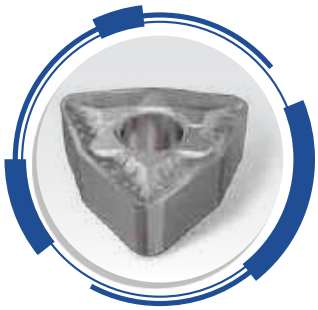
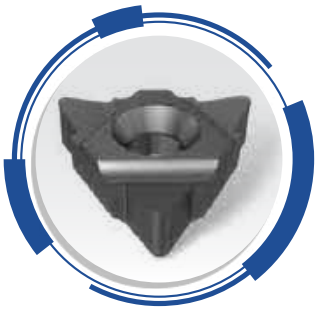
ISCAR TOOLS FOR MACHINING **ALUMINUM**

Metric Catalog

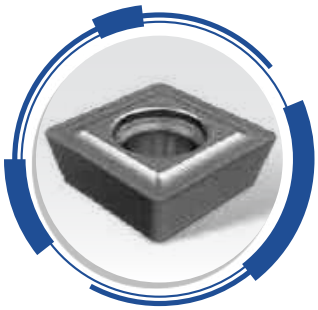


MACHINING INTELLIGENTLY







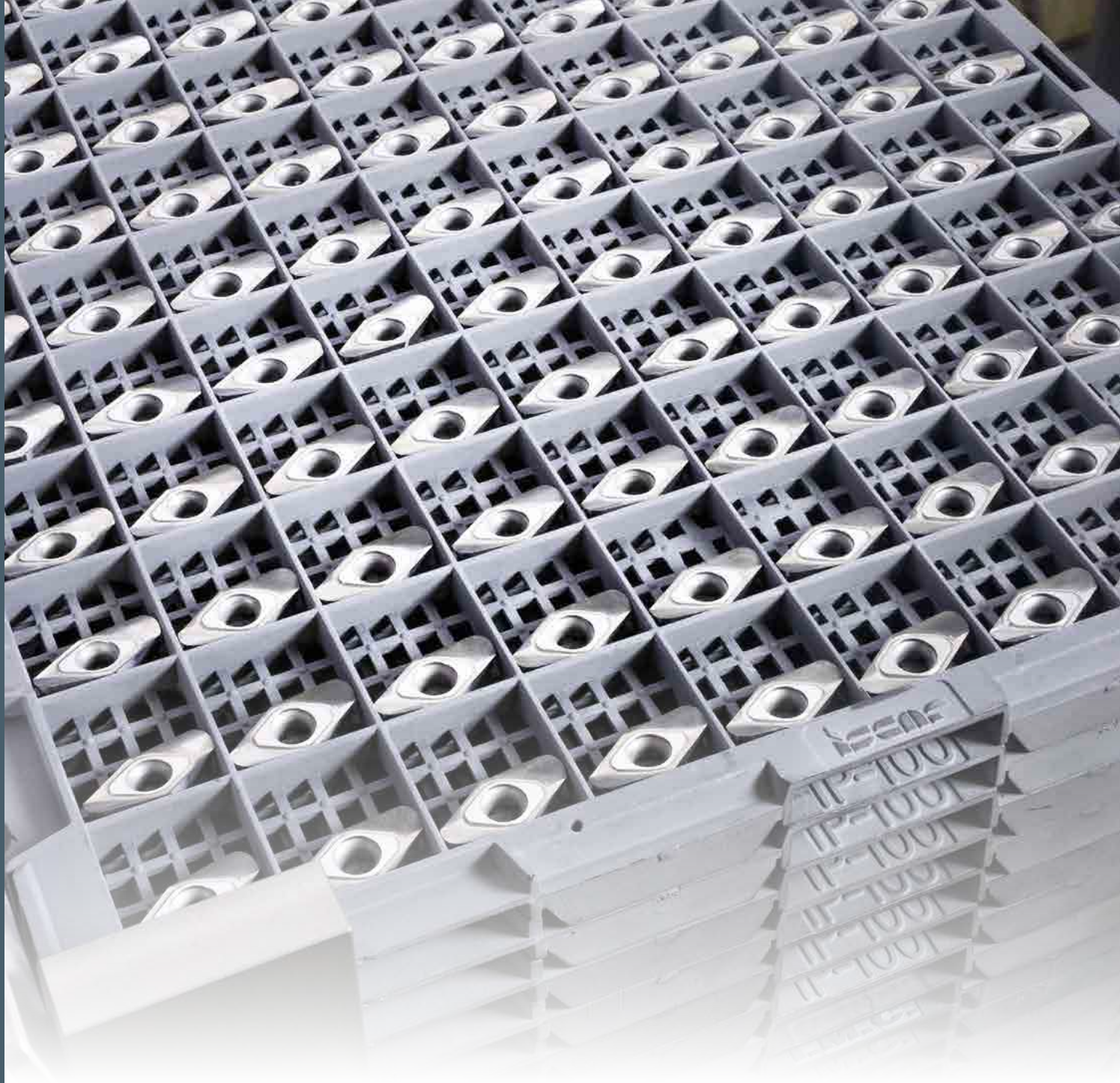


TURNING | THREADING | MILLING | HOLEMAKING

Member IMC Group

ISCAR

www.iscar.com



CERTIFIED QMS AS 9100 THE STANDARDS INSTITUTION OF ISRAEL

CERTIFIED QMS SI ISO 9001: 2015 THE STANDARDS INSTITUTION OF ISRAEL

CERTIFIED EMS SI ISO 14001: 2015 THE STANDARDS INSTITUTION OF ISRAEL

CERTIFIED OHS SYSTEM SI ISO 45001:2018 THE STANDARDS INSTITUTION OF ISRAEL

CERTIFIED ENERGY MANAGEMENT SYSTEM SI ISO 50001 THE STANDARDS INSTITUTION OF ISRAEL

Quality Standard

ISCAR has been certified by the prestigious Standards Institution, as being in full compliance to ensure delivery of the finest quality goods. Quality control facilities include the metallurgical laboratory, raw metal testing, an online testing procedure and a machining center for tool performance testing and final product inspection. Only the finest products are packaged for entry into ISCAR's inventory.

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Turning



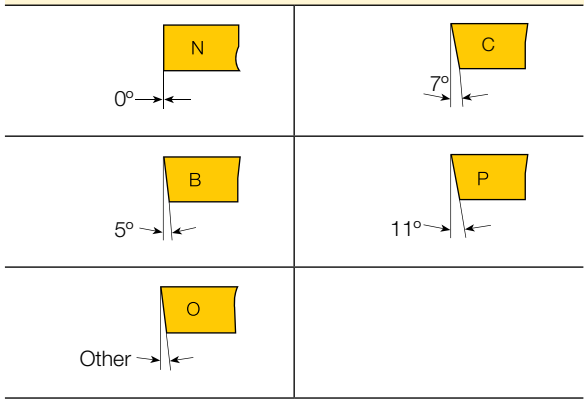
ISOTURN

W	N	M	G	08	04	08	E	GN
1	2	3	4	5	6	7	8	9

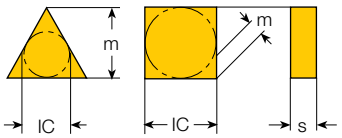
1. Shape

	R	75°	E	80°	W
90°	S	55°	D		L
60°	T	35°	V	55°	K
80°/100°	C	25°	Y	80°	Q

2. Clearance Angle



3. Tolerance



	M		S	IC	
E		±0.025	±0.025		±0.025
G		±0.025	±0.13		±0.025
M	from	±0.08	±0.13	from	±0.05
	to	±0.18(1)		to	±0.13(1)
U	from	±0.13	±0.13	from	±0.08
	to	±0.38(1)		to	±0.25(1)

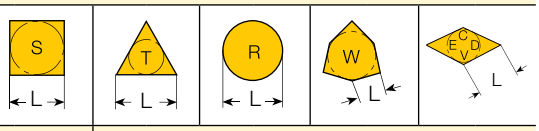
(1) Exact tolerance depends on insert size

IC	Tolerance in Mm			
	On m		On IC	
	Class M	Class U	Class M	Class U
6.35	±0.08	±0.13	±0.05	±0.08
9.52	±0.08	±0.13	±0.05	±0.08
12.70	±0.13	±0.20	±0.08	±0.13
15.87	±0.15	±0.27	±0.10	±0.18
19.05	±0.15	±0.27	±0.10	±0.18
25.40	±0.18	±0.38	±0.13	±0.25

4. Type

	A	without chipbreaker, with hole
	G	chipbreaker on both sides, with hole
	M, S	chipbreaker on one side, with hole
	R	chipbreaker on one side, without hole
	B, W	countersink on one side, with hole
	T, H	chipbreaker on one side, with hole and countersink
	P	neg./pos. on one or both sides, with hole
	Z, X	special

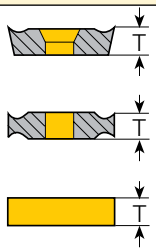
5. Cutting Edge Length



IC		Symbol (L)							
Inch	Mm	C	D	R	S	T	V	W	Q
5/32	3.97		04		03	06	06	02(1)	
7/32	5.56	05				09			
1/4	6.35	06	07			11	11		
9/32	7.15						12		
	8.00			08					
3/8	9.52	09	11		09	16	16	06	09
	10.00			10					
	12.00			12					
1/2	12.70	12	15		12	22	22	08	12
5/8	15.88	16			15	27			
	16.00			16					
3/4	19.05	19			19	33		13	
	20.00			20					
	25.00			25					
1	25.40				25				

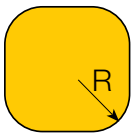
(1) WBMT 06

6. Thickness



01	=	1.59 mm
T1	=	1.98 mm
02	=	2.38 mm
03	=	3.18 mm
T3	=	3.97 mm
04	=	4.76 mm
06	=	6.35 mm
07	=	7.94 mm

7. Corner Radius



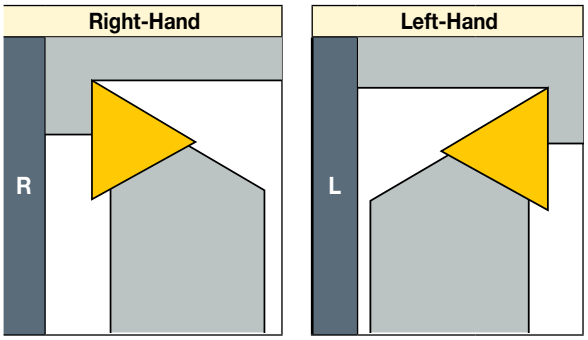
02	=	0.2 mm
04	=	0.4 mm
08	=	0.8 mm
12	=	1.2 mm
16	=	1.6 mm
20	=	2.0 mm
24	=	2.4 mm

8. Cutting Edge (Optional)

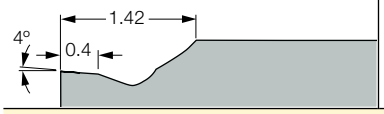
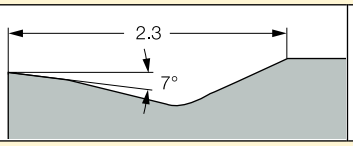
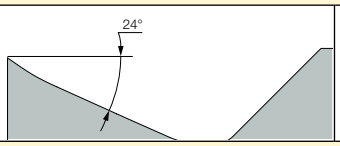
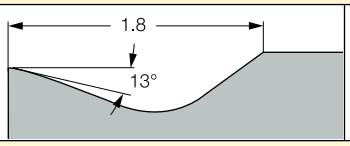
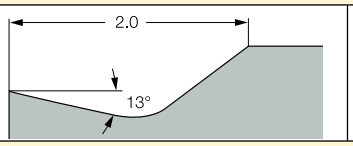
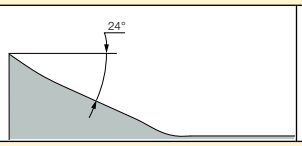
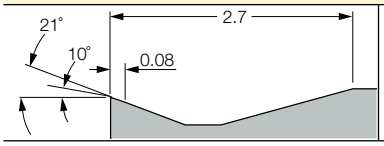
	F	sharp
	E	honed (rounded)
	T	chamfered (negative land)
	S	chamfered + honed

9. Chipformer Designation

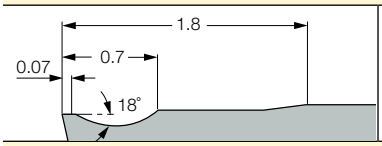
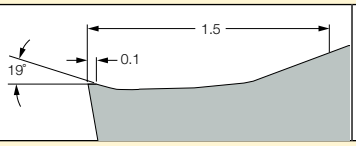
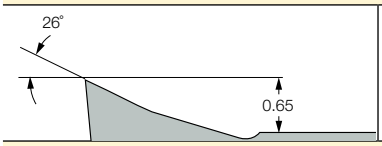
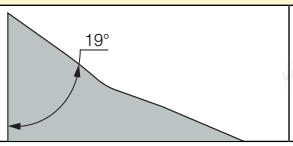
AS	TF
NF	PP
SM	GN
14	



Negative Chipformers

NF Chipformer		
		double-sided for semi-finishing and finishing applications. low cutting forces are due to a very sharp edge and positive rake.
Gn Chipformer		
		double-sided for general applications.
F3n Chipformer		
		polished and extra sharp positive insert for machining aluminum and non-ferrous materials for finishing applications.
Tf Chipformer		
		double-sided positive rake angles to prevent strain hardening. the rake angle varies along the edge to a negative angle which prevents chipping.
Pp Chipformer		
		double-sided, very positive rake, sharp- and positive radial edge for aluminum alloys.
M3n Chipformer		
		polished and extra sharp positive insert for machining aluminum and non-ferrous materials for medium applications.
12 Chipformer		
		single-sided for medium to rough machining on aluminum and soft materials.

Positive Chipformers

SM Chipformer		
		finishing and boring applications. feed range: 0.06-0.25 mm/rev. doc 0.5-2.5 mm.
14 Chipformer		
		semi-finishing and finishing. medium feeds.
As Chipformer		
		for general use machining on aluminum and soft materials.
R3n Chipformer		
		35° rhombic, double-sided sharp-edged positive and polished rake inserts. used for rough machining on soft and non-ferrous materials. soft cut and low cutting forces eliminate built-up edg

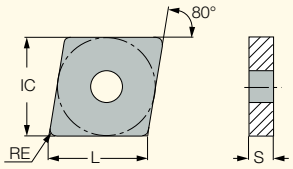
Indexable Inserts

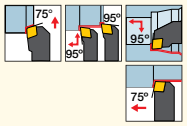
ISOTURN

CNMG-GN

Double-Sided 80° Rhombic Inserts for General Applications







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CNMG 120404-GN	12.90	12.70	4.76	0.40	●	1.00-4.00	0.14-0.40
CNMG 120408-GN	12.90	12.70	4.76	0.80	●	1.00-4.50	0.16-0.45

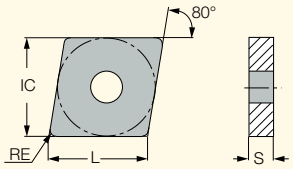
- For user guide and cutting speed recommendations, see pages 4-6,26

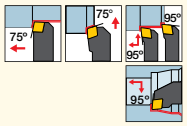
ISOTURN

CNMG/CNGG-TF

Double-Sided 80° Rhombic Inserts for Machining a Wide Range of Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CNMG 120404-TF	12.90	12.70	4.76	0.40	●	1.00-4.00	0.12-0.35
CNMG 120408-TF	12.90	12.70	4.76	0.80	●	1.00-4.00	0.12-0.35
CNMG 120412-TF	12.90	12.70	4.76	1.20	●	1.50-4.50	0.15-0.40

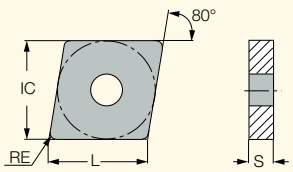
- For user guide and cutting speed recommendations, see pages 4-6,26

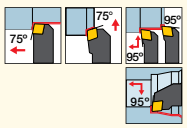
ISOTURN

CNMG/CNGG-PP

Double-Sided 80° Rhombic Inserts for Machining Very Ductile Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC28	IC10	Recommended Machining Data a_p (mm)	f (mm/rev)
CNMG 120404-PP	12.90	12.70	4.76	0.40		●	1.00-4.00	0.14-0.30
CNMG 120408-PP	12.90	12.70	4.76	0.80	●	●	1.00-4.00	0.14-0.30

- For user guide and cutting speed recommendations, see pages 4-6,26

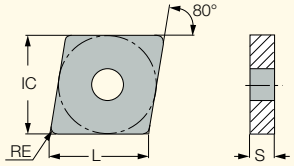
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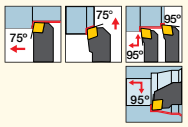
ISOTURN

CNMS-12

80° Rhombic Single-Sided Inserts for Soft and Nonferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CNMS 120408-12	12.90	12.70	4.76	0.80	●	1.00-4.00	0.10-0.35

- For user guide and cutting speed recommendations, see pages 4-6,26

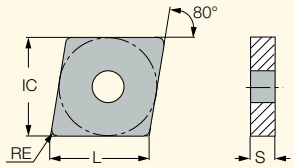
ISOTURN

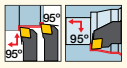
ALUPTURN POSITIVE DOUBLE SIDED

CNGG-F3N

Double-Sided Sharp Edged Positive and Polished Rake Inserts for Finishing Aluminum and Other Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CNGG 090402-F3N-P	9.70	9.52	4.76	0.20	●	0.30-3.00	0.10-0.30
CNGG 090404-F3N-P	9.70	9.52	4.76	0.40	●	0.40-3.00	0.10-0.30
CNGG 090408-F3N-P	9.70	9.52	4.76	0.80	●	0.80-3.00	0.10-0.30

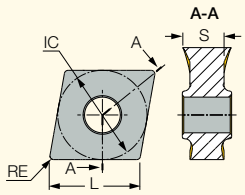
- For user guide and cutting speed recommendations, see pages 4-6,26

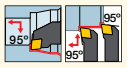
ALUPTURN POSITIVE DOUBLE SIDED

CNGX-M3N

Double-Sided Positive Rake Inserts with High Helical and Sharp Edge for Medium Machining Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CNGX 090604-M3N-P	9.70	9.52	4.40	0.40	●	0.40-3.00	0.10-0.30
CNGX 090608-M3N-P	9.70	9.52	4.40	0.80	●	0.80-3.00	0.10-0.30

- PCLNR/L.X and A-PCLNR/L-X are most recommended as they were designed especially for this insert
- For user guide and cutting speed recommendations, see pages 4-6,26

ISCAR

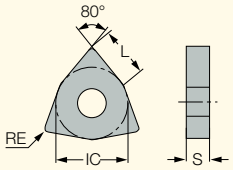
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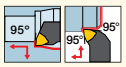
ISOTURN

WNMG-GN

Double-Sided Trigon Inserts for General Applications







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
WNMG 06T304-GN	6.52	9.52	3.97	0.40	●	1.00-3.50	0.14-0.40
WNMG 080408-GN	8.70	12.70	4.76	0.80	●	1.00-4.50	0.16-0.45

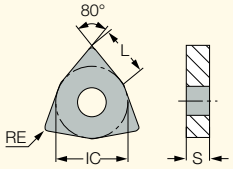
- For user guide and cutting speed recommendations, see pages 4-6,26

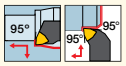
ISOTURN

WNMG-TF

Double-Sided Trigon Inserts for Machining a Wide Range of Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
WNMG 06T304-TF	6.52	9.52	3.97	0.40	●	1.00-3.00	0.12-0.35
WNMG 06T308-TF	6.52	9.52	3.97	0.80	●	1.00-3.00	0.12-0.35
WNMG 080404-TF	8.70	12.70	4.76	0.40	●	1.00-4.00	0.12-0.35
WNMG 080408-TF	8.70	12.70	4.76	0.80	●	1.00-4.00	0.12-0.35
WNMG 080412-TF	8.70	12.70	4.76	1.20	●	1.50-4.50	0.15-0.40

- For user guide and cutting speed recommendations, see pages 4-6,26

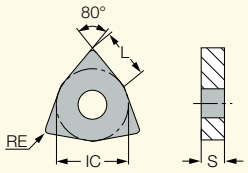
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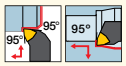
ALUPTURN POSITIVE DOUBLE SIDED

WNGG-F3N

Double-Sided Sharp Edged Positive and Polished Rake Inserts for Finishing Aluminum and Other Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
WNGG 060402-F3N-P	6.52	9.52	4.76	0.20	●	0.20-3.00	0.10-0.30
WNGG 060404-F3N-P	6.52	9.52	4.76	0.40	●	0.40-3.00	0.12-0.35
WNGG 060408-F3N-P	6.52	9.52	4.76	0.80	●	0.80-3.00	0.15-0.40

- For user guide and cutting speed recommendations, see pages 4-6,26

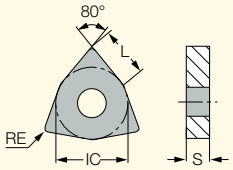
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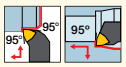
ISOTURN

WNMG-PP

Double-Sided Trigon Inserts for Machining Very Ductile Materials under Medium Cutting Conditions







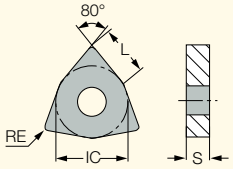
Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC28	IC10	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
WNMG 06T304-PP	6.52	9.52	3.97	0.40		●		1.00-3.00	0.14-0.30
WNMG 080404-PP	8.70	12.70	4.76	0.40		●		1.00-3.50	0.14-0.30
WNMG 080408-PP	8.70	12.70	4.76	0.80	●	●		1.00-4.00	0.14-0.30
WNMG 080412-PP	8.70	12.70	4.76	1.20			●	1.50-5.00	0.18-0.40

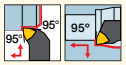
- For user guide and cutting speed recommendations, see pages 4-6,26

WNMG-NF

Double-Sided Trigon Inserts for Semi-Finishing and Finishing Applications







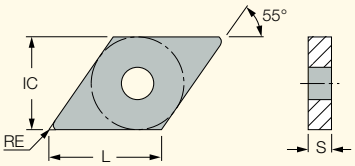
Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC10	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
WNMG 06T302-NF	6.52	9.52	3.97	0.20	●		0.30-1.50	0.08-0.17
WNMG 06T304-NF	6.52	9.52	3.97	0.40	●	●	0.40-2.50	0.07-0.25
WNMG 06T308-NF	6.52	9.52	3.97	0.80	●	●	0.60-3.00	0.08-0.25

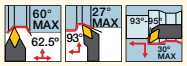
- For user guide and cutting speed recommendations, see pages 4-6,26

DNMG/DNGG-TF

Double-Sided 55° Rhombic Inserts for Machining a Wide Range of Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DNMG 110404-TF	11.63	9.52	4.76	0.40	●	1.00-3.00	0.12-0.30
DNMG 150404-TF	15.50	12.70	4.76	0.40	●	1.00-3.00	0.15-0.30
DNMG 150408-TF	15.50	12.70	4.76	0.80	●	1.00-3.50	0.15-0.30
DNMG 150604-TF	15.50	12.70	6.35	0.40	●	1.00-3.00	0.14-0.30
DNMG 150608-TF	15.50	12.70	6.35	0.80	●	1.00-3.50	0.15-0.30
DNMG 150612-TF	15.50	12.70	6.35	1.20	●	1.50-4.00	0.11-0.35

- For user guide and cutting speed recommendations, see pages 4-6,26

ISCAR

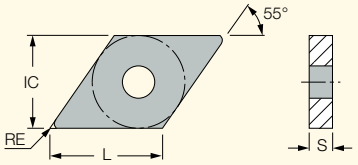
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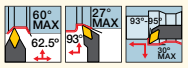
ISOTURN

DNMS-12

55° Rhombic Single-Sided Inserts for Soft and Nonferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DNMS 150408-12	15.50	12.70	4.76	0.80	●	1.00-4.00	0.07-0.35

- For user guide and cutting speed recommendations, see pages 4-6,26

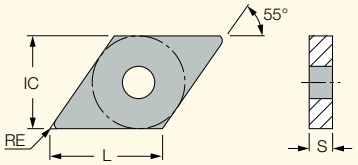
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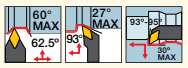
ALUPTURN POSITIVE DOUBLE SIDED

DNGG-M3N

Double-Sided Sharp-Edged Positive and Polished Rake Inserts for Finishing Aluminum and Other Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DNGG 110402-M3N-P	11.63	9.52	4.76	0.20	●	0.30-3.00	0.10-0.30
DNGG 110404-M3N-P	11.63	9.52	4.76	0.40	●	0.30-3.00	0.10-0.30
DNGG 110408-M3N-P	11.63	9.52	4.76	0.80	●	0.30-3.00	0.10-0.30

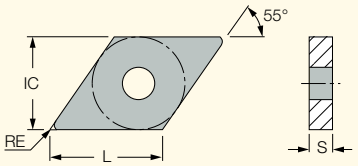
- For user guide and cutting speed recommendations, see pages 4-6,26

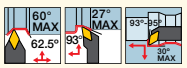
ISOTURN

DNMG/DNGG-PP

55° Double-Sided Rhombic Inserts for Machining Very Ductile Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC10	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DNMG 110404-PP	11.63	9.52	4.76	0.40		●	0.40-3.00	0.12-0.30
DNMG 110408-PP	11.63	9.52	4.76	0.80	●		1.00-3.50	0.12-0.30
DNMG 150408-PP	15.50	12.70	4.76	0.80		●	1.00-4.00	0.12-0.30
DNMG 150608-PP	15.50	12.70	6.35	0.80		●	1.00-3.50	0.12-0.30

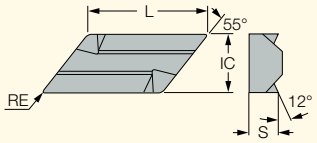
- For user guide and cutting speed recommendations, see pages 4-6,26

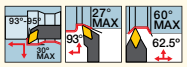
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Enter the item description in the search field to access additional related data.

ISOTURN

KNUX
55° Parallelogram Profiling Inserts







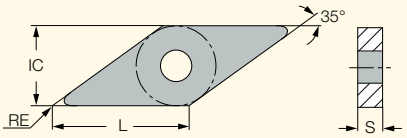
Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
KNUX 160405 L11	19.72	9.52	4.76	0.50	●	1.00-4.00	0.10-0.40
KNUX 160405 R11	19.72	9.52	4.76	0.50	●	1.00-4.00	0.10-0.40

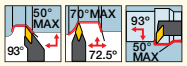
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN
ALUPTURN POSITIVE DOUBLE SIDED

VNGG-M3N
Double-Sided Sharp Edged Positive and Polished Rake Inserts for Finishing on Aluminum and Other Non-Ferrous Materials







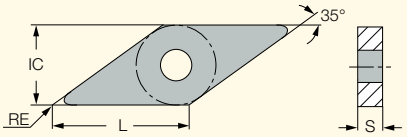
Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNGG 160402-M3N-P	16.60	9.52	4.76	0.20	●	0.20-3.00	0.10-0.25
VNGG 160404-M3N-P	16.60	9.52	4.76	0.40	●	0.40-3.00	0.12-0.30
VNGG 160408-M3N-P	16.60	9.52	4.76	0.80	●	0.80-3.00	0.15-0.35

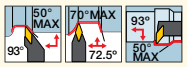
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN

VNMM-PP
Single-Sided 35° Rhombic Inserts for Machining Very Ductile Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNMM 12T304-PP	12.40	7.15	3.97	0.40	●	0.80-2.50	0.12-0.20
VNMM 12T308-PP	12.40	7.15	3.97	0.80	●	1.00-2.50	0.12-0.25

- For user guide and cutting speed recommendations, see pages 4-6,26

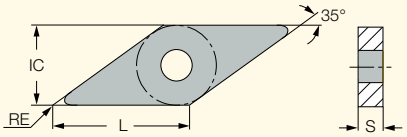
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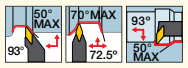
ISOTURN

VNMG/VNGG-NF

Double-Sided 35° Rhombic Inserts for Semi-Finishing and Finishing Applications







Designation	Dimensions L	IC	S	RE	Tough ↔ Hard IC10	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNMG 12T302-NF	12.40	7.15	3.97	0.20	●		0.40-2.50	0.07-0.18
VNMG 12T304-NF	12.40	7.15	3.97	0.40	●		0.70-2.00	0.07-0.24
VNMG 12T308-NF	12.40	7.15	3.97	0.80	●		1.00-3.00	0.08-0.24
VNMG 160408-NF	16.60	9.52	4.76	0.80		●	1.00-3.00	0.08-0.25

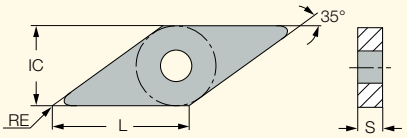
- For user guide and cutting speed recommendations, see pages 4-6,26

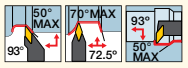
ISOTURN

VNMS-12

35° Rhombic Single-Sided Inserts for Soft and Nonferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNMS 160404-12	16.60	9.52	4.76	0.40	●	1.00-3.00	0.07-0.30
VNMS 160408-12	16.60	9.52	4.76	0.80	●	1.00-3.50	0.07-0.33

- For user guide and cutting speed recommendations, see pages 4-6,26

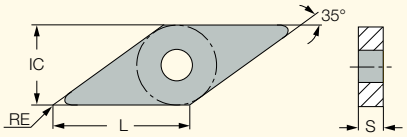
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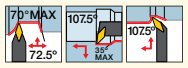
ALUPTURN POSITIVE DOUBLE SIDED

VNGU-R3N

Double-Sided Sharp Edged Positive Rake Inserts for Rough Machining Aluminum and Other Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNGU 220612-R3N	22.00	12.70	6.77	1.20	●	1.00-4.50	0.10-0.30
VNGU 220616-R3N	22.00	12.70	6.51	1.60	●	1.50-4.50	0.10-0.35
VNGU 220630-R3N	22.00	12.70	6.35	3.00	●	1.50-4.50	0.15-0.40

- For user guide and cutting speed recommendations, see pages 4-6,26

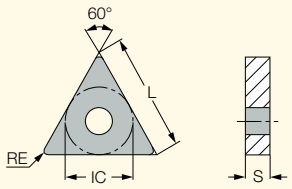
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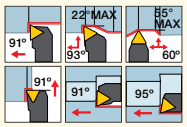
ISOTURN

TNMG-GN

Double-Sided Triangular Inserts for General Applications







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNMG 160408-GN	16.50	9.52	4.76	0.80	●	1.00-3.50	0.18-0.39

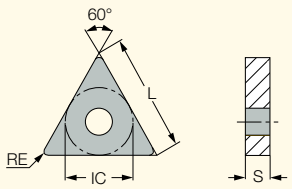
- For user guide and cutting speed recommendations, see pages 4-6,26

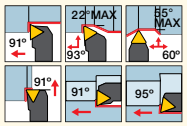
ISOTURN

TNMG/TNGG-PP

Double-Sided Triangular Inserts for Machining Very Ductile Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNMG 160404-PP	16.50	9.52	4.76	0.40	●	0.50-3.00	0.13-0.30
TNMG 160408-PP	16.50	9.52	4.76	0.80	●	1.00-3.00	0.12-0.30
TNMG 220408-PP	22.00	12.70	4.76	0.80	●	1.00-3.50	0.14-0.32

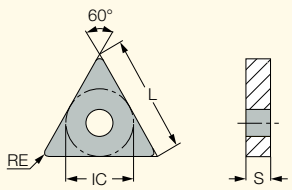
- For user guide and cutting speed recommendations, see pages 4-6,26

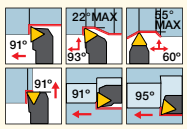
ISOTURN

TNMG-TF

Double-Sided Triangular Inserts for Machining a Wide Range of Materials under Medium Cutting Conditions







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNMG 160404-TF	16.50	9.52	4.76	0.40	●	1.00-3.00	0.12-0.30

- For user guide and cutting speed recommendations, see pages 4-6,26

ISCAR

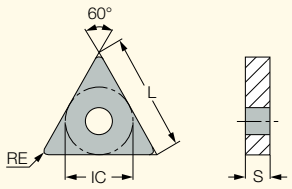
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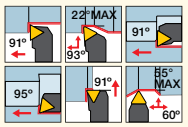
ISOTURN

TNMA

Double-Sided Triangular Inserts with no Chipformer for Short Chipping Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNMA 160408	16.50	9.52	4.76	0.80	●	1.00-4.00	0.05-0.25
TNMA 220408	22.00	12.70	4.76	0.80	●	1.50-5.00	0.05-0.33

- For user guide and cutting speed recommendations, see pages 4-6,26

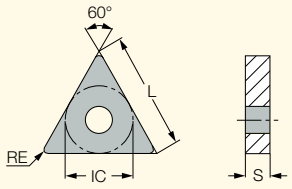
ISOTURN

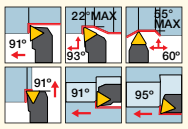
ALUPTURN POSITIVE DOUBLE SIDED

TNGG-M3N

Double-Sided Sharp Edged Positive and Polished Rake Inserts for Finishing Aluminum and Other Non-Ferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNGG 160402-M3N-P	16.50	9.52	4.76	0.20	●	0.30-3.00	0.10-0.30
TNGG 160404-M3N-P	16.50	9.52	4.76	0.40	●	0.30-3.00	0.10-0.30
TNGG 160408-M3N-P	16.50	9.52	4.76	0.80	●	0.30-3.00	0.10-0.30

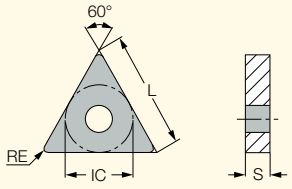
- For user guide and cutting speed recommendations, see pages 4-6,26

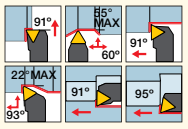
ISOTURN

TNMS-12

Triangular Single-Sided Inserts for Soft and Nonferrous Materials







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TNMS 160404-12	16.50	9.52	4.76	0.40	●	0.50-3.00	0.07-0.32
TNMS 160408-12	16.50	9.52	4.76	0.80	●	0.50-3.00	0.10-0.35
TNMS 220404-12	22.00	12.70	4.76	0.40	●	1.00-4.00	0.07-0.32
TNMS 220408-12	22.00	12.70	4.76	0.80	●	1.00-4.00	0.10-0.35

- For user guide and cutting speed recommendations, see pages 4-6,26

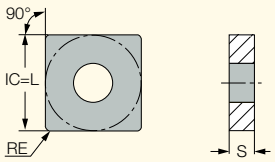
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Enter the item description in the search field to access additional related data.

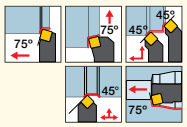
ISOTURN

SNMG-TF

Double-Sided Square Inserts for Machining a Wide Range of Materials under Medium Cutting Conditions







Designation	Dimensions IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SNMG 120412-TF	12.70	4.76	1.20	●	1.50-4.00	0.15-0.40

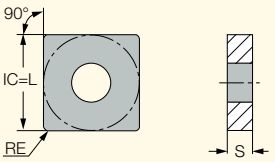
- For user guide and cutting speed recommendations, see pages 4-6,26

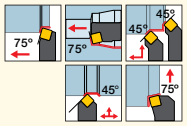
ISOTURN

SNMA

Double-Sided Square Inserts Without a Chipformer for Short Chipping Materials







Designation	Dimensions IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SNMA 120408	12.70	4.76	0.80	●	1.50-5.00	0.05-0.50
SNMA 120412	12.70	4.76	1.20	●	1.50-5.00	0.10-0.50
SNMA 190612	19.05	6.35	1.20	●	2.00-7.00	0.10-0.60

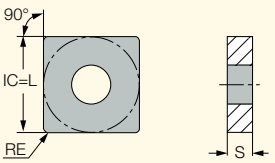
- For user guide and cutting speed recommendations, see pages 4-6,26

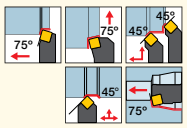
ISOTURN

SNMG-GN

Double-Sided Square Inserts for General Applications







Designation	Dimensions IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SNMG 120408-GN	12.70	4.76	0.80	●	1.00-5.00	0.20-0.45
SNMG 150612-GN	15.88	6.35	1.20	●	2.00-7.00	0.30-0.60

- For user guide and cutting speed recommendations, see pages 4-6,26

ISCAR

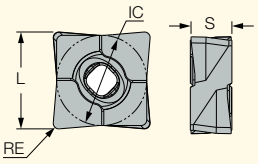
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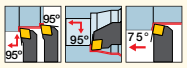
LOGIQ4TURN POSITIVE DOUBLE SIDED
ALUPTURN POSITIVE DOUBLE SIDED

CXGG-M3N-P

CXGG 80° Double-Sided and Double-Positive Polished rhombic inserts







Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CXGG 090404-M3N-P	10.40	9.35	4.66	0.40	●	0.30-3.00	0.10-0.50
CXGG 090402-M3N-P	10.44	9.35	4.66	0.20	●	0.15-3.00	0.05-0.50
CXGG 12T508-M3N-P	13.75	12.50	5.80	0.80	●	0.50-5.00	0.15-0.50
CXGG 12T504-M3N-P	13.83	12.50	5.80	0.40	●	0.30-5.00	0.10-0.50

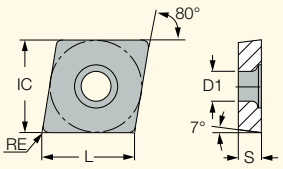
- For user guide and cutting speed recommendations, see pages 4-6,26

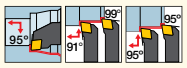
ISOTURN

CCMT-14

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finish and Finish Turning







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060204-14	6.30	6.35	2.38	0.40	2.80	●	0.50-2.50	0.14-0.25
CCMT 09T308-14	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.14-0.30
CCMT 120408-14	12.90	12.70	4.76	0.80	5.50	●	0.80-3.00	0.14-0.30

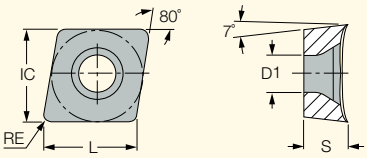
- For user guide and cutting speed recommendations, see pages 4-6,26

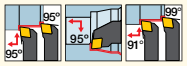
ISOTURN

CCGT-AS

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060201-AS	6.40	6.35	2.38	0.10	2.80	●	0.50-2.00	0.10-0.20
CCGT 060202-AS	6.40	6.35	2.38	0.20	2.80	●	0.50-2.00	0.10-0.20
CCGT 060204-AS	6.40	6.35	2.38	0.40	2.80	●	0.50-2.00	0.10-0.25
CCGT 09T301-AS	9.70	9.52	3.97	0.10	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T302-AS	9.70	9.52	3.97	0.20	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T304-AS	9.70	9.52	3.97	0.40	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T308-AS	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.10-0.30
CCGT 120402-AS	12.90	12.70	4.76	0.20	5.50	●	0.50-2.50	0.10-0.25
CCGT 120404-AS	12.90	12.70	4.76	0.40	5.50	●	0.50-2.50	0.10-0.25
CCGT 120408-AS	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.10-0.30

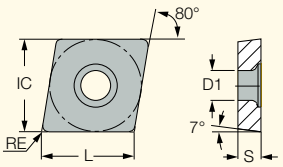
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN

CCMT/CCGT

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finishing and Finish Turning







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060202L [1]	6.45	6.35	2.38	0.20	2.80	●	0.50-2.00	0.10-0.20

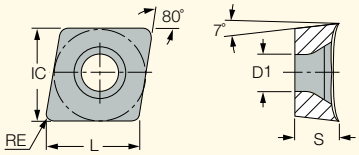
- Use left-hand inserts for left-hand external tools and for right-hand internal tools

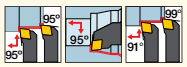
[1] Left-hand insert

CCGT-AF

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







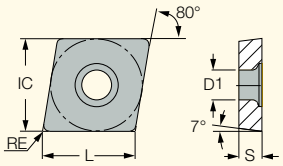
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 09T308-AF	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.15-0.25
CCGT 120408-AF	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.15-0.30

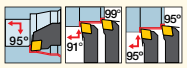
- For user guide and cutting speed recommendations, see pages 4-6,26

CCMT/CCGT-SM

Single-Sided Turning Inserts for Semi-Finish and Finishing on Soft Materials and Exotic Alloys







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 09T304-SM	9.70	9.52	3.97	0.40	4.40	●	0.50-2.50	0.06-0.25

- For user guide and cutting speed recommendations, see pages 4-6,26

ISCAR

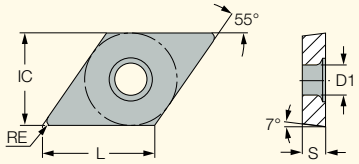
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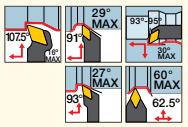
ISOTURN

DCMT-14

55° Rhombic Inserts with a Positive Flank for Semi-Finish and Finish Turning on Soft Materials and Exotic Alloys







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DCMT 11T304-14	11.60	9.52	3.97	0.40	4.40	●	1.00-2.50	0.14-0.25
DCMT 11T308-14	11.60	9.52	3.97	0.80	4.40	●	1.50-3.00	0.14-0.29

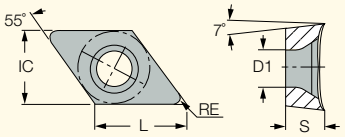
- For user guide and cutting speed recommendations, see pages 4-6,26

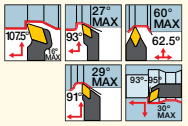
ISOTURN

DCGT-AF

Inserts with a Very Positive Rake Angle and Sharp Cutting Edge for Semi-Finishing and Finishing Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DCGT 11T304-AF	11.60	9.52	3.97	0.40	4.40	●	0.50-2.50	0.05-0.25

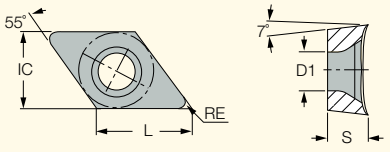
- For user guide and cutting speed recommendations, see pages 4-6,26

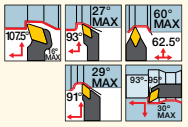
ISOTURN

DCGT-AS

55° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
DCGT 070201-AS	7.75	6.35	2.38	0.10	2.80	●	0.50-2.00	0.03-0.20
DCGT 070202-AS	7.75	6.35	2.38	0.20	2.80	●	0.50-2.00	0.05-0.20
DCGT 070204-AS	7.75	6.35	2.38	0.40	2.80	●	0.50-2.50	0.05-0.25
DCGT 11T301-AS	11.60	9.52	3.97	0.10	4.40	●	0.50-2.50	0.05-0.25
DCGT 11T302-AS	11.60	9.52	3.97	0.20	4.40	●	0.50-2.50	0.05-0.26
DCGT 11T304-AS	11.60	9.52	3.97	0.40	4.40	●	0.50-2.50	0.05-0.25
DCGT 11T308-AS	11.60	9.52	3.97	0.80	4.40	●	0.80-3.00	0.08-0.30

- For user guide and cutting speed recommendations, see pages 4-6,26

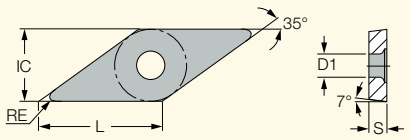
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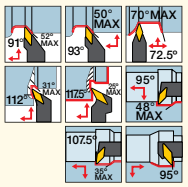
ISOTURN

VCMT-14

35° Rhombic Inserts with a 7° Positive Flank for Semi-Finish and Finish Turning on Soft Materials and Exotic Alloys







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCMT 160404-14	16.60	9.52	4.76	0.40	4.40	●	1.00-5.00	0.12-0.25
VCMT 160408-14	16.60	9.52	4.76	0.80	4.40	●	1.00-5.00	0.12-0.30

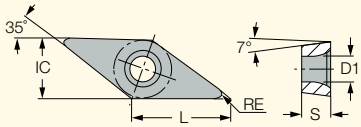
- For user guide and cutting speed recommendations, see pages 4-6,26

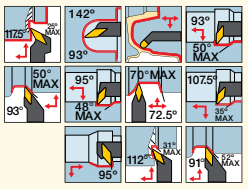
ISOTURN

VCGT-AS

35° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 110302-AS	11.10	6.35	3.18	0.20	2.90	●	0.20-2.50	0.05-0.20
VCGT 110304-AS	11.10	6.35	3.18	0.40	2.90	●	0.50-3.00	0.05-0.25
VCGT 160401-AS	16.60	9.52	4.76	0.10	4.40	●	0.20-2.50	0.05-0.20
VCGT 160402-AS	16.60	9.52	4.76	0.20	4.40	●	0.50-2.50	0.05-0.25
VCGT 160404-AS	16.60	9.52	4.76	0.40	4.40	●	0.50-3.00	0.05-0.25
VCGT 160408-AS	16.60	9.52	4.76	0.80	4.40	●	0.50-3.00	0.10-0.25
VCGT 160412-AS	16.60	9.52	4.76	1.20	4.40	●	0.50-3.00	0.10-0.25
VCGT 220530-AS	22.10	12.70	5.56	3.00	5.50	●	1.50-4.50	0.15-0.30

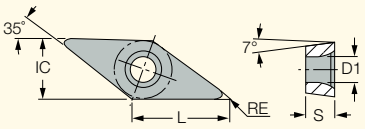
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN

VCGT-AF

Inserts with a Very Positive Rake Angle and Sharp Cutting Edge for Semi-Finishing and Finishing Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 220508-AF	22.10	12.70	5.56	0.80	5.50	●	1.00-4.50	0.10-0.25
VCGT 220512-AF	22.10	12.70	5.56	1.20	5.50	●	1.00-4.50	0.10-0.30
VCGT 220516-AF	22.10	12.70	5.56	1.60	5.50	●	1.50-4.50	0.10-0.35

- For user guide and cutting speed recommendations, see pages 4-6,26

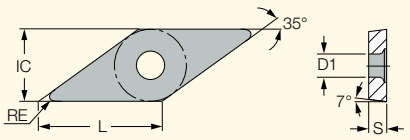
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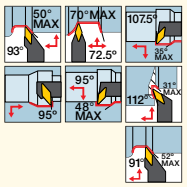
ISOTURN

VCMW
35° Rhombic Inserts with a 7° Positive Flank



Tolerances:
IC= ±0.05
S= ±0.13





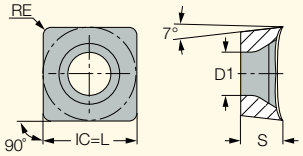
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCMW 160404	16.60	9.52	4.76	0.40	4.40	●	0.70-4.00	0.05-0.25
VCMW 160408	16.60	9.52	4.76	0.80	4.40	●	1.00-5.00	0.05-0.25

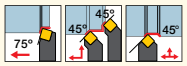
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN

SCGT-AS
Square Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







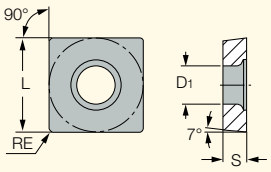
Designation	Dimensions IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SCGT 09T308-AS	9.52	3.97	0.80	4.40	●	0.50-3.00	0.10-0.30
SCGT 120404-AS	12.70	4.76	0.40	5.50	●	1.00-4.00	0.10-0.30
SCGT 120408-AS	12.70	4.76	0.80	5.50	●	1.00-4.00	0.10-0.30

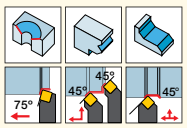
- For user guide and cutting speed recommendations, see pages 4-6,26

ISOTURN

SCMW
Square 7° Positive Flank, Flat Rake Inserts, for Short Chipping Materials







Designation	Dimensions L	S	RE	D1	IC20
SCMW 09T304	9.52	3.97	0.40	4.40	●
SCMW 120408	12.70	4.76	0.80	5.50	●

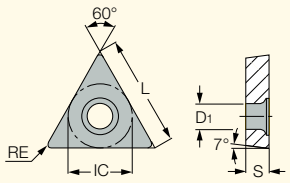
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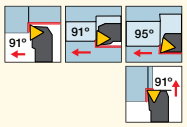
ISOTURN

TCMT-19

Triangular Inserts with a 7° Positive Flat Rake for Semi-Roughing Applications at Medium to High Feeds







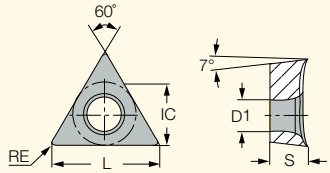
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TCMT 110204-19	11.00	6.35	2.38	0.40	2.80	●	0.50-3.00	0.10-0.30
TCMT 16T308-19	16.50	9.52	3.97	0.80	4.40	●	1.00-4.00	0.20-0.35

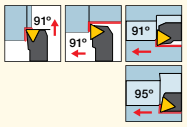
ISOTURN

TCGT-AS

Triangular Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TCGT 110204-AS	11.00	6.35	2.38	0.40	2.80	●	0.20-3.00	0.05-0.30
TCGT 16T304-AS	16.50	9.52	3.97	0.40	4.40	●	0.50-3.00	0.05-0.30
TCGT 16T308-AS	16.50	9.52	3.97	0.80	4.40	●	0.50-3.00	0.10-0.30

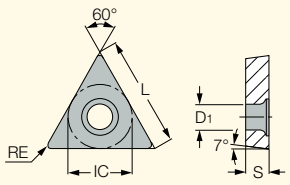
- For user guide and cutting speed recommendations, see pages 4-6,26

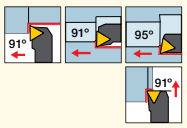
ISOTURN

TCMT-14

Triangular 7° Positive Flank Inserts, for Semi-Finish and Finish Turning on Soft Materials and Exotic Alloys







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TCMT 16T304-14	16.50	9.52	3.97	0.40	4.40	●	1.00-4.00	0.18-0.40

- For user guide and cutting speed recommendations, see pages 4-6,26

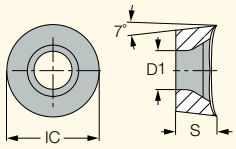
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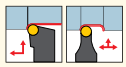
ISOTURN

RCGT-AS

Round Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions IC	S	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
RCGT 0803M0-AS	8.00	3.18	3.40	●	1.00-4.00	0.20-0.40
RCGT 1003M0-AS	10.00	3.18	4.00	●	1.00-5.00	0.20-0.40
RCGT 10T3M0-AS	10.00	3.97	4.40	●	1.00-5.00	0.20-0.40

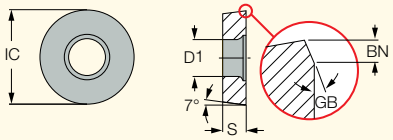
- For user guide and cutting speed recommendations, see pages 4-6,26

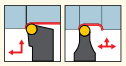
ISOTURN

RCMT-14

Round Inserts with a 7° Positive Flank for Medium and Finish Profiling on a Wide Range of Materials







Designation	Dimensions IC	S	D1	GB	BN	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
RCMT 0803M0-14	8.00	3.18	3.40	15.0	0.15	●	1.00-4.00	0.30-0.45
RCMT 10T3M0-14	10.00	3.97	4.40	15.0	0.15	●	1.50-5.00	0.30-0.50
RCMT 1204M0-14	12.00	4.76	5.50	15.0	0.15	●	1.50-6.00	0.30-0.50
RCMT 1606M0-14	16.00	6.35	5.50	15.0	0.25	●	2.00-8.00	0.40-0.60
RCMT 2006M0-14	20.00	6.35	6.50	15.0	0.25	●	2.50-10.00	0.50-0.70

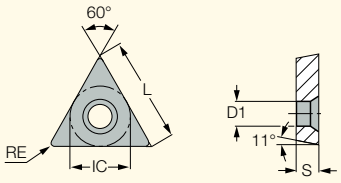
- For user guide and cutting speed recommendations, see pages 4-6,26

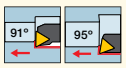
ISOTURN

TPGB

Triangular Inserts with an 11° Positive Flank for Short Chipping Materials







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGB 110204	11.00	6.35	2.38	0.40	3.00	●	1.00-3.00	0.05-0.25

- For user guide and cutting speed recommendations, see pages 4-6,26

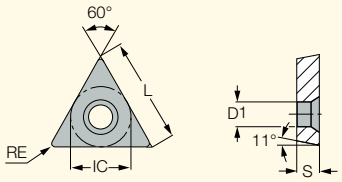
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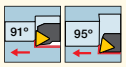
ISOTURN

TPGH-R/L

Triangular Inserts with an 11° Positive and Ground Chipformer for Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC20	IC70	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGH 110204-L	11.00	6.35	2.38	0.40	3.00	●	•	1.00-3.00	0.05-0.25
TPGH 160304-L	16.50	9.52	3.18	0.40	4.30	●	•	1.00-4.00	0.05-0.30
TPGH 160304-R	16.50	9.52	3.18	0.40	4.30		•	1.00-4.00	0.05-0.30
TPGH 160308-L	16.50	9.52	3.18	0.80	4.30	●	•	1.00-4.00	0.05-0.30

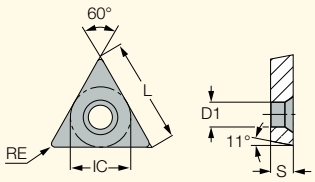
- For user guide and cutting speed recommendations, see pages 4-6,26
- ● First choice grade

ISOTURN

TPGX

Triangular Inserts with an 11° Positive Flank and Ground Chipformer for Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC54	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202-L	9.52	5.56	2.38	0.20	3.00		●	1.00-2.00	0.10-0.20
TPGX 090204-L	9.52	5.56	2.38	0.40	3.00	•	●	1.00-2.50	0.15-0.20
TPGX 110302-L	11.00	6.35	3.18	0.20	3.50		●	1.00-2.50	0.10-0.20
TPGX 110304-L	11.00	6.35	3.18	0.40	3.50	•	●	1.00-3.00	0.15-0.20
TPGX 110308-L	11.00	6.35	3.18	0.80	3.50		●	1.00-3.50	0.15-0.25

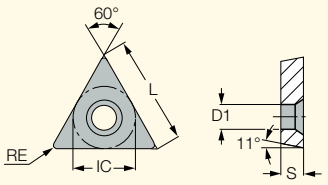
- For user guide and cutting speed recommendations, see pages 4-6,26
- ● First choice grade

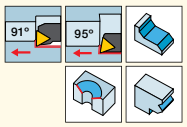
ISOTURN

TPMT

Triangular 11° Positive Inserts with a Positive Chipformer Exerts Low Cutting Forces for Internal Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC20	IC70	Recommended Machining Data a_p (mm)(1)	f (mm/rev)(2)
TPMT 110204	11.00	6.35	2.38	0.40	3.00	●	•	1.00-3.00	0.12-0.30
TPMT 110208	11.00	6.35	2.38	0.80	3.00	●		1.00-4.00	0.15-0.30
TPMT 160304	16.50	9.52	3.18	0.40	4.30	●	•	1.00-4.00	0.12-0.30
TPMT 160308	16.50	9.52	3.18	0.80	4.30	●		5.00-12.00	0.15-0.35

- For cutting speed recommendations, see pages 4-6,26

(1) For turning

(2) For turning

- ● First choice grade

ISCAR

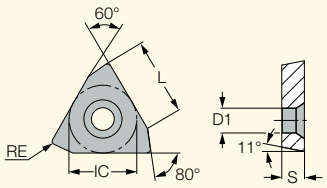
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Enter the item description in the search field to access additional related data.

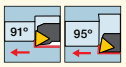
ISOTURN

TPGH-XL

Triangular Inserts with an 11° Positive and Ground Chipformer for Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC20	IC70	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGH 110204-XL	11.00	6.35	2.38	0.40	3.00	●	•	1.00-3.00	0.05-0.25

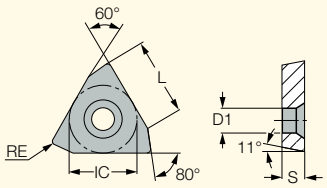
- For user guide and cutting speed recommendations, see pages 4-6,26
- ● First choice grade

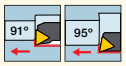
ISOTURN

TPGB-XL

Triangular Inserts with an 11° Positive Flank for Short Chipping Materials







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGB 110204-XL	11.00	6.35	2.38	0.40	3.00	●	1.00-3.00	0.05-0.25

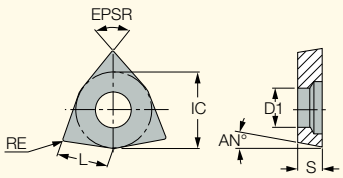
- For user guide and cutting speed recommendations, see pages 4-6,26

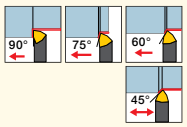
ISOTURN

WPEX

80° and 84° Precision Trigon Inserts with Positive 8° and 12° Clearance for Finishing Applications







Designation	Dimensions L	S	RE	IC	D1	EPSR	AN	IC08	Recommended Machining Data a_p (mm)	f (mm/rev)
WPEX 040200R/L08	4.00	2.50	0.00	6.60	3.20	84.0	8.0	●	0.20-2.00	0.05-0.20
WPEX 040200R12	4.00	2.50	0.00	6.60	3.20	84.0	12.0	●	0.20-2.00	0.05-0.20
WPEX 040202R/L08	4.00	2.50	0.20	6.60	3.20	84.0	8.0	●	0.20-2.00	0.05-0.20
WPEX 050300R/L08	5.00	3.18	0.00	7.94	3.70	80.0	8.0	●	0.20-2.50	0.05-0.20
WPEX 050300R12	5.00	3.18	0.00	7.94	3.70	80.0	12.0	●	0.20-2.50	0.05-0.20
WPEX 050302R/L08	5.00	3.18	0.20	7.94	3.70	80.0	8.0	●	0.20-2.50	0.05-0.20
WPEX 050304R/L08	5.00	3.18	0.40	7.94	3.70	80.0	8.0	●	0.20-2.50	0.05-0.20
WPEX 060400R/L08	6.00	4.00	0.00	9.52	3.70	80.0	8.0	●	0.20-3.00	0.05-0.20
WPEX 060400R/L12	6.00	4.00	0.00	9.52	3.70	80.0	12.0	●	0.20-3.00	0.05-0.20
WPEX 060402R/L08	6.00	4.00	0.20	9.52	3.70	80.0	8.0	●	0.20-3.00	0.05-0.20
WPEX 060402R/L12	6.00	4.00	0.20	9.52	3.70	80.0	12.0	●	0.20-3.00	0.05-0.20
WPEX 060404R/L08	6.00	4.00	0.40	9.52	3.70	80.0	8.0	●	0.20-3.00	0.05-0.20
WPEX 060404R12	6.00	4.00	0.40	9.52	3.70	80.0	12.0	●	0.20-3.00	0.05-0.20

- For user guide and cutting speed recommendations, see pages 4-6,26

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Machining Data and Speed Recommendations for Turning

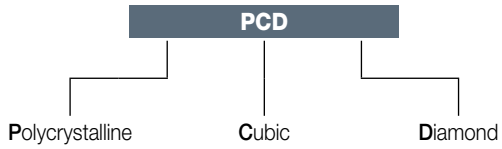
ISO	Material		Condition	Hardness HB	Material No.	Cutting Speed V_c m/min
N	aluminum-wrought alloys		not cureable	60	21	1000-2500
			cured	100	22	300-1000
	aluminum-cast alloys	<=12% Si	not cureable	75	23	300-1000
			cured	90	24	200-600
		>12% Si	high temp.	130	25	
	copper alloys	>1% Pb	free cutting	110	26	250-600
			brass	90	27	180-400
			electrolitic copper	100	28	150-300
	non-metallic		duroplastics, fiber plastics		29	
			hard rubber		30	



PCD Indexable Inserts

PCD

PCD has become a global industry standard for enhanced part quality and significant cost reductions in the overall production cycle.



Non-Ferrous Machining

When it comes to non-ferrous materials processing such as aluminum alloys, titanium, carbon fiber, reinforced plastics, ceramic and other non-metallic materials, PCD (polycrystalline cubic diamond) is an advanced material that significantly reduces machining time and provides excellent surface quality due to excellent abrasion resistance and low coefficient of friction.

PCD has a high thermal conductivity and good heat dissipation from the cutting area. PCD possesses the highest flexural strength of all cutting materials. PCD is very well adapted for aluminum machining with high Si content or other abrasive filler materials.
Temperature hardness up to approximatley 650 °C.

High grinding efficiency, low grinding force: Less heat will be generated by the hole in the grinding process. This can decrease or prevent burns and cracks on the surface of the workpiece, and decrease the equipment's wear and energy consumption.

High wear resistance: Diamond grinding tools' change in dimension is small. This can lead to good grinding quality and high grinding precision.

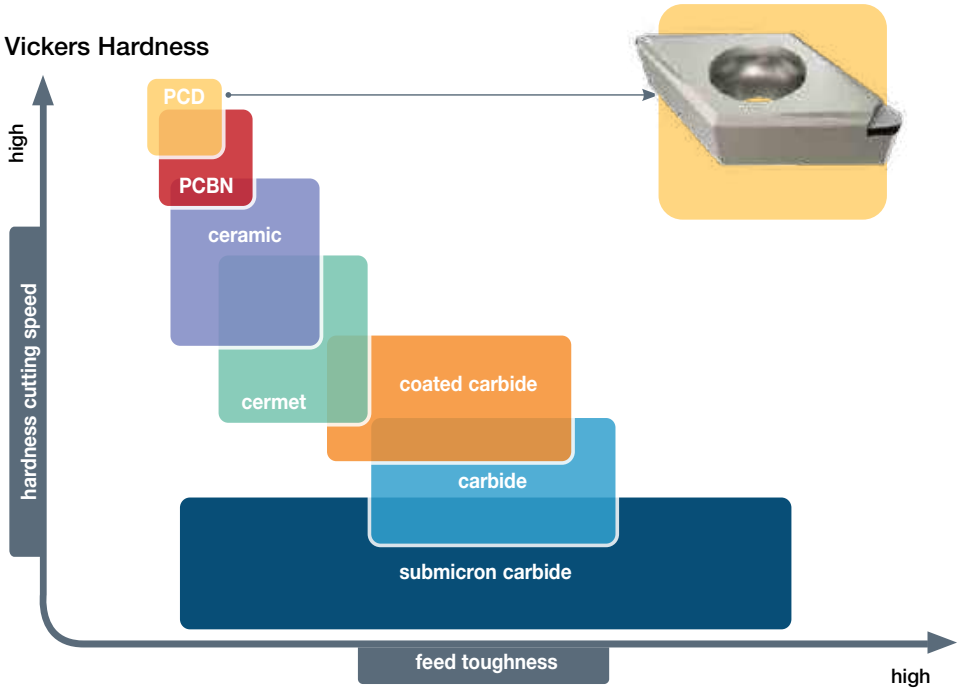
Long lifespan, long dressing period: This can greatly increase work efficiency and decrease the product's labor intensity. Low comprehensive cost: The processing cost of each workpiece is lower.



Recommended Cutting Conditions for PCD Grades

Materials on Hardness Scales

PCD is characterized by a hardness that is comparable to natural diamond, and it can achieve hardness of 6000HV and more.





Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
Al Alloy (4-9% Si)	ID5	800-2500	0.1-0.3	0.05-0.3
Al Alloy (9-14% Si)	ID5, ID6	600-1300	0.1-0.3	
Al Alloy (14-18% Si)	ID5, ID6	300-600	0.1-0.3	
Cemented Carbide	ID5, ID6	20-40	0.05-0.2	0.02-0.5
Wood	ID5, ID4	1000-5000	0.1-0.5	0.2-5.0
Cu Alloy	ID5	600-1000	0.05-0.2	0.05-3.0
Plastic, FRP	ID5, ID4	300-1000	0.05-0.25	0.05-3.0

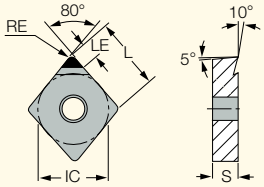
* ID4 and ID6 grades can be offered as special options

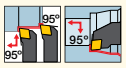
ISOTURN

CNMA (PCD)

80° Rhombic Inserts with a Single PCD Top Corner Tip and Positive Rake for Finishing Applications







Designation	Dimensions L	IC	S	RE	LE	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
CNMA 120404D	12.90	12.70	4.76	0.40	3.9	●	0.10-3.00	0.05-0.26
CNMA 120408D	12.90	12.70	4.76	0.80	3.6	●	0.10-3.00	0.05-0.26

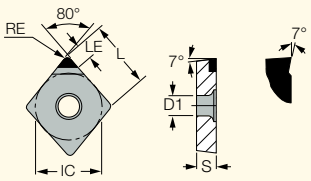
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

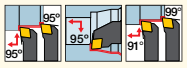
ISOTURN

CCMT (PCD)

Inserts with a Single PCD Top Corner Tip, 7° Clearance and Positive Rake Angle for Finishing Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060202D	6.30	6.35	2.38	0.20	3.1	2.80	●	0.08-3.00	0.05-0.30
CCMT 060204D	6.30	6.35	2.38	0.40	3.0	2.80	●	0.10-3.00	0.05-0.30
CCMT 09T304D	9.70	9.52	3.97	0.40	3.9	4.40	●	0.10-3.00	0.05-0.30

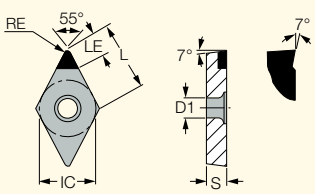
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

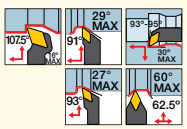
ISOTURN

DCMT (PCD)

55° Rhombic Inserts with a PCD Single Top Corner Tip, 7° Clearance and Positive Rake Angle for Finishing Applications







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
DCMT 11T302D	11.60	9.52	3.97	0.20	3.7	4.40	●	0.10-3.00	0.05-0.30
DCMT 11T304D	11.60	9.52	3.97	0.40	3.6	4.40	●	0.10-3.00	0.05-0.30
DCMT 11T308D	11.60	9.52	3.97	0.80	3.3	4.40	●	0.10-3.00	0.05-0.29

- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

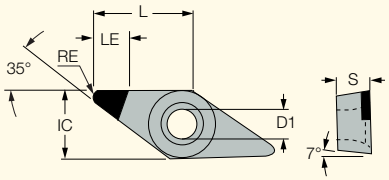
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

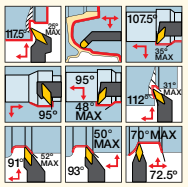
ISOTURN

VCGT-DW (PCD)

Inserts with 7° Clearance and a Single PCD Top Corner Tip Chipformer for Machining Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 160404-DW	16.60	9.52	4.76	0.40	6.60	4.40	●	0.10-3.00	0.05-0.30
VCGT 160408-DW	16.60	9.52	4.76	0.80	6.40	4.40	●	0.10-3.00	0.05-0.30
VCGT 160412-DW	16.60	9.52	4.76	1.20	6.30	4.40	●	0.10-3.00	0.05-0.30
VCGT 220516-DW	22.10	12.70	5.56	1.60	6.30	5.50	●	0.10-3.00	0.05-0.30
VCGT 220520-DW	22.10	12.70	5.56	2.00	6.20	5.50	●	0.10-3.00	0.05-0.30
VCGT 220530-DW	22.10	12.70	5.56	3.00	6.00	5.50	●	0.10-3.00	0.05-0.30

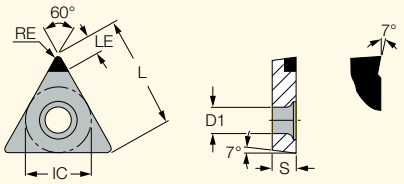
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

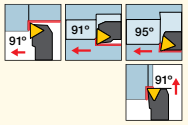
ISOTURN

TCMT (PCD)

Inserts with a Single PCD Top Corner Tip, 7° Clearance and Positive Rake Angle for Finishing Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
TCMT 110204D	11.00	6.35	2.38	0.40	3.8	2.80	●	0.10-3.00	0.05-0.30

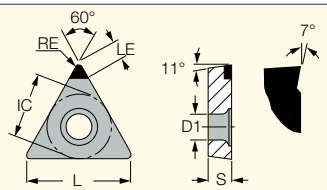
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

ISOTURN

TPGX (PCD)

Triangular Inserts with PCD Single Top Corner Brazed Tip, 11° Clearance and Positive Rake Angle for Finishing Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202	9.52	5.56	2.38	0.20	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 090204	9.52	5.56	2.38	0.40	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 110302	11.00	6.35	3.18	0.20	3.4	3.50	●	0.10-3.00	0.05-0.30
TPGX 110304	11.00	6.35	3.18	0.40	3.8	3.50	●	0.10-3.00	0.05-0.30

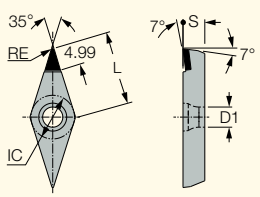
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

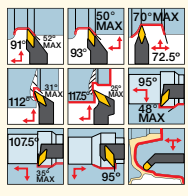
ISOTURN

VCGT (PCD)

35° Rhombic Single Brazed Tip Corner Inserts for Aluminum Finishing (PCD)







Designation	Dimensions IC	S	RE	L	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 160404D	9.52	4.76	0.40	16.60	4.40	●	0.10-3.00	0.05-0.30
VCGT 160408D	9.52	4.76	0.80	16.60	4.40	●	0.10-3.00	0.05-0.30

- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Machining Data and Speed Recommendations for Turning

ISO	Material		Condition	Hardness HB	Material No.	PCD ID5
N	aluminum-wrought alloys		not hardenable	60	21	600-2500
			hardenable	100	22	600-2500
	aluminum-cast alloys	≤12% Si	not hardenable	75	23	600-2500
			hardenable	90	24	600-2500
		>12% Si	high temperature	130	25	
	copper alloys	>1% Pb	free cutting	110	26	600-1000
			brass	90	27	600-800
			electrolytic copper	100	28	600-800
	non metallic		duroplastics, fiber plastics	70 shore D	29	
			hard rubber	55 shore D	30	



Groove-Turn - Indexable Inserts

Chipbreaker Selection

Problematic and Specific Materials

PA-Type

- First choice for machining aluminum.
- High positive rake.
- Peripheral ground and polished top rake with a very sharp edge.
- Suitable also for finish operations on titanium and heat resistant alloys.
- Width range external: 3-8 mm.



