HY-PRO

Carbide Milling & Drilling

HY-PRO

Series 5

Tool Material

CARBIDE — Tungsten carbide

1

Tolerance for Drill Diameter

m7 — Drill diameter tolerance

h8 — Drill diameter tolerance

2

Dril Point Angle

120° — Point angle

3

Milling Examples

 Suitable for contouring

 Slotting ball end

 Profiling

 Side milling

 Slotting square end

 Profiling

 Side milling

 Side milling ball end

 Ramping

 Slotting corner radius

 Trochoidal milling

 Helical milling

 High feed corner radius milling

4

Helix Angle

45° — Flute helix angle

5

Surface Treatment

TiAlN — Titanium aluminium nitride coating

DIA — Diamond coating

DLC — Diamond like coating

TiSiN — Multi-layer coating for exotic nickel and titanium alloys

EgiAs — Multi-layer coating, for improved wear resistance and performance

AlCrN — Multi-layer coating with unique nanostructure for high temperature resistance.

6

Shank

SHRINK FIT — Suitable for shrink fit system

 Flatted shank

SHANK h6 — Shank diameter tolerance

 Whistle notch

7

Miscellaneous

 Centre cutting

R ± 0.01 — Tolerance ball nose end mills

 Through coolant

 Milling conditions

SPEED FEED — Cutting conditions

8

HOME

OSG HY-PRO

Welcome to OSG UK's latest HY-PRO brochure.

HY-PRO VOLUME 5

At OSG UK, our committed team is devoted to delivering superior tooling solutions in support of our clients manufacturing requirements.

Through ongoing investments in our UK Manufacturing sites, we are delighted to expand the spectrum of available offerings. The HY-PRO range has consistently represented a cost-effective performance solution tailored to enhance manufacturers' daily requirements.

OSG UK's enduring success is attributable to the dedicated passion of our team and collaborative partnerships. As our operations expand and a broader array of offerings becomes accessible, we are committed to nurturing these relationships to provide enhanced support to our clients

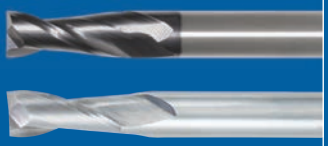
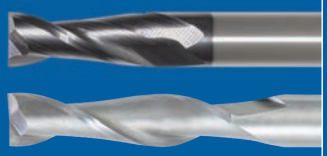
GLOBAL KNOWLEDGE, UK MANUFACTURING, LOCAL SUPPORT.

DRILLS

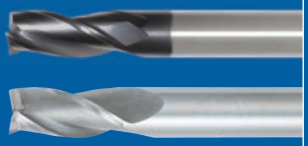
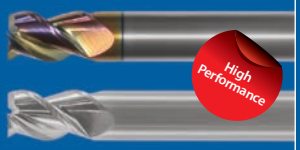
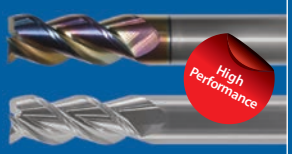
Application key: General | Non-ferrous | Aerospace | PCD | Diamond

	Description	Material	Range	Page
	HYP-JOBBER – jobber, uncoated		1-12.7	34
	HC-H-DRL – stub, uncoated		1-12	32
	HYP-HPO-3D – stub, through coolant		3-20	12
	HYP-HP-3D – stub		1-20	
	HYP-HPO-3D-HE – stub		3-20	
	HYP-AL-3D – Stub		1-12.7	18
	HYP-ALO-5D – regular, through coolant		3-12.7	20
	HYP-HPO-5D – regular, through coolant		3-20	22
	HYP-HP-5D – regular		1-20	
	HYP-HPO-5D-HE – regular		3-20	
	HYP-HPO-8D – long, through coolant		3-20	28
	HYP-CHF – 4 flute, 60°, 82°, 90° & 100°		4-12	31
	HYP-LDS – 2 flute, 90°, 120° & 142°		3-20	30
	HYP-HP-SC(O)-3D/5D, 2 flute drill + chamfer		3-20	36
	HYP-HP-SC(O)-3D/5D, 2 flute drill + chamfer		1-20	

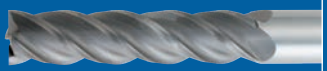
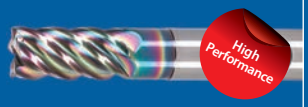
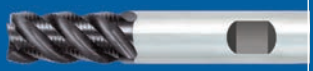
END MILLS

	Description	Material	Range	Page
	HYP-ZDS – 2 flutes, regular, counterboring holes for bolts & pre drilled holes on angled surfaces		4-10	67
	HYP-EDS-XCEED – 2 flutes, regular, centre cutting, TiALN coated HYP-EDS – 2 flutes, regular, centre cutting		1-25 1-25	42
	HYP-EDS-55, 2 flute, regular cut length, 55° helix		3-25	68
	HYP-EDL-55 – 2 flutes, long, 55° helix, centre cutting		3-25	69
	HYP-EDL-XCEED – 2 flutes, long, centre cutting, TiALN coated HYP-EDL – 2 flutes, long, centre cutting		3-25 3-25	22
	HYP-EDXL-XCEED – 2 flutes, extra long, centre cutting, TiALN coated HYP-EDXL – 2 flutes, extra long, centre cutting		3-12 3-12	44
	HYP-AL-EDS DLC – 2 flute, long reach HYP-AL-EDS – 2 flute, long reach		6-25 6-25	72
	HYP-AL-EDL DLC – 2 flute, long reach HYP-AL-EDL – 2 flute, long reach		6-25 6-25	72
	HYP-AL-LS-EDS DLC – 2 flute, long reach length HYP-AL-LS-EDS – 2 flute, long reach length		3-12 3-12	73

Application key: General | Non-ferrous | Aerospace | PCD | Diamond

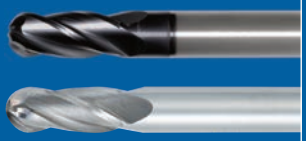
	Description	Material	Range	Page
	HYP-ETS-XCEED, 3 flute, regular cut length		1-25	47
	HYP-ETS, 3 flute, regular cut length		1-25	
	HYP-ACE-STUB-DLC, 3 flute, stub cut length		3-25	74
	HYP-ACE-STUB, 3 flute, stub cut length		3-25	
	HYP-ACE-Regular-DLC, 3 flute, regular cut length		3-25	75
	HYP-ACE-Regular, 3 flute, regular cut length		3-25	
	HYP-AL-PKE-DLC, 3 flute, reduced neck, long reach		6-16	78
	HYP-AL-PKE, 3 flute, reduced neck, long reach		6-16	
	HYP-ETS-55, 3 flute, regular cut length, 55° helix		6-16	70
	HYP-ETL-55, 3 flute, long cut length, 55° helix		6-16	71
	HYP-EMS-XCEED, 4 flute, regular cut length		1-25	50
	HYP-EMS, 4 flute, regular cut length		1-25	
	HYP-VG4-EMS, 4 flute, regular cut length, Aerospace Alloys		3-20	82
	HYP-VG4-LN-EMS, 4 flute, reduced neck, long Cut length, Aerospace Alloys		6-16	85
	HYP-EMS-DIAMOND, 4 flute, regular cut length		1-20	81

END MILLS (CONTINUED)

	Description	Material	Range	Page
	HYP-CR-EHS, 4 flute, regular cut length		6-12	65
	HYP-HS-CRE, 4 Flute, High Feed Cutter		6-12	66
	HYP-EML-XCEED, 4 flute, long cut length		3-25	51
	HYP-EML, 4 flute, long cut length		3-25	
	HYP-EMXL-XCEED, 2 flute, extra long cut length		3-25	52
	HYP-EMXL, 2 flute, extra long cut length		3-25	
	EPL-HP-5FL, regular cut length		6-20	86
	HYP-VG7-EMS, 7 flute, long cut length		10-16	90
	HYP-HP-(W)RESF, 4 flute, regular cut length		6-25	63
	HYP-ROCKET MILL, 4,6 & 8 flute, regular cut length		3-25	64
	HYP-LS-ROCKET MILL, 4,6 & 8 flute, long cut length		6-25	64
	HYP-CHB-EML, 5 Flute, long cut length		6-20	62

BALL NOSE

Application key: General | Non-ferrous | Aerospace | PCD | Diamond

	Description	Material	Range	Page
	HYP-EBD-XCEED, 2 flute, regular cut length		1-25	55
	HYP-EBD, 2 flute, regular cut length		1-25	
	HYP-EBDL-XCEED, 2 flute, long cut length		3-25	56
	HYP-EBDL, 2 flute, long cut length		3-25	
	HYP-EBDXL-XCEED, 2 flute, extra long cut length		3-25	57
	HYP-EBDXL, 2 flute, extra long cut length		3-25	
	HYP-AL-LS-EBD-DLC 2 flute, long cut length		3-12	73
	HYP-AL-LS-EBD, 2 flute, long cut length		3-12	
	HYP-TI-EBD, regular cut length		3-12	89
	HYP-SB-EBD, 2 flute, regular cut length		3-12	61
	HYP-EBM-XCEED, 4 flute, regular cut length		1-25	58
	HYP-EBM, 4 flute, regular cut length		1-25	
	HYP-EBML-XCEED, 4 flute, long cut length		3-25	59
	HYP-EBML, 4 flute, long cut length		3-25	
	HYP-EBMXL-XCEED, 4 flute, extra long cut length		3-25	60
	HYP-EBMXL, 4 flute, extra long cut length		3-25	

BALL NOSE (CONTINUED)

	Description	Material	Range	Page
	HYP-VG4-EBM, 4 flute, regular cut length		3-12	88
	HYP-EBM-DIAMOND, 4 flute, regular cut length		3-10	81

PCD TOOLING

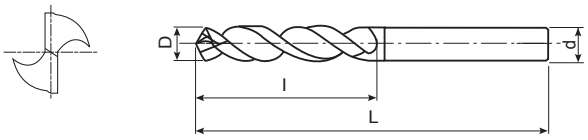
	HYP-EDS-PCD, 2 flutes, regular, centre cutting		3-12	92
	HYP-LN-EDS-PCD, 2 flutes, long, centre cutting		6-12	92
	HYP-EBD-PCD, 2 flutes, regular, ball end, centre cutting		3-12	93
	HYP-LN-EBD-PCD, 2 flutes, long, ball end, centre cutting		6-12	93


HOME
DRILLS

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance

CARBIDE | EgiAs | 30° | SHANK h6 | 140° | m7 | SPEED FEED P 37

Icon key page 2



HYP-HP-3D				
EDP	D	L	l	d
30200100	1,0	35	7	3
30200110	1,1	35	7	3
30200120	1,2	35	8	3
30200130	1,3	35	8	3
30200140	1,4	35	9	3
30200150	1,5	40	9	3
30200160	1,6	40	10	3
30200170	1,7	40	10	3
30200180	1,8	40	11	3
30200190	1,9	40	11	3
30200200	2,0	45	13	3
30200210	2,1	45	13	3
30200220	2,2	45	13	3
30200230	2,3	45	13	3
30200240	2,4	45	15	3
30200250	2,5	50	15	3
30200260	2,6	50	15	3
30200270	2,7	50	17	3
30200280	2,8	50	17	3
30200290	2,9	50	17	3
30200300	3,0	62	20	6
30200310	3,1	62	20	6
30200317	3,17 (1/8)	62	20	6
30200320	3,2	62	20	6
30200330	3,3	62	20	6
30200340	3,4	62	20	6
30200350	3,5	62	20	6
30200357	3,57 (9/64)	62	20	6
30200360	3,6	62	20	6
30200370	3,7	62	20	6
30200380	3,8	66	24	6
30200390	3,9	66	24	6
30200397	3,97 (5/32)	66	24	6
30200400	4,0	66	24	6
30200410	4,1	66	24	6
30200420	4,2	66	24	6
30200430	4,3	66	24	6
30200437	4,37 (11/64)	66	24	6
30200440	4,4	66	24	6
30200450	4,5	66	24	6
30200455	4,55	66	24	6

HYP-HP-3D				
EDP	D	L	l	d
30200460	4,6	66	24	6
30200470	4,7	66	24	6
30200476	4,76 (3/16)	66	24	6
30200480	4,8	66	28	6
30200490	4,9	66	28	6
30200500	5,0	66	28	6
30200510	5,1	66	28	6
30200516	5,16 (13/64)	66	28	6
30200520	5,2	66	28	6
30200530	5,3	66	28	6
30200540	5,4	66	28	6
30200550	5,5	66	28	6
30200556	5,56 (7/32)	66	28	6
30200560	5,6	66	28	6
30200570	5,7	66	28	6
30200580	5,8	66	28	6
30200590	5,9	66	28	6
30200595	5,95 (15/64)	66	28	6
30200600	6,0	66	28	6
30200610	6,1	79	34	8
30200620	6,2	79	34	8
30200630	6,3	79	34	8
30200635	6,35 (1/4)	79	34	8
30200640	6,4	79	34	8
30200650	6,5	79	34	8
30200660	6,6	79	34	8
30200670	6,7	79	34	8
30200675	6,75 (17/64)	79	34	8
30200680	6,8	79	34	8
30200690	6,9	79	34	8
30200700	7,0	79	34	8
30200710	7,1	79	34	8
30200714	7,14 (9/32)	79	41	8
30200720	7,2	79	41	8
30200730	7,3	79	41	8
30200740	7,4	79	41	8
30200750	7,5	79	41	8
30200754	7,54 (19/64)	79	41	8
30200760	7,6	79	41	8
30200770	7,7	79	41	8
30200780	7,8	79	41	8

HYP-HP-3D				
EDP	D	L	l	d
30200790	7,9	79	41	8
30200794	7,94 (5/16)	79	41	8
30200800	8,0	79	41	8
30200810	8,1	79	41	10
30200820	8,2	79	41	10
30200830	8,3	79	41	10
30200833	8,33 (21/64)	89	47	10
30200840	8,4	89	47	10
30200850	8,5	89	47	10
30200860	8,6	89	47	10
30200870	8,7	89	47	10
30200873	8,73 (11/32)	89	47	10
30200880	8,8	89	47	10
30200890	8,9	89	47	10
30200900	9,0	89	47	10
30200910	9,1	89	47	10
30200913	9,13 (23/64)	89	47	10
30200920	9,2	89	47	10
30200930	9,3	89	47	10
30200940	9,4	89	47	10
30200950	9,5	89	47	10
30200952	9,52 (3/8)	89	47	10
30200960	9,6	89	47	10
30200970	9,7	89	47	10
30200980	9,8	89	47	10
30200990	9,9	89	47	10
30200992	9,92 (25/64)	89	47	10
30201000	10,0	89	47	10
30201010	10,1	89	47	12
30201020	10,2	102	55	12
30201030	10,3	102	55	12
30201032	10,32 (13/32)	102	55	12
30201040	10,4	102	55	12
30201050	10,5	102	55	12
30201060	10,6	102	55	12
30201070	10,7	102	55	12
30201072	10,72 (27/64)	102	55	12

HYP-HP-3D				
EDP	D	L	l	d
30201080	10,8	102	55	12
30201090	10,9	102	55	12
30201100	11,0	102	55	12
30201110	11,1	102	55	12
30201111	11,11 (7/16)	102	55	12
30201120	11,2	102	55	12
30201130	11,3	102	55	12
30201140	11,4	102	55	12
30201150	11,5	102	55	12
30201151	11,51 (29/64)	102	55	12
30201160	11,6	102	55	12
30201170	11,7	102	55	12
30201180	11,8	102	55	12
30201190	11,9	102	55	12
30201191	11,91 (15/32)	102	55	12
30201200	12,0	102	55	12
30201230	12,30 (31/64)	107	60	14
30201250	12,5	107	60	14
30201270	12,70 (1/2)	107	60	14
30201300	13,0	107	60	14
30201350	13,5	107	60	14
30201400	14,0	107	60	14
30201429	14,29 (9/16)	115	65	16
30201450	14,5	115	65	16
30201500	15,0	115	65	16
30201550	15,5	115	65	16
30201587	15,87 (5/8)	115	65	16
30201600	16,0	115	65	16
30201650	16,5	123	73	18
30201700	17,0	123	73	18
30201750	17,5	123	73	18
30201800	18,0	123	73	18
30201850	18,5	131	79	20
30201900	19,0	131	79	20
30201950	19,5	131	79	20
30202000	20,0	131	79	20

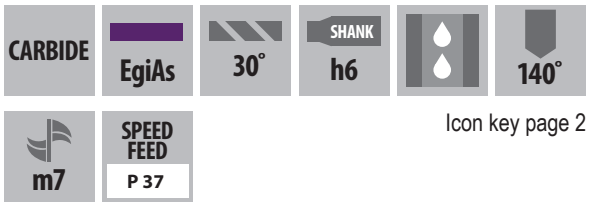
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

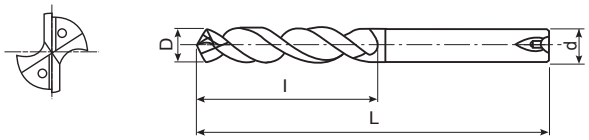
HYP-HPO-3D

COATED CARBIDE DRILL WITH OIL HOLE DRILLING 3XD

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance



Icon key page 2



HYP-HPO-3D

EDP	D	L	l	d
30210300	3,0	62	20	6
30210310	3,1	62	20	6
30210317	3,17 (1/8)	62	20	6
30210320	3,2	62	20	6
30210330	3,3	62	20	6
30210340	3,4	62	20	6
30210350	3,5	62	20	6
30210357	3,57 (9/64)	62	20	6
30210360	3,6	62	20	6
30210370	3,7	62	20	6
30210380	3,8	66	24	6
30210390	3,9	66	24	6
30210397	3,97 (5/32)	66	24	6
30210400	4,0	66	24	6
30210410	4,1	66	24	6
30210420	4,2	66	24	6
30210430	4,3	66	24	6
30210437	4,37 (11/64)	66	24	6
30210440	4,4	66	24	6
30210450	4,5	66	24	6
30210460	4,6	66	24	6
30210465	4.65	66	24	6
30210470	4,7	66	24	6
30210476	4,76 (3/16)	66	24	6
30210480	4,8	66	28	6
30210490	4,9	66	28	6
30210500	5,0	66	28	6
30210510	5,1	66	28	6
30210516	5,16 (13/64)	66	28	6
30210520	5,2	66	28	6
30210530	5,3	66	28	6
30210540	5,4	66	28	6
30210550	5,5	66	28	6
30210555	5,55	66	28	6
30210556	5,56 (7/32)	66	28	6
30210560	5,6	66	28	6
30210570	5,7	66	28	6
30210580	5,8	66	28	6
30210590	5,9	66	28	6
30210595	5,95 (15/64)	66	28	6
30210600	6,0	66	28	6

HYP-HPO-3D

EDP	D	L	l	d
30210610	6,1	79	34	8
30210620	6,2	79	34	8
30210630	6,3	79	34	8
30210635	6,35 (1/4)	79	34	8
30210640	6,4	79	34	8
30210650	6,5	79	34	8
30210660	6,6	79	34	8
30210670	6,7	79	34	8
30210675	6,75 (17/64)	79	34	8
30210680	6,8	79	34	8
30210690	6,9	79	34	8
30210700	7,0	79	34	8
30210710	7,1	79	34	8
30210714	7,14 (9/32)	79	41	8
30210720	7,2	79	41	8
30210730	7,3	79	41	8
30210740	7,4	79	41	8
30210750	7,5	79	41	8
30210754	7,54 (19/64)	79	41	8
30210760	7,6	79	41	8
30210770	7,7	79	41	8
30210780	7,8	79	41	8
30210790	7,9	79	41	8
30210794	7,94 (5/16)	79	41	8
30210800	8,0	79	41	8
30210810	8,1	79	41	10
30210820	8,2	79	41	10
30210830	8,3	79	41	10
30210833	8,33 (21/64)	89	47	10
30210840	8,4	89	47	10
30210850	8,5	89	47	10
30210860	8,6	89	47	10
30210870	8,7	89	47	10
30210873	8,73 (11/32)	89	47	10
30210880	8,8	89	47	10
30210890	8,9	89	47	10
30210900	9,0	89	47	10
30210910	9,1	89	47	10
30210913	9,13 (23/64)	89	47	10
30210920	9,2	89	47	10
30210930	9,3	89	47	10

HYP-HPO-3D				
EDP	D	L	l	d
30210940	9,4	89	47	10
30210950	9,5	89	47	10
30210952	9,52 (3/8)	89	47	10
30210960	9,6	89	47	10
30210970	9,7	89	47	10
30210980	9,8	89	47	10
30210990	9,9	89	47	10
30210992	9,92 (25/64)	89	47	10
30211000	10,0	89	47	10
30211010	10,1	89	47	12
30211020	10,2	102	55	12
30211030	10,3	102	55	12
30211032	10,32 (13/32)	102	55	12
30211040	10,4	102	55	12
30211050	10,5	102	55	12
30211060	10,6	102	55	12
30211070	10,7	102	55	12
30211072	10,72 (27/64)	102	55	12
30211080	10,8	102	55	12
30211090	10,9	102	55	12
30211100	11,0	102	55	12
30211110	11,1	102	55	12
30211111	11,11 (7/16)	102	55	12
30211120	11,2	102	55	12
30211130	11,3	102	55	12
30211140	11,4	102	55	12
30211150	11,5	102	55	12
30211151	11,51 (29/64)	102	55	12
30211160	11,6	102	55	12

HYP-HPO-3D				
EDP	D	L	l	d
30211170	11,7	102	55	12
30211180	11,8	102	55	12
30211190	11,9	102	55	12
30211191	11,91 (15/32)	102	55	12
30211200	12,0	102	55	12
30211230	12,30 (31/64)	107	60	14
30211250	12,5	107	60	14
30211270	12,70 (1/2)	107	60	14
30211300	13,0	107	60	14
30211350	13,5	107	60	14
30211370	13,7	107	60	14
30211400	14,0	107	60	14
30211429	14,29 (9/16)	115	65	16
30211450	14,5	115	65	16
30211470	14,7	115	65	16
30211500	15,0	115	65	16
30211550	15,5	115	65	16
30211570	15,7	115	65	16
30211587	15,87 (5/8)	115	65	16
30211600	16,0	115	65	16
30211650	16,5	123	73	18
30211700	17,0	123	73	18
30211750	17,5	123	73	18
30211800	18,0	123	73	18
30211850	18,5	131	79	20
30211900	19,0	131	79	20
30211950	19,5	131	79	20
30212000	20,0	131	79	20

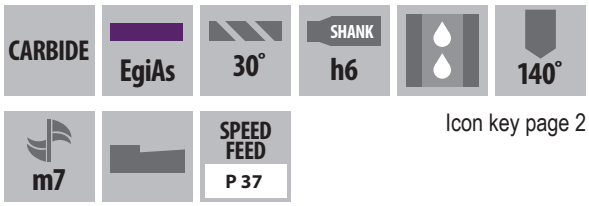
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

HYP-HPO-3D-HE

COATED CARBIDE DRILL, WHISTLE NOTCH
SHANK WITH OIL HOLE DRILLING 3XD

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance



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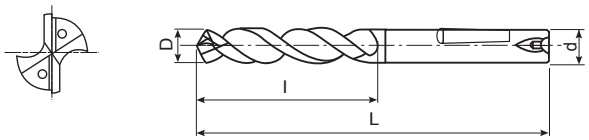


HYP-HPO-3D-HE				
EDP	D	L	l	d
30210300-HE	3,0	62	20	6
30210310-HE	3,1	62	20	6
30210317-HE	3,17 (1/8)	62	20	6
30210320-HE	3,2	62	20	6
30210330-HE	3,3	62	20	6
30210340-HE	3,4	62	20	6
30210350-HE	3,5	62	20	6
30210357-HE	3,57 (9/64)	62	20	6
30210360-HE	3,6	62	20	6
30210370-HE	3,7	62	20	6
30210380-HE	3,8	66	24	6
30210390-HE	3,9	66	24	6
30210397-HE	3,97 (5/32)	66	24	6
30210400-HE	4,0	66	24	6
30210410-HE	4,1	66	24	6
30210420-HE	4,2	66	24	6
30210430-HE	4,3	66	24	6
30210437-HE	4,37 (11/64)	66	24	6
30210440-HE	4,4	66	24	6
30210450-HE	4,5	66	24	6
30210460-HE	4,6	66	24	6
30210470-HE	4,7	66	24	6
30210476-HE	4,76 (3/16)	66	24	6
30210480-HE	4,8	66	28	6
30210490-HE	4,9	66	28	6
30210500-HE	5,0	66	28	6
30210510-HE	5,1	66	28	6
30210516-HE	5,16 (13/64)	66	28	6
30210520-HE	5,2	66	28	6
30210530-HE	5,3	66	28	6
30210540-HE	5,4	66	28	6
30210550-HE	5,5	66	28	6
30210556-HE	5,56 (7/32)	66	28	6
30210560-HE	5,6	66	28	6
30210570-HE	5,7	66	28	6
30210580-HE	5,8	66	28	6
30210590-HE	5,9	66	28	6
30210595-HE	5,95 (15/64)	66	28	6
30210600-HE	6,0	66	28	6
30210610-HE	6,1	79	34	8
30210620-HE	6,2	79	34	8

HYP-HPO-3D-HE				
EDP	D	L	l	d
30210630-HE	6,3	79	34	8
30210635-HE	6,35 (1/4)	79	34	8
30210640-HE	6,4	79	34	8
30210650-HE	6,5	79	34	8
30210660-HE	6,6	79	34	8
30210670-HE	6,7	79	34	8
30210675-HE	6,75 (17/64)	79	34	8
30210680-HE	6,8	79	34	8
30210690-HE	6,9	79	34	8
30210700-HE	7,0	79	34	8
30210710-HE	7,1	79	34	8
30210714-HE	7,14 (9/32)	79	41	8
30210720-HE	7,2	79	41	8
30210730-HE	7,3	79	41	8
30210740-HE	7,4	79	41	8
30210750-HE	7,5	79	41	8
30210754-HE	7,54 (19/64)	79	41	8
30210760-HE	7,6	79	41	8
30210770-HE	7,7	79	41	8
30210780-HE	7,8	79	41	8
30210790-HE	7,9	79	41	8
30210794-HE	7,94 (5/16)	79	41	8
30210800-HE	8,0	79	41	8
30210810-HE	8,1	79	41	10
30210820-HE	8,2	79	41	10
30210830-HE	8,3	79	41	10
30210833-HE	8,33 (21/64)	89	47	10
30210840-HE	8,4	89	47	10
30210850-HE	8,5	89	47	10
30210860-HE	8,6	89	47	10
30210870-HE	8,7	89	47	10
30210873-HE	8,73 (11/32)	89	47	10
30210880-HE	8,8	89	47	10
30210890-HE	8,9	89	47	10
30210900-HE	9,0	89	47	10
30210910-HE	9,1	89	47	10
30210913-HE	9,13 (23/64)	89	47	10
30210920-HE	9,2	89	47	10
30210930-HE	9,3	89	47	10
30210940-HE	9,4	89	47	10
30210950-HE	9,5	89	47	10

HYP-HPO-3D-HE

HYP-HPO-3D-HE				
EDP	D	L	l	d
30210952-HE	9,52 (3/8)	89	47	10
30210960-HE	9,6	89	47	10
30210970-HE	9,7	89	47	10
30210980-HE	9,8	89	47	10
30210990-HE	9,9	89	47	10
30210992-HE	9,92 (25/64)	89	47	10
30211000-HE	10,0	89	47	10
30211010-HE	10,1	89	47	12
30211020-HE	10,2	102	55	12
30211030-HE	10,3	102	55	12
30211032-HE	10,32 (13/32)	102	55	12
30211040-HE	10,4	102	55	12
30211050-HE	10,5	102	55	12
30211060-HE	10,6	102	55	12
30211070-HE	10,7	102	55	12
30211072-HE	10,72 (27/64)	102	55	12
30211080-HE	10,8	102	55	12
30211090-HE	10,9	102	55	12
30211100-HE	11,0	102	55	12
30211110-HE	11,1	102	55	12
30211111-HE	11,11 (7/16)	102	55	12
30211120-HE	11,2	102	55	12
30211130-HE	11,3	102	55	12
30211140-HE	11,4	102	55	12
30211150-HE	11,5	102	55	12
30211151-HE	11,51 (29/64)	102	55	12

HYP-HPO-3D-HE				
EDP	D	L	l	d
30211160-HE	11,6	102	55	12
30211170-HE	11,7	102	55	12
30211180-HE	11,8	102	55	12
30211190-HE	11,9	102	55	12
30211191-HE	11,91 (15/32)	102	55	12
30211200-HE	12,0	102	55	12
30211230-HE	12,30 (31/64)	107	60	14
30211250-HE	12,5	107	60	14
30211270-HE	12,70 (1/2)	107	60	14
30211300-HE	13,0	107	60	14
30211350-HE	13,5	107	60	14
30211400-HE	14,0	107	60	14
30211429-HE	14,29 (9/16)	115	65	16
30211450-HE	14,5	115	65	16
30211500-HE	15,0	115	65	16
30211550-HE	15,5	115	65	16
30211587-HE	15,87 (5/8)	115	65	16
30211600-HE	16,0	115	65	16
30211650-HE	16,5	123	73	18
30211700-HE	17,0	123	73	18
30211750-HE	17,5	123	73	18
30211800-HE	18,0	123	73	18
30211850-HE	18,5	131	79	20
30211900-HE	19,0	131	79	20
30211950-HE	19,5	131	79	20
30212000-HE	20,0	131	79	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

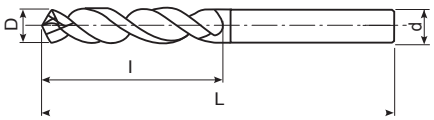
HYP-AL-3D

UNCOATED CARBIDE DRILL 3XD

- OSG Standard, 2 flutes, for aluminium applications
- Material : MG (micro grain carbide)
- Surface treatment : uncoated

CARBIDE | 30° | SHRINK FIT | 130° | m7 | SPEED FEED P 39 | NEW DESIGN

Icon key page 2

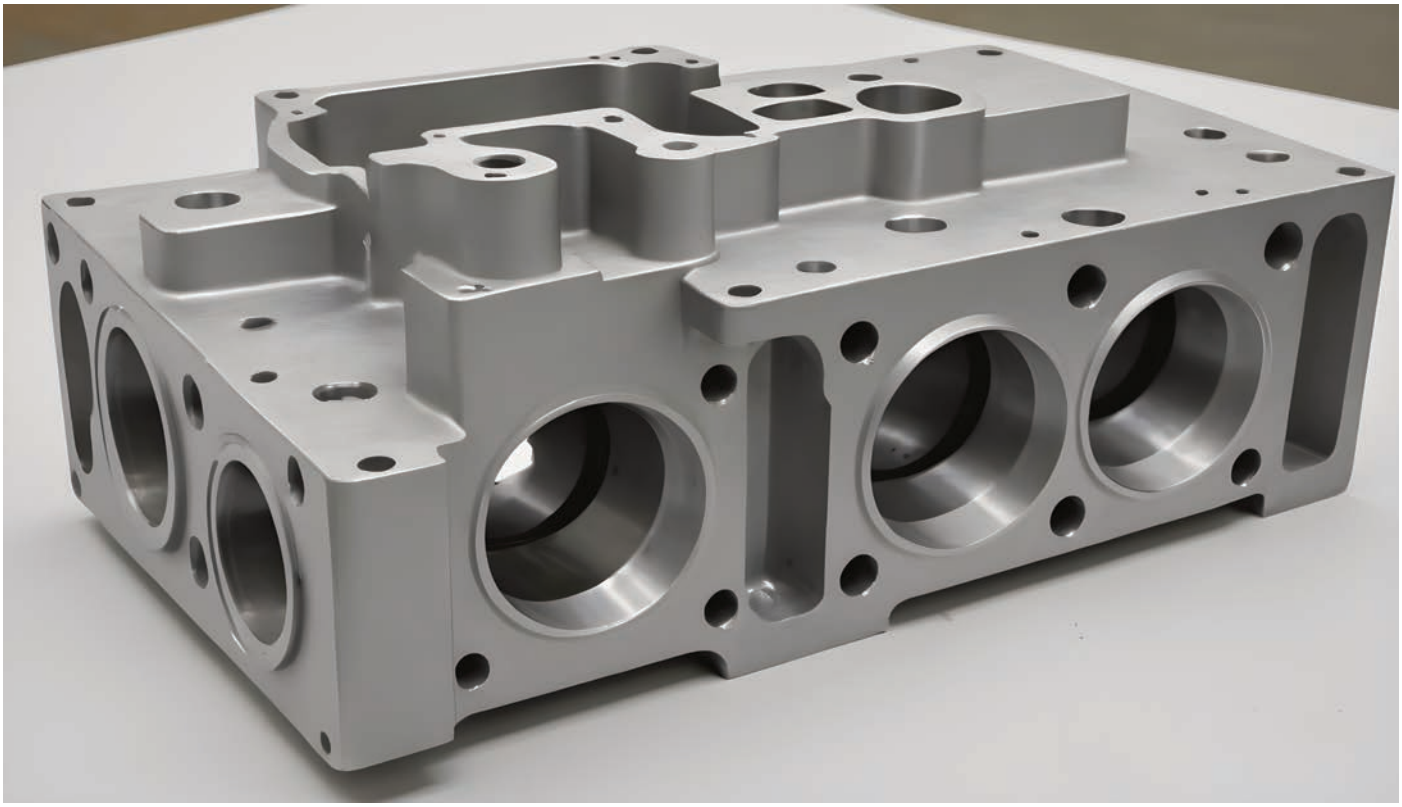


HYP-AL-3D				
EDP	DC	LCF	OAL	DCON
110301000	1	7	35	3
110301100	1,1	7	35	3
110301200	1,2	8	35	3
110301300	1,3	8	35	3
110301400	1,4	9	35	3
110301500	1,5	9	40	3
110301600	1,6	10	40	3
110301700	1,7	10	40	3
110301800	1,8	11	40	3
110301900	1,9	11	40	3
110302000	2	13	45	3
110302100	2,1	13	45	3
110302200	2,2	13	45	3
110302300	2,3	13	45	3
110302400	2,4	15	45	3
110302500	2,5	15	50	3
110302600	2,6	15	50	3
110302700	2,7	17	50	3
110302800	2,8	17	50	3
110302900	2,9	17	50	3
110303000	3	20	62	6
110303100	3,1	20	62	6
110303170	3,17	20	62	6
110303200	3,2	20	62	6
110303300	3,3	20	62	6
110303400	3,4	20	62	6
110303500	3,5	20	62	6
110303570	3,57	20	62	6
110303600	3,6	20	62	6
110303700	3,7	20	62	6
110303800	3,8	24	66	6
110303900	3,9	24	66	6
110303970	3,97	24	66	6
110304000	4	24	66	6
110304100	4,1	24	66	6
110304200	4,2	24	66	6
110304300	4,3	24	66	6
110304370	4,37	24	66	6
110304400	4,4	24	66	6
110304500	4,5	24	66	6
110304600	4,6	24	66	6
110304700	4,7	24	66	6
110304760	4,76	28	66	6
110304800	4,8	28	66	6
110304900	4,9	28	66	6
110305000	5	28	66	6

