
	Austenitic	304S11	-	2352	304L	1.4306	-	Z2CN18-10	X2CrNi18 11	-	-
		304S31	58E	2332/2333	304	1.4350	X5CrNi189	Z6CN18.09	X5CrNi18 10	F.3551	SUS304
										F.3541	
										F.3504	
		303S21	58M	2346	303	1.4305	X12CrNiS18 8	Z10CNF 18.09	X10CrNiS 18.09	F.3508	SUS303
		304S15	58E	2332	304	1.4301	X5CrNi189	Z6CN18.09	X5CrNi18 10	F.3551	SUS304
		304C12		2333				Z3CN19.10	-	-	SUS304L
		304S12	-	2352	304L	1.4306	X2CrNi18 9	Z2CrNi18 10	X2CrNi18 11	F.3503	SCS19
		-	-	2331	301	1.4310	X12CrNi17 7	Z12CN17.07	X12CrNi17 07	F.3517	SUS301
		304S62	-	2371	304LN	1.4311	X2CrNiN18 10	Z2CN18.10	-	-	SUS304LN
		316S16	58J	2347	316	1.4401	X5CrNiMo18 10	Z6CND17.11	X5CrNiMo17 12	F.3543	SUS316
		-	-	2375	316LN	1.4429	X2CrNiMoN18 13	Z2CND17.13	-	-	SUS316LN
		316S13		2348	316L	1.4404	-	Z2CND17-12	X2CrNiMo1712	-	-
		316S13	-	2353	316L	1.4435	X2CrNiMo18 12	Z2CND17.12	X2CrNiMo1712	-	SCS16
								-	-	-	SUS316L
		316S33	-	2343	316	1.4436	-	Z6CND18.12-03	X8CrNiMo1713	-	-
				2347							
		317S12	-	2367	317L	1.4438	X2CrNiMo18 16	Z2CND19.15	X2CrNiMo18 16	-	SUS317L
		-		2562	UNS	1.4539	X1NiCrMo	Z2 NCDU25-20	-	-	-
					V 0890A						
		321S12	58B	2337	321	1.4541	X10CrNiTi18 9	Z6CNT18.10	X6CrNiTi18 11	F.3553	SUS321
										F.3523	
		347S17	58F	2338	347	1.4550	X10CrNiNb18 9	Z6CNNb18.10	X6CrNiNb18 11	F.3552	SUS347
										F.3524	
		320S17	58J	2350	316Ti	1.4571	X10CrNiMoTi18 10	Z6NDT17.12	X6CrNiMoTi17 12	F.3535	-
		-	-	-	318	1.4583	X10CrNiMoNb18 12	Z6CNDNb17 13B	X6CrNiMoNb17 13	-	-
		309S24	-	-	309	1.4828	X15CrNiSi20 12	Z15CNS20.12	-	-	SUH309
		310S24	-	2361	310S	1.4845	X12CrNi25 21	Z12CN25 20	X6CrNi25 20	F.331	SUH310
		301S21	58C	2370	308	1.4406	X10CrNi18.08	Z1NCDU25.20	-	F.8414	SCS17
		-		2387	-	1.4418	X4 CrNiMo16 5	Z6CND16-04-01			
		316S111	-	-	17-7PH	1.4568/	-	Z8CNA17-07	X2CrNiMo1712	-	-
						1.4504					
		-	-	2584	NO8028	1.4563	-	Z1NCDU31-27-03	-	-	-
		-	-	2378	S31254	-	-	Z1NCDU20-18-06AZ	-	-	-
	Austenitic-Ferritic (Duplex)	-	-	2376	S31500	1.4417	X2CrNiMoSi19 5	-	-	-	-
		-	-	2324	S32900	-	X8CrNiMo27 5	-	-	-	-
		-	-	2327	S32304	-	X2CrNiN23 4	Z2CN23-04AZ	-	-	-
		-	-	2328	-	-	-	-	-	-	-
		-	-	2377	S31803	-	X2CrNiMoN22 53	Z2CND22-05-03	-	-	-

K		Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
		BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Cast iron	Malleable cast iron	8 290/6		0814			-	MN 32-8			FCMB310
		B 340/12		0815	32510		GTS-35	MN 35-10			FCMW330
		P 440/7		0852	40010	0.8145	GTS-45	Mn 450	GMN 45		FCMW370
		P 510/4		0854	50005	0.8155	GTS-55	MP 50-5	GMN 55		FCMP490
		P 570/3		0858	70003		GTS-65	MP 60-3			FCMP540
		P570/3		0856	A220-70003	0.8165	GTS-65-02	Mn 650-3	GMN 65		FCMP590
		P690/2		0862	A220-80002	0.8170	GTS-70-02	Mn700-2	GMN 70		FCMP690
	Grey cast iron			0100							
				0110	No 20 B		GG10	Ft 10 D			FC100
		Grade 150		0115	No 25 B	0.6015	GG 15	Ft 15 D	G 15	FG 15	FC150
		Grade 220		0120	No 30 B	0.6020	GG 20	Ft 20 D	G 20		FC200
		Grade 260		0125	No 35 B	0.6025	GG 25	Ft 25 D	G 25	FG 25	FC250
					No 40 B						
		Grade 300		0130	No 45 B	0.6030	GG 30	Ft 30 D	G 30	FG 30	FC300
		Grade 350		0135	No 50 B	0.6035	GG 35	Ft 35 D	G 35	FG 35	FC350
		Grade 400		0140	No 55 B	0.6040	GG 40	Ft 40 D			
		L-NiCuCr202		0523	A436 Type 2	0.6660	GGL-NiCr202	L-NC 202	-	-	
	Ductile cast iron	SNG 420/12		0717-02	60-40-18	0.7040	GGG 40	FGS 400-12	GS 370-17	FGE 38-17	FCD400
		SNG 370:17		0717-12	-		GGG 40.3	FGS 370-17			
		-		0717-15	-	0.7033	GGG 35.3	-			
		SNG 500/7		0727-02	80-55-06	0.7050	GGG 50	FGS 500-7	GS 500	FGE 50-7	FCD500
		Grade S6		0776	A43D2	0.7660	GGG-NiCr202	S-NC 202	-	-	
		SNG 600/3		0732-03	-		GGG 60	FGS 600-3			FCD600
		SNG 700/2		0737-01	100-70-03	0.7070	GGG 70	FGS 700-2	GS 700-2	FGS 70-2	FCD700