Profiling (full Radius)

PA-Type

- First choice for profiling aluminum.
- High positive rake.
- Peripheral ground and polished top rake with a very sharp edge.
- Suitable also for finish operations on titanium and heat resistant alloys.
- Width range external: 3-8 mm.



YZ-Type

- First choice for profiling ductile aluminum.
- Peripheral ground and polished top rake with a very sharp edge.
- Width range external: 3-8 mm.

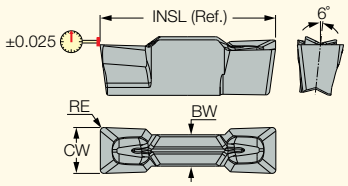


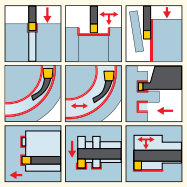
HELIGRIP

GRIPA

Ground Double-Ended Inserts for External, Internal and Face Machining







Designation	Dimensions						IC07	Recommended Machining Data				
	CW	CWTOL(1)	RE	RETOL(2)	INSL	BW		a_p (mm)	f turn (mm/rev)	f groove (mm/rev)	f face-groove (mm/rev)	f face-turn (mm/rev)
GRIPA 3.00-0.40	3.00	0.020	0.40	0.030	16.00	2.28	●	0.25-1.80	0.15-0.19	0.07-0.11	0.08-0.14	0.12-0.20
GRIPA 4.00-0.40	4.00	0.020	0.40	0.030	19.02	2.82	●	0.50-2.40	0.18-0.24	0.09-0.15	0.10-0.20	0.14-0.31
GRIPA 5.00-0.40	5.00	0.020	0.40	0.030	19.02	3.40	●	0.50-3.00	0.20-0.30	0.11-0.20	0.11-0.23	0.16-0.34
GRIPA 6.00-0.80	6.00	0.020	0.80	0.050	19.00	4.20	●	0.50-3.60	0.24-0.42	0.13-0.25	0.11-0.26	0.19-0.41

- For user guide, see page 32

(1) Cutting width tolerance (+/-)

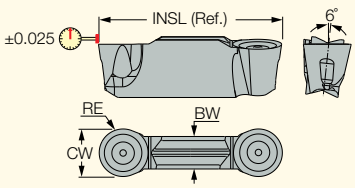
(2) Corner radius tolerance (+/-)

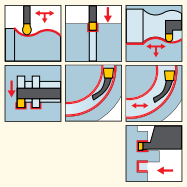
HELIGRIP

GRIPA (full radius)

Ground Double-Ended Full Radius Inserts for External, Internal and Face Machining







Designation	Dimensions						IC07	Recommended Machining Data				
	CW	CWTOL(1)	RE	RETOL(2)	INSL	BW		a_p (mm)	f turn (mm/rev)	f groove (mm/rev)	f face-groove (mm/rev)	f face-turn (mm/rev)
GRIPA 3.00-1.50	3.00	0.020	1.50	0.050	15.96	2.28	●	0.25-1.80	0.18-0.26	0.07-0.13	0.08-0.14	0.12-0.20
GRIPA 4.00-2.00	4.00	0.020	2.00	0.050	19.16	2.82	●	0.50-2.40	0.20-0.34	0.09-0.17	0.10-0.20	0.14-0.31
GRIPA 5.00-2.50	5.00	0.020	2.50	0.050	19.16	3.40	●	0.50-3.00	0.23-0.42	0.11-0.21	0.11-0.23	0.16-0.34
GRIPA 6.00-3.00	6.00	0.020	3.00	0.050	19.16	3.97	●	0.50-3.60	0.24-0.50	0.13-0.25	0.11-0.26	0.19-0.41

- For user guide, see page 32

(1) Cutting width tolerance (+/-)

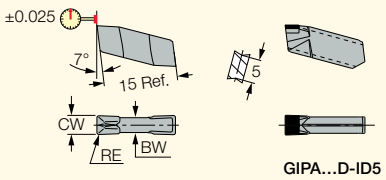
(2) Corner radius tolerance (+/-)

CUTGRIP

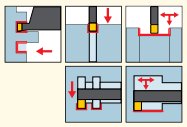
GIPA (W=3-6)

Double-Ended Precision Ground Inserts with a Polished Top Rake for Machining Aluminum





GIPA...D-ID5



Designation	Dimensions CW	RE	CWTOL[2]	RETOL[3]	BW	Tough ↔ Hard IC20	ID5	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GIPA 3.00-0.20	3.00	0.20	0.020	0.030	2.40	●		0.25-1.80	0.12-0.20	0.08-0.14
GIPA 3.00-0.20-D [1]	3.00	0.20	0.020	0.030	2.40		●	0.25-1.80	0.12-0.25	0.09-0.16
GIPA 4.00-0.40	4.00	0.40	0.020	0.030	3.20	●		0.50-2.40	0.14-0.31	0.10-0.20
GIPA 5.00-0.40	5.00	0.40	0.020	0.030	4.00	●		0.50-3.00	0.16-0.34	0.11-0.23
GIPA 6.00-0.40	6.00	0.40	0.020	0.030	4.80	●		0.50-3.60	0.19-0.41	0.11-0.26

- DMIN for internal machining = 70 mm
- For user guide, see page 32

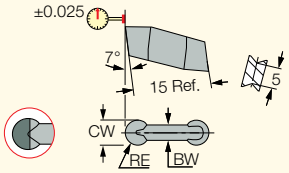
[1] Single-ended PCD tipped insert
[2] Cutting width tolerance (+/-)
[3] Corner radius tolerance (+/-)

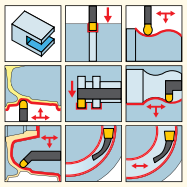
CUTGRIP

GIPA (full radius W=3-6)

Precision Double-Ended Inserts with Polished Top Rake for Machining Aluminum







Designation	Dimensions CW	RE	CWTOL[4]	RETOL[5]	BW	Tough ↔ Hard IC20	IC806	IC4	ID5	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GIPA 3.00-1.50	3.00	1.50	0.020	0.050	2.40	●				0.00-1.50	0.15-0.30	0.08-0.16
GIPA 3.00-1.50-D [1]	3.00	1.50	0.020	0.050	2.40				●	0.00-1.50	0.19-0.36	0.09-0.19
GIPA 4.00-2.00	4.00	2.00	0.020	0.050	3.20	●	•			0.00-2.00	0.20-0.43	0.10-0.22
GIPA 4.00-2.00-D [1]	4.00	2.00	0.020	0.050	3.20				●	0.00-2.00	0.25-0.53	0.12-0.26
GIPA 4.00-2.00YZ-D [2]	4.00	2.00	0.020	0.050	3.20				●	0.00-2.00	0.25-0.53	0.12-0.26
GIPA 5.00-2.50	5.00	2.50	0.020	0.050	3.90	●	•			0.00-2.50	0.21-0.48	0.09-0.24
GIPA 5.00-2.50-D [1]	5.00	2.50	0.020	0.050	3.90				●	0.00-2.50	0.22-0.60	0.11-0.30
GIPA 5.00-2.50YZ-D [2]	5.00	2.50	0.020	0.050	3.90				●	0.00-2.50	0.22-0.60	0.11-0.30
GIPA 6.00-3.00	6.00	3.00	0.020	0.050	4.80	●		●		0.00-3.00	0.21-0.58	0.11-0.29
GIPA 6.00-3.00-D [1]	6.00	3.00	0.020	0.050	4.80				●	0.00-3.00	0.26-0.72	0.13-0.36
GIPA 6.00-3.00YZ	6.00	3.00	0.020	0.050	4.80	●				0.00-3.00	0.21-0.58	0.11-0.29
GIPA 6.00-3.00YZ-D [2]	6.00	3.00	0.020	0.050	4.80				●	0.00-3.00	0.26-0.72	0.13-0.36
GIPA 6.00-3.00CB [3]	6.00	3.00	0.020	0.050	4.80				●	0.00-3.00	0.21-0.58	0.11-0.29

- For user guide, see page 32

[1] Single-ended PCD tipped insert
[2] Single-ended molded PCD chipformer tipped insert
[3] Single-ended flat PCD tipped insert with chip deflector
[4] Cutting width tolerance (+/-)
[5] Corner radius tolerance (+/-)
● First choice grade









ISCAR

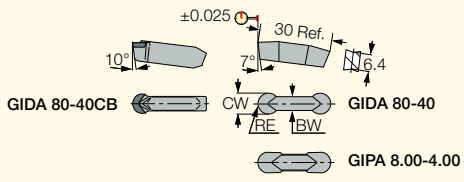
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Enter the item description in the search field to access additional related data.

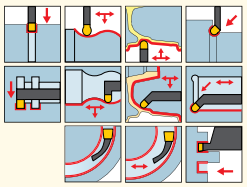
CUTGRIP

GIPA/GIDA 8 (full radius)

Precision Double-Ended Inserts with Polished Top Rake for Machining Aluminum







Designation	Dimensions CW	RE	CWTOL[2]	RETOL[3]	BW	Tough ↔ Hard IC20	IC4	ID5	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GIDA 80-40	8.00	4.00	0.020	0.050	5.60	●	●		0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40-D	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40CB-D [1]	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40YZ	8.00	4.00	0.020	0.050	5.60	●	●		0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40YZ-D	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.35-0.96	0.18-0.48
GIPA 8.00-4.00	8.00	4.00	0.020	0.050	6.00	●			0.00-4.00	0.24-0.67	0.14-0.38

• ID5 is a single-ended PCD tipped insert • For user guide, see page 32

[1] Should not be clamped on tools with "A" suffix

[2] Cutting width tolerance (+/-)

[3] Corner radius tolerance (+/-)











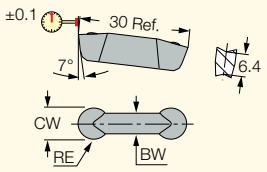


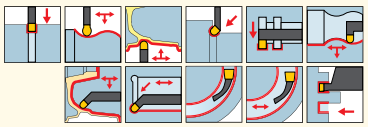
CUTGRIP

GDMA

Utility Double-Ended Insert for Machining Aluminum







Can cut arcs to 250°

Designation	Dimensions CW	RE	CWTOL[1]	RETOL[2]	BW	Tough ↔ Hard IC07	IC507	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GDMA 840	8.00	4.00	0.050	0.050	5.60	●	●	0.00-4.00	0.24-0.67	0.14-0.38

• For heavy-duty machining • DMIN for internal machining = 65 mm • For user guide, see page 32

[1] Cutting width tolerance (+/-)

[2] Corner radius tolerance (+/-)

● First choice grade

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Parting - Indexable Inserts



TANG-GRIP PARTING LINE

TAG N-A



TANG-GRIP PARTING LINE

TAG N-J/JS



TANG-GRIP PARTING LINE

TAG R/L-J/JS



DO-GRIP TWISTED 2-SIDED

DGN/DGNM-J/JS



DO-GRIP TWISTED 2-SIDED

DGN-P



DO-GRIP TWISTED 2-SIDED

DGR/L-J/JS



DO-GRIP TWISTED 2-SIDED

DGR-P

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.



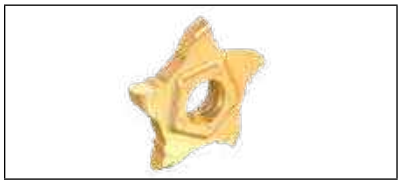
PENTACUT PARTING & GROOVING LINE

PENTA 24N-PF/P



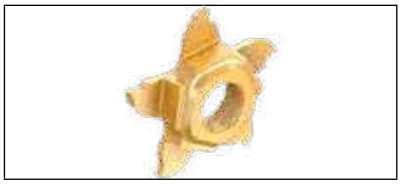
PENTACUT PARTING & GROOVING LINE

PENTA 24R-P



PENTACUT PARTING & GROOVING LINE

PENTA 17-P-RS/LS (full radius)



PENTACUT PARTING & GROOVING LINE

PENTA 17 R/L-P-RS



PENTACUT PARTING & GROOVING LINE

PENTA 24N-J



PENTACUT PARTING & GROOVING LINE

PENTA 24R/L-J



PENTACUT PARTING & GROOVING LINE

PENTA 24N-J (full radius)



PENTACUT PARTING & GROOVING LINE

PENTA 34N-J



PENTACUT PARTING & GROOVING LINE

PENTA 34R/L-J



PENTA IQ GRIP PARTING LINE

PENTA D-N-J



PENTA IQ GRIP PARTING LINE

PENTA D-R/L-J



PENTACUT PARTING & GROOVING LINE

PENTA 24N-J-RS



PENTACUT PARTING & GROOVING LINE

PENTA 24N-Z



PENTACUT PARTING & GROOVING LINE

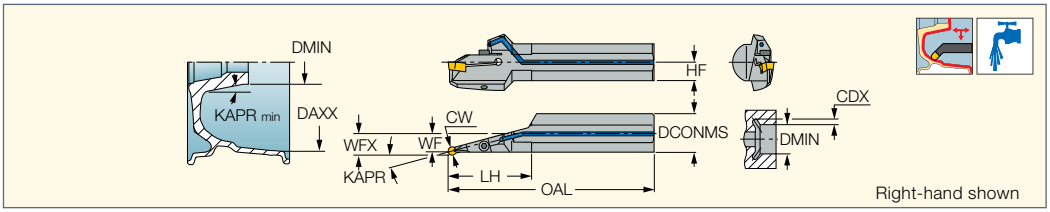
PENTA 24R/L-Z

Tools and Inserts for Machining Aluminum Wheels

CUTGRIP

GHIUR/L-C-A (15° & 27.5°) Bars

Internal Grooving and Turning Bars for Machining Aluminum Wheels



Designation	CW	DCONMS	DMIN	CDX(1)	OAL	LH	WFX	WF	HF	KAPR(2)
GHIUR/L 40C-15A-6	6.00	40.00	160.00	-	320.00	83.0	21.20	19.0	18.0	15.0
GHIUR/L 40C-15A-8	8.00	40.00	160.00	0.00 (3)	320.00	83.0	21.00	18.0	18.0	15.0
GHIUR 50C-15A-8	8.00	50.00	100.00	0.00 (4)	350.00	83.0	26.00	23.0	23.0	15.0
GHIUR/L 40C-27.5A-6	6.00	40.00	90.00	0.60 (5)	320.00	80.0	25.10	23.5	18.0	27.5
GHIUR/L 50C-27.5A-8	8.00	50.00	120.00	1.80 (5)	350.00	82.0	30.20	28.0	23.0	27.5

- Upper jaw with hard coating to sustain chip deflection

(1) Dimension for minimum bore diameter
(2) Tool cutting edge angle
(3) For bore diameter D>200, CDX is 0.5 mm
(4) For bore diameter D>200, CDX is 1.4 mm
(5) For bore diameter D>200, CDX is 4.0 mm

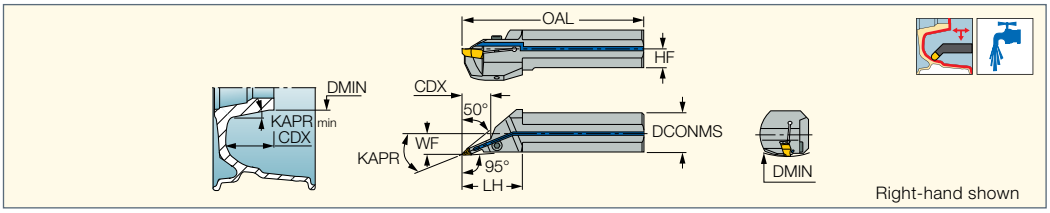
Spare Parts

Designation			
GHIUR/L 40C-15A-6	SR M5X20DIN912	HW 4.0	PL 40
GHIUR/L 40C-15A-8	SR M6X20 DIN912	HW 5.0	PL 40
GHIUR 50C-15A-8	SR M6X25 DIN912	HW 5.0	PL 40
GHIUL 40C-27.5A-6	SR M6X25 DIN912	HW 5.0	PL 40
GHIUR 40C-27.5A-6	SR M6X20 DIN912	HW 5.0	PL 40
GHIUR/L 50C-27.5A-8	SR M6X25 DIN912	HW 5.0	PL 40

CUTGRIP

GHIUR/L-C-22.5A-8V

22.5° Approach Angle Bars for Facing and Internal Machining



Designation	CW	DCONMS	DMIN	CDX	OAL	LH	HF	WF	KAPR(1)
GHIUR/L 40C-22.5A-8V	8.00	40.00	300.00	28.50	250.00	60.0	18.0	21.00	22.5

- Upper jaw with hard coating to sustain chip deflection

(1) Tool cutting edge angle

Spare Parts

Designation			
GHIUR/L-C-22.5A-8V	SR M6X20 DIN912	HW 5.0	PL 40

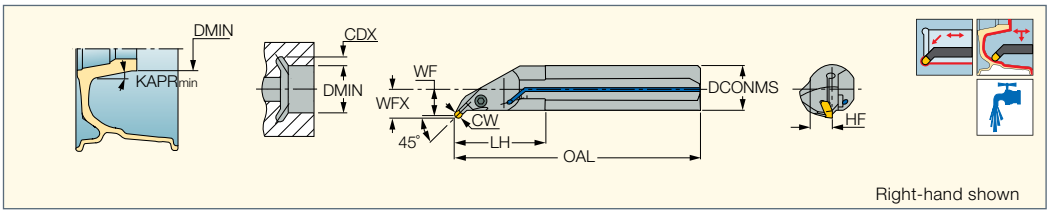
ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

CUTGRIP

GHIUR/L-UC

45° Undercutting Bars for Internal Turning Aluminum Wheels



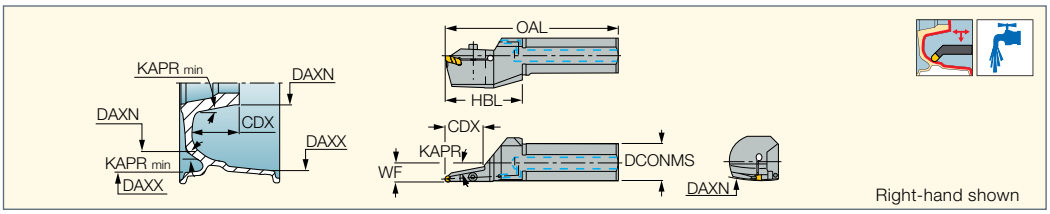
Designation	CW	DCONMS	DMIN	CDX(1)	OAL	LH	WFX	WF	HF			
GHIUR/L 40UC-6	6.00	40.00	70.00	0.00 (2)	350.00	75.0	23.80	24.7	18.0	SR M6X20 DIN912	HW 5.0	PL 40
GHIUR 50UC-6	6.00	50.00	78.00	0.00 (3)	350.00	75.0	28.80	29.7	23.0	SR M6X20 DIN912	HW 5.0	PL 40
GHIUR/L 40UC-8	8.00	40.00	68.00	0.00 (4)	350.00	79.0	28.80	26.0	18.0	SR M6X20 DIN912	HW 5.0	PL 40
GHIUR 50UC-8	8.00	50.00	58.00	0.00 (5)	350.00	80.0	30.20	31.4	23.0	SR M6X20 DIN912	HW 5.0	PL 40

(1) Cutting depth maximum
(2) For bore diameter more than 200, CDX is 1.3 mm
(3) For bore diameter more than 200, CDX is 2.0 mm
(4) For bore diameter more than 200, CDX is 2.8 mm
(5) For bore diameter more than 200, CDX is 6.0 mm

CUTGRIP

GHIFR/L-A

8° / 10° Approach Angle Bars for Facing and Internal Machining



Designation	CW	DAXN(1)	DAXX(2)	OAL	HBL	CDX	WF	KAPR(3)	DCONMS			
GHIFR/L 40C-10A-6	6.00	300.00	360.0	300.00	80.0	40.00	19.30	10.0	40.00	SR M5X20DIN912	HW 4.0	PL 40
GHIFR/L 40C-8A-8	8.00	300.00	360.0	320.00	100.0	70.00	19.50	8.0	40.00	SR M6X25 DIN912	HW 5.0	PL 40

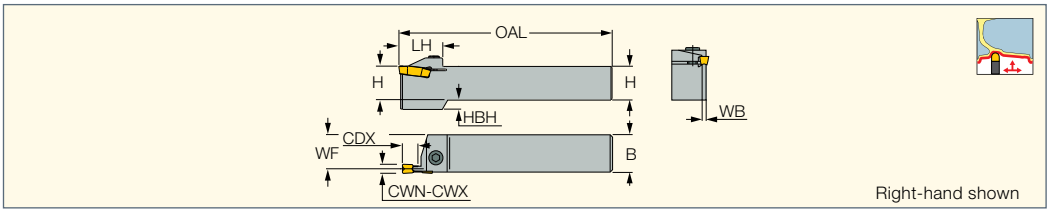
- Upper jaw with hard coating to sustain chip deflection

(1) Minimum axial grooving diameter
(2) Maximum axial grooving diameter
(3) Tool cutting edge angle

CUTGRIP

GHDR/L-8A

External Tools for Turning, Grooving and Parting; Upper Jaw with Hard Coating to Sustain Chip Deflection



Designation	H	CWN(1)	CWX(2)	CDX(3)	B	OAL	WF	WB	LH	HBH		
GHDR/L 25-8A	25.0	8.00	8.00	25.00	25.0	150.00	22.00	6.00	40.0	7.6	SR M6X16 DIN912	HW 5.0(a)
GHDR 32-8A	32.0	8.00	8.00	25.00	32.0	170.00	29.00	6.00	40.0	-	SR M6X16 DIN912	HW 5.0(a)

- Upper jaw with hard coating to sustain chip deflection

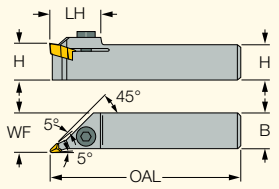
(1) Minimum cutting width
(2) Maximum cutting width
(3) Cutting depth maximum
(a) For optional key with limited tightening torque click on "More Info"

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

CUTGRIP

GHVR/L

Internal and External Profiling Holders for Machining Aluminum Wheels





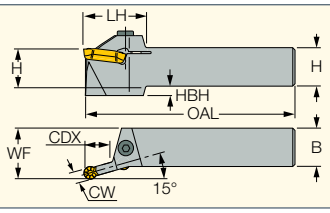
Right-hand shown

Designation	H	B	OAL	WF	LH		
GHVR/L 25-8	25.0	25.0	150.00	29.00	41.0	SR M6X16 DIN912	HW 5.0

CUTGRIP

GHDKR/L

External and Internal Profiling Holders for Machining Aluminum Wheels

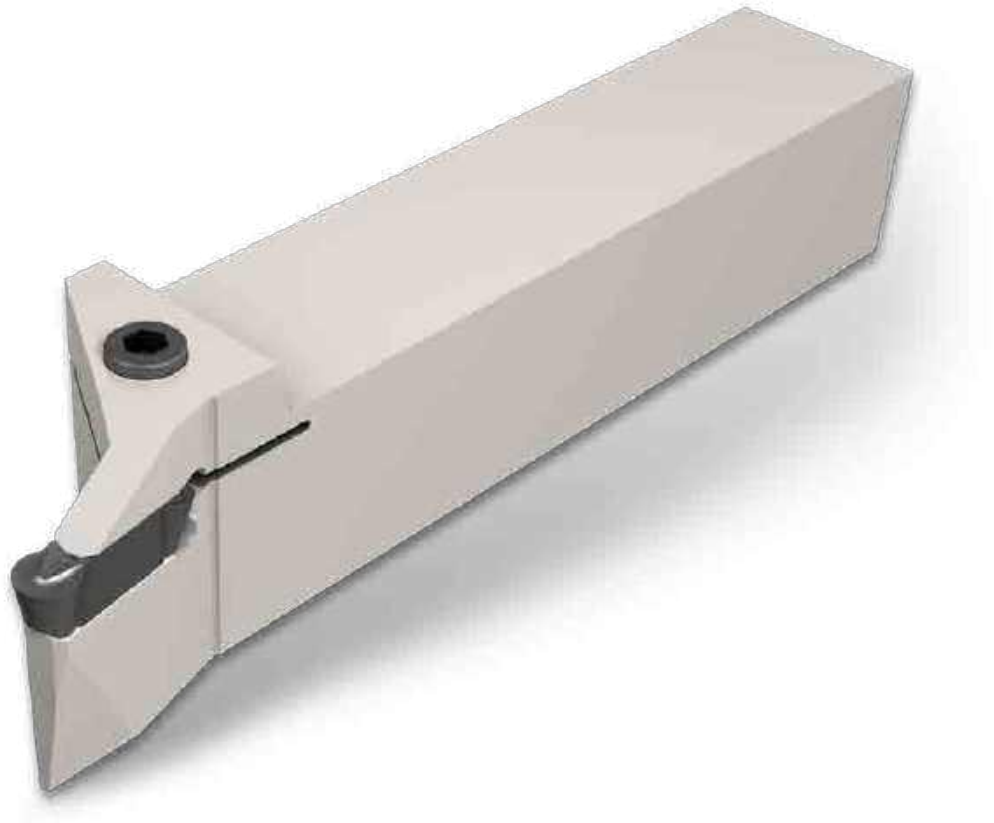




Right-hand shown

Designation	CW	H	B	LF	LH	WF	HBH		
GHDKR/L 25-6 (1)	6.00	25.0	25.0	150.00	40.0	32.20	6.0	SR M6X20 DIN912	HW 5.0
GHDKR/L 25-8	8.00	25.0	25.0	150.00	44.0	33.00	6.0	SR M6X20 DIN912	HW 5.0
GHDKR/L 32-8	8.00	32.0	32.0	170.00	44.0	40.00	-	SR M6X20 DIN912	HW 5.0

(1) Only insert GIPA 6.00-3.00 is suitable for this tool



ISCAR

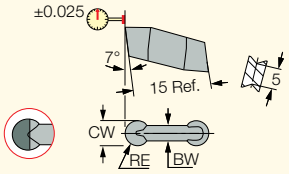
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

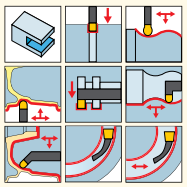
CUTGRIP

GIPA (full radius W=3-6)

Precision Double-Ended Inserts with Polished Top Rake for Machining Aluminum







Designation	Dimensions					Tough ↔ Hard			Recommended Machining Data		
	CW	RE	CWTOL[4]	RETOL[5]	BW	IC20	IC4	ID5	a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GIPA 3.00-1.50	3.00	1.50	0.020	0.050	2.40	●			0.00-1.50	0.15-0.30	0.08-0.16
GIPA 3.00-1.50-D [1]	3.00	1.50	0.020	0.050	2.40			●	0.00-1.50	0.19-0.36	0.09-0.19
GIPA 4.00-2.00	4.00	2.00	0.020	0.050	3.20	●			0.00-2.00	0.20-0.43	0.10-0.22
GIPA 4.00-2.00-D [1]	4.00	2.00	0.020	0.050	3.20			●	0.00-2.00	0.25-0.53	0.12-0.26
GIPA 4.00-2.00YZ-D [2]	4.00	2.00	0.020	0.050	3.20			●	0.00-2.00	0.25-0.53	0.12-0.26
GIPA 5.00-2.50	5.00	2.50	0.020	0.050	3.90	●			0.00-2.50	0.21-0.48	0.09-0.24
GIPA 5.00-2.50-D [1]	5.00	2.50	0.020	0.050	3.90			●	0.00-2.50	0.22-0.60	0.11-0.30
GIPA 5.00-2.50YZ-D [2]	5.00	2.50	0.020	0.050	3.90			●	0.00-2.50	0.22-0.60	0.11-0.30
GIPA 6.00-3.00	6.00	3.00	0.020	0.050	4.80	●	●		0.00-3.00	0.21-0.58	0.11-0.29
GIPA 6.00-3.00-D [1]	6.00	3.00	0.020	0.050	4.80			●	0.00-3.00	0.26-0.72	0.13-0.36
GIPA 6.00-3.00YZ	6.00	3.00	0.020	0.050	4.80	●			0.00-3.00	0.21-0.58	0.11-0.29
GIPA 6.00-3.00YZ-D [2]	6.00	3.00	0.020	0.050	4.80			●	0.00-3.00	0.26-0.72	0.13-0.36
GIPA 6.00-3.00CB [3]	6.00	3.00	0.020	0.050	4.80			●	0.00-3.00	0.21-0.58	0.11-0.29

[1] Single-ended PCD tipped insert
[2] Single-ended molded PCD chipformer tipped insert
[3] Single-ended flat PCD tipped insert with chip deflector
[4] Cutting width tolerance (+/-)
[5] Corner radius tolerance (+/-)









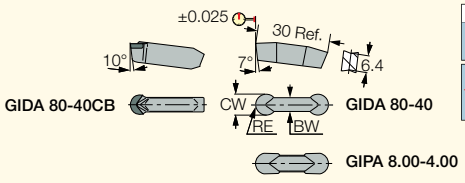
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

CUTGRIP

GIPA/GIDA 8 (full radius)

Precision Double-Ended Inserts with Polished Top Rake for Machining Aluminum





Designation	Dimensions CW	RE	CWTOL[2]	RETOL[3]	BW	Tough ↔ Hard IC20	IC4	ID5	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GIDA 80-40	8.00	4.00	0.020	0.050	5.60	●	●		0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40-D	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40CB-D [1]	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40YZ	8.00	4.00	0.020	0.050	5.60	●	●		0.00-4.00	0.24-0.67	0.14-0.38
GIDA 80-40YZ-D	8.00	4.00	0.020	0.050	5.60			●	0.00-4.00	0.35-0.96	0.18-0.48
GIPA 8.00-4.00	8.00	4.00	0.020	0.050	6.00	●			0.00-4.00	0.24-0.67	0.14-0.38

- ID5 is a single-ended PCD tipped insert

[1] Should not be clamped on tools with "A" suffix

[2] Cutting width tolerance (+/-)

[3] Corner radius tolerance (+/-)











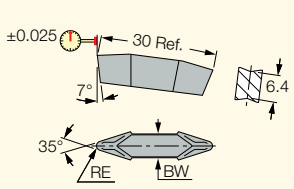


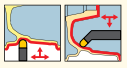
CUTGRIP

GIPA 8-35V (V-shape)

V-Shaped Inserts for Machining Aluminum Wheels







Designation	Dimensions RE	RETOL[2]	BW	Tough ↔ Hard IC20	IC4	ID5	Recommended Machining Data a_p (mm)	f turn (mm/rev)
GIPA 6.0-35V-0.8	0.80	0.050	4.80	●			1.00-3.60	0.21-0.48
GIPA 8YZ-35V-0.80	0.80	0.050	6.00		●		1.00-4.80	0.24-0.56
GIPA 8YZ-35V-1.20	1.20	0.050	6.00		●		1.45-4.80	0.24-0.62
GIPA 8YZ-35V-1.20-D [1]	1.20	0.050	6.00			●	1.45-4.80	0.35-0.88
GIPA 8-35V-1.20	1.20	0.050	6.00	●			1.45-4.80	0.24-0.62
GIPA 8-35V-1.20-D [1]	1.20	0.050	6.00			●	1.45-4.80	0.35-0.88
GIPA 8-35V-3.0	3.00	0.050	6.00	●			3.60-4.80	0.24-0.67

- Precision ground and polished rake to avoid built-up edge
- Toolholder seat needs to be modified according to insert profile to ensure clearance

[1] Single-ended PCD tipped insert

[2] Corner radius tolerance (+/-)

ISCAR

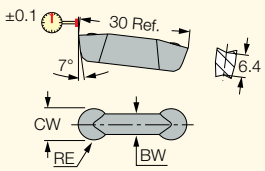
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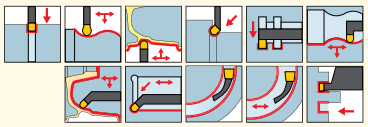
CUTGRIP

GDMA

Utility Double-Ended Insert
for Machining Aluminum







Can cut arcs to 250°

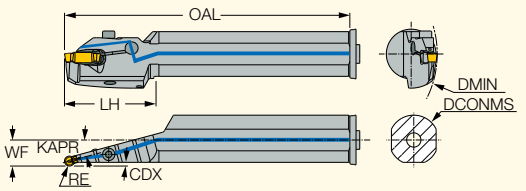
Designation	Dimensions CW	RE	CWTOL(1)	RETOL(2)	BW	Tough ↔ Hard IC07	IC507	Recommended Machining Data a_p (mm)	f turn (mm/rev)	f groove (mm/rev)
GDMA 840	8.00	4.00	0.050	0.050	5.60	●	•	0.00-4.00	0.24-0.67	0.14-0.38

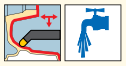
• For heavy-duty machining • DMIN for internal machining = 65 mm
(1) Cutting width tolerance (+/-)
(2) Corner radius tolerance (+/-)
● First choice grade

FIXGRIP

FSHIUR

10° / 15° Approach Angle
Bars for Facing and Internal
Profiling of Aluminum



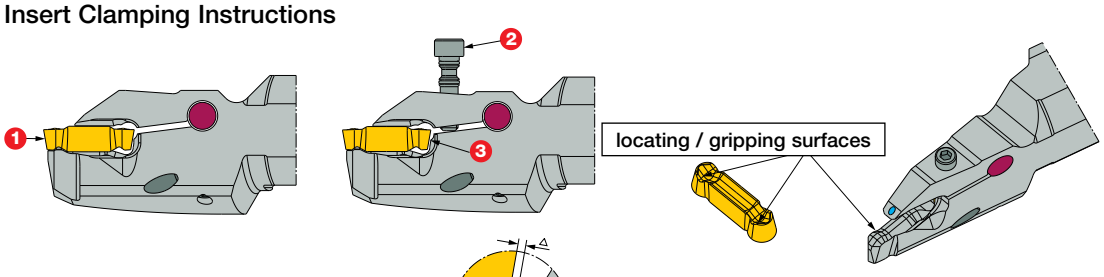


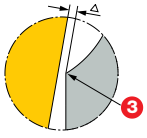
Right-hand shown

Designation	CW	DCONMS	DMIN	OAL	LH	CDX(1)	WF	KAPR(2)					
FSHIUR 40C-15A-6	6.00	40.00	160.00	320.00	68.0	2.20	21.00	15.0	SR M6X1-28509	HW 5.0	OR 5X1N	PU SEAL-28510	PL 40
FSHIUR 40C-10A-8	8.00	40.00	160.00	320.00	68.0	2.40	24.30	10.0	SR M6X1-28509	HW 5.0	OR 5X1N	PU SEAL-28510	PL 40
FSHIUR 40C-15A-8	8.00	40.00	160.00	320.00	68.0	3.00	21.00	15.0	SR M6X1-28509	HW 5.0	OR 5X1N	PU SEAL-28510	PL 40

• Clamping torque for FSHIUR-6: 9 Nxm, for FSHDR-8: 10.5 Nxm
(1) Cutting depth maximum
(2) Tool cutting edge angle

Insert Clamping Instructions





1 Position the insert in the pocket so the notch on the insert sits on top of the frontal bulge of the pocket.
2 Close the clamping screw Warning.

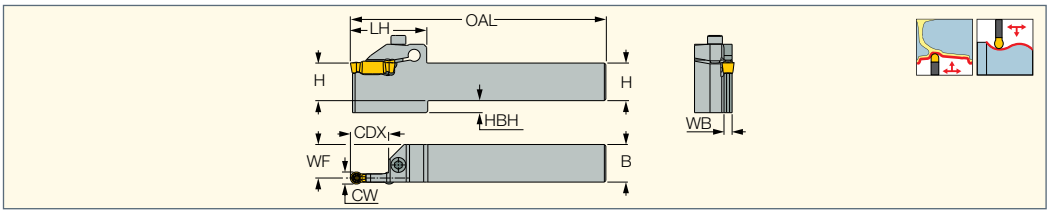
Warning

- Do not apply force and do not hold the insert in place while closing the screw
- There is no contact between the insert and pocket rear wall 3 .

FIXGRIP

FSHDR

Tools with a Very Strong Insert Grip for Interrupted Cuts and Back Turning Aluminum Wheels

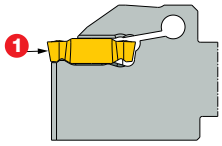


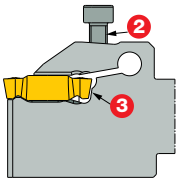
Designation	CW	CDX(1)	H	B	WF	WB	LH	HBH	OAL		
FSHDR 25-6	6.00	21.00	25.0	25.0	22.80	4.40	51.0	8.0	150.00	SR M5X20DIN912	HW 4.0
FSHDR 25-8	8.00	25.50	25.0	25.0	22.30	5.40	51.5	8.0	170.00	SR M6X25 DIN912	HW 5.0

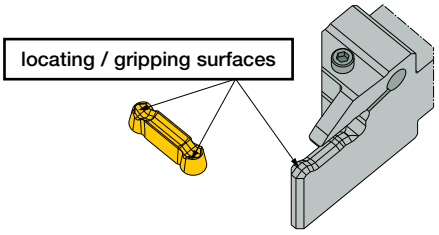
- Clamping torque for FSHDR-6: 7.5 Nxm, for FSHDR-8: 10 Nxm

(1) Cutting depth maximum

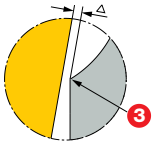
Insert Clamping Instructions







1 Position the insert in the pocket so the notch on the insert sits on top of the front bulge of the pocket.
2 Close the clamping screw.



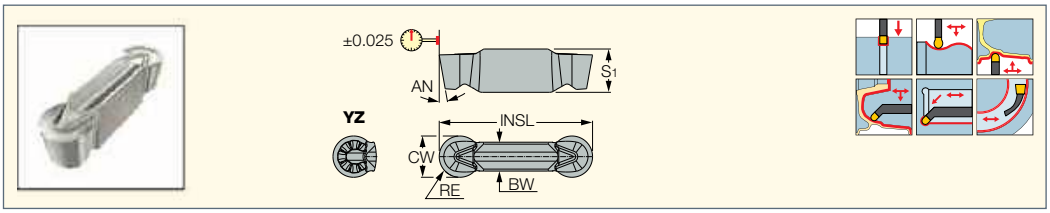
Warning

- Do not apply force and do not hold the insert in place while closing the screw.
- There is no contact between the insert and pocket rear wall 3.

FIXGRIP

FSPA/FSMA

Full Radius Precision Inserts for Machining Aluminum at Medium to High Feeds



Designation	Dimensions							Tough ↔ Hard			Recommended Machining Data	
	CW	CWTOL(2)	RE	S1	BW	INSL	AN	IC20	IC07	ID5	a_p (mm)	f turn (mm/rev)
FSPA 6.00-3.00	6.00	0.020	3.00	7.50	4.60	25.00	9.0	●			0.05-3.00	0.30-0.55
FSPA 6.00-3.00YZ	6.00	0.020	3.00	7.50	4.60	25.00	9.0	●			0.05-3.00	0.30-0.55
FSPA 6.00-3.00YZ-D	6.00	0.020	3.00	7.50	4.60	25.00	9.0			●	0.05-3.00	0.30-0.55
FSPA 80-40	8.00	0.020	4.00	8.40	5.60	29.70	10.0	●			0.05-4.00	0.40-0.72
FSPA 80-40-D	8.00	0.020	4.00	8.40	5.60	29.70	10.0			●	0.05-4.00	0.40-0.72
FSPA 80-40YZ	8.00	0.020	4.00	8.40	5.60	29.70	10.0	●			0.05-4.00	0.40-0.72
FSPA 80-40YZ-D	8.00	0.020	4.00	8.40	5.60	29.70	10.0			●	0.05-4.00	0.40-0.72
FSMA 80-40 (1)	8.00	0.040	4.00	8.40	5.60	29.70	10.0		●		0.05-4.00	0.40-0.72

(1) Utility insert
(2) Cutting width tolerance (+/-)



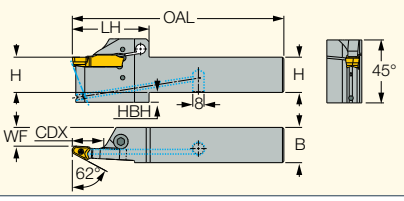
ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

FIXGRIP

FGHDUR

Tools for Interrupted Cuts and Back Turning Aluminum Wheels



Right-hand shown

Designation	CDX(1)	H	B	OAL	WF	LH	HBH		
FGHDUR 25C-3A-10S	22.30	25.0	25.0	150.00	13.30	54.4	7.0	SR M6X25 DIN912	HW 5.0

- Upper jaw with hard coating to sustain chip deflection

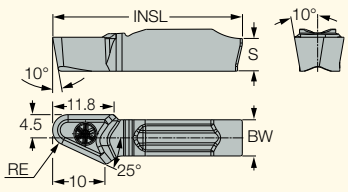
(1) Cutting depth maximum

FIXGRIP

FGPAM

V-Shaped Inserts for Machining Aluminum Wheels



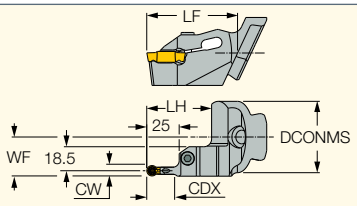


Designation	Dimensions RE	BW	S	INSL	IC20	Recommended Machining Data a_p (mm)	f turn (mm/rev)
FGPAM 10S-3R-25A	3.00	7.00	8.20	36.50	●	0.05-12.00	0.40-0.72

FIXGRIP

DTF50 FSHDR-8

CUT-GRIP Heads with Dovetail Connection for External Turning Aluminum Wheels



Right hand shown

Designation	CW	CDX	LH	WF	LF	DCONMS	Insert
DTF50 FSHDR-8	8.00	21.50	50.0	30.00	70.00	55.00	FSPA 8...

Spare Parts

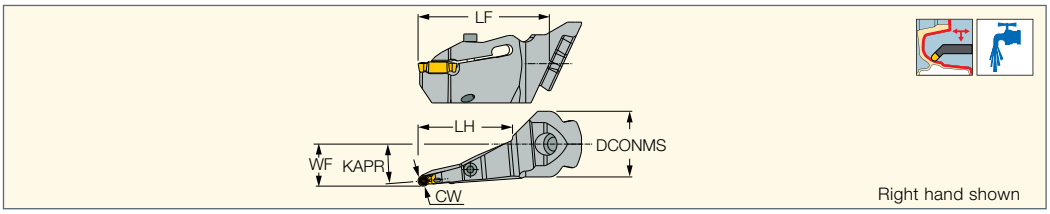
Designation		
DTF50 FSHDR-8	SR M6X25DIN912	HW 5.0X120 MM

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

FIXGRIP

DTF50 FSHIUR

CUT-GRIP Heads for Internal Profiling, Undercutting and Facing of Aluminum Wheels



Designation	DMIN	CW	KAPR[1]	LH	WF	LF	DCONMS	Insert
DTF50 FSHIUR-5A-8	250.00	8.00	5.0	72.0	32.00	100.00	50.00	FSPA 8...
DTF50 FSHIUR-8A-8	250.00	8.00	8.0	72.0	32.00	100.00	50.00	FSPA 8...
DTF50 FSHIUR-15A-8	250.00	8.00	15.0	80.0	36.00	100.00	50.00	FSPA 8...
DTF50 FSHIUR-22.5A-8	250.00	8.00	22.5	50.0	36.00	70.00	50.00	FSPA 8...
DTF50 FSHIUR-27.5A-8	250.00	8.00	27.5	60.0	40.00	80.00	50.00	FSPA 8...
DTF50 FSHIUR-45A-8	250.00	8.00	45.0	-	55.00	70.00	50.00	FSPA 8...
DTF50 FSHIUR-67.5A-8	250.00	8.00	67.5	-	60.00	70.00	50.00	FSPA 8...
DTF50 FSHIUR-80A-8	250.00	8.00	80.0	-	60.00	70.00	50.00	FSPA 8...

(1) Tool cutting edge angle

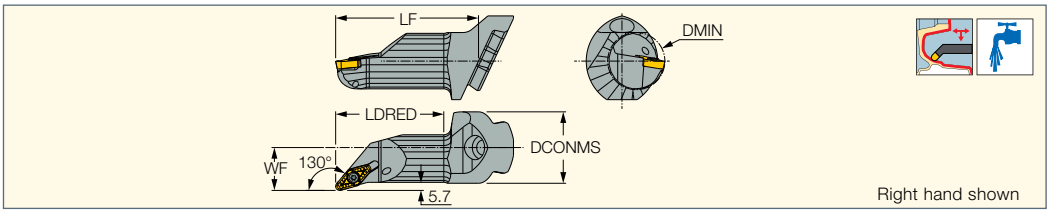
Spare Parts

Designation			
DTF50 FSHIUR-5A-8	SR M6X25DIN912	SR M5X6 DIN913	HW 5.0X120 MM
DTF50 FSHIUR-8A-8	SR M6X25DIN912	SR M6X6 DIN913	HW 5.0X120 MM
DTF50 FSHIUR-15A-8	SR M6X25DIN912	SR M6X6 DIN913	HW 5.0X120 MM
DTF50 FSHIUR-22.5A-8	SR M6X25DIN912		HW 5.0X120 MM
DTF50 FSHIUR-27.5A-8	SR M6X25DIN912		HW 5.0X120 MM
DTF50 FSHIUR-45A-8	SR M6X25DIN912		HW 5.0X120 MM
DTF50 FSHIUR-67.5A-8	SR M6X25DIN912	SR M5X6 DIN913	HW 5.0X120 MM
DTF50 FSHIUR-80A-8	SR M6X25DIN912		HW 5.0X120 MM

ISOTURN

DTF50 SVXCR-22

ISO Boring Heads with Dovetail Connection VCGT 22 Inserts for Machining Aluminum Wheels



Designation	DMIN	WF	LF	LDRED	DCONMS	Insert
DTF50 SVXCR-22	40.00	30.00	100.00	76.0	50.00	VCGT 22...

Spare Parts

Designation		
DTF50 SVXCR-22	SR 16-212	T-20/5



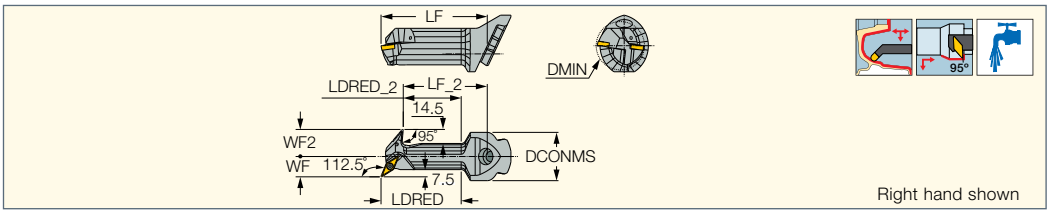
ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

ISOTURN

DTF50 SVXCR-16X2

ISO Double Pocket Boring Heads with Dovetail Connection VCGT 16 Inserts for Machining Aluminum Wheels



Designation	DMIN	WF	WF2	LF	LF_2	LDRED	LDRED_2	DCONMS	Insert
DTF50 SVXCR-16X2	50.00	21.00	28.0	110.00	87.00	83.0	60.0	50.00	VCGT 16...

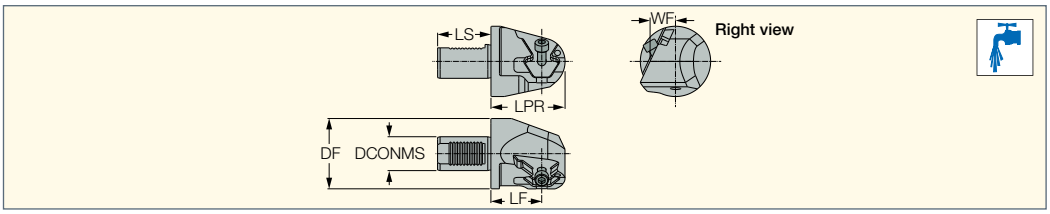
Spare Parts

Designation		
DTF50 SVXCR-16X2	SR 16-236	T-15/5

VDI

VDI-DTF50E-L60R

QUICK-CHANGE Holder with a Dovetail Connection for External Turning Aluminum Wheels with CUT-GRIP Heads



Designation	WF	LF	LPR	LS	DF	DCONMS
VDI40-DTF50E-L60R	30.00	60.00	87.50	63.0	83.00	40.00
VDI50-DTF50E-L60R (1)	37.00	60.00	87.50	78.0	98.00	50.00

(1) on request

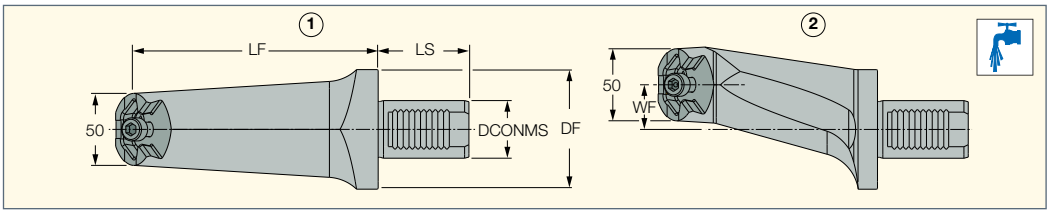
Spare Parts

Designation			
VDI-DTF50E-L60R	SR M10X45 DIN912	HW8 L208	OR 5X1N

VDI

VDI-DTF50

QUICK-CHANGE Holder with Dovetail Connection Internal Turning Aluminum Wheels with CUT-GRIP and ISOTURN Heads



Designation	WF	LF	LS	DF	DCONMS	Fig.
VDI40-DTF50F31L140R	31.00	140.00	63.0	83.00	40.00	2
VDI40-DTF50L110	0.00	110.00	63.0	83.00	40.00	1
VDI40-DTF50L140	0.00	140.00	63.0	83.00	40.00	1
VDI40-DTF50L170	0.00	170.00	63.0	83.00	40.00	1
VDI50-DTF50F31L140R (1)	31.00	140.00	78.0	98.00	50.00	2
VDI50-DTF50L110 (1)	0.00	110.00	78.0	98.00	50.00	1
VDI50-DTF50L140 (1)	0.00	140.00	78.0	98.00	50.00	1
VDI50-DTF50L170 (1)	0.00	170.00	78.0	98.00	50.00	1

(1) on request

Spare Parts

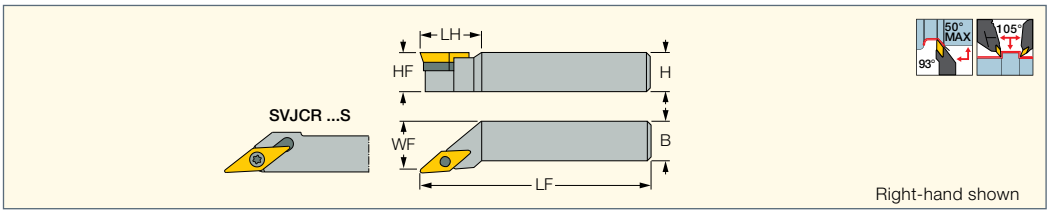
Designation		
VDI-DTF50	SR M10X45 DIN912	HW8 L208

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

ISOTURN

SVJCR/L

93° Lead Angle Screw Lock Tools Carrying 35° Diamond Inserts with 7° Clearance Angle



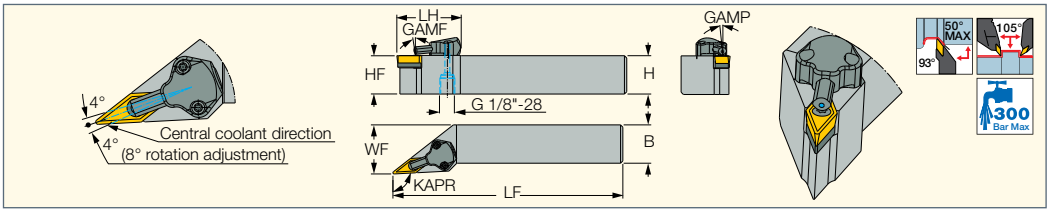
Designation	H	HF	B	LF	LH	WF	Insert					
SVJCR/L 0808K-11S (1)	8.0	8.0	8.0	125.00	11.5	8.20	VC..1103	SR 14-560	T-8/5			
SVJCR/L 1010K-11S (1)	10.0	10.0	10.0	125.00	22.0	10.20	VC..1103	SR 14-560	T-8/5			
SVJCR/L 1212K-11S (1)	12.0	12.0	12.0	125.00	-	12.20	VC..1103	SR 14-560	T-8/5			
SVJCR/L 1616K-11	16.0	16.0	16.0	125.00	25.0	20.00	VC..1103	SR 14-560	T-8/5			
SVJCR/L 2020K-11	20.0	20.0	20.0	125.00	30.0	25.00	VC..1103	SR 14-560	T-8/5			
SVJCR/L 2525M-11	25.0	25.0	25.0	150.00	30.0	32.00	VC..1103	SR 14-560	T-8/5			
SVJCR/L 2020K-16	20.0	20.0	20.0	125.00	30.0	25.00	VC..1604	SR 16-236 P	T-15/5	TVC 3-1	SR TC-3	HW 2.5
SVJCR/L 2525M-16	25.0	25.0	25.0	150.00	30.0	32.00	VC..1604	SR 16-236 P	T-15/5	TVC 3-1	SR TC-3	HW 2.5

(1) For Swiss-type machines

ISOTURN JETCUT

SVJCR/L-16-JHP

Screw Lock Tools with Channels for High-Pressure Coolant Carrying 35° Rhombic Inserts with 7° Clearance Angle



Designation	H	B	HF	LF	LH	WF	KAPR(1)	GAMP	GAMF	Insert
SVJCR/L 2525M-16-JHP	25.0	25.0	25.0	150.00	42.0	32.00	93.0	0.0	0.0	VCMT 1604

(1) Tool cutting edge angle

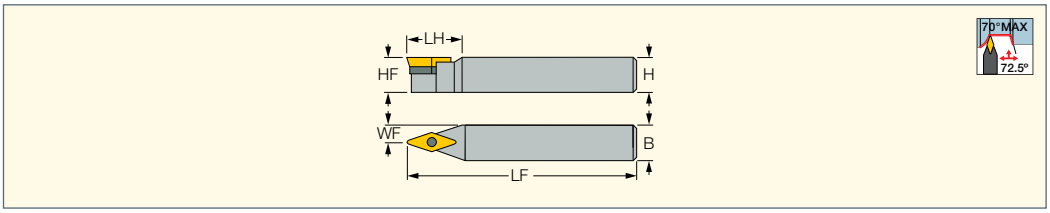
Spare Parts

Designation							
SVJCR/L 2525M-16-JHP	TVC 3-1	SR TC-3	SR 16-236 P	CU-V-JHP	T-15/5	HW 2.5	T-8/5

ISOTURN

SVVCN

72.5° Lead Angle Screw Lock Tools Carrying 35° Diamond Inserts with 7° Clearance Angle



Designation	H	HF	B	LF	LH	WF	Insert					
SVVCN 0808K-11S (1)	8.0	8.0	8.0	125.00	-	4.30	VC..1103	SR 14-560	T-8/5			
SVVCN 1010K-11S (1)	10.0	10.0	10.0	125.00	-	5.30	VC..1103	SR 14-560	T-8/5			
SVVCN 1212K-11S (1)	12.0	12.0	12.0	125.00	-	6.30	VC..1103	SR 14-560	T-8/5			
SVVCN 1616K-11S (1)	16.0	16.0	16.0	125.00	-	8.30	VC..1103	SR 14-560	T-8/5			
SVVCN 2020K-16	20.0	20.0	20.0	125.00	34.0	10.00	VC..1604	SR 16-236 P	T-15/5	TVC 3-1	SR TC-3	HW 2.5
SVVCN 2525M-16	25.0	25.0	25.0	150.00	38.1	12.50	VC..1604	SR 16-236 P	T-15/5	TVC 3-1	SR TC-3	HW 2.5

(1) For Swiss-type machines

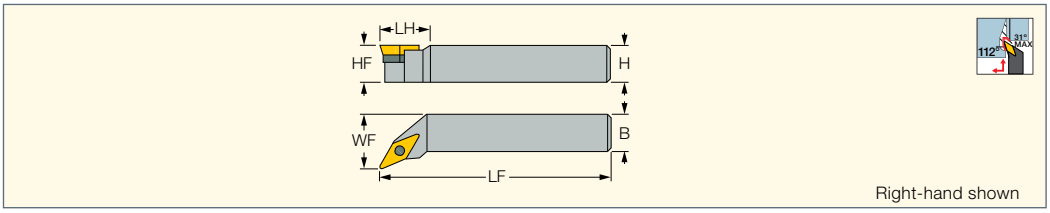
ISCAR

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ISOTURN

SVXCR/L

112° Lead Angle Screw Lock Tools Carrying 35° Diamond Inserts with 7° Clearance Angle

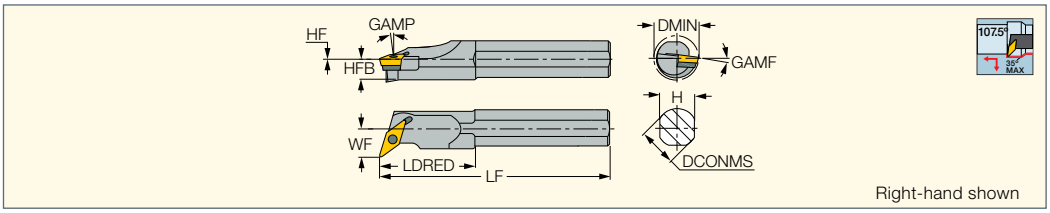


Designation	H	HF	B	LF	LH	WF	Insert					
SVXCR/L 2020K-16	20.0	20.0	20.0	125.00	25.0	25.00	VC..1604	TVC 3-1	SR TC-3	HW 2.5	SR 16-236 P	T-15/5
SVXCR/L 2525M-16	25.0	25.0	25.0	150.00	30.0	32.00	VC..1604	TVC 3-1	SR TC-3	HW 2.5	SR 16-236 P	T-15/5

ISOTURN

A/S-SVQCR/L

Screw Lock Boring Bars Carrying 35° Rhombic Inserts with 7° Clearance



Designation	DCONMS	LF	LDRED	H	HFB	WF	HF	DMIN	GAMP	GAMF	CSP(1)	Insert
S25S SVQCR/L-16	25.00	250.00	61.0	23.0	12.0	17.00	0.5	32.00	0.0	-5.0	0	VC.. 1604
S32T SVQCR/L-16	32.00	300.00	70.0	30.0	15.0	22.00	0.0	40.00	0.0	-5.0	0	VC.. 1604
A40U SVQCR/L-22	40.00	350.00	64.0	36.0	18.0	27.00	0.0	47.50	0.0	-8.0	1	VCGT 2205

(1) 0 - Without coolant supply, 1 - With coolant supply

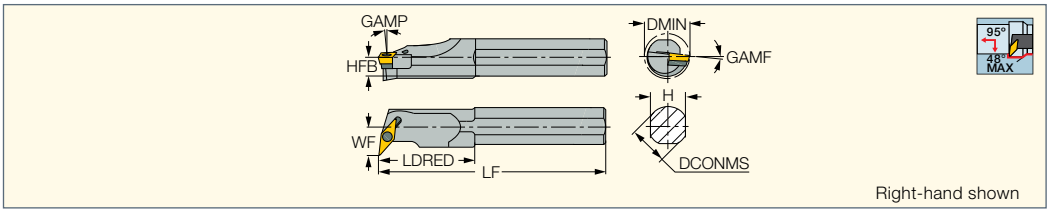
Spare Parts

Designation						
S25S SVQCR/L-16	SR 16-236 P	T-15/5				
S32T SVQCR/L-16	SR 16-236 P	T-15/5	TVC 3-1P	SR TC-3P	HW 4.0	
A40U SVQCR/L-22	SR 14-536	T-20/5	TVC 22T330	SR TC-3	HW 2.5	PL 40

ISOTURN

A/S-SVLFCR/L; A-SVUCR/L

Screw Lock Boring Bars Carrying 35° Rhombic Inserts with 7° Clearance



Designation	DCONMS	LF	LDRED	H	HFB	WF	DMIN	GAMP	GAMF	CSP(2)	Insert
A32T SVUCR/L-16 (1)	32.00	300.00	50.0	29.0	14.5	22.00	40.00	0.0	-8.0	1	VC.. 1604
S32T SVLFCR/L-16	32.00	300.00	56.0	29.0	14.5	22.00	39.50	0.0	-8.0	0	VC.. 1604
S40U SVLFCR/L-16	40.00	350.00	-	36.0	18.0	27.00	49.00	0.0	-5.0	0	VC.. 1604
A40U SVLFCR/L-22	40.00	350.00	70.0	36.0	18.0	27.00	48.00	0.0	-8.0	1	VC.. 2205

(1) 93° approach angle

(2) 0 - Without coolant supply, 1 - With coolant supply

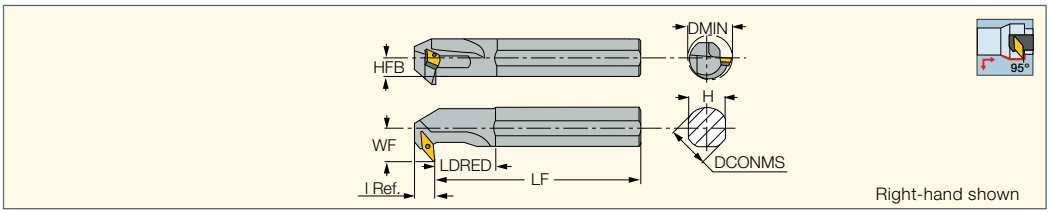
Spare Parts

Designation							
A32T SVUCR/L-16	TVC 3-1P	SR TC-3P	HW 1.5	HW 4.0	SR 16-236 P	PL 32	T-15/5
S32T SVLFCL-16	TVC 3-1P	SR TC-3P	HW 4.0		SR 16-236 P		T-15/5
S32T SVLFCR-16	TVC 3-1P	SR TC-3P	HW 4.0		SR 16-236 P		T-15/5
S40U SVLFCL-16	TVC 3-1P	SR TC-3P	HW 4.0		SR 16-236 P		T-15/5
S40U SVLFCR-16	TVC 3-1P	SR TC-3P	HW 4.0		SR 16-236 P		T-15/5
A40U SVLFCL-22	TVC 22T330	SR TC-3	HW 2.5		SR 14-536	PL 40	T-20/5
A40U SVLFCR-22	TVC 22T330	SR TC-3	HW 2.5		SR 14-536	PL 40	T-20/5

ISOTURN

A/S-SVLBCR/L

Screw Lock Back Boring Bars Carrying 35° Rhombic Inserts with 7° Clearance



Designation	DCONMS	LF	LDRED	l Ref.	H	HFB	WF	DMIN	CSP(1)	Insert
A32T SVLBCL-16	32.00	300.00	76.5	18.50	29.0	14.5	27.50	40.00	1	VC.. 1604
A32T SVLBCR-16	32.00	300.00	76.5	18.50	29.0	14.5	27.50	40.00	0	VC.. 1604
S32T SVLBCR/L-16	32.00	300.00	63.2	18.50	29.0	14.5	22.00	40.00	0	VC.. 1604
S40U SVLBCR/L-16	40.00	350.00	60.0	20.00	36.0	18.0	27.00	49.50	0	VC.. 1604

(1) 0 - Without coolant supply, 1 - With coolant supply

Spare Parts

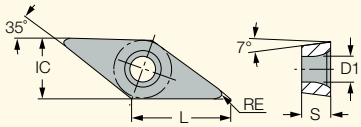
Designation					
A/S-SVLBCR/L	TVC 3-1P	SR TC-3P	HW 4.0	SR 16-236 P	T-15/5

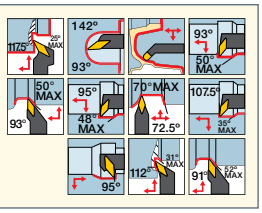
ISOTURN

VCGT-AS

35° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum

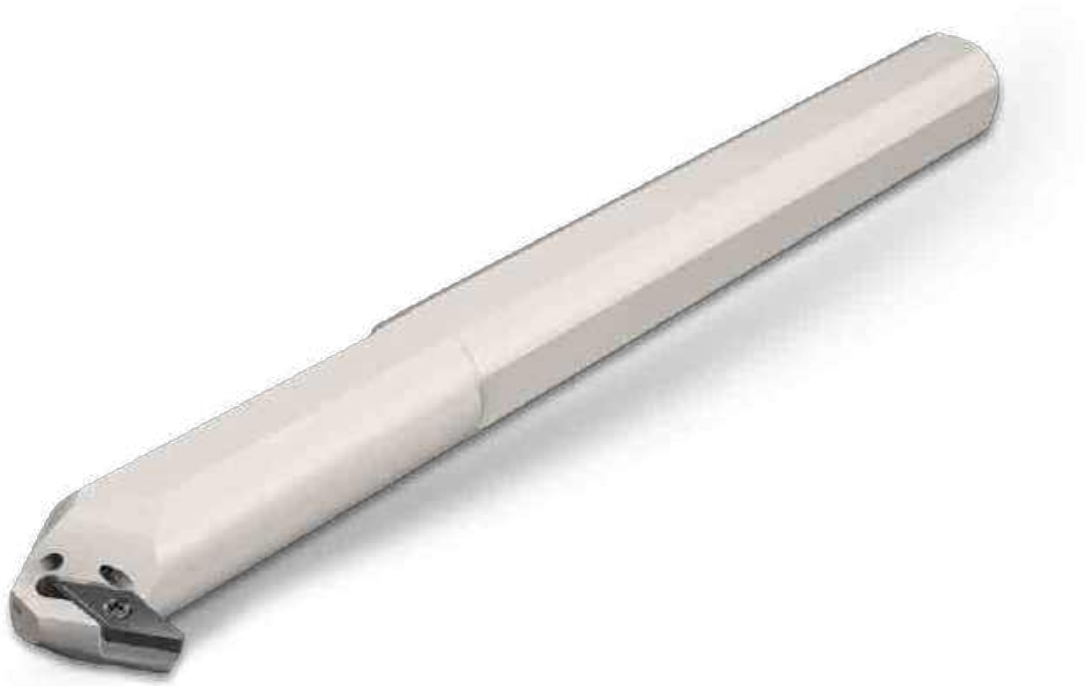






Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 110302-AS	11.10	6.35	3.18	0.20	2.90	●	0.20-2.50	0.05-0.20
VCGT 110304-AS	11.10	6.35	3.18	0.40	2.90	●	0.50-3.00	0.05-0.25
VCGT 160401-AS	16.60	9.52	4.76	0.10	4.40	●	0.20-2.50	0.05-0.20
VCGT 160402-AS	16.60	9.52	4.76	0.20	4.40	●	0.50-2.50	0.05-0.25
VCGT 160404-AS	16.60	9.52	4.76	0.40	4.40	●	0.50-3.00	0.05-0.25
VCGT 160408-AS	16.60	9.52	4.76	0.80	4.40	●	0.50-3.00	0.10-0.25
VCGT 160412-AS	16.60	9.52	4.76	1.20	4.40	●	0.50-3.00	0.10-0.25
VCGT 220530-AS	22.10	12.70	5.56	3.00	5.50	●	1.50-4.50	0.15-0.30

• For user guide and cutting speed recommendations, see pages 4-5,26



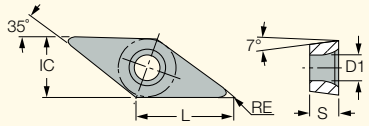
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ISOTURN

VCGT-AF

Inserts with a Very Positive Rake Angle and Sharp Cutting Edge for Semi-Finishing and Finishing on Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 220508-AF	22.10	12.70	5.56	0.80	5.50	●	1.00-4.50	0.10-0.25
VCGT 220512-AF	22.10	12.70	5.56	1.20	5.50	●	1.00-4.50	0.10-0.30
VCGT 220516-AF	22.10	12.70	5.56	1.60	5.50	●	1.50-4.50	0.10-0.35