HYP-AL-3D				
EDP	DC	LCF	OAL	DCON
110305100	5,1	28	66	6
110305160	5,16	28	66	6
110305200	5,2	28	66	6
110305300	5,3	28	66	6
110305400	5,4	28	66	6
110305500	5,5	28	66	6
110305560	5,56	28	66	6
110305600	5,6	28	66	6
110305700	5,7	28	66	6
110305800	5,8	28	66	6
110305900	5,9	28	66	6
110305950	5,95	28	66	6
110306000	6	28	66	6
110306100	6,1	34	79	8
110306200	6,2	34	79	8
110306300	6,3	34	79	8
110306350	6,35	34	79	8
110306400	6,4	34	79	8
110306500	6,5	34	79	8
110306600	6,6	34	79	8
110306700	6,7	34	79	8
110306750	6,75	34	79	8
110306800	6,8	34	79	8
110306900	6,9	34	79	8
110307000	7	34	79	8
110307100	7,1	41	79	8
110307140	7,14	41	79	8
110307200	7,2	41	79	8
110307300	7,3	41	79	8
110307400	7,4	41	79	8
110307500	7,5	41	79	8
110307540	7,54	41	79	8
110307600	7,6	41	79	8
110307700	7,7	41	79	8
110307800	7,8	41	79	8
110307900	7,9	41	79	8
110307940	7,94	41	79	8
110308000	8	41	79	8
110308100	8,1	47	89	10
110308200	8,2	47	89	10
110308300	8,3	47	89	10
110308330	8,33	47	89	10
110308400	8,4	47	89	10
110308500	8,5	47	89	10
110308600	8,6	47	89	10
110308700	8,7	47	89	10

HYP-AL-3D				
EDP	DC	LCF	OAL	DCON
110308730	8,73	47	89	10
110308800	8,8	47	89	10
110308900	8,9	47	89	10
110309000	9	47	89	10
110309100	9,1	47	89	10
110309130	9,13	47	89	10
110309200	9,2	47	89	10
110309300	9,3	47	89	10
110309400	9,4	47	89	10
110309500	9,5	47	89	10
110309520	9,52	47	89	10
110309600	9,6	47	89	10
110309700	9,7	47	89	10
110309800	9,8	47	89	10
110309900	9,9	47	89	10
110309920	9,92	47	89	10
110310000	10	47	89	10
110310100	10,1	55	102	12
110310200	10,2	55	102	12
110310300	10,3	55	102	12
110310320	10,32	55	102	12
110310400	10,4	55	102	12
110310500	10,5	55	102	12

HYP-AL-3D				
EDP	DC	LCF	OAL	DCON
110310600	10,6	55	102	12
110310700	10,7	55	102	12
110310720	10,72	55	102	12
110310800	10,8	55	102	12
110310900	10,9	55	102	12
110311000	11	55	102	12
110311100	11,1	55	102	12
110311110	11,11	55	102	12
110311200	11,2	55	102	12
110311300	11,3	55	102	12
110311400	11,4	55	102	12
110311500	11,5	55	102	12
110311510	11,51	55	102	12
110311600	11,6	55	102	12
110311700	11,7	55	102	12
110311800	11,8	55	102	12
110311900	11,9	55	102	12
110311910	11,91	55	102	12
110312000	12	55	102	12
110312300	12,3	60	107	14
110312500	12,5	60	107	14
110312700	12,7	60	107	14

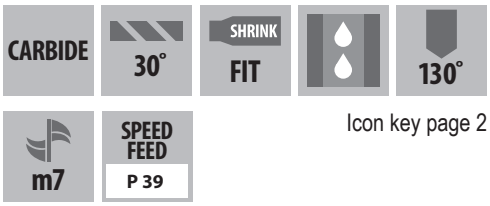


◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
				◎	◎							

HYP-ALO-5D

- OSG Standard, 2 flutes, for aluminium applications
- Material : MG (micro grain carbide)
- Surface treatment : uncoated



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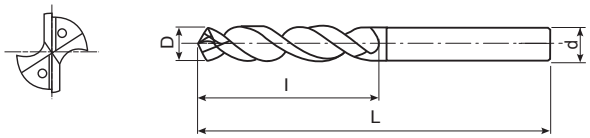


HYP-ALO-5D				
EDP	DC	LCF	OAL	DCON
111503000	3	28	66	6
111503100	3,1	28	66	6
111503170	3,17	28	66	6
111503200	3,2	28	66	6
111503300	3,3	28	66	6
111503400	3,4	28	66	6
111503500	3,5	28	66	6
111503570	3,57	28	66	6
111503600	3,6	28	66	6
111503700	3,7	28	66	6
111503800	3,8	36	74	6
111503900	3,9	36	74	6
111503970	3,97	36	74	6
111504000	4	36	74	6
111504100	4,1	36	74	6
111504200	4,2	36	74	6
111504300	4,3	36	74	6
111504370	4,37	36	74	6
111504400	4,4	36	74	6
111504500	4,5	36	74	6
111504600	4,6	36	74	6
111504650	4,65	36	74	6
111504700	4,7	36	74	6
111504760	4,76	44	82	6
111504800	4,8	44	82	6
111504900	4,9	44	82	6
111505000	5	44	82	6
111505100	5,1	44	82	6
111505160	5,16	44	82	6
111505200	5,2	44	82	6
111505300	5,3	44	82	6
111505400	5,4	44	82	6
111505500	5,5	44	82	6
111505550	5,55	44	82	6
111505560	5,56	44	82	6
111505600	5,6	44	82	6
111505700	5,7	44	82	6
111505800	5,8	44	82	6
111505900	5,9	44	82	6
111505950	5,95	44	82	6
111506000	6	44	82	6
111506100	6,1	53	91	8
111506200	6,2	53	91	8
111506300	6,3	53	91	8
111506350	6,35	53	91	8
111506400	6,4	53	91	8

HYP-ALO-5D				
EDP	DC	LCF	OAL	DCON
111506500	6,5	53	91	8
111506600	6,6	53	91	8
111506700	6,7	53	91	8
111506750	6,75	53	91	8
111506800	6,8	53	91	8
111506900	6,9	53	91	8
111507000	7	53	91	8
111507100	7,1	53	91	8
111507140	7,14	53	91	8
111507200	7,2	53	91	8
111507300	7,3	53	91	8
111507400	7,4	53	91	8
111507500	7,5	53	91	8
111507540	7,54	53	91	8
111507600	7,6	53	91	8
111507700	7,7	53	91	8
111507800	7,8	53	91	8
111507900	7,9	53	91	8
111507940	7,94	53	91	8
111508000	8	53	91	8
111508100	8,1	61	103	10
111508200	8,2	61	103	10
111508300	8,3	61	103	10
111508330	8,33	61	103	10
111508400	8,4	61	103	10
111508500	8,5	61	103	10
111508600	8,6	61	103	10
111508700	8,7	61	103	10
111508730	8,73	61	103	10
111508800	8,8	61	103	10
111508900	8,9	61	103	10
111509000	9	61	103	10
111509100	9,1	61	103	10
111509130	9,13	61	103	10
111509200	9,2	61	103	10
111509300	9,3	61	103	10
111509400	9,4	61	103	10
111509500	9,5	61	103	10
111509520	9,52	61	103	10
111509600	9,6	61	103	10
111509700	9,7	61	103	10
111509800	9,8	61	103	10
111509900	9,9	61	103	10
111509920	9,92	61	103	10
111510000	10	61	103	10
111510100	10,1	71	118	12

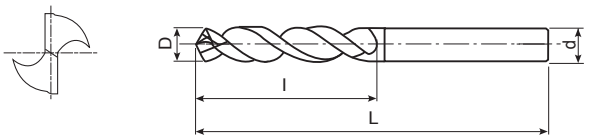
HYP-ALO-5D				
EDP	DC	LCF	OAL	DCON
111510200	10,2	71	118	12
111510300	10,3	71	118	12
111510320	10,32	71	118	12
111510400	10,4	71	118	12
111510500	10,5	71	118	12
111510600	10,6	71	118	12
111510700	10,7	71	118	12
111510720	10,72	71	118	12
111510800	10,8	71	118	12
111510900	10,9	71	118	12
111511000	11	71	118	12
111511100	11,1	71	118	12
111511110	11,11	71	118	12
111511200	11,2	71	118	12

HYP-ALO-5D				
EDP	DC	LCF	OAL	DCON
111511300	11,3	71	118	12
111511400	11,4	71	118	12
111511500	11,5	71	118	12
111511510	11,51	71	118	12
111511600	11,6	71	118	12
111511700	11,7	71	118	12
111511800	11,8	71	118	12
111511900	11,9	71	118	12
111511910	11,91	71	118	12
111512000	12	71	118	12
111512300	12,3	77	124	14
111512500	12,5	77	124	14
111512700	12,7	77	124	14

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
				◎	◎							

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance



HYP-HP-5D				
EDP	D	L	l	d
31200100	1	38	9	3
31200110	1,1	38	9	3
31200120	1,2	38	11	3
31200130	1,3	38	11	3
31200140	1,4	38	12	3
31200150	1,5	45	12	3
31200160	1,6	45	14	3
31200170	1,7	45	14	3
31200180	1,8	45	16	3
31200190	1,9	45	16	3
31200200	2,0	50	18	3
31200210	2,1	50	18	3
31200220	2,2	52	20	3
31200230	2,3	52	20	3
31200240	2,4	52	22	3
31200250	2,5	56	22	3
31200260	2,6	56	22	3
31200270	2,7	56	23	3
31200280	2,8	56	23	3
31200290	2,9	56	23	3
31200300	3,0	66	28	6
31200310	3,1	66	28	6
31200317	3,17 (1/8)	66	28	6
31200320	3,2	66	28	6
31200330	3,3	66	28	6
31200340	3,4	66	28	6
31200350	3,5	66	28	6
31200357	3,57 (9/64)	66	28	6
31200360	3,6	66	28	6
31200370	3,7	66	28	6
31200380	3,8	74	36	6
31200390	3,9	74	36	6
31200397	3,97 (5/32)	74	36	6
31200400	4,0	74	36	6
31200410	4,1	74	36	6
31200420	4,2	74	36	6
31200430	4,3	74	36	6
31200437	4,37 (11/64)	74	36	6
31200440	4,4	74	36	6
31200450	4,5	74	36	6
31200460	4,6	74	36	6

HYP-HP-5D				
EDP	D	L	l	d
31200470	4,7	82	44	6
31200476	4,76 (3/16)	82	44	6
31200480	4,8	82	44	6
31200490	4,9	82	44	6
31200500	5,0	82	44	6
31200510	5,1	82	44	6
31200516	5,16 (13/64)	82	44	6
31200520	5,2	82	44	6
31200530	5,3	82	44	6
31200540	5,4	82	44	6
31200550	5,5	82	44	6
31200556	5,56 (7/32)	82	44	6
31200560	5,6	82	44	6
31200570	5,7	82	44	6
31200580	5,8	82	44	6
31200590	5,9	82	44	6
31200595	5,95 (15/64)	82	44	6
31200600	6,0	82	44	6
31200610	6,1	91	53	8
31200620	6,2	91	53	8
31200630	6,3	91	53	8
31200635	6,35 (1/4)	91	53	8
31200640	6,4	91	53	8
31200650	6,5	91	53	8
31200660	6,6	91	53	8
31200670	6,7	91	53	8
31200675	6,75 (17/64)	91	53	8
31200680	6,8	91	53	8
31200690	6,9	91	53	8
31200700	7,0	91	53	8
31200710	7,1	91	53	8
31200714	7,14 (9/32)	91	53	8
31200720	7,2	91	53	8
31200730	7,3	91	53	8
31200740	7,4	91	53	8
31200750	7,5	91	53	8
31200754	7,54 (19/64)	91	53	8
31200760	7,6	91	53	8
31200770	7,7	91	53	8
31200780	7,8	91	53	8
31200790	7,9	91	53	8

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HYP-HP-5D				
EDP	D	L	l	d
31200794	7,94 (5/16)	91	53	8
31200800	8,0	91	53	8
31200810	8,1	103	61	8
31200820	8,2	103	61	10
31200830	8,3	103	61	10
31200833	8,33 (21/64)	103	61	10
31200840	8,4	103	61	10
31200850	8,5	103	61	10
31200860	8,6	103	61	10
31200870	8,7	103	61	10
31200873	8,73 (11/32)	103	61	10
31200880	8,8	103	61	10
31200890	8,9	103	61	10
31200900	9,0	103	61	10
31200910	9,1	103	61	10
31200913	9,13 (23/64)	103	61	10
31200920	9,2	103	61	10
31200930	9,3	103	61	10
31200940	9,4	103	61	10
31200950	9,5	103	61	10
31200952	9,52 (3/8)	103	61	10
31200960	9,6	103	61	10
31200970	9,7	103	61	10
31200980	9,8	103	61	10
31200990	9,9	103	61	10
31200992	9,92 (25/64)	103	61	10
31201000	10,0	103	61	10
31201010	10,1	118	71	12
31201020	10,2	118	71	12
31201030	10,3	118	71	12
31201032	10,32 (13/32)	118	71	12
31201040	10,4	118	71	12
31201050	10,5	118	71	12
31201060	10,6	118	71	12
31201070	10,7	118	71	12
31201072	10,72 (27/64)	118	71	12

HYP-HP-5D				
EDP	D	L	l	d
31201080	10,8	118	71	12
31201090	10,9	118	71	12
31201100	11,0	118	71	12
31201110	11,1	118	71	12
31201111	11,11 (7/16)	118	71	12
31201120	11,2	118	71	12
31201130	11,3	118	71	12
31201140	11,4	118	71	12
31201150	11,5	118	71	12
31201151	11,51 (29/64)	118	71	12
31201160	11,6	118	71	12
31201170	11,7	118	71	12
31201180	11,8	118	71	12
31201190	11,9	118	71	12
31201191	11,91 (15/32)	118	71	12
31201200	12,0	118	71	12
31201230	12,3 (31/64)	124	77	14
31201250	12,5	124	77	14
31201270	12,7 (1/2)	124	77	14
31201300	13,0	124	77	14
31201350	13,5	124	77	14
31201400	14,0	124	77	14
31201429	14,29 (9/16)	133	83	16
31201450	14,5	133	83	16
31201500	15,0	133	83	16
31201550	15,5	133	83	16
31201587	15,87 (5/8)	133	83	16
31201600	16,0	133	93	18
31201650	16,5	143	93	18
31201700	17,0	143	93	18
31201750	17,5	143	93	18
31201800	18,0	143	93	18
31201850	18,5	153	101	20
31201900	19,0	153	101	20
31201950	19,5	153	101	20
31202000	20,0	153	101	20

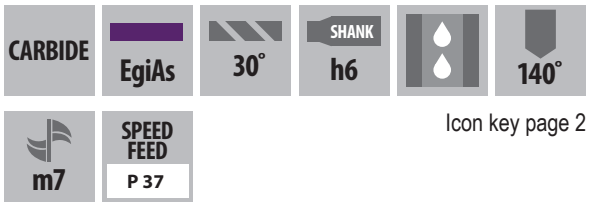
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

HYP-HPO-5D

COATED CARBIDE DRILL WITH OIL HOLE DRILLING 5XD

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance



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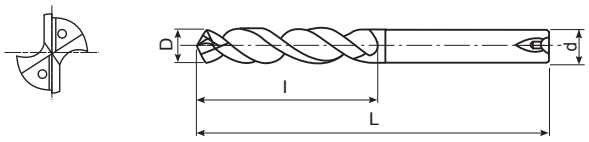


HYP-HPO-5D				
EDP	D	L	l	d
30220300	3,0	66	28	6
30220310	3,1	66	28	6
30220317	3,17 (1/8)	66	28	6
30220320	3,2	66	28	6
30220330	3,3	66	28	6
30220340	3,4	66	28	6
30220350	3,5	66	28	6
30220357	3,57 (9/64)	66	28	6
30220360	3,6	66	28	6
30220370	3,7	66	28	6
30220380	3,8	74	36	6
30220390	3,9	74	36	6
30220397	3,97 (5/32)	74	36	6
30220400	4,0	74	36	6
30220410	4,1	74	36	6
30220420	4,2	74	36	6
30220430	4,3	74	36	6
30220437	4,37 (11/64)	74	36	6
30220440	4,4	74	36	6
30220450	4,5	74	36	6
30220460	4,6	74	36	6
30220465	4,65	74	36	6
30220470	4,7	82	44	6
30220476	4,76 (3/16)	82	44	6
30220480	4,8	82	44	6
30220490	4,9	82	44	6
30220500	5,0	82	44	6
30220510	5,1	82	44	6
30220516	5,16 (13/64)	82	44	6
30220520	5,2	82	44	6
30220530	5,3	82	44	6
30220540	5,4	82	44	6
30220550	5,5	82	44	6
30220555	5,55	82	44	6
30220556	5,56 (7/32)	82	44	6
30220560	5,6	82	44	6
30220570	5,7	82	44	6
30220580	5,8	82	44	6
30220590	5,9	82	44	6
30220595	5,95 (15/64)	82	44	6
30220600	6,0	82	44	6

HYP-HPO-5D				
EDP	D	L	l	d
30220610	6,1	91	53	8
30220620	6,2	91	53	8
30220630	6,3	91	53	8
30220635	6,35 (1/4)	91	53	8
30220640	6,4	91	53	8
30220650	6,5	91	53	8
30220660	6,6	91	53	8
30220670	6,7	91	53	8
30220675	6,75 (17/64)	91	53	8
30220680	6,8	91	53	8
30220690	6,9	91	53	8
30220700	7,0	91	53	8
30220710	7,1	91	53	8
30220714	7,14 (9/32)	91	53	8
30220720	7,2	91	53	8
30220730	7,3	91	53	8
30220740	7,4	91	53	8
30220750	7,5	91	53	8
30220754	7,54 (19/64)	91	53	8
30220760	7,6	91	53	8
30220770	7,7	91	53	8
30220780	7,8	91	53	8
30220790	7,9	91	53	8
30220794	7,94 (5/16)	91	53	8
30220800	8,0	91	53	8
30220810	8,1	103	61	8
30220820	8,2	103	61	10
30220830	8,3	103	61	10
30220833	8,33 (21/64)	103	61	10
30220840	8,4	103	61	10
30220850	8,5	103	61	10
30220860	8,6	103	61	10
30220870	8,7	103	61	10
30220873	8,73 (11/32)	103	61	10
30220880	8,8	103	61	10
30220890	8,9	103	61	10
30220900	9,0	103	61	10
30220910	9,1	103	61	10
30220913	9,13 (23/64)	103	61	10
30220920	9,2	103	61	10
30220925	9,25	103	61	10

HYP-HPO-5D				
EDP	D	L	l	d
30220930	9,3	103	61	10
30220940	9,4	103	61	10
30220950	9,5	103	61	10
30220952	9,52 (3/8)	103	61	10
30220960	9,6	103	61	10
30220970	9,7	103	61	10
30220980	9,8	103	61	10
30220990	9,9	103	61	10
30220992	9,92 (25/64)	103	61	10
30221000	10,0	103	61	10
30221010	10,1	118	71	12
30221020	10,2	118	71	12
30221030	10,3	118	71	12
30221032	10,32 (13/32)	118	71	12
30221040	10,4	118	71	12
30221050	10,5	118	71	12
30221060	10,6	118	71	12
30221070	10,7	118	71	12
30221072	10,72 (27/64)	118	71	12
30221080	10,8	118	71	12
30221090	10,9	118	71	12
30221100	11,0	118	71	12
30221110	11,1	118	71	12
30221111	11,11 (7/16)	118	71	12
30221120	11,2	118	71	12
30221130	11,3	118	71	12
30221140	11,4	118	71	12
30221150	11,5	118	71	12
30221151	11,51 (29/64)	118	71	12

HYP-HPO-5D				
EDP	D	L	l	d
30221160	11,6	118	71	12
30221170	11,7	118	71	12
30221180	11,8	118	71	12
30221190	11,9	118	71	12
30221191	11,91 (15/32)	118	71	12
30221200	12,0	118	71	12
30221230	12,3 (31/64)	124	77	14
30221250	12,5	124	77	14
30221270	12,7 (1/2)	124	77	14
30221300	13,0	124	77	14
30221350	13,5	124	77	14
30221370	13,7	124	77	14
30221400	14,0	124	77	14
30221429	14,29 (9/16)	133	83	16
30221450	14,5	133	83	16
30221470	14,7	133	83	16
30221500	15,0	133	83	16
30221550	15,5	133	83	16
30221570	15,7	133	83	16
30221587	15,87 (5/8)	133	83	16
30221600	16,0	133	83	16
30221650	16,5	143	93	18
30221700	17,0	143	93	18
30221750	17,5	143	93	18
30221800	18,0	143	93	18
30221850	18,5	153	101	20
30221900	19,0	153	101	20
30221950	19,5	153	101	20
30222000	20,0	153	101	20

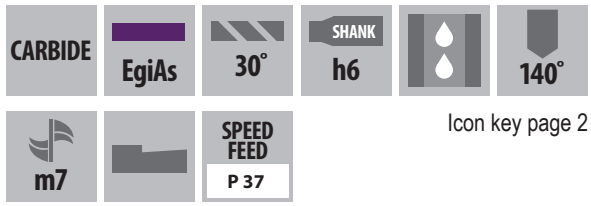
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

HYP-HPO-5D-HE

COATED CARBIDE DRILL, WHISTLE NOTCH
SHANK WITH OIL HOLE DRILLING 5XD

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance



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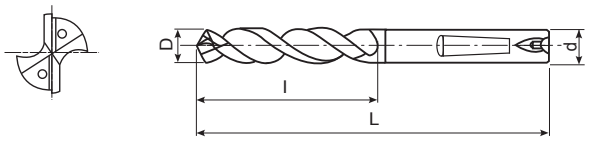


HYP-HPO-5D-HE				
EDP	D	L	l	d
30220300-HE	3	66	28	6
30220310-HE	3,1	66	28	6
30220317-HE	3,17 (1/8)	66	28	6
30220320-HE	3,2	66	28	6
30220330-HE	3,3	66	28	6
30220340-HE	3,4	66	28	6
30220350-HE	3,5	66	28	6
30220357-HE	3,57 (9/64)	66	28	6
30220360-HE	3,6	66	28	6
30220370-HE	3,7	66	28	6
30220380-HE	3,8	74	36	6
30220390-HE	3,9	74	36	6
30220397-HE	3,97 (5/32)	74	36	6
30220400-HE	4	74	36	6
30220410-HE	4,1	74	36	6
30220420-HE	4,2	74	36	6
30220430-HE	4,3	74	36	6
30220437-HE	4,37 (11/64)	74	36	6
30220440-HE	4,4	74	36	6
30220450-HE	4,5	74	36	6
30220460-HE	4,6	74	36	6
30220470-HE	4,7	82	44	6
30220476-HE	4,76 (3/16)	82	44	6
30220480-HE	4,8	82	44	6
30220490-HE	4,9	82	44	6
30220500-HE	5	82	44	6
30220510-HE	5,1	82	44	6
30220516-HE	5,16 (13/64)	82	44	6
30220520-HE	5,2	82	44	6
30220530-HE	5,3	82	44	6
30220540-HE	5,4	82	44	6
30220550-HE	5,5	82	44	6
30220556-HE	5,56 (7/32)	82	44	6
30220560-HE	5,6	82	44	6
30220570-HE	5,7	82	44	6
30220580-HE	5,8	82	44	6
30220590-HE	5,9	82	44	6
30220595-HE	5,95 (15/64)	82	44	6
30220600-HE	6	82	44	6
30220610-HE	6,1	91	53	8
30220620-HE	6,2	91	53	8

HYP-HPO-5D-HE				
EDP	D	L	l	d
30220630-HE	6,3	91	53	8
30220635-HE	6,35 (1/4)	91	53	8
30220640-HE	6,4	91	53	8
30220650-HE	6,5	91	53	8
30220660-HE	6,6	91	53	8
30220670-HE	6,7	91	53	8
30220675-HE	6,75 (17/64)	91	53	8
30220680-HE	6,8	91	53	8
30220690-HE	6,9	91	53	8
30220700-HE	7	91	53	8
30220710-HE	7,1	91	53	8
30220714-HE	7,14 (9/32)	91	53	8
30220720-HE	7,2	91	53	8
30220730-HE	7,3	91	53	8
30220740-HE	7,4	91	53	8
30220750-HE	7,5	91	53	8
30220754-HE	7,54 (19/64)	91	53	8
30220760-HE	7,6	91	53	8
30220770-HE	7,7	91	53	8
30220780-HE	7,8	91	53	8
30220790-HE	7,9	91	53	8
30220794-HE	7,94 (5/16)	91	53	8
30220800-HE	8	91	53	8
30220810-HE	8,1	103	61	8
30220820-HE	8,2	103	61	10
30220830-HE	8,3	103	61	10
30220833-HE	8,33 (21/64)	103	61	10
30220840-HE	8,4	103	61	10
30220850-HE	8,5	103	61	10
30220860-HE	8,6	103	61	10
30220870-HE	8,7	103	61	10
30220873-HE	8,73 (11/32)	103	61	10
30220880-HE	8,8	103	61	10
30220890-HE	8,9	103	61	10
30220900-HE	9	103	61	10
30220910-HE	9,1	103	61	10
30220913-HE	9,13 (23/64)	103	61	10
30220920-HE	9,2	103	61	10
30220930-HE	9,3	103	61	10
30220940-HE	9,4	103	61	10
30220950-HE	9,5	103	61	10

HYP-HPO-5D-HE

HYP-HPO-5D-HE				
EDP	D	L	l	d
30220952-HE	9,52 (3/8)	103	61	10
30220960-HE	9,6	103	61	10
30220970-HE	9,7	103	61	10
30220980-HE	9,8	103	61	10
30220990-HE	9,9	103	61	10
30220992-HE	9,92 (25/64)	103	61	10
30221000-HE	10	103	61	10
30221010-HE	10,1	118	71	12
30221020-HE	10,2	118	71	12
30221030-HE	10,3	118	71	12
30221032-HE	10,32 (13/32)	118	71	12
30221040-HE	10,4	118	71	12
30221050-HE	10,5	118	71	12
30221060-HE	10,6	118	71	12
30221070-HE	10,7	118	71	12
30221072-HE	10,72 (27/64)	118	71	12
30221080-HE	10,8	118	71	12
30221090-HE	10,9	118	71	12
30221100-HE	11	118	71	12
30221110-HE	11,1	118	71	12
30221111-HE	11,11 (7/16)	118	71	12
30221120-HE	11,2	118	71	12
30221130-HE	11,3	118	71	12
30221140-HE	11,4	118	71	12
30221150-HE	11,5	118	71	12
30221151-HE	11,51 (29/64)	118	71	12

HYP-HPO-5D-HE				
EDP	D	L	l	d
30221160-HE	11,6	118	71	12
30221170-HE	11,7	118	71	12
30221180-HE	11,8	118	71	12
30221190-HE	11,9	118	71	12
30221191-HE	11,91 (15/32)	118	71	12
30221200-HE	12	118	71	12
30221230-HE	12,3 (31/64)	124	77	14
30221250-HE	12,5	124	77	14
30221270-HE	12,7 (1/2)	124	77	14
30221300-HE	13	124	77	14
30221350-HE	13,5	124	77	14
30221400-HE	14	124	77	14
30221429-HE	14,29 (9/16)	133	83	16
30221450-HE	14,5	133	83	16
30221500-HE	15	133	83	16
30221550-HE	15,5	133	83	16
30221587-HE	15,87 (5/8)	133	83	16
30221600-HE	16	133	83	16
30221650-HE	16,5	143	93	18
30221700-HE	17	143	93	18
30221750-HE	17,5	143	93	18
30221800-HE	18	143	93	18
30221850-HE	18,5	153	101	20
30221900-HE	19	153	101	20
30221950-HE	19,5	153	101	20
30222000-HE	20	153	101	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

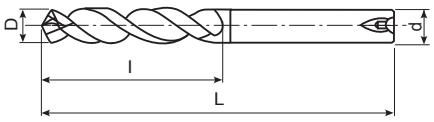
HYP-HPO-8D

COATED CARBIDE DRILL WITH OIL HOLE DRILLING 8XD

- OSG Standard, 2 flutes, for general applications
- Material : MG (micro grain carbide)
- Surface treatment : Multi-layer coating for improved wear resistance

CARBIDE | EgiAs | 30° | SHANK h6 | 140° | m7 | SPEED FEED P 37

Icon key page 2



HYP-HPO-8D				
EDP	D	L	l	d
32210300	3.0	70	30	4
32210310	3.1	74	34	4
32210317	3.17 (1/8)	74	34	4
32210320	3.2	74	34	4
32210330	3.3	74	34	4
32210340	3.4	74	34	4
32210350	3.5	80	40	4
32210357	3.57 (9/64)	80	40	4
32210360	3.6	80	40	4
32210370	3.7	80	40	4
32210380	3.8	80	40	4
32210390	3.9	80	40	4
32210397	3.97 (5/32)	80	40	4
32210400	4.0	80	40	4
32210410	4.1	90	43	6
32210420	4.2	90	43	6
32210430	4.3	90	43	6
32210437	4.37 (11/64)	90	43	6
32210440	4.4	90	50	6
32210450	4.5	90	50	6
32210460	4.6	90	50	6
32210470	4.7	90	50	6
32210476	4.76 (3/16)	90	50	6
32210480	4.8	90	50	6
32210490	4.9	90	50	6
32210500	5.0	90	50	6
32210510	5.1	97	57	6
32210516	5.16 (13/64)	97	57	8
32210520	5.2	97	57	6
32210530	5.3	97	57	8
32210540	5.4	97	57	6
32210550	5,5	97	57	8
32210556	5.56 (7/32)	97	57	6
32210560	5.6	97	57	8
32210570	5.7	97	57	6
32210580	5.8	97	57	8
32210590	5.9	97	57	6
32210595	5.95 (15/64)	97	57	8
32210600	6.0	97	57	6
32210610	6.1	106	66	8
32210620	6.2	106	66	8

HYP-HPO-8D				
EDP	D	L	l	d
32210630	6.3	106	66	8
32210635	6,35 (1/4)	106	66	8
32210640	6.4	106	66	8
32210650	6,5	106	66	8
32210660	6.6	106	66	8
32210670	6.7	106	66	8
32210675	6.75 (17/64)	106	66	8
32210680	6,8	106	66	8
32210690	6.9	116	76	8
32210700	7.0	116	76	8
32210710	7.1	116	76	8
32210714	7.14 (9/32)	116	76	8
32210720	7.2	116	76	8
32210730	7.3	116	76	8
32210740	7.4	116	76	8
32210750	7,5	116	76	8
32210754	7.54 (19/64)	116	76	8
32210760	7.6	116	76	8
32210770	7.7	116	76	8
32210780	7,8	116	76	8
32210790	7.9	116	76	8
32210794	7.94 (5/16)	116	76	8
32210800	8.0	116	76	8
32210810	8.1	131	87	10
32210820	8.2	131	87	10
32210830	8.3	131	87	10
32210833	8.33 (21/64)	131	87	10
32210840	8.4	131	87	10
32210850	8,5	131	87	10
32210860	8.6	131	87	10
32210870	8.7	131	87	10
32210873	8.73 (11/32)	131	87	10
32210880	8.8	131	87	10
32210890	8.9	131	87	10
32210900	9.0	131	87	10
32210910	9.1	139	95	10
32210913	9.13 (23/64)	139	95	10
32210920	9.2	139	95	10
32210930	9.3	139	95	10
32210940	9.4	139	95	10
32210950	9,5	139	95	10

HYP-HPO-8D				
EDP	D	L	l	d
32210952	9,52 (3/8)	139	95	10
32210960	9.6	139	95	10
32210970	9.7	139	95	10
32210980	9.8	139	95	10
32210990	9.9	139	95	10
32210992	9.92 (25/64)	139	95	10
32211000	10.0	139	95	10
32211010	10.1	155	106	12
32211020	10,2	155	106	12
32211030	10.3	155	106	12
32211032	10.32 (13/32)	155	106	12
32211040	10.4	155	106	12
32211050	10,5	155	106	12
32211060	10.6	155	106	12
32211070	10.7	155	106	12
32211072	10.72 (27/64)	155	106	12
32211080	10.8	155	106	12
32211090	10.9	155	106	12
32211100	11.0	155	106	12
32211110	11.1	163	114	12
32211111	11.11 (7/16)	163	114	12
32211120	11.2	163	114	12
32211130	11.3	163	114	12
32211140	11.4	163	114	12
32211150	11,5	163	114	12
32211151	11.51 (29/64)	163	114	12

HYP-HPO-8D				
EDP	D	L	l	d
32211160	11.6	163	114	12
32211170	11.7	163	114	12
32211180	11.8	163	114	12
32211190	11.9	163	114	12
32211191	11.91 (15/32)	163	114	12
32211200	12.0	163	114	12
32211230	12.3 (31/64)	182	133	14
32211250	12,5	182	133	14
32211270	12,7 (1/2)	182	133	14
32211300	13.0	182	133	14
32211350	13,5	182	133	14
32211400	14.0	182	133	14
32211429	14.29 (9/16)	204	152	16
32211450	14,5	204	152	16
32211500	15.0	204	152	16
32211550	15,5	204	152	16
32211587	15.87 (5/8)	204	152	16
32211600	16.0	204	152	16
32211650	16.5	223	171	18
32211700	17.0	223	171	18
32211750	17.5	223	171	18
32211800	18.0	223	171	18
32211850	18.5	244	190	20
32211900	19.0	244	190	20
32211950	19.5	244	190	20
32212000	20.0	244	190	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
								○	○			

HYP-LDS

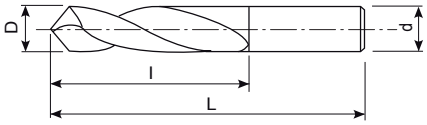
MICRO GRAIN CARBIDE SPOTTING & CHAMFERING DRILL

- OSG Standard, 2 Flutes, for general applications
- Material : Micro Grain Carbide.
- Surface treatment : Bright

CARBIDE | 20° | SHANK h6 | 90° | 120° | 142°

SPEED FEED P 38

Icon key page 2



HYP-LDS (90deg)					
EDP	D	L	l	d	a
20900300	3	35	8	3	90
20900400	4	40	10	4	90
20900600	6	50	16	6	90
20900800	8	60	23	8	90

HYP-LDS (90deg)					
EDP	D	L	l	d	a
20901000	10	70	24	10	90
20901200	12	70	25	12	90
20901600	16	80	30	16	90
20902000	20	100	35	20	90

HYP-LDS (120deg)					
EDP	D	L	l	d	a
21200300	3	35	8	3	120
21200400	4	40	10	4	120
21200600	6	50	16	6	120
21200800	8	60	23	8	120