N	Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
	BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Non-ferrous metals	-	-	4251	SC64D	3.2373	G-AlSI9MGWA	A-S7G	-	-	C4BS
	LM5	-	4252	GD-AlSI12	-	G-ALMG5	A-SU12	-	-	AC4A
	LM25		4244	356.1						A5052
			4247	A413.0		GD-AlSi12				A6061
	LM24		4250	A380.1		GD-AlSi8Cu3				A7075
	LM20		4260	A413.1		G-AlSi12 (Cu)				ADC12
	LM6		4261	A413.2		G-AlSi12				
	LM9		4253	A360.2		G-AlSi10Mg(Cu)				

S		Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
		BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Difficult-to-cut materials	Ni-based alloys	-	-	-	330	1.4864	X12NiCrSi36 16	Z12NCS35.16	F-3313	-	SUH330
		330C11	-	-	-	1.4865	G-X40NiCrSi38 18	-	XG50NiCr39 19	-	SCH15
		-	-	-	5390A	2.4603	-	NC22FeD	-	-	
		-	-	-	5666	2.4856	NiCr22Mo9Nb	NC22FeDNB	-	-	
		HR5,203-4	-	-	-	2.4630	NiCr2OTi	NC20T	-	-	
		-	-	-	5660	LW2.4662	NiFe35Cr14MoTi	ZSNCDT42	-	-	
		3146-3	-	-	5391	LW2 4670	S-NiCr13A16MoNb	NC12AD	-	-	
		HR8	-	-	5383	LW2.4668	NiCr19Fe19NbMo	NC19eNB	-	-	
		3072-76	-	-	4676	2.4375	NiCu30Al	-	-	-	
		Hr401,601	-	-	-	2.4631	NiCr2OTiAk	NC20TA	-	-	
		-	-	-	AMS 5399	2.4973	NiCr19Co11MoTi	NC19KDT	-	-	
		-	-	-	AMS 5544	LW2.4668	NiCr19Fe19NbMo	NC20K14	-	-	
		-	-	-	AMS 5397	LW2 4674	NiCo15Cr10MoAlTi	-	-	-	
		-	-	-	5537C	LW2.4964	CoCr20W15Ni	KC20WN	-	-	
		-	-	-	AMS 5772	-	CoCr22W14Ni	KC22WN	-	-	
	Titanium alloys	TA14/17	-	-	AMS R54520	-	TiAl5Sn2.5	T-A5E	-	-	
		TA10-13/TA28	-	-	AMS R56400	-	TiAl6V4	T-A6V	-	-	
		TA11	-	-	AMS R56401	-	TiAl6V4ELI	-	-	-	
		-	-	-	-	-	TiAl4Mo4Sn4Si0.5	-	-	-	

H	Great Britain		Sweden	U.S.A.	Germany		France	Italy	Spain	Japan
	BS	EN	SS	AISI/SAE	W. No.	DIN	AFNOR	UNI	UNE	JIS
Hard materials	-	-	2258-08	440A	1.4108	X100CrMo13	-	-	-	C4BS
	-	-	2534-05	610	1.4111	X110CrMoV15	-	-	-	AC4A
	-	-	2541-06	0-2	-	X65CrMo14	-	-	-	AC4A