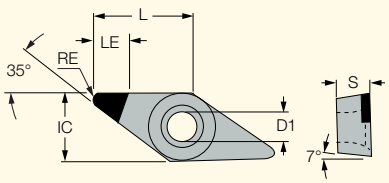
- For user guide and cutting speed recommendations, see pages 4-5,26

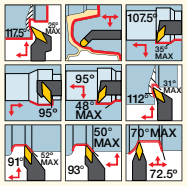
ISOTURN

VCGT-DW (PCD)

Inserts with 7° Clearance and a Single PCD Top Corner Tip Chipformer for Machining Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 160404-DW	16.60	9.52	4.76	0.40	6.60	4.40	●	0.10-3.00	0.05-0.30
VCGT 160408-DW	16.60	9.52	4.76	0.80	6.40	4.40	●	0.10-3.00	0.05-0.30
VCGT 160412-DW	16.60	9.52	4.76	1.20	6.30	4.40	●	0.10-3.00	0.05-0.30
VCGT 220516-DW	22.10	12.70	5.56	1.60	6.30	5.50	●	0.10-3.00	0.05-0.30
VCGT 220520-DW	22.10	12.70	5.56	2.00	6.20	5.50	●	0.10-3.00	0.05-0.30
VCGT 220530-DW	22.10	12.70	5.56	3.00	6.00	5.50	●	0.10-3.00	0.05-0.30

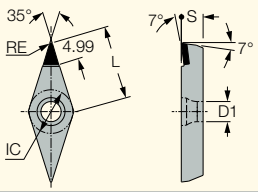
- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

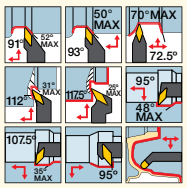
ISOTURN

VCGT (PCD)

35° Rhombic Single Brazed Tip Corner Inserts for Aluminum Finishing (PCD)







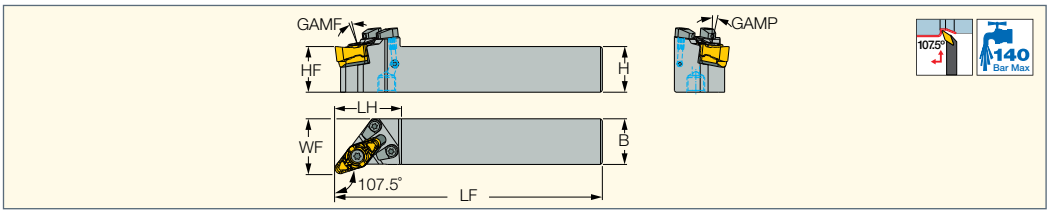
Designation	Dimensions IC	S	RE	L	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
VCGT 160404D	9.52	4.76	0.40	16.60	4.40	●	0.10-3.00	0.05-0.30
VCGT 160408D	9.52	4.76	0.80	16.60	4.40	●	0.10-3.00	0.05-0.30

- For user guide and cutting speed recommendations, see pages 4-5,27-28,31

ISOTURN JETCUT

SVHNR/L-AL-JHP

Screw Lock Tools with Channels for High-Pressure Coolant Carrying 35° Rhombic Inserts



Designation	H	B	HF	LF	LH	WF	GAMP	GAMF	MIID[1]
SVHNR/L 2525M-22-AL-JHP	25.0	25.0	25.0	146.34	36.3	30.03	7.0	6.0	VNGU 220630-R3N

(1) Master insert identification

Spare Parts

Designation									
SVHNR/L 2525M-22-AL-JHP	TVX 2230[a]	SR 14-591/L-SN	SW6-T-SH	BLD T20/S7	HW 3.0	SR TC-4	CH-1.9D-JHP-A SET	TVX 2212[b]*	TVX 2216[c]*

* Optional, to be ordered separately

(a) For VNGU 220630-R3N insert

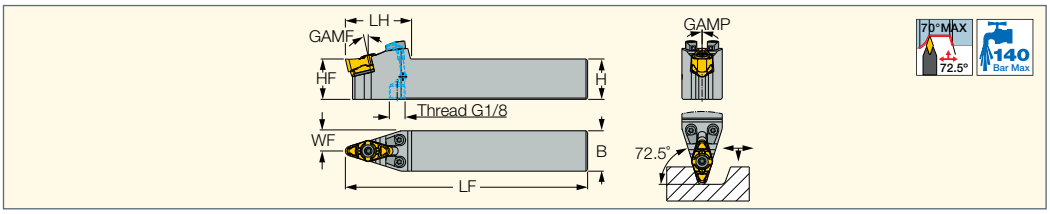
(b) For VNGU 220612-R3N insert

(c) For VNGU 220616-R3N insert

ISOTURN JETCUT

SVVNN-AL-JHP

Screw Lock Tools with Channels for High-Pressure Coolant Carrying 35° Rhombic Inserts



Designation	H	HF	B	LF	LH	WF	GAMP	GAMF	MIID[1]
SVVNN 2525M-22-AL-JHP	25.0	25.0	25.0	150.00	41.0	12.50	0.0	-13.5	VNGU 220630-R3N

(1) Master insert identification

Spare Parts

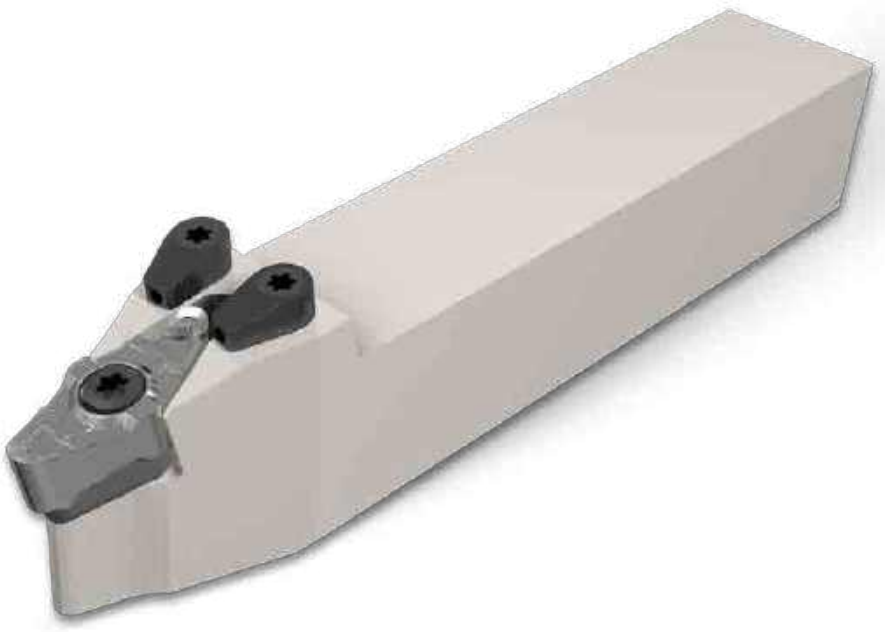
Designation									
SVVNN 2525M-22-AL-JHP	TVX 2230[a]	HW 3.0	BLD T20/S7	SW6-T-SH	SR TC-4	SR 14-591/L-SN	CH-1.9D-JHP-A SET	TVX 2212[b]*	TVX 2216[c]*

* Optional, to be ordered separately

(a) For VNGU 220630-R3N insert

(b) For VNGU 220612-R3N insert

(c) For VNGU 220616-R3N insert

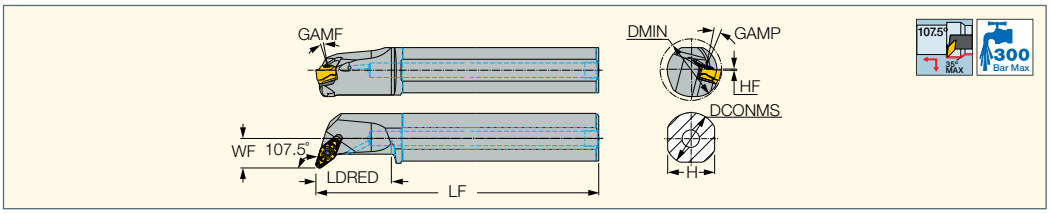


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ISOTURN

A-SVQNR/L-AL-JHP

Screw Lock Boring Bars
Carrying 35° Rhombic Inserts



Designation	DCONMS	LF	LDRED	H	HF	WF	DMIN	GAMP	GAMF	MIID[1]
A40U SVQNR/L-22-AL-JHP	40.00	348.10	60.0	36.0	0.1	23.40	49.00	14.5	6.5	VNGU 220630-R3N

(1) Master insert identification

Spare Parts

Designation									
A40U SVQNR/L-22-AL-JHP	TVX 2230[a]	SR 14-591/L-SN	HW 3.0	SW6-T-SH	BLD T20/S7	PL 40	SR TC-4	TVX 2212[b]*	TVX 2216[c]*

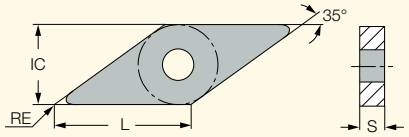
* Optional, to be ordered separately
(a) For VNGU 220630-R3N insert
(b) For VNGU 220612-R3N insert
(c) For VNGU 220616-R3N insert

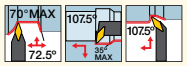
ISOTURN
ALUPTURN POSITIVE DOUBLE SIDED

VNGU-R3N

Double-Sided Sharp Edged
Positive Rake Inserts for Rough
Machining Aluminum and
Other Non-Ferrous Materials





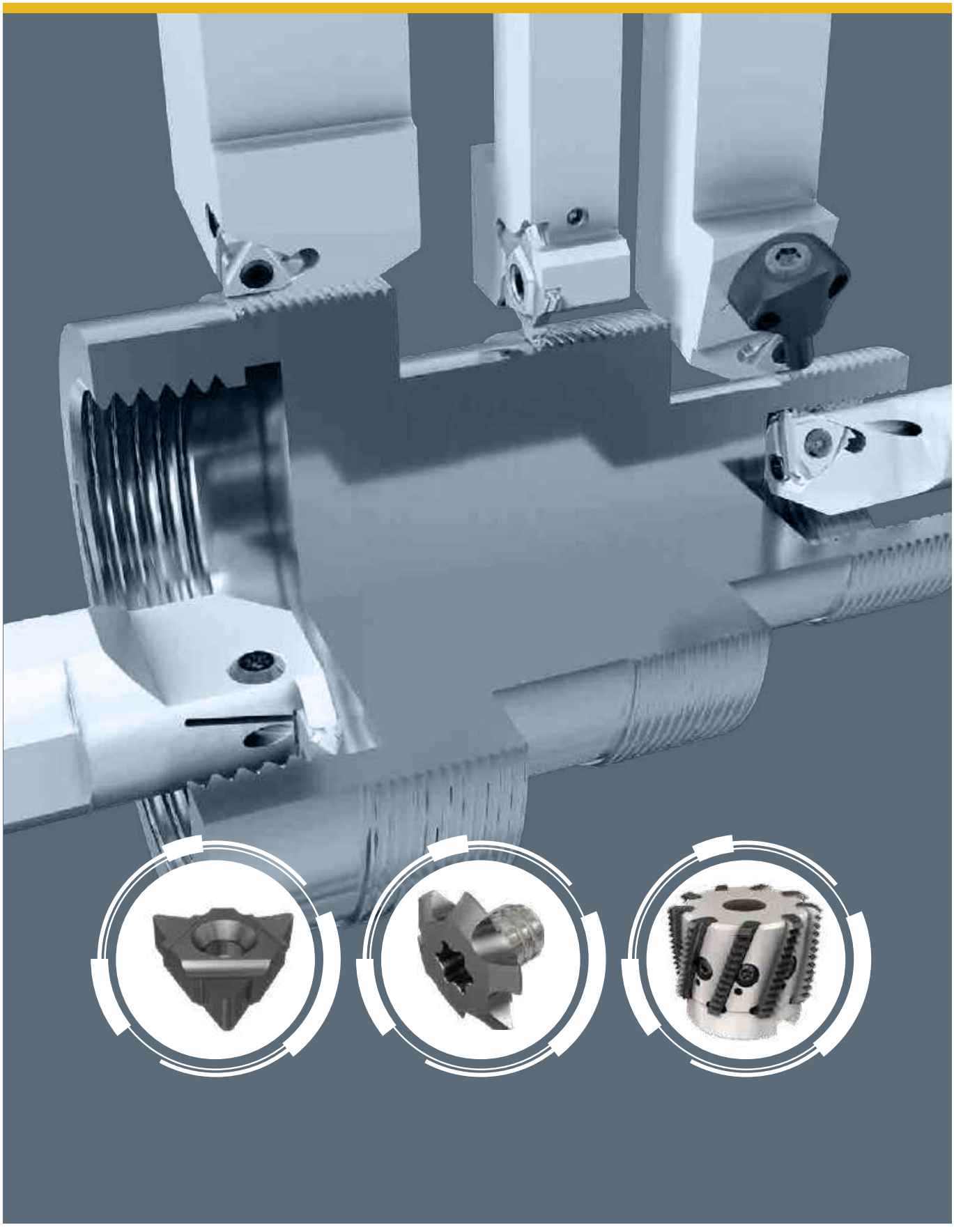


Designation	Dimensions L	IC	S	RE	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
VNGU 220612-R3N	22.00	12.70	6.77	1.20	●	1.00-4.50	0.10-0.30
VNGU 220616-R3N	22.00	12.70	6.51	1.60	●	1.50-4.50	0.10-0.35
VNGU 220630-R3N	22.00	12.70	6.35	3.00	●	1.50-4.50	0.15-0.40

• For user guide and cutting speed recommendations, see pages 4-5,26

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Threading



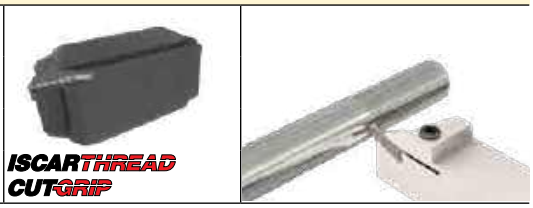
Main Type Laydown Inserts

	B/M-TYPE	U-TYPE	REGULAR TYPE	MULTI-TOOTH
	 ISCARTHREAD	 ISCARTHREAD	 ISCARTHREAD	 ISCARTHREAD

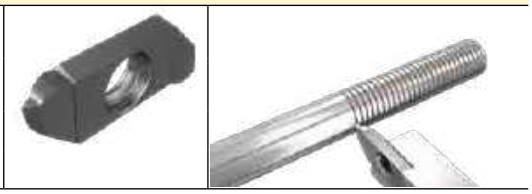
Additional Threading Systems

External

CUT-GRIP External



SWISSCUT External



PENTACUT External

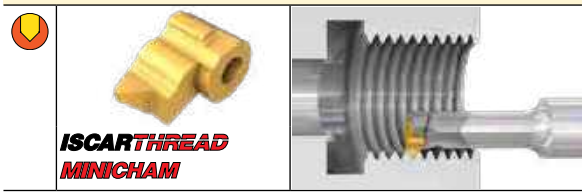


partial profile

full profile

Internal

MINICHAM Internal



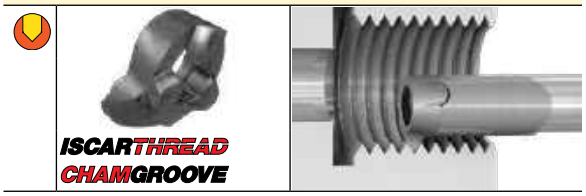
minimum bore dia. 4 mm

PICCOCUT Mini-Bar



minimum bore dia. 2.4 mm

CHAMGROOVE Internal



minimum bore dia. 8.0 mm

CUT-GRIP Internal



minimum bore dia. 12.5 mm

minimum bore dia. 20 mm

partial profile

full profile

Thread Milling



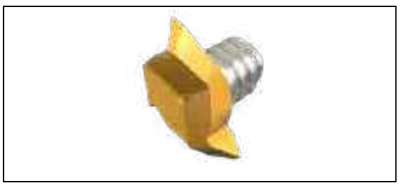
SOLIDTHREAD
MTEC, MTECB MTECZ, MTECQ



SOLIDTHREAD
MTECS, MTECD, MTECSH



SOLIDTHREAD
MTECI



MULTI-MASTER
MM TRD



MULTI-MASTER
MM TRF



MULTI-MASTER
MT-...-MM



T-SLOT
SD TRD



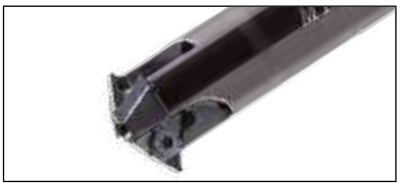
MILLTHREAD Endmill
MTE



MILLTHREAD Endmill
MTSRH



MILLTHREAD Endmill
MTSR M.I. S.P



MILLTHREAD Endmill
MTSR M.I. S.P.-U



MILLTHREAD Endmill
MTET



MILLTHREAD Shell Mill
MTF-MULTI



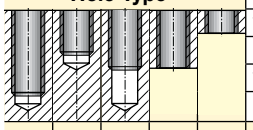
MILLTHREAD Shell Mill
MTSRH



MILLTHREAD Shell Mill
MTFLE

Taps

Tap Selection Guide and Cutting Speed Recommendations

Hole Type[4]					tap color code[1]	W[1]	M	M	M	M	M	M	N	H	F
					tool material[1]	HSS	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
					surface treatment/coating[2]	-	-	TI	ST	-	TI	ST	ST	ST	TI
					flute hand and angle	-	-	-	-	R40°	R40°	R40°	R40°	R40°	-
					lead according to DIN 2197[3]	1\2\3	B	B	B	C	C	C	C	C	C
1	2	3	4	5	Hole Type[4]	1-2-3-4-5	4-5	4-5	4-5	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3	1-2-3-4-5

Material No.	Material		Condition	Hardness HB	Chip	Coolant	m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min		m/min
21	aluminum-wrought alloy		not cureable	60	medium	T		•	25-35	•	50-70	•	12-25	••	25-35	•	30-60	•	12-25	••	12-25	••	25-35	••	
22			cured	100	medium	T		•	25-35	•	50-70	•	12-25	••	25-35	•	30-60	•	12-25	••	12-25	••	25-35	••	
23	aluminum-cast, alloyed	<=12% Si	not cureable	75	short	T		•	10-15	•	10-40	•	10-25	••	10-15	•	15-40	•	10-25	••	10-25	••	10-15	••	
24			cured	90	short	T		•	10-15	•	10-40	•	10-25	••	10-15	•	15-40	•	10-25	••	10-25	••	10-15	••	
25		>12% Si	high temp.	130	short	T		•	10-15	•	10-30	•	10-20	••	10-15	•	15-30	•	10-20	••	10-20	••	10-15	••	
26	copper alloys	>1% Pb	free cutting	110	med/short	T		•	25-35	•	50-70	•	20-40	••	25-35	•	30-65	•	20-40	••	20-40	••	25-35	••	17-40
27			brass	90	long	T		•	15-20	•	5-60	•	13-30	••	15-20	•	20-45	•	13-30	••	13-30	••	15-20	••	20-60
28			electrolitic copper	100	long	T		•	15-20	•	5-25	•	10-17	••	15-20	•	15-30	•	10-17	••	10-17	••	15-20	••	20-60
29	non metallic		duroplastics, fiber plastics		short	Z		•	6-10	•	5-25	•	6-13	••	6-10	•	10-20	•	6-13	••	6-13	••	6-10	••	

[1] See page 58
[2] See page 65
[3] See page 66
[4] See page 66

Coolant
T -oil emulsion
Z -dry or emulsion

• Recommended
•• Suitable
[1] Hand tap

Tap Designation Code Key

TPG	UNC	1/4-20	M	□	HE	Ti

Tap Style

TPH	- hand tap
TPF	- forming tap
TPG	- gun point
TPS	- spiral flute
TPST	- straight flute

D- TPI
D- pitch

B - Bore for Coolant

(on request)

Coating Types*

Ni	- nitriding
Ti	- TiN
TC	- TiCN
TA	- TiAlN
St	- black oxide

* On request

Thread Standard

M	- ISO metric coars thread DIN-13
MF	- ISO metric fine thread DIN-13
UNF	- unfied fine thread
UNC	- unfied coarse thread

Tap Color Codes(1)

M	- multi-material application
W	- steel with good machinability rm<750 n/mm^2
S	- stainless steel
H	- hardened steel and high temp./super alloys rm>750 n/mm^2
G	- grey cast iron
N	- low alloy steel rm<600 n/mm^2
A	- aluminum and aluminum alloys
F	- any material with at least 8~10% elongation

(1) The tools have a matching colored ring around the shank

Tap Materials

HS	- H.S.S. (M2)
HE	- H.S.S- E 5% co. HSS (M35)
PM	- compacted powder
HM	- solid carbide

Chamfer Lead According to DIN2197 (Specified for Each Tool Family)

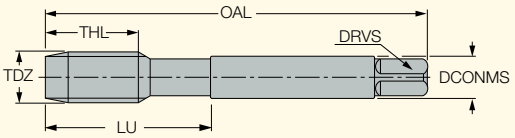
- **A** form A (chamfer lead 5-6 threads)
- **B** form B (with gun-nose and chamfer lead 4-5 threads)
- **C** form C (chamfer lead 2-3 threads)
- **D** form D (chamfer lead 4-5 threads)
- **E** form E (chamfer lead 1.5-2 threads)

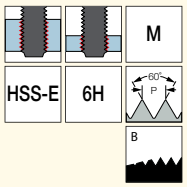


ONETAP

TPG M (HSS)

DIN 13 HSS Gun Point Machine Taps - ISO Metric Coarse Threads for a Wide Range of Materials





Designation	Dimensions										HE
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	
TPG M-2X0.4-M	M2	0.400	45.00	8.0	13.0	2.80	3	2.10	1.60	DIN 371	●
TPG M-2.2X0.45-M	M2.2	0.450	45.00	8.0	13.0	2.80	3	2.10	1.75	DIN 371	●
TPG M-2.3X0.4-M	M2.3	0.400	45.00	8.0	13.0	2.80	3	2.10	1.90	DIN 371	●
TPG M-2.5X0.45-M	M2.5	0.450	50.00	9.0	15.0	2.80	3	2.10	2.05	DIN 371	●
TPG M-2.6X0.45-M	M2.6	0.450	50.00	9.0	15.0	2.80	3	2.10	2.10	DIN 371	●
TPG M-3X0.5-M	M3	0.500	56.00	11.0	18.0	3.50	3	2.70	2.50	DIN 371	●
TPG M-3.5X0.6-M	M3.5	0.600	56.00	12.0	20.0	4.00	3	3.00	2.90	DIN 371	●
TPG M-4X0.7-M	M4	0.700	63.00	13.0	21.0	4.50	3	3.40	3.30	DIN 371	●
TPG M-4.5X0.75-M	M4.5	0.750	70.00	14.0	25.0	6.00	3	4.90	3.70	DIN 371	●
TPG M-5X0.8-M	M5	0.800	70.00	15.0	25.0	6.00	3	4.90	4.20	DIN 371	●
TPG M-6X1.0-M	M6	1.000	80.00	17.0	30.0	6.00	3	4.90	5.00	DIN 371	●
TPG M-7X1.0-M	M7	1.000	80.00	17.0	30.0	7.00	3	5.50	6.00	DIN 371	●
TPG M-8X1.25-M	M8	1.250	90.00	20.0	35.0	8.00	3	6.20	6.80	DIN 371	●
TPG M-9X1.25-M	M9	1.250	90.00	20.0	35.0	9.00	3	7.00	7.80	DIN 371	●
TPG M-10X1.5-M	M10	1.500	100.00	22.0	39.0	10.00	3	8.00	8.50	DIN 371	●
TPG M-11X1.5-M	M11	1.500	100.00	22.0	-	8.00	3	6.20	9.50	DIN 376	●
TPG M-12X1.75-M	M12	1.750	110.00	24.0	-	9.00	3	7.00	10.20	DIN 376	●
TPG M-14X2.0-M	M14	2.000	110.00	26.0	-	11.00	3	9.00	12.00	DIN 376	●
TPG M-16X2.0-M	M16	2.000	110.00	27.0	-	12.00	3	9.00	14.00	DIN 376	●
TPG M-18X2.5-M	M18	2.500	125.00	30.0	-	14.00	4	11.00	15.50	DIN 376	●
TPG M-20X2.5-M	M20	2.500	140.00	32.0	-	16.00	4	12.00	17.50	DIN 376	●
TPG M-22X2.5-M	M22	2.500	140.00	32.0	-	18.00	4	14.50	19.50	DIN 376	●
TPG M-24X3.0-M	M24	3.000	160.00	34.0	-	18.00	4	14.50	21.00	DIN 376	●
TPG M-27X3.0-M	M27	3.000	160.00	36.0	-	20.00	4	16.00	24.00	DIN 376	●
TPG M-30X3.5-M	M30	3.500	180.00	40.0	-	22.00	4	18.00	26.50	DIN 376	●

• For user guide and cutting conditions, see pages 57-58,65-79

(1) Thread pitch

(2) Number of flutes

(3) Torque key size

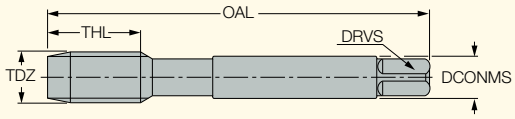


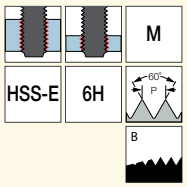
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ONETAP

TPG MF (HSS)

DIN 13 HSS Gun Point Machine Taps - ISO Metric Fine Threads for a Wide Range of Materials





Designation	Dimensions									HE
	TDZ	TP[1]	OAL	THL	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	
TPG MF-4X0.5-M	M4	0.500	63.00	10.0	2.80	3	2.10	3.50	DIN 374	●
TPG MF-5X0.5-M	M5	0.500	70.00	11.0	3.50	3	2.70	4.50	DIN 374	●
TPG MF-6X0.75-M	M6	0.750	80.00	13.0	4.50	3	3.40	5.20	DIN 374	●
TPG MF-6X0.5-M	M6	0.500	80.00	13.0	4.50	3	3.40	5.50	DIN 374	●
TPG MF-7X0.75-M	M7	0.750	80.00	14.0	5.50	3	4.30	6.20	DIN 374	●
TPG MF-8X1.0-M	M8	1.000	90.00	17.0	6.00	3	4.90	7.00	DIN 374	●
TPG MF-8X0.75-M	M8	0.750	80.00	14.0	6.00	3	4.90	7.20	DIN 374	●
TPG MF-10X1.25-M	M10	1.250	100.00	22.0	7.00	3	5.50	8.80	DIN 374	●
TPG MF-10X1.0-M	M10	1.000	90.00	18.0	7.00	3	5.50	9.00	DIN 374	●
TPG MF-10X0.75-M	M10	0.750	90.00	18.0	7.00	3	5.50	9.20	DIN 374	●
TPG MF-12X1.5-M	M12	1.500	100.00	22.0	9.00	3	7.00	10.50	DIN 374	●
TPG MF-12X1.25-M	M12	1.250	100.00	22.0	9.00	3	7.00	10.80	DIN 374	●
TPG MF-12X1.0-M	M12	1.000	100.00	18.0	9.00	3	7.00	11.00	DIN 374	●
TPG MF-14X1.5-M	M14	1.500	100.00	22.0	11.00	3	9.00	12.50	DIN 374	●
TPG MF-14X1.25-M	M14	1.250	100.00	22.0	11.00	3	9.00	12.80	DIN 374	●
TPG MF-14X1.0-M	M14	1.000	100.00	18.0	11.00	3	9.00	13.00	DIN 374	●
TPG MF-16X1.5-M	M16	1.500	100.00	22.0	12.00	3	9.00	14.50	DIN 374	●
TPG MF-16X1.0-M	M16	1.000	100.00	18.0	12.00	3	9.00	15.00	DIN 374	●
TPG MF-18X1.5-M	M18	1.500	110.00	25.0	14.00	4	11.00	16.50	DIN 374	●
TPG MF-18X1.0-M	M18	1.000	110.00	20.0	14.00	4	11.00	17.00	DIN 374	●
TPG MF-20X1.5-M	M20	1.500	125.00	25.0	16.00	4	12.00	18.50	DIN 374	●
TPG MF-20X1.0-M	M20	1.000	125.00	20.0	16.00	4	12.00	19.00	DIN 374	●
TPG MF-22X1.5-M	M22	1.500	125.00	25.0	18.00	4	14.50	20.50	DIN 374	●
TPG MF-22X1.0-M	M22	1.000	125.00	20.0	18.00	4	14.50	21.00	DIN 374	●
TPG MF-24X2.0-M	M24	2.000	140.00	27.0	18.00	4	14.50	22.00	DIN 374	●
TPG MF-24X1.5-M	M24	1.500	140.00	27.0	18.00	4	14.50	22.50	DIN 374	●
TPG MF-26X1.5-M	M26	1.500	140.00	28.0	18.00	4	14.50	24.50	DIN 374	●
TPG MF-27X2.0-M	M27	2.000	140.00	28.0	20.00	4	16.00	25.00	DIN 374	●
TPG MF-27X1.5-M	M27	1.500	140.00	28.0	20.00	4	16.00	25.50	DIN 374	●
TPG MF-28X1.5-M	M28	1.500	140.00	28.0	20.00	4	16.00	26.50	DIN 374	●
TPG MF-30X2.0-M	M30	2.000	150.00	30.0	22.00	4	18.00	28.00	DIN 374	●
TPG MF-30X1.5-M	M30	1.500	150.00	30.0	22.00	4	18.00	28.50	DIN 374	●

• For user guide and cutting conditions, see pages 57-58,65-79

(1) Thread pitch

(2) Number of flutes

(3) Torque key size

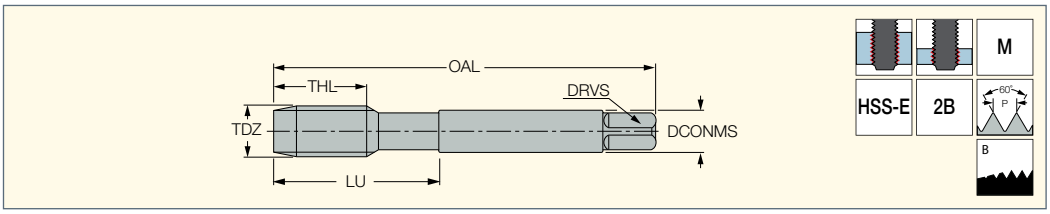
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ONETAP

TPG UNC (HSS)

HSS Gun Point Machine Taps
- Unified Coarse Threads for
a Wide Range of Materials



Designation	Dimensions										HE
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	
TPG UNC-#4-40-M	#4	40.0	56.00	11.0	18.0	3.50	3	2.70	2.30	DIN 371	●
TPG UNC-#5-40-M	#5	40.0	56.00	11.0	18.0	3.50	3	2.70	2.60	DIN 371	●
TPG UNC-#6-32-M	#6	32.0	56.00	12.0	20.0	4.00	3	3.00	2.85	DIN 371	●
TPG UNC-#8-32-M	#8	32.0	63.00	13.0	21.0	4.50	3	3.40	3.50	DIN 371	●
TPG UNC-#10-24-M	#10	24.0	70.00	15.0	25.0	6.00	3	4.90	3.90	DIN 371	●
TPG UNC-#12-24-M	#12	24.0	80.00	16.0	30.0	6.00	3	4.90	4.50	DIN 371	●
TPG UNC-1/4-20-M	1/4"	20.0	80.00	17.0	30.0	7.00	3	5.50	5.20	DIN 371	●
TPG UNC-5/16-18-M	5/16"	18.0	90.00	20.0	35.0	8.00	3	6.20	6.60	DIN 371	●
TPG UNC-3/8-16-M	3/8"	16.0	100.00	22.0	39.0	9.00	3	7.00	8.00	DIN 371	●
TPG UNC-7/16-14-M	7/16"	14.0	100.00	22.0	-	8.00	3	6.20	9.40	DIN 376	●
TPG UNC-1/2-13-M	1/2"	13.0	110.00	25.0	-	9.00	3	7.00	10.75	DIN 376	●
TPG UNC-9/16-12-M	9/16"	12.0	110.00	26.0	-	11.00	3	9.00	12.25	DIN 376	●
TPG UNC-5/8-11-M	5/8"	11.0	110.00	27.0	-	12.00	3	9.00	13.50	DIN 376	●
TPG UNC-3/4-10-M	3/4"	10.0	125.00	30.0	-	14.00	4	11.00	16.50	DIN 376	●
TPG UNC-7/8-9-M	7/8"	9.0	140.00	32.0	-	18.00	4	14.50	19.50	DIN 376	●
TPG UNC-1-8-M	1"	8.0	160.00	36.0	-	20.00	4	16.00	22.25	DIN 376	●

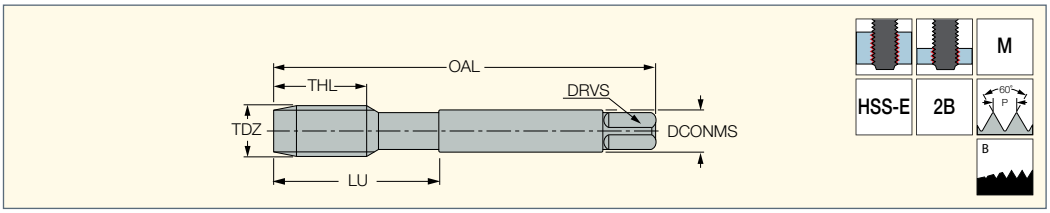
- For user guide and cutting conditions, see pages 57-58,65-79

(1) Threads per inch
(2) Number of flutes
(3) Torque key size

ONETAP

TPG UNF (HSS)

HSS Gun Point Machine Taps
Unified Fine Threads for a
Wide Range of Materials



Designation	Dimensions										HE
	TDZ	TPI[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	
TPG UNF-#4-48-M	#4	48.0	56.00	11.0	18.0	3.50	3	2.70	2.40	DIN 371	●
TPG UNF-#5-44-M	#5	44.0	56.00	11.0	18.0	3.50	3	2.70	2.70	DIN 371	●
TPG UNF-#6-40-M	#6	40.0	56.00	12.0	20.0	4.00	3	3.00	3.00	DIN 371	●
TPG UNF-#8-36-M	#8	36.0	63.00	13.0	21.0	4.50	3	3.40	3.50	DIN 371	●
TPG UNF-#10-32-M	#10	32.0	70.00	15.0	25.0	6.00	3	4.90	4.10	DIN 371	●
TPG UNF-#12-28-M	#12	28.0	80.00	16.0	30.0	6.00	3	4.90	4.70	DIN 371	●
TPG UNF-1/4-28-M	1/4"	28.0	80.00	17.0	30.0	7.00	3	5.50	5.50	DIN 371	●
TPG UNF-5/16-24-M	5/16"	24.0	90.00	17.0	35.0	8.00	3	6.20	6.90	DIN 371	●
TPG UNF-3/8-24-M	3/8"	24.0	100.00	18.0	39.0	9.00	3	7.00	8.50	DIN 371	●
TPG UNF-7/16-20-M	7/16"	20.0	100.00	22.0	-	8.00	3	6.20	9.90	DIN 374	●
TPG UNF-1/2-20-M	1/2"	20.0	100.00	22.0	-	9.00	3	7.00	11.50	DIN 374	●
TPG UNF-9/16-18-M	9/16"	18.0	100.00	22.0	-	11.00	3	9.00	12.90	DIN 374	●
TPG UNF-5/8-18-M	5/8"	18.0	100.00	22.0	-	12.00	3	9.00	14.50	DIN 374	●
TPG UNF-3/4-16-M	3/4"	16.0	110.00	25.0	-	14.00	4	11.00	17.50	DIN 374	●
TPG UNF-7/8-14-M	7/8"	14.0	125.00	26.0	-	18.00	4	14.50	20.50	DIN 374	●
TPG UNF-1-12-M	1"	12.0	140.00	28.0	-	20.00	4	16.00	23.25	DIN 374	●

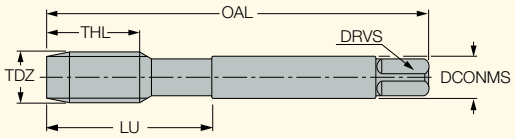
- For user guide and cutting conditions, see pages 57-58,65-79

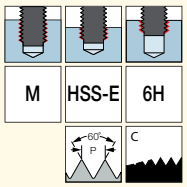
(1) Threads per inch
(2) Number of flutes
(3) Torque key size

ONETAP

TPS M (HSS)

DIN 13 HSS Spiral Flute Machine Taps - Metric Coarse Threads for a Wide Range of Materials





Designation	Dimensions											HE
	TDZ	TP[1]	OAL	THL	LU	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	CSP[4]	
TPS M-2X0.4-M	M2	0.400	45.00	8.0	13.0	2.80	3	2.10	1.60	DIN 371	0	●
TPS M-2.2X0.45-M	M2.2	0.450	45.00	8.0	13.0	2.80	3	2.10	1.75	DIN 371	0	●
TPS M-2.3X0.4-M	M2.3	0.400	45.00	8.0	13.0	2.80	3	2.10	1.90	DIN 371	0	●
TPS M-2.5X0.45-M	M2.5	0.450	50.00	9.0	15.0	2.80	3	2.10	2.05	DIN 371	0	●
TPS M-2.6X0.45-M	M2.6	0.450	50.00	9.0	15.0	2.80	3	2.10	2.10	DIN 371	0	●
TPS M-3X0.5-M	M3	0.500	56.00	6.0	18.0	3.50	3	2.70	2.50	DIN 371	0	●
TPS M-3.5X0.6-M	M3.5	0.600	56.00	7.0	20.0	4.00	3	3.00	2.90	DIN 371	0	●
TPS M-4X0.7-M	M4	0.700	63.00	7.0	21.0	4.50	3	3.40	3.30	DIN 371	0	●
TPS M-4.5X0.75-M	M4.5	0.750	70.00	8.0	25.0	6.00	3	4.90	3.70	DIN 371	0	●
TPS M-5X0.8-M	M5	0.800	70.00	8.0	25.0	6.00	3	4.90	4.20	DIN 371	0	●
TPS M-6X1.0-M	M6	1.000	80.00	10.0	30.0	6.00	3	4.90	5.00	DIN 371	0	●
TPS M-7X1.0-M	M7	1.000	80.00	10.0	30.0	7.00	3	5.50	6.00	DIN 371	0	●
TPS M-8X1.25-M	M8	1.250	90.00	13.0	35.0	8.00	3	6.20	6.80	DIN 371	0	●
TPS M-9X1.25-M	M9	1.250	90.00	13.0	35.0	9.00	3	7.00	7.80	DIN 371	0	●
TPS M-10X1.5-M	M10	1.500	100.00	15.0	39.0	10.00	3	8.00	8.50	DIN 371	0	●
TPS M-11X1.5-M	M11	1.500	100.00	17.0	-	8.00	3	6.20	9.50	DIN 376	0	●
TPS M-12X1.75-M	M12	1.750	110.00	18.0	-	9.00	3	7.00	10.20	DIN 376	0	●
TPS M-14X2.0-M	M14	2.000	110.00	20.0	-	11.00	3	9.00	12.00	DIN 376	0	●
TPS M-16X2.0-M	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	0	●
TPS M-16X2.0-M-B	M16	2.000	110.00	20.0	-	12.00	3	9.00	14.00	DIN 376	1	●
TPS M-18X2.5-M	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	0	●
TPS M-18X2.5-M-B	M18	2.500	125.00	25.0	-	14.00	4	11.00	15.50	DIN 376	1	●
TPS M-20X2.5-M	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	0	●
TPS M-20X2.5-M-B	M20	2.500	140.00	25.0	-	16.00	4	12.00	17.50	DIN 376	1	●
TPS M-22X2.5-M	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	0	●
TPS M-22X2.5-M-B	M22	2.500	140.00	25.0	-	18.00	4	14.50	19.50	DIN 376	1	●
TPS M-24X3.0-M	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	0	●
TPS M-24X3.0-M-B	M24	3.000	160.00	30.0	-	18.00	4	14.50	21.00	DIN 376	1	●
TPS M-27X3.0-M	M27	3.000	160.00	30.0	-	20.00	4	16.00	24.00	DIN 376	0	●
TPS M-30X3.5-M	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	0	●
TPS M-30X3.5-M-B	M30	3.500	180.00	35.0	-	22.00	4	18.00	26.50	DIN 376	1	●

• For user guide and cutting conditions, see pages 57-58,65-79

[1] Thread pitch

[2] Number of flutes

[3] Torque key size

[4] 0 - Without coolant supply, 1 - With coolant supply

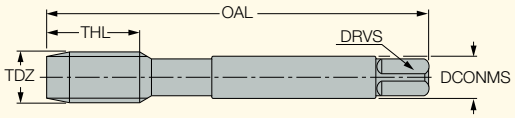
ISCAR

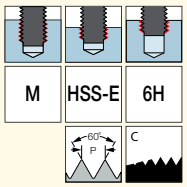
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Enter the item description in the search field to access additional related data.

ONETAP

TPS MF (HSS)

DIN 13 HSS Spiral Flute Machine Taps - Metric Fine Threads for a Wide Range of Materials





Designation	Dimensions									HE
	TDZ	TP[1]	OAL	THL	DCONMS	NOF[2]	DRVS[3]	Pre-hole	Standard	
TPS MF-4X0.5-M	M4	0.500	63.00	5.0	2.80	3	2.10	3.50	DIN 374	●
TPS MF-5X0.5-M	M5	0.500	70.00	5.0	3.50	3	2.70	4.50	DIN 374	●
TPS MF-6X0.75-M	M6	0.750	80.00	8.0	4.50	3	3.40	5.20	DIN 374	●
TPS MF-6X0.5-M	M6	0.500	80.00	5.0	4.50	3	3.40	5.50	DIN 374	●
TPS MF-7X0.75-M	M7	0.750	80.00	10.0	5.50	3	4.30	6.20	DIN 374	●
TPS MF-8X1.0-M	M8	1.000	90.00	10.0	6.00	3	4.90	7.00	DIN 374	●
TPS MF-8X0.75-M	M8	0.750	80.00	8.0	6.00	3	4.90	7.20	DIN 374	●
TPS MF-10X1.25-M	M10	1.250	100.00	16.0	7.00	3	5.50	8.80	DIN 374	●
TPS MF-10X1.0-M	M10	1.000	90.00	10.0	7.00	3	5.50	9.00	DIN 374	●
TPS MF-10X0.75-M	M10	0.750	90.00	10.0	7.00	3	5.50	9.20	DIN 374	●
TPS MF-12X1.5-M	M12	1.500	100.00	15.0	9.00	3	7.00	10.50	DIN 374	●
TPS MF-12X1.25-M	M12	1.250	100.00	15.0	9.00	3	7.00	10.80	DIN 374	●
TPS MF-12X1.0-M	M12	1.000	100.00	11.0	9.00	3	7.00	11.00	DIN 374	●
TPS MF-14X1.5-M	M14	1.500	100.00	15.0	11.00	3	9.00	12.50	DIN 374	●
TPS MF-14X1.25-M	M14	1.250	100.00	15.0	11.00	3	9.00	12.80	DIN 374	●
TPS MF-14X1.0-M	M14	1.000	100.00	11.0	11.00	3	9.00	13.00	DIN 374	●
TPS MF-16X1.5-M	M16	1.500	100.00	15.0	12.00	3	9.00	14.50	DIN 374	●
TPS MF-16X1.0-M	M16	1.000	100.00	12.0	12.00	3	9.00	15.00	DIN 374	●
TPS MF-18X1.5-M	M18	1.500	110.00	17.0	14.00	4	11.00	16.50	DIN 374	●
TPS MF-18X1.0-M	M18	1.000	110.00	13.0	14.00	4	11.00	17.00	DIN 374	●
TPS MF-20X1.5-M	M20	1.500	125.00	17.0	16.00	4	12.00	18.50	DIN 374	●
TPS MF-20X1.0-M	M20	1.000	125.00	14.0	16.00	4	12.00	19.00	DIN 374	●
TPS MF-22X1.5-M	M22	1.500	125.00	17.0	18.00	4	14.50	20.50	DIN 374	●
TPS MF-22X1.0-M	M22	1.000	125.00	14.0	18.00	4	14.50	21.00	DIN 374	●
TPS MF-24X2.0-M	M24	2.000	140.00	20.0	18.00	4	14.50	22.00	DIN 374	●
TPS MF-24X1.5-M	M24	1.500	140.00	20.0	18.00	4	14.50	22.50	DIN 374	●
TPS MF-26X1.5-M	M26	1.500	140.00	20.0	18.00	4	14.50	24.50	DIN 374	●
TPS MF-27X2.0-M	M27	2.000	140.00	20.0	20.00	4	16.00	25.00	DIN 374	●
TPS MF-27X1.5-M	M27	1.500	140.00	20.0	20.00	4	16.00	25.50	DIN 374	●
TPS MF-28X1.5-M	M28	1.500	140.00	20.0	20.00	4	16.00	26.50	DIN 374	●
TPS MF-30X2.0-M	M30	2.000	150.00	22.0	22.00	4	18.00	28.00	DIN 374	●
TPS MF-30X1.5-M	M30	1.500	150.00	22.0	22.00	4	18.00	28.50	DIN 374	●

• For user guide and cutting conditions, see pages 57-58,65-79

(1) Thread pitch

(2) Number of flutes

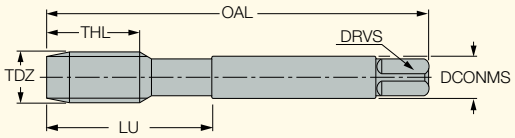
(3) Torque key size

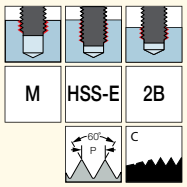
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ONETAP

TPS UNC (HSS)

HSS Spiral Flute Machine Taps Unified Coarse Threads for a Wide Range of Materials





Designation	Dimensions										HE
	TDZ	TPI(1)	OAL	THL	LU	DCONMS	NOF(2)	DRVS(3)	Pre-hole	Standard	
TPS UNC-#4-40-M	#4	40.0	56.00	6.0	18.0	3.50	3	2.70	2.30	DIN 371	●
TPS UNC-#5-40-M	#5	40.0	56.00	7.0	18.0	3.50	3	2.70	2.60	DIN 371	●
TPS UNC-#6-32-M	#6	32.0	56.00	7.0	20.0	4.00	3	3.00	2.85	DIN 371	●
TPS UNC-#8-32-M	#8	32.0	63.00	8.0	21.0	4.50	3	3.40	3.50	DIN 371	●
TPS UNC-#10-24-M	#10	24.0	70.00	10.0	25.0	6.00	3	4.90	3.90	DIN 371	●
TPS UNC-#12-24-M	#12	24.0	80.00	10.0	30.0	6.00	3	4.90	4.50	DIN 371	●
TPS UNC-1/4-20-M	1/4"	20.0	80.00	13.0	30.0	7.00	3	5.50	5.20	DIN 371	●
TPS UNC-5/16-18-M	5/16"	18.0	90.00	14.0	35.0	8.00	3	6.20	6.60	DIN 371	●
TPS UNC-3/8-16-M	3/8"	16.0	100.00	16.0	39.0	9.00	3	7.00	8.00	DIN 371	●
TPS UNC-7/16-14-M	7/16"	14.0	100.00	17.0	-	8.00	3	6.20	9.40	DIN 376	●
TPS UNC-1/2-13-M	1/2"	13.0	110.00	20.0	-	9.00	3	7.00	10.75	DIN 376	●
TPS UNC-9/16-12-M	9/16"	12.0	110.00	20.0	-	11.00	3	9.00	12.25	DIN 376	●
TPS UNC-5/8-11-M	5/8"	11.0	110.00	22.0	-	12.00	3	9.00	13.50	DIN 376	●
TPS UNC-3/4-10-M	3/4"	10.0	125.00	25.0	-	14.00	4	11.00	16.50	DIN 376	
TPS UNC-7/8-9-M	7/8"	9.0	140.00	27.0	-	18.00	4	14.50	19.50	DIN 376	●
TPS UNC-1-8-M	1"	8.0	160.00	30.0	-	20.00	4	16.00	22.25	DIN 376	●

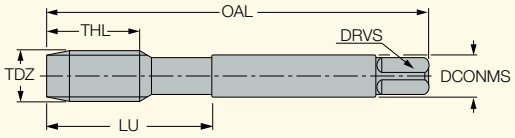
- For user guide and cutting conditions, see pages 57-58,65-79

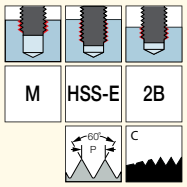
(1) Threads per inch
(2) Number of flutes
(3) Torque key size

ONETAP

TPS UNF (HSS)

HSS Spiral Flute Machine Taps - Unified Fine Threads for a Wide Range of Materials





Designation	Dimensions										HE
	TDZ	TPI(1)	OAL	THL	LU	DCONMS	NOF(2)	DRVS(3)	Pre-hole	Standard	
TPS UNF-#4-48-M	#4	48.0	56.00	6.0	18.0	3.50	3	2.70	2.40	DIN 371	●
TPS UNF-#5-44-M	#5	44.0	56.00	7.0	18.0	3.50	3	2.70	2.70	DIN 371	●
TPS UNF-#6-40-M	#6	40.0	56.00	7.0	20.0	4.00	3	3.00	3.00	DIN 371	●
TPS UNF-#8-36-M	#8	36.0	63.00	8.0	21.0	4.50	3	3.40	3.50	DIN 371	●
TPS UNF-#10-32-M	#10	32.0	70.00	10.0	25.0	6.00	3	4.90	4.10	DIN 371	●
TPS UNF-#12-28-M	#12	28.0	80.00	10.0	30.0	6.00	3	4.90	4.70	DIN 371	●
TPS UNF-1/4-28-M	1/4"	28.0	80.00	10.0	30.0	7.00	3	5.50	5.50	DIN 371	●
TPS UNF-5/16-24-M	5/16"	24.0	90.00	10.0	35.0	8.00	3	6.20	6.90	DIN 371	●
TPS UNF-3/8-24-M	3/8"	24.0	100.00	10.0	39.0	9.00	3	7.00	8.50	DIN 371	●
TPS UNF-7/16-20-M	7/16"	20.0	100.00	13.0	-	8.00	3	6.20	9.90	DIN 374	●
TPS UNF-1/2-20-M	1/2"	20.0	100.00	13.0	-	9.00	3	7.00	11.50	DIN 374	
TPS UNF-9/16-18-M	9/16"	18.0	100.00	15.0	-	11.00	3	9.00	12.90	DIN 374	●
TPS UNF-5/8-18-M	5/8"	18.0	100.00	15.0	-	12.00	3	9.00	14.50	DIN 374	●
TPS UNF-3/4-16-M	3/4"	16.0	110.00	17.0	-	14.00	4	11.00	17.50	DIN 374	●
TPS UNF-7/8-14-M	7/8"	14.0	125.00	17.0	-	18.00	4	14.50	20.50	DIN 374	●
TPS UNF-1-12-M	1"	12.0	140.00	20.0	-	20.00	4	16.00	23.25	DIN 374	●

- For user guide and cutting conditions, see pages 57-58,65-79

(1) Threads per inch
(2) Number of flutes
(3) Torque key size

ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Tap Surface Treatments and Coating Types

The high speed steels we use grant high wear resistance and toughness. For machining certain materials, various surface treatments are an advantage.

Steam Tempered (ST)
The steam tempered is a Fe_3O_4 oxide coating which reduces the friction between the tool and workpiece and prevents cold welding.

Nitriding (NI)
Recommended surface treatment for machining hard wear/abrasive materials such as grey cast iron, aluminum alloys with high silicon percentage (more than 10%).

TiN Coating (TI)
The TiN coating has a hardness of approximately 2,300 HV and is temperature resistant up to approximately 600°C. This is an excellent golden colored coating for general applications.

TiCN-COATING – TiCN
TiCN takes place of TiN when the conditions require the coating to have a different hardness and toughness. The TiCN brings an advantage to machining very difficult steels or cutting interrupted bores. The TiCN-coating has a hardness of approx. 3,000 HV, but is temperature resistant up to approx. 400°C only. That means TiCN needs excellent cooling for long service life. Color: Blue-grey coefficient of friction against steel : 0.4

TiAlN-COATING – TiAlN
This is a special coating for machining abrasive materials such as: grey cast iron, alu-alloys with silicon, fiber reinforced plastics, etc., or machining under high temperatures, which means with insufficient cooling, or high speeds ≥ 600m/min. TiAlN has a hardness of approx. 3,000 HV and is temperature resistant up to approx. 800°C. Color: Violet-grey coefficient of friction against steel : 0.4

Hardslick-COATING – Hardslick
Hardslick combines in a novel way the advantages of an extremely hard, thermally stable TiAlN-coating with the sliding and lubricating properties of an outer WC/C (Tungsten carbide/carbon) coating. The hardslick coating has a hardness of approx. 3,000 HV and is temperature-resistant up to approx. 800°C. Color: Violet-grey coefficient of friction against steel : 0.2

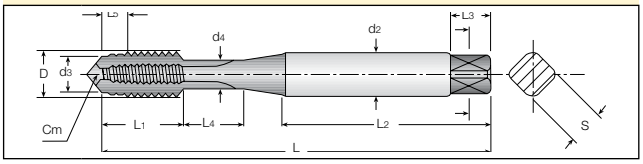
Tolerances According to DIN EN 22857
For taps with ISO metric threads.
The following chart gives a comparison between the new standard DIN EN 22857 and the withdrawn standard DIN 802 part 1. An important change is the re-classification from tap tolerance to tap application class.

Application Class for Taps to DIN EN 22857		Tolerance Class to Withdrawn Standard DIN 802 Part 1	Allotment of the Tolerance Zones of the Nut Thread to Be Cut				
class 1	ISO 1	4H	4H	5H	-	-	-
class 2	ISO 2	6H	5G	5G	6H	-	-
class 3	ISO 3	6G	-	-	6G	7H	8H
-	-	7G	-	-	-	7G	8G

A suitable transition period is to be expected.
Codes for tolerance classes 7G/8G and <X> tolerance zones have yet to be standardized within DIN EN 22857, and the values from DIN 802 part will remain valid.

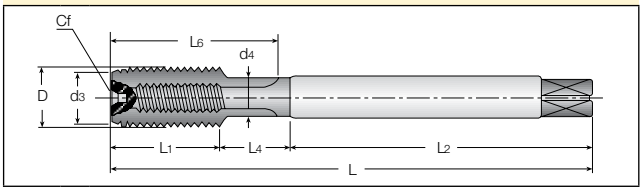
Tap Nomenclature and Standards

DIN 371



D - major diameter
d2 - shank diameter
d3 - chamfer diameter
d4 - neck diameter

DIN 376

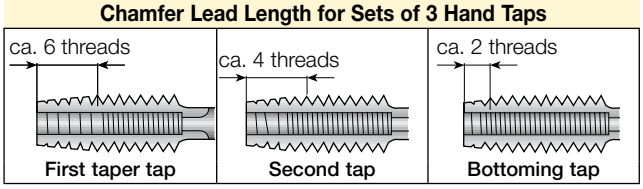


L - total length
L - total length
L1 - thread length
L2 - shank length
L3 - square length
L4 - neck length
L5 - chamfer length
L6 - flute length
S - square size
Cm - center male
Cf - center female

Chamfer Lead Forms According to DIN 2197

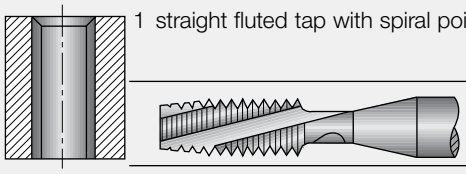
A	6-8 threads	**Form A** Long, 6-8 threads for short through holes.
B	3.5-5 threads	**Form B** Medium, 3.5-5 threads, with spiral point for all through holes and deep tapping holes.
C	2-3 threads	**Form C** Long, 2-3 threads for blind holes and generally for aluminum grey cast iron and brass.
D	3.5-5 threads	**Form D** Medium, 3.5-5 threads for through and blind holes with sufficient runout.
E	1.5-2 threads	**Form E** Extremely short, 1.5-2 threads for blind holes with little runout depth. Avoid use if possible.
F	1-1.5 threads	**Form F** Extremely short, 1-1.5 threads for blind holes with little runout depth. Avoid use if possible.

Chamfer Lead Length for Sets of 3 Hand Taps



Tap Styles for Hole Types

throughole

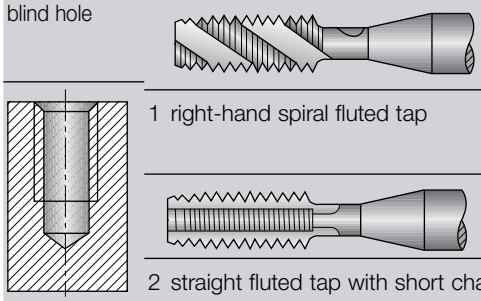


1 straight fluted tap with spiral point

2 left-hand spiral fluted tap

3 straight fluted tap with long chamfer lead

blind hole



1 right-hand spiral fluted tap

2 straight fluted tap with short chamfer lead

Front and End Configurations According to **DIN2197**

Front End	Shank End
1 External Center	4 External Center
2 Stepped External Center	5 Chamfer
3 Internal Center	6 Internal Center

Thread Dia. Range (mm)	Front End	Shank End	Tap Standard
≤Ø6	1	4 5	DIN352
Ø7	1 2	4 5 6	DIN371
≥Ø8	1 2 3	5 6	DIN376

Pre-Tapping Hole Sizes

ISO Metric Threads Coarse Pitch			
M	Pitch mm	Max Core Dia.mm	Drill Size mm
1	0.25	0.785	0.75
1.1	0.25	0.885	0.85
1.2	0.25	0.985	0.95
1.4	0.30	1.160	1.10
1.6	0.35	1.321	1.25
1.7	0.35	1.346	1.30
1.8	0.35	1.521	1.45
2	0.40	1.679	1.60
2.2	0.45	1.838	1.75
2.3	0.40	1.920	1.90
2.5	0.45	2.138	2.05
2.6	0.45	2.176	2.10
3	0.50	2.599	2.50
3.5	0.60	3.010	2.90
4	0.70	3.422	3.30
4,5	0.75	3.878	3.70
5	0.80	4.334	4.20
6	1.00	5.153	5.00
7	1.00	6.153	6.00
8	1.25	6.912	6.80
9	1,25	7.912	7.80
10	1.50	8.676	8.50
11	1.50	9.676	9.50
12	1.75	10.441	10.20
14	2.00	12.210	12.00
16	2.00	14.210	14.00
18	2.50	15.744	15.50
20	2.50	17.744	17.50
22	2.50	19.744	19.50
24	3.00	21.252	21.00
27	3.00	24.252	24.00
30	3.50	26.771	26.50
33	3.50	29.771	29.50
36	4.00	32.270	32.00
39	4.00	35.270	35.00
42	4.50	37.799	37.50
45	4.50	40.799	40.50
48	5.00	43.297	43.00
52	5.00	47.297	47.00
56	5.50	50.796	50.50
60	5.50	54.796	54.50
64	6.00	58.305	58.00
68	6.00	62.305	62.00

ISO Metric Threads Fine Pitch			
MF	Pitch mm	Max Core Dia.mm	Drill Size mm
2.5	0.35	2.221	2.15
3	0.35	2.271	2.65
3.5	0.35	3.221	3.15
4	0.50	3.599	3.50
4.5	0.50	4.099	4.00
5	0.50	4.599	4.50
5.5	0.50	5.099	5.00
6	0.75	5.378	5.20
7	0.75	6.378	6.20
8	0.75	7.378	7.20
8	1.00	7.153	7.00
9	0.75	8.378	8.20
9	1.00	8.153	8.00
10	0.75	9.378	9.20
10	1.00	9.153	9.00
10	1.25	8.912	8.80
11	0.75	10.378	10.20
11	1.00	10.153	10.00
12	1.00	11.153	11.00
12	1,25	10.912	10.80
12	1,50	10.676	10.50
14	1,00	13.153	13.00
14	1,25	12.912	12.80
14	1.50	12.676	12.50
15	1.00	14.153	14.00
15	1.50	13.676	13.50
16	1.00	15.153	15.00
16	1.50	14.676	14.50
17	1.00	16.153	16.00
17	1.50	15.676	15.50
18	1.00	17.153	17.00
18	1.50	16.676	16.50
18	2.00	16.210	16.00
20	1.00	19.153	19.00
20	1.50	18.676	18.50
20	2.00	18.210	18.00
22	1,00	21.153	21.00
22	1.50	20.676	20.50
22	2.00	20.210	20.00
24	1.00	23.153	23.00
24	1,50	22.676	22.50
24	2,00	22.210	22.00
25	1.00	24.153	24.00
25	1.50	23.676	23.50

ISO Metric Threads Fine Pitch			
MF	Pitch mm	Max Core Dia.mm	Drill Size mm
25	2.00	23.210	23.00
26	1.50	24.676	24.50
27	1.00	26.153	26.00
27	1.50	25.676	25.50
27	2.00	25.210	25.00
28	1.00	27.153	27.00
28	1.50	26.676	26.50
28	2.00	26.210	26.00
30	1.00	29.153	29.00
30	1.50	28.676	28.50
30	2.00	28.210	28.00
30	3.00	27.252	27.00
32	1.50	30.675	30.50
32	2.00	30.210	30.00
33	1.50	31.676	31.50
33	2.00	31.210	31.00
33	3.00	30.252	30.00
35	1.50	33.676	33.50
36	1.50	34.676	34.50
36	2.00	34.210	34.00
36	3.00	33.252	33.00
38	1.50	36.676	36.50
39	1.50	37.676	37.50
39	2.00	37.210	37.00
39	3.00	36.252	36.00
40	1,50	38.676	38.50
40	2.00	38.210	38.00
40	3,00	37.252	37.00
42	1,50	40.676	40.50
42	2,00	40.210	40.00
42	3,00	39.252	39.00
45	1.50	43.676	43.50
45	2.00	43.210	43.00
45	3.00	42.252	42.00
48	1.50	46.676	46.50
48	2.00	46.210	46.00
48	3.00	45.252	45.00
50	1.50	48.676	48.50
50	2.00	48.210	48.00
50	3.00	47.252	47.00
52	1.50	50.676	50.50
52	2.00	50.210	50.00
52	3.00	49.252	49.00

Pre-Tapping Hole Sizes - Forming Taps

Recommended Tap Drill Size		
M	Pitch mm	Drill Size mm
1	0.25	0.9
1.1	0.25	1
1.2	0.25	1.1
1.4	0.3	1.28
1.6	0.35	1.47
1.7	0.35	1.57
1.8	0.35	1.67
2	0.4	1.85
2.2	0.45	2.03
2.3	0.4	2.15
2.5	0.45	2.33
2.6	0.45	2.43
3	0.5	2.8
3.5	0.6	3.25
4	0.7	3.7
4.5	0.75	4.2
5	0.8	4.65
6	1	5.55
7	1	6.55
8	1.25	6.6
9	1.25	7.45
10	1.5	8.45
11	1.5	9.35
12	1.75	11.25
14	2	13.1
16	2	15.1
18	2.5	16.85
20	2.5	18.85
22	2.5	20.85
24	3	22.65
27	3	25.65
30	3.5	28.4
33	3.5	31.4
36	4	34.15
39	4	37.15
42	4.5	39.9
45	4.5	42.9
48	5	45.65

Recommended Tap Drill Size		
MF	Pitch mm	Drill Size mm
2.5	0.35	2.37
2.6	0.35	2.47
3	0.35	2.88
3.5	0.35	3.38
4	0.5	3.8
5	0.5	4.8
6	0.5	5.8
6	0.75	5.7
7	0.75	6.7
8	0.75	7.7
8	1	7.6
9	0.75	8.7
9	1	8.6
10	0.75	9.7
10	1	9.6
10	1.25	9.45
11	1	10.6
12	1	11.6
12	1.25	11.45
12	1.5	11.35
14	1	13.6
14	1.25	13.45
14	1.5	13.35
15	1	14.6
15	1.5	14.35
16	1	15.6
16	1.5	15.35
18	4	17.6
18	1.5	17.35
18	2	17.1
20	1	19.6
20	1.5	19.35
20	2	19.1
24	2	23.1
30	2	29.1
36	3	34.65
42	4	40.15
48	3	46.65

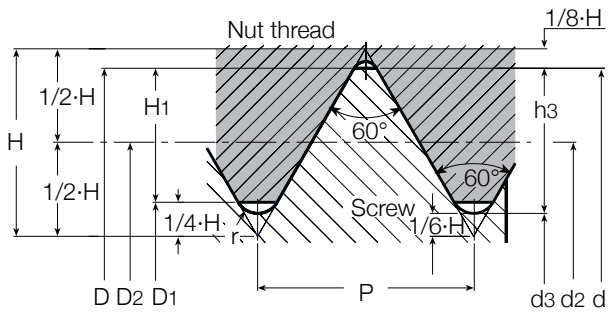
Pre-Tapping Hole Sizes - General Taps

American Unified Coarse Threads			
UNC	T.P.I	Max. Core Dia. Inch	Drill Size mm
#1	64	1.585	1.5
#2	56	1.872	1.8
#3	48	2.146	2.1
#4	40	2.385	2.3
#5	40	2.697	2.6
#6	32	2.896	2.85
#8	32	3.528	3.5
#10	24	3.95	3.9
#12	24	4.59	4.5
1/4"	20	5.25	5.2
5/16"	18	6.68	6.6
3/8"	16	8.082	8
7/16"	14	9.441	9.4
1/2"	13	10.881	10.75
9/16"	12	12.301	12.25
5/8"	11	13.693	13.5
3/4"	10	16.624	16.5
7/8"	9	19.52	19.5
1"	8	22.344	22.25
1*1/8"	7	25.082	25
1*1/4"	7	28.258	28.25
1*3/8"	6	30.851	30.75
1*1/2"	6	34.026	34
1*3/4"	5	39.56	39.5
2"	4.5	45.367	45.25

American Unified Fine Threads			
UNF	T.P.I	Max. Core Dia. Inch	Drill Size mm
#0	80	1.306	1.3
#1	72	1.613	1.6
#2	64	1.913	1.9
#3	56	2.197	2.1
#4	48	2.459	2.4
#5	44	2.741	2.7
#6	40	3.012	3
#8	36	3.597	3.5
#10	32	4.168	4.1
#12	28	4.717	4.7
1/4"	28	5.563	5.5
5/16"	24	6.995	6.9
3/8"	24	8.565	8.5
7/16"	20	9.947	9.9
1/2"	20	11.524	11.5
9/16"	18	12.969	12.9
5/8"	18	14.554	14.5
3/4"	16	17.546	17.5
7/8"	14	20.493	20.5
1"	12	23.363	23.25
1*1/8"	12	26.538	26.5
1*1/4"	12	29.713	29.5
1*3/8"	12	32.888	32.7
1*1/2"	12	36.063	36

ISO Metric Thread
Nominal Dimensions According to UNI 4535-64

tap flank diameter production tolerances for iso 6h nut threads limit dimensions - nut threads iso 6h



