Solid Carbide

END MILLS & DRILLS



TaeguTec
Member IMC Group

TaeguTec Smart Productionn System



R&D

Development of optimized solutions for achieving excellent performance and long tool life.

Production

Manufacturing products with precise and consistent quality through the latest automated processes.

Quality Control

High-precision quality management through precision measuring equipment and systematic inspection processes.

Inventory & Logistics

An automated logistics system featuring efficient inventory management and strategically positioned warehouses.

Solid Carbide **End Mills**



P4 – P131

- HARD-MILL
- SLIK-SOLID
- APEX-MILL
- STAR-MILL
- ALU-MILL
- CERAMIC-SFEED
- DIA-MILL

Solid Carbide **Drills**

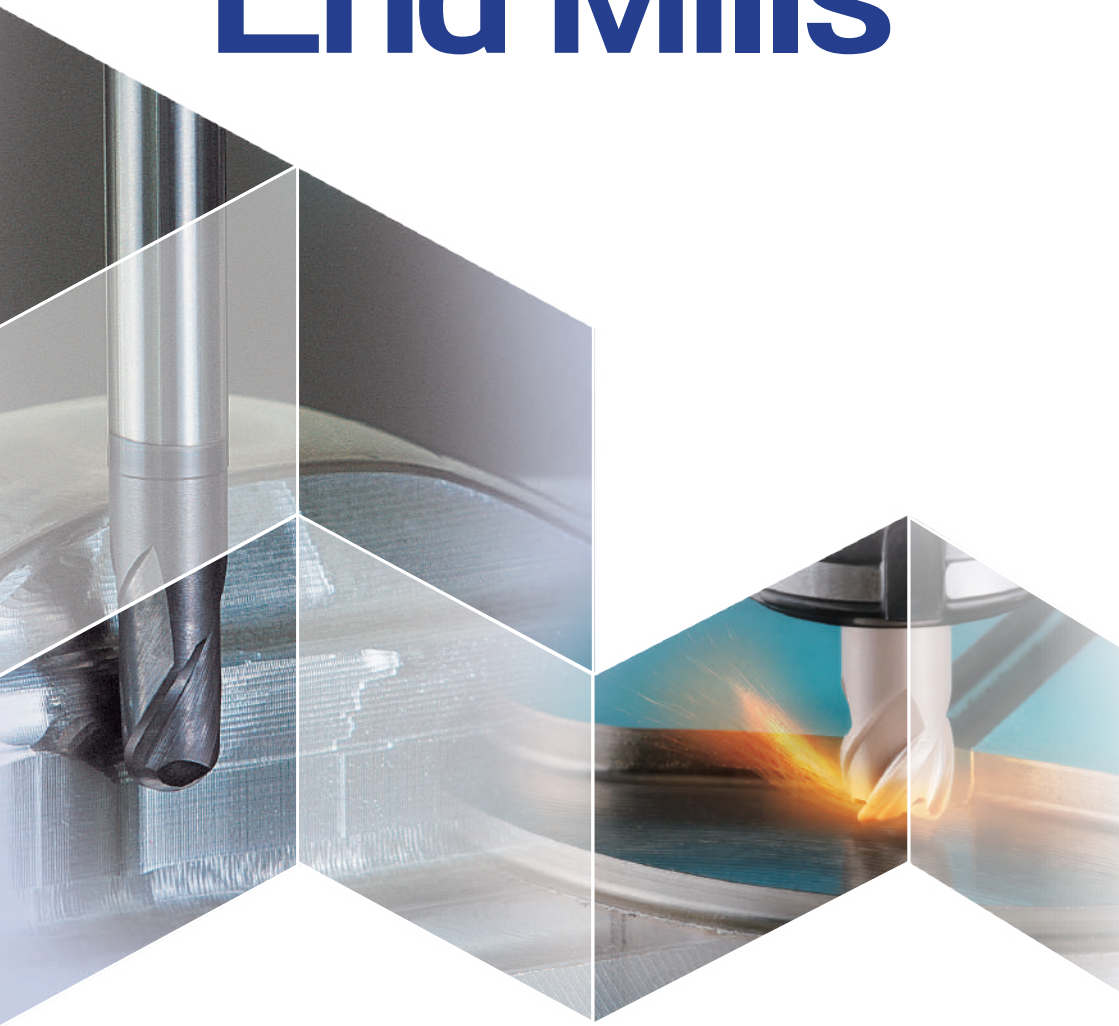


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- H-DRILL
- SOLID-3-DRILL
- MQL-DRILL

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Solid Carbide
End Mills



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Tool Selection Guide

Series		Type	Flute	Diameter range	Application & Material							Pages
					P	M	K	N	S	H		
HARDMILL												
	**HSB 2**	Ball	2	0.3-12.0	○		○			●	H.S.M*	14
	**HSB 2…S6**	Ball	2	0.6-2.0	○		○			●	H.S.M*	18
	**HSB 2…S/M**	Ball	2	0.3-12.0	○		○			●	H.S.M*	19
	**HSB 4…M**	Ball	4	4.0-12.0	○		○			●	H.S.M*	21
	**HSF 2**	Flat	2	0.3-12.0	○		○			●	H.S.M*	22
	**HSF 2…M**	Flat	2	0.3-12.0	○		○			●	H.S.M*	26
	**HSF 4**	Flat	4	1.0-12.0	○		○			●	H.S.M*	28
	**HSF 4…M**	Flat	4	1.0-12.0	○		○			●	H.S.M*	30
	**HSF 6…M**	Flat	6	3.0-12.0	○		○			●	H.S.M*	31
	**HSF 6…XLT**	Flat	6	5.0-12.0	○		○			●	H.S.M*	31
	**HSR 2**	Corner R	2	0.3-12.0	○		○			●	H.S.M*	32
	**HSR 2…M**	Corner R	2	0.3-12.0	○		○			●	H.S.M*	39
	**HSR 4**	Corner R	4	1.0-12.0	○		○			●	H.S.M*	42
	**HSR 4…M**	Corner R	4	1.0-12.0	○		○			●	H.S.M*	46
	**HSR 6**	Corner R	6	6.0-12.0	○		○			●	Finishing	48
	**HSR 6…M**	Corner R	6	6.0-12.0	○		○			●	Finishing	48
	**HSB 2CBN**	CBN Ball	2	0.4-4.0						●	Finishing	49
SLIKSOLID												
	**UHP 4**	Flat	4	2.0-25.0	●		●				General	52
	**UHP 4…R**	Corner R	4	3.0-20.0	●		●				General	53

▸ H.S.M* : High Speed Machining

● Recommended, ○ Suitable

Series		Type	Flute	Diameter range	Application & Material							Pages
APEXMILL					P	M	K	N	S	H		
	**SDM 3**	Corner R	3	10.0-20.0	●	○					General	56
	**SBE 2…S**	Ball	2	2.0-20.0	●	○	●		○		General	57
	**SBE 2**	Ball	2	1.0-20.0				●			General	58
	**SBE 2…T**	Ball	2	1.0-20.0	●	○	●		○		General	59
	**SBE 2…L**	Ball	2	3.0-16.0				●			General	60
	**SBE 2…LT**	Ball	2	2.0-16.0	●	○	●		○		General	61
	**SBE 4**	Ball	4	10.0-20.0				●			General	62
	**SBE 4…T**	Ball	4	1.0-20.0	●	○	●		○		General	63
	**BES 2…T**	Ball	2	3.0-16.0	●	○	○		○		General	64
	**BES 4…T**	Ball	4	3.0-10.0	●	○	○		○		General	64
	**TSE 2…M**	Flat	2	1.0-25.0	●	○	●	●	○		General	65
	**TSE 4…M**	Flat	4	1.0-25.0	●	○	●	●	○		General	67
	**HES 2…LT**	Flat	2	3.0-20.0	●	○	●		○		General	69
	**HES 2…XLT**	Flat	2	3.0-20.0	●	○	●		○		General	70
	**HES 4…LT**	Flat	4	3.0-20.0	●	○	●		○		General	71
	**HES 4…XLT**	Flat	4	3.0-20.0	●	○	●		○		General	72
	**HES 2…T-R**	Corner R	2	3.0-20.0	●	○	●		○		General	73
	**HES 2…LT-R**	Corner R	2	3.0-12.0	●	○	●		○		General	74
	**HES 4…T-R**	Corner R	4	3.0-20.0	●	○	●		○		General	75
	**HES 4…LT-R**	Corner R	4	3.0-12.0	●	○	●		○		General	76

● Recommended, ○ Suitable

Tool Selection Guide

Series		Type	Flute	Diameter range	Application & Material							Pages
					P	M	K	N	S	H		
APEXMILL												
	**CEM 2…-C60**	Chamfer 60°	2	4.0-20.0	●	○	○	●	○		General	77
	**CEM 2**	Chamfer 45°	2	4.0-20.0	●	○	○	●	○		General	77
	**CEM 2…-C120**	Chamfer 30°	2	4.0-20.0	●	○	○	●	○		General	78
	**ECEM 2**	Chamfer 45°	2	2.0-16.0	●	○	○	●	○		General	78
	**ECEM 4**	Chamfer 45°	4	6.0-12.0	●	○	○	●	○		General	79
	**HCEM 5**	Chamfer 45°	5	8.0-16.0	●	○	●		○		General	79
	**SCSL**	Lens Shape	4,6	8.0-12.0	●	●					5-axis profiling	80
	**SCSO**	Oval Shape	4	8.0-12.0	●	●					5-axis profiling	80
	**SCST**	Oval Shape	4	8.0-12.0	●	●					5-axis profiling	81
	**HTB 2…/3…**	Taper	2,3	3.0-8.0	●	○	●		○		General (5-axis)	81
	**HFM 2**	Flat	2	4.0-12.0	●		●			○	H.F.M*	84
	**HFM 4**	Flat	4	6.0-12.0	●		●			○	H.F.M*	84
	**CFM 4…M**	Corner Ch	4	6.0-25.0	●	●	○		●		General	85
	**REL …L**	Corner Ch	3-4	6.0-20.0	●	○	○		○	●	Roughing	86
	**FSM 4…M**	Corner Ch	4	6.0-25.0	●		○				Roughing +Finishing	87
STARMILL												
	**SBT 3…U**	Ball	3	4.0-12.0	○	●			●		Difficult-to-cut	90
	**SBT 4…U**	Ball	4	3.0-12.0	○	●			●		Difficult-to-cut	91
	**SED 4…U**	Flat	4	1.0-20.0	○	●			●		Difficult-to-cut	92
	**SED 4…UL**	Flat	4	3.0-12.0	○	●			●		Difficult-to-cut	93
	**SED 4…-R**	Corner R	4	2.0-16.0	○	●			●		Difficult-to-cut	94
	**SED 4…-C**	Corner Ch	4	4.0-12.0	○	●			●		Difficult-to-cut	95

▸ H.F.M* : High Feed Machining

● Recommended, ○ Suitable

Series		Type	Flute	Diameter range	Application & Material							Pages
STARMILL					P	M	K	N	S	H		
	**SED 7**	Corner R	7	6.0-20.0	○	●			●		Difficult-to-cut	95
	**SED 7…N**	Corner R	7	6.0-20.0	○	●			●		Difficult-to-cut	96
	**SER**	Splitter	3-5	3.0-20.0	○	●			●		Roughing	97
	**REH …S**	Corner Ch	4-6	6.0-20.0	●	●	●		○		Roughing	98
	**REH …L**	Corner Ch	4-6	6.0-20.0	●	●	●		○		Roughing	98
	**REH …M**	Corner Ch	3-6	4.0-25.0	●	●	●		○		Roughing	99
ALUMILL												
	**AES 2**	Flat	2	1.0-20.0				●			Aluminum	102
	**AES 2…XL**	Flat	2	2.0-20.0				●			Aluminum	103
	**AES 3**	Flat	3	1.0-25.0				●			Aluminum	104
	**AES 3…ML**	Flat	3	3.0-20.0				●			Aluminum	105
	**AES 3…XL**	Flat	3	6.0-20.0				●			Aluminum	106
	**AES 2…R**	Corner R	2	6.0-16.0				●			Aluminum	107
	**AES 3…R**	Corner R	3	6.0-16.0				●			Aluminum	108
	**REMA 3/ 3…C**	Corner R	3	6.0-20.0				●			Aluminum	109
	**REA 3…L**	Corner Ch	3	6.0-20.0				●			Aluminum	109
	**AWE 3**	Flat (Wave edge)	3	6.0-20.0				●			Aluminum	110
	**AWE 3…ML**	Flat (Wave edge)	3	6.0-20.0				●			Aluminum	110
	**AWE 3…ML-R**	Corner R (Wave edge)	3	6.0-12.0				●			Aluminum	111

● Recommended, ○ Suitable

Tool Selection Guide

Series		Type	Flute	Diameter range	Application & Material							Pages
CERAMICSPEED					P	M	K	N	S	H		
	CRF 4	Corner R	4	6.0-16.0					●		H.S.M*	114
	CRF 6	Corner R	6	6.0-16.0					●		H.S.M*	114
	CRH 4	Corner R	4	6.0-16.0					●		H.S.M*	115
	CRFB 6	Corner R	6	6.0-16.0					●		H.S.M*	115

▸ H.S.M* : High Speed Machining

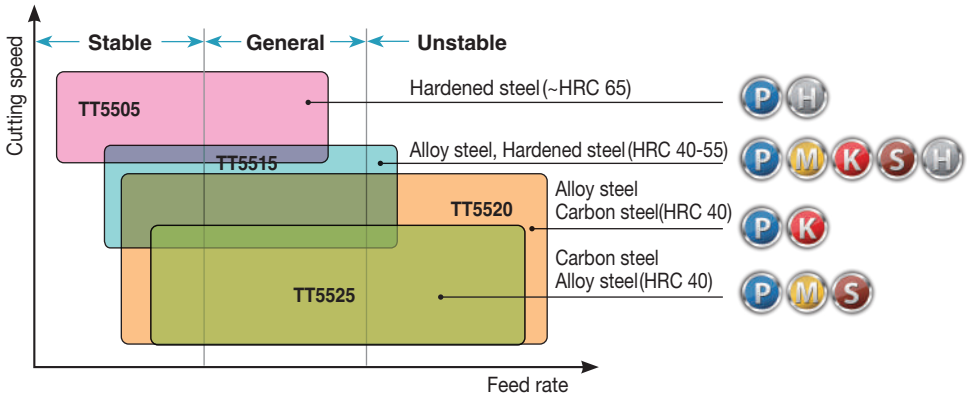
● Recommended, ○ Suitable

Series		Type	Flute	Diameter range	Application & Material	Pages
DIAMILL						
	DMB 2	Ball	2	0.6-2.0	Graphite	118
	DEB 2…S	Ball	2	3.0-12.0	Graphite	118
	DEB 2…L	Ball	2	3.0-12.0	Graphite	119
	DMR 2	Flat	2	0.6-2.0	Graphite	119
	DER 3…S	Corner R	3	3.0-12.0	Graphite	120
	DER 3…L	Corner R	3	4.0-12.0	Graphite	120
	RRFE	Flat	6-12	4.0-12.0	Composite material (CFRP)	121
	RCFE	Flat	-	4.0-12.0	Composite material (CFRP)	121
	RCME	Flat	-	4.0-12.0	Composite material (CFRP)	122
	RCDE	Flat	-	4.0-12.0	Composite material (CFRP)	122
	RCOM	Flat	4,6	6.0-12.0	Composite material (CFRP)	123
	RDCF	Flat	4-8	4.0-12.0	Composite material (CFRP)	123

Grade

Grade	ISO	Characteristics & applications
TT5505 PVD coated	P05 – P25 H05 – H25	•High wear and oxidation resistance that delivers exceptional productivity levels •Hardened steel, pre-hardened steel (Hardness < 65 HRC) •High speed machining
TT5515 PVD coated	P10 – P30 M15 – M30 K10 – K30 S10 – S30 H10 – H30	•An ultra wear resistant high performance grade covering all ISO ranges •Alloy steel, pre-hardeded steel, stainless steel, high-temp alloy (45 < HRC < 55) •Medium to high speed machining
TT5520 PVD coated	P10 – P30 K10 – K30	•Anti-abrasion and chipping resistant PVD coated layer •Single direction crystal aligned AlCrN layer - Excellent abrasion resistance with sub-micron substrate - Anti-abrasion and oxidation resistant PVD AlCrN coated layer
TT5525 PVD coated	P20 – P40 M20 – M40 S20 – S40	•Optimally balanced with wear resistant and anti-chipping properties •General machining of carbon steel, alloy steel, stainless steel, high-temp alloy (< 40 HRC) •Low to medium speed machining
TTD620 Diamond coated	Graphite	•High hardness and excellent wear resistance •Machining of graphite
TTD610 Diamond coated	Composite material	•Advanced nano diamond coating provides longer tool life and stability of machining •Excellent abrasive wear resistance (Hardness: more Hv 8000) •Machining of composite material
UF10N **UF10** Uncoated	P25 – P35 M25 – M35 N25 – N35	•General machining of steel, aluminum alloys, non-ferrous materials •Submicron substrate
TC3030 Ceramic	S25 – S35	•SiAlON ceramic grade •High speed machining of nikel based super alloys

Selection guide for solid end mill grades



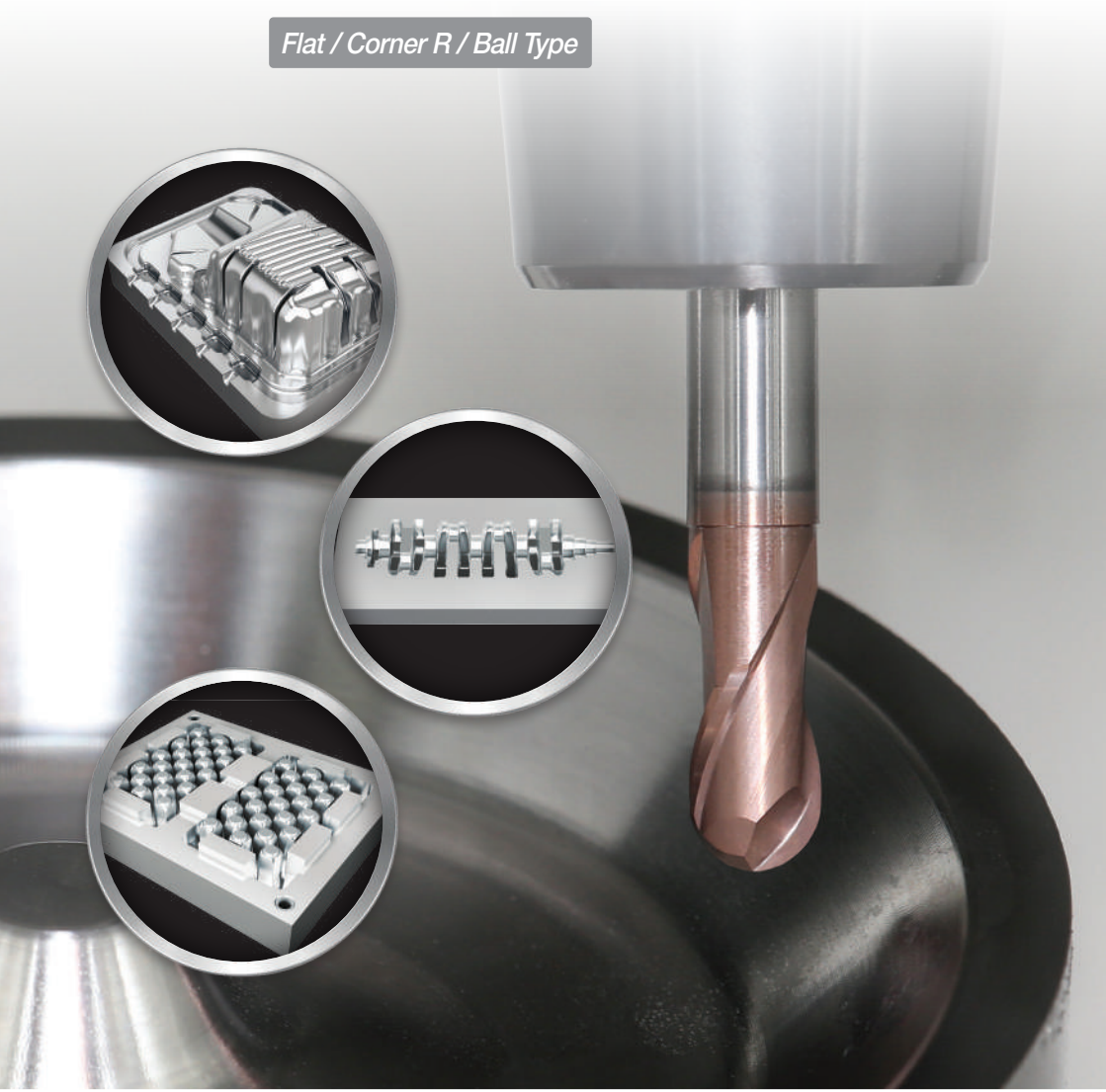
01

High-speed end mills for high hardness materials

HARDMILL

- *First recommended grade for high hardness material machining*
- *Suitable for high-speed machining of steels*
- *Optimized for precision finishing machining*

Flat / Corner R / Ball Type



Best high hardness machining solution

Up to HRC 65 cace

High-speed

Excellent performance and tool life under high-speed machining

TT5505 special coated grade

Excellent wear and heat resistance



Available in 1,000 standard items

Wide range: Ø 0.3-Ø 12 in various neck lengths

High-precision

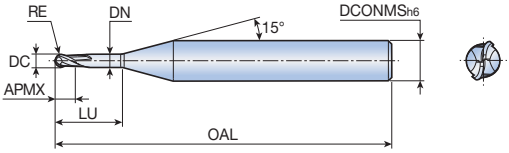
Precise tolerances adapted to finish machining



HSB 2

2 flute long neck ball





RE	
DC≤6	±0.005
DC>6	±0.010

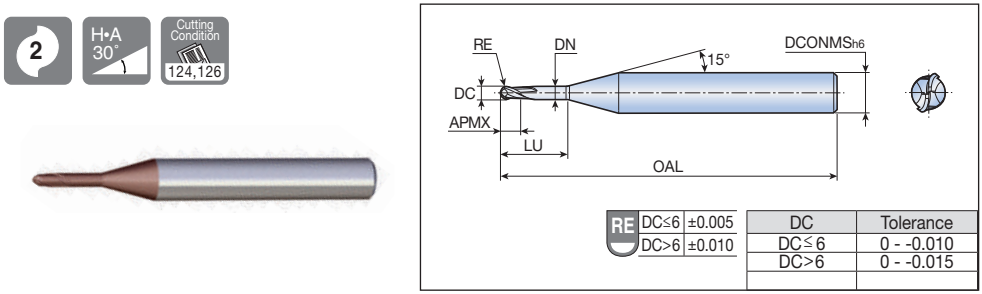
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2003 003 010	0.3	0.15	45	0.3	1.0	0.27	4.0	●
2003 003 020	0.3	0.15	45	0.3	2.0	0.27	4.0	●
2003 003 030	0.3	0.15	45	0.3	3.0	0.27	4.0	●
2004 004 010	0.4	0.2	45	0.4	1.0	0.36	4.0	●
2004 004 015	0.4	0.2	45	0.4	1.5	0.36	4.0	●
2004 004 020	0.4	0.2	45	0.4	2.0	0.36	4.0	●
2004 004 025	0.4	0.2	45	0.4	2.5	0.36	4.0	●
2004 004 030	0.4	0.2	45	0.4	3.0	0.36	4.0	●
2004 004 040	0.4	0.2	45	0.4	4.0	0.36	4.0	●
2005 005 010	0.5	0.25	45	0.5	1.0	0.45	4.0	●
2005 005 015	0.5	0.25	45	0.5	1.5	0.45	4.0	●
2005 005 020	0.5	0.25	45	0.5	2.0	0.45	4.0	●
2005 005 025	0.5	0.25	45	0.5	2.5	0.45	4.0	●
2005 005 030	0.5	0.25	45	0.5	3.0	0.45	4.0	●
2005 005 040	0.5	0.25	45	0.5	4.0	0.45	4.0	●
2005 005 050	0.5	0.25	45	0.5	5.0	0.45	4.0	●
2005 005 060	0.5	0.25	45	0.5	6.0	0.45	4.0	●
2005 005 080	0.5	0.25	45	0.5	8.0	0.45	4.0	●
2006 006 020	0.6	0.3	45	0.6	2.0	0.55	4.0	●
2006 006 030	0.6	0.3	45	0.6	3.0	0.55	4.0	●
2006 006 040	0.6	0.3	45	0.6	4.0	0.55	4.0	●
2006 006 050	0.6	0.3	45	0.6	5.0	0.55	4.0	●
2006 006 060	0.6	0.3	45	0.6	6.0	0.55	4.0	●
2006 006 080	0.6	0.3	45	0.6	8.0	0.55	4.0	●
2006 006 100	0.6	0.3	45	0.6	10.0	0.55	4.0	●
2008 008 020	0.8	0.4	45	0.8	2.0	0.75	4.0	●
2008 008 030	0.8	0.4	45	0.8	3.0	0.75	4.0	●
2008 008 040	0.8	0.4	45	0.8	4.0	0.75	4.0	●
2008 008 050	0.8	0.4	45	0.8	5.0	0.75	4.0	●
2008 008 060	0.8	0.4	45	0.8	6.0	0.75	4.0	●
2008 008 080	0.8	0.4	45	0.8	8.0	0.75	4.0	●
2008 008 100	0.8	0.4	45	0.8	10.0	0.75	4.0	●
2008 008 120	0.8	0.4	45	0.8	12.0	0.75	4.0	●

●: Standard items

HSB 2

2 flute long neck ball

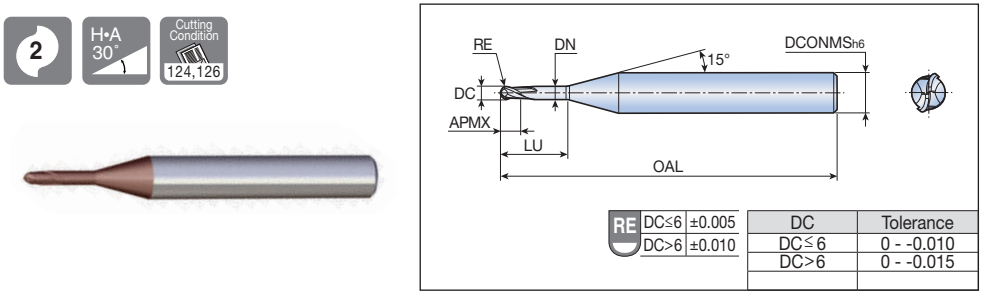


Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2010 010 030	1.0	0.5	50	1.0	3	0.97	4.0	●
2010 010 040	1.0	0.5	50	1.0	4	0.97	4.0	●
2010 010 050	1.0	0.5	50	1.0	5	0.97	4.0	●
2010 010 060	1.0	0.5	50	1.0	6	0.97	4.0	●
2010 010 070	1.0	0.5	50	1.0	7	0.97	4.0	●
2010 010 080	1.0	0.5	50	1.0	8	0.95	4.0	●
2010 010 090	1.0	0.5	50	1.0	9	0.95	4.0	●
2010 010 100	1.0	0.5	50	1.0	10	0.95	4.0	●
2010 010 120	1.0	0.5	50	1.0	12	0.93	4.0	●
2010 010 140	1.0	0.5	50	1.0	14	0.93	4.0	●
2010 010 160	1.0	0.5	50	1.0	16	0.93	4.0	●
2010 010 180	1.0	0.5	55	1.0	18	0.93	4.0	●
2010 010 200	1.0	0.5	55	1.0	20	0.93	4.0	●
2012 012 040	1.2	0.6	50	1.2	4	1.15	4.0	●
2012 012 060	1.2	0.6	50	1.2	6	1.15	4.0	●
2012 012 080	1.2	0.6	50	1.2	8	1.15	4.0	●
2012 012 100	1.2	0.6	50	1.2	10	1.15	4.0	●
2012 012 120	1.2	0.6	50	1.2	12	1.13	4.0	●
2015 015 040	1.5	0.75	50	1.5	4	1.45	4.0	●
2015 015 060	1.5	0.75	50	1.5	6	1.45	4.0	●
2015 015 080	1.5	0.75	50	1.5	8	1.45	4.0	●
2015 015 100	1.5	0.75	50	1.5	10	1.45	4.0	●
2015 015 120	1.5	0.75	50	1.5	12	1.43	4.0	●
2015 015 140	1.5	0.75	50	1.5	14	1.43	4.0	●
2015 015 160	1.5	0.75	50	1.5	16	1.41	4.0	●
2015 015 180	1.5	0.75	55	1.5	18	1.41	4.0	●
2015 015 200	1.5	0.75	55	1.5	20	1.39	4.0	●
2020 030 060	2.0	1.0	50	3.0	6	1.95	4.0	●
2020 030 080	2.0	1.0	50	3.0	8	1.95	4.0	●
2020 030 100	2.0	1.0	50	3.0	10	1.95	4.0	●
2020 030 120	2.0	1.0	50	3.0	12	1.93	4.0	●
2020 030 140	2.0	1.0	50	3.0	14	1.93	4.0	●
2020 030 160	2.0	1.0	50	3.0	16	1.93	4.0	●
2020 030 180	2.0	1.0	55	3.0	18	1.93	4.0	●
2020 030 200	2.0	1.0	55	3.0	20	1.93	4.0	●

●: Standard items

HSB 2

2 flute long neck ball



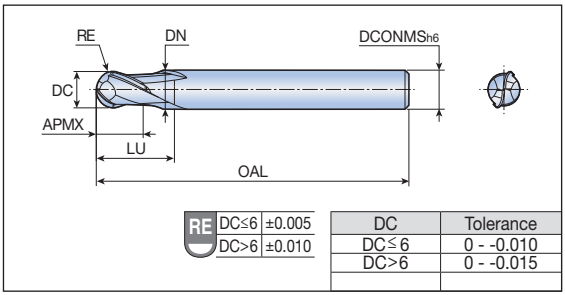
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2020 030 250	2.0	1.0	60	3.0	25	1.93	4.0	●
2020 030 300	2.0	1.0	70	3.0	30	1.93	4.0	●
2025 035 080	2.5	1.25	55	3.5	8	2.45	4.0	●
2025 035 100	2.5	1.25	55	3.5	10	2.45	4.0	●
2025 035 120	2.5	1.25	55	3.5	12	2.43	4.0	●
2025 035 160	2.5	1.25	55	3.5	16	2.41	4.0	●
2025 035 200	2.5	1.25	55	3.5	20	2.41	4.0	●
2030 040 080	3.0	1.5	55	4.0	8	2.85	6.0	●
2030 040 100	3.0	1.5	55	4.0	10	2.85	6.0	●
2030 040 120	3.0	1.5	55	4.0	12	2.85	6.0	●
2030 040 140	3.0	1.5	55	4.0	14	2.85	6.0	●
2030 040 160	3.0	1.5	55	4.0	16	2.85	6.0	●
2030 040 180	3.0	1.5	60	4.0	18	2.85	6.0	●
2030 040 200	3.0	1.5	60	4.0	20	2.85	6.0	●
2030 040 250	3.0	1.5	60	4.0	25	2.85	6.0	●
2030 040 300	3.0	1.5	75	4.0	30	2.85	6.0	●
2030 040 350	3.0	1.5	75	4.0	35	2.85	6.0	●
2030 040 400	3.0	1.5	80	4.0	40	2.85	6.0	●
2040 050 100	4.0	2.0	55	5.0	10	3.9	6.0	●
2040 050 120	4.0	2.0	55	5.0	12	3.9	6.0	●
2040 050 160	4.0	2.0	55	5.0	16	3.9	6.0	●
2040 050 200	4.0	2.0	60	5.0	20	3.9	6.0	●
2040 050 250	4.0	2.0	60	5.0	25	3.9	6.0	●
2040 050 300	4.0	2.0	75	5.0	30	3.9	6.0	●
2040 050 350	4.0	2.0	75	5.0	35	3.9	6.0	●
2040 050 400	4.0	2.0	80	5.0	40	3.9	6.0	●
2050 060 120	5.0	2.5	70	6.0	12	4.9	6.0	●
2050 060 300	5.0	2.5	70	6.0	30	4.9	6.0	●

●: Standard items

HSB 2

2 flute long neck ball





RE		
	DC≤6	±0.005
	DC>6	±0.010

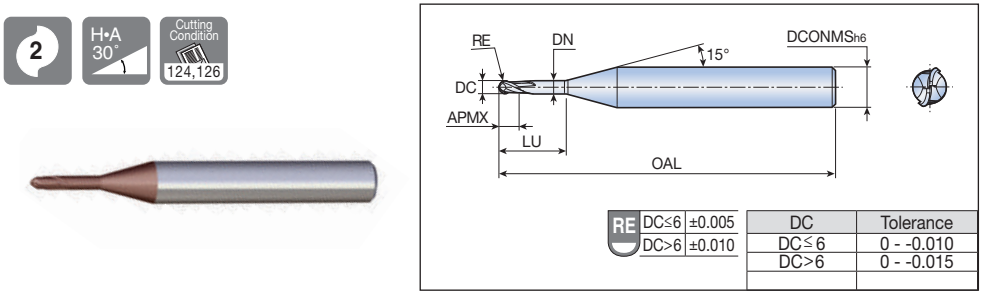
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2060 080 150	6.0	3	60	8	15	5.9	6.0	●
2060 080 200	6.0	3	60	8	20	5.9	6.0	●
2060 080 300	6.0	3	80	8	30	5.9	6.0	●
2060 080 350	6.0	3	80	8	35	5.9	6.0	●
2080 100 150	8.0	4	80	10	15	7.9	8.0	●
2080 100 200	8.0	4	80	10	20	7.9	8.0	●
2080 100 300	8.0	4	100	10	30	7.9	8.0	●
2100 120 200	10.0	5	80	12	20	9.9	10.0	●
2100 120 250	10.0	5	80	12	25	9.9	10.0	●
2100 120 350	10.0	5	100	12	35	9.9	10.0	●
2120 140 250	12.0	6	80	14	25	11.9	12.0	●
2120 140 400	12.0	6	110	14	40	11.9	12.0	●

●: Standard items

HSB 2...S6

2 flute long neck ball (Shank 6mm)

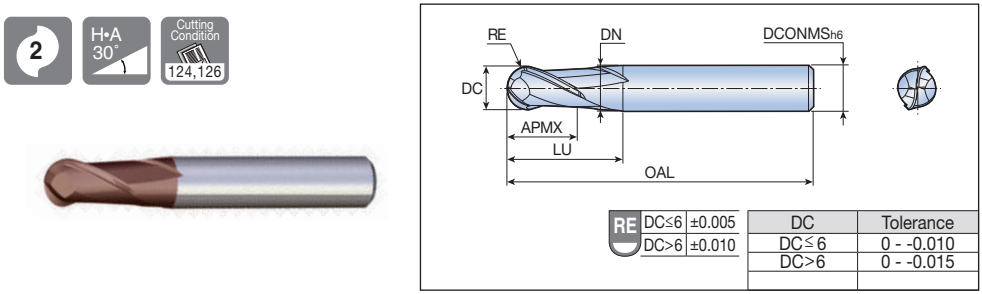


Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2006 006 020 S6	0.6	0.3	45	0.6	2	0.55	6.0	●
2006 006 040 S6	0.6	0.3	45	0.6	4	0.55	6.0	●
2006 006 060 S6	0.6	0.3	45	0.6	6	0.55	6.0	●
2008 008 020 S6	0.8	0.4	45	0.8	2	0.75	6.0	●
2008 008 040 S6	0.8	0.4	45	0.8	4	0.75	6.0	●
2008 008 060 S6	0.8	0.4	45	0.8	6	0.75	6.0	●
2008 008 080 S6	0.8	0.4	45	0.8	8	0.75	6.0	●
2010 010 030 S6	1.0	0.5	50	1.0	3	0.95	6.0	●
2010 010 040 S6	1.0	0.5	50	1.0	4	0.95	6.0	●
2010 010 060 S6	1.0	0.5	50	1.0	6	0.95	6.0	●
2010 010 080 S6	1.0	0.5	50	1.0	8	0.95	6.0	●
2010 010 100 S6	1.0	0.5	50	1.0	10	0.95	6.0	●
2015 015 040 S6	1.5	0.75	50	1.5	4	1.45	6.0	●
2015 015 060 S6	1.5	0.75	50	1.5	6	1.45	6.0	●
2015 015 080 S6	1.5	0.75	50	1.5	8	1.45	6.0	●
2015 015 100 S6	1.5	0.75	50	1.5	10	1.45	6.0	●
2015 015 120 S6	1.5	0.75	50	1.5	12	1.45	6.0	●
2020 030 060 S6	2.0	1.0	50	3.0	6	1.95	6.0	●
2020 030 080 S6	2.0	1.0	50	3.0	8	1.95	6.0	●
2020 030 100 S6	2.0	1.0	50	3.0	10	1.95	6.0	●
2020 030 120 S6	2.0	1.0	50	3.0	12	1.95	6.0	●
2020 030 160 S6	2.0	1.0	50	3.0	16	1.95	6.0	●

●: Standard items

HSB 2...S

2 flute short ball

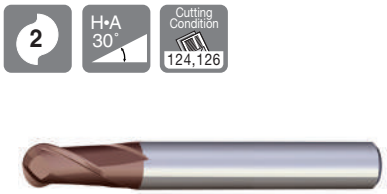


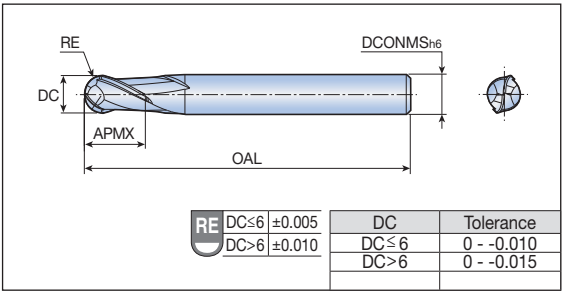
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 2010S 015 025	1.0	0.5	38	1.5	2.5	0.95	6.0	●
2015S 025 045	1.5	0.75	38	2.5	4.5	1.45	6.0	●
2020S 030 065	2.0	1.0	38	3.0	6.5	1.95	6.0	●
2030S 045 080	3.0	1.5	38	4.5	8.0	2.9	6.0	●
2040S 060 100	4.0	2.0	54	6.0	10.0	3.9	6.0	●
2050S 075 150	5.0	2.5	54	7.5	15.0	4.9	6.0	●
2060S 090 170	6.0	3.0	54	9.0	17.0	5.9	6.0	●
2080S 120 200	8.0	4.0	58	12.0	20.0	7.9	8.0	●
2100S 150 250	10.0	5.0	66	15.0	25.0	9.9	10.0	●
2120S 180 300	12.0	6.0	73	18.0	30.0	11.9	12.0	●

●: Standard items

HSB 2...M

2 flute medium ball





RE	
DC≤6	±0.005
DC>6	±0.010

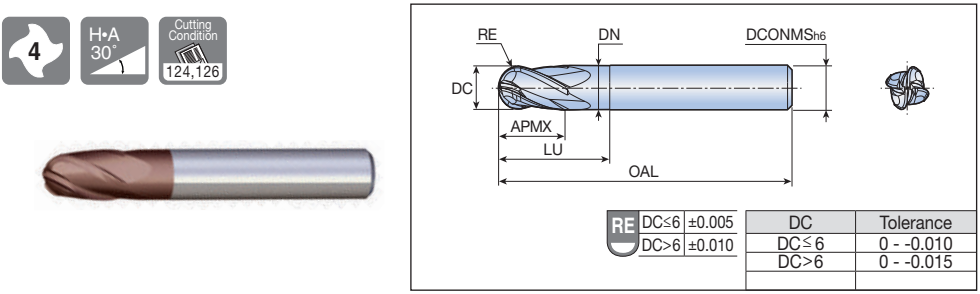
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	TT5505
HSB 2003M 006	0.3	0.15	45	0.6	4.0	●
2004M 008	0.4	0.2	45	0.8	4.0	●
2005M 010	0.5	0.25	45	1.0	4.0	●
2006M 012	0.6	0.3	45	1.2	4.0	●
2007M 014	0.7	0.35	45	1.4	4.0	●
2008M 016	0.8	0.4	45	1.6	4.0	●
2009M 018	0.9	0.45	45	1.8	4.0	●
2010M 025	1.0	0.5	50	2.5	6.0	●
2015M 040	1.5	0.75	50	4.0	6.0	●
2020M 050	2.0	1.0	50	5.0	6.0	●
2025M 070	2.5	1.25	60	7.0	6.0	●
2030M 080	3.0	1.5	60	8.0	6.0	●
2035M 080	3.5	1.75	70	8.0	6.0	●
2040M 080	4.0	2.0	70	8.0	6.0	●
2045M 100	4.5	2.25	80	10.0	6.0	●
2050M 100	5.0	2.5	80	10.0	6.0	●
2060M 120	6.0	3.0	80	12.0	6.0	●
2080M 140	8.0	4.0	90	14.0	8.0	●
2100M 180	10.0	5.0	100	18.0	10.0	●
2120M 220	12.0	6.0	110	22.0	12.0	●

●: Standard items

HSB 4...M

4 flute medium ball

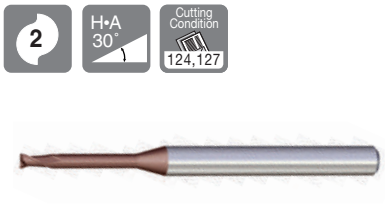


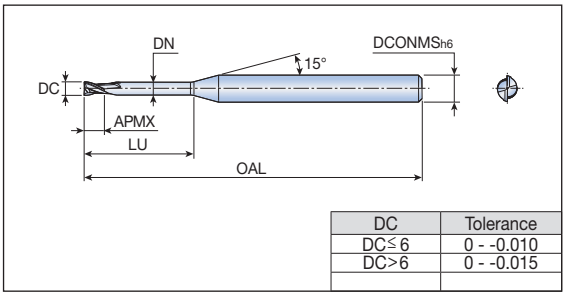
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSB 4040M 060 100	4.0	2.0	70	6.0	10	3.9	6.0	●
4050M 075 150	5.0	2.5	80	7.5	15	4.9	6.0	●
4060M 090 170	6.0	3.0	80	9.0	17	5.9	6.0	●
4080M 120 200	8.0	4.0	90	12.0	20	7.9	8.0	●
4100M 150 250	10.0	5.0	100	15.0	25	9.9	10.0	●
4120M 180 300	12.0	6.0	110	18.0	30	11.9	12.0	●

●: Standard items

HSF 2

2 flute long neck flat





DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

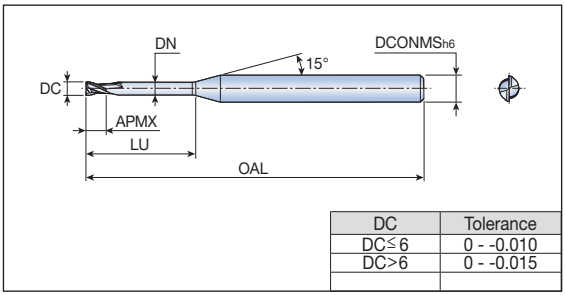
Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF 2003 004 010	0.001-0.005	0.3	45	0.4	1.0	0.27	4.0	●
2003 004 015	0.001-0.005	0.3	45	0.4	1.5	0.27	4.0	●
2003 004 020	0.001-0.005	0.3	45	0.4	2.0	0.27	4.0	●
2003 004 025	0.001-0.005	0.3	45	0.4	2.5	0.27	4.0	●
2003 004 030	0.001-0.005	0.3	45	0.4	3.0	0.27	4.0	●
2003 004 040	0.001-0.005	0.3	45	0.4	4.0	0.27	4.0	●
2003 004 050	0.001-0.005	0.3	45	0.4	5.0	0.27	4.0	●
2004 006 010	0.001-0.007	0.4	45	0.6	1.0	0.37	4.0	●
2004 006 015	0.001-0.007	0.4	45	0.6	1.5	0.37	4.0	●
2004 006 020	0.001-0.007	0.4	45	0.6	2.0	0.37	4.0	●
2004 006 025	0.001-0.007	0.4	45	0.6	2.5	0.37	4.0	●
2004 006 030	0.001-0.007	0.4	45	0.6	3.0	0.37	4.0	●
2004 006 040	0.001-0.007	0.4	45	0.6	4.0	0.37	4.0	●
2004 006 050	0.001-0.007	0.4	45	0.6	5.0	0.37	4.0	●
2004 006 060	0.001-0.007	0.4	45	0.6	6.0	0.37	4.0	●
2005 007 010	0.001-0.008	0.5	45	0.7	1.0	0.45	4.0	●
2005 007 015	0.001-0.008	0.5	45	0.7	1.5	0.45	4.0	●
2005 007 020	0.001-0.008	0.5	45	0.7	2.0	0.45	4.0	●
2005 007 025	0.001-0.008	0.5	45	0.7	2.5	0.45	4.0	●
2005 007 030	0.001-0.008	0.5	45	0.7	3.0	0.45	4.0	●
2005 007 040	0.001-0.008	0.5	45	0.7	4.0	0.45	4.0	●
2005 007 050	0.001-0.008	0.5	45	0.7	5.0	0.45	4.0	●
2005 007 060	0.001-0.008	0.5	45	0.7	6.0	0.45	4.0	●
2005 007 080	0.001-0.008	0.5	45	0.7	8.0	0.45	4.0	●
2006 009 020	0.001-0.010	0.6	45	0.9	2.0	0.55	4.0	●
2006 009 030	0.001-0.010	0.6	45	0.9	3.0	0.55	4.0	●
2006 009 040	0.001-0.010	0.6	45	0.9	4.0	0.55	4.0	●
2006 009 050	0.001-0.010	0.6	45	0.9	5.0	0.55	4.0	●
2006 009 060	0.001-0.010	0.6	45	0.9	6.0	0.55	4.0	●
2006 009 080	0.001-0.010	0.6	45	0.9	8.0	0.55	4.0	●
2006 009 100	0.001-0.010	0.6	45	0.9	10.0	0.55	4.0	●
2007 012 020	0.001-0.010	0.7	45	1.2	2.0	0.65	4.0	●
2007 012 040	0.001-0.010	0.7	45	1.2	4.0	0.65	4.0	●
2007 012 060	0.001-0.010	0.7	45	1.2	6.0	0.65	4.0	●
2007 012 080	0.001-0.010	0.7	45	1.2	8.0	0.65	4.0	●
2007 012 100	0.001-0.010	0.7	45	1.2	10.0	0.65	4.0	●

●: Standard items

HSF 2

2 flute long neck flat





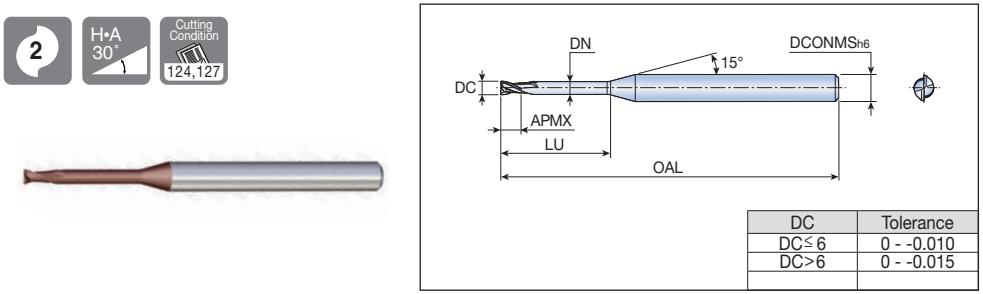
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF 2007 012 120	0.001-0.010	0.7	45	1.2	12.0	0.65	4.0	●
2008 012 020	0.001-0.015	0.8	45	1.2	2.0	0.75	4.0	●
2008 012 030	0.001-0.015	0.8	45	1.2	3.0	0.75	4.0	●
2008 012 040	0.001-0.015	0.8	45	1.2	4.0	0.75	4.0	●
2008 012 050	0.001-0.015	0.8	45	1.2	5.0	0.75	4.0	●
2008 012 060	0.001-0.015	0.8	45	1.2	6.0	0.75	4.0	●
2008 012 080	0.001-0.015	0.8	45	1.2	8.0	0.73	4.0	●
2008 012 100	0.001-0.015	0.8	45	1.2	10.0	0.73	4.0	●
2008 012 120	0.001-0.015	0.8	45	1.2	12.0	0.73	4.0	●
2010 015 030	0.002-0.020	1.0	50	1.5	3.0	0.97	4.0	●
2010 015 040	0.002-0.020	1.0	50	1.5	4.0	0.97	4.0	●
2010 015 050	0.002-0.020	1.0	50	1.5	5.0	0.97	4.0	●
2010 015 060	0.002-0.020	1.0	50	1.5	6.0	0.97	4.0	●
2010 015 070	0.002-0.020	1.0	50	1.5	7.0	0.97	4.0	●
2010 015 080	0.002-0.020	1.0	50	1.5	8.0	0.95	4.0	●
2010 015 100	0.002-0.020	1.0	50	1.5	10.0	0.95	4.0	●
2010 015 120	0.002-0.020	1.0	50	1.5	12.0	0.93	4.0	●
2010 015 140	0.002-0.020	1.0	50	1.5	14.0	0.93	4.0	●
2010 015 160	0.002-0.020	1.0	50	1.5	16.0	0.91	4.0	●
2010 015 180	0.002-0.020	1.0	55	1.5	18.0	0.91	4.0	●
2010 015 200	0.002-0.020	1.0	55	1.5	20.0	0.85	4.0	●
2012 018 040	0.004-0.030	1.2	50	1.8	4.0	1.17	4.0	●
2012 018 060	0.004-0.030	1.2	50	1.8	6.0	1.17	4.0	●
2012 018 080	0.004-0.030	1.2	50	1.8	8.0	1.15	4.0	●
2012 018 100	0.004-0.030	1.2	50	1.8	10.0	1.15	4.0	●
2012 018 120	0.004-0.030	1.2	50	1.8	12.0	1.15	4.0	●
2012 018 160	0.004-0.030	1.2	50	1.8	16.0	1.13	4.0	●
2015 023 040	0.006-0.040	1.5	50	2.3	4.0	1.47	4.0	●
2015 023 060	0.006-0.040	1.5	50	2.3	6.0	1.47	4.0	●
2015 023 080	0.006-0.040	1.5	50	2.3	8.0	1.45	4.0	●
2015 023 100	0.006-0.040	1.5	50	2.3	10.0	1.45	4.0	●
2015 023 120	0.006-0.040	1.5	50	2.3	12.0	1.43	4.0	●
2015 023 140	0.006-0.040	1.5	50	2.3	14.0	1.43	4.0	●
2015 023 160	0.006-0.040	1.5	50	2.3	16.0	1.41	4.0	●
2015 023 180	0.006-0.040	1.5	55	2.3	18.0	1.41	4.0	●
2015 023 200	0.006-0.040	1.5	55	2.3	20.0	1.41	4.0	●

●: Standard items

HSF 2

2 flute long neck flat



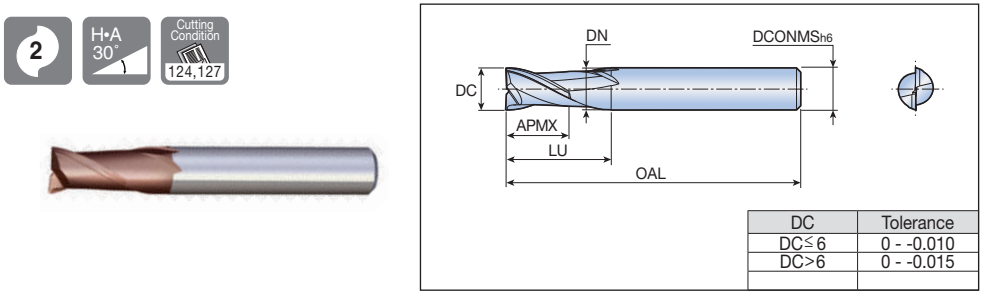
DC	Tolerance
DC≤ 6	0 - -0.010
DC>6	0 - -0.015

Designation		Feed (mm/tooth)	Dimension (mm)						Grade
			DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF	2020 030 040	0.007-0.045	2.0	50	3.0	4	1.95	4.0	●
	2020 030 060	0.007-0.045	2.0	50	3.0	6	1.95	4.0	●
	2020 030 080	0.007-0.045	2.0	50	3.0	8	1.95	4.0	●
	2020 030 100	0.007-0.045	2.0	50	3.0	10	1.95	4.0	●
	2020 030 120	0.007-0.045	2.0	50	3.0	12	1.93	4.0	●
	2020 030 140	0.007-0.045	2.0	50	3.0	14	1.93	4.0	●
	2020 030 160	0.007-0.045	2.0	50	3.0	16	1.91	4.0	●
	2020 030 180	0.007-0.045	2.0	55	3.0	18	1.91	4.0	●
	2020 030 200	0.007-0.045	2.0	55	3.0	20	1.91	4.0	●
	2020 030 250	0.007-0.045	2.0	60	3.0	25	1.91	4.0	●
	2020 030 300	0.007-0.045	2.0	70	3.0	30	1.91	4.0	●
	2025 040 080	0.007-0.050	2.5	50	4.0	8	2.4	4.0	●
	2025 040 100	0.007-0.050	2.5	50	4.0	10	2.4	4.0	●
	2025 040 120	0.007-0.050	2.5	50	4.0	12	2.4	4.0	●
	2025 040 160	0.007-0.050	2.5	50	4.0	16	2.4	4.0	●
	2025 040 200	0.007-0.050	2.5	55	4.0	20	2.4	4.0	●
	2030 045 080	0.010-0.060	3.0	55	4.5	8	2.85	6.0	●
	2030 045 100	0.010-0.060	3.0	55	4.5	10	2.85	6.0	●
	2030 045 120	0.010-0.060	3.0	55	4.5	12	2.85	6.0	●
	2030 045 140	0.010-0.060	3.0	55	4.5	14	2.85	6.0	●
	2030 045 160	0.010-0.060	3.0	55	4.5	16	2.85	6.0	●
	2030 045 180	0.010-0.060	3.0	60	4.5	18	2.85	6.0	●
	2030 045 200	0.010-0.060	3.0	60	4.5	20	2.85	6.0	●
	2030 045 250	0.010-0.060	3.0	60	4.5	25	2.85	6.0	●
	2030 045 300	0.010-0.060	3.0	70	4.5	30	2.85	6.0	●
	2030 045 350	0.010-0.060	3.0	75	4.5	35	2.85	6.0	●
	2030 045 400	0.010-0.060	3.0	80	4.5	40	2.85	6.0	●
	2040 060 100	0.020-0.070	4.0	55	6.0	10	3.9	6.0	●
	2040 060 120	0.020-0.070	4.0	55	6.0	12	3.9	6.0	●
	2040 060 160	0.020-0.070	4.0	55	6.0	16	3.9	6.0	●
	2040 060 200	0.020-0.070	4.0	60	6.0	20	3.9	6.0	●
	2040 060 250	0.020-0.070	4.0	60	6.0	25	3.9	6.0	●
	2040 060 300	0.020-0.070	4.0	70	6.0	30	3.9	6.0	●
	2040 060 350	0.020-0.070	4.0	75	6.0	35	3.9	6.0	●
	2040 060 400	0.020-0.070	4.0	80	6.0	40	3.9	6.0	●