Approximate Conversion Table of Hardness

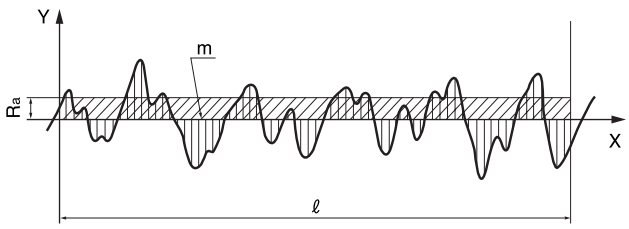
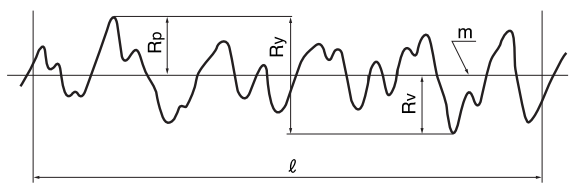
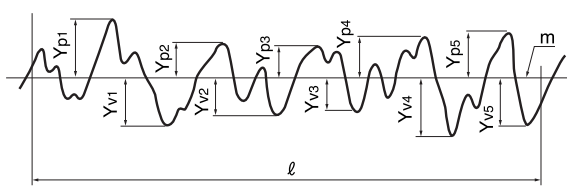
Brinell, 10 mm ball, Load 3000 kg, Standard ball HB	Vickers HV	Rockwell B Scale, Load 100 kg, Diameter 1/16 in. Steel ball HRB	Rockwell C Scale, Load 150 kg, brale diamond HRC	Shore HS
-	940	-	68.0	97
-	920	-	67.5	96
-	900	-	67.0	95
(767)	880	-	66.4	93
(757)	860	-	65.9	92
(745)	840	-	65.3	91
(733)	820	-	64.7	90
(722)	800	-	64.0	88
(712)	-	-	-	-
(710)	780	-	63.3	87
(698)	760	-	62.5	86
(684)	740	-	61.8	-
(682)	737	-	61.7	84
(670)	720	-	61.0	83
(656)	700	-	60.1	-
(653)	697	-	60.0	81
(647)	690	-	59.7	-
(638)	680	-	59.2	80
-	677	-	59.1	-
(630)	670	-	58.8	-
(627)	667	-	58.7	79
(601)	640	-	57.3	77
-	640	-	57.3	-
(578)	615	-	56.0	75
-	607	-	55.6	-
(555)	591	-	54.7	73
-	579	-	54.0	-
(534)	569	-	53.5	71
-	553	-	52.5	-
(514)	547	-	52.1	70
495	539	-	51.6	-
-	530	-	51.1	-
-	528	-	51.0	68
477	516	-	50.3	-
-	508	-	49.6	-
-	508	-	49.6	66
461	495	-	48.8	-
-	491	-	48.5	-
-	491	-	48.5	65
444	474	-	47.2	-
-	472	-	47.1	-
-	472	-	47.1	63

Brinell, 10 mm ball, Load 3000 kg, Standard ball HB	Vickers HV	Rockwell B Scale, Load 100 kg, Diameter 1/16 in. Steel ball HRB	Rockwell C Scale, Load 150 kg, brale diamond HRC	Shore HS
429	455	-	45.7	61
415	440	-	44.5	59
401	425	-	43.1	58
388	410	-	41.8	56
375	396	-	40.4	54
363	383	-	39.1	52
352	372	110.0	37.9	51
341	360	109.0	36.6	50
331	350	108.5	35.5	48
321	339	108.0	34.3	47
311	328	107.5	33.1	46
302	319	107.0	32.1	45
293	309	106.0	30.9	43
285	301	105.5	29.9	-
277	292	104.5	28.8	41
269	284	104.0	27.6	40
262	276	103.0	26.6	39
255	269	102.0	25.4	38
248	261	101.0	24.2	37
241	253	100.0	22.8	36
235	247	99.0	21.7	35
229	241	98.2	20.5	34
223	234	97.3	18.8	-
217	228	96.4	17.5	33
212	222	95.5	16.0	-
207	218	94.6	15.2	32
201	212	93.8	13.8	31
197	207	92.8	12.7	30
192	202	91.9	11.5	29
187	196	90.7	10.0	-
183	192	90.0	9.0	28
179	188	89.0	8.0	27
174	182	87.8	6.4	-
170	178	86.8	5.4	26
167	175	86.0	4.4	-
163	171	85.0	3.3	25
156	163	82.9	0.9	-
149	156	80.8	-	23
143	150	78.7	-	22
137	143	76.4	-	21
131	137	74.0	-	-
126	132	72.0	-	20
121	127	69.8	-	19
116	122	67.6	-	18
111	117	65.7	-	15

Note: Figures in ( ) under Brinell indicate values using tungsten carbide ball.

■ Surface roughness

According to JIS B 0601, 1994 and its explanation

Type	Symbol	How to determine	Example (Fig.)
Arithmetic mean roughness	**Ra**	Extract the reference length in the direction of mean line from the roughness curve. Take the X axis in the vertical magnification direction. Express the roughness curve by Y = f(x). In this case, the value determined by the following equation is expressed in micrometer (μm) and called the arithmetic mean roughness. $Ra = \frac{1}{l}\int_0^l \lvert f(x) \rvert \, dx$	
Maximum height	**Ry**	Extract the reference length in the direction of mean line from the roughness curve. Measure the distance between crest and bottom lines of the extracted portion in the direction of the vertical magnification direction of the roughness curve. Express this value in micrometer (μm) and call it the maximum height. $Ry = Rp + Rv$	
Ten point mean roughness	**Rz**	Extract the reference length in the direction of mean line from the roughness curve. Determine the sum of the average of the absolute value of the height (Yp) of the fifth crest from the average line and the average of the absolute value of the height (Yv) of the fifth bottom from the lowest bottom. Express this value in micrometer (μm) and call it the ten-point mean roughness. $Rz = \frac{\lvert Yp1 + Yp2 + Yp3 + Yp4 + Yp5 \rvert + \lvert Yv1 + Yv2 + Yv3 + Yv4 + Yv5 \rvert}{5}$	 $Y_{p1}, Y_{p2}, Y_{p3}, Y_{p4}, Y_{p5}$: Height of the fifth crest from the highest crest of the sampled portion equivalent to the reference length. $Y_{v1}, Y_{v2}, Y_{v3}, Y_{v4}, Y_{v5}$: Height of the fifth bottom from the lowest crest of the sampled portion equivalent to the reference length.

