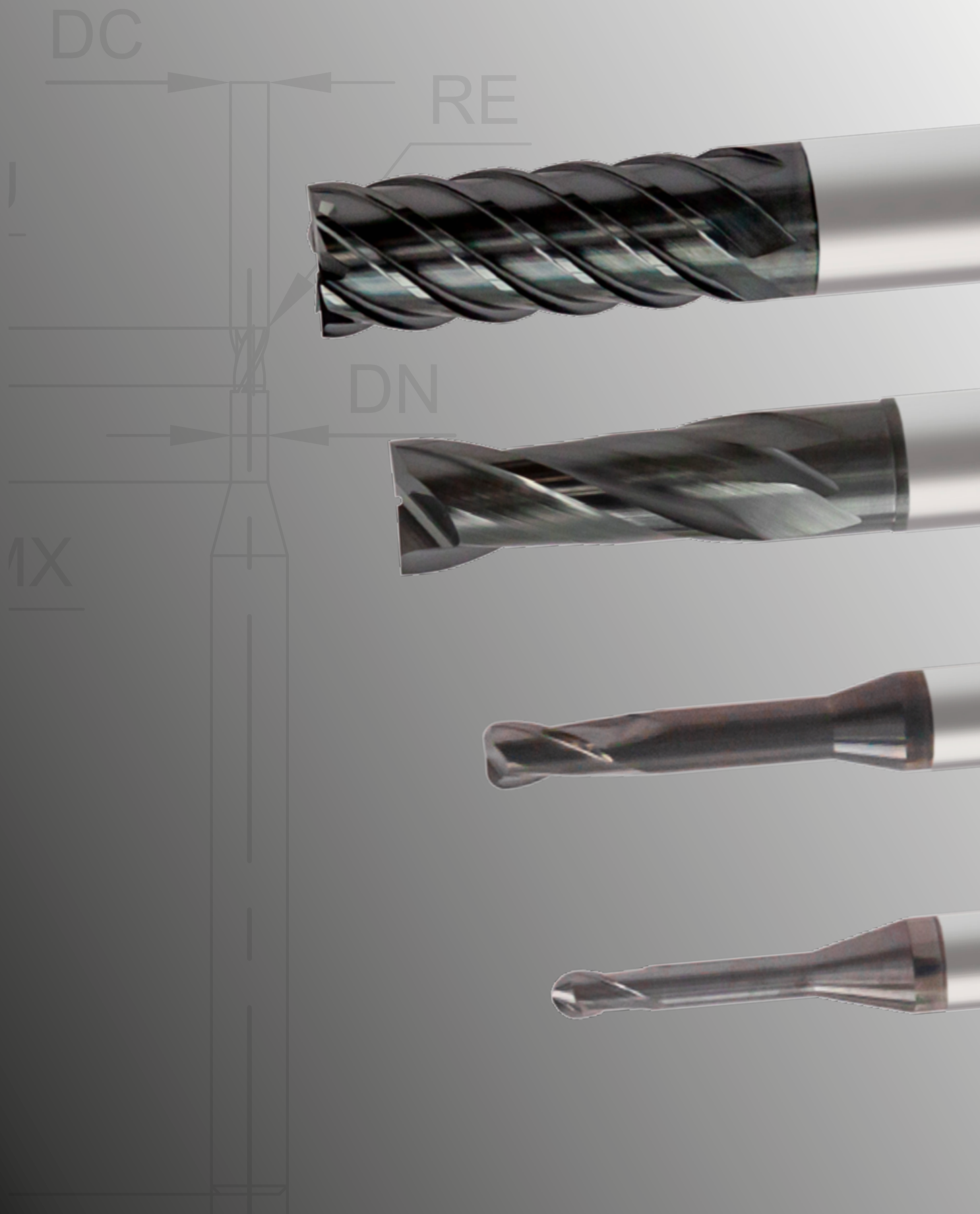


PULSAR **DMX**

Designed for high speed
cutting of pre-hardened
steels up to HRc55

**EUROPA
TOOL**

Clarkson



2 FLUTE END MILLS

Code	Item	Description	Page No.
116365		Standard Length ø0.2mm - 20.0mm	P.3-4
118365		Long Length ø1.0mm - 12.0mm	P.5-7
108365		Standard Length Corner Radius ø2.0mm - 16.0mm	P.8
120365		Extended Neck ø0.4mm - 6.0mm	P.9-10
110365		Extended Neck Corner Radius ø0.2mm - 10.0mm	P.11-15
100365		Standard Length Ball Nose ø0.1mm - 20.0mm	P.17-18
102365		Extended Neck Ball Nose ø0.2mm - 12.0mm	P.19-20

4 FLUTE END MILLS

104365		Standard Length Heavy Cut ø1.0mm - 20.0mm	P.22
122365		Standard Length ø1.0mm - 20.0mm	P.21
124365		Long Length ø1.0mm - 25.0mm	P.23-24
112365		Standard Length Corner Radius ø3.0mm - 16.0mm	P.25-26
126365		Extended Neck ø1.0mm - 10.0mm	P.31
114365		Extended Neck Corner Radius ø1.0mm - 12.0mm	P.27-30

6 FLUTE END MILLS

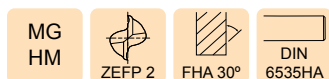
106365		Standard Length 45° Helix ø6.0mm - 20.0mm	P.16
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ROUGHING END MILLS

167123 167323		Short Length Corner Radius ø6.0mm - 20.0mm	P.32
168123 168323		Long Length Corner Radius ø6.0mm - 20.0mm	P.33
169123 169323		Extended Neck Corner Radius ø6.0mm - 20.0mm	P.34
		Cutting Data	P.35-60



STANDARD LENGTH



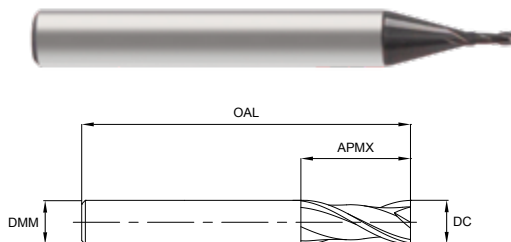
Series No. 116365

► cutting conditions : p.46-49

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Sharp edge geometry at end tooth increases cutting performance.



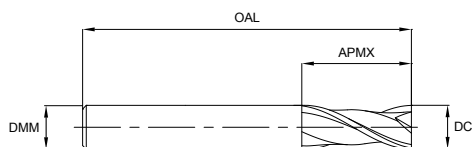
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1163650020	0.2	4	0.4	40
1163650030	0.3	4	0.6	40
1163650040	0.4	4	0.8	40
1163650050	0.5	4	1.0	40
1163650060	0.6	4	1.2	40
1163650070	0.7	4	1.4	40
1163650080	0.8	4	1.6	40
1163650090	0.9	4	1.8	40
1163650100	1.0	6	2.5	50
1163650120	1.2	6	3.0	50
1163650150	1.5	6	4.0	50
1163650200	2.0	6	6.0	50
1163650250	2.5	6	7.0	50
1163650300	3.0	6	8.0	50
1163650350	3.5	6	10.0	50
1163650400	4.0	6	10.0	50
1163650450	4.5	6	14.0	50
1163650500	5.0	6	15.0	60
1163650600	6.0	6	15.0	60

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
≤ Ø6.0	0.00 / -0.012	h6
> Ø6.0	0.00 / -0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●		○	●	●								●	○
○ Secondary																



STANDARD LENGTH



Series No. 116365

► cutting conditions : p.46-49

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Sharp edge geometry at end tooth increases cutting performance.

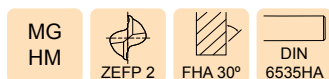
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1163650650	6.5	8	18.0	60
1163650800	8.0	8	20.0	70
1163650850	8.5	10	22.0	70
1163650900	9.0	10	22.0	70
1163650950	9.5	10	24.0	70
1163651000	10.0	10	25.0	75
1163651050	10.5	12	26.0	75
1163651100	11.0	12	30.0	75
1163651200	12.0	12	30.0	80
1163651300	13.0	12	35.0	100
1163651400	14.0	14	35.0	100
1163651401	14.0	16	35.0	100
1163651500	15.0	16	38.0	100
1163651600	16.0	16	40.0	100
1163652000	20.0	20	45.0	100

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
≤ ø6.0	0.00 / -0.012	h6
> ø6.0	0.00 / -0.015	

ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary	○	○	●		○	●	●								●	○



LONG LENGTH

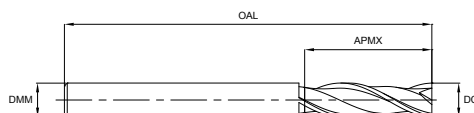


Series No. 118365

► cutting conditions : p.50

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRc55.