HYP-LDS (120deg)					
EDP	D	L	l	d	a
21201000	10	70	24	10	120
21201200	12	70	25	12	120
21201600	16	80	30	16	120
21202000	20	100	35	20	120

HYP-LDS (142deg)					
EDP	D	L	l	d	a
21420300	3	35	8	3	142
21420400	4	40	10	4	142
21420600	6	50	16	6	142
21420800	8	60	23	8	142

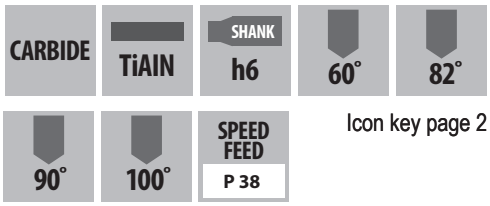
HYP-LDS (142deg)					
EDP	D	L	l	d	a
21421000	10	70	24	10	142
21421200	12	70	25	12	142
21421600	16	80	30	16	142
21422000	20	100	35	20	142

◎ EXCELLENT ○ GOOD

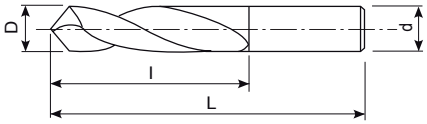
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	○				○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
○					○			○	○			

HYP-CHF

- OSG Standard, 4 Flutes, for general applications
- Material : Micro Grain Carbide.
- Surface treatment : Bright / TiALN Coated



Icon key page 2



HYP-CHF-Bright (60deg)	
EDP	D
205-157560	4
205-196860	5
205-236260	6
205-315060	8
205-393760	10
205-472460	12

HYP-CHF-XCEED (60deg)	
EDP	D
205-15756011	4
205-19686011	5
205-23626011	6
205-31506011	8
205-39376011	10
205-47246011	12

HYP-CHF-Bright (82deg)	
EDP	D
205-157582	4
205-196882	5
205-236282	6
205-315082	8
205-393782	10
205-472482	12

HYP-CHF-XCEED (82deg)	
EDP	D
205-15758211	4
205-19688211	5
205-23628211	6
205-31508211	8
205-39378211	10
205-47248211	12

HYP-CHF-Bright (90deg)	
EDP	D
205-157590	4
205-196890	5
205-236290	6
205-315090	8
205-393790	10
205-472490	12

HYP-CHF-XCEED (90deg)	
EDP	D
205-15759011	4
205-19689011	5
205-23629011	6
205-31509011	8
205-39379011	10
205-47249011	12

HYP-CHF-Bright (100deg)	
EDP	D
205-1575100	4
205-1968100	5
205-2362100	6
205-3150100	8
205-3937100	10
205-4724100	12

HYP-CHF-XCEED (100deg)	
EDP	D
205-157510011	4
205-196810011	5
205-236210011	6
205-315010011	8
205-393710011	10
205-472410011	12

Dimensions		
D	L	d
4	54	4
5	54	5
6	75	6
8	80	8
10	90	10
12	110	12

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	○				○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Vinyl	CFRP
○					○			○	○			

HC-H-DRL

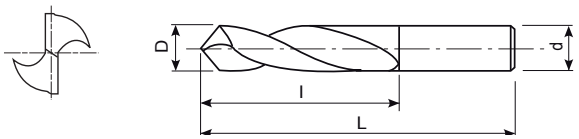
SLOW SPIRAL CARBIDE DRILL

- OSG Standard, 2 flutes , stub, for difficult to drill materials
- Material : MG (micro grain carbide)
- Surface treatment : Bright

CARBIDE | 12° | SHANK h6 | 135° | m7 | SPEED FEED P 38

Drill dia tol : +.000 / -.013mm

Icon key page 2



H-CH-DRL				
EDP	D	L	l	d
215-0394	1	38	13	1
215-0433	1,1	38	13	1,1
215-0472	1,2	38	13	1,2
215-0512	1,3	38	13	1,3
215-0551	1,4	38	13	1,4
215-0591	1,5	38	13	1,5
215-0630	1,6	43	18	1,6
215-0669	1,7	43	18	1,7
215-0709	1,8	43	18	1,8
215-0748	1,9	43	18	1,9
215-0787	2	45	19	2
215-0827	2,1	45	19	2,1
215-0866	2,2	45	19	2,2
215-0906	2,3	45	19	2,3
215-0945	2,4	46	21	2,4
215-0984	2,5	46	21	2,5
215-1024	2,6	46	21	2,6
215-1063	2,7	46	21	2,7
215-1102	2,8	48	22	2,8
215-1142	2,9	48	22	2,9
215-1181	3	48	22	3
215-1220	3,1	48	22	3,1
215-1260	3,2	52	24	3,2
215-1299	3,3	52	24	3,3
215-1339	3,4	52	24	3,4
215-1378	3,5	52	24	3,5
215-1417	3,6	52	25	3,6
215-1457	3,7	52	25	3,7
215-1496	3,8	52	25	3,8
215-1535	3,9	52	25	3,9
215-1575	4	53	27	4
215-1614	4,1	53	27	4,1
215-1654	4,2	53	27	4,2
215-1693	4,3	53	27	4,3
215-1732	4,4	55	29	4,4
215-1772	4,5	55	29	4,5
215-1811	4,6	55	29	4,6
215-1850	4,7	57	29	4,7
215-1890	4,8	57	30	4,8
215-1929	4,9	57	30	4,9
215-1968	5	57	30	5

H-CH-DRL				
EDP	D	L	l	d
215-2008	5,1	57	30	5,1
215-2047	5,2	60	32	5,2
215-2087	5,3	60	32	5,3
215-2126	5,4	60	32	5,4
215-2165	5,5	60	32	5,5
215-2205	5,6	61	33	5,6
215-2244	5,7	61	33	5,7
215-2283	5,8	61	33	5,8
215-2323	5,9	61	33	5,9
215-2362	6	61	33	6
215-2402	6,1	63	35	6,1
215-2441	6,2	63	35	6,2
215-2480	6,3	63	35	6,3
215-2520	6,4	63	35	6,4
215-2559	6,5	63	35	6,5
215-2598	6,6	67	37	6,6
215-2638	6,7	67	37	6,7
215-2677	6,8	68	38	6,8
215-2717	6,9	68	38	6,9
215-2756	7	68	38	7
215-2795	7,1	69	38	7,1
215-2835	7,2	70	40	7,2
215-2874	7,3	70	40	7,3
215-2913	7,4	70	40	7,4
215-2953	7,5	70	40	7,5
215-2992	7,6	71	41	7,6
215-3031	7,7	71	41	7,7
215-3071	7,8	71	41	7,8
215-3110	7,9	71	41	7,9
215-3150	8	71	41	8
215-3189	8,1	75	43	8,1
215-3228	8,2	75	43	8,2
215-3268	8,3	75	43	8,3
215-3307	8,4	76	43	8,4
215-3346	8,5	76	43	8,5
215-3386	8,6	76	43	8,6
215-3425	8,7	76	43	8,7
215-3465	8,8	78	44	8,8
215-3504	8,9	78	44	8,9
215-3543	9	78	44	9
215-3583	9,1	78	44	9,1

H-CH-DRL				
EDP	D	L	l	d
215-3622	9,2	79	46	9,2
215-3661	9,3	79	46	9,3
215-3701	9,4	79	46	9,4
215-3740	9,5	79	46	9,5
215-3780	9,6	83	48	9,6
215-3819	9,7	83	48	9,7
215-3858	9,8	83	48	9,8
215-3898	9,9	83	48	9,9
215-3937	10	83	48	10
215-3976	10,1	84	49	10,1
215-4016	10,2	84	49	10,2
215-4055	10,3	84	49	10,3
215-4094	10,4	86	51	10,4
215-4134	10,5	86	51	10,5
215-4173	10,6	86	51	10,6

H-CH-DRL				
EDP	D	L	l	d
215-4213	10,7	86	51	10,7
215-4252	10,8	87	52	10,8
215-4291	10,9	87	52	10,9
215-4331	11	87	52	11
215-4370	11,1	87	52	11,1
215-4409	11,2	90	54	11,2
215-4449	11,3	90	54	11,3
215-4488	11,4	90	54	11,4
215-4528	11,5	90	54	11,5
215-4567	11,6	92	54	11,6
215-4606	11,7	92	54	11,7
215-4646	11,8	92	54	11,8
215-4685	11,9	92	54	11,9
215-4724	12	92	54	12

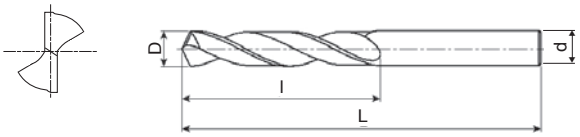
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	SCM	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	SUS	SKD	SC	GG	GGG
○	○	○	○	○	○			○	○		○	○
Cu	BS	BsC	PB	Al	AC,ADC	MC	ZDC	Ti	Ni	Plastic	Vinyl	CFRP
					○			○	○			

- OSG Standard, 2 flutes ,for general applications
- Material : Carbide
- Surface treatment : Bright

CARBIDE | 20° | 118° | m7 | SPEED FEED P 38

Icon key page 2



HYP-JOBBER				
EDP	D	L	l	d
71150100	1	38,1	15,9	1,0
71150110	1,1	38,1	19,1	1,1
71150120	1,2	38,1	19,1	1,2
71150130	1,3	38,1	19,1	1,3
71150140	1,4	38,1	19,1	1,4
71150150	1,5	38,1	19,1	1,5
71150160	1,6	38,1	19,1	1,6
71150170	1,7	38,1	19,1	1,7
71150180	1,8	44,5	22,2	1,8
71150190	1,9	44,5	22,2	1,9
71150200	2	44,5	22,2	2,0
71150210	2,1	44,5	22,2	2,1
71150220	2,2	50,8	25,4	2,2
71150230	2,3	50,8	25,4	2,3
71150238	3/32(2,38)	50,8	25,4	3/32(2,38)
71150240	2,4	50,8	25,4	2,4
71150250	2,5	50,8	25,4	2,5
71150260	2,6	57,2	31,8	2,6
71150270	2,7	57,2	31,8	2,7
71150278	7/64(2,78)	57,2	31,8	7/64(2,78)
71150280	2,8	57,2	31,8	2,8
71150290	2,9	57,2	31,8	2,9
71150300	3	57,2	31,8	3,0
71150310	3,1	57,2	31,8	3,1
71150317	1/8(3,17)	57,2	31,8	1/8(3,17)
71150320	3,2	57,2	31,8	3,2
71150330	3,3	57,2	31,8	3,3
71150340	3,4	63,5	34,9	3,4
71150350	3,5	63,5	34,9	3,5
71150357	9/64(3,57)	63,5	34,9	9/64(3,57)
71150360	3,6	63,5	34,9	3,6
71150370	3,7	63,5	34,9	3,7
71150380	3,8	63,5	34,9	3,8
71150390	3,9	63,5	34,9	3,9
71150397	5/32(3,97)	63,5	34,9	5/32(3,97)
71150400	4	63,5	34,9	4,0
71150410	4,1	63,5	34,9	4,1
71150420	4,2	69,9	41,3	4,2
71150430	4,3	69,9	41,3	4,3
71150437	11/64(4,37)	69,9	41,3	11/64(4,37)
71150440	4,4	69,9	41,3	4,4

HYP-JOBBER				
EDP	D	L	l	d
71150450	4,5	69,9	41,3	4,5
71150460	4,6	69,9	41,3	4,6
71150470	4,7	69,9	41,3	4,7
71150476	3/16(4,76)	69,9	41,3	3/16(4,76)
71150480	4,8	69,9	41,3	4,8
71150490	4,9	69,9	41,3	4,9
71150500	5	76,2	44,5	5,0
71150510	5,1	76,2	44,5	5,1
71150520	5,2	76,2	44,5	5,2
71150530	5,3	76,2	44,5	5,3
71150540	5,4	76,2	44,5	5,4
71150550	5,5	76,2	44,5	5,5
71150560	5,6	76,2	44,5	5,6
71150570	5,7	76,2	44,5	5,7
71150580	5,8	76,2	44,5	5,8
71150590	5,9	82,6	50,8	5,9
71150600	6	82,6	50,8	6,0
71150610	6,1	82,6	50,8	6,1
71150620	6,2	82,6	50,8	6,2
71150630	6,3	82,6	50,8	6,3
71150635	1/4(6,35)	82,6	50,8	1/4(6,35)
71150640	6,4	82,6	50,8	6,4
71150650	6,5	82,6	50,8	6,5
71150660	6,6	88,9	54,0	6,6
71150670	6,7	88,9	54,0	6,7
71150680	6,8	88,9	54,0	6,8
71150690	6,9	88,9	54,0	6,9
71150700	7	88,9	54,0	7,0
71150710	7,1	88,9	54,0	7,1
71150714	9/32(7,14)	88,9	54,0	9/32(7,14)
71150720	7,2	88,9	54,0	7,2
71150730	7,3	88,9	54,0	7,3
71150740	7,4	88,9	54,0	7,4
71150750	7,5	95,3	60,3	7,5
71150760	7,6	95,3	60,3	7,6
71150770	7,7	95,3	60,3	7,7
71150780	7,8	95,3	60,3	7,8
71150790	7,9	95,3	60,3	7,9
71150794	5/16(7,94)	95,3	60,3	5/16(7,94)
71150800	8	95,3	60,3	8,0
71150810	8,1	95,3	60,3	8,1

HYP-JOBBER				
EDP	D	L	l	d
71150820	8,2	95,3	60,3	8,2
71150830	8,3	101,6	36,5	8,3
71150840	8,4	101,6	36,5	8,4
71150850	8,5	101,6	36,5	8,5
71150860	8,6	101,6	36,5	8,6
71150870	8,7	101,6	36,5	8,7
71150873	11/32(8,73)	101,6	36,5	11/32(8,73)
71150880	8,8	101,6	36,5	8,8
71150890	8,9	101,6	36,5	8,9
71150900	9	101,6	36,5	9,0
71150910	9,1	101,6	36,5	9,1
71150920	9,2	108,0	69,9	9,2
71150930	9,3	108,0	69,9	9,3
71150940	9,4	108,0	69,9	9,4
71150950	9,5	108,0	69,9	9,5
71150960	9,6	108,0	69,9	9,6
71150970	9,7	114,3	73,0	9,7
71150980	9,8	114,3	73,0	9,8
71150990	9,9	114,3	73,0	9,9
71151000	10	114,3	73,0	10,0
71151010	10,1	114,3	73,0	10,1
71151020	10,2	114,3	73,0	10,2

HYP-JOBBER				
EDP	D	L	l	d
71151030	10,3	114,3	73,0	10,3
71151040	10,4	114,3	73,0	10,4
71151050	10,5	114,3	73,0	10,5
71151060	10,6	114,3	73,0	10,6
71151070	10,7	114,3	73,0	10,7
71151080	10,8	114,3	73,0	10,8
71151090	10,9	114,3	73,0	10,9
71151100	11	114,3	73,0	11,0
71151110	11,1	114,3	73,0	11,1
71151111	7/16(11,11)	114,3	73,0	7/16(11,11)
71151120	11,2	120,7	76,2	11,2
71151130	11,3	120,7	76,2	11,3
71151140	11,4	120,7	76,2	11,4
71151150	11,5	120,7	76,2	11,5
71151160	11,6	120,7	76,2	11,6
71151170	11,7	120,7	76,2	11,7
71151180	11,8	120,7	76,2	11,8
71151190	11,9	120,7	76,2	11,9
71151191	15/32(11,91)	120,7	76,2	15/32(11,91)
71151200	12	120,7	76,2	12,0
71151270	1/2(12,7)	120,7	76,2	1/2(12,7)

◎ EXCELLENT ○ GOOD

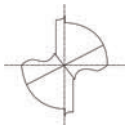
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	SCM	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	SUS	SKD	SC	GG	GGG
○	○	○	○	○	○						○	
Cu	BS	BsC	PB	Al	AC,ADC	MC	ZDC	Ti	Ni	Plastic	Vinyl	CFRP
				○	○							

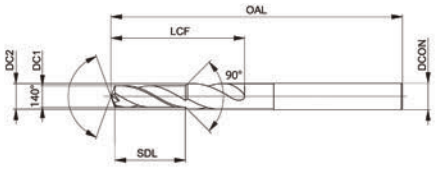
Drilling | Solid carbide | 3xD

CARBIDE | EgiAs | 30° | SHRINK FIT | 140°

h8 | SPEED FEED P 39

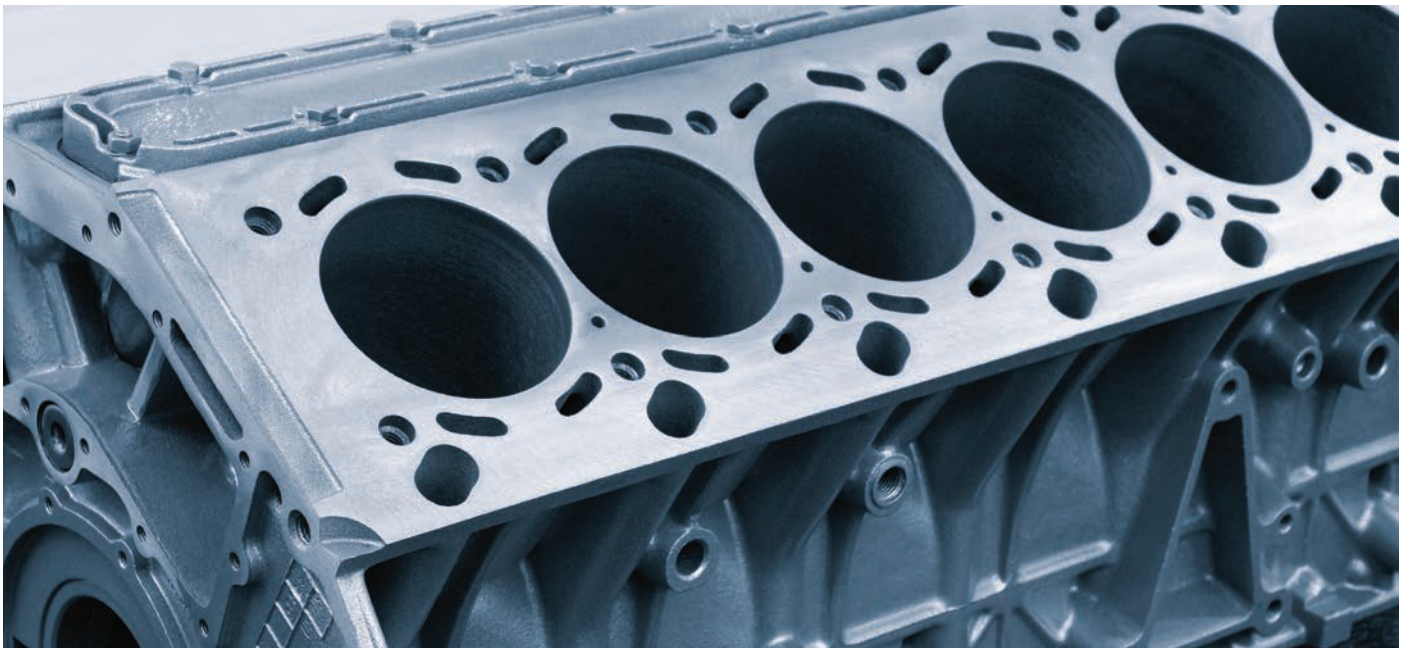
Icon key page 2





HYP-HP-SC-3D							
EDP	For threading	DC1	DC2	DCON	SDL	LCF	OAL
EP0201138	M3x0,5	2,5	6	6	9	13	66
EP0201144	M4x0,7	3,3	6	6	12	16	66
EP0201149	M5x0,8	4,2	6	6	15	18	66
EP0201155	M6x1	5	8	8	18	23	79
EP0201161	M8x1,25	6,8	10	10	24	29	89
EP0201169	M10x1,5	8,5	12	12	30	35	89
EP0201179	M12x1,75	10,2	14	14	36	41	112

HYP-HPO-SC-3D							
EDP	For threading	DC1	DC2	DCON	SDL	LCF	OAL
EP0202144	M4x0,7	3,3	6	6	12	16	66
EP0202149	M5x0,8	4,2	6	6	15	18	66
EP0202155	M6x1	5	8	8	18	23	79
EP0202161	M8x1,25	6,8	10	10	24	29	89
EP0202169	M10x1,5	8,5	12	12	30	35	89
EP0202179	M12x1,75	10,2	14	14	36	41	112



◎ EXCELLENT ○ GOOD

Work Material											
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎							◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP

HYP-HP-3D / HYP-HPO-3D / HE

	Steel			Cu	A5052 / A7075	Al < 13% Si
	< 700 N/mm²	< 850 N/mm²	< 1000 N/mm²			< 130 HB
Vc	100 ~ 120 m/min	80 ~ 110 m/min	70 ~ 100 m/min	50 ~ 90 m/min	60 ~ 110 m/min	120 ~ 220 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
3	0,09~0,12	0,09~0,12	0,09~0,12	0,02~0,03	0,09~0,20	0,09~0,28
4	0,10~0,15	0,10~0,15	0,10~0,15	0,02~0,04	0,10~0,24	0,10~0,38
5	0,12~0,18	0,12~0,18	0,12~0,18	0,03~0,05	0,12~0,28	0,12~0,40
6	0,14~0,20	0,14~0,20	0,14~0,20	0,03~0,06	0,14~0,34	0,14~0,48
8	0,16~0,24	0,16~0,24	0,16~0,24	0,04~0,08	0,16~0,38	0,16~0,53
10	0,18~0,27	0,18~0,27	0,18~0,27	0,05~0,10	0,18~0,45	0,18~0,63
12	0,20~0,30	0,20~0,30	0,20~0,30	0,06~0,12	0,20~0,53	0,20~0,75
14	0,22~0,35	0,22~0,35	0,22~0,35	0,08~0,16	0,22~0,57	0,22~0,81
16	0,25~0,36	0,25~0,36	0,25~0,36	0,10~0,18	0,25~0,61	0,25~0,85
18	0,28~0,38	0,28~0,38	0,28~0,38	0,12~0,20	0,28~0,63	0,28~0,90
20	0,30~0,40	0,30~0,40	0,30~0,40	0,20~0,28	0,28~0,68	0,30~0,98

HYP-HP-3D / HYP-HPO-3D / HE

	GG (G)		SUS	High-Alloy Steel	Special Alloys	Hardened Steel
	< 180 HB	< 300 HB	< 820 HB	< 1200 N/mm²	< 30 HRC	< 55 HRC
Vc	120 ~ 150 m/min	100 ~ 120 m/min	40 ~ 50 m/min	50 ~60 m/min	15 ~ 25 m/min	15 ~ 25 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
3	0,12~0,15	0,12~0,15	0,09~0,12	0,07~0,11	0,05~0,09	0,03~0,05
4	0,13~0,18	0,13~0,18	0,10~0,15	0,08~0,13	0,06~0,10	0,04~0,06
5	0,15~0,22	0,15~0,22	0,12~0,18	0,10~0,15	0,08~0,12	0,05~0,07
6	0,18~0,25	0,18~0,25	0,14~0,20	0,12~0,18	0,09~0,15	0,05~0,07
8	0,20~0,30	0,20~0,30	0,16~0,24	0,14~0,22	0,12~0,20	0,06~0,08
10	0,23~0,33	0,23~0,33	0,18~0,27	0,15~0,25	0,13~0,23	0,07~0,10
12	0,25~0,38	0,25~0,38	0,20~0,30	0,17~0,26	0,14~0,24	0,09~0,12
14	0,30~0,43	0,30~0,43	0,22~0,35	0,18~0,30	0,15~0,26	0,10~0,13
16	0,35~0,50	0,35~0,50	0,25~0,36	0,20~0,32	0,16~0,26	0,10~0,13
18	0,38~0,55	0,38~0,55	0,28~0,38	0,23~0,33	0,18~0,28	0,12~0,16
20	0,40~0,63	0,40~0,63	0,30~0,40	0,25~0,35	0,20~0,30	0,14~0,18

HYP-HP-5D / HYP-HPO-5D / HE / HYP-HPO-8D

	Steel			Cu	A5052 / A7075	Al < 13% Si
	< 700 N/mm²	< 850 N/mm²	< 1000 N/mm²			< 130 HB
Vc	100 ~ 120 m/min	80 ~ 110 m/min	70 ~ 100 m/min	50 ~ 90 m/min	60 ~ 110 m/min	120 ~ 220 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
3	0,09~0,12	0,09~0,12	0,09~0,12	0,02~0,03	0,09~0,20	0,09~0,28
4	0,10~0,15	0,10~0,15	0,10~0,15	0,02~0,04	0,10~0,24	0,10~0,38
5	0,12~0,18	0,12~0,18	0,12~0,18	0,03~0,05	0,12~0,28	0,12~0,40
6	0,14~0,20	0,14~0,20	0,14~0,20	0,03~0,06	0,14~0,34	0,14~0,48
8	0,16~0,24	0,16~0,24	0,16~0,24	0,04~0,08	0,16~0,38	0,16~0,53
10	0,18~0,27	0,18~0,27	0,18~0,27	0,05~0,10	0,18~0,45	0,18~0,63
12	0,20~0,30	0,20~0,30	0,20~0,30	0,06~0,12	0,20~0,53	0,20~0,75
14	0,22~0,35	0,22~0,35	0,22~0,35	0,08~0,16	0,22~0,57	0,22~0,81
16	0,25~0,36	0,25~0,36	0,25~0,36	0,10~0,18	0,25~0,61	0,25~0,85
18	0,28~0,38	0,28~0,38	0,28~0,38	0,12~0,20	0,28~0,63	0,28~0,90
20	0,30~0,40	0,30~0,40	0,30~0,40	0,20~0,28	0,28~0,68	0,30~0,98

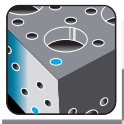
HYP-HP-5D / HYP-HPO-5D / HE / HYP-HPO-8D

	GG (G)		SUS	High-Alloy Steel	Special Alloys	Hardened Steel
	< 180 HB	< 300 HB	< 820 HB	< 1200 N/mm²	< 30 HRC	< 55 HRC
Vc	120 ~ 150 m/min	100 ~ 120 m/min	40 ~ 50 m/min	50 ~60 m/min	15 ~ 25 m/min	15 ~ 25 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
3	0,12~0,15	0,12~0,15	0,09~0,12	0,07~0,11	0,05~0,09	0,03~0,05
4	0,13~0,18	0,13~0,18	0,10~0,15	0,08~0,13	0,06~0,10	0,04~0,06
5	0,15~0,22	0,15~0,22	0,12~0,18	0,10~0,15	0,08~0,12	0,05~0,07
6	0,18~0,25	0,18~0,25	0,14~0,20	0,12~0,18	0,09~0,15	0,05~0,07
8	0,20~0,30	0,20~0,30	0,16~0,24	0,14~0,22	0,12~0,20	0,06~0,08
10	0,23~0,33	0,23~0,33	0,18~0,27	0,15~0,25	0,13~0,23	0,07~0,10
12	0,25~0,38	0,25~0,38	0,20~0,30	0,17~0,26	0,14~0,24	0,09~0,12
14	0,30~0,43	0,30~0,43	0,22~0,35	0,18~0,30	0,15~0,26	0,10~0,13
16	0,35~0,50	0,35~0,50	0,25~0,36	0,20~0,32	0,16~0,26	0,10~0,13
18	0,38~0,55	0,38~0,55	0,28~0,38	0,23~0,33	0,18~0,28	0,12~0,16
20	0,40~0,63	0,40~0,63	0,30~0,40	0,25~0,35	0,20~0,30	0,14~0,18

When using non-through coolant drills we recommend that you reduce speeds / feeds by 10~15%

DRILLING CONDITIONS

HYP-LDS / CHF



	C≤0,2%		Carbon Steel		Alloy Steel		Special Steel		Special Steel		Cast Iron		Cast Al	
	St40 ~ 500 N/mm²		CK45 500 ~ 710 N/mm²		SCM440 710 ~ 900 N/mm²		SKD61 28 HRC		SKD11 34 HRC		GG25 ~ 350 N/mm²		AC4D	
Vc	63 ~ 80 m/min		40 ~ 63 m/min		32 ~ 50 m/min		20 ~ 28 m/min		16 ~ 22 m/min		63 ~ 100 m/min		80 ~ 160 m/min	
Ø	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)	S (min⁻¹)	F (mm/rev.)
3	7.500	0,04~0,08	5.500	0,04~0,08	4.500	0,04~0,08	2.500	0,04~0,08	2.000	0,04~0,08	8.000	0,05~0,09	12.000	0,10~0,22
4	5.700	0,05~0,10	4.100	0,05~0,10	3.300	0,05~0,10	1.900	0,05~0,10	1.500	0,05~0,10	6.500	0,07~0,12	9.500	0,12~0,25
6	3.800	0,06~0,12	2.700	0,06~0,12	2.300	0,06~0,12	1.250	0,06~0,12	1.000	0,06~0,12	4.300	0,12~0,18	6.400	0,14~0,28
8	2.800	0,08~0,15	2.000	0,08~0,15	1.700	0,08~0,15	950	0,08~0,15	750	0,08~0,15	3.200	0,13~0,20	4.800	0,18~0,32
10	2.300	0,10~0,18	1.700	0,10~0,18	1.400	0,10~0,18	750	0,10~0,18	600	0,10~0,18	2.600	0,17~0,25	3.800	0,22~0,36
12	1.900	0,12~0,21	1.400	0,12~0,21	1.200	0,12~0,21	650	0,12~0,21	500	0,12~0,21	2.200	0,21~0,30	3.200	0,25~0,40
16	1.400	0,16~0,28	1.000	0,16~0,28	900	0,16~0,28	500	0,16~0,28	380	0,16~0,28	1.600	0,24~0,32	2.400	0,32~0,48
20	1.150	0,20~0,34	820	0,20~0,34	700	0,20~0,34	400	0,20~0,34	300	0,20~0,34	1.300	0,26~0,40	1.900	0,40~0,60

HC-H-DRL / JOBBER

	Cast Iron	Mild Steels Carbon Steels	Alloy Tool Steels Tool Steels	Hardened Steels Prehardened Steels		Titanium Alloys (Annealed)
	< 180 HB	< 1000 N/mm²	< 1200 N/mm²	< 35 HRC	< 45 HRC	< 38 HRC
Vc	90 m/min	90 m/min	85 m/min	55 ~65 m/min	45 ~ 55 m/min	40m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
1	0,02	0,025	0,01	0,01	0,01	0,01
2	0,04	0,05	0,02	0,02	0,02	0,02
3	0,05	0,07	0,03	0,03	0,03	0,03
4	0,07	0,08	0,04	0,04	0,04	0,04
5	0,09	0,09	0,05	0,05	0,05	0,04
6	0,10	0,10	0,05	0,06	0,06	0,05
8	0,11	0,12	0,06	0,07	0,07	0,06
10	0,12	0,15	0,10	0,10	0,10	0,06
12	0,14	0,19	0,13	0,11	0,11	0,07

HC-H-DRL / JOBBER

	Special Alloys Inconel	Aluminium	Graphite Composite	Epoxy Fibre	Acrylic Plastics	Composite Titanium Stack
	< 42 HRC	< 130 HB				
Vc	15 ~ 20 m/min	150 ~ 180 m/min	50 ~ 70 m/min	50 ~70 m/min	40 ~ 60 m/min	5 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
1	0,007	0,02	n/a	n/a	n/a	n/a
2	0,015	0,05	0,03	0,03	0,03	0,02
3	0,02	0,07	0,05	0,05	0,05	0,02
4	0,02	0,09	0,06	0,06	0,06	0,02
5	0,03	0,11	0,07	0,07	0,07	0,05
6	0,04	0,11	0,10	0,10	0,10	0,05
8	0,04	0,14	0,12	0,12	0,12	0,07
10	0,05	0,17	0,13	0,13	0,13	0,10
12	0,05	0,20	0,14	0,14	0,14	0,10

When drilling deep holes using HC-H-DRL, the recommended speeds and feeds should be reduced proportionally based on the hole depth.
See table opposite for guidelines for reducing the speeds and feeds.