Grade Comparison Charts

●CVD Coated Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
P Steels	P01	**T9005**	UE6005	AC700G	GC4005	CA5505	HC5000	JC110V		TP1000 TK1000		IC9015
	P10	**T9005** **T9015**	UE6005 UE6010 UC6010 UE6020	AC700G AC2000	GC4005 GC4015 GC3115	CA5505 CA5515	GM10 GM8015 HG8010	JC110V JC215V JC730U	CP2 CP5	TP1000 TP2000 TK1000	KC9110 TN7005 TN7010 TN2510 TN25M	IC9015
	P20	**T9015** **T9025**	UE6010 UC6010 UE6020 F7030	AC2000 AC3000	GC4015 GC4020 GC2015 GC4225	CA5515 CA5525 CA9025	GM8020 HG8025	JC110V JC215V JC730U	CP2 CP5	TP2000 TP200 T200M T250M TK2000	KC9125 CM4 TN7015 TN7525	IC9015 IC9025
	P30	**T9025** **T9035** **T3030**	UH6400 UE6035 F7030 US735	AC3000 AC630M AC230	GC4030 GC4035 GC2025 GC2135 GC4225	CA5525 CA5535 CR9025	GM25	JC215V JC325V		TP2000 TP3000 T250M T350M T25M	KC8050 KC930M TN8025 TN7535 TN7025	IC9025
	P40	**T9035**	UH6400 UE6035 US735	AC630M AC230	GC4035 GC4240 GC235	CA5535	GM8035 GX30 GF30 GX2030	JC325V JC450V		TP3000 TP400 TP40 T350M	KC7935 KC9040 TPC35	
M Stainless steel	M10	**T9015**	US7020	AC610M	GC2015	CA6015	GM10	JC110V	CP2 CP5	TP200	TN25M TN7010	
	M20	**T6020** **T9025**	US7020 F7030	AC610M AC630M	GC2025	CA6015	GM8020	JC110V JC215V JC730U	CP2 CP5	TP200 TP3000 T250M T25M	KC9225 KC925M TN7015 TN7025	IC9025
	M30	**T6030** **T3030**	US735 F7030	AC630M	GC2040 GC2135 GC235		GM25 HG8025	JC215V JC325V		TP3000 TP400 TP40 T350M T25M	KC8050 KC9040 KC930M TN7025 TN8025 TN7535	IC9025 IC9054
	M40						GX30 GF30	JC325V JC450V		TP400 TP40	KC9240 KC9245 TPC35	IC9025
K Cast irons	K01	**T5105** **T5010**	UC5105	AC300G	GC3205 GC3210	CA4010	GM3005	JC105V JC600		TK1000		IC9007 IC428
	K10	**T5105** **T5115** **T5010** **T5020** **T1015**	UC5115 F5010	AC700G AC211	GC3205 GC3210 GC3115	CA4010 CA4115	GM8015 HG8010	JC110V JC600 JC610	CP2 CP5	TK1000 TK2000	KC9315 TN5015 TN5505 TN2510 KC915M TN5515 TN7010	IC9015
	K20	**T5125** **T5020** **T5115**	F5020 UC5115	AC700G	GC3215 GC3220 K20W K20D	CA4010 CA4120	GM8020 HG8025	JC110V JC215V JC610	CP2 CP5	TP200 T200M TK2000 T150M	KC9325 KC925M TN7015 TN5020 TN5520	IC9015
	K30	**T5125**			GC3040		GM25	JC215V JC610		TP200 T200M	KC8050 KC9040 KC930M TN7025	

Note: The above chart is based on published data and not authorized by each manufacturer.