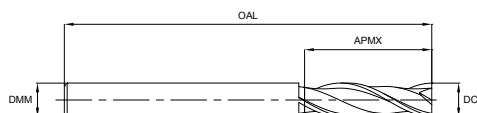
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1183650100	1.0	6	3.0	60
1183650101	1.0	6	4.0	60
1183650102	1.0	6	6.0	60
1183650103	1.0	6	8.0	60
1183650104	1.0	6	10.0	60
1183650150	1.5	6	6.0	60
1183650151	1.5	6	8.0	60
1183650152	1.5	6	10.0	60
1183650153	1.5	6	12.0	60
1183650154	1.5	6	16.0	60
1183650200	2.0	6	8.0	60
1183650201	2.0	6	10.0	60
1183650202	2.0	6	12.0	60
1183650203	2.0	6	16.0	60
1183650250	2.5	6	16.0	60
1183650300	3.0	6	10.0	70
1183650301	3.0	6	12.0	70
1183650302	3.0	6	16.0	70
1183650303	3.0	6	20.0	70
1183650304	3.0	6	26.0	70

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



LONG LENGTH



Series No. 118365

► cutting conditions : p.50

Coating and geometry designed for outstanding cutting ability and wear resistance.
Excellent performance in pre-hardened steels and alloy steels <HRc55.

EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1183650400	4.0	6	12.0	70
1183650401	4.0	6	16.0	70
1183650402	4.0	6	20.0	70
1183650403	4.0	6	26.0	70
1183650404	4.0	6	30.0	70
1183650500	5.0	6	20.0	70
1183650501	5.0	6	25.0	70
1183650502	5.0	6	30.0	80
1183650503	5.0	6	40.0	100
1183650600	6.0	6	15.0	60
1183650601	6.0	6	15.0	80
1183650602	6.0	6	20.0	70
1183650603	6.0	6	20.0	90
1183650604	6.0	6	25.0	75
1183650605	6.0	6	30.0	80
1183650606	6.0	6	30.0	100
1183650607	6.0	6	30.0	150
1183650608	6.0	6	35.0	90
1183650609	6.0	6	40.0	90
1183650610	6.0	6	45.0	150

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



LONG LENGTH

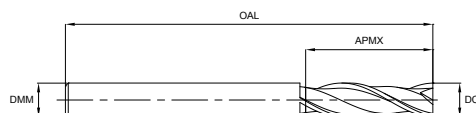
MG
HM

Series No. 118365

► cutting conditions : p.50

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRc55.



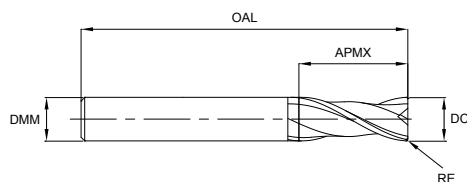
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1183650800	8.0	8	25.0	80
1183650801	8.0	8	30.0	80
1183650802	8.0	8	35.0	90
1183650803	8.0	8	40.0	90
1183650804	8.0	8	40.0	120
1183650805	8.0	8	45.0	100
1183650806	8.0	8	50.0	100
1183651000	10.0	10	30.0	80
1183651001	10.0	10	30.0	100
1183651002	10.0	10	35.0	90
1183651003	10.0	10	40.0	90
1183651004	10.0	10	40.0	120
1183651005	10.0	10	45.0	100
1183651006	10.0	10	50.0	100
1183651007	10.0	10	60.0	110
1183651200	12.0	12	35.0	90
1183651201	12.0	12	40.0	100
1183651202	12.0	12	45.0	130
1183651203	12.0	12	50.0	100
1183651204	12.0	12	55.0	110
1183651205	12.0	12	60.0	110

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



STANDARD LENGTH CORNER RADIUS

MG
HM

Series No. 108365

► cutting conditions : p.40

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRc55.

EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1083650200	2.0	0.5	6	6.0	50
1083650300	3.0	0.5	6	8.0	60
1083650400	4.0	0.5	6	10.0	70
1083650500	5.0	0.5	6	13.0	90
1083650600	6.0	0.5	6	15.0	60
1083650601	6.0	1.0	6	15.0	60
1083650800	8.0	0.5	8	20.0	70
1083650801	8.0	1.0	8	20.0	70
1083650802	8.0	2.0	8	20.0	100
1083651000	10.0	0.5	10	25.0	100
1083651001	10.0	1.0	10	25.0	100
1083651002	10.0	2.0	10	25.0	100
1083651200	12.0	0.5	12	30.0	110
1083651201	12.0	1.0	12	30.0	110
1083651202	12.0	2.0	12	30.0	110
1083651601	16.0	1.0	16	32.0	150
1083651602	16.0	2.0	16	32.0	150

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ Ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> Ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary	○	○	●			●	●								●	○



EXTENDED NECK

MG
HM

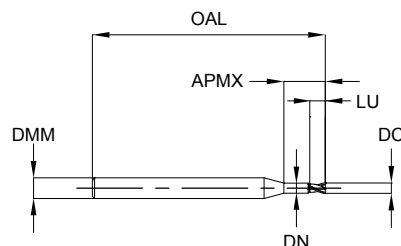
Series No. 120365

► cutting conditions : p.52-53

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Sizes under 1.0mm have double neck for increased rigidity.



EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1203650040	0.4	4	0.6	2.0	40
1203650041	0.4	4	0.6	3.0	40
1203650042	0.4	4	0.6	4.0	40
1203650043	0.4	4	0.6	5.0	40
1203650050	0.5	4	0.7	2.0	45
1203650051	0.5	4	0.7	4.0	45
1203650052	0.5	4	0.7	6.0	45
1203650060	0.6	4	0.9	2.0	45
1203650061	0.6	4	0.9	4.0	45
1203650062	0.6	4	0.9	6.0	45
1203650080	0.8	4	1.2	4.0	45
1203650081	0.8	4	1.2	6.0	45
1203650100	1.0	4	1.5	4.0	50
1203650101	1.0	4	1.5	6.0	50
1203650102	1.0	4	1.5	8.0	50
1203650103	1.0	4	1.5	10.0	50
1203650104	1.0	4	1.5	12.0	50
1203650105	1.0	4	1.5	16.0	50
1203650106	1.0	4	1.5	20.0	50
1203650120	1.2	4	1.8	6.0	50
1203650121	1.2	4	1.8	8.0	50
1203650140	1.4	4	2.1	6.0	50
1203650141	1.4	4	2.1	8.0	50
1203650150	1.5	4	2.3	6.0	50
1203650151	1.5	4	2.3	8.0	50
1203650152	1.5	4	2.3	10.0	50
1203650153	1.5	4	2.3	12.0	50
1203650154	1.5	4	2.3	16.0	50
1203650155	1.5	4	2.3	20.0	50

Mill Dia. DC(mm)	Mill Dia. Tolerance TDCD(mm)	Shank Dia. Tolerance TCDMM
≤ Ø6.0	0.00 / -0.012	h6
> Ø6.0	0.00 / -0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK



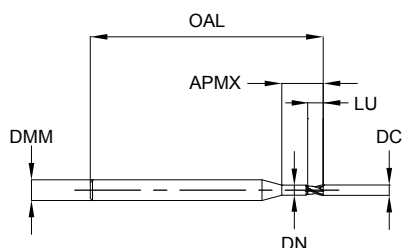
Series No. 120365

► cutting conditions : p.52-53

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Sizes under 1.0mm have double neck for increased rigidity.



EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1203650180	1.8	4	2.7	8.0	50
1203650181	1.8	4	2.7	10.0	50
1203650182	1.8	4	2.7	12.0	50
1203650200	2.0	4	3.0	6.0	50
1203650201	2.0	4	3.0	8.0	50
1203650202	2.0	4	3.0	10.0	50
1203650203	2.0	4	3.0	12.0	50
1203650204	2.0	4	3.0	14.0	50
1203650205	2.0	4	3.0	16.0	50
1203650206	2.0	4	3.0	20.0	50
1203650250	2.5	4	4.0	8.0	50
1203650251	2.5	4	4.0	12.0	50
1203650252	2.5	4	4.0	16.0	50
1203650253	2.5	4	4.0	20.0	50
1203650300	3.0	6	4.5	12.0	60
1203650301	3.0	6	4.5	14.0	60
1203650302	3.0	6	4.5	16.0	60
1203650303	3.0	6	4.5	18.0	60
1203650304	3.0	6	4.5	20.0	60
1203650400	4.0	6	6.0	16.0	60
1203650401	4.0	6	6.0	20.0	60
1203650402	4.0	6	6.0	30.0	70
1203650403	5.0	6	8.0	20.0	60
1203650500	5.0	6	8.0	30.0	70
1203650501	5.0	6	8.0	35.0	75
1203650502	5.0	6	8.0	40.0	80
1203650503	5.0	6	8.0	50.0	90
1203650600	6.0	6	9.0	20.0	60
1203650601	6.0	6	9.0	30.0	70

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
≤ ø6.0	0.00 / -0.012	h6
> ø6.0	0.00 / -0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS

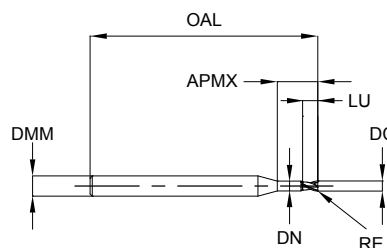


Series No. 110365

► cutting conditions : p.42-43

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1103650020	0.2	0.02	4	0.3	1.0	40
1103650021	0.2	0.05	4	0.3	1.0	40
1103650030	0.3	0.02	4	0.5	1.0	40
1103650031	0.3	0.02	4	0.5	2.0	40
1103650032	0.3	0.05	4	0.5	1.0	40
1103650033	0.3	0.05	4	0.5	2.0	40
1103650040	0.4	0.05	4	0.6	1.0	40
1103650041	0.4	0.05	4	0.6	2.0	40
1103650042	0.4	0.05	4	0.6	2.5	40
1103650043	0.4	0.1	4	0.6	1.0	40
1103650044	0.4	0.1	4	0.6	2.0	40
1103650050	0.5	0.05	4	0.7	1.0	45
1103650051	0.5	0.05	4	0.7	2.0	45
1103650052	0.5	0.05	4	0.7	4.0	45
1103650053	0.5	0.1	4	0.7	2.0	45
1103650054	0.5	0.1	4	0.7	3.0	45
1103650060	0.6	0.05	4	0.9	3.0	45
1103650061	0.6	0.05	4	0.9	6.0	45
1103650062	0.6	0.1	4	0.9	2.0	45
1103650063	0.6	0.1	4	0.9	4.0	45
1103650064	0.6	0.1	4	0.9	6.0	45
1103650065	0.6	0.2	4	0.9	2.0	45
1103650066	0.6	0.2	4	0.9	4.0	45
1103650067	0.6	0.2	4	0.9	6.0	45
1103650080	0.8	0.05	4	1.2	2.0	45
1103650081	0.8	0.05	4	1.2	4.0	45
1103650082	0.8	0.05	4	1.2	6.0	45
1103650083	0.8	0.1	4	1.2	2.0	45

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS

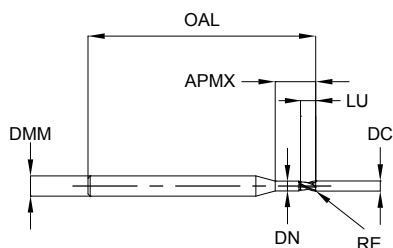
MG
HM

Series No. 110365

► cutting conditions : p.42-43

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1103650084	0.8	0.1	4	1.2	4.0	45
1103650085	0.8	0.1	4	1.2	6.0	45
1103650086	0.8	0.1	4	1.2	8.0	45
1103650087	0.8	0.2	4	1.2	4.0	45
1103650088	0.8	0.2	4	1.2	6.0	45
1103650089	0.8	0.2	4	1.2	8.0	45
1103650100	1.0	0.05	4	1.5	3.0	50
1103650101	1.0	0.05	4	1.5	4.0	50
1103650102	1.0	0.05	4	1.5	6.0	50
1103650103	1.0	0.1	4	1.5	3.0	50
1103650104	1.0	0.1	4	1.5	4.0	50
1103650105	1.0	0.1	4	1.5	6.0	50
1103650106	1.0	0.1	4	1.5	8.0	50
1103650107	1.0	0.2	4	1.5	4.0	50
1103650108	1.0	0.2	4	1.5	6.0	50
1103650109	1.0	0.2	4	1.5	8.0	50
1103650110	1.0	0.2	4	1.5	10.0	50
1103650111	1.0	0.3	4	1.5	4.0	50
1103650112	1.0	0.3	4	1.5	6.0	50
1103650113	1.0	0.3	4	1.5	8.0	50
1103650114	1.0	0.3	4	1.5	10.0	50
1103650120	1.2	0.05	4	1.8	4.0	50
1103650121	1.2	0.05	4	1.8	6.0	50
1103650122	1.2	0.05	4	1.8	8.0	50
1103650123	1.2	0.1	4	1.8	4.0	50
1103650124	1.2	0.1	4	1.8	6.0	50
1103650125	1.2	0.1	4	1.8	8.0	50
1103650126	1.2	0.2	4	1.8	4.0	50

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS

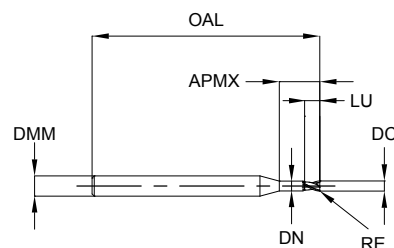


Series No. 110365

► cutting conditions : p.42-43

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1103650127	1.2	0.2	4	1.8	6.0	50
1103650128	1.2	0.2	4	1.8	8.0	50
1103650129	1.2	0.3	4	1.8	4.0	50
1103650130	1.2	0.3	4	1.8	6.0	50
1103650131	1.2	0.3	4	1.8	8.0	50
1103650150	1.5	0.05	4	2.3	4.0	50
1103650151	1.5	0.05	4	2.3	6.0	50
1103650152	1.5	0.05	4	2.3	8.0	50
1103650153	1.5	0.1	4	2.3	6.0	50
1103650154	1.5	0.1	4	2.3	8.0	50
1103650155	1.5	0.2	4	2.3	4.0	50
1103650156	1.5	0.2	4	2.3	6.0	50
1103650157	1.5	0.2	4	2.3	8.0	50
1103650158	1.5	0.2	4	2.3	10.0	50
1103650159	1.5	0.3	4	2.3	4.0	50
1103650160	1.5	0.3	4	2.3	6.0	50
1103650161	1.5	0.3	4	2.3	8.0	50
1103650162	1.5	0.3	4	2.3	10.0	50
1103650200	2.0	0.1	4	3.0	6.0	50
1103650201	2.0	0.1	4	3.0	8.0	50
1103650202	2.0	0.1	4	3.0	10.0	50
1103650203	2.0	0.1	4	3.0	12.0	50
1103650204	2.0	0.2	4	3.0	6.0	50
1103650205	2.0	0.2	4	3.0	8.0	50
1103650206	2.0	0.2	4	3.0	10.0	50
1103650207	2.0	0.2	4	3.0	12.0	50
1103650208	2.0	0.3	4	3.0	6.0	50
1103650209	2.0	0.3	4	3.0	8.0	50

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS

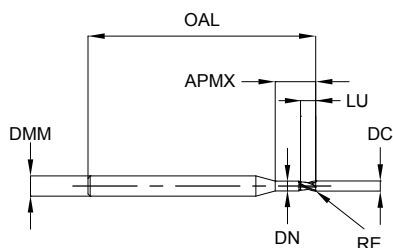
MG
HM

Series No. 110365

► cutting conditions : p.42-43

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1103650210	2.0	0.3	4	3.0	10.0	50
1103650211	2.0	0.3	4	3.0	12.0	50
1103650212	2.0	0.5	4	3.0	6.0	50
1103650213	2.0	0.5	4	3.0	8.0	50
1103650214	2.0	0.5	4	3.0	10.0	50
1103650215	2.0	0.5	4	3.0	12.0	50
1103650300	3.0	0.1	6	4.5	10.0	50
1103650301	3.0	0.1	6	4.5	12.0	50
1103650302	3.0	0.2	6	4.5	8.0	50
1103650303	3.0	0.2	6	4.5	10.0	50
1103650304	3.0	0.2	6	4.5	12.0	50
1103650305	3.0	0.2	6	4.5	16.0	60
1103650306	3.0	0.2	6	4.5	20.0	60
1103650307	3.0	0.3	6	4.5	8.0	50
1103650308	3.0	0.3	6	4.5	10.0	50
1103650309	3.0	0.3	6	4.5	12.0	50
1103650310	3.0	0.3	6	4.5	16.0	60
1103650311	3.0	0.3	6	4.5	20.0	60
1103650312	3.0	0.5	6	4.5	8.0	50
1103650313	3.0	0.5	6	4.5	10.0	50
1103650314	3.0	0.5	6	4.5	12.0	50
1103650315	3.0	0.5	6	4.5	16.0	60
1103650316	3.0	0.5	6	4.5	20.0	60
1103650317	3.0	1.0	6	4.5	8.0	50
1103650318	3.0	1.0	6	4.5	10.0	50
1103650319	3.0	1.0	6	4.5	12.0	50
1103650320	3.0	1.0	6	4.5	16.0	60
1103650321	3.0	1.0	6	4.5	20.0	60