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

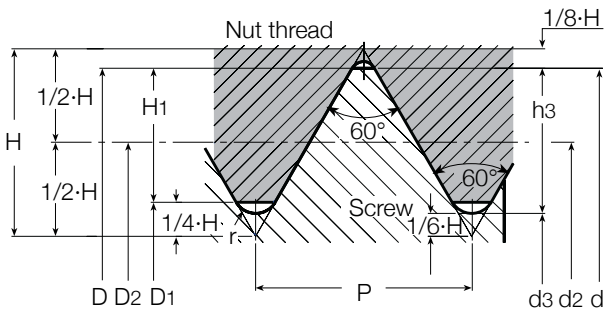
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. D2=d2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H D2		Flank Dia. Tap Tolerance 6H	
			Screw D3	Nut D1	Screw H3	Nut H1		Min.	Max.	Min.	Max.
M1.6	0.35	1.373	1.171	1.221	0.215	0.189	0.051	1.393	1.407	1.373	1.458
M1.8	0.35	1.573	1.371	1.421	0.215	0.189	0.051	1.593	1.607	1.573	1.658
M2	0.4	1.740	1.509	1.567	0.245	0.217	0.058	1.761	1.776	1.740	1.830
M2.2	0.45	1.908	1.648	1.713	0.276	0.244	0.065	1.931	1.946	1.908	2.003
M2.5	0.45	2.208	1.948	2.013	0.276	0.244	0.065	2.231	2.246	2.208	2.303
M3	0.5	2.675	2.387	2.459	0.307	0.271	0.072	2.699	2.715	2.675	2.775
M3.5	0.6	3.110	2.764	2.850	0.368	0.325	0.087	3.137	3.155	3.110	3.222
M4	0.7	3.545	3.141	3.242	0.429	0.379	0.101	3.574	3.593	3.545	3.663
M4.5	0.75	4.013	3.580	3.688	0.460	0.406	0.108	4.042	4.061	4.013	4.131
M5	0.8	4.480	4.019	4.134	0.491	0.433	0.115	4.510	4.530	4.480	4.605
M6	1	5.350	4.773	4.917	0.613	0.541	0.144	5.385	5.409	5.350	5.500
M7	1	6.350	5.773	5.917	0.613	0.541	0.144	6.385	6.409	6.350	6.500
M8	1.25	7.188	6.466	6.647	0.767	0.677	0.180	7.226	7.251	7.188	7.348
M9	1.25	8.188	7.466	7.647	0.767	0.677	0.180	8.226	8.251	8.188	8.348
M10	1.5	9.026	8.160	8.376	0.920	0.812	0.217	9.068	9.096	9.026	9.206
M11	1.5	10.026	9.160	9.376	0.920	0.812	0.217	10.068	10.096	10.026	10.206
M12	1.75	10.863	9.853	10.106	1.074	0.947	0.253	10.911	10.943	10.863	11.063
M14	2	12.701	11.546	11.835	1.227	1.083	0.289	12.752	12.786	12.701	12.913
M16	2	14.701	13.546	13.835	1.227	1.083	0.289	14.752	14.786	14.701	14.913
M18	2.5	16.376	14.933	15.294	1.534	1.353	0.361	16.430	16.466	16.376	16.600
M20	2.5	18.376	16.933	17.294	1.534	1.353	0.361	18.430	18.466	18.376	18.600
M22	2.5	20.376	18.933	19.294	1.534	1.353	0.361	20.430	20.466	20.376	20.600
M24	3	22.051	20.319	20.752	1.840	1.624	0.433	22.115	22.157	22.051	22.316
M27	3	25.051	23.319	23.752	1.840	1.624	0.433	25.115	25.157	25.051	25.316
M30	3.5	27.727	25.706	26.211	2.147	1.894	0.505	27.794	27.839	27.727	28.007
M33	3.5	30.727	28.706	29.211	2.147	1.894	0.505	30.794	30.839	30.727	31.007
M36	4	33.402	31.093	31.670	2.454	2.165	0.577	33.473	33.520	33.402	33.702
M39	4	36.402	34.093	34.670	2.454	2.165	0.577	36.473	36.520	36.402	36.702
M42	4.5	39.077	36.479	37.129	2.760	2.436	0.650	39.152	39.202	39.077	39.392
M45	4.5	42.077	39.479	40.129	2.760	2.436	0.650	42.152	42.202	42.077	42.392
M48	5	44.752	41.866	42.587	3.067	2.706	0.722	44.832	44.885	44.752	45.087
M52	5	48.752	45.866	46.587	3.067	2.706	0.722	48.832	48.885	48.752	49.087
M56	5.5	52.428	49.252	50.046	3.374	2.977	0.794	52.512	52.568	52.428	52.783
M60	5.5	56.428	53.252	54.046	3.374	2.977	0.794	56.512	56.568	56.428	56.783
M64	6	60.103	56.639	57.505	3.681	3.248	0.866	60.193	60.253	60.103	60.478
M68	6	64.103	60.639	61.505	3.681	3.248	0.866	64.193	64.253	64.103	64.478
Metric Thread MA (Old UNI 159 Profile)								**Nut Tolerance SH8**			
M1.7	0.35	1.473	1.246	1.246	0.227	0.227	0.040	1.493	1,507	1.473	1.529
M2.3	0.4	2.040	1.780	1.780	0.260	0.260	0.040	2.061	2.076	2.040	2.120
M2.6	0.45	2.308	2.016	2.016	0.292	0.292	0.050	2.331	2.346	2.308	2.388

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

tap flank diameter production tolerances for iso 6h nut threads limit dimensions - nut threads iso 6h



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

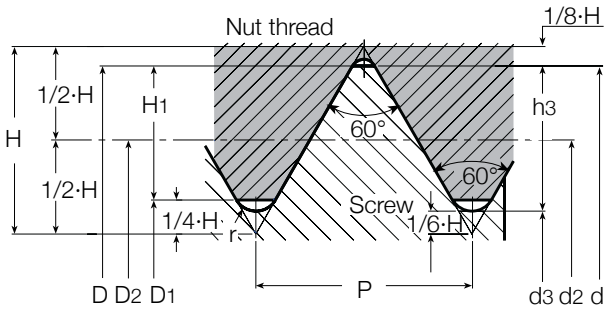
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. D2=d2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H D2		Flank Dia. Tap Tolerance 6H	
			Screw D3	Nut D1	Screw H3	Nut H1		Min.	Max.	Min.	Max.
M 2	0.25	1.838	1.693	1.729	0.153	0.135	0.036	1.844	1.856	1.838	1.886
M 2.5	0.35	2.273	2.701	2.121	0.215	0.189	0.051	2.293	2.307	2.273	2.358
M 3	0.35	2.773	2.571	2.621	0.215	0.189	0.051	2.794	2.809	2.773	2.863
M 3.5	0.35	3.273	3.071	3.121	0.215	0.189	0.051	3.294	3.309	3.273	3.363
M 4	0.5	3.675	3.387	3.459	0.307	0.271	0.072	3.699	3.715	3.675	3.775
M 4.5	0.5	4.175	3.887	3.959	0.307	0.271	0.072	4.199	4.215	4.175	4.275
M 5	0.5	4.675	4.387	4.459	0.307	0.271	0.072	4.699	4.715	4.675	4.775
M 5.5	0.5	5.175	4.887	4.959	0.307	0.271	0.072	5.199	5.215	5.175	5.275
M 6	0.5	5.675	5.387	5.459	0.307	0.271	0.072	5.702	5.72	5.675	5.787
M 6	0.75	5.513	5.08	5.188	0.46	0.406	0.108	5.545	5.566	5.513	5.645
M 7	0.75	6.513	6.08	6.188	0.46	0.406	0.108	6.545	6.566	6.513	6.645
M 8	0.5	7.675	7.387	7.459	0.307	0.271	0.072	7.702	7.72	7.675	7.787
M 8	0.75	7.513	7.08	7.188	0.46	0.406	0.108	7.545	7.566	7.513	7.645
M 8	1	7.35	6.773	6.917	0.613	0.541	0.144	7.835	7.409	7.35	7.5
M 9	0.75	8.513	8.08	8.188	0.46	0.406	0.108	8.545	8.566	8.513	8.645
M 9	1	8.35	7.773	7.917	0.613	0.541	0.144	8.385	8.409	8.35	8.5
M 10	0.5	9.675	9.387	9.459	0.307	0.271	0.072	9.702	9.72	9.675	9.787
M 10	0.75	9.513	9.08	9.188	0.46	0.406	0.108	9.545	9.566	9.513	9.645
M 10	1	9.35	8.773	8.917	0.613	0.541	0.144	9.385	9.409	9.35	9.5
M 10	1.25	9.188	8.466	8.647	0.767	0.677	0.18	9.226	9.251	9.188	9.348
M 11	0.75	10.513	10.08	10.188	0.46	0.406	0.108	10.545	10.566	10.513	10.645
M 11	1	10.35	9.773	9.917	0.613	0.541	0.144	10.385	10.409	10.35	10.5
M 12	0.75	11.513	11.08	11.188	0.46	0.406	0.108	11.547	11.569	11.513	11.653
M 12	1	11.35	10.773	10.917	0.613	0.541	0.144	11.388	11.413	11.35	11.51
M 12	1.25	11.188	10.466	10.647	0.767	0.677	0.18	11.23	11.258	11.188	11.368
M 12	1.5	11.026	10.16	10.376	0.92	0.812	0.217	11.071	11.101	11.026	11.216
M 13	1	12.35	11.773	11.917	0.613	0.541	0.144	12.388	12.413	12.35	12.51
M 14	1	13.35	12.773	12.917	0.613	0.541	0.144	13.388	13.413	13.35	13.51
M 14	1.25	13.188	12.466	12.647	0.767	0.677	0.18	13.23	13.258	13.188	13.368
M 14	1.5	13.026	12.16	12.376	0.92	0.812	0.217	13.071	13.101	13.026	13.216
M 15	1	14.35	13.773	13.917	0.613	0.541	0.144	14.388	14.413	14.35	14.51
M 15	1.5	14.026	13.16	13.376	0.92	0.812	0.217	14.071	14.101	14.026	14.216
M 16	1	15.35	14.773	14.917	0.613	0.541	0.144	15.388	15.413	15.35	15.51
M 16	1.25	15.188	14.466	14.647	0.767	0.677	0.18	15.23	15.258	15.188	15.368
M 16	1.5	15.026	14.16	14.376	0.92	0.812	0.217	15.071	15.101	15.026	15.216
M 17	1	16.35	15.773	15.917	0.613	0.541	0.144	16.388	16.413	16.35	16.51
M 17	1.5	16.026	15.16	15.376	0.92	0.812	0.217	16.071	16.101	16.026	16.216
M 18	1	17.350	16.773	16.917	0.613	0.541	0.144	17.388	17.413	17.35	17.51
M 18	1.5	17.026	16.16	16.376	0.92	0.812	0.217	17.071	17.101	17.026	17.216
M 18	2	16.701	15.546	15.835	1.227	1.083	0.289	16.752	16.786	16.701	16.913

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

tap flank diameter production tolerances for iso 6h nut threads limit dimensions - nut threads iso 6h



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

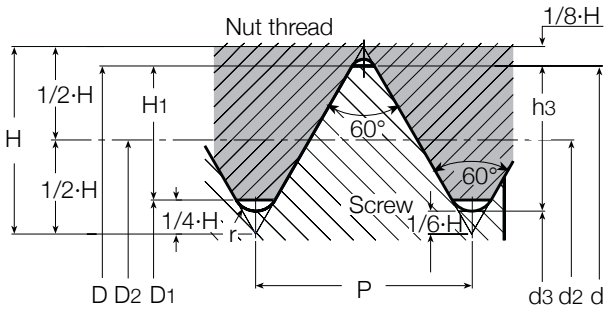
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. D2=D2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H D2		Flank Dia. Tap Tolerance 6H	
			Screw D3	Nut D1	Screw H3	Nut H1		Min.	Max.	Min.	Max.
M 20	1	19.35	18.773	18.917	0.613	0.541	0.144	19.388	19.413	19.35	19.51
M 20	1.5	19.026	18.16	18.376	0.92	0.812	0.217	19.071	19.101	19.026	19.216
M 20	2	18.701	17.546	17.835	1.227	1.083	0.289	18.752	18.786	18.701	18.913
M 22	1	21.35	20.773	20.917	0.613	0.541	0.144	21.388	21.413	21.35	21.51
M 22	1.5	21.026	20.16	20.376	0.92	0.812	0.217	21.071	21.101	21.026	21.216
M 22	2	20.701	19.546	19.835	1.227	1.083	0.289	20.752	20.786	20.701	20.913
M 24	1	23.350	22.773	22.917	0.613	0.541	0.144	23.390	23.416	23.350	23.520
M 24	1.5	23.026	22.160	22.376	0.920	0.812	0.217	23.074	23.106	23.026	23.226
M 24	2	22.701	21.546	21.835	1.227	1.083	0.289	22.754	22.791	22.701	22.925
M 25	1	24.350	23.773	23.917	0.613	0.541	0.144	24.390	24.416	24.350	24.520
M 25	1.5	24.026	23.160	23.376	0.920	0.812	0.217	24.074	24.106	24.026	24.226
M 25	2	23.701	22.546	22.835	1.227	1.083	0.289	23.754	23.791	23.701	23.925
M 26	1	25.350	24.773	24.917	0.613	0.541	0.144	25.390	25.416	25.350	25.520
M 26	1.5	25.026	24.160	24.376	0.920	0.812	0.217	25.074	25.106	25.026	25.226
M 26	2	24.701	23.546	23.835	1.227	1.083	0.289	24.754	24.791	24.701	24.925
M 27	1	26.350	25.773	25.917	0.613	0.541	0.144	26.390	26.416	26.350	26.520
M 27	1.5	26.026	25.160	25.376	0.920	0.812	0.217	26.074	26.106	26.026	26.226
M 27	2	25.701	24.546	24.835	1.227	1.083	0.289	25.754	25.791	25.701	25.925
M 28	1	27.350	26.773	26.917	0.613	0.541	0.144	27.390	27.416	27.350	27.520
M 28	1.5	27.026	26.160	26.376	0.920	0.812	0.217	27.074	27.106	27.026	27.226
M 28	2	26.701	25.546	25.835	1.227	1.083	0.289	26.754	26.791	26.701	26.925
M 30	1	29.350	28.773	28.917	0.613	0.541	0.144	29.390	29.416	29.350	29.520
M 30	1.5	29.026	28.160	28.376	0.920	0.812	0.217	29.074	29.106	29.026	29.226
M 30	2	28.701	27.546	27.835	1.227	1.083	0.289	28.754	28.791	28.701	28.925
M 30	3	28.051	26.319	26.752	1.840	1.624	0.433	28.115	28.157	28.051	28.316
M 32	1.5	31.026	30.160	30.376	0.920	0.812	0.217	31.074	31.106	31.026	31.226
M 32	2	30.701	29.546	29.835	1.227	1.083	0.289	30.754	30.791	30.701	30.925
M 33	1.5	32.026	31.160	31.376	0.920	0.812	0.217	32.074	32.106	32.026	32.226
M 33	2	31.701	30.546	30.835	1.227	1.083	0.289	31.754	31.791	31.701	31.925
M 33	3	31.051	29.319	29.752	1.840	1.624	0.433	31.115	31.157	31.051	31.316
M 35	1.5	34.026	33.160	33.376	0.920	0.812	0.217	34.074	34.106	34.026	34.226
M 35	2	33.701	32.546	32.835	1.227	1.083	0.289	33.754	33.791	33.701	33.925
M 36	1.5	35.026	34.160	34.376	0.920	0.812	0.217	35.074	35.106	35.026	35.226
M 36	2	34.701	33.546	33.835	1.227	1.083	0.289	34.754	34.791	34.701	34.925
M 36	3	34.051	32.319	32.752	1.840	1.624	0.433	34.115	34.157	34.051	34.316
M 38	1.5	37.026	36.160	36.376	0.920	0.812	0.217	37.074	37.106	37.026	37.226
M 39	1.5	38.026	37.160	37.376	0.920	0.812	0.217	38.074	38.106	38.026	38.226
M 39	2	37.701	36.546	36.835	1.227	1.083	0.289	37.754	37.791	37.701	37.925
M 39	3	37.051	35.319	35.752	1.840	1.624	0.433	37.115	37.157	37.051	37.316
M 40	1.5	39.026	38.160	38.376	0.920	0.812	0.217	39.074	39.106	39.026	39.226

ISO Metric Fine Thread
Nominal Dimensions According to UNI 4535-64

tap flank diameter production tolerances for iso 6h nut threads limit dimensions - nut threads iso 6h



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

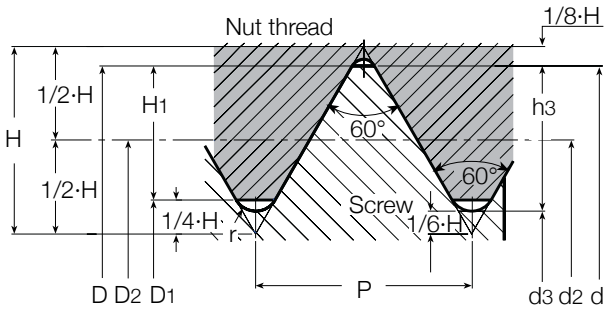
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal Dia. d=D	Pitch P	Flank Dia. D2=d2	Minor Diameter		Thread Depth		Radius r	Flank Dia. Tap Tolerance 6H D2		Flank Dia. Tap Tolerance 6H	
			Screw D3	Nut D1	Screw H3	Nut H1		Min.	Max.	Min.	Max.
M 40	2	38.701	37.546	37.835	1.227	1.083	0.289	38.754	38.791	38.701	38.925
M 40	3	38.051	36.319	36.752	1.840	1.624	0.433	38.115	38.157	38.051	38.316
M 42	1.5	41.026	40.160	40.376	0.920	0.812	0.217	41.074	41.106	41.026	41.226
M 42	2	40.701	39.546	39.835	1.227	1.083	0.289	40.754	40.791	40.701	40.925
M 42	3	40.051	38.319	38.752	1.840	1.624	0.433	40.115	40.157	40.051	40.316
M 45	1.5	44.026	43.160	43.376	0.920	0.812	0.217	44.074	44.106	44.026	44.226
M 45	2	43.701	42.546	42.835	1.227	1.083	0.289	43.754	43.791	43.701	43.925
M 45	3	43.051	41.319	41.752	1.840	1.624	0.433	43.115	43.157	43.051	43.316
M 48	1.5	47.026	46.160	46.376	0.920	0.812	0.217	47.077	47.111	47.026	47.238
M 48	2	46.701	45.546	45.835	1.227	1.083	0.289	46.758	46.796	46.701	46.937
M 48	3	46.051	44.319	44.752	1.840	1.624	0.433	46.118	46.163	46.051	46.331
M 50	1.5	49.026	48.160	48.376	0.920	0.812	0.217	49.077	49.111	49.026	49.238
M 50	2	48.701	47.546	47.835	1.227	1.083	0.289	48.758	48.796	48.701	48.937
M 50	3	48.051	46.319	46.752	1.840	1.624	0.433	48.118	48.163	48.051	48.331
M 52	1.5	51.026	50.160	50.376	0.920	0.812	0.217	51.077	51.111	51.026	51.238
M 52	2	50.701	49.546	49.835	1.227	1.083	0.289	50.758	50.796	50.701	50.937
M 52	3	50.051	48.319	48.752	1.840	1.624	0.433	50.118	50.163	50.051	50.331
M 55	1.5	54.026	53.160	53.376	0.920	0.812	0.217	54.077	54.111	54.026	54.238
M 55	2	53.701	52.546	52.835	1.227	1.083	0.289	53.758	53.796	53.701	53.937
M 55	3	53.051	51.319	51.752	1.840	1.624	0.433	53.118	53.163	53.051	53.331
M 56	1.5	55.026	54.160	54.376	0.920	0.812	0.217	55.077	55.111	55.026	55.238
M 56	2	54.701	53.546	53.835	1.227	1.083	0.289	54.758	54.796	54.701	54.937
M 56	3	54.051	52.319	52.752	1.840	1.624	0.433	54.118	54.163	54.051	54.331
M 58	1.5	57.026	56.160	56.376	0.920	0.812	0.217	57.077	57.111	57.026	57.238
M 58	2	56.701	55.546	55.835	1.227	1.083	0.289	56.758	56.796	56.701	56.937
M 58	3	56.051	54.319	54.752	1.840	1.624	0.433	56.118	56.163	56.051	56.331
M 60	1.5	59.026	58.160	58.376	0.920	0.812	0.217	59.077	59.111	59.026	59.238
M 60	2	58.701	57.546	57.835	1.227	1.083	0.289	58.758	58.796	58.701	58.937
M 60	3	58.051	56.319	56.752	1.840	1.624	0.433	58.118	58.163	58.051	58.331
Metric Thread MA (Old UNI 160 Profile)								**Nut Tolerance SH8**			
M 2,3	0.25	2.138	1.976	1.976	0.162	0.162	0.03	2.144	2.156	2.138	2.194
M 2,6	0.35	2.373	2.146	2.146	0.227	0.227	0.04	2.393	2.407	2.373	2.429

UNIFIED Coarse Thread
Nominal Dimensions According to ANSI B1.1

tap flank diameter production tolerances for iso 2b
nut threads limit dimensions - nut threads ansi b1.1, 2b-3b



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

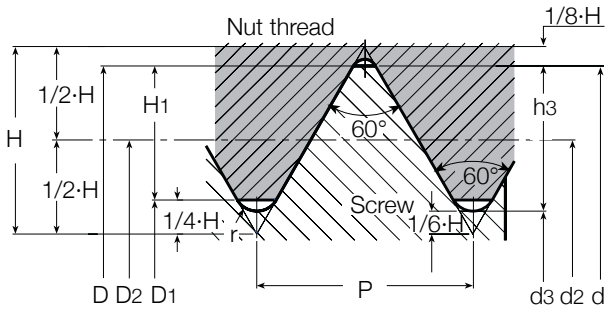
$d_3 = d - 2h_3 = d - 1.22687P$

$r = \frac{H}{6} = 0.14434P$

Nominal T.P.I Dia.		Pitch P	External Dia. d=D	Flank Dia. D2=D2	Minor Diameter		Pitch Diameter Tap Tolerance 2B		Pitch Diameter Nut Tolerance		
					Nut D1	Screw H3	Min.	Max.	Max. 2B/3B	Max. 2B	Max. 3B
UNC#1	64	0.397	1.854	1.598	1.425	1.367	1.610	1.623	1.598	1.664	1.646
UNC# 2	64	0.454	2.184	1.890	1.694	1.628	1.902	1.915	1.890	1.961	1.943
UNC#3	48	0.529	2.515	2.172	1.941	1.864	2.184	2.197	2.172	2.248	2.228
UNC# 4	40	0.635	2.845	2.433	2.156	2.065	2.446	2.459	2.433	2.517	2.494
UNC# 5	40	0.635	3.175	2.764	2.487	2.395	2.776	2.789	2.764	2.847	2.827
UNC# 6	32	0.794	3.505	2.990	2.647	2.532	3.105	3.028	2.990	3.084	3.058
UNC# 8	32	0.794	4.166	3.650	3.307	3.193	3.675	3.688	3.650	3.746	3.721
UNC# 10	24	1.058	4.826	4.138	3.680	3.528	4.163	4.176	4.138	4.247	4.219
UNC# 12	24	1.058	5.486	4.798	4.341	4.188	4.823	4.836	4.798	4.910	4.882
UNC 1/4"	20	1.270	6.350	5.524	4.976	4.793	5.575	5.588	5.524	5.646	5.616
UNC 5/16"	18	1.411	7.938	7.021	6.411	6.205	7.071	7.084	7.021	7.155	7.120
UNC 3/8"	16	1.588	9.525	8.494	7.805	7.577	8.545	8.557	8.494	8.639	8.603
UNC 7/16"	14	1.814	11.112	9.934	9.149	8.887	9.985	9.997	9.934	10.089	10.051
UNC 1/2"	13	1.954	12.700	11.430	10.584	10.302	11.481	11.494	11.430	11.595	11.552
UNC 9/16"	12	2.117	14.288	12.913	11.996	11.692	12.964	12.977	12.913	13.086	13.043
UNC 5/8"	11	2.309	15.875	14.376	13.376	13.043	14.427	14.440	14.376	14.559	14.514
UNC 3/4"	10	2.540	19.050	17.399	16.229	15.933	17.450	17.463	17.399	17.595	17.544
UNC 7/8"	9	2.822	22.225	20.391	19.169	18.763	20.455	20.467	20.391	20.599	20.546
UNC 1"	8	3.175	25.400	23.338	21.963	21.504	23.401	23.414	23.338	23.561	23.505
UNC 1 1/8"	7	3.629	28.575	26.218	24.648	24.122	26.294	26.319	26.218	26.457	26.398
UNC 1 1/4"	7	3.629	31.750	29.393	27.823	27.297	29.469	29.494	29.393	29.637	29.576
UNC 1 3/8"	6	4.233	34.925	32.174	30.343	29.731	32.250	32.276	32.174	32.438	32.372
UNC 1 1/2"	6	4.233	38.100	35.349	33.518	32.906	35.425	35.451	35.349	35.616	35.550
UNC 1 3/4"	5	5.080	44.450	41.151	38.951	38.217	41.241	41.266	41.151	41.445	41.372
UNC 2"	4 1/2	5.644	50.800	47.135	44.689	43.876	47.235	47.260	47.135	47.450	47.371
UNC 2 1/4"	4 1/2	5.644	57.150	53.485	51.039	50.226			53.485	53.805	53.726
UNC 2 1/2"	4	6.350	63.500	59.375	56.627	55.710			59.375	59.718	59.632
UNC 2 3/4"	4	6.350	69.850	65.725	62.977	62.060			65.725	66.073	65.987
UNC 3"	4	6.350	76.200	72.075	69.327	68.410			72.075	72.428	72.339
UNC 3 1/4"	4	6.350	82.550	78.425	75.677	74.760			78.425	78.783	78.694
UNC 3 1/2"	4	6.350	88.900	84.775	82.027	81.110			84.775	85.183	85.049
UNC 3 3/4"	4	6.350	95.250	91.125	88.377	87.460			91.125	91.493	91.402
UNC 4"	4	6.350	101.600	97.475	94.727	93.810			97.475	97.848	97.757

UNIFIED Fine Thread
Nominal Dimensions According to ANSI B1.1

tap flank diameter production tolerances for iso 2b
nut threads limit dimensions - nut threads ansi b1.1, 2b-3b



coarse pitch threads dimensions in mm

$H = 0.86603P$

$H_1 = \frac{5}{8} H = 0.54127P$

$h_3 = \frac{17}{24} H = 0.61343P$

$d_2 = D_2 = d - \frac{3}{4} H = d - 0.64952P$

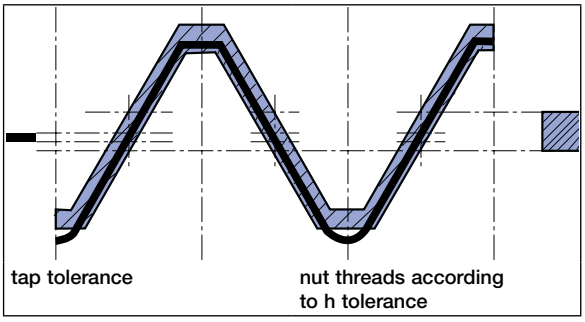
$d_3 = d - 2h_3 = d - 1.22687P$

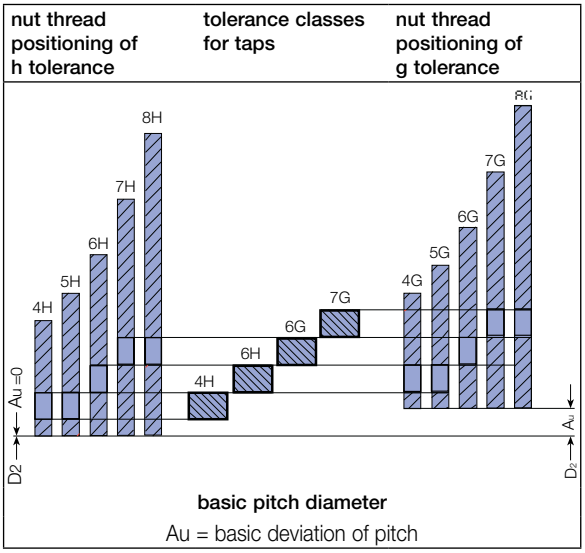
$r = \frac{H}{6} = 0.14434P$

Nominal T.P.I Dia.		Pitch P	External Dia. d=D	Flank Dia. D2=D2	Minor Diameter		Pitch Diameter Tap Tolerance 2B		Pitch Diameter Nut Tolerance		
					Nut D1	Screw H3	Min.	Max.	Max. 2B/3B	Max. 2B	Max. 3B
UNF#0	80	0.318	1.524	1.318	1.181	1.135	1.331	1.344	1.318	1.377	1.361
UNF#1	72	0.353	1.854	1.626	1.473	1.422	1.638	1.651	1.626	1.689	1.674
UNF#2	64	0.397	2.184	1.928	1.755	1.697	1.941	1.953	1.928	1.996	1.979
UNF#3	56	0.454	2.515	2.220	2.024	1.958	2.233	2.245	2.220	2.291	2.273
UNF#4	48	0.529	2.845	2.502	2.271	2.195	2.515	2.527	2.502	2.581	2.560
UNF#5	44	0.577	3.175	2.799	2.550	2.466	2.812	2.824	2.799	2.880	2.860
UNF#6	40	0.635	3.505	3.094	2.817	2.725	3.108	3.119	3.094	3.180	3.157
UNF#8	36	0.706	4.166	3.708	3.401	3.299	3.721	3.734	3.708	3.800	3.777
UNF#10	32	0.794	4.826	4.310	3.967	3.853	4.336	4.348	4.310	4.409	4.384
UNF#12	28	0.907	5.486	4.897	4.503	4.374	4.923	4.935	4.897	5.004	4.976
UNF 1/4"	28	0.907	6.350	5.761	5.367	5.237	5.799	5.812	5.761	5.870	5.842
UNF 5/16"	24	1.058	7.938	7.249	6.792	6.640	7.287	7.300	7.249	7.371	7.341
UNF 3/8"	24	1.058	9.525	8.837	8.379	8.227	8.875	8.887	8.837	8.961	8.931
UNF 7/16"	20	1.270	11.112	10.287	9.738	9.555	10.338	10.351	10.287	10.424	10.391
UNF 1/2"	20	1.270	12.700	11.874	11.326	11.143	11.925	11.938	11.874	12.017	11.981
UNF 9/16"	18	1.411	14.288	13.371	12.761	12.555	13.421	13.434	13.371	13.520	13.482
UNF 5/8"	18	1.411	15.875	14.958	14.348	14.143	15.009	15.022	14.958	15.110	15.072
UNF 3/4"	16	1.588	19.050	18.019	17.330	17.102	18.070	18.082	18.019	18.184	18.143
UNF 7/8"	14	1.814	22.225	21.046	20.262	20.000	21.110	21.123	21.046	21.224	21.181
UNF 1"	12	2.117	25.400	24.026	23.109	22.804	24.089	24.102	24.026	24.219	24.171
UNF 1*1/8"	12	2.117	28.575	27.201	26.284	25.979	27.252	27.277	27.201	27.339	27.351
UNF 1*1/4"	12	2.117	31.750	30.376	29.459	29.154	30.427	30.452	30.376	30.579	30.528
UNF 1*3/8"	12	2.117	34.925	33.551	32.634	32.329	33.602	33.627	33.551	33.759	33.706
UNF 1*1/2"	12	2.117	38.100	36.726	35.809	35.504	36.777	36.802	36.726	36.937	36.886

Tap Tolerances

Tolerance classes of taps and tolerance positions for screw threads as per ISO metric standard.





For Optimum Tapping Conditions, Reduced Machining Times and Increased Tap Life

Selection of the Most Suitable Tap

As a general rule, materials with deformation capability of at least 10% can be cold-formed. To decide on the most suitable tap, please refer to the tap recommendation table on page 57.

Pre-Tapping Holes

Check that the holes are within the prescribed size range depending on the application (see table on page 67) The holes should be clean and swarf-free.

Lubrication

Frequently the lubricant content of the coolant used for general machining is too low for tapping.

- If it is not possible to increase the lubricant content, following are some possible solutions:
- A separate lubricating unit can be connected to the machine control to deliver the required quantity of concentrated emulsion into the core hole or onto the tap.Tapping in separate operations allows the use of the ideal tapping lubricant.

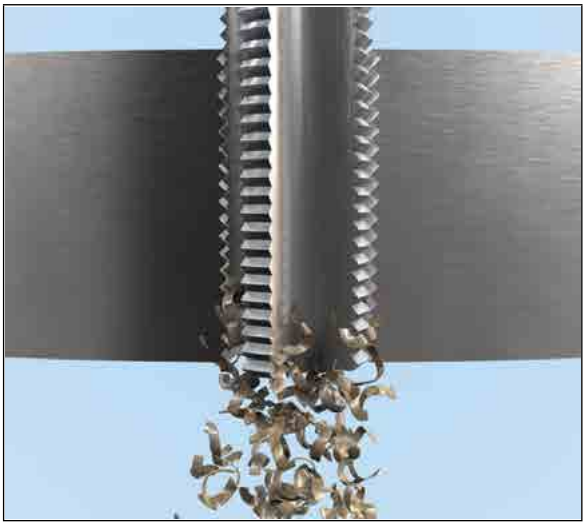
Tapping Speeds

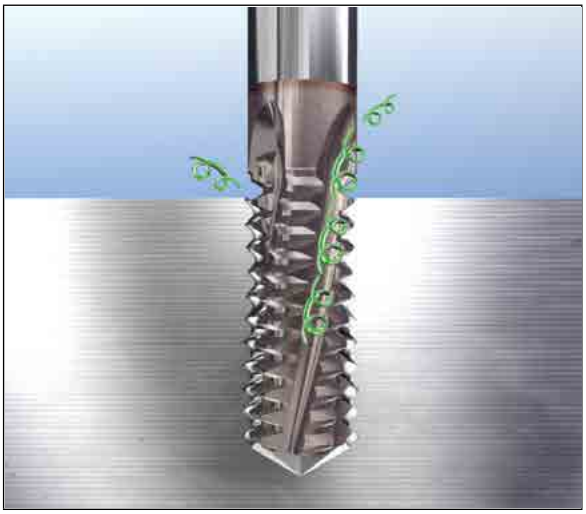
The tapping speed has a great influence on chip flow and the life of the tap. It is worthwhile to establish the ideal speed by tapping trials. For recommended initial values, see table on page 57. In addition, the following should be taken into consideration: characteristics of the material, machine and clamping method.

Effects of Unsuitable Tapping Speed

- forced tapping
- tap lead chipping caused by overloaded cutting tooth
- torn threads
- unsatisfactory tap life
- rejected threads

Chip Explusion
Tap selection is also influenced by the type of hole being threaded. Through hole tapping usually requires a tap that pushes the chips out in front of the cutting edge and through the other end of the hole. A bottom hole tap must pull chips up and out of the hole.





Tap Jamming
Some possible causes of tap jamming are:

- unsuitable tap
- tap with incorrect cutting geometry
- unsuitable coolant for material
- insufficient coolant
- axial pressure (pull or push) on the tap
- core hole too small
- breaks in walls of core hole
- speed too high or too low
- swarf trapped in the hole
- incorrect alignment of tap and core hole
- tap eccentricity

Results of Tap Jamming

- torn threads
- short tap life
- rejected threads
- tap breakage
- scrap workpieces

Tap Mounting
The tap must be mounted on the axis of the core hole. On non-synchronized machines (feed/speed) we recommend using a tapping spindle. (**ISCAR GTI**, **GTIN** collets, see pages 78-79)

Tapping Heads
As a rule, with non-synchronized machine spindles (feed/ speed), the feed rate should be programmed approximately 5-10% lower than the thread pitch. In these cases, a tapping chuck must be used which will compensate the difference between the feed rate and the thread pitch. It is important that the tension spring in the axial compensation is set to a minimum pressure to avoid axially loading the tap. The compression spring should be tensioned so the tap starts to cut by compressing the spring up to one-half pitch.

Important
Verify that the correct speed has been selected. Ensure that ample lubricating coolant is being used. Machine and equipment stability are essential for optimal performance and results.

Forming Taps
Forming taps (roll forming or cold forming) produce threads by deforming the material near the hole walls rather than by cutting the material. This method often works well in ductile materials. However, in brittle materials it often results in unsatisfactory threads.

Torque requirements for forming taps are considerably higher than for cutting taps. When forming taps are used, chuck capacity must be decreased by 25%. Forming taps do not produce chips.

Troubleshooting

Problem	Cause	Solution
Tapped Hole Oversized	incorrect tap (cutting geometry unsuitable for application)	use tap selected from the relevant material group
	faulty alignment	ensure that the tap is correctly aligned with the core hole axis
	tap jamming	improve lubrication and direction of coolant adjust cutting speed
	incorrectly reground tap (lead tip is not concentric)	regrind tap
Stripped Threads	incorrect tap (cutting geometry incorrect for application)	use a tap from the relevant material group
	spindle speed and feed rate are not synchronized	Check feed rate programming and/or pitch of leading spindle. Use a tapping spindle with axial float (**GTI**/**GTIN**)
	insufficient starting pressure exerted on tap (causes peeling)	Increase starting pressure
Bell Mouthed Tapped Hole	incorrect starting pressure	use a tapping spindle with axial float (**GTI**/**GTIN**)
Unsatisfactory Thread Surface Finish	incorrect tap (cutting geometry unsuitable for application)	select tap for the relevant material group
	the tap is blunt	replace or regrind tap
	tap badly re-ground	regrind tap. check that cutting geometry is suitable for material
	incorrect lubricant, concentration or quantity	ensure the use of a suitable coolant and an ample supply
Partial Tap Chipping	swarf jamming	check cutting speed. use alternative tap
	tap has jammed against bottom of pre-hole	check hole and thread depths. drill a deeper pre-hole
	tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	ensure that correct dimensions are maintained when regrinding
	irregular workpiece material structure	adjust cutting speed. improve lubricant quality of coolant
Partial Tap Chipping	swarf jamming	check cutting speed. use alternative tap
	tap has jammed against bottom of pre-hole	check hole and thread depths. drill a deeper pre-hole
	tap incorrectly reground (lead-in diameter too short, therefore too few cutting teeth)	ensure that correct dimensions are maintained when regrinding
	irregular workpiece material structure	adjust cutting speed. improve lubricant quality of coolant
Excessive Tap Wear	incorrect cutting speed	adjust cutting speed to suit workpiece material
	coolant lacking in lubricating qualities and/or quantity	ensure the use of a suitable coolant and an ample supply. check that the coolant is reaching the cutting zone
	surface of the pre-hole is compacted	check pre-hole drilling conditions (drill carefully to reduce risk of surface compacting). check drill cutting edges
Tap Breakage	incorrect tap in use (cutting geometry unsuitable for application)	use tap from the relevant material group
	centering error	ensure that axes of tap and pre-hole are aligned
	blunt tap	regrind tap
	tap has reached bottom of pre-hole	use tapping spindle with axial float and slipping clutch (**GTI**/**GTIN**)
	pre-hole too small	check for correct pre-hole size, see pages 67-68

GTI / GTIN - Tapping Attachment

Compact tapping collet with tension and compression floating mechanism for ER32 collet chucks.
A tapping collet for standard and rigid tapping operations.
The **GTIN** ER32 collet makes tap removal and replacement easy, quick and reliable.
Designed for stationary and rotating applications, the **GTIN** ER32 collets are economical and efficient due to the ability to use existing ER32 collet chucks (with various shank sizes and types).

Applications

The **GTIN** ER32 tapping collet is designed especially for CNC mill/turn centers, for regular and rigid tapping.

Advantages

- Quick tap change with a front clamping nut.
- Compact design for minimal clearance between the turret and chuck.
- Fits every type of stationary and rotating ER32 collet chuck.
- Positive tap drive with internal square driver.
- Compensates for machine feed and tap pitch variance, resulting in greater thread accuracy.
- Floating mechanism compensates for misalignment between tap and workpiece.
- High accuracy due to tension and compression mechanism.
- Available for all tap shank standards (DIN, ISO, AN SI, JIS).
- Tapping range M1-M16 (#0 to 5/8″).
- Saves setup time by quick tap changing without removing **GTIN** from the machine.
- Optimal for machines which have limited space between the turret and workpiece.



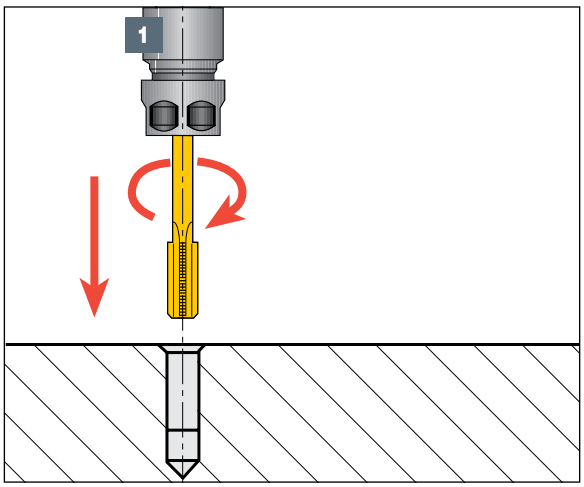
GTI / GTIN - Tapping Attachment



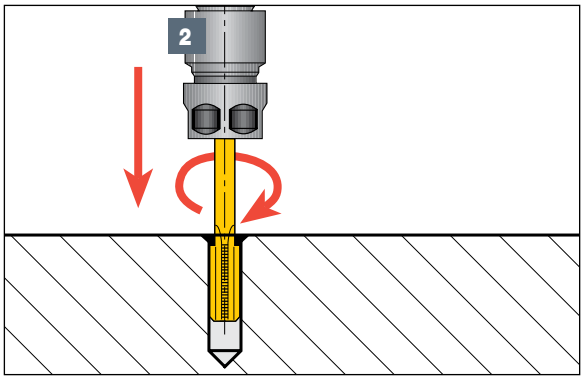
Operation

For through- and blind-hole tapping:

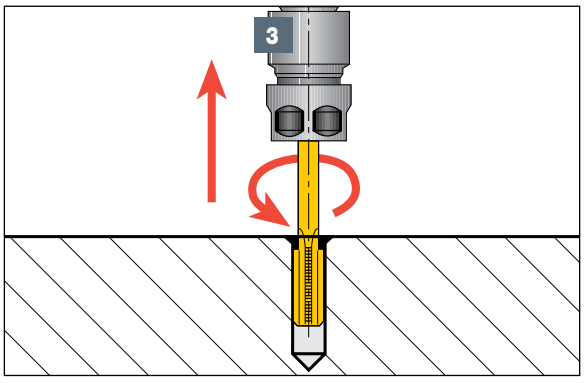
1 Enter feed rate according to thread pitch (or 1-2 % lower). Set spindle to starting point with 0.08 mm clearance.



2 Start spindle forward with right hand rotation until reaching desired depth.



3 Stop feed and rotation and reverse to starting point.



Description

Short tap chucks for ER collets.

Application

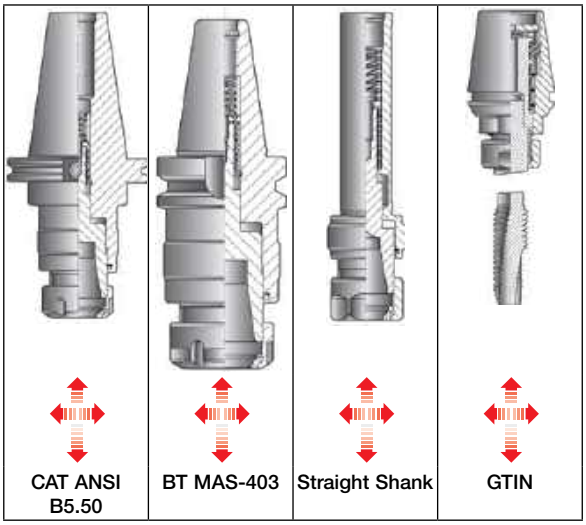
Axial Float/tension/compression Type for CNC Milling Machines and Lathes with Reversing Motors and Rigid Tapping.

Features

- Compensates for machine feed and tap pitch variance.
- Floating mechanism compensates for misalignment between tap and workpiece.
- Right- and left-hand tapping.

Advantages

- Practical and efficient tap holding by the ER spring collet without using jaw drive.
- Compact design for minimal clearance applications.
- Heavy duty design for high torque drive ensures the same accuracy as the tap itself.



Milling



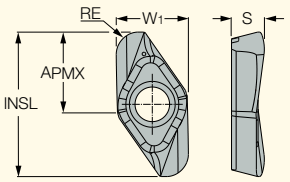
Indexable Milling Inserts

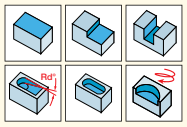
HELIALU

HSM90S APCR 1405

Super Positive Inserts with a Polished Rake for Machining Aluminum at High Rotation Speed







Designation	Dimensions W1	RE(2)	APMX	INSL	S	Tough ↔ Hard IC28	IC08	Recommended Machining Data a_p (mm)	f_z (mm/t)
HSM90S APCR 140508R-P	12.50	0.80	13.50	25.00	6.05	●	●	1.20-13.50	0.10-0.30
HSM90S APCR 140516R-P	12.50	1.60	13.50	25.00	6.00	●		2.40-13.50	0.10-0.30
HSM90S APCR 140520R-P	12.50	2.00	13.50	25.00	5.95	●	●	3.39-13.50	0.10-0.30
HSM90S APCR 140530R-P	12.50	3.00	13.50	25.00	5.85	●	●	3.40-13.50	0.10-0.30
HSM90S APCR 140532R-P	12.50	3.20	13.50	25.00	5.80	●	●	3.60-13.50	0.10-0.30
HSM90S APCR 140540R-P	12.50	4.00	13.50	25.00	5.70	●	●	4.40-13.50	0.10-0.30
HSM90S APCR 140550R-P (1)	12.50	5.00	13.50	25.00	5.50	●	●	5.40-13.50	0.10-0.30
HSM90S APCR 140564R-P (1)	12.50	6.40	11.00	25.00	5.50	●		6.80-11.00	0.10-0.30

- When machining at very high cutting speed and replacing the insert, it is also recommended to replace the screw

(1) Tool's pocket should be modified by rounding its corners to R=2.5 mm

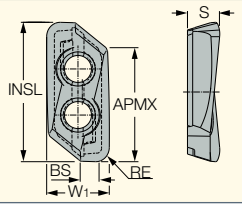
(2) Measured on the cutter

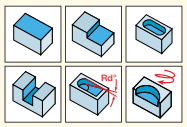
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HSM90S APCR 2207

Super Positive Inserts with a Polished Rake for Machining Aluminum at High Rotational Speed







Designation	Dimensions W1	RE(1)	APMX	BS	INSL	S	IC08	Recommended Machining Data a_p (mm)	f_z (mm/t)
HSM90S APCR 220708R-P	13.10	0.80	22.00	5.00	29.20	6.90	●	1.20-22.00	0.15-0.30
HSM90S APCR 220716R-P	13.10	1.60	22.00	4.20	29.10	6.90	●	2.00-22.00	0.15-0.30
HSM90S APCR 220720R-P	13.10	2.00	22.00	3.90	29.10	6.80	●	2.40-22.00	0.15-0.30
HSM90S APCR 220730R-P	13.10	3.00	22.00	2.90	29.00	6.70	●	3.40-22.00	0.15-0.30
HSM90S APCR 220732R-P	13.10	3.20	22.00	2.70	29.00	6.70	●	3.60-22.00	0.15-0.30
HSM90S APCR 220740R-P	13.10	4.00	22.00	1.90	29.00	6.60	●	4.40-22.00	0.15-0.30
HSM90S APCR 220750R-P	13.10	5.00	22.00	0.90	28.90	6.50	●	5.40-22.00	0.15-0.30

- When machining at very high cutting speed it is recommended to replace the screw when replacing the insert

(1) Measured on the cutter

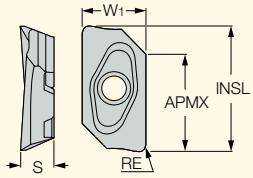
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

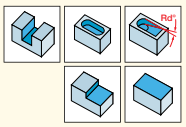
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HM90 AXCR 1505

Super Positive Inserts with a Polished Rake for Machining Aluminum







Designation	Dimensions W1	S	APMX	INSL	RE	Tough ↔ Hard IC28	IC08	Recommended Machining Data a_p (mm)	f_z (mm/t)
HM90 AXCR 150502R-P	10.00	5.00	14.00	19.20	0.20	●	●	0.60-14.00	0.10-0.20
HM90 AXCR 150504R-P	10.00	5.00	14.00	19.20	0.40	●	●	0.80-14.00	0.10-0.20
HM90 AXCR 150508R-P	10.00	5.00	14.00	19.20	0.80	●	●	1.20-14.00	0.10-0.20
HM90 AXCR 150520R-P	10.00	5.00	14.00	19.20	2.00	●	●	2.40-14.00	0.10-0.20
HM90 AXCR 150525R-P	10.00	5.00	14.00	19.20	2.50	●	●	2.90-14.00	0.10-0.20
HM90 AXCR 150530R-P	10.00	5.00	14.00	19.20	3.00	●	●	3.40-14.00	0.10-0.20
HM90 AXCR 150532R-P	10.00	5.00	14.00	19.20	3.20	●	●	3.60-14.00	0.10-0.20
HM90 AXCR 150540R-P	10.00	5.00	14.00	19.20	4.00	●	●	4.40-14.00	0.10-0.20

- Note: It is recommended to use the insert and screw set when machining at very high cutting speed



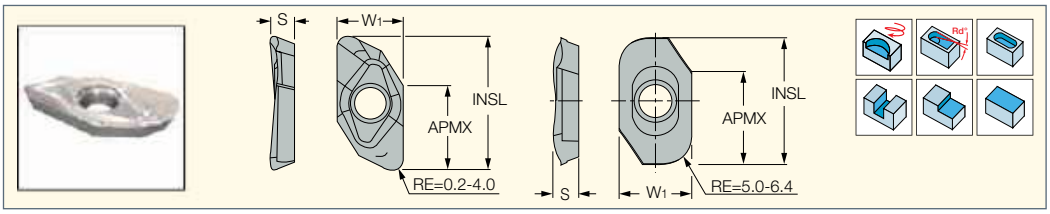
ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

HELIALU

HM90 APCR 1605..R-P

Super Positive Inserts
with a Polished Rake for
Machining Aluminum



Designation	Dimensions W1	RE[2]	APMX	INSL	S	Tough ↔ Hard IC28	IC08	Recommended Machining Data a_p (mm)	f_z (mm/t)
HM90 APCR 160502R-P	12.80	0.20	15.50	25.50	4.80	●	●	0.60-15.50	0.15-0.25
HM90 APCR 160504R-P	12.80	0.40	15.50	25.50	4.80	●	●	0.80-15.50	0.15-0.25
HM90 APCR 160505R-P	12.80	0.50	15.50	25.50	4.80	●	●	0.90-15.50	0.15-0.25
HM90 APCR 160508R-P	12.80	0.80	15.50	25.50	4.80	●	●	1.20-15.50	0.15-0.25
HM90 APCR 160516R-P	12.80	1.60	15.50	25.50	4.80	●	●	2.00-15.50	0.15-0.25
HM90 APCR 160520R-P	12.80	2.00	15.50	25.40	4.80	●	●	2.40-15.50	0.15-0.25
HM90 APCR 160525R-P	12.80	2.50	15.50	25.40	4.80	●	●	2.90-15.50	0.15-0.25
HM90 APCR 160530R-P	12.80	3.00	15.50	24.40	4.80	●	●	3.40-15.50	0.15-0.25
HM90 APCR 160532R-P	12.80	3.20	15.50	24.40	4.80	●	●	3.60-15.50	0.15-0.25
HM90 APCR 160540R-P	12.80	4.00	15.50	23.40	4.80	●	●	4.40-15.50	0.15-0.25
HM90 APCR 160550R-P [1]	12.70	5.00	16.00	22.70	4.80	●	●	5.40-16.00	0.15-0.25
HM90 APCR 160560R-P [1]	12.70	6.00	16.00	22.70	4.80	●		6.40-16.00	0.15-0.25
HM90 APCR 160564R-P [1]	12.70	6.40	16.00	22.70	4.80	●		6.80-16.00	0.15-0.25

- It is recommended to use the insert and screw set when machining at very high cutting speeds

[1] Use with HM90 16BR tools only

[2] Measured on the cutter

Insert and Screw Set (5+5) for High Speed Machining Applications

In order to maintain high machining reliability, we strongly recommend that when replacing the worn out insert, the clamping screw is replaced as well. Available are packages that contain 5 **HM90 APCR 1605..R-P IC28** or **HM90 AXCR 1505..R-P IC28** inserts and 5 matching screws.

These packages contain inserts with a weight tolerance of 0.02 gm. This tight tolerance ensures the dynamic balance of the tool is maintained after insert indexing.



HM90 SET APCR-P

Set Designation		5 Included Inserts		5 Included Screws
HSM90 Set APCR 160502RP IC28	=	HM90 APCR 160502R-P IC28	+	SR 14-0180
HSM90 Set APCR 160504RP IC28		HM90 APCR 160504R-P IC28		SR 14-0180
HSM90 Set APCR 160508RP IC28		HM90 APCR 160508R-P IC28		SR 14-0180
HSM90 Set APCR 160516RP IC28		HM90 APCR 160516R-P IC28		SR 14-0180
HSM90 Set APCR 160520RP IC28		HM90 APCR 160520R-P IC28		SR 14-0180
HSM90 Set APCR 160525RP IC28		HM90 APCR 160525R-P IC28		SR 14-0180
HSM90 Set APCR 160532RP IC28		HM90 APCR 160532R-P IC28		SR 14-0180
HSM90 Set APCR 160540RP IC28		HM90 APCR 160540R-P IC28		SR 14-0180
HSM90 Set APCR 160564RP IC28		HM90 APCR 160564R-P IC28		SR 14-0180

HM90 SET AXCR-P

Set Designation		5 Included Inserts		5 Included Screws
HSM90 Set AXCR 150504RP IC28	=	HM90 AXCR 150504R-P IC28	+	SR 14-562
HSM90 Set AXCR 150520RP IC28		HM90 AXCR 150520R-P IC28		SR 14-562

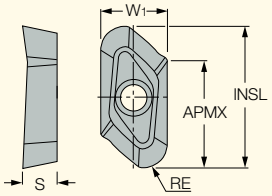
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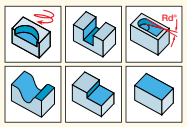
HELIALU

HM90 APCR 2206..R-P

Super Positive Inserts with a Polished Rake for Machining Aluminum







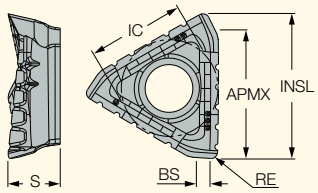
Designation	Dimensions W1	RE	APMX	INSL	S	Tough ↔ Hard IC28	IC08	Recommended Machining Data a_p (mm)	f_z (mm/t)
HM90 APCR 220605R-P	13.90	0.50	22.00	30.50	6.90	●	●	0.90-22.00	0.07-0.30
HM90 APCR 220608R-P	13.72	0.80	22.00	29.70	6.90	●	●	1.20-22.00	0.07-0.30
HM90 APCR 220616R-P	13.72	1.60	22.00	29.70	6.90	●	●	2.00-22.00	0.07-0.30
HM90 APCR 220620R-P	13.72	2.00	22.00	29.70	6.60		●	2.40-22.00	0.07-0.30
HM90 APCR 220623R-P	13.72	2.30	22.00	29.70	6.60	●	●	2.70-22.00	0.07-0.30
HM90 APCR 220632R-P	13.72	3.20	22.00	29.40	6.60	●	●	3.60-22.00	0.07-0.30
HM90 APCR 220640R-P	13.72	4.00	22.00	29.00	6.60	●	●	4.40-22.00	0.07-0.30
HM90 APCR 220650R-P	13.72	5.00	22.00	28.20	6.10	●	●	5.40-22.00	0.07-0.30
HM90 APCR 220664R-P	13.72	6.40	22.00	26.80	6.00	●	●	6.80-22.00	0.07-0.30

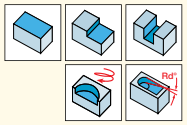
HELI3MILL HM390 LINE

HM390 TDCR 1505

Triangular Inserts with 3 Helical Cutting Edges for 90° Shoulder Accuracy







Designation	Dimensions INSL	IC	S	APMX	RE	BS	Tough ↔ Hard IC28	IC4	Recommended Machining Data a_p (mm)	f_z (mm/t)
HM390 TDCR 150502PDFR-P	16.80	11.40	6.00	13.00	0.20	2.40	●		0.60-13.00	0.08-0.20
HM390 TDCR 150504PDFR-P	16.80	11.40	6.00	13.00	0.40	2.35	●		0.80-13.00	0.08-0.20
HM390 TDCR 1505PDFR-P	16.70	11.40	6.00	13.00	0.80	1.60	●	●	1.20-13.00	0.08-0.20
HM390 TDCR 150520PDFR-P	16.00	11.40	6.00	13.00	2.00	1.00	●		2.40-13.00	0.08-0.20
HM390 TDCR 150532PDFR-P (1)	15.00	11.40	6.00	13.00	3.20	0.50	●		3.60-13.00	0.08-0.20
HM390 TDCR 150540PDFR-P (1)	14.00	11.40	6.00	13.00	4.00	0.70	●		4.40-13.00	0.08-0.20
HM390 TDCR 150508 FW-P (2)	17.10	11.40	6.40	13.00	0.80	2.30	●		1.20-13.00	0.08-0.22
HM390 TDCR 150532 FW-P (3)	17.10	11.40	6.40	13.00	3.20	0.50	●		3.60-13.00	0.08-0.22

- Peripherally ground flank, super positive polished rake formilling aluminum, titanium and magnesium

(1) Tools should be modified by rounding the insert pocket corners to 2.0 mm

(2) Insert with serrated cutting edge

(3) Tools should be modified by rounding the insert pocket corners to 2.0 mm Insert with serrated cutting edge

Table - Average Cutting Data for HM390 TDCR 1505... FW-P Inserts

ISO Class DIN/ISO 513	Workpiece Material: Material No.	Material	Condition	Hardness HB	Typical Representative: AISI/SAE/ASTM	DIN W.-Nr.	Carbide Grade	Cutting Speed V_c [m/min]	Max. D.O.C. Ap [mm]	Feed Fz [mm/tooth]	Coolant
N	21	aluminum-wrought alloys	not hardenable	60 HB	1000	3.0255	IC28	480-640	13	0.08-0.22	wet
	22		hardenable	100 HB	7050	3.4345		400-560			
	23	Aluminum-cast, alloyed <12% Si	not hardenable	75 HB	A360.2	3.2383		480-640			
	24	Aluminum-cast, alloyed	hardenable	90 HB	4218B	3.2371		400-560			
	25	Aluminum-cast, alloyed >12% Si	high temperature	130 HB	A390.0	EN AB-48100**		240-320			
	26	Copper alloys >1% Pb	free cutting	110 HB	C 93800	2.1182		240-320			
	27	Copper alloys	brass	90 HB	C 86500	2.0592		240-320			
	28		electrolytic copper	100 HB	C 63000	2.0966		160-240			

* ISCAR material group in accordance with VDI 3323 standard

** Euro norm

For machining in unstable conditions, the recommended cutting data should be reduced by 20-30%

ISCAR

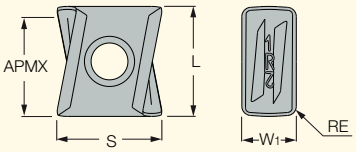
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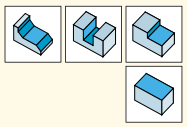
HELITANG T490 LINE

T490 LNAR-P

Tangentially Clamped Precision Ground Inserts with a Super Positive Rake for Machining Aluminum







Designation	Dimensions W1	L	APMX	RE	S	IC07	Recommended Machining Data a_p (mm)	f_z (mm/t)
T490 LNAR 0804PN-R-P	4.25	8.60	8.00	0.40	7.50	●	1.00-5.00	0.08-0.15
T490 LNAR 1306PN-R-P	6.65	13.81	12.50	0.80	13.00	●	4.00-12.00	0.08-0.20
T490 LNAR 1306PNR-P-RD (1)	6.65	13.75	12.50	0.80	13.05	●	4.00-12.00	0.10-0.20
T490 LNAR 1607PN-R-P	7.05	17.05	16.00	0.80	15.90	●	5.00-14.00	0.15-0.25

- For T490 ELN-13 on diameter 25 mm at a_p=5, f_z=0.15 at a_p=10, f_z=0.1

(1) Used for ramping down applications on aluminum with 32 mm and larger tools, see table below

T490 LNAR 1306PNR-P-RD

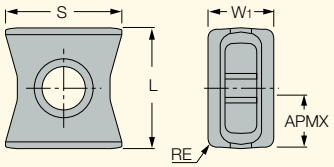
Tool Diameter	a - Rampdown
32	2.8°
40	2.0°
50	1.5°
63	1.1°
80	0.9°
100	0.7°

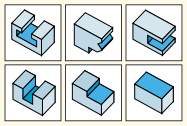
TANGMILL TANGENTIAL LINE

LNAR 1106

Tangentially Clamped Inserts with Positive Polished Rake







Designation	Dimensions W1	L	S	RE	APMX(1)	Tough ↔ Hard IC07	IC907	Recommended Machining Data a_p (mm)	f_z (mm/t)
LNAR 1106 PN-N	6.00	11.16	10.72	0.50	5.00		●	1.50-5.00	0.15-0.20
LNAR 1106 PN-N-P	6.00	11.16	10.72	0.50	5.00	●		1.50-5.00	0.15-0.20

- Polished rake and sharp cutting edge
- Recommended for machining high silicon and cast aluminum, titanium and magnesium
- 4 R.H. and 4 L.H. cutting edges

(1) D.O.C. when the insert is on the cutter

● First choice grade

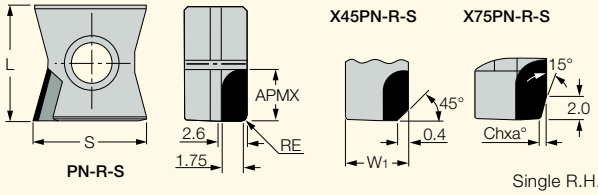
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TANGMILL TANGENTIAL LINE

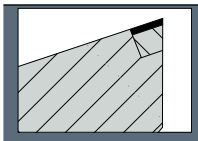
LNAR 1106 (PCD)

Tangentially Clamped Milling Inserts with a Brazed PCD Tip for Machining Aluminum





Single R.H. cutting edge PCD insert



Designation	Dimensions W1	L	S	RE	Ch	a°	APMX	Tough ↔ Hard ID8	ID5	Recommended Machining Data a_p (mm)	f_z (mm/t)
LNAR 110604PN-R-S	6.00	11.11	10.76	0.40	-	90	5.00	●	●	0.10-2.00	0.10-0.25
LNAR 110604X45PN-R-S	6.00	11.11	10.70	-	0.4	45	5.00	●	●	0.10-2.00	0.10-0.25
LNAR 110620X75PN-R-S	6.00	11.11	10.72	-	0.15	75	5.00		●	0.10-2.00	0.10-0.25

- The chamfered corner used for reduced chipping on the machined component edges
- Use ID5 for aluminum alloys with <12% silicon
- Use ID8 for aluminum alloys with >12% silicon
- The inserts are supplied with spare screws

PCD
Recommended Machining Conditions

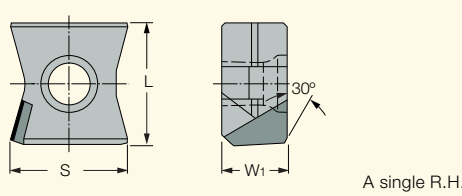
ISO	Grade	DOC mm	Material	V_c N/mm	Fee mm/tooth	Cutting Edge
N	ID5	<2.0	Aluminum-wrought alloys <12% silicon	300-3000	0.05-0.25	Sharp
		<2.0	Chipboard Fiberboard Plastics	2000-3000	0.05-0.25	
		<2.0	Copper Brass alloys	500-1500	0.05-0.25	
	ID8	<2.0	Aluminum >12% silicon	250-1000	0.05-0.25	
		<2.0	Aluminum <12% silicon	300-3000	0.05-0.25	
		<2.0	Chipboard Fiberboard Plastics MMC	2000-3000	0.05-0.25	
				200-600	0.05-0.25	

TANGMILL TANGENTIAL LINE

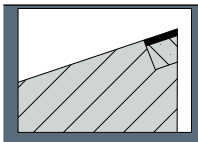
LNAR 1106PN-R-S-W (PCD)

Tangentially Clamped Wiper Milling Inserts with a Brazed PCD Tip for Machining Aluminum



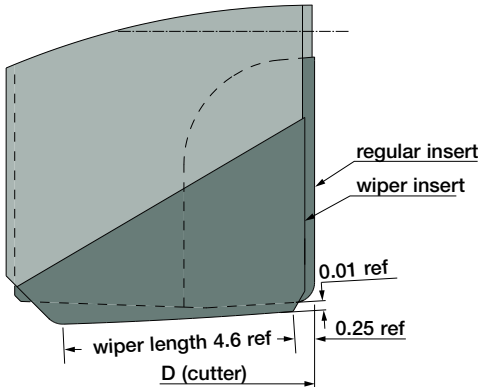


A single R.H. cutting edge PCD insert



Designation	Dimensions W1	L	S	ID5	Recommended Machining Data f_z (mm/t)
LNAR 1106PN-R-S-W	5.98	11.26	10.75	●	0.10-0.25

- The chamfered corner is used for reduced chipping on the machined component edges
- The wiper insert should not be used with LNAR 110620x75PN-R-S inserts
- For D.O.C., cutting speed recommendations and grade data, see page 86



ISCAR

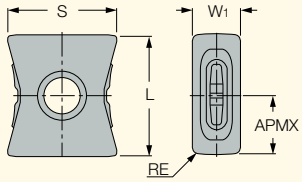
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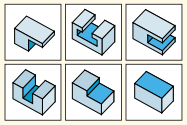
TANGMILL TANGENTIAL LINE

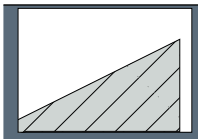
LNAR 1506

Tangentially Clamped Insert with a Positive Polished Land and Sharp Cutting Edge









Designation	Dimensions W1	L	S	RE	APMX	IC07	Recommended Machining Data a_p (mm)	f_z (mm/t)
LNAR 1506 PN-N-P	6.00	15.00	13.56	0.80	7.00	●	2.00-7.00	0.10-0.15

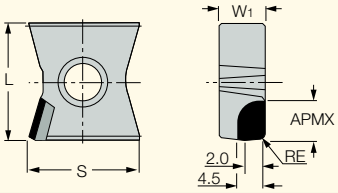
- Note: Do not use this insert on F86LNX tools
- Recommended for machining high silicon aluminum, titanium and magnesium
- 4 R.H. and 4 L.H. cutting edges when used on F90LN cutters

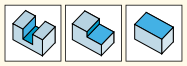
TANGMILL TANGENTIAL LINE

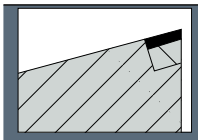
LNAR 1506 PN-R-S (PCD)

Tangentially Clamped Insert with a Brazed PCD Tip for Machining Aluminum









Designation	Dimensions W1	L	S	RE	APMX	Tough ↔ Hard ID8	ID5	Recommended Machining Data a_p (mm)	f_z (mm/t)
LNAR 150604PN-R-S	6.00	15.06	14.00	0.40	5.00	●	●	0.05-2.00	0.10-0.25

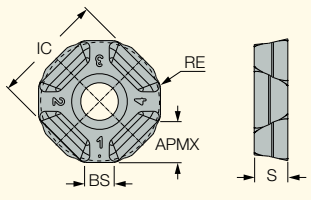
- The insert features a single R.H. cutting edge
- Use ID5 for aluminum alloys with less than 12% silicon and ID8 for aluminum alloys with more than 12% silicon
- The inserts are supplied with spare screws
- For D.O.C., cutting speed recommendations and grade data, see page 86

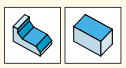
DOVEIQMILL 845 LINE

IQ845 SYHU-07

Square Inserts with 8 Cutting Edges







Designation	Dimensions APMX	BS	RE	IC	S	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
IQ845 SYHU 0704ADN-P	4.60	3.40	0.80	13.80	4.20	●	1.00-4.00	0.10-0.25

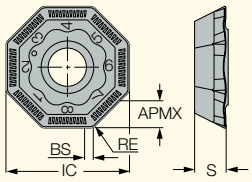
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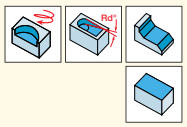
HELIOCTO

OFCR/OFCT-AEN/AETN

Octagonal Milling Inserts
with Positive Rake and
Sharp Cutting Edges



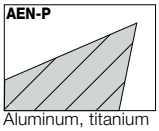




ECONOMICAL SOLUTION

Designation	Dimensions IC	APMX	BS	RE	S	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
OFCR 07T3-AEN-P (1)	17.80	4.60	1.60	0.60	4.35	●	1.00-3.00	0.10-0.20

(1) Polished rake used for aluminum



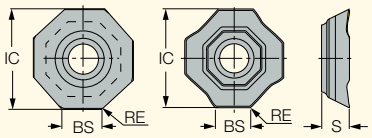
Aluminum, titanium
and stainless steel

HELIOCTO

OFCR/OFCT-RW/AER (wiper)

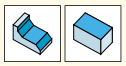
Octagonal Milling Inserts with
Four Wiper Cutting Edges





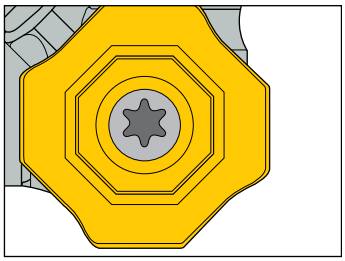
OFCT 07T3-RW-16
OFCR 07T3-RW-P

OFCT 07T3-AER



Designation	Dimensions IC	BS	S	RE	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
OFCR 07T3-RW-P	18.45	6.80	4.58	0.60	●	0.50-1.00	0.10-0.15

A single wiper insert mounted on the HOF D..R07 cutter does the required job.
The wiper insert protrudes less than 0.1 mm axially. Wiper inserts have only 4 cutting edges.
There are 4 marks engraved on the wiper inserts. Pay attention when mounting the insert in the pocket that the marked cutting edges are parallel to the bottom of the cutter (see sketch).
Maximum depth of cut when using the wiper insert is 2.5 mm. It is recommended to use wiper inserts in a_p=0.5-1.0 mm to achieve the best results. The criterion for indexing the wiper insert should be the decreased quallity of the surface finish.
Recommended machining conditions for finishing operations:
V_c (finishing)= V_c (roughing) x 1.25 m/min f_z=0.10-0.15 mm/t