●PVD Coated Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
P Steels	P01					PR915	PTH08M PCA08M PCS08M TB6005	JC5003				
	P10	**AH710**	VP10MF	ACZ310	GC1025 GC1030 P10A	PR630 PR730 PR830 PR930	CY9020 PCA12M PCA15M PC20M JX1020	JC5003 JC5030		CP200	KC5010 KC792M KC715M KC637M	IC570 IC950
	P20	**AH710**	VP20MF VP15TF VP20RT	ACZ310 ACZ330	GC1020 GC4125 GC1025 P20A GC1030	PR630 PR730 PR830 PR930	TB6020 CY150 CY15	JC5015 JC5030 JC5040	VM1 QM1 TA1 TAS	CP250 F25M	KC7215 KC7315 KC522M KC625M KC635M KC525M	IC570 IC908 IC950
	P30	**GH330** **GH730** **AH120** **AH330** **AH740**	VP15TF VP30RT VP20RT	ACZ330 ACZ350		PR660	TB6045 CY250 CY25 HC844	JC5015 JC5040	ZM3 QM3 TA3	CP500 F25M F30M	KC7015 KC7020 KC7235 KC725M	IC908 IC1008 IC328 IC3028 IC354 IC950
	P40	**AH120** **AH140**	VP30RT	ACZ350	GC2145		PTH30E TB6060 PTH40H	JC5040	ZM3 QM3 TA3	CP500 F40M T60M	KC7030 KC7040 KC7140 KC735M	IC3028 IC328 IC354
M Stainless steel	M01			EH510Z			PCS08H					
	M10	**AH710**	VP10MF	EH510Z	GC1005 GC1105	PR630 PR730 PR915 PR925	CY9020	JC5003		CP200	KC5010 KC6005 KC6105 KC792M KC715M	IC907 IC507
	M20	**GH330** **GH730**	VP20MF VP15TF VP20RT	EH520Z ACZ310	GC1025 GC4125 GC1030	PR630 PR730 PR915 PR925	TB6020 CY150 CY15	JC5015 JC8015	VM1 QM1 TA1 TAS	CP200 CP500 F25M	KC7020 KC7025 KC522M KC633M KC525M	IC907 IC507 IC328/3028 IC908 IC1008 IC1028
	M30	**AH120**	VP15TF VP20RT VP30RT	ACZ330 ACZ350	GC1020 GC2030 GC2035	PR660	TB6045 CY250 CY25 HC844	JC5015 JC8015	ZM3 QM3 TA3	CP500 F30M F40M	KC5025 KC7030 KC720 KC7225 KC725M KC735M	IC507 IC328/3028 IC908 IC1008 IC1028 IC928
	M40	**AH140**	VP30RT	ACZ350	GC2145		PTH30E TB6060 PTH40H		ZM3 QM3 TA3			IC328/3028 IC1028 IC928
K Cast irons	K01	**AH110**		EH10Z EH510Z		PR510	PTH08M PCA08M TB6005 PTH05A	JC5003				
	K10	**GH110** **AH110**		EH10Z EH510Z		PR510 PR905	CY9020 PTH13S	JC5015 JC5003		CP200	KC5010 KC7210 TN2505 KC510M	IC507 IC910
	K20	**AH120**	VP15TF VP20RT	EH20Z ACZ310 EH520Z	GC1020	PR905	TB6020 CY150 CY15	JC5015	QM1 TA1	CP200 CP250	KC7015 KC7215 KC7315 KC520M KC522M KC525M	IC507 IC328 IC908 IC910
	K30		VP15TF VP20RT	ACZ310			TB6045 CY250 PTH40H		QM3 TA3	CP500	KC7225 KC725M	IC328 IC908

Note: The above chart is based on published data and not authorized by each manufacturer.

●PVD Coated Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
N Nonferrous metals	N01	**GH110**		ACZ305 DL1000			PCS08M					
	N10			EH10Z EH510Z			CY100H CY10H				KC5410 KC510M KC637M	
	N20			EH20Z EH520Z						F15M F17M	KC631M	IC308 IC908 IC328
S Super alloys	S01	**AH110**	VP05RT					JC5003	TAS			
	S10	**AH120**	VP05RT VP10RT	EH510Z	GC1005 GC1105	PR915	PCS08M	JC5015 JC8015	QM1 TA1 TAS	CP200 CP250 CP500	KC5410 KC6005 KC7030 KC510M KC5510	IC507 IC907
	S20		VP10RT VP15TF	EH520Z EH20Z	GC4125 GC1025 GC1030		CY100H CY10H		QM1 TA1 ZM3 TA3 TAS	CP250 CP500	KC7020 KC730 KC522M KC625M KC5525 KC525M	IC507 IC907 IC328 IC908 IC1008 IC1028
	S30		VP15TF		GC2030					F40M	KC720 KC725M	IC328/3028 IC1028 IC928
H Hard materials	H01	**AH710**						JC5003				
	H10	**AH110** **AH120**	VP15TF	EZ510Z			PTH08M PCA08M TB6005 PTH80D	JC5015 JC8008 JC8015		F15M	KC6312 TN2505	
	H20		VP15TF							CP200 F15M	KC635M	
	H30									F30M		

●Cermet/Coated Cermet Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
P Steels	P01	**GT720** **NS520** **GT520**	AP25N	T110A T2000Z		TN30 PV30		LN10 CX50	T3N T15			IC20N IC520N
	P10	**GT720** **GT730** **NS520** **AT530**	NX2525 AP25N	T1200A T2000Z	CT5015 GC1525	TN60 TN6020 PV60 PV7020	CZ25	CX50 CX75	T15 C7X	CM C15M CMP	KT315 KT6215 TTI25	IC20N IC520N IC530N IC75T
	P20	**NS730** **GT730** **NS530** **AT530** **GT530**	NX2525 NX3035 AP25N UP35N	T1200A T2000Z T3000Z	CT530 GC1525	TN90 TN100M TN6020 PV90 PV7020	MZ1000 CH550 MZ2000 CH7030	CX75 CX90	C7X	C15M	KT325 KT530M HT7 KT605M	IC20N IC520N IC530N IC75T IC30N
	P30	**NS730** **NS740** **NS530** **NS540**	NX4545 VP45N	T3000Z T250A			MZ3000 CH7035	CX90 CX99	N40			IC30N IC75T

Note: The above charts are based on published data and not authorized by each manufacturer.