●: Standard items

HSF 2

2 flute long neck flat



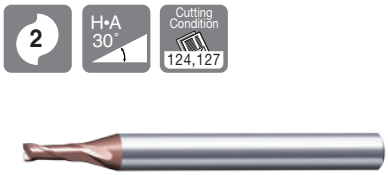
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

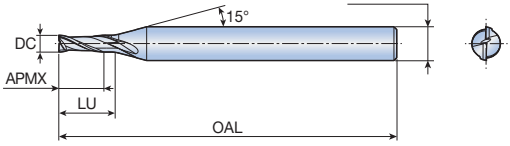
Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF 2050 080 150	0.030-0.070	5.0	60	8	15	4.8	6.0	●
2050 080 300	0.030-0.070	5.0	90	8	30	4.8	6.0	●
2060 090 150	0.030-0.090	6.0	60	9	15	5.9	6.0	●
2060 090 200	0.030-0.090	6.0	80	9	20	5.9	6.0	●
2060 090 300	0.030-0.090	6.0	90	9	30	5.9	6.0	●
2080 120 200	0.040-0.100	8.0	65	12	20	7.9	8.0	●
2080 120 300	0.040-0.100	8.0	80	12	30	7.9	8.0	●
2080 120 400	0.040-0.100	8.0	100	12	40	7.9	8.0	●
2100 150 250	0.050-0.120	10.0	70	15	25	9.9	10.0	●
2100 150 350	0.050-0.120	10.0	85	15	35	9.9	10.0	●
2100 150 450	0.050-0.120	10.0	100	15	45	9.9	10.0	●
2120 180 300	0.050-0.120	12.0	80	18	30	11.9	12.0	●
2120 180 400	0.050-0.120	12.0	100	18	40	11.9	12.0	●
2120 180 500	0.050-0.120	12.0	120	18	50	11.9	12.0	●

●: Standard items

HSF 2...M

2 flute medium flat





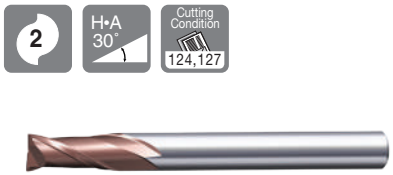
DC	Tolerance
DC≤ 6	0 - -0.010
DC>6	0 - -0.015

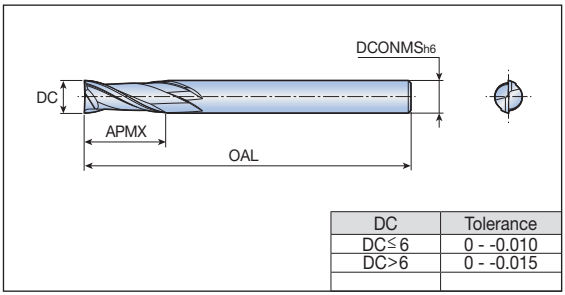
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5505
HSF 2003M 003	0.001-0.005	0.3	45	0.3	0.6	4.0	●
2003M 006	0.001-0.005	0.3	45	0.6	0.9	4.0	●
2004M 004	0.001-0.007	0.4	45	0.4	0.7	4.0	●
2004M 008	0.001-0.007	0.4	45	0.8	1.1	4.0	●
2005M 005	0.001-0.008	0.5	45	0.5	0.8	4.0	●
2005M 010	0.001-0.008	0.5	45	1.0	1.3	4.0	●
2006M 006	0.001-0.010	0.6	45	0.6	0.9	4.0	●
2006M 012	0.001-0.010	0.6	45	1.2	1.5	4.0	●
2008M 008	0.001-0.015	0.8	45	0.8	1.2	4.0	●
2008M 016	0.001-0.015	0.8	45	1.6	2	4.0	●
2010M 025	0.002-0.020	1.0	50	2.5	4	6.0	●
2012M 030	0.004-0.030	1.2	50	3.0	5	6.0	●
2015M 040	0.006-0.040	1.5	50	4.0	6	6.0	●
2020M 060	0.007-0.045	2.0	50	6.0	8	6.0	●
2025M 070	0.007-0.050	2.5	50	7.0	9	6.0	●
2030M 080	0.010-0.060	3.0	60	8.0	10	6.0	●
2040M 100	0.020-0.070	4.0	60	10.0	13	6.0	●
2050M 130	0.030-0.070	5.0	60	13.0	16	6.0	●

●: Standard items

HSF 2...M

2 flute medium flat





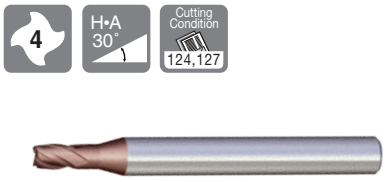
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

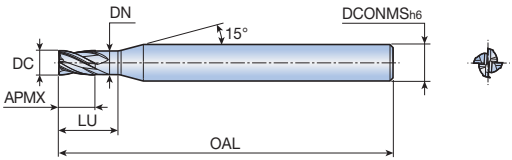
Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TT5505
HSF 2060M 150	0.030-0.090	6.0	60	15.0	6.0	●
2080M 200	0.040-0.100	8.0	65	20.0	8.0	●
2100M 250	0.050-0.120	10.0	70	25.0	10.0	●
2120M 300	0.050-0.120	12.0	80	30.0	12.0	●

●: Standard items

HSF 4

4 flute long neck flat





DC	Tolerance
DC≤ 6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF 4010 015 030	0.002-0.015	1.0	50	1.5	3	0.97	4.0	●
4010 015 040	0.002-0.015	1.0	50	1.5	4	0.97	4.0	●
4010 015 060	0.002-0.015	1.0	50	1.5	6	0.97	4.0	●
4010 015 080	0.002-0.015	1.0	50	1.5	8	0.97	4.0	●
4010 015 100	0.002-0.015	1.0	50	1.5	10	0.97	4.0	●
4015 025 040	0.006-0.025	1.5	50	2.5	4	1.45	4.0	●
4015 025 060	0.006-0.025	1.5	50	2.5	6	1.45	4.0	●
4015 025 080	0.006-0.025	1.5	50	2.5	8	1.45	4.0	●
4015 025 100	0.006-0.025	1.5	50	2.5	10	1.45	4.0	●
4015 025 120	0.006-0.025	1.5	50	2.5	12	1.45	4.0	●
4015 025 160	0.006-0.025	1.5	50	2.5	16	1.45	4.0	●
4020 030 060	0.007-0.030	2.0	50	3.0	6	1.95	4.0	●
4020 030 080	0.007-0.030	2.0	50	3.0	8	1.95	4.0	●
4020 030 100	0.007-0.030	2.0	50	3.0	10	1.95	4.0	●
4020 030 120	0.007-0.030	2.0	50	3.0	12	1.95	4.0	●
4020 030 160	0.007-0.030	2.0	50	3.0	16	1.95	4.0	●
4020 030 200	0.007-0.030	2.0	50	3.0	20	1.95	4.0	●
4030 045 080	0.010-0.040	3.0	55	4.5	8	2.85	6.0	●
4030 045 100	0.010-0.040	3.0	55	4.5	10	2.85	6.0	●
4030 045 120	0.010-0.040	3.0	55	4.5	12	2.85	6.0	●
4030 045 160	0.010-0.040	3.0	55	4.5	16	2.85	6.0	●
4030 045 200	0.010-0.040	3.0	60	4.5	20	2.85	6.0	●
4040 060 100	0.015-0.050	4.0	55	6.0	10	3.90	6.0	●
4040 060 120	0.015-0.050	4.0	55	6.0	12	3.90	6.0	●
4040 060 160	0.015-0.050	4.0	55	6.0	16	3.90	6.0	●
4040 060 200	0.015-0.050	4.0	60	6.0	20	3.90	6.0	●
4040 060 250	0.015-0.050	4.0	60	6.0	25	3.90	6.0	●
4050 080 150	0.015-0.060	5.0	60	8.0	15	4.80	6.0	●
4050 080 300	0.015-0.060	5.0	90	8.0	30	4.80	6.0	●

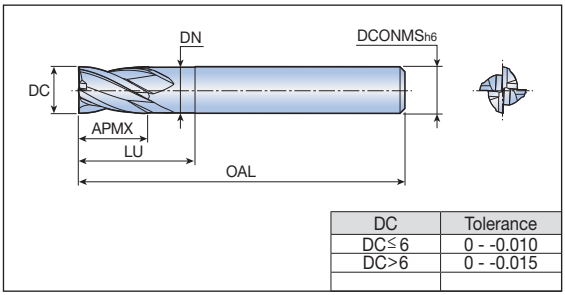
●: Standard items

HSF 4

4 flute long neck flat







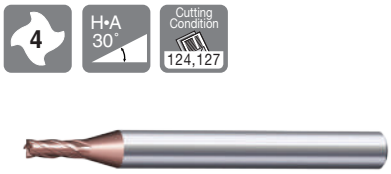
DC	Tolerance
DC≦6	0 - -0.010
DC>6	0 - -0.015

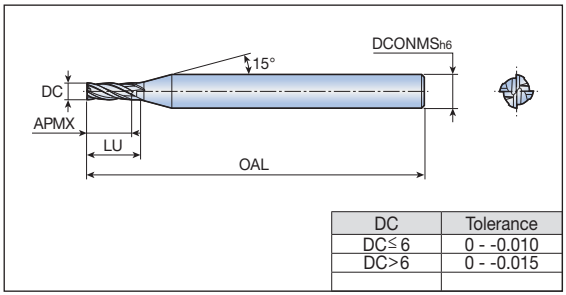
Designation		Feed (mm/tooth)	Dimension (mm)						Grade
			DC	OAL	APMX	LU	DN	DCONMS	TT5505
HSF	4060 090 150	0.025-0.080	6.0	60	9	15	5.9	6.0	●
	4060 090 200	0.025-0.080	6.0	80	9	20	5.9	6.0	●
	4060 090 300	0.025-0.080	6.0	100	9	30	5.9	6.0	●
	4080 120 200	0.030-0.100	8.0	65	12	20	7.9	8.0	●
	4080 120 300	0.030-0.100	8.0	80	12	30	7.9	8.0	●
	4080 120 400	0.030-0.100	8.0	100	12	40	7.9	8.0	●
	4100 150 250	0.040-0.120	10.0	70	15	25	9.9	10.0	●
	4100 150 350	0.040-0.120	10.0	80	15	35	9.9	10.0	●
	4100 150 450	0.040-0.120	10.0	100	15	45	9.9	10.0	●
	4120 180 300	0.045-0.120	12.0	80	18	30	11.9	12.0	●
	4120 180 400	0.045-0.120	12.0	100	18	40	11.9	12.0	●
	4120 180 500	0.045-0.120	12.0	120	18	50	11.9	12.0	●

●: Standard items

HSF 4...M

4 flute medium flat





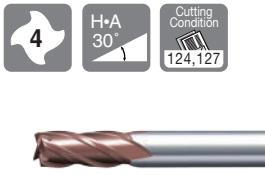
DC	Tolerance
DC≤ 6	0 - -0.010
DC>6	0 - -0.015

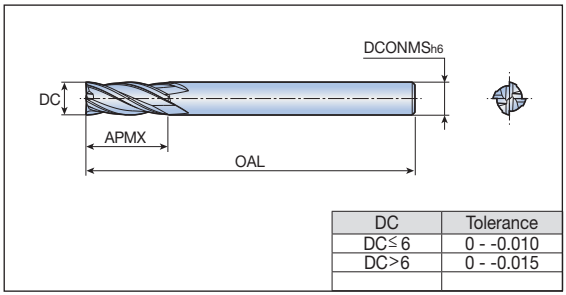
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5505
HSF 4010M 025	0.002-0.015	1.0	50	2.5	3	6.0	●
4012M 030	0.004-0.020	1.2	50	3.0	4	6.0	●
4015M 040	0.006-0.025	1.5	50	4.0	5	6.0	●
4020M 060	0.007-0.030	2.0	50	6.0	7	6.0	●
4025M 070	0.007-0.035	2.5	50	7.0	8.5	6.0	●
4030M 080	0.010-0.040	3.0	60	8.0	9.5	6.0	●
4035M 090	0.010-0.045	3.5	60	9.0	11	6.0	●
4040M 100	0.015-0.050	4.0	60	10.0	12	6.0	●
4050M 130	0.015-0.060	5.0	60	13.0	15.5	6.0	●
4070M 180	0.025-0.090	7.0	65	18.0	22	8.0	●
4090M 220	0.035-0.110	9.0	70	22.0	25	10.0	●
4110M 280	0.040-0.120	11.0	80	28.0	33	12.0	●

●: Standard items

HSF 4...M

4 flute medium flat





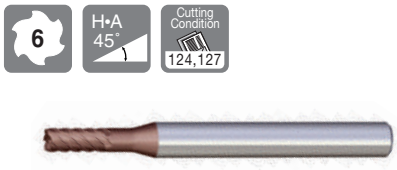
DC	Tolerance
DC≤ 6	0 - -0.010
DC>6	0 - -0.015

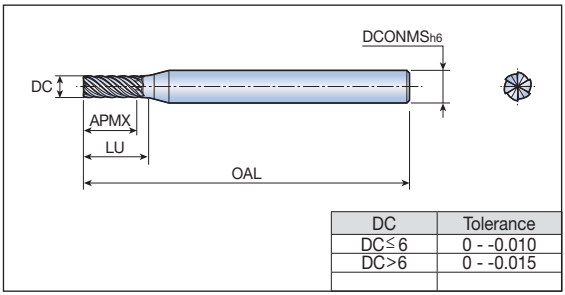
Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TT5505
HSF 4060M 150	0.025-0.080	6.0	60	15.0	6.0	●
4080M 200	0.030-0.100	8.0	65	20.0	8.0	●
4100M 250	0.040-0.120	10.0	70	25.0	10.0	●
4120M 300	0.045-0.120	12.0	80	30.0	12.0	●

●: Standard items

HSF 6...M

6 flute medium flat





DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

• Finishing

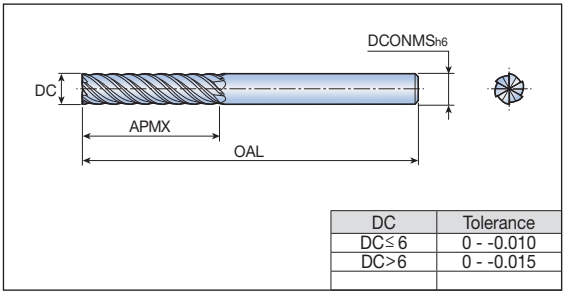
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5505
HSF 6030M 080	0.010-0.030	3.0	50	8	10	6.0	●
6040M 100	0.015-0.040	4.0	60	10	12	6.0	●
6050M 150	0.015-0.050	5.0	60	15	17	6.0	●
6060M 150	0.020-0.050	6.0	60	15	-	6.0	●
6080M 200	0.030-0.060	8.0	65	20	-	8.0	●
6100M 220	0.035-0.080	10.0	70	22	-	10.0	●
6120M 260	0.040-0.100	12.0	80	26	-	12.0	●

●: Standard items

HSF 6...XLT

6 flute extra long flat





DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

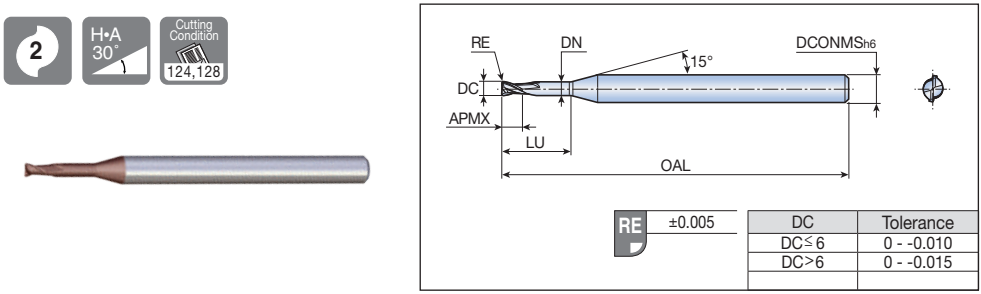
• Finishing

Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TT5505
HSF 6050XLT 250	0.015-0.050	5.0	80	25	6.0	●
6060XLT 250	0.020-0.050	6.0	80	25	6.0	●
6080XLT 350	0.030-0.060	8.0	90	35	8.0	●
6100XLT 450	0.035-0.080	10.0	100	45	10.0	●
6120XLT 550	0.040-0.100	12.0	110	55	12.0	●

●: Standard items

HSR 2

2 flute long neck corner radius



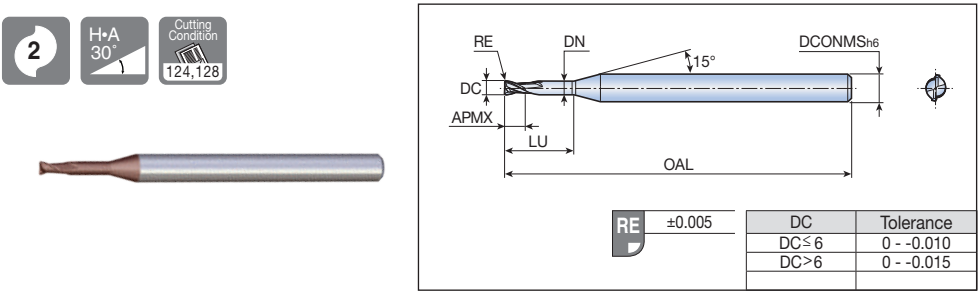
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2003 005 010	0.001-0.005	0.3	0.05	45	0.4	1.0	0.27	4.0	●
2003 005 020	0.001-0.005	0.3	0.05	45	0.4	2.0	0.27	4.0	●
2003 005 030	0.001-0.005	0.3	0.05	45	0.4	3.0	0.27	4.0	●
2004 005 010	0.001-0.007	0.4	0.05	45	0.6	1.0	0.37	4.0	●
2004 005 015	0.001-0.007	0.4	0.05	45	0.6	1.5	0.37	4.0	●
2004 005 025	0.001-0.007	0.4	0.05	45	0.6	2.5	0.37	4.0	●
2004 005 030	0.001-0.007	0.4	0.05	45	0.6	3.0	0.37	4.0	●
2004 005 040	0.001-0.007	0.4	0.05	45	0.6	4.0	0.37	4.0	●
2005 005 010	0.001-0.008	0.5	0.05	45	0.7	1.0	0.45	4.0	●
2005 005 015	0.001-0.008	0.5	0.05	45	0.7	1.5	0.45	4.0	●
2005 005 025	0.001-0.008	0.5	0.05	45	0.7	2.5	0.45	4.0	●
2005 005 030	0.001-0.008	0.5	0.05	45	0.7	3.0	0.45	4.0	●
2005 005 040	0.001-0.008	0.5	0.05	45	0.7	4.0	0.45	4.0	●
2006 005 020	0.001-0.010	0.6	0.05	45	0.9	2.0	0.55	4.0	●
2006 005 040	0.001-0.010	0.6	0.05	45	0.9	4.0	0.55	4.0	●
2006 005 060	0.001-0.010	0.6	0.05	45	0.9	6.0	0.55	4.0	●
2006 010 020	0.001-0.010	0.6	0.10	45	0.9	2.0	0.55	4.0	●
2006 010 040	0.001-0.010	0.6	0.10	45	0.9	4.0	0.55	4.0	●
2006 010 060	0.001-0.010	0.6	0.10	45	0.9	6.0	0.55	4.0	●
2006 020 020	0.001-0.010	0.6	0.20	45	0.9	2.0	0.55	4.0	●
2006 020 040	0.001-0.010	0.6	0.20	45	0.9	4.0	0.55	4.0	●
2006 020 060	0.001-0.010	0.6	0.20	45	0.9	6.0	0.55	4.0	●
2008 005 020	0.001-0.015	0.8	0.05	45	1.2	2.0	0.75	4.0	●
2008 005 040	0.001-0.015	0.8	0.05	45	1.2	4.0	0.75	4.0	●
2008 005 060	0.001-0.015	0.8	0.05	45	1.2	6.0	0.75	4.0	●
2008 005 080	0.001-0.015	0.8	0.05	45	1.2	8.0	0.73	4.0	●
2008 010 020	0.001-0.015	0.8	0.10	45	1.2	2.0	0.75	4.0	●
2008 010 040	0.001-0.015	0.8	0.10	45	1.2	4.0	0.75	4.0	●
2008 010 060	0.001-0.015	0.8	0.10	45	1.2	6.0	0.75	4.0	●
2008 010 080	0.001-0.015	0.8	0.10	45	1.2	8.0	0.73	4.0	●
2008 020 020	0.001-0.015	0.8	0.20	45	1.2	2.0	0.75	4.0	●
2008 020 040	0.001-0.015	0.8	0.20	45	1.2	4.0	0.75	4.0	●
2008 020 060	0.001-0.015	0.8	0.20	45	1.2	6.0	0.75	4.0	●
2008 020 080	0.001-0.015	0.8	0.20	45	1.2	8.0	0.73	4.0	●

●: Standard items

HSR 2

2 flute long neck corner radius



RE	±0.005

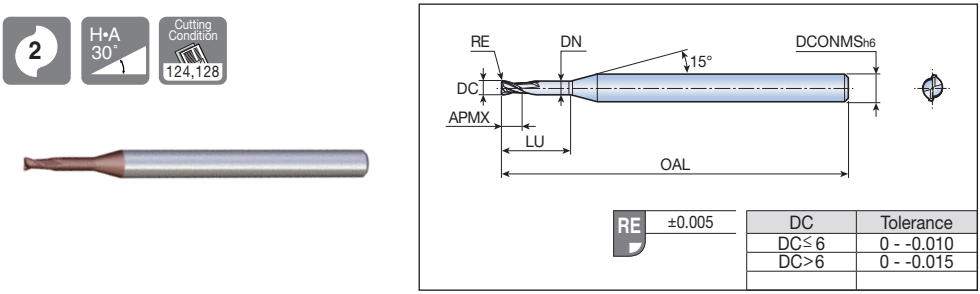
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2010 005 030	0.002-0.020	1.0	0.05	50	2.0	3	0.97	4.0	●
2010 005 040	0.002-0.020	1.0	0.05	50	2.0	4	0.97	4.0	●
2010 005 060	0.002-0.020	1.0	0.05	50	2.0	6	0.97	4.0	●
2010 005 080	0.002-0.020	1.0	0.05	50	2.0	8	0.95	4.0	●
2010 005 100	0.002-0.020	1.0	0.05	50	2.0	10	0.95	4.0	●
2010 010 030	0.002-0.020	1.0	0.10	50	2.0	3	0.97	4.0	●
2010 010 040	0.002-0.020	1.0	0.10	50	2.0	4	0.97	4.0	●
2010 010 060	0.002-0.020	1.0	0.10	50	2.0	6	0.97	4.0	●
2010 010 080	0.002-0.020	1.0	0.10	50	2.0	8	0.95	4.0	●
2010 010 100	0.002-0.020	1.0	0.10	50	2.0	10	0.95	4.0	●
2010 020 030	0.002-0.020	1.0	0.20	50	2.0	3	0.97	4.0	●
2010 020 040	0.002-0.020	1.0	0.20	50	2.0	4	0.97	4.0	●
2010 020 060	0.002-0.020	1.0	0.20	50	2.0	6	0.97	4.0	●
2010 020 080	0.002-0.020	1.0	0.20	50	2.0	8	0.95	4.0	●
2010 020 100	0.002-0.020	1.0	0.20	50	2.0	10	0.95	4.0	●
2010 030 030	0.002-0.020	1.0	0.30	50	2.0	3	0.97	4.0	●
2010 030 040	0.002-0.020	1.0	0.30	50	2.0	4	0.97	4.0	●
2010 030 060	0.002-0.020	1.0	0.30	50	2.0	6	0.97	4.0	●
2010 030 080	0.002-0.020	1.0	0.30	50	2.0	8	0.95	4.0	●
2010 030 100	0.002-0.020	1.0	0.30	50	2.0	10	0.95	4.0	●
2012 010 040	0.004-0.030	1.2	0.10	50	2.2	4	1.17	4.0	●
2012 010 060	0.004-0.030	1.2	0.10	50	2.2	6	1.17	4.0	●
2012 010 080	0.004-0.030	1.2	0.10	50	2.2	8	1.15	4.0	●
2012 010 100	0.004-0.030	1.2	0.10	50	2.2	10	1.15	4.0	●
2012 020 040	0.004-0.030	1.2	0.20	50	2.2	4	1.17	4.0	●
2012 020 060	0.004-0.030	1.2	0.20	50	2.2	6	1.17	4.0	●
2012 020 080	0.004-0.030	1.2	0.20	50	2.2	8	1.15	4.0	●
2012 020 100	0.004-0.030	1.2	0.20	50	2.2	10	1.15	4.0	●
2012 030 040	0.004-0.030	1.2	0.30	50	2.2	4	1.17	4.0	●
2012 030 060	0.004-0.030	1.2	0.30	50	2.2	6	1.17	4.0	●
2012 030 080	0.004-0.030	1.2	0.30	50	2.2	8	1.15	4.0	●
2012 030 100	0.004-0.030	1.2	0.30	50	2.2	10	1.15	4.0	●

●: Standard items

HSR 2

2 flute long neck corner radius

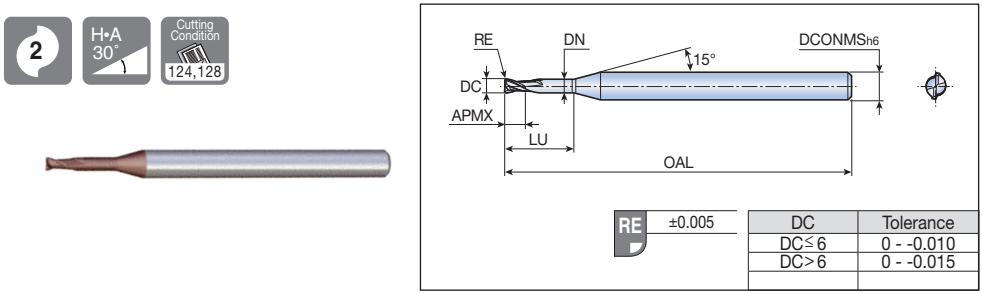


Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2015 005 060	0.006-0.040	1.5	0.05	50	2.5	6	1.47	4.0	●
2015 005 080	0.006-0.040	1.5	0.05	50	2.5	8	1.45	4.0	●
2015 005 100	0.006-0.040	1.5	0.05	50	2.5	10	1.45	4.0	●
2015 005 120	0.006-0.040	1.5	0.05	50	2.5	12	1.43	4.0	●
2015 010 040	0.006-0.040	1.5	0.10	50	2.5	4	1.47	4.0	●
2015 010 060	0.006-0.040	1.5	0.10	50	2.5	6	1.47	4.0	●
2015 010 080	0.006-0.040	1.5	0.10	50	2.5	8	1.45	4.0	●
2015 010 100	0.006-0.040	1.5	0.10	50	2.5	10	1.45	4.0	●
2015 010 120	0.006-0.040	1.5	0.10	50	2.5	12	1.43	4.0	●
2015 020 040	0.006-0.040	1.5	0.20	50	2.5	4	1.47	4.0	●
2015 020 060	0.006-0.040	1.5	0.20	50	2.5	6	1.47	4.0	●
2015 020 080	0.006-0.040	1.5	0.20	50	2.5	8	1.45	4.0	●
2015 020 100	0.006-0.040	1.5	0.20	50	2.5	10	1.45	4.0	●
2015 020 120	0.006-0.040	1.5	0.20	50	2.5	12	1.43	4.0	●
2015 030 040	0.006-0.040	1.5	0.30	50	2.5	4	1.47	4.0	●
2015 030 060	0.006-0.040	1.5	0.30	50	2.5	6	1.47	4.0	●
2015 030 080	0.006-0.040	1.5	0.30	50	2.5	8	1.45	4.0	●
2015 030 100	0.006-0.040	1.5	0.30	50	2.5	10	1.45	4.0	●
2015 030 120	0.006-0.040	1.5	0.30	50	2.5	12	1.43	4.0	●
2015 050 040	0.006-0.040	1.5	0.50	50	2.5	4	1.47	4.0	●
2015 050 060	0.006-0.040	1.5	0.50	50	2.5	6	1.47	4.0	●
2015 050 080	0.006-0.040	1.5	0.50	50	2.5	8	1.45	4.0	●
2015 050 100	0.006-0.040	1.5	0.50	50	2.5	10	1.45	4.0	●
2015 050 120	0.006-0.040	1.5	0.50	50	2.5	12	1.43	4.0	●
2020 010 060	0.007-0.045	2.0	0.10	50	3.0	6	1.95	4.0	●
2020 010 080	0.007-0.045	2.0	0.10	50	3.0	8	1.95	4.0	●
2020 010 100	0.007-0.045	2.0	0.10	50	3.0	10	1.95	4.0	●
2020 010 120	0.007-0.045	2.0	0.10	50	3.0	12	1.93	4.0	●
2020 010 160	0.007-0.045	2.0	0.10	50	3.0	16	1.91	4.0	●
2020 010 200	0.007-0.045	2.0	0.10	50	3.0	20	1.91	4.0	●

●: Standard items

HSR 2

2 flute long neck corner radius

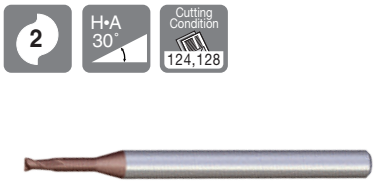


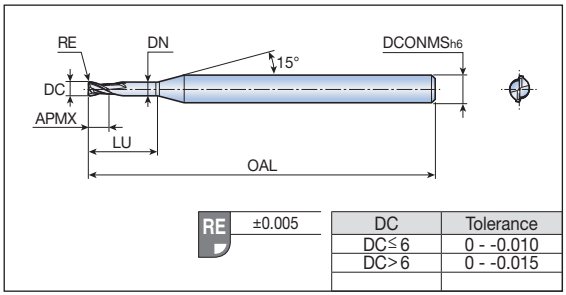
Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2020 020 060	0.007-0.045	2.0	0.2	50	3.0	6	1.95	4.0	●
2020 020 080	0.007-0.045	2.0	0.2	50	3.0	8	1.95	4.0	●
2020 020 100	0.007-0.045	2.0	0.2	50	3.0	10	1.95	4.0	●
2020 020 120	0.007-0.045	2.0	0.2	50	3.0	12	1.93	4.0	●
2020 020 160	0.007-0.045	2.0	0.2	50	3.0	16	1.91	4.0	●
2020 020 200	0.007-0.045	2.0	0.2	50	3.0	20	1.91	4.0	●
2020 030 060	0.007-0.045	2.0	0.3	50	3.0	6	1.95	4.0	●
2020 030 080	0.007-0.045	2.0	0.3	50	3.0	8	1.95	4.0	●
2020 030 100	0.007-0.045	2.0	0.3	50	3.0	10	1.95	4.0	●
2020 030 120	0.007-0.045	2.0	0.3	50	3.0	12	1.93	4.0	●
2020 030 160	0.007-0.045	2.0	0.3	50	3.0	16	1.91	4.0	●
2020 030 200	0.007-0.045	2.0	0.3	50	3.0	20	1.91	4.0	●
2020 050 060	0.007-0.045	2.0	0.5	50	3.0	6	1.95	4.0	●
2020 050 080	0.007-0.045	2.0	0.5	50	3.0	8	1.95	4.0	●
2020 050 100	0.007-0.045	2.0	0.5	50	3.0	10	1.95	4.0	●
2020 050 120	0.007-0.045	2.0	0.5	50	3.0	12	1.93	4.0	●
2020 050 160	0.007-0.045	2.0	0.5	50	3.0	16	1.91	4.0	●
2020 050 200	0.007-0.045	2.0	0.5	50	3.0	20	1.91	4.0	●
2025 020 080	0.007-0.050	2.5	0.2	55	3.5	8	2.4	4.0	●
2025 020 100	0.007-0.050	2.5	0.2	55	3.5	10	2.4	4.0	●
2025 020 120	0.007-0.050	2.5	0.2	55	3.5	12	2.4	4.0	●
2025 020 160	0.007-0.050	2.5	0.2	55	3.5	16	2.4	4.0	●
2025 030 080	0.007-0.050	2.5	0.3	55	3.5	8	2.4	4.0	●
2025 030 100	0.007-0.050	2.5	0.3	55	3.5	10	2.4	4.0	●
2025 030 120	0.007-0.050	2.5	0.3	55	3.5	12	2.4	4.0	●
2025 030 160	0.007-0.050	2.5	0.3	55	3.5	16	2.4	4.0	●
2025 050 080	0.007-0.050	2.5	0.5	55	3.5	8	2.4	4.0	●
2025 050 100	0.007-0.050	2.5	0.5	55	3.5	10	2.4	4.0	●
2025 050 120	0.007-0.050	2.5	0.5	55	3.5	12	2.4	4.0	●
2025 050 160	0.007-0.050	2.5	0.5	55	3.5	16	2.4	4.0	●

●: Standard items

HSR 2

2 flute long neck corner radius





RE	±0.005

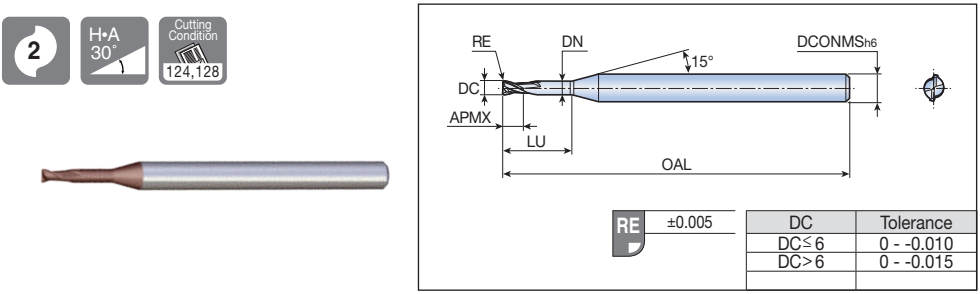
DC	Tolerance
DC≤ 6	0 - -0.010
DC> 6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2030 010 080	0.010-0.060	3.0	0.1	55	4.5	8	2.85	6.0	●
2030 010 100	0.010-0.060	3.0	0.1	55	4.5	10	2.85	6.0	●
2030 010 120	0.010-0.060	3.0	0.1	55	4.5	12	2.85	6.0	●
2030 010 160	0.010-0.060	3.0	0.1	55	4.5	16	2.85	6.0	●
2030 010 200	0.010-0.060	3.0	0.1	60	4.5	20	2.85	6.0	●
2030 010 250	0.010-0.060	3.0	0.1	60	4.5	25	2.85	6.0	●
2030 020 080	0.010-0.060	3.0	0.2	55	4.5	8	2.85	6.0	●
2030 020 100	0.010-0.060	3.0	0.2	55	4.5	10	2.85	6.0	●
2030 020 120	0.010-0.060	3.0	0.2	55	4.5	12	2.85	6.0	●
2030 020 160	0.010-0.060	3.0	0.2	55	4.5	16	2.85	6.0	●
2030 020 200	0.010-0.060	3.0	0.2	60	4.5	20	2.85	6.0	●
2030 020 250	0.010-0.060	3.0	0.2	60	4.5	25	2.85	6.0	●
2030 030 080	0.010-0.060	3.0	0.3	55	4.5	8	2.85	6.0	●
2030 030 100	0.010-0.060	3.0	0.3	55	4.5	10	2.85	6.0	●
2030 030 120	0.010-0.060	3.0	0.3	55	4.5	12	2.85	6.0	●
2030 030 160	0.010-0.060	3.0	0.3	55	4.5	16	2.85	6.0	●
2030 030 200	0.010-0.060	3.0	0.3	60	4.5	20	2.85	6.0	●
2030 030 250	0.010-0.060	3.0	0.3	60	4.5	25	2.85	6.0	●
2030 050 080	0.010-0.060	3.0	0.5	55	4.5	8	2.85	6.0	●
2030 050 100	0.010-0.060	3.0	0.5	55	4.5	10	2.85	6.0	●
2030 050 120	0.010-0.060	3.0	0.5	55	4.5	12	2.85	6.0	●
2030 050 160	0.010-0.060	3.0	0.5	55	4.5	16	2.85	6.0	●
2030 050 200	0.010-0.060	3.0	0.5	60	4.5	20	2.85	6.0	●
2030 050 250	0.010-0.060	3.0	0.5	60	4.5	25	2.85	6.0	●
2030 100 080	0.010-0.060	3.0	1.0	55	4.5	8	2.85	6.0	●
2030 100 100	0.010-0.060	3.0	1.0	55	4.5	10	2.85	6.0	●
2030 100 120	0.010-0.060	3.0	1.0	55	4.5	12	2.85	6.0	●
2030 100 160	0.010-0.060	3.0	1.0	55	4.5	16	2.85	6.0	●
2030 100 200	0.010-0.060	3.0	1.0	60	4.5	20	2.85	6.0	●

●: Standard items

HSR 2

2 flute long neck corner radius

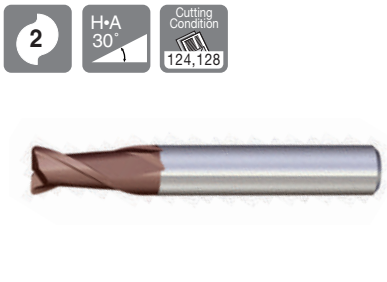


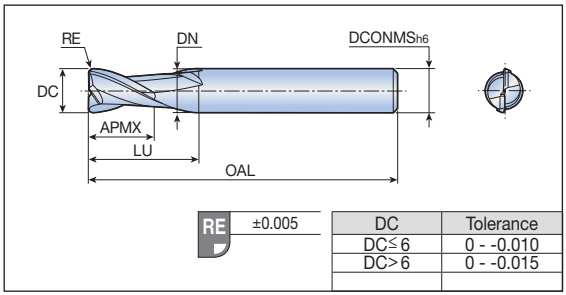
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR	2040 010 100	0.020-0.070	4.0	0.1	55	6.0	10	3.9	6.0	●
	2040 010 120	0.020-0.070	4.0	0.1	55	6.0	12	3.9	6.0	●
	2040 010 160	0.020-0.070	4.0	0.1	55	6.0	16	3.9	6.0	●
	2040 010 200	0.020-0.070	4.0	0.1	60	6.0	20	3.9	6.0	●
	2040 010 250	0.020-0.070	4.0	0.1	60	6.0	25	3.9	6.0	●
	2040 010 300	0.020-0.070	4.0	0.1	70	6.0	30	3.9	6.0	●
	2040 020 100	0.020-0.070	4.0	0.2	55	6.0	10	3.9	6.0	●
	2040 020 120	0.020-0.070	4.0	0.2	55	6.0	12	3.9	6.0	●
	2040 020 160	0.020-0.070	4.0	0.2	55	6.0	16	3.9	6.0	●
	2040 020 200	0.020-0.070	4.0	0.2	60	6.0	20	3.9	6.0	●
	2040 020 250	0.020-0.070	4.0	0.2	60	6.0	25	3.9	6.0	●
	2040 020 300	0.020-0.070	4.0	0.2	70	6.0	30	3.9	6.0	●
	2040 030 100	0.020-0.070	4.0	0.3	55	6.0	10	3.9	6.0	●
	2040 030 120	0.020-0.070	4.0	0.3	55	6.0	12	3.9	6.0	●
	2040 030 160	0.020-0.070	4.0	0.3	55	6.0	16	3.9	6.0	●
	2040 030 200	0.020-0.070	4.0	0.3	60	6.0	20	3.9	6.0	●
	2040 030 250	0.020-0.070	4.0	0.3	60	6.0	25	3.9	6.0	●
	2040 030 300	0.020-0.070	4.0	0.3	70	6.0	30	3.9	6.0	●
	2040 050 100	0.020-0.070	4.0	0.5	55	6.0	10	3.9	6.0	●
	2040 050 120	0.020-0.070	4.0	0.5	55	6.0	12	3.9	6.0	●
	2040 050 160	0.020-0.070	4.0	0.5	55	6.0	16	3.9	6.0	●
	2040 050 200	0.020-0.070	4.0	0.5	60	6.0	20	3.9	6.0	●
	2040 050 250	0.020-0.070	4.0	0.5	60	6.0	25	3.9	6.0	●
	2040 050 300	0.020-0.070	4.0	0.5	70	6.0	30	3.9	6.0	●
	2040 100 100	0.020-0.070	4.0	1.0	55	6.0	10	3.9	6.0	●
	2040 100 120	0.020-0.070	4.0	1.0	55	6.0	12	3.9	6.0	●
	2040 100 160	0.020-0.070	4.0	1.0	55	6.0	16	3.9	6.0	●
	2040 100 200	0.020-0.070	4.0	1.0	60	6.0	20	3.9	6.0	●
	2040 100 250	0.020-0.070	4.0	1.0	60	6.0	25	3.9	6.0	●

●: Standard items

HSR 2

2 flute long neck corner radius



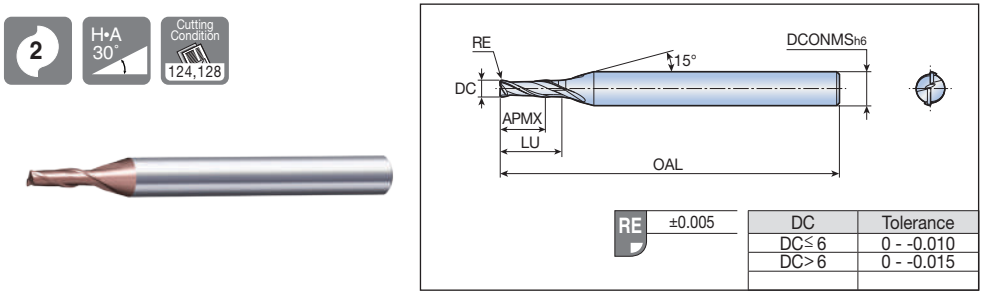


Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 2060 020 150	0.030-0.090	6.0	0.2	60	9	15	5.9	6.0	●
2060 030 150	0.030-0.090	6.0	0.3	60	9	15	5.9	6.0	●
2060 030 200	0.030-0.090	6.0	0.3	60	9	20	5.9	6.0	●
2060 050 150	0.030-0.090	6.0	0.5	60	9	15	5.9	6.0	●
2060 050 200	0.030-0.090	6.0	0.5	60	9	20	5.9	6.0	●
2060 100 150	0.030-0.090	6.0	1.0	60	9	15	5.9	6.0	●
2060 100 200	0.030-0.090	6.0	1.0	60	9	20	5.9	6.0	●
2060 150 150	0.030-0.090	6.0	1.5	60	9	15	5.9	6.0	●
2060 200 150	0.030-0.090	6.0	2.0	60	9	15	5.9	6.0	●
2080 020 200	0.040-0.100	8.0	0.2	65	12	20	7.9	8.0	●
2080 030 200	0.040-0.100	8.0	0.3	65	12	20	7.9	8.0	●
2080 050 200	0.040-0.100	8.0	0.5	65	12	20	7.9	8.0	●
2080 100 200	0.040-0.100	8.0	1.0	65	12	20	7.9	8.0	●
2080 150 200	0.040-0.100	8.0	1.5	65	12	20	7.9	8.0	●
2100 020 250	0.050-0.120	10.0	0.2	75	15	25	9.9	10.0	●
2100 030 250	0.050-0.120	10.0	0.3	75	15	25	9.9	10.0	●
2100 050 250	0.050-0.120	10.0	0.5	75	15	25	9.9	10.0	●
2100 100 250	0.050-0.120	10.0	1.0	75	15	25	9.9	10.0	●
2100 150 250	0.050-0.120	10.0	1.5	75	15	25	9.9	10.0	●
2100 200 250	0.050-0.120	10.0	2.0	75	15	25	9.9	10.0	●
2120 030 280	0.050-0.120	12.0	0.3	85	18	28	11.9	12.0	●
2120 050 280	0.050-0.120	12.0	0.5	85	18	28	11.9	12.0	●
2120 100 280	0.050-0.120	12.0	1.0	85	18	28	11.9	12.0	●
2120 150 280	0.050-0.120	12.0	1.5	85	18	28	11.9	12.0	●
2120 200 280	0.050-0.120	12.0	2.0	85	18	28	11.9	12.0	●

●: Standard items

HSR 2...M

2 flute medium corner radius

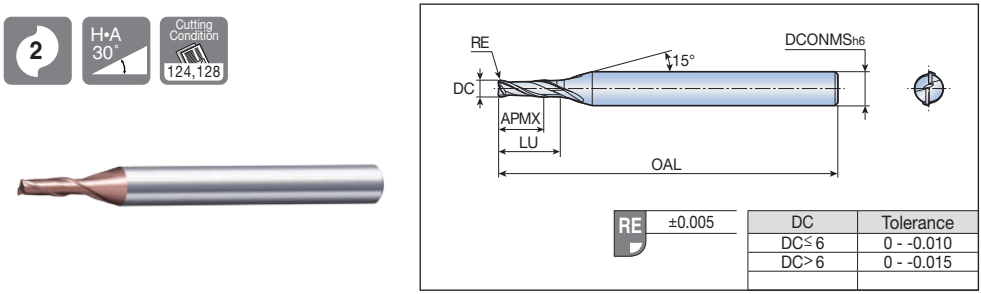


Designation		Feed (mm/tooth)	Dimension (mm)						Grade
			DC	RE	OAL	APMX	LU	DCONMS	TT5505
HSR	2003M 002	0.001-0.005	0.3	0.02	45	0.6	0.9	4.0	●
	2003M 005	0.001-0.005	0.3	0.05	45	0.6	0.9	4.0	●
	2004M 005	0.001-0.007	0.4	0.05	45	0.8	1.1	4.0	●
	2004M 010	0.001-0.007	0.4	0.10	45	0.8	1.1	4.0	●
	2005M 005	0.001-0.008	0.5	0.05	45	1.0	1.3	4.0	●
	2005M 010	0.001-0.008	0.5	0.10	45	1.0	1.3	4.0	●
	2006M 005	0.001-0.010	0.6	0.05	45	1.2	1.5	4.0	●
	2006M 010	0.001-0.010	0.6	0.10	45	1.2	1.5	4.0	●
	2006M 020	0.001-0.010	0.6	0.20	45	1.2	1.5	4.0	●
	2008M 005	0.001-0.015	0.8	0.05	45	1.6	2	4.0	●
	2008M 010	0.001-0.015	0.8	0.10	45	1.6	2	4.0	●
	2008M 020	0.001-0.015	0.8	0.20	45	1.6	2	4.0	●
	2010M 005	0.002-0.020	1.0	0.05	50	2.0	3.5	6.0	●
	2010M 010	0.002-0.020	1.0	0.10	50	2.0	3.5	6.0	●
	2010M 020	0.002-0.020	1.0	0.20	50	2.0	3.5	6.0	●
	2010M 030	0.002-0.020	1.0	0.30	50	2.0	3.5	6.0	●
	2012M 005	0.004-0.030	1.2	0.05	50	2.5	4	6.0	●
	2012M 010	0.004-0.030	1.2	0.10	50	2.5	4	6.0	●
	2012M 020	0.004-0.030	1.2	0.20	50	2.5	4	6.0	●
	2012M 030	0.004-0.030	1.2	0.30	50	2.5	4	6.0	●
	2015M 005	0.006-0.040	1.5	0.05	50	3.0	5	6.0	●
	2015M 010	0.006-0.040	1.5	0.10	50	3.0	5	6.0	●
	2015M 020	0.006-0.040	1.5	0.20	50	3.0	5	6.0	●
	2015M 030	0.006-0.040	1.5	0.30	50	3.0	5	6.0	●
	2020M 010	0.007-0.045	2.0	0.10	50	5.0	7	6.0	●
	2020M 020	0.007-0.045	2.0	0.20	50	5.0	7	6.0	●
	2020M 030	0.007-0.045	2.0	0.30	50	5.0	7	6.0	●
	2020M 050	0.007-0.045	2.0	0.50	50	5.0	7	6.0	●
	2025M 010	0.007-0.050	2.5	0.10	60	7.0	9	6.0	●
	2025M 020	0.007-0.050	2.5	0.20	60	7.0	9	6.0	●
	2025M 030	0.007-0.050	2.5	0.30	60	7.0	9	6.0	●
	2025M 050	0.007-0.050	2.5	0.50	60	7.0	9	6.0	●

●: Standard items

HSR 2...M

2 flute medium corner radius

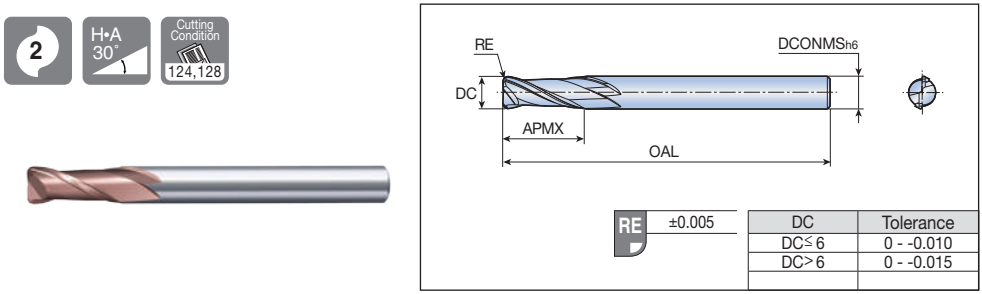


Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	RE	OAL	APMX	LU	DCONMS	TT5505
HSR 2030M 010	0.010-0.060	3.0	0.1	60	8.0	10	6.0	●
2030M 020	0.010-0.060	3.0	0.2	60	8.0	10	6.0	●
2030M 030	0.010-0.060	3.0	0.3	60	8.0	10	6.0	●
2030M 050	0.010-0.060	3.0	0.5	60	8.0	10	6.0	●
2040M 010	0.020-0.070	4.0	0.1	70	10.0	13	6.0	●
2040M 020	0.020-0.070	4.0	0.2	70	10.0	13	6.0	●
2040M 030	0.020-0.070	4.0	0.3	70	10.0	13	6.0	●
2040M 050	0.020-0.070	4.0	0.5	70	10.0	13	6.0	●

●: Standard items

HSR 2...M

2 flute medium corner radius



Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TT5505
HSR 2060M 020	0.030-0.090	6.0	0.2	90	15.0	6.0	●
2060M 030	0.030-0.090	6.0	0.3	90	15.0	6.0	●
2060M 050	0.030-0.090	6.0	0.5	90	15.0	6.0	●
2060M 100	0.030-0.090	6.0	1.0	90	15.0	6.0	●
2080M 010	0.040-0.100	8.0	0.1	100	20.0	8.0	●
2080M 020	0.040-0.100	8.0	0.2	100	20.0	8.0	●
2080M 030	0.040-0.100	8.0	0.3	100	20.0	8.0	●
2080M 050	0.040-0.100	8.0	0.5	100	20.0	8.0	●
2080M 100	0.040-0.100	8.0	1.0	100	20.0	8.0	●
2080M 200	0.040-0.100	8.0	2.0	100	20.0	8.0	●
2100M 020	0.050-0.120	10.0	0.2	100	25.0	10.0	●
2100M 030	0.050-0.120	10.0	0.3	100	25.0	10.0	●
2100M 050	0.050-0.120	10.0	0.5	100	25.0	10.0	●
2100M 100	0.050-0.120	10.0	1.0	100	25.0	10.0	●
2100M 200	0.050-0.120	10.0	2.0	100	25.0	10.0	●
2120M 020	0.050-0.120	12.0	0.2	110	30.0	12.0	●
2120M 030	0.050-0.120	12.0	0.3	110	30.0	12.0	●
2120M 050	0.050-0.120	12.0	0.5	110	30.0	12.0	●
2120M 100	0.050-0.120	12.0	1.0	110	30.0	12.0	●
2120M 200	0.050-0.120	12.0	2.0	110	30.0	12.0	●

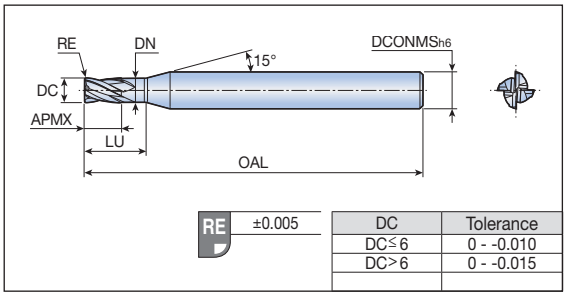
●: Standard items

HSR 4

4 flute long neck corner radius







RE ±0.005

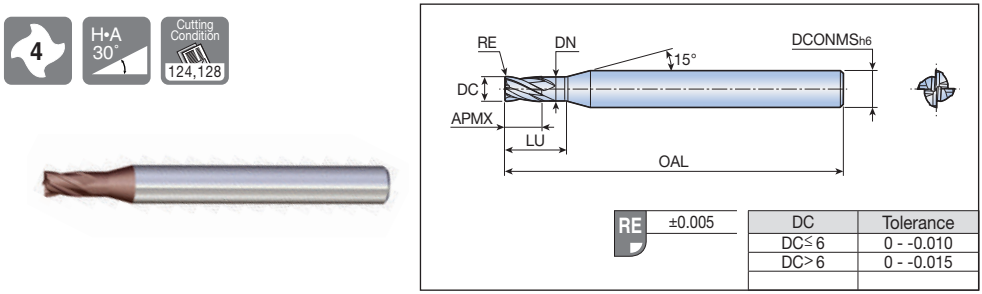
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 4010 010 030	0.002-0.015	1.0	0.1	50	2.0	3	0.97	4.0	●
4010 010 040	0.002-0.015	1.0	0.1	50	2.0	4	0.97	4.0	●
4010 010 060	0.002-0.015	1.0	0.1	50	2.0	6	0.97	4.0	●
4010 020 030	0.002-0.015	1.0	0.2	50	2.0	3	0.97	4.0	●
4010 020 040	0.002-0.015	1.0	0.2	50	2.0	4	0.97	4.0	●
4010 020 060	0.002-0.015	1.0	0.2	50	2.0	6	0.97	4.0	●
4010 030 030	0.002-0.015	1.0	0.3	50	2.0	3	0.97	4.0	●
4010 030 040	0.002-0.015	1.0	0.3	50	2.0	4	0.97	4.0	●
4010 030 060	0.002-0.015	1.0	0.3	50	2.0	6	0.97	4.0	●
4015 010 040	0.006-0.025	1.5	0.1	50	2.5	4	1.45	4.0	●
4015 010 060	0.006-0.025	1.5	0.1	50	2.5	6	1.45	4.0	●
4015 020 040	0.006-0.025	1.5	0.2	50	2.5	4	1.45	4.0	●
4015 020 060	0.006-0.025	1.5	0.2	50	2.5	6	1.45	4.0	●
4015 030 040	0.006-0.025	1.5	0.3	50	2.5	4	1.45	4.0	●
4015 030 060	0.006-0.025	1.5	0.3	50	2.5	6	1.45	4.0	●
4020 010 060	0.007-0.030	2.0	0.1	50	3.0	6	1.95	4.0	●
4020 010 080	0.007-0.030	2.0	0.1	50	3.0	8	1.95	4.0	●
4020 010 100	0.007-0.030	2.0	0.1	50	3.0	10	1.95	4.0	●
4020 010 120	0.007-0.030	2.0	0.1	50	3.0	12	1.95	4.0	●
4020 010 160	0.007-0.030	2.0	0.1	50	3.0	16	1.95	4.0	●
4020 020 060	0.007-0.030	2.0	0.2	50	3.0	6	1.95	4.0	●
4020 020 080	0.007-0.030	2.0	0.2	50	3.0	8	1.95	4.0	●
4020 020 100	0.007-0.030	2.0	0.2	50	3.0	10	1.95	4.0	●
4020 020 120	0.007-0.030	2.0	0.2	50	3.0	12	1.95	4.0	●
4020 020 160	0.007-0.030	2.0	0.2	50	3.0	16	1.95	4.0	●
4020 030 060	0.007-0.030	2.0	0.3	50	3.0	6	1.95	4.0	●
4020 030 080	0.007-0.030	2.0	0.3	50	3.0	8	1.95	4.0	●
4020 030 100	0.007-0.030	2.0	0.3	50	3.0	10	1.95	4.0	●
4020 030 120	0.007-0.030	2.0	0.3	50	3.0	12	1.95	4.0	●
4020 030 160	0.007-0.030	2.0	0.3	50	3.0	16	1.95	4.0	●
4020 050 060	0.007-0.030	2.0	0.5	50	3.0	6	1.95	4.0	●
4020 050 080	0.007-0.030	2.0	0.5	50	3.0	8	1.95	4.0	●
4020 050 100	0.007-0.030	2.0	0.5	50	3.0	10	1.95	4.0	●
4020 050 120	0.007-0.030	2.0	0.5	50	3.0	12	1.95	4.0	●
4020 050 160	0.007-0.030	2.0	0.5	50	3.0	16	1.95	4.0	●