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS

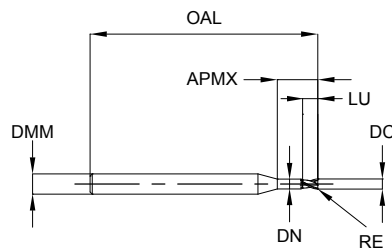


Series No. 110365

► cutting conditions : p.42-43

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



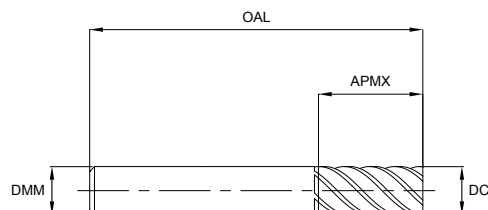
EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1103650400	4.0	0.1	6	6.0	10.0	50
1103650401	4.0	0.1	6	6.0	12.0	50
1103650402	4.0	0.1	6	6.0	16.0	60
1103650403	4.0	0.2	6	6.0	10.0	50
1103650404	4.0	0.2	6	6.0	12.0	50
1103650405	4.0	0.2	6	6.0	16.0	60
1103650406	4.0	0.2	6	6.0	20.0	60
1103650407	4.0	0.2	6	6.0	26.0	65
1103650408	4.0	0.3	6	6.0	12.0	50
1103650409	4.0	0.3	6	6.0	16.0	60
1103650410	4.0	0.3	6	6.0	20.0	60
1103650411	4.0	0.3	6	6.0	26.0	65
1103650412	4.0	0.5	6	6.0	10.0	50
1103650413	4.0	0.5	6	6.0	12.0	50
1103650414	4.0	0.5	6	6.0	16.0	60
1103650415	4.0	0.5	6	6.0	20.0	60
1103650416	4.0	0.5	6	6.0	26.0	65
1103650417	4.0	1.0	6	6.0	10.0	50
1103650418	4.0	1.0	6	6.0	16.0	60
1103650419	4.0	1.0	6	6.0	20.0	60
1103650600	6.0	0.5	6	9.0	20.0	60
1103650601	6.0	1.0	6	9.0	20.0	60
1103650800	8.0	0.5	8	12.0	25.0	70
1103650801	8.0	1.0	8	12.0	25.0	70
1103651000	10.0	0.5	10	15.0	30.0	75
1103651001	10.0	1.0	10	15.0	30.0	75

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ Ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> Ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



STANDARD LENGTH 45° HELIX


**MG
HM**

**DIN
6535HA**

Series No. 106365

► cutting conditions : p.51

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

45° helix for improved surface finish.

EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1063650600	6.0	6	15.0	60
1063650800	8.0	8	20.0	70
1063651000	10.0	10	25.0	75
1063651200	12.0	12	30.0	80
1063651600	16.0	16	40.0	100
1063652000	20.0	20	45.0	100

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary	○	○	●			●	●								●	○



STANDARD LENGTH BALL NOSE

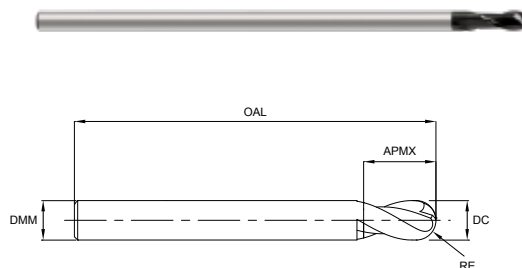
MG
HM

Series No. 100365

► cutting conditions : p.36-37

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



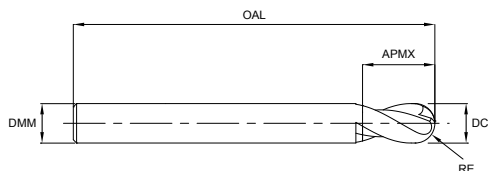
EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1003650010	0.1	0.05	4	0.2	40
1003650020	0.2	0.1	4	0.4	40
1003650030	0.3	0.15	4	0.6	40
1003650040	0.4	0.2	4	0.8	40
1003650050	0.5	0.25	4	1.0	40
1003650060	0.6	0.3	4	1.2	40
1003650080	0.8	0.4	4	1.6	40
1003650100	1.0	0.5	6	2.5	50
1003650150	1.5	0.75	6	4.0	50
1003650200	2.0	1.0	6	5.0	50
1003650250	2.5	1.25	6	6.0	60
1003650300	3.0	1.5	6	4.5	40
1003650301	3.0	1.5	6	6.0	60
1003650400	4.0	2.0	6	8.0	70
1003650401	4.0	2.0	6	8.0	100
1003650500	5.0	2.5	6	7.5	60
1003650501	5.0	2.5	6	10.0	80
1003650600	6.0	3.0	6	9.0	50
1003650601	6.0	3.0	6	12.0	90
1003650602	6.0	3.0	6	12.0	130

Mill Dia. DC(mm)	Mill Dia. Tolerance TDCD(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



STANDARD LENGTH BALL NOSE



Series No. 100365

► cutting conditions : p.36-37

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1003650800	8.0	4.0	8	12.0	50
1003650801	8.0	4.0	8	12.0	90
1003650802	8.0	4.0	8	14.0	100
1003650803	8.0	4.0	8	14.0	150
1003651000	10.0	5.0	10	15.0	60
1003651001	10.0	5.0	10	15.0	90
1003651002	10.0	5.0	10	18.0	100
1003651003	10.0	5.0	10	18.0	130
1003651004	10.0	5.0	10	18.0	150
1003651005	10.0	5.0	10	18.0	180
1003651200	12.0	6.0	12	18.0	80
1003651201	12.0	6.0	12	18.0	100
1003651202	12.0	6.0	12	22.0	110
1003651203	12.0	6.0	12	22.0	200
1003651600	16.0	8.0	16	30.0	150
1003652000	20.0	10.0	20	38.0	150

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary	○	○	●			●	●								●	○



EXTENDED NECK BALL NOSE

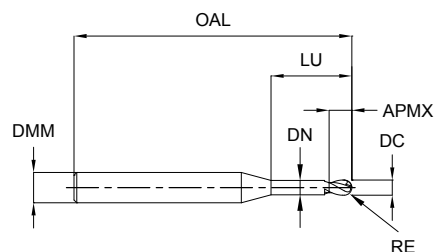
MG
HM

Series No. 102365

► cutting conditions : p.38-39

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1023650020	0.2	0.1	4	0.2	1.0	40
1023650030	0.3	0.15	4	0.3	1.0	40
1023650040	0.4	0.2	4	0.4	1.0	40
1023650050	0.5	0.25	4	0.5	2.0	45
1023650051	0.5	0.25	4	0.5	4.0	45
1023650052	0.5	0.25	4	0.5	6.0	45
1023650053	0.5	0.25	4	0.5	8.0	45
1023650060	0.6	0.3	4	0.6	2.0	45
1023650061	0.6	0.3	4	0.6	4.0	45
1023650062	0.6	0.3	4	0.6	6.0	45
1023650063	0.6	0.3	4	0.6	8.0	45
1023650080	0.8	0.4	4	0.8	2.0	45
1023650081	0.8	0.4	4	0.8	4.0	45
1023650082	0.8	0.4	4	0.8	6.0	45
1023650083	0.8	0.4	4	0.8	10.0	45
1023650100	1.0	0.5	4	1.0	3.0	50
1023650101	1.0	0.5	4	1.0	4.0	50
1023650102	1.0	0.5	4	1.0	5.0	50
1023650103	1.0	0.5	4	1.0	6.0	50
1023650104	1.0	0.5	4	1.0	8.0	50
1023650105	1.0	0.5	4	1.0	10.0	50
1023650106	1.0	0.5	4	1.0	12.0	50
1023650107	1.0	0.5	4	1.0	16.0	50
1023650108	1.0	0.5	4	1.0	20.0	50
1023650120	1.2	0.6	4	1.2	8.0	50
1023650150	1.5	0.75	4	1.5	6.0	50
1023650151	1.5	0.75	4	1.5	8.0	50
1023650152	1.5	0.75	4	1.5	10.0	50
1023650153	1.5	0.75	4	1.5	12.0	50
1023650154	1.5	0.75	4	1.5	16.0	50
1023650155	1.5	0.75	4	1.5	20.0	50