●Cermet/Coated Cerment Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
	M01											
	M10	**GT730 NS520 AT530 GT530**	NX2525 AP25N	T110A T2000Z	GC1525	TN60 TN6020 PV60 PV7020		LN10 CX50	T15 C7X	CM CMP	TTI25	IC30N
M Stainless steel	M20	**NS730 NS530**	NX2525 NX3035 AP25N	T1200A T2000Z	CT530	TN90 TN100M TN6020 PV90 PV7020	MZ1000 CH550 MZ2000 CM7030	CX50 CX75	C45 C7X	C15M	KT530M HT7 KT605M	IC30N
	M30	**NS740 NS540**	NX4545	T3000Z T250A			MZ3000 CM7035	CX90 CX99	N40			
	K01	**GT720 NS520 AT520 GT520**	NX2525 AP25N	T110A T2000Z		TN30 PV30		LN10	T3N T15			
K Cast irons	K10	**GT730 NS730 NS530 GT530**	NX2525 AP25N	T1200A T2000Z		TN60 TN6020 PV60 PV7020		LN10	T15 C7X		KT325 KT6215 TTI25	
	K20		NX2525 AP25N	T3000Z				CX75			KT530M HT7	

●Ceramics Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Seco Tool	Kennametal	Iscar
P Steels	P01	**LX11 LX21**		NB90S NB100C		A66N		HC1 HC4 HC7 ZC7				
	P10			WX120				WA1	Whiskal			
	P20											
	M01											
M Stainless steel	M10			WX120				WA1	Whiskal		KY1540	
	M20											
	K01	**LX11 LX21**		NB90S NB90M	CC620 CC650	KA30		HC1 HW2 HC2 HC6 HC7	NPC-H2 NPC-A2 Win		KY1615 KY1310	
K Cast irons	K10	**CXC73**		NS260C NS260 WX120	CC6090 CC1690	A65 A66N KS500		WA1 SX1 SP2 SX9	NX NXA Whiskal		KY3500 KY4300	
	K20	**FX105 CX710**		NS260C NS260		KS500 KS6000		SX8 SP2 SX1	NX NXA			
	S01								NPC-H2 NPC-A2			
S Super alloys	S10			WX120	CC670 CC6080			WA1	Whiskal Win		KY4300 KY1540	
	S20											
	H01	**LX11**		NB100C	GC6050 CC650 CC670	A65 A66N		HC4 HC7 ZC7	NPC-A2			
H Hard materials	H10					A65 A66N		WA1	NPC-A2 Win		KY4300 KY1615	
	H20											

Note: The above charts are based on published data and not authorized by each manufacturer.

● PCBN + PCD

Application code			Tungaloy	Mitsubishi Material	Sumitomo Electric Hartmetall	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Nippon	Seco Tool	Kennametal	Iscar
PCBN	K Cast irons	K01	**BX930**	MB710	BN500	CB50 CB7050	KBN900 KBN65B		JBN795	B20 B22 B16	NBN10 NBN20 NBN30		KD120 PB100	IB85 IB90A
		K10	**BX470** **BX480** **BX950**	MB710 MB730	BN700		KBN900	BH200	JBN330	B20 B22 B16	NBN10 NBN20 NBN30	CBN200 CBN300 CBN300P	KB9610	IB90 IB90A
		K20	**BX950** **BX90S** **BXC90**	MB730 MBS140	BN700 BNS800			BH250				CBN200 CBN300 CBN300P		
		K30	**BXC90** **BX90S**	MBS140	BNS800							CBN350	KB9640	
	S Super alloys	S01	**BX950** **BX450** **BX480**	MB730	BN700									IB85
		S10											KD120 PB100	
		S20												
		S30												
	H Hard materials	H01	**BXC30** **BX310**	MBC010 MB810	BNX10 BNC150 BNC80		KBN510 KBN10B KBN10N KBN25N			B20 B24	NBN10	CBN10 CBN100 CBN100P CBN050	PB250	
		H10	**BXC50** **BXC30** **BX330**	MB820 MB8025 MBC020	BNC150 BNC200 BN250	CB7015 CB7020 CB20	KBN25N KBN900 KBN525	BH200	JBN300	B20 B24	NBN10	CBN100 CBN100P CBN300 CBN300P CBN200	KD050 KD120 KB9610	IB50
		H20	**BXC50** **BX360**	MB825 MB8025 MBC020	BNC200 BNX20	CB50 CB7050		BH250	JBN245	B26		CBN150 CBN300 CBN300P CBN350 CBN200	KB5625	IB55
		H30	**BXC50** **BX380**	MB8025 MB835 MBC020	BNC300 BN350 BNX25					B36		CBN350	KB9640	IB85
PCD	N Nonferrous metals	N01	**DX180** **DX160**	MD205	DA90	CD10	KPD001		JDA30 JDA735	PD1	NPD		PD100 KD1405	
		N10	**DX140**	MD205 MD220	DA150 DA2200		KPD001 KPD010		JDA40 JDA745			PCD10	KD100 KD1410 KD1415	ID5
		N20	**DX120**	MD220 MD230	DA2200				JDA10 JDA715			PCD20		
		N30	**DX120**	MD230	DA2200							PCD30		

●Ultra-fine Grain Cemented Carbide Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hartmetall	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Nippon	Seco Tool	Kennametal	Iscar
P Steels	P01									SN03			
	P10	**TX10S**		ST10P	S1P		WS10	SRT		SN10		P10	IC70
	P20	**TX20** **TX25**	UTi20T	ST20E	SMA		EX35	SRT DX30		SN20 FL37S		K125M TTM	IC70 IC50M
	P30	**TX30** **UX30**	UTi20T	A30 A30N	SM30	PW30	EX35 EX40	SR30 DX35		SN30		GK K600 TTR	IC50M IC54
	P40	**TX40**		ST40E	S6		EX45	SR30 DX35		SN40		G13	IC54

Note: The above charts are based on published data and not authorized by each manufacturer.