●: Standard items

HSR 4

4 flute long neck corner radius



DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 4030 010 080	0.010-0.040	3.0	0.1	55	4	8	2.85	6.0	●
4030 010 100	0.010-0.040	3.0	0.1	55	4	10	2.85	6.0	●
4030 010 120	0.010-0.040	3.0	0.1	55	4	12	2.85	6.0	●
4030 010 160	0.010-0.040	3.0	0.1	55	4	16	2.85	6.0	●
4030 010 200	0.010-0.040	3.0	0.1	60	4	20	2.85	6.0	●
4030 010 250	0.010-0.040	3.0	0.1	60	4	25	2.85	6.0	●
4030 020 080	0.010-0.040	3.0	0.2	55	4	8	2.85	6.0	●
4030 020 100	0.010-0.040	3.0	0.2	55	4	10	2.85	6.0	●
4030 020 120	0.010-0.040	3.0	0.2	55	4	12	2.85	6.0	●
4030 020 160	0.010-0.040	3.0	0.2	55	4	16	2.85	6.0	●
4030 020 200	0.010-0.040	3.0	0.2	60	4	20	2.85	6.0	●
4030 020 250	0.010-0.040	3.0	0.2	60	4	25	2.85	6.0	●
4030 030 080	0.010-0.040	3.0	0.3	55	4	8	2.85	6.0	●
4030 030 100	0.010-0.040	3.0	0.3	55	4	10	2.85	6.0	●
4030 030 120	0.010-0.040	3.0	0.3	55	4	12	2.85	6.0	●
4030 030 160	0.010-0.040	3.0	0.3	55	4	16	2.85	6.0	●
4030 030 200	0.010-0.040	3.0	0.3	60	4	20	2.85	6.0	●
4030 030 250	0.010-0.040	3.0	0.3	60	4	25	2.85	6.0	●
4030 050 080	0.010-0.040	3.0	0.5	55	4	8	2.85	6.0	●
4030 050 100	0.010-0.040	3.0	0.5	55	4	10	2.85	6.0	●
4030 050 120	0.010-0.040	3.0	0.5	55	4	12	2.85	6.0	●
4030 050 160	0.010-0.040	3.0	0.5	55	4	16	2.85	6.0	●
4030 050 200	0.010-0.040	3.0	0.5	60	4	20	2.85	6.0	●
4030 050 250	0.010-0.040	3.0	0.5	60	4	25	2.85	6.0	●
4030 100 080	0.010-0.040	3.0	1.0	55	4	8	2.85	6.0	●
4030 100 100	0.010-0.040	3.0	1.0	55	4	10	2.85	6.0	●
4030 100 120	0.010-0.040	3.0	1.0	55	4	12	2.85	6.0	●
4030 100 160	0.010-0.040	3.0	1.0	55	4	16	2.85	6.0	●
4030 100 200	0.010-0.040	3.0	1.0	60	4	20	2.85	6.0	●

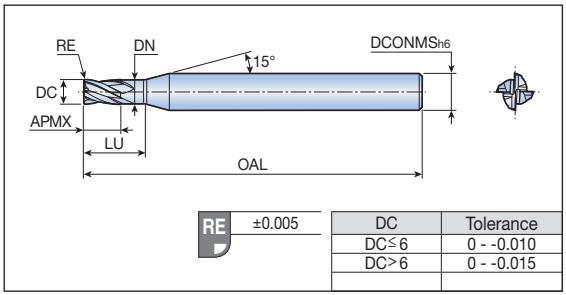
●: Standard items

HSR 4

4 flute long neck corner radius







RE	±0.005

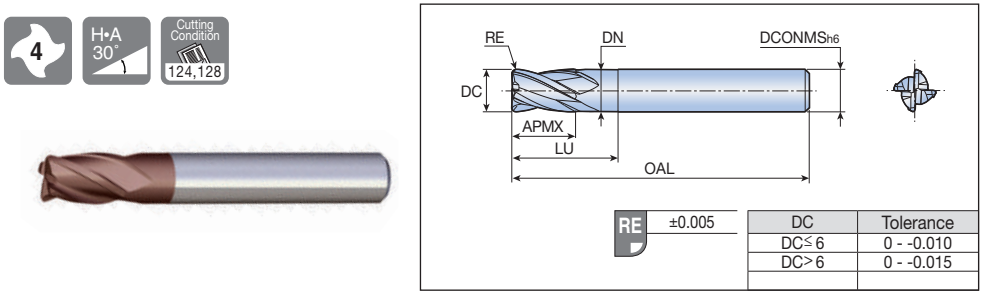
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR	4040 010 100	0.015-0.050	4.0	0.1	55	6	10	3.9	6.0	●
	4040 010 120	0.015-0.050	4.0	0.1	55	6	12	3.9	6.0	●
	4040 010 160	0.015-0.050	4.0	0.1	55	6	16	3.9	6.0	●
	4040 010 200	0.015-0.050	4.0	0.1	60	6	20	3.9	6.0	●
	4040 010 250	0.015-0.050	4.0	0.1	60	6	25	3.9	6.0	●
	4040 010 300	0.015-0.050	4.0	0.1	70	6	30	3.9	6.0	●
	4040 020 100	0.015-0.050	4.0	0.2	55	6	10	3.9	6.0	●
	4040 020 120	0.015-0.050	4.0	0.2	55	6	12	3.9	6.0	●
	4040 020 160	0.015-0.050	4.0	0.2	55	6	16	3.9	6.0	●
	4040 020 200	0.015-0.050	4.0	0.2	60	6	20	3.9	6.0	●
	4040 020 250	0.015-0.050	4.0	0.2	60	6	25	3.9	6.0	●
	4040 020 300	0.015-0.050	4.0	0.2	70	6	30	3.9	6.0	●
	4040 030 100	0.015-0.050	4.0	0.3	55	6	10	3.9	6.0	●
	4040 030 120	0.015-0.050	4.0	0.3	55	6	12	3.9	6.0	●
	4040 030 160	0.015-0.050	4.0	0.3	55	6	16	3.9	6.0	●
	4040 030 200	0.015-0.050	4.0	0.3	60	6	20	3.9	6.0	●
	4040 030 250	0.015-0.050	4.0	0.3	60	6	25	3.9	6.0	●
	4040 030 300	0.015-0.050	4.0	0.3	70	6	30	3.9	6.0	●
	4040 050 100	0.015-0.050	4.0	0.5	55	6	10	3.9	6.0	●
	4040 050 120	0.015-0.050	4.0	0.5	55	6	12	3.9	6.0	●
	4040 050 160	0.015-0.050	4.0	0.5	55	6	16	3.9	6.0	●
	4040 050 200	0.015-0.050	4.0	0.5	60	6	20	3.9	6.0	●
	4040 050 250	0.015-0.050	4.0	0.5	60	6	25	3.9	6.0	●
	4040 050 300	0.015-0.050	4.0	0.5	70	6	30	3.9	6.0	●
	4040 100 100	0.015-0.050	4.0	1.0	55	6	10	3.9	6.0	●
	4040 100 120	0.015-0.050	4.0	1.0	55	6	12	3.9	6.0	●
	4040 100 160	0.015-0.050	4.0	1.0	55	6	16	3.9	6.0	●
	4040 100 200	0.015-0.050	4.0	1.0	60	6	20	3.9	6.0	●
	4040 100 250	0.015-0.050	4.0	1.0	60	6	25	3.9	6.0	●

●: Standard items

HSR 4

4 flute long neck corner radius



RE	±0.005

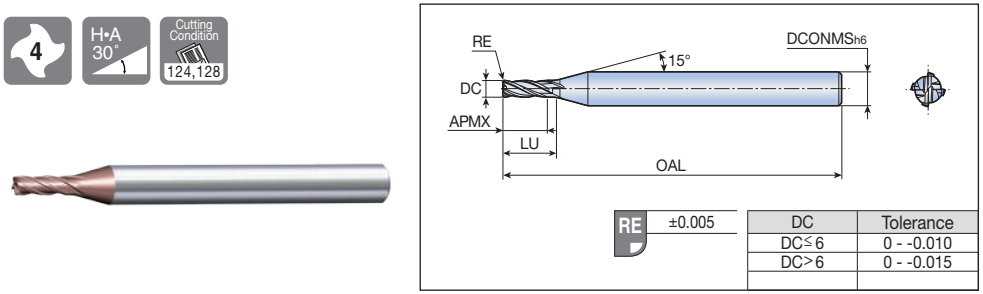
DC	Tolerance
DC≤6	0 - -0.010
DC>6	0 - -0.015

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 4060 020 150	0.025-0.080	6.0	0.2	60	9	15	5.9	6.0	●
4060 030 150	0.025-0.080	6.0	0.3	60	9	15	5.9	6.0	●
4060 050 150	0.025-0.080	6.0	0.5	60	9	15	5.9	6.0	●
4060 100 150	0.025-0.080	6.0	1.0	60	9	15	5.9	6.0	●
4060 150 150	0.025-0.080	6.0	1.5	60	9	15	5.9	6.0	●
4060 200 150	0.025-0.080	6.0	2.0	60	9	15	5.9	6.0	●
4080 020 200	0.030-0.100	8.0	0.2	70	12	20	7.9	8.0	●
4080 030 200	0.030-0.100	8.0	0.3	70	12	20	7.9	8.0	●
4080 050 200	0.030-0.100	8.0	0.5	70	12	20	7.9	8.0	●
4080 100 200	0.030-0.100	8.0	1.0	70	12	20	7.9	8.0	●
4080 150 200	0.030-0.100	8.0	1.5	70	12	20	7.9	8.0	●
4080 200 200	0.030-0.100	8.0	2.0	70	12	20	7.9	8.0	●
4100 020 250	0.040-0.120	10.0	0.2	75	15	25	9.9	10.0	●
4100 030 250	0.040-0.120	10.0	0.3	75	15	25	9.9	10.0	●
4100 050 250	0.040-0.120	10.0	0.5	75	15	25	9.9	10.0	●
4100 100 250	0.040-0.120	10.0	1.0	75	15	25	9.9	10.0	●
4100 150 250	0.040-0.120	10.0	1.5	75	15	25	9.9	10.0	●
4100 200 250	0.040-0.120	10.0	2.0	75	15	25	9.9	10.0	●
4120 030 300	0.045-0.120	12.0	0.3	85	18	30	11.9	12.0	●
4120 050 300	0.045-0.120	12.0	0.5	85	18	30	11.9	12.0	●
4120 100 300	0.045-0.120	12.0	1.0	85	18	30	11.9	12.0	●
4120 150 300	0.045-0.120	12.0	1.5	85	18	30	11.9	12.0	●
4120 200 300	0.045-0.120	12.0	2.0	85	18	30	11.9	12.0	●

●: Standard items

HSR 4...M

4 flute medium corner radius

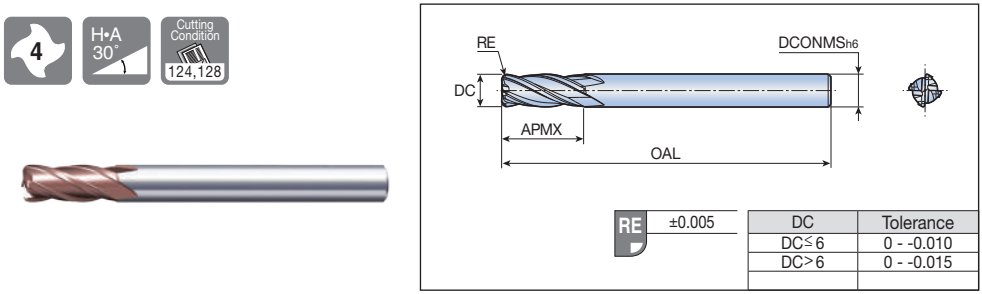


Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	RE	OAL	APMX	LU	DCONMS	TT5505
HSR 4010M 005	0.002-0.015	1.0	0.05	50	2.0	2.5	6.0	●
4010M 010	0.002-0.015	1.0	0.1	50	2.0	2.5	6.0	●
4010M 020	0.002-0.015	1.0	0.2	50	2.0	2.5	6.0	●
4010M 030	0.002-0.015	1.0	0.3	50	2.0	2.5	6.0	●
4012M 005	0.004-0.020	1.2	0.05	50	2.5	3	6.0	●
4012M 010	0.004-0.020	1.2	0.1	50	2.5	3	6.0	●
4012M 020	0.004-0.020	1.2	0.2	50	2.5	3	6.0	●
4012M 030	0.004-0.020	1.2	0.3	50	2.5	3	6.0	●
4015M 005	0.006-0.025	1.5	0.05	50	3.0	3.5	6.0	●
4015M 010	0.006-0.025	1.5	0.1	50	3.0	3.5	6.0	●
4015M 020	0.006-0.025	1.5	0.2	50	3.0	3.5	6.0	●
4015M 030	0.006-0.025	1.5	0.3	50	3.0	3.5	6.0	●
4020M 010	0.007-0.030	2.0	0.1	50	5.0	6	6.0	●
4020M 020	0.007-0.030	2.0	0.2	50	5.0	6	6.0	●
4020M 030	0.007-0.030	2.0	0.3	50	5.0	6	6.0	●
4020M 050	0.007-0.030	2.0	0.5	50	5.0	6	6.0	●
4025M 010	0.007-0.035	2.5	0.1	60	7.0	8	6.0	●
4025M 020	0.007-0.035	2.5	0.2	60	7.0	8	6.0	●
4025M 030	0.007-0.035	2.5	0.3	60	7.0	8	6.0	●
4025M 050	0.007-0.035	2.5	0.5	60	7.0	8	6.0	●
4030M 010	0.010-0.040	3.0	0.1	60	8.0	9.5	6.0	●
4030M 020	0.010-0.040	3.0	0.2	60	8.0	9.5	6.0	●
4030M 030	0.010-0.040	3.0	0.3	60	8.0	9.5	6.0	●
4030M 050	0.010-0.040	3.0	0.5	60	8.0	9.5	6.0	●
4040M 010	0.015-0.050	4.0	0.1	70	10.0	12	6.0	●
4040M 020	0.015-0.050	4.0	0.2	70	10.0	12	6.0	●
4040M 030	0.015-0.050	4.0	0.3	70	10.0	12	6.0	●
4040M 050	0.015-0.050	4.0	0.5	70	10.0	12	6.0	●
4040M 100	0.015-0.050	4.0	1.0	70	10.0	12	6.0	●

●: Standard items

HSR 4...M

4 flute medium corner radius

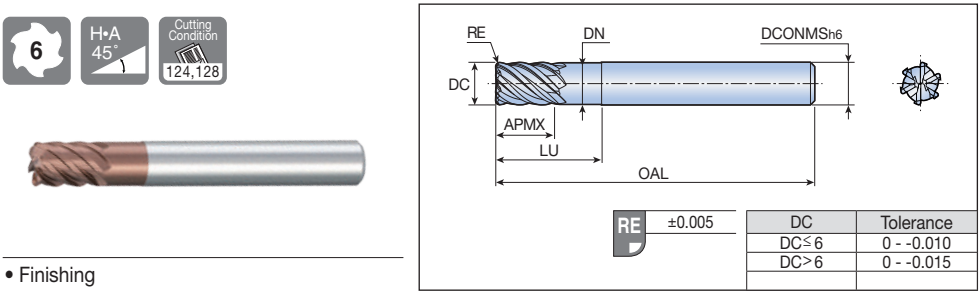


Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TT5505
HSR 4060M 020	0.025-0.080	6.0	0.2	90	15	6.0	●
4060M 030	0.025-0.080	6.0	0.3	90	15	6.0	●
4060M 050	0.025-0.080	6.0	0.5	90	15	6.0	●
4060M 100	0.025-0.080	6.0	1.0	90	15	6.0	●
4060M 150	0.025-0.080	6.0	1.5	90	15	6.0	●
4060M 200	0.025-0.080	6.0	2.0	90	15	6.0	●
4080M 020	0.030-0.100	8.0	0.2	100	20	8.0	●
4080M 030	0.030-0.100	8.0	0.3	100	20	8.0	●
4080M 050	0.030-0.100	8.0	0.5	100	20	8.0	●
4080M 100	0.030-0.100	8.0	1.0	100	20	8.0	●
4080M 150	0.030-0.100	8.0	1.5	100	20	8.0	●
4080M 200	0.030-0.100	8.0	2.0	100	20	8.0	●
4100M 020	0.040-0.120	10.0	0.2	100	25	10.0	●
4100M 030	0.040-0.120	10.0	0.3	100	25	10.0	●
4100M 050	0.040-0.120	10.0	0.5	100	25	10.0	●
4100M 100	0.040-0.120	10.0	1.0	100	25	10.0	●
4100M 150	0.040-0.120	10.0	1.5	100	25	10.0	●
4100M 200	0.040-0.120	10.0	2.0	100	25	10.0	●
4120M 030	0.045-0.120	12.0	0.3	110	30	12.0	●
4120M 050	0.045-0.120	12.0	0.5	110	30	12.0	●
4120M 100	0.045-0.120	12.0	1.0	110	30	12.0	●
4120M 150	0.045-0.120	12.0	1.5	110	30	12.0	●
4120M 200	0.045-0.120	12.0	2.0	110	30	12.0	●

●: Standard items

HSR 6

6 flute long neck corner radius



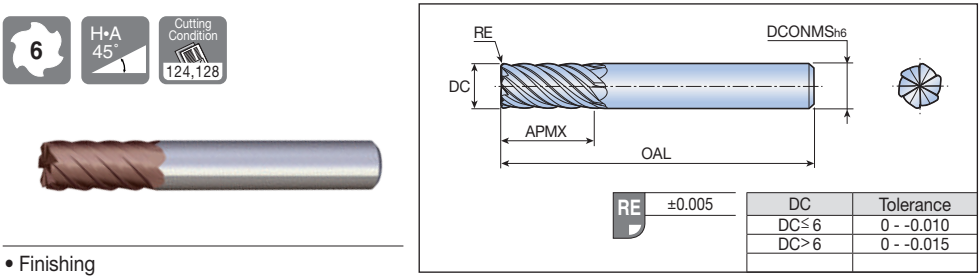
• Finishing

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TT5505
HSR 6060 050 150	0.020-0.050	6.0	0.5	60	9	15	5.8	6.0	●
6060 100 150	0.020-0.050	6.0	1.0	60	9	15	5.8	6.0	●
6080 050 200	0.030-0.060	8.0	0.5	70	12	20	7.8	8.0	●
6080 100 200	0.030-0.060	8.0	1.0	70	12	20	7.8	8.0	●
6100 050 250	0.035-0.080	10.0	0.5	75	15	25	9.8	10.0	●
6100 100 250	0.035-0.080	10.0	1.0	75	15	25	9.8	10.0	●
6120 050 300	0.040-0.100	12.0	0.5	85	18	30	11.6	12.0	●
6120 100 300	0.040-0.100	12.0	1.0	85	18	30	11.6	12.0	●

●: Standard items

HSR 6…M

6 flute medium corner radius



• Finishing

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TT5505
HSR 6060M 050	0.020-0.050	6.0	0.5	60	15	6.0	●
6060M 100	0.020-0.050	6.0	1.0	60	15	6.0	●
6080M 050	0.030-0.060	8.0	0.5	65	20	8.0	●
6080M 100	0.030-0.060	8.0	1.0	65	20	8.0	●
6100M 050	0.035-0.080	10.0	0.5	70	22	10.0	●
6100M 100	0.035-0.080	10.0	1.0	70	22	10.0	●
6100M 150	0.035-0.080	10.0	1.5	70	22	10.0	●
6120M 050	0.040-0.100	12.0	0.5	80	26	12.0	●
6120M 100	0.040-0.100	12.0	1.0	80	26	12.0	●
6120M 150	0.040-0.100	12.0	1.5	80	26	12.0	●

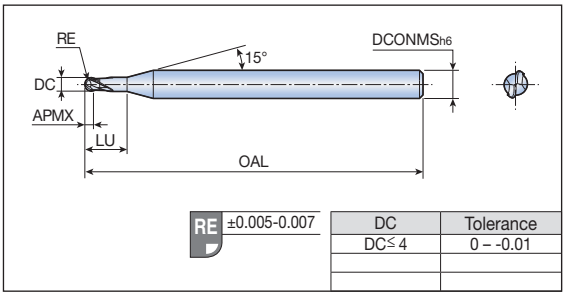
●: Standard items

HSB 2CBN

2 flute CBN ball







Designation		Feed (mm/tooth)	Dimension (mm)						Grade
			DC	RE	OAL	APMX	LU	DCONMS	TB7015
HSB 2CBN	**2004-1.5**	0.007-0.009	0.4	0.2	48	0.3	1.5	4	●
	2004-6.0	0.007-0.009	0.4	0.2	48	0.3	6.0	4	●
	2006-1.5	0.013-0.014	0.6	0.3	48	0.5	1.5	4	●
	2008-4.0	0.013-0.018	0.8	0.4	48	0.6	4.0	4	●
	2010-2.5	0.022-0.028	1.0	0.5	48	0.7	2.5	4	●
	2010-4.0	0.022-0.028	1.0	0.5	48	0.7	4.0	4	●
	2010-6.0	0.022-0.028	1.0	0.5	48	0.7	6.0	4	●
	2015-6.0	0.023-0.028	1.5	0.75	48	1.0	6.0	4	●
	2020-1.2	0.032-0.040	2.0	1.0	50	1.2	-	4	●
	2020-4.0	0.032-0.040	2.0	1.0	50	1.2	4.0	4	●
	2040-8.0	0.035-0.040	4.0	2.0	66	2.4	8.0	6	●

●: Standard items

02

High-performance end mills for steel

SLIKSOLID

- *Suitable for machining of steels and cast iron*
- *End mills optimized for high-performance machining and especially slot milling*

Flat / Corner R Type



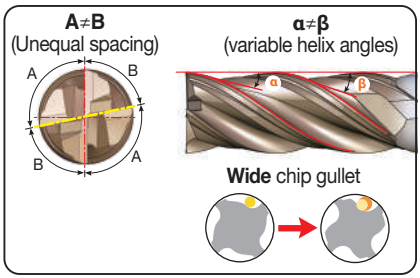
End mills for slot milling of steel and cast iron

High-performance end mills

Excellent machining performance under high cutting conditions

Optimized helix angle

Smooth and stable machining by unequal spacing and double (α≠β) helix angle

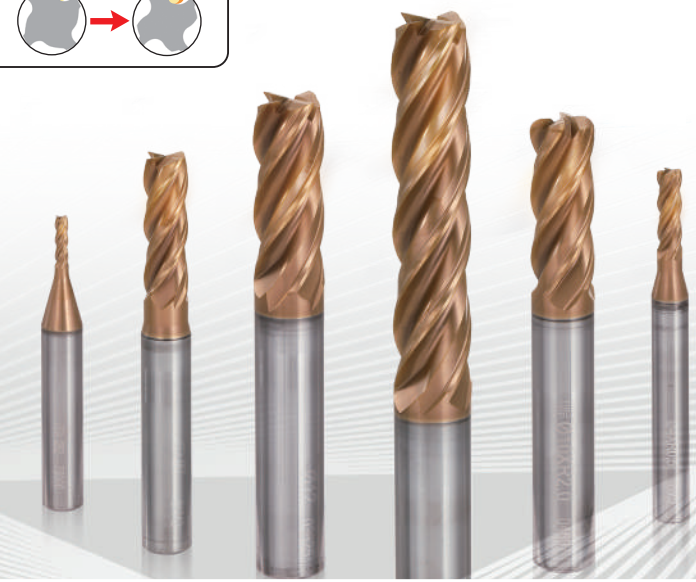


Improved chip gullet and flute geometries

Excellent chip evacuation

New TT5520 grade

Improved machinability and wear resistance

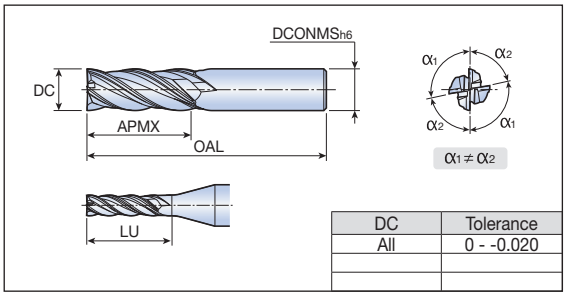


UHP 4

4 flute medium flat







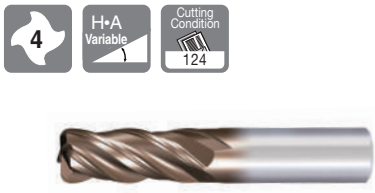
DC	Tolerance
All	0 - -0.020

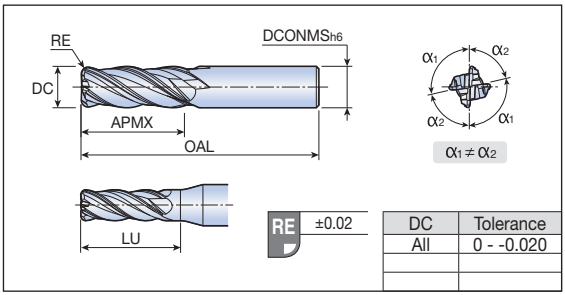
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5520
UHP 4020X6X42	0.005-0.010	2	42	6	7	6	●
4030X10X57	0.010-0.015	3	57	10	12	6	●
4040X12X57	0.015-0.020	4	57	12	15	6	●
4040X20X70	0.015-0.020	4	70	20	25	6	●
4050X14X57	0.020-0.030	5	57	14	17.5	6	●
4060X16X57	0.025-0.035	6	57	16	-	6	●
4060X25X80	0.025-0.035	6	80	25	-	6	●
4070X20X63	0.025-0.040	7	63	20	25	8	●
4080X20X63	0.025-0.045	8	63	20	-	8	●
4080X35X90	0.025-0.045	8	90	35	-	8	●
4090X25X72	0.025-0.045	9	72	25	30	10	●
4100X25X72	0.030-0.050	10	72	25	-	10	●
4100X45X100	0.030-0.050	10	100	45	-	10	●
4110X30X83	0.030-0.050	11	83	30	36	12	●
4120X30X83	0.030-0.050	12	83	30	-	12	●
4120X55X110	0.030-0.050	12	110	55	-	12	●
4140X40X92	0.030-0.050	14	92	40	45	16	●
4160X40X92	0.035-0.050	16	92	40	-	16	●
4160X70X125	0.035-0.050	16	125	70	-	16	●
4180X45X110	0.035-0.055	18	110	45	54	20	●
4200X45X110	0.035-0.055	20	110	45	-	20	●
4200X75X150	0.035-0.055	20	150	75	-	20	●
4250X65X140	0.035-0.055	25	140	65	-	25	●

●: Standard items

UHP 4...R

4 flute medium corner radius





DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	RE	OAL	APMX	LU	DCONMS	TT5520
UHP 4030X10X57R0.3	0.010-0.015	3	0.3	57	10	12	6	●
4030X10X57R0.5	0.010-0.015	3	0.5	57	10	12	6	●
4040X12X57R0.3	0.015-0.020	4	0.3	57	12	15	6	●
4040X12X57R0.5	0.015-0.020	4	0.5	57	12	15	6	●
4040X12X57R1.0	0.015-0.020	4	1.0	57	12	15	6	●
4050X14X57R0.3	0.020-0.030	5	0.3	57	14	17.5	6	●
4060X16X57R0.5	0.025-0.035	6	0.5	57	16	-	6	●
4060X16X57R1.0	0.025-0.035	6	1.0	57	16	-	6	●
4080X20X63R0.5	0.025-0.045	8	0.5	63	20	-	8	●
4080X20X63R1.0	0.025-0.045	8	1.0	63	20	-	8	●
4080X20X63R2.0	0.025-0.045	8	2.0	63	20	-	8	●
4100X25X72R0.5	0.030-0.050	10	0.5	72	25	-	10	●
4100X25X72R1.0	0.030-0.050	10	1.0	72	25	-	10	●
4100X25X72R2.0	0.030-0.050	10	2.0	72	25	-	10	●
4100X25X72R3.0	0.030-0.050	10	3.0	72	25	-	10	●
4120X30X83R0.5	0.030-0.050	12	0.5	83	30	-	12	●
4120X30X83R1.0	0.030-0.050	12	1.0	83	30	-	12	●
4120X30X83R2.0	0.030-0.050	12	2.0	83	30	-	12	●
4120X30X83R3.0	0.030-0.050	12	3.0	83	30	-	12	●
4160X40X92R0.5	0.035-0.050	16	0.5	92	40	-	16	●
4160X40X92R1.0	0.035-0.050	16	1.0	92	40	-	16	●
4160X40X92R3.0	0.035-0.050	16	3.0	92	40	-	16	●
4200X45X110R0.5	0.035-0.055	20	0.5	110	45	-	20	●
4200X45X110R3.0	0.035-0.055	20	3.0	110	45	-	20	●

●: Standard items

03 General purpose end mills for steel

APEX MILL

- Suitable for high-speed machining of steel and cast iron

Flat / Corner R / Ball / Chamfer Type



End mills for steel and cast iron



Wide machining area

Higher machinability range: profiling, roughing and finishing of side slot and pocket

Available in various shapes

Flat, corner R, ball and chamfer profiles especially in Lens & Barrel tools for finishing machining

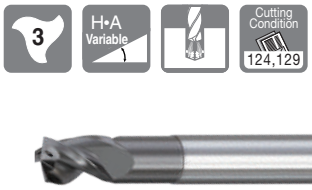
Recommended grades

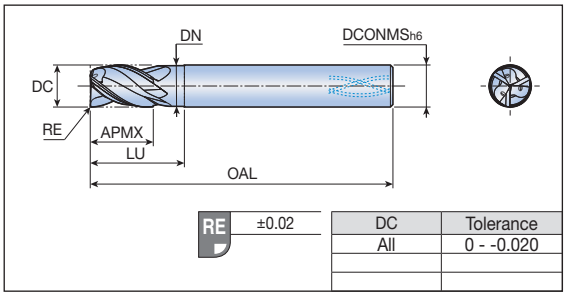
- *TT5515: Mold steel and hardened steel*
- *TT5525: Carbon steel and alloy steel*



SDM 3

3 flute drill-mills





RE	±0.02

DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)							Coolant hole	Grade TT5525
		DC	RE	OAL	APMX	LU	DN	DCONMS		
SDM 3100X15X72R0.2	0.025-0.08	10	0.2	72	15	30	9.6	10	●	●
3120X18X83R0.2	0.025-0.10	12	0.2	83	18	36	11.7	12	●	●
3160X24X92R0.2	0.03-0.12	16	0.2	92	24	40	15.3	16	●	●
3200X30X110R0.2	0.04-0.16	20	0.2	110	30	55	18.3	20	●	●

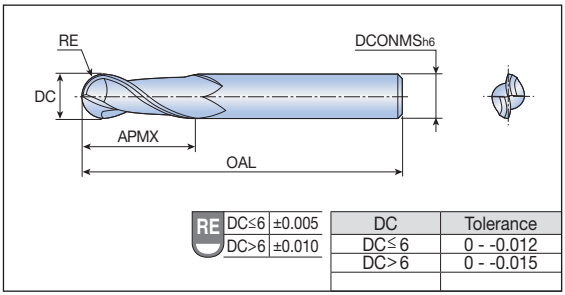
●: Standard items

SBE 2...S

2 flute short ball







RE		
DC≤6	±0.005
DC>6	±0.010

DC	Tolerance
DC≤6	0 - -0.012
DC>6	0 - -0.015

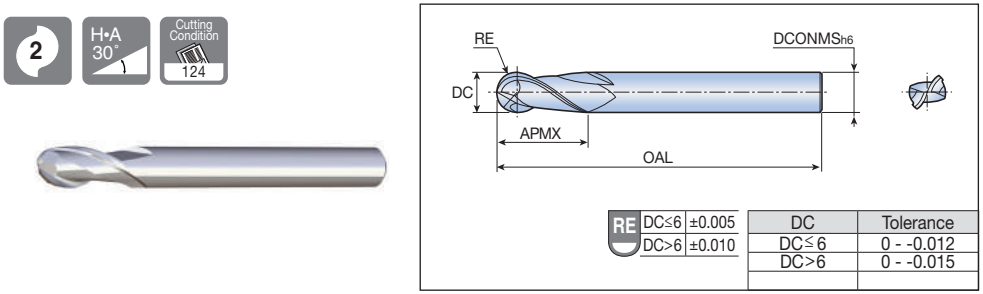
Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	TT5515
SBE 2020S	2	1.0	50	3	6	●
2030S	3	1.5	50	4	6	●
2040S	4	2.0	54	5	6	●
2050S	5	2.5	54	6	6	●
2060S	6	3.0	54	7	6	●
2070S	7	3.5	58	8	8	●
2080S	8	4.0	58	9	8	●
2100S	10	5.0	66	11	10	●
2110S	11	5.5	73	11	12	●
2120S	12	6.0	73	12	12	●
2160S	16	8.0	82	16	16	●
2200S	20	10.0	92	20	20	●

▶ Weldon shank is available on request (Ordering example: SBEW 2...S)

●: Standard items

SBE 2

2 flute medium ball



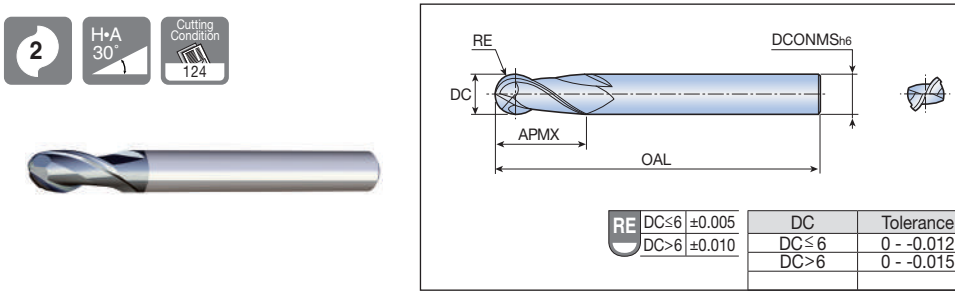
Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	UF10N
SBE 2010	1.0	0.5	50	1.5	4	●
2010-6	1.0	0.5	50	1.5	6	●
2015	1.5	0.75	50	2.3	4	●
2015-6	1.5	0.75	50	2.3	6	●
2020	2.0	1.0	50	3.0	4	●
2020-6	2.0	1.0	50	3.0	6	●
2025-6	2.5	1.25	50	3.8	6	●
2030	3.0	1.5	70	8.0	6	●
2040	4.0	2.0	70	8.0	6	●
2050	5.0	2.5	80	12.0	6	●
2060	6.0	3.0	80	12.0	6	●
2070	7.0	3.5	90	15.0	8	●
2080	8.0	4.0	90	15.0	8	●
2090	9.0	4.5	100	20.0	10	●
2100	10.0	5.0	100	20.0	10	●
2120	12.0	6.0	110	25.0	12	●
2130	13.0	6.5	120	30.0	12	●
2140	14.0	7.0	120	30.0	12	●
2160	16.0	8.0	125	35.0	16	●
2200	20.0	10.0	150	40.0	20	●

▶ Weldon shank is available on request (Ordering example: SBEW 2...)

●: Standard items

SBE 2...T

2 flute medium ball



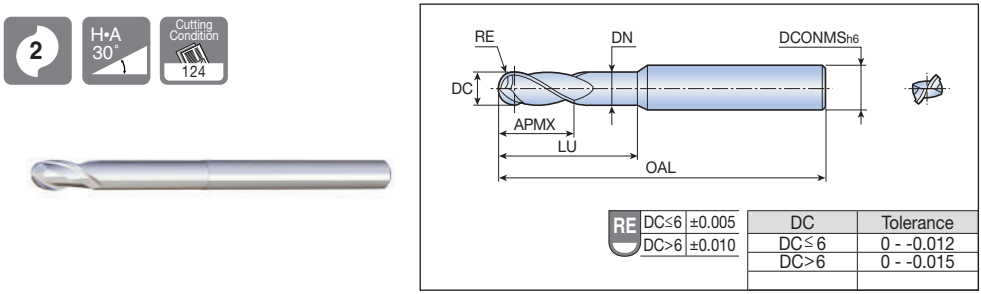
Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	TT5515
SBE 2010T	1.0	0.5	50	1.5	4	●
2010T-6	1.0	0.5	50	1.5	6	●
2012T	1.2	0.6	50	1.8	4	●
2015T	1.5	0.75	50	2.3	4	●
2015T-5X70	1.5	0.75	70	5.0	6	●
2015T-6	1.5	0.75	50	2.3	6	●
2016T	1.6	0.8	50	2.4	4	●
2020T	2.0	1.0	50	3.0	4	●
2020T-6	2.0	1.0	50	3.0	6	●
2020T-7X70	2.0	1.0	70	7.0	6	●
2025T	2.5	1.25	50	3.8	4	●
2025T-6	2.5	1.25	50	3.8	6	●
2030T	3.0	1.5	70	8.0	6	●
2030T-10X70	3.0	1.5	70	10.0	6	●
2035T	3.5	1.75	70	8.0	6	●
2040T	4.0	2.0	70	8.0	6	●
2040T-12X70	4.0	2.0	70	12.0	6	●
2045T	4.5	2.25	80	8.0	6	●
2050T	5.0	2.5	80	12.0	6	●
2050T-15X80	5.0	2.5	80	15.0	6	●
2060T	6.0	3.0	80	12.0	6	●
2060T-15X80	6.0	3.0	80	15.0	6	●
2065T	6.5	3.25	90	12.0	8	●
2070T	7.0	3.5	90	15.0	8	●
2080T	8.0	4.0	90	15.0	8	●
2080T-20X90	8.0	4.0	90	20.0	8	●
2090T	9.0	4.5	100	20.0	10	●
2100T	10.0	5.0	100	20.0	10	●
2100T-25X100	10.0	5.0	100	25.0	10	●
2110T	11.0	5.5	110	25.0	12	●
2120T	12.0	6.0	110	25.0	12	●
2120T-30X100	12.0	6.0	100	30.0	12	●
2140T	14.0	7.0	120	30.0	12	●
2150T	15.0	7.5	125	35.0	16	●
2160T	16.0	8.0	125	35.0	16	●
2180T	18.0	9.0	150	40.0	20	●
2200T	20.0	10.0	150	40.0	20	●

▶ Weldon shank is available on request (Ordering example: SBEW 2...T)

●: Standard items

SBE 2...L

2 flute long ball

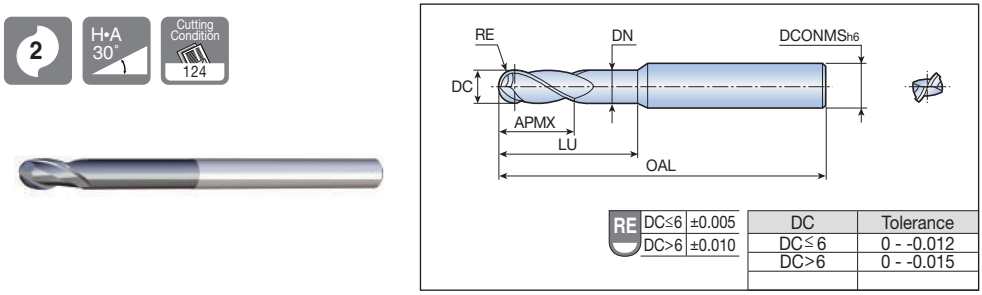


Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	UF10N
SBE 2030L	3	1.5	100	4	35	2.85	6	●
2040L	4	2.0	100	6	35	3.85	6	●
2060L	6	3.0	115	8	45	5.8	8	●
2060L-6D	6	3.0	115	8	45	5.8	6	●
2070L	7	3.5	125	10	45	6.8	10	●
2080L	8	4.0	125	12	55	7.8	10	●
2090L	9	4.5	140	15	65	8.8	10	●
2100L	10	5.0	140	15	65	9.8	10	●
2120L	12	6.0	150	18	75	11.8	12	●
2160L	16	8.0	155	30	75	15.6	16	●

●: Standard items

SBE 2...LT

2 flute long ball



DC	Tolerance
DC≤6	0 - -0.012
DC>6	0 - -0.015

Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TT5515
SBE 2020LT	2	1.0	100	4	20	1.85	6	●
2030LT	3	1.5	100	4	35	2.85	6	●
2040LT	4	2.0	100	6	35	3.85	6	●
2050LT	5	2.5	115	7	40	4.8	8	●
2060LT	6	3.0	115	8	45	5.8	8	●
2060LT-6D	6	3.0	115	8	45	5.8	6	●
2060LT-6D WU	6	3.0	115	8	-	-	6	●
2070LT	7	3.5	125	10	45	6.8	10	●
2080LT	8	4.0	125	12	55	7.8	10	●
2080LT-8D	8	4.0	125	12	55	7.8	8	●
2080LT-8D WU	8	4.0	125	12	-	-	8	●
2100LT	10	5.0	140	15	65	9.8	10	●
2100LT-WU	10	5.0	140	15	-	-	10	●
2120LT	12	6.0	150	18	75	11.8	12	●
2140LT	14	7.0	155	23	75	13.6	16	●
2160LT	16	8.0	155	30	75	15.6	16	●
2160LT-WU	16	8.0	155	30	-	-	16	●

▶ WU: Without under cut

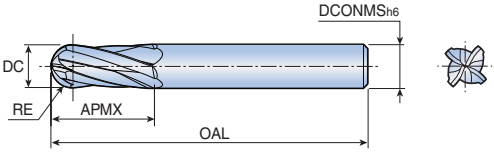
●: Standard items

SBE 4

4 flute medium ball







RE		
DC≤6	±0.005	
DC>6	±0.010	

DC	Tolerance
All	0 - -0.020

Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	UF10N
SBE 4100	10	5	100	20	10	●
4120	12	6	110	25	12	●
4200	20	10	150	40	20	●

▶ Weldon shank is available on request (Ordering example: SBEW 4...)

●: Standard items

SBE 4...T

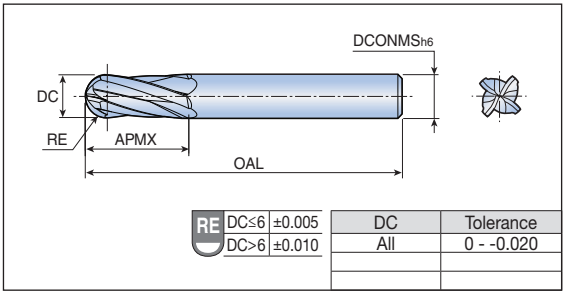
4 flute medium ball











RE	DC≤6	±0.005
	DC>6	±0.010

DC	Tolerance
All	0 - -0.020

Designation	Dimension (mm)					Grade
	DC	RE	OAL	APMX	DCONMS	TT5515
SBE 4010T-6	1.0	0.5	50	2.5	6	●
4015T	1.5	0.75	50	4.0	4	●
4020T	2.0	1.0	50	5.0	6	●
4030T	3.0	1.5	57	8.0	6	●
4040T	4.0	2.0	70	8.0	6	●
4050T	5.0	2.5	80	12.0	6	●
4060T	6.0	3.0	80	12.0	6	●
4070T	7.0	3.5	90	15.0	8	●
4080T	8.0	4.0	90	15.0	8	●
4090T	9.0	4.5	100	20.0	10	●
4100T	10.0	5.0	100	20.0	10	●
4120T	12.0	6.0	110	25.0	12	●
4160T	16.0	8.0	125	35.0	16	●
4180T	18.0	9.0	150	40.0	20	●
4200T	20.0	10.0	150	40.0	20	●

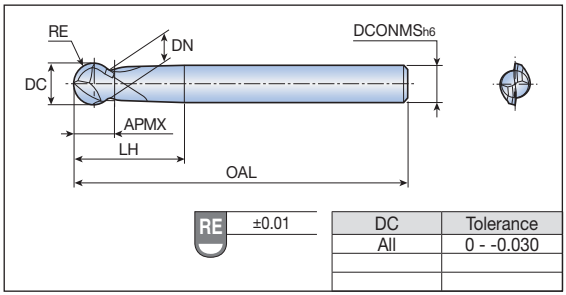
▶ Weldon shank is available on request (Ordering example: SBEW 4...T)

●: Standard items

BES 2...T

2 flute spherical ball





RE	±0.01

DC	Tolerance
All	0 - -0.030

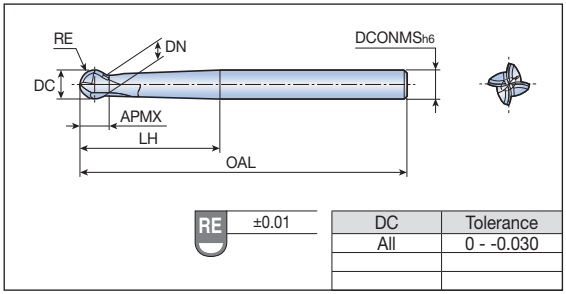
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LH	DN	DCONMS	TT5515
BES 2030T	3	1.5	80	3.3	28.5	2.52	6	●
2040T	4	2.0	80	4.1	28.5	3.35	6	●
2050T	5	2.5	80	5.4	38.0	4.19	6	●
2060T	6	3.0	100	6.1	28.0	5.03	6	●
2080T	8	4.0	100	8.2	33.0	6.71	8	●
2100T	10	5.0	100	9.7	40.0	8.39	10	●
2120T	12	6.0	110	12.3	49.0	10.06	12	●
2160T	16	8.0	155	15.4	58.0	13.42	16	●

●: Standard items

BES 4...T

4 flute spherical ball





RE	±0.01

DC	Tolerance
All	0 - -0.030

Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LH	DN	DCONMS	TT5515
BES 4030T	3	1.5	80	3.3	28.5	2.52	6	●
4040T	4	2.0	80	4.1	28.5	3.35	6	●
4050T	5	2.5	80	5.4	38.0	4.19	6	●
4060T	6	3.0	100	6.1	28.0	5.03	6	●
4080T	8	4.0	100	8.2	33.0	6.71	8	●
4100T	10	5.0	100	9.7	40.0	8.39	10	●

●: Standard items

TSE 2...M

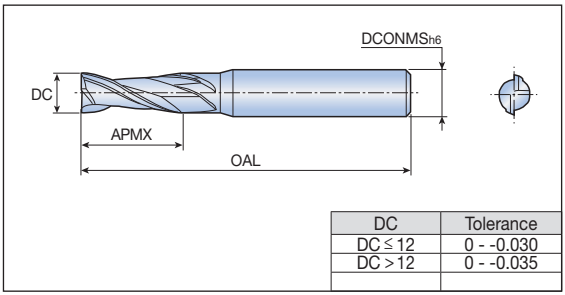
2 flute medium flat











DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade		
		DC	OAL	APMX	DCONMS	TT5515	TT5525	UF10
TSE 2010M-4	0.008-0.030	1.0	40	3	4	●	●	●
2010M	0.008-0.030	1.0	42	3	6	●	●	
2012M	0.008-0.030	1.2	42	3	6	●		
2015M-4	0.008-0.030	1.5	40	4	4	●	●	
2015M	0.008-0.030	1.5	42	4	6	●	●	
2020M-4	0.010-0.030	2.0	40	6	4	●	●	
2020M	0.010-0.030	2.0	42	6	6	●	●	●
2025M-4	0.010-0.030	2.5	40	8	4	●	●	●
2025M	0.010-0.030	2.5	42	8	6	●	●	●
2030M	0.010-0.030	3.0	57	10	6	●	●	
2035M-4	0.010-0.030	3.5	50	12	4	●		
2035M	0.010-0.030	3.5	47	10	6	●	●	●
2040M(12X47)	0.010-0.050	4.0	47	12	6			●
2040M-4	0.010-0.050	4.0	50	12	4	●	●	
2040M	0.010-0.050	4.0	57	12	6	●	●	●
2045M	0.010-0.050	4.5	57	14	6	●	●	●
2050M-5	0.015-0.060	5.0	50	14	5	●	●	●
2050M	0.015-0.060	5.0	57	14	6	●	●	
2055M	0.015-0.060	5.5	57	16	6	●	●	
2060M	0.020-0.060	6.0	57	16	6	●	●	●
2065M-7	0.020-0.060	6.5	60	20	7		●	
2065M	0.020-0.060	6.5	60	20	8	●	●	●
2070M	0.030-0.070	7.0	60	20	8	●	●	●
2075M	0.030-0.070	7.5	63	20	8	●	●	
2080M	0.030-0.100	8.0	63	20	8	●	●	●
2085M	0.030-0.100	8.5	72	22	10	●		
2090M	0.030-0.100	9.0	68	25	10	●	●	
2095M	0.030-0.100	9.5	72	24	10	●	●	
2100M(25X68)	0.030-0.120	10.0	68	25	10	●	●	
2100M	0.030-0.120	10.0	72	22	10	●	●	
2105M	0.030-0.120	10.5	76	26	12	●	●	
2110M	0.030-0.120	11.0	76	30	12	●	●	
2115M	0.030-0.120	11.5	83	30	12	●	●	
2120M(30X76)	0.030-0.120	12.0	76	30	12	●	●	●

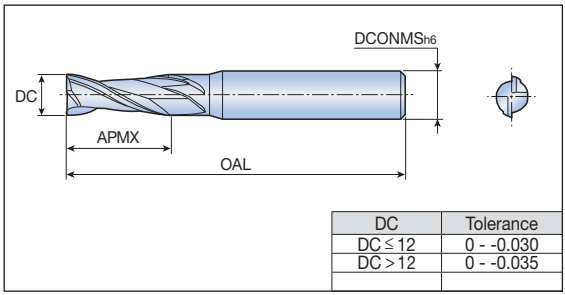
▶ Weldon shank is available on request (Ordering example: TSEW 2...M)

●: Standard items

TSE 2...M

2 flute medium flat





DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade		
		DC	OAL	APMX	DCONMS	TT5515	TT5525	UF10
TSE 2120M	0.030-0.120	12	83	25	12	●	●	●
2130M	0.030-0.132	13	85	35	14	●	●	●
2140M-14	0.030-0.132	14	83	25	14	●	●	
2140M	0.030-0.132	14	85	35	16		●	
2150M	0.040-0.140	15	92	32	16	●	●	
2160M	0.040-0.140	16	92	32	16	●	●	●
2160M(40X92)	0.040-0.120	16	92	40	16	●		
2180M-18	0.040-0.140	18	92	32	18	●	●	
2180M(45X110)	0.040-0.140	18	110	45	20	●		
2200M	0.040-0.140	20	104	38	20	●	●	●
2250M	0.050-0.146	25	120	50	25	●	●	

▶ Weldon shank is available on request (Ordering example: TSEW 2...M)

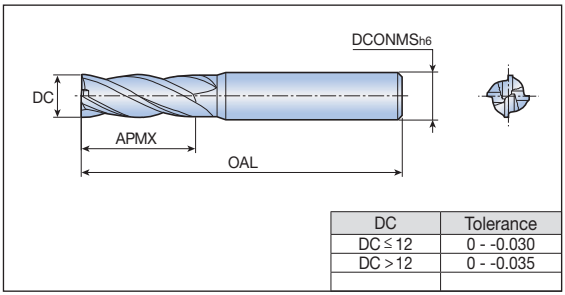
●: Standard items

TSE 4...M

4 flute medium flat







DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade		
		DC	OAL	APMX	DCONMS	TT5515	TT5525	UF10
TSE 4010M	0.005-0.010	1.0	42	2.5	6	●	●	
4015M	0.005-0.012	1.5	42	4	6	●	●	
4020M	0.008-0.017	2.0	42	6	6	●	●	
4025M-4	0.008-0.017	2.5	40	8	4	●	●	●
4025M	0.008-0.017	2.5	42	8	6	●	●	
4030M	0.009-0.020	3.0	57	10	6	●	●	●
4035M-4	0.010-0.028	3.5	50	12	4	●		
4035M	0.010-0.028	3.5	47	10	6	●	●	●
4040M-4	0.010-0.042	4.0	50	12	4	●	●	●
4040M	0.010-0.042	4.0	57	12	6	●	●	●
4045M	0.010-0.042	4.5	57	12	6	●		
4050M	0.020-0.059	5.0	57	14	6	●	●	●
4055M	0.020-0.059	5.5	57	14	6	●	●	
4060M	0.020-0.075	6.0	57	16	6	●	●	●
4065M	0.020-0.075	6.5	60	20	8	●	●	
4070M	0.020-0.075	7.0	60	20	8	●	●	●
4075M	0.020-0.075	7.5	60	20	8	●	●	
4080M	0.030-0.100	8.0	63	20	8	●	●	●
4085M	0.030-0.100	8.5	68	25	10	●	●	
4090M	0.030-0.100	9.0	68	25	10	●	●	
4095M	0.030-0.100	9.5	68	25	10	●	●	
4100M(25X68)	0.030-0.120	10.0	68	25	10	●	●	
4100M	0.030-0.120	10.0	72	22	10	●	●	●
4105M	0.030-0.120	10.5	76	30	12	●	●	
4110M	0.030-0.120	11.0	76	30	12	●	●	
4115M	0.030-0.120	11.5	76	30	12	●	●	
4120M(30X76)	0.030-0.136	12.0	76	30	12	●	●	
4120M	0.030-0.136	12.0	83	25	12	●	●	●
4130M	0.030-0.136	13.0	85	35	14	●	●	
4140M-14	0.030-0.136	14.0	83	25	14	●	●	
4140M	0.030-0.136	14.0	85	35	16		●	
4140M(35X85)	0.030-0.136	14.0	85	35	16	●		●
4150M	0.040-0.140	15.0	92	32	16	●	●	
4160M(40X90)	0.040-0.146	16.0	90	40	16	●	●	