Mill Dia. DC(mm)	Mill Dia. Tolerance TDCD(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK BALL NOSE

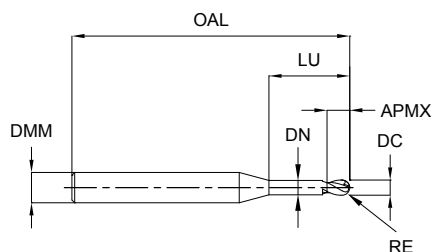


Series No. 102365

► cutting conditions : p.38-39

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



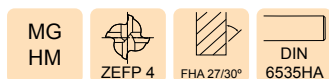
EUROPA CODE ORDCODE	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1023650200	2.0	1.0	4	2.0	6.0	50
1023650201	2.0	1.0	4	2.0	8.0	50
1023650202	2.0	1.0	4	2.0	10.0	50
1023650203	2.0	1.0	4	2.0	12.0	50
1023650204	2.0	1.0	4	2.0	14.0	50
1023650205	2.0	1.0	4	2.0	16.0	50
1023650206	2.0	1.0	4	2.0	20.0	50
1023650207	2.0	1.0	4	2.0	30.0	70
1023650300	3.0	1.5	6	3.0	8.0	50
1023650301	3.0	1.5	6	3.0	10.0	50
1023650302	3.0	1.5	6	3.0	12.0	50
1023650303	3.0	1.5	6	3.0	16.0	60
1023650304	3.0	1.5	6	3.0	20.0	60
1023650305	3.0	1.5	6	3.0	30.0	70
1023650306	3.0	1.5	6	3.0	35.0	70
1023650400	4.0	2.0	6	4.0	10.0	50
1023650401	4.0	2.0	6	4.0	12.0	50
1023650402	4.0	2.0	6	4.0	16.0	60
1023650403	4.0	2.0	6	4.0	20.0	60
1023650404	4.0	2.0	6	4.0	30.0	70
1023650405	4.0	2.0	6	4.0	35.0	70
1023650500	5.0	2.5	6	6.0	30.0	70
1023650600	6.0	3.0	6	8.0	20.0	60
1023650601	6.0	3.0	6	8.0	30.0	60
1023650800	8.0	4.0	8	10.0	25.0	70
1023651000	10.0	5.0	10	12.0	30.0	75
1023651001	10.0	5.0	10	18.0	30.0	100
1023651200	12.0	6.0	12	14.0	32.0	80
1023651201	12.0	6.0	12	22.0	32.0	100

Mill Dia. DC(mm)	Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
		RETOLL	RETOLU	
≤ ø6.0	0.00 / -0.012	-0.010	+0.010	h6
> ø6.0	0.00 / -0.015	-0.015	+0.015	

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



STANDARD LENGTH



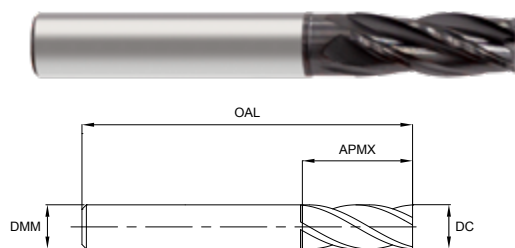
Series No. 122365

► cutting conditions : p.56-58

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.



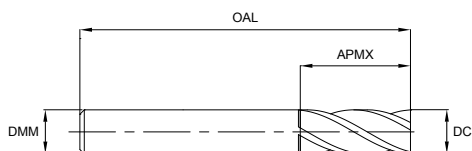
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1223650100	1.0	6	2.5	50
1223650150	1.5	6	4.0	50
1223650200	2.0	6	6.0	50
1223650250	2.5	6	7.0	50
1223650300	3.0	6	8.0	50
1223650350	3.5	6	10.0	50
1223650400	4.0	6	10.0	50
1223650450	4.5	6	14.0	50
1223650500	5.0	6	15.0	60
1223650550	5.5	6	15.0	60
1223650600	6.0	6	15.0	60
1223650650	6.5	8	18.0	60
1223650700	7.0	8	20.0	60
1223650750	7.5	8	20.0	60
1223650800	8.0	8	20.0	70
1223650850	8.5	10	22.0	70
1223650900	9.0	10	22.0	70
1223650950	9.5	10	24.0	70
1223651000	10.0	10	25.0	75
1223651100	11.0	12	30.0	75
1223651200	12.0	12	30.0	80
1223651400	14.0	14	35.0	100
1223651401	14.0	16	35.0	100
1223651600	16.0	16	40.0	100
1223651800	18.0	18	45.0	100
1223652000	20.0	20	45.0	100

Mill Dia. Tolerance TCD C (mm)	Shank Dia. Tolerance TCD M M M
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●		○	●	●								●	○
○ Secondary																



STANDARD LENGTH HEAVY CUT



Series No. 104365

► cutting conditions : p.56-58

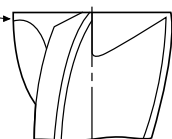
Coating and geometry designed for outstanding cutting ability and wear resistance.

Multiple helix geometry 3.0mm and above.

Special gash land geometry on end teeth and protected corner to allow high depths of cut.

EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1043650100	1.0	6	2.5	50
1043650120	1.2	6	3.0	50
1043650150	1.5	6	4.0	50
1043650200	2.0	6	6.0	50
1043650250	2.5	6	7.0	50
1043650300	3.0	6	8.0	50
1043650400	4.0	6	10.0	50
1043650500	5.0	6	15.0	60
1043650600	6.0	6	15.0	60
1043650800	8.0	8	20.0	70
1043651000	10.0	10	25.0	75
1043651200	12.0	12	30.0	80
1043651600	16.0	16	32.0	100
1043652000	20.0	20	45.0	100

Corner
protected

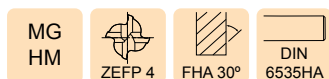


Mill Dia. Tolerance TDCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●		○	●	●								●	○



LONG LENGTH

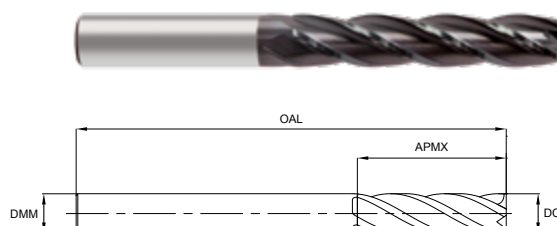


Series No. 124365

► cutting conditions : p.54-55

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



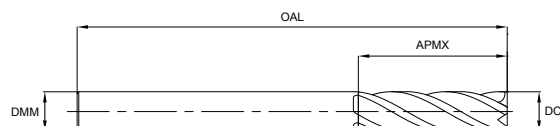
EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1243650100	1.0	6	3.0	60
1243650101	1.0	6	4.0	60
1243650102	1.0	6	6.0	60
1243650150	1.5	6	6.0	60
1243650200	2.0	6	8.0	60
1243650201	2.0	6	10.0	60
1243650202	2.0	6	12.0	60
1243650203	2.0	6	14.0	60
1243650250	2.5	6	10.0	60
1243650251	2.5	6	12.0	60
1243650300	3.0	6	10.0	70
1243650301	3.0	6	12.0	70
1243650302	3.0	6	16.0	70
1243650303	3.0	6	20.0	70
1243650304	3.0	6	26.0	70
1243650305	3.0	6	30.0	70
1243650400	4.0	6	12.0	70
1243650401	4.0	6	16.0	70
1243650402	4.0	6	20.0	70
1243650403	4.0	6	26.0	70
1243650404	4.0	6	30.0	70
1243650500	5.0	6	20.0	70
1243650501	5.0	6	25.0	70
1243650502	5.0	6	30.0	80
1243650600	6.0	6	15.0	60
1243650601	6.0	6	20.0	70
1243650602	6.0	6	25.0	75
1243650603	6.0	6	30.0	80

Mill Dia. Tolerance TDCD(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



LONG LENGTH



Series No. 124365

► cutting conditions : p.54-55

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1243650604	6.0	6	35.0	90
1243650605	6.0	6	40.0	90
1243650606	6.0	6	40.0	120
1243650800	8.0	8	25.0	80
1243650801	8.0	8	30.0	80
1243650802	8.0	8	35.0	90
1243650803	8.0	8	40.0	90
1243650804	8.0	8	45.0	100
1243650805	8.0	8	50.0	100
1243651000	10.0	10	30.0	80
1243651001	10.0	10	30.0	100
1243651002	10.0	10	35.0	90
1243651003	10.0	10	40.0	90
1243651004	10.0	10	45.0	100
1243651005	10.0	10	50.0	100
1243651200	12.0	12	35.0	90
1243651201	12.0	12	40.0	100
1243651202	12.0	12	45.0	130
1243651203	12.0	12	50.0	100
1243651204	12.0	12	55.0	110
1243651205	12.0	12	60.0	110
1243651400	14.0	16	50.0	110
1243651600	16.0	16	50.0	110
1243651601	16.0	16	60.0	120
1243651602	16.0	16	70.0	130
1243652000	20.0	20	60.0	130
1243652500	25.0	25	90.0	150

Mill Dia. Tolerance TDCD(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



STANDARD LENGTH CORNER RADIUS



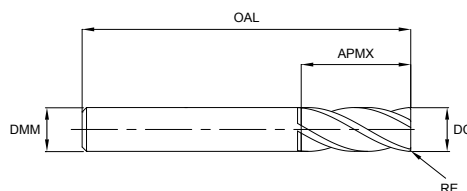
Series No. 112365

► cutting conditions : p.41

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRc55.