●Ultra-fine Grain Cemented Carbide Grades

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hartmetall	Sandvik	Kyocera	Hitachi Tool	Dijet	NTK	Nippon	Seco Tool	Kennametal	Iscar
M Stainless steel	M01									UN10			
	M10	**TU10**		EH510 U10E	H10A		WA10B	UMN	MT1	UN20	890	K313	
	M20	**TU20**	UTi20T	EH520 U2	H13A		EX35	DX25 UMS	KM1	UN30	HX 883	K68 KMF K125M TTM	IC07 IC08
	M30	**UX30**	UTi20T	A30 A30N	H10F SM30		EX40 EX45	DX25 UMS	KM3	UN40		K600 TTR	IC28
	M40	**TU40**			S6		EX45	UM40				G13	IC28
K Cast irons	K01	**TH03**	HTi05T	H1 H2	H1P		WH05	KG03		HN05		K605	
	K10	**G1F** **TH10**	HTi10	EH10 EH510	H1P H10 HM	KW10	WH10	KG10 KT09		HN10 G1	890	K10 K313 KF1 KM1 K110M THM THM-U	IC20
	K20	**G2F** **G2** **KS20**	UTi20T	G10E EH20 EH520	H13A	GW10	WH20	CR1 KG20	KM1	G2	890 HX 883	K715 KMF K600	IC20 IC10
	K30	**G3**	UTi20T	G10E				KG30	KM3	G3	883	THR	IC10 IC28
	K40											G13	IC28
N Nonferrous metals	N01			H1 H2	H10 H13A			KG03				K605	
	N10	**TH10** **H10T** **KS05F**	HTi10	EH10 EH510				KG10 KT9		HN05	890 H15	K10 K313 KF1 KM1 K110M THM THM-U	IC08 IC20
	N20			G10E EH20 EH520				CR1 KG20	KM1		HX KX 883 H15 H25	K715 KMF K600	IC28 IC20
	N30							KG30	KM3		H25	G13 THR	
S Super alloys	S01		RT9005					KG03					
	S10	**TH10**	RT9005 RT9010	EH10 EH510	H10 H10A H10F H13A			FZ05 KG10		HN05 HN10	890	K10 K313 THM	IC20
	S20	**KS20**	RT9010 TF15	EH20 EH520				FZ15 KG20			890 883 HX H25	K715 KMF	IC20
	S30		TF15					KG30				G13 K600 THR	IC28
H Hard materials	H01	**TH03**		H1				KG03		HN05			
	H10	**TH10**						FZ05 KG10		HN10			
	H20							FZ15 KG20			890 HX 883		

Note: The above chart is based on published data and not authorized by each manufacturer.

Chipbreaker Comparison Charts

●Negative inserts

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Kyocera	Sandvik	Hitachi Tool	Kennametal	Dijet	Iscar
P Steels	Precision finishing	**TF, 01**	PK	FA, FL	DP, XP CF			FF	PF	SF
	Finishing and light cutting	**TS, TSF** **ZF** **11, 17, NS** **AS** **AFW, ASW** **27, NM** **CB** **C**	FH, SY, FY FS, C SH SW, MW SA R/L-1G, R/L-K R/L-F, R/L-FS	FP LU, SU, SK LUW, GUW SP ST, C	HQ, PS, GP VF XQ CJ WQ CQ	PF QF MF WF, WM, WR	BCT FE CE BE	FN	UA, FT UR, UT	NF No sign WG C, RF
	Medium cutting	**TM** **DM** **32Y** **ZM, 37, 38** **33, All round**	MV, MZ, MA MH All round	UG, UU GUW, UX, GU UA UM, UZ, MC	GS, HS CS, PT HK, XS GC, All round	PM, QM SM R/L-K	AE , AY AH Y, V	P MN	PG, UB, GN GNP	TF, PP, LF
	Medium to heavy cutting	**TH**	GH	MU, MX UZ	GT, HT	PR(P) MR	RE AR	RN, RP MG	GG, UD	TNM, NR
	Heavy cutting	**TU** **57** **65**	HZ, HX, HV, HA HAS, HBS, HCS HDS, HXD	MP, HG, HP	HX	PR MR 31, HR, QR	TE, UE H HX, HE	RM RH	UC	NM Without chipbreaker
M Stainless steel	Finishing and light cutting	**SS**	MS	SU	GU	MF 23	SE	FP	SF	
	Medium cutting	**S** **SM**	ES, 2G MA	EX, UP, UG MU, MM, GU	ST HU, SU	 MM, QM	DE	MP , P	SG	TF, PP
	Heavy cutting	**TH** **TU**		MP, HG, HP		MR QR, HR		RM RH		
K Cast irons	Finishing	**CF** **Without chipbreaker**	SH	FX, FY	All round, C	KF Without chipbreaker	Y , V Without chipbreaker	FN	Without chipbreaker	
	Medium cutting	**CM, All round** **33**	All round	UM, UX	ZS	KM QM	AE	UM, P		
	Heavy cutting	**CH**	Without chipbreaker	MU, UZ, MM	GC Without chipbreaker	KR MR QR	RE	RP, MG RN	GG	GN
N Nonferrous metals	Cutting of nonferrous metals	**P**		UP, FY, GX	A3 AH	23	R/L	MS, MP RP, MG		PP
S Super alloys	Cutting of heat resisting alloy	**SA** **SM**	MS ES FJ, MJ, GJ	FY, FX, SU EX, UP MU	SU	23 SR, NGP SM(NMX)		FS, LF K, GP, P MG-MS		PP

Note: The above chart is based on published data and not authorized by each manufacturer.