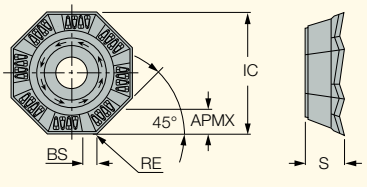


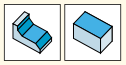
HELIOCTO

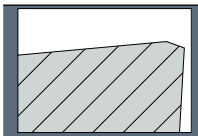
OEMT/OEKT 060405

Octagonal Milling Inserts
for General Use









Designation	Dimensions IC	APMX	BS	RE	S	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
OEMT 060405AER-76	14.27	2.50	1.60	0.50	4.74	●	1.00-2.45	0.15-0.25

ISCAR

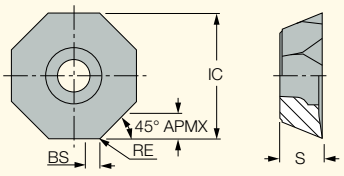
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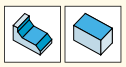
HELIOCTO

OECR

Octagonal Milling Inserts with Positive Rake and Sharp Cutting Edges







Designation	Dimensions IC	APMX	BS	RE	S	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
OECR 060405AER-P (1)	14.45	3.70	1.60	0.50	4.90	●	1.00-3.70	0.08-0.20

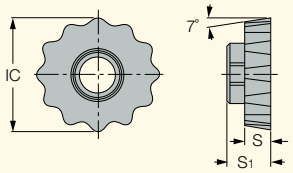
(1) Polished rake used for aluminum

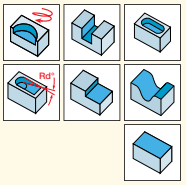
MILLSHRED ROUND LINE

RCMT-FW

Fully Effective Serrated Inserts with Four Options for Indexing Orientation

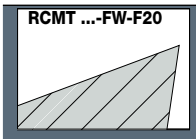






Designation	Dimensions IC	S	S1	Tough ↔ Hard IC830	IC928	IC908	Recommended Machining Data a_p (mm)	f_z (mm/t)
RCMT 1004-FW-F20 (1)	10.00	3.20	4.80	●			2.00-4.00	0.15-0.30
RCMT 1206-FW-F20 (1)	12.00	4.00	6.40		●	●	2.50-5.00	0.20-0.35
RCMT 1607-FW-F20 (1)	16.00	5.00	7.90		●	●	3.00-6.00	0.20-0.35
RCMT 2009-FW-F20 (1)	20.00	6.00	9.40		●		4.00-8.00	0.20-0.35

RCMT ...-FW-F20



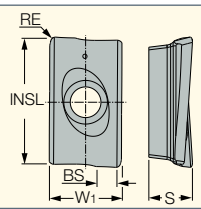
(1) For aluminum

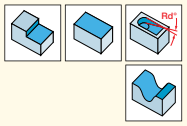
MILLSHRED P290 LINE

P290 ACCT/KT

Single-Sided Rectangular Inserts with Two 12 and 18 mm Straight Cutting Edges







Designation	Dimensions W1	INSL	S	RE	BS	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
P290 ACCT 1806PDR-HL-P	10.75	19.40	6.50	0.80	2.50	●	5.00-18.00	0.08-0.12

- HL-P - Polished rake, used for aluminum

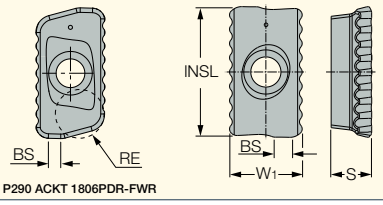
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

MILLSHRED P290 LINE

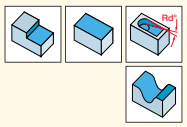
P290 ACKT

Single-Sided Rectangular Inserts with 2 Serrated Cutting Edges





P290 ACKT 1806PDR-FWR



Designation	Dimensions W1	INSL	S	RE(2)	BS	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
P290 ACKT 1806PDR-FWE-P (1)	10.70	18.50	6.00	1.20	2.00	●	5.00-18.00	0.08-0.12

(1) Polished rake, used for rough milling of aluminum

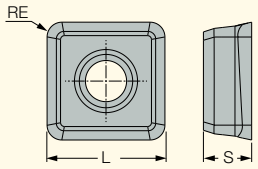
(2) Radius for programming

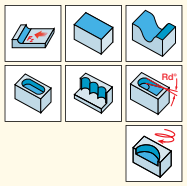
MILL4FEED

FFQ4 SOMT 1205

Single-Sided Square Inserts with 4 Cutting Edges for Fast Feed Milling







Designation	Dimensions L	S	RE	IC28	Recommended Machining Data a_p (mm)	f_z (mm/t)
FFQ4 SOMT 120516HP-P	12.70	5.20	1.60	●	0.50-1.50	0.40-1.80

- For side plunging, the initial cutting feed is 0.1 mm/t
- HP-P - Positive rake face, used for aluminum

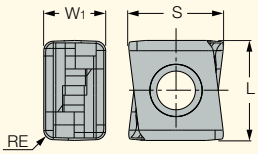
ISO Class DIN/ISO 513	Workpiece Material: Description	Material Group No.	Hardness HB	Typical Materials: AISI/SAE/ASTM/AA	Typical Materials: W.Nr/DIN	Insert Type	Carbide Grade	D.O.C. a_p (mm): Recommended	D.O.C. a_p (mm): Range	Cutting Spped v_c (m/min)	Feed f_z (mm/tooth): Recommended	Feed f_z (mm/tooth): Range	Coolant
N	wrought and cast aluminum alloys	21-24	60-100	7075	3.437	HP-P	IC28	1.2	0.4-1.5	250-450	1.0	0.5-2.0	Wet

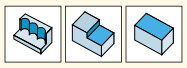
TANGPLUNGE PLUNGING LINE

HTP LN.. 1006

Tangentially Clamped Inserts with 4 Cutting Edges for Plungers

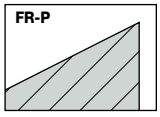






Designation	Dimensions W1	L	S	RE	IC07	Recommended Machining Data f_z (mm/t)
HTP LNAR 1006 FR-P	6.50	10.50	10.13	1.00	●	0.05-0.15

- FR-P - For machining aluminum



ISCAR

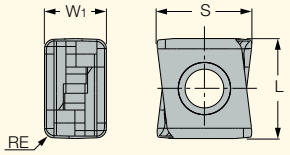
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

TANGPLUNGE PLUNGING LINE

HTP LN.. 0604

Tangentially Clamped Inserts with 4 Cutting Edges for Plungers





Designation	Dimensions W1	L	S	RE	IC07	Recommended Machining Data f_z (mm/t)
HTP LNAR 0604 FR-P	4.06	6.50	6.77	0.80	●	0.05-0.15

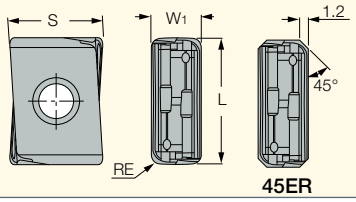
- FR-P-For machining aluminum

TANGPLUNGE PLUNGING LINE

HTP LN.. 1606

Tangentially Clamped Inserts with 4 Cutting Edges for Plungers





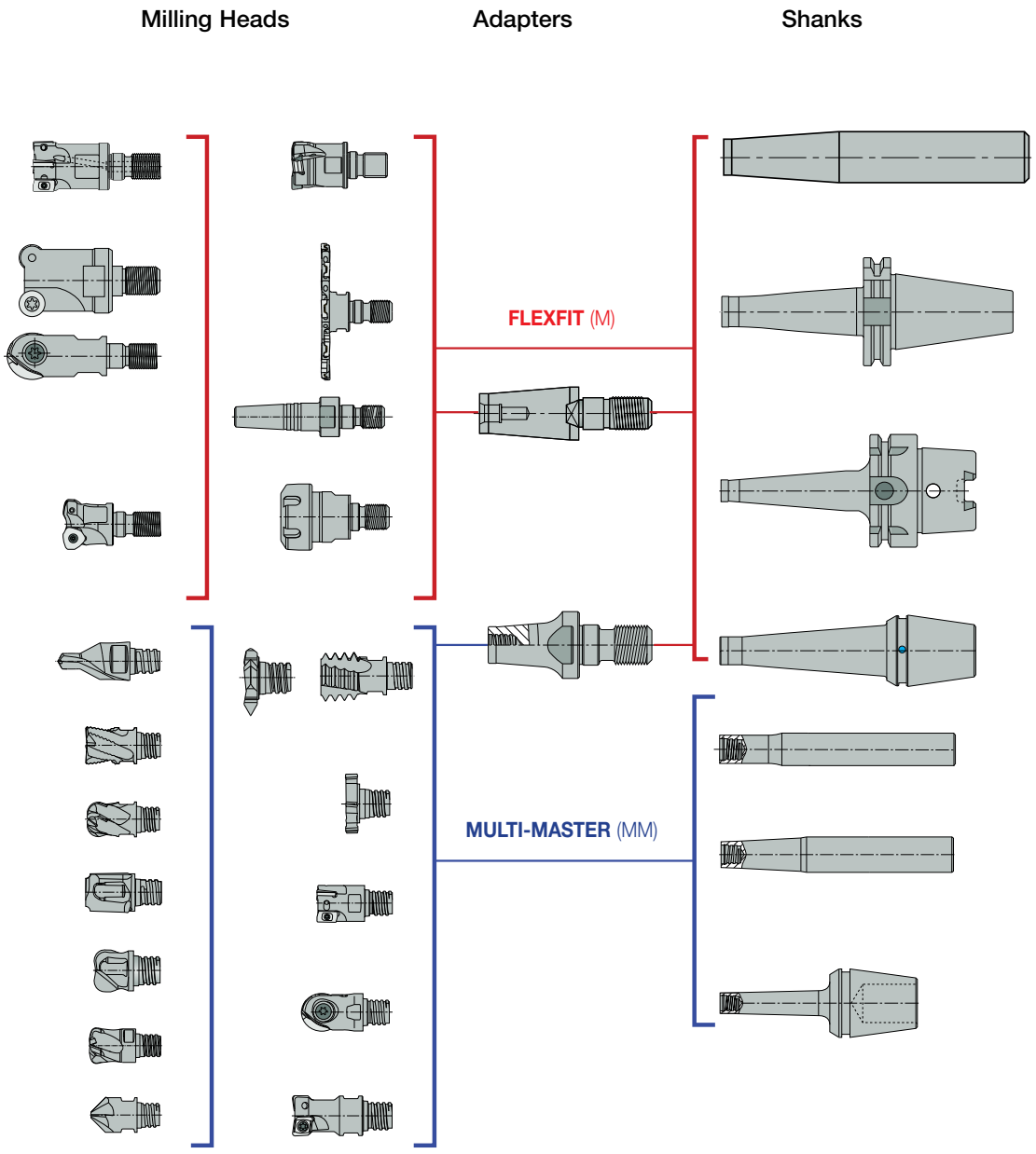
Designation	Dimensions W1	L	S	RE	IC07	Recommended Machining Data f_z (mm/t)
HTP LNAR 1606 FR-P	6.50	16.50	12.28	1.20	●	0.05-0.15

- FR-P-For machining aluminum



Multi-Master - Solid Carbide Interchangeable Milling Heads

MULTI-MASTER and FLEXFIT Connection Options



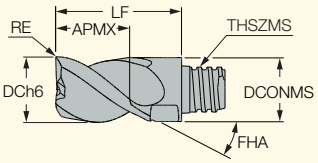
Features
Modular system reduces stock cost by using the same head with different shank options. Enables machining with larger overhangs. Same head can be mounted on metric and inch combinations.

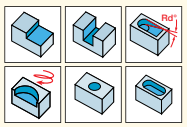
CHATTERFREE
MULTI-MASTER LINE

MM EA-CF

Interchangeable Solid Carbide Endmill Heads with Different Helix for Machining Aluminum







ALUMINUM

Designation	Dimensions DC	NOF(1)	APMX	RE	THSZMS	DCONMS	LF	FHA	IC08	Recommended Machining Data f_z (mm/t)
MM EA080H08R0CF-4T05	8.00	4	8.00	0.00	T05	7.70	15.00	40.0	●	0.03-0.09
MM EA100H10R0CF-4T06	10.00	4	10.00	0.00	T06	9.60	19.00	40.0	●	0.03-0.10
MM EA120H12R0.2CF-3T08	12.00	3	12.00	0.20	T08	11.70	23.00	40.0	●	0.04-0.11
MM EA120H12R0CF-4T08	12.00	4	12.00	0.00	T08	11.70	23.00	40.0	●	0.04-0.11
MM EA160H16R0.0CF-3T10	16.00	3	16.00	0.00	T10	15.30	28.00	40.0	●	0.05-0.13
MM EA160H16R0.2CF-3T10	16.00	3	16.00	0.20	T10	15.30	28.00	40.0	●	0.05-0.13
MM EA160H16R0.5CF-3T10	16.00	3	16.00	0.50	T10	15.30	28.00	40.0	●	0.05-0.13
MM EA160H16R2.5CF-3T10	16.00	3	16.00	2.50	T10	15.30	28.00	40.0	●	0.05-0.13
MM EA160H16R0CF-4T10	16.00	4	16.00	0.00	T10	15.30	26.00	40.0	●	0.05-0.12
MM EA200H20R0.0CF-3T12	20.00	3	20.00	0.00	T12	18.45	34.00	40.0	●	0.05-0.13
MM EA200H20R0.2CF-3T12	20.00	3	20.00	0.20	T12	18.45	34.00	40.0	●	0.05-0.13
MM EA200H20R0.5CF-3T12	20.00	3	20.00	0.50	T12	18.45	34.00	40.0	●	0.05-0.13
MM EA200H20R2.5CF-3T12	20.00	3	20.00	2.50	T12	18.45	34.00	40.0	●	0.05-0.13
MM EA250H19R0.5-3T15	25.00	3	19.00	0.50	T15	23.90	37.00	40.0	●	0.06-0.16
MM EA250H19R1.0-3T15	25.00	3	19.00	1.00	T15	23.90	37.00	40.0	●	0.06-0.16
MM EA250H19R3.0-3T15	25.00	3	19.00	3.00	T15	23.90	37.00	40.0	●	0.06-0.16

- For clamping keys (to be ordered separately), tightening torques and clamping instructions, see page 95 • Do not apply lubricant to the threaded connection
- For user guide, see page 92

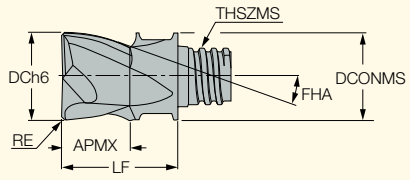
(1) Number of flutes

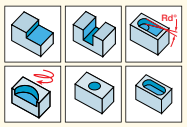
MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE

MM EA

Interchangeable Solid Carbide Slot Drill Milling Heads for Machining Aluminum







ALUMINUM

Designation	Dimensions DC	NOF(1)	APMX	RE	THSZMS	DCONMS	LF	FHA	IC08	Recommended Machining Data f_z (mm/t)
MM EA060B03R0.0-3T04	6.00	3	3.20	0.00	T04	5.80	8.50	45.0	●	0.02-0.05
MM EA080B05R0.5-2T05	8.00	2	5.00	0.50	T05	7.70	10.00	45.0	●	0.03-0.09
MM EA080B05R0.5-3T05	8.00	3	5.00	0.50	T05	7.70	10.00	45.0	●	0.03-0.09
MM EA100B07R0.5-2T06	10.00	2	7.00	0.50	T06	9.60	13.00	45.0	●	0.03-0.10
MM EA100B07R1.0-2T06	10.00	2	7.00	1.00	T06	9.60	13.00	45.0	●	0.03-0.10
MM EA100B06R0.5-3T06	10.00	3	6.00	0.50	T06	9.60	13.00	45.0	●	0.03-0.10
MM EA100B06R1.0-3T06	10.00	3	6.00	1.00	T06	9.60	13.00	45.0	●	0.03-0.10
MM EA120B09R0.5-2T08	12.00	2	9.00	0.50	T08	11.70	16.50	45.0	●	0.04-0.11
MM EA120B09R1.0-2T08	12.00	2	9.00	1.00	T08	11.70	16.50	45.0	●	0.04-0.11
MM EA120B08R0.5-3T08	12.00	3	8.00	0.50	T08	11.70	16.50	45.0	●	0.04-0.11
MM EA120B08R1.0-3T08	12.00	3	8.00	1.00	T08	11.70	16.50	45.0	●	0.04-0.11
MM EA120B08R3.0-3T08	12.00	3	8.00	3.00	T08	11.70	16.50	45.0	●	0.04-0.11
MM EA160B10R000-3T10	16.00	3	10.00	0.00	T10	15.30	20.50	45.0	●	0.05-0.13
MM EA160B10R1.0-3T10	16.00	3	10.00	1.00	T10	15.30	20.50	45.0	●	0.05-0.13
MM EA160B10R2.0-3T10	16.00	3	10.00	2.00	T10	15.30	20.50	45.0	●	0.05-0.13
MM EA160B10R3.0-3T10	16.00	3	10.00	3.00	T10	15.30	20.50	45.0	●	0.05-0.13
MM EA160B10R4.0-3T10	16.00	3	10.00	4.00	T10	15.30	20.50	45.0	●	0.05-0.13
MM EA200B12R0.5-3T12	20.00	3	12.00	0.50	T12	18.45	25.50	45.0	●	0.05-0.13
MM EA200B12R1.0-3T12	20.00	3	12.00	1.00	T12	18.45	25.50	45.0	●	0.05-0.13
MM EA200B12R2.0-3T12	20.00	3	12.00	2.00	T12	18.45	25.50	45.0	●	0.05-0.13
MM EA200B12R3.0-3T12	20.00	3	12.00	3.00	T12	18.45	25.50	45.0	●	0.05-0.13
MM EA200B12R4.0-3T12	20.00	3	12.00	4.00	T12	18.45	25.50	45.0	●	0.05-0.13

- For clamping keys (to be ordered separately), tightening torques and clamping instructions, see page 95 • Do not apply lubricant to the threaded connection

(1) Number of flutes

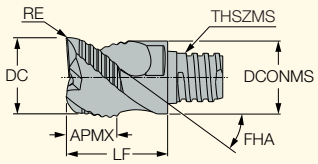
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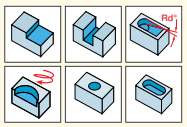
MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE

MM ERA

Interchangeable Solid Carbide Rough Milling Heads for Machining Aluminum at High Metal Removal Rates







ALUMINUM

Designation	Dimensions DC	NOF(1)	APMX	RE	THSZMS	DCONMS	LF	FHA	IC08	Recommended Machining Data f_z (mm/t)
MM ERA080B05R0.2-3T05	8.00	3	5.00	0.20	T05	7.70	10.00	45.0	●	0.03-0.15
MM ERA100B06R0.2-3T06	10.00	3	6.00	0.20	T06	9.60	13.00	45.0	●	0.05-0.20
MM ERA120B08R0.2-3T08	12.00	3	8.00	0.20	T08	11.70	16.50	45.0	●	0.07-0.22
MM ERA160B10R0.2-3T10	16.00	3	10.00	0.20	T10	15.30	20.50	45.0	●	0.07-0.25
MM ERA200B12R0.2-3T12	20.00	3	12.00	0.20	T12	18.45	25.50	45.0	●	0.07-0.25
MM ERA250B19R0.2-3T15	25.00	3	19.00	0.20	T15	23.90	37.00	45.0	●	0.07-0.25

- For clamping keys (to be ordered separately), tightening torques and clamping instructions, see page 95 • Do not apply lubricant to the threaded connection
- For user guide, see page 92

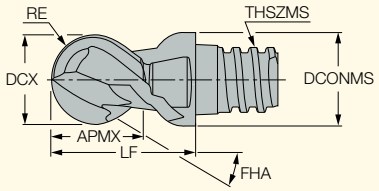
(1) Number of flutes

MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE

MM EBA

Interchangeable 2 Flute High Precision Solid Carbide Ball Nose Heads for Machining Aluminum







ALUMINUM

Designation	Dimensions DCX(1)	NOF(2)	APMX	RE	RETOL(3)	THSZMS	DCONMS	LF	FHA	IC08
MM EBA080B05-2T05	8.00	2	5.00	3.98	0.010	T05	7.70	10.00	45.0	●
MM EBA100B07-2T06	10.00	2	7.00	4.98	0.010	T06	9.60	13.00	45.0	●
MM EBA120B09-2T08	12.00	2	9.00	5.98	0.012	T08	11.50	16.50	45.0	●
MM EBA160B12-2T10	16.00	2	12.00	7.98	0.012	T10	15.30	20.50	45.0	●
MM EBA200B15-2T12	20.00	2	15.00	9.97	0.012	T12	18.45	25.50	45.0	●
MM EBA250B22-2T15	25.00	2	22.00	12.50	0.012	T15	23.90	37.00	45.0	●

- For clamping keys (to be ordered separately), tightening torques and clamping instructions, see page 95 • Do not apply lubricant to the threaded connection
- For user guide, see page 92

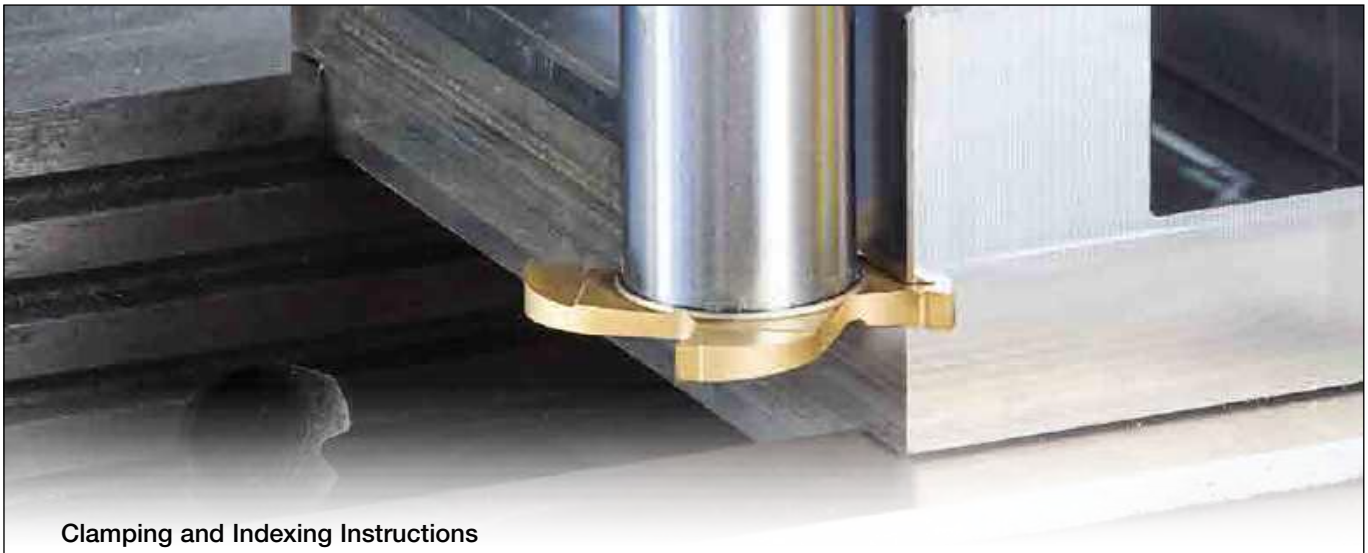
(1) Cutting diameter maximum
(2) Number of flutes
(3) Corner radius tolerance (+/-)

Machining Data for MULTI-MASTER Groove Milling Heads

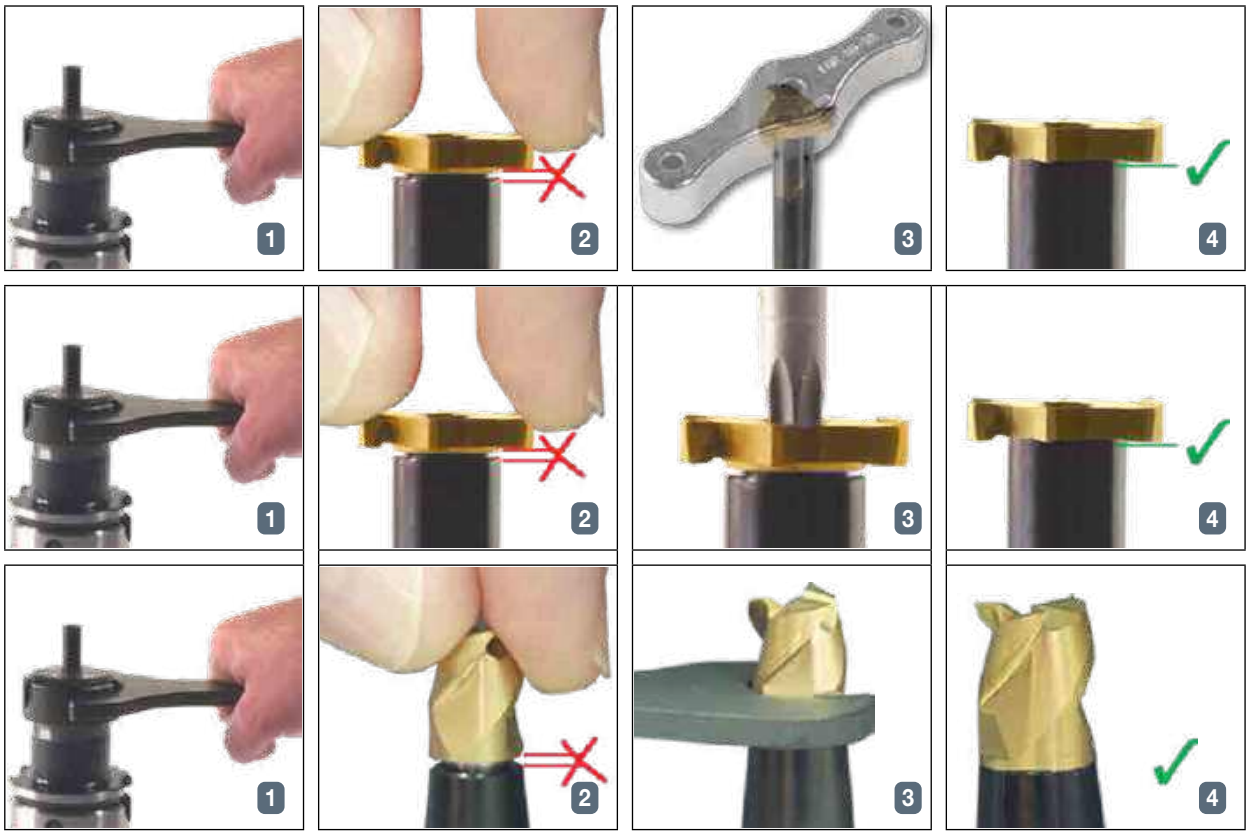
ISO	Material		Condition	Hardness HB	Material No.	MM-TS Speed V m/min	MM-TS Feed mm/t $F_{z\,(min)}$	MM-TS Feed mm/t $F_{z\,(max)}$	MM-GRIT K-TYPE Speed V m/min	MM-GRIT K-TYPE Feed mm/t $F_{z\,(min)}$	MM-GRIT K-TYPE Feed mm/t $F_{z\,(max)}$	MM-GRIT P-TYPE Speed V m/min	MM-GRIT P-TYPE Feed mm/t $F_{z\,(min)}$	MM-GRIT P-TYPE Feed mm/t $F_{z\,(max)}$
N	aluminum-wrought alloys		not hardenable	60	21	800-1200	0.10	0.20	-	-	-	800-1200	0.05	0.15
			hardenable	100	22	800-1200	0.10	0.20	-	-	-	800-1200	0.05	0.15
	aluminum-cast alloys	≤12% Si	not hardenable	75	23	-	-	-	-	-	-	600-1000	0.05	0.15
			hardenable	90	24	-	-	-	-	-	-	500-1000	0.05	0.15
		>12% Si	high temperature	130	25	-	-	-	-	-	-	200-400	0.05	0.15
	copper alloys	>1% Pb	free cutting	110	26	-	-	-	-	-	-	-	-	-
			brass	90	27	-	-	-	-	-	-	-	-	-
			electrolytic copper	100	28	-	-	-	-	-	-	-	-	-
	non metallic		duroplastics, fiber plastics		29	-	-	-	-	-	-	-	-	-
			hard rubber		30	-	-	-	-	-	-	-	-	-

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Clamping and Indexing Instructions



Do not apply lubricant to the threaded connection

Thread Size	Key(1)	Tightening Torque (Nxcm)
T04	MM key 6x4	400
T05	MM key 6x4	700
T06	MM key 8x5	1000
T08	MM key 10x7	1500
T10	MM key 13x8	2800
T12	MM key 16x9	2800
T15	MM key 20	4000
T21	MM wrench 24-21	11000

(1) Order separately

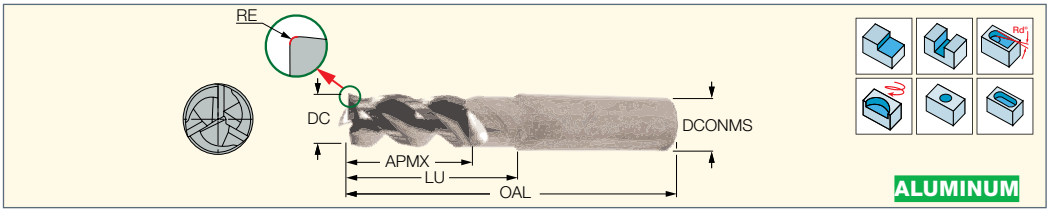


Solid Carbide Cutters

CHATTERFREE SOLID MILL LINE

ECA-H3-CF

Solid Carbide Endmills with Different Helix, Variable Pitch, and Relieved Neck for Machining Aluminum



Designation	Dimensions									Tough ↔ Hard		Recommended Machining Data
	DC	DCONMS	APMX	OAL	NOF[1]	LU	RMPX°[2]	Shank[3]	RE	IC08	IC1508	f_z (mm/t)
ECA-H3 01-04C06CF-R.05	1.00	6.00	4.00	57.00	3	-	5.0	C	0.05	●		0.01-0.01
ECA-H3 015-04/06C06CF-R01	1.50	6.00	4.00	57.00	3	6.00	5.0	C	0.10	●		0.01-0.01
ECA-H3 02-05/08C06CF-R01	2.00	6.00	5.00	57.00	3	8.00	5.0	C	0.10	●		0.01-0.02
ECA-H3 025-05/08C06CF-R01	2.50	6.00	5.00	57.00	3	8.00	5.0	C	0.10	●		0.01-0.02
ECA-H3 03-07/12C06CF-R01	3.00	6.00	7.00	57.00	3	12.00	5.0	C	0.10	●		0.03-0.05
ECA-H3 04-10/16C06CF-R02	4.00	6.00	10.00	57.00	3	16.00	5.0	C	0.20	●		0.03-0.05
ECA-H3 05-12/20C06CF-R02	5.00	6.00	12.00	57.00	3	20.00	5.0	C	0.20	●		0.03-0.06
ECA-H3 06-09/18C06CF-R02	6.00	6.00	9.00	57.00	3	18.00	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-09/18C06CF-R02D	6.00	6.00	9.00	57.00	3	18.00	5.0	C	0.20		●	0.03-0.07
ECA-H3 06-09/18C06CF-R04	6.00	6.00	9.00	57.00	3	18.00	5.0	C	0.40	●		0.03-0.07
ECA-H3 06-09/18C06CF-R08	6.00	6.00	9.00	57.00	3	18.00	5.0	C	0.80	●		0.03-0.07
ECA-H3 06-09/30C06CF-R02	6.00	6.00	9.00	65.00	3	30.00	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-09/30C06CF-R02D	6.00	6.00	9.00	65.00	3	30.00	5.0	C	0.20		●	0.03-0.07
ECA-H3 06-09/30C06CF-R04	6.00	6.00	9.00	65.00	3	30.00	5.0	C	0.40	●		0.03-0.07
ECA-H3 06-09/30C06CF-R08	6.00	6.00	9.00	65.00	3	30.00	5.0	C	0.80	●		0.03-0.07
ECA-H3 06-09C06CF-R02-57	6.00	6.00	9.00	57.00	3	-	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-12/18C06CF-R02C	6.00	6.00	12.00	57.00	3	18.00	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-12/30C06CF-R02C	6.00	6.00	12.00	64.00	3	30.00	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-14/24C06CF-R02	6.00	6.00	14.00	60.00	3	24.00	5.0	C	0.20	●		0.03-0.07
ECA-H3 06-14/24C06CF-R02D	6.00	6.00	14.00	60.00	3	24.00	5.0	C	0.20		●	0.03-0.07
ECA-H3 08-12/24C08CF-R02	8.00	8.00	12.00	63.00	3	24.00	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-12/24C08CF-R02D	8.00	8.00	12.00	63.00	3	24.00	5.0	C	0.20		●	0.03-0.09
ECA-H3 08-12/24C08CF-R04	8.00	8.00	12.00	63.00	3	24.00	5.0	C	0.40	●		0.03-0.09
ECA-H3 08-12/24C08CF-R08	8.00	8.00	12.00	63.00	3	24.00	5.0	C	0.80	●		0.03-0.09
ECA-H3 08-12/24C08CF-R30	8.00	8.00	12.00	63.00	3	24.00	5.0	C	3.00	●		0.03-0.09
ECA-H3 08-12/40C08CF-R02	8.00	8.00	12.00	79.00	3	40.00	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-12/40C08CF-R02D	8.00	8.00	12.00	79.00	3	40.00	5.0	C	0.20		●	0.03-0.09
ECA-H3 08-12/40C08CF-R04	8.00	8.00	12.00	79.00	3	40.00	5.0	C	0.40	●		0.03-0.09
ECA-H3 08-12/40C08CF-R08	8.00	8.00	12.00	79.00	3	40.00	5.0	C	0.80	●		0.03-0.09
ECA-H3 08-12C08CF-R02-63	8.00	8.00	12.00	63.00	3	-	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-16/24C08CF-R02C	8.00	8.00	16.00	63.00	3	24.00	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-16/40C08CF-R02C	8.00	8.00	16.00	78.00	3	40.00	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-18/32C08CF-R02	8.00	8.00	18.00	68.00	3	32.00	5.0	C	0.20	●		0.03-0.09
ECA-H3 08-18/32C08CF-R02D	8.00	8.00	18.00	68.00	3	32.00	5.0	C	0.20		●	0.03-0.09
ECA-H3 10-15/30C10CF-R02	10.00	10.00	15.00	72.00	3	30.00	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-15/30C10CF-R02D	10.00	10.00	15.00	72.00	3	30.00	5.0	C	0.20		●	0.03-0.10
ECA-H3 10-15/30C10CF-R04	10.00	10.00	15.00	72.00	3	30.00	5.0	C	0.40	●		0.03-0.10
ECA-H3 10-15/30C10CF-R08	10.00	10.00	15.00	72.00	3	30.00	5.0	C	0.80	●		0.03-0.10
ECA-H3 10-15/30C10CF-R16	10.00	10.00	15.00	72.00	3	30.00	5.0	C	1.60	●		0.03-0.10
ECA-H3 10-15/30C10CF-R30	10.00	10.00	15.00	72.00	3	30.00	5.0	C	3.00	●		0.03-0.10
ECA-H3 10-15/50C10CF-R02	10.00	10.00	15.00	92.00	3	50.00	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-15/50C10CF-R02D	10.00	10.00	15.00	92.00	3	50.00	5.0	C	0.20		●	0.03-0.10
ECA-H3 10-15/50C10CF-R04	10.00	10.00	15.00	92.00	3	50.00	5.0	C	0.40	●		0.03-0.10
ECA-H3 10-15/50C10CF-R08	10.00	10.00	15.00	92.00	3	50.00	5.0	C	0.80	●		0.03-0.10
ECA-H3 10-15/50C10CF-R16	10.00	10.00	15.00	92.00	3	50.00	5.0	C	1.60	●		0.03-0.10
ECA-H3 10-15/50C10CF-R20	10.00	10.00	15.00	92.00	3	50.00	5.0	C	2.00	●		0.03-0.10
ECA-H3 10-15/50C10CF-R30	10.00	10.00	15.00	92.00	3	50.00	5.0	C	3.00	●		0.03-0.10
ECA-H3 10-15C10CF-R02-72	10.00	10.00	15.00	72.00	3	-	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-20/30C10CF-R02C	10.00	10.00	20.00	72.00	3	30.00	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-20/50C10CF-R02C	10.00	10.00	20.00	100.00	3	50.00	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-22/40C10CF-R02	10.00	10.00	22.00	80.00	3	40.00	5.0	C	0.20	●		0.03-0.10
ECA-H3 10-22/40C10CF-R02D	10.00	10.00	22.00	80.00	3	40.00	5.0	C	0.20		●	0.03-0.10
ECA-H3 10-22/40C10CF-R30	10.00	10.00	22.00	80.00	3	40.00	5.0	C	3.00	●		0.03-0.10

• For user guide, see page 103 • Grade IC1508 - DLC Coating

(1) Number of flutes

(2) Maximum ramping angle

(3) C-Cylindrical

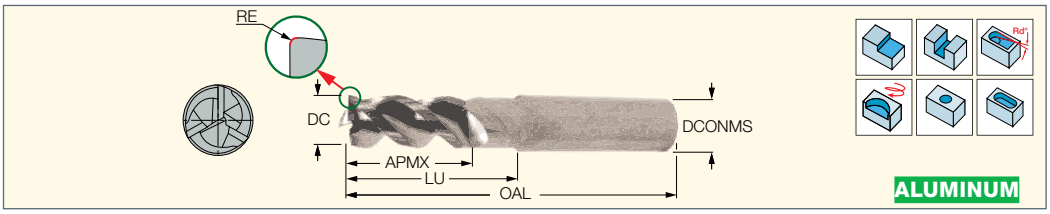
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CHATTERFREE SOLID MILL LINE

ECA-H3-CF

Solid Carbide Endmills with Different Helix, Variable Pitch, and Relieved Neck for Machining Aluminum



Designation	Dimensions									Tough ↔ Hard		Recommended Machining Data
	DC	DCONMS	APMX	OAL	NOF(1)	LU	RMPX°(2)	Shank(3)	RE	IC08	IC1508	f_z (mm/t)
ECA-H3 12-18/36C12CF-R02	12.00	12.00	18.00	83.00	3	36.00	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-18/36C12CF-R02D	12.00	12.00	18.00	83.00	3	36.00	5.0	C	0.20		●	0.04-0.11
ECA-H3 12-18/36C12CF-R04	12.00	12.00	18.00	83.00	3	36.00	5.0	C	0.40	●		0.04-0.11
ECA-H3 12-18/36C12CF-R08	12.00	12.00	18.00	83.00	3	36.00	5.0	C	0.80	●		0.04-0.11
ECA-H3 12-18/36C12CF-R16	12.00	12.00	18.00	83.00	3	36.00	5.0	C	1.60	●		0.04-0.11
ECA-H3 12-18/36C12CF-R20	12.00	12.00	18.00	83.00	3	36.00	5.0	C	2.00	●		0.04-0.11
ECA-H3 12-18/36C12CF-R25	12.00	12.00	18.00	83.00	3	36.00	5.0	C	2.50	●		0.04-0.11
ECA-H3 12-18/36C12CF-R30	12.00	12.00	18.00	83.00	3	36.00	5.0	C	3.00	●		0.04-0.11
ECA-H3 12-18/60C12CF-R02	12.00	12.00	18.00	100.00	3	60.00	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-18/60C12CF-R02D	12.00	12.00	18.00	100.00	3	60.00	5.0	C	0.20		●	0.04-0.11
ECA-H3 12-18/60C12CF-R04	12.00	12.00	18.00	100.00	3	60.00	5.0	C	0.40	●		0.04-0.11
ECA-H3 12-18/60C12CF-R08	12.00	12.00	18.00	100.00	3	60.00	5.0	C	0.80	●		0.04-0.11
ECA-H3 12-18/60C12CF-R16	12.00	12.00	18.00	100.00	3	60.00	5.0	C	1.60	●		0.04-0.11
ECA-H3 12-18/60C12CF-R20	12.00	12.00	18.00	100.00	3	60.00	5.0	C	2.00	●		0.04-0.11
ECA-H3 12-18/60C12CF-R25	12.00	12.00	18.00	100.00	3	60.00	5.0	C	2.50	●		0.04-0.11
ECA-H3 12-18/60C12CF-R30	12.00	12.00	18.00	100.00	3	60.00	5.0	C	3.00	●		0.04-0.11
ECA-H3 12-18C12CF-R02-83	12.00	12.00	18.00	83.00	3	-	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-24/36C12CF-R02C	12.00	12.00	24.00	83.00	3	36.00	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-24/60C12CF-R02C	12.00	12.00	24.00	100.00	3	60.00	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-26/48C12CF-R02	12.00	12.00	26.00	93.00	3	48.00	5.0	C	0.20	●		0.04-0.11
ECA-H3 12-26/48C12CF-R02D	12.00	12.00	26.00	93.00	3	48.00	5.0	C	0.20		●	0.04-0.11
ECA-H3 16-24/48C16CF-R02	16.00	16.00	24.00	92.00	3	48.00	5.0	C	0.20	●		0.05-0.13
ECA-H3 16-24/48C16CF-R02D	16.00	16.00	24.00	92.00	3	48.00	5.0	C	0.20		●	0.05-0.13
ECA-H3 16-24/48C16CF-R04	16.00	16.00	24.00	92.00	3	48.00	5.0	C	0.40	●		0.05-0.13
ECA-H3 16-24/48C16CF-R08	16.00	16.00	24.00	92.00	3	48.00	5.0	C	0.80	●		0.05-0.13
ECA-H3 16-24/48C16CF-R16	16.00	16.00	24.00	92.00	3	48.00	5.0	C	1.60	●		0.05-0.13
ECA-H3 16-24/48C16CF-R20	16.00	16.00	24.00	92.00	3	48.00	5.0	C	2.00	●		0.05-0.13
ECA-H3 16-24/48C16CF-R25	16.00	16.00	24.00	92.00	3	48.00	5.0	C	2.50	●		0.05-0.13
ECA-H3 16-24/48C16CF-R30	16.00	16.00	24.00	92.00	3	48.00	5.0	C	3.00	●		0.05-0.13
ECA-H3 16-24/48C16CF-R32	16.00	16.00	24.00	92.00	3	48.00	5.0	C	3.20	●		0.05-0.13
ECA-H3 16-24/48C16CF-R40	16.00	16.00	24.00	92.00	3	48.00	5.0	C	4.00	●		0.05-0.13
ECA-H3 16-24/48C16CF-R50	16.00	16.00	24.00	92.00	3	48.00	5.0	C	5.00	●		0.05-0.13
ECA-H3 16-24/80C16CF-R02	16.00	16.00	24.00	128.00	3	80.00	5.0	C	0.20	●		0.05-0.13
ECA-H3 16-24/80C16CF-R04	16.00	16.00	24.00	128.00	3	80.00	5.0	C	0.40	●		0.05-0.13
ECA-H3 16-24/80C16CF-R08	16.00	16.00	24.00	128.00	3	80.00	5.0	C	0.80	●		0.05-0.13
ECA-H3 16-24/80C16CF-R16	16.00	16.00	24.00	128.00	3	80.00	5.0	C	1.60	●		0.05-0.13
ECA-H3 16-24/80C16CF-R20	16.00	16.00	24.00	128.00	3	80.00	5.0	C	2.00	●		0.05-0.13
ECA-H3 16-24/80C16CF-R25	16.00	16.00	24.00	128.00	3	80.00	5.0	C	2.50	●		0.05-0.13
ECA-H3 16-24/80C16CF-R30	16.00	16.00	24.00	128.00	3	80.00	5.0	C	3.00	●		0.05-0.13
ECA-H3 16-24/80C16CF-R32	16.00	16.00	24.00	128.00	3	80.00	5.0	C	3.20	●		0.05-0.13
ECA-H3 16-24/80C16CF-R40	16.00	16.00	24.00	128.00	3	80.00	5.0	C	4.00	●		0.05-0.13
ECA-H3 16-24/80C16CF-R50	16.00	16.00	24.00	128.00	3	80.00	5.0	C	5.00	●		0.05-0.13
ECA-H3 16-32/48C16CF-R02C	16.00	16.00	32.00	92.00	3	48.00	5.0	C	0.20	●		0.05-0.13
ECA-H3 16-32/80C16CF-R02C	16.00	16.00	32.00	127.00	3	80.00	5.0	C	0.20	●		0.05-0.13
ECA-H3 16-34/64C16CF-R02	16.00	16.00	34.00	115.00	3	64.00	5.0	C	0.20	●		0.05-0.13
ECA-H3 16-34/64C16CF-R02D	16.00	16.00	34.00	115.00	3	64.00	5.0	C	0.20		●	0.05-0.13
ECA-H3 20-30/100C20CF-R02	20.00	20.00	30.00	150.00	3	100.00	5.0	C	0.20	●		0.05-0.14
ECA-H3 20-30/100C20CF-R04	20.00	20.00	30.00	150.00	3	100.00	5.0	C	0.40	●		0.05-0.14
ECA-H3 20-30/100C20CF-R08	20.00	20.00	30.00	150.00	3	100.00	5.0	C	0.80	●		0.05-0.14
ECA-H3 20-30/100C20CF-R32	20.00	20.00	30.00	150.00	3	100.00	5.0	C	3.20	●		0.05-0.14
ECA-H3 20-30/100C20CF-R40	20.00	20.00	30.00	150.00	3	100.00	5.0	C	4.00	●		0.05-0.14
ECA-H3 20-30/100C20CF-R50	20.00	20.00	30.00	150.00	3	100.00	5.0	C	5.00	●		0.05-0.14
ECA-H3 20-30/60C20CF-R02	20.00	20.00	30.00	110.00	3	60.00	5.0	C	0.20	●		0.05-0.14
ECA-H3 20-30/60C20CF-R02D	20.00	20.00	30.00	110.00	3	60.00	5.0	C	0.20		●	0.05-0.14
ECA-H3 20-30/60C20CF-R04	20.00	20.00	30.00	110.00	3	60.00	5.0	C	0.40	●		0.05-0.14
ECA-H3 20-30/60C20CF-R08	20.00	20.00	30.00	110.00	3	60.00	5.0	C	0.80	●		0.05-0.14
ECA-H3 20-30/60C20CF-R16	20.00	20.00	30.00	110.00	3	60.00	5.0	C	1.60	●		0.05-0.14
ECA-H3 20-30/60C20CF-R20	20.00	20.00	30.00	110.00	3	60.00	5.0	C	2.00	●		0.05-0.14
ECA-H3 20-30/60C20CF-R32	20.00	20.00	30.00	110.00	3	60.00	5.0	C	3.20	●		0.05-0.14
ECA-H3 20-30/60C20CF-R40	20.00	20.00	30.00	110.00	3	60.00	5.0	C	4.00	●		0.05-0.14

• For user guide, see page 103 • Grade IC1508 - DLC Coating

(1) Number of flutes

(2) Maximum ramping angle

(3) C-Cylindrical

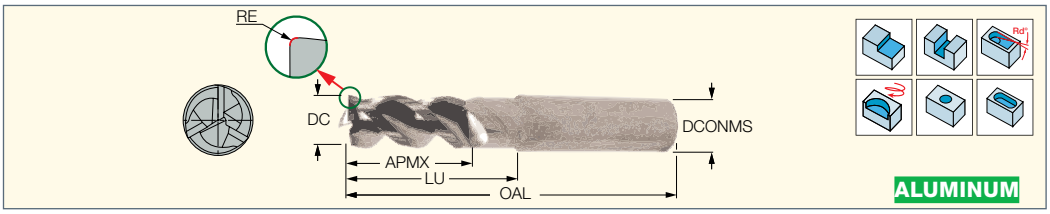
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CHATTERFREE SOLID MILL LINE

ECA-H3-CF

Solid Carbide Endmills with Different Helix, Variable Pitch, and Relieved Neck for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	OAL	NOF(1)	LU	RMPX°(2)	Shank(3)	RE	Tough ↔ Hard IC08	IC1508	Recommended Machining Data f_z (mm/t)
ECA-H3 20-30/60C20CF-R50	20.00	20.00	30.00	110.00	3	60.00	5.0	C	5.00	●		0.05-0.14
ECA-H3 20-40/60C20CF-R02C	20.00	20.00	40.00	109.00	3	60.00	5.0	C	0.20	●		0.05-0.14
ECA-H3 20-42/80C20CF-R02	20.00	20.00	42.00	130.00	3	80.00	5.0	C	0.20	●		0.05-0.14
ECA-H3 20-42/80C20CF-R02D	20.00	20.00	42.00	130.00	3	80.00	5.0	C	0.20		●	0.05-0.14
ECA-H320-40/100C20CF-R02C	20.00	20.00	40.00	149.00	3	100.00	5.0	C	0.20	●		0.05-0.14
ECA-H3 25-38/125C25CF-R02	25.00	25.00	38.00	185.00	3	125.00	5.0	C	0.20	●		0.05-0.15
ECA-H3 25-38/125C25CF-R08	25.00	25.00	38.00	185.00	3	125.00	5.0	C	0.80	●		0.05-0.15
ECA-H3 25-38/125C25CF-R16	25.00	25.00	38.00	185.00	3	125.00	5.0	C	1.60	●		0.05-0.15
ECA-H3 25-38/125C25CF-R20	25.00	25.00	38.00	185.00	3	125.00	5.0	C	2.00	●		0.05-0.15
ECA-H3 25-38/125C25CF-R40	25.00	25.00	38.00	185.00	3	125.00	5.0	C	4.00	●		0.05-0.15
ECA-H3 25-38/125C25CF-R50	25.00	25.00	38.00	185.00	3	125.00	5.0	C	5.00	●		0.05-0.15
ECA-H3 25-38/75C25CF-R02	25.00	25.00	38.00	130.00	3	75.00	5.0	C	0.20	●		0.05-0.15
ECA-H3 25-38/75C25CF-R04	25.00	25.00	38.00	130.00	3	75.00	5.0	C	0.40	●		0.05-0.15
ECA-H3 25-38/75C25CF-R16	25.00	25.00	38.00	130.00	3	75.00	5.0	C	1.60	●		0.05-0.15
ECA-H3 25-38/75C25CF-R20	25.00	25.00	38.00	130.00	3	75.00	5.0	C	2.00	●		0.05-0.15
ECA-H3 25-38/75C25CF-R32	25.00	25.00	38.00	130.00	3	75.00	5.0	C	3.20	●		0.05-0.15
ECA-H3 25-38/75C25CF-R50	25.00	25.00	38.00	130.00	3	75.00	5.0	C	5.00	●		0.05-0.15
ECA-H3 25-50/75C25CF-R02C	25.00	25.00	50.00	128.00	3	75.00	5.0	C	0.20	●		0.05-0.15
ECA-H3 25-52/100C25CF-R02	25.00	25.00	52.00	156.00	3	100.00	5.0	C	0.20	●		0.05-0.15
ECA-H325-50/125C25CF-R02C	25.00	25.00	50.00	183.00	3	125.00	5.0	C	0.20	●		0.05-0.15

- For user guide, see page 103 • Grade IC1508 - DLC Coating

(1) Number of flutes

(2) Maximum ramping angle

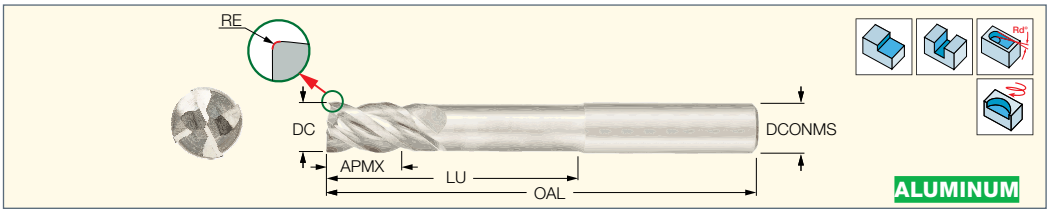
(3) C-Cylindrical

SOLIDMILL PREMIUM LINE

CHATTERFREE SOLID MILL LINE

ECA-H4-CF

Solid Carbide Endmills with Different Helix and Long Neck Relief for Machining Aluminum



Designation	Dimensions DC	APMX	LU	OAL	DCONMS	RE	NOF(1)	RMPX°(2)	Shank(3)	IC08	Recommended Machining Data f_z (mm/t)
ECA-H4 06-09/30C06CFR02	6.00	9.00	30.00	65.00	6.00	0.20	4	5.0	C	●	0.03-0.07
ECA-H4 06-12/18C06CFR02	6.00	12.00	18.00	57.00	6.00	0.20	4	5.0	C	●	0.03-0.07
ECA-H4 08-12/40C08CFR02	8.00	12.00	40.00	79.00	8.00	0.20	4	5.0	C	●	0.03-0.09
ECA-H4 08-16/24C08CFR02	8.00	16.00	24.00	63.00	8.00	0.20	4	5.0	C	●	0.03-0.09
ECA-H4 10-15/50C10CFR02	10.00	15.00	50.00	92.00	10.00	0.20	4	5.0	C	●	0.04-0.10
ECA-H4 10-20/30C10CFR02	10.00	20.00	30.00	72.00	10.00	0.20	4	5.0	C	●	0.04-0.10
ECA-H4 12-18/60C12CFR02	12.00	18.00	60.00	100.00	12.00	0.20	4	5.0	C	●	0.04-0.11
ECA-H4 12-24/36C12CFR02	12.00	24.00	36.00	83.00	12.00	0.20	4	5.0	C	●	0.04-0.11
ECA-H4 16-24/80C16CFR02	16.00	24.00	80.00	128.00	16.00	0.20	4	5.0	C	●	0.05-0.13
ECA-H4 16-32/48C16CFR02	16.00	32.00	48.00	100.00	16.00	0.20	4	5.0	C	●	0.05-0.13
ECA-H4 20-30/100C20CFR02	20.00	30.00	100.00	150.00	20.00	0.20	4	5.0	C	●	0.05-0.14
ECA-H4 20-40/60C20CFR02	20.00	40.00	60.00	110.00	20.00	0.20	4	5.0	C	●	0.05-0.14
ECA-H4 25-38/125C25CFR02	25.00	38.00	125.00	185.00	25.00	0.20	4	5.0	C	●	0.08-0.14
ECA-H4 25-50/75C25CFR02	25.00	50.00	75.00	130.00	25.00	0.20	4	5.0	C	●	0.08-0.14

- For user guide, see page 103

(1) Number of flutes

(2) Maximum ramping angle

(3) C-Cylindrical

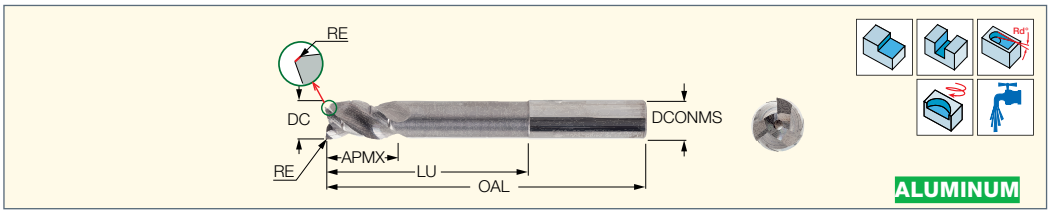
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CHATTERFREE SOLID MILL LINE

ECAP-H3-CF

Solid Carbide Endmills with Different Helix, Variable Pitch, Chip Splitters, and Coolant Holes for Machining Aluminum



Designation	Dimensions DC	APMX	LU	OAL	DCONMS	RE	NOF(1)	RMPX°(2)	Shank(3)	IC08	Recommended Machining Data f_z (mm/t)
ECAP-H3 10-15/50C10CFR02C	10.00	15.00	50.0	92.00	10.00	0.20	3	5.0	C	●	0.03-0.10
ECAP-H3 10-22/40C10CFR02C	10.00	22.00	40.0	80.00	10.00	0.20	3	5.0	C	●	0.03-0.10
ECAP-H3 12-18/60C12CFR02C	12.00	18.00	60.0	100.00	12.00	0.20	3	5.0	C	●	0.04-0.11
ECAP-H3 12-26/48C12CFR02C	12.00	26.00	48.0	93.00	12.00	0.20	3	5.0	C	●	0.04-0.11
ECAP-H3 16-24/80C16CFR02C	16.00	24.00	80.0	128.00	16.00	0.20	3	5.0	C	●	0.05-0.13
ECAP-H3 16-34/64C16CFR02C	16.00	34.00	64.0	115.00	16.00	0.20	3	5.0	C	●	0.05-0.13
ECAP-H320-30/100C20CFR02C	20.00	30.00	100.0	150.00	20.00	0.20	3	5.0	C	●	0.05-0.14
ECAP-H3 20-42/80C20CFR02C	20.00	42.00	80.0	130.00	20.00	0.20	3	5.0	C	●	0.05-0.14
ECAP-H325-38/125C25CFR02C	25.00	38.00	125.0	185.00	25.00	0.20	3	5.0	C	●	0.05-0.14
ECAP-H325-52/100C25CFR02C	25.00	52.00	100.0	158.00	25.00	0.20	3	5.0	C	●	0.05-0.14

- For user guide, see page 103

(1) Number of flutes

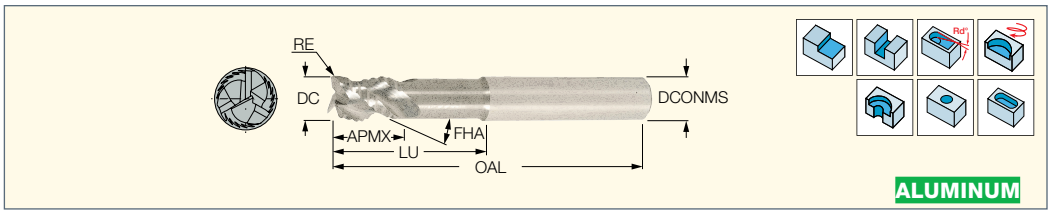
(2) Maximum ramping angle

(3) C-Cylindrical

SOLIDSHRED

ECR-B3-R

3 Flute, 45° Helix Solid Carbide Roughing Endmills with 3xD Relieved Necks for High Stock Removal Rates of Aluminum



Designation	Dimensions DC	DCONMS	LU	OAL	NOF(1)	FHA	RMPX°(2)	APMX	Shank(3)	RE	Tough ↔ Hard IC08	IC1508	Recommended Machining Data f_z (mm/t)
ECR-B3 06-09/21C06R02A57	6.00	6.00	21.00	57.00	3	45.0	5.0	9.00	C	0.20	●		0.03-0.07
ECR-B3 06-09/21C06R02DA57	6.00	6.00	21.00	57.00	3	45.0	5.0	9.00	C	0.20		●	0.03-0.07
ECR-B3 06-09/21W06R02A57	6.00	6.00	21.00	57.00	3	45.0	5.0	9.00	W	0.20	●		0.03-0.07
ECR-B3 06-09/30C06R02A65	6.00	6.00	30.00	65.00	3	45.0	5.0	9.00	C	0.20	●		0.03-0.07
ECR-B3 06-09/30W06R02A65	6.00	6.00	30.00	65.00	3	45.0	5.0	9.00	W	0.20	●		0.03-0.07
ECR-B3 08-12/27C08R02A63	8.00	8.00	27.00	63.00	3	45.0	5.0	12.00	C	0.20	●		0.03-0.15
ECR-B3 08-12/27C08R02DA63	8.00	8.00	27.00	63.00	3	45.0	5.0	12.00	C	0.20		●	0.03-0.15
ECR-B3 08-12/27W08R02A63	8.00	8.00	27.00	63.00	3	45.0	5.0	12.00	W	0.20	●		0.03-0.15
ECR-B3 08-12/40C08R02A78	8.00	8.00	40.00	78.50	3	45.0	5.0	12.00	C	0.20	●		0.03-0.15
ECR-B3 08-12/40W08R02A78	8.00	8.00	40.00	78.50	3	45.0	5.0	12.00	W	0.20	●		0.03-0.15
ECR-B3 10-12/31C10R02A72	10.00	10.00	31.00	72.00	3	45.0	5.0	12.00	C	0.20	●		0.05-0.20
ECR-B3 10-12/31C10R02DA72	10.00	10.00	31.00	72.00	3	45.0	5.0	12.00	C	0.20		●	0.05-0.20
ECR-B3 10-12/31W10R02A72	10.00	10.00	31.00	72.00	3	45.0	5.0	12.00	W	0.20	●		0.05-0.20
ECR-B3 10-12/50C10R02A100	10.00	10.00	50.00	100.00	3	45.0	5.0	12.00	C	0.20	●		0.05-0.20
ECR-B3 10-12/50W10R02A100	10.00	10.00	50.00	100.00	3	45.0	5.0	12.00	W	0.20	●		0.05-0.20
ECR-B3 12-12/37C12R02A83	12.00	12.00	37.00	83.00	3	45.0	5.0	12.00	C	0.20	●		0.07-0.22
ECR-B3 12-12/37C12R02DA83	12.00	12.00	37.00	83.00	3	45.0	5.0	12.00	C	0.20		●	0.07-0.22
ECR-B3 12-12/37W12R02A83	12.00	12.00	37.00	83.00	3	45.0	5.0	12.00	W	0.20	●		0.07-0.22
ECR-B3 12-14/55C12R02A100	12.00	12.00	55.00	100.00	3	45.0	5.0	14.00	C	0.20	●		0.07-0.22
ECR-B3 12-14/55W12R02A100	12.00	12.00	55.00	100.00	3	45.0	5.0	14.00	W	0.20	●		0.07-0.22
ECR-B3 16-14/43C16R02A92	16.00	16.00	43.00	92.00	3	45.0	5.0	14.00	C	0.20	●		0.07-0.25
ECR-B3 16-14/43C16R02DA92	16.00	16.00	43.00	92.00	3	45.0	5.0	14.00	C	0.20		●	0.07-0.25
ECR-B3 16-14/43W16R02A92	16.00	16.00	43.00	92.00	3	45.0	5.0	14.00	W	0.20	●		0.07-0.25
ECR-B3 16-18/80C16R02A150	16.00	16.00	80.00	150.00	3	45.0	5.0	18.00	C	0.20	●		0.07-0.25
ECR-B3 16-18/80W16R02A150	16.00	16.00	80.00	150.00	3	45.0	5.0	18.00	W	0.20	●		0.07-0.25
ECR-B3 20-17/53C20R02A104	20.00	20.00	53.00	104.00	3	45.0	5.0	17.00	C	0.20	●		0.07-0.25
ECR-B3 20-17/53W20R02A104	20.00	20.00	53.00	104.00	3	45.0	5.0	17.00	W	0.20	●		0.07-0.25
ECR-B3 20-22/80C20R02A150	20.00	20.00	80.00	150.00	3	45.0	5.0	22.00	C	0.20	●		0.07-0.25
ECR-B3 20-22/80W20R02A150	20.00	20.00	80.00	150.00	3	45.0	5.0	22.00	W	0.20	●		0.07-0.25

- For user guide, see page 103
- Grade IC1508 - DLC Coating

(1) Number of flutes

(2) Maximum ramping angle

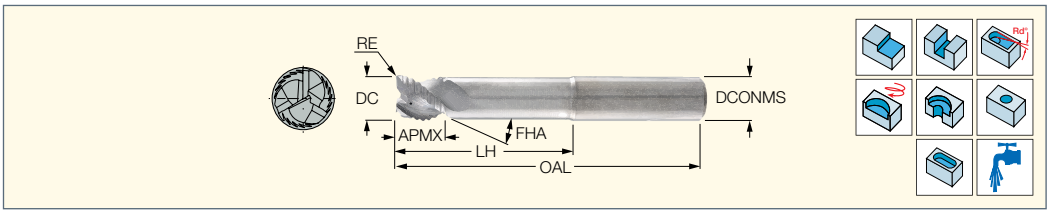
(3) C-Cylindrical, W-Weldon

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SOLIDMILL PREMIUM LINE
SOLIDSHRED

ECR-B3-R-C

3 Flute, 45° Helix Solid Carbide Roughing Endmills with 3xD Relieved Necks and Coolant Channels for Aluminum



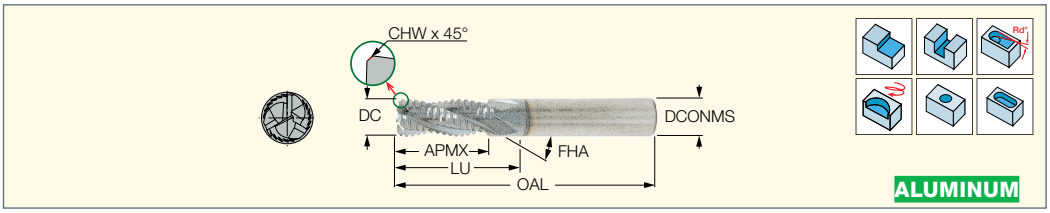
Designation	Dimensions DC	DCONMS	LH	OAL	NOF(1)	FHA	RMPX°(2)	APMX	Shank(3)	RE	IC08	Recommended Machining Data f_z (mm/t)
ECR-B3 08-12/41C08R02A83C	8.00	8.00	41.0	83.00	3	45.0	20.0	12.00	C	0.20	●	0.05-0.15
ECR-B3 08-12/41C08R20A83C	8.00	8.00	41.0	83.00	3	45.0	20.0	12.00	C	2.00	●	0.05-0.15
ECR-B3 10-12/41C10R.2A83C	10.00	10.00	41.0	83.00	3	45.0	20.0	12.00	C	0.20	●	0.07-0.20
ECR-B3 10-12/41C10R20A83C	10.00	10.00	41.0	83.00	3	45.0	20.0	12.00	C	2.00	●	0.07-0.20
ECR-B3 12-12/41C12R.2A87C	12.00	12.00	41.0	87.00	3	45.0	20.0	12.00	C	0.20	●	0.10-0.22
ECR-B3 16-14/60C16R2A109C	16.00	16.00	60.0	109.00	3	45.0	20.0	14.00	C	2.00	●	0.10-0.25
ECR-B316-14/60C16R.2A109C	16.00	16.00	60.0	109.00	3	45.0	20.0	14.00	C	0.20	●	0.10-0.25
ECR-B316-14/60C16R40A109C	16.00	16.00	60.0	109.00	3	45.0	20.0	14.00	C	4.00	●	0.10-0.25
ECR-B320-17/60C20R40A111C	20.00	20.00	60.0	111.00	3	45.0	20.0	17.00	C	4.00	●	0.10-0.25
ECR-B320-30/100C25R4A150C	20.00	20.00	100.0	150.00	3	45.0	20.0	30.00	C	4.00	●	0.10-0.25
ECR-B325-25/74C25R40A130C	25.00	25.00	74.0	130.00	3	45.0	20.0	25.00	C	4.00	●	0.10-0.25

• For user guide, see page 103
(1) Number of flutes
(2) Maximum ramping angle
(3) C-Cylindrical

SOLIDSHRED

ERC-E-3

3 Flute, 38° Helix Medium Length Solid Carbide Roughing Endmills with 3xD Relieved Necks for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	LU	OAL	NOF(1)	FHA	RMPX°(2)	Shank(3)	CHW	KCH	Tough ↔ Hard IC08	IC1508	Recommended Machining Data f_z (mm/t)
ERC060E13-3C06	6.00	6.00	13.00	21.00	57.00	3	38.0	5.0	C	0.50	45.0	●		0.03-0.07
ERC060E13-3C06CH05DA57	6.00	6.00	13.00	21.00	57.00	3	38.0	5.0	C	0.50	45.0		●	0.03-0.07
ERC060E13-3W06	6.00	6.00	13.00	21.00	57.00	3	38.0	5.0	W	0.50	45.0	●		0.03-0.07
ERC080E20-3C08	8.00	8.00	20.00	28.00	63.00	3	38.0	5.0	C	0.50	45.0	●		0.03-0.15
ERC080E20-3C08CH05DA63	8.00	8.00	20.00	28.00	63.00	3	38.0	5.0	C	0.50	45.0		●	0.03-0.15
ERC080E20-3W08	8.00	8.00	20.00	28.00	63.00	3	38.0	5.0	W	0.50	45.0	●		0.03-0.15
ERC100E22-3C10	10.00	10.00	22.00	30.00	72.00	3	38.0	5.0	C	0.60	45.0	●		0.05-0.20
ERC100E22-3C10CH06DA72	10.00	10.00	22.00	30.00	72.00	3	38.0	5.0	C	0.60	45.0		●	0.05-0.20
ERC100E22-3W10	10.00	10.00	22.00	30.00	72.00	3	38.0	5.0	W	0.60	45.0	●		0.05-0.20
ERC120E25-3C12	12.00	12.00	25.00	37.00	83.00	3	38.0	5.0	C	0.60	45.0	●		0.07-0.22
ERC120E25-3C12CH06DA83	12.00	12.00	25.00	37.00	83.00	3	38.0	5.0	C	0.60	45.0		●	0.07-0.22
ERC120E25-3W12	12.00	12.00	25.00	37.00	83.00	3	38.0	5.0	W	0.60	45.0	●		0.07-0.22
ERC160E32-3C16	16.00	16.00	32.00	44.00	92.00	3	38.0	5.0	C	0.60	45.0	●		0.07-0.25
ERC160E32-3C16CH06DA92	16.00	16.00	32.00	44.00	92.00	3	38.0	5.0	C	0.60	45.0		●	0.07-0.25
ERC160E32-3W16	16.00	16.00	32.00	44.00	92.00	3	38.0	5.0	W	0.60	45.0	●		0.07-0.25
ERC200E38-3C20	20.00	20.00	38.00	55.00	104.00	3	38.0	5.0	C	0.70	45.0	●		0.07-0.25
ERC200E38-3W20	20.00	20.00	38.00	55.00	104.00	3	38.0	5.0	W	0.70	45.0	●		0.07-0.25
ERC250E45-3C25	25.00	25.00	45.00	64.00	121.00	3	38.0	5.0	C	0.70	45.0	●		0.07-0.25