Multiple helix geometry 3.0mm and above.



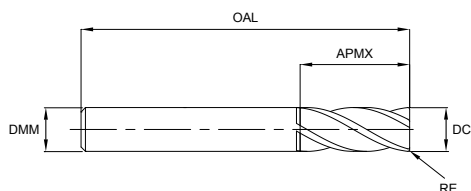
EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1123650300	3.0	0.3	6	8.0	60
1123650301	3.0	0.5	6	8.0	60
1123650400	4.0	0.3	6	10.0	70
1123650401	4.0	0.5	6	10.0	70
1123650402	4.0	1.0	6	10.0	70
1123650500	5.0	0.3	6	13.0	90
1123650501	5.0	0.5	6	13.0	90
1123650600	6.0	0.3	6	15.0	90
1123650601	6.0	0.5	6	15.0	90
1123650602	6.0	1.0	6	15.0	90
1123650800	8.0	0.3	8	20.0	70
1123650801	8.0	0.5	8	20.0	70
1123650802	8.0	1.0	8	20.0	70
1123650803	8.0	0.5	8	20.0	100
1123650804	8.0	1.0	8	20.0	100
1123650805	8.0	1.5	8	20.0	100
1123650806	8.0	2.0	8	20.0	100
1123651000	10.0	0.3	10	25.0	100
1123651001	10.0	0.5	10	25.0	100
1123651002	10.0	1.0	10	25.0	100
1123651003	10.0	1.5	10	25.0	100
1123651004	10.0	2.0	10	25.0	100

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



STANDARD LENGTH CORNER RADIUS

MG
HM

Series No. 112365

► cutting conditions : p.41

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.

EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL
1123651200	12.0	0.5	12	30.0	80
1123651201	12.0	1.0	12	30.0	80
1123651202	12.0	0.5	12	30.0	110
1123651203	12.0	1.0	12	30.0	110
1123651204	12.0	1.5	12	30.0	110
1123651205	12.0	2.0	12	30.0	110
1123651600	16.0	0.5	16	32.0	150
1123651601	16.0	1.0	16	32.0	150
1123651602	16.0	1.5	16	32.0	150
1123651603	16.0	2.0	16	32.0	150

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary	○	○	●			●	●								●	○



EXTENDED NECK CORNER RADIUS



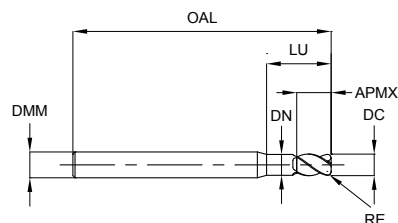
Series No. 114365

► cutting conditions : p.44

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1143650100	1.0	0.1	4	1.5	4.0	50
1143650101	1.0	0.1	4	1.5	6.0	50
1143650102	1.0	0.1	4	1.5	8.0	50
1143650103	1.0	0.2	4	1.5	4.0	50
1143650104	1.0	0.2	4	1.5	6.0	50
1143650105	1.0	0.2	4	1.5	8.0	50
1143650106	1.0	0.3	4	1.5	4.0	50
1143650107	1.0	0.3	4	1.5	6.0	50
1143650108	1.0	0.3	4	1.5	8.0	50
1143650120	1.2	0.1	4	1.8	4.0	50
1143650121	1.2	0.1	4	1.8	6.0	50
1143650122	1.2	0.1	4	1.8	8.0	50
1143650123	1.2	0.2	4	1.8	4.0	50
1143650124	1.2	0.2	4	1.8	6.0	50
1143650125	1.2	0.2	4	1.8	8.0	50
1143650126	1.2	0.3	4	1.8	4.0	50
1143650127	1.2	0.3	4	1.8	6.0	50
1143650128	1.2	0.3	4	1.8	8.0	50
1143650150	1.5	0.1	4	2.3	6.0	50
1143650151	1.5	0.1	4	2.3	8.0	50
1143650152	1.5	0.1	4	2.3	10.0	50
1143650153	1.5	0.1	4	2.3	12.0	50
1143650154	1.5	0.2	4	2.3	6.0	50
1143650155	1.5	0.2	4	2.3	8.0	50
1143650156	1.5	0.2	4	2.3	10.0	50
1143650157	1.5	0.2	4	2.3	12.0	50
1143650158	1.5	0.3	4	2.3	6.0	50
1143650159	1.5	0.3	4	2.3	8.0	50
1143650160	1.5	0.3	4	2.3	10.0	50
1143650161	1.5	0.3	4	2.3	12.0	50

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	○	○	●			●	●								●	○



EXTENDED NECK CORNER RADIUS

MG
HM

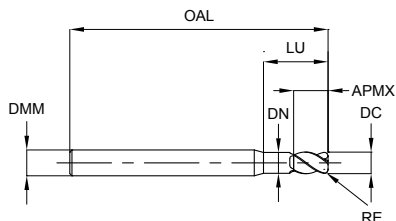
Series No. 114365

► cutting conditions : p.44

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1143650162	1.5	0.5	4	2.3	6.0	50
1143650163	1.5	0.5	4	2.3	8.0	50
1143650164	1.5	0.5	4	2.3	10.0	50
1143650165	1.5	0.5	4	2.3	12.0	50
1143650200	2.0	0.1	4	3.0	6.0	50
1143650201	2.0	0.1	4	3.0	8.0	50
1143650202	2.0	0.1	4	3.0	10.0	50
1143650203	2.0	0.1	4	3.0	12.0	50
1143650204	2.0	0.2	4	3.0	6.0	50
1143650205	2.0	0.2	4	3.0	8.0	50
1143650206	2.0	0.2	4	3.0	10.0	50
1143650207	2.0	0.2	4	3.0	12.0	50
1143650208	2.0	0.3	4	3.0	6.0	50
1143650209	2.0	0.3	4	3.0	8.0	50
1143650210	2.0	0.3	4	3.0	10.0	50
1143650211	2.0	0.3	4	3.0	12.0	50
1143650212	2.0	0.5	4	3.0	6.0	50
1143650213	2.0	0.5	4	3.0	8.0	50
1143650214	2.0	0.5	4	3.0	10.0	50
1143650215	2.0	0.5	4	3.0	12.0	50
1143650300	3.0	0.1	6	4.5	8.0	50
1143650301	3.0	0.1	6	4.5	10.0	50
1143650302	3.0	0.1	6	4.5	12.0	50
1143650303	3.0	0.1	6	4.5	16.0	60
1143650304	3.0	0.2	6	4.5	10.0	50
1143650305	3.0	0.2	6	4.5	12.0	50
1143650306	3.0	0.2	6	4.5	16.0	60
1143650307	3.0	0.2	6	4.5	20.0	60

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS



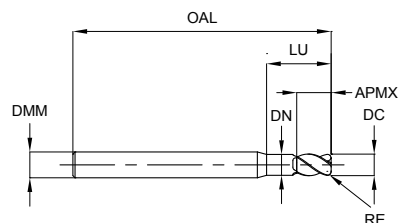
Series No. 114365

► cutting conditions : p.44

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1143650308	3.0	0.3	6	4.5	8.0	50
1143650309	3.0	0.3	6	4.5	10.0	50
1143650310	3.0	0.3	6	4.5	12.0	50
1143650311	3.0	0.3	6	4.5	16.0	60
1143650312	3.0	0.3	6	4.5	20.0	60
1143650313	3.0	0.5	6	4.5	8.0	50
1143650314	3.0	0.5	6	4.5	10.0	50
1143650315	3.0	0.5	6	4.5	12.0	50
1143650316	3.0	0.5	6	4.5	16.0	60
1143650317	3.0	0.5	6	4.5	20.0	60
1143650318	3.0	1.0	6	4.5	8.0	50
1143650319	3.0	1.0	6	4.5	10.0	50
1143650320	3.0	1.0	6	4.5	12.0	50
1143650321	3.0	1.0	6	4.5	16.0	60
1143650400	4.0	0.1	6	6.0	10.0	50
1143650401	4.0	0.1	6	6.0	12.0	50
1143650402	4.0	0.1	6	6.0	16.0	60
1143650403	4.0	0.1	6	6.0	20.0	60
1143650404	4.0	0.2	6	6.0	10.0	50
1143650405	4.0	0.2	6	6.0	12.0	50
1143650406	4.0	0.2	6	6.0	16.0	60
1143650407	4.0	0.2	6	6.0	20.0	60
1143650408	4.0	0.2	6	6.0	26.0	65
1143650409	4.0	0.3	6	6.0	10.0	50
1143650410	4.0	0.3	6	6.0	12.0	50
1143650411	4.0	0.3	6	6.0	16.0	60
1143650412	4.0	0.3	6	6.0	20.0	60
1143650413	4.0	0.3	6	6.0	26.0	65