●Positive inserts

Application code		Tungaloy	Mitsubishi Material	Sumitomo Electric Hard Metal	Kyocera	Sandvik	Hitachi Tool	Kennametal	Dijet	Iscar
P Steels	Precision finishing	**01**		FW	CF		No sign	UF		SF
	Finishing and light cutting	**PF**	FV , SQ	FP, FZ, LU	XP, GP, DP	UF, PF	JQ	11, GM	FT	PF
		PS	SV	FK, SS, SC SU, SK, SF US	HQ, XQ , VF GP	PF(MF) PM(MM) UF, UM	JE	LF		SM, 14, 17 19, XL
		W08~20	R/L, R/L-FD R/L-FS, R/L-MV R/L-F, R/L-L	W, SD FX, FY	R/L A, B, C, H, Y	R/L-K				R/L RF, LF No sign
	Medium cutting	**PM**	MV No sign RR, RBS	SU, MU	HQ	PM, PR UM, UR	J	MF		DT, HQ
		23		UJ	GP, DP	53				
		24		SC (except for G-class inserts)	All round (No sign) G	No mark	JE			
		All round					All round			
		RS	No sign	RP		No mark	RG		GG	
	High-feed, small depth of cut cutting	**61**	No sign			No mark	WE			No sign 14
	Turning on small lathes	**J08~10**	R/L-SR, R/L-SN R/L-SS		F, J, U, CK FSF, USF, JSF	R/L-F			MF, MM ALU, MM1 ASF FT, ACB	
M Stainless steel	Finishing	**SS**	FV			MF MM, UM MR		GM, LF MF		
K Cast irons	Cutting of cast irons	**Without chipbreaker**	Without chipbreaker No sign	Without chipbreaker	Without chipbreaker	KF, R/L-K, KM Without chipbreaker UM, KR	Without chipbreaker	Without chipbreaker	Without chipbreaker	19
N Nonferrous metals	Cutting of nonferrous metals	**AL**	MJ, FJ	AG, AW	AH	AL		GT-HP		AS
		Read-type	R/L-F R/L	FY	A3					

Note: The above chart is based on published data and not authorized by each manufacturer.

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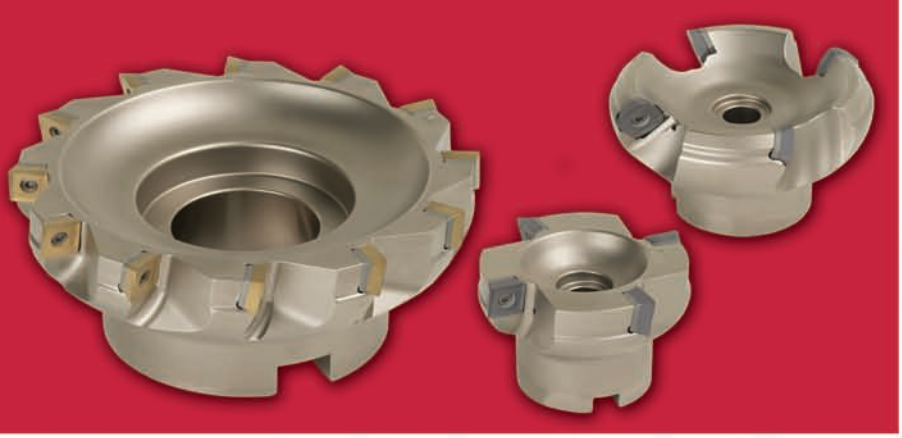
MEMO



45° TAW & 90° TPW Milling cutter

タンガロイ

Milling made “easy”

HJ chipbreaker
= High feed milling

With the newly developed tool system for face and square shoulder milling Tungaloy strikes out in a new direction in precision and design. This modern tool concept convinces in various application fields and enables productive and flexible utilisation on all different machining centres. Due to two different versions (standard pitch and close pitch type) this tool system offers optimal adaptation to a great variety of working materials.

All tools dispose of an inner coolant system directed precisely on each insert. Thanks to the highly positive rake angle and the application oriented chipbreaker, lowest cutting forces can be achieved.

Thus especially the machining of unstable work pieces on low power machining centres becomes totally uncomplicated. The application of the HJ high feed geometry in the 45° TAW milling cutter is revolutionary.

Simply by changing the insert the face milling cutter turns into a high feed milling cutter. This points out the complete potential of our new milling system as it realizes significantly shorter machining times.

Milling

Turning

Drilling

Keeping the Customer First

Tungaloy Europe GmbH

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*…precision in detail.

The newly developed **„Stream Jet Bars“** represent another outstanding milestone in Tungaloy's most successful history of tool development. The innovative and modern design combined with numerous outstanding features give way for economic and stable machining processes of even complex components.

Special construction characteristics in the insert seat reduce vibration and guarantee maximum component precision at even large boring depths. Large chip pockets guarantee excellent chip flow and prevent chip packing. The result is significant: **Low vibration, increased tool life.**

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Tungaloy

T5105
T5115
T5125

NEW

NEW

NEW

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*...high performance is gold.

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Tungaloy Corporation