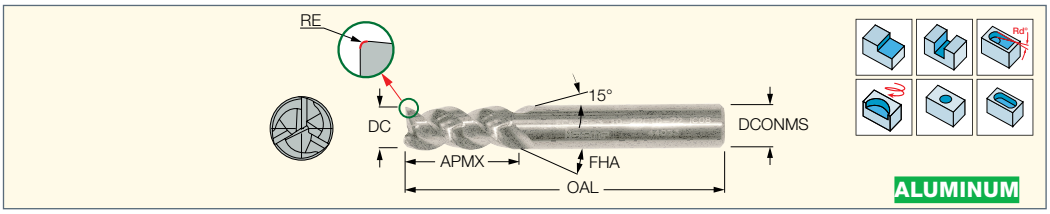
• For user guide, see page 103 • Grade IC1508 - DLC Coating
(1) Number of flutes
(2) Maximum ramping angle
(3) C-Cylindrical, W-Weldon

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

SOLIDMILL PREMIUM LINE

ECA-B-3

3 Flute, 45° Helix Medium Length Solid Carbide Endmills for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	OAL	NOF(1)	FHA	RMPX°(2)	Shank(3)	RE	Tough ↔ Hard IC08	IC1508	Recommended Machining Data f_z (mm/t)
ECA-B-3 04-12C06-57	4.00	6.00	12.00	57.00	3	45.0	5.0	C	0.10	●		0.02-0.05
ECA-B-3 04-12C06-57 R02D	4.00	6.00	12.00	57.00	3	45.0	5.0	C	0.20		●	0.02-0.05
ECA-B-3 04-12W06-57	4.00	6.00	12.00	57.00	3	45.0	5.0	W	0.10	●		0.02-0.05
ECA-B-3 05-14C06-57	5.00	6.00	14.00	57.00	3	45.0	5.0	C	0.20	●		0.02-0.06
ECA-B-3 05-14C06-57 R02D	5.00	6.00	14.00	57.00	3	45.0	5.0	C	0.20		●	0.02-0.06
ECA-B-3 05-14W06-57	5.00	6.00	14.00	57.00	3	45.0	5.0	W	0.20	●		0.02-0.06
ECA-B-3 06-16C06-57	6.00	6.00	16.00	57.00	3	45.0	5.0	C	0.20	●		0.03-0.07
ECA-B-3 06-16C06-57 R02D	6.00	6.00	16.00	57.00	3	45.0	5.0	C	0.20		●	0.03-0.07
ECA-B-3 06-16W06-57	6.00	6.00	16.00	57.00	3	45.0	5.0	W	0.20	●		0.03-0.07
ECA-B-3 08-20C08-63	8.00	8.00	20.00	63.00	3	45.0	5.0	C	0.20	●		0.03-0.09
ECA-B-3 08-20C08-63 R02D	8.00	8.00	20.00	63.00	3	45.0	5.0	C	0.20		●	0.03-0.09
ECA-B-3 08-20C08R3-63	8.00	8.00	20.00	63.00	3	45.0	5.0	C	3.00	●		0.03-0.09
ECA-B-3 08-20W08-63	8.00	8.00	20.00	63.00	3	45.0	5.0	W	0.20	●		0.03-0.09
ECA-B-3 10-22C10-72	10.00	10.00	22.00	72.00	3	45.0	5.0	C	0.20	●		0.03-0.10
ECA-B-3 10-22C10-72 R02D	10.00	10.00	22.00	72.00	3	45.0	5.0	C	0.20		●	0.03-0.10
ECA-B-3 10-22W10-72	10.00	10.00	22.00	72.00	3	45.0	5.0	W	0.20	●		0.03-0.10
ECA-B-3 10-25C10R3-72	10.00	10.00	25.00	72.00	3	45.0	5.0	C	3.00	●		0.03-0.10
ECA-B-3 10-25C10R4-72	10.00	10.00	25.00	72.00	3	45.0	5.0	C	4.00	●		0.03-0.10
ECA-B-3 12-25C12-83	12.00	12.00	25.00	83.00	3	45.0	5.0	C	0.20	●		0.04-0.11
ECA-B-3 12-25C12-83 R02D	12.00	12.00	25.00	83.00	3	45.0	5.0	C	0.20		●	0.04-0.11
ECA-B-3 12-25W12-83	12.00	12.00	25.00	83.00	3	45.0	5.0	W	0.20	●		0.04-0.11
ECA-B-3 12-30C12R3-83	12.00	12.00	30.00	83.00	3	45.0	5.0	C	3.00	●		0.04-0.11
ECA-B-3 12-30C12R4-83	12.00	12.00	30.00	83.00	3	45.0	5.0	C	4.00	●		0.04-0.11
ECA-B-3 14-30C14-83	14.00	14.00	30.00	83.00	3	45.0	5.0	C	0.20	●		0.04-0.12
ECA-B-3 14-30W14-83	14.00	14.00	30.00	83.00	3	45.0	5.0	W	0.20	●		0.04-0.12
ECA-B-3 16-32C16-92	16.00	16.00	32.00	92.00	3	45.0	5.0	C	0.20	●		0.05-0.13
ECA-B-3 16-32C16-92 R02D	16.00	16.00	32.00	92.00	3	45.0	5.0	C	0.20		●	0.05-0.13
ECA-B-3 16-32W16-92	16.00	16.00	32.00	92.00	3	45.0	5.0	W	0.20	●		0.05-0.13
ECA-B-3 20-38C20-104	20.00	20.00	38.00	104.00	3	45.0	5.0	C	0.20	●		0.05-0.13
ECA-B-3 20-38C20-104 R02D	20.00	20.00	38.00	104.00	3	45.0	5.0	C	0.20		●	0.05-0.13
ECA-B-3 20-38W20-104	20.00	20.00	38.00	104.00	3	45.0	5.0	W	0.20	●		0.05-0.13

- For user guide, see page 103 • Grade IC1508 - DLC Coating

(1) Number of flutes

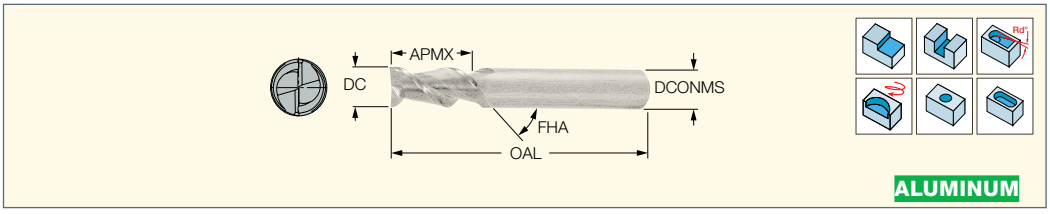
(2) Maximum ramping angle

(3) C-Cylindrical, W-Weldon

SOLIDMILL PREMIUM LINE

ECA-B-2

2 Flute, 45° Helix Medium Length Solid Carbide Endmills for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	OAL	NOF(1)	FHA	RMPX°(2)	Shank(3)	IC08	Recommended Machining Data f_z (mm/t)
ECA040B12-2C06	4.00	6.00	12.00	57.00	2	45.0	5.0	C	●	0.02-0.05
ECA050B14-2C06	5.00	6.00	14.00	57.00	2	45.0	5.0	C	●	0.02-0.06
ECA060B16-2C06	6.00	6.00	16.00	57.00	2	45.0	5.0	C	●	0.03-0.07
ECA080B20-2C08	8.00	8.00	20.00	63.00	2	45.0	5.0	C	●	0.03-0.09
ECA100B22-2C10	10.00	10.00	22.00	72.00	2	45.0	5.0	C	●	0.03-0.10
ECA120B25-2C12	12.00	12.00	25.00	83.00	2	45.0	5.0	C	●	0.04-0.11
ECA160B32-2C16	16.00	16.00	32.00	92.00	2	45.0	5.0	C	●	0.05-0.13
ECA200B38-2C20	20.00	20.00	38.00	104.00	2	45.0	5.0	C	●	0.05-0.13

- For user guide, see page 103

(1) Number of flutes

(2) Maximum ramping angle

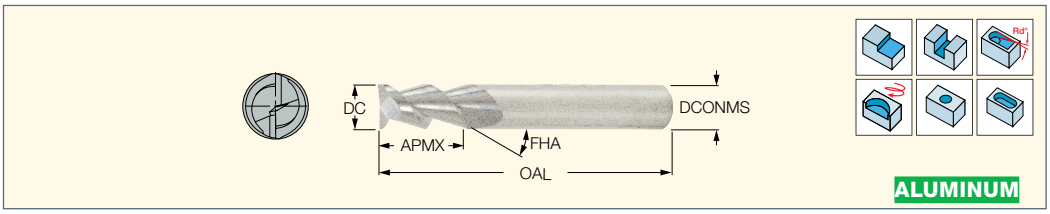
(3) C-Cylindrical

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

SOLIDMILL PREMIUM LINE

ECA-F-2

2 Flute, 55° Helix Medium Length Solid Carbide Endmills for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	OAL	NOF(1)	FHA	RMPX°(2)	Shank(3)	IC08	Recommended Machining Data f_z (mm/t)
ECA040F11-2C04	4.00	4.00	11.00	50.00	2	55.0	5.0	C	●	0.02-0.05
ECA060F13-2C06	6.00	6.00	13.00	57.00	2	55.0	5.0	C	●	0.03-0.07
ECA080F20-2C08	8.00	8.00	20.00	63.00	2	55.0	5.0	C	●	0.03-0.09
ECA100F22-2C10	10.00	10.00	22.00	72.00	2	55.0	5.0	C	●	0.03-0.10
ECA120F25-2C12	12.00	12.00	25.00	83.00	2	55.0	5.0	C	●	0.04-0.11
ECA160F32-2C16	16.00	16.00	32.00	92.00	2	55.0	5.0	C	●	0.05-0.13
ECA200F38-2C20	20.00	20.00	38.00	104.00	2	55.0	5.0	C	●	0.05-0.13
ECA250F45-2C25	25.00	25.00	45.00	121.00	2	55.0	5.0	C	●	0.05-0.13

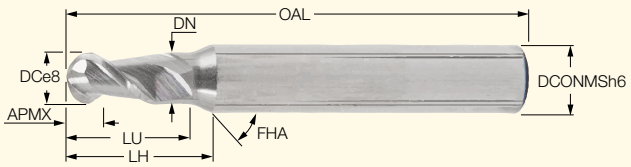
- For user guide, see page 103

(1) Number of flutes
(2) Maximum ramping angle
(3) C-Cylindrical

SOLIDMILL PREMIUM LINE

EBA-B2

2 Flute High Precision Solid Carbide Ball Nose Endmills for Machining Aluminum



Designation	Dimensions DC	DCONMS	APMX	OAL	LU	LH	DN	NOF(1)	FHA	Shank(2)	RETOLL(3)	RETOLU(4)	IC08
EBA-B2 010-010/02C6-57	1.00	6.00	1.00	57.00	2.0	12.0	0.95	2	45.0	C	0.000	0.004	●
EBA-B2 020-020/04C6-57	2.00	6.00	2.00	57.00	4.0	12.0	1.80	2	45.0	C	0.000	0.005	●
EBA-B2 030-030/06C6-57	3.00	6.00	3.00	57.00	6.0	12.0	2.70	2	45.0	C	-0.010	0.010	●
EBA-B2 040-040/08C6-57	4.00	6.00	4.00	57.00	8.0	12.0	3.70	2	45.0	C	-0.010	0.010	●
EBA-B2 050-050/10C6-57	5.00	6.00	5.00	57.00	10.0	12.0	4.70	2	45.0	C	-0.010	0.010	●
EBA-B2 060-060/12C6-57	6.00	6.00	6.00	57.00	12.0	13.0	5.50	2	45.0	C	-0.010	0.010	●

- For user guide, see page 103

(1) Number of flutes
(2) C-Cylindrical
(3) Corner radius tolerance lower
(4) Corner radius tolerance upper

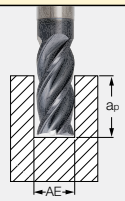
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Finishing

N (Non-Ferrous Metals)	
Tool Type	**Features**
ECA-H3-CF	• suitable for roughing and finishing operations • **CHATTERFREE** • full slot up to 1.5XDC and 2XDC * • excellent solution for low power machines
ECA-H3-CF-C	• suitable for roughing and finishing operations • **CHATTERFREE** • full slot up to 2XDC • internal coolant for better chip evacuation in deep cavity
ECAP-H3-CF	• suitable for roughing • chip splitter **CHATTERFREE** • internal coolant for better chip evacuation in deep cavity
ECA-H4-CF	• suitable for roughing and finishing operations • **CHATTERFREE** • full slot up to 1XDC
ECA-B-3	• suitable for roughing and finishing operations • excellent surface finish
ECR-B3-R	• suitable for roughing • good cheap evacuation

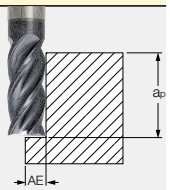
D 2x ROUGH: AE = 40% - Full Cut , A_p = 1.5xDC*

Material Group Parameters	Alu Wrought Alloy	Alu Cast Alloy	Copper Alloy	Electrolitic Copper	Non-Metallic
	21-22	23-25	26-27	28	29-30
V_c (IC08) (m/min)	700-760	400-550	500-520	350-360	350-360
F_z (Ø6–8) (mm/t)	0.02-0.04	0.02-0.04	0.02-0.04	0.02-0.04	0.02-0.04
F_z (Ø10-12) (mm/t)	0.03-0.05	0.03-0.05	0.03-0.05	0.03-0.05	0.03-0.05
F_z (Ø 16-20) (mm/t)	0.03-0.07	0.03-0.07	0.03-0.07	0.03-0.07	0.03-0.07



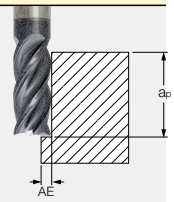
SEMI-FINISH: AE = 10% - 40%, A_p = 2 x DC

Material Group Parameters	Alu Wrought Alloy	Alu Cast Alloy	Copper Alloy	Electrolitic Copper	Non-Metallic
	21-22	23-25	26-27	28	29-30
V_c (IC08) (m/min)	760-840	550-700	520-530	360-370	360-370
F_z (Ø6–8) (mm/t)	0.04-0.06	0.04-0.06	0.03-0.05	0.03-0.05	0.03-0.05
F_z (Ø 10-12) (mm/t)	0.06-0.08	0.06-0.08	0.045-0.055	0.045-0.055	0.045-0.055
F_z (Ø 16-20) (mm/t)	0.08-0.1	0.08-0.1	0.055-0.07	0.055-0.07	0.055-0.07



FINISH / H.S.M: AE = 5% - 10%, A_p = Max. Cutting Length

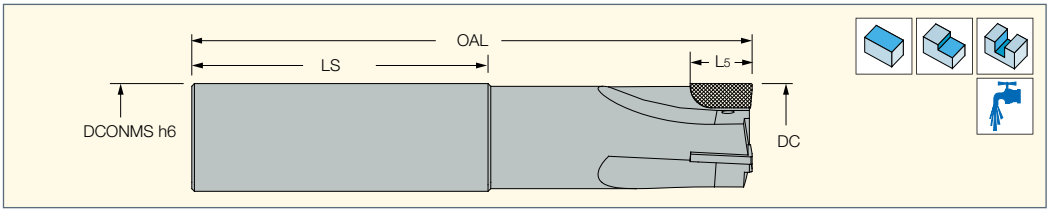
Material Group Parameters	Alu Wrought Alloy	Alu Cast Alloy	Copper Alloy	Electrolitic Copper	Non-Metallic
	21-22	23-25	26-27	28	29-30
V_c (IC08) (m/min)	840-900	700-900	530-550	370-380	370-380
F_z (Ø6–8)(mm/t)	0.045-0.07	0.045-0.07	0.035-0.06	0.035-0.06	0.035-0.06
F_z (Ø10-12) (mm/t)	0.07-0.1	0.07-0.1	0.06-0.07	0.06-0.07	0.06-0.07
F_z (Ø16-20) (mm/t)	0.1-0.15	0.1-015	0.065-0.08	0.065-0.08	0.065-0.08



PCD Endmills

ISCAR PCD LINE

SEHFD
PCD Endmills for Machining Aluminum, CFRP, Graphite, Specifically for Roughing and Finishing Applications



Designation		DC	DCONMS	OAL	LS	L5
SEHFD10Z03CM10L10R02	L	10.00	10.00	72.00	44.0	10.00
SEHFD12Z03CM12L10R02	L	12.00	12.00	83.00	50.0	10.00
SEHFD16Z03CM16L10R02	L	16.00	16.00	92.00	53.0	10.00

RECOMMENDED CUTTING PARAMETERS FOR ENDMILLS

The below cutting datas are purely an indication and are calculated assuming optimal working conditions; they can depend on stability of the fixture, the machine and the workpiece.
For more detailed information and for choosing the best grade, you should contact **ISCAR** PCD's offices.

Material	Grade	V_c (m/min)	F_z (mm/z)*	Axial Depht Of Cut (a_p)
Aluminum Alloys (Si <4%)	PCD	≤5000	0.05÷0.2	0.1÷5.0
Aluminum Alloys (Si 4÷8%)	PCD	≤4000	0.05÷0.2	0.1÷5.0
Aluminum Alloys (Si 9÷12%)	PCD	≤4000	0.05÷0.2	0.1÷5.0
Aluminum Alloys (Si>12%)	PCD	≤3000	0.03÷0.15	0.1÷3.0
Copper, Bronze, Brass, Zinc and Magnesium Alloys	PCD	≤5000	0.05÷0.3	0.1÷4.0
Graphite	PCD	≤2500	0.05÷0.2	0.1÷3.0
Gfk-Cfk	PCD	≤4000	0.08÷1.0	0.1÷5.0

* f_z value is strongly inluenced by V_c and a_p combined together

ISCAR

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Holemaking

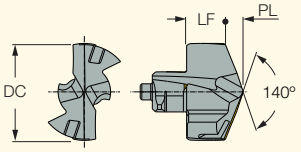


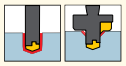
Exchangeable Drilling Heads

SUMOCHAM CHAMDRILL LINE

ICN
Exchangeable SUMOCHAM Drilling Heads for Machining ISO N Materials







Designation	Dimensions DC	PL	LF	SIG	SSC(1)	IC08
ICN 0476	4.76	0.710	2.84	140	4.0	●
ICN 051	5.10	0.680	3.02	140	5.0	●
ICN 054	5.40	0.730	2.97	140	5.0	●
ICN 0635	6.35	1.020	2.98	140	6.0	●
ICN 0794	7.94	1.180	3.42	140	7.0	●
ICN 0952	9.52	1.440	4.36	140	9.0	●
ICN 100	10.00	1.500	4.70	140	10.0	●
ICN 102	10.20	1.540	4.66	140	10.0	●
ICN 103	10.30	1.550	4.65	140	10.0	●
ICN 105	10.50	1.590	4.61	140	10.0	●
ICN 107	10.70	1.630	4.57	140	10.0	●
ICN 108	10.80	1.650	4.55	140	10.0	●
ICN 110	11.00	1.670	4.93	140	11.0	●
ICN 111	11.10	1.690	4.91	140	11.0	●
ICN 115	11.50	1.760	4.84	140	11.0	●
ICN 119	11.90	1.830	4.77	140	11.0	●
ICN 120	12.00	1.820	5.18	140	12.0	●
ICN 123	12.30	1.870	5.13	140	12.0	●
ICN 125	12.50	1.910	5.09	140	12.0	●
ICN 127	12.70	1.950	5.05	140	12.0	●
ICN 130	13.00	1.960	5.64	140	13.0	●
ICN 135	13.50	2.050	5.55	140	13.0	●
ICN 137	13.70	2.090	5.51	140	13.0	●
ICN 140	14.00	2.120	6.03	140	14.0	●
ICN 141	14.10	2.140	6.01	140	14.0	●
ICN 142	14.20	2.160	5.99	140	14.0	●
ICN 1427	14.27	2.170	5.98	140	14.0	●
ICN 145	14.50	2.210	5.94	140	14.0	●
ICN 147	14.70	2.250	5.90	140	14.0	●
ICN 150	15.00	2.270	6.46	140	15.0	●
ICN 157	15.70	2.400	6.33	140	15.0	●
ICN 158	15.80	2.420	6.31	140	15.0	●
ICN 1587	15.87	2.43	6.30	140	15.0	●
ICN 1588	15.88	2.43	6.30	140	15.0	●
ICN 160	16.00	2.420	6.88	140	16.0	●
ICN 165	16.50	2.510	6.79	140	16.0	●
ICN 167	16.70	2.550	6.75	140	16.0	●
ICN 170	17.00	2.590	7.31	140	17.0	●
ICN 175	17.50	2.680	7.22	140	17.0	●
ICN 180	18.00	2.730	7.77	140	18.0	●
ICN 185	18.50	2.820	7.68	140	18.0	●
ICN 190	19.00	2.880	8.12	140	19.0	●
ICN 1905	19.05	2.890	8.11	140	19.0	●
ICN 195	19.50	2.970	8.03	140	19.0	●
ICN 2062	20.62	3.130	8.47	140	20.0	●
ICN 2222	22.22	3.360	9.40	140	22.0	●
ICN 234	23.40	3.530	9.80	140	23.0	●
ICN 250	25.00	3.800	10.70	140	25.0	●
ICN 254	25.40	3.870	10.63	140	25.0	●
ICN 2857	28.57	4.350	11.87	140	28.0	●
ICN 3175	31.75	4.900	13.06	140	31.0	●

• The drill is manufactured with a sharp cutting edge and polished flutes • For cutting conditions see pages 107-110

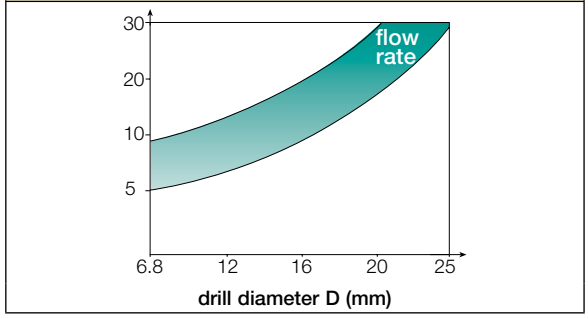
(1) Seat size code

ISCAR

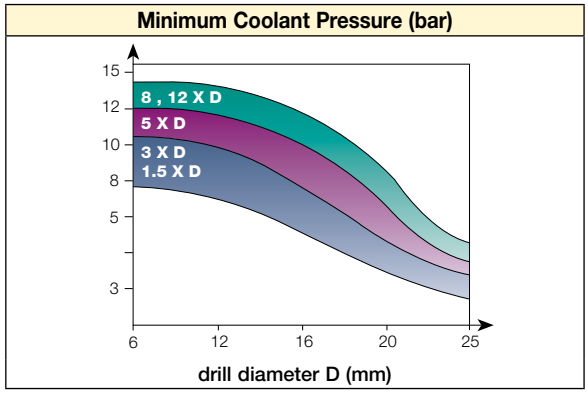
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

- Following is the recommended coolant flow rate and pressure.

Coolant Flow Rate (liter/min)



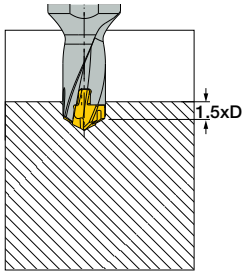
Minimum Coolant Pressure (bar)



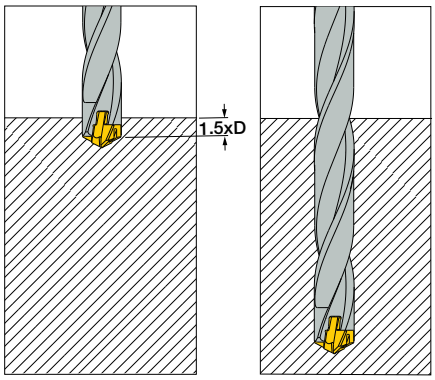
- For optimal performance, it is recommended to adjust runout of outer points or chisel with a maximum of 0.02 mm. Large runout will influence drill performance tool life and hole quality.
- No setup time is needed after indexing the **SUMOCHAM** drill head.
- **SUMOCHAM** drills can be used either on milling centers or lathe machines.
- When using **SUMOCHAM** drill in stationary (lathe) applications, we recommend using the **ISCAR GYRO** device or eccenter sleeve to reduce misalignment. Misalignment will cause poor performance of the **SUMOCHAM** drill or even tool breakage.

- Prior to using 8D or 12D drills, it is recommended to drill a 1.5xD pre-hole using a short tool assembled with same drilling head as for further operation
- Enter the pre-hole at slow speed and feed until 2-5 mm from its bottom. Start the cooling system and increase rotation to the recommended drilling speed. Hold for 2-3 seconds, then continue at the recommended drilling feed.

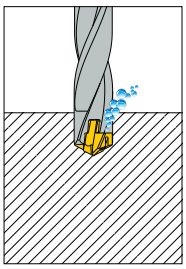
1 Pre-hole for a 1.5xD depth for piloting.



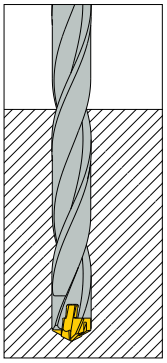
2 Enter the pre-hole at slow speed and feed until 2-5 mm from its bottom.



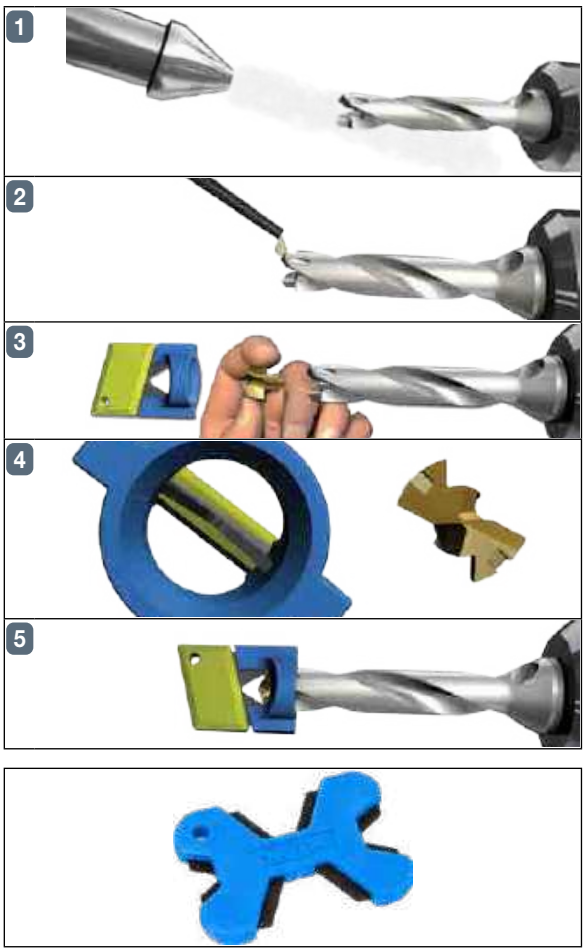
3 Start the cooling system and increase rotation to the recommended drilling speed.



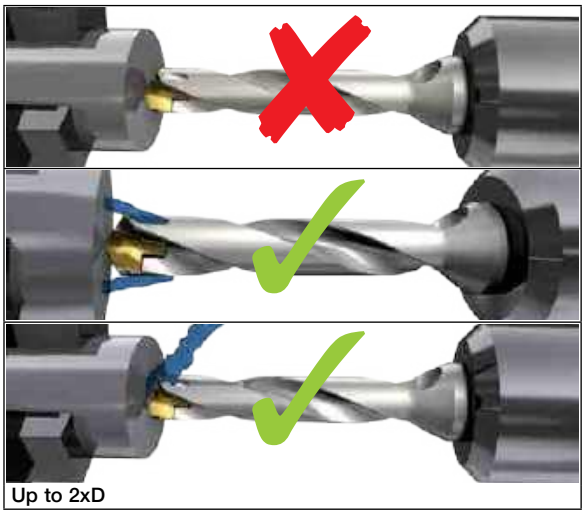
4 Hold for 2-3 seconds, then continue at the recommended drilling feed.



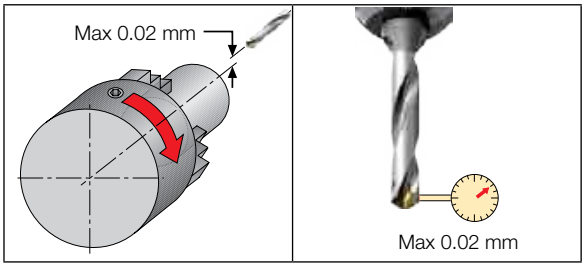
Drilling Head Mounting Procedure



Coolant Recommendations



Maximum Runout, Misalignment

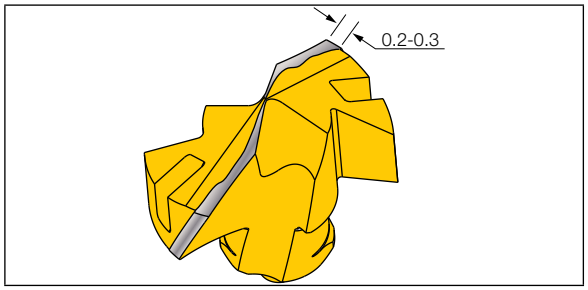


K DCN MULTI

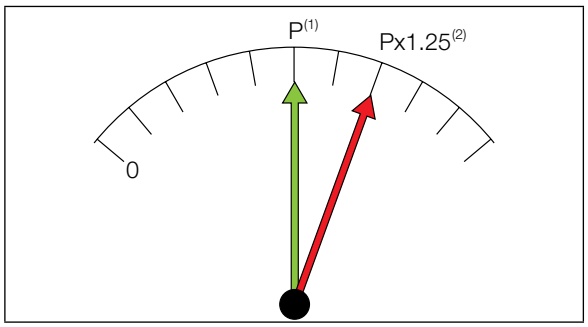
The optional K DCN MULTI key enables clamping all currently available **SUMOCHAM** drilling heads in a 6-26.9 mm diameter range.

Indication of Drill Head Wear

Wear Limit



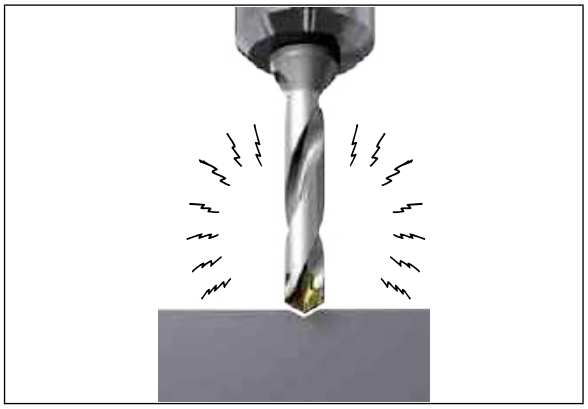
Power Restriction



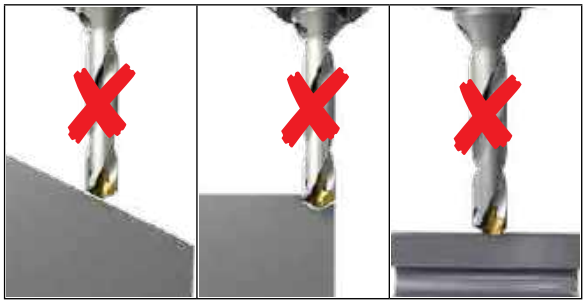
(1) New drilling head
(2) Worn-out drilling head

Diameter Change	Surface Finish Declines
Ø > D nominal + 0.15 mm D nominal Ø < D nominal - 0.03 mm	Ra

Vibration Noise Drastically Increases



Drilling Limitations



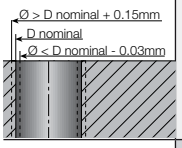
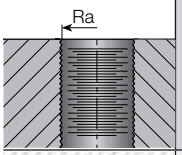
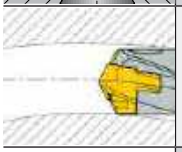
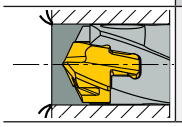
Recommended Machining Conditions for ICN Inserts

Mtl. No.	V m/min	SUMOCHAM Feed Vs. Drill Diameter D=4-4.9 mm/rev	D=5-5.9 mm/rev	D=6-7.99 mm/rev	D=8-9.99 mm/rev	D=20-25.9 mm/rev	D=26-32.9 mm/rev
21	90-**155**-220	0.04	0.10	0.12	0.20	0.45	0.50
22	90-**155**-220	**0.06**	**0.13**	**0.15**	**0.27**	**0.57**	**0.67**
23	90-**155**-220	0.08	0.15	0.18	0.35	0.70	0.75
24	90-**155**-220						
25	80-**120**-160						
26	90-**155**-220						
27	90-**155**-220						
28	90-**155**-220						

Recommended cutting data

According to the wear results, conditions can be changed to optimize performance
* For small diameters (4-5.99), reduce cutting speed by 20%
* When using more than 5xD drill ratio, reduce cutting parameters by 10%

Troubleshooting

	**Cutting Edge Chipping** 1 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 2 Reduce feed rate, increase speed. 3 If the drill vibrates, reduce cutting speed and increase feed rate. 4 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30-50% when entering and exiting. 5 Check cooling lubricant and increase coolant pressure. In case of external coolant supply, improve jet direction and add cooling jets.
	**Chisel Area Chipping** 1 Reduce feed rate. 2 Increase coolant pressure. 3 Check the adaptation. Use hydraulic clamping chuck, MAXIN power chuck or side lock systems. 4 Increase workpiece chucking force.
	**Excessive Flank Wear** 1 Reduce cutting speed. 2 Increase internal coolant pressure.
	**Excessive Flute Land Wear** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Reduce cutting speed. 3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30-50% when entering and exiting. 4 Increase coolant pressure. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 6 Increase workpiece chucking force stability and rigidity. 7 If there is low pocket gripping force - replace drill body.
	**Built-Up Edge** 1 Increase cutting speed/feed. 2 Increase coolant pressure.
	**Deviation of Hole Tolerance** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial cutting points). 2 Reduce feed rate. 3 Check the chisel point runout and make sure that it is within 0.02 mm T.I.R. 4 Wrong cutting edge. Replace head. 5 Increase workpiece chucking force. 6 Check the adaptation. Use hydraulic clamping chuck, MAXIN power chuck or side clamping systems. 7 Increase internal coolant pressure.
	**Surface Finish Too Rough** 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Adjust the feed for improved chip formation. 3 In case of chip jamming - increase the coolant flow and/or reduce the cutting speed. 4 Increase the coolant pressure. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R. 6 Use pecking cycle.
	**Hole Not Straight:** 1 Drill a pre-hole for centering by short tool. 2 Increase coolant pressure, improve jet direction in case of external coolant supply. 3 Increase the feed.
	Inaccurate Hole Position 1 Check the runout and make sure it is within 0.02 mm T.I.R. (radial and axial). 2 Check the stability of the machine spindle, tool and workpiece clamping rigidity. 3 When drilling rough, hard or sloped surfaces (up to 7°), reduce the feed rate by 30%-50% when entering. 4 Drill a pre-hole with a 140° point angle for centering. 5 Check the chisel point runout and make sure it is within 0.02 mm T.I.R.
	**Burrs on Exit** 1 Reduce the feed rate by 30%-50% when exiting. 2 Replace the worn head. 3 Check the adaptation. Use hydraulic clamping chuck, MAXIN power chuck or side clamping systems.

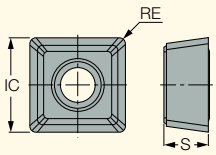
Indexable Drilling Insert

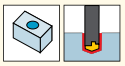
DR-TWIST INDEXABLE DRILL LINE

SOGX/T-AL

DR Drill Inserts for Aluminum







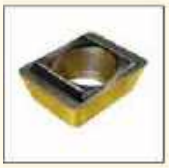
Designation	Dimensions IC	S	RE	IC08
SOGX 050204-AL	5.40	2.40	0.40	●
SOGX 060304-AL	6.20	3.20	0.40	●
SOGX 070305-AL	7.70	3.60	0.50	●
SOGT 09T306-AL	9.00	3.81	0.60	●
SOGT 120408-AL	12.70	4.76	0.80	●

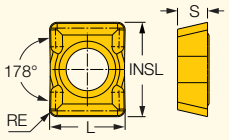
- Sharp cutting edge with polished rake for aluminum
- For user guide and cutting conditions, see pages 112-117

DR-TWIST INDEXABLE DRILL LINE

AOGT

Inserts for DR Drills







Designation	Dimensions L	S	RE	INSL	IC08
AOGT 040204-90AL	4.00	1.60	0.40	5.00	●

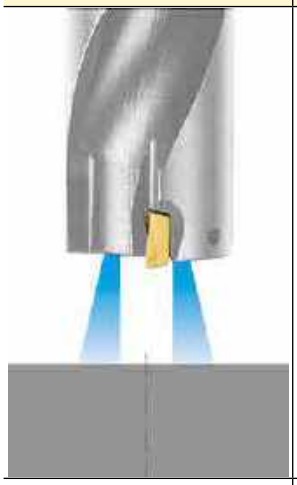
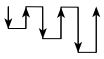
- Used on 12-13.5 mm DR drills
- For user guide and cutting conditions, see pages 112-117

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

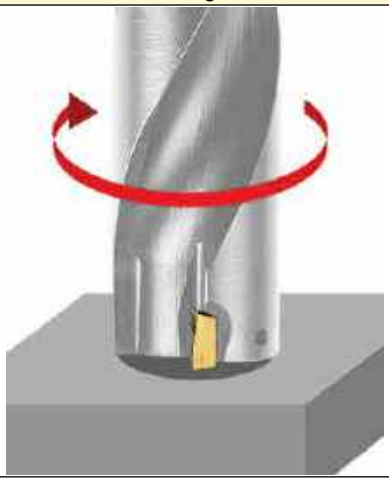
Machining Conditions

Cooling Methods

Directing the coolant through the tool is essential for reliable machining. This method prevents chip pile up, insert damage or breakage, and damage to the workpiece surface.

Internal Coolant	External Coolant
	
Apply standard cutting data.	Drilling depth is limited to 1.5xD. For larger depths, a pecking cycle is recommended. 

Rotating Drills



For Best Results

1 Check adapter rigidity.
2 Minimize drill runout in relation to spindle center line.
3 Use recommended cutting conditions.

Optimizing Chip Shape

Chip control is one of the most important factors for tool performance in order to facilitate chip evacuation and avoid tool damage.
Cutting conditions must be adjusted to achieve optimal chip shape.

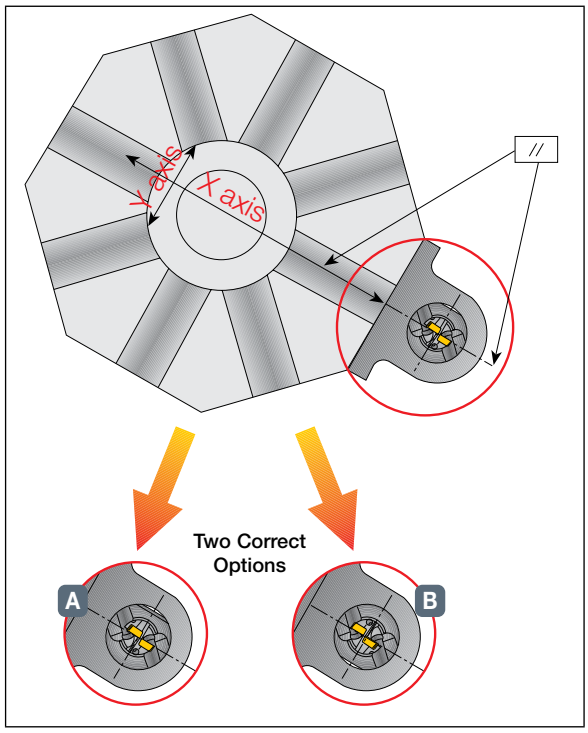
How to Achieve Optimal Chip Shape

too tight increase speed within recommended limits. if not satisfactory, decrease feed.	→ optimal shape ←	**too long** if machining at high speed, first reduce speed. if unsatisfactory, increase feed, but do not exceed upper limit.

Setup of Non-Rotating Drills

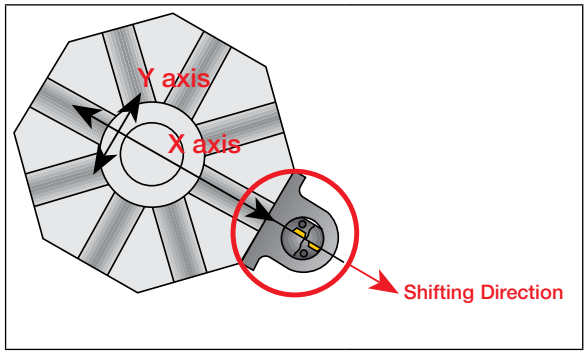
Drill Positioning on Turret Lathe

The peripheral insert cutting edge should be parallel to the machine X-axis.



The drill can be mounted on the X-axis or on a 180º rotation.

For better chip evacuation it is recommended to apply option **A** peripheral insert position.



Change hole diameter by shifting drill's center along lathe x-axis.

Diameter Change by Center Shift

DR-06	
D Nominal	**D Max. on Lathe**
16	19.5
17	20.0
18	20.5
19	21.0
20	21.5
21	22.0
22	23.0

DR-09	
D Nominal	**D Max. on Lathe**
23	28.5
24	29.0
25	29.5
26	30.0
27	30.5
28	31.0
29	31.5
30	32.0
31	32.5
32	33.3
33	34.0
34	34.5
35	35.0

DR-12	
D Nominal	**D Max. on Lathe**
34	39.5
35	40.0
36	40.5
37	41.0
38	41.5
39	42.0
40	42.5
41	43.0
42	43.5
43	44.0
44	44.5
45	51.0
46	51.5
47	52.0
48	52.5
49	53.0
50	54.0
51	54.5
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59	59.0
60	60.0

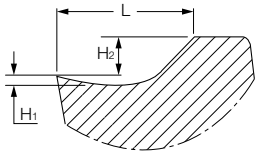
Applicable only when using SOMT inserts

Setup of Non-Rotating Drills

Machining Conditions

Optimizing Chip Shape for DR Drills

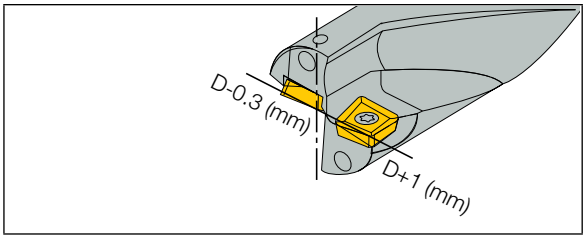
AL



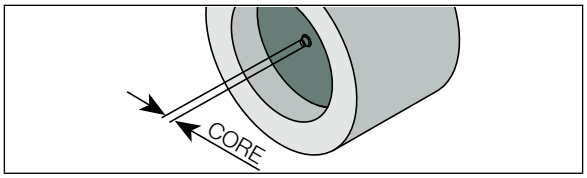
for medium up to high feed rates
for iso – n material
L – open
H2 – high
H1 – deep

Make Sure the Center Line of the Drill Is Aligned with the Spindle Center Line. It Is Recommended to Verify the Setup According to the Instructions Shown Below.

DR-06



Under regular conditions it is possible to adjust the center line of the drill (X-axis of the machine) in order to change hole diameter size.



1 Drill a hole 6 mm deep with the drill center line aligned with the spindle center line.
2 Check the existing core. If there is no core, check the alignment of the Y-axis of the drill and spindle. Correct by checking the adapter or adjusting the Y-axis.
3 Check that the hole diameter equals the drill diameter +0.0- +0.2 mm. If not, adjust the X-axis.
4 Note: In some operations, part of the core may break. If this occurs, use finger contact to verify if any core remains

Warning: As the drill goes all the way through a workpiece, it ejects a disc.
For worker safety, guards should be used.

Cutting Conditions

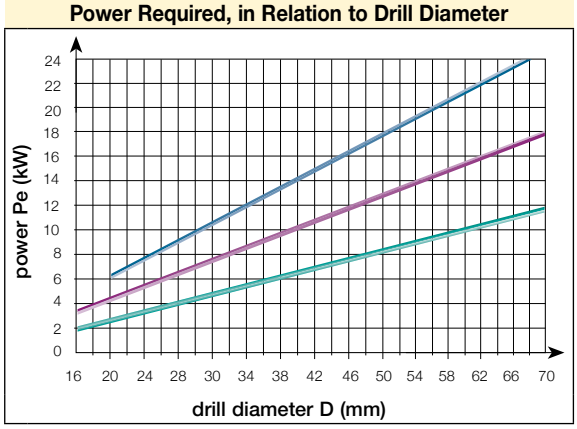
ISO	Material		Condition	Hardness HB	Group No.(1)	Mat. No.	Cutting Speed V_c m/min	DR-04 AL	Feed Vs. Drill Diameter mm/rev DR-05 AL	DR-06 AL	DR-07 AL	DR-09/10 AL	DR-11/12 AL
N	aluminum-wrought alloys		not hardenable	60	21	21	150-300	0.08-0.24	0.12-0.25	0.12-0.25	0.12-0.25	0.20-0.30	0.2-0.35
			hardenable	100	22	22							
	aluminum-cast alloys	≤12% Si	not hardenable	75	23	23							
			hardenable	90	24	24							
		>12% Si	high temperature	130	25	25	120-250						
	copper alloys	>1% Pb	free cutting	110	26	26	150-300						
			brass	90	27	27							
			electrolytic copper	100	28	28							
	non metallic		duroplastics, fiber plastics	70 shore D	29	29							
			hard rubber	55 shore D	30	30							

- When using external coolant supply only, reduce cutting speed by 10%
- This table refers to 2/3xD drill lengths • For 4xD and 5XD drills, decrease cutting data by 15%

Machining Conditions

Machine Power and Feed Force Requirements

Power Required, in Relation to Drill Diameter



f=0.25
f=0.18
f=0.1

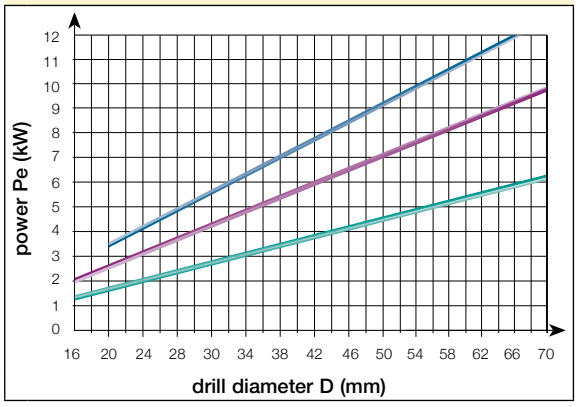
Machine Power

$$P = \frac{Pe \cdot C}{\eta}$$

V_c [m/min]	100	150	200
C	1.0	1.5	2.0

η=machine efficiency

Feed Force (thrust Force) Required, in Relation to Drill Diameter

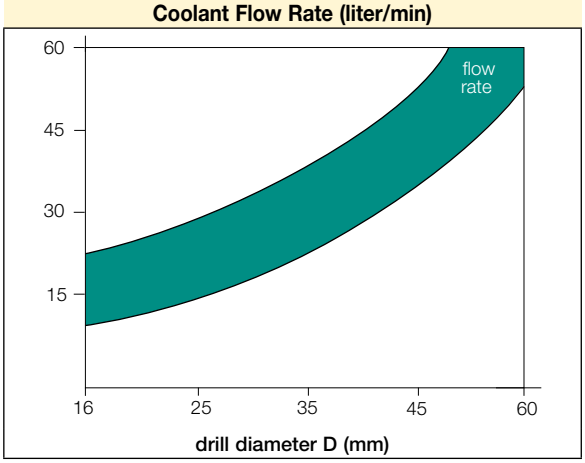


f=0.25
f=0.18
f=0.1

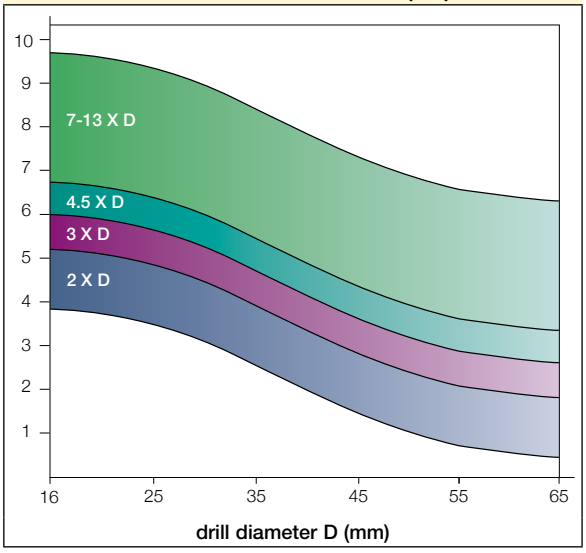
Internal Coolant Pressure

Selecting Coolant Pressure and Flow Rate

Coolant Flow Rate (liter/min)



Minimum Coolant Pressure (bar)



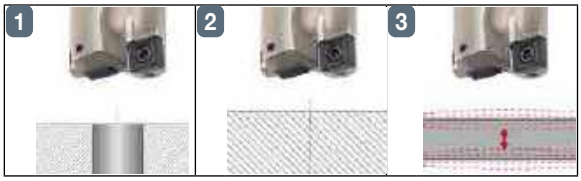
* For special drills more than 4xD, it is recommended to use high coolant pressure 15–70 bar

Troubleshooting

Irregular Conditions for DR Drills



If surface slope exceeds 5º, reduce feed by 50% during penetration or when exiting. It is preferred to pre-face the surface to eliminate slope.



1 Drilling into a pre-hole reduces feed to eliminate deflection(1) of the drill body.

2 Drilling an interrupted cut reduces feed during crossing to eliminate deflection(1) of the drill body.

3 Insufficient stability of workpiece requires additional support. Reduce feed.

(1) Deflection may be observed by a mark on the drill body.

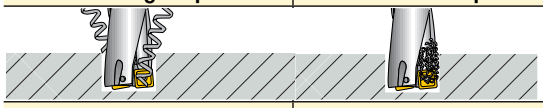
Stacked Plates

Drilling operation is not recommended, but may be done by specially designed drills. Apply standard cutting data.

Regular Conditions for DR Drills



Indexable Insert Drills - Troubleshooting DR Chips

Chip Jamming Due to Long Chips	Chip Jamming Despite Short Chips
	
Solutions	**Solutions**
1 Increase feed. 2 Long chips that rotate around the drill are problematic. If chip formation can not be improved by changing the machining conditions, use a pecking cycle. 	1 Increase coolant pressure/volume. 2 Reduce cutting speed.

Undersized Holes	Oversized Holes
	

Rotating Drill

- Check that overlapping is correct between inner and outer inserts.
- Check inner insert over center.
- Increase coolant pressure.

Non-Rotating Drill

- Check misalignment.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert over center.
- Rotate drill 180 degrees.
- Increase coolant pressure.

Pin in Hole	Vibrations
	

Rotating Drill

- Use shorter drill overhang (if possible).
- Reduce feed by 30-50%.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert is positioned over center within its limits.
- Increase coolant pressure.

Non-Rotating Drill

- Check misalignment.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert over center.
- Rotate drill 180 degrees.
- Increase coolant pressure.

Troubleshooting

Cone Hole



Rotating Drill
- Use shorter drill overhang (if possible).
- Reduce feed by 30-50%.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert is positioned over center within its limits.
- Increase coolant pressure.

Non-Rotating Drill
- Check misalignment.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert is positioned over center within its limits.
- Rotate drill 180 degrees.
- Increase coolant pressure.

Bad Surface Finish



Rotating Drill
- Improve chip formation (change cutting condition).
- Increase coolant pressure.
- Increase speed and reduce feed.
- Stabilize clamping device.

Non-Rotating Drill
- Improve chip formation (change cutting condition).
- Increase coolant pressure.
- Increase speed and reduce feed.
- Stabilize clamping device.

Chip Jamming



Rotating Drill
- Improve chip formation (change or cutting condition).
- Increase coolant pressure.

Non-Rotating Drill
- Improve chip formation (change or cutting condition).
- Increase coolant pressure.

Deflection



Rotating Drill
- Use shorter drill overhang (if possible).
- Reduce feed by 30-50%.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert is positioned over center within its limits.
- Increase coolant pressure.
- Stabilize clamping device.

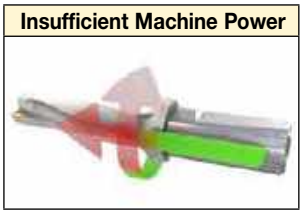
Non-Rotating Drill
- Check misalignment.
- Check that overlapping is correct between inner and outer inserts.
- Check inner insert is positioned over center within its limits.
- Rotate drill 180 degrees.
- Increase coolant pressure.

Broken Screw



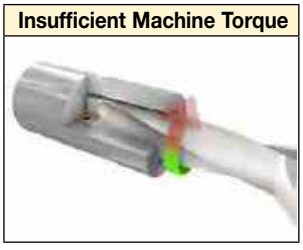
- Use recommended torque wrench.
- Lubricate the screw before tightening.

Insufficient Machine Power



- Reduce speed and feed.

Insufficient Machine Torque

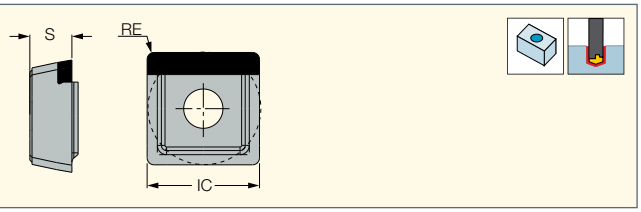


- Reduce feed.

PCD Indexable Drilling Inserts

ISCAR PCD LINE

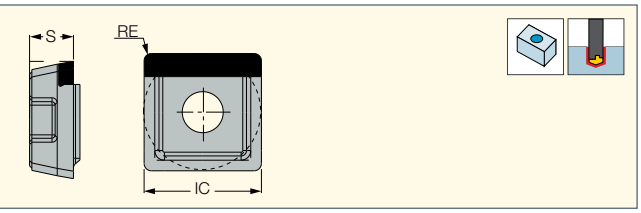
SOMX
Inserts for DR Drills with Brazed PCD Tip for Machining ISO N Materials



Designation	Dimensions IC	S	RE	ID5
SOMX 050204	5.40	2.40	0.40	●
SOMX 060304	6.20	3.20	0.40	●
SOMX 070305	7.70	3.60	0.50	●

ISCAR PCD LINE

SOMT
Inserts for DR Drills with Brazed PCD Tip for Machining ISO N Materials



Designation	Dimensions IC	S	RE	ID5
SOMT 09T306	9.00	3.81	0.60	●
SOMT 120408	12.70	4.76	0.80	●
SOMT 160512	16.00	5.56	1.20	●

Cutting Conditions

ISO	Material		Condition	Hardness HB	Group No.(1)	Mat. No.	Cutting Speed V_c m/min	Feed Vs. Drill Diameter mm/rev DR-05 PCD	DR-06 PCD	DR-07 PCD	DR-09 PCD	DR-12/16 PCD
N	aluminum-wrought alloys		not hardenable	60	21	21	300-600	0.08-0.25	0.08-0.25	0.08-0.25	0.1-0.25	0.1-0.25
			hardenable	100	22	22						
	aluminum-cast alloys	≤12% Si	not hardenable	75	23	23						
			hardenable	90	24	24						
		>12% Si	high temperature	130	25	25						
	copper alloys	>1% Pb	free cutting	110	26	26						
			brass	90	27	27						
			electrolytic copper	100	28	28						
	non metallic		duroplastics, fiber plastics	70 shore D	29	29						
			hard rubber	55 shore D	30	30						

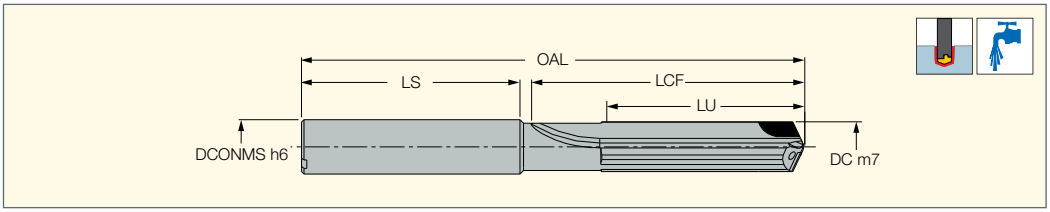
- When using external coolant supply only, reduce cutting speed by 10%
- This table refers to 2/3xD drill lengths • For 4xD and 5XD drills, decrease cutting data by 15%

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Solid Carbide Drills With Brazed PCD Tips

ISCAR PCD LINE

MPD
Solid Carbide Drills with Brazed PCD Tips, Internal Coolant Channels.



Designation	DC	DCONMS	OAL	LU	LS	LCF
MPD 050-025-06C-5D	5.00	6.00	82.00	35.00	36.0	42.0
MPD 060-030-06C-5D	6.00	6.00	82.00	35.00	36.0	44.0
MPD 068-034-08C-5D	6.80	8.00	91.00	43.00	36.0	53.0
MPD 070-035-08C-5D	7.00	8.00	91.00	43.00	36.0	53.0
MPD 080-040-08C-5D	8.00	8.00	91.00	43.00	36.0	53.0
MPD 085-043-010C-5D	8.50	10.00	103.00	49.00	40.0	60.0
MPD 090-045-010C-5D	9.00	10.00	103.00	49.00	40.0	61.0
MPD 100-050-010C-5D	10.00	10.00	103.00	49.00	40.0	61.0
MPD 102-051-012C-5D	10.20	12.00	118.00	56.00	45.0	71.0
MPD 110-055-012C-5D	11.00	12.00	118.00	56.00	45.0	71.0
MPD 120-060-012C-5D	12.00	12.00	118.00	56.00	45.0	71.0
MPD 130-065-014C-5D	14.00	14.00	124.00	60.00	45.0	77.0
MPD 140-070-014C-5D	14.00	14.00	124.00	60.00	45.0	77.0
MPD 160-080-016C-5D	16.00	16.00	133.00	63.00	45.0	83.0
MPD 180-090-018C-5D	18.00	18.00	143.00	71.00	48.0	93.0
MPD 200-100-020C-5D	20.00	20.00	153.00	77.00	48.0	101.0

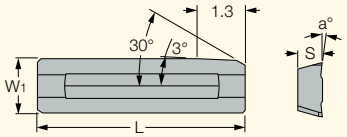
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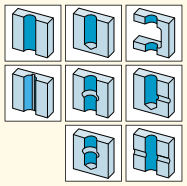
Interchangeable High Precision Reaming Heads

INDEXH-REAM

RM-SEI-B
Single-Edged Reaming Inserts for General Applications at High Cutting Speeds





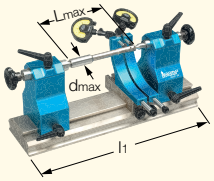


Designation	SSC(1)	a°	L	W1	S	Tough ↔ Hard IC30N	IC07	IC507	IC907
RM-SEI-1B-00	1.0	0	15.50	2.80	1.50				•
RM-SEI-1B-06	1.0	6	15.50	2.80	1.50			•	•
RM-SEI-1B-12	1.0	12	15.50	2.80	1.50		●		•
RM-SEI-2B-00	2.0	0	15.50	3.60	1.50				•
RM-SEI-2B-06	2.0	6	15.50	3.60	1.50			•	•
RM-SEI-2B-12	2.0	12	15.50	3.60	1.50		●		•
RM-SEI-3B-00	3.0	0	17.00	4.40	2.00				•
RM-SEI-3B-06	3.0	6	17.00	4.40	2.00			•	•
RM-SEI-3B-12	3.0	12	17.00	4.40	2.00		●		•
RM-SEI-4B-06	4.0	6	22.50	6.60	3.00	•		•	•
RM-SEI-4B-12	4.0	12	22.50	6.60	3.00		●		•

• Lead type of insert should be compatible with lead type of the tool
(1) Insert size
● First choice grade

Accessories

RM SETTING DEVICE
Reamer Setting Device





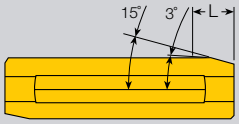
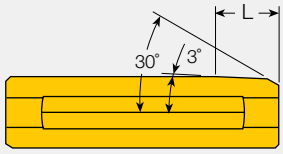
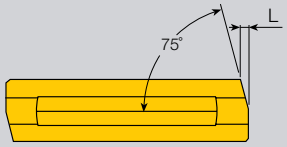
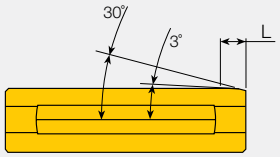
Designation	L max	l1	d max	kg
RM SETTING DEVICE	265.0	450.00	170.0	25.00

ISCAR

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

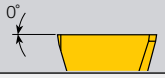
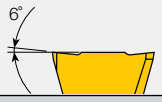
Front Angles and Cutting Geometries

4 Standard Lead Angles Are Available:

Lead	L [mm]	Use
A	3	higher surface quality, lower cutting conditions (not recommended for nonferrous materials) 
B	1.3	universal use, high speed cutting conditions. can be used on a wide range of materials 
C	0.55	suitable for aluminum and brass at high cutting speed 
D(1)	0.6	when needed for blind hole - lower feed 

(1) On request

3 Standard Cutting Angles Are Available:

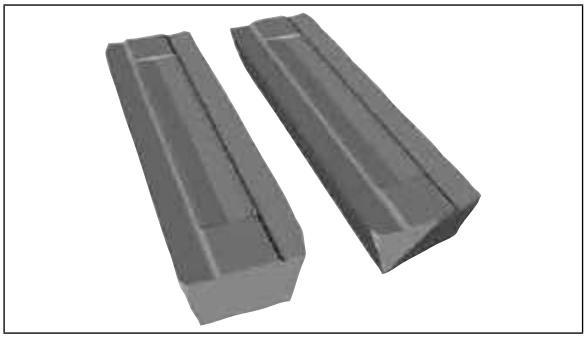
	Angle [deg.]	Use
00		for cast iron applications
06		general use
12		for stainless steel and aluminum

Carbide Grades

IC07 grade is the basic substrate for reaming inserts. It is a very versatile submicron grade. **IC07** features very high fracture toughness and wear resistance, which is required for efficient high speed reaming. An uncoated **IC07** can be used for machining nonferrous (N type material group) applications.

The following grades can be provided on request:

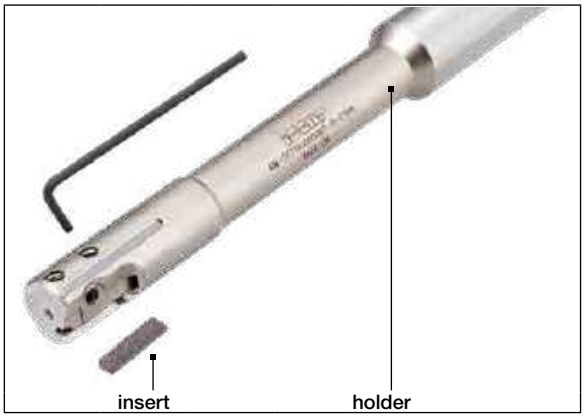
- **PCD** grade for machining aluminum



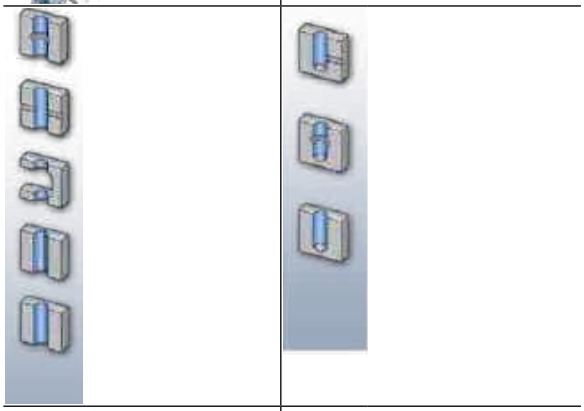
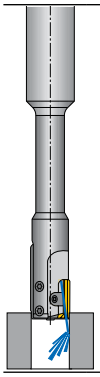
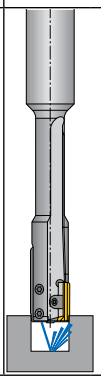
Concept

The **INDEX-H-REAM** Line is available in 4 sizes and features two different holder geometries (short flute and long flute). The holder selection depends on the hole type (through or blind).

RM-SEI-1	RM-SEI-2	RM-SEI-3	RM-SEI-4
			
Ø8.00-9.99 mm (Ø.315-.393")	Ø10.00-11.99 mm (Ø.393-.472")	Ø12.00-25.99 mm (Ø.472-1.024")	Ø26.00-32.00 mm (Ø1.024-1.260")



Applications

Through Hole	Blind Hole
	
Through Hole Short flute holder. This holder has a lateral coolant outlet located right above the insert. The coolant is pointed directly to the cutting edge to lubricate it and divert the chips forward. Additional coolant outlets are located behind the guiding pads. Their purpose is to reduce high friction that is created between the pads and the reamed surface during machining.	**Blind Hole** Long flute holder. This holder has a front coolant outlet. The liquid reaches the bottom of the blind hole and evacuates the formed chips. These chips are conveyed backwards through the long chip gullet (flute) of the holder.
	

Setting Procedure

1 Place the reamer between the centering pins of the device.



2 Use the pad as a reference for setting the indicator to zero.



3 Rotate and place the inserts against indicators.



4 Tighten the adjustment screws in a clockwise direction.





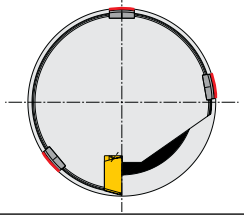
5 Adjust the frontal side of the insert to:
+15 µm (+0.6 µin) on D≤9.99,
+20 µm (+0.8 µin) on D≤10.00

6 Adjust the rear side of insert to:
+5 µm (+0.2 µin) on D≤9.99,
+10 µm (+0.4 µin) on D≤10.00

Back Taper

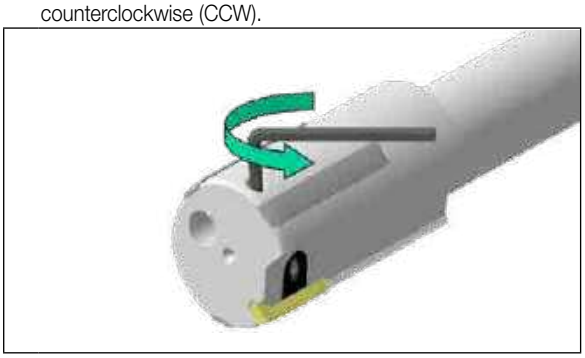
The back taper prevents the reamer from jamming, as well as lowering reaming forces and improving surface quality. Incorrect back taper may cause unstable reaming, accelerated wear and rough surface finish.

High Friction Lubricated Zones

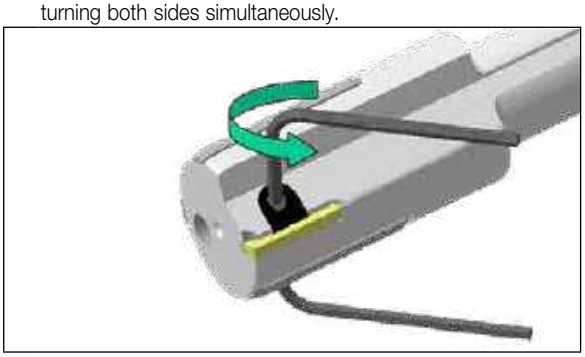


Insert Indexing

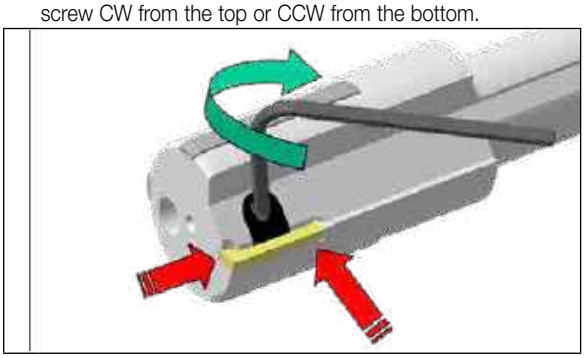
1 Rotate the adjustment screws one turn counterclockwise (CCW).