HC-H-DRL / JOBBER

Drilling Depth	Spindle Speed Reduction	Feed Rate Reduction
3 x Dia	10%	10%
4 x Dia	20%	10%
5 x Dia	30%	20%
6 x Dia	35%	20%
8 x Dia	40%	20%

HYP-HP-SC-3D

	Steel			Cu	A5052 /A7075	Al < 13% Si < 130 HB
	< 700 N/mm²	< 300 HB	< 820 HB			
Vc	100 ~ 150 m/min	80 ~ 120 m/min	70 ~ 110 m/min	50 ~ 90 m/min	60 ~ 110 m/min	120 ~ 220 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev)	F (mm/rev)	F (mm/rev)	F (mm/rev)
3	0,09~0,12	0,09~0,12	0,09~0,12	0,02~0,03	0,09~0,20	0,09~0,28
4	0,10~0,15	0,10~0,15	0,10~0,15	0,02~0,04	0,10~0,24	0,10~0,38
5	0,12~0,18	0,12~0,18	0,12~0,18	0,03~0,05	0,12~0,28	0,12~0,40
6	0,14~0,20	0,14~0,20	0,14~0,20	0,03~0,06	0,14~0,34	0,14~0,48
8	0,16~0,24	0,16~0,24	0,16~0,24	0,04~0,08	0,16~0,38	0,16~0,53
10	0,18~0,27	0,18~0,27	0,18~0,27	0,05~0,10	0,18~0,45	0,18~0,63
12	0,20~0,30	0,20~0,30	0,20~0,30	0,06~0,12	0,20~0,53	0,20~0,75
14	0,22~0,35	0,22~0,35	0,22~0,35	0,08~0,16	0,22~0,57	0,22~0,81
16	0,25~0,36	0,25~0,36	0,25~0,36	0,10~0,18	0,25~0,61	0,25~0,85
18	0,28~0,38	0,28~0,38	0,28~0,38	0,12~0,20	0,28~0,63	0,28~0,90
20	0,30~0,40	0,30~0,40	0,30~0,40	0,20~0,28	0,28~0,68	0,30~0,98

HYP-HPO-SC-3D

	GG (G)		Stainless Steel	High-Alloy Steel	Special Alloys	Hardened Steel
	< 180 HB	< 300 HB	< 820 HB	< 1200 N/mm²	< 30 HRC	< 60 HRC
Vc	150 ~ 200 m/min	100 ~ 150 m/min	40 ~ 50 m/min	50 ~ 60 m/min	15 ~ 25 m/min	15 ~ 25 m/min
Ø	F (mm/rev.)	F (mm/rev.)	F (mm/rev)	F (mm/rev)	F (mm/rev)	F (mm/rev)
3	0,12~0,15	0,12~0,15	0,09~0,12	0,07~0,11	0,05~0,09	0,03~0,05
4	0,13~0,18	0,13~0,18	0,10~0,15	0,08~0,13	0,06~0,10	0,04~0,06
5	0,15~0,22	0,15~0,22	0,12~0,18	0,10~0,15	0,08~0,12	0,05~0,07
6	0,18~0,25	0,18~0,25	0,14~0,20	0,12~0,18	0,09~0,15	0,05~0,07
8	0,20~0,30	0,20~0,30	0,16~0,24	0,14~0,22	0,12~0,20	0,06~0,08
10	0,23~0,33	0,23~0,33	0,18~0,27	0,15~0,25	0,13~0,23	0,07~0,10
12	0,25~0,38	0,25~0,38	0,20~0,30	0,17~0,26	0,14~0,24	0,09~0,12
14	0,30~0,43	0,30~0,43	0,22~0,35	0,18~0,30	0,15~0,26	0,10~0,13
16	0,35~0,50	0,35~0,50	0,25~0,36	0,20~0,32	0,16~0,26	0,10~0,13
18	0,38~0,55	0,38~0,55	0,28~0,38	0,23~0,33	0,18~0,28	0,12~0,16
20	0,40~0,63	0,40~0,63	0,30~0,40	0,25~0,35	0,20~0,30	0,14~0,18

HYP-AL-3D

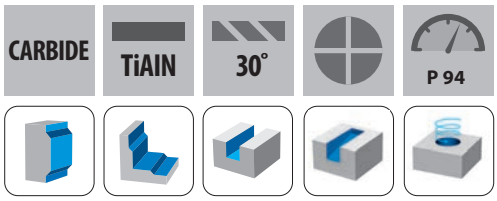
	Cast Aluminum		Aluminum Alloy		Copper Alloy		Magnesium Alloy	
Vc	80 ~ 200 m/min		80 ~ 150 m/min		40 ~ 100 m/min		60 ~ 100 m/min	
Ø		F (mm/rev)	S (min⁻¹)	F (mm/rev)	S (min⁻¹)	F (mm/rev)	S (min⁻¹)	F (mm/rev)
1	25000	0,02 ~ 0,08	25000	0,02 ~ 0,05	22300	0,008 ~ 0,02	25000	0,02 ~ 0,05
2	22300	0,04 ~ 0,16	18300	0,04 ~ 0,10	11100	0,016 ~ 0,04	12700	0,04 ~ 0,10
3	14900	0,06 ~ 0,24	12200	0,06 ~ 0,15	7400	0,024 ~ 0,06	8500	0,06 ~ 0,15
4	11100	0,08 ~ 0,32	9200	0,08 ~ 0,20	5600	0,032 ~ 0,08	6400	0,08 ~ 0,20
6	7400	0,12 ~ 0,48	6100	0,12 ~ 0,30	3700	0,048 ~ 0,12	4200	0,12 ~ 0,30
8	5600	0,16 ~ 0,64	4600	0,16 ~ 0,40	2800	0,064 ~ 0,16	3200	0,16 ~ 0,40
10	4500	0,20 ~ 0,80	3700	0,20 ~ 0,50	2200	0,080 ~ 0,20	2500	0,20 ~ 0,50
12	3700	0,24 ~ 0,96	3100	0,24 ~ 0,60	1900	0,096 ~ 0,24	2100	0,24 ~ 0,60

HYP-AL-5D

	Cast Aluminum		Aluminum Alloy		Copper Alloy		Magnesium Alloy	
Vc	120 ~ 250 m/min		80 ~ 200 m/min		40 ~ 120 m/min		60 ~ 130 m/min	
Ø	S (min⁻¹)	F (mm/rev)	S (min⁻¹)	F (mm/rev)	S (min⁻¹)	F (mm/rev)	S (min⁻¹)	F (mm/rev)
1	25000	0,02 ~ 0,08	25000	0,02 ~ 0,05	25000	0,008 ~ 0,02	25000	0,02 ~ 0,05
2	29500	0,04 ~ 0,16	22300	0,04 ~ 0,10	12700	0,016 ~ 0,04	15100	0,04 ~ 0,10
3	19600	0,06 ~ 0,24	14900	0,06 ~ 0,15	8500	0,024 ~ 0,06	10100	0,06 ~ 0,15
4	14700	0,08 ~ 0,32	11100	0,08 ~ 0,20	6400	0,032 ~ 0,08	7600	0,08 ~ 0,20
6	9800	0,12 ~ 0,48	7400	0,12 ~ 0,30	4200	0,048 ~ 0,12	5000	0,12 ~ 0,30
8	7400	0,16 ~ 0,64	5600	0,16 ~ 0,40	3200	0,064 ~ 0,16	3800	0,16 ~ 0,40
10	5900	0,20 ~ 0,80	4500	0,20 ~ 0,50	2500	0,080 ~ 0,20	3000	0,20 ~ 0,50
12	4900	0,24 ~ 0,96	3700	0,24 ~ 0,60	2100	0,096 ~ 0,24	2500	0,24 ~ 0,60


MILLING

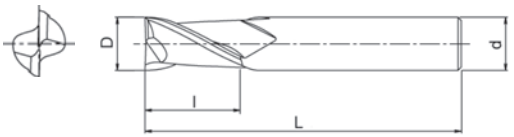
- 2 flutes, regular, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EDS	HYP-EDS-XCEED	Dimensions			
EDP	EDP	D	L	l	d
402-0394	402-039411	1	39	3	3
402-0591	402-059111	1,5	39	5	3
402-0787	402-078711	2	39	7	3
402-0984	402-098411	2,5	39	8	3
402-1181	402-118111	3	39	10	3
402-1378	402-137811	3,5	51	12	4
402-1575	402-157511	4	51	14	4
402-1772	402-177211	4,5	51	14	5
402-1968	402-196811	5	51	16	5
402-2362	402-236211	6	64	19	6
402-2756	402-275611	7	64	19	8
402-3150	402-315011	8	64	21	8
402-3543	402-354311	9	70	22	10
402-3937	402-393711	10	70	25	10
402-4331	402-433111	11	70	25	11
402-4724	402-472411	12	76	25	12
402-5512	402-551211	14	89	30	14
402-6299	402-629911	16	89	32	16
402-7087	402-708711	18	102	35	18
402-7874	402-787411	20	102	38	20
402-8661	402-866111	22	102	38	22
402-9843	402-984311	25	102	38	25

HYP-EDS (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

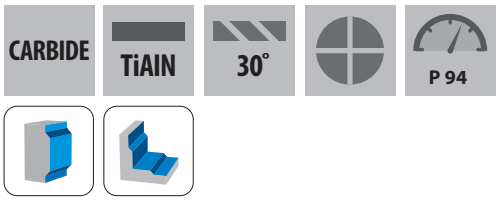
HYP-EDS-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-EDL / HYP-EDL-XCEED

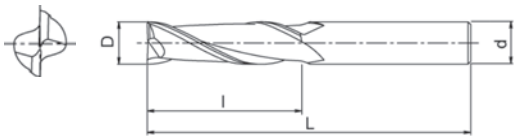
- 2 flutes, long, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EDL	HYP-EDL-XCEED	Dimensions			
EDP	EDP	D	L	l	d
462-1181	462-118111	3	60	19	3
462-1575	462-157511	4	60	19	4
462-1968	462-196811	5	64	25	5
462-2362	462-236211	6	75	28	6
462-3150	462-315011	8	75	29	8
462-3937	462-393711	10	75	32	10
462-4724	462-472411	12	100	51	12
462-5512	462-551211	14	127	57	14
462-6299	462-629911	16	130	57	16
462-7087	462-708711	18	130	57	18
462-7874	462-787411	20	130	57	20
462-9843	462-984311	25	130	57	25

HYP-EDL (uncoated)

◎ EXCELLENT ○ GOOD

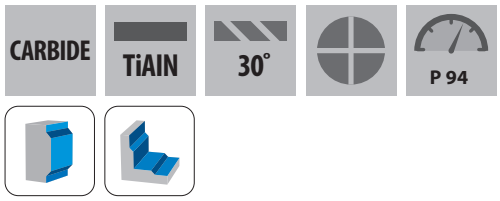
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

HYP-EDL-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

- 2 flutes, extra long, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



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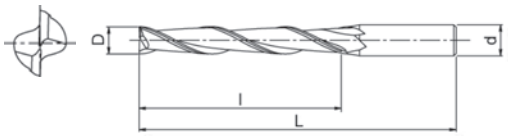


Bright

HYP-EDXL
EDP
482-1181
482-1575
482-1968
482-2362
482-3150
482-3937
482-4724
482-5512
482-6299
482-7087
482-7874
482-9843

TiALN coated

HYP-EDXL-XCEED
EDP
482-118111
482-157511
482-196811
482-236211
482-315011
482-393711
482-472411
482-551211
482-629911
482-708711
482-787411
482-984311

Dimensions			
D	L	l	d
3	75	25	3
4	75	28	4
5	76	32	5
6	100	38	6
8	100	42	8
10	100	45	10
12	150	76	12
14	153	76	14
16	150	76	16
18	150	76	18
20	150	76	20
25	150	76	25

HYP-EDXL (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

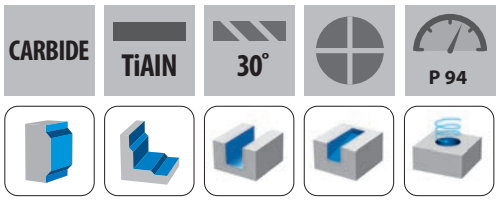
HYP-EDXL-XCEED (coated)

◎ EXCELLENT ○ GOOD

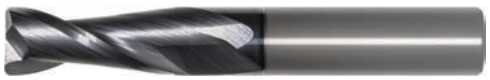
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

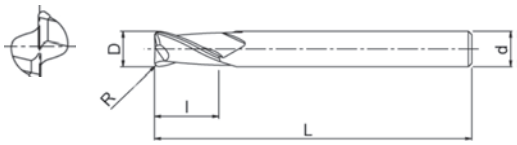
HYP-CR-EDS

- 2 flutes, regular, corner radius, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



Icon key page 2

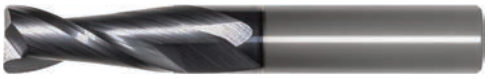


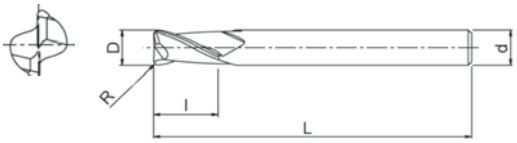


EDP	Dimensions				
	D	R	L	l	d
402-1575R02	4	0,2	51	14	4
402-1575R025	4	0,25	51	14	4
402-1575R04	4	0,4	51	14	4
402-1575R05	4	0,5	51	14	4
402-1575R075	4	0,75	51	14	4
402-1575R10	4	1,0	51	14	4
402-1575R15	4	1,5	51	14	4
402-1968R025	5	0,25	51	16	5
402-1968R05	5	0,5	51	16	5
402-1968R075	5	0,75	51	16	5
402-1968R10	5	1,0	51	16	5
402-1968R125	5	1,25	51	16	5
402-1968R15	5	1,5	51	16	5
402-1968R20	5	2,0	51	16	5
402-2362R02	6	0,2	64	19	6
402-2362R025	6	0,25	64	19	6
402-2362R05	6	0,5	64	19	6
402-2362R075	6	0,75	64	19	6
402-2362R08	6	0,8	64	19	6
402-2362R10	6	1,0	64	19	6
402-2362R125	6	1,25	64	19	6
402-2362R15	6	1,5	64	19	6
402-2362R20	6	2,0	64	19	6
402-3150R02	8	0,2	64	21	8
402-3150R025	8	0,25	64	21	8
402-3150R03	8	0,3	64	21	8
402-3150R05	8	0,5	64	21	8
402-3150R04	8	0,4	64	21	8
402-3150R075	8	0,75	64	21	8
402-3150R08	8	0,8	64	21	8
402-3150R10	8	1,0	64	21	8
402-3150R125	8	1,25	64	21	8
402-3150R15	8	1,5	64	21	8
402-3150R20	8	2,0	64	21	8

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				





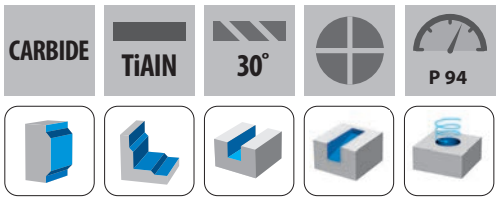
EDP	Dimensions				
	D	R	L	l	d
402-3150R25	8	2,5	64	21	8
402-3150R30	8	3,0	64	21	8
402-3937R02	10	0,2	70	25	10
402-3937R025	10	0,25	70	25	10
402-3937R04	10	0,4	70	25	10
402-3937R05	10	0,5	70	25	10
402-3937R08	10	0,8	70	25	10
402-3937R10	10	1,0	70	25	10
402-3937R125	10	1,25	70	25	10
402-3937R15	10	1,5	70	25	10
402-3937R20	10	2,0	70	25	10
402-3937R25	10	2,5	70	25	10
402-3937R30	10	3,0	70	25	10
402-3937R32	10	3,2	70	25	10
402-3937R40	10	4,0	70	25	10
402-4724R02	12	0,2	76	25	12
402-4724R025	12	0,25	76	25	12
402-4724R03	12	0,3	76	25	12
402-4724R05	12	0,5	76	25	12
402-4724R075	12	0,75	76	25	12
402-4724R08	12	0,8	76	25	12
402-4724R10	12	1,0	76	25	12
402-4724R15	12	1,5	76	25	12
402-4724R20	12	2,0	76	25	12
402-4724R25	12	2,5	76	25	12
402-4724R30	12	3,0	76	25	12
402-4724R32	12	3,2	76	25	12
402-4724R40	12	4,0	76	25	12
402-6299R05	16	0,5	89	32	16
402-6299R10	16	1,0	89	32	16
402-6299R15	16	1,5	89	32	16
402-6299R20	16	2,0	89	32	16
402-6299R25	16	2,5	89	32	16
402-6299R30	16	3,0	89	32	16
402-6299R40	16	4,0	89	32	16
402-6299R50	16	5,0	89	32	16
402-7874R05	20	0,5	102	38	20
402-7874R10	20	1,0	102	38	20
402-7874R20	20	2,0	102	38	20
402-7874R30	20	3,0	102	38	20
402-7874R50	20	5,0	102	38	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-ETS / HYP-ETS-XCEED

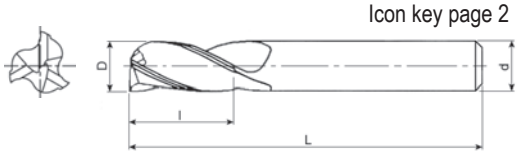
- 3 flutes, regular, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-ETS	HYP-ETS-XCEED	Dimensions			
EDP	EDP	D	L	l	d
403-0394	403-039411	1	39	3	3
403-0591	403-059111	1,5	39	5	3
403-0787	403-078711	2	39	7	3
403-0984	403-098411	2,5	39	8	3
403-1181	403-118111	3	39	10	3
403-1378	403-137811	3,5	51	12	4
403-1575	403-157511	4	51	14	4
403-1772	403-177211	4,5	51	14	5
403-1968	403-196811	5	51	16	5
403-2362	403-236211	6	64	19	6
403-2756	403-275611	7	64	19	8
403-3150	403-315011	8	64	21	8
403-3543	403-354311	9	70	22	10
403-3937	403-393711	10	70	25	10
403-4331	403-433111	11	70	25	11
403-4724	403-472411	12	76	25	12
403-5512	403-551211	14	89	30	14
403-6299	403-629911	16	89	32	16
403-7087	403-708711	18	102	35	18
403-7874	403-787411	20	102	38	20
403-8661	403-866111	22	102	38	22
403-9843	403-984311	25	102	38	25

HYP-ETS (uncoated)

◎ EXCELLENT ○ GOOD

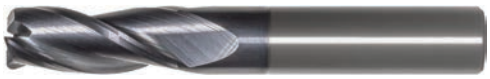
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

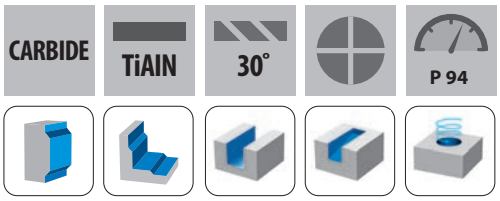
HYP-ETS-XCEED (coated)

◎ EXCELLENT ○ GOOD

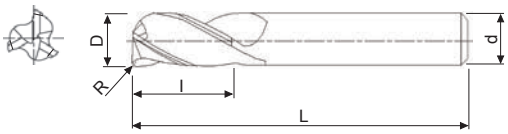
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

- 3 flutes, regular, corner radius, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated





Icon key page 2



EDP	Dimensions				
	D	R	L	l	d
403-1575R02	4	0,2	51	14	4
403-1575R025	4	0,25	51	14	4
403-1575R04	4	0,4	51	14	4
403-1575R05	4	0,5	51	14	4
403-1575R075	4	0,75	51	14	4
403-1575R10	4	1,0	51	14	4
403-1575R15	4	1,5	51	14	4
403-1968R025	5	0,25	51	16	5
403-1968R05	5	0,5	51	16	5
403-1968R075	5	0,75	51	16	5
403-1968R10	5	1,0	51	16	5
403-1968R125	5	1,25	51	16	5
403-1968R15	5	1,5	51	16	5
403-1968R20	5	2,0	51	16	5
403-2362R02	6	0,2	64	19	6
403-2362R025	6	0,25	64	19	6
403-2362R05	6	0,5	64	19	6
403-2362R075	6	0,75	64	19	6
403-2362R08	6	0,8	64	19	6
403-2362R10	6	1,0	64	19	6
403-2362R125	6	1,25	64	19	6
403-2362R15	6	1,5	64	19	6
403-2362R20	6	2,0	64	19	6
403-3150R02	8	0,2	64	21	8
403-3150R025	8	0,25	64	21	8
403-3150R03	8	0,3	64	21	8
403-3150R05	8	0,5	64	21	8
403-3150R075	8	0,75	64	21	8
403-3150R08	8	0,8	64	21	8
403-3150R10	8	1,0	64	21	8
403-3150R125	8	1,25	64	21	8
403-3150R15	8	1,5	64	21	8
403-3150R20	8	2,0	64	21	8

◎ EXCELLENT ○ GOOD

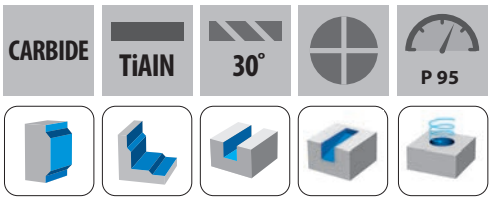
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

EDP	Dimensions				
	D	R	L	l	d
403-3150R25	8	2,5	64	21	8
403-3150R30	8	3,0	64	21	8
403-3937R02	10	0,2	70	25	10
403-3937R025	10	0,25	70	25	10
403-3937R04	10	0,4	70	25	10
403-3937R05	10	0,5	70	25	10
403-3937R08	10	0,8	70	25	10
403-3937R10	10	1,0	70	25	10
403-3937R125	10	1,25	70	25	10
403-3937R15	10	1,5	70	25	10
403-3937R20	10	2,0	70	25	10
403-3937R25	10	2,5	70	25	10
403-3937R30	10	3,0	70	25	10
403-3937R32	10	3,2	70	25	10
403-3937R40	10	4,0	70	25	10
403-4724R02	12	0,2	76	25	12
403-4724R025	12	0,25	76	25	12
403-4724R03	12	0,3	76	25	12
403-4724R05	12	0,5	76	25	12
403-4724R075	12	0,75	76	25	12
403-4724R08	12	0,8	76	25	12
403-4724R10	12	1,0	76	25	12
403-4724R15	12	1,5	76	25	12
403-4724R20	12	2,0	76	25	12
403-4724R25	12	2,5	76	25	12
403-4724R30	12	3,0	76	25	12
403-4724R32	12	3,2	76	25	12
403-4724R40	12	4,0	76	25	12
403-6299R05	16	0,5	89	32	16
403-6299R10	16	1,0	89	32	16
403-6299R15	16	1,5	89	32	16
403-6299R20	16	2,0	89	32	16
403-6299R25	16	2,5	89	32	16
403-6299R30	16	3,0	89	32	16
403-6299R40	16	4,0	89	32	16
403-6299R50	16	5,0	89	32	16
403-7874R05	20	0,5	102	38	20
403-7874R10	20	1,0	102	38	20
403-7874R20	20	2,0	102	38	20
403-7874R30	20	3,0	102	38	20
403-7874R50	20	5,0	102	38	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

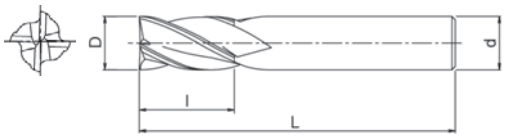
- 4 flutes, regular, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EMS	HYP-EMS-XCEED	Dimensions			
EDP	EDP	D	L	l	d
404-0394	404-039411	1	39	3	3
404-0591	404-059111	1,5	39	5	3
404-0787	404-078711	2	39	7	3
404-0984	404-098411	2,5	39	8	3
404-1181	404-118111	3	39	10	3
404-1378	404-137811	3,5	51	12	4
404-1575	404-157511	4	51	14	4
404-1772	404-177211	4,5	51	14	5
404-1968	404-196811	5	51	16	5
404-2362	404-236211	6	64	19	6
404-2756	404-275611	7	64	19	8
404-3150	404-315011	8	64	21	8
404-3543	404-354311	9	70	22	10
404-3937	404-393711	10	70	25	10
404-4331	404-433111	11	70	25	11
404-4724	404-472411	12	76	25	12
404-5512	404-551211	14	89	30	14
404-6299	404-629911	16	89	32	16
404-7087	404-708711	18	102	35	18
404-7874	404-787411	20	102	38	20
404-8661	404-866111	22	102	38	22
404-9843	404-984311	25	102	38	25

HYP-EMS (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

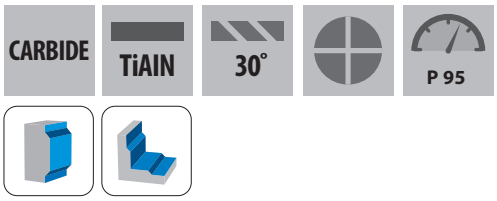
HYP-EMS-XCEED (coated)

◎ EXCELLENT ○ GOOD

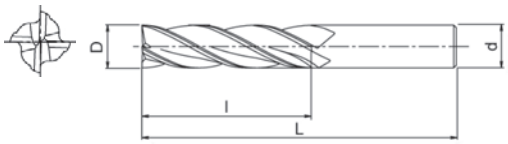
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-EML / HYP-EML-XCEED

- 4 flutes, long, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2



Bright

TiALN coated

HYP-EML	HYP-EML-XCEED	Dimensions			
EDP	EDP	D	L	l	d
464-1181	464-118111	3	60	19	3
464-1575	464-157511	4	60	19	4
464-1968	464-196811	5	64	25	5
464-2362	464-236211	6	75	28	6
464-3150	464-315011	8	75	29	8
464-3937	464-393711	10	75	32	10
464-4724	464-472411	12	100	51	12
464-5512	464-551211	14	127	57	14
464-6299	464-629911	16	130	57	16
464-7087	464-708711	18	130	57	18
464-7874	464-787411	20	130	57	20
464-9843	464-984311	25	130	57	25

HYP-EML (uncoated)

◎ EXCELLENT ○ GOOD

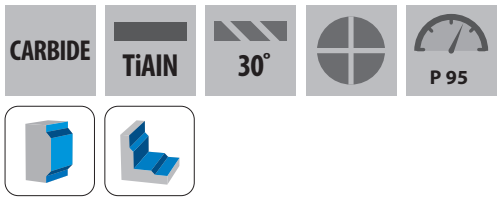
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

HYP-EML-XCEED (coated)

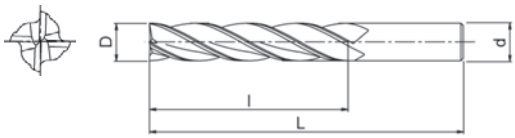
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

- 4 flutes, extra long, centre cutting, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2



Bright

HYP-EMXL
EDP
484-1181
484-1575
484-1968
484-2362
484-3150
484-3937
484-4724
484-5512
484-6299
484-7087
484-7874
484-9843

TiALN coated

HYP-EMXL-XCEED
EDP
484-118111
484-157511
484-196811
484-236211
484-315011
484-393711
484-472411
484-551211
484-629911
484-708711
484-787411
484-984311

Dimensions			
D	L	l	d
3	75	25	3
4	75	28	4
5	76	32	5
6	100	38	6
8	100	42	8
10	100	45	10
12	150	76	12
14	153	76	14
16	150	76	16
18	150	76	18
20	150	76	20
25	150	76	25

HYP-EMXL (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

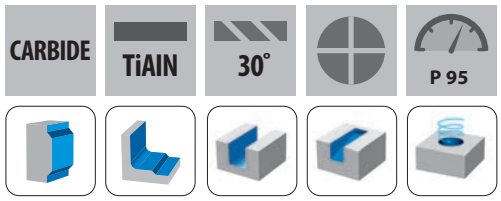
HYP-EMXL-XCEED (coated)

◎ EXCELLENT ○ GOOD

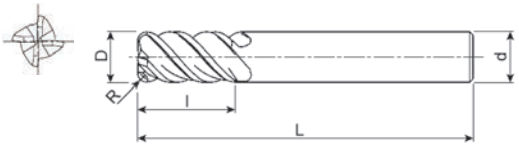
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-CR-EMS

- 4 flutes, regular, corner radius, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



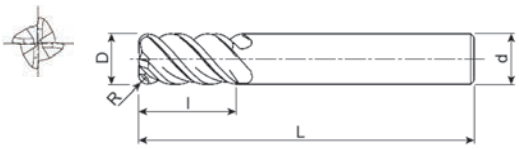
Icon key page 2



EDP	Dimensions				
	D	R	L	l	d
404-1575R02	4	0,2	51	14	4
404-1575R025	4	0,25	51	14	4
404-1575R04	4	0,4	51	14	4
404-1575R05	4	0,5	51	14	4
404-1575R075	4	0,75	51	14	4
404-1575R10	4	1,0	51	14	4
404-1575R15	4	1,5	51	14	4
404-1968R025	5	0,25	51	16	5
404-1968R05	5	0,5	51	16	5
404-1968R075	5	0,75	51	16	5
404-1968R10	5	1,0	51	16	5
404-1968R125	5	1,25	51	16	5
404-1968R15	5	1,5	51	16	5
404-1968R20	5	2,0	51	16	5
404-2362R02	6	0,2	64	19	6
404-2362R025	6	0,25	64	19	6
404-2362R05	6	0,5	64	19	6
404-2362R075	6	0,75	64	19	6
404-2362R08	6	0,8	64	19	6
404-2362R10	6	1,0	64	19	6
404-2362R125	6	1,25	64	19	6
404-2362R15	6	1,5	64	19	6
404-2362R20	6	2,0	64	19	6
404-3150R02	8	0,2	64	21	8
404-3150R025	8	0,25	64	21	8
404-3150R03	8	0,3	64	21	8
404-3150R05	8	0,5	64	21	8
404-3150R075	8	0,75	64	21	8
404-3150R08	8	0,8	64	21	8
404-3150R10	8	1,0	64	21	8
404-3150R125	8	1,25	64	21	8
404-3150R15	8	1,5	64	21	8
404-3150R20	8	2,0	64	21	8

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				



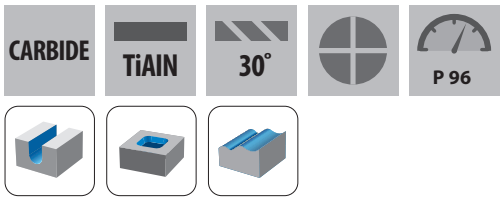
EDP	Dimensions				
	D	R	L	l	d
404-3150R25	8	2,5	64	21	8
404-3150R30	8	3,0	64	21	8
404-3937R02	10	0,2	70	25	10
404-3937R025	10	0,25	70	25	10
404-3937R04	10	0,4	70	25	10
404-3937R05	10	0,5	70	25	10
404-3937R08	10	0,8	70	25	10
404-3937R10	10	1,0	70	25	10
404-3937R125	10	1,25	70	25	10
404-3937R15	10	1,5	70	25	10
404-3937R20	10	2,0	70	25	10
404-3937R25	10	2,5	70	25	10
404-3937R30	10	3,0	70	25	10
404-3937R32	10	3,2	70	25	10
404-3937R40	10	4,0	70	25	10
404-4724R02	12	0,2	76	25	12
404-4724R025	12	0,25	76	25	12
404-4724R03	12	0,3	76	25	12
404-4724R05	12	0,5	76	25	12
404-4724R075	12	0,75	76	25	12
404-4724R08	12	0,8	76	25	12
404-4724R10	12	1,0	76	25	12
404-4724R15	12	1,5	76	25	12
404-4724R20	12	2,0	76	25	12
404-4724R25	12	2,5	76	25	12
404-4724R30	12	3,0	76	25	12
404-4724R32	12	3,2	76	25	12
404-4724R40	12	4,0	76	25	12
404-6299R05	16	0,5	89	32	16
404-6299R10	16	1,0	89	32	16
404-6299R15	16	1,5	89	32	16
404-6299R20	16	2,0	89	32	16
404-6299R25	16	2,5	89	32	16
404-6299R30	16	3,0	89	32	16
404-6299R40	16	4,0	89	32	16
404-6299R50	16	5,0	89	32	16
404-7874R05	20	0,5	102	38	20
404-7874R10	20	1,0	102	38	20
404-7874R20	20	2,0	102	38	20
404-7874R30	20	3,0	102	38	20
404-7874R50	20	5,0	102	38	20

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-EBD / HYP-EBD-XCEED

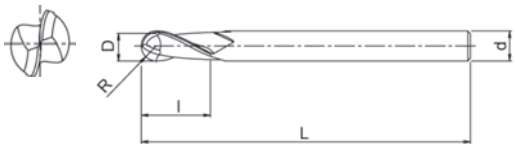
- 2 flutes, regular, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EBD	HYP-EBD-XCEED	Dimensions			
EDP	EDP	D	L	l	d
402-0394-BN	402-0394-BN11	1	39	3	3
402-0591-BN	402-0591-BN11	1,5	39	5	3
402-0787-BN	402-0787-BN11	2	39	7	3
402-0984-BN	402-0984-BN11	2,5	39	8	3
402-1181-BN	402-1181-BN11	3	39	10	3
402-1378-BN	402-1378-BN11	3,5	51	12	4
402-1575-BN	402-1575-BN11	4	51	14	4
402-1772-BN	402-1772-BN11	4,5	51	14	5
402-1968-BN	402-1968-BN11	5	51	16	5
402-2362-BN	402-2362-BN11	6	64	19	6
402-2756-BN	402-2756-BN11	7	64	19	8
402-3150-BN	402-3150-BN11	8	64	21	8
402-3543-BN	402-3543-BN11	9	70	22	10
402-3937-BN	402-3937-BN11	10	70	25	10
402-4331-BN	402-4331-BN11	11	70	25	11
402-4724-BN	402-4724-BN11	12	76	25	12
402-5512-BN	402-5512-BN11	14	89	30	14
402-6299-BN	402-6299-BN11	16	89	32	16
402-7087-BN	402-7087-BN11	18	102	35	18
402-7874-BN	402-7874-BN11	20	102	38	20
402-8661-BN	402-8661-BN11	22	102	38	22
402-9843-BN	402-9843-BN11	25	102	38	25

HYP-EBD (uncoated)

◎ EXCELLENT ○ GOOD

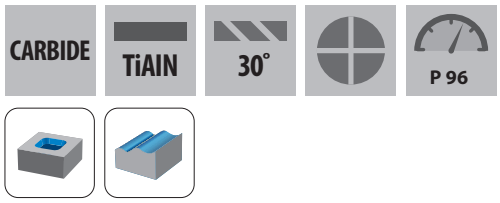
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

HYP-EBD-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

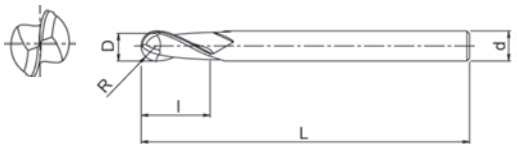
- 2 flutes, long, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EBDL	HYP-EBDL-XCEED	Dimensions			
EDP	EDP	D	L	l	d
462-1181-BN	462-1181-BN11	3	60	19	3
462-1575-BN	462-1575-BN11	4	60	19	4
462-1968-BN	462-1968-BN11	5	64	25	5
462-2362-BN	462-2362-BN11	6	75	28	6
462-3150-BN	462-3150-BN11	8	75	29	8
462-3937-BN	462-3937-BN11	10	75	32	10
462-4724-BN	462-4724-BN11	12	100	51	12
462-5512-BN	462-5512-BN11	14	127	57	14
462-6299-BN	462-6299-BN11	16	130	57	16
462-7087-BN	462-7087-BN11	18	130	57	18
462-7874-BN	462-7874-BN11	20	130	57	20
462-9843-BN	462-9843-BN11	25	130	57	25

HYP-EBDL (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

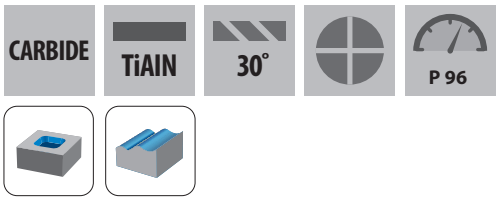
HYP-EBDL-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-EBDXL / HYP-EBDXL-XCEED

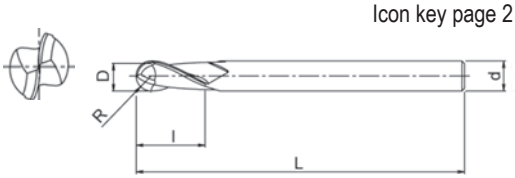
- 2 flutes, extra long, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2

Bright

TiALN coated



HYP-EBDXL	HYP-EBDXL-XCEED	Dimensions			
EDP	EDP	D	L	l	d
482-1181-BN	482-1181-BN11	3	75	25	3
482-1575-BN	482-1575-BN11	4	75	28	4
482-1968-BN	482-1968-BN11	5	76	32	5
482-2362-BN	482-2362-BN11	6	100	38	6
482-3150-BN	482-3150-BN11	8	100	42	8
482-3937-BN	482-3937-BN11	10	100	45	10
482-4724-BN	482-4724-BN11	12	150	76	12
482-5512-BN	482-5512-BN11	14	153	76	14
482-6299-BN	482-6299-BN11	16	150	76	16
482-7087-BN	482-7087-BN11	18	150	76	18
482-7874-BN	482-7874-BN11	20	150	76	20
482-9843-BN	482-9843-BN11	25	150	76	25

HYP-EBDXL (uncoated)