▶ Weldon shank is available on request (Ordering example: TSEW 4...M)

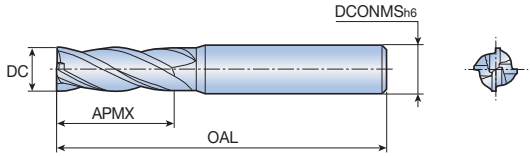
●: Standard items

TSE 4...M

4 flute medium flat







DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade		
		DC	OAL	APMX	DCONMS	TT5515	TT5525	UF10
TSE 4160M	0.040-0.146	16	92	32	16	●	●	●
4170M(45X110)	0.050-0.146	17	110	45	20	●		
4180M-18	0.050-0.146	18	92	32	18	●	●	
4180M(45X110)	0.050-0.146	18	110	45	20	●	●	
4200M	0.050-0.146	20	104	38	20	●	●	●
4200M(45X110)	0.050-0.146	20	110	45	20	●	●	
4250M	0.050-0.146	25	140	65	25	●	●	●

▶ Weldon shank is available on request (Ordering example: TSEW 4...M)

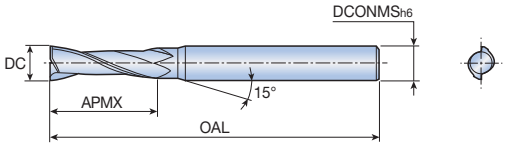
●: Standard items

HES 2...LT

2 flute long flat







DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TT5525
HES 2030LT(10x70)	0.010-0.040	3	70	10	6	●
2040LT(12x70)	0.020-0.050	4	70	12	6	●
2050LT(15x80)	0.020-0.060	5	80	15	6	●
2060LT(15x80)	0.030-0.076	6	80	15	6	●
2080LT(20x90)	0.030-0.097	8	90	20	8	●
2100LT(25x100)	0.030-0.107	10	100	25	10	●
2120LT(30x110)	0.040-0.108	12	110	30	12	●
2140LT	0.040-0.120	14	125	35	16	●
2160LT	0.040-0.130	16	125	40	16	●
2180LT	0.050-0.130	18	150	45	20	●
2200LT	0.050-0.130	20	150	45	20	●

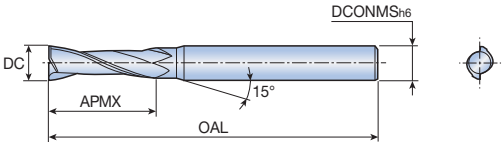
●: Standard items

HES 2...XLT

2 flute extra long flat







DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade	
		DC	OAL	APMX	DCONMS	TT5515	TT5525
HES 2030XLT(20x70)	0.010-0.040	3	70	20	6	●	
2040XLT(20x70)	0.020-0.050	4	70	20	6	●	●
2050XLT(25x80)	0.020-0.060	5	80	25	6	●	●
2060XLT(25x80)	0.030-0.076	6	80	25	6	●	●
2070XLT(35x90)	0.030-0.076	7	90	35	8	●	
2080XLT(35x90)	0.030-0.097	8	90	35	8	●	●
2090XLT(45X100)	0.030-0.097	9	100	45	10	●	
2100XLT(45x100)	0.030-0.107	10	100	45	10	●	●
2120XLT(55x110)	0.040-0.108	12	110	55	12	●	●
2140XLT	0.040-0.120	14	125	60	16	●	●
2160XLT	0.040-0.130	16	125	70	16	●	●
2180XLT	0.050-0.130	18	150	75	20	●	●
2200XLT	0.050-0.130	20	150	75	20	●	●

●: Standard items

HES 4...LT

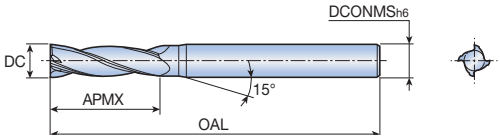
4 flute long flat











DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TT5525
HES 4030LT(10x70)	0.01-0.04	3	70	10	6	●
4040LT(12x70)	0.02-0.05	4	70	12	6	●
4050LT(15x80)	0.02-0.06	5	80	15	6	●
4060LT(15x80)	0.03-0.07	6	80	15	6	●
4080LT(20x90)	0.03-0.09	8	90	20	8	●
4100LT(25x100)	0.03-0.10	10	100	25	10	●
4120LT(30x110)	0.04-0.11	12	110	30	12	●
4140LT	0.04-0.12	14	125	35	16	●
4160LT	0.05-0.13	16	125	40	16	●
4180LT	0.05-0.13	18	150	45	20	●
4200LT	0.05-0.13	20	150	45	20	●

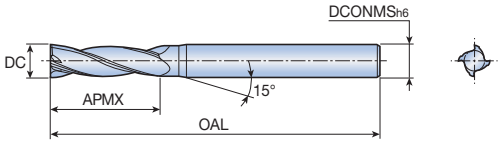
●: Standard items

HES 4...XLT

4 flute extra long flat







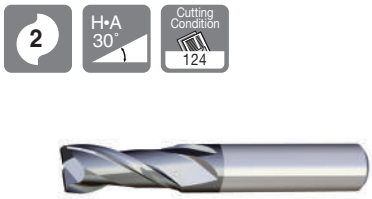
DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

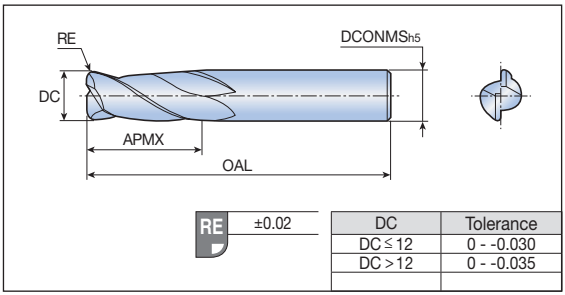
Designation	Feed (mm/tooth)	Dimension (mm)				Grade	
		DC	OAL	APMX	DCONMS	TT5515	TT5525
HES 4030XLT(20x70)	0.01-0.04	3	70	20	6	●	●
4040XLT(20x70)	0.02-0.05	4	70	20	6	●	●
4050XLT(25x80)	0.02-0.06	5	80	25	6	●	●
4060XLT(25x80)	0.03-0.07	6	80	25	6	●	●
4070XLT(35X90)	0.03-0.07	7	90	35	8	●	
4080XLT(35x90)	0.03-0.09	8	90	35	8	●	●
4090XLT(45X100)	0.03-0.09	9	100	45	10	●	
4100XLT(45x100)	0.03-0.10	10	100	45	10	●	●
4120XLT(55x110)	0.04-0.11	12	110	55	12	●	●
4140XLT	0.04-0.12	14	125	60	16	●	●
4160XLT	0.05-0.13	16	125	70	16	●	●
4180XLT	0.05-0.13	18	150	75	20	●	●
4200XLT	0.05-0.13	20	150	75	20	●	●

●: Standard items

HES 2...T-R

2 flute medium corner radius





RE ±0.02

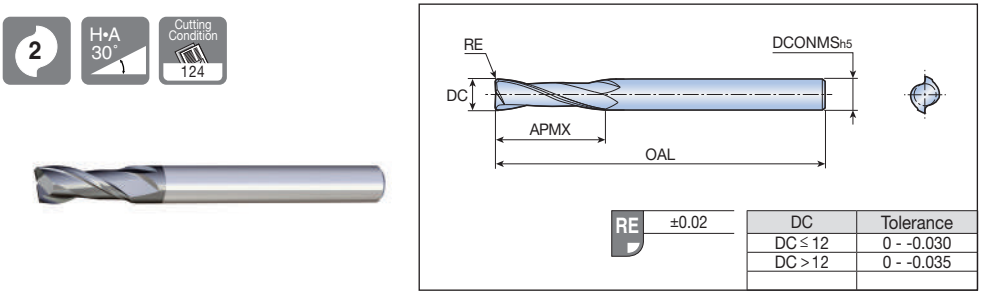
DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

Designation	Feed (mm/tooth)	Dimension (mm)					Grade	
		DC	RE	OAL	APMX	DCONMS	TT5515	TT5525
HES 2030T-R0.5	0.010-0.030	3	0.5	47	10	6	●	●
2040T-R0.5	0.010-0.050	4	0.5	47	12	6	●	●
2050T-R0.5	0.020-0.060	5	0.5	52	15	6	●	●
2060T-R0.5	0.020-0.060	6	0.5	52	15	6	●	●
2060T-R1.0	0.020-0.060	6	1.0	52	15	6	●	●
2080T-R0.5	0.030-0.100	8	0.5	60	20	8	●	●
2080T-R1.0	0.030-0.100	8	1.0	60	20	8	●	●
2080T-R1.5	0.030-0.100	8	1.5	60	20	8	●	●
2080T-R2.0	0.030-0.100	8	2.0	60	20	8	●	
2100T-R0.5	0.030-0.120	10	0.5	68	25	10	●	●
2100T-R1.0	0.030-0.120	10	1.0	68	25	10	●	
2100T-R1.5	0.030-0.120	10	1.5	68	25	10	●	
2100T-R2.0	0.030-0.120	10	2.0	68	25	10	●	
2100T-R2.5	0.030-0.120	10	2.5	68	25	10	●	
2100T-R3.0	0.030-0.120	10	3.0	68	25	10	●	
2120T-R0.5	0.030-0.120	12	0.5	76	30	12	●	
2120T-R1.0	0.030-0.120	12	1.0	76	30	12	●	
2120T-R1.5	0.030-0.120	12	1.5	76	30	12	●	●
2120T-R2.0	0.030-0.120	12	2.0	76	30	12	●	
2120T-R2.5	0.030-0.120	12	2.5	76	30	12	●	
2120T-R3.0	0.030-0.120	12	3.0	76	30	12	●	●
2160T-R0.5	0.040-0.142	16	0.5	90	40	16	●	
2160T-R1.0	0.040-0.142	16	1.0	90	40	16	●	●
2160T-R1.5	0.040-0.142	16	1.5	90	40	16	●	●
2160T-R2.0	0.040-0.142	16	2.0	90	40	16	●	
2160T-R3.0	0.040-0.142	16	3.0	90	40	16	●	●
2200T-R0.5	0.040-0.142	20	0.5	110	45	20	●	
2200T-R1.0	0.040-0.142	20	1.0	110	45	20	●	
2200T-R1.5	0.040-0.142	20	1.5	110	45	20	●	
2200T-R2.0	0.040-0.142	20	2.0	110	45	20	●	●
2200T-R3.0	0.040-0.142	20	3.0	110	45	20	●	

●: Standard items

HES 2...LT-R

2 flute long corner radius

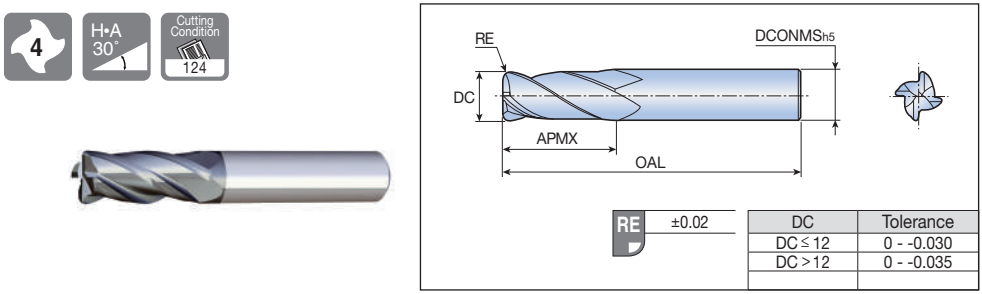


Designation	Feed (mm/tooth)	Dimension (mm)					Grade	
		DC	RE	OAL	APMX	DCONMS	TT5515	TT5525
HES 2030LT-R0.5	0.010-0.040	3	0.5	70	10	6		●
2040LT-R0.5	0.020-0.050	4	0.5	70	12	6	●	
2050LT-R0.3	0.020-0.060	5	0.3	80	15	6	●	
2050LT-R0.5	0.020-0.060	5	0.5	80	15	6	●	●
2060LT-R0.5	0.030-0.076	6	0.5	80	15	6	●	●
2060LT-R1.0	0.030-0.076	6	1.0	80	15	6	●	
2080LT-R0.5	0.030-0.097	8	0.5	90	20	8	●	●
2080LT-R1.0	0.030-0.097	8	1.0	90	20	8	●	
2080LT-R1.5	0.030-0.097	8	1.5	90	20	8	●	
2100LT-R0.5	0.030-0.107	10	0.5	100	25	10	●	
2100LT-R1.0	0.030-0.107	10	1.0	100	25	10	●	●
2120LT-R0.5	0.040-0.108	12	0.5	110	30	12	●	
2120LT-R1.0	0.040-0.108	12	1.0	110	30	12	●	●

●: Standard items

HES 4...T-R

4 flute medium corner radius



Designation	Feed (mm/tooth)	Dimension (mm)					Grade	
		DC	RE	OAL	APMX	DCONMS	TT5515	TT5525
HES 4030T-R0.3	0.01-0.04	3	0.3	47	10	6	●	●
4040T-R0.3	0.02-0.05	4	0.3	47	12	6	●	●
4050T-R0.3	0.02-0.06	5	0.3	52	15	6	●	●
4060T-R0.5	0.03-0.07	6	0.5	52	15	6	●	●
4060T-R1.0	0.03-0.07	6	1.0	52	15	6	●	●
4080T-R0.5	0.03-0.09	8	0.5	60	20	8	●	●
4080T-R1.0	0.03-0.09	8	1.0	60	20	8	●	●
4080T-R1.5	0.03-0.09	8	1.5	60	20	8	●	●
4080T-R2.0	0.03-0.09	8	2.0	60	20	8	●	
4100T-R0.5	0.03-0.10	10	0.5	68	25	10	●	●
4100T-R1.0	0.03-0.10	10	1.0	68	25	10	●	●
4100T-R1.5	0.03-0.10	10	1.5	68	25	10	●	●
4100T-R2.0	0.03-0.10	10	2.0	68	25	10	●	●
4100T-R2.5	0.03-0.10	10	2.5	68	25	10	●	
4100T-R3.0	0.03-0.10	10	3.0	68	25	10	●	●
4120T-R0.5	0.04-0.11	12	0.5	76	30	12	●	●
4120T-R1.0	0.04-0.11	12	1.0	76	30	12	●	●
4120T-R1.5	0.04-0.11	12	1.5	76	30	12	●	
4120T-R2.0	0.04-0.11	12	2.0	76	30	12	●	●
4120T-R2.5	0.04-0.11	12	2.5	76	30	12	●	
4120T-R3.0	0.04-0.11	12	3.0	76	30	12	●	●
4160T-R0.5	0.05-0.13	16	0.5	90	40	16	●	●
4160T-R1.0	0.05-0.13	16	1.0	90	40	16	●	●
4160T-R1.5	0.05-0.13	16	1.5	90	40	16	●	●
4160T-R2.0	0.05-0.13	16	2.0	90	40	16	●	●
4160T-R3.0	0.05-0.13	16	3.0	90	40	16	●	●
4200T-R0.5	0.05-0.13	20	0.5	110	45	20	●	●
4200T-R1.0	0.05-0.13	20	1.0	110	45	20	●	●
4200T-R1.5	0.05-0.13	20	1.5	110	45	20	●	
4200T-R2.0	0.05-0.13	20	2.0	110	45	20	●	
4200T-R3.0	0.05-0.13	20	3.0	110	45	20	●	●

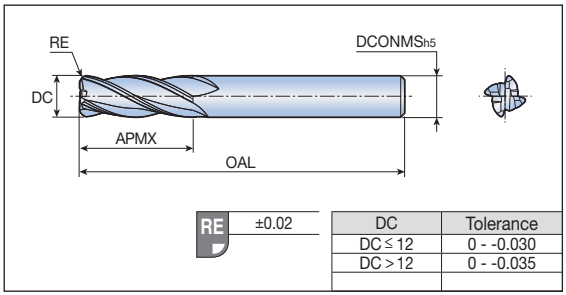
●: Standard items

HES 4...LT-R

4 flute long corner radius







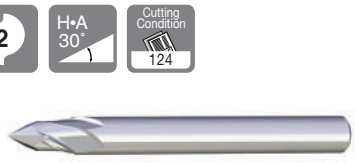
DC	Tolerance
DC ≤ 12	0 - -0.030
DC > 12	0 - -0.035

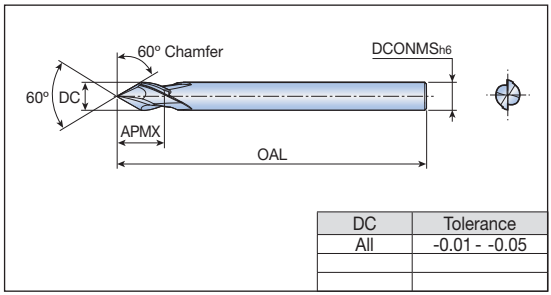
Designation	Feed (mm/tooth)	Dimension (mm)					Grade	
		DC	RE	OAL	APMX	DCONMS	TT5515	TT5525
HES 4030LT-R0.5	0.02-0.05	3	0.5	70	10	6	●	●
4040LT-R0.5	0.02-0.05	4	0.5	70	12	6	●	●
4040LT-R1.0	0.02-0.05	4	1.0	70	12	6	●	●
4060LT-R0.5	0.03-0.07	6	0.5	80	15	6	●	●
4060LT-R1.0	0.03-0.07	6	1.0	80	15	6	●	●
4080LT-R0.5	0.03-0.09	8	0.5	90	20	8	●	●
4080LT-R1.0	0.03-0.09	8	1.0	90	20	8	●	●
4100LT-R0.5	0.03-0.10	10	0.5	100	25	10	●	●
4100LT-R1.0	0.03-0.10	10	1.0	100	25	10	●	●
4120LT-R0.5	0.04-0.11	12	0.5	110	30	12	●	●
4120LT-R1.0	0.04-0.11	12	1.0	110	30	12	●	●

●: Standard items

CEM 2...-C60

2 flute, 60° chamfering





DC	Tolerance
All	-0.01 - -0.05

- Multi-function
  - Chamfer boring, chamfer milling, side milling

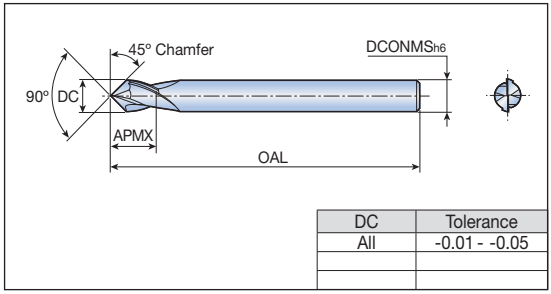
Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	UF10
CEM 2040-C60	0.02-0.04	4	70	7.5	6	●
2060-C60	0.02-0.04	6	80	11.2	6	●
2080-C60	0.03-0.06	8	90	14.9	8	●
2100-C60	0.03-0.08	10	100	18.7	10	●
2120-C60	0.04-0.09	12	110	22.4	12	●
2160-C60	0.05-0.10	16	125	29.9	16	●
2200-C60	0.05-0.10	20	150	37.3	20	●

●: Standard items

CEM 2

2 flute, 45° chamfering





DC	Tolerance
All	-0.01 - -0.05

- Multi-function
  - Chamfer boring, chamfer milling, side milling, *centering, V-slot milling

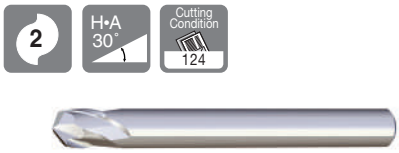
Designation	Feed (mm/tooth)	Dimension (mm)				Grade	
		DC	OAL	APMX	DCONMS	UF10	TT5525
CEM 2040	0.02-0.05	4	70	6	6	●	●
2060	0.02-0.05	6	80	9	6	●	●
2080	0.03-0.07	8	90	12	8	●	●
2100	0.03-0.10	10	100	15	10	●	●
2120	0.04-0.10	12	110	18	12	●	●
2160	0.05-0.10	16	125	24	16	●	●
2200	0.05-0.10	20	150	30	20	●	●

▶ *Centering of 45° is only applicable on cast iron & non-ferrous material

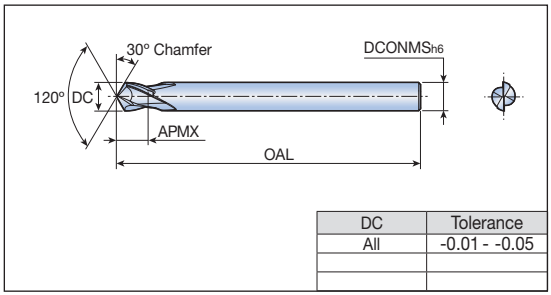
●: Standard items

CEM 2...-C120

2 flute, 30° chamfering



- Multi-function
  - Chamfer boring, chamfer milling, side milling, centering, V-slot milling, drilling



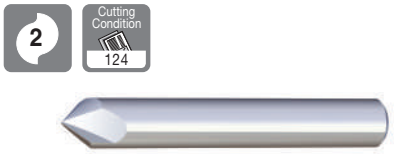
DC	Tolerance
All	-0.01 - -0.05

Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	UF10
CEM 2040-C120	0.02-0.05	4	70	5.2	6	●
2060-C120	0.02-0.05	6	80	7.7	6	●
2080-C120	0.03-0.07	8	90	10.3	8	●
2100-C120	0.03-0.10	10	100	12.9	10	●
2120-C120	0.04-0.10	12	110	15.5	12	●
2160-C120	0.05-0.10	16	125	20.6	16	●
2200-C120	0.05-0.10	20	150	25.8	20	●

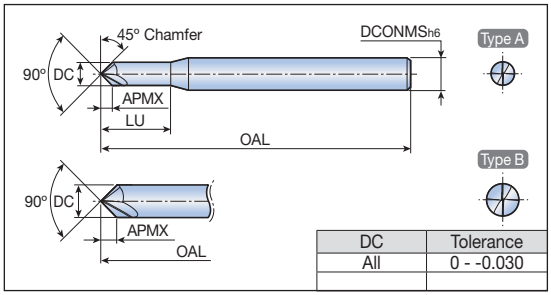
●: Standard items

ECEM 2

2 flute, 45° chamfering



- Multi-function
  - Chamfer boring, chamfer milling, centering, V-slot milling



DC	Tolerance
All	0 - -0.030

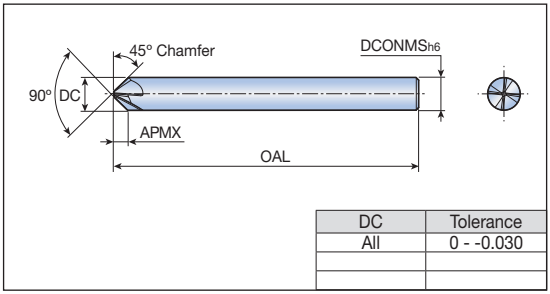
Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	OAL	APMX	LU	DCONMS	Type	UF10
ECEM 2020	0.01-0.03	2	57	1.0	6	6	A	●
2030	0.01-0.04	3	57	1.5	9	6	A	●
2040	0.02-0.05	4	57	2.0	12	6	A	●
2060	0.02-0.05	6	57	2.9	-	6	B	●
2080	0.03-0.07	8	63	3.8	-	8	B	●
2100	0.03-0.10	10	72	4.9	-	10	B	●
2120	0.04-0.10	12	83	5.9	-	12	B	●
2160	0.05-0.10	16	92	7.9	-	16	B	●

●: Standard items

ECEM 4

4 flute, 45° chamfering – Economical type





DC	Tolerance
All	0 - -0.030

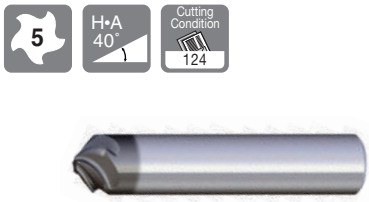
• Chamfer milling

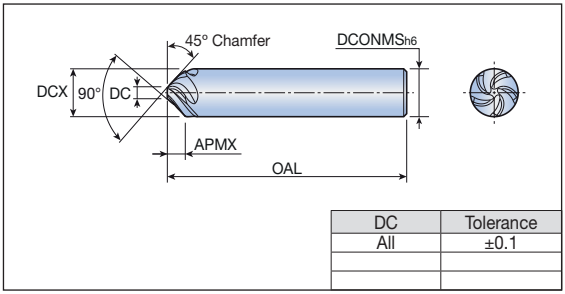
Designation		Feed (mm/tooth)	Dimension (mm)				Grade	
			DC	OAL	APMX	DCONMS	UF10	TT5525
ECEM	**4060**	0.02-0.04	6	57	2.5	6	●	●
	4080	0.02-0.05	8	63	3.4	8	●	●
	4100	0.03-0.08	10	72	4.4	10	●	●
	4120	0.03-0.08	12	83	5.1	12	●	●

●: Standard items

HCEM 5

5 flute, 45° chamfering





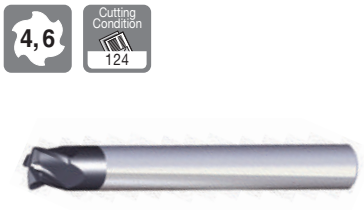
DC	Tolerance
All	±0.1

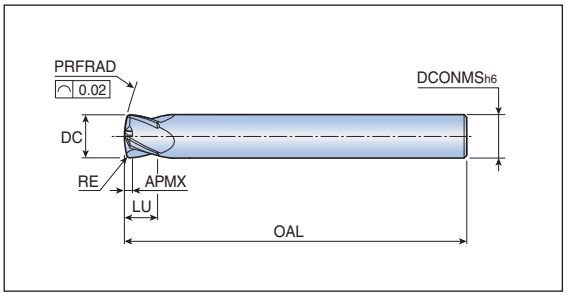
Designation		Feed (mm/tooth)	Dimension (mm)					Grade
			DCX	DC	OAL	APMX	DCONMS	TT5525
HCEM	**5080**	0.02-0.06	8	2	63	3.0	8	●
	5100	0.03-0.07	10	2.5	72	3.8	10	●
	5120	0.03-0.08	12	3	83	4.5	12	●
	5160	0.04-0.10	16	4	92	6.0	16	●

●: Standard items

SCSL

4, 6 flute, lens shape for 5-axis profiling





Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	NOF	PRFRAD	RE	APMX	LU	DCONMS	OAL	TT5515
SCSL	4080R015X05	0.02-0.08	8	4	15	0.75	1.1	5.0	8	63	●
	6100R020X07	0.03-0.09	10	6	20	1.0	1.4	7.0	10	72	●
	6120R025X09	0.03-0.10	12	6	25	1.0	1.5	9.0	12	83	●

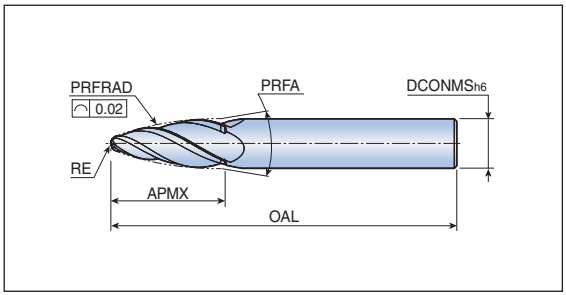
▶ PRFRAD: Profile radius

●: Standard items

SCSO

4 flute, oval shape(barrel) for 5-axis profiling





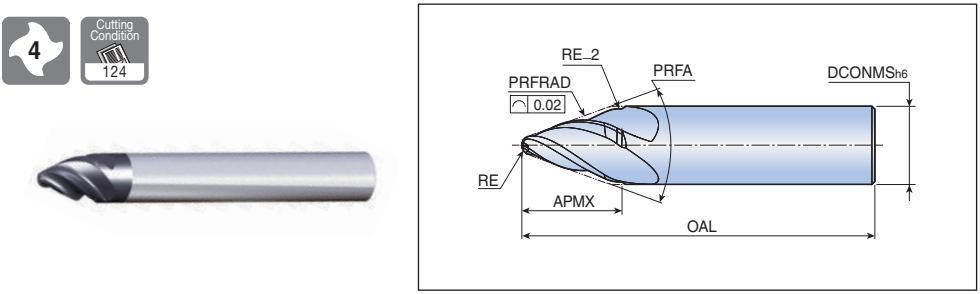
Designation		Feed (mm/tooth)	Dimension (mm)						Grade
			PRFRAD	RE	APMX	PRFA	DCONMS	OAL	TT5515
SCSO	4080R090X24	0.02-0.08	90	1.0	24.8	14.9	8	63	●
	4100R085X26	0.03-0.09	85	2.0	26.6	15.5	10	72	●
	4120R080X27	0.03-0.10	80	2.0	27.1	18.4	12	83	●

▶ PRFRAD: Profile radius

●: Standard items

SCST

4 flute, tapered shape(barrel) for 5-axis profiling



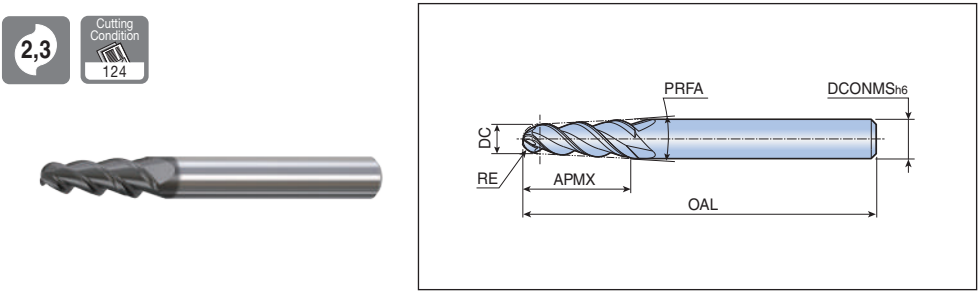
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			PRFRAD	RE	RE_2	APMX	PRFA	DCONMS	OAL	TT5515
SCST	4080R250A40X10	0.02-0.08	250	1.0	4.0	10	40	8	63	●
	4100R250A40X11	0.03-0.09	250	2.0	5.0	11	40	10	63	●
	4120R250A40X12	0.03-0.10	250	3.0	6.0	12	40	12	63	●

▶ PRFRAD: Profile radius

●: Standard items

HTB 2…/3…

2, 3 flute, taper ball shape



Designation		Dimension (mm)							Grade
		DC	NOF	RE	APMX	PRFA	DCONMS	OAL	TT5515
HTB	2030TA4-06	3	2	1.5	22	8	6	70	●
	3040TA4-08	4	3	2.0	30	8	8	75	●
	3040TA4-10	4	3	2.0	44	8	10	95	●
	3050TA4-12	5	3	2.5	52	8	12	110	●
	3060TA3-12	6	3	3.0	60	6	12	120	●
	3080TA3-16	8	3	4.0	80	6	16	150	●

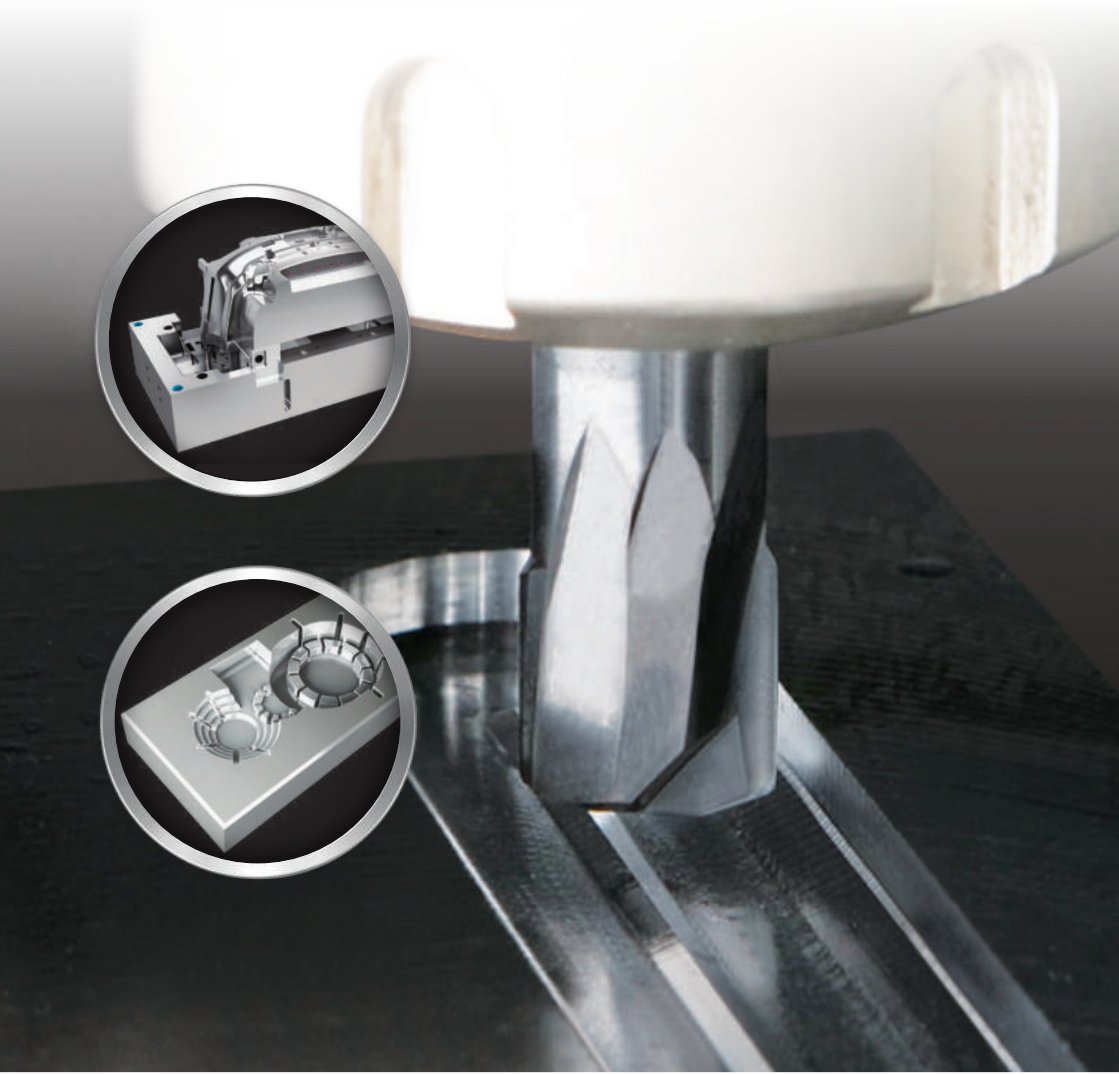
●: Standard items

04 High feed and roughing end mills for steel

APEX MILL

- *High feed machining of steel and cast iron (HFM…)*
- *Excellent chip segmentain in rough machining (REL…)*

High feed / Roughing type



Serrated roughing end mill

Excellent chip segmenting in deep DOC operations

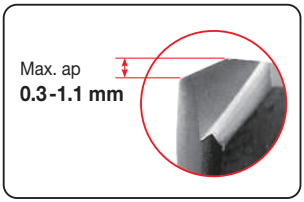
Increased productivity

Slotting, shouldering, pocketing

REL

High feed capable

Cutting edge optimized for high feed applications



High feed rate up to 1.0 mm/tooth

Suitable when insert type is not possible

HFM

Enhanced rigidity and minimized vibration



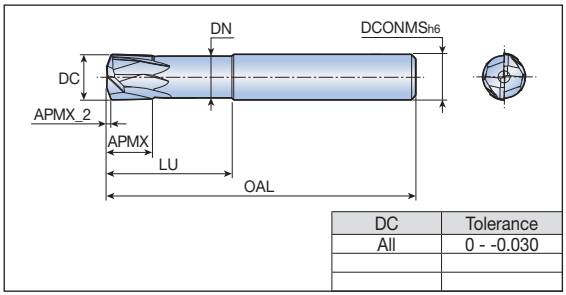
HFM 2

2 flute high feed flat





• High Feed Machining (H.F.M)



DC	Tolerance
All	0 - -0.030

Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	OAL	APMX	APMX_2*	LU	DN	DCONMS	TT5515
HFM	2040	0.2-0.4	4	47	4	0.3	10	3.9	6	●
	2060	0.3-0.6	6	52	6	0.5	16	5.5	6	●
	2080	0.4-0.7	8	60	8	0.75	22	7.3	8	●
	2100	0.5-0.9	10	68	10	1.0	28	9.2	10	●
	2120	0.5-1.0	12	76	12	1.1	33	11.0	12	●

▸ *: Maximum D.O.C for high feed milling

●: Standard items

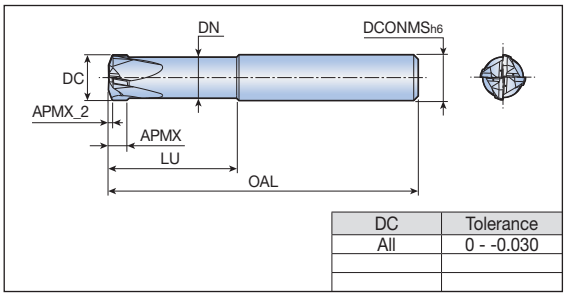
HFM 4

4 flute high feed flat





• High Feed Machining (H.F.M)



DC	Tolerance
All	0 - -0.030

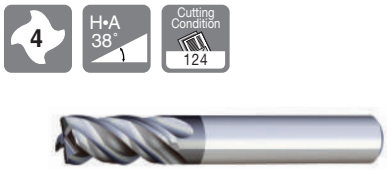
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	OAL	APMX	APMX_2*	LU	DN	DCONMS	TT5515
HFM	4060	0.3-0.5	6	52	2.5	0.5	16	5.4	6	●
	4080	0.3-0.6	8	60	3.5	0.7	24	7.2	8	●
	4100	0.4-0.8	10	68	4.0	0.75	28	9.2	10	●
	4120	0.4-1.0	12	76	5.0	1.05	33	11.0	12	●

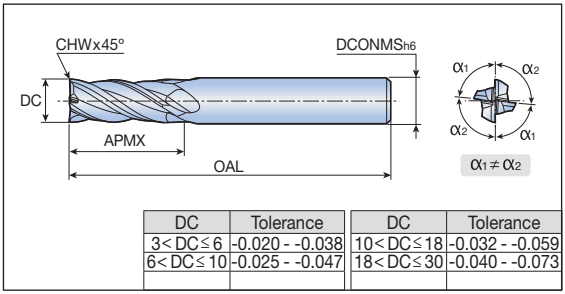
▸ *: Maximum D.O.C for high feed milling

●: Standard items

CFM 4...M

4 flute corner chamfer





DC	Tolerance	DC	Tolerance
3< DC≤ 6	-0.020 - -0.038	10< DC≤ 18	-0.032 - -0.059
6< DC≤ 10	-0.025 - -0.047	18< DC≤ 30	-0.040 - -0.073

• Vibration free mill

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	CHW	OAL	APMX	DCONMS	TT5525
CFM 4040M	0.02-0.05	4	0.15	57	10	6	●
4060M	0.03-0.07	6	0.25	57	14	6	●
4080M	0.03-0.08	8	0.3	63	18	8	●
4100M	0.03-0.10	10	0.4	72	22	10	●
4120M	0.04-0.11	12	0.5	83	26	12	●
4160M	0.05-0.13	16	0.6	100	34	16	●
4200M	0.05-0.17	20	0.6	110	42	20	●
4250M	0.06-0.20	25	0.6	121	52	25	●

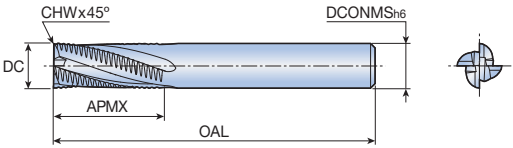
●: Standard items

REL ...L

3-4 flute rough long corner chamfer







DC	Tolerance	DC	Tolerance
DC≤ 3	0 - -0.040	10< DC≤ 18	0 - -0.070
3< DC≤ 6	0 - -0.048	18< DC≤ 30	0 - -0.084
6< DC≤ 10	0 - -0.058		

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	NOF	CHW	OAL	APMX	DCONMS	TT5515
REL 3060L	0.03-0.06	6	3	0.38	57	16	6	●
3080L	0.03-0.08	8	3	0.38	63	16	8	●
4100L	0.03-0.09	10	4	0.61	72	22	10	●
4120L	0.04-0.10	12	4	0.61	83	26	12	●
4140L-14	0.05-0.11	14	4	0.61	83	26	14	●
4160L	0.05-0.11	16	4	0.61	92	32	16	●
4200L	0.05-0.11	20	4	0.61	104	38	20	●

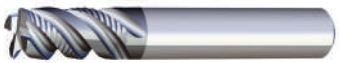
▶ Weldon shank is available on request (Ordering example: RELW ....L)
▶ NOF: Number of flutes

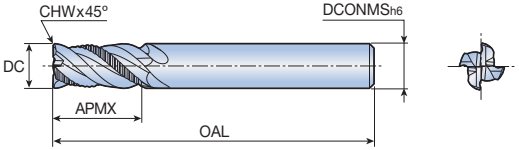
●: Standard items

FSM 4...M

4 flute medium corner chamfer







DC	Tolerance	DC	Tolerance
3< DC≤ 6	-0.020 - -0.038	10< DC≤ 18	-0.032 - -0.059
6< DC≤ 10	-0.025 - -0.047	18< DC≤ 30	-0.040 - -0.073

• MULTIMILL (Rough + Finish)

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	CHW	OAL	APMX	DCONMS	TT5525
FSM 4060M	0.03-0.06	6	0.25	57	14	6	●
4080M	0.03-0.08	8	0.3	63	18	8	●
4100M	0.03-0.09	10	0.3	72	22	10	●
4120M	0.04-0.11	12	0.4	83	26	12	●
4140M	0.04-0.11	14	0.4	83	30	14	●
4160M	0.05-0.11	16	0.6	92	34	16	●
4200M	0.05-0.11	20	0.6	104	42	20	●
4250M	0.06-0.11	25	0.6	121	52	25	●

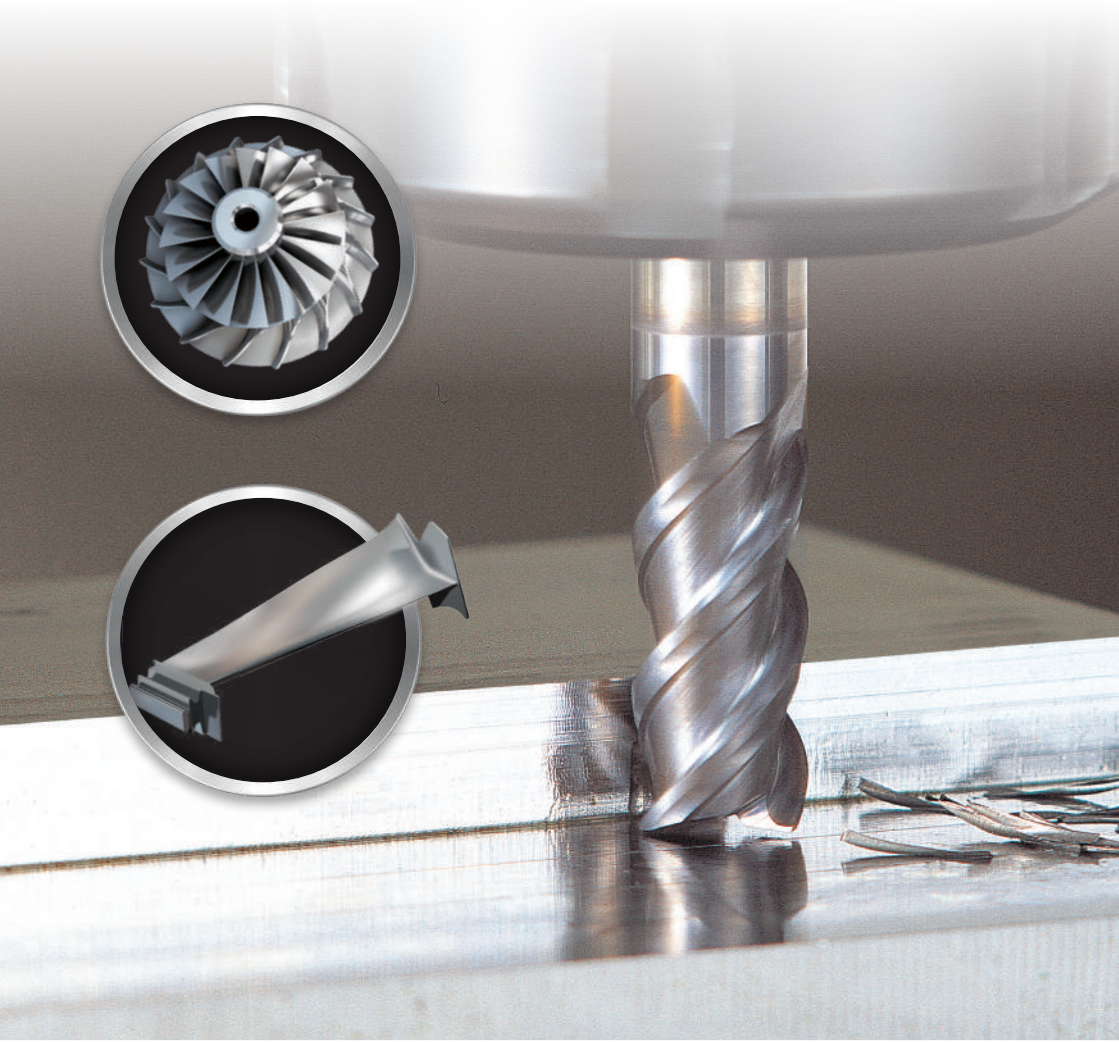
●: Standard items

05 High productivity end mills for difficult-to-cut materials

STARMILL

- *Minimal vibration for excellent surface roughness*
- *High productivity with up to 7 flutes*

Flat / Corner R / Ball Type / Roughing Type



Difficult-to-cut materials machining

Optimized for stainless steel and titanium alloy steel

Trochoidal milling End mills (4/7 flutes)



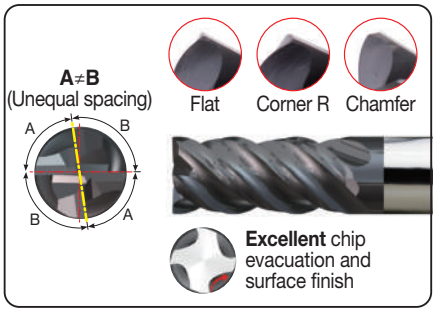
Unequally spaced flutes

Improved productivity in difficult-to-cut material machining



End mills available in a variety of shapes

SED 4



7-flute chip splitter

Optimized for finish shouldering of difficult-to-cut materials



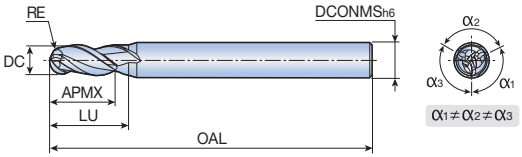
SED 7



SBT 3...U

3 flute medium ball (Unequal spacing)





RE	
DC≤6	±0.005
DC>6	±0.010

DC	Tolerance
All	0 - -0.020

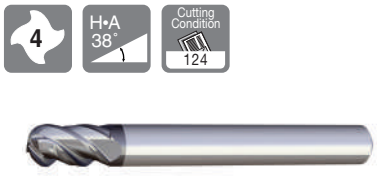
- Excellent chatter damping credit to unequal spacing of cutting edges

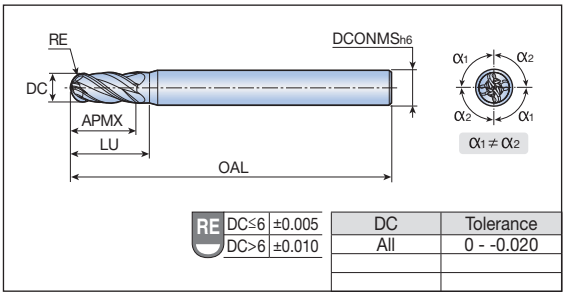
Designation	Dimension (mm)						Grade
	DC	RE	OAL	APMX	LU	DCONMS	TT5515
SBT 3040U	4	2	70	8	10	6	●
3060U	6	3	80	12	-	6	●
3080U	8	4	90	16	-	8	●
3100U	10	5	100	20	-	10	●
3120U	12	6	110	25	-	12	●

●: Standard items

SBT 4...U

4 flute medium ball (Unequal spacing)





RE	DC≤6	±0.005
	DC>6	±0.010

DC	Tolerance
All	0 - -0.020

- Excellent chatter damping credit to unequal spacing of cutting edges

Designation	Dimension (mm)						Grade
	DC	RE	OAL	APMX	LU	DCONMS	TT5515
SBT 4030U	3	1.5	70	8	10	6	●
4040U	4	2	70	8	10	6	●
4050U	5	2.5	80	10	12	6	●
4060U	6	3	80	12	-	6	●
4080U	8	4	90	16	-	8	●
4100U	10	5	100	20	-	10	●
4120U	12	6	110	25	-	12	●
4160U	16	8	125	35	-	16	●
4200U	20	10	150	40	-	20	●

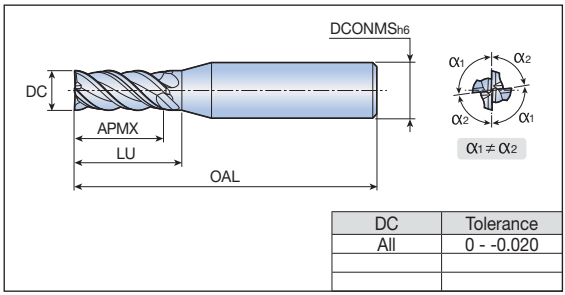
●: Standard items

SED 4...U

4 flute medium ball (Unequal spacing)







DC	Tolerance
All	0 - -0.020

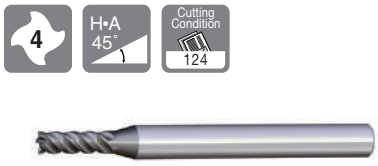
- Excellent chatter damping credit to unequal spacing of cutting edges

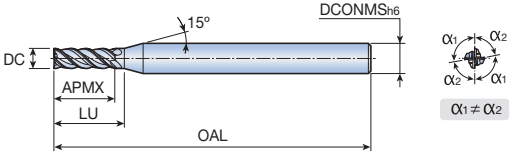
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5515
SED 4010U	0.003-0.005	1	42	2.5	3.5	6	●
4015U	0.003-0.005	1.5	42	4	5.5	6	●
4020U	0.005-0.010	2	42	6	8	6	●
4025U	0.010-0.015	2.5	42	8	10	6	●
4030U	0.010-0.020	3	57	10	12	6	●
4040U	0.010-0.025	4	57	12	14	6	●
4050U	0.015-0.030	5	57	15	16	6	●
4060U	0.015-0.035	6	57	15	-	6	●
4070U	0.020-0.045	7	63	16	21	8	●
4080U	0.020-0.050	8	70	25	-	8	●
4080US	0.020-0.050	8	70	20	-	8	●
4100U	0.025-0.060	10	72	25	-	10	●
4120U	0.030-0.070	12	83	30	-	12	●
4140U	0.035-0.080	14	90	35	-	14	●
4160U	0.040-0.090	16	100	42	-	16	●
4200U	0.045-0.100	20	104	48	-	20	●

●: Standard items

SED 4...UL

4 flute long flat (Unequal spacing)





DC	Tolerance
All	0 - -0.020

- Excellent chatter damping credit to unequal spacing of cutting edges

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	TT5515
SED 4030UL	0.010-0.020	3	63	10	12	6	●
4040UL	0.010-0.025	4	63	12	14	6	●
4060UL	0.015-0.035	6	65	20	-	6	●
4080UL	0.020-0.050	8	83	30	-	8	●
4100UL	0.025-0.060	10	83	35	-	10	●
4120UL	0.030-0.070	12	92	40	-	12	●

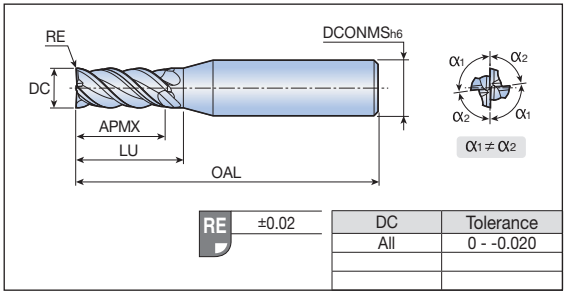
●: Standard items

SED 4...-R

4 flute medium corner radius (Unequal spacing)



- Excellent chatter damping credit to unequal spacing of cutting edges



RE	±0.02

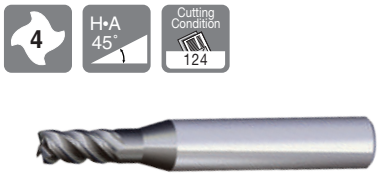
DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	RE	OAL	APMX	LU	DCONMS	TT5515
SED 4020U-R0.1	0.005-0.010	2	0.1	42	6	8	6	●
4030U-R0.2	0.010-0.020	3	0.2	57	10	12	6	●
4040U-R0.1	0.010-0.025	4	0.1	57	12	14	6	●
4040U-R0.2	0.010-0.025	4	0.2	57	12	14	6	●
4040U-R0.5	0.010-0.025	4	0.5	57	12	14	6	●
4050U-R0.15	0.015-0.030	5	0.15	57	15	16	6	●
4050U-R0.2	0.015-0.030	5	0.2	57	15	16	6	●
4060U-R0.2	0.015-0.035	6	0.2	57	15	-	6	●
4060U-R0.3	0.015-0.035	6	0.3	57	15	-	6	●
4060U-R0.5	0.015-0.035	6	0.5	57	15	-	6	●
4080U-R0.2	0.020-0.050	8	0.2	70	25	-	8	●
4080U-R0.3	0.020-0.050	8	0.3	70	25	-	8	●
4080U-R0.5	0.020-0.050	8	0.5	70	25	-	8	●
4080U-R1.0	0.020-0.050	8	1.0	70	25	-	8	●
4100U-R0.2	0.025-0.060	10	0.2	72	25	-	10	●
4100U-R0.3	0.025-0.060	10	0.3	72	25	-	10	●
4100U-R0.5	0.025-0.060	10	0.5	72	25	-	10	●
4100U-R1.0	0.025-0.060	10	1.0	72	25	-	10	●
4100U-R2.0	0.025-0.060	10	2.0	72	25	-	10	●
4120U-R0.2	0.030-0.070	12	0.2	83	30	-	12	●
4120U-R0.3	0.030-0.070	12	0.3	83	30	-	12	●
4120U-R0.5	0.030-0.070	12	0.5	83	30	-	12	●
4120U-R1.0	0.030-0.070	12	1.0	83	30	-	12	●
4160U-R0.5	0.040-0.090	16	0.5	100	42	-	16	●
4160U-R1.0	0.040-0.090	16	1.0	100	42	-	16	●
4160U-R2.0	0.040-0.090	16	2.0	100	42	-	16	●
4160U-R3.0	0.040-0.090	16	3.0	100	42	-	16	●