2 Rotate the clamping screw CCW from the top and/or clockwise (CW) from the bottom, turning both sides simultaneously.



3 Remove the insert. Clean the insert and the pocket. Place the sharp edge on the outer position. Press the insert against the back stopper and the two adjustment pins. Tighten the clamping wedge by rotating the clamping screw CW from the top or CCW from the bottom.



Setting Methods

There are two optional setting methods - comparison micrometer and setting device. Comparison micrometer with dial gauge, although a low cost solution and readily available for small workshops, is prone to damaging the cutting edge and therefore not recommended.

Using a Comparison Micrometer
Set the micrometer to the correct diameter using the precision blocks. Adjust the frontal diameter and back taper by turning the adjustment screw clockwise. The front diameter should be larger than the rear diameter by approximately 0.015 mm.(0.6 µin).

Using a Setting Device
ISCAR's mechanical setting device enables easy, quick and accurate adjustment. Due to its modular construction, it can be used for standard, special and more complicated reamer adjustments.

Setting Device Located Between Centers

- shorter setting time
- modular system
- higher accuracy
- no risk of damaging the cutting edge





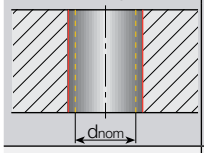
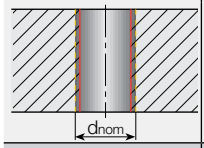
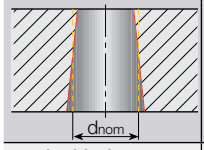
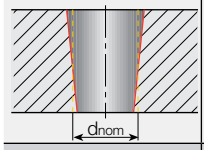
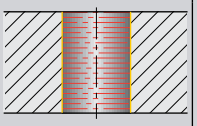
H-REAM Cutting Conditions

The cutting conditions in the table below should be used to start a new application. Optimal conditions for a specific application should be evaluated by examining the results and changing the machining conditions accordingly.

Material No.	Material	Lead A=15°/3° L3 (Reaming Allowance = 0.1-0.3)			Lead B=30°/3° L1.3 (Reaming Allowance = 0.1-0.3)			
		Cutting Speed V_c [m/min]					Cutting Speed V_c [m/min]	
		PCD			Feed [mm/rev]	Rake [°]	Carbide	PCD
21-22	aluminum-wrought alloys	please ask			0.1-0.3	12	160-200	please ask
23-25	aluminum-cast alloys				0.1-0.3	12	160-200	
26-28	copper alloys				0.1-0.2	0	80-100	
29-30	non metallic				0.1-0.3	0	10-70	

Material No.	Material	Lead D=30°/3° L0.6 (Reaming Allowance = 0.1-0.2)				Lead C=75°/3° L0.55 (Reaming Allowance = 0.2-0.4)			
				Cutting Speed V_c [m/min]				Cutting Speed V_c [m/min]	
		Feed [mm/rev]	Rake [°]	Carbide	PCD	Feed [mm/rev]	Rake [°]	Carbide	PCD
21-22	aluminum-wrought alloys	0.05-0.2	12	110-200	please ask	0.15-0.3	12	150-250	please ask
23-25	aluminum-cast alloys	0.05-0.2	12	180-200		0.15-0.3	12	150-250	
26-28	copper alloys	0.05-0.2	0	80-100					
29-30	non metallic								

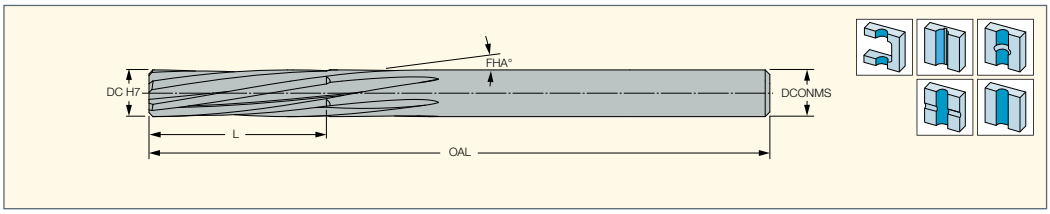
Troubleshooting

Problem	Cause	Solution
hole too large 	• reamer or pilot hole not centered • reamer too large • cooling / lubrication problems	• use a floating reamer chuck or correct pilot hole • check size of reamer and correct if necessary • change lubricant and increase coolant pressure
hole too small 	• worn reamer • reaming allowance too small • cooling / lubrication problems	• replace the reamer • increase reaming allowance • change lubricant and increase coolant pressure
conical hole (larger bottom) 	• misalignment between pre hole and reamer centers	• re-align or use a floating reamer chuck
conical hole (larger entrance) 	• misalignment between pre-hole and reamer centers • material jammed between reamer and hole in the upper hole section	• re-align or use a floating reamer chuck • secure the tool axially
poor surface finish 	• worn reamer • misalignment between pre-hole and reamer centers • problems with chip evacuation • incorrect cutting parameters • built-up edge	• replace the tool • re-align or use a floating reamer chuck • increase coolant pressure • change cutting parameters • change cutting parameters or coolant conditions

SOLIDH-REAM

RM-FCR-H7N-CS-C

DIN 212B Solid Carbide Reamers with Helical Flutes and a Cylindrical Shank for Through Holes



Designation	Dimensions						IC07
	DC	L	OAL	NOF(1)	FHA	DCONMS	
RM-FCR-0300-H7N-CS-C	3.00	15.00	61.00	5	10.0	3.00	●
RM-FCR-0350-H7N-CS-C	3.50	18.00	70.00	5	10.0	3.50	●
RM-FCR-0400-H7N-CS-C	4.00	19.00	75.00	5	10.0	4.00	●
RM-FCR-0450-H7N-CS-C	4.50	21.00	80.00	5	10.0	4.50	●
RM-FCR-0500-H7N-CS-C	5.00	23.00	86.00	5	10.0	5.00	●
RM-FCR-0550-H7N-CS-C	5.50	26.00	93.00	6	10.0	5.50	●
RM-FCR-0600-H7N-CS-C	6.00	26.00	93.00	6	10.0	6.00	●
RM-FCR-0650-H7N-CS-C	6.50	28.00	101.00	6	10.0	6.50	●
RM-FCR-0700-H7N-CS-C	7.00	31.00	109.00	6	10.0	7.00	●
RM-FCR-0750-H7N-CS-C	7.50	33.00	117.00	6	10.0	7.50	●
RM-FCR-0800-H7N-CS-C	8.00	33.00	117.00	6	10.0	8.00	●
RM-FCR-0850-H7N-CS-C	8.50	36.00	125.00	6	10.0	8.50	●
RM-FCR-0900-H7N-CS-C	9.00	36.00	125.00	6	10.0	9.00	●
RM-FCR-0950-H7N-CS-C	9.50	38.00	133.00	6	10.0	9.50	●
RM-FCR-1000-H7N-CS-C	10.00	38.00	133.00	6	10.0	10.00	●
RM-FCR-1050-H7N-CS-C	10.50	41.00	142.00	7	10.0	10.50	●
RM-FCR-1100-H7N-CS-C	11.00	41.00	142.00	7	10.0	11.00	●
RM-FCR-1200-H7N-CS-C	12.00	44.00	151.00	7	10.0	12.00	●
RM-FCR-1300-H7N-CS-C	13.00	44.00	151.00	7	10.0	13.00	●
RM-FCR-1400-H7N-CS-C	14.00	47.00	160.00	7	10.0	14.00	●
RM-FCR-1500-H7N-CS-C	15.00	50.00	162.00	7	10.0	15.00	●
RM-FCR-1600-H7N-CS-C	16.00	52.00	170.00	7	10.0	16.00	●

- Hole tolerance: H7 manufacturing tolerance according to DIN1420
- Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated
- Special diameters are available on request
- For user guide and cutting conditions, see pages 127-129

(1) Number of flutes

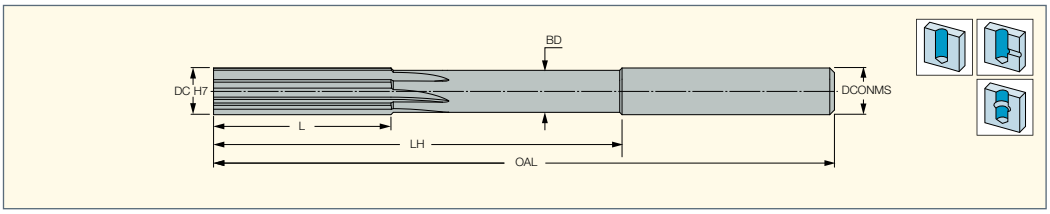
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SOLIDH-REAM

RM-FCR-H7S-CS-C

DIN 212C Solid Carbide Reamers with Straight Flutes and a Cylindrical Shank for Blind Holes



Designation	Dimensions							IC07
	DC	L	LH	BD	OAL	NOF(1)	DCONMS	
RM-FCR-0300-H7S-CS-C	3.00	15.00	30.0	-	61.00	6	3.00	●
RM-FCR-0320-H7S-CS-C	3.20	18.00	33.0	-	70.00	6	3.20	●
RM-FCR-0350-H7S-CS-C	3.50	18.00	33.0	-	70.00	6	3.50	●
RM-FCR-0400-H7S-CS-C	4.00	19.00	44.0	3.50	75.00	6	4.00	●
RM-FCR-0450-H7S-CS-C	4.50	21.00	46.0	4.00	80.00	6	4.50	●
RM-FCR-0500-H7S-CS-C	5.00	23.00	53.0	4.30	86.00	6	5.00	●
RM-FCR-0550-H7S-CS-C	5.50	26.00	56.0	4.50	93.00	6	5.60	●
RM-FCR-0600-H7S-CS-C	6.00	26.00	56.0	5.00	93.00	6	5.60	●
RM-FCR-0650-H7S-CS-C	6.50	28.00	63.0	5.50	101.00	6	6.30	●
RM-FCR-0700-H7S-CS-C	7.00	31.00	69.0	6.50	109.00	6	7.10	●
RM-FCR-0750-H7S-CS-C	7.50	31.00	69.0	6.50	109.00	6	7.10	●
RM-FCR-0800-H7S-CS-C	8.00	33.00	75.0	7.00	117.00	6	8.00	●
RM-FCR-0850-H7S-CS-C	8.50	33.00	75.0	7.00	117.00	6	8.00	●
RM-FCR-0900-H7S-CS-C	9.00	36.00	81.0	8.00	125.00	6	9.00	●
RM-FCR-0950-H7S-CS-C	9.50	36.00	81.0	8.00	125.00	6	9.00	●
RM-FCR-1000-H7S-CS-C	10.00	38.00	87.0	9.00	133.00	6	10.00	●
RM-FCR-1050-H7S-CS-C	10.50	38.00	87.0	9.00	133.00	6	10.00	●
RM-FCR-1100-H7S-CS-C	11.00	41.00	96.0	9.00	142.00	6	10.00	●
RM-FCR-1200-H7S-CS-C	12.00	44.00	105.0	9.00	151.00	6	10.00	●
RM-FCR-1300-H7S-CS-C	13.00	44.00	105.0	9.00	151.00	6	10.00	●
RM-FCR-1400-H7S-CS-C	14.00	47.00	110.0	11.50	160.00	8	12.50	●
RM-FCR-1500-H7S-CS-C	15.00	50.00	112.0	11.50	162.00	8	12.50	●
RM-FCR-1600-H7S-CS-C	16.00	52.00	120.0	11.50	170.00	8	12.50	●

- Hole tolerance: H7 manufacturing tolerance according to DIN1420
- Available grades: IC07 - uncoated, optional: IC907 - TiAlN PVD coated
- Special diameters are available on request
- For user guide and cutting conditions, see pages 127-129

(1) Number of flutes

Machining Conditions for Solid Carbide Reamers

Material	Tensile Strength or Brinell Hardness N/mm² Bzw. HB	Reamer Diameter mm	Reaming Allowance Relative to Diameter	Feed mm/rev	Cutting Speed m/min
Aluminum Alloy		up to 10	0.06-0.12	0.20-0.30	Si<7% 10-30
	over 80 HB	10-25	0.10-0.30	0.30-0.50	
		25-40	0.30-0.50	0.40-0.70	Si<7% 30-60
Copper		up to 10	0.10-0.20	0.30-0.60	
		10-25	0.20-0.40	0.40-0.80	20-60
		25-40	0.40-0.60	0.50-1.00	
Brass Red Bronze Cast Bronze		up to 10	0.06-0.12	0.20-0.30	
		10-25	0.10-0.30	0.30-0.50	15-50
		25-40	0.30-0.50	0.40-0.70	
Thermoset Polymers		up to 10	0.10-0.25	0.30-0.60	
		10-25	0.20-0.40	0.40-0.80	15-30
		25-40	0.40-0.60	0.50-1.00	

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Reamer Manufacturing Tolerances

Nominal Diameter of Reamer D1 in mm		Reamer Manufacturing Tolerances DIN 1420 Admissible Maximum and Minimum Reamer Dimensions of Nominal Diameter D1 in Mm for Drilling Tolerance Range									
Over	Up To	A9	A11	B8	B9	B10	B11	C8	C9	C10	C11
1	3	+291	+321	+151	+161	+174	+191	+ 71	+ 81	+ 94	+111
		+282	+300	+146	+152	+160	+170	+ 66	+ 72	+ 80	+ 90
3	6	+295	+333	+155	+165	+180	+203	+ 85	+ 95	+110	+133
		+284	+306	+148	+154	+163	+176	+ 78	+ 84	+ 93	+106
6	10	+310	+356	+168	+180	+199	+226	+ 98	+110	+129	+156
		+297	+324	+160	+167	+178	+194	+ 90	+ 97	+108	+124
10	18	+326	+383	+172	+186	+209	+243	+117	+131	+154	+188
		+310	+344	+162	+170	+184	+204	+107	+115	+129	+149
18	30	+344	+410	+188	+204	+231	+270	+138	+154	+181	+220
		+325	+364	+176	+185	+201	+224	+126	+135	+151	+174
30	40	+362	+446	+203	+222	+255	+206	+153	+172	+205	+256
		+340	+390	+189	+200	+220	+250	+139	+150	+170	+200
40	50	+372	+456	+213	+232	+265	+316	+163	+182	+215	+266
		+350	+400	+199	+210	+230	+260	+149	+160	+180	+210
50	65	+402	+501	+229	+252	+292	+351	+179	+202	+242	+301
		+376	+434	+212	+226	+250	+284	+162	+176	+200	+234
65	80	+422	+521	+239	+262	+302	+361	+189	+212	+252	+311
		+396	+454	+222	+236	+260	+294	+172	+186	+210	+244
80	100	+453	+567	+265	+293	+339	+407	+215	+243	+289	+357
		+422	+490	+246	+262	+290	+330	+196	+212	+240	+280
100	120	+483	+597	+285	+313	+359	+427	+225	+253	+299	+367
		+452	+520	+266	+282	+310	+350	+206	+222	+250	+290
120	140	+545	+672	+313	+345	+396	+472	+253	+285	+336	+412
		+510	+584	+290	+310	+340	+384	+230	+250	+280	+324
140	160	+605	+732	+333	+365	+416	+492	+263	+295	+346	+422
		+570	+644	+310	+330	+360	+404	+240	+260	+290	+334
160	180	+665	+792	+363	+395	+446	+522	+283	+315	+366	+442
		+630	+704	+340	+360	+390	+434	+260	+280	+310	+354

Over	Up To	D8	D9	D10	D11	E7	E8	E9	F6	F7	F8	F9	G6	G7
1	3	+ 31	+ 41	+ 54	+ 71	+ 22	+ 25	+ 35	+ 11	+ 14	+ 17	+ 27	+ 7	+ 10
		+ 26	+ 32	+ 40	+ 50	+ 18	+ 20	+ 26	+ 8	+ 10	+ 12	+ 18	+ 4	+ 6
3	6	+ 45	+ 55	+ 70	+ 93	+ 30	+ 35	+ 45	+ 16	+ 20	+ 25	+ 35	+ 10	+ 14
		+ 38	+ 44	+ 53	+ 66	+ 25	+ 28	+ 34	+ 13	+ 15	+ 18	+ 24	+ 7	+ 9
6	10	+ 58	+ 70	+ 89	+116	+ 37	+ 43	+ 55	+ 20	+ 25	+ 31	+ 43	+ 12	+ 17
		+ 50	+ 57	+ 68	+ 84	+ 31	+ 35	+ 42	+ 16	+ 19	+ 23	+ 30	+ 8	+ 11
10	18	+ 72	+ 86	+109	+143	+ 47	+ 54	+ 68	+ 25	+ 31	+ 38	+ 52	+ 15	+ 21
		+ 62	+ 70	+ 84	+104	+ 40	+ 44	+ 52	+ 21	+ 24	+ 28	+ 36	+ 11	+ 14
18	30	+ 93	+109	+136	+175	+ 57	+ 68	+ 84	+ 31	+ 37	+ 48	+ 64	+ 18	+ 24
		+ 81	+ 90	+106	+129	+ 49	+ 56	+ 65	+ 26	+ 29	+ 36	+ 45	+ 13	+ 16
30	50	+113	+132	+165	+216	+ 71	+ 83	+ 102	+ 38	+ 46	+ 58	+ 77	+ 22	+ 30
		+ 99	+110	+130	+160	+ 62	+ 69	+ 80	+ 32	+ 37	+ 44	+ 55	+ 16	+ 21
50	80	+139	+162	+202	+261	+ 5	+ 99	+122	+ 46	+ 55	+ 69	+ 92	+ 26	+ 35
		+122	+136	+160	+194	+ 74	+ 82	+ 96	+ 39	+ 44	+ 52	+ 66	+ 19	+ 24
80	120	+165	+193	+239	+307	+101	+117	+145	+ 54	+ 65	+ 81	+109	+ 30	+ 41
		+146	+162	+190	+230	+ 88	+ 98	+114	+ 46	+ 52	+ 62	+ 78	+ 22	+ 28
120	180	+198	+230	+281	+357	+119	+138	+170	+ 64	+ 77	+ 96	+ 128	+ 35	+ 48
		+175	+195	+225	+269	+105	+115	+135	+ 55	+ 63	+ 73	+ 93	+ 26	+ 34

Reamer Manufacturing Tolerances (continued)

Nominal Diameter of Reamer D_1 in mm		Reamer Manufacturing Tolerances DIN 1420 Admissible Maximum and Minimum Reamer Dimensions of Nominal Diameter D1 in Mm for Drilling Tolerance Range											
Over	Up To	R6	R7	S6	S7	T6	U6	U7	U10	X10	X11	Z10	Z11
1	3	-11	-12	-15	-16	-19	-19	-20	-24	-26	-29	-32	-35
		-14	-16	-18	-20	-22	-22	-24	-38	-40	-50	-46	-56
3	6	-14	-13	-18	-17	-22	-22	-21	-31	-36	-40	-43	-47
		-17	-18	-21	-22	-25	-25	-26	-48	-53	-67	-60	-56
6	10	-18	-16	-22	-20	-27	-27	-25	-37	-43	-48	-51	-47
		-22	-22	-26	-26	-31	-31	-31	-58	-64	-80	-72	-74
10	14	-22	-19	-27	-24	-32	-32	-29	-44	-51	-57	-61	-56
		-26	-26	-31	-31	-36	-36	-36	-69	-76	-96	-86	-88
14	18	-22	-19	-27	-24	-32	-32	-29	-44	- 56	-62	-71	-67
		-26	-26	-31	-31	-36	-36	-36	-69	- 81	-101	-96	-106
18	24	-26	-24	-33	-31	-39	-39	-37	-54	- 67	-74	-86	-77
		-31	-32	-38	-39	-44	-44	-45	-84	- 97	-120	-116	-116
24	30	-26	-24	-33	-31	-39	-46	-44	-61	- 77	-84	-101	-108
		-31	-32	-38	-39	-44	-51	-52	-69	-107	-130	-131	-154
30	40	-32	-29	-41	-38	-46	-58	-55	-75	- 95	-104	-127	-136
		-38	-38	-47	-47	-52	-64	-64	-110	-130	-160	-162	-192
40	50	-32	-29	-41	-38	-52	-68	-65	-85	-112	-121	-151	-160
		-38	-38	-47	-47	-58	-74	-74	-120	-147	-177	-186	-216
50	65	-38	-35	-50	-47	-63	-84	-81	-105	-140	-151	-190	-201
		-45	-46	-57	-58	-70	-91	-92	-147	-182	-218	-232	-268
65	80	-40	-37	-56	-53	-72	-99	-96	-120	-164	-175	-228	-239
		-47	-48	-63	-64	-79	-106	-107	-162	-206	-242	-170	-306
80	100	-48	-44	-68	-64	-88	-121	-117	-145	-199	-211	-179	-291
		-56	-57	-76	-77	-96	-129	-130	-194	-248	-288	-328	-368
100	120	-51	-47	-76	-72	-101	-141	-139	-165	-231	-243	-331	-343
		-59	-60	-84	-85	-109	-149	-150	-214	-280	-320	-380	-420
120	140	-60	-54	-89	-83	-119	-167	-161	-194	-272	-286	-389	-403
		-69	-68	-98	-97	-128	-176	-175	-250	-328	-374	-445	-491
140	160	-62	-56	-97	-91	-131	-187	-181	-214	-304	-318	-439	-453
		-71	-70	-106	-105	-140	-196	-195	-270	-360	-406	-495	-541

Over	Up To	H6	H7	H8	H9	H10	H11	H12	J6	J7	J8	JS6	JS7	JS8	JS9
1	3	+5	+8	+11	+21	+34	+51	+85	+1	+2	+3	+2	+3	+4	+8
		+2	+4	+6	+12	+20	+30	+50	-2	-2	-2	-1	-1	-1	-1
3	6	+6	+10	+15	+25	+40	+63	+102	+3	+4	+7	+2	+4	+6	+10
		+3	+5	+8	+14	+23	+30	+60	0	-1	0	-1	-1	-1	-1
6	10	+7	+12	+18	+30	+49	+76	+127	+3	+5	+8	+3	+5	+7	+12
		+3	+6	+10	+17	+28	+44	+74	-1	-1	0	-1	-1	-1	-1
10	16	+9	+15	+22	+36	+59	+93	+153	+4	+7	+10	+3	+6	+9	+15
		+5	+8	+12	+20	+34	+54	+90	0	0	0	-1	-1	-1	-1
18	30	+11	+17	+28	+44	+71	+110	+178	+6	+8	+15	+4	+7	+11	+18
		+6	+9	+16	+25	+41	+64	+104	+1	0	+3	-1	-1	-1	-1
30	50	+13	+21	+33	+52	+85	+136	+212	+7	+10	+18	+5	+8	+13	+21
		+7	+12	+19	+30	+50	+80	+124	+1	+1	+4	-1	-1	-1	-1
50	80	+16	+25	+39	+62	+102	+161	+255	+10	+13	+21	+6	+10	+16	+25
		+9	+14	+22	+36	+60	+94	+150	+3	+2	+4	-1	-1	-1	-1
90	120	+18	+29	+45	+73	+119	+187	+297	+12	+16	+25	+7	+12	+18	+30
		+10	+16	+26	+42	+70	+110	+174	+4	+3	+6	-1	-1	-1	-1
120	180	+21	+34	+53	+85	+136	+212	+360	+14	+20	+31	+8	+16	+72	+35
		+12	+20	+30	+50	+80	+124	+200	+5	+6	+8	-1	0	-1	0

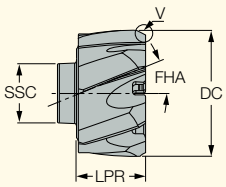
Over	Up to	K6	K7	K8	M6	M7	M8	N6	N7	N8	N9	N10	N11	P6	P7
1	3	-1	-2	-3	-3	-4	-5	-5	-6	-7	-8	-10	-13	-7	-8
		-4	-6	-8	-6	-8	-10	-8	-10	-12	-17	-24	-34	-10	-12
3	6	0	+1	+2	-3	-2	-1	-7	-6	-5	-5	-8	-12	-11	-10
		-3	-4	-5	-6	-7	-8	-10	-11	-12	-16	-25	-39	-14	-15
6	10	0	+2	+2	-5	-3	-3	-9	-7	-7	-6	-9	-14	-14	-12
		-4	-4	-6	-9	-9	-11	-13	-13	-15	-19	-30	-46	-18	-18
10	18	0	+3	+3	-6	-3	-3	-11	-8	-8	-7	-11	-17	-17	-14
		-4	-4	-7	-10	-10	-13	-15	-15	-18	-23	-36	-56	-21	-21
18	30	0	+2	+5	-6	-4	-1	-13	-11	-8	-8	-13	-20	-20	-18
		-5	-6	-7	-11	-12	-13	-18	-19	-20	-27	-43	-66	-25	-26
30	50	0	+3	+6	-7	-4	-1	-15	-12	-9	-10	-15	-24	-24	-21
		-6	-6	-8	-13	-13	-15	-21	-21	-23	-32	-50	-80	-30	-30
50	80	+1	+4	+7	-8	-5	-2	-17	-14	-11	-12	-18	-29	-29	-26
		-6	-7	-10	-15	-16	-19	-24	-25	-28	-38	-60	-96	-36	-37
80	120	0	+4	+7	-10	-6	-3	-20	-16	-13	-14	-21	-33	-34	-30
		-8	-9	-12	-18	-19	-22	-28	-29	-32	-45	-70	-110	-42	-43
120	180	0	+6	+10	-12	-6	-2	-24	-18	-14	-15	-24	-38	-40	-34
		-9	-8	-13	-21	-20	-25	-33	-32	-37	-50	-80	-126	-49	+48

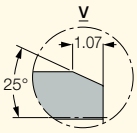
BAYOT-REAM

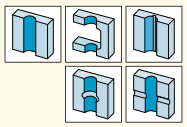
RM-BN-H7LB

Quick Change Left-Hand Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming Through Holes









Designation	Dimensions					IC08
	SSC[2]	DC	LPR	NOF[3]	FHA	
RM-BN5-11.501-H7LB	BN5	11.501	9.50	6	20.0	●
RM-BN5-12.000-H7LB	BN5	12.000	9.50	6	20.0	●
RM-BN5-13.000-H7LB	BN5	13.000	9.50	6	20.0	●
RM-BN5-13.500-H7LB	BN5	13.500	9.50	6	20.0	●
RM-BN6-13.501-H7LB	BN6	13.501	9.50	6	20.0	●
RM-BN6-14.000-H7LB	BN6	14.000	9.50	6	20.0	●
RM-BN6-15.000-H7LB	BN6	15.000	9.50	6	20.0	●
RM-BN6-16.000-H7LB	BN6	16.000	9.50	6	20.0	●
RM-BN7-16.001-H7LB	BN7	16.001	10.70	6	20.0	●
RM-BN7-17.000-H7LB	BN7	17.000	10.70	6	20.0	●
RM-BN7-18.000-H7LB	BN7	18.000	10.70	6	20.0	●
RM-BN7-19.000-H7LB	BN7	19.000	10.70	6	20.0	●
RM-BN7-20.000-H7LB	BN7	20.000	10.70	6	20.0	●
RM-BN8-20.001-H7LB	BN8	20.001	12.90	8	20.0	●
RM-BN8-21.000-H7LB	BN8	21.000	12.90	8	20.0	●
RM-BN8-22.000-H7LB	BN8	22.000	12.90	8	20.0	●
RM-BN8-23.000-H7LB	BN8	23.000	12.90	8	20.0	●
RM-BN8-24.000-H7LB	BN8	24.000	12.90	8	20.0	●
RM-BN8-25.000-H7LB	BN8	25.000	12.90	8	20.0	●
RM-BN9-26.000-H7LB [1]	BN9	26.000	12.90	8	20.0	
RM-BN9-27.000-H7LB [1]	BN9	27.000	12.90	8	20.0	
RM-BN9-28.000-H7LB [1]	BN9	28.000	12.90	8	20.0	
RM-BN9-29.000-H7LB [1]	BN9	29.000	12.90	8	20.0	
RM-BN9-30.000-H7LB [1]	BN9	30.000	12.90	8	20.0	
RM-BN9-31.000-H7LB [1]	BN9	31.000	12.90	8	20.0	
RM-BN9-32.000-H7LB [1]	BN9	32.000	12.90	8	20.0	

• For user guide, see pages 132-137

[1] The uncoated fine grain IC08 is available on request

[2] Seat size code

[3] Number of flutes

Complementary Grades (On Request)

ID5 (PCD) recommended for high speed reaming of aluminum (special cases).
RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.



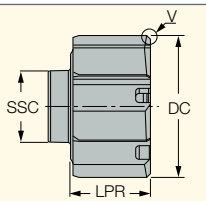
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

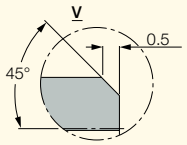
BAYOT-REAM

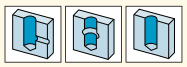
RM-BN-H7SA

Quick Change Straight Flute Interchangeable Solid Carbide Reaming Heads for High Speed Reaming Blind Holes









Designation	Dimensions				IC08
	SSC[2]	DC	LPR	NOF[3]	
RM-BN5-11.501-H7SA	BN5	11.501	9.50	6	●
RM-BN5-12.000-H7SA	BN5	12.000	9.50	6	●
RM-BN5-13.000-H7SA	BN5	13.000	9.50	6	●
RM-BN5-13.500-H7SA	BN5	13.500	9.50	6	●
RM-BN6-13.501-H7SA	BN6	13.501	9.50	6	●
RM-BN6-14.000-H7SA	BN6	14.000	9.50	6	●
RM-BN6-15.000-H7SA	BN6	15.000	9.50	6	●
RM-BN6-16.000-H7SA	BN6	16.000	9.50	6	●
RM-BN7-16.001-H7SA	BN7	16.001	10.70	6	●
RM-BN7-17.000-H7SA	BN7	17.000	10.70	6	●
RM-BN7-18.000-H7SA	BN7	18.000	10.70	6	●
RM-BN7-19.000-H7SA	BN7	19.000	10.70	6	●
RM-BN7-20.000-H7SA	BN7	20.000	10.70	6	●
RM-BN8-20.001-H7SA	BN8	20.001	12.90	8	●
RM-BN8-21.000-H7SA	BN8	21.000	12.90	8	●
RM-BN8-22.000-H7SA	BN8	22.000	12.90	8	●
RM-BN8-23.000-H7SA	BN8	23.000	12.90	8	
RM-BN8-24.000-H7SA	BN8	24.000	12.90	8	●
RM-BN8-25.000-H7SA	BN8	25.000	12.90	8	●
RM-BN9-26.000-H7SA	BN9	26.000	12.90	8	●
RM-BN9-27.000-H7SA [1]	BN9	27.000	12.90	8	
RM-BN9-28.000-H7SA [1]	BN9	28.000	12.90	8	
RM-BN9-29.000-H7SA [1]	BN9	29.000	12.90	8	
RM-BN9-30.000-H7SA [1]	BN9	30.000	12.90	8	
RM-BN9-31.000-H7SA [1]	BN9	31.000	12.90	8	
RM-BN9-32.000-H7SA [1]	BN9	32.000	12.90	8	

• For user guide, see pages 132-137

[1] The uncoated fine grain IC08 is available on request

[2] Seat size code

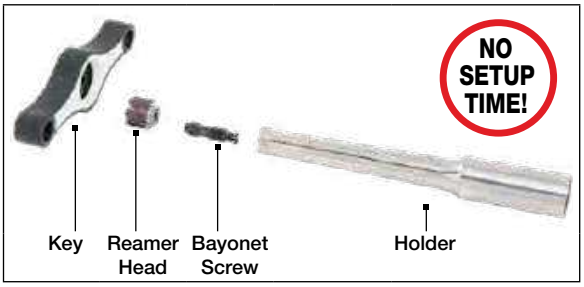
[3] Number of flutes

Complementary Grades (On Request)

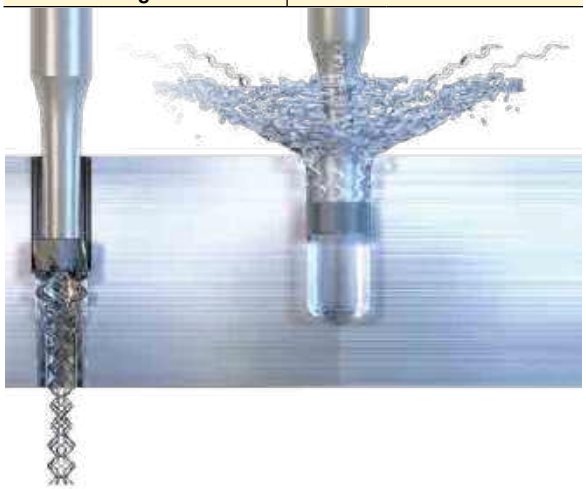
ID5 (PCD) recommended for high speed reaming aluminum (special cases).
RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.

The BAYO-T-REAM Line Is Available in 5 Sizes

Each size has its own diameter range and holder.
For example:
The same RM-BN7 holder can hold any head between Ø16.001–20.000 mm



RM-BN9	RM-BN8	RM-BN7	RM-BN6	RM-BN5
				
Ø25.401-32.000 mm	Ø20.001-25.400 mm	Ø16.001-20.000 mm	Ø13.501-16.000 mm	Ø11.500-13.500 mm

Through Hole	Blind Hole
	
	
Left-Hand Flute The left-hand spiral is designed especially for through hole reaming. Due to this design, the chips are being pushed forward immediately after formation.	**Straight Flute** The coolant flow assists the chip evacuation process. It directs the just-formed chips backwards. The chips pass through the straight flutes and are thrown out of the hole, without causing any damage to the reamer or hole surface.

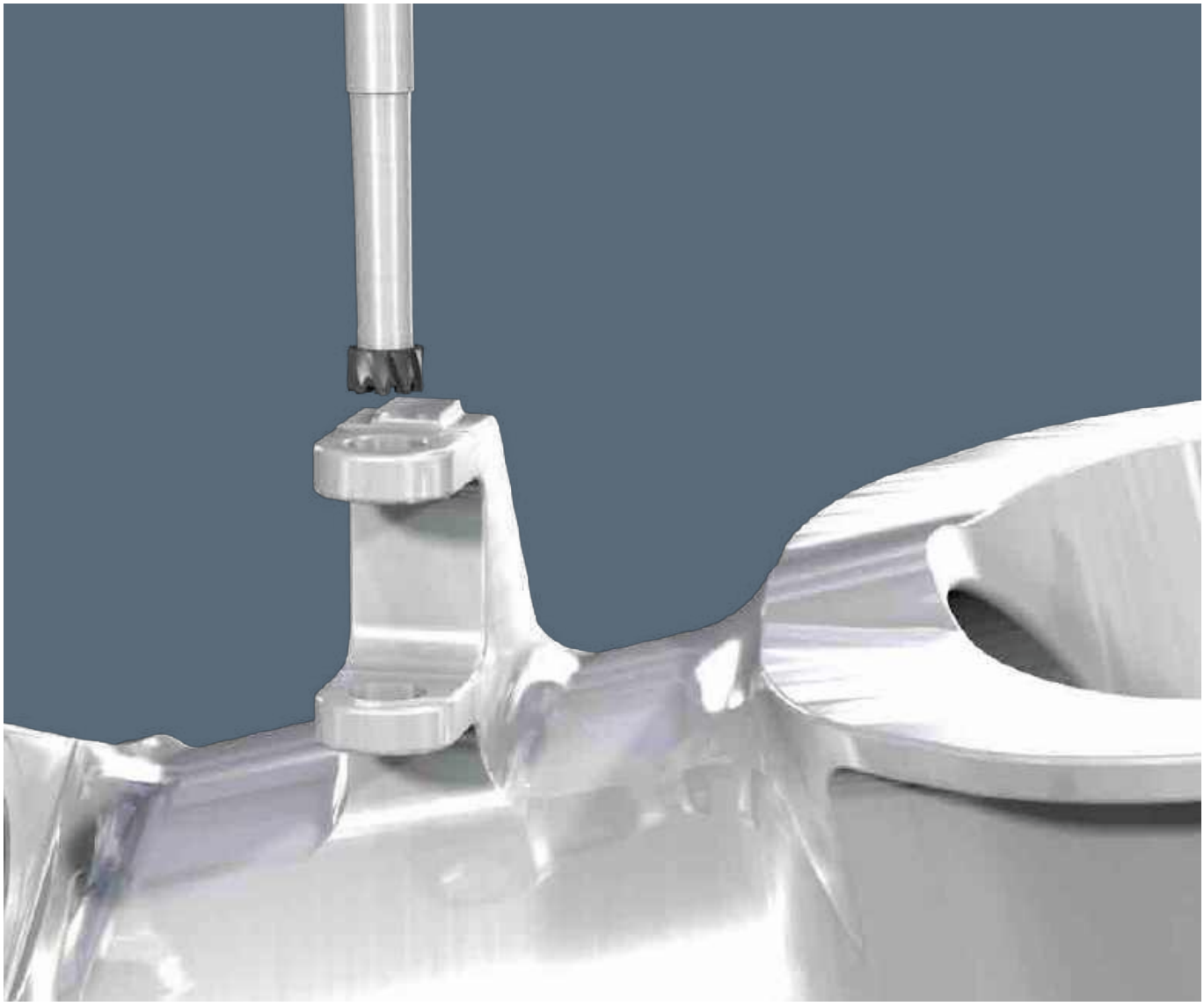
Recommeded Cutting Conditions for BAYO-T-REAM High Speed Reaming Heads

ISO	Material	Condition	Material No.(1)	Through Hole				Interrupted Through Hole			
				First Choice		Second Choice		First Choice		Second Choice	
N	aluminum-wrought alloys	not hardenable	21	RN01	LG or SG	ID5	SG	RN01	LG	ID5	SG
		hardenable	22	V_c = 150 - 400		V_c = 200 - 500		V_c = 150 - 350		V_c = 200 - 500	
	aluminum-cast alloys	not hardenable	23								
		hardenable	24	BN4 - BN6	f_z = 0.08 - 0.16	BN4 - BN6	f_z = 0.08 - 0.2	BN4 - BN6	f_z = 0.08 - 0.16	BN4 - BN6	f_z = 0.08 - 0.2
		high temperature	25	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24
	copper alloys	free cutting	26	IC30N	SA or SG	IC08	SG or SA	IC08	SG or SA		
				V_c = 180 - 240		V_c = 30 - 100		V_c = 30 - 100			
		brass	27	BN4 - BN6	f_z = 0.05 - 0.16	BN4 - BN6	f_z = 0.04 - 0.13	BN4 - BN6	f_z = 0.04 - 0.13		
		electrolytic copper	28	BN7 - BN9	f_z = 0.04 - 0.20	BN7 - BN9	f_z = 0.05 - 0.16	BN7 - BN9	f_z = 0.05 - 0.16		
	non metallic	duroplastics, fiber plastics	29	IC908	SA	IC908	LB	IC908	SA	IC908	LB
				V_c = 25 - 80		V_c = 25 - 80		V_c = 25 - 80		V_c = 25 - 80	
		hard rubber	30	BN4 - BN6	f_z = 0.05 - 0.10	BN4 - BN6	f_z = 0.05 - 0.12	BN4 - BN6	f_z = 0.05 - 0.10	BN4 - BN6	f_z = 0.05 - 0.12
				BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.23	BN7 - BN9	f_z = 0.10 - 0.20	BN7 - BN9	f_z = 0.10 - 0.23

* Standard edge geometries are not suitable for reaming titanium and high temperature alloys In order to choose a proper geometry, please ask for our recommendations

- The given cutting data recommendations refer to the short holders (3xD effective reaming overhang) • For longer holders, the cutting speed should be reduced proportionally
- For relatively large leading angles (spot-facing geometries), the feed should be reduced up to 30%
- All the given cutting data recommendations refer to the machines with spindle through coolant supply

(1) For workpiece materials list, see pages 160-163



Material No.	Blind Hole				Interrupted Blind Hole				IC08	
	First Choice		Second Choice		First Choice		Second Choice		Through Hole - LB Blind Hole - SA	
21	RN01	SG or SA	ID5	SG or SA	RN01	SG or SA	ID5	SG or SA	V_c = 10 - 30	
22 23	V_c = 150 - 400		V_c = 200 - 400		V_c = 150 - 300		V_c = 200 - 400			
24	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.07 - 0.15	BN_4 - BN6	f_z = 0.08 - 0.16	BN_4 - BN6	f_z = 0.05 - 0.12
25	BN7 - BN9	f_z = 0.11 - 0.20	BN7 - BN9	f_z = 0.11 - 0.24	BN7 - BN9	f_z = 0.11 - 0.20	BN7 - BN9	f_z = 0.11- 0.24	BN7 - BN9	f_z = 0.08 - 0.15
26	IC30N	SG or SA	IC08	SG or SA	IC08	SG or SA			V_c = 30 - 100	
	V_c = 180 - 240		V_c = 30 - 100		V_c = 30 - 100					
27	BN_4 - BN6	f_z = 0.05 - 0.16	BN_4 - BN6	f_z = 0.04 - 0.13	BN_4 - BN6	f_z = 0.04 - 0.13			BN_4 - BN6	f_z = 0.04 - 0.13
28	BN7 - BN9	f_z = 0.05 - 0.21	BN7 - BN9	f_z = 0.05 - 0.16	BN7 - BN9	f_z = 0.05 - 0.16			BN7 - BN9	f_z = 0.05 - 0.16
29	IC908	SA			IC908	SA			V_c = 10 - 20	
	V_c = 25 - 80				V_c = 25 - 80					
30	BN_4 - BN6	f_z = 0.05 - 0.10			BN_4 - BN6	f_z = 0.05 - 0.10			BN_4 - BN6	f_z = 0.05 - 0.12
	BN7 - BN9	f_z = 0.10 - 0.20			BN7 - BN9	f_z = 0.10 - 0.20			BN7 - BN9	f_z = 0.08 - 0.16

Legend:

grade	**LB**	**IC908**
cutting speed [m/min]	**V_c = 10 - 20**	
BAYO T-REAM head size	**f_z = 0.04 - 0.15**	**BN4-BN6**
	f_z = 0.05 - 0.20	**BN7-BN9**

cutting geometry

feed [mm/tooth]



ATTENTION: Cutting tools can break during use.
To avoid injury always use safety precautions
such as gloves, shields and eye protection.

Assembly Instructions (BN5-BN9)

First Assembly

- Clean the toolholder pocket (fig. 1).
- Clean the reamer head clamping cone.
- Insert the clamping screw into the holder and rotate it 2-3 turns in a clockwise direction (fig. 2).
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (fig. 3).
- Manually rotate the reaming head until it sits firmly in the pocket.
- Tighten with the special key (fig. 4).
- Make sure there is no face gap between the toolholder and the reaming head (fig. 5).

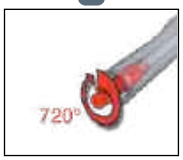
Indexing

- Release the reaming head with the key, turning in a counterclockwise direction until it rotates freely.
- Rotate another one turn by hand.
- Remove the reamer head from the tool; the clamping screw should remain inside.
- Clean the pocket of the toolholder (fig. 1).
- Clean the cone on the new reamer head.
- Clamp the reaming head on the screw; note, BN8 and BN9 can be assembled only in a specific position relative to the screw (rotate the head until locating the correct position) (fig. 3).
- Manually rotate the reaming head. In the beginning it should rotate without the screw and then (after 1/6 of a turn) it should engage with the screw. Rotate until it sits firmly in the pocket. If the screw rotates together with the reaming head from the beginning, remove the reaming head and open the screw another one turn.
- Tighten with the special key (fig. 4).
- Make sure that there is no face gap between the toolholder and the reaming head (fig. 5).

1



2



3

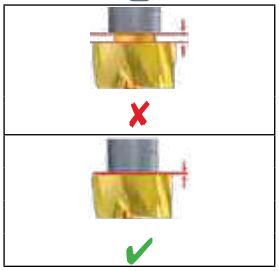


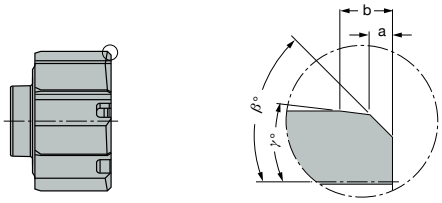
4



BN9: 21-23 N*m
BN8: 17-20 N*m
BN7: 13-15 N*m
BN6: 8-10 N*m
BN5: 7-8 N*m

5





Lead Code / Parameter	B°	A [mm]	G°	B [mm]
A	45°	0.5	-	-
B	25°	1.07	-	-
C	45°	0.5	8°	0.75
D	30°	0.5	4°	1.85
E	45°	0.2	-	-
F	90°	-	-	-
G	75°	0.15	-	-
X	specially tailored (undesignated)			

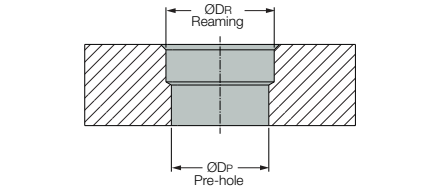
When choosing a reamer, it is important to select a lead geometry that covers the reaming allowance

Reaming Allowance

Reaming allowance is the stock material which should be removed by reaming. It is recommended to leave different reaming allowances depending on the workpiece material and the pre-hole quality. Pre-hole should be smooth and straight, without deep scratches on it.

Complementary Grades (on Request):

ID5 (PCD) recommended for high speed reaming of aluminum (special cases). RN01 (DLC coating) recommended for reaming the following materials: aluminum alloys (cast, wrought, etc.), brass, bronze and other nonferrous materials.



Material	Hole Ø mm						
	< 9.5	9.5 - 11.5	11.5 - 13.5	13.5 - 16	16 - 32	>32	
Aluminum and Brass	0.07-0.10	0.10-0.15	0.15-0.25	0.20-0.30	0.20-0.40	0.20-0.50	mm/Ø

Δ - Reaming allowance

Δ = ØDR - ØDP

problem			solutions	Cutting Data/ Allowance			Tool; Toolholder						Workpiece	Machine			Machining Process			
				Feed FZ	Spindle Speed Min^{-1}	Diameter Allowance	Geometry Angle	Runout Maximum 5µm	Wear Check / Change Insert	Optimize Tool Length and Diameter	Floating Chuck GFIS	ADJ Chuck FineFit/ RC RING	Workpiece Fixture / Pressure	Coolant Mixture	Coolant Pressure	Angle Error / Centic Error / Axis Deviation	Spindle Speed on Entry	Entry Geomerty / Chamfer / Oblique Surface At Entry	Feed in and Out Same	Chip Evacuation
hole too large			vibration	●			●						●	●	●		●	●		
			runout error					●			●	●								
			built up edge	●	●	●			●								●			
			diameter allowance			●														●
hole too small			tool wear						●				● ●	● ●	● ●			●		
			compression of material				●		●				● ●					●	●	
			compression of clamping			●	●													
			diameter allowance			●														
tapered hole			deformation by clamping			●							● ●							
			unequal wall thickness			●	●													
			machine					●		●	●	●				●				
			chip flow											●	●					●
hole shows chatter marks			vibration	●	●	●	●		●	●			●	●	●		●	●		
			rumout error					●		●	●	●				●				
insufficient surface			vibration	●	●		●		●	●			●	●			●	●		
			built up edge	●	●				●					●	●					
			runout error					●			●	●								
			cutting geometry						●	●										●
			machine										●	●		●				

solutions			Cutting Data/ Allowance			Tool; Toolholder						Workpiece	Machine			Machining Process			
			Feed FZ	Spindle Speed Min^{-1}	Diameter Allowance	Geometry Angle	Runout Maximum 5µm	Wear Check / Change Insert	Optimize Tool Length and Diameter	Floating Chuck GFIS	ADJ Chuck FineFit/ RC RING	Workpiece Fixture / Pressure	Coolant Mixture	Coolant Pressure	Angle Error / Centic Error / Axis Deviation	Spindle Speed on Entry	Entry Geomerty / Chamfer / Oblique Surface At Entry	Feed in and Out Same	Chip Evacuation
problem	retraction marks		built up edge	●	●			●	●	●	●	●		●		●		●		
			compression of material			●	●		●	●	●	●	●					●	●	
			compression of clamping																	
	slight defect in shape / noncircular hole		tool wear		●			●												●
			chip flow		●								●	●						●
			machine			●	●	●	●	●	●				●		● ●			●
			compression of clamping		●							●								

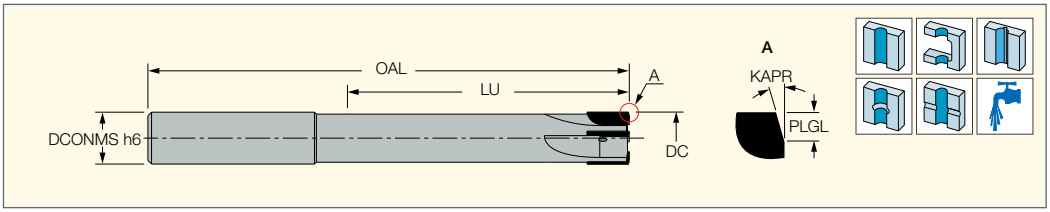
- ● check / optimize
- ● increase / improve
- ● reduce / decrease
- ● apply / use



Brazed Pollycrystalline Diamond Reamer

ISCAR PCD LINE

RMSP-T
Brazed Polycrystalline Diamond Reamer with Internal Coolant for High-Speed Reaming of Through Holes in Aluminum

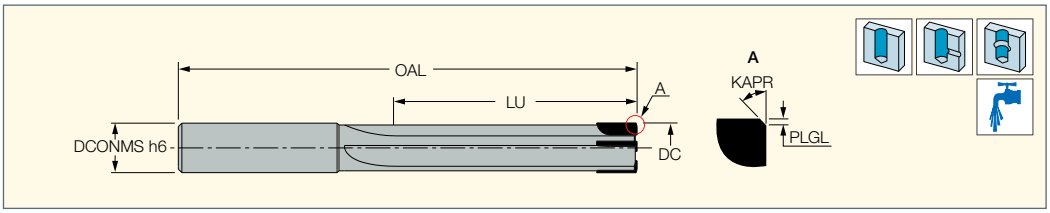


Designation	DC	DCONMS	OAL	LU	CICT(1)	PLGL	KAPR(2)
RMSP-T-D06.000-K05	6.00	6.00	79.00	39.00	2	1.000	15.0
RMSP-T-D08.000-K05	8.00	8.00	92.00	52.00	4	1.000	15.0
RMSP-T-D10.000-K05	10.00	10.00	106.00	62.00	4	1.000	15.0
RMSP-T-D12.000-K10	12.00	12.00	124.00	74.00	4	1.000	15.0
RMSP-T-D14.000-K10	14.00	14.00	135.00	85.00	4	1.000	15.0
RMSP-T-D16.000-K10	16.00	16.00	150.00	97.00	4	1.000	15.0
RMSP-T-D18.000-K10	18.00	18.00	164.00	97.00	4	1.000	15.0
RMSP-T-D20.000-K10	20.00	20.00	164.00	100.00	4	1.000	15.0

(1) Number of inserts
(2) Tool cutting edge angle

ISCAR PCD LINE

RMSP-B
Brazed Polycrystalline Diamond Reamer with Internal Coolant for High-Speed Reaming of Blind Holes in Aluminum



Designation	DC	DCONMS	OAL	LU	CICT(1)	PLGL	KAPR(2)
RMSP-B-D06.000-C02	6.00	6.00	79.00	30.00	2	0.200	45.0
RMSP-B-D08.000-C02	8.00	8.00	92.00	40.00	4	0.200	45.0
RMSP-B-D10.000-C04	10.00	10.00	106.00	50.00	4	0.400	45.0
RMSP-B-D12.000-C04	12.00	12.00	125.00	60.00	4	0.400	45.0
RMSP-B-D14.000-C04	14.00	14.00	135.00	73.00	4	0.400	45.0
RMSP-B-D16.000-C04	16.00	16.00	150.00	80.00	4	0.400	45.0
RMSP-B-D18.000-C04	18.00	18.00	164.00	90.00	4	0.400	45.0
RMSP-B-D20.000-C04	20.00	20.00	164.00	100.00	4	0.400	45.0

(1) Number of inserts
(2) Tool cutting edge angle

Recommended Cutting Parameters for Reamers

The below cutting datas are purely an indication and are calculated assuming optimal working conditions; they can depend on stability of the fixture, the machine and the workpiece.

For more detailed information and for choosing the best grade, you should contact **ISCAR** PCD's offices.

Material	Hole Type	Grade	V_c (m/min)	F_z (mm/z)
Aluminum Casting Alloys (Si <12%)	Through	PCD	300÷500	0.05÷0.18
Aluminum Casting Alloys (Si >12%)	Through	PCD	300÷500	0.04÷0.14
Copper, Bronze, Brass Alloys	Through	PCD	300÷500	0.03÷0.08
Magnesium Alloys	Through	PCD	300÷500	0.06÷0.16
Graphite	Through	PCD	300÷500	0.06÷0.16
Aluminum Casting Alloys (Si <12%)	Blind	PCD	300÷500	0.03÷0.09
Aluminum Casting Alloys (Si >12%)	Blind	PCD	300÷500	0.02÷0.07
Copper, Bronze, Brass Alloys	Blind	PCD	300÷500	0.015÷0.04
Magnesium Alloys	Blind	PCD	300÷500	0.03÷0.08

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

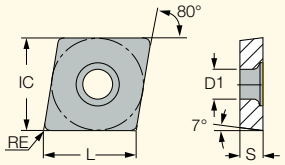
ITS Bore Indexable Inserts

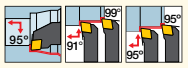
ISOTURN

CCMT/CCGT-SM

Single-Sided Turning Inserts for Semi-Finishing and Finishing on Soft Materials and Exotic Alloys







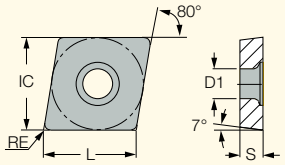
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC6025	IC8250	IC6015	IC8150	IC20	IC5010	IC428	IC5005	IC806	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060201-SM	6.45	6.35	2.38	0.10	2.80											●	0.25-2.00	0.05-0.20
CCGT 060202-SM	6.45	6.35	2.38	0.20	2.80											●	0.25-2.00	0.05-0.25
CCMT 060202-SM	6.45	6.35	2.38	0.20	2.80		●		●					●			0.25-2.00	0.05-0.25
CCMT 060204-SM	6.45	6.35	2.38	0.40	2.80	●	●	●	●					●	●	●	0.50-2.50	0.07-0.25
CCMT 060208-SM	6.45	6.35	2.38	0.80	2.80	●		●							●	●	0.50-2.50	0.07-0.25
CCMT 09T302-SM	9.70	9.52	3.97	0.20	4.40	●	●	●						●	●	●	0.50-2.50	0.06-0.25
CCMT 09T304-SM	9.70	9.52	3.97	0.40	4.40	●	●		●	●	●	●	●	●	●	●	0.50-2.50	0.06-0.25
CCMT 09T308-SM	9.70	9.52	3.97	0.80	4.40	●	●	●	●		●		●	●	●	●	0.50-3.00	0.07-0.25
CCMT 120404-SM	12.90	12.70	4.76	0.40	5.50		●		●					●	●	●	0.70-3.50	0.07-0.25
CCMT 120408-SM	12.90	12.70	4.76	0.80	5.50	●	●	●	●						●	●	0.70-3.50	0.07-0.30

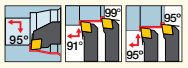
ISOTURN

CCMT-14

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finish and Finish Turning







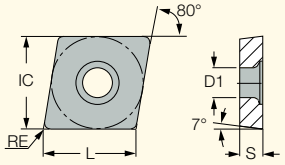
Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC830	IC8250	IC20	IC428	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060204-14	6.30	6.35	2.38	0.40	2.80	●		●	●	●	●	●	0.50-2.50	0.14-0.25
CCMT 09T304-14	9.70	9.52	3.97	0.40	4.40		●				●	●	0.50-3.00	0.14-0.25
CCMT 09T308-14	9.70	9.52	3.97	0.80	4.40	●	●	●	●	●			0.80-3.00	0.14-0.30
CCMT 120408-14	12.90	12.70	4.76	0.80	5.50	●		●					0.80-3.00	0.14-0.30

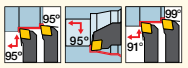
ISOTURN

CCMT/CCGT

80° Rhombic Inserts with a 7° Positive Flank for Semi-Finish and Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC8250	IC30N	IC20	IC20N	IC520N	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060202	6.45	6.35	2.38	0.20	2.80		●				0.50-2.00	0.10-0.20
CCGT 060202L (1)	6.45	6.35	2.38	0.20	2.80		●	●			0.50-2.00	0.10-0.20
CCGT 060204	6.45	6.35	2.38	0.40	2.80		●				0.50-2.00	0.10-0.20
CCGT 060204L (1)	6.45	6.35	2.38	0.40	2.80		●				0.50-2.00	0.10-0.20
CCMT 060202	6.45	6.35	2.38	0.20	2.80	●			●		0.50-2.00	0.10-0.20
CCMT 060204	6.45	6.35	2.38	0.40	2.80		●		●	●	0.50-2.00	0.12-0.22
CCMT 09T302	9.70	9.52	3.97	0.20	4.40				●	●	0.50-2.50	0.12-0.25
CCMT 09T304	9.70	9.52	3.97	0.40	4.40				●	●	0.50-2.50	0.12-0.25
CCMT 09T308	9.70	9.52	3.97	0.80	4.40				●	●	0.80-3.00	0.14-0.25

• Use left-hand inserts for left-hand external tools and for right-hand internal tools

(1) Left-hand insert

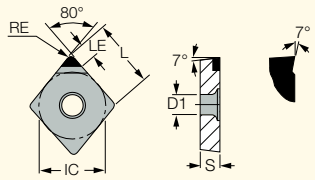
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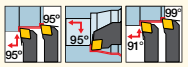
ISOTURN

CCMT (PCD)

Inserts with a Single PCD Top Corner Tip, 7° Clearance and Positive Rake Angle for Aluminum Finishing







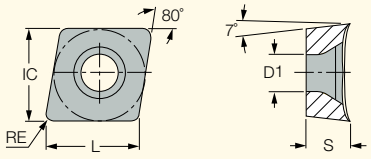
Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
CCMT 060202D	6.30	6.35	2.38	0.20	3.1	2.80	●	0.08-3.00	0.05-0.30
CCMT 060204D	6.30	6.35	2.38	0.40	3.0	2.80	●	0.10-3.00	0.05-0.30
CCMT 09T304D	9.70	9.52	3.97	0.40	3.9	4.40	●	0.10-3.00	0.05-0.30

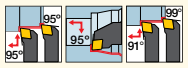
ISOTURN

CCGT-AS

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







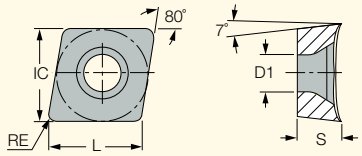
Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 060201-AS	6.40	6.35	2.38	0.10	2.80	●	0.50-2.00	0.10-0.20
CCGT 060202-AS	6.40	6.35	2.38	0.20	2.80	●	0.50-2.00	0.10-0.20
CCGT 060204-AS	6.40	6.35	2.38	0.40	2.80	●	0.50-2.00	0.10-0.25
CCGT 09T301-AS	9.70	9.52	3.97	0.10	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T302-AS	9.70	9.52	3.97	0.20	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T304-AS	9.70	9.52	3.97	0.40	4.40	●	0.50-2.50	0.10-0.25
CCGT 09T308-AS	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.10-0.30
CCGT 120402-AS	12.90	12.70	4.76	0.20	5.50	●	0.50-2.50	0.10-0.25
CCGT 120404-AS	12.90	12.70	4.76	0.40	5.50	●	0.50-2.50	0.10-0.25
CCGT 120408-AS	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.10-0.30

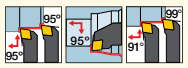
ISOTURN

CCGT-AF

80° Rhombic Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







Designation	Dimensions L	IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
CCGT 09T308-AF	9.70	9.52	3.97	0.80	4.40	●	0.80-3.00	0.15-0.25
CCGT 120408-AF	12.90	12.70	4.76	0.80	5.50	●	1.00-3.50	0.15-0.30

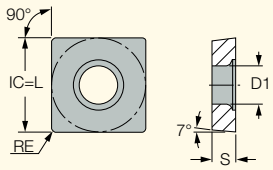
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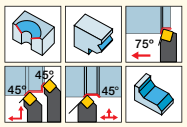
ISOTURN

SCMT-19

Square Inserts with a 7° Positive Flank for Semi-Roughing at Medium to High Feeds







Designation	Dimensions L	S	RE	D1	Tough ↔ Hard IC830	IC20	IC5005	IC807	IC907	Recommended Machining Data a_p (mm)	f_z (mm/rev)
SCMT 120408-19	12.70	4.76	0.80	5.50	●	●	●	●	●	3.00-8.00	0.08-0.15
SCMT 120412-19	12.70	4.76	1.20	5.50		●				3.00-8.00	0.08-0.15

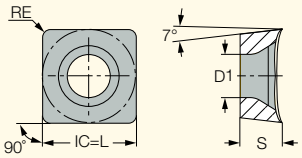
● First choice grade

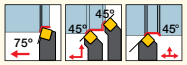
ISOTURN

SCGT-AS

Square Inserts with a 7° Positive Flank, Very Positive Rake Angle and Sharp Cutting Edge for Machining Aluminum







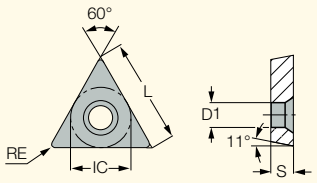
Designation	Dimensions IC	S	RE	D1	IC20	Recommended Machining Data a_p (mm)	f (mm/rev)
SCGT 09T308-AS	9.52	3.97	0.80	4.40	●	0.50-3.00	0.10-0.30
SCGT 120404-AS	12.70	4.76	0.40	5.50	●	1.00-4.00	0.10-0.30
SCGT 120408-AS	12.70	4.76	0.80	5.50	●	1.00-4.00	0.10-0.30

ISOTURN

TPGX

Triangular Inserts with an 11° Positive Flank and Ground Chipformer for Finish Turning







Designation	Dimensions L	IC	S	RE	D1	Tough ↔ Hard IC54	IC908	IC20	IC20N	IC520N	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202-L	9.52	5.56	2.38	0.20	3.00		●	●	●	●	1.00-2.00	0.10-0.20
TPGX 090204-L	9.52	5.56	2.38	0.40	3.00	●	●	●	●	●	1.00-2.50	0.15-0.20
TPGX 110302-L	11.00	6.35	3.18	0.20	3.50		●	●	●	●	1.00-2.50	0.10-0.20
TPGX 110304-L	11.00	6.35	3.18	0.40	3.50	●	●	●	●	●	1.00-3.00	0.15-0.20
TPGX 110308-L	11.00	6.35	3.18	0.80	3.50			●			1.00-3.50	0.15-0.25

● First choice grade

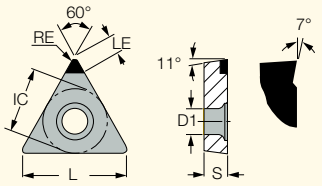
Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

ISOTURN

TPGX (PCD)

Triangular Inserts with PCD Single Top Corner Brazed Tip, 11° Clearance and Positive Rake Angle for Finishing Aluminum







Designation	Dimensions L	IC	S	RE	LE	D1	ID5	Recommended Machining Data a_p (mm)	f (mm/rev)
TPGX 090202	9.52	5.56	2.38	0.20	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 090204	9.52	5.56	2.38	0.40	3.0	2.50	●	0.10-3.00	0.05-0.30
TPGX 110302	11.00	6.35	3.18	0.20	3.4	3.50	●	0.10-3.00	0.05-0.30
TPGX 110304	11.00	6.35	3.18	0.40	3.8	3.50	●	0.10-3.00	0.05-0.30

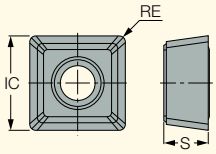
DR-TWIST

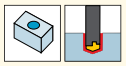
INDEXABLE DRILL LINE

SOGX/T-AL

DR Drill Inserts for Aluminum







Designation	Dimensions IC	S	RE	IC08
SOGX 050204-AL	5.40	2.40	0.40	●
SOGX 060304-AL	6.20	3.20	0.40	●
SOGX 070305-AL	7.70	3.60	0.50	●
SOGT 09T306-AL	9.00	3.81	0.60	●
SOGT 120408-AL	12.70	4.76	0.80	●

- Sharp cutting edge with polished rake for aluminum

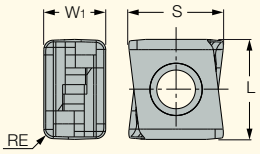
TANGPLUNGE

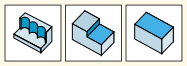
PLUNGING LINE

HTP LN.. 1006

Tangentially Clamped Inserts with 4 Cutting Edges for Plungers







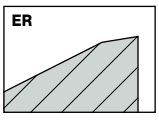
Designation	Dimensions W1	L	S	RE	Tough ↔ Hard IC330	IC830	IC808	IC810	IC07	Recommended Machining Data f_z (mm/t)
HTP LNAR 1006 FR (1)	6.50	10.50	10.13	1.00			●			0.05-0.15
HTP LNAR 1006 FR-P	6.50	10.50	10.13	1.00					●	0.05-0.15
HTP LNHT 1006 ER	6.50	10.50	9.93	1.00	●	●	●	●		0.10-0.15
HTP LNHT 1006 ETR	6.50	10.50	9.93	1.00	●	●	●			0.12-0.20
HTP LNMT 1006 ER (2)	6.50	10.50	9.96	1.00	●	●	●			0.08-0.15

- FR-P - For machining aluminum, ER- For general applications, ETR- First priority for hardened steel

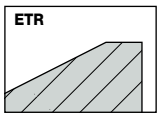
(1) FR - Sharp cutting edge for unstable conditions and for ISO S material

(2) Mounting this insert increases tool diameter by 0.1 mm

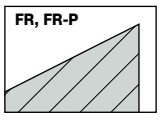
● First choice grade



ER- for general applications



ETR- first priority for hardened steel



FR-P- for machining aluminum

Scan the QR code for additional information.
Enter the item description in the search field to access additional related data.

Aluminum Machining Applications







Aerospace

Control Valve Mount

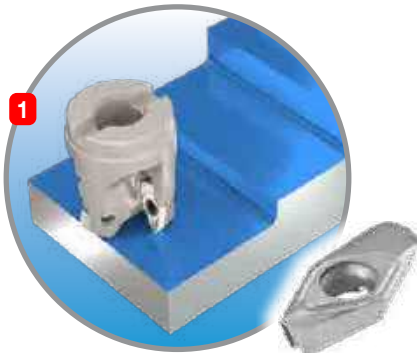
Strong Tool Body

High Productivity

Longer Tool Life

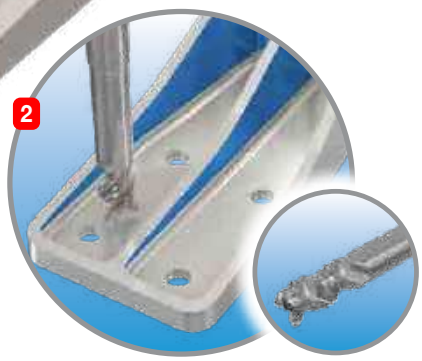
The base construction mount holds the temperature control valve. The mount is produced from 6061-T651 aluminum to resist corrosion damage and typically includes milling and drilling machining with high surface finish requirements.