Mill Dia. Tolerance TDCD(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK CORNER RADIUS



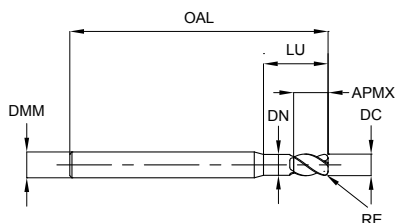
Series No. 114365

► cutting conditions : p.44

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.

Multiple helix geometry 3.0mm and above.



EUROPA CODE ORDCODE	DIAMETER DC	CORNER RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1143650414	4.0	0.5	6	6.0	12.0	50
1143650415	4.0	0.5	6	6.0	16.0	60
1143650416	4.0	0.5	6	6.0	20.0	60
1143650417	4.0	0.5	6	6.0	26.0	65
1143650418	4.0	1.0	6	6.0	10.0	50
1143650419	4.0	1.0	6	6.0	12.0	50
1143650420	4.0	1.0	6	6.0	16.0	60
1143650421	4.0	1.0	6	6.0	20.0	60
1143650422	4.0	1.0	6	6.0	26.0	65
1143650600	6.0	0.3	6	9.0	20.0	60
1143650601	6.0	0.5	6	9.0	20.0	60
1143650602	6.0	1.0	6	9.0	20.0	60
1143650800	8.0	0.2	8	12.0	25.0	70
1143650801	8.0	0.5	8	12.0	25.0	70
1143650803	8.0	1.0	8	12.0	25.0	70
1143651000	10.0	0.5	10	15.0	30.0	75
1143651001	10.0	1.0	10	15.0	30.0	75
1143651200	12.0	0.5	12	18.0	32.0	80
1143651201	12.0	1.0	12	18.0	32.0	80

Mill Dia. Tolerance TCDC(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance TCDMM
	RETOLL	RETOLU	
0.00 / -0.03	-0.020	+0.020	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																



EXTENDED NECK

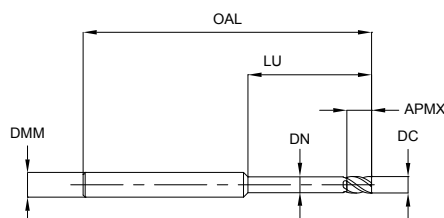


Series No. 126365

► cutting conditions : p.45

Coating and geometry designed for outstanding cutting ability and wear resistance.

Excellent performance in pre-hardened steels and alloy steels <HRC55.



EUROPA CODE ORDCODE	DIAMETER DC	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL
1263650100	1.0	4	1.5	4.0	50
1263650101	1.0	4	1.5	5.0	50
1263650102	1.0	4	1.5	6.0	50
1263650103	1.0	4	1.5	8.0	50
1263650150	1.5	4	2.3	6.0	50
1263650151	1.5	4	2.3	8.0	50
1263650152	1.5	4	2.3	10.0	50
1263650153	1.5	4	2.3	12.0	50
1263650200	2.0	4	3.0	8.0	50
1263650201	2.0	4	3.0	10.0	50
1263650202	2.0	4	3.0	12.0	50
1263650300	3.0	6	4.5	10.0	50
1263650301	3.0	6	4.5	12.0	50
1263650302	3.0	6	4.5	16.0	60
1263650303	3.0	6	4.5	20.0	60
1263650400	4.0	6	6.0	12.0	50
1263650401	4.0	6	6.0	16.0	60
1263650402	4.0	6	6.0	20.0	60
1263650500	5.0	6	8.0	20.0	60
1263650600	6.0	6	9.0	15.0	60
1263650800	8.0	8	12.0	25.0	70
1263651000	10.0	10	15.0	30.0	75

Mill Dia. Tolerance TDCD(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.03	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○	○	●			●	●								●	○
○ Secondary																

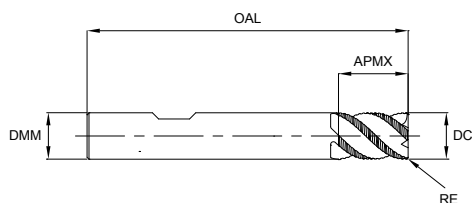


SHORT LENGTH ROUGHING



Series No. 167123, 167323

► cutting conditions : p.59-60



Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.

EUROPA CODE ORDCODE FLAT	EUROPA CODE ORDCODE PLAIN	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL	NO. OF FLUTES ZEFP
1671230600	1673230600	6.0	0.5	6	9.0	57	4
1671230800	1673230800	8.0	0.5	8	12.0	63	4
1671231000	1673231000	10.0	0.5	10	15.0	72	4
1671231200	1673231200	12.0	0.5	12	18.0	83	4
1671231600	1673231600	16.0	1.0	16	24.0	92	5
1671232000	1673232000	20.0	1.0	20	30.0	104	5

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.05	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	●			●	●									



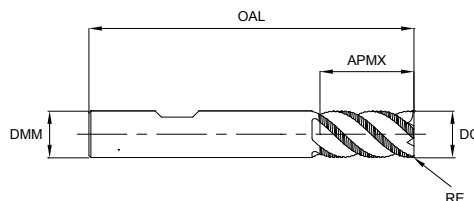
LONG LENGTH ROUGHING



Series No. 168123,168323

► cutting conditions : p.59-60

Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.



EUROPA CODE ORDCODE FLAT	EUROPA CODE ORDCODE PLAIN	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	OVERALL LENGTH OAL	NO. OF FLUTES ZEFP
1681230600	1683230600	6.0	0.5	6	12.0	57	4
1681230800	1683230800	8.0	0.5	8	16.0	63	4
1681231000	1683231000	10.0	0.5	10	20.0	72	4
1681231200	1683231200	12.0	0.5	12	24.0	83	4
1681231600	1683231600	16.0	1.0	16	32.0	92	5
1681232000	1683232000	20.0	1.0	20	40.0	104	5

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.05	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	●			●	●									