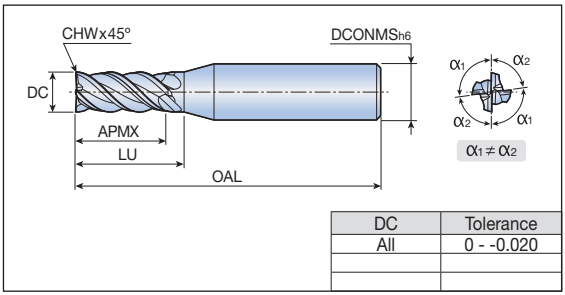
●: Standard items

SED 4...-C

4 flute medium corner chamfer (Unequal spacing)



- Excellent chatter damping credit to unequal spacing of cutting edges



DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	CHW	OAL	APMX	LU	DCONMS	TT5515
SED 4040U-C0.1	0.010-0.025	4	0.1	57	12	14	6	●
4060U-C0.2	0.015-0.035	6	0.2	57	15	-	6	●
4080U-C0.3	0.020-0.050	8	0.3	70	25	-	8	●
4100U-C0.3	0.025-0.060	10	0.3	72	25	-	10	●
4120U-C0.4	0.030-0.070	12	0.4	83	30	-	12	●

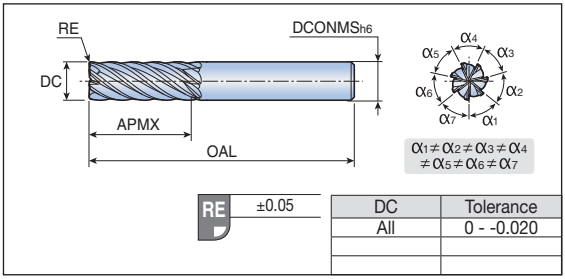
●: Standard items

SED 7

7 flute medium corner radius (Unequal spacing)



- Excellent chatter damping credit to unequal spacing of cutting edges
- For trochoidal operation



DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TT5515
SED 7060	0.02-0.04	6	0.5	57	15	6	●
7060-4D	0.02-0.04	6	0.5	70	24	6	●
7080	0.02-0.05	8	0.5	70	25	8	●
7080-4D	0.02-0.05	8	0.5	90	32	8	●
7100	0.03-0.07	10	0.5	72	25	10	●
7100-4D	0.03-0.07	10	0.5	100	40	10	●
7120	0.03-0.09	12	0.5	83	30	12	●
7120-4D	0.03-0.09	12	0.5	110	48	12	●
7140	0.04-0.10	14	0.5	90	35	14	●
7160	0.04-0.11	16	0.5	100	42	16	●
7160-4D	0.04-0.11	16	0.5	125	64	16	●
7200	0.05-0.12	20	0.5	104	48	20	●
7200-4D	0.05-0.12	20	0.5	150	80	20	●

▶ 4D: 4xD depth of cut

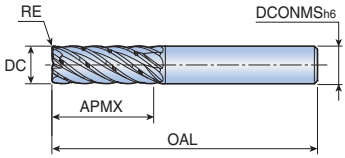
●: Standard items

SED 7...N

7 flute medium corner radius (Unequal spacing, Chip splitter type)



- Excellent chatter damping credit to unequal spacing of cutting edges with chip splitters
- For trochoidal operation



RE	±0.05

DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TT5515
SED 7060-N	0.02-0.04	6	0.5	57	15	6	●
7060-4D-N	0.02-0.04	6	0.5	70	24	6	●
7080-N	0.02-0.05	8	0.5	70	25	8	●
7080-4D-N	0.02-0.05	8	0.5	90	32	8	●
7100-N	0.03-0.07	10	0.5	72	25	10	●
7100-4D-N	0.03-0.07	10	0.5	100	40	10	●
7120-N	0.03-0.09	12	0.5	83	30	12	●
7120-4D-N	0.03-0.09	12	0.5	110	48	12	●
7160-N	0.04-0.11	16	0.5	100	42	16	●
7160-4D-N	0.04-0.11	16	0.5	125	64	16	●
7200-N	0.05-0.12	20	0.5	104	48	20	●
7200-4D-N	0.05-0.12	20	0.5	150	80	20	●

▶ N: Chip splitter type

●: Standard items

SER

3-5 flute chip splitter type

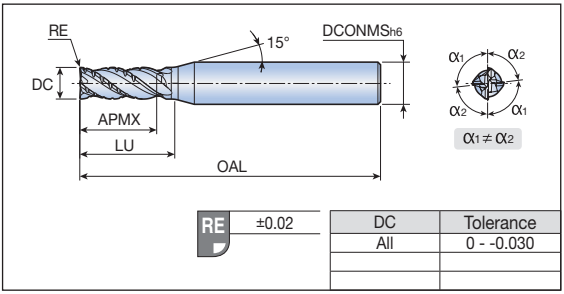








- Excellent chatter damping credit to unequal spacing of cutting edges



RE	±0.02

DC	Tolerance
All	0 - -0.030

Designation	Feed (mm/tooth)		Dimension (mm)						Grade
			DC	RE	OAL	APMX	LU	DCONMS	TT5525
SER 3030M 020	0.010-0.030	3	3	0.2	52	8	10	6	●
3040M 020	0.020-0.040	3	4	0.2	52	10	12	6	●
4050M 020	0.020-0.040	4	5	0.2	57	13	18	6	●
4060M 020	0.025-0.070	4	6	0.2	57	13	-	6	●
4060M 050	0.025-0.070	4	6	0.5	57	13	-	6	●
4070M 020	0.025-0.070	4	7	0.2	63	18	25	8	●
4080M 020	0.030-0.090	4	8	0.2	63	19	-	8	●
4080M 100	0.030-0.090	4	8	1.0	63	19	-	8	●
4090M 030	0.030-0.090	4	9	0.3	72	20	30	10	●
4100M 030	0.030-0.100	4	10	0.3	72	22	-	10	●
4100M 100	0.030-0.100	4	10	1.0	72	22	-	10	●
4110M 030	0.030-0.100	4	11	0.3	83	25	35	12	●
4120M 030	0.035-0.110	4	12	0.3	83	26	-	12	●
4120M 100	0.035-0.110	4	12	1.0	83	26	-	12	●
5140M 050	0.035-0.110	5	14	0.5	92	28	40	16	●
5160M 050	0.050-0.130	5	16	0.5	92	32	-	16	●
5160M 150	0.050-0.130	5	16	1.5	92	32	-	16	●
5180M 050	0.050-0.130	5	18	0.5	110	38	55	20	●
5180M 200	0.050-0.130	5	18	2.0	110	38	55	20	●
5200M 050	0.050-0.170	5	20	0.5	110	38	-	20	●
5200M 200	0.050-0.170	5	20	2.0	110	38	-	20	●

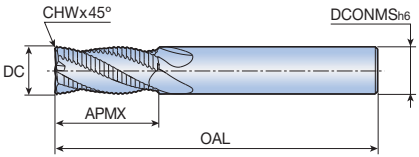
●: Standard items

REH ...S

4-6 flute rough short corner chamfer







DC	Tolerance	DC	Tolerance
DC≤ 3	0 - -0.040	10< DC≤ 18	0 - -0.070
3< DC≤ 6	0 - -0.048	18< DC≤ 30	0 - -0.084
6< DC≤ 10	0 - -0.058		

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	NOF	CHW	OAL	APMX	DCONMS	TT5525
REH 4060S	0.04-0.12	6	4	0.25	54	7	6	●
4080S	0.05-0.16	8	4	0.30	58	9	8	●
4100S	0.06-0.18	10	4	0.36	66	14	10	●
4120S	0.06-0.20	12	4	0.36	73	16	12	●
5160S	0.08-0.22	16	5	0.36	82	22	16	●
6200S	0.08-0.22	20	6	0.36	92	26	20	●

▶ Weldon shank is available on request (Ordering example: REHW ....S)
▶ NOF: Number of flutes

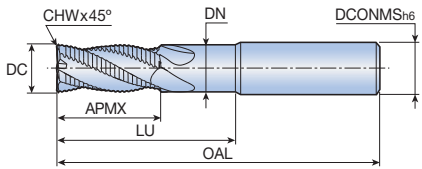
●: Standard items

REH ...L

4-6 flute rough long neck corner chamfer







DC	Tolerance	DC	Tolerance
DC≤ 3	0 - -0.040	10< DC≤ 18	0 - -0.070
3< DC≤ 6	0 - -0.048	18< DC≤ 30	0 - -0.084
6< DC≤ 10	0 - -0.058		

Designation	Feed (mm/tooth)	Dimension (mm)								Grade
		DC	NOF	CHW	OAL	APMX	LU	DN	DCONMS	TT5525
REH 4060L	0.04-0.12	6	4	0.25	57	16	20	5.5	6	●
4080L	0.05-0.16	8	4	0.30	63	16	26	7.5	8	●
4100L	0.06-0.18	10	4	0.36	72	22	31	9.5	10	●
4120L	0.06-0.20	12	4	0.36	83	26	37	11.5	12	●
5160L	0.08-0.22	16	5	0.36	100	32	51	15.5	16	●
6200L	0.08-0.22	20	6	0.36	110	38	59	19.2	20	●

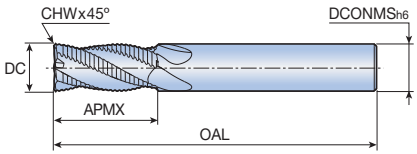
▶ Weldon shank is available on request (Ordering example: REHW ....L)
▶ NOF: Number of flutes

●: Standard items

REH ...M

3-6 flute rough medium corner chamfer





DC	Tolerance	DC	Tolerance
DC≤ 3	0 - -0.040	10< DC≤ 18	0 - -0.070
3< DC≤ 6	0 - -0.048	18< DC≤ 30	0 - -0.084
6< DC≤ 10	0 - -0.058		

Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	NOF	CHW	OAL	APMX	DCONMS	TT5525
REH 3040M	0.02-0.05	4	3	0.15	57	11	6	●
4050M	0.02-0.05	5	4	0.20	57	13	6	●
4060M	0.04-0.12	6	4	0.25	57	16	6	●
4070M	0.05-0.16	7	4	0.28	63	16	8	●
4080M	0.05-0.16	8	4	0.30	63	16	8	●
4090M	0.06-0.18	9	4	0.33	72	19	10	●
4100M	0.06-0.18	10	4	0.36	72	22	10	●
4120M	0.06-0.20	12	4	0.36	83	26	12	●
5140M-14	0.08-0.22	14	5	0.36	83	26	14	●
5160M	0.08-0.22	16	5	0.36	92	32	16	●
6200M	0.08-0.22	20	6	0.36	104	38	20	●
6250M	0.08-0.22	25	6	0.36	121	45	25	●

▶ Weldon shank is available on request (Ordering example: REHW ....M)

▶ NOF: Number of flutes

●: Standard items

06 End mills for aluminum and non-ferrous metals

ALUMILL

- *Suitable for end milling of aluminum, non-ferrous metals*
- *Minimized built-up edge*

Flat / Corner R / Roughing Wave Type



End mill for aluminum and non-ferrous metals

Minimize built-up edges with sharp cutting edges

Enables smooth cutting and good chip evacuation

Wide range

Flat, Corner R, Splitter Roughing & Wave End Mills

AES

Wave Helix

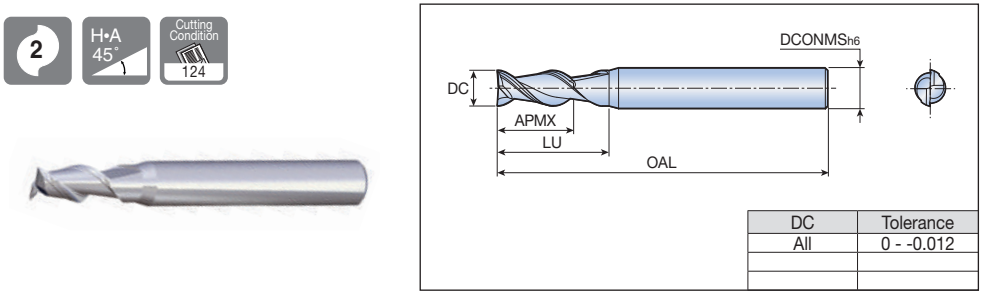
Improved surface roughness and good chip evacuation

AWE



AES 2

2 flute medium flat



DC	Tolerance
All	0 - -0.012

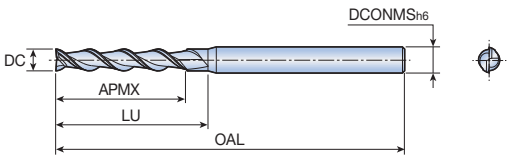
Designation		Feed (mm/tooth)	Dimension (mm)					Grade
			DC	OAL	APMX	LU	DCONMS	UF10
AES	2010	0.02-0.04	1	40	3	5	4	●
	2010-6	0.02-0.04	1	47	3	5	6	●
	2015	0.02-0.04	1.5	40	3	5	4	●
	2015-6	0.02-0.04	1.5	47	3	5	6	●
	2020	0.02-0.04	2	40	6	8	4	●
	2020-6	0.02-0.04	2	47	6	8	6	●
	2025	0.02-0.05	2.5	40	8	10	4	●
	2025-6	0.02-0.05	2.5	47	8	10	6	●
	2030	0.02-0.05	3	47	10	13	6	●
	2035	0.02-0.05	3.5	47	10	13	6	●
	2040	0.02-0.05	4	47	12	15	6	●
	2050	0.02-0.06	5	52	15	20	6	●
	2060	0.03-0.07	6	52	15	-	6	●
	2070	0.03-0.09	7	60	20	26	8	●
	2080	0.03-0.09	8	60	20	-	8	●
	2090	0.03-0.10	9	68	25	31	10	●
	2100	0.03-0.10	10	68	25	31	10	●
	2110	0.03-0.12	11	76	30	37	12	●
	2120	0.03-0.12	12	76	30	-	12	●
	2130	0.03-0.12	13	85	35	40	14	●
	2140	0.05-0.14	14	85	35	40	14	●
	2150	0.05-0.14	15	90	40	50	16	●
	2160	0.05-0.14	16	90	40	-	16	●
	2170	0.05-0.15	17	110	45	55	18	●
	2180	0.05-0.15	18	110	45	55	18	●
	2190	0.05-0.15	19	110	45	55	20	●
	2200	0.05-0.15	20	110	45	-	20	●

●: Standard items

AES 2...XL

2 flute extra long flat





DC	Tolerance
All	0 - -0.012

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	UF10
AES **2020XL**	0.02-0.04	2	60	12	15	4	●
2030XL	0.02-0.04	3	70	20	23	6	●
2040XL	0.02-0.04	4	70	25	28	6	●
2050XL	0.02-0.06	5	80	30	35	6	●
2060XL	0.03-0.07	6	80	30	-	6	●
2080XL	0.03-0.09	8	90	40	-	8	●
2100XL	0.03-0.10	10	100	50	-	10	●
2120XL	0.03-0.12	12	110	55	-	12	●
2160XL	0.05-0.14	16	125	70	-	16	●
2200XL	0.05-0.15	20	150	75	-	20	●

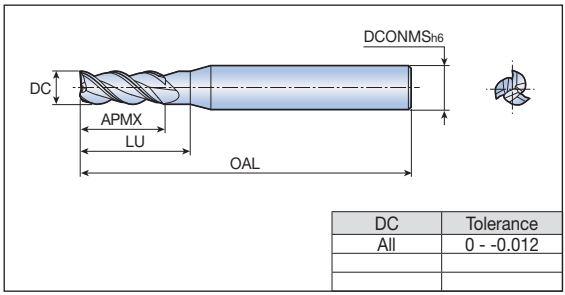
●: Standard items

AES 3

3 flute medium flat







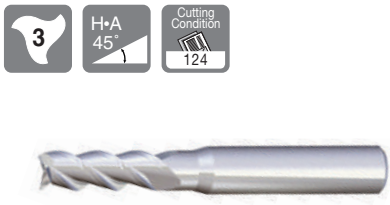
DC	Tolerance
All	0 - -0.012

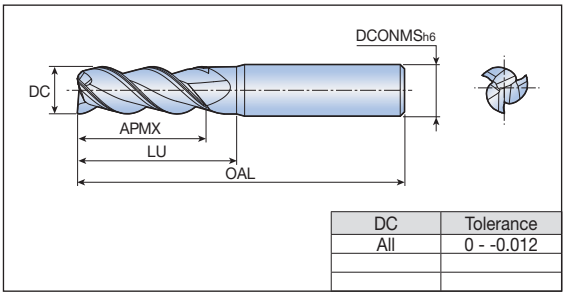
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	UF10
AES 3010(4X50)-4	0.01-0.015	1	50	4	5	4	●
3015(6X50)-6	0.01-0.02	1.5	50	6	7	6	●
3020(7X50)-6	0.02-0.04	2	50	7	9	6	●
3020-6	0.02-0.04	2	47	6	8	6	●
3030	0.02-0.05	3	47	10	13	6	●
3030(12X57)	0.02-0.05	3	57	12	14.5	6	●
3040	0.02-0.05	4	47	12	15	6	●
3040(14X57)	0.02-0.05	4	57	14	17	6	●
3050	0.02-0.06	5	52	15	20	6	●
3050(18X57)	0.02-0.06	5	57	18	22	6	●
3060	0.03-0.07	6	52	15	-	6	●
3060(18X60)	0.03-0.07	6	60	18	-	6	●
3070	0.03-0.09	7	60	20	26	8	●
3080	0.03-0.09	8	60	20	-	8	●
3080(23X70)	0.03-0.09	8	70	23	-	8	●
3090	0.03-0.10	9	68	25	31	10	●
3100	0.03-0.10	10	68	25	-	10	●
3100(28X75)	0.03-0.10	10	75	28	-	10	●
3110	0.03-0.12	11	76	30	37	12	●
3120	0.03-0.12	12	76	30	-	12	●
3120(33X80)	0.03-0.12	12	80	33	-	12	●
3130	0.03-0.12	13	85	35	40	14	●
3140	0.05-0.14	14	85	35	40	14	●
3150	0.05-0.14	15	90	40	50	16	●
3160	0.05-0.14	16	90	40	-	16	●
3160(43X100)	0.05-0.14	16	100	43	-	16	●
3180	0.05-0.15	18	110	45	55	18	●
3200	0.05-0.15	20	110	45	-	20	●
3200(49X100)	0.05-0.15	20	100	49	-	20	●
3250	0.05-0.15	25	140	65	-	25	●

●: Standard items

AES 3...ML

3 flute long flat





DC	Tolerance
All	0 - -0.012

Designation		Feed (mm/tooth)	Dimension (mm)					Grade
			DC	OAL	APMX	LU	DCONMS	UF10
AES	3030ML	0.02-0.05	3	60	15	18	6	●
	3040ML	0.02-0.05	4	60	20	25	6	●
	3050ML	0.02-0.06	5	65	25	30	6	●
	3060ML	0.03-0.07	6	65	25	-	6	●
	3070ML	0.03-0.09	7	75	30	35	8	●
	3080ML	0.03-0.09	8	75	30	-	8	●
	3090ML	0.03-0.10	9	80	35	40	10	●
	3100ML	0.03-0.10	10	80	35	-	10	●
	3120ML	0.03-0.12	12	95	40	-	12	●
	3140ML	0.05-0.14	14	110	55	62	16	●
	3160ML	0.05-0.14	16	110	55	-	16	●
	3180ML	0.05-0.15	18	125	60	70	20	●
	3200ML	0.05-0.15	20	125	60	-	20	●

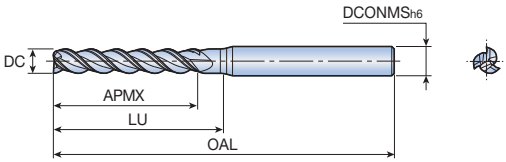
●: Standard items

AES 3...XL

3 flute extra long flat







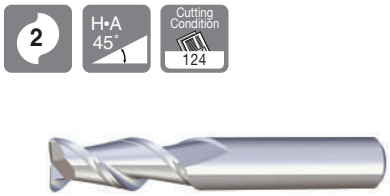
DC	Tolerance
All	0 - -0.012

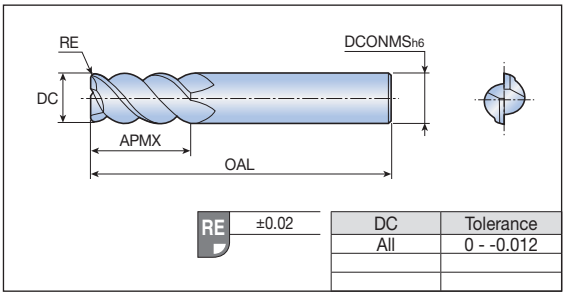
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	OAL	APMX	LU	DCONMS	UF10
AES 3060XL	0.03-0.07	6	80	30	-	6	●
3080XL	0.03-0.09	8	90	40	-	8	●
3100XL	0.03-0.10	10	100	50	-	10	●
3120XL	0.03-0.12	12	110	55	-	12	●
3160XL	0.05-0.14	16	125	70	-	16	●
3180XL	0.05-0.15	18	150	75	85	20	●
3180XL(80x150)	0.05-0.15	18	150	80	90	20	●
3200XL	0.05-0.15	20	150	75	-	20	●
3200XL(80x150)	0.05-0.15	20	150	80	-	20	●

●: Standard items

AES 2...R

2 flute medium corner radius





RE	±0.02

DC	Tolerance
All	0 - -0.012

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	UF10
AES 2060-R0.5	0.03-0.07	6	0.5	52	15	6	●
2060-R1.0	0.03-0.07	6	1.0	52	15	6	●
2060-R2.0	0.03-0.07	6	2.0	52	15	6	●
2080-R0.5	0.03-0.09	8	0.5	60	20	8	●
2080-R1.0	0.03-0.09	8	1.0	60	20	8	●
2080-R2.0	0.03-0.09	8	2.0	60	20	8	●
2080-R3.0	0.03-0.09	8	3.0	60	20	8	●
2100-R1.0	0.03-0.10	10	1.0	68	25	10	●
2100-R1.5	0.03-0.10	10	1.5	68	25	10	●
2100-R2.0	0.03-0.10	10	2.0	68	25	10	●
2100-R3.0	0.03-0.10	10	3.0	68	25	10	●
2100-R4.0	0.03-0.10	10	4.0	68	25	10	●
2120-R1.0	0.03-0.12	12	1.0	76	30	12	●
2120-R2.0	0.03-0.12	12	2.0	76	30	12	●
2120-R3.0	0.03-0.12	12	3.0	76	30	12	●
2120-R4.0	0.03-0.12	12	4.0	76	30	12	●
2140-R1.0	0.05-0.14	14	1.0	85	35	14	●
2140-R3.0	0.05-0.14	14	3.0	85	35	14	●
2140-R4.0	0.05-0.14	14	4.0	85	35	14	●
2160-R1.0	0.05-0.14	16	1.0	90	40	16	●
2160-R2.0	0.05-0.14	16	2.0	90	40	16	●
2160-R3.0	0.05-0.14	16	3.0	90	40	16	●
2160-R4.0	0.05-0.14	16	4.0	90	40	16	●
2160-R5.0	0.05-0.14	16	5.0	90	40	16	●

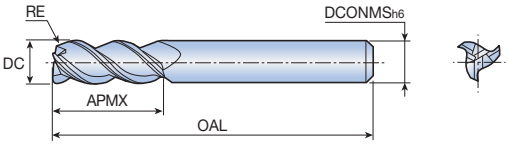
●: Standard items

AES 3...R

3 flute medium corner radius







RE	±0.02

DC	Tolerance
All	0 - -0.012

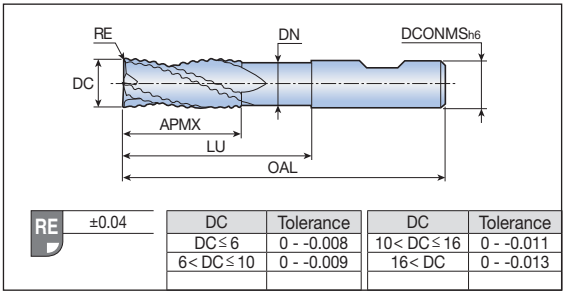
Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	UF10
AES 3060-R0.5	0.03-0.07	6	0.5	52	15	6	●
3060-R1.0	0.03-0.07	6	1.0	52	15	6	●
3060-R2.0	0.03-0.07	6	2.0	52	15	6	●
3080-R0.5	0.03-0.09	8	0.5	60	20	8	●
3080-R1.0	0.03-0.09	8	1.0	60	20	8	●
3080-R2.0	0.03-0.09	8	2.0	60	20	8	●
3100-R1.0	0.03-0.10	10	1.0	68	25	10	●
3100-R1.5	0.03-0.10	10	1.5	68	25	10	●
3100-R2.0	0.03-0.10	10	2.0	68	25	10	●
3100-R3.0	0.03-0.10	10	3.0	68	25	10	●
3100-R4.0	0.03-0.10	10	4.0	68	25	10	●
3120-R1.0	0.03-0.12	12	1.0	76	30	12	●
3120-R2.0	0.03-0.12	12	2.0	76	30	12	●
3120-R3.0	0.03-0.12	12	3.0	76	30	12	●
3120-R4.0	0.03-0.12	12	4.0	76	30	12	●
3160-R1.0	0.05-0.14	16	1.0	90	40	16	●
3160-R2.0	0.05-0.14	16	2.0	90	40	16	●
3160-R3.0	0.05-0.14	16	3.0	90	40	16	●

●: Standard items

REMA 3/ 3...C

3 flute rough corner radius





RE ±0.04

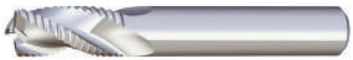
DC	Tolerance	DC	Tolerance
DC≤6	0 - -0.008	10< DC≤16	0 - -0.011
6< DC≤10	0 - -0.009	16< DC	0 - -0.013

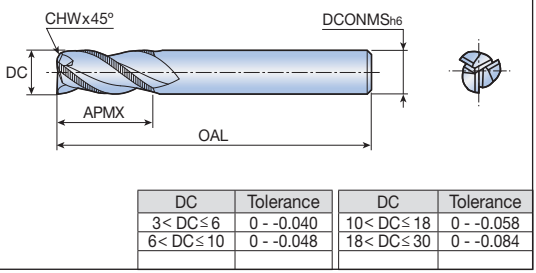
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
Cylindrical shank	Welden shank		DC	RE	OAL	APMX	LU	DN	DCONMS	UF10
REMA 3060C	**REMA 3060**	0.03-0.07	6	0.2	57	9	21	5.5	6	●
3080C	**3080**	0.03-0.11	8	0.2	63	12	27	7.2	8	●
3100C	**3100**	0.05-0.14	10	0.2	72	12	31	9.0	10	●
3120C	**3120**	0.07-0.16	12	0.2	83	12	37	11.0	12	●
3160C		0.07-0.18	16	0.2	92	14	43	15.0	16	●
3200C	**3200**	0.07-0.20	20	0.2	104	17	53	18.8	20	●

●: Standard items

REA 3...L

3 flute rough corner chamfer





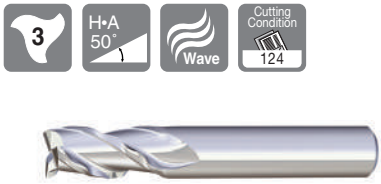
DC	Tolerance	DC	Tolerance
3< DC≤6	0 - -0.040	10< DC≤18	0 - -0.058
6< DC≤10	0 - -0.048	18< DC≤30	0 - -0.084

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	CHW	OAL	APMX	DCONMS	UF10
REA 3060L	0.03-0.07	6	0.61	57	16	6	●
3080L	0.03-0.15	8	0.61	63	16	8	●
3100L	0.05-0.20	10	0.61	72	22	10	●
3120L	0.07-0.22	12	0.66	83	26	12	●
3160L	0.07-0.25	16	0.99	92	32	16	●
3200L	0.07-0.25	20	0.99	104	38	20	●

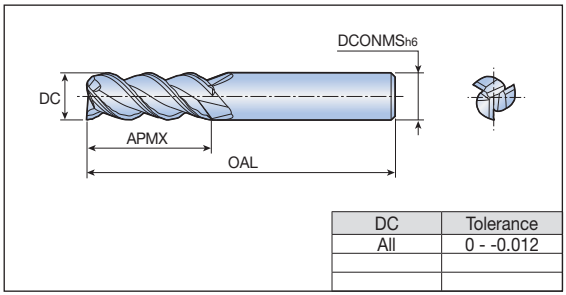
●: Standard items

AWE 3

3 flute wave flat



- Wave cutting edge



DC	Tolerance
All	0 - -0.012

Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	UF10
AWE 3060	0.03-0.07	6	52	14	6	●
3080	0.03-0.09	8	60	14	8	●
3100	0.03-0.10	10	68	19	10	●
3120	0.03-0.12	12	76	22	12	●
3140	0.05-0.14	14	85	24	14	●
3160	0.05-0.14	16	90	30	16	●
3180	0.05-0.15	18	110	34	18	●
3200	0.05-0.15	20	110	38	20	●

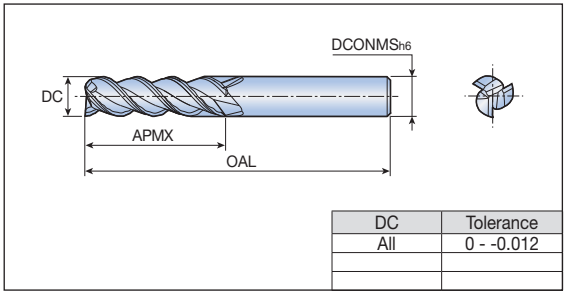
●: Standard items

AWE 3...ML

3 flute wave long flat



- Wave cutting edge



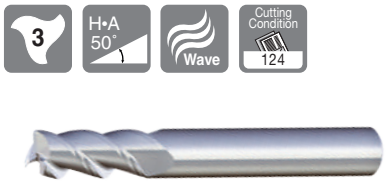
DC	Tolerance
All	0 - -0.012

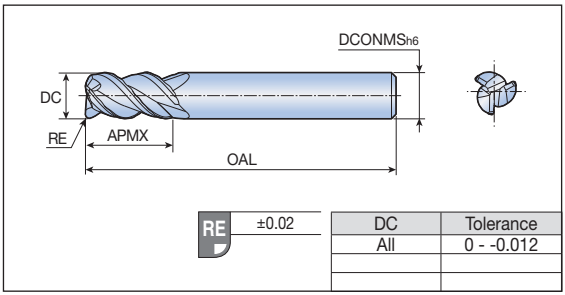
Designation	Feed (mm/tooth)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	UF10
AWE 3060ML	0.03-0.07	6	65	20	6	●
3080ML	0.03-0.09	8	75	20	8	●
3100ML	0.03-0.10	10	80	25	10	●
3120ML	0.03-0.12	12	95	30	12	●
3140ML	0.03-0.12	14	110	35	14	●
3160ML	0.05-0.14	16	110	40	16	●
3180ML	0.05-0.15	18	125	45	18	●
3200ML	0.05-0.15	20	125	45	20	●

●: Standard items

AWE 3...ML-R

3 flute wave long corner radius





DC	Tolerance
All	0 - -0.012

- Wave cutting edge

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	UF10
AWE 3060ML-R0.5	0.03-0.07	6	0.5	65	20	6	●
3080ML-R0.5	0.03-0.09	8	0.5	75	20	8	●
3100ML-R1.0	0.03-0.10	10	1.0	80	25	10	●
3120ML-R1.0	0.03-0.12	12	1.0	95	30	12	●

●: Standard items

07 Roughing ceramic end mills for HRSA materials

CERAMICSFEED
HARD PART & EXOTIC MATERIALS

- *Optimally designed for roughing operations on heat-resistant alloys*
- *Air cooled ceramic end mills for high-speed machining*

Corner R / High Feed Type



HRSA Machining

Specifically designed for Ni-Co-based heat-resistant alloys

For high-speed, dry roughing operations

High-speed machining ensures better productivity

Large corner radius and High feed geometry

- *Optimized edge geometry*
- *Large corner R shape optimized for high feed machining*

TC3030

Heat-resistant ceramic grade

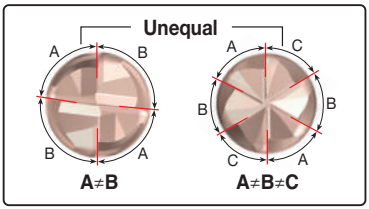


Excellent rigidity

Enhanced rigidity design for high-speed, high feed machining

Unequal Flute Design

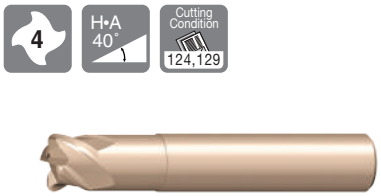
Minimizes chattering and vibration

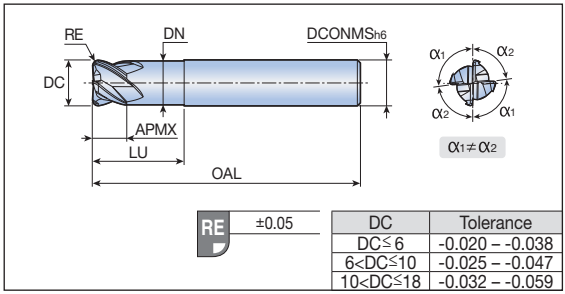




CRF 4

4 flute, Ceramic end mills





DC	Tolerance
DC≤6	-0.020 – -0.038
6<DC≤10	-0.025 – -0.047
10<DC≤18	-0.032 – -0.059

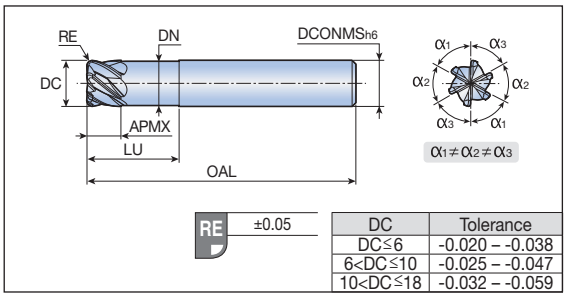
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	RE	OAL	APMX	LU	DN	DCONMS	TC3030
CRF	4060 050 120	0.02-0.03	6	0.5	50	4.5	12	5.8	6	●
	4080 100 160	0.02-0.03	8	1.0	57	6.0	16	7.7	8	●
	4100 100 200	0.02-0.04	10	1.0	63	7.5	20	9.6	10	●
	4120 150 240	0.03-0.05	12	1.5	70	9.0	24	11.5	12	●
	4160 200 320	0.03-0.05	16	2.0	83	12.0	32	15.5	16	●

●: Standard items

CRF 6

6 flute, Ceramic end mills





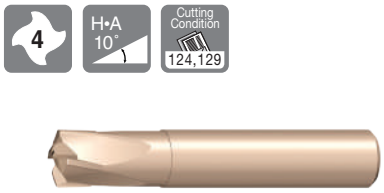
DC	Tolerance
DC≤6	-0.020 – -0.038
6<DC≤10	-0.025 – -0.047
10<DC≤18	-0.032 – -0.059

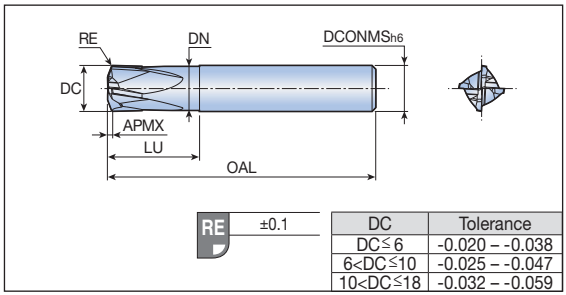
Designation		Feed (mm/tooth)	Dimension (mm)							Grade
			DC	RE	OAL	APMX	LU	DN	DCONMS	TC3030
CRF	6060 050 120	0.02-0.03	6	0.5	50	4.5	12	5.8	6	●
	6080 100 160	0.02-0.03	8	1.0	57	6.0	16	7.7	8	●
	6100 100 200	0.02-0.04	10	1.0	63	7.5	20	9.6	10	●
	6120 150 240	0.03-0.05	12	1.5	70	9.0	24	11.5	12	●
	6160 200 320	0.03-0.05	16	2.0	83	12.0	32	15.5	16	●

●: Standard items

CRH 4

4 flute, Ceramic end mills for high feed milling





RE ±0.1

DC	Tolerance
DC≤6	-0.020 – -0.038
6<DC≤10	-0.025 – -0.047
10<DC≤18	-0.032 – -0.059

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TC3030
CRH 4060	0.1-0.15	6	0.7	50	0.55	12	5.8	6	●
4080	0.1-0.2	8	0.9	57	0.75	16	7.7	8	●
4100	0.1-0.2	10	1.0	63	0.85	20	9.6	10	●
4120	0.1-0.3	12	1.4	70	1.15	24	11.5	12	●
4160	0.1-0.3	16	1.8	83	1.55	32	15.5	16	●

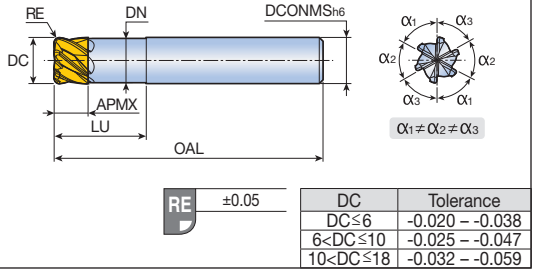
▶ RE: Program corner R

●: Standard items

CRFB 6

6 flute, Ceramic brazed end mills





RE ±0.05

DC	Tolerance
DC≤6	-0.020 – -0.038
6<DC≤10	-0.025 – -0.047
10<DC≤18	-0.032 – -0.059

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TC3030
CRFB 6060 050 120	0.02-0.03	6	0.5	50	4.5	12	5.8	6	●
6080 100 160	0.02-0.03	8	1.0	57	6.0	16	7.7	8	●
6100 100 200	0.02-0.04	10	1.0	63	7.5	20	9.6	10	●
6120 150 240	0.03-0.05	12	1.5	70	9.0	24	11.5	12	●
6160 200 320	0.03-0.05	16	2.0	83	12.0	32	15.5	16	●

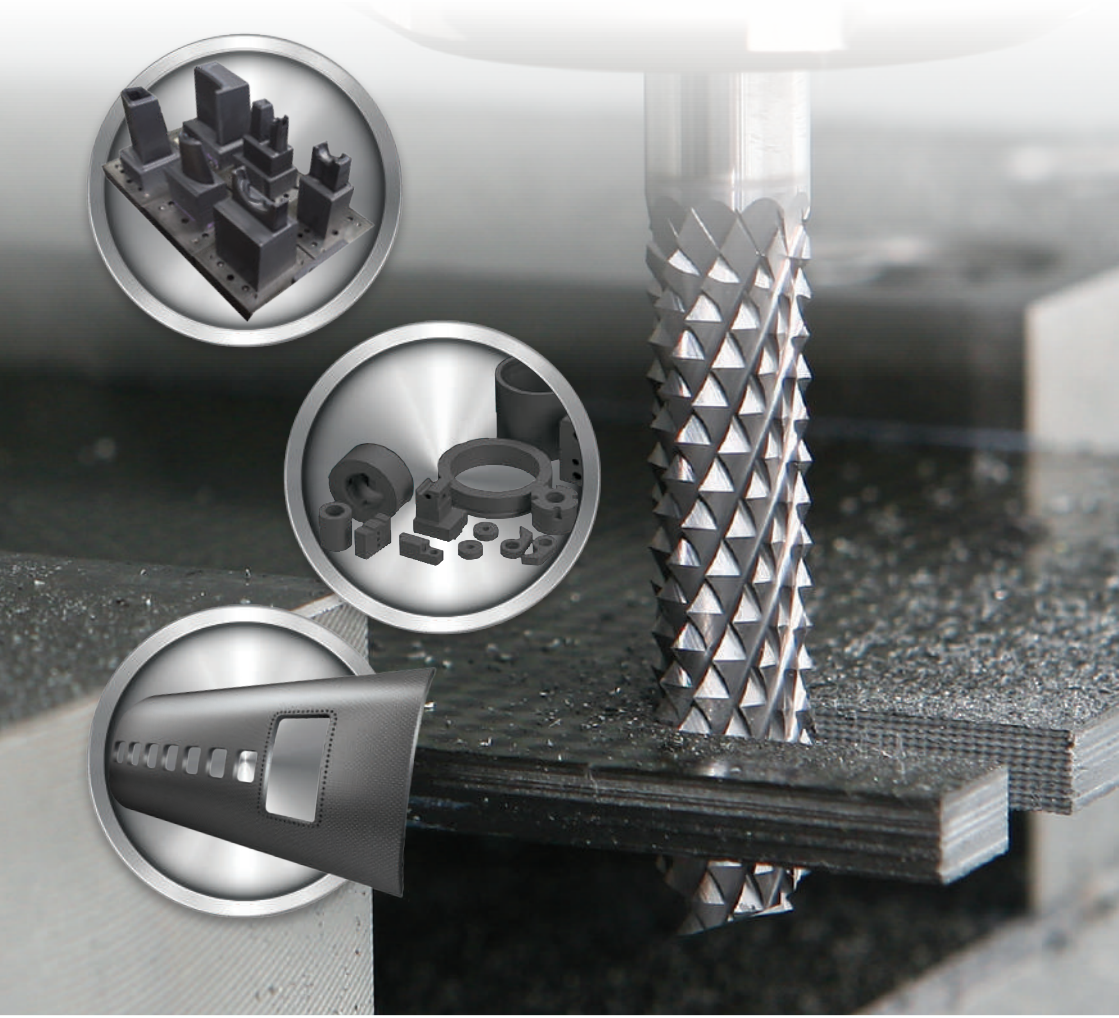
●: Standard items

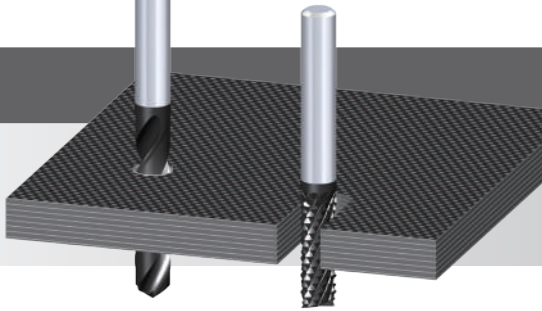
08

Diamond-coated end mills for graphite and composites

DIAMILL
DIAMOND COATING

- *Optimally suited for composite machining (GFRP, CFRP)*
- *Optimally suited for graphite and ceramic machining*
- *Geometry designed according to application*
- *Special diamond coating*

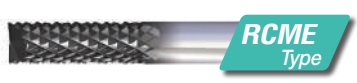








Anti-vibration, high-productivity ***multi-flute geometry*** *for roughing with low cutting resistance on composite materials*



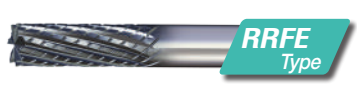


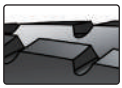
RCFE multi-flute geometry for medium to finishing of composites with improved surface finish





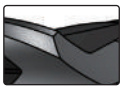
Added drill edge point to RCME types, slot milling possible after drilling





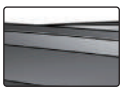
Splitter router end mills for high-productivity roughing of composite material with less cutting force





Left and righe-hand helix type that eliminates delamination and splintering for finishing applications





Low helix angle type that eliminates delamination and splintering. Higher number of teeth (6z,8z) dedicated to finishing applications



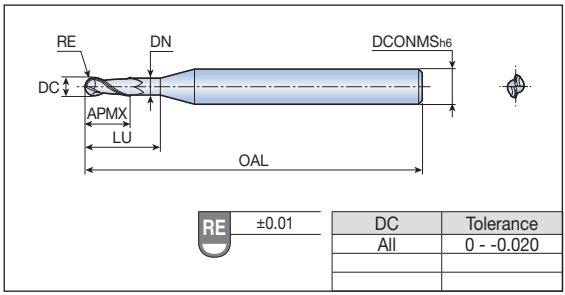
TTD610
:For composites
TTD620
:For graphite

DMB 2

2 flute miniature ball – Graphite







Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TTD620
DMB 2006-0.6X3.0	0.6	0.3	40	0.6	3.0	0.55	3	●
2010-1.0X5.0	1.0	0.5	40	1.0	5.0	0.95	3	●
2010-1.0X8.5	1.0	0.5	40	1.0	8.5	0.95	3	●
2015-1.5X7.5	1.5	0.75	50	1.5	7.5	1.4	3	●
2015-1.5X12.0	1.5	0.75	50	1.5	12.0	1.4	3	●
2020-2.2X10.0	2.0	1.0	60	2.2	10.0	1.9	3	●
2020-2.2X16.0	2.0	1.0	60	2.2	16.0	1.9	3	●

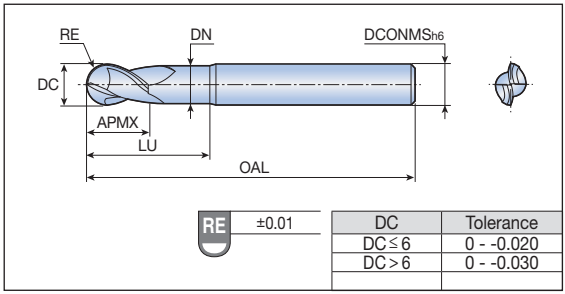
●: Standard items

DEB 2...S

2 flute short ball – Graphite







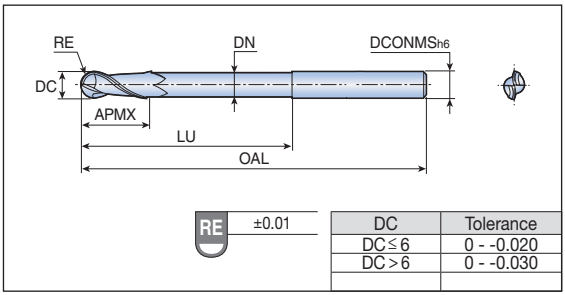
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TTD620
DEB 2030S	3	1.5	60	4.5	6.5	2.8	6	●
2040S	4	2.0	65	6.0	8.0	3.7	6	●
2060S	6	3.0	75	9.0	12.0	5.6	6	●
2120S	12	6.0	90	18.0	36.0	11.4	12	●

●: Standard items

DEB 2...L

2 flute long neck ball – Graphite





RE	±0.01

DC	Tolerance
DC≤6	0 - -0.020
DC>6	0 - -0.030

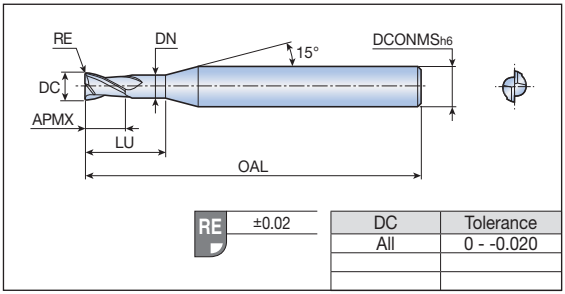
Designation	Dimension (mm)							Grade
	DC	RE	OAL	APMX	LU	DN	DCONMS	TTD620
DEB 2030L-4	3	1.5	80	15	25	2.9	4	●
2040L-4	4	2.0	80	20	30	3.9	4	●
2060L	6	3.0	100	30	50	5.5	6	●
2080L	8	4.0	110	40	60	7.5	8	●
2100L	10	5.0	120	50	70	9.5	10	●
2120L	12	6.0	130	55	75	11.5	12	●

●: Standard items

DMR 2

2 flute miniature corner radius – Graphite





RE	±0.02

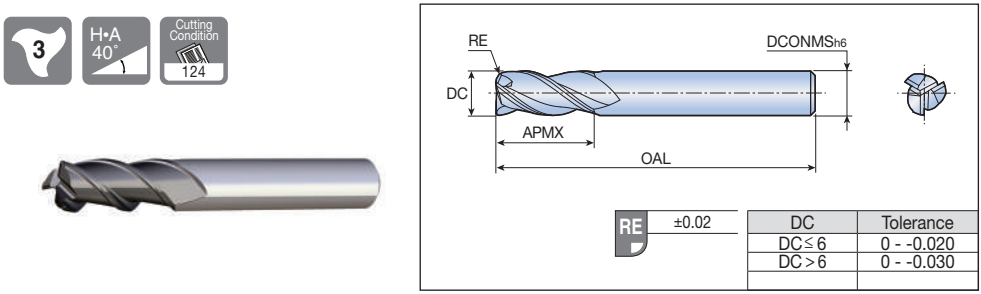
DC	Tolerance
All	0 - -0.020

Designation	Feed (mm/tooth)	Dimension (mm)							Grade
		DC	RE	OAL	APMX	LU	DN	DCONMS	TTD620
DMR 2006-0.9X3.0	0.006-0.010	0.6	0.05	40	0.9	3.0	0.55	3	●
2008-1.2X4.0	0.008-0.015	0.8	0.05	40	1.2	4.0	0.75	3	●
2010-1.5X5.0	0.010-0.020	1.0	0.1	40	1.5	5.0	0.95	3	●
2010-1.5X8.5	0.010-0.020	1.0	0.1	40	1.5	8.5	0.95	3	●
2012-1.8X6.0	0.010-0.025	1.2	0.1	50	1.8	6.0	1.15	3	●
2015-2.2X7.5	0.015-0.035	1.5	0.15	50	2.2	7.5	1.4	3	●
2015-2.2X12.0	0.015-0.030	1.5	0.15	50	2.2	12.0	1.4	3	●
2020-2.2X10.0	0.015-0.040	2.0	0.15	60	2.2	10.0	1.9	3	●
2020-2.2X16.0	0.015-0.035	2.0	0.15	60	2.2	16.0	1.9	3	●

●: Standard items

DER 3...S

3 flute short corner radius – Graphite



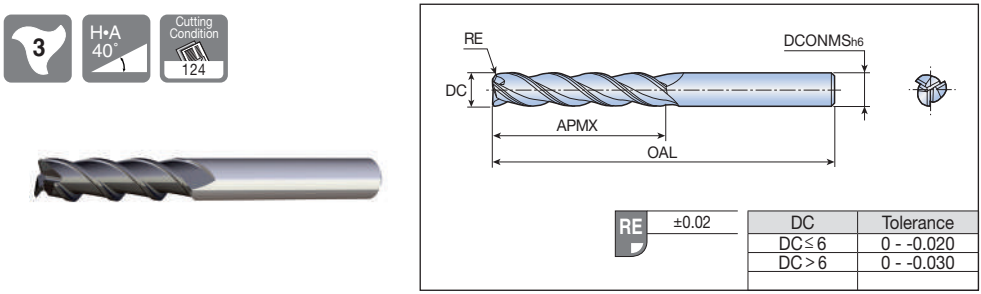
DC	Tolerance
DC≤ 6	0 - -0.020
DC > 6	0 - -0.030

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TTD620
DER 3030S-3	0.025-0.05	3	0.15	40	12	3	●
3040S-4	0.04-0.06	4	0.2	50	14	4	●
3050S-5	0.05-0.08	5	0.3	50	16	5	●
3060S	0.06-0.09	6	0.3	65	20	6	●
3080S	0.07-0.10	8	0.5	65	20	8	●
3100S	0.08-0.13	10	0.5	75	25	10	●
3120S	0.10-0.15	12	0.5	75	25	12	●

●: Standard items

DER 3...L

3 flute long corner radius – Graphite



DC	Tolerance
DC≤ 6	0 - -0.020
DC > 6	0 - -0.030

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	RE	OAL	APMX	DCONMS	TTD620
DER 3040L-4	0.03-0.05	4	0.2	60	30	4	●
3050L-5	0.04-0.07	5	0.3	70	35	5	●
3060L	0.05-0.08	6	0.3	100	40	6	●
3080L	0.06-0.09	8	0.5	100	40	8	●
3100L	0.07-0.12	10	0.5	100	40	10	●
3120L	0.09-0.14	12	0.5	100	45	12	●

●: Standard items

RRFE

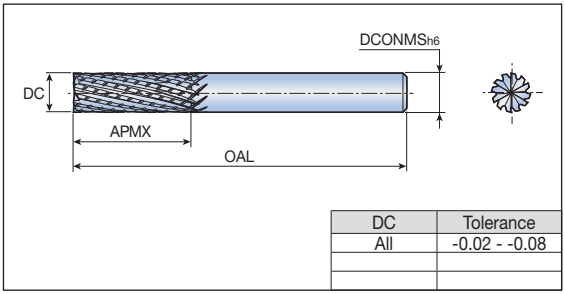
Roughing for chip splitter – Composite material











DC	Tolerance
All	-0.02 - -0.08

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	NOF	OAL	APMX	DCONMS	TTD610
RRFE 040	0.01-0.02	4	6	50	12	4	●
060	0.01-0.02	6	8	65	18	6	●
080	0.01-0.03	8	10	75	24	8	●
100	0.02-0.04	10	12	85	30	10	●
120	0.02-0.05	12	12	100	36	12	●

▶ NOF: Number of flutes

●: Standard items

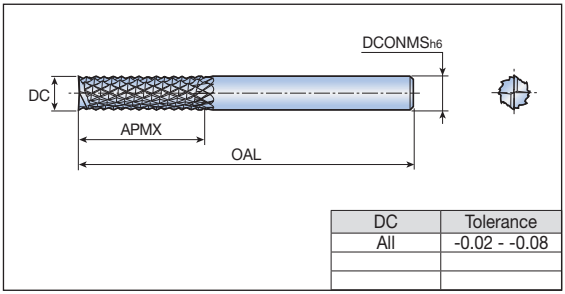
RCFE

Roughing for multi-flute – Composite material









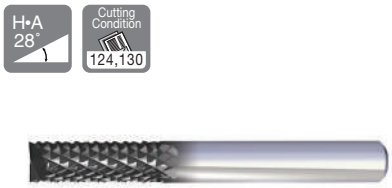
DC	Tolerance
All	-0.02 - -0.08

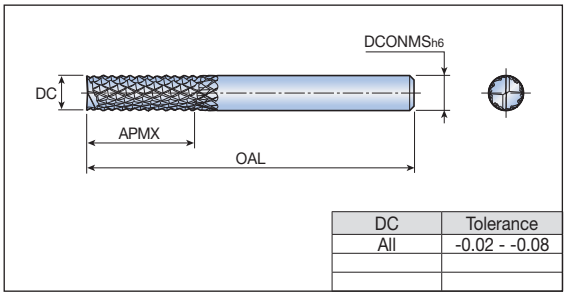
Designation	Feed (mm/rev)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TTD610
RCFE 040	0.03-0.06	4	50	12	4	●
060	0.07-0.15	6	65	18	6	●
080	0.10-0.20	8	75	24	8	●
100	0.15-0.30	10	85	30	10	●
120	0.20-0.40	12	100	36	12	●

●: Standard items

RCME

Medium to finishing for multi-flute – Composite material





DC	Tolerance
All	-0.02 - -0.08

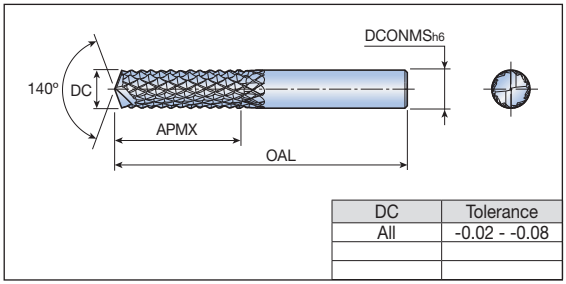
Designation	Feed (mm/rev)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TTD610
RCME 040	0.03-0.06	4	50	12	4	●
060	0.07-0.15	6	65	18	6	●
080	0.10-0.20	8	75	24	8	●
100	0.15-0.30	10	85	30	10	●
120	0.20-0.40	12	100	36	12	●

●: Standard items

RCDE

Medium to finishing for multi-flute+ drill point – Composite material





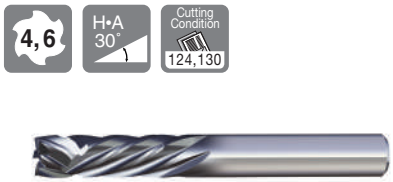
DC	Tolerance
All	-0.02 - -0.08

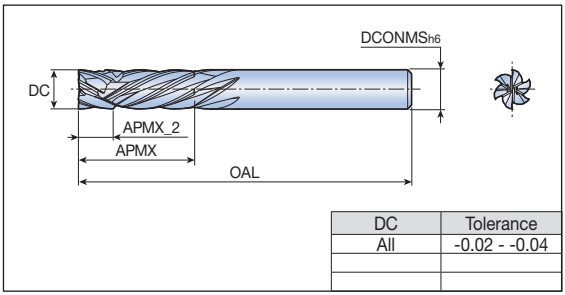
Designation	Feed (mm/rev)	Dimension (mm)				Grade
		DC	OAL	APMX	DCONMS	TTD610
RCDE 040	0.03-0.06	4	50	12	4	●
060	0.07-0.15	6	65	18	6	●
080	0.10-0.20	8	75	24	8	●
100	0.15-0.30	10	85	30	10	●
120	0.20-0.40	12	100	36	12	●

●: Standard items

RCOM

4, 6 flute for finishing with left and right hand helix angle – Composite material





DC	Tolerance
All	-0.02 - -0.04

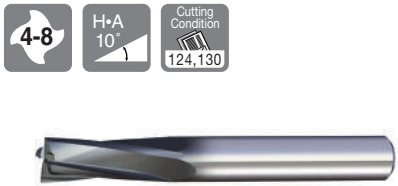
Designation	Feed (mm/tooth)	Dimension (mm)						Grade
		DC	NOF	OAL	APMX	APMX_2	DCONMS	TTD610
RCOM 4060	0.02-0.04	6	4	65	18	6.7	6	●
4080	0.02-0.05	8	4	75	24	9.2	8	●
6100	0.03-0.06	10	6	85	30	7.9	10	●
6120	0.04-0.08	12	6	100	36	9.2	12	●

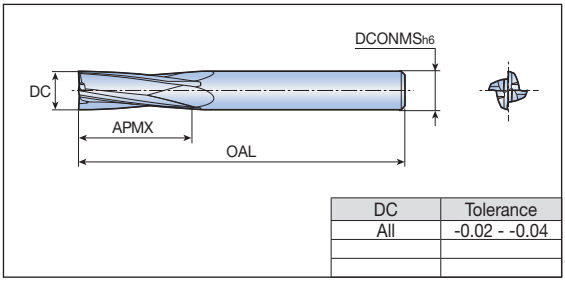
▸ NOF: Number of flutes ●: Standard items

▸ Notice: For best machining performance, the end mill's intersection point(APMX_2) should be positioned at the center of the workpiece thickness.