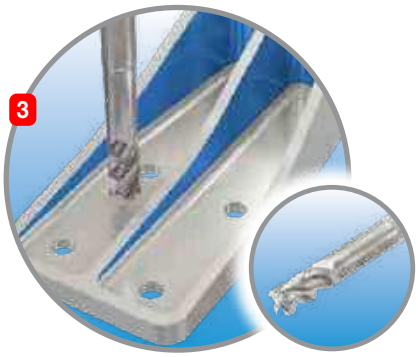
HELIALU

face milling



SOLIDSHRED

rough pocket milling



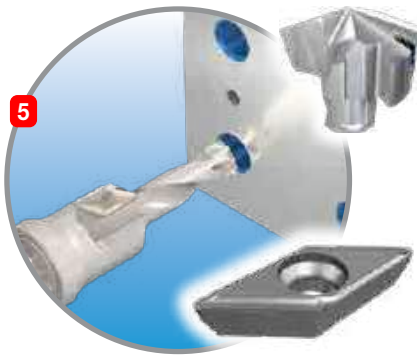
CHATTERFREE
SOLID MILL LINE

finish wall shouldering



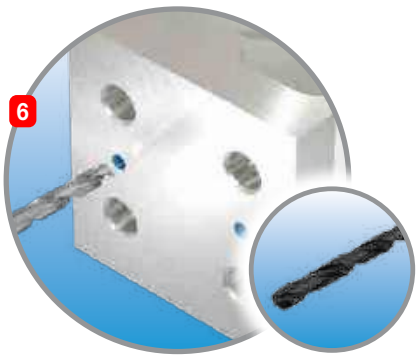
MULTI-MASTER
INDEXABLE SOLID CARBIDE LINE

radius pocket milling



PRETHREAD

drilling main base



SOLIDDRILL

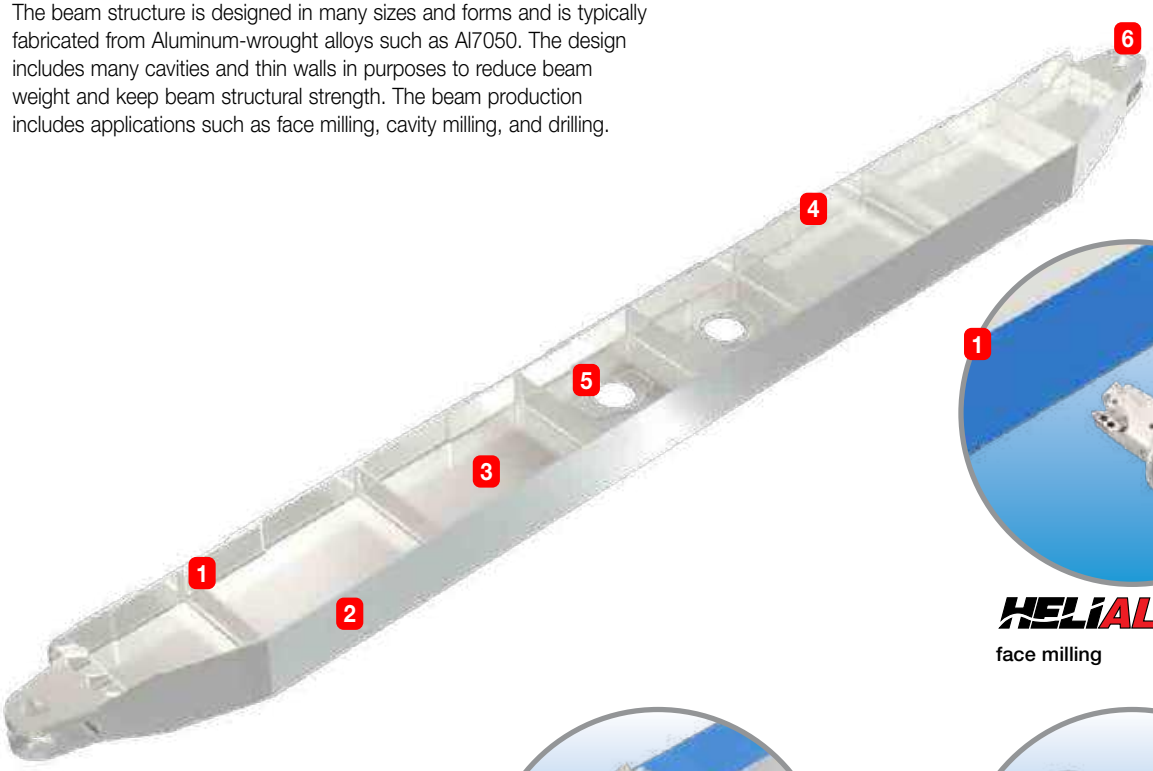
drilling locating pin

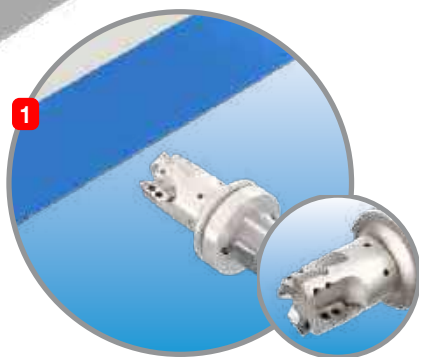
Aerospace

Beam Structure

Strong Tool Body | **High Productivity** | **Longer Tool Life**

The beam structure is designed in many sizes and forms and is typically fabricated from Aluminum-wrought alloys such as Al7050. The design includes many cavities and thin walls in purposes to reduce beam weight and keep beam structural strength. The beam production includes applications such as face milling, cavity milling, and drilling.

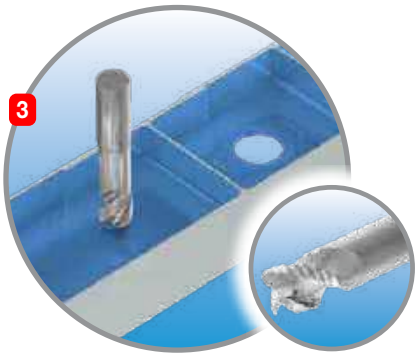




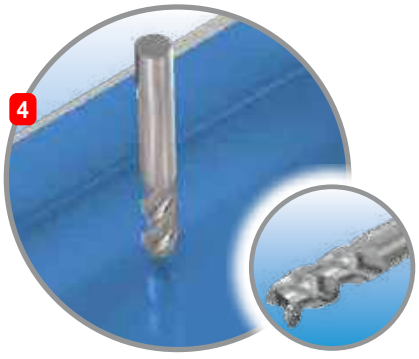
HELIALU
face milling



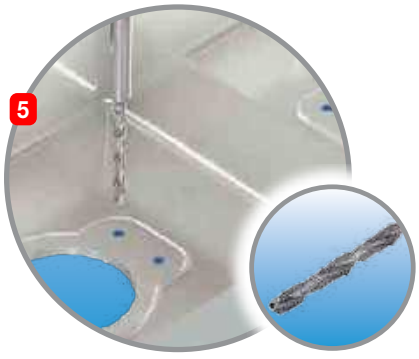
HELIALU
shoulder milling



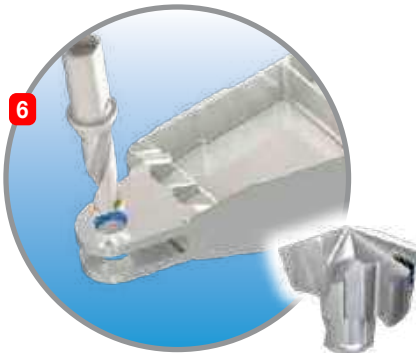
SOLIDMILL PREMIUM LINE
cavity milling



SOLIDMILL PREMIUM LINE
wall and corner finishing



SOLIDDRILL
drilling cavity area



SUMOCHAM CHAMDRILL LINE
flange drilling

Automotive

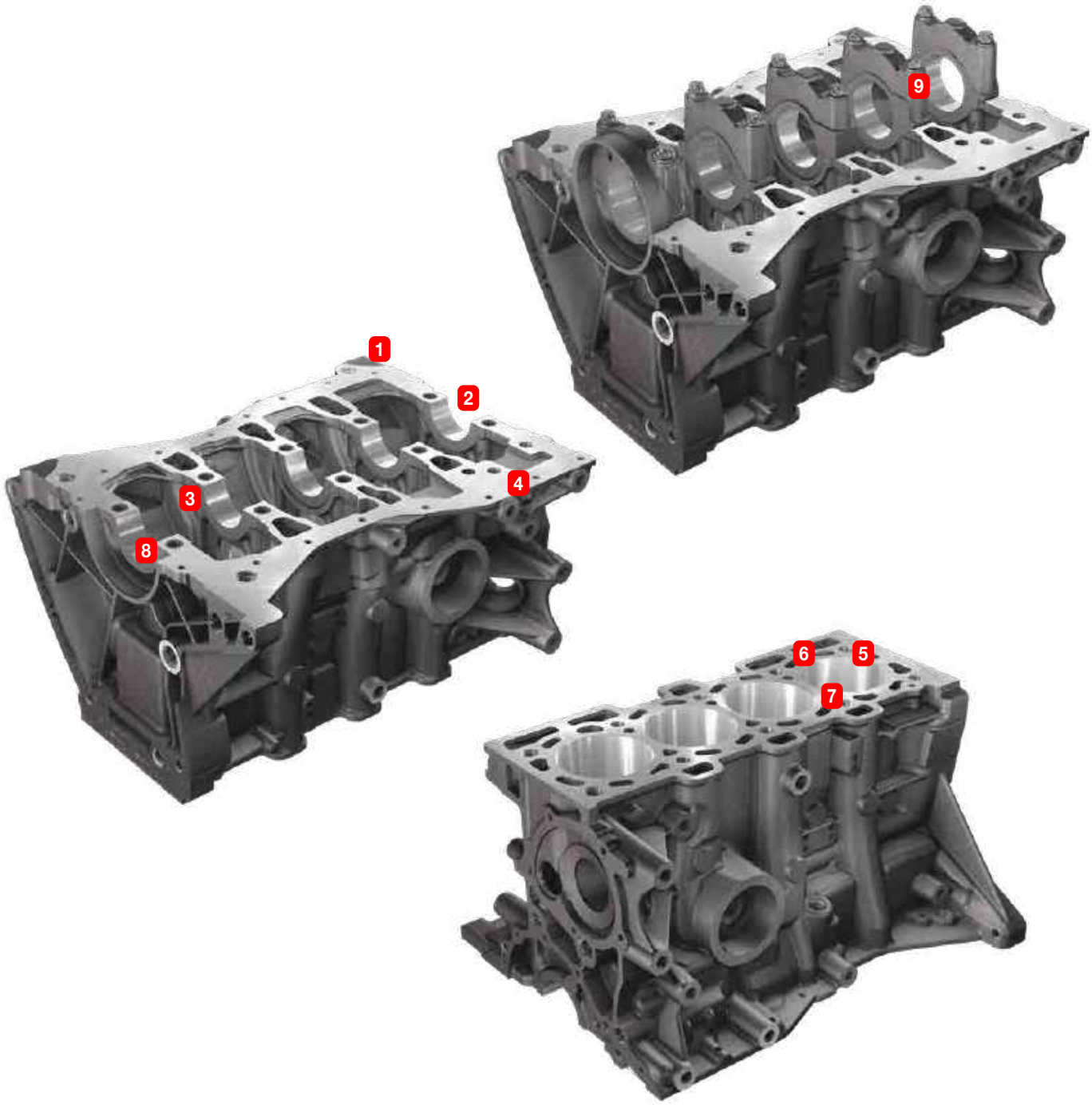
Cylinder Block

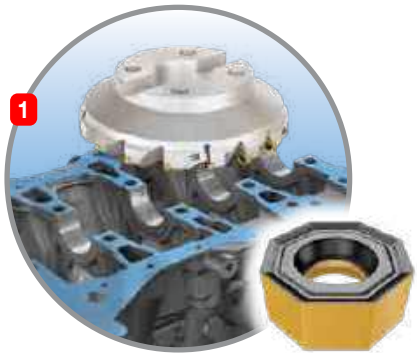
Strong Tool Body

Easy Chip Evacuation

Longer Tool Life

The cylinder block is the supporting structure portion of the engine between the cylinder head and sump (oil pan). It is traditionally manufactured from cast iron and was upgraded to a bi-metal block design (aluminum block with inserted cast iron liners) to reduce weight. Nowadays, newer technology of thermal spray coating processes on the cylinder bore is being used on aluminum blocks. **ISCAR** provides a wide range of standard and special tooling machining technologies for a variety of block configurations, sizes and materials.



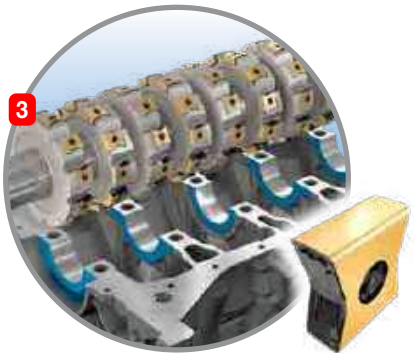


HELIDO
800 LINE

engine bottom block
face milling

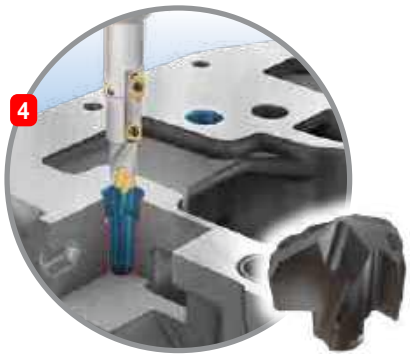


bearing seats
rough milling



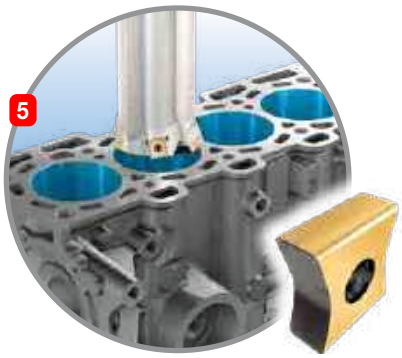
TANGMILL
TANGENTIAL LINE

side bearing caps
gang milling



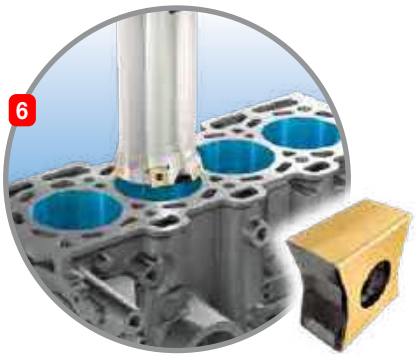
SUMOCHAM
CHAMDRILL LINE

bush rods hole
step drilling and chamfering



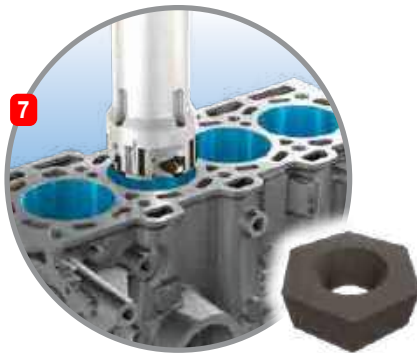
TANGMILL
TANGENTIAL LINE

cylinder bore rough boring



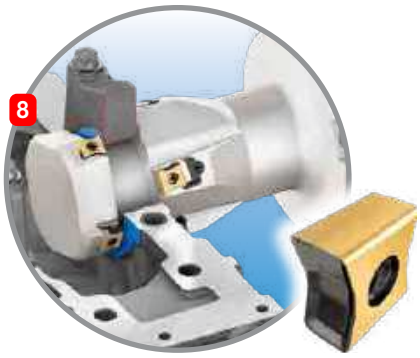
TANGMILL
TANGENTIAL LINE

cylinder bore
semi-finish boring



ISCARREAMER

cylinder bore finish boring



TANGMILL
TANGENTIAL LINE

thrust face milling



ISCARREAMER

bearing seats pilot reamer
and long reamer finishing

Automotive

Cylinder Head

Strong Tool Body

Deep Boring

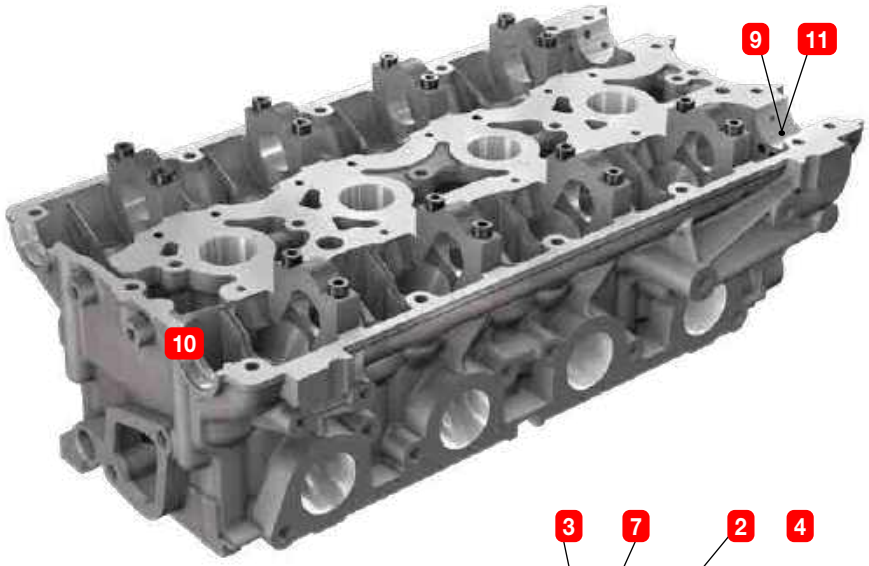
Longer Tool Life

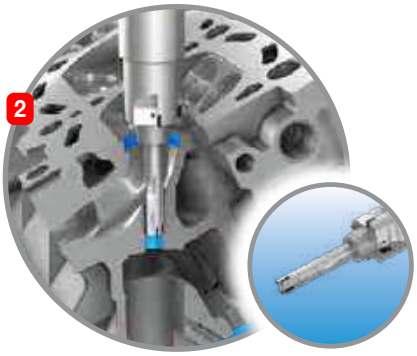
Cylinder heads perform several functions in the car engine. These include the exhuast housing and intake valves, the fuel injector, necessary linkages and passages for fuel and air mixture. They are commonly produced from gray cast iron or cast aluminum for newer light weight vehicles. **ISCAR** provides a wide range of standard and special tooling machining technologies for a variety of cylinder head configurations, sizes and materials.



ALUFRAISE

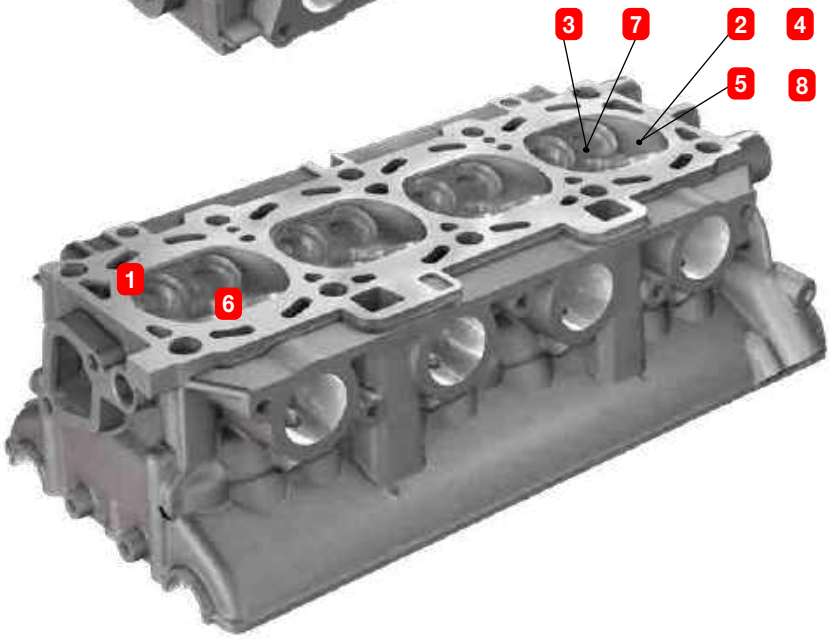
top and bottom - face milling

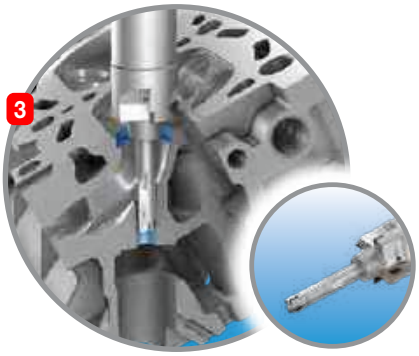




ISCARREAMER

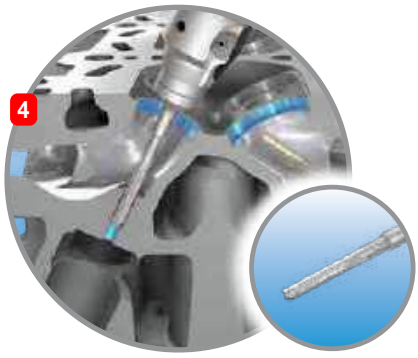
valve line intake (before press in) – boring & sport face





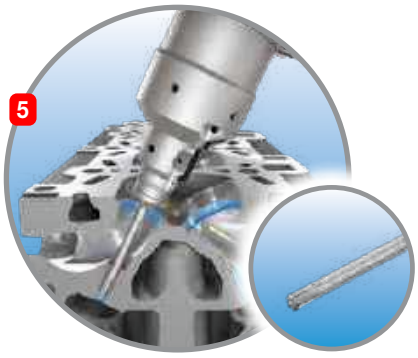
ISCARREAMER

valve line exhaust - boring & spot face



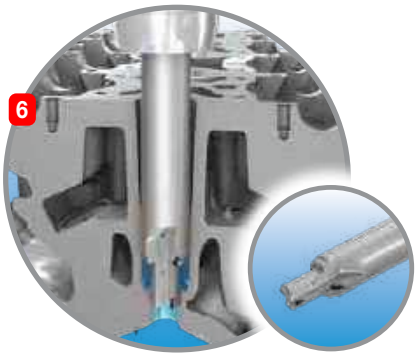
ISCARREAMER

valve line intake and exhaust
(after press in) – semi finish reaming



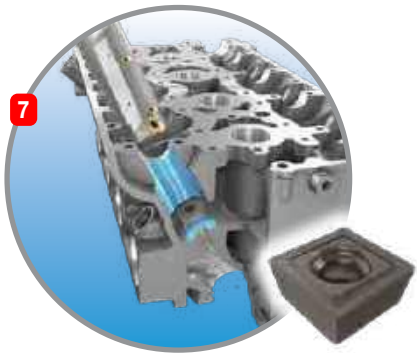
ISCARREAMER

valve line intake and exhaust
(after press in) – finish reaming



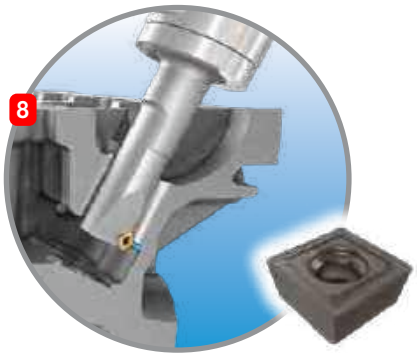
ISCARREAMER

injector hole boring
and spot face



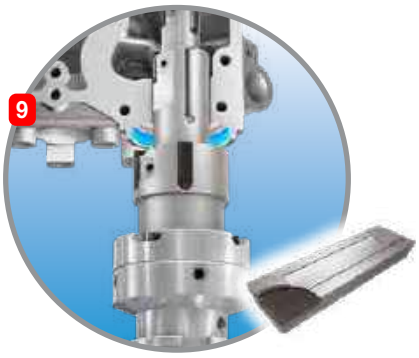
DR-TWIST
INDEXABLE DRILL LINE

spring seat boring
and bottom facing



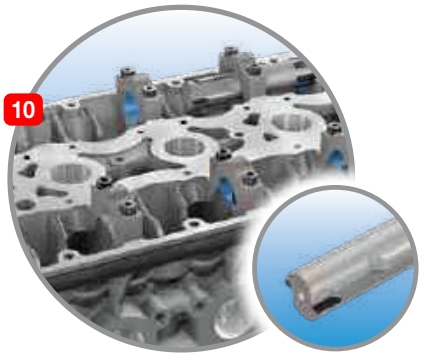
DR-TWIST
INDEXABLE DRILL LINE

spring seat
back chamfering



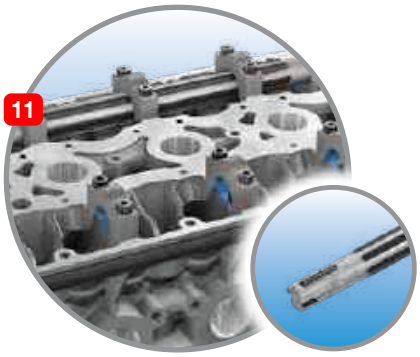
INDEXH-REAM

cam axis inlet
and exhaust reaming



ISCARREAMER

cam shaft axis
pilot boring



ISCARREAMER

cam shaft axis boring
and spot facing

Automotive

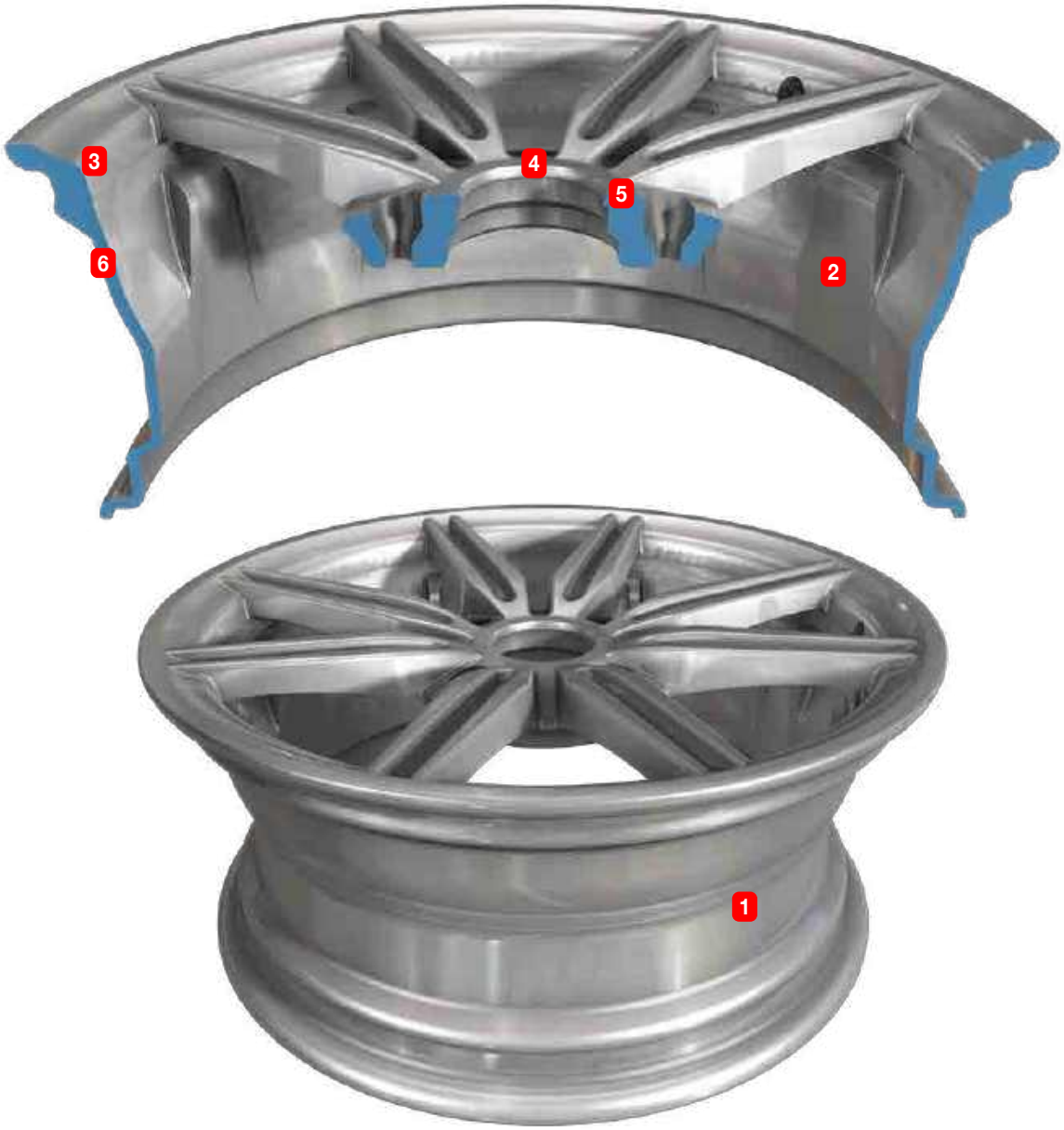
Aluminum Wheels

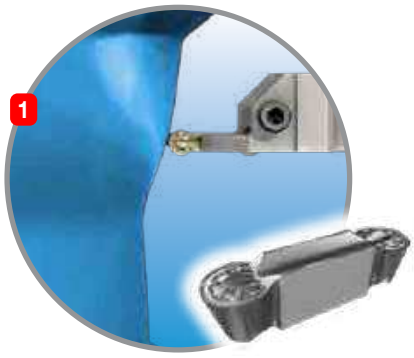
Easy Chip Evacuation

High Temperatures Resistant

High Productivity

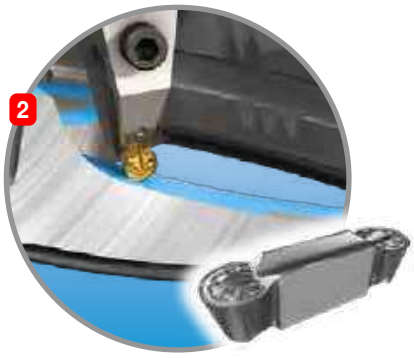
Aluminum wheels are made of magnesium aluminum alloy casting, which typically provides lighter weight with no compromise to structural strength, and often produced with PCD type tooling for roughing and finishing operations. **ISCAR** has developed unique PCD special tools, inserts with chip formers and polished edges for optimized chip formation and prolonged edge life.





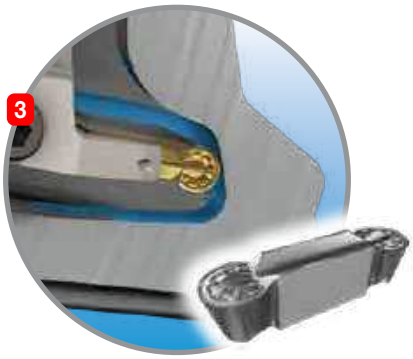
FIXGRIP

outer diameter
grooving and turning



FIXGRIP

inner diameter
grooving and turning



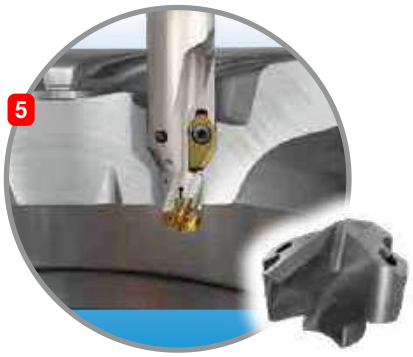
FIXGRIP

undercuting grooving and turning



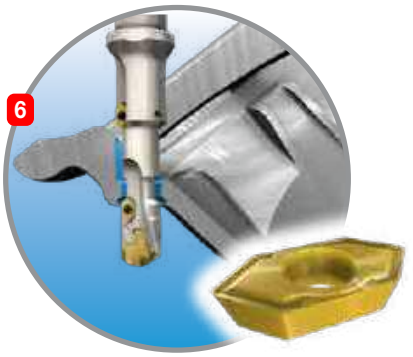
ISOTURN

bore turning



CHAMDRILL JET

lug hole drilling and chamfering



PRETHREAD

valve hole drilling with rear
and front chamfering

Automotive

Electric Car Motor Housing

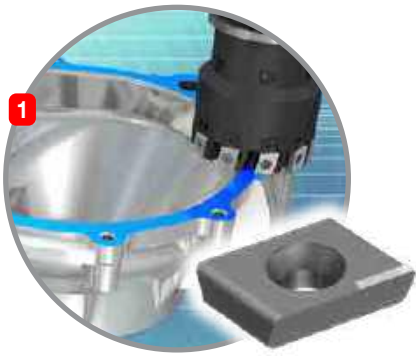
Super Finish

High Temperatures Resistant

PCD Inserts

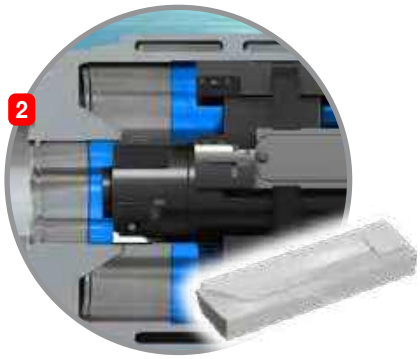
As batteries are replacing fuel as an energy source for vehicles, the battery case is an integral component of car design. Large size and light weight requirements make aluminum a natural choice for manufacturing this part. **ISCAR** has an arsenal of tools specially designed to machine aluminum and provide productive and economical solutions for any application.





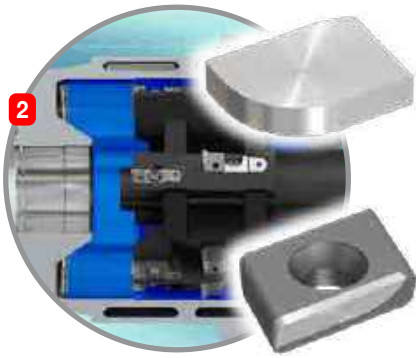
ISCAR PCD LINE

motor housing cover face milling



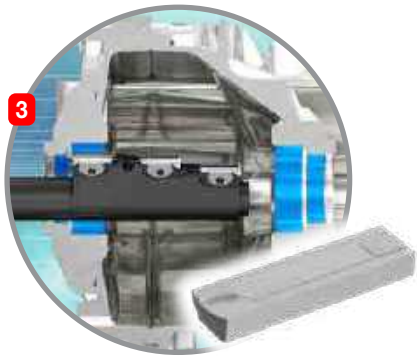
ISCAR PCD LINE

reaming



ISCAR PCD LINE

boring



ISCAR PCD LINE

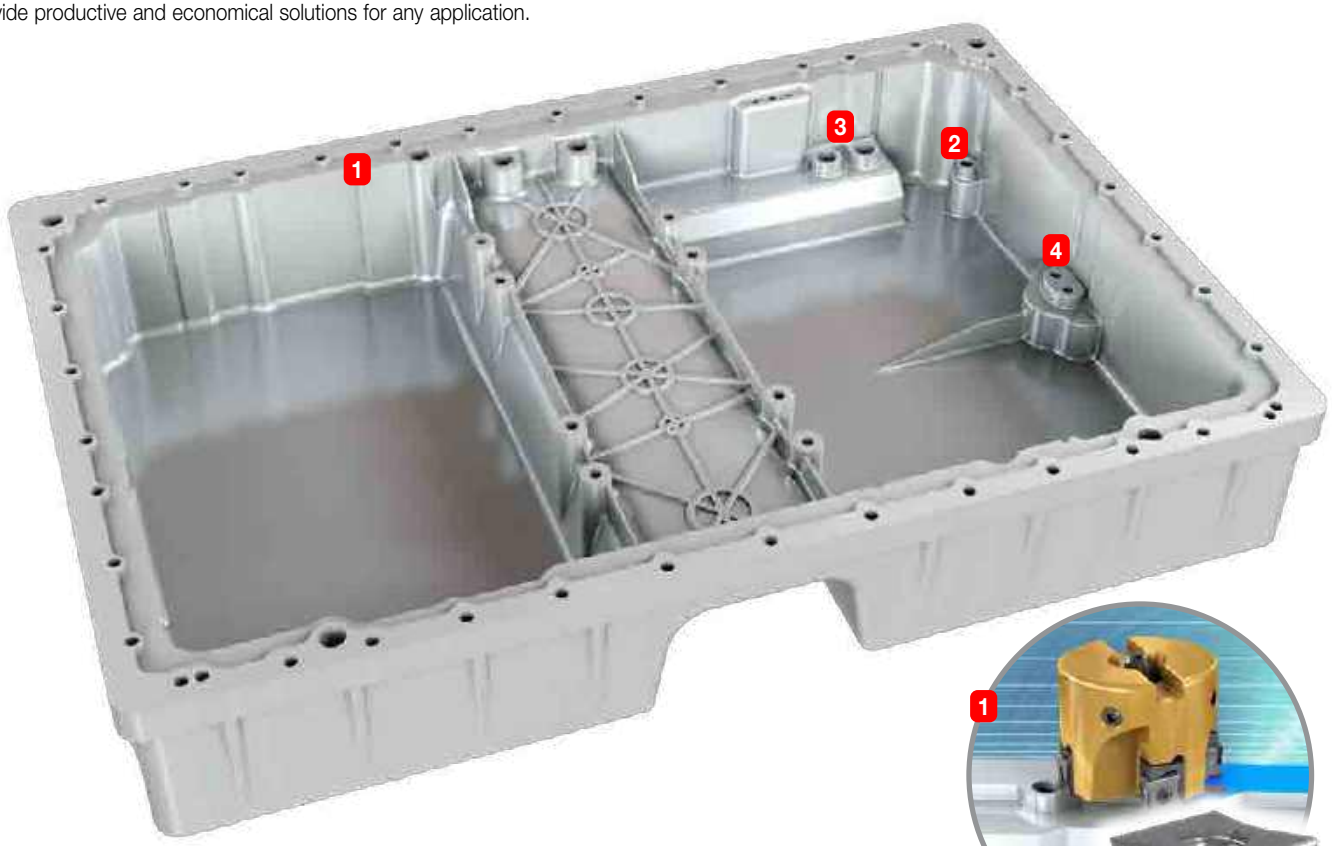
motor housing bearing seat reaming

Automotive

Electric Car Battery Case

Ease of Use | **High Productivity** | **No Setup Time**

Battery cases have become an alternative solution to energy in modern car designs. Large size and light weight requirements make aluminum a natural choice for manufacturing this part. **ISCAR** provides a wide choice of tools of tools specially designed to machine aluminum and provide productive and economical solutions for any application.



ALUTANG
face milling



BAYOT-REAM
reaming



drilling and chamfering



CHATTERFREE
MULTI-MASTER LINE
face milling

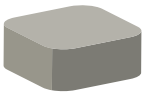
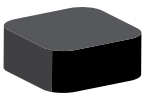
Technical Information



Cutting Material Grades for Machining Aluminum

Main Grades

	Grade	ISO	Uncoated Layers	Uncoated
UNCOATED	IC4	N05-N15	Base	
	IC07	N05-N20	Base	
	IC08	N10-N25	Base	
	IC10	N10-N30	Base	
	IC20	N05-N25	Base	
	IC28	N15-N30	Base	
	HE	N01-N30	Base	
PCD	ID5	N01-N10	Base	
	ID8	N05-N15	Base	

	Grade	ISO	Coating Layers	Coating Color*
PVD Coated	IC228	N20-N40	TiN TiCN Base	
	IC508	N10-N30	TiN TiCN Base	
	IC520	N10-N15	TiN TiCN Base	
	IC920	N10-N25	TiAlN Base	
DLC	IC1508	N10-N20	DLC Base	

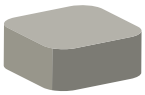
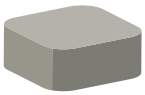
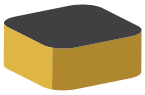
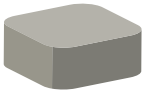
* For coated grades

Complementary Grade

UNCOATED

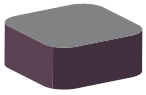
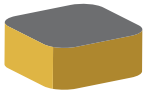
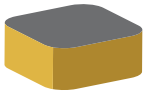
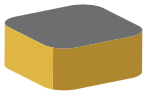
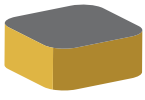
Grade	Uncoated Layers	Uncoated
IC20N	Base	
IC30N	Base	
IC50M	Base	
IC54	Base	
IC70	Base	

PVD Coated

Grade	Coating Layers	Coating Color*
IC250	TiN TiCN Base	
IC308	TiCN Base	
IC328	TiCN Base	
IC330	TiCN Base	
IC354	TiCN Base	

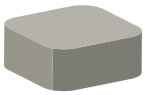
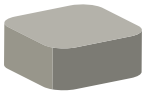
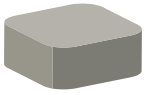
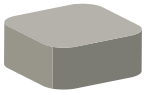
* For coated grades

PVD Coated

Grade	Coating Layers	Coating Color*
IC507	TiN TiCN Base	
IC520N	TiN TiCN Base	
IC528	TiN TiCN Base	
IC806	TiAlN AlTiN Base	
IC807	TiN TiAlN Base	
IC807G	TiN TiAlN Base	
IC808	TiN TiAlN Base	
IC808G	**TiN** TiAlN Base	
IC810	TiN AiTCrN Base	
IC830	TiN TiAlN Base	

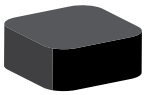
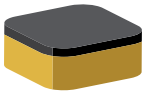
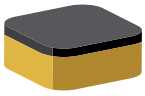
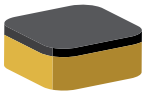
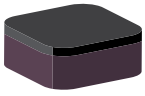
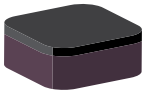
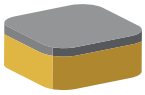
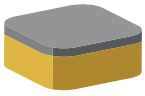
* For coated grades

PVD COATED

Grade	Coating Layers	Coating Color*
IC903	AlTiN Base	
IC907	TiAlN Base	
IC908	TiAlN Base	
IC928	AlTiN Base	
IC1007	TiN TiAlN Base	
IC1008	TiN TiAlN Base	
IC1010	TiN AlTiN Base	
IC1028	TiN AlTiCrN Base	
IC1030	TiN AlTiN Base	

* For coated grades

CVD COATED

Grade	Coating Layers	Coating Color*
IC428	Al_2O_3 Tic Base	
IC5005	TiN Al_2O_3 TiCN Base	
IC5010	TiN Al_2O_3 TiCN Base	
IC5400	TiN Al_2O_3 TiCN Base	
IC6015	TiN Al_2O_3 TiCN Base	
IC6025	TiN Al_2O_3 TiCN Base	
IC8150	TiN Al_2O_3 TiCN Base	
IC8250	TiN Al_2O_3 TiCN Base	

* For coated grades

MATERIAL GROUPS

Based on ISO 513 and VDI 3323 Standards

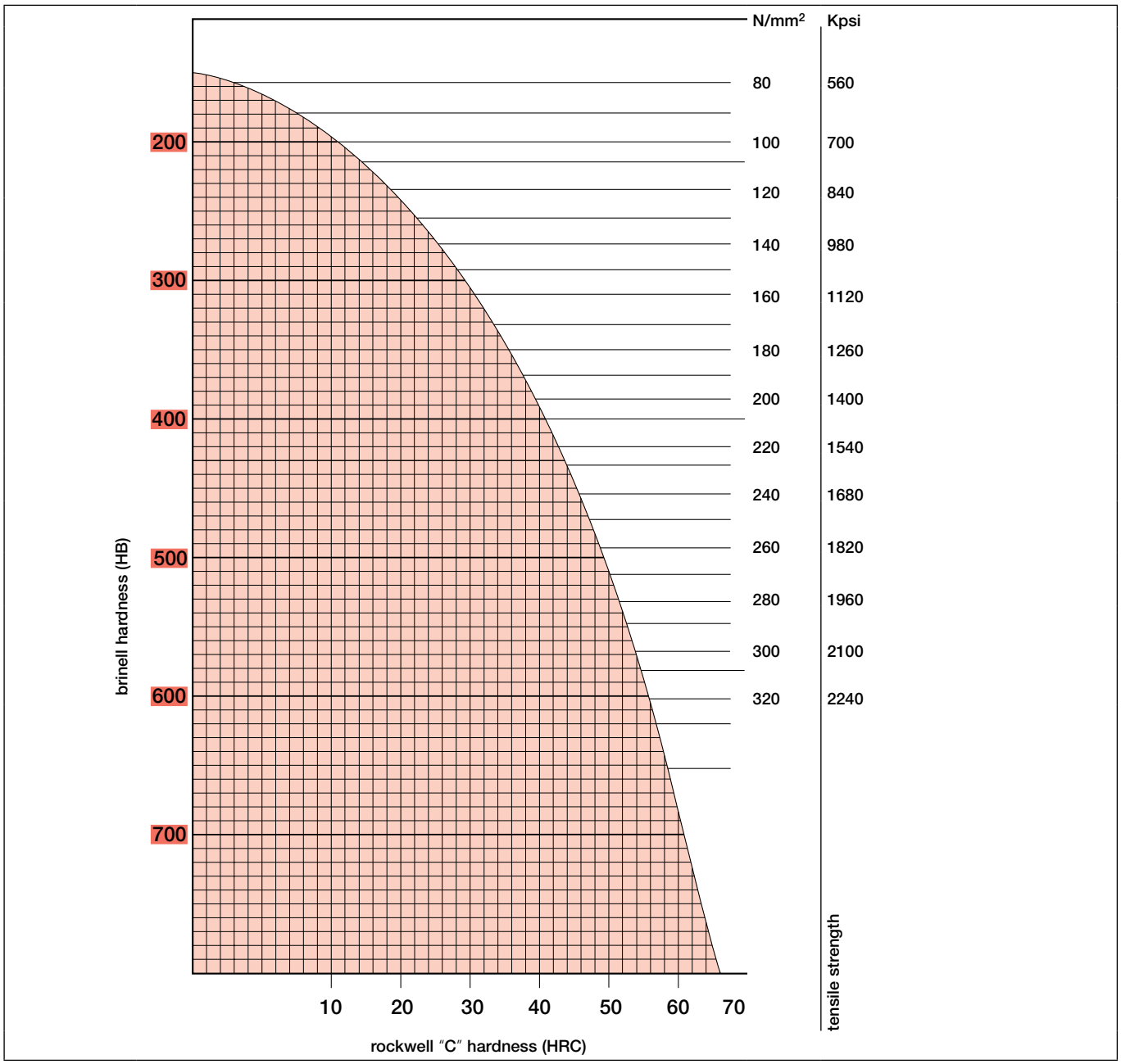
ISO	Material		Condition	Kc1[1] [N/mm²]	Mc[2]	Hardness HB	Material Group No.
N	aluminum-wrought alloys		not hardenable	700	0.25	60	21
			hardenable	800	0.25	100	22
	aluminum-cast alloys	≤12% Si	not hardenable	700	0.25	75	23
			hardenable	700	0.28	90	24
		>12% Si	high temperature	750	0.25	130	25
		>1% Pb	free cutting	700	0.27	110	26
	copper alloys		brass	700	0.27	90	27
			electrolytic copper	700	0.27	100	28
	non metallic		duroplastics, fiber plastics	200	0.20	70 shore D	29
			hard rubber	200	0.20	55 shore D	30

non-ferrous metals

(1) Specific cutting force for 1 mm² chip section
(2) Chip thickness factor

MATERIAL GROUPS

Hardness Conversion Table



Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	Euronorm
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
21	AA5005; AA5006; A95005; A95006; 5005; 5005A; 5006	3.3315	AlMg1; AlMg1C	N41	A G0-6	144106	L3350		A5005	1510; AMg1	AlMg1C; 5005A
21	AA1050; A91050; 1050; 1050A	3.0255	Al99,5; Al99.5	1B	A5	14407	9001/2	L-3051		AD0	Al99.5; Al99,5; 1050A
21	AA1200; A91200 ; 1200; 1200A	3.0205	Al99,0; Al99.0; Al99	1C	A4	144010	Al99.0	L-3001	A1200	A0	Al99.0; AL99,0; 1200
22	AA2017; A92017; 2017; 2017A	3.1325; 3.1124	AlCu2,5Si(A); AlCu2.5Si(A); AlCuMg1		A-U4G			L-3120		V65	AlCu2,5Si(A); AlCu2.,5Si(A); 2017A
22		3.2315	AlMgSi1	H30	A-SGM0.7	144312	9006/4	L-3453		AD35	AlSiMgMn; 6082
22		3.4345	AlZnMgCuO,5; AlZnMgCuO.5								AlZnMgCu0.5; AlZnMgCu0,5; 7022
22		3.1655	AlCu6BiPb; AlCuBiPb	FC1	A-U5PbBi	144355	9002/5	L-3192	A2011		AlCu6BiPb; 2011
22	AA7075; A97075; 7075	3.4365; 3.4364	AlZn5,5MgCu; AlZn5.5MgCu; AlZnMgCu1,5; AlZnMgCu1.5	7075; L95; L96	A-Z5GU		9007/2	L-3710	A7075	B95	AlZn5.5MgCu; AlZn5,.5MgCu; AW-7075; 7075
22	AA2024; A92024; 2024	3.1355; 3.1354	AlCuMg2	2024; 2L97	A-U4G1		9002/4; 3583	L-3140	A2024	D16	AlCu4Mg1; 2024
22		3.4335	AlZn4,5Mg1; AlZn4.5Mg1	H17	A-Z5G	144425	9007/1	L-3741			AlZn4.5Mg1; AlZn4,5Mg1; 7020
22	AA6061; A96061; 6061	3.3211; 3.3214	AlMg1SiCu	H20	A-GSUC		9006/2	L-3420	A6061	AD33	EN AW-6061; EN AW-AlMg1SiCu; AlMg1SiCu
23		3.3261	G-AlMg5Si; GK-AlMg5Si; AlMg5Si; VDS 245	LM5		144163				AL13	EN AC-51400; EN AC-AlMg5Si; G-AlMg5Si; AlMg5Si
23		3.2982	GD-AlSi12(Cu); G-AlSi12(Cu); AlSi12(Cu); VDS 231 D		A-S12U		3048				EN AC-47100; EN AC-AlSi12C; G-AlSi12Cu; AlSi12Cu; AlSi12Cu1(Fe)
23	520.0; AA 520.0; A05200				A-G10S		3056	L-2310	AC7B	A18	
23	222.0; AA 222.0; A02220			LM12			3041	L-2110			
23	518.0; AA 518.0; A05180	3.3292	G-AlMg9; GD-AlMg9; AlMg9; VDS 349								EN AC-51200; EN AC-AlMg9; G-AlMg9; AlMg9
23	203.0; AA 203.0; A02030	3.1754	G-AlCu5Ni1,5; G-AlCu5Ni1.5		AU5NKZr						
23	ER4047; A94047	3.2585	SG-AlSi12	4047A; NG2		144262					SG-AlSi12; EL-AlSi12
23	712.0; AA 712.0; A07120		G-AlZn10Si8Mg; GK-AlZn10Si8Mg; AlZn10Si8Mg; VDS 108		A-Z5GF		3602				EN AC-71100; EN AC-AlZn10Si8Mg; G-AlZn10Si8Mg; AlZn10Si8Mg

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	Euronorm
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
23	514.0; 514.1; AA 514.0; AA 514.1; A05140; A05141	3.3561	G-AlMg5; GK-AlMg5; AlMg5; EN AC-51300; VDS 244		A-G6		3058	L-2331		AL28; AMg5Mz;	EN AC-51300; EN AC-AlMg5; G-AlMg5; AlMg5
23	B413.0; AA B413.0; A24130; B213.0; AA 213.0; A22130	3.2581; 3,2582	G-AlSi12; GK-AlSi12; GD-AlSi12; AlSi12	LM6	A-S13	144261	4514	L-2520	AC3		EN AC-44200; EN AC-AlSi12; G-AlSi12; GD-AlSi12; AlSi12
23		3.2211	G-AlSi11; GK-AlSi11; AlSi11								EN AC-44000; EN AC-AlSi11; G-AlSi11
23	A444.0; AA A444.0; A14440									AK7	
23		3.3541	G-AlMg3; GK-AlMg3; GF-AlMg3; AlMg3; VDC 244	H20	A-G3T	144224	3059	L-2341	ADC6		EN AC-51100; EN AC-AlMg3; G-AlMg3; AlMg3
24	515.0; AA 515.0; A05150	3.3241	G-AlMg3Si; GK-AlMg3Si; GF-AlMg3Si; AlMg3Si; AlMg3Si1								G-AlMg3Si1; AlMg3Si
24		3.2373	G-AlSi9Mg; GK-AlSi9Mg; AlSi9Mg		A-S9G		3051		AC4A	AK9	G-AlSi9Mg; AlSi9Mg
24	A356.0; AA A356.0; A13560; A356.2; AA A356.2; A13562	3.2371	G-AlSi7Mg; GK-AlSi7Mg; GF-AlSi7Mg; AlSi7Mg	2L99	A-S7G03			L-2651	AC4CH	AL9	G-AlSi7Mg; AlSi7Mg
24	204.0; AA 204.0; A02040	3.1371	G-AlCu4TiMg; GK-AlCu4TiMg; GF-AlCu4TiMg; AlCu4TiMg		AU5GT			L-2140	AC1B		EN AC-21000; EN AC-AlCu4TiMg; G-AlCu4TiMg
24	A333.0; AA A333.0; A13330	3.2161	G-AlSi8Cu3; GK-AlSi8Cu3			144163				AL13	EN AC-AlSi8Cu3; EN AC-AlSi8Cu3; G-AlSi8Cu3
24	380.0; AA 380.0; A03800	3.2163	G-AlSi9Cu3; GD-AlSi9Cu3; AlSi9Cu3; VDS 226	LM24	A-S9U3	144252	3610	L-2630	AC4B	AK8M3; AK8	EN AC-46200; EN AC-AlSi8Cu3; G-AlSi9Cu3; AlSi8Cu3
24	365.0; AA 365.0; A03650		G-AlSi10MnMg								EN AC-43500; EN AC-AlSi10MnMg; G-AlSi10MnMg
24	319.0; AA 319.0; A03190	3.2151	G-AlSi6Cu4; GK-AlSi6Cu4; AlSi6Cu4; VDS 225	LM21	A-S5UZ	144230	7369/4	L-2620	AC2B	AK5M	EN AC-45000; EN AC-AlSi6Cu4; G-AlSi6Cu4; AlSi6Cu4
24		3.2383	G-AlSi10MgCu; GK-AlSi10MgCu; G-AlSi10Mg(Cu); GK-AlSi10Mg(Cu); AlSi10MgCu; AlSi10Mg(Cu)		A-S10UG						
24		3.2381; 3.2385	G-AlSi10Mg; GK-AlSi10Mg; GD-AlSi10Mg; AlSi10Mg; VDS 239		A-S10G	144253					EN AC-43000; EN AC-AlSi10Mg; G-AlSi10Mg; AlSi10Mg
24		3.1841	G-AlCu4Ti; AlCu4Ti							AL19	EN AC-21100; EN AC-AlCu4Ti; G-AlCu4Ti; AlCu4Ti

Material Group No.	USA	Germany		U.K.	France	Sweden	Italy	Spain	Japan	Russia	Euronorm
	AISI/SAE/ UNS/ ASTM/AA	Werkstoff	DIN	BS	AFNOR	SS	UNI	UNE	JIS	GOST	EN
25	390.0; AA 390.0; A03900		G-AlSi17Cu4Mg	LM30		4282					EN AB-48100; EN AC-48100; G-AlSi17Cu4Mg; AlSi17Cu4Mg
25	393.0; AA 393.0; A03930		G-AlSi20CuMgNi; AlSi20CuMgNi	LM29						AK21M2N2	
25			G-AlSi18Cu1MgNi; AlSi18Cu1MgNi	LM28							
26	C36000	2.0375	CuZn36Pb3	CZ124	CuZn36Pb3		12167		C3600; C3601; C3602		CuZn36Pb3; CW603N
26	C83810	2.1098	CuSn3Zn8Pb5-C; G-CuSn2ZnPb	LG1							CuSn3Zn8Pb5-C
26	C83600	2.1096; 2.1096.01	CuSn5Zn5Pb5-C; G-CuSn5ZnPb; Rg 5	LG2	CuPb5Sn5Zn5; UE5; U-E 5 Pb 5 Z 5	5204-15			H5111; H2203	BrO5Ts5S5	CuSn5Zn5Pb5-C
26	C93200	2.1090	CuSn7Zn4Pb7-C; G-CuSn7ZnPb; GC-CuSn7ZnPb; GZ-CuSn7ZnPb; Rg 7	GC 493K	CuSn7Pb6Zn4; UE7; U-E 7 Z 5 Pb 4						CuSn7Zn4Pb7-C
26	C93800	2.1182	CuSn7Pb15-C; G-CuPb15Sn; GC-CuPb15Sn; GZ-CuPb15Sn	LB1	U-Pb15E8; U-Pb 15 E8			C-3300			CuSn7Pb15-C; CC496K
26	C93700	2.1176	CuSn10Pb10-C; G-CuPb10Sn; GC-CuPb10Sn; GZ-CuPb10Sn	LB2	U-Pb10						CuSn10Pb10-C
27	C22000	2.0230	CuZn10; Ms90	CZ101	U-Z10; CuZn10		P-CuZn10; P-OT90		C2200	L90	CuZn10; CW501L
27	C86200; SAE 430A	2.0596	CuZn34Mn3Al2Fe1-C; G-CuZn34Al2; GK-CuZn34Al2; GZ-CuZn34Al2	HTB 1	U-Z36N3; CuZn19Al6Y20				HBSC4; H5102/class 3; H5102/class 4	LTs23A; LTs23A6Zh3MTs2	CuZn34Mn3Al2 Fe1-C; CC764S
27	C27200	2.0335	CuZn36; Ms64	CZ108	U-Z36; CuZn 36		C 2700			L63	CuZn36; CW507L
27	C27400	2.0321	CuZn37; Ms63	CZ108			P-CuZn37; P-OT63		C2720	L63	CuZn37; CW508L
27	C86400	2.0592	CuZn35Mn2Al1Fe1-C; G-CuZn35Al1; GK-CuZn35Al1; GZ-CuZn35Al1; G-Ms60	HTB 1					HBSC1; CAC301		CuZn35Mn2Al1 Fe1-C; CC765S
27	C46400	2.0530	CuZn38Sn1As; CuZn38Sn1	CZ112			P-CuZn39Sn1		C4640	LO60-1	CuZn38Sn1As; CW717R
27	C23000; 85Cu-15Zn	2.0240	CuZn15 ; CuZn 15	CZ102	U-Z15; CuZn15	5112-02; 5112-04; 5112-05			C2300		CuZn15; CW502L
27	C24000; 80Cu-20Zn	2.0250	CuZn20; CuZn 20; Ms80	CZ103	CuZn20	5114-02; 5114-04; 5114-05			C2400		CuZn20; CW503L
27	C26000; CA260	2.0265	CuZn30; CuZn 30	CZ106	CuZn30				C2600		CuZn30; CW505L
28	C63000	2.0966	CuAl10Ni5Fe4; CuAl 10 Ni 5 Fe 4	CA 104	U-A10N; CuAl9Ni5Fe3		P-CuAl10Ni5Fe5		C6301	BrAD; BrAZhN10-4-4; N10-4-4	CuAl10Ni5Fe4; CW307G
28	C90700	2.1050	CuSn10-C; G-CuSn 10; SnBz10	CT1	CuSn8						CuSn10-C; CC480K
28	C90800; C91700	2.1052; 2.1052.01; 2.1052.04; 2.1052.03	CuSn12-C; G-CuSn12; GZ-CuSn12; SnBz12, Gbz12	PB2	UE12P				CAC502C; PBC2C		CuSn12-C; CC483K
28	C95800; C95810	2.0975	G-CuAl10Fe5Ni5-C; G-CuAl 10 Ni; NiAlBz-F60		CuAl10Fe5Ni5 Y70				CAC703C		CC333G

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28	C11000	2.0060	Cu-ETP; E-Cu57; E Cu 57	C101	Cu-B		Cu-DHP	C11020	C1100	M1	Cu-ETP; E-Cu57; CW004A
28	C81500	2.1292	G-CuCrF 35	CC1-FF	U-Cr0.8Zr						
28	C10300	2.0070	Cu-HCP; Cu-PHC; SE-Cu						C103	LS60-2	Cu-HCP; CW020A; Cu-PHC; CW021A
28	C10100; C10200	2.0040	Cu-OF; OF-Cu	C103; C110	Ci-c1; Cu-c2			C-1120	C1011; C1020	M0b	Cu-OF; CW008A
28	C86550	2.0590	G-CuZn40Fe; G-SoMsF30								G-CuZn40Fe
28	C18100; C18150	2.1293	CuCr1Zr; CuCrZr	CC102	U-C1Z; U-Cr0.8Zr						CuCr1Zr; CW106C
28	C11000; C12200	2.0090	Cu-DHP; E-Cu58; E Cu 58 SF-Cu	C106	Cu-B				C1100; C1220	M1f	Cu-DHP; E-Cu58; CW024A
28	C95500	2.0971	CuAl9Ni3Fe2		UA9					BrA10Zh4N4L	
28	C61000	2.0920	CuAl8; Cu Al 8		CuAl8					BrA7	CuAl8
29											
29											
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ISCAR LTD.
Israel
Headquarters
Tel +972 (0)4 997 0311
Fax+972 (0)4 987 3741
headquarter@iscar.co.il

Argentina
ISCAR TOOLS ARGENTINA SA
Tel +54 114 912 2200
Fax+54 114 912 4411
admin@iscararg.com.ar

Australia
ISCAR AUSTRALIA PTY. LTD
Tel +61 (0) 2 8848 3500
Fax+61 (0) 2 8848 3511
iscaraus@iscar.com.au

Austria
ISCAR AUSTRIA GmbH
Tel +43 7252 71200-0
Fax+43 7252 71200-999
office@iscar.at

Belarus
JV ALC "TWING-M"
Tel +375 17 506-32-38
+375 17 506-33-31/65
Tel/Fax +375 17 506-32-37
info@twing.by
www.twing.by

Belgium
n.v. ISCAR BENELUX s.a.
Tel +32 (0) 2 464 2020
Fax+32 (0) 2 522 5121
info@iscar.be

Bosnia
(Representative Office)
Tel +387 32 201 100
Fax+387 32 201 101
info@iscar.ba

Brazil
ISCAR DO BRASIL COML. LTDA.
Tel +55 19 3826-7100
Fax+55 19 3826-7171
DDG 0800 701 8877
iscar@iscarbrasil.com.br

Bulgaria
ISCAR BULGARIA
Tel/Fax +359 431 62557
aa_iscar@infotel.bg

Canada
ISCAR TOOLS INC.
Tel +1 905 829 9000
Fax+1 905 829 9100
admin@iscar.ca

Chile
J&A INTERNATIONAL
Tel +56 2 2232 5838
amedina@jya.cl
www.jya.cl

China
ISCAR CHINA
Tel +86 21 8024 8888
iscar@iscar.com.cn

Colombia
ISCAR Andina
Tel +57 310 380 9932
Tel/fax +57 1 896 65 78
iscar@iscar.com.co

Croatia
ISCAR ALATI d.o.o.
Tel +385 (0) 1 33 23 301
Fax+385 (0) 1 33 76 145
podrska@iscar.hr

Cyprus
WAMET (Demetriades) Ltd.
Tel +357 (0) 2 336660/5498
Fax+357 (0) 2 333386
wamet@cytanet.com.cy

Czech Republic
ISCAR CR s.r.o.
Tel +420 377 420 625
Fax+420 377 420 630
iscar@iscar.cz

Denmark
KJ VAERKTOEJ AS/ISCAR DENMARK
Tel +45 70 11 22 44
Fax+45 46 98 67 10
kj@kj.dk

Ecuador
ISCAR Andina
Tel/fax +57 1 821 93 38
iscar@iscar.com.co
atencioncliente@iscar.com.co

Estonia
KATOMSK AS
Tel +372 6775 671
Fax+372 6720 266
aleksei@katomsk.ee

Finland
ISCAR FINLAND OY
Tel +358-(0)9-439 1420
Fax+358-(0)9-466 328
info@iscar.fi

France
ISCAR FRANCE SAS
Tel +33 (0)1 30 12 92 92
Fax+33 (0)1 30 12 95 82
info@iscar.fr

Germany
ISCAR Germany GmbH
Tel +49 (0) 72 43 9908-0
Fax+49 (0) 72 43 9908-93
gmbh@iscar.de
www.iscar.de

Greece
INTERNATIONAL TOOLS
K.-X. GEORGOPOULOS & SIA O.E
Tel +30 210 346 0133
Fax+30 210 342 5621
info@internationaltools.gr

VIMA
V. Mazloumian & Sons
Tel +30 2310 517-117 / 544-521
Fax+30 2310 529-107
vimaco@otenet.gr
http://www.vimaco.gr

Hong Kong
MTC TOOLING SYSTEMS LTD
Tel +85-2-23054838
Fax+85-2-27988789
yoongkamsing@hotmail.com

Hungary
ISCAR HUNGARY KFT.
Tel +36 28 887 700
Fax+36 28 887 710
iscar@iscar.hu

India
ISCAR India Ltd.
Tel +91 77009 63707
sales@iscar.in

Indonesia
CV MULTI TEKNIK
Tel +62-21-29206242/44/45/59
Fax+62-21-29206243
contact@multi-teknik.co.id

Ireland
HARD METAL MACHINE TOOLS
Tel +353 (0) 1 286 2466
Fax+353 (0) 1 286 1514
phannigan@hardmetal.ie
www.hardmetal.ie

Italy
ISCAR ITALIA srl
Tel +39 02 93 528 1
Fax+39 02 93 528 213
marketing@iscaritalia.it

Japan
ISCAR JAPAN LTD.
Tel +81 6 6835 5471
Fax+81 6 6835 5472
iscar@iscar.co.jp

Latvia
MECHA, UAB
Tel +370 37 407 230
Fax+370 37 407 231
info@mecha.lt

Lithuania
MECHA, UAB
Tel +370 37 407 230
Fax+370 37 407 231
sigitas@mecha.lt

Mexico
ISCAR DE MÉXICO
Tel +52 (442) 214 5505
Fax+52 (442) 214 5510
iscarmex@iscar.com.mx

The Netherlands
ISCAR NEDERLAND B.V.
Tel +31 (0) 182 535523
Fax+31 (0) 182 572777
info@iscar.nl

New Zealand
ISCAR PACIFIC LTD.
Tel +64 (0) 9 573 1280
Fax+64 (0) 9 573 0781
iscar@iscarpac.co.nz

North Macedonia
(Representative Office)
Tel +389 2 309 02 52
Fax+389 2 309 02 54
info@iscar.com.mk

Norway
SVEA MASKINER AS
Tel +47 32277750
Fax+47 32277751
per.martin.bakken@svea.no

Peru
HARTMETALL SAC
Tel: (511) 6612699
otorres@hartmetallgroup.com

Philippines
MESCO
Tel +63 2631 1775
Fax+63 2635 0276
mesco@mesco.com.ph

Poland
ISCAR POLAND Sp. z o.o.
Tel +48 32 735 7700
Fax+48 32 735 7701
iscar@iscar.pl

Portugal
ISCAR Portugal, SA
Tel +351 256 579950
Fax+351 256 586764
info@iscarportugal.pt

Romania
ISCAR Tools SRL
Tel +40 (0)312 286 614
Fax+40 (0)312 286 615
iscar-romania@iscar.com

Russia
Moscow
ISCAR LLC
Tel/fax +7 495 660 91 25/31
iscar@iscar.ru

Serbia
ISCAR TOOLS d.o.o.
Tel +381 11 314 90 38
Fax+381 11 314 91 47
info@iscartools.rs

Singapore
SINO TOOLING SYSTEM
Tel +65 6566 7668
Fax+65 6567 7336
sinotool@singnet.com.sg

Slovakia
ISCAR SR, s.r.o.
Tel +421 (0) 41 5074301
Fax+421 (0) 41 5074311
info@iscar.sk

Slovenia
ISCAR SLOVENIJA d.o.o.
Tel +386 1 580 92 30
Fax+386 1 562 21 84
info@iscar.si

South Africa
ISCAR SOUTH AFRICA (PTY) LTD.
ShareCall 08600-47227
Tel +27 11 997 2700
Fax+27 11 388 9750
iscar@iscarsa.co.za

South Korea
ISCAR KOREA
Tel +82 53 760 7594
Fax+82 53 760 7500
leeyj@taegutec.co.kr

Spain
ISCAR IBERICA SA
Tel +34 93 594 6484
Fax+34 93 582 4458
iscar@iscarib.es

Sweden
ISCAR SVERIGE AB
Tel +46 (0) 18 66 90 60
Fax+46 (0) 18 122 920
info@iscar.se

Switzerland
ISCAR HARTMETALL AG
Tel +41 (0) 52 728 0850
Fax+41 (0) 52 728 0855
office@iscar.ch

Taiwan
ISCAR Taiwan Ltd.
Tel +886 (0)4-24731573
Fax+886 (0)4-24731530
iscar.taiwan@msa.hinet.net

Thailand
ISCAR Thailand Ltd.
Tel +66 (2) 7136633-8
Fax+66 (2) 7136632
iscar@iscarthailand.com

Turkey
ISCAR Kesici Takim
TIC. VE. IML. LTD
Tel +90 (262) 751 04 84 (Pbx)
Fax+90 (262) 751 04 85
iscar@iscar.com.tr

Ukraine
ISCAR UKRAINE LLC
Tel +38 (050) 440 23 91
info@iscar.com.ua

United Arab Emirates
SVRS General Trading LLC
Tel +971 4 342 6699
www.svrs-mena.com

United Kingdom
ISCAR TOOLS LTD.
Tel +44 (0) 121 422 8585
Fax+44 (0) 121 423 2789
sales@iscar.co.uk

United States
ISCAR METALS INC.
Tel +1 817 258 3200
Tech Tel 1-877-BY-ISCAR
Fax+1 817 258 3221
info@iscarmetals.com

Venezuela
FERREINDUSTRIAL ISO-DIN C.A.
Tel +58 2 632 8211/633 4657
Fax+58 2 632 5277
iso-din@cantv.net

Vietnam
ISCAR VIETNAM
(Representative Office)
Tel +84 8 38 123 519/20
Fax+84 8 38 123 521
iscarvn@hcm.fpt.vn

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