◎ EXCELLENT ○ GOOD

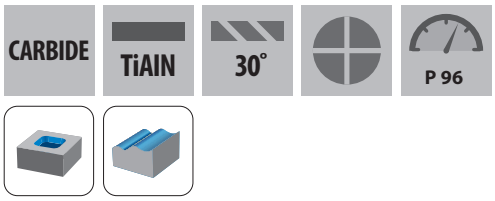
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

HYP-EBDXL-XCEED (coated)

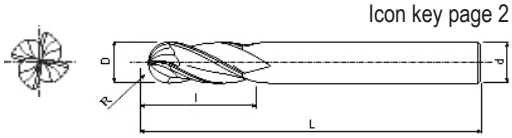
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

- 4 flutes, regular, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



Icon key page 2



Bright

HYP-EBM	Dimensions			
EDP	D	L	l	d
404-0394-BN	1	39	3	3
404-0591-BN	1,5	39	5	3
404-0787-BN	2	39	7	3
404-0984-BN	2,5	39	8	3
404-1181-BN	3	39	10	3
404-1378-BN	3,5	51	12	4
404-1575-BN	4	51	14	4
404-1772-BN	4,5	51	14	5
404-1968-BN	5	51	16	5
404-2362-BN	6	64	19	6
404-2756-BN	7	64	19	8
404-3150-BN	8	64	21	8
404-3543-BN	9	70	22	10
404-3937-BN	10	70	25	10
404-4331-BN	11	70	25	11
404-4724-BN	12	76	25	12
404-5512-BN	14	89	30	14
404-6299-BN	16	89	32	16
404-7087-BN	18	102	35	18
404-7874-BN	20	102	38	20
404-8661-BN	22	102	38	22
404-9843-BN	25	102	38	25

TiALN coated

HYP-EBM-XCEED
EDP
404-0394-BN11
404-0591-BN11
404-0787-BN11
404-0984-BN11
404-1181-BN11
404-1378-BN11
404-1575-BN11
404-1772-BN11
404-1968-BN11
404-2362-BN11
404-2756-BN11
404-3150-BN11
404-3543-BN11
404-3937-BN11
404-3331-BN11
404-4724-BN11
404-5512-BN11
404-6299-BN11
404-7087-BN11
404-7874-BN11
404-8661-BN11
404-9843-BN11

HYP-EBM (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

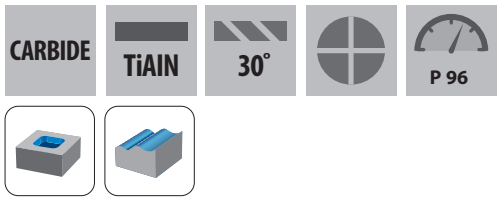
HYP-EBM-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-EBML / HYP-EBML-XCEED

- 4 flutes, long, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



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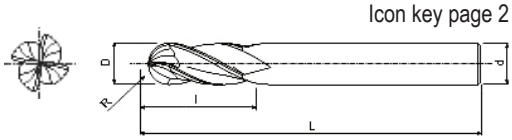


Bright

TiALN coated

HYP-EBML	HYP-EBML-XCEED	Dimensions			
EDP	EDP	D	L	l	d
464-1181-BN	464-1181-BN11	3	60	19	3
464-1575-BN	464-1575-BN11	4	60	19	4
464-1968-BN	464-1968-BN11	5	64	25	5
464-2362-BN	464-2362-BN11	6	75	28	6
464-3150-BN	464-3150-BN11	8	75	29	8
464-3937-BN	464-3937-BN11	10	75	32	10
464-4724-BN	464-4724-BN11	12	100	51	12
464-5512-BN	464-5512-BN11	14	127	57	14
464-6299-BN	464-6299-BN11	16	130	57	16
464-7087-BN	464-7087-BN11	18	130	57	18
464-7874-BN	464-7874-BN11	20	130	57	20
464-9843-BN	464-9843-BN11	25	130	57	25

HYP-EBML (uncoated)

◎ EXCELLENT ○ GOOD

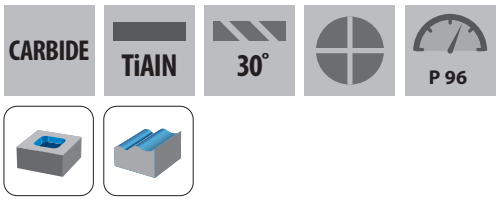
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

HYP-EBML-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

- 4 flutes, extra long, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / TiALN Coated



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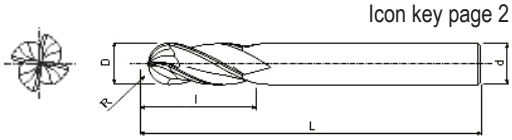


Bright

HYP-EBMXL	Dimensions			
EDP	D	L	l	d
484-1181-BN	3	75	25	3
484-1575-BN	4	75	28	4
484-1968-BN	5	76	32	5
484-2362-BN	6	100	38	6
484-3150-BN	8	100	42	8
484-3937-BN	10	100	45	10
484-4724-BN	12	150	76	12
484-5512-BN	14	153	76	14
484-6299-BN	16	150	76	16
484-7087-BN	18	150	76	18
484-7874-BN	20	150	76	20
484-9843-BN	25	150	76	25

TiALN coated

HYP-EBMXL-XCEED
EDP
484-1181-BN11
484-1575-BN11
484-1968-BN11
484-2362-BN11
484-3150-BN11
484-3937-BN11
484-4724-BN11
484-5512-BN11
484-6299-BN11
484-7087-BN11
484-7874-BN11
484-9843-BN11

HYP-EBMXL (uncoated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○								

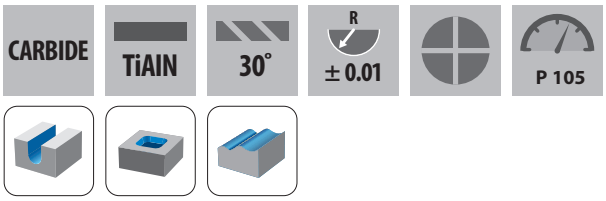
HYP-EBMXL-XCEED (coated)

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				○				○				

HYP-SB-EBD

- 2 flutes, regular, ball end, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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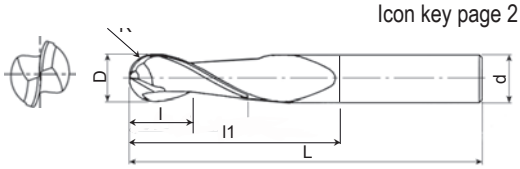
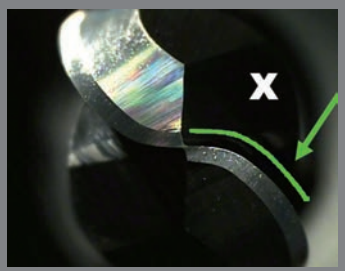


EDP	Dimensions				
	D	L	l	l1	d
48350030	3	57	4	9	6
48350040	4	57	5	12	6
48350050	5	57	6	15	6
48350060	6	57	7	18	6
48350080	8	63	9	20	8
48350100	10	72	11	25	10
48351200	12	83	13	25	12

Technical

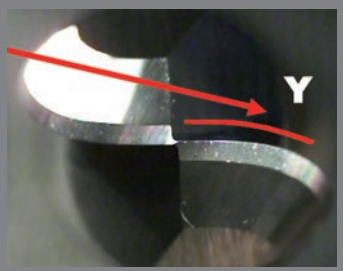


HYP-SB-EBD
Long cutting edge

Less torque
Less heat build up
Better surface finish
Longer tool life

Standard Geometry
Short cutting edge

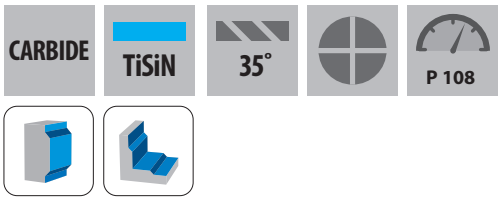
Normal torque
Normal heat build up
Average surface finish
Standard tool life



◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎	◎		○	○		◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				○								

- 5 flute, long, with chipbreaker, for side milling upto 4 x D
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiSiN Coated



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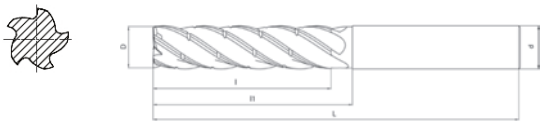


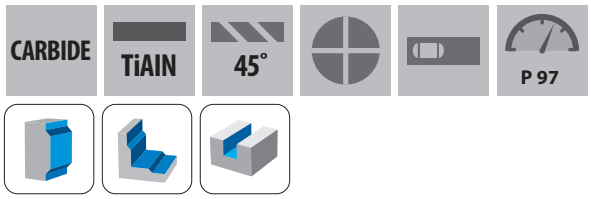
EDP	Dimensions						
	D	L	l	l1	d1	d	No Flutes
485-2362-N11	6	70	26	29	5.5	6	5
485-3150-N11	8	90	34	38	7.5	8	5
485-3937-N11	10	100	42	47	9.5	10	5
485-4724-N11	12	100	50	56	11.5	12	5
485-5512-N11	14	103	58	65	13.5	14	5
485-6299-N11	16	130	66	74	15.5	16	5
485-7087-N11	18	130	74	83	17.5	18	5
485-7874-N11	20	150	82	92	19.5	20	5

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

HYP-HP-(W)RESF

- 4 flutes, regular, roughing, for general applications
- Shank : FS (with flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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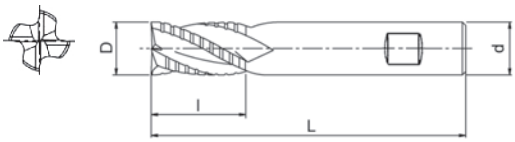
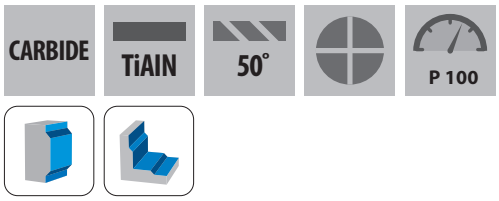


EDP	Dimensions			
	D	L	l	d
48624060	6	64	19	6
48624080	8	64	21	8
48624100	10	70	22	10
48624120	12	76	25	12
48625160	16	89	32	16
48626200	20	102	38	20
48626250	25	102	38	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP

- 4,6 & 8 flute, regular, finishing, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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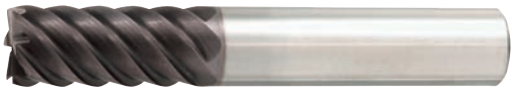
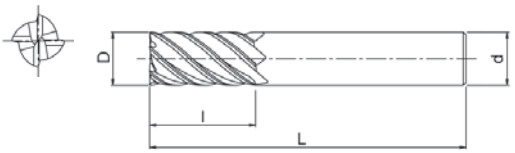
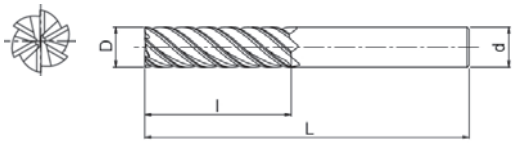




EDP	Dimensions				
	D	L	l	d	No. Flutes
HP450-1181	3	50	10	3	4
HP450-1575	4	51	14	4	4
HP450-1969	5	51	16	5	4
HP450-2362	6	65	19	6	6
HP450-3150	8	64	21	8	6
HP450-3937	10	67	25	10	6
HP450-4724	12	74	25	12	6
HP450-5512	14	89	30	14	6
HP450-6299	16	93	35	16	6
HP450-7087	18	102	35	18	6
HP450-7874	20	105	38	20	6
HP450-8661	22	105	38	22	6
HP450-9843	25	105	38	25	8

HYP-LS-ROCKET-MILL

- Long series rocket mill



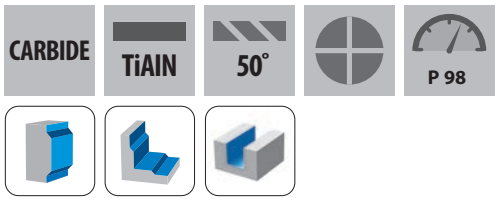
EDP	Dimensions				
	D	L	l	d	No. Flutes
HP450L-2362	6	100	26	6	6
HP450L-3150	8	100	36	8	6
HP450L-3937	10	100	46	10	6
HP450L-4724	12	110	56	12	6
HP450L-6299	16	130	66	16	6
HP450L-7874	20	140	76	20	6
HP450L-9843	25	180	92	25	8

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○	○		○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								○	○			

HYP-EHS

- 4 flutes, regular, high helix, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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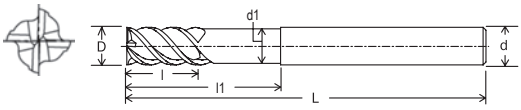
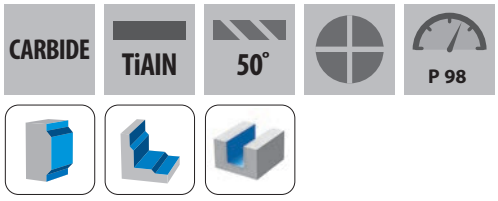


EDP	Dimensions					
	D	L	l	l1	d1	d
HP453-1575	4	60	6	12	3,9	4
HP453-2362	6	60	9	18	5,9	6
HP453-3150	8	75	12	24	7,9	8
HP453-3937	10	80	15	30	9,9	10
HP453-4724	12	100	18	36	11,9	12
HP453-6299	16	110	24	48	15,9	16
HP453-7874	20	125	30	60	19,9	20

HYP-CR-EHS

- 4 flutes, regular, corner radius, high helix, general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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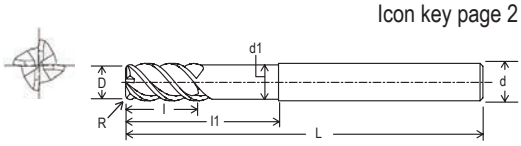


EDP	Dimensions						
	D	R	L	l	l1	d1	d
HP456-2363	6	0.5	60	9	18	5,9	6
HP456-2364	6	1.0	60	9	18	5,9	6
HP456-3151	8	0.5	75	12	24	7,9	8
HP456-3152	8	1.0	75	12	24	7,9	8
HP456-3938	10	0.5	80	15	30	9,9	10
HP456-3939	10	1.0	80	15	30	9,9	10
HP456-4725	12	0.5	100	18	36	11,9	12
HP456-4726	12	1.0	100	18	36	11,9	12
HP456-4727	12	1.5	100	18	36	11,9	12

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
○	○	○	○	○	○			○	○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP

HYP-HS-CRE

- 4 flutes, regular, corner radius, low speed high feed
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated

CARBIDE | TiAlN | HIGH SPEED | RF | P 105

Icon key page 2

EDP	Dimensions						
	D	R	L	l	l1	d1	d
48340060	6	1,5	57	2,5	24	5	6
48340080	8	2,0	63	3,5	32	7	8
48340100	10	2,0	72	4	40	9	10
48340120	12	3,0	83	5	48	11	12

◎ EXCELLENT ○ GOOD

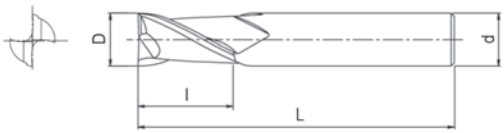
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎	◎	○				◎	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP

- 2 flutes, regular, counterboring, for general applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated

CARBIDE | TiAlN | 20° | P 100

Counterboring holes for bolts and pre drilled holes on angled surfaces.

Icon key page 2



EDP	Dimensions			
	D	L	l	d
48370040	4	50	11	6
48370050	5	60	13	6
48370060	6	60	13	6
48370070	7	70	16	8
48370080	8	70	19	8
48370090	9	80	19	10
48370100	10	80	22	10

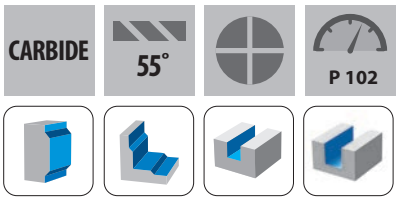
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎	○		○	○		◎	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				○								

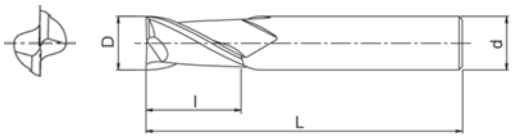
HYP-EDS-55 / CR-EDS-55

FOR ALUMINIUM

- 2 flutes, regular, centre cutting, square end & corner radius 55° helix for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright



Icon key page 2



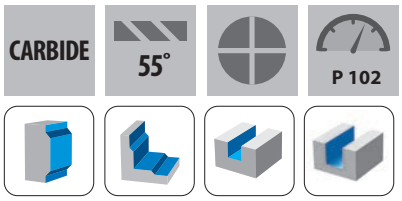
EDP	Dimensions				
	D	R	L	l	d
402-118155	3	-	39	10	3
402-157655	4	-	51	14	4
402-196855	5	-	51	16	5
402-236255	6	-	64	19	6
402-236255R03	6	0,3	64	19	6
402-236255R05	6	0,5	64	19	6
402-236255R10	6	1,0	64	19	6
402-315055	8	-	64	21	8
402-315055R03	8	0,3	64	21	8
402-315055R05	8	0,5	64	21	8
402-315055R10	8	1,0	64	21	8
402-315055R15	8	1,5	64	21	8
402-393755	10	-	70	25	10
402-393755R05	10	0,5	70	25	10
402-393755R10	10	1,0	70	25	10
402-393755R15	10	1,5	70	25	10
402-393755R20	10	2,0	70	25	10
402-472455	12	-	76	25	12
402-472455R05	12	0,5	76	25	12
402-472455R10	12	1,0	76	25	12
402-472455R15	12	1,5	76	25	12
402-472455R20	12	2,0	76	25	12
402-472455R30	12	3,0	76	25	12
402-551255	14	-	89	30	14
402-629955	16	-	89	32	16
402-629955R05	16	0,5	89	32	16
402-629955R10	16	1,0	89	32	16
402-629955R15	16	1,5	89	32	16
402-629955R20	16	2,0	89	32	16
402-629955R30	16	3,0	89	32	16
402-708755	18	-	102	35	18
402-787455	20	-	102	38	20
402-984355	25	-	102	38	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

HYP-EDL-55 / CR-EDL-55

- 2 flutes, long, centre cutting, square end & corner radius 55° helix for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- MG (micro grain carbide)



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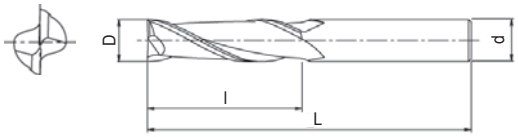


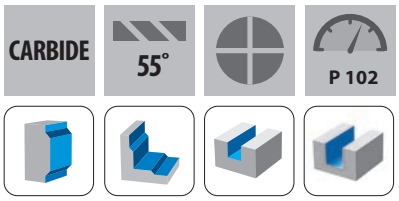
EDP	Dimensions				
	D		L	l	d
462-118155	3	-	60	19	3
462-157655	4	-	60	19	4
462-196855	5	-	64	25	5
462-236255	6	-	75	28	6
462-236255R03	6	0,3	75	28	6
462-236255R05	6	0,5	75	28	6
462-236255R10	6	1,0	75	28	6
462-315055	8	-	75	29	8
462-315055R03	8	0,3	75	29	8
462-315055R05	8	0,5	75	29	8
462-315055R10	8	1,0	75	29	8
462-315055R15	8	1,5	75	29	8
462-393755	10	-	75	32	10
462-393755R05	10	0,5	75	32	10
462-393755R10	10	1,0	75	32	10
462-393755R15	10	1,5	75	32	10
462-393755R20	10	2,0	75	32	10
462-472455	12	-	100	51	12
462-472455R05	12	0,5	100	51	12
462-472455R10	12	1,0	100	51	12
462-472455R15	12	1,5	100	51	12
462-472455R20	12	2,0	100	51	12
462-472455R30	12	3,0	100	51	12
462-551255	14	-	127	57	14
462-629955	16	-	130	57	16
462-629955R05	16	0,5	130	57	16
462-629955R10	16	1,0	130	57	16
462-629955R15	16	1,5	130	57	16
462-629955R20	16	2,0	130	57	16
462-629955R30	16	3,0	130	57	16
462-708755	18	-	130	57	18
462-787455	20	-	130	57	20
462-984355	25	-	130	57	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

HYP-ETS-55 / CR-ETS-55

- 3 flutes, regular, centre cutting, square end & corner radius 55° helix for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright



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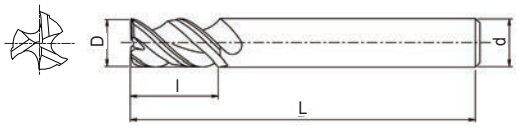


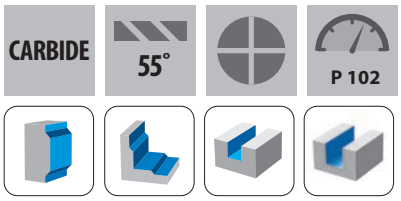
EDP	Dimensions				
	D	R	L	l	d
403-118155	3	-	39	10	3
403-157655	4	-	51	14	4
403-196855	5	-	51	16	5
403-236255	6	-	64	19	6
403-236255R03	6	0,3	64	19	6
403-236255R05	6	0,5	64	19	6
403-236255R10	6	1,0	64	19	6
403-315055	8	-	64	21	8
403-315055R03	8	0,3	64	21	8
403-315055R05	8	0,5	64	21	8
403-315055R10	8	1,0	64	21	8
403-315055R15	8	1,5	64	21	8
403-393755	10	-	70	25	10
403-393755R05	10	0,5	70	25	10
403-393755R10	10	1,0	70	25	10
403-393755R15	10	1,5	70	25	10
403-393755R20	10	2,0	70	25	10
403-472455	12	-	76	25	12
403-472455R05	12	0,5	76	25	12
403-472455R10	12	1,0	76	25	12
403-472455R15	12	1,5	76	25	12
403-472455R20	12	2,0	76	25	12
403-472455R30	12	3,0	76	25	12
403-551255	14	-	89	30	14
403-629955	16	-	89	32	16
403-629955R05	16	0,5	89	32	16
403-629955R10	16	1,0	89	32	16
403-629955R15	16	1,5	89	32	16
403-629955R20	16	2,0	89	32	16
403-629955R30	16	3,0	89	32	16
403-708755	18	-	102	35	18
403-787455	20	-	102	38	20
403-984355	25	-	102	38	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

HYP-ETL-55 / CR-ETL-55

- 3 flutes, long, centre cutting, square end & corner radius 55° helix for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright



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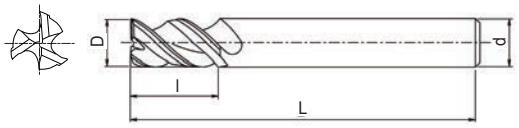


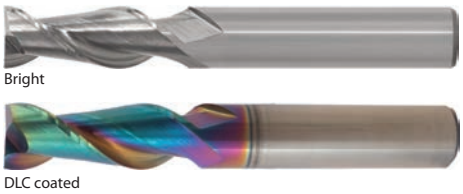
EDP	Dimensions				
	D	R	L	l	d
463-118155	3	-	60	19	3
463-157655	4	-	60	19	4
463-196855	5	-	64	25	5
463-236255	6	-	75	28	6
463-236255R03	6	0,3	75	28	6
463-236255R05	6	0,5	75	28	6
463-236255R10	6	1,0	75	28	6
463-315055	8	-	75	29	8
463-315055R03	8	0,3	75	29	8
463-315055R05	8	0,5	75	29	8
463-315055R10	8	1,0	75	29	8
463-315055R15	8	1,5	75	29	8
463-393755	10	-	75	32	10
463-393755R05	10	0,5	75	32	10
463-393755R10	10	1,0	75	32	10
463-393755R15	10	1,5	75	32	10
463-393755R20	10	2,0	75	32	10
463-472455	12	-	100	51	12
463-472455R05	12	0,5	100	51	12
463-472455R10	12	1,0	100	51	12
463-472455R15	12	1,5	100	51	12
463-472455R20	12	2,0	100	51	12
463-472455R30	12	3,0	100	51	12
463-551255	14	-	127	57	14
463-629955	16	-	130	57	16
463-629955R05	16	0,5	130	57	16
463-629955R10	16	1,0	130	57	16
463-629955R15	16	1,5	130	57	16
463-629955R20	16	2,0	130	57	16
463-629955R30	16	3,0	130	57	16
463-708755	18	-	130	57	18
463-787455	20	-	130	57	20
463-984355	25	-	130	57	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

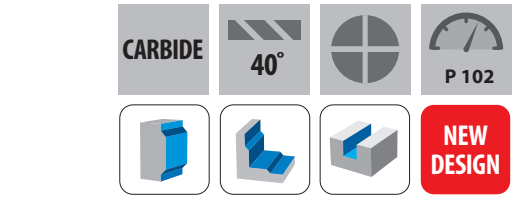
HYP-AL-EDS

- 2 flutes, regular, centre cutting, for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC



Bright

DLC coated



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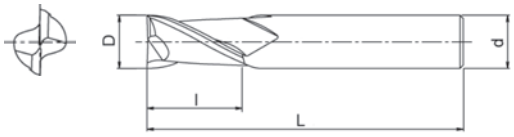
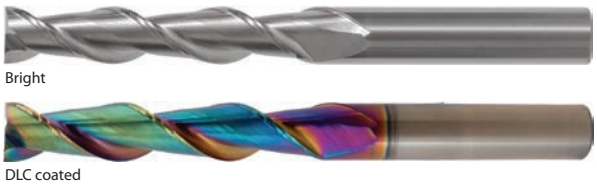


EDP	EDP DLC	Dimensions			
		D	L	l	d
440-2362	440-236211	6	64	19	6
440-3150	440-315011	8	64	21	8
440-3937	440-393711	10	70	25	10
440-4724	440-472411	12	76	25	12
440-6299	440-629911	16	89	32	16
440-7874	440-787411	20	102	38	20
440-9843	440-984311	25	127	57	25

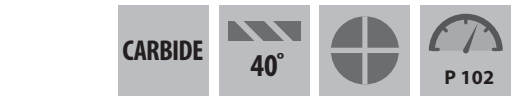
HYP-AL-EDL

- 2 flutes, long, centre cutting, for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC



Bright

DLC coated



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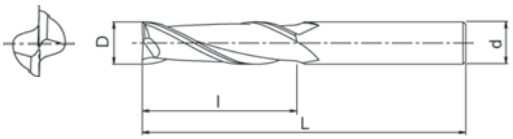


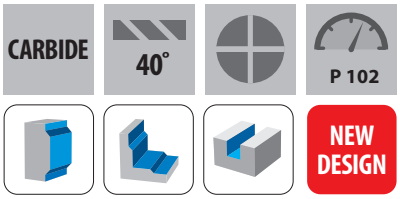
EDP	EDP DLC	Dimensions			
		D	L	l	d
440-2363	440-236311	6	100	38	6
440-3151	440-315111	8	100	41	8
440-3938	440-393811	10	100	51	10
440-4725	440-472511	12	100	51	12
440-6300	440-630011	16	130	57	16
440-7875	440-787511	20	130	57	20
440-9844	440-984411	25	150	76	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

HYP-AL-LS-EDS

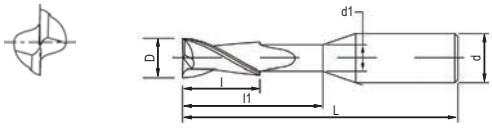
- 2 flutes, long (with neck), centre cutting, for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC



Icon key page 2


Bright

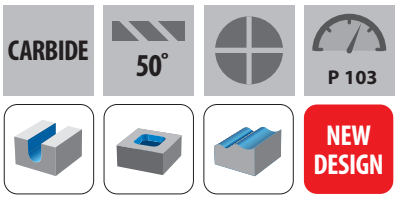
DLC coated



EDP	EDP DLC					Dimensions	
		D	L	l	l1	d1	d
430-7222	430-722211	3	75	3	12	2,8	6
430-7223	430-722311	4	75	4	15	3,8	6
430-7224	430-722411	5	75	5	20	4,8	6
430-7225	430-722511	6	100	6	20	5,8	6
430-7226	430-722611	8	100	8	25	7,8	8
430-7227	430-722711	10	100	10	25	9,8	10
430-7228	430-722811	12	100	12	40	11,8	12

HYP-AL-LS-EBD

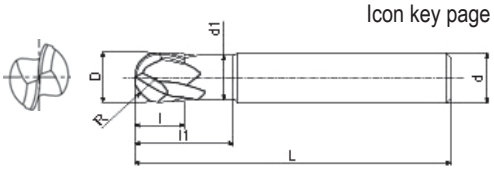
- 2 flutes, long (with neck), ball end, for aluminium
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC



Icon key page 2


Bright

DLC coated



EDP	EDP DLC					Dimensions	
		D	L	l	l1	d1	d
430-7229	430-722911	3	75	5	9	2,8	6
430-7230	430-723011	4	75	6	15	3,8	6
430-7231	430-723111	5	75	7	18	4,8	6
430-7232	430-723211	6	100	8	20	5,8	6
430-7233	430-723311	8	100	10	25	7,8	8
430-7234	430-723411	10	100	12	30	9,8	10
430-7235	430-723511	12	100	16	40	11,8	12

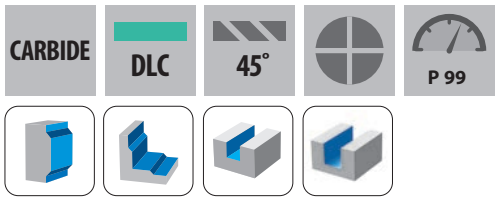
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎								

HYP-ACE-STUB / CR-ACE-STUB / DLC

FOR ALUMINIUM

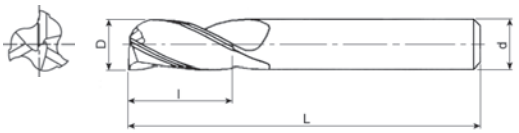
- 3 flutes, short, centre cutting, square end and corner radius
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC (polished flutes)



Icon key page 2

Bright

DLC coated



HYP-ACE / CR-ACE-STUB	HYP-ACE / CR-ACE-STUB-DLC	Dimensions				
EDP	EDP	D	R	L	l	d
475-1181	475-118111	3	-	38	4,5	6
475-1575	475-157511	4	-	51	6	6
475-2362	475-236211	6	-	64	9	6
475-2362R03	475-2362R0311	6	0,3	64	9	6
475-2362R05	475-2362R0511	6	0,5	64	9	6
475-2362R10	475-2362R1011	6	1,0	64	9	6
475-3150	475-315011	8		64	12	8
475-3150R03	475-3150R0311	8	0,3	64	12	8
475-3150R05	475-3150R0511	8	0,5	64	12	8
475-3150R10	475-3150R1011	8	1,0	64	12	8
475-3150R15	475-3150R1511	8	1,5	64	12	8
475-3937	475-393711	10	-	70	15	10
475-3937R05	475-3937R0511	10	0,5	70	15	10
475-3937R10	475-3937R1011	10	1,0	70	15	10
475-3937R15	475-3937R1511	10	1,5	70	15	10
475-3937R20	475-3937R2011	10	2,0	70	15	10
475-4724	475-472411	12	-	76	18	12
475-4724R05	475-4724R0511	12	0,5	76	18	12
475-4724R10	475-4724R1011	12	1,0	76	18	12
475-4724R15	475-4724R1511	12	1,5	76	18	12
475-4724R20	475-4724R2011	12	2,0	76	18	12
475-4724R30	475-4724R3011	12	3,0	76	18	12
475-6299	475-629911	16	-	89	24	16
475-6299R05	475-6299R0511	16	0,5	89	24	16
475-6299R10	475-6299R1011	16	1,0	89	24	16
475-6299R15	475-6299R1511	16	1,5	89	24	16
475-6299R20	475-6299R2011	16	2,0	89	24	16
475-6299R30	475-6299R3011	16	3,0	89	24	16
475-7874	475-787411	20	-	102	30	20
475-9843	475-984311	25	-	102	37,5	25

◎ EXCELLENT ○ GOOD

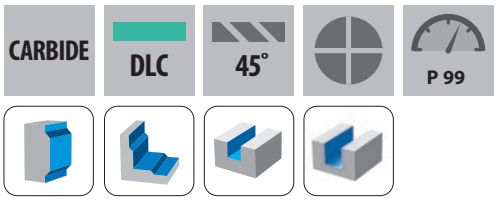
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
◎				◎						○		

DLC coated = ◎ for Plastic

Tel : 01268 567660

FOR ALUMINIUM HYP-ACE-REGULAR / CR-ACE-REGULAR / DLC

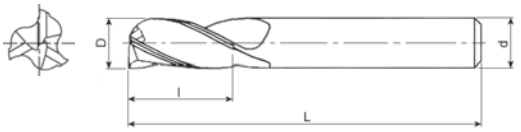
- 3 flutes, regular, centre cutting, square end and corner radius
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright / DLC (polished flutes)



Icon key page 2

Bright

DLC coated



HYP-ACE / CR-ACE-REGULAR	HYP-ACE / CR-ACE-REGULAR-DLC	Dimensions				
EDP	EDP	D	R	L	l	d
476-1181	476-118111	3	-	38	7,5	6
476-1181R025	476-1181R02511	3	0,25	38	7,5	6
476-1181R05	476-1181R0511	3	0,5	38	7,5	6
476-1181R075	476-1181R07511	3	0,75	38	7,5	6
476-1181R10	476-1181R1011	3	1,0	38	7,5	6
476-1575	476-157511	4	-	51	10	6
476-1575R025	476-1575R02511	4	0,25	51	10	6
476-1575R50	476-1575R5011	4	0,5	51	10	6
476-1575R075	476-1575R07511	4	0,75	51	10	6
476-1575R10	476-1575R1011	4	1,0	51	10	6
476-2362	476-236211	6	-	64	15	6
476-2362R025	476-2362R02511	6	0,25	64	15	6
476-2362R03	476-2362R0311	6	0,3	64	15	6
476-2362R05	476-2362R0511	6	0,5	64	15	6
476-2362R075	476-2362R07511	6	0,75	64	15	6
476-2362R10	476-2362R1011	6	1,0	64	15	6
476-3150	476-315011	8	-	64	20	8
476-3150R025	476-3150R02511	8	0,25	64	20	8
476-3150R05	476-3150R0511	8	0,5	64	20	8
476-3150R075	476-3150R07511	8	0,75	64	20	8
476-3150R10	476-3150R1011	8	1,0	64	20	8
476-3150R125	476-3150R12511	8	1,25	64	20	8
476-3150R15	476-3150R1511	8	1,5	64	20	8
476-3937	476-393711	10	-	70	25	10
476-3937R025	476-3937R02511	10	0,25	70	25	10
476-3937R05	476-3937R0511	10	0,5	70	25	10
476-3937R075	476-3937R07511	10	0,75	70	25	10
476-3937R10	476-3937R1011	10	1,0	70	25	10
476-3937R125	476-3937R12511	10	1,25	70	25	10
476-3937R15	476-3937R1511	10	1,5	70	25	10
476-3937R20	476-3937R2011	10	2,0	70	25	10
476-3937R24	476-3937R2411	10	2,4	70	25	10
476-4724	476-472411	12	-	76	30	12