RDCF

4-8 flute for finishing of low helix angle – Composite material





DC	Tolerance
All	-0.02 - -0.04

Designation	Feed (mm/tooth)	Dimension (mm)					Grade
		DC	NOF	OAL	APMX	DCONMS	TTD610
RDCF 4040	0.01-0.03	4	4	50	12	4	●
6040	0.01-0.03	4	6	50	12	4	●
4060	0.02-0.04	6	4	65	18	6	●
6060	0.02-0.04	6	6	65	18	6	●
4080	0.03-0.05	8	4	75	24	8	●
6080	0.03-0.05	8	6	75	24	8	●
4100	0.04-0.06	10	4	85	30	10	●
8100	0.04-0.06	10	8	85	30	10	●
4120	0.04-0.08	12	4	100	36	12	●
8120	0.04-0.08	12	8	100	36	12	●

▸ NOF: Number of flutes ●: Standard items

Recommended Cutting Conditions

Machining data for solid end mill

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1
		>=0.25%C	Annealed	650	190	2
		<0.55%C	Quenched and tempered	850	250	3
		>=0.55%C	Annealed	750	220	4
			Quenched and tempered	1000	300	5
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6
			Quenched and tempered	930	275	7
				1000	300	8
				1200	350	9
	High alloy steel, cast steel and tool steel		Annealed	680	200	10
			Quenched and tempered	1100	325	11
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12
			Martensitic	820	240	13
			Austenitic	600	180	14
K	Gray cast iron (GG)		Ferritic		160	15
			Pearlitic		250	16
	Cast iron nodular (GGG)		Ferritic		180	17
			Pearlitic		260	18
	Malleable cast iron		Ferritic		130	19
			Pearlitic		230	20
N	Aluminum - Wrought alloy		Not cureable		60	21
			Cured		100	22
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23
			Cured		90	24
		>12% Si	High temp.		130	25
	Copper alloys	>1% Pb	Free cutting		110	26
			Brass		90	27
			Electrolitic copper		100	28
	Non-metallic		Duroplastics, graphite		70 Shore D	29
			Hard rubber		55 Shore D	30
S	High temp. alloys	Fe based	Annealed		200	31
			Cured		280	32
		Ni or Co based	Annealed		250	33
			Cured		350	34
			Cast		320	35
	Titanium, Ti alloys		Pure	Rm 400	190	36
			Alpha+beta alloys cured	Rm 1050	310	37
H	Hardened steel		Hardened		55HRC	38
			Hardened		60HRC	39
	Chilled cast iron		Cast		400	40
	Cast iron nodular		Hardened		55HRC	41

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Cutting speed Vc(m/min)							
CBN	Coated					Uncoated	Ceramic
TB7015	TT5505	TT5515	TT5520	TT5525	TTA101	UF10N/UF10	TC3030
	260-300	260-280	210-270	210-220		140-200	
	200-250	200-230	160-220	160-180		120-160	
	160-230	160-220	130-200	130-180		100-150	
	160-230	160-220	130-200	130-180		100-140	
	140-200	140-180	110-160	110-140		90-130	
	160-230	160-220	130-200	130-180		110-150	
	120-200	120-180	100-160	100-140		80-130	
	140-200	130-180	100-160	100-140		90-130	
	140-200	140-180	110-160	110-140		100-130	
	140-200	130-180	100-160	100-140		90-130	
	80-150	70-120	60-110	60-100		50-80	
		80-160	60-140	60-130		60-110	
		60-150	50-130	50-120		40-100	
		60-120	50-110	50-100		40-80	
	100-300	80-260	60-240	60-210		60-180	
	130-280	130-240	100-220	100-190		90-170	
	150-280	150-270	120-240	120-220		100-200	
	90-280	90-270	70-240	70-220		60-200	
	150-280	150-270	120-240	120-220		100-200	
	140-250	140-240	110-220	110-190		100-170	
					800-900	800-900	
					700-800	700-800	
					800-900	800-900	
					750-850	750-850	
					400-450	400-450	
					500-550	500-550	
					500-550	500-550	
					350-380	350-380	
	20-40	20-40	20-30	20-30		10-20	
	20-30	20-30	20-30	20-30		10-20	
	20-30	20-30	20-30	20-30		20-50	300-1000
	20-30	20-30	20-30	20-30		20-50	300-1000
	30-80	30-70	20-60	20-60		20-50	300-1000
		30-70	20-60	20-60		20-30	
		30-70	20-60	20-60		20-30	
100-210	30-60					40-60	
90-200	30-40					20-30	
120-200	70-90	60-80	40-70			65-75	
120-200	30-60	30-50	20-40			40-45	

Recommended Cutting Conditions

HARD-MILL

Machining data for HARD-MILL

HSB 2

▸ ap: Axial Depth ae: Radial Depth (Unit: mm)

Diameter	Feed (mm/tooth)		Shouldering & profiling	
	MIN	MAX	ap	ae
0.3	0.003	0.015	0.03xD	0.1xD
0.4	0.004	0.015		
0.5	0.004	0.020		
0.6	0.005	0.020		
0.8	0.008	0.025		
1	0.010	0.035		
1.2	0.015	0.045		
1.5	0.020	0.045		
2	0.023	0.050		
2.5	0.025	0.050		
3	0.030	0.085		
4	0.060	0.110		
5	0.070	0.130		
6	0.080	0.150		
8	0.080	0.160		
10	0.080	0.180		
12	0.090	0.180		

HSB 4

Diameter	Feed (mm/tooth)		Shouldering & profiling	
	MIN	MAX	ap	ae
4	0.030	0.050	0.1xD	0.3xD
5	0.040	0.050		
6	0.050	0.060		
8	0.050	0.070		
10	0.060	0.080		
12	0.070	0.090		

Recommended Cutting Conditions

HARD-MILL

Machining data for HARD-MILL

HSB 2

▸ ap: Axial Depth ae: Radial Depth (Unit: mm)

Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
0.3	0.001	0.005	~0.5xD	0.2xD	0.05xD
0.4	0.001	0.007			
0.5	0.001	0.008			
0.6	0.001	0.010			
0.7	0.001	0.010			
0.8	0.001	0.015			
1	0.002	0.020			
1.2	0.004	0.030			
1.5	0.006	0.040			
2	0.007	0.045			
2.5	0.007	0.050			
3	0.010	0.060			
4	0.020	0.070			
5	0.030	0.070			
6	0.030	0.090			
8	0.040	0.100			
10	0.050	0.120			
12	0.050	0.120			

HSF 4

Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
1	0.002	0.015	~0.5xD	0.15xD	0.05xD
1.2	0.004	0.020			
1.5	0.006	0.025			
2	0.007	0.030			
2.5	0.007	0.035			
3	0.010	0.040			
3.5	0.010	0.045			
4	0.015	0.050			
5	0.015	0.060			
6	0.025	0.080			
7	0.025	0.090			
8	0.030	0.100			
9	0.035	0.110			
10	0.040	0.120			
11	0.040	0.120			
12	0.045	0.120			

HSF 6

Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
3	0.010	0.030	~0.5xD	0.1xD	-
4	0.015	0.040			
5	0.015	0.050			
6	0.020	0.050			
8	0.030	0.060			
10	0.035	0.080			
12	0.040	0.100			

Recommended Cutting Conditions

HARD-MILL

Machining data for HARD-MILL

HSR 2

▸ ap: Axial Depth ae: Radial Depth (Unit: mm)

Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
0.3	0.001	0.005	~0.5xD	0.2xD	0.05xD
0.4	0.001	0.007			
0.5	0.001	0.008			
0.6	0.001	0.010			
0.8	0.001	0.015			
1	0.002	0.020			
1.2	0.004	0.030			
1.5	0.006	0.040			
2	0.007	0.045			
2.5	0.007	0.050			
3	0.010	0.060			
4	0.020	0.070			
6	0.030	0.090			
8	0.040	0.100			
10	0.050	0.120			
12	0.050	0.120			

HSR 4

Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
1	0.002	0.015	~0.5xD	0.15xD	0.05xD
1.2	0.004	0.020			
1.5	0.006	0.025			
2	0.007	0.030			
2.5	0.007	0.035			
3	0.010	0.040			
4	0.015	0.050			
6	0.025	0.080			
8	0.030	0.100			
10	0.040	0.120			
12	0.045	0.120			

HSR 6

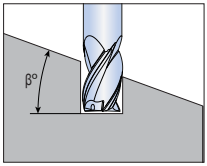
Diameter	Feed (mm/tooth)		Shouldering		Slotting
	MIN	MAX	ap	ae	ap
6	0.020	0.050	~0.5xD	0.1xD	-
8	0.030	0.060			
10	0.035	0.080			
12	0.040	0.100			

Recommended Cutting Conditions

Machining data for SDM end mills and MXDM heads

Drilling

ISO	Material	Cutting Speed (m/min)	Feed (mm/rev) by diameter			
			Ø10	Ø12	Ø16	Ø20
P	Carbon steel and Alloy steel	60-120	0.10-0.25	0.10-0.25	0.12-0.30	0.12-0.35
M	Stainless steel	40-60	0.05-0.15	0.05-0.15	0.06-0.20	0.06-0.20



- Drilling depth: Max. 1xD (diameter)
- When machining with a slope (β) lower than 30°, apply 40-60% feed
- When machining with a slope (β) higher than 30°, apply 20-40% feed, 60-80% cutting speed

Machining data for ceramic end mill

CRF 4 & 6

▸ ap: Axial Depth ae: Radial Depth (Unit: mm)

Diameter	Cutting Speed Vc(m/min)	Feed (mm/tooth)	Shouldering & profiling		Slotting (CRF 4 teeth)
			ap	ae	ae
Ø6	300-1000	0.02-0.03	-0.6xD	-0.1xD	-0.05xD
Ø8	300-1000	0.02-0.03	-0.6xD	-0.1xD	-0.05xD
Ø10	300-1000	0.02-0.04	-0.6xD	-0.1xD	-0.05xD
Ø12	300-1000	0.03-0.05	-0.6xD	-0.1xD	-0.05xD
Ø16	300-1000	0.03-0.05	-0.6xD	-0.1xD	-0.05xD

- ae must not exceed a maximum 1 mm
- Apply a 30% reduction in feed during slotting, ramping (less 2.5°)

CRH 4

▸ ap: Axial Depth ae: Radial Depth (Unit: mm)

Diameter	Cutting Speed Vc(m/min)	Feed (mm/tooth)	Shouldering & profiling	
			ap	ae
Ø6	300-1000	0.1-0.15	-0.05xD	-0.6xD
Ø8	300-1000	0.1-0.2	-0.05xD	-0.6xD
Ø10	300-1000	0.1-0.2	-0.05xD	-0.6xD
Ø12	300-1000	0.1-0.3	-0.05xD	-0.6xD
Ø16	300-1000	0.1-0.3	-0.05xD	-0.6xD

- ae must not exceed a maximum 1 mm
- Apply a 30% reduction in feed during ramping (less 2.5°)

Recommended Cutting Conditions

Machining data for diamond coating end mill

Grade: TTD610

Material		Cutting Speed Vc(m/min)					
		RRFE		RCFE		RCDE	
		Shouldering	Slotting	Shouldering	Slotting	Shouldering	Slotting
CFRP	CFRP	100-300	50-120	100-300	50-120	80-250	50-120
	Honeycomb	150-250	100-200	150-250	100-200	120-200	100-200
GFRP	GFRP	50-150	30-70	50-150	30-70	50-130	30-70
	Honeycomb	150-250	100-200	150-250	100-200	120-200	100-200

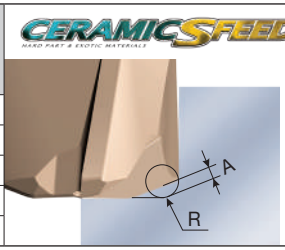
Material		Cutting Speed Vc(m/min)					
		RCME		RCOM		RDCF	
		Shouldering	Slotting	Shouldering	Slotting	Shouldering	Slotting
CFRP	CFRP	80-250	50-120	50-200	50-120	100-300	50-120
	Honeycomb	120-200	100-200	-	-	-	-
GFRP	GFRP	50-130	30-70	50-100	30-70	50-150	30-70
	Honeycomb	120-200	100-200	-	-	-	-

Material	RCDE				
	Drilling				
	Cutting speed Vc (m/min)	Drill diameter (mm) vs. Feed (mm/rev)			
		Ø3.0-Ø6.0	Ø6.1-Ø8.0	Ø8.1-Ø10.0	Ø10.1-Ø12.7
CFRP	50-150	0.02-0.07	0.03-0.08	0.03-0.08	0.04-0.10
GFRP	40-120	0.02-0.07	0.03-0.08	0.03-0.08	0.04-0.10

Programming tip for High-feed

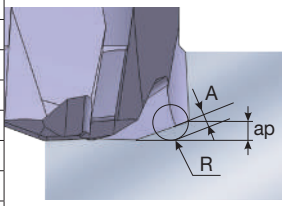
CRH

Diameter (CRH 4 teeth)	R (Program)	A Un-machined material thickness
Ø6	0.7	0.35
Ø8	0.9	0.47
Ø10	1.0	0.50
Ø12	1.4	0.70
Ø16	1.8	0.95



HFM 2/ HFM 4

Designation	Diameter	R (Program)	A (Un-machined)	ap (Max)
HFM 2040	Ø4	0.38	0.25	0.3
HFM 2060	Ø6	0.65	0.43	0.5
HFM 2080	Ø8	0.87	0.57	0.75
HFM 2100	Ø10	1.09	0.71	1
HFM 2120	Ø12	1.3	0.86	1.1
HFM 4060	Ø6	0.59	0.38	0.5
HFM 4080	Ø8	0.78	0.51	0.7
HFM 4100	Ø10	0.85	0.55	0.75
HFM 4120	Ø12	1.17	0.77	1.05



Solid Carbide Drills



134-135 Tool Selection Guide and Grade

09 136-157 HDRILL
Carbide drills for various workpiece materials (for steel, cast iron, aluminum)

10 158-169 SOLID3DRILL
High-productivity 3-flute carbide drill

11 170-173 MQLDRILL
Carbide drill for deep hole machining

12 174-175 HDRILL
Carbide drill for pre-thread holes

13 176-177 HDRILL
Carbide drill for composite material machining

14 178-191 HDRILL
Carbide drill for general-purpose applications

192-204 Recommended Cutting Conditions

Tool Selection Guide

Series		Coolant	Flute	Diameter range (mm)	Drilling depth	Application & Material							Pages
						P	M	K	N	S	H		
HDRILL													
	NHD … PE	External	2	3.0-12.0	3,5xDc	●	○	○				General	138
	NHD … PI	Internal	2	3.0-12.0	3,5xDc	●	○	○				General	144
	NHD … KI	Internal	2	3.0-12.0	3,5xDc			●				Cast iron	150
	NHD … NI	Internal	2	3.0-12.0	3,5xDc				●			Aliminum	152
SOLID3DRILL													
	3HD … PI	Internal	3	4.0-12.0	3,5,8xDc	●		●				H.S.M*	160
	3HD … FI	Internal	3	4.0-12.0	3,5xDc	●		●				H.S.M*	167
	3HD … CI	Internal	3	6.0-12.0	12xDc	●		●				H.S.M*	169
MQLDRILL													
	SHO 10/15/20	Internal	2	4.0-10.0	10,15,20 xDc	●	○	○				Deep hole drilling	172
	SHO 3…-PH	Internal	2	4.03-10.03	–	○	○	○				Deep hole drilling	173
HDRILL													
	SHO … M	Internal	2	M4-M10(ISO)	–	●	○	○				Pre-thread	175
	CDF	–	2	3.0-12.7	–	Composite material (CFRP)						Composite material	177
	TED	External	2	3.0-12.0	3,5xDc	●	○	○				General	180
	TEO	Internal	2	3.0-12.0	3,5xDc	●	○	○				General	186

▶ H.S.M* : High Speed Machining

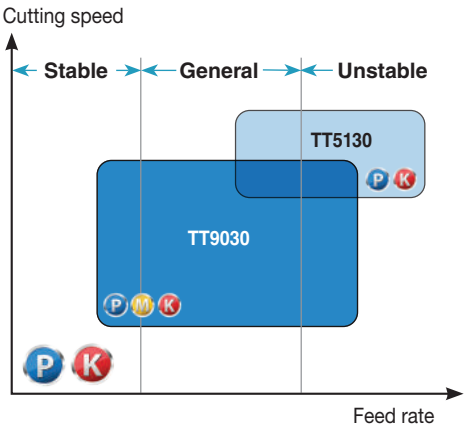
● Recommended, ○ Suitable

Grade

Grade	ISO	Characteristics & applications
TT5130 PVD coated	P20 – P40 K20 – K40	• Drilling of steel • High speed drilling of cast iron
TT9030 PVD coated	P20 – P40 M20 – M40 S20 – S40	• General machining of steel • General machining of stainless steel • General machining of heat-resistant alloy
UF10 Uncoated	N10 – N25 S10 – S30	• General machining of aluminum alloys and non-ferrous materials • General machining of heat-resistant alloy

Selection guide for holemaking grades

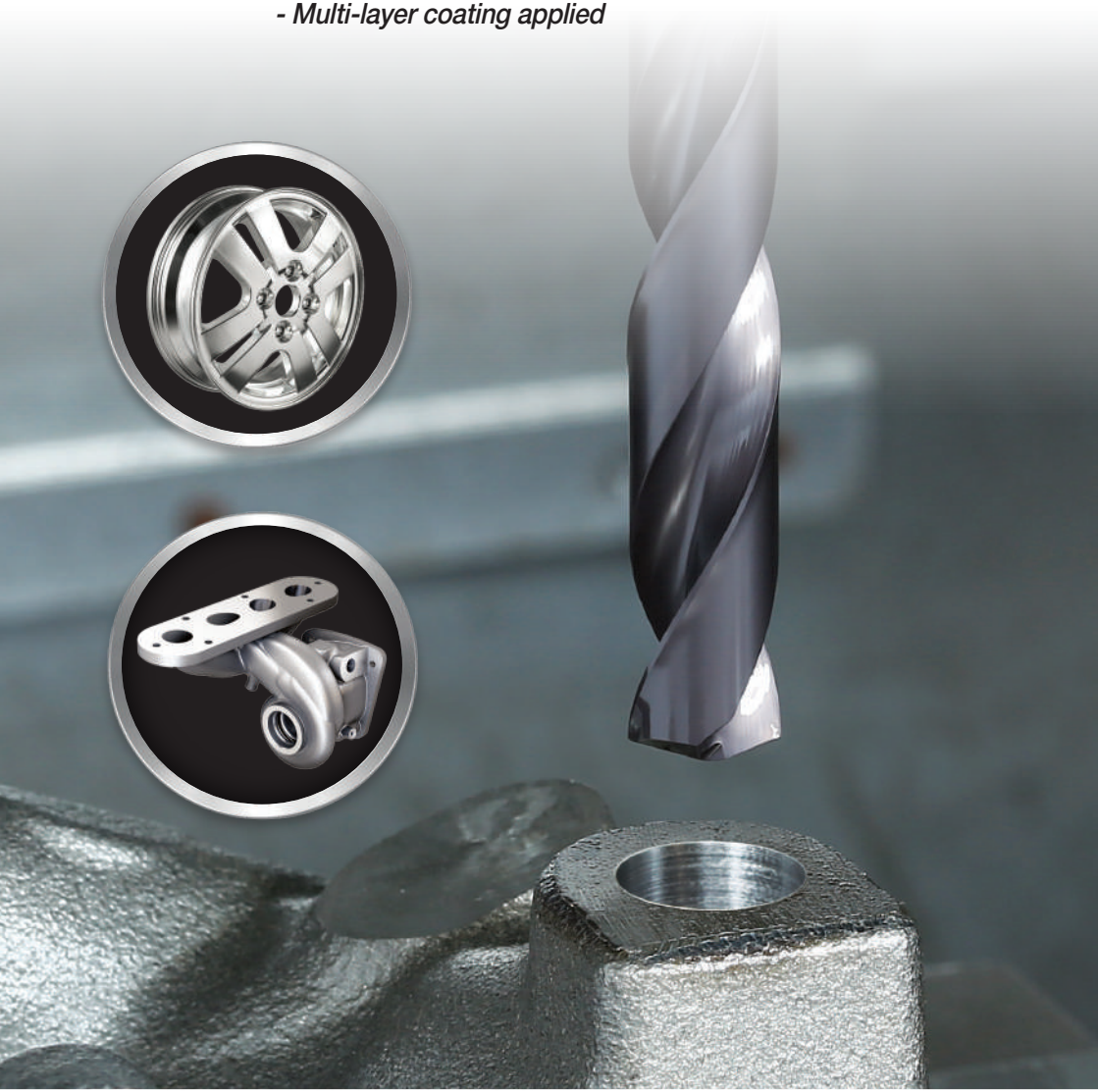
For steel and cast iron



09 Carbide drills for various workpiece materials

HDRILL

- *Suitable for machining steel, cast iron, aluminum, and non-ferrous metals*
- *Optimized cutting edge design*
- *Multi-layer coating applied*



Optimized cutting edge and flute design

Improved machining stability and smooth chip evacuation

Application of multi-layer coating grade – TT9030

Enhanced tool life

Various cutting edge shapes

Optimized cutting edge design for each workpiece material



Internal / External coolant supply

For machining general steel, cast iron, stainless steel, and aluminum

Cutting edge shapes



General | Cast iron | Aliminum



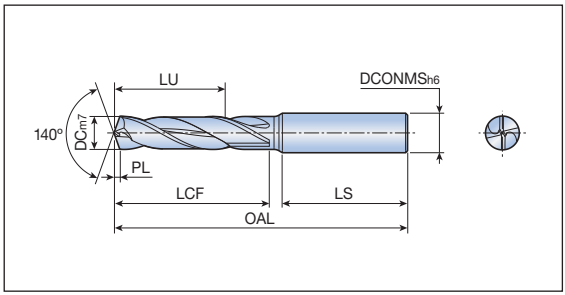
NHD...PE3

Solid carbide drills without oil holes





• Drilling depth: 3xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-014-06 PE3	3.0	6	62	14	21	34	0.5	●
031-014-06 PE3	3.1	6	62	14	21	34	0.5	●
032-014-06 PE3	3.2	6	62	14	21	34	0.5	●
033-014-06 PE3	3.3	6	62	14	21	34	0.5	●
034-014-06 PE3	3.4	6	62	14	21	34	0.5	●
035-014-06 PE3	3.5	6	62	14	21	34	0.6	●
036-014-06 PE3	3.6	6	62	14	21	34	0.6	●
037-014-06 PE3	3.7	6	62	14	21	34	0.6	●
038-017-06 PE3	3.8	6	66	17	25	35	0.6	●
039-017-06 PE3	3.9	6	66	17	25	35	0.6	●
040-017-06 PE3	4.0	6	66	17	25	35	0.6	●
041-017-06 PE3	4.1	6	66	17	25	35	0.7	●
042-017-06 PE3	4.2	6	66	17	25	35	0.7	●
043-017-06 PE3	4.3	6	66	17	25	35	0.7	●
044-017-06 PE3	4.4	6	66	17	25	35	0.7	●
045-017-06 PE3	4.5	6	66	17	25	35	0.7	●
046-017-06 PE3	4.6	6	66	17	25	35	0.7	●
047-017-06 PE3	4.7	6	66	17	25	35	0.8	●
048-020-06 PE3	4.8	6	66	20	29	36	0.8	●
049-020-06 PE3	4.9	6	66	20	29	36	0.8	●
050-020-06 PE3	5.0	6	66	20	29	36	0.8	●
051-020-06 PE3	5.1	6	66	20	29	36	0.8	●
052-020-06 PE3	5.2	6	66	20	29	36	0.8	●
053-020-06 PE3	5.3	6	66	20	29	36	0.8	●
054-020-06 PE3	5.4	6	66	20	29	36	0.8	●
055-020-06 PE3	5.5	6	66	20	29	36	0.9	●
056-020-06 PE3	5.6	6	66	20	29	36	0.9	●
057-020-06 PE3	5.7	6	66	20	29	36	0.9	●
058-020-06 PE3	5.8	6	66	20	29	36	0.9	●
059-020-06 PE3	5.9	6	66	20	29	36	0.9	●
060-020-06 PE3	6.0	6	66	20	29	36	0.9	●
061-024-08 PE3	6.1	8	79	24	35	36	1.0	●
062-024-08 PE3	6.2	8	79	24	35	36	1.0	●
063-024-08 PE3	6.3	8	79	24	35	36	1.0	●

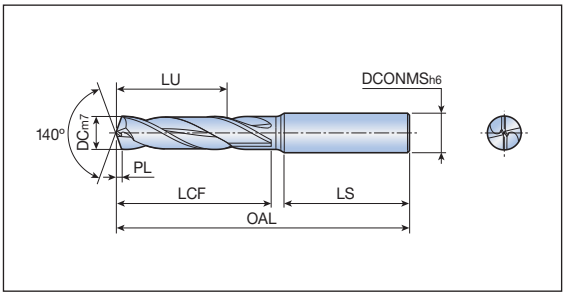
●: Standard items

NHD...PE3

Solid carbide drills without oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 064-024-08 PE3	6.4	8	79	24	35	36	1.0	●
065-024-08 PE3	6.5	8	79	24	35	36	1.0	●
066-024-08 PE3	6.6	8	79	24	35	36	1.0	●
067-024-08 PE3	6.7	8	79	24	35	36	1.1	●
068-024-08 PE3	6.8	8	79	24	35	36	1.1	●
069-024-08 PE3	6.9	8	79	24	35	36	1.1	●
070-024-08 PE3	7.0	8	79	24	35	36	1.1	●
071-029-08 PE3	7.1	8	79	29	42	36	1.1	●
072-029-08 PE3	7.2	8	79	29	42	36	1.1	●
073-029-08 PE3	7.3	8	79	29	42	36	1.1	●
074-029-08 PE3	7.4	8	79	29	42	36	1.2	●
075-029-08 PE3	7.5	8	79	29	42	36	1.2	●
076-029-08 PE3	7.6	8	79	29	42	36	1.2	●
077-029-08 PE3	7.7	8	79	29	42	36	1.2	●
078-029-08 PE3	7.8	8	79	29	42	36	1.2	●
079-029-08 PE3	7.9	8	79	29	42	36	1.3	●
080-029-08 PE3	8.0	8	79	29	42	36	1.3	●
081-035-10 PE3	8.1	10	89	35	48	40	1.3	●
082-035-10 PE3	8.2	10	89	35	48	40	1.3	●
083-035-10 PE3	8.3	10	89	35	48	40	1.3	●
084-035-10 PE3	8.4	10	89	35	48	40	1.3	●
085-035-10 PE3	8.5	10	89	35	48	40	1.3	●
086-035-10 PE3	8.6	10	89	35	48	40	1.4	●
087-035-10 PE3	8.7	10	89	35	48	40	1.4	●
088-035-10 PE3	8.8	10	89	35	48	40	1.4	●
089-035-10 PE3	8.9	10	89	35	48	40	1.4	●
090-035-10 PE3	9.0	10	89	35	48	40	1.4	●
091-035-10 PE3	9.1	10	89	35	48	40	1.4	●
092-035-10 PE3	9.2	10	89	35	48	40	1.4	●
093-035-10 PE3	9.3	10	89	35	48	40	1.5	●
094-035-10 PE3	9.4	10	89	35	48	40	1.5	●
095-035-10 PE3	9.5	10	89	35	48	40	1.5	●
096-035-10 PE3	9.6	10	89	35	48	40	1.5	●
097-035-10 PE3	9.7	10	89	35	48	40	1.5	●

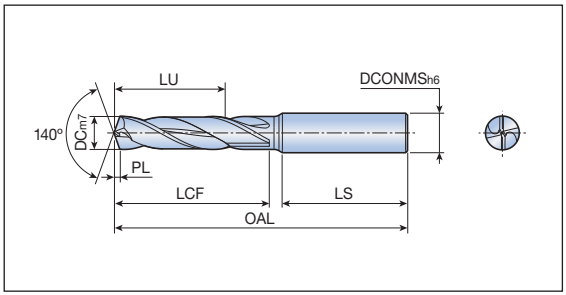
●: Standard items

NHD...PE3

Solid carbide drills without oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 098-035-10 PE3	9.8	10	89	35	48	40	1.6	●
099-035-10 PE3	9.9	10	89	35	48	40	1.6	●
100-035-10 PE3	10.0	10	89	35	48	40	1.6	●
101-040-12 PE3	10.1	12	101	40	54	45	1.6	●
102-040-12 PE3	10.2	12	101	40	54	45	1.6	●
103-040-12 PE3	10.3	12	101	40	54	45	1.6	●
104-040-12 PE3	10.4	12	101	40	54	45	1.6	●
105-040-12 PE3	10.5	12	101	40	54	45	1.6	●
106-040-12 PE3	10.6	12	101	40	54	45	1.7	●
107-040-12 PE3	10.7	12	101	40	54	45	1.7	●
108-040-12 PE3	10.8	12	101	40	54	45	1.7	●
109-040-12 PE3	10.9	12	101	40	54	45	1.7	●
110-040-12 PE3	11.0	12	101	40	54	45	1.7	●
111-040-12 PE3	11.1	12	101	40	55	45	1.7	●
112-040-12 PE3	11.2	12	101	40	55	45	1.8	●
113-040-12 PE3	11.3	12	101	40	55	45	1.8	●
114-040-12 PE3	11.4	12	101	40	55	45	1.8	●
115-040-12 PE3	11.5	12	101	40	55	45	1.8	●
116-040-12 PE3	11.6	12	101	40	55	45	1.8	●
117-040-12 PE3	11.7	12	101	40	55	45	1.9	●
118-040-12 PE3	11.8	12	101	40	55	45	1.9	●
119-040-12 PE3	11.9	12	101	40	55	45	1.9	●
120-040-12 PE3	12.0	12	101	40	55	45	1.9	●

●: Standard items

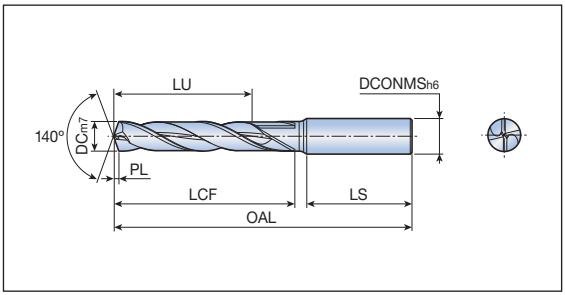
NHD...PE5

Solid carbide drills without oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-023-06 PE5	3.0	6	66	23	29	34	0.5	●
031-023-06 PE5	3.1	6	66	23	29	34	0.5	●
032-023-06 PE5	3.2	6	66	23	29	34	0.5	●
033-023-06 PE5	3.3	6	66	23	29	34	0.5	●
034-023-06 PE5	3.4	6	66	23	29	34	0.5	●
035-023-06 PE5	3.5	6	66	23	29	34	0.6	●
036-023-06 PE5	3.6	6	66	23	29	34	0.6	●
037-023-06 PE5	3.7	6	66	23	29	34	0.6	●
038-029-06 PE5	3.8	6	74	29	37	35	0.6	●
039-029-06 PE5	3.9	6	74	29	37	35	0.6	●
040-029-06 PE5	4.0	6	74	29	37	35	0.6	●
041-029-06 PE5	4.1	6	74	29	37	35	0.7	●
042-029-06 PE5	4.2	6	74	29	37	35	0.7	●
043-029-06 PE5	4.3	6	74	29	37	35	0.7	●
044-029-06 PE5	4.4	6	74	29	37	35	0.7	●
045-029-06 PE5	4.5	6	74	29	37	35	0.7	●
046-029-06 PE5	4.6	6	74	29	37	35	0.7	●
047-029-06 PE5	4.7	6	74	29	37	35	0.8	●
048-035-06 PE5	4.8	6	82	35	45	36	0.8	●
049-035-06 PE5	4.9	6	82	35	45	36	0.8	●
050-035-06 PE5	5.0	6	82	35	45	36	0.8	●
051-035-06 PE5	5.1	6	82	35	45	36	0.8	●
052-035-06 PE5	5.2	6	82	35	45	36	0.8	●
053-035-06 PE5	5.3	6	82	35	45	36	0.8	●
054-035-06 PE5	5.4	6	82	35	45	36	0.8	●
055-035-06 PE5	5.5	6	82	35	45	36	0.9	●
056-035-06 PE5	5.6	6	82	35	45	36	0.9	●
057-035-06 PE5	5.7	6	82	35	45	36	0.9	●
058-035-06 PE5	5.8	6	82	35	45	36	0.9	●
059-035-06 PE5	5.9	6	82	35	45	36	0.9	●
060-035-06 PE5	6.0	6	82	35	45	36	0.9	●
061-043-08 PE5	6.1	8	91	43	54	36	1.0	●
062-043-08 PE5	6.2	8	91	43	54	36	1.0	●
063-043-08 PE5	6.3	8	91	43	54	36	1.0	●

●: Standard items

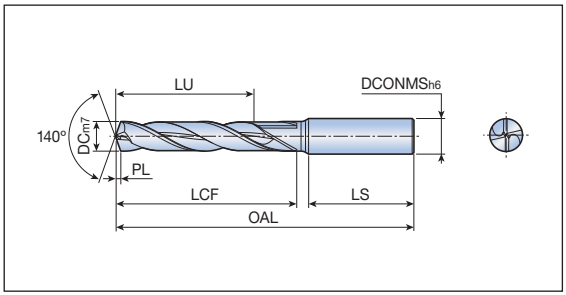
NHD...PE5

Solid carbide drills without oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 064-043-08 PE5	6.4	8	91	43	54	36	1.0	●
065-043-08 PE5	6.5	8	91	43	54	36	1.0	●
066-043-08 PE5	6.6	8	91	43	54	36	1.0	●
067-043-08 PE5	6.7	8	91	43	54	36	1.1	●
068-043-08 PE5	6.8	8	91	43	54	36	1.1	●
069-043-08 PE5	6.9	8	91	43	54	36	1.1	●
070-043-08 PE5	7.0	8	91	43	54	36	1.1	●
071-043-08 PE5	7.1	8	91	43	54	36	1.1	●
072-043-08 PE5	7.2	8	91	43	54	36	1.1	●
073-043-08 PE5	7.3	8	91	43	54	36	1.1	●
074-043-08 PE5	7.4	8	91	43	54	36	1.2	●
075-043-08 PE5	7.5	8	91	43	54	36	1.2	●
076-043-08 PE5	7.6	8	91	43	54	36	1.2	●
077-043-08 PE5	7.7	8	91	43	54	36	1.2	●
078-043-08 PE5	7.8	8	91	43	54	36	1.2	●
079-043-08 PE5	7.9	8	91	43	54	36	1.3	●
080-043-08 PE5	8.0	8	91	43	54	36	1.3	●
081-049-10 PE5	8.1	10	103	49	62	40	1.3	●
082-049-10 PE5	8.2	10	103	49	62	40	1.3	●
083-049-10 PE5	8.3	10	103	49	62	40	1.3	●
084-049-10 PE5	8.4	10	103	49	62	40	1.3	●
085-049-10 PE5	8.5	10	103	49	62	40	1.3	●
086-049-10 PE5	8.6	10	103	49	62	40	1.4	●
087-049-10 PE5	8.7	10	103	49	62	40	1.4	●
088-049-10 PE5	8.8	10	103	49	62	40	1.4	●
089-049-10 PE5	8.9	10	103	49	62	40	1.4	●
090-049-10 PE5	9.0	10	103	49	62	40	1.4	●
091-049-10 PE5	9.1	10	103	49	62	40	1.4	●
092-049-10 PE5	9.2	10	103	49	62	40	1.4	●
093-049-10 PE5	9.3	10	103	49	62	40	1.5	●
094-049-10 PE5	9.4	10	103	49	62	40	1.5	●
095-049-10 PE5	9.5	10	103	49	62	40	1.5	●
096-049-10 PE5	9.6	10	103	49	62	40	1.5	●
097-049-10 PE5	9.7	10	103	49	62	40	1.5	●

●: Standard items

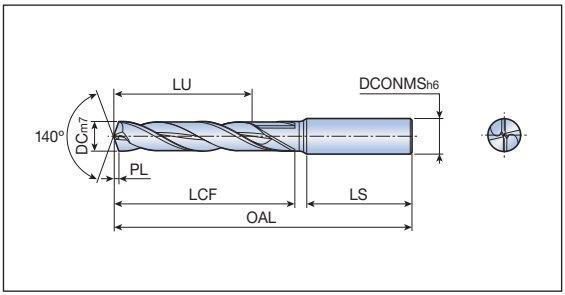
NHD...PE5

Solid carbide drills without oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 098-049-10 PE5	9.8	10	103	49	62	40	1.6	●
099-049-10 PE5	9.9	10	103	49	62	40	1.6	●
100-049-10 PE5	10.0	10	103	49	62	40	1.6	●
101-056-12 PE5	10.1	12	118	56	71	45	1.6	●
102-056-12 PE5	10.2	12	118	56	71	45	1.6	●
103-056-12 PE5	10.3	12	118	56	71	45	1.6	●
104-056-12 PE5	10.4	12	118	56	71	45	1.6	●
105-056-12 PE5	10.5	12	118	56	71	45	1.6	●
106-056-12 PE5	10.6	12	118	56	71	45	1.7	●
107-056-12 PE5	10.7	12	118	56	71	45	1.7	●
108-056-12 PE5	10.8	12	118	56	71	45	1.7	●
109-056-12 PE5	10.9	12	118	56	71	45	1.7	●
110-056-12 PE5	11.0	12	118	56	71	45	1.7	●
111-056-12 PE5	11.1	12	118	56	72	45	1.7	●
112-056-12 PE5	11.2	12	118	56	72	45	1.8	●
113-056-12 PE5	11.3	12	118	56	72	45	1.8	●
114-056-12 PE5	11.4	12	118	56	72	45	1.8	●
115-056-12 PE5	11.5	12	118	56	72	45	1.8	●
116-056-12 PE5	11.6	12	118	56	72	45	1.8	●
117-056-12 PE5	11.7	12	118	56	72	45	1.9	●
118-056-12 PE5	11.8	12	118	56	72	45	1.9	●
119-056-12 PE5	11.9	12	118	56	72	45	1.9	●
120-056-12 PE5	12.0	12	118	56	72	45	1.9	●

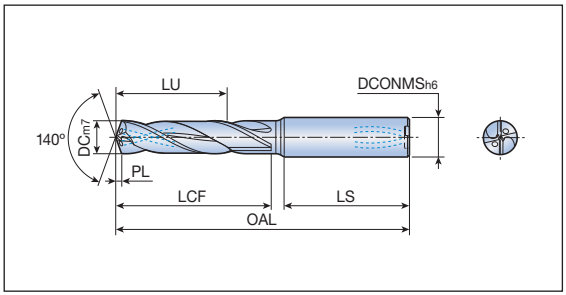
●: Standard items

NHD...PI3

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-014-06 PI3	3.0	6	62	14	21	34	0.5	●
031-014-06 PI3	3.1	6	62	14	21	34	0.5	●
032-014-06 PI3	3.2	6	62	14	21	34	0.5	●
033-014-06 PI3	3.3	6	62	14	21	34	0.5	●
034-014-06 PI3	3.4	6	62	14	21	34	0.5	●
035-014-06 PI3	3.5	6	62	14	21	34	0.6	●
036-014-06 PI3	3.6	6	62	14	21	34	0.6	●
037-014-06 PI3	3.7	6	62	14	21	34	0.6	●
038-017-06 PI3	3.8	6	66	17	25	35	0.6	●
039-017-06 PI3	3.9	6	66	17	25	35	0.6	●
040-017-06 PI3	4.0	6	66	17	25	35	0.6	●
041-017-06 PI3	4.1	6	66	17	25	35	0.7	●
042-017-06 PI3	4.2	6	66	17	25	35	0.7	●
043-017-06 PI3	4.3	6	66	17	25	35	0.7	●
044-017-06 PI3	4.4	6	66	17	25	35	0.7	●
045-017-06 PI3	4.5	6	66	17	25	35	0.7	●
046-017-06 PI3	4.6	6	66	17	25	35	0.7	●
047-017-06 PI3	4.7	6	66	17	25	35	0.8	●
048-020-06 PI3	4.8	6	66	20	29	36	0.8	●
049-020-06 PI3	4.9	6	66	20	29	36	0.8	●
050-020-06 PI3	5.0	6	66	20	29	36	0.8	●
051-020-06 PI3	5.1	6	66	20	29	36	0.8	●
052-020-06 PI3	5.2	6	66	20	29	36	0.8	●
053-020-06 PI3	5.3	6	66	20	29	36	0.8	●
054-020-06 PI3	5.4	6	66	20	29	36	0.8	●
055-020-06 PI3	5.5	6	66	20	29	36	0.9	●
056-020-06 PI3	5.6	6	66	20	29	36	0.9	●
057-020-06 PI3	5.7	6	66	20	29	36	0.9	●
058-020-06 PI3	5.8	6	66	20	29	36	0.9	●
059-020-06 PI3	5.9	6	66	20	29	36	0.9	●
060-020-06 PI3	6.0	6	66	20	29	36	0.9	●
061-024-08 PI3	6.1	8	79	24	35	36	1.0	●
062-024-08 PI3	6.2	8	79	24	35	36	1.0	●
063-024-08 PI3	6.3	8	79	24	35	36	1.0	●

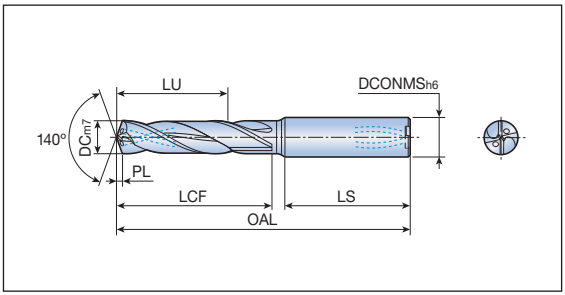
●: Standard items

NHD...PI3

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 064-024-08 PI3	6.4	8	79	24	35	36	1.0	●
065-024-08 PI3	6.5	8	79	24	35	36	1.0	●
066-024-08 PI3	6.6	8	79	24	35	36	1.0	●
067-024-08 PI3	6.7	8	79	24	35	36	1.1	●
068-024-08 PI3	6.8	8	79	24	35	36	1.1	●
069-024-08 PI3	6.9	8	79	24	35	36	1.1	●
070-024-08 PI3	7.0	8	79	24	35	36	1.1	●
071-029-08 PI3	7.1	8	79	29	42	36	1.1	●
072-029-08 PI3	7.2	8	79	29	42	36	1.1	●
073-029-08 PI3	7.3	8	79	29	42	36	1.1	●
074-029-08 PI3	7.4	8	79	29	42	36	1.2	●
075-029-08 PI3	7.5	8	79	29	42	36	1.2	●
076-029-08 PI3	7.6	8	79	29	42	36	1.2	●
077-029-08 PI3	7.7	8	79	29	42	36	1.2	●
078-029-08 PI3	7.8	8	79	29	42	36	1.2	●
079-029-08 PI3	7.9	8	79	29	42	36	1.3	●
080-029-08 PI3	8.0	8	79	29	42	36	1.3	●
081-035-10 PI3	8.1	10	89	35	48	40	1.3	●
082-035-10 PI3	8.2	10	89	35	48	40	1.3	●
083-035-10 PI3	8.3	10	89	35	48	40	1.3	●
084-035-10 PI3	8.4	10	89	35	48	40	1.3	●
085-035-10 PI3	8.5	10	89	35	48	40	1.3	●
086-035-10 PI3	8.6	10	89	35	48	40	1.4	●
087-035-10 PI3	8.7	10	89	35	48	40	1.4	●
088-035-10 PI3	8.8	10	89	35	48	40	1.4	●
089-035-10 PI3	8.9	10	89	35	48	40	1.4	●
090-035-10 PI3	9.0	10	89	35	48	40	1.4	●
091-035-10 PI3	9.1	10	89	35	48	40	1.4	●
092-035-10 PI3	9.2	10	89	35	48	40	1.4	●
093-035-10 PI3	9.3	10	89	35	48	40	1.5	●
094-035-10 PI3	9.4	10	89	35	48	40	1.5	●
095-035-10 PI3	9.5	10	89	35	48	40	1.5	●
096-035-10 PI3	9.6	10	89	35	48	40	1.5	●
097-035-10 PI3	9.7	10	89	35	48	40	1.5	●

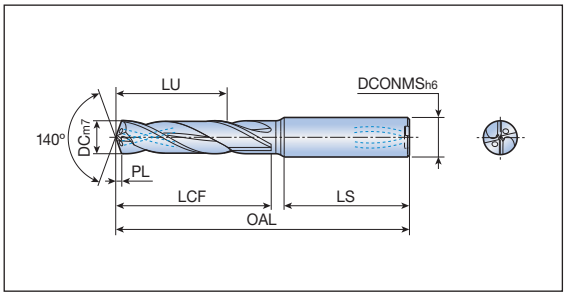
●: Standard items

NHD...PI3

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 098-035-10 PI3	9.8	10	89	35	48	40	1.6	●
099-035-10 PI3	9.9	10	89	35	48	40	1.6	●
101-040-12 PI3	10.1	12	102	40	55	45	1.6	●
102-040-12 PI3	10.2	12	102	40	55	45	1.6	●
103-040-12 PI3	10.3	12	102	40	55	45	1.6	●
104-040-12 PI3	10.4	12	102	40	55	45	1.6	●
105-040-12 PI3	10.5	12	102	40	55	45	1.6	●
106-040-12 PI3	10.6	12	102	40	55	45	1.7	●
107-040-12 PI3	10.7	12	102	40	55	45	1.7	●
108-040-12 PI3	10.8	12	102	40	55	45	1.7	●
109-040-12 PI3	10.9	12	102	40	55	45	1.7	●
110-040-12 PI3	11.0	12	102	40	55	45	1.7	●
111-040-12 PI3	11.1	12	102	40	56	45	1.7	●
112-040-12 PI3	11.2	12	102	40	56	45	1.8	●
113-040-12 PI3	11.3	12	102	40	56	45	1.8	●
114-040-12 PI3	11.4	12	102	40	56	45	1.8	●
115-040-12 PI3	11.5	12	102	40	56	45	1.8	●
116-040-12 PI3	11.6	12	102	40	56	45	1.8	●
117-040-12 PI3	11.7	12	102	40	56	45	1.9	●
118-040-12 PI3	11.8	12	102	40	56	45	1.9	●
119-040-12 PI3	11.9	12	102	40	56	45	1.9	●
120-040-12 PI3	12.0	12	102	40	56	45	1.9	●

●: Standard items

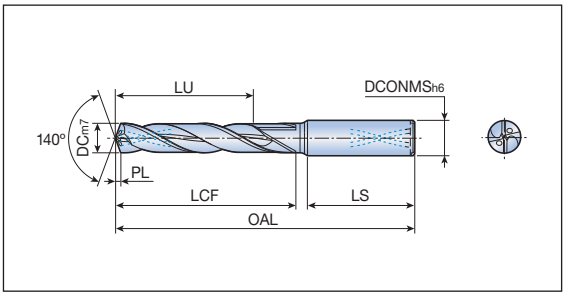
NHD...PI5

Solid carbide drills with oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-023-06 PI5	3.0	6	66	23	29	34	0.5	●
031-023-06 PI5	3.1	6	66	23	29	34	0.5	●
032-023-06 PI5	3.2	6	66	23	29	34	0.5	●
033-023-06 PI5	3.3	6	66	23	29	34	0.5	●
034-023-06 PI5	3.4	6	66	23	29	34	0.5	●
035-023-06 PI5	3.5	6	66	23	29	34	0.6	●
036-023-06 PI5	3.6	6	66	23	29	34	0.6	●
037-023-06 PI5	3.7	6	66	23	29	34	0.6	●
038-029-06 PI5	3.8	6	74	29	37	35	0.6	●
039-029-06 PI5	3.9	6	74	29	37	35	0.6	●
040-029-06 PI5	4.0	6	74	29	37	35	0.6	●
041-029-06 PI5	4.1	6	74	29	37	35	0.7	●
042-029-06 PI5	4.2	6	74	29	37	35	0.7	●
043-029-06 PI5	4.3	6	74	29	37	35	0.7	●
044-029-06 PI5	4.4	6	74	29	37	35	0.7	●
045-029-06 PI5	4.5	6	74	29	37	35	0.7	●
046-029-06 PI5	4.6	6	74	29	37	35	0.7	●
047-029-06 PI5	4.7	6	74	29	37	35	0.8	●
048-035-06 PI5	4.8	6	82	35	45	36	0.8	●
049-035-06 PI5	4.9	6	82	35	45	36	0.8	●
050-035-06 PI5	5.0	6	82	35	45	36	0.8	●
051-035-06 PI5	5.1	6	82	35	45	36	0.8	●
052-035-06 PI5	5.2	6	82	35	45	36	0.8	●
053-035-06 PI5	5.3	6	82	35	45	36	0.8	●
054-035-06 PI5	5.4	6	82	35	45	36	0.8	●
055-035-06 PI5	5.5	6	82	35	45	36	0.9	●
056-035-06 PI5	5.6	6	82	35	45	36	0.9	●
057-035-06 PI5	5.7	6	82	35	45	36	0.9	●
058-035-06 PI5	5.8	6	82	35	45	36	0.9	●
059-035-06 PI5	5.9	6	82	35	45	36	0.9	●
060-035-06 PI5	6.0	6	82	35	45	36	0.9	●
061-043-08 PI5	6.1	8	91	43	54	36	1.0	●
062-043-08 PI5	6.2	8	91	43	54	36	1.0	●
063-043-08 PI5	6.3	8	91	43	54	36	1.0	●

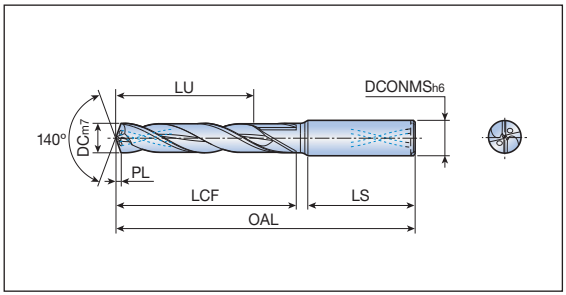
●: Standard items

NHD...PI5

Solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 064-043-08 PI5	6.4	8	91	43	54	36	1.0	●
065-043-08 PI5	6.5	8	91	43	54	36	1.0	●
066-043-08 PI5	6.6	8	91	43	54	36	1.0	●
067-043-08 PI5	6.7	8	91	43	54	36	1.1	●
068-043-08 PI5	6.8	8	91	43	54	36	1.1	●
069-043-08 PI5	6.9	8	91	43	54	36	1.1	●
070-043-08 PI5	7.0	8	91	43	54	36	1.1	●
071-043-08 PI5	7.1	8	91	43	54	36	1.1	●
072-043-08 PI5	7.2	8	91	43	54	36	1.1	●
073-043-08 PI5	7.3	8	91	43	54	36	1.1	●
074-043-08 PI5	7.4	8	91	43	54	36	1.2	●
075-043-08 PI5	7.5	8	91	43	54	36	1.2	●
076-043-08 PI5	7.6	8	91	43	54	36	1.2	●
077-043-08 PI5	7.7	8	91	43	54	36	1.2	●
078-043-08 PI5	7.8	8	91	43	54	36	1.2	●
079-043-08 PI5	7.9	8	91	43	54	36	1.3	●
080-043-08 PI5	8.0	8	91	43	54	36	1.3	●
081-049-10 PI5	8.1	10	103	49	62	40	1.3	●
082-049-10 PI5	8.2	10	103	49	62	40	1.3	●
083-049-10 PI5	8.3	10	103	49	62	40	1.3	●
084-049-10 PI5	8.4	10	103	49	62	40	1.3	●
085-049-10 PI5	8.5	10	103	49	62	40	1.3	●
086-049-10 PI5	8.6	10	103	49	62	40	1.4	●
087-049-10 PI5	8.7	10	103	49	62	40	1.4	●
088-049-10 PI5	8.8	10	103	49	62	40	1.4	●
089-049-10 PI5	8.9	10	103	49	62	40	1.4	●
090-049-10 PI5	9.0	10	103	49	62	40	1.4	●
091-049-10 PI5	9.1	10	103	49	62	40	1.4	●
092-049-10 PI5	9.2	10	103	49	62	40	1.4	●
093-049-10 PI5	9.3	10	103	49	62	40	1.5	●
094-049-10 PI5	9.4	10	103	49	62	40	1.5	●
095-049-10 PI5	9.5	10	103	49	62	40	1.5	●
096-049-10 PI5	9.6	10	103	49	62	40	1.5	●
097-049-10 PI5	9.7	10	103	49	62	40	1.5	●

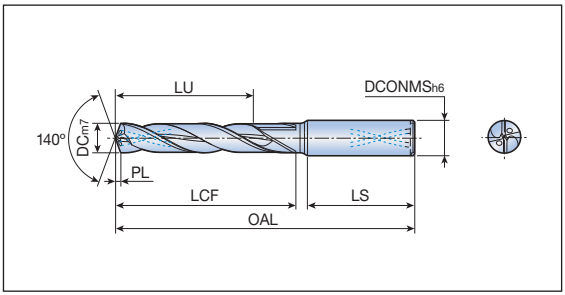
●: Standard items

NHD...PI5

Solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 098-049-10 PI5	9.8	10	103	49	62	40	1.6	●
099-049-10 PI5	9.9	10	103	49	62	40	1.6	●
100-049-10 PI5	10.0	10	103	49	62	40	1.6	●
101-056-12 PI5	10.1	12	118	56	71	45	1.6	●
102-056-12 PI5	10.2	12	118	56	71	45	1.6	●
103-056-12 PI5	10.3	12	118	56	71	45	1.6	●
104-056-12 PI5	10.4	12	118	56	71	45	1.6	●
105-056-12 PI5	10.5	12	118	56	71	45	1.6	●
106-056-12 PI5	10.6	12	118	56	71	45	1.7	●
107-056-12 PI5	10.7	12	118	56	71	45	1.7	●
108-056-12 PI5	10.8	12	118	56	71	45	1.7	●
109-056-12 PI5	10.9	12	118	56	71	45	1.7	●
110-056-12 PI5	11.0	12	118	56	71	45	1.7	●
111-056-12 PI5	11.1	12	118	56	72	45	1.7	●
112-056-12 PI5	11.2	12	118	56	72	45	1.8	●
113-056-12 PI5	11.3	12	118	56	72	45	1.8	●
114-056-12 PI5	11.4	12	118	56	72	45	1.8	●
115-056-12 PI5	11.5	12	118	56	72	45	1.8	●
116-056-12 PI5	11.6	12	118	56	72	45	1.8	●
117-056-12 PI5	11.7	12	118	56	72	45	1.9	●
118-056-12 PI5	11.8	12	118	56	72	45	1.9	●
119-056-12 PI5	11.9	12	118	56	72	45	1.9	●
120-056-12 PI5	12.0	12	118	56	72	45	1.9	●

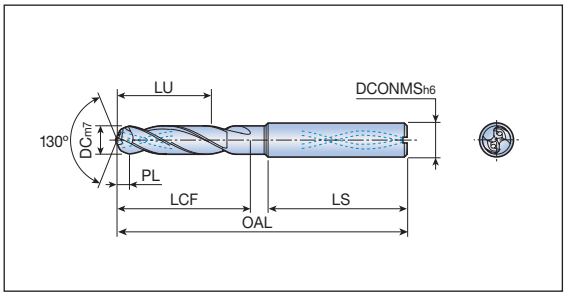
●: Standard items

NHD...KI3

Solid carbide drills with oil holes for cast iron machining







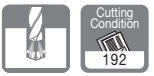
• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-014-06 KI3	3.0	6	62	14	20	34	1.4	●
033-014-06 KI3	3.3	6	62	14	20	34	1.6	●
035-014-06 KI3	3.5	6	62	14	20	34	1.7	●
040-017-06 KI3	4.0	6	66	17	24	35	1.9	●
041-017-06 KI3	4.1	6	66	17	24	35	2.0	●
042-017-06 KI3	4.2	6	66	17	24	35	2.0	●
045-017-06 KI3	4.5	6	66	17	24	35	2.2	●
046-017-06 KI3	4.6	6	66	17	24	35	2.2	●
050-020-06 KI3	5.0	6	66	20	27	36	2.4	●
051-020-06 KI3	5.1	6	66	20	27	36	2.5	●
052-020-06 KI3	5.2	6	66	20	27	36	2.5	●
055-020-06 KI3	5.5	6	66	20	27	36	2.6	●
060-020-06 KI3	6.0	6	66	20	27	36	2.9	●
061-024-08 KI3	6.1	8	79	24	34	36	2.9	●
065-024-08 KI3	6.5	8	79	24	34	36	3.1	●
067-024-08 KI3	6.7	8	79	24	34	36	3.2	●
068-024-08 KI3	6.8	8	79	24	34	36	3.3	●
070-024-08 KI3	7.0	8	79	24	34	36	3.4	●
075-029-08 KI3	7.5	8	79	29	40	36	3.6	●
080-029-08 KI3	8.0	8	79	29	40	36	3.8	●
081-035-10 KI3	8.1	10	89	35	45	40	3.9	●
085-035-10 KI3	8.5	10	89	35	45	40	4.1	●
087-035-10 KI3	8.7	10	89	35	45	40	4.2	●
089-035-10 KI3	8.9	10	89	35	45	40	4.3	●
090-035-10 KI3	9.0	10	89	35	45	40	4.3	●
095-035-10 KI3	9.5	10	89	35	45	40	4.6	●
100-035-10 KI3	10.0	10	89	35	45	40	4.8	●
103-040-12 KI3	10.3	12	102	40	53	45	4.9	●
105-040-12 KI3	10.5	12	102	40	53	45	5.0	●
110-040-12 KI3	11.0	12	102	40	53	45	5.3	●
115-040-12 KI3	11.5	12	102	40	53	45	5.5	●
120-040-12 KI3	12.0	12	102	40	53	45	5.8	●

●: Standard items

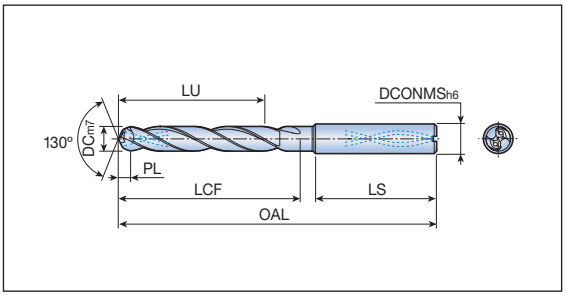
NHD...KI5

Solid carbide drills with oil holes for cast iron machining





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
NHD 030-023-06 KI5	3.0	6	66	23	27	34	1.4	•
033-023-06 KI5	3.3	6	66	23	27	34	1.6	•
035-023-06 KI5	3.5	6	66	23	27	34	1.7	•
040-029-06 KI5	4.0	6	74	29	34	35	1.9	•
042-029-06 KI5	4.2	6	74	29	34	35	2.0	•
045-029-06 KI5	4.5	6	74	29	35	35	2.2	•
046-029-06 KI5	4.6	6	74	29	35	35	2.2	•
050-035-06 KI5	5.0	6	82	35	43	36	2.4	•
052-035-06 KI5	5.2	6	82	35	43	36	2.5	•
055-035-06 KI5	5.5	6	82	35	43	36	2.6	•
060-035-06 KI5	6.0	6	82	35	43	36	2.9	•
065-043-08 KI5	6.5	8	91	43	52	36	3.1	•
067-043-08 KI5	6.7	8	91	43	52	36	3.2	•
068-043-08 KI5	6.8	8	91	43	52	36	3.3	•
070-043-08 KI5	7.0	8	91	43	52	36	3.4	•
075-043-08 KI5	7.5	8	91	43	52	36	3.6	•
080-043-08 KI5	8.0	8	91	43	52	36	3.8	•
081-049-10 KI5	8.1	10	103	49	59	40	3.9	•
085-049-10 KI5	8.5	10	103	49	59	40	4.1	•
087-049-10 KI5	8.7	10	103	49	59	40	4.2	•
089-049-10 KI5	8.9	10	103	49	59	40	4.3	•
090-049-10 KI5	9.0	10	103	49	59	40	4.3	•
095-049-10 KI5	9.5	10	103	49	59	40	4.6	•
100-049-10 KI5	10.0	10	103	49	59	40	4.8	•
103-056-12 KI5	10.3	12	118	56	69	45	4.9	•
105-056-12 KI5	10.5	12	118	56	69	45	5.0	•
110-056-12 KI5	11.0	12	118	56	69	45	5.3	•
115-056-12 KI5	11.5	12	118	56	69	45	5.5	•
120-056-12 KI5	12.0	12	118	56	69	45	5.8	•

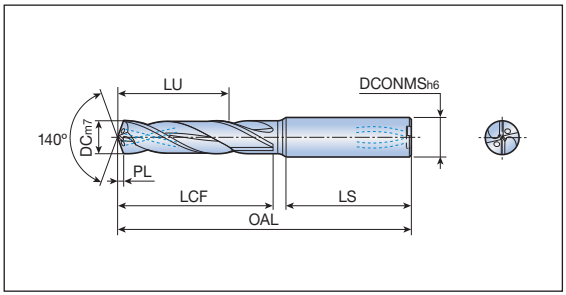
●: Standard items

NHD...NI3

Solid carbide drills with oil holes for aluminum machining







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 030-014-06 NI3	3.0	6	62	14	21	34	0.5	●
031-014-06 NI3	3.1	6	62	14	21	34	0.5	●
032-014-06 NI3	3.2	6	62	14	21	34	0.5	●
033-014-06 NI3	3.3	6	62	14	21	34	0.5	●
034-014-06 NI3	3.4	6	62	14	21	34	0.5	●
035-014-06 NI3	3.5	6	62	14	21	34	0.6	●
036-014-06 NI3	3.6	6	62	14	21	34	0.6	●
037-014-06 NI3	3.7	6	62	14	21	34	0.6	●
038-017-06 NI3	3.8	6	66	17	25	35	0.6	●
039-017-06 NI3	3.9	6	66	17	25	35	0.6	●
040-017-06 NI3	4.0	6	66	17	25	35	0.6	●
041-017-06 NI3	4.1	6	66	17	25	35	0.7	●
042-017-06 NI3	4.2	6	66	17	25	35	0.7	●
043-017-06 NI3	4.3	6	66	17	25	35	0.7	●
044-017-06 NI3	4.4	6	66	17	25	35	0.7	●
045-017-06 NI3	4.5	6	66	17	25	35	0.7	●
046-017-06 NI3	4.6	6	66	17	25	35	0.7	●
047-017-06 NI3	4.7	6	66	17	25	35	0.8	●
048-020-06 NI3	4.8	6	66	20	29	36	0.8	●
049-020-06 NI3	4.9	6	66	20	29	36	0.8	●
050-020-06 NI3	5.0	6	66	20	29	36	0.8	●
051-020-06 NI3	5.1	6	66	20	29	36	0.8	●
052-020-06 NI3	5.2	6	66	20	29	36	0.8	●
053-020-06 NI3	5.3	6	66	20	29	36	0.8	●
054-020-06 NI3	5.4	6	66	20	29	36	0.8	●
055-020-06 NI3	5.5	6	66	20	29	36	0.9	●
056-020-06 NI3	5.6	6	66	20	29	36	0.9	●
057-020-06 NI3	5.7	6	66	20	29	36	0.9	●
058-020-06 NI3	5.8	6	66	20	29	36	0.9	●
059-020-06 NI3	5.9	6	66	20	29	36	0.9	●
060-020-06 NI3	6.0	6	66	20	29	36	0.9	●
061-024-08 NI3	6.1	8	79	24	35	36	1.0	●
062-024-08 NI3	6.2	8	79	24	35	36	1.0	●
063-024-08 NI3	6.3	8	79	24	35	36	1.0	●

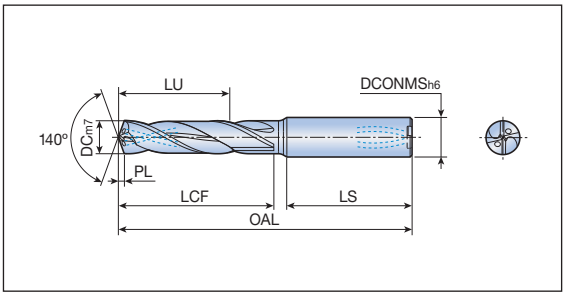
●: Standard items

NHD…NI3

Solid carbide drills with oil holes for aluminum machining







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 064-024-08 NI3	6.4	8	79	24	35	36	1.0	●
065-024-08 NI3	6.5	8	79	24	35	36	1.0	●
066-024-08 NI3	6.6	8	79	24	35	36	1.0	●
067-024-08 NI3	6.7	8	79	24	35	36	1.1	●
068-024-08 NI3	6.8	8	79	24	35	36	1.1	●
069-024-08 NI3	6.9	8	79	24	35	36	1.1	●
070-024-08 NI3	7.0	8	79	24	35	36	1.1	●
071-029-08 NI3	7.1	8	79	29	42	36	1.1	●
072-029-08 NI3	7.2	8	79	29	42	36	1.1	●
073-029-08 NI3	7.3	8	79	29	42	36	1.1	●
074-029-08 NI3	7.4	8	79	29	42	36	1.2	●
075-029-08 NI3	7.5	8	79	29	42	36	1.2	●
076-029-08 NI3	7.6	8	79	29	42	36	1.2	●
077-029-08 NI3	7.7	8	79	29	42	36	1.2	●
078-029-08 NI3	7.8	8	79	29	42	36	1.2	●
079-029-08 NI3	7.9	8	79	29	42	36	1.3	●
080-029-08 NI3	8.0	8	79	29	42	36	1.3	●
081-035-10 NI3	8.1	10	89	35	48	40	1.3	●
082-035-10 NI3	8.2	10	89	35	48	40	1.3	●
083-035-10 NI3	8.3	10	89	35	48	40	1.3	●
084-035-10 NI3	8.4	10	89	35	48	40	1.3	●
085-035-10 NI3	8.5	10	89	35	48	40	1.3	●
086-035-10 NI3	8.6	10	89	35	48	40	1.4	●
087-035-10 NI3	8.7	10	89	35	48	40	1.4	●
088-035-10 NI3	8.8	10	89	35	48	40	1.4	●
089-035-10 NI3	8.9	10	89	35	48	40	1.4	●
090-035-10 NI3	9.0	10	89	35	48	40	1.4	●
091-035-10 NI3	9.1	10	89	35	48	40	1.4	●
092-035-10 NI3	9.2	10	89	35	48	40	1.4	●
093-035-10 NI3	9.3	10	89	35	48	40	1.5	●
094-035-10 NI3	9.4	10	89	35	48	40	1.5	●
095-035-10 NI3	9.5	10	89	35	48	40	1.5	●
096-035-10 NI3	9.6	10	89	35	48	40	1.5	●
097-035-10 NI3	9.7	10	89	35	48	40	1.5	●

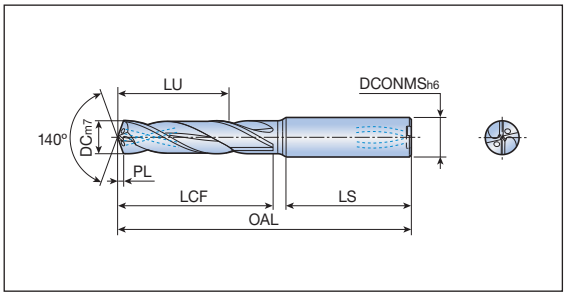
●: Standard items

NHD...NI3

Solid carbide drills with oil holes for aluminum machining







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 098-035-10 NI3	9.8	10	89	35	48	40	1.6	●
099-035-10 NI3	9.9	10	89	35	48	40	1.6	●
100-035-10 NI3	10.0	10	89	35	48	40	1.6	●
101-040-12 NI3	10.1	12	102	40	55	45	1.6	●
102-040-12 NI3	10.2	12	102	40	55	45	1.6	●
103-040-12 NI3	10.3	12	102	40	55	45	1.6	●
104-040-12 NI3	10.4	12	102	40	55	45	1.6	●
105-040-12 NI3	10.5	12	102	40	55	45	1.6	●
106-040-12 NI3	10.6	12	102	40	55	45	1.7	●
107-040-12 NI3	10.7	12	102	40	55	45	1.7	●
108-040-12 NI3	10.8	12	102	40	55	45	1.7	●
109-040-12 NI3	10.9	12	102	40	55	45	1.7	●
110-040-12 NI3	11.0	12	102	40	55	45	1.7	●
111-040-12 NI3	11.1	12	102	40	56	45	1.7	●
112-040-12 NI3	11.2	12	102	40	56	45	1.8	●
113-040-12 NI3	11.3	12	102	40	56	45	1.8	●
114-040-12 NI3	11.4	12	102	40	56	45	1.8	●
115-040-12 NI3	11.5	12	102	40	56	45	1.8	●
116-040-12 NI3	11.6	12	102	40	56	45	1.8	●
117-040-12 NI3	11.7	12	102	40	56	45	1.9	●
118-040-12 NI3	11.8	12	102	40	56	45	1.9	●
119-040-12 NI3	11.9	12	102	40	56	45	1.9	●
120-040-12 NI3	12.0	12	102	40	56	45	1.9	●

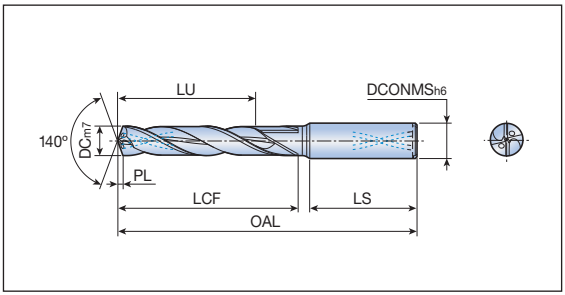
●: Standard items

NHD...NI5

Solid carbide drills with oil holes for aluminum machining







• Drilling depth: 5xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 030-023-06 NI5	3.0	6	66	23	29	34	0.5	●
031-023-06 NI5	3.1	6	66	23	29	34	0.5	●
032-023-06 NI5	3.2	6	66	23	29	34	0.5	●
033-023-06 NI5	3.3	6	66	23	29	34	0.5	●
034-023-06 NI5	3.4	6	66	23	29	34	0.5	●
035-023-06 NI5	3.5	6	66	23	29	34	0.6	●
036-023-06 NI5	3.6	6	66	23	29	34	0.6	●
037-023-06 NI5	3.7	6	66	23	29	34	0.6	●
038-029-06 NI5	3.8	6	74	29	37	35	0.6	●
039-029-06 NI5	3.9	6	74	29	37	35	0.6	●
040-029-06 NI5	4.0	6	74	29	37	35	0.6	●
041-029-06 NI5	4.1	6	74	29	37	35	0.7	●
042-029-06 NI5	4.2	6	74	29	37	35	0.7	●
043-029-06 NI5	4.3	6	74	29	37	35	0.7	●
044-029-06 NI5	4.4	6	74	29	37	35	0.7	●
045-029-06 NI5	4.5	6	74	29	37	35	0.7	●
046-029-06 NI5	4.6	6	74	29	37	35	0.7	●
047-029-06 NI5	4.7	6	74	29	37	35	0.8	●
048-035-06 NI5	4.8	6	82	35	45	36	0.8	●
049-035-06 NI5	4.9	6	82	35	45	36	0.8	●
050-035-06 NI5	5.0	6	82	35	45	36	0.8	●
051-035-06 NI5	5.1	6	82	35	45	36	0.8	●
052-035-06 NI5	5.2	6	82	35	45	36	0.8	●
053-035-06 NI5	5.3	6	82	35	45	36	0.8	●
054-035-06 NI5	5.4	6	82	35	45	36	0.8	●
055-035-06 NI5	5.5	6	82	35	45	36	0.9	●
056-035-06 NI5	5.6	6	82	35	45	36	0.9	●
057-035-06 NI5	5.7	6	82	35	45	36	0.9	●
058-035-06 NI5	5.8	6	82	35	45	36	0.9	●
059-035-06 NI5	5.9	6	82	35	45	36	0.9	●
060-035-06 NI5	6.0	6	82	35	45	36	0.9	●
061-043-08 NI5	6.1	8	91	43	54	36	1.0	●
062-043-08 NI5	6.2	8	91	43	54	36	1.0	●
063-043-08 NI5	6.3	8	91	43	54	36	1.0	●

●: Standard items

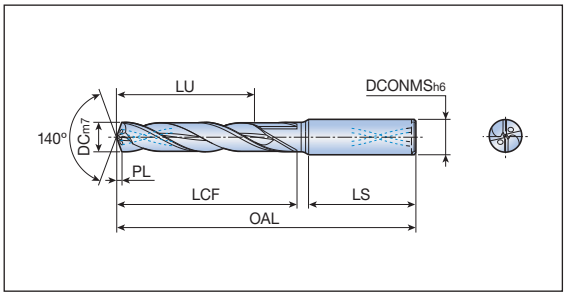
NHD...NI5

Solid carbide drills with oil holes for aluminum machining





• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 064-043-08 NI5	6.4	8	91	43	54	36	1.0	●
065-043-08 NI5	6.5	8	91	43	54	36	1.0	●
066-043-08 NI5	6.6	8	91	43	54	36	1.0	●
067-043-08 NI5	6.7	8	91	43	54	36	1.1	●
068-043-08 NI5	6.8	8	91	43	54	36	1.1	●
069-043-08 NI5	6.9	8	91	43	54	36	1.1	●
070-043-08 NI5	7.0	8	91	43	54	36	1.1	●
071-043-08 NI5	7.1	8	91	43	54	36	1.1	●
072-043-08 NI5	7.2	8	91	43	54	36	1.1	●
073-043-08 NI5	7.3	8	91	43	54	36	1.1	●
074-043-08 NI5	7.4	8	91	43	54	36	1.2	●
075-043-08 NI5	7.5	8	91	43	54	36	1.2	●
076-043-08 NI5	7.6	8	91	43	54	36	1.2	●
077-043-08 NI5	7.7	8	91	43	54	36	1.2	●
078-043-08 NI5	7.8	8	91	43	54	36	1.2	●
079-043-08 NI5	7.9	8	91	43	54	36	1.3	●
080-043-08 NI5	8.0	8	91	43	54	36	1.3	●
081-049-10 NI5	8.1	10	103	49	62	40	1.3	●
082-049-10 NI5	8.2	10	103	49	62	40	1.3	●
083-049-10 NI5	8.3	10	103	49	62	40	1.3	●
084-049-10 NI5	8.4	10	103	49	62	40	1.3	●
085-049-10 NI5	8.5	10	103	49	62	40	1.3	●
086-049-10 NI5	8.6	10	103	49	62	40	1.4	●
087-049-10 NI5	8.7	10	103	49	62	40	1.4	●
088-049-10 NI5	8.8	10	103	49	62	40	1.4	●
089-049-10 NI5	8.9	10	103	49	62	40	1.4	●
090-049-10 NI5	9.0	10	103	49	62	40	1.4	●
091-049-10 NI5	9.1	10	103	49	62	40	1.4	●
092-049-10 NI5	9.2	10	103	49	62	40	1.4	●
093-049-10 NI5	9.3	10	103	49	62	40	1.5	●
094-049-10 NI5	9.4	10	103	49	62	40	1.5	●
095-049-10 NI5	9.5	10	103	49	62	40	1.5	●
096-049-10 NI5	9.6	10	103	49	62	40	1.5	●
097-049-10 NI5	9.7	10	103	49	62	40	1.5	●

●: Standard items

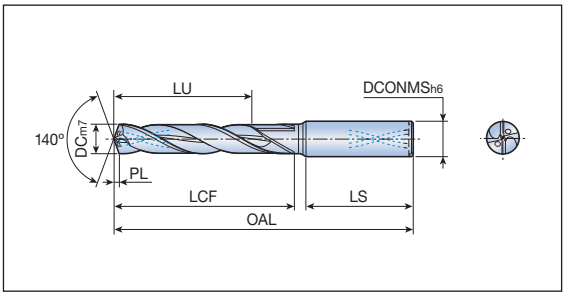
NHD...NI5

Solid carbide drills with oil holes for aluminum machining





• Drilling depth: 5xdiameter



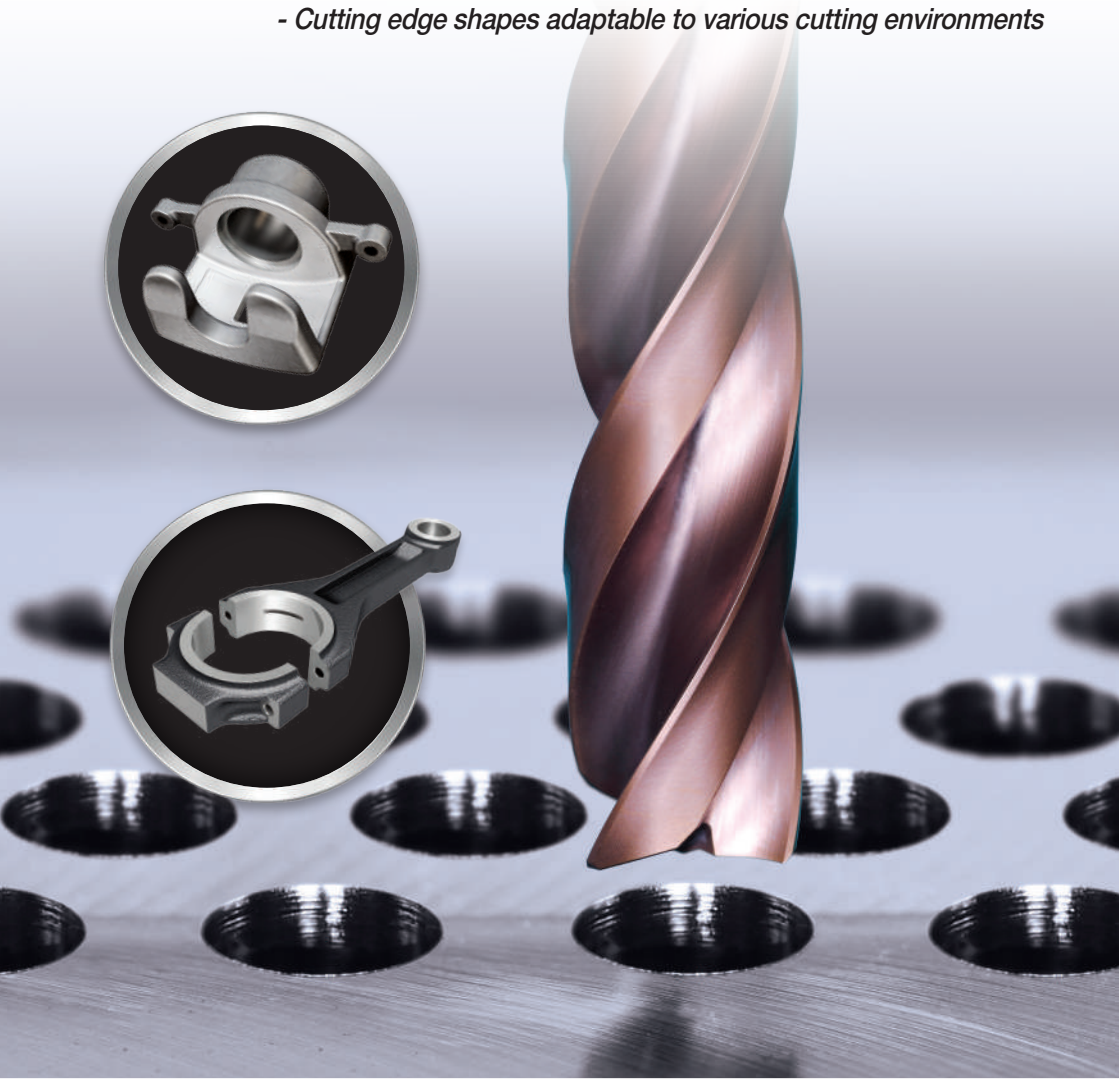
Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	UF10
NHD 098-049-10 NI5	9.8	10	103	49	62	40	1.6	●
099-049-10 NI5	9.9	10	103	49	62	40	1.6	●
100-049-10 NI5	10.0	10	103	49	62	40	1.6	●
101-056-12 NI5	10.1	12	118	56	71	45	1.6	●
102-056-12 NI5	10.2	12	118	56	71	45	1.6	●
103-056-12 NI5	10.3	12	118	56	71	45	1.6	●
104-056-12 NI5	10.4	12	118	56	71	45	1.6	●
105-056-12 NI5	10.5	12	118	56	71	45	1.6	●
106-056-12 NI5	10.6	12	118	56	71	45	1.7	●
107-056-12 NI5	10.7	12	118	56	71	45	1.7	●
108-056-12 NI5	10.8	12	118	56	71	45	1.7	●
109-056-12 NI5	10.9	12	118	56	71	45	1.7	●
110-056-12 NI5	11.0	12	118	56	71	45	1.7	●
111-056-12 NI5	11.1	12	118	56	72	45	1.7	●
112-056-12 NI5	11.2	12	118	56	72	45	1.8	●
113-056-12 NI5	11.3	12	118	56	72	45	1.8	●
114-056-12 NI5	11.4	12	118	56	72	45	1.8	●
115-056-12 NI5	11.5	12	118	56	72	45	1.8	●
116-056-12 NI5	11.6	12	118	56	72	45	1.8	●
117-056-12 NI5	11.7	12	118	56	72	45	1.9	●
118-056-12 NI5	11.8	12	118	56	72	45	1.9	●
119-056-12 NI5	11.9	12	118	56	72	45	1.9	●
120-056-12 NI5	12.0	12	118	56	72	45	1.9	●

●: Standard items

10 High-productivity 3-flute carbide drill

SOLID 3 DRILL
3 FLUTE

- *High productivity with 3-flute cutting edge design*
- *Maximized machining stability under high cutting conditions*
- *Suitable for hole machining in general steel and cast iron materials*
- *Cutting edge shapes adaptable to various cutting environments*



For machining general steel and cast iron



Latest multi-layer coating grade -TT5130

Improved toughness and wear resistance

3-flute cutting edge design

50% higher productivity compared to 2-flute drills

Internal coolant supply

Flute surface treatment

Excellent chip evacuation & improved tool life

Machining depth: 3D-2D

No pilot drill required for deep holes over 8D

* Pilot drill required when precise hole tolerance is needed

Various cutting edge shapes

Cutting edge shapes



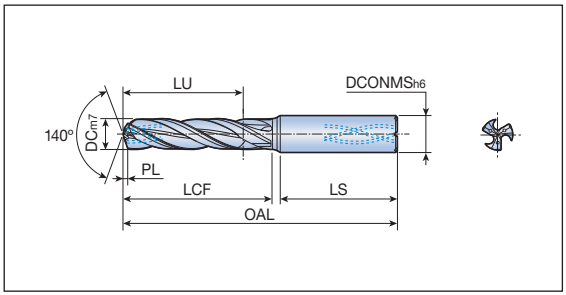


3HD...PI3

3 flute solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 040-017-06 PI3	4.0	6	66	17	25	35	0.82	●
041-017-06 PI3	4.1	6	66	17	25	35	0.83	●
042-017-06 PI3	4.2	6	66	17	25	35	0.84	●
043-017-06 PI3	4.3	6	66	17	25	35	0.86	●
044-017-06 PI3	4.4	6	66	17	25	35	0.87	●
045-017-06 PI3	4.5	6	66	17	25	35	0.88	●
046-017-06 PI3	4.6	6	66	17	25	35	0.90	●
047-017-06 PI3	4.7	6	66	17	25	35	0.91	●
048-020-06 PI3	4.8	6	66	20	29	36	0.93	●
049-020-06 PI3	4.9	6	66	20	29	36	0.94	●
050-020-06 PI3	5.0	6	66	20	29	36	0.96	●
051-020-06 PI3	5.1	6	66	20	29	36	0.98	●
052-020-06 PI3	5.2	6	66	20	29	36	1.01	●
053-020-06 PI3	5.3	6	66	20	29	36	1.03	●
054-020-06 PI3	5.4	6	66	20	29	36	1.06	●
055-020-06 PI3	5.5	6	66	20	29	36	1.08	●
056-020-06 PI3	5.6	6	66	20	29	36	1.10	●
057-020-06 PI3	5.7	6	66	20	29	36	1.12	●
058-020-06 PI3	5.8	6	66	20	29	36	1.13	●
059-020-06 PI3	5.9	6	66	20	29	36	1.15	●
060-020-06 PI3	6.0	6	66	20	29	36	1.17	●
061-024-08 PI3	6.1	8	79	24	35	36	1.19	●
062-024-08 PI3	6.2	8	79	24	35	36	1.21	●
063-024-08 PI3	6.3	8	79	24	35	36	1.22	●
064-024-08 PI3	6.4	8	79	24	35	36	1.24	●
065-024-08 PI3	6.5	8	79	24	35	36	1.26	●
066-024-08 PI3	6.6	8	79	24	35	36	1.28	●
067-024-08 PI3	6.7	8	79	24	35	36	1.30	●
068-024-08 PI3	6.8	8	79	24	35	36	1.31	●
069-024-08 PI3	6.9	8	79	24	35	36	1.33	●
070-024-08 PI3	7.0	8	79	24	35	36	1.35	●
071-029-08 PI3	7.1	8	79	29	42	36	1.36	●
072-029-08 PI3	7.2	8	79	29	42	36	1.37	●
073-029-08 PI3	7.3	8	79	29	42	36	1.38	●

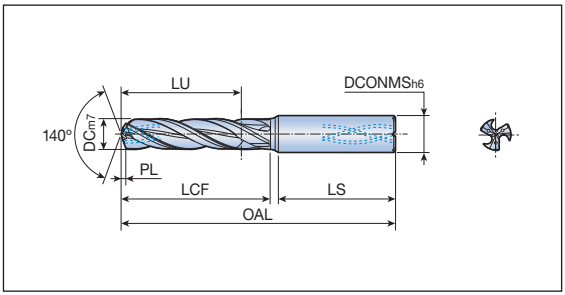
●: Standard items

3HD...PI3

3 flute solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 074-029-08 PI3	7.4	8.0	79.0	29.0	42.0	36.0	1.39	●
075-029-08 PI3	7.5	8.0	79.0	29.0	42.0	36.0	1.40	●
076-029-08 PI3	7.6	8.0	79.0	29.0	42.0	36.0	1.42	●
077-029-08 PI3	7.7	8.0	79.0	29.0	42.0	36.0	1.44	●
078-029-08 PI3	7.8	8.0	79.0	29.0	42.0	36.0	1.45	●
079-029-08 PI3	7.9	8.0	79.0	29.0	42.0	36.0	1.47	●
080-029-08 PI3	8.0	8.0	79.0	29.0	42.0	36.0	1.49	●
081-035-10 PI3	8.1	10.0	89.0	35.0	48.0	40.0	1.52	●
082-035-10 PI3	8.2	10.0	89.0	35.0	48.0	40.0	1.55	●
083-035-10 PI3	8.3	10.0	89.0	35.0	48.0	40.0	1.57	●
084-035-10 PI3	8.4	10.0	89.0	35.0	48.0	40.0	1.60	●
085-035-10 PI3	8.5	10.0	89.0	35.0	48.0	40.0	1.63	●
086-035-10 PI3	8.6	10.0	89.0	35.0	48.0	40.0	1.65	●
087-035-10 PI3	8.7	10.0	89.0	35.0	48.0	40.0	1.67	●
088-035-10 PI3	8.8	10.0	89.0	35.0	48.0	40.0	1.69	●
089-035-10 PI3	8.9	10.0	89.0	35.0	48.0	40.0	1.70	●
090-035-10 PI3	9.0	10.0	89.0	35.0	48.0	40.0	1.72	●
091-035-10 PI3	9.1	10.0	89.0	35.0	48.0	40.0	1.73	●
092-035-10 PI3	9.2	10.0	89.0	35.0	48.0	40.0	1.73	●
093-035-10 PI3	9.3	10.0	89.0	35.0	48.0	40.0	1.74	●
094-035-10 PI3	9.4	10.0	89.0	35.0	48.0	40.0	1.74	●
095-035-10 PI3	9.5	10.0	89.0	35.0	48.0	40.0	1.75	●
096-035-10 PI3	9.6	10.0	89.0	35.0	48.0	40.0	1.77	●
097-035-10 PI3	9.7	10.0	89.0	35.0	48.0	40.0	1.79	●
098-035-10 PI3	9.8	10.0	89.0	35.0	48.0	40.0	1.81	●
099-035-10 PI3	9.9	10.0	89.0	35.0	48.0	40.0	1.83	●
100-035-10 PI3	10.0	10.0	89.0	35.0	48.0	40.0	1.85	●
101-040-12 PI3	10.1	12.0	102.0	40.0	55.0	45.0	1.88	●
102-040-12 PI3	10.2	12.0	102.0	40.0	55.0	45.0	1.91	●
103-040-12 PI3	10.3	12.0	102.0	40.0	55.0	45.0	1.94	●
104-040-12 PI3	10.4	12.0	102.0	40.0	55.0	45.0	1.96	●
105-040-12 PI3	10.5	12.0	102.0	40.0	55.0	45.0	1.98	●
106-040-12 PI3	10.6	12.0	102.0	40.0	55.0	45.0	2.00	●
107-040-12 PI3	10.7	12.0	102.0	40.0	55.0	45.0	2.02	●

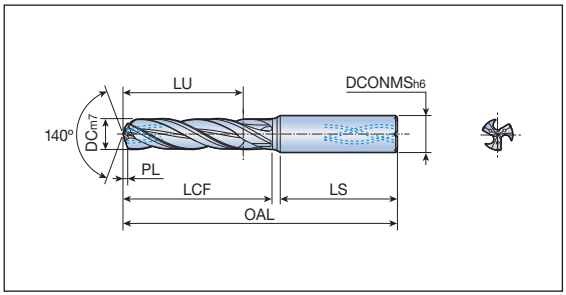
●: Standard items

3HD...PI3

3 flute solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 108-040-12 PI3	10.8	12	102	40	55	45	2.03	●
109-040-12 PI3	10.9	12	102	40	55	45	2.05	●
110-040-12 PI3	11.0	12	102	40	55	45	2.07	●
111-040-12 PI3	11.1	12	102	40	56	45	2.08	●
112-040-12 PI3	11.2	12	102	40	56	45	2.09	●
113-040-12 PI3	11.3	12	102	40	56	45	2.10	●
114-040-12 PI3	11.4	12	102	40	56	45	2.11	●
115-040-12 PI3	11.5	12	102	40	56	45	2.12	●
116-040-12 PI3	11.6	12	102	40	56	45	2.14	●
117-040-12 PI3	11.7	12	102	40	56	45	2.16	●
118-040-12 PI3	11.8	12	102	40	56	45	2.17	●
119-040-12 PI3	11.9	12	102	40	56	45	2.19	●
120-040-12 PI3	12.0	12	102	40	56	45	2.21	●

●: Standard items

3HD...PI5

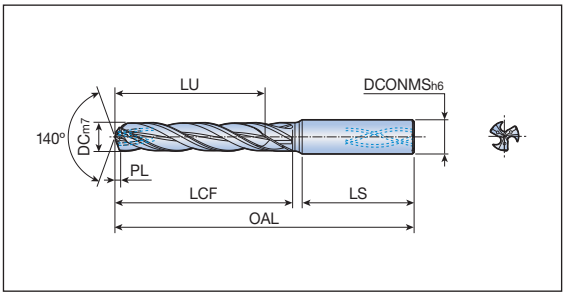
3 flute solid carbide drills with oil holes







• Drilling depth: 5xdiameter



Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 040-029-06 PI5	4.0	6	74	29	37	35	0.82	●
041-029-06 PI5	4.1	6	74	29	37	35	0.83	●
042-029-06 PI5	4.2	6	74	29	37	35	0.84	●
043-029-06 PI5	4.3	6	74	29	37	35	0.86	●
044-029-06 PI5	4.4	6	74	29	37	35	0.87	●
045-029-06 PI5	4.5	6	74	29	37	35	0.88	●
046-029-06 PI5	4.6	6	74	29	37	35	0.90	●
047-029-06 PI5	4.7	6	74	29	37	35	0.91	●
048-035-06 PI5	4.8	6	82	35	45	36	0.93	●
049-035-06 PI5	4.9	6	82	35	45	36	0.94	●
050-035-06 PI5	5.0	6	82	35	45	36	0.96	●
051-035-06 PI5	5.1	6	82	35	45	36	0.98	●
052-035-06 PI5	5.2	6	82	35	45	36	1.01	●
053-035-06 PI5	5.3	6	82	35	45	36	1.03	●
054-035-06 PI5	5.4	6	82	35	45	36	1.06	●
055-035-06 PI5	5.5	6	82	35	45	36	1.08	●
056-035-06 PI5	5.6	6	82	35	45	36	1.10	●
057-035-06 PI5	5.7	6	82	35	45	36	1.12	●
058-035-06 PI5	5.8	6	82	35	45	36	1.13	●
059-035-06 PI5	5.9	6	82	35	45	36	1.15	●
060-035-06 PI5	6.0	6	82	35	45	36	1.17	●
061-043-08 PI5	6.1	8	91	43	54	36	1.19	●
062-043-08 PI5	6.2	8	91	43	54	36	1.21	●
063-043-08 PI5	6.3	8	91	43	54	36	1.22	●
064-043-08 PI5	6.4	8	91	43	54	36	1.24	●
065-043-08 PI5	6.5	8	91	43	54	36	1.26	●
066-043-08 PI5	6.6	8	91	43	54	36	1.28	●
067-043-08 PI5	6.7	8	91	43	54	36	1.30	●
068-043-08 PI5	6.8	8	91	43	54	36	1.31	●
069-043-08 PI5	6.9	8	91	43	54	36	1.33	●
070-043-08 PI5	7.0	8	91	43	54	36	1.35	●
071-043-08 PI5	7.1	8	91	43	54	36	1.36	●
072-043-08 PI5	7.2	8	91	43	54	36	1.37	●
073-043-08 PI5	7.3	8	91	43	54	36	1.38	●

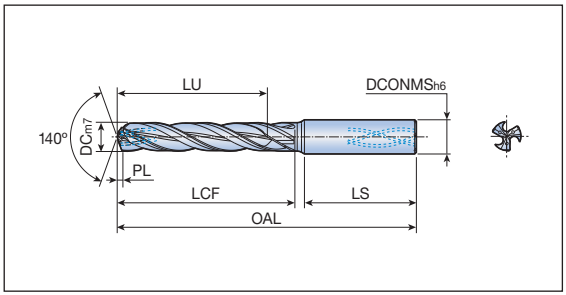
●: Standard items

3HD...PI5

3 flute solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 074-043-08 PI5	7.4	8	91	43	54	36	1.39	●
075-043-08 PI5	7.5	8	91	43	54	36	1.40	●
076-043-08 PI5	7.6	8	91	43	54	36	1.42	●
077-043-08 PI5	7.7	8	91	43	54	36	1.44	●
078-043-08 PI5	7.8	8	91	43	54	36	1.45	●
079-043-08 PI5	7.9	8	91	43	54	36	1.47	●
080-043-08 PI5	8.0	8	91	43	54	36	1.49	●
081-049-10 PI5	8.1	10	103	49	62	40	1.52	●
082-049-10 PI5	8.2	10	103	49	62	40	1.55	●
083-049-10 PI5	8.3	10	103	49	62	40	1.57	●
084-049-10 PI5	8.4	10	103	49	62	40	1.60	●
085-049-10 PI5	8.5	10	103	49	62	40	1.63	●
086-049-10 PI5	8.6	10	103	49	62	40	1.65	●
087-049-10 PI5	8.7	10	103	49	62	40	1.67	●
088-049-10 PI5	8.8	10	103	49	62	40	1.69	●
089-049-10 PI5	8.9	10	103	49	62	40	1.70	●
090-049-10 PI5	9.0	10	103	49	62	40	1.72	●
091-049-10 PI5	9.1	10	103	49	62	40	1.73	●
092-049-10 PI5	9.2	10	103	49	62	40	1.73	●
093-049-10 PI5	9.3	10	103	49	62	40	1.74	●
094-049-10 PI5	9.4	10	103	49	62	40	1.74	●
095-049-10 PI5	9.5	10	103	49	62	40	1.75	●
096-049-10 PI5	9.6	10	103	49	62	40	1.77	●
097-049-10 PI5	9.7	10	103	49	62	40	1.79	●
098-049-10 PI5	9.8	10	103	49	62	40	1.81	●
099-049-10 PI5	9.9	10	103	49	62	40	1.83	●
100-049-10 PI5	10.0	10	103	49	62	40	1.85	●
101-056-12 PI5	10.1	12	118	56	71	45	1.88	●
102-056-12 PI5	10.2	12	118	56	71	45	1.91	●
103-056-12 PI5	10.3	12	118	56	71	45	1.94	●
104-056-12 PI5	10.4	12	118	56	71	45	1.96	●
105-056-12 PI5	10.5	12	118	56	71	45	1.98	●
106-056-12 PI5	10.6	12	118	56	71	45	2.00	●
107-056-12 PI5	10.7	12	118	56	71	45	2.02	●

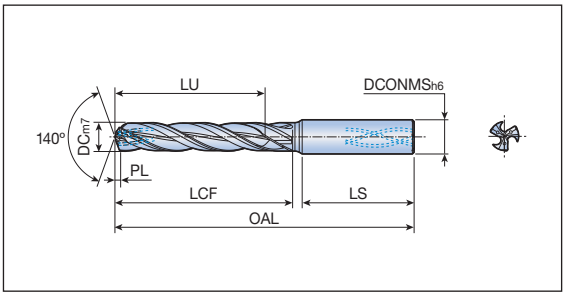
●: Standard items

3HD...PI5

3 flute solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation		Dimension (mm)							Grade
		DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD	108-056-12 PI5	10.8	12	118	56	71	45	2.03	●
	109-056-12 PI5	10.9	12	118	56	71	45	2.05	●
	110-056-12 PI5	11.0	12	118	56	71	45	2.07	●
	111-056-12 PI5	11.1	12	118	56	72	45	2.08	●
	112-056-12 PI5	11.2	12	118	56	72	45	2.09	●
	113-056-12 PI5	11.3	12	118	56	72	45	2.10	●
	114-056-12 PI5	11.4	12	118	56	72	45	2.11	●
	115-056-12 PI5	11.5	12	118	56	72	45	2.12	●
	116-056-12 PI5	11.6	12	118	56	72	45	2.14	●
	117-056-12 PI5	11.7	12	118	56	72	45	2.16	●
	118-056-12 PI5	11.8	12	118	56	72	45	2.17	●
	119-056-12 PI5	11.9	12	118	56	72	45	2.19	●
	120-056-12 PI5	12.0	12	118	56	72	45	2.21	●

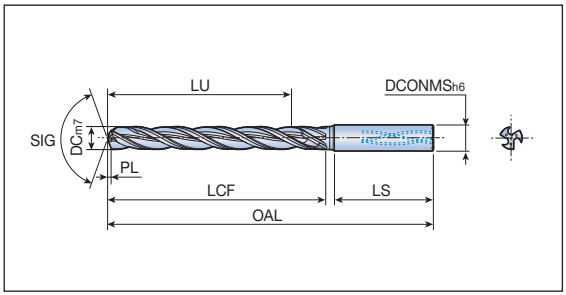
●: Standard items

3HD...PI8

3 flute solid carbide drills with oil holes







• Drilling depth: 8xdiameter

Designation		Dimension (mm)								Grade
		DC	DCONMS	OAL	SIG	LU	LCF	LS	PL	TT5130
3HD	040-036-06 PI8	4.0	6	81	140	36	43	35	0.82	●
	045-036-06 PI8	4.5	6	81	140	36	43	35	0.88	●
	050-048-06 PI8	5.0	6	95	140	48	57	36	0.96	●
	055-048-06 PI8	5.5	6	95	140	48	57	36	1.08	●
	060-048-06 PI8	6.0	6	95	140	48	57	36	1.17	●
	065-064-08 PI8	6.5	8	114	140	64	76	36	1.26	●
	070-064-08 PI8	7.0	8	114	140	64	76	36	1.35	●
	075-064-08 PI8	7.5	8	114	140	64	76	36	1.40	●
	080-064-08 PI8	8.0	8	114	140	64	76	36	1.49	●
	085-080-10 PI8	8.5	10	142	130	80	95	40	2.04	●
	090-080-10 PI8	9.0	10	142	130	80	95	40	2.16	●
	095-080-10 PI8	9.5	10	142	130	80	95	40	2.29	●
	100-080-10 PI8	10.0	10	142	130	80	95	40	2.33	●
	105-096-12 PI8	10.5	12	162	130	96	113	45	2.50	●
	110-096-12 PI8	11.0	12	162	130	96	113	45	2.61	●
	115-096-12 PI8	11.5	12	162	130	96	113	45	2.67	●
	120-096-12 PI8	12.0	12	162	130	96	113	45	2.80	●

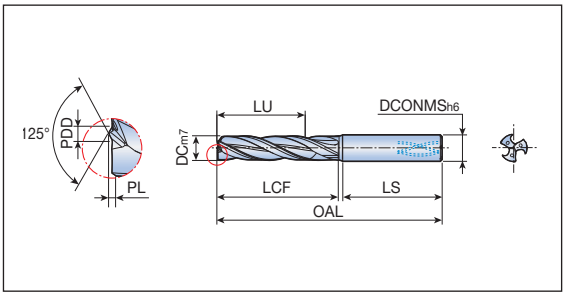
●: Standard items

3HD...FI3

3 flute solid carbide drills for flat bottom holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)								Grade
	DC	DCONMS	OAL	LU	LCF	LS	PDD	PL	TT5130
3HD 040-017-06 FI3	4.0	6	66	17	25	35	0.77	0.43	●
045-017-06 FI3	4.5	6	66	17	25	35	0.86	0.45	●
050-020-06 FI3	5.0	6	66	20	29	36	0.97	0.47	●
055-020-06 FI3	5.5	6	66	20	29	36	1.08	0.58	●
060-020-06 FI3	6.0	6	66	20	29	36	1.08	0.58	●
065-024-08 FI3	6.5	8	79	24	35	36	1.26	0.62	●
070-024-08 FI3	7.0	8	79	24	35	36	1.26	0.62	●
075-029-08 FI3	7.5	8	79	29	42	36	1.44	0.66	●
080-029-08 FI3	8.0	8	79	29	42	36	1.44	0.66	●
085-035-10 FI3	8.5	10	89	35	48	40	1.62	0.79	●
090-035-10 FI3	9.0	10	89	35	48	40	1.62	0.79	●
095-035-10 FI3	9.5	10	89	35	48	40	1.80	0.82	●
100-035-10 FI3	10.0	10	89	35	48	40	1.80	0.82	●
105-040-12 FI3	10.5	12	102	40	55	45	1.98	0.95	●
110-040-12 FI3	11.0	12	102	40	55	45	1.98	0.95	●
115-040-12 FI3	11.5	12	102	40	56	45	2.16	0.98	●
120-040-12 FI3	12.0	12	102	40	56	45	2.16	0.98	●

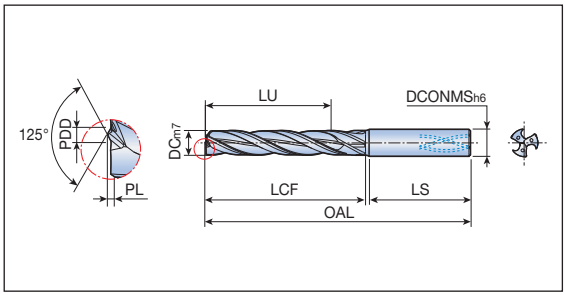
●: Standard items

3HD...FI5

3 flute solid carbide drills for flat bottom holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)								Grade
	DC	DCONMS	OAL	LU	LCF	LS	PDD	PL	TT9030
3HD 040-017-06 FI3	4.0	6	66	17	25	35	0.77	0.43	●
045-017-06 FI3	4.5	6	66	17	25	35	0.86	0.45	●
050-020-06 FI3	5.0	6	66	20	29	36	0.97	0.47	●
055-020-06 FI3	5.5	6	66	20	29	36	1.08	0.58	●
060-020-06 FI3	6.0	6	66	20	29	36	1.08	0.58	●
065-024-08 FI3	6.5	8	79	24	35	36	1.26	0.62	●
070-024-08 FI3	7.0	8	79	24	35	36	1.26	0.62	●
075-029-08 FI3	7.5	8	79	29	42	36	1.44	0.66	●
080-029-08 FI3	8.0	8	79	29	42	36	1.44	0.66	●
085-035-10 FI3	8.5	10	89	35	48	40	1.62	0.79	●
090-035-10 FI3	9.0	10	89	35	48	40	1.62	0.79	●
095-035-10 FI3	9.5	10	89	35	48	40	1.80	0.82	●
100-035-10 FI3	10.0	10	89	35	48	40	1.80	0.82	●
105-040-12 FI3	10.5	12	102	40	55	45	1.98	0.95	●
110-040-12 FI3	11.0	12	102	40	55	45	1.98	0.95	●
115-040-12 FI3	11.5	12	102	40	56	45	2.16	0.98	●
120-040-12 FI3	12.0	12	102	40	56	45	2.16	0.98	●

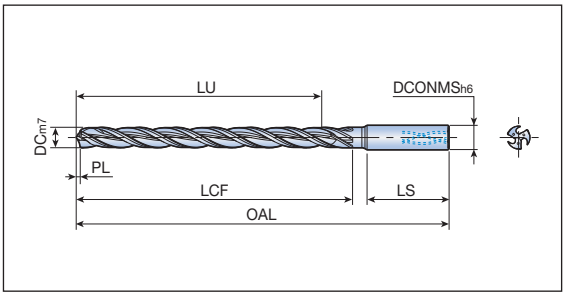
●: Standard items

3HD...CI12

3 flute solid carbide drill with oil holes (12xD)