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
◎				◎						○		

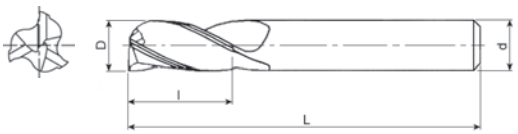
DLC coated = ◎ for Plastic

HYP-ACE-REGULAR / CR-ACE-REGULAR / DLC *FOR ALUMINIUM*

Bright

DLC coated

NEW SIZES



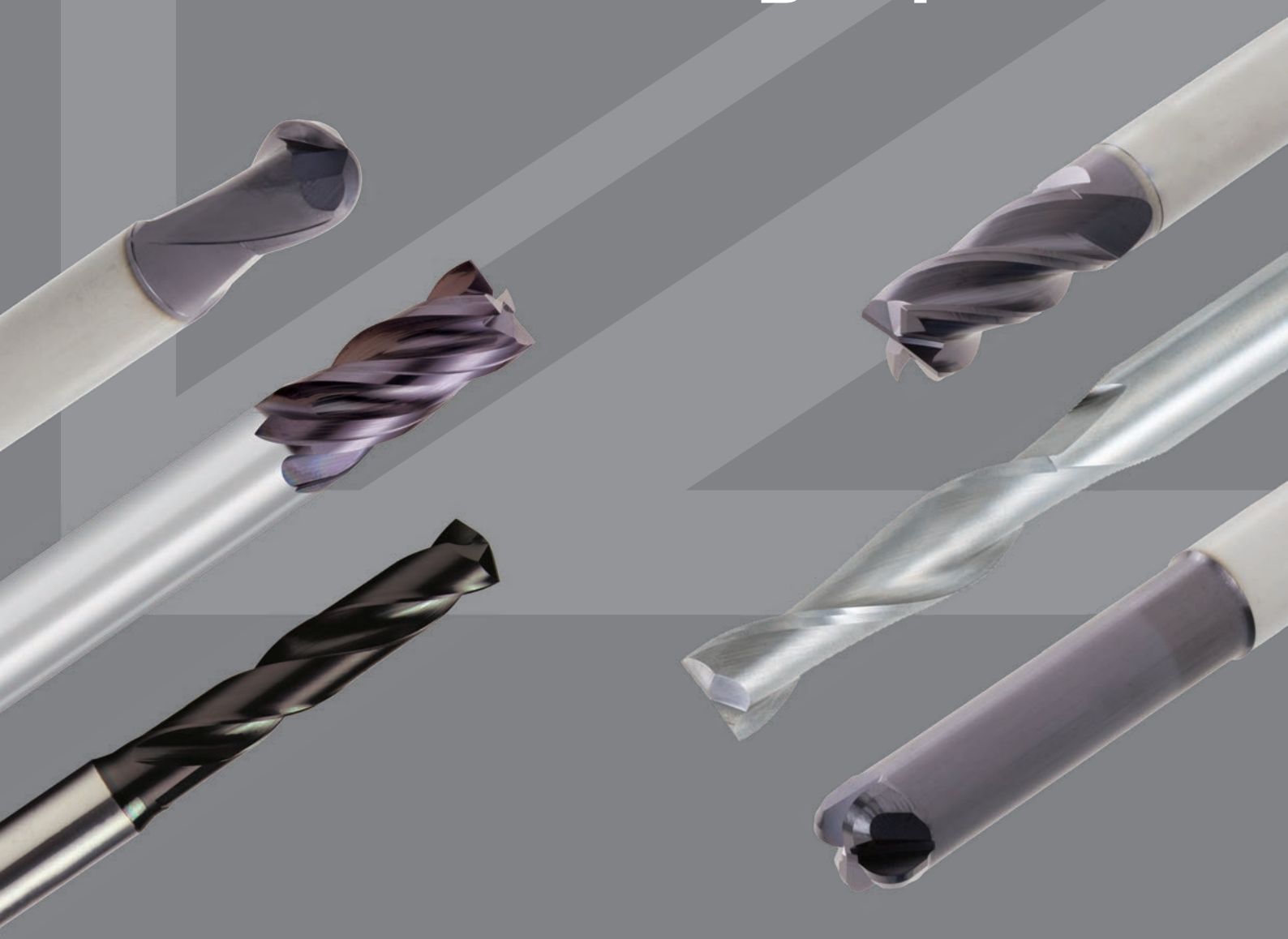
HYP-ACE-REGULAR	HYP-ACE-REGULAR-DLC	Dimensions				
EDP	EDP	D	R	L	l	d
476-4724R025	476-4724R02511	12	0,25	76	30	12
476-4724R05	476-4724R0511	12	0,5	76	30	12
476-4724R075	476-4724R07511	12	0,75	76	30	12
476-4724R10	476-4724R1011	12	1,0	76	30	12
476-4724R125	476-4724R12511	12	1,25	76	30	12
476-4724R15	476-4724R1511	12	1,5	76	30	12
476-4724R20	476-4724R2011	12	2,0	76	30	12
476-4724R24	476-4724R2411	12	2,4	76	30	12
476-4724R30	476-4724R3011	12	3,0	76	30	12
476-6299	476-629911	16	-	89	40	16
476-6299R025	476-6299R02511	16	0,25	89	40	16
476-6299R05	476-6299R0511	16	0,5	89	40	16
476-6299R075	476-6299R07511	16	0,75	89	40	16
476-6299R10	476-6299R1011	16	1,0	89	40	16
476-6299R125	476-6299R12511	16	1,25	89	40	16
476-6299R15	476-6299R1511	16	1,5	89	40	16
476-6299R20	476-6299R2011	16	2,0	89	40	16
476-6299R24	476-6299R2411	16	2,4	89	40	16
476-6299R30	476-6299R3011	16	3,0	89	40	16
476-7874	476-787411	20	-	102	50	20
476-7874R025	476-7874R02511	20	0,25	102	50	20
476-7874R05	476-7874R0511	20	0,5	102	50	20
476-7874R075	476-7874R07511	20	0,75	102	50	20
476-7874R10	476-7874R1011	20	1,0	102	50	20
476-7874R125	476-7874R12511	20	1,25	102	50	20
476-7874R15	476-7874R1511	20	1,5	102	50	20
476-7874R20	476-7874R2011	20	2,0	102	50	20
476-7874R24	476-7874R2411	20	2,4	102	50	20
476-7874R30	476-7874R3011	20	3,0	102	50	20
476-9843	476-984311	25	-	125	62,5	25
476-9843R025	476-9843R02511	25	0,25	125	62,5	25
476-9843R05	476-9843R0511	25	0,5	125	62,5	25
476-9843R075	476-9843R07511	25	0,75	125	62,5	25
476-9843R10	476-9843R1011	25	1,0	125	62,5	25
476-9843R125	476-9843R12511	25	1,25	125	62,5	25
476-9843R15	476-9843R1511	25	1,5	125	62,5	25
476-9843R20	476-9843R2011	25	2,0	125	62,5	25
476-9843R24	476-9843R2411	25	2,4	125	62,5	25
476-9843R30	476-9843R3011	25	3,0	125	62,5	25

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
◎				◎						○		

DLC coated = ◎ for Plastic

Premium Quality Specials



Made to order in the UK

Our vast experience and expertise in the production of Special cutting tools has made OSG UK a leading force in the special cutting tool market. Together with our parent company OSG Corporation of Japan, we are able to offer exceptional technical support and production capability.

We are continuously striving to improve our existing product range and service and to this end our "HYPRO" range of carbide end mills and drills has been designed to offer exceptional performance and value for money.

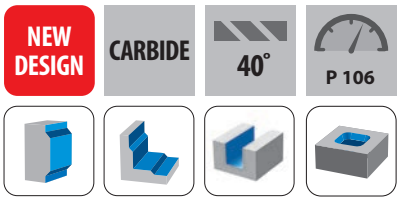
To compliment this we are pleased to announce the introduction of a specials "HYPRO" carbide tool service.

Special tools can now be offered for a quick turnaround to many different designs.

OSG HY-PRO

HYP-AL-PKE

- 3 flutes, regular, corner radius, for pocket milling applications in aluminium and non-ferrous materials
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright



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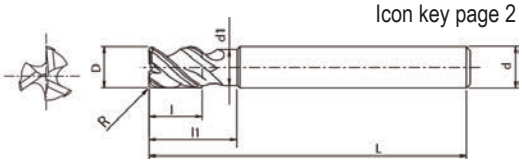


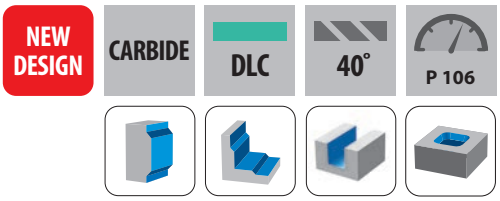
EDP	Dimensions						
	D	R	L	l1	l	d1	d
403-2362PR05	6	0,5	60	24	9	5,5	6
403-2362PR10	6	1,0	60	24	9	5,5	6
403-3150PR05	8	0,5	70	32	12	7,5	8
403-3150PR10	8	1,0	70	32	12	7,5	8
403-3937PR05	10	0,5	80	40	15	9,5	10
403-3937PR10	10	1,0	80	40	15	9,5	10
403-4724PR05	12	0,5	90	48	18	11,5	12
403-4724PR10	12	1,0	90	48	18	11,5	12
403-6299PR05	16	0,5	108	64	24	15,5	16
403-6299PR10	16	1,0	108	64	24	15,5	16
403-6299PR20	16	2,0	108	64	24	15,5	16
403-6299PR30	16	3,0	108	64	24	15,5	16

◎ EXCELLENT ○ GOOD

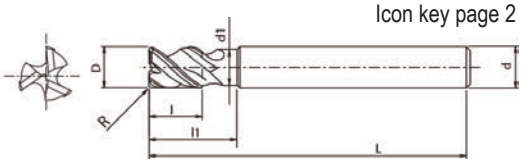
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
◎				◎						○		

HYP-AL-PKE-DLC

- 3 flutes, regular, corner radius, for pocket milling applications in aluminium and non-ferrous materials
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : DLC

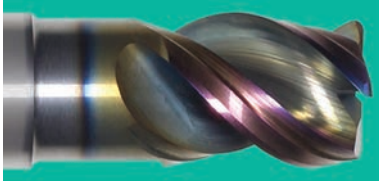


Icon key page 2



EDP	Dimensions						
	D	R	L	l1	l	d1	d
403-236211PR05	6	0,5	60	24	9	5,5	6
403-236211PR10	6	1,0	60	24	9	5,5	6
403-315011PR05	8	0,5	70	32	12	7,5	8
403-315011PR10	8	1,0	70	32	12	7,5	8
403-393711PR05	10	0,5	80	40	15	9,5	10
403-393711PR10	10	1,0	80	40	15	9,5	10
403-472411PR05	12	0,5	90	48	18	11,5	12
403-472411PR10	12	1,0	90	48	18	11,5	12
403-629911PR05	16	0,5	108	64	24	15,5	16
403-629911PR10	16	1,0	108	64	24	15,5	16
403-629911PR20	16	2,0	108	64	24	15,5	16
403-629911PR30	16	3,0	108	64	24	15,5	16

Technical



Coating: DLC
Thickness: 0,5 - 1,5um
Hardness: 5000 HV.
Application: non-ferrous metals and plastic

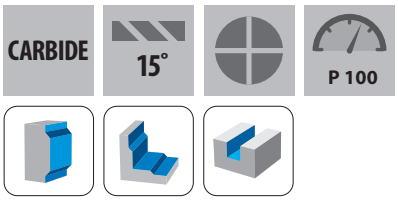
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
◎				◎						◎		

HYP-F1

FOR ALUMINIUM

- Single flute, short, centre cutting, for aluminium and plastics
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Bright



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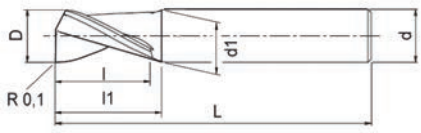
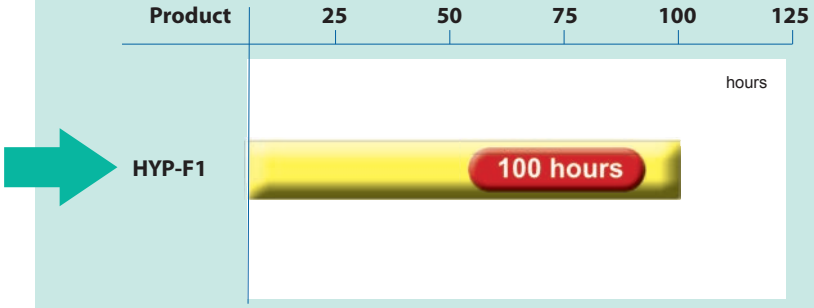


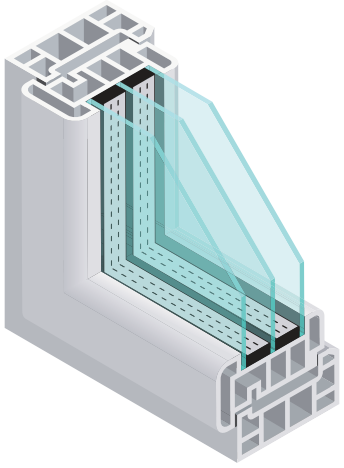
EDP	Dimensions					
		L	l	l1	d1	d
48360030	3	40	4	5	-	6
48360040	4	50	5	6	-	6
48360050	5	50	7	8	-	6
48360060	6	50	8	15	5,4	6
48360080	8	60	11	20	7	8
48360100	10	70	13	25	9	10
48360120	12	70	15	30	11	12

Technical

Work Material	Aluminium
Tool Diameter	6,0mm
ae	6,0mm
ap (depth of cut)	2,0mm
Cutting Speed	24,000 min^{-1}
Feed	4,000 mm/min
Coolant	Air
Machine	Vertical



Processing examples

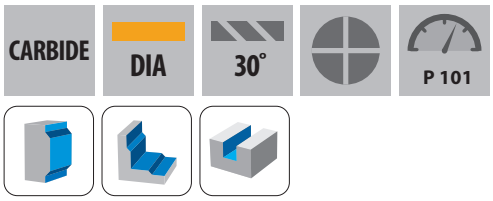


◎ EXCELLENT ○ GOOD

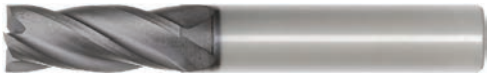
Work Material											
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium ◎	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic ◎	Graphite	CFRP

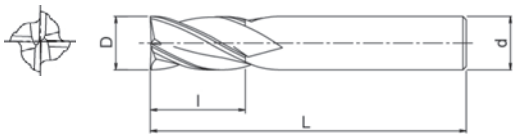
HYP-EMS-(DIAMOND)

- 4 flutes, regular, centre cutting, for plastic and graphite
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Diamond Coated



Icon key page 2

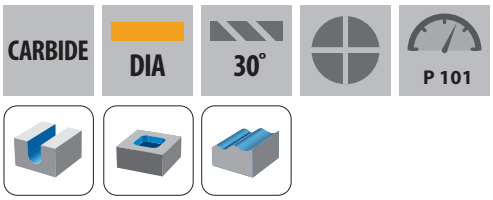




EDP	Dimensions			
	D	L	l	d
404-0394DIA	1	39	3	3
404-0787DIA	2	39	7	3
404-1181DIA	3	39	10	3
404-1378DIA	3.5	51	12	4
404-1575DIA	4	51	14	4
404-1968DIA	5	51	16	5
404-2362DIA	6	64	19	6
404-3150DIA	8	64	21	8
404-3937DIA	10	70	25	10
404-4724DIA	12	76	25	12
404-6299DIA	16	89	32	16
404-7874DIA	20	102	38	20

HYP-EBM-(DIAMOND)

- 4 flutes, regular, ball end, for plastic & graphite
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : Diamond Coated



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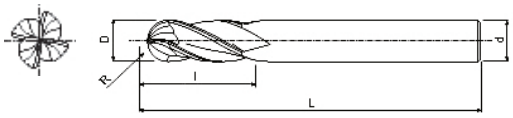


EDP	Dimensions			
	D	L	l	d
404-1181-BNDIA	3	39	10	3
404-1575-BNDIA	4	51	14	4
404-2362-BNDIA	6	64	19	6
404-2756-BNDIA	7	64	19	8
404-3937-BNDIA	10	70	25	10

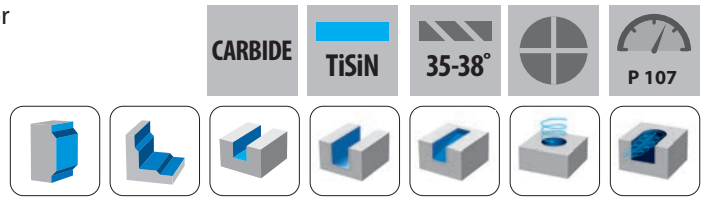
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
○				◎	○					◎	◎	

HYP-VG4-EMS / CR-VG4-EMS

FOR AEROSPACE ALLOYS

- 4 flutes, regular square end & corner radius, variable lead for difficult to machine materials
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiSiN Coated



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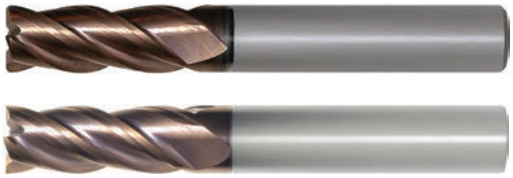
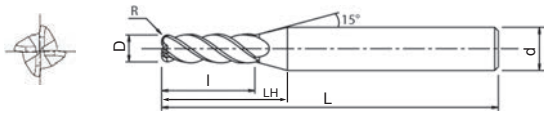
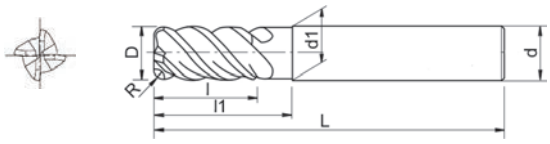




Type 1



Type 2

VARIABLE LEAD

EDP	Dimensions								
	D	R	L	LH	l1	l	d1	d	Type
501-1181	3	-	58	17	-	8	-	6	1
501-1181R03	3	0,3	58	17	-	8	-	6	1
501-1181R05	3	0,5	58	17	-	8	-	6	1
501-1575	4	-	58	18	-	11	-	6	1
501-1575R03	4	0,3	58	18	-	11	-	6	1
501-1575R05	4	0,5	58	18	-	11	-	6	1
501-1968	5	-	58	20	-	13	-	6	1
501-1968R03	5	0,3	58	20	-	13	-	6	1
501-1968R05	5	0,5	58	20	-	13	-	6	1
501-2362	6	-	58	-	20	15	5,8	6	2
501-2362R03	6	0,3	58	-	20	15	5,8	6	2
501-2362R05	6	0,5	58	-	20	15	5,8	6	2
501-2362R10	6	1,0	58	-	20	15	5,8	6	2
501-2362R15	6	1,5	58	-	20	15	5,8	6	2
501-2362R20	6	2,0	58	-	20	15	5,8	6	2
501-3150	8	-	64	-	25	20	7,8	8	2
501-3150R03	8	0,3	64	-	25	20	7,8	8	2
501-3150R05	8	0,5	64	-	25	20	7,8	8	2
501-3150R10	8	1,0	64	-	25	20	7,8	8	2
501-3150R15	8	1,5	64	-	25	20	7,8	8	2
501-3150R20	8	2,0	64	-	25	20	7,8	8	2
501-3937	10	-	73	-	30	25	9,8	10	2
501-3937R03	10	0,3	73	-	30	25	9,8	10	2
501-3937R05	10	0,5	73	-	30	25	9,8	10	2
501-3937R10	10	1,0	73	-	30	25	9,8	10	2
501-3937R15	10	1,5	73	-	30	25	9,8	10	2
501-3937R20	10	2,0	73	-	30	25	9,8	10	2
501-3937R30	10	3,0	73	-	30	25	9,8	10	2

◎ EXCELLENT ○ GOOD

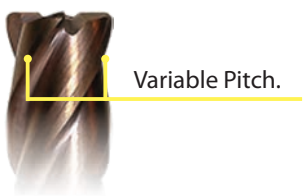
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

HYP-VG4-EMS / CR-VG4-EMS

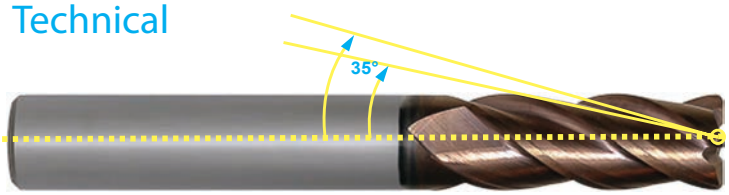
EDP	Dimensions								
	D	R	L	LH	l1	l	d1	d	Type
501-4724	12	-	84	-	38	30	11,8	12	2
501-4724R03	12	0,3	84	-	38	30	11,8	12	2
501-4724R05	12	0,5	84	-	38	30	11,8	12	2
501-4724R10	12	1,0	84	-	38	30	11,8	12	2
501-4724R15	12	1,5	84	-	38	30	11,8	12	2
501-4724R20	12	2,0	84	-	38	30	11,8	12	2
501-4724R30	12	3,0	84	-	38	30	11,8	12	2
501-6299	16	-	93	-	45	40	15,8	16	2
501-6299R03	16	0,3	93	-	45	40	15,8	16	2
501-6299R05	16	0,5	93	-	45	40	15,8	16	2
501-6299R10	16	1,0	93	-	45	40	15,8	16	2
501-6299R15	16	1,5	93	-	45	40	15,8	16	2
501-6299R20	16	2,0	93	-	45	40	15,8	16	2
501-6299R30	16	3,0	93	-	45	40	15,8	16	2
501-6299R40	16	4,0	93	-	45	40	15,8	16	2
501-7874	20	-	105	-	60	50	19,8	20	2
501-7874R03	20	0,3	105	-	60	50	19,8	20	2
501-7874R05	20	0,5	105	-	60	50	19,8	20	2
501-7874R10	20	1,0	105	-	60	50	19,8	20	2
501-7874R15	20	1,5	105	-	60	50	19,8	20	2
501-7874R20	20	2,0	105	-	60	50	19,8	20	2
501-7874R30	20	3,0	105	-	60	50	19,8	20	2
501-7874R40	20	4,0	105	-	60	50	19,8	20	2
501-7874R50	20	5,0	105	-	60	50	19,8	20	2

Carbide end mills incorporating new variable helix flute design for better balance, resulting in a superb surface finish. TiSiN multi layered coating for increased tool life for exotic nickel and titanium alloys.

Variable Lead



Technical



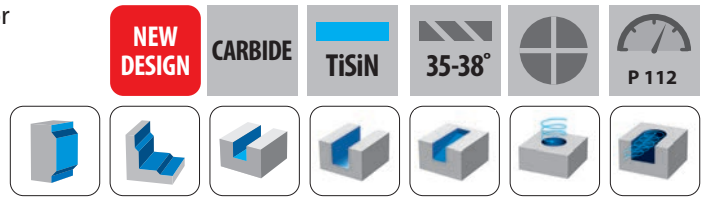
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

VG4-WEMS

FOR AEROSPACE ALLOYS

- 4 flutes, regular square end & corner radius, variable lead for difficult to machine materials
- Shank : NS (with flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiSiN Coated



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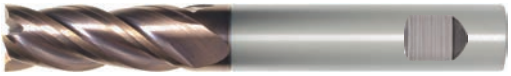
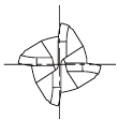
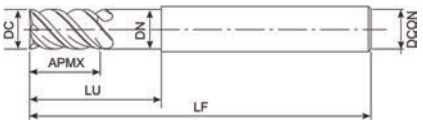






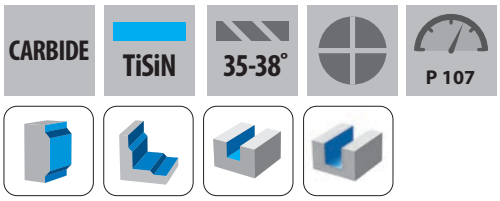
EDP	DC	LU	LF	AMPX	DCON	DN
501-2362-W	6	20	58	25	6	5,8
501-3150-W	8	25	64	20	8	7,8
501-3937-W	10	30	73	25	10	9,8
501-4724-W	12	38	84	30	20	11,8
501-6299-W	16	45	93	40	16	15,8
501-7874-W	20	60	105	50	20	19,8

◎ EXCELLENT ○ GOOD

Work Material											
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

HYP-VG4-LN-EMS, CR-VG4-LN-EMS

- 4 flutes, long series square end & corner radius, variable lead, for difficult to machine materials
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiSiN Coated



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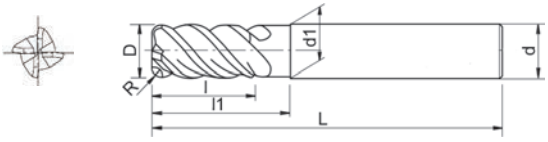


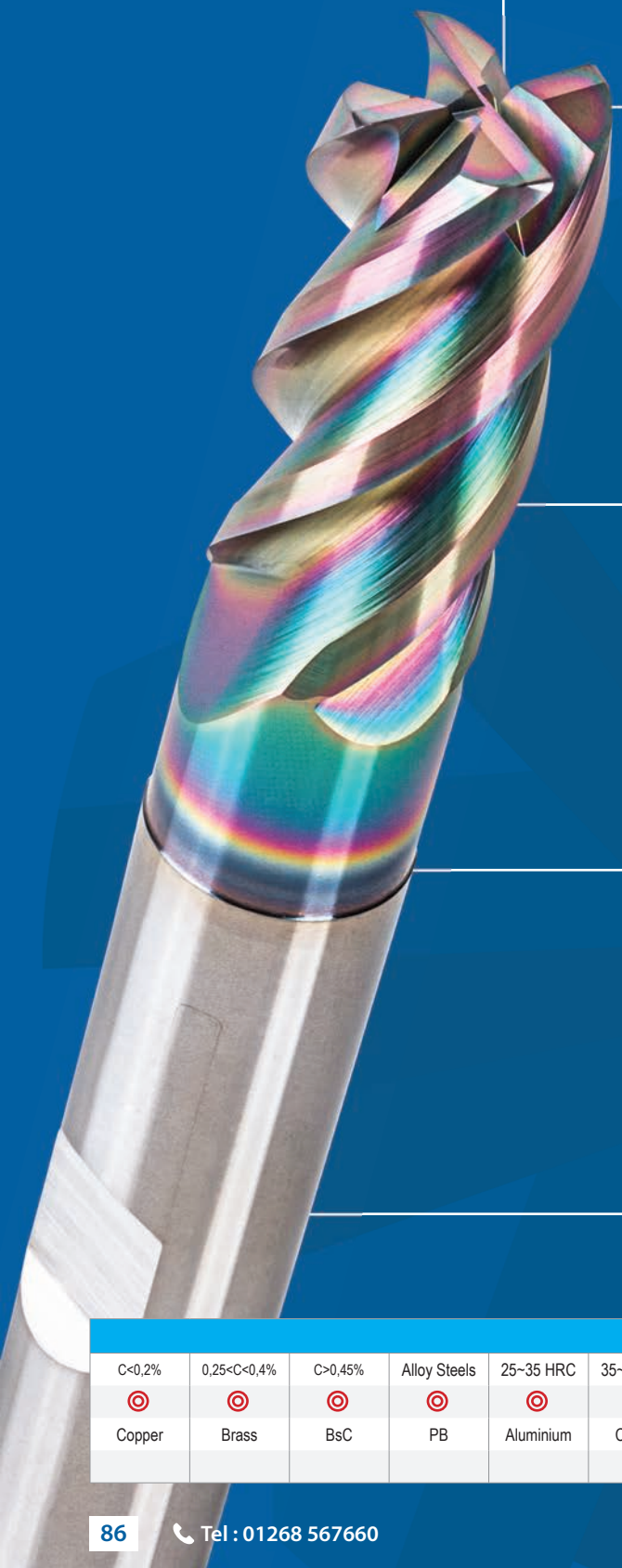
VARIABLE LEAD

EDP	Dimensions						
	D	R	L	l1	l	d1	d
502-2362	6	-	100	30	12	5,8	6
502-2362R03	6	0,3	100	30	12	5,8	6
502-2362R05	6	0,5	100	30	12	5,8	6
502-2362R10	6	1,0	100	30	12	5,8	6
502-3150	8	-	100	40	16	7,6	8
502-3150R03	8	0,3	100	40	16	7,6	8
502-3150R05	8	0,5	100	40	16	7,6	8
502-3150R10	8	1,0	100	40	16	7,6	8
502-3150R15	8	1,5	100	40	16	7,6	8
502-3937	10	-	120	50	20	9,6	10
502-3937R03	10	0,3	120	50	20	9,6	10
502-3937R05	10	0,5	120	50	20	9,6	10
502-3937R10	10	1,0	120	50	20	9,6	10
502-3937R15	10	1,5	120	50	20	9,6	10
502-3937R20	10	2,0	120	50	20	9,6	10
502-4724	12	-	150	60	24	11,4	12
502-4724R03	12	0,3	150	60	24	11,4	12
502-4724R05	12	0,5	150	60	24	11,4	12
502-4724R10	12	1,0	150	60	24	11,4	12
502-4724R15	12	1,5	150	60	24	11,4	12
502-4724R20	12	2,0	150	60	24	11,4	12
502-4724R30	12	3,0	150	60	24	11,4	12
502-6299	16	-	150	80	32	15,2	16
502-6299R03	16	0,3	150	80	32	15,2	16
502-6299R05	16	0,5	150	80	32	15,2	16
502-6299R10	16	1,0	150	80	32	15,2	16
502-6299R15	16	1,5	150	80	32	15,2	16
502-6299R20	16	2,0	150	80	32	15,2	16
502-6299R30	16	3,0	150	80	32	15,2	16

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

KEY FEATURES: EPL-HP-5FL



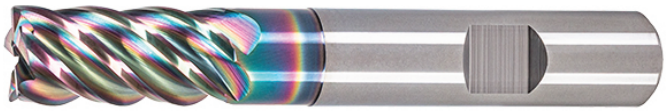
1. Unequal spacing, variable lead results in superior vibration suppression
2. Optimal flute shape for smooth evacuation of chips
3. Web taper: highly efficient milling due to increased rigidity
4. Available with 4 and 5 flutes
5. Weldon shank

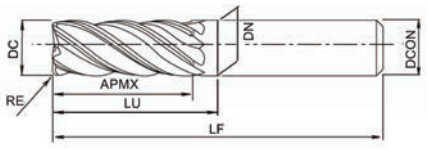
◎ EXCELLENT ○ GOOD

Work Material											
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		◎	
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

EPL-HP-5FL

- 5 flutes, regular, centre cutting, square end and corner radius
- Shank : NS
- Material : MG (micro grain carbide)
- Surface treatment : EgiAs coating

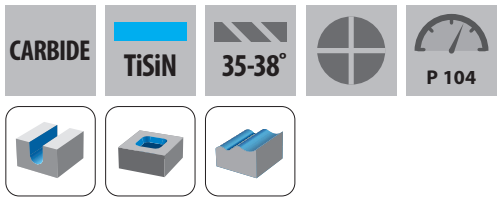




EDP	DC	RE	LU	LF	AMPX	DCON	DN
EP01940699	6	-	20	57	13	6	5,8
EP01940600	6	0,25	20	57	13	6	5,8
EP01940601	6	0,5	20	57	13	6	5,8
EP01940602	6	1	20	57	13	6	5,8
EP01940899	8	-	25	63	19	8	7,8
EP01940800	8	0,25	25	63	19	8	7,8
EP01940801	8	0,5	25	63	19	8	7,8
EP01940802	8	1	25	63	19	8	7,8
EP01940803	8	1,5	25	63	19	8	7,8
EP01941099	10	-	30	72	22	10	9,8
EP01941000	10	0,25	30	72	22	10	9,8
EP01941001	10	0,5	30	72	22	10	9,8
EP01941002	10	1	30	72	22	10	9,8
EP01941003	10	1,5	30	72	22	10	9,8
EP01941004	10	2	30	72	22	10	9,8
EP01941006	10	3	30	72	22	10	9,8
EP01941299	12	-	38	83	26	12	11,8
EP01941200	12	0,25	38	83	26	12	11,8
EP01941201	12	0,5	38	83	26	12	11,8
EP01941202	12	1	38	83	26	12	11,8
EP01941204	12	2	38	83	26	12	11,8
EP01941206	12	3	38	83	26	12	11,8
EP01941207	12	4	38	83	26	12	11,8
EP01941699	16	-	44	92	32	16	15,8
EP01941600	16	0,25	44	92	32	16	15,8
EP01941601	16	0,5	44	92	32	16	15,8
EP01941602	16	1	44	92	32	16	15,8
EP01941604	16	2	44	92	32	16	15,8
EP01941606	16	3	44	92	32	16	15,8
EP01941607	16	4	44	92	32	16	15,8
EP01942099	20	-	54	104	38	20	19,8
EP01942000	20	0,25	54	104	38	20	19,8
EP01942001	20	0,5	54	104	38	20	19,8
EP01942002	20	1	54	104	38	20	19,8
EP01942004	20	2	54	104	38	20	19,8
EP01942006	20	3	54	104	38	20	19,8
EP01942007	20	4	54	104	38	20	19,8

HYP-VG4-EBM

- 4 flutes, regular, ball end, variable lead, for titanium and other difficult applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiSiN Coated



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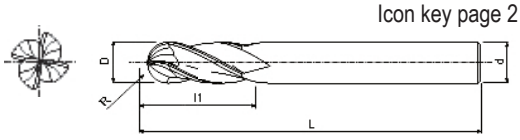


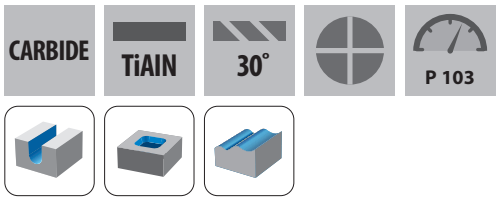
VARIABLE LEAD

EDP	Dimensions			
	D	L	l	d
430-7916	3	39	10	3
430-7917	4	51	14	4
430-7918	5	51	16	5
430-7919	6	65	19	6
430-7920	8	65	21	8
430-7921	10	73	25	10
430-7922	12	74	26	12

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

- 2 flutes, regular, ball end, for titanium and difficult applications
- Shank : NS (without flat)
- Material : MG (micro grain carbide)
- Surface treatment : TiALN Coated