• Drilling depth: 12xdiameter

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT5130
3HD 060-069-06 CI12	6.0	6	116	69	78	36	1.38	●
065-096-08 CI12	6.5	8	146	96	108	36	1.57	●
070-096-08 CI12	7.0	8	146	96	108	36	1.60	●
075-096-08 CI12	7.5	8	146	96	108	36	1.78	●
080-096-08 CI12	8.0	8	146	96	108	36	1.81	●
085-105-10 CI12	8.5	10	162	105	120	40	2.07	●
090-105-10 CI12	9.0	10	162	105	120	40	2.10	●
095-105-10 CI12	9.5	10	162	105	120	40	2.27	●
100-105-10 CI12	10.0	10	162	105	120	40	2.30	●
105-139-12 CI12	10.5	12	204	139	156	45	2.56	●
110-139-12 CI12	11.0	12	204	139	156	45	2.59	●
115-139-12 CI12	11.5	12	204	139	156	45	2.76	●
120-139-12 CI12	12.0	12	204	139	156	45	2.79	●

●: Standard items

11 Carbide drill for deep hole machining

MQL DRILL

- *Solid carbide drill for deep hole Machining (10D – 20D)*
- *Use of pilot drill increased tool life and machining stability*

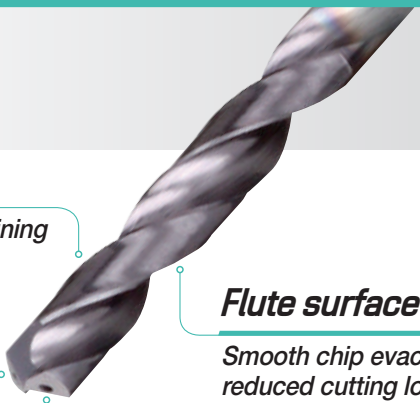


Machining depth -10D, 15D, 20D

Solid drills for deep hole machining

Stable cutting edge design

Enhanced drill rigidity and improved tool life



Flute surface treatment

Smooth chip evacuation and reduced cutting load

Internal coolant supply

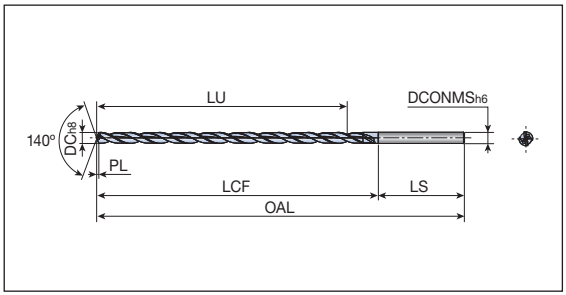


SHO 10/15/20

Solid long drills with oil holes







- Drilling depth: 10/15/20xdiameter
- M.Q.L drilling is available

Designation	Dimension (mm)							Grade
	DC	DCONMS	OAL	LU	LCF	LS	PL	TT9030
SHO 10040	4.0	4	105.6	50	55.6	50	0.6	●
10050	5.0	5	115.8	60	65.8	50	0.8	●
10060	6.0	6	131.0	76	81.0	50	1.0	●
10070	7.0	7	141.1	86	91.1	50	1.1	●
10080	8.0	8	156.3	98	106.3	50	1.3	●
10090	9.0	9	171.4	108	116.4	55	1.4	●
10100	10.0	10	191.6	123	131.6	60	1.6	●
15040	4.0	4	125.6	70	75.6	50	0.6	●
15050	5.0	5	140.8	85	90.8	50	0.8	●
15060	6.0	6	161.0	106	111.0	50	1.0	●
15070	7.0	7	176.1	121	126.1	50	1.1	●
15080	8.0	8	196.3	138	146.3	50	1.3	●
15090	9.0	9	221.4	153	161.4	60	1.4	●
15100	10.0	10	241.6	173	181.6	60	1.6	●
20040	4.0	4	140.6	85	90.6	50	0.6	●
20050	5.0	5	165.8	110	115.8	50	0.8	●
20060	6.0	6	191.0	136	141.0	50	1.0	●
20070	7.0	7	211.1	156	161.1	50	1.1	●
20080	8.0	8	231.3	173	181.3	50	1.3	●
20090	9.0	9	266.4	198	206.4	60	1.4	●
20100	10.0	10	286.6	218	226.6	60	1.6	●

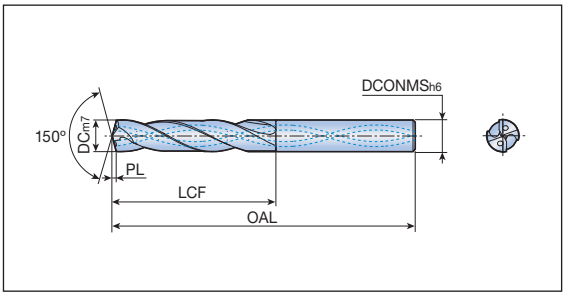
●: Standard items

SHO 3...-PH

Solid long drills with oil holes







• M.Q.L drilling is available

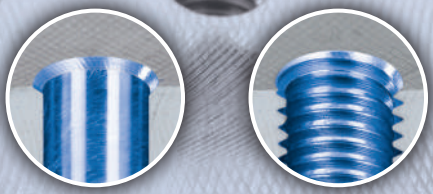
Designation	Dimension (mm)					Grade
	DC	DCONMS	OAL	LCF	PL	TT9030
SHO 30403-PH	4.03	4	66.5	24.5	0.5	●
30503-PH	5.03	5	68.6	30.6	0.6	●
30603-PH	6.03	6	68.7	30.7	0.7	●
30703-PH	7.03	7	73.8	35.8	0.8	●
30803-PH	8.03	8	79.9	41.9	0.9	●
30903-PH	9.03	9	91.0	49.0	1.0	●
31003-PH	10.03	10	91.1	49.1	1.1	●

●: Standard items

12 Carbide drill for pre-thread holes

HDRILL

- Pilot drill diameter for ISO thread standards
- Chamfer design for smooth tapping
- Carbide drill for pre-thread holes





Chamfer design for improved tapping performance

Wide range of drill diameters for pre-thread holes

Available sizes:
M4, M5, M6, M8, M10

Internal coolant supply

Multi-layer coating grade - TT9030

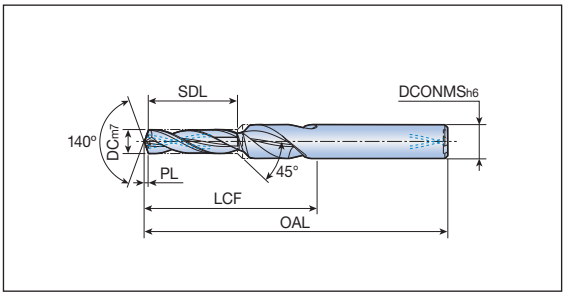
Enhanced tool life

SHO...-M

Solid carbide drills for pre-thread holes







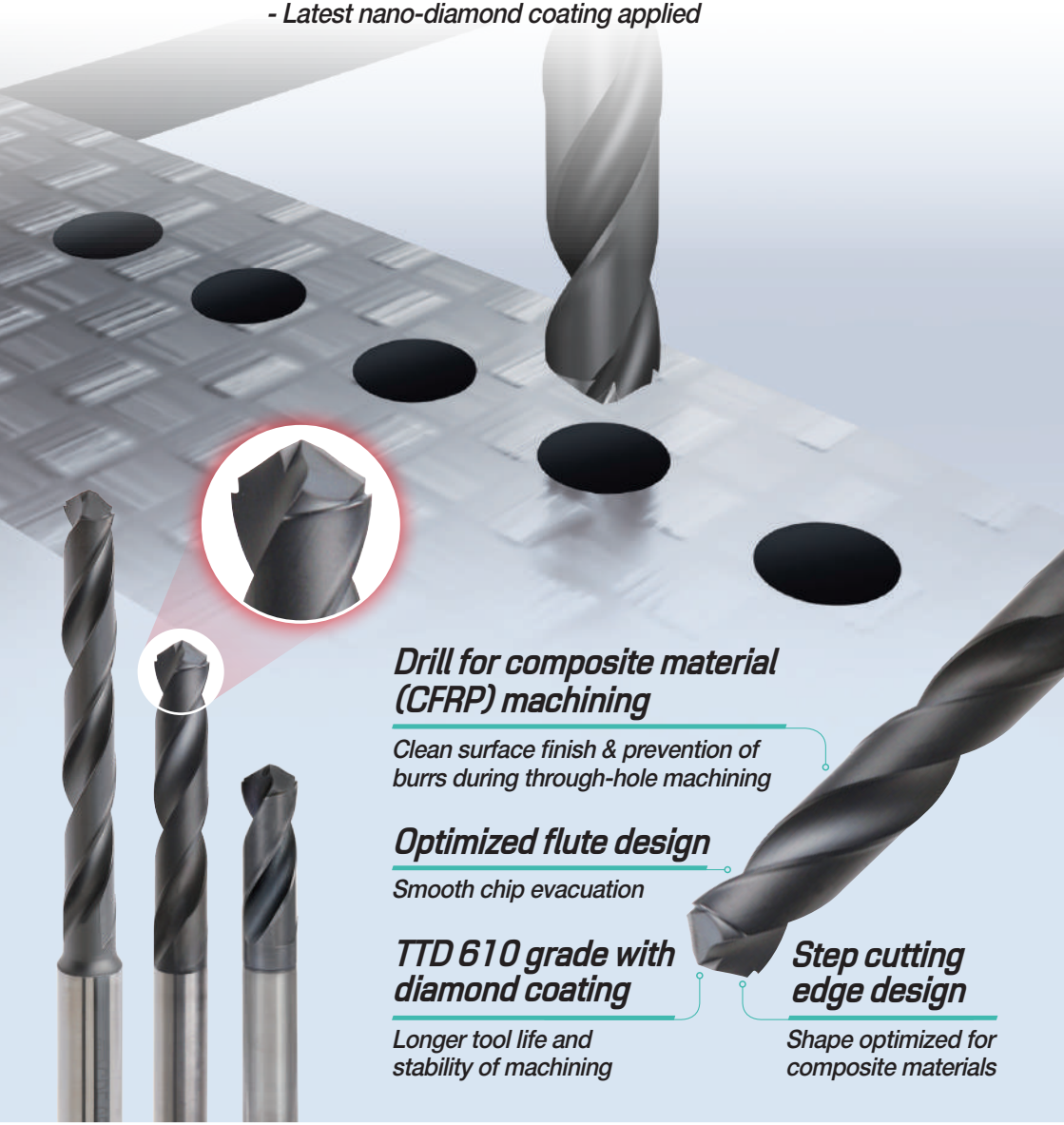
Designation		ISO thread	Dimension (mm)						Grade
			DC	OAL	SDL	LCF	DCONMS	PL	TT9030
SHO	033x12x6-M4	M4	3.3	62.5	12	26.5	6	0.5	●
	042x15x6-M5	M5	4.2	66.6	15	28.6	6	0.6	●
	050x18x8-M6	M6	5.0	79.8	18	36.8	8	0.8	●
	068x24x10-M8	M8	6.8	91.0	24	49.0	10	1.0	●
	085x30x12-M10	M10	8.5	103.3	30	56.3	12	1.3	●

●: Standard items

13 Carbide drill for composite material machining

HDRILL

- *Optimized cutting edge for composite materials (CFRP)*
- *Latest nano-diamond coating applied*



Drill for composite material (CFRP) machining

Clean surface finish & prevention of burrs during through-hole machining

Optimized flute design

Smooth chip evacuation

TTD 610 grade with diamond coating

Longer tool life and stability of machining

Step cutting edge design

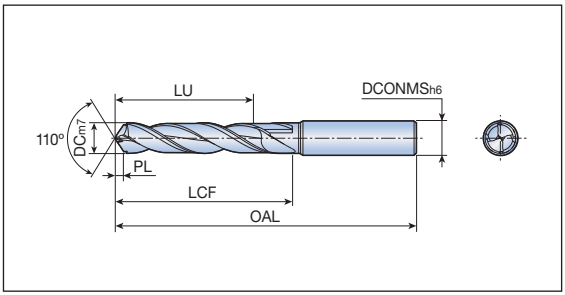
Shape optimized for composite materials

CDF

Solid carbide drills for composite material







Designation		Dimension (mm)							Grade
		DC (Metric)	DC (Inch)	DCONMS	OAL	LU	LCF	PL	TTD610
CDF	030-027-06	3	-	6	72.7	28	34.7	0.7	●
	040-027-06	4	-	6	73.0	28	35.0	1.0	●
	0476-034-06	4.76	3/16	6	81.3	35	43.3	1.3	●
	050-034-06	5	-	6	81.3	35	43.3	1.3	●
	060-034-06	6	-	6	81.7	36	43.7	1.7	●
	0635-040-08	6.35	-	8	89.7	42	51.7	1.7	●
	070-040-08	7	-	8	89.9	42	51.9	1.9	●
	0794-040-08	7.94	5/16	8	90.2	42	52.2	2.2	●
	080-040-08	8	-	8	90.2	42	52.2	2.2	●
	090-045-10	9	-	10	101.5	48	59.5	2.5	●
	0952-045-10	9.52	3/8	10	101.6	48	59.6	2.6	●
	100-045-10	10	-	10	101.8	48	59.8	2.8	●
	110-052-12	11	-	12	117.1	55	70.1	3.1	●
	1111-052-12	11.11	7/16	12	117.1	55	70.1	3.1	●
	120-052-12	12	-	12	117.4	55	70.4	3.4	●
	127-055-14	12.7	1/2	14	122.6	59c	75.6	3.6	●

●: Standard items

14 Carbide drill for general-purpose applications

HDRILL

- *Optimized cutting edge for increased cutting force and reduced cutting load*
- *Flute design for superior chip evacuation*
- *Multi-layer coating applied for excellent wear resistance*





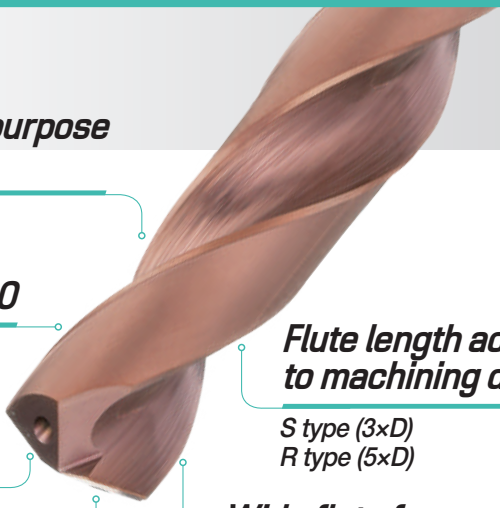
Economical general-purpose carbide drill

Latest multi-layer coating grade: TT5130

Improved toughness and wear resistance

Stable cutting edge

Optimized for increased cutting force and reduced cutting load clean surface finish



Flute length according to machining depth

S type (3×D)
R type (5×D)

Wide flute for chip evacuation

Internal /external coolant supply

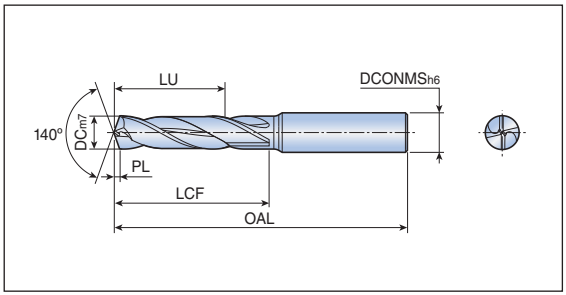


TED S

Solid carbide drills without oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED S030-4	3.0	4	62	11	18	0.5	●
S031-4	3.1	4	62	11	18	0.5	●
S032-4	3.2	4	62	11	18	0.5	●
S033-4	3.3	4	62	11	18	0.5	●
S034-4	3.4	4	62	11	18	0.5	●
S035-4	3.5	4	62	11	18	0.6	●
S036-4	3.6	4	62	11	18	0.6	●
S037-4	3.7	4	62	11	18	0.6	●
S038-4	3.8	4	66	12	18	0.6	●
S039-4	3.9	4	66	12	18	0.6	●
S040-4	4.0	4	66	12	18	0.6	●
S041-5	4.1	5	66	19	27	0.7	●
S042-5	4.2	5	66	19	27	0.7	●
S043-5	4.3	5	66	19	27	0.7	●
S044-5	4.4	5	66	19	27	0.7	●
S045-5	4.5	5	66	19	27	0.7	●
S046-5	4.6	5	66	19	27	0.8	●
S047-5	4.7	5	66	19	27	0.8	●
S048-5	4.8	5	66	19	27	0.8	●
S049-5	4.9	5	66	19	27	0.8	●
S050-5	5.0	5	66	19	27	0.8	●
S051-6	5.1	6	66	22	31	0.8	●
S052-6	5.2	6	66	22	31	0.8	●
S053-6	5.3	6	66	22	31	0.8	●
S054-6	5.4	6	66	22	31	0.8	●
S055-6	5.5	6	66	22	31	0.9	●
S056-6	5.6	6	66	22	31	0.9	●
S057-6	5.7	6	66	22	31	0.9	●
S058-6	5.8	6	66	22	31	0.9	●
S059-6	5.9	6	66	22	31	0.9	●
S060-6	6.0	6	66	22	31	0.9	●
S061-7	6.1	7	79	26	37	1	●
S062-7	6.2	7	79	26	37	1	●
S063-7	6.3	7	79	26	37	1	●

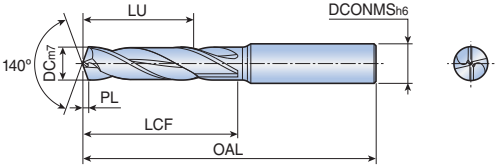
●: Standard items

TED S

Solid carbide drills without oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED S064-7	6.4	7	79	26	37	1	●
S065-7	6.5	7	79	26	37	1	●
S066-7	6.6	7	79	26	37	1	●
S067-7	6.7	7	79	26	37	1.1	●
S068-7	6.8	7	79	26	37	1.1	●
S069-7	6.9	7	79	26	37	1.1	●
S070-7	7.0	7	79	26	37	1.1	●
S071-8	7.1	8	79	28	41	1.1	●
S072-8	7.2	8	79	28	41	1.1	●
S073-8	7.3	8	79	28	41	1.1	●
S074-8	7.4	8	79	28	41	1.2	●
S075-8	7.5	8	79	28	41	1.2	●
S076-8	7.6	8	79	28	41	1.2	●
S077-8	7.7	8	79	28	41	1.2	●
S078-8	7.8	8	79	28	41	1.2	●
S079-8	7.9	8	79	28	41	1.3	●
S080-8	8.0	8	79	28	41	1.3	●
S081-9	8.1	9	89	32	45	1.3	●
S082-9	8.2	9	89	32	45	1.3	●
S083-9	8.3	9	89	32	45	1.3	●
S084-9	8.4	9	89	32	45	1.3	●
S085-9	8.5	9	89	32	45	1.3	●
S086-9	8.6	9	89	32	45	1.4	●
S087-9	8.7	9	89	32	45	1.4	●
S088-9	8.8	9	89	32	45	1.4	●
S089-9	8.9	9	89	32	45	1.4	●
S090-9	9.0	9	89	32	45	1.4	●
S091-10	9.1	10	89	35	48	1.4	●
S092-10	9.2	10	89	35	48	1.4	●
S093-10	9.3	10	89	35	48	1.5	●
S094-10	9.4	10	89	35	48	1.5	●
S095-10	9.5	10	89	35	48	1.5	●
S096-10	9.6	10	89	35	48	1.5	●
S097-10	9.7	10	89	35	48	1.5	●

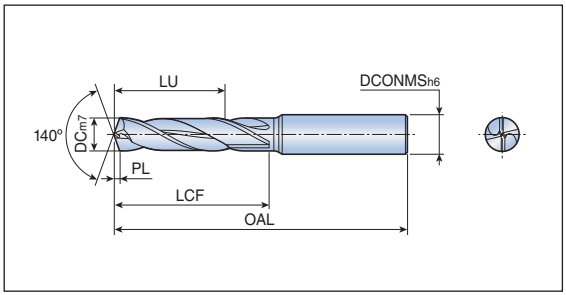
●: Standard items

TED S

Solid carbide drills without oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED S098-10	9.8	10	89	35	48	1.6	●
S099-10	9.9	10	89	35	48	1.6	●
S100-10	10.0	10	89	35	48	1.6	●
S101-11	10.1	11	102	36	50	1.6	●
S102-11	10.2	11	102	36	50	1.6	●
S103-11	10.3	11	102	36	50	1.6	●
S104-11	10.4	11	102	36	50	1.6	●
S105-11	10.5	11	102	36	50	1.6	●
S106-11	10.6	11	102	36	50	1.7	●
S107-11	10.7	11	102	36	50	1.7	●
S108-11	10.8	11	102	36	50	1.7	●
S109-11	10.9	11	102	36	50	1.7	●
S110-11	11.0	11	102	36	50	1.7	●
S111-12	11.1	12	102	42	57	1.7	●
S112-12	11.2	12	102	42	57	1.8	●
S113-12	11.3	12	102	42	57	1.8	●
S114-12	11.4	12	102	42	57	1.8	●
S115-12	11.5	12	102	42	57	1.8	●
S116-12	11.6	12	102	42	57	1.8	●
S117-12	11.7	12	102	42	57	1.9	●
S118-12	11.8	12	102	42	57	1.9	●
S119-12	11.9	12	102	42	57	1.9	●
S120-12	12.0	12	102	42	57	1.9	●

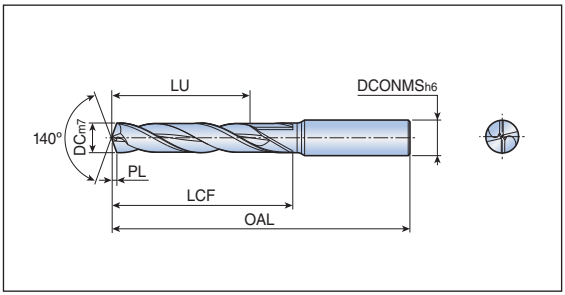
●: Standard items

TED R

Solid carbide drills without oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED R030-4	3.0	4	66	24	30	0.5	●
R031-4	3.1	4	66	24	30	0.5	●
R032-4	3.2	4	66	24	30	0.5	●
R033-4	3.3	4	66	24	30	0.5	●
R034-4	3.4	4	66	24	30	0.5	●
R035-4	3.5	4	66	24	30	0.6	●
R036-4	3.6	4	66	24	30	0.6	●
R037-4	3.7	4	66	24	30	0.6	●
R038-4	3.8	4	74	24	30	0.6	●
R039-4	3.9	4	74	24	30	0.6	●
R040-4	4.0	4	74	24	30	0.6	●
R041-5	4.1	5	74	32	40	0.7	●
R042-5	4.2	5	74	32	40	0.7	●
R043-5	4.3	5	74	32	40	0.7	●
R044-5	4.4	5	74	32	40	0.7	●
R045-5	4.5	5	74	32	40	0.7	●
R046-5	4.6	5	74	32	40	0.7	●
R047-5	4.7	5	74	32	40	0.8	●
R048-5	4.8	5	82	32	40	0.8	●
R049-5	4.9	5	82	32	40	0.8	●
R050-5	5.0	5	82	32	40	0.8	●
R051-6	5.1	6	82	35	45	0.8	●
R052-6	5.2	6	82	35	45	0.8	●
R053-6	5.3	6	82	35	45	0.8	●
R054-6	5.4	6	82	35	45	0.8	●
R055-6	5.5	6	82	35	45	0.9	●
R056-6	5.6	6	82	35	45	0.9	●
R057-6	5.7	6	82	35	45	0.9	●
R058-6	5.8	6	82	35	45	0.9	●
R059-6	5.9	6	82	35	45	0.9	●
R060-6	6.0	6	82	35	45	0.9	●
R061-7	6.1	7	91	37	48	1	●
R062-7	6.2	7	91	37	48	1	●
R063-7	6.3	7	91	37	48	1	●

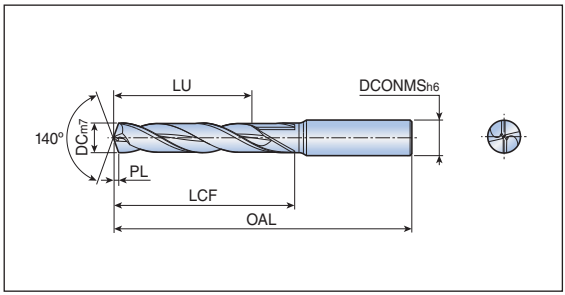
●: Standard items

TED R

Solid carbide drills without oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED R064-7	6.4	7	91	37	48	1	●
R065-7	6.5	7	91	37	48	1	●
R066-7	6.6	7	91	37	48	1	●
R067-7	6.7	7	91	37	48	1.1	●
R068-7	6.8	7	91	37	48	1.1	●
R069-7	6.9	7	91	37	48	1.1	●
R070-7	7.0	7	91	37	48	1.1	●
R071-8	7.1	8	91	42	53	1.1	●
R072-8	7.2	8	91	42	53	1.1	●
R073-8	7.3	8	91	42	53	1.1	●
R074-8	7.4	8	91	42	53	1.2	●
R075-8	7.5	8	91	42	53	1.2	●
R076-8	7.6	8	91	42	53	1.2	●
R077-8	7.7	8	91	42	53	1.2	●
R078-8	7.8	8	91	42	53	1.2	●
R079-8	7.9	8	91	42	53	1.3	●
R080-8	8.0	8	91	42	53	1.3	●
R081-9	8.1	9	103	46	59	1.3	●
R082-9	8.2	9	103	46	59	1.3	●
R083-9	8.3	9	103	46	59	1.3	●
R084-9	8.4	9	103	46	59	1.3	●
R085-9	8.5	9	103	46	59	1.3	●
R086-9	8.6	9	103	46	59	1.4	●
R087-9	8.7	9	103	46	59	1.4	●
R088-9	8.8	9	103	46	59	1.4	●
R089-9	8.9	9	103	46	59	1.4	●
R090-9	9.0	9	103	46	59	1.4	●
R091-10	9.1	10	103	50	63	1.4	●
R092-10	9.2	10	103	50	63	1.4	●
R093-10	9.3	10	103	50	63	1.5	●
R094-10	9.4	10	103	50	63	1.5	●
R095-10	9.5	10	103	50	63	1.5	●
R096-10	9.6	10	103	50	63	1.5	●
R097-10	9.7	10	103	50	63	1.5	●

●: Standard items

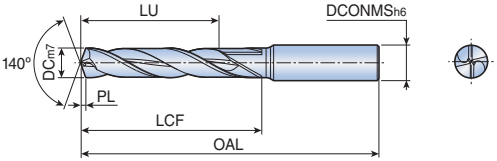
TED R

Solid carbide drills without oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TED R098-10	9.8	10	103	50	63	1.6	●
R099-10	9.9	10	103	50	63	1.6	●
R100-10	10.0	10	103	50	63	1.6	●
R101-11	10.1	11	118	53	68	1.6	●
R102-11	10.2	11	118	53	68	1.6	●
R103-11	10.3	11	118	53	68	1.6	●
R104-11	10.4	11	118	53	68	1.6	●
R105-11	10.5	11	118	53	68	1.6	●
R106-11	10.6	11	118	53	68	1.7	●
R107-11	10.7	11	118	53	68	1.7	●
R108-11	10.8	11	118	53	68	1.7	●
R109-11	10.9	11	118	53	68	1.7	●
R110-11	11.0	11	118	53	68	1.7	●
R111-12	11.1	12	118	59	75	1.7	●
R112-12	11.2	12	118	59	75	1.8	●
R113-12	11.3	12	118	59	75	1.8	●
R114-12	11.4	12	118	59	75	1.8	●
R115-12	11.5	12	118	59	75	1.8	●
R116-12	11.6	12	118	59	75	1.8	●
R117-12	11.7	12	118	59	75	1.9	●
R118-12	11.8	12	118	59	75	1.9	●
R119-12	11.9	12	118	59	75	1.9	●
R120-12	12.0	12	118	59	75	1.9	●

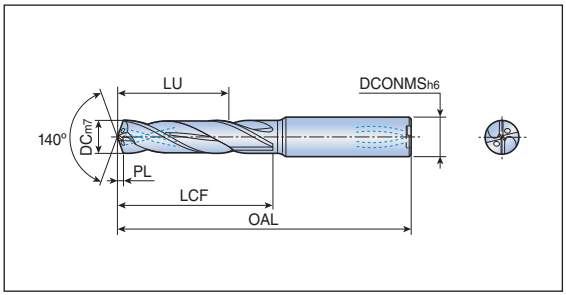
●: Standard items

TEO S

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO S030-6	3.0	6	62	11	18	0.5	●
S031-6	3.1	6	62	11	18	0.5	●
S032-6	3.2	6	62	11	18	0.5	●
S033-6	3.3	6	62	11	18	0.5	●
S034-6	3.4	6	62	11	18	0.5	●
S035-6	3.5	6	62	11	18	0.6	●
S036-6	3.6	6	62	11	18	0.6	●
S037-6	3.7	6	62	11	18	0.6	●
S038-6	3.8	6	66	12	18	0.6	●
S039-6	3.9	6	66	12	18	0.6	●
S040-6	4.0	6	66	12	18	0.6	●
S041-6	4.1	6	66	19	27	0.7	●
S042-6	4.2	6	66	19	27	0.7	●
S043-6	4.3	6	66	19	27	0.7	●
S044-6	4.4	6	66	19	27	0.7	●
S045-6	4.5	6	66	19	27	0.7	●
S046-6	4.6	6	66	19	27	0.8	●
S047-6	4.7	6	66	19	27	0.8	●
S048-6	4.8	6	66	19	27	0.8	●
S049-6	4.9	6	66	19	27	0.8	●
S050-6	5.0	6	66	19	27	0.8	●
S051-6	5.1	6	66	22	31	0.8	●
S052-6	5.2	6	66	22	31	0.8	●
S053-6	5.3	6	66	22	31	0.8	●
S054-6	5.4	6	66	22	31	0.8	●
S055-6	5.5	6	66	22	31	0.9	●
S056-6	5.6	6	66	22	31	0.9	●
S057-6	5.7	6	66	22	31	0.9	●
S058-6	5.8	6	66	22	31	0.9	●
S059-6	5.9	6	66	22	31	0.9	●
S060-6	6.0	6	66	22	31	0.9	●
S061-7	6.1	7	79	26	37	1	●
S062-7	6.2	7	79	26	37	1	●
S063-7	6.3	7	79	26	37	1	●

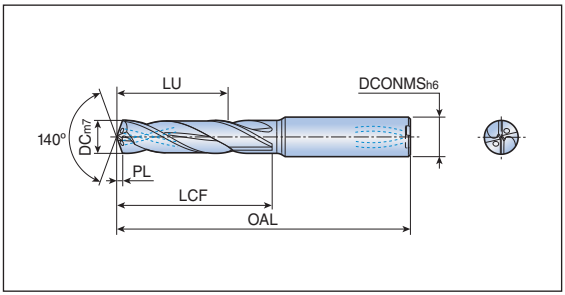
●: Standard items

TEO S

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO S064-7	6.4	7	79	26	37	1	●
S065-7	6.5	7	79	26	37	1	●
S066-7	6.6	7	79	26	37	1	●
S067-7	6.7	7	79	26	37	1.1	●
S068-7	6.8	7	79	26	37	1.1	●
S069-7	6.9	7	79	26	37	1.1	●
S070-7	7.0	7	79	26	37	1.1	●
S071-8	7.1	8	79	28	41	1.1	●
S072-8	7.2	8	79	28	41	1.1	●
S073-8	7.3	8	79	28	41	1.1	●
S074-8	7.4	8	79	28	41	1.2	●
S075-8	7.5	8	79	28	41	1.2	●
S076-8	7.6	8	79	28	41	1.2	●
S077-8	7.7	8	79	28	41	1.2	●
S078-8	7.8	8	79	28	41	1.2	●
S079-8	7.9	8	79	28	41	1.3	●
S080-8	8.0	8	79	28	41	1.3	●
S081-9	8.1	9	89	32	45	1.3	●
S082-9	8.2	9	89	32	45	1.3	●
S083-9	8.3	9	89	32	45	1.3	●
S084-9	8.4	9	89	32	45	1.3	●
S085-9	8.5	9	89	32	45	1.3	●
S086-9	8.6	9	89	32	45	1.4	●
S087-9	8.7	9	89	32	45	1.4	●
S088-9	8.8	9	89	32	45	1.4	●
S089-9	8.9	9	89	32	45	1.4	●
S090-9	9.0	9	89	32	45	1.4	●
S091-10	9.1	10	89	35	48	1.4	●
S092-10	9.2	10	89	35	48	1.4	●
S093-10	9.3	10	89	35	48	1.5	●
S094-10	9.4	10	89	35	48	1.5	●
S095-10	9.5	10	89	35	48	1.5	●
S096-10	9.6	10	89	35	48	1.5	●
S097-10	9.7	10	89	35	48	1.5	●

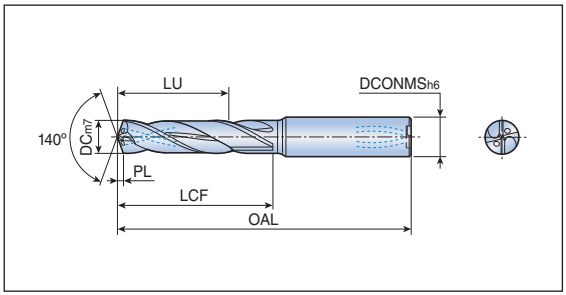
●: Standard items

TEO S

Solid carbide drills with oil holes







• Drilling depth: 3xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO S098-10	9.8	10	89	35	48	1.6	●
S099-10	9.9	10	89	35	48	1.6	●
S100-10	10.0	10	89	35	48	1.6	●
S101-11	10.1	11	102	36	50	1.6	●
S102-11	10.2	11	102	36	50	1.6	●
S103-11	10.3	11	102	36	50	1.6	●
S104-11	10.4	11	102	36	50	1.6	●
S105-11	10.5	11	102	36	50	1.6	●
S106-11	10.6	11	102	36	50	1.7	●
S107-11	10.7	11	102	36	50	1.7	●
S108-11	10.8	11	102	36	50	1.7	●
S109-11	10.9	11	102	36	50	1.7	●
S110-11	11.0	11	102	36	50	1.7	●
S111-12	11.1	12	102	42	57	1.7	●
S112-12	11.2	12	102	42	57	1.8	●
S113-12	11.3	12	102	42	57	1.8	●
S114-12	11.4	12	102	42	57	1.8	●
S115-12	11.5	12	102	42	57	1.8	●
S116-12	11.6	12	102	42	57	1.8	●
S117-12	11.7	12	102	42	57	1.9	●
S118-12	11.8	12	102	42	57	1.9	●
S119-12	11.9	12	102	42	57	1.9	●
S120-12	12.0	12	102	42	57	1.9	●

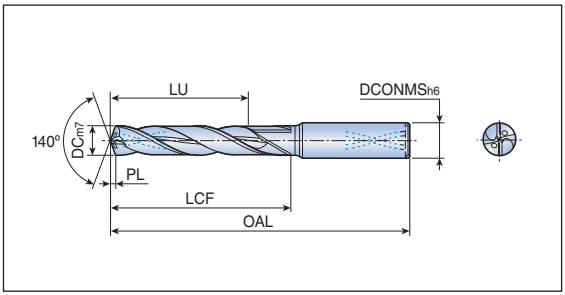
●: Standard items

TEO R

Solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO R030-6	3.0	6	66	24	30	0.5	●
R031-6	3.1	6	66	24	30	0.5	●
R032-6	3.2	6	66	24	30	0.5	●
R033-6	3.3	6	66	24	30	0.5	●
R034-6	3.4	6	66	24	30	0.5	●
R035-6	3.5	6	66	24	30	0.6	●
R036-6	3.6	6	66	24	30	0.6	●
R037-6	3.7	6	66	24	30	0.6	●
R038-6	3.8	6	74	24	30	0.6	●
R039-6	3.9	6	74	24	30	0.6	●
R040-6	4.0	6	74	24	30	0.6	●
R041-6	4.1	6	74	32	40	0.7	●
R042-6	4.2	6	74	32	40	0.7	●
R043-6	4.3	6	74	32	40	0.7	●
R044-6	4.4	6	74	32	40	0.7	●
R045-6	4.5	6	74	32	40	0.7	●
R046-6	4.6	6	74	32	40	0.7	●
R047-6	4.7	6	74	32	40	0.8	●
R048-6	4.8	6	82	32	40	0.8	●
R049-6	4.9	6	82	32	40	0.8	●
R050-6	5.0	6	82	32	40	0.8	●
R051-6	5.1	6	82	35	45	0.8	●
R052-6	5.2	6	82	35	45	0.8	●
R053-6	5.3	6	82	35	45	0.8	●
R054-6	5.4	6	82	35	45	0.8	●
R055-6	5.5	6	82	35	45	0.9	●
R056-6	5.6	6	82	35	45	0.9	●
R057-6	5.7	6	82	35	45	0.9	●
R058-6	5.8	6	82	35	45	0.9	●
R059-6	5.9	6	82	35	45	0.9	●
R060-6	6.0	6	82	35	45	0.9	●
R061-7	6.1	7	91	37	48	1	●
R062-7	6.2	7	91	37	48	1	●
R063-7	6.3	7	91	37	48	1	●

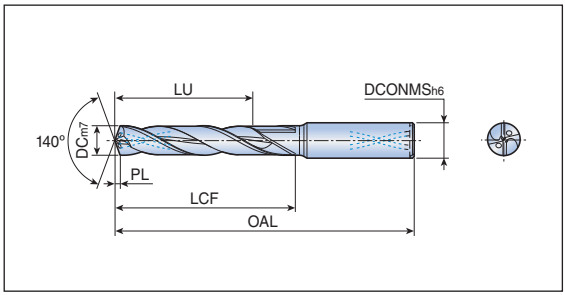
●: Standard items

TEO R

Solid carbide drills with oil holes







• Drilling depth: 5xdiameter

Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO R064-7	6.4	7	91	37	48	1	●
R065-7	6.5	7	91	37	48	1	●
R066-7	6.6	7	91	37	48	1	●
R067-7	6.7	7	91	37	48	1.1	●
R068-7	6.8	7	91	37	48	1.1	●
R069-7	6.9	7	91	37	48	1.1	●
R070-7	7.0	7	91	37	48	1.1	●
R071-8	7.1	8	91	42	53	1.1	●
R072-8	7.2	8	91	42	53	1.1	●
R073-8	7.3	8	91	42	53	1.1	●
R074-8	7.4	8	91	42	53	1.2	●
R075-8	7.5	8	91	42	53	1.2	●
R076-8	7.6	8	91	42	53	1.2	●
R077-8	7.7	8	91	42	53	1.2	●
R078-8	7.8	8	91	42	53	1.2	●
R079-8	7.9	8	91	42	53	1.3	●
R080-8	8.0	8	91	42	53	1.3	●
R081-9	8.1	9	103	46	59	1.3	●
R082-9	8.2	9	103	46	59	1.3	●
R083-9	8.3	9	103	46	59	1.3	●
R084-9	8.4	9	103	46	59	1.3	●
R085-9	8.5	9	103	46	59	1.3	●
R086-9	8.6	9	103	46	59	1.4	●
R087-9	8.7	9	103	46	59	1.4	●
R088-9	8.8	9	103	46	59	1.4	●
R089-9	8.9	9	103	46	59	1.4	●
R090-9	9.0	9	103	46	59	1.4	●
R091-10	9.1	10	103	50	63	1.4	●
R092-10	9.2	10	103	50	63	1.4	●
R093-10	9.3	10	103	50	63	1.5	●
R094-10	9.4	10	103	50	63	1.5	●
R095-10	9.5	10	103	50	63	1.5	●
R096-10	9.6	10	103	50	63	1.5	●
R097-10	9.7	10	103	50	63	1.5	●

●: Standard items

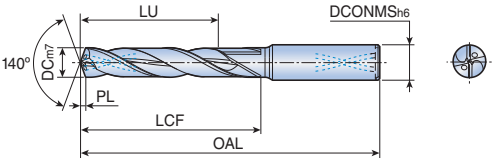
TEO R

Solid carbide drills with oil holes





• Drilling depth: 5xdiameter



Designation	Dimension (mm)						Grade
	DC	DCONMS	OAL	LU	LCF	PL	TT5130
TEO R098-10	9.8	10	103	50	63	1.6	●
R099-10	9.9	10	103	50	63	1.6	●
R100-10	10.0	10	103	50	63	1.6	●
R101-11	10.1	11	118	53	68	1.6	●
R102-11	10.2	11	118	53	68	1.6	●
R103-11	10.3	11	118	53	68	1.6	●
R104-11	10.4	11	118	53	68	1.6	●
R105-11	10.5	11	118	53	68	1.6	●
R106-11	10.6	11	118	53	68	1.7	●
R107-11	10.7	11	118	53	68	1.7	●
R108-11	10.8	11	118	53	68	1.7	●
R109-11	10.9	11	118	53	68	1.7	●
R110-11	11.0	11	118	53	68	1.7	●
R111-12	11.1	12	118	59	75	1.7	●
R112-12	11.2	12	118	59	75	1.8	●
R113-12	11.3	12	118	59	75	1.8	●
R114-12	11.4	12	118	59	75	1.8	●
R115-12	11.5	12	118	59	75	1.8	●
R116-12	11.6	12	118	59	75	1.8	●
R117-12	11.7	12	118	59	75	1.9	●
R118-12	11.8	12	118	59	75	1.9	●
R119-12	11.9	12	118	59	75	1.9	●
R120-12	12.0	12	118	59	75	1.9	●

●: Standard items

Recommended Cutting Conditions

Machining data for NHD

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	80-120
		>=0.25%C	Annealed	650	190	2	80-110
		<0.55%C	Quenched and tempered	850	250	3	70-100
		>=0.55%C	Annealed	750	220	4	70-100
			Quenched and tempered	1000	300	5	70-100
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	70-90
			Quenched and tempered	930	275	7	70-90
				1000	300	8	50-80
				1200	350	9	40-70
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	50-80
			Quenched and tempered	1100	325	11	40-70
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	30-60
			Martensitic	820	240	13	30-60
			Austenitic	600	180	14	30-60
K	Gray cast iron (GG)		Ferritic		160	15	65-80
			Pearlitic		250	16	65-80
	Cast iron nodular (GGG)		Ferritic		180	17	85-105
			Pearlitic		260	18	75-90
	Malleable cast iron		Ferritic		130	19	65-80
			Pearlitic		230	20	65-80
N	Aluminum - Wrought alloy		Not cureable		60	21	70-200
			Cured		100	22	70-200
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	70-200
			Cured		90	24	70-200
		>12% Si	High temp.		130	25	70-150
	Copper alloys	>1% Pb	Free cutting		110	26	70-200
			Brass		90	27	70-200
			Electrolitic copper		100	28	70-200
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	15-40
			Cured		280	32	15-40
		Ni or Co based	Annealed		250	33	15-40
			Cured		350	34	15-40
			Cast		320	35	15-40
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	10-40
			Hardened		60HRC	39	10-40
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter		
Ø3 - Ø5	Ø5.1 - Ø8	Ø8.1 - Ø12
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.08-0.18	0.10-0.20	0.15-0.25
0.08-0.18	0.10-0.20	0.15-0.25
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12

Recommended Cutting Conditions

Machining data for 3HD 3, 5, 8xD

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	80-140
		>=0.25%C	Annealed	650	190	2	80-130
		<0.55%C	Quenched and tempered	850	250	3	80-120
		>=0.55%C	Annealed	750	220	4	70-110
			Quenched and tempered	1000	300	5	50-90
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	80-120
			Quenched and tempered	930	275	7	70-110
				1000	300	8	50-90
				1200	350	9	40-70
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	50-90
			Quenched and tempered	1100	325	11	40-80
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	
			Martensitic	820	240	13	
			Austenitic	600	180	14	
K	Gray cast iron (GG)		Ferritic		160	15	80-140
			Pearlitic		250	16	70-120
	Cast iron nodular (GGG)		Ferritic		180	17	80-120
			Pearlitic		260	18	70-110
	Malleable cast iron		Ferritic		130	19	80-120
			Pearlitic		230	20	70-110
N	Aluminum - Wrought alloy		Not cureable		60	21	
			Cured		100	22	
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	
			Cured		90	24	
		>12% Si	High temp.		130	25	
	Copper alloys	>1% Pb	Free cutting		110	26	
			Brass		90	27	
			Electrolitic copper		100	28	
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	
			Cured		280	32	
		Ni or Co based	Annealed		250	33	
			Cured		350	34	
			Cast		320	35	
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	
			Hardened		60HRC	39	
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter 3,5,8xD				
Ø4 - Ø5	Ø5.1 - Ø6	Ø6.1 - Ø8	Ø8.1 - Ø10	Ø10.1 - Ø12
0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
0.15-0.25	0.20-0.35	0.25-0.45	0.30-0.55	0.35-0.60
0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.50	0.35-0.55
0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.50	0.35-0.55
0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.50	0.35-0.55
0.15-0.25	0.20-0.35	0.25-0.40	0.30-0.50	0.35-0.55
0.15-0.20	0.20-0.30	0.25-0.35	0.30-0.45	0.35-0.50
0.15-0.20	0.20-0.30	0.25-0.35	0.30-0.45	0.35-0.50
0.20-0.30	0.25-0.45	0.35-0.55	0.40-0.60	0.45-0.65
0.20-0.30	0.25-0.45	0.35-0.55	0.40-0.60	0.45-0.65
0.20-0.30	0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
0.20-0.30	0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
0.20-0.30	0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
0.20-0.30	0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60

Recommended Cutting Conditions

Machining data for 3HD 12xD

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	40-80
		>=0.25%C	Annealed	650	190	2	40-80
		<0.55%C	Quenched and tempered	850	250	3	40-80
		>=0.55%C	Annealed	750	220	4	30-70
			Quenched and tempered	1000	300	5	30-70
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	40-80
			Quenched and tempered	930	275	7	30-70
				1000	300	8	30-70
				1200	350	9	20-60
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	30-70
			Quenched and tempered	1100	325	11	20-60
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	
			Martensitic	820	240	13	
			Austenitic	600	180	14	
K	Gray cast iron (GG)		Ferritic		160	15	40-80
			Pearlitic		250	16	40-80
	Cast iron nodular (GGG)		Ferritic		180	17	40-80
			Pearlitic		260	18	30-70
	Malleable cast iron		Ferritic		130	19	40-80
			Pearlitic		230	20	30-70
N	Aluminum - Wrought alloy		Not cureable		60	21	
			Cured		100	22	
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	
			Cured		90	24	
		>12% Si	High temp.		130	25	
	Copper alloys	>1% Pb	Free cutting		110	26	
			Brass		90	27	
			Electrolitic copper		100	28	
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	
			Cured		280	32	
		Ni or Co based	Annealed		250	33	
			Cured		350	34	
			Cast		320	35	
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	
			Hardened		60HRC	39	
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter 12xD			
Ø6	Ø6.1 - Ø8	Ø8.1 - Ø10	Ø10.1 - Ø12
0.15-0.30	0.20-0.40	0.25-0.45	0.30-0.50
0.15-0.30	0.20-0.40	0.25-0.45	0.30-0.50
0.15-0.30	0.20-0.40	0.25-0.45	0.30-0.50
0.15-0.30	0.20-0.40	0.25-0.45	0.30-0.50
0.15-0.30	0.20-0.40	0.25-0.45	0.30-0.50
0.15-0.30	0.20-0.35	0.25-0.40	0.30-0.45
0.15-0.30	0.20-0.35	0.25-0.40	0.30-0.45
0.15-0.30	0.20-0.35	0.25-0.40	0.30-0.45
0.15-0.30	0.20-0.35	0.25-0.40	0.30-0.45
0.15-0.25	0.20-0.30	0.25-0.35	0.30-0.40
0.15-0.25	0.20-0.30	0.25-0.35	0.30-0.40
0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
0.20-0.40	0.30-0.50	0.35-0.55	0.40-0.60
0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55
0.15-0.35	0.25-0.45	0.30-0.50	0.35-0.55

Recommended Cutting Conditions

Machining data for MQL-DRILL

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	60-120
		>=0.25%C	Annealed	650	190	2	60-110
		<0.55%C	Quenched and tempered	850	250	3	60-100
		>=0.55%C	Annealed	750	220	4	60-100
			Quenched and tempered	1000	300	5	60-100
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	50-70
			Quenched and tempered	930	275	7	50-70
				1000	300	8	50-70
				1200	350	9	30-60
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	50-70
			Quenched and tempered	1100	325	11	30-60
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	30-60
			Martensitic	820	240	13	30-60
			Austenitic	600	180	14	30-60
K	Gray cast iron (GG)		Ferritic		160	15	50-80
			Pearlitic		250	16	50-80
	Cast iron nodular (GGG)		Ferritic		180	17	70-100
			Pearlitic		260	18	60-90
	Malleable cast iron		Ferritic		130	19	50-80
			Pearlitic		230	20	50-80
N	Aluminum - Wrought alloy		Not cureable		60	21	50-170
			Cured		100	22	50-170
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	50-170
			Cured		90	24	50-170
		>12% Si	High temp.		130	25	50-130
	Copper alloys	>1% Pb	Free cutting		110	26	50-170
			Brass		90	27	50-170
			Electrolitic copper		100	28	50-170
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	10-30
			Cured		280	32	10-30
		Ni or Co based	Annealed		250	33	10-30
			Cured		350	34	10-30
			Cast		320	35	10-30
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	10-30
			Hardened		60HRC	39	10-30
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter		
Ø4 - Ø5	Ø5.1 - Ø8	Ø8.1 - Ø10
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.08-0.18	0.10-0.20	0.15-0.25
0.08-0.18	0.10-0.20	0.15-0.25
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12

Recommended Cutting Conditions

Machining data for SHO...M

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	80-120
		>=0.25%C	Annealed	650	190	2	80-110
		<0.55%C	Quenched and tempered	850	250	3	70-100
		>=0.55%C	Annealed	750	220	4	70-100
			Quenched and tempered	1000	300	5	70-100
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	70-90
			Quenched and tempered	930	275	7	70-90
				1000	300	8	50-80
				1200	350	9	40-70
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	50-80
			Quenched and tempered	1100	325	11	40-70
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	30-60
			Martensitic	820	240	13	30-60
			Austenitic	600	180	14	30-60
K	Gray cast iron (GG)		Ferritic		160	15	65-80
			Pearlitic		250	16	65-80
	Cast iron nodular (GGG)		Ferritic		180	17	85-105
			Pearlitic		260	18	75-90
	Malleable cast iron		Ferritic		130	19	65-80
			Pearlitic		230	20	65-80
N	Aluminum - Wrought alloy		Not cureable		60	21	70-200
			Cured		100	22	70-200
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	70-200
			Cured		90	24	70-200
		>12% Si	High temp.		130	25	70-150
	Copper alloys	>1% Pb	Free cutting		110	26	70-200
			Brass		90	27	70-200
			Electrolitic copper		100	28	70-200
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	15-40
			Cured		280	32	15-40
		Ni or Co based	Annealed		250	33	15-40
			Cured		350	34	15-40
			Cast		320	35	15-40
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	10-40
			Hardened		60HRC	39	10-40
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter		
M4 / M5 / M6	M8	M10
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.08-0.18	0.10-0.20	0.15-0.25
0.08-0.18	0.10-0.20	0.15-0.25
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12

Recommended Cutting Conditions

Machining data for TED / TEO

ISO	Material		Condition	Tensile strength (N/mm^2)	Hardness HB	Material No.	Cutting speed Vc(m/min)
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	80-120
		>=0.25%C	Annealed	650	190	2	80-110
		<0.55%C	Quenched and tempered	850	250	3	70-100
		>=0.55%C	Annealed	750	220	4	70-100
			Quenched and tempered	1000	300	5	70-100
	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200	6	70-90
			Quenched and tempered	930	275	7	70-90
				1000	300	8	50-80
				1200	350	9	40-70
	High alloy steel, cast steel and tool steel		Annealed	680	200	10	50-80
			Quenched and tempered	1100	325	11	40-70
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	12	30-60
			Martensitic	820	240	13	30-60
			Austenitic	600	180	14	30-60
K	Gray cast iron (GG)		Ferritic		160	15	65-80
			Pearlitic		250	16	65-80
	Cast iron nodular (GGG)		Ferritic		180	17	85-105
			Pearlitic		260	18	75-90
	Malleable cast iron		Ferritic		130	19	65-80
			Pearlitic		230	20	65-80
N	Aluminum - Wrought alloy		Not cureable		60	21	70-200
			Cured		100	22	70-200
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	70-200
			Cured		90	24	70-200
		>12% Si	High temp.		130	25	70-150
	Copper alloys	>1% Pb	Free cutting		110	26	70-200
			Brass		90	27	70-200
			Electrolitic copper		100	28	70-200
	Non-metallic		Duroplastics, graphite		70 Shore D	29	
			Hard rubber		55 Shore D	30	
S	High temp. alloys	Fe based	Annealed		200	31	15-40
			Cured		280	32	15-40
		Ni or Co based	Annealed		250	33	15-40
			Cured		350	34	15-40
			Cast		320	35	15-40
	Titanium, Ti alloys		Pure	Rm 400	190	36	
			Alpha+beta alloys cured	Rm 1050	310	37	
H	Hardened steel		Hardened		55HRC	38	10-40
			Hardened		60HRC	39	10-40
	Chilled cast iron		Cast		400	40	
	Cast iron nodular		Hardened		55HRC	41	

▸ For more information of material groups, see the materials & grades "material conversion table"

Steel Stainless steel Cast iron Nonferrous High temp. alloys Hardened steel

Feed (mm/rev) vs. drill diameter		
Ø3 - Ø5	Ø5.1 - Ø8	Ø8.1 - Ø12
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.08-0.18	0.10-0.20	0.15-0.25
0.08-0.18	0.10-0.20	0.15-0.25
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.06-0.12	0.10-0.15	0.12-0.18
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.20	0.15-0.25	0.20-0.30
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.10-0.25	0.15-0.35	0.25-0.45
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.08-0.18	0.15-0.25	0.20-0.35
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12
0.02-0.08	0.04-0.10	0.06-0.12

Recommended Cutting Conditions

HDRILL

Machining data for CDF

Material	Tensile strength (N/mm^2)	Hardness HB	Cutting speed Vc (m/min)	Feed (mm/rev) vs. drill diameter			
				Ø3.0 - Ø6.0	Ø6.1- Ø8.0	Ø8.1- Ø10.0	Ø10.1- Ø12.7
CFRP	420	125	50-150	0.02-0.07	0.03-0.08	0.03-0.08	0.04-0.10
GFRP	650	190	40-120	0.02-0.07	0.03-0.08	0.03-0.08	0.04-0.10

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