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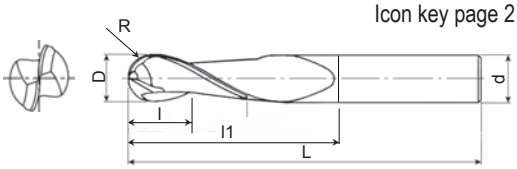
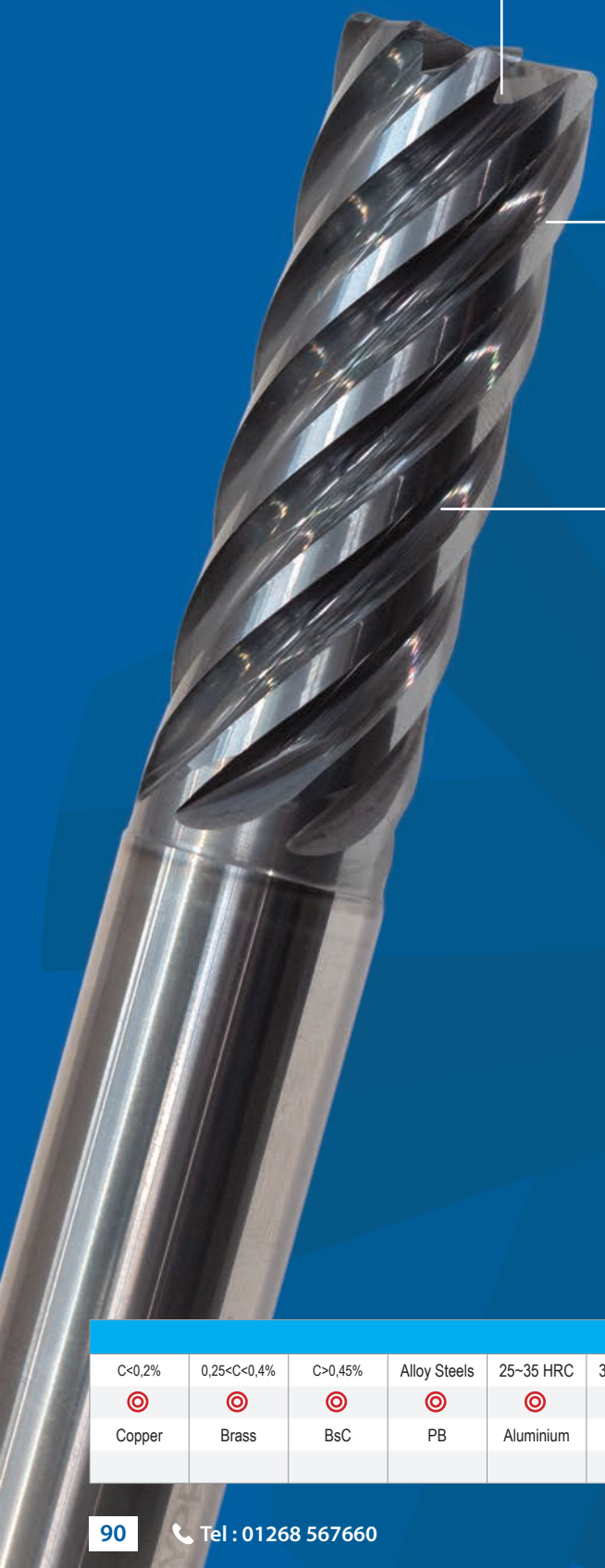


EDP	Dimensions				
	D	L	l	l1	d
430-7215	3	75	5	9	6
430-7216	4	75	6	15	6
430-7217	5	75	7	18	6
430-7218	6	100	8	18	6
430-7219	8	100	10	20	8
430-7220	10	100	12	25	10
430-7221	12	100	16	25	12

◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
				◎	◎	○			○		○	○
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	○			

KEY FEATURES: HYP-VG7-(CR)-EMS



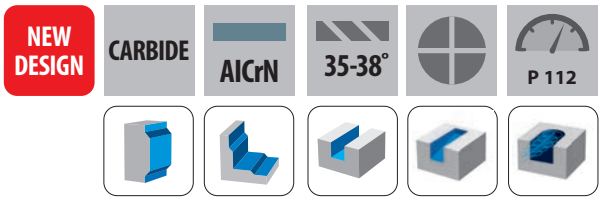
1. 7 fluted cutters allow for faster and more efficient material removal while reducing the potential of chip buildup and tool wear
2. Low cutting force and high productivity
3. Carbide end mill with AlCrN coating

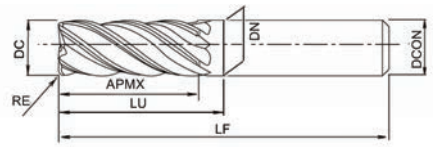
◎ EXCELLENT ○ GOOD

Work Material											
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
◎	◎	◎	◎	◎	◎			◎	◎		○	◎
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
								◎	◎			

HYP-VG7-EMS

- 7 flutes, long, centre cutting, square end and corner radius
- Shank : NS
- Material : MG (micro grain carbide)
- Surface treatment : AlCrN coating

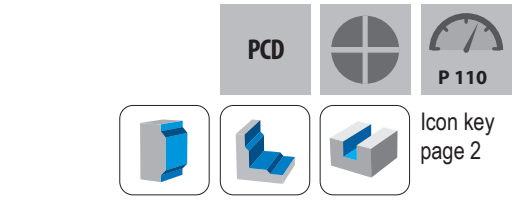




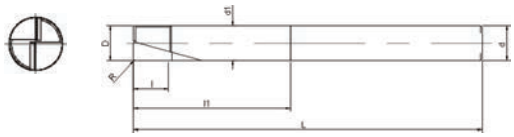
EDP	RE	DC	LU	LF	AMPX	DCON	DN
507-3937	-	10	27	73	22	10	9.8
507-3937R05	0.5	10	27	73	22	10	9.8
507-3937R10	1.0	10	27	73	22	10	9.8
507-4724	-	12	38	84	32	12	11.8
507-4724R05	0.5	12	38	84	32	12	11.8
507-4724R10	1.0	12	38	84	32	12	11.8
507-4724R20	2	12	38	84	32	12	11.8
507-6299	-	16	50	110	44	16	15.8
507-6299R05	0.5	16	50	110	44	16	15.8
507-6299R10	1.0	16	50	110	44	16	15.8
507-6299R20	2.0	16	50	110	44	16	15.8
507-6299R30	3.0	16	50	110	44	16	15.8
507-6299R40	4.0	16	50	110	44	16	15.8
507-5874R10	1.0	20	72	125	62	20	19.6
507-5874R50	5.0	20	72	125	62	20	19.6

HYP-EDS-PCD

- 2 flutes, regular, for graphite and CFRP
- Shank : NS (without flat)
- Material : PCD
- Surface treatment : Bright



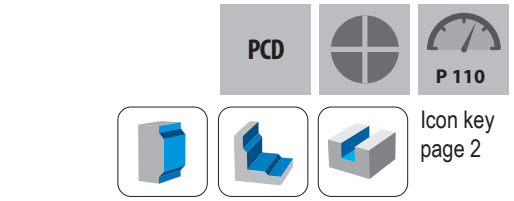
Icon key page 2



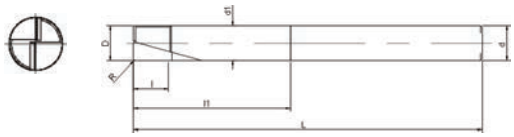
EDP	Dimensions						
	D	R	L	l	l1	d1	d
PCD402-1181	3	0,2	75	3	15	2,8	6
PCD402-1575	4	0,2	75	4	20	3,8	6
PCD402-1968	5	0,2	75	5	25	4,8	6
PCD402-2362	6	0,2	100	6	30	5,8	6
PCD402-3150	8	0,2	100	8	40	7,8	8
PCD402-3937	10	0,2	100	10	45	9,8	10
PCD402-4724	12	0,2	100	12	45	11,8	12

HYP-LS-EDS-PCD

- 2 flutes, regular, for graphite and CFRP
- Shank : NS (without flat)
- Material : PCD
- Surface treatment : Bright



Icon key page 2



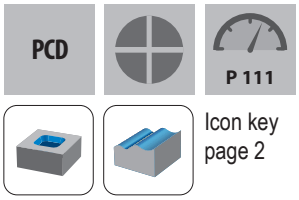
EDP	Dimensions						
	D	R	L	l	l1	d1	d
PCD484-2362	6	0,2	150	8	30	5.8	6
PCD484-3150	8	0,2	150	10	40	7.8	8
PCD484-3937	10	0,2	150	12	45	9.8	10
PCD484-4724	12	0,2	150	12	45	11.8	12

◎ EXCELLENT ○ GOOD

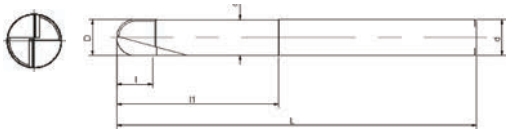
Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				◎							◎	◎

HYP-EBD-PCD

- 2 flutes, long, ball end, for graphite and CFRP
- Shank : NS (without flat)
- Material : PCD
- Surface treatment : Bright



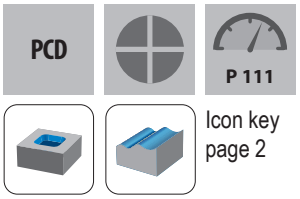
Icon key page 2



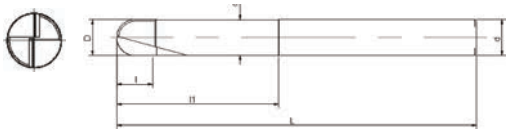
EDP	Dimensions					
	D	L	l	l1	d1	d
PCD402-1181-BN	3	75	3	15	2,8	6
PCD402-1575-BN	4	75	4	20	3,8	6
PCD402-1968-BN	5	75	5	25	4,8	6
PCD402-2362-BN	6	100	6	30	5,8	6
PCD402-3150-BN	8	100	8	40	7,8	8
PCD402-3937-BN	10	100	10	45	9,8	10
PCD402-4724-BN	12	100	12	45	11,8	12

HYP-LS-EBD-PCD

- 2 flutes, extra long, ball end, for graphite and CFRP
- Shank : NS (without flat)
- Material : PCD
- Surface treatment : Bright



Icon key page 2



EDP	Dimensions					
	D	L	l	l1	d1	d
PCD484-2362-BN	6	150	8	30	5.8	6
PCD484-3150-BN	8	150	10	40	7.8	8
PCD484-3937-BN	10	150	12	45	9.8	10
PCD484-4724-BN	12	150	12	45	11.8	12

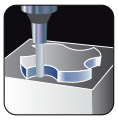
◎ EXCELLENT ○ GOOD

Work Material												
C<0,2%	0,25<C<0,4%	C>0,45%	Alloy Steels	25~35 HRC	35~45 HRC	45~52 HRC	52~62 HRC	Stainless	Tool Steel	SC	Cast Iron	Ductile
Copper	Brass	BsC	PB	Aluminium	Cast Al	MC	Zinc Alloy	Titanium	Ni Alloys	Plastic	Graphite	CFRP
				◎							◎	◎

MILLING CONDITIONS

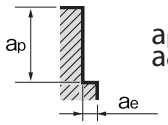
2 flute and 3 flute carbide end mill (see notes below for long series & coated)

SIDE MILLING



	Aluminium		Cast Iron		HYP-EDS,CR-EDS,EDL,EDXL,ETS,CR-ETS					
					Mild Steels		Pre-hardened Steels		Hardened	
					Carbon Steels		Die & Alloy Steels		Steels	
			< 180 HB		< 180 HB		< 30 HRC	< 40 HRC		< 50 HRC
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min	25 ~ 35 m/min		15 m/min
ø	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)
1	31,500	450	14,000	175	11,000	85	8,000	60	8,000	35	4,800	14
1.5	21,200	450	9,500	175	7,500	85	5,300	60	5,400	35	3,200	14
2	16,000	450	7,100	250	5,500	85	4,000	60	4,000	35	2,400	14
3	12,500	450	4,750	300	4,500	150	3,550	120	3,150	45	1,600	25
4	9,500	475	3,550	300	3,550	175	2,650	120	2,360	45	1,200	25
5	7,500	475	2,800	300	2,800	200	2,120	125	1,900	45	950	25
6	6,300	475	2,360	300	2,360	200	1,700	125	1,600	45	800	25
8	4,750	500	1,800	300	1,800	200	1,320	125	1,180	45	600	25
10	3,750	500	1,400	315	1,400	225	1,060	125	950	45	480	25
12	3,150	560	1,180	315	1,180	225	850	125	800	45	400	25
16	2,360	560	900	375	900	250	670	140	600	45	300	25
20	1,900	560	710	375	710	250	530	150	475	45	240	25
25	1,500	500	560	375	560	250	425	140	375	35	190	20

Maximum depth of cut



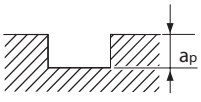
ap=1.5D
ae=0.1D

(1) Reduce speeds & feeds 20-30% for HYP-EDL (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EDXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EDS-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.
(5) Increase speeds & feeds 20-30% for HYP-ETS.
(6) Increase speeds & feeds 20-40% for HYP-ETS-XCEED (coated).

SLOTTING

	Aluminium		Cast Iron		HYP-EDS,CR-EDS,EDL,EDXL,ETS,CR-ETS					
					Mild Steels		Pre-hardened Steels		Hardened	
					Carbon Steels		Die & Alloy Steels		Steels	
			< 180 HB		< 180 HB		< 30 HRC	< 40 HRC		< 50 HRC
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min	25 ~ 35 m/min		15 m/min
ø	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)
1	31,500	200	14,000	140	12,500	75	7,500	30	7,000	15	4,800	8
1.5	21,200	200	9,500	140	8,500	90	6,500	35	5,000	20	3,200	11
2	16,000	300	7,100	150	6,300	100	5,000	60	4,000	30	2,400	16
3	11,200	300	4,750	160	4,250	100	3,200	80	2,600	30	1,600	16
4	8,000	300	3,550	160	3,150	100	2,400	80	2,000	30	1,200	16
5	6,300	300	2,800	160	2,500	100	2,000	80	1,600	30	950	16
6	5,300	300	2,360	200	2,120	100	1,600	80	1,300	30	800	16
8	4,000	300	1,800	236	1,600	100	1,200	80	1,000	30	600	16
10	3,150	300	1,400	236	1,250	100	1,000	80	800	30	480	16
12	2,650	300	1,180	236	1,060	100	820	80	700	30	400	16
16	2,000	300	900	236	800	100	640	85	500	37	300	12
20	1,600	300	710	236	630	100	500	85	400	37	240	10
25	1,250	300	560	236	500	100	400	85	320	37	190	8

Maximum depth of cut



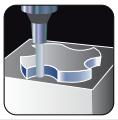
D < 2	0.5D
2 < D	1D

(1) Reduce speeds & feeds 20-30% for HYP-EDL (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EDXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EDS-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.
(5) Increase speeds & feeds 20-30% for HYP-ETS.
(6) Increase speeds & feeds 20-40% for HYP-ETS-XCEED (coated).

4 flute carbide end mill (see notes below for long series & coated)

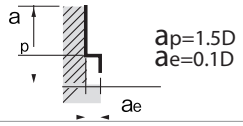
SIDE MILLING

HYP-EMS,CR-EMS,EML,EMXL



	Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
			< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min		25 ~ 35 m/min		15 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
1	31,500	630	14,000	245	11,000	120	8,000	85	8,000	50	4,800	20
1.5	21,200	630	9,500	245	7,500	120	5,300	85	5,400	50	3,200	20
2	16,000	630	7,100	350	5,500	120	4,000	85	4,000	50	2,400	20
3	12,500	630	4,750	420	4,500	210	3,550	170	3,150	63	1,600	35
4	9,500	665	3,550	420	3,550	245	2,650	170	2,360	63	1,200	35
5	7,500	665	2,800	420	2,800	280	2,120	170	1,900	63	950	35
6	6,300	665	2,360	420	2,360	280	1,700	170	1,600	63	800	35
8	4,750	700	1,800	420	1,800	280	1,320	170	1,180	63	600	35
10	3,750	700	1,400	440	1,400	310	1,060	170	950	63	480	35
12	3,150	780	1,180	440	1,180	310	850	170	800	63	400	35
16	2,360	780	900	525	900	350	670	200	600	63	300	35
20	1,900	780	710	525	710	350	530	200	475	63	240	35
25	1,500	700	560	525	560	350	425	200	375	50	190	28

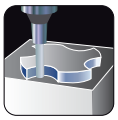
Maximum depth of cut



(1) Reduce speeds & feeds 20-30% for HYP-EML (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EMXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EMS-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.

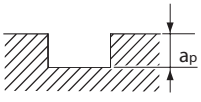
SLOTTING

HYP-EMS,CR-EMS,EML



	Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
			< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min		25 ~ 35 m/min		15 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
1	31,500	280	14,000	200	12,500	105	7,500	42	7,000	20	4,800	10
1.5	21,200	280	9,500	200	8,500	125	6,500	50	5,000	28	3,200	15
2	16,000	420	7,100	210	6,300	140	5,000	85	4,000	42	2,400	22
3	11,200	420	4,750	225	4,250	140	3,200	110	2,600	42	1,600	22
4	8,000	420	3,550	225	3,150	140	2,400	110	2,000	42	1,200	22
5	6,300	420	2,800	225	2,500	140	2,000	110	1,600	42	950	22
6	5,300	420	2,360	280	2,120	140	1,600	110	1,300	42	800	22
8	4,000	420	1,800	330	1,600	140	1,200	110	1,000	42	600	22
10	3,150	420	1,400	330	1,250	140	1,000	110	800	42	480	22
12	2,650	420	1,180	330	1,060	140	820	110	700	42	400	22
16	2,000	420	900	330	800	140	640	120	500	50	300	17
20	1,600	420	710	330	630	140	500	120	400	50	240	14
25	1,250	420	560	330	500	140	400	120	320	50	190	11

Maximum depth of cut



D < 2	0.3D
2 < D	0.5D

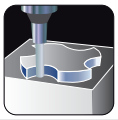
(1) Reduce speeds & feeds 20-30% for HYP-EML (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EMXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EMS-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.
(5) Slotting is not recommended for HYP-EMXL.

MILLING CONDITIONS

2 flute ball nose carbide end mill (see notes below for long series & coated)

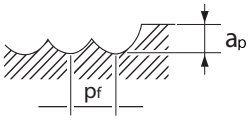
PROFILING

HYP-EDB,EBDL,EBDXL



	Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
			< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 m/min		35 m/min		35 m/min		25 m/min		20 m/min		15 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
1	32,000	190	11,000	90	11,000	80	8,000	45	6,400	26	4,800	24
2	16,000	190	5,600	90	5,600	80	4,000	45	3,200	26	2,387	24
3	10,000	190	3,700	100	3,700	90	2,600	50	2,100	35	2,000	30
4	8,000	190	2,800	100	2,800	90	2,000	50	1,600	35	1,195	30
5	6,400	190	2,200	100	2,200	90	1,600	50	1,300	35	955	30
6	5,300	190	1,900	100	1,900	90	1,320	50	1,000	35	800	30
8	4,000	220	1,400	100	1,400	90	1,000	50	800	35	600	30
10	3,200	220	1,100	100	1,100	90	800	50	640	35	475	30
12	2,600	220	930	100	930	90	660	50	530	35	400	30
16	2,000	220	700	100	700	90	500	50	400	35	300	30
20	1,600	220	560	100	560	90	400	50	320	35	240	30
25	1,200	220	450	100	450	90	320	50	250	35	190	30

Maximum depth of cut



a_p=0.3D

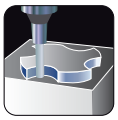
p_f=0.7D

(1) Reduce speeds & feeds 20-30% for HYP-EBDL (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EBDXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EBD-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.

4 flute ball nose carbide end mill (see notes below for long series & coated)

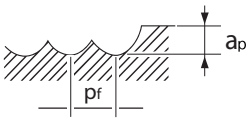
PROFILING

HYP-EBM,EBML,EBMXL



	Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
			< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 m/min		35 m/min		35 m/min		25 m/min		20 m/min		15 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
1	32,000	226	11,000	126	11,000	112	8,000	63	6,400	43	4,800	34
2	16,000	226	5,600	126	5,600	112	4,000	63	3,200	43	2,387	34
3	10,000	226	3,700	140	3,700	126	2,600	70	2,100	50	2,000	42
4	8,000	226	2,800	140	2,800	126	2,000	70	1,600	50	1,195	42
5	6,400	226	2,200	140	2,200	126	1,600	70	1,300	50	955	42
6	5,300	226	1,900	140	1,900	126	1,320	70	1,000	50	800	42
8	4,000	308	1,400	140	1,400	126	1,000	70	800	50	600	42
10	3,200	308	1,100	140	1,100	126	800	70	640	50	475	42
12	2,600	308	930	140	930	126	660	70	530	50	400	42
16	2,000	308	700	140	700	126	500	70	400	50	300	42
20	1,600	308	560	140	560	126	400	70	320	50	240	42
25	1,200	308	450	140	450	126	320	70	250	50	190	42

Maximum depth of cut



a_p=0.3D

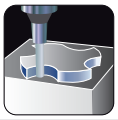
p_f=0.7D

(1) Reduce speeds & feeds 20-30% for HYP-EBML (Long series).
(2) Reduce speeds & feeds 40-50% for HYP-EBMXL. (Extra long series).
(3) Increase speeds & feeds 20-30% for HYP-EBM-XCEED (coated).
(4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.

High performance 4 flute carbide roughing end mill

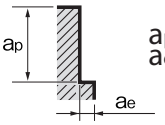
PROFILING

HYP-HP-WRESF



	Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels / Die & Alloy Steels				Hardened Steels / SUS 304	
			< 180 HB		< 30 HRC		< 38 HRC		< 45 HRC	
Vc	80 m/min		80 m/min		70 m/min		55 m/min		m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
6	4,200	585	4,200	585	3,700	370	2,900	230	2,650	210
8	3,150	565	3,150	565	2,750	350	2,150	230	1,950	210
10	2,500	500	2,500	500	2,200	350	1,750	230	1,550	210
12	2,100	500	2,100	500	1,850	330	1,450	230	1,300	210
16	1,550	400	1,550	400	1,350	320	1,050	230	995	210
20	1,250	375	1,250	375	1,100	320	875	240	795	220
25	870	300	870	300	830	295	640	220	575	200

Maximum depth of cut



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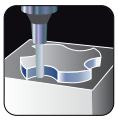
ae=0.1D

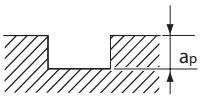
SLOTTING

HYP-HP-WRESF



	Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels / Die & Alloy Steels				Hardened Steels / SUS 304	
			< 180 HB		< 30 HRC		< 38 HRC		< 45 HRC	
Vc	m/min		m/min		m/min		m/min		m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
6	3,150	315	3,150	315	2,650	265	2,300	180	2,100	165
8	2,350	300	2,350	300	1,950	250	1,750	175	1,550	155
10	1,900	300	1,900	300	1,550	245	1,400	165	1,250	150
12	1,550	280	1,550	280	1,300	235	1,150	160	1,050	145
16	1,150	280	1,150	280	995	235	875	140	795	125
20	955	280	955	280	795	235	700	140	635	125
25	700	245	700	245	640	225	510	125	460	115

Maximum depth of cut



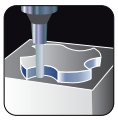
D < 2	0.3D
2 < D	0.5D

MILLING CONDITIONS

4 flute high helix carbide end mill

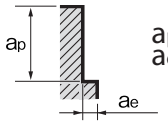
SIDE MILLING

HYP-EHS, CR-EHS



	Cast Iron		Mild Steels Carbon Steels		Alloy Steels Tool Steels Ti (Annealed)		Hardened Steels Titanium Alloys Treated & aged		Hardened Steels Stainless Steels Nickel Base Alloys		Aluminium Alloys	
			< 220 HB		< 30 HRC		< 38 HRC		< 45 HRC			
Vc	102 m/min		120 m/min		96 m/min		72 m/min		48 m/min		132 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
4	8,160	840	9,600	1,800	7,680	1,560	5,760	480	3,840	288	10,560	1,320
6	5,400	960	6,360	2,040	5,040	1,800	3,840	480	2,520	312	6,960	1,560
8	4,080	840	4,800	1,920	3,840	1,680	2,880	744	1,920	492	5,280	1,440
10	3,240	816	3,840	1,680	3,000	1,560	2,280	720	1,560	492	4,200	1,320
12	2,760	792	3,240	1,680	2,520	1,440	1,920	612	1,260	420	3,480	1,200
16	2,040	660	2,400	1,320	1,920	1,140	1,440	468	960	396	2,640	1,080
20	1,620	540	2,160	1,080	1,500	900	1,140	384	780	312	2,100	960

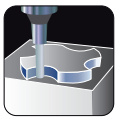
Maximum depth of cut



ap=1.5D
ae=0.1D

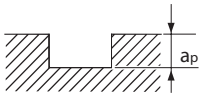
SLOTTING

HYP-EHS, CR-EHS



	Cast Iron		Mild Steels Carbon Steels		Alloy Steels Tool Steels Ti (Annealed)		Hardened Steels Titanium Alloys Treated & aged		Hardened Steels Stainless Steels Nickel Base Alloys		Aluminium Alloys	
			< 220 HB		< 30 HRC		< 38 HRC		< 45 HRC			
Vc	72 m/min		108 m/min		90 m/min		60 m/min		35 m/min		120 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
4	5,760	480	8,640	756	7,200	540	4,800	348	2,880	204	9,548	1,080
6	3,840	480	5,760	876	4,800	756	3,240	408	1,920	276	6,350	1,200
8	2,880	744	4,320	792	3,600	696	2,400	408	1,440	276	4,775	1,140
10	2,280	720	3,480	720	2,880	564	1,920	372	1,140	252	3,800	1,080
12	1,920	612	2,880	696	2,400	540	1,560	348	960	240	3,200	960
16	1,440	468	2,160	576	1,800	475	1,200	264	720	216	2,400	840
20	1,140	384	1,680	504	1,440	384	960	216	576	168	1,900	720

Maximum depth of cut



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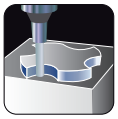
= < D x 0.5

SLOTTING



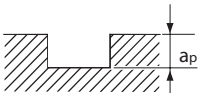
HYP-ACE-STUB / CR -ACE-STUB / DLC

Aluminium Alloys

A6061, A7075

Vc	365 m/min		
Ø	Speed (min^{-1})	Fz (mm)	Feed (mm/min.)
3	38,700	0.03	3,810
4	29,000	0.05	4,590
6	19,400	0.09	5,280
8	14,500	0.13	5,490
10	11,600	0.16	5,550
12	9,700	0.19	5,540
16	7,300	0.24	5,360
20	5,800	0.29	5,040
25	4,600	0.33	4,580

Maximum depth of cut



= < D x 0.5

(1) For side milling increase feeds 20-50%

SLOTTING

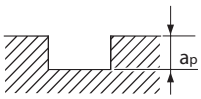
HYP-ACE-REGULAR / CR-A CE-REG / DLC

Aluminium Alloys

A6061, A7075

Vc	300 m/min		
Ø	Speed (min^{-1})	Fz (mm)	Feed (mm/min.)
3	31,800	0.03	3,130
4	23,900	0.05	3,780
6	15,900	0.09	4,330
8	11,900	0.13	4,510
10	9,500	0.16	4,550
12	8,000	0.19	4,570
16	6,000	0.24	4,410
20	4,800	0.29	4,170
25	3,800	0.33	3,790

Maximum depth of cut



= < D x 0.5

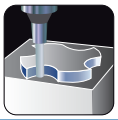
(1) For side milling increase feeds 20-50%

MILLING CONDITIONS

Multi-flute carbide end mill

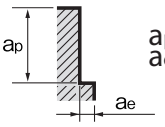
SIDE MILLING

HYP-ROCKET-MILL, LS-ROCKET-MILL



	Mild Steels Cast Iron		Alloy Steels Tool Steels		Hardened Steels Tool Steels				Titanium Alloy		Nickel Base Alloys	
	< 25 HRC		< 45 HRC		< 55 HRC		< 60 HRC		< 40 HRC		< 45 HRC	
Vc	132 m/min		72 m/min		39 m/min		22 m/min		66 m/min		20 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	11,400	1,800	6,360	480	3,240	192	2,280	120	5,040	840	1,680	54
4	8,640	1,800	4,800	480	2,640	240	1,800	120	3,840	900	1,260	66
5	6,840	1,560	3,840	480	2,160	264	1,560	120	3,000	900	984	84
6	6,360	3,120	3,480	1,020	1,920	360	1,320	192	2,520	1,080	840	108
8	4,800	2,880	2,640	1,020	1,440	360	996	180	1,920	1,080	624	108
10	3,840	2,520	2,160	1,020	1,152	336	804	180	1,560	960	480	108
12	3,480	2,520	1,920	924	960	336	672	156	1,260	900	408	96
16	2,640	1,920	1,440	696	720	264	528	120	960	840	312	84
20	2,160	1,560	1,140	552	576	192	420	102	780	720	240	84
25	1,500	1,440	900	570	450	216	300	96	720	600	216	72

Maximum depth of cut



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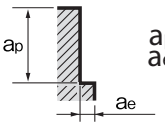
ae=0.1D

Maximum depth of cut



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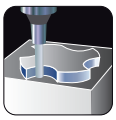
1 Flute carbide end mill

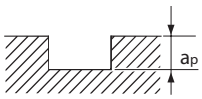
SLOTTING

HYP-F1



	Aluminium		Plastics	
Vc				
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	40,000	2,500	20,000	2,000
4	35,000	2,500	20,000	2,000
5	30,000	3,000	20,000	3,000
6	25,000	3,000	20,000	3,000
8	25,000	3,000	20,000	3,000
10	22,300	3,000	16,000	3,000
12	18,600	3,000	13,500	3,000

Maximum depth of cut



= < D x 0.5

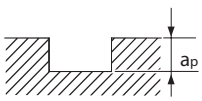
2 Flute carbide end mill

COUNTERBORING

HYP-ZDS

	GG, S55C SS400, GG25 ~750N/mm²		SCM SKS, SKT SKD		NAK55 HPMI, SKT SKD		Stainless Steel Sus 304 SKD		Aluminium Alloy		Aluminium Alloy Casting	
			< 30 HRC		< 38 HRC		< 45 HRC		A7075		< Si 13%	
Vc	60~80 m/min		40~60 m/min		30~50 m/min		20~40 m/min		80~200 m/min		40~150 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
4	5.950	360	4.950	295	4.000	240	3.200	155	12.500	915	9.550	575
5	4.800	360	3.950	295	3.200	240	2.550	155	10.000	915	7.650	575
6	4.000	360	3.300	295	2.700	240	2.150	155	8.400	915	6.400	575
7	3.400	360	2.800	295	2.300	240	1.850	155	7.200	915	5.500	575
8	3.000	360	2.450	295	2.000	240	1.600	155	6.350	915	4.750	575
9	2.650	360	2.200	295	1.800	240	1.450	155	5.600	915	4.200	575
10	2.400	360	2.000	295	1.600	240	1.300	155	5.000	915	3.800	575

Maximum depth of cut

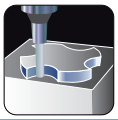


= < D x 0.5

MILLING CONDITIONS

4 flute square end / ball nose diamond coated carbide end mills

HYP-EMS-DIAMOND / EBM DIAMOND



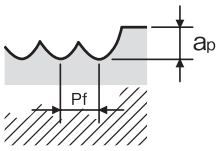
	Graphite		Green Ceramic Thermoset Plastic		Fibre Filler Plastic	
Vc	50 ~ 900 m/min		25 ~ 420 m/min		40 ~ 240 m/min	
Ø	**Speed (min⁻¹)**	**Fz (mm)**	**Speed (min⁻¹)**	**Fz (mm)**	**Speed (min⁻¹)**	**Fz (mm)**
2	40,000	0.025 ~ 0.05	20,000	0.025 ~ 0.05	11,000	0.025 ~ 0.05
3	40,000	0.025 ~ 0.05	16,000	0.025 ~ 0.05	10,500	0.025 ~ 0.05
4	40,000	0.025 ~ 0.05	16,000	0.025 ~ 0.05	10,500	0.025 ~ 0.05
5	40,000	0.025 ~ 0.05	15,000	0.025 ~ 0.05	10,000	0.025 ~ 0.05
6	36,000	0.050 ~ 0.10	12,500	0.050 ~ 0.10	9,000	0.040 ~ 0.08
8	32,000	0.050 ~ 0.10	12,000	0.050 ~ 0.10	8,000	0.050 ~ 0.10
10	28,000	0.075 ~ 0.12	11,500	0.075 ~ 0.12	7,000	0.075 ~ 0.12
12	24,000	0.075 ~ 0.12	11,000	0.075 ~ 0.12	6,000	0.075 ~ 0.12
16	19,000	0.075 ~ 0.12	8,750	0.075 ~ 0.12	4,750	0.075 ~ 0.12
20	15,000	0.075 ~ 0.12	7,000	0.075 ~ 0.12	3,800	0.075 ~ 0.12

(1) For high speed / feed milling reduce the depth of cut.
(2) Reduce speeds & feeds 30% for slotting > 0.5D.

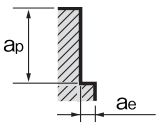
HYP-EMS-DIAMOND / EBM DIAMOND

	Aluminium Alloys		MMC		Copper Alloys	
Vc	50 ~ 2400 m/min		30 ~ 225 m/min		100 ~ 2000 m/min	
Ø	**Speed (min⁻¹)**	**Fz (mm)**	**Speed (min⁻¹)**	**Fz (mm)**	**Speed (min⁻¹)**	**Fz (mm)**
2	25,000	0.025 ~ 0.05	20,000	0.025 ~ 0.05	25,000	0.025 ~ 0.05
3	24,000	0.025 ~ 0.05	16,000	0.025 ~ 0.05	24,000	0.025 ~ 0.05
4	20,000	0.025 ~ 0.05	16,000	0.025 ~ 0.05	20,000	0.025 ~ 0.05
5	16,000	0.025 ~ 0.05	15,000	0.025 ~ 0.05	16,000	0.025 ~ 0.05
6	12,000	0.040 ~ 0.08	12,000	0.040 ~ 0.08	12,000	0.040 ~ 0.08
8	9,500	0.050 ~ 0.10	9,500	0.050 ~ 0.10	9,500	0.050 ~ 0.10
10	8,000	0.075 ~ 0.12	8,000	0.075 ~ 0.12	8,000	0.075 ~ 0.12
12	6,000	0.075 ~ 0.12	6,000	0.075 ~ 0.12	6,000	0.075 ~ 0.12
16	4,750	0.075 ~ 0.12	4,750	0.075 ~ 0.12	4,750	0.075 ~ 0.12
20	3,900	0.075 ~ 0.12	3,900	0.075 ~ 0.12	3,900	0.075 ~ 0.12

Dia	ap	pf
D < 3	0.02D	0.05D
D > 3	0.1D	0.2D



Dia	ap	ae
D < 3	0.5D	0.05D
D > 3	1D	0.1D



MILLING CONDITIONS

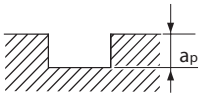
2 flute and 3 flute carbide end mills for Aluminium (including corner radius versions)

SLOTTING

HYP-EDS-55 / EDL-55 / ETS-55 / ETL-55 / AL-EDS / EDL / LS-EDS

	Aluminium Alloys		Copper Alloys	
Vc	150 m/min		75 m/min	
Ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
6	7,950	630	3,950	310
8	5,950	665	2,950	350
10	4,750	745	2,350	365
12	3,950	790	1,950	390
16	2,950	795	1,450	390
20	2,350	785	1,150	385
25	1,900	785	950	385

Maximum depth of cut



= < D x 1

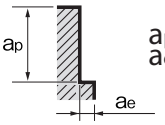
(1) Reduce speeds & feeds 20-30% for HYP-AL-EDL / HYP-EDL-55 (Long series).
and HYP-AL-LS-EDS (Long with neck).
(2) Increase speeds & feeds 30-40% for HYP-ETS-55.

SIDE MILLING

HYP-EDS-55 / EDL-55 / ETS-55 / ETL-55 / AL-EDS / EDL / LS-EDS

	Aluminium Alloys		Copper Alloys	
Vc	200 m/min		75 m/min	
Ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
6	10,500	830	3,950	310
8	7,950	890	2,950	350
10	6,350	995	2,350	365
12	5,300	1,050	1,950	390
16	3,950	1,050	1,450	390
20	3,150	1,050	1,150	385
25	2,250	1,050	950	385

Maximum depth of cut



ap=1.5D
ae=0.1D

(1) Reduce speeds & feeds 20-30% for HYP-AL-EDL / HYP-EDL-55 (Long series).
and HYP-AL-LS-EDS (Long with neck).
(2) Increase speeds & feeds 30-40% for HYP-ETS-55.

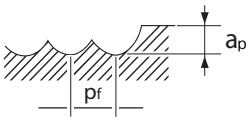
2 flute ball end carbide end mill for Aluminium

PROFILING

HYP-AL-LS-EBD

	Aluminium Alloys		Copper Alloy	
	A6061, A7075		C1100	
Vc	200 m/min		150 m/min	
ø	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)
3	21,200	1,550	15,900	1,150
4	15,900	1,550	11,900	1,150
5	12,750	1,575	9,500	1,150
6	10,600	1,600	7,950	1,150
8	7,950	1,950	5,950	1,450
10	6,350	1,750	4,750	1,300
12	5,300	1,650	3,950	1,200

Maximum depth of cut



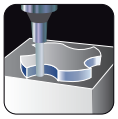
ap=0.1D

pf=0.2D

2 flute ball end carbide end mill for difficult materials

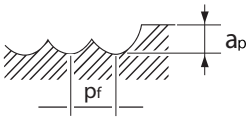
PROFILING

HYP-Ti-EBD



	Cast Iron		Mild Steels Carbon Steels		Tool Steels Ti (Annealed)		Pre-hardened / Die / Alloy Steels Titanium (treated & aged) Inconel				Hardened Steels	
			< 225 HB		< 30 HRC		< 38 HRC		< 45 HRC		< 55 HRC	
Vc	210 m/min		168 m/min		138 m/min		108 m/min		96 m/min		84 m/min	
ø	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)	Speed (min⁻¹)	Feed (mm/min.)
3	21,212	1,350	17,244	1,100	14,475	906	11,628	588	10,188	432	8,736	312
4	16,740	1,350	13,800	1,100	11,560	906	9,228	636	8,064	528	6,910	384
5	13,320	1,512	10,656	1,230	8,890	918	7,068	642	6,228	534	5,316	408
6	10,944	1,572	8,736	1,280	7,280	990	5,770	690	5,076	576	4,332	432
8	8,652	1,860	6,912	1,500	5,740	1,128	4,570	792	3,996	648	3,420	462
10	6,648	1,704	5,316	1,360	4,420	1,056	3,500	744	3,072	618	2,640	474
12	4,000	1,554	4,296	1,240	3,610	990	2,870	696	2,508	594	2,120	438

Maximum depth of cut



ap=0.1D

pf=0.2D

ap=0.05D

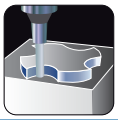
pf=0.1D

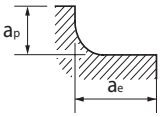
MILLING CONDITIONS

4 flute variable lead ball nose carbide endmill.

SIDE MILLING

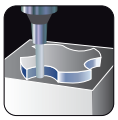
HYP-VG4-EBM

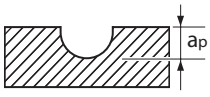


	Mild Steels Carbon Steels Cast Iron		400 Stainless Steels Alloy Steels		300 Stainless Steels Hardened Steel		PH Stainless Steels Hardened Steel		Hardened Steel		Titanium Alloys		Nickel Base Alloys	
	< 25 HRC		< 30 HRC		< 35 HRC		< 45 HRC		< 50 HRC		< 35 HRC		< 35 HRC	
Vc	120 ~ 150 m/min		90 ~120 m/min		60 ~ 110 m/min		60 ~ 75 m/min		50 ~ 70 m/min		50 ~ 75 m/min		30 ~ 45 m/min	
Ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	14,300	1,100	11,100	640	9,000	480	7,200	380	6,400	360	6,600	330	4,000	250
4	10,700	1,160	8,400	720	6,800	530	5,400	420	4,800	410	4,900	340	3,000	290
5	8,600	1,170	6,700	780	5,400	520	4,300	420	3,800	420	3,900	350	2,400	290
6	7,200	1,210	5,600	810	4,500	550	3,600	440	3,200	450	3,300	380	2,000	310
8	5,400	1,180	4,200	770	3,400	530	2,700	430	2,400	410	2,500	370	1,500	290
10	4,300	1,140	3,300	750	2,700	520	2,200	420	1,900	400	2,000	350	1,200	290
12	3,600	1,140	2,800	730	2,300	510	1,800	400	1,600	400	1,600	350	1,000	280
Maximum depth of cut			ap=1.5D ae=0.5D				ap=1.25D ae=0.4D		ap=1.25D ae=0.2D		ap=1.25D ae=0.4D		ap=1D ae=0.2D	

SLOTTING

HYP-VG4-EBM

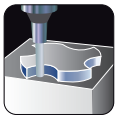


	Mild Steels Carbon Steels Cast Iron		400 Stainless Steels Alloy Steels		300 Stainless Steels Hardened Steel		PH Stainless Steels Hardened Steel		Hardened Steel		Titanium Alloys		Nickel Base Alloys	
	< 25 HRC		< 30 HRC		< 35 HRC		< 45 HRC		< 50 HRC		< 35 HRC		< 35 HRC	
Vc	100 ~ 120 m/min		75 ~100 m/min		50 ~ 85 m/min		50 ~ 60 m/min		45 ~ 55 m/min		40 ~ 60 m/min		20 ~ 30 m/min	
Ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	11,700	900	9300	540	7200	390	5800	270	5300	300	5300	270	2700	170
4	8,800	960	7000	600	5400	440	4400	290	4000	340	4000	290	2000	190
5	7,000	950	5600	640	4300	430	3500	310	3200	370	3200	300	1600	190
6	5,800	970	4700	680	3600	460	2900	330	2700	380	2700	310	1300	200
8	4,400	960	3500	640	2700	440	2200	310	2000	340	2000	290	1000	190
10	3,500	920	2800	620	2100	410	1800	310	1600	340	1600	300	800	190
12	2,900	920	2300	600	1800	410	1500	300	1300	330	1300	290	700	200
Maximum depth of cut			= < D x 1				= < D x 0.75		= < D x 0.5		= < D x 0.5		= < D x 0.2	

High feed side milling carbide end mill

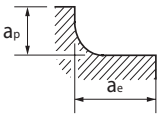
HIGH FEED SIDE MILLING

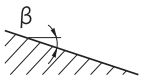
HYP-HS-CRE



	Cast Iron		SKT / SKD NAK55 / HPM1		SUS30 / SKD NAK80 / HPM50		Hardened Steels			
			< 38 HRC		< 45 HRC		< 55 HRC		< 60HRC	
Vc	m/min		m/min		m/min		m/min		m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
6 X R 1,50	5,300	6,300	4,250	4,600	3,700	4,000	2,650	2,600	1,600	1,050
8 X R 2,00	4,000	6,300	3,200	4,600	2,800	4,000	2,000	2,600	1,200	1,050
10 X R 2,00	3,200	6,300	2,550	4,600	2,250	4,000	1,600	2,600	955	1,050
12 X R 3,00	2,650	6,300	2,100	4,600	1,850	4,000	1,350	2,600	795	1,050

Maximum depth of cut





ap	ae
0.1 x R	0.3D

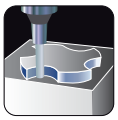
Dia	ap	ae
R ≤ 2	0.1 x R	0.3D
2 < R	0.2 mm	0.3D

Dia	ap	ae
R ≤ 2	0.05 x R	0.3D
2 < R	0.1 mm	0.3D

2 flute ball nose carbide end mill (low torque / better surface finish / longer life)

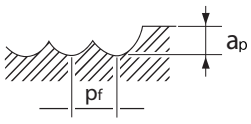
PROFILING

HYP-SB-EBD



	Copper Alloy				Pre Hardened / Hardened Steels											
					< 35 HRC				< 42 HRC				< 55 HRC			
Vc	300 m/min				280 m/min				260 m/min				240 m/min			
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**ap (mm)**	**pf (mm)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**ap (mm)**	**pf (mm)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**ap (mm)**	**pf (mm)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**ap (mm)**	**pf (mm)**
3	31,847	2,866	0.15	0.60	29,724	2,675	0.15	0.60	27,601	2,484	0.15	0.60	25,478	2,293	0.15	0.60
4	23,885	2,866	0.20	0.80	22,293	2,675	0.20	0.80	20,701	2,484	0.20	0.80	19,108	2,293	0.20	0.80
5	19,108	2,866	0.25	1.00	17,834	2,675	0.25	1.00	16,561	2,484	0.25	1.00	15,287	2,293	0.25	1.00
6	15,924	2,866	0.30	1.20	14,862	2,675	0.30	1.20	13,800	2,484	0.30	1.20	12,739	2,293	0.30	1.20
8	11,943	2,866	0.40	1.60	11,146	2,675	0.40	1.60	10,350	2,484	0.40	1.60	9,554	2,293	0.40	1.60
10	9,664	2,866	0.50	2.00	8,917	2,675	0.50	2.00	8,280	2,484	0.50	2.00	7,643	2,293	0.50	2.00
12	7,962	2,866	0.60	2.40	7,431	2,675	0.60	2.40	6,900	2,484	0.60	2.40	6,369	2,293	0.60	2.40

Maximum depth of cut

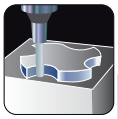


MILLING CONDITIONS

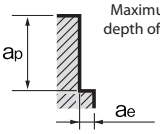
3 flute corner radius endmill for pocket milling

SIDE MILLING

HYP-AL-PKE, AL-PKE-DLC



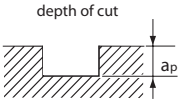
	Aluminium alloy A7075				Aluminium Alloy Casting Die Casting				Magnesium Alloy Copper Alloy			
	Regular Milling		High Speed Milling		Regular Milling		High Speed Milling		Regular Milling		High Speed Milling	
Vc	200 m/min		500 m/min		200 m/min		300 m/min		100 m/min		200 m/min	
ø	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)
6	10600	1910	26550	4780	10600	1910	15900	2860	5300	950	10600	1910
8	7950	1910	19900	4780	7950	1910	11950	2870	4000	960	7950	1910
10	6350	1910	15900	4770	6350	1910	9550	2870	3200	960	6350	1910
12	5300	1910	13250	4770	5300	1910	7950	2860	2650	950	5300	1910
16	4000	1920	9950	4780	4000	1920	5950	2860	2000	960	4000	1920
Maximum depth of cut	ap=1D ae=0.2D		ap=1D ae=0.1D		ap=1D ae=0.2D		ap=1D ae=0.1D		ap=1D ae=0.2D		ap=1D ae=0.1D	



SLOTTING

HYP-AL-PKE, AL-PKE-DLC

	Aluminium alloy A7075				Aluminium Alloy Casting Die Casting				Magnesium Alloy Copper Alloy			
	Regular Milling		High Speed Milling		Regular Milling		High Speed Milling		Regular Milling		High Speed Milling	
Vc	200 m/min		500 m/min		200 m/min		300 m/min		100 m/min		200 m/min	
ø	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)	Speed (min^{-1})	Feed (mm/min.)
6	10600	1270	26550	3190	10600	1270	15900	1910	5300	640	10600	1270
8	7950	1430	19900	3580	7950	1430	11950	2150	4000	720	7950	1430
10	6350	1520	15900	3820	6350	1520	9550	2290	3200	770	6350	1520
12	5300	1590	13250	3980	5300	1590	7950	2390	2650	800	5300	1590
16	4000	1440	9950	3580	4000	1440	5950	2140	2000	720	4000	1440
Maximum depth of cut	= < D x 0.5		= < D x 0.25		= < D x 0.5		= < D x 0.25		= < D x 0.5		= < D x 0.25	



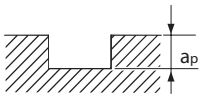
4 flute variable lead carbide endmill

SLOTTING

HYP-VG4-EMS / LN-VG4-EMS

	Low Carbon / Alloy / Tool Steels						Cast Iron		Stainless Steel		Titanium		Nickel Alloy		Aluminium Alloy	
			< 30 HRC		< 40 HRC		< 180 HB									
Vc	100 m/min		90 m/min		80 m/min		100 m/min		70 m/min		60 m/min		30 m/min		150 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	10600	760	9550	610	8500	510	10600	640	7450	480	6350	410	2100	170	15900	1270
4	7950	800	7150	660	6350	510	7950	640	5550	440	4750	380	1600	140	11950	1200
5	6350	840	5750	720	5100	610	6350	760	4450	390	3800	330	1250	130	9550	1260
6	5300	1060	4750	860	4250	680	5300	850	3700	370	3200	320	1050	130	7950	1590
8	4000	880	3600	720	3200	640	4000	800	2800	390	2400	340	800	130	5950	1430
10	3200	830	2850	680	2550	560	3200	700	2250	360	1900	300	650	130	4750	1330
12	2650	800	2400	670	2100	550	2650	690	1850	370	1600	320	550	120	4000	1200
16	2000	600	1800	500	1600	420	2000	520	1400	360	1200	310	400	90	3000	900
20	1600	510	1450	440	1250	350	1600	450	1100	310	950	270	300	70	2400	770

Maximum depth of cut



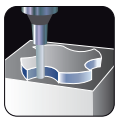
= < D x 1

ap = 0.5

(1) The above milling coditions are guideline based on an overhang length of 3 X D
(2) Reduce speeds & feeds 20-30% for HYP-LN-VG4-EMS (Long with neck).

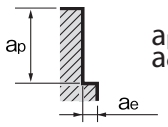
SIDE MILLING

HYP-VG4-EMS / LN-VG4-EMS



	Low Carbon / Alloy / Tool Steels						Cast Iron		Stainless Steel		Titanium		Nickel Alloy		Aluminium Alloy	
			< 30 HRC		< 40 HRC		< 180 HB									
Vc	150 m/min		130 m/min		110 m/min		130 m/min		110 m/min		100 m/min		40 m/min		200 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	15900	1910	13800	1100	11650	840	13800	990	11650	930	10600	850	3200	260	21200	3390
4	11950	2060	10350	1240	8750	880	10350	1040	8750	1050	7950	950	2400	240	15900	3180
5	9550	2290	8300	1330	7000	980	8300	1160	7000	1260	6350	1140	1900	230	12750	3570
6	7950	2390	6900	1660	5850	1170	6900	1380	5850	1170	5300	1060	1600	260	10600	3820
8	5950	2020	5150	1650	4400	1140	5150	1340	4400	1140	4000	1040	1200	220	7950	4130
10	4750	1900	4150	1490	3500	980	4150	1160	3500	1120	3200	1020	950	190	6350	4060
12	4000	1760	3450	1380	2900	810	3450	970	2900	1040	2650	950	800	210	5300	4030
16	3000	1440	2600	1140	2200	700	2600	830	2200	880	2000	800	600	190	4000	3840
20	2400	1150	2050	900	1750	560	2050	660	1750	840	1600	770	500	200	3200	3070

Maximum depth of cut



ap=1.5D
ae=0.2D

(1) The above milling coditions are guideline based on an overhang length of 3 X D
(2) Reduce speeds & feeds 20-30% for HYP-LN-VG4-EMS (Long with neck).

MILLING CONDITIONS

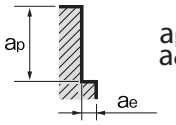
5 flute with chipbreaker for side milling endmill upto 4 x D

SIDE MILLING

HYP-CHB-EML

	Low Carbon / Alloy / Tool Steels						Cast Iron		Stainless Steel		Titanium		Nickel Alloy		Aluminium Alloy	
			< 30 HRC		< 40 HRC		< 180 HB									
Vc	160 m/min		150 m/min		140 m/min		150 m/min		110 m/min		100 m/min		40 m/min		250 m/min	
ø	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**	**Speed (min^{-1})**	**Feed (mm/min.)**
6	7450	2610	6900	2170	6350	1750	6900	1900	5300	1540	4750	1380	1050	290	10600	4770
8	5550	1940	5150	1620	4750	1310	5150	1420	4000	1160	3600	1040	800	220	7950	3580
10	4450	1780	4150	1560	3800	1330	4150	1450	3200	1040	2850	930	650	230	6350	3180
12	3700	1480	3450	1290	3200	1120	3450	1210	2650	860	2400	780	550	190	5300	2650
14	3200	1440	2950	1250	2750	1100	2950	1180	2250	840	2050	770	450	180	4550	2730
16	2800	1260	2600	1110	2400	960	2600	1040	2000	750	1800	680	400	160	4000	2400
18	2500	1250	2300	1090	2100	950	2300	1040	1750	740	1600	680	350	160	3550	2490
20	2250	1130	2050	970	1900	860	2050	920	1600	680	1450	620	300	140	3200	2240

Maximum depth of cut

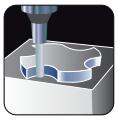


ap=4D
ae=0.05D

4 flute variable lead carbide endmill

MILLING

HYP-HI-EMS / (W)EMS / CR-HI-(W)EMS / CR-HD-(W)EMS



	Low Carbon / Alloy / Tool Steel									Cast Iron			Stainless Steel			Aluminium / Mg			Titanium		
	500 ~ 800 N/mm² HB 150-250			800 ~ 100 N/mm² HRC 20~30			1000 ~ 1300 N/mm² HRC 30~40			> HB 180			< 20 HRC						< 50 HRC		
Vc	160 m/min			120 m/min			100 m/min			140 m/min			50 m/min			180 m/min			65 m/min		
Ø	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**	**FZ**	**S=n**	**F=Vf**
4	0,035	12,730	1,790	0,03	9,550	1,150	0,03	7,960	960	0,035	11,150	1,570	0,03	3,980	480	0,035	14,330	2,010	0,025	5,180	520
6	0,04	8,490	1,360	0,035	6,370	900	0,035	5,310	750	0,04	7,430	1,190	0,035	2,660	380	0,04	9,550	1,530	0,027	3,450	380
8	0,07	6,370	1,790	0,065	4,780	1,250	0,065	3,980	1,040	0,7	5,580	1,570	0,065	1,990	520	0,07	7,170	2,010	0,031	2,590	330
10	0,1	5,090	2,040	0,08	3,820	1,230	0,08	3,190	1,030	0,1	4,460	1,790	0,08	1,600	520	0,1	5,730	2,300	0,038	2,070	320
12	0,12	4,240	2,040	0,1	3,190	1,280	0,1	2,660	1,070	0,12	3,720	1,790	0,1	1,330	540	0,12	4,780	2,300	0,045	1,730	320
16	0,13	3,180	1,660	0,12	2,390	1,150	0,12	1,990	960	0,13	2,790	1,460	0,12	1,000	480	0,13	3,590	1,870	0,052	1,300	280
20	0,15	2,550	1,530	0,12	1,910	920	0,12	1,600	770	0,15	2,230	1,340	0,12	800	390	0,15	2,870	1,730	0,059	1,040	250

ae = width of cut / ap = depth of cut

When changing milling type from slotting to side milling please reduce speeds and feeds using the coefficients below.

ap	Coe.
0.5	**1.0**
1.0	0.7
1.5	0.5
2.0	0.3

ae = 1 x D

ap	Coe.
0.5	1.2
1.0	**1.0**
1.5	0.7
2.0	0.5

ae = 0.5 x D

ap	Cow.
0.5	1.3
1.0	1.2
1.5	**1.0**
2.0	0.8

ae = 0.2 x D

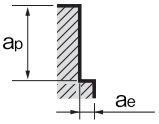
The above stated milling conditions are based on using the RED marked parameters

MILLING CONDITIONS

2 flute PCD endmill

SIDE MILLING

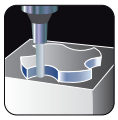
HYP-EDS-PCD / LS-EDS-PCD

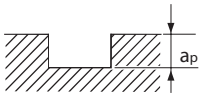
	Aluminium		Graphite		CFRP	
Vc	250 m/min		400 m/min		200 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	26,550	1,060	42,450	3,400	21,200	850
4	19,900	1,200	31,850	3,200	15,900	950
5	15,900	1,600	25,450	3,550	12,750	1,000
6	13,250	1,600	21,200	3,400	10,600	1,050
8	9,950	1,600	15,900	3,200	7,950	1,050
10	7,950	1,600	12,750	3,050	6,350	1,050
12	6,650	1,600	10,600	3,200	5,300	1,050
Maximum depth of cut	 ap=1D ae=0.3D		ap=1D ae=0.1D		ap=1D ae=0.2D	

Reduce speeds & feeds 30-40% for HYP-LS-EDS-PCD.

SLOTTING

HYP-EDS-PCD / LS-EDS-PCD



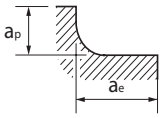
	Aluminium		Graphite		CFRP	
Vc	250 m/min		400 m/min		200 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	26550	1120	37150	1860	15900	640
4	19900	1120	27850	1950	11950	600
5	15900	1120	22300	1780	9550	550
6	13250	1120	18550	1800	7950	500
8	9950	1120	13950	1650	5950	450
10	7950	1120	11150	1600	4750	450
12	6650	1120	9300	1650	4000	500
Maximum depth of cut	 = < D x 0.5D					

Reduce speeds & feeds 30-40% for HYP-LS-EDS-PCD.

2 flute PCD ball nose endmill

SIDE MILLING

HYP-EBD-PCD / LS-EBD-PCD

	Aluminium		Graphite		CFRP	
Vc	250 m/min		450 m/min		400 m/min	
ø	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**	**Speed (min⁻¹)**	**Feed (mm/min.)**
3	26550	2150	47750	2400	42450	2100
4	19900	2400	35800	2500	31850	2250
5	15900	2550	28650	2850	25450	2550
6	13250	2650	23850	2600	21200	2350
8	9950	2400	17900	2150	15900	1900
10	7950	2250	14300	1850	12750	1650
12	6650	2150	11950	1650	10600	1500
Maximum depth of cut		ap=0.1D ae=0.2D		ap=0.3D ae=0.1D		ap=0.03D ae=0.6D

Reduce speeds & feeds 30-40% for HYP-LS-EBD-PCD.

MILLING CONDITIONS

HYP-VG7-EMS

SIDE MILLING

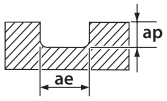
	Mild Steels Carbon Steels Cast Iron			Tool Steel Alloy Steel <30HRC			Stainless steel			Titanium			Inconel		
	Ap = up to Max LOC, Ae= 0.15xD			Ap = up to Max LOC, Ae= 0.15xD			Ap = up to Max LOC, Ae= 0.1xD			Ap = up to Max LOC, Ae= 0.1xD			Ap = up to Max LOC, Ae= 0.1xD		
Vc	120 m/min			120 m/min			120 m/min			100 m/min			50 m/min		
Ø	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)
10	3820	2675	0.100	3820	2675	0.100	3180	1560	0.070	3180	1560	0.070	1590	780	0.070
12	3180	2450	0.110	3180	2450	0.110	2650	1575	0.085	2650	1575	0.085	1330	700	0.075
16	2390	2010	0.120	2390	2010	0.120	1990	1395	0.100	1990	1395	0.100	990	555	0.080
20	1910	1740	0.130	1910	1740	0.130	1590	1335	0.120	1590	1335	0.120	800	505	0.090

EPL-HP-5FL

SLOTTING

		Steels St-52 • C45 • GG-25			Hardened steels ~35 HRC 42CrMo4			Hardened steels ~45 HRC 1.2379			Stainless steel 1.4301			Titanium Ti6AlV4		
Vc		120 m/min			120 m/min			70 m/min			60 m/min			50 m/min		
Ø	Z	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)
6	5	6.369	1.433	0,045	6.369	1.433	0,045	3.715	836	0,045	3.185	650	0,035	2.654	464	0,035
8	5	4.775	1.432	0,060	4.775	1.432	0,060	2.785	836	0,060	2.387	477	0,040	1.989	398	0,040
10	5	3.820	1.432	0,075	3.820	1.432	0,075	2.228	836	0,075	1.910	477	0,050	1.592	398	0,050
12	5	3.183	1.432	0,090	3.183	1.432	0,090	1.857	836	0,090	1.592	477	0,060	1.326	398	0,060
16	5	2.387	1.432	0,120	2.387	1.432	0,120	1.393	836	0,120	1.194	477	0,080	995	398	0,080
20	5	1.910	1.432	0,150	1.910	1.432	0,150	1.114	836	0,150	955	477	0,100	796	398	0,100

ap x d
F(fz)
correction



ae
1xd

ap	Fakt.
0,5	**1,0**
1,0	0,7
1,5	0,5
2,0	0,3

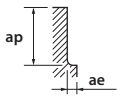
The above stated application data are as per **RED** marked parameters.

EPL-HP-5FL

SIDE MILLING

		Steels St-52 • C45 • GG-25			Hardened steels ~35 HRC 42CrMo4			Hardened steels ~45 HRC 1.2379			Stainless steel 1.4301			Titanium Ti6AlV4		
Vc		140 m/min			140 m/min			80 m/min			70 m/min			60 m/min		
Ø	Z	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)	S (min^{-1})	F (mm/min)	fz (mm)
6	5	7.431	4.459	0,120	7.431	4.459	0,120	4.246	2.548	0,120	3.715	1.274	0,060	3.185	955	0,060
8	5	5.570	4.456	0,160	5.570	4.456	0,160	3.183	2.546	0,160	2.785	1.114	0,080	2.387	955	0,080
10	5	4.456	4.456	0,200	4.456	4.456	0,200	2.546	2.546	0,200	2.228	1.114	0,100	1.910	955	0,100
12	5	3.714	4.456	0,240	3.714	4.456	0,240	2.122	2.546	0,240	1.857	1.114	0,120	1.592	955	0,120
16	5	2.785	4.456	0,320	2.785	4.456	0,320	1.592	2.546	0,320	1.393	1.114	0,160	1.194	955	0,160
20	5	2.228	4.456	0,400	2.228	4.456	0,400	1.273	2.546	0,400	1.114	1.114	0,200	955	955	0,200

ap x d
F(fz)
correction



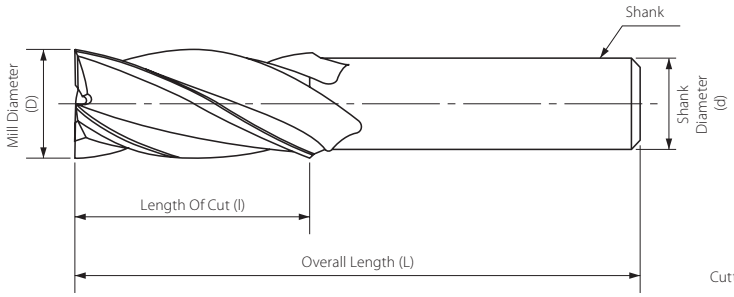
ae
0,2xd

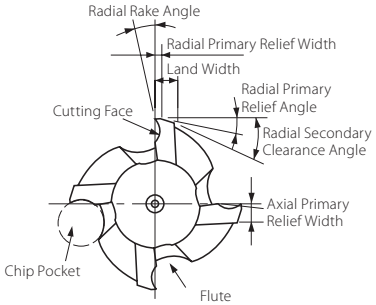
ap	Fakt.
0,5	1,3
1	1,2
1,5	**1,0**
2	0,8

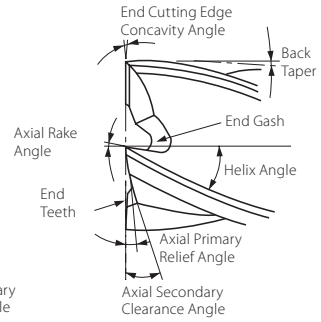
ae
0,5xd

ap	Fakt.
0,5	1,2
1,0	**1,0**
1,5	0,7
2,0	0,5

The above stated application data are as per **RED** marked parameters.

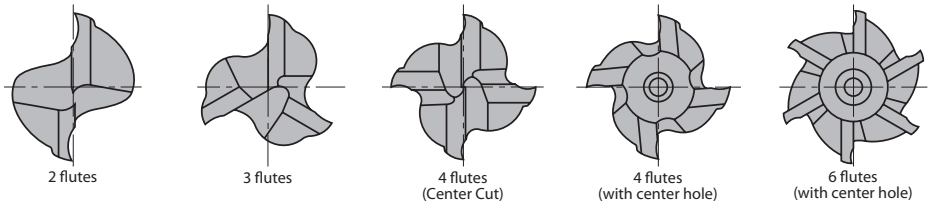






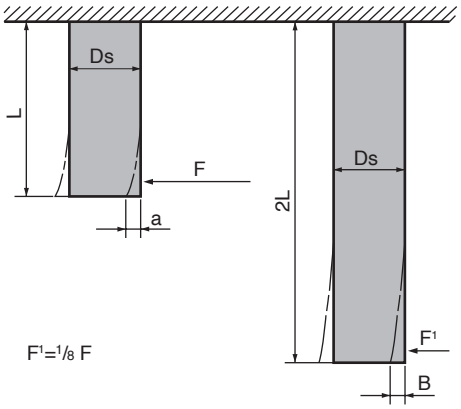
Number of flutes

The number of flutes should be determined by the work material, dimensions of the work piece and milling conditions. In general, an end mill with a small number of flutes and large chip room is used for roughing, and an end mill with a large number of flutes is used for finishing.



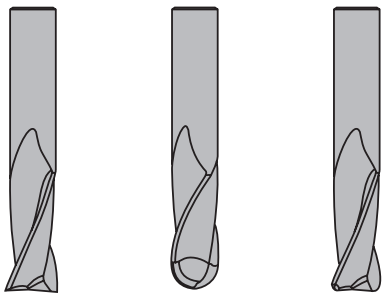
Length of cut

The shorter the end mill, the smaller the deflection and the stronger the rigidity. Because rigidity varies in proportion to length of cut by a factor to the power of 3 (for example, when the length of cut doubles, the rigidity decreases to 1/8), it is necessary to keep the length of cut as short as possible.



End profile

Stocked end profiles are typically square end ball nose and corner radius.



Disclaimer

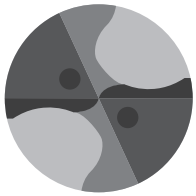
OSG UK Ltd reserves the right to alter any dimensions, coatings, or tool specifications as depicted in the literature above upon requirement. OSG UK Ltd is not obliged to notify clients of these changes at the time of alteration.

HARDNESS / TENSILE STRENGTH CONVERSION

N/mm²(MPa)	Brinel	Rockwell	Rockwell	Shore Scale		Tensile Strength	
HV	HB	HRB	HRC		Tons / sq.in	Kg / sq.mm	N/mm2 (MPa)
965			70	106			
936			69	103			
908			68	100			
880			67	97			
853			66	95			
826			65	93			
799			64	91			
773			63	89			
747			62	87			
718	682		61	64	147	232	
687	653		59	82	142	224	
660	627		58.5	81	137	216	2220
633	601		57	78	132	208	2110
608	578		56	76	127	200	2030
584	555		55	75	122	192	
562	534		53.5	72	117	179	1845
541	541		52	70	112	176	1775
521	495		51	68	108	170	1700
502	477		50	67	105	165	1630
485	461		48	65	101	160	1485
457	444		47	63	98	156	
452	429		45.5	61	95	150	1455
437	415		44.5	59	92	145	1410
422	401		42	55	88	139	1350
408	388		41	54	85	134	1320
395	375		40	52	82	130	
382	363		39	51	80	126	1220
371	352		37.5	50	77	122	1190
359	341		36.5	49	75	118	
348	331		35.5	48	73	114	1120
338	321		34	45	71	111	1095
327	311		33	44	68	107	
318	302		32	43	66	104	1030
308	293		31	42	64	101	
300	285		29.5	40	63	99	965
292	277		28.5	38	61	96	930
283	269		27	38	59	93	905
276	262		26	37	56	91	880
268	255		25	37	56	69	855
261	248		24	36	55	87	
254	241		23.5	35	53	84	
247	235		21.5	34	51	81	
241	229		20.5	33	50	79	770
235	223	99.9	19.5	33	49	77	755
228	217	98.7		32	48	76	
223	212	98		32	46	73	
218	207	97		31	45	71	
213	202	95.5		31	44	70	
207	197	95		30	43	68	

N/mm²(MPa)	Brinel	Rockwell	Rockwell	Shore Scale		Tensile Strength	
HV	HB	HRB	HRC		Tons / sq.in	Kg / sq.mm	N/mm2 (MPa)
202	192	94		30	42	66	
197	187	93		29	41	65	
192	182	92		29	40	64	
188	179	91		28	40	62	
183	174	90		28	39	60	305
179	170	88		27	39	57	
175	166	88		26	37	55	
172	163	87		26	36	55	
167	169	85.5		25	35	56	280
164	156	84		25	34	54	
161	153	84		25	34	52	
157	149	82		24	33	51	
154	146	81		23	33	55	
151	143	81		23	32	49	270
147	140	79		22	31	49	
144	137	78		22	31	48	
141	134	76		21	30	48	255
138	131	74		20	30	47	
135	126	73		20	29	47	
133	126	72			28	46	
131	124	72			28	45	
127	121	70			27	44	
124	118	68			27	43	
122	116	67			26	43	
120	114	66			26	41	
110	112	64			26	41	
115	109	64			25	40	
113	107	61			25	40	
111	105	61			24	39	
108	103				24	39	

HY-PRO



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Tool specifications subject to change without notice

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