EXTENDED NECK ROUGHING

MG
HM

ZEFP 4



ZEFP 5



RE



M-HELIX



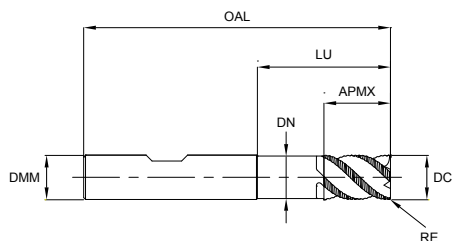
FINE

DIN
6535HADIN
6535HB

NECK

Series No. 169123, 169323

► cutting conditions : p.59-60

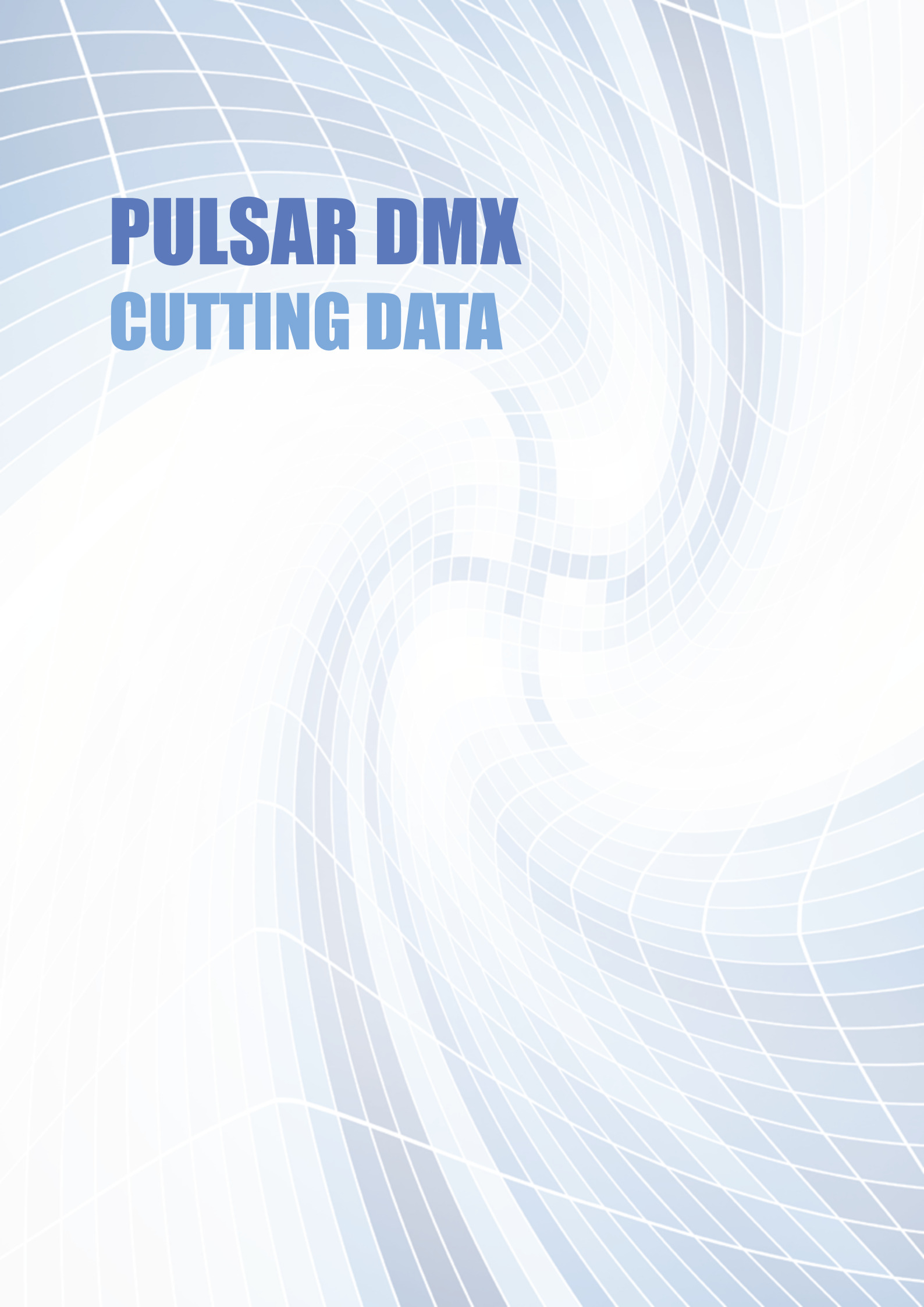


Unique flute design for excellent chip evacuation and vibration reduction.
Optimal roughing tooth profile to reduce cutting forces.
Special tool geometry for high feed rate and heavy cutting.
Strong end tooth design for plunge and pocket milling.
Custom engineered coating to allow long tool life and excellent chip evacuation.

EUROPA CODE ORDCODE FLAT	EUROPA CODE ORDCODE PLAIN	DIAMETER DC	RADIUS RE	SHANK DIAMETER DMM	LENGTH OF CUT APMX	EFFECTIVE LENGTH LU	OVERALL LENGTH OAL	NO. OF FLUTES ZEFP
1691230600	1693230600	6.0	0.5	6	9.0	18.0	57	4
1691230800	1693230800	8.0	0.5	8	12.0	24.0	63	4
1691231000	1693231000	10.0	0.5	10	15.0	30.0	72	4
1691231200	1693231200	12.0	0.5	12	18.0	36.0	83	4
1691231600	1693231600	16.0	1.0	16	24.0	48.0	100	5
1691232000	1693232000	20.0	1.0	20	30.0	60.0	110	5

Mill Dia. Tolerance TCDC(mm)	Shank Dia. Tolerance TCDMM
0.00 / -0.05	h6

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	●			●	●									



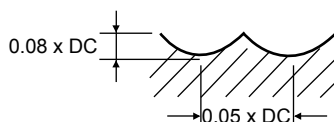
PULSAR DMX CUTTING DATA



CUTTING DATA

100365 (2 Flute Ball Nose)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)									
					0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	13	19	28	38	47	57	75	94	141	187
				n	40000	30000	30000	30000	30000	30000	30000	30000	30000	29820
				f _z	0.007	0.012	0.015	0.019	0.024	0.029	0.039	0.048	0.054	0.057
				f (mm/min)	550	720	900	1140	1440	1740	2340	2880	3240	3420
	6-9	Low alloy Steel	25-35	v _c (m/min)	13	19	28	38	47	57	75	94	141	187
				n	40000	30000	30000	30000	30000	30000	30000	30000	30000	29820
				f _z	0.007	0.012	0.015	0.019	0.024	0.029	0.039	0.048	0.054	0.057
				f (mm/min)	550	720	900	1140	1440	1740	2340	2880	3240	3420
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	13	19	28	38	47	57	75	94	141	187
				n	40000	30000	30000	30000	30000	30000	30000	30000	30000	29820
				f _z	0.007	0.012	0.015	0.019	0.024	0.029	0.039	0.048	0.054	0.057
				f (mm/min)	550	720	900	1140	1440	1740	2340	2880	3240	3420
K	15-20	Cast Iron		v _c (m/min)	13	19	28	38	47	57	75	94	141	187
				n	40000	30000	30000	30000	30000	30000	30000	30000	30000	29820
				f _z	0.007	0.012	0.015	0.019	0.024	0.029	0.039	0.048	0.054	0.057
				f (mm/min)	550	720	900	1140	1440	1740	2340	2880	3240	3420
H	38	Hardened Steel	45-55	v _c (m/min)	10	17	25	34	42	51	68	85	122	151
				n	31800	27000	26500	27000	26700	27000	27000	27000	25800	24000
				f _z	0.006	0.011	0.013	0.017	0.021	0.024	0.033	0.042	0.047	0.05
				f (mm/min)	380	590	690	920	1120	1300	1780	2270	2400	2400
	40	Chilled Cast Iron		v _c (m/min)	13	19	28	38	47	57	75	94	136	180
				n	41000	30000	29700	30200	29900	30200	29800	30000	28800	28600
				f _z	0.006	0.011	0.014	0.017	0.021	0.025	0.033	0.042	0.047	0.05
				f (mm/min)	500	660	830	1000	1250	1510	1970	2500	2700	2800
	41	Hardened Cast Iron		v _c (m/min)	10	17	25	34	42	51	68	85	122	151
				n	31800	27000	26500	27000	26700	27000	27000	27000	25800	24000
				f _z	0.006	0.011	0.013	0.017	0.021	0.024	0.033	0.042	0.047	0.05
				f (mm/min)	380	590	690	920	1120	1300	1780	2270	2400	2400



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut

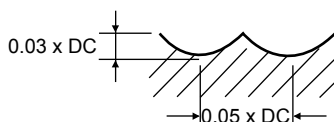


CUTTING DATA

100365 (2 Flute Ball Nose)														
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)									
					2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	187	187	187	175	157	167	175	157	168	168
				n	23800	19860	14900	11160	8340	6660	5580	4170	3340	2670
				f _z	0.074	0.091	0.121	0.156	0.174	0.189	0.199	0.212	0.238	0.264
				f (mm/min)	3510	3600	3600	3480	2910	2520	2220	1770	1590	1410
	6-9	Low alloy Steel	25-35	v _c (m/min)	187	187	187	175	157	167	175	157	168	168
				n	23800	19860	14900	11160	8340	6660	5580	4170	3340	2670
				f _z	0.074	0.091	0.121	0.156	0.174	0.189	0.199	0.212	0.238	0.264
				f (mm/min)	3510	3600	3600	3480	2910	2520	2220	1770	1590	1410
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	187	187	187	175	157	167	175	157	168	168
				n	23800	19860	14900	11160	8340	6660	5580	4170	3340	2670
				f _z	0.074	0.091	0.121	0.156	0.174	0.189	0.199	0.212	0.238	0.264
				f (mm/min)	3510	3600	3600	3480	2910	2520	2220	1770	1590	1410
K	15-20	Cast Iron	v _c (m/min)	187	187	187	175	157	167	175	157	168	168	
			n	23800	19860	14900	11160	8340	6660	5580	4170	3340	2670	
			f _z	0.074	0.091	0.121	0.156	0.174	0.189	0.199	0.212	0.238	0.264	
			f (mm/min)	3510	3600	3600	3480	2910	2520	2220	1770	1590	1410	
H	38	Hardened Steel	45-55	v _c (m/min)	151	151	151	141	124	136	141	127	136	136
				n	19200	16000	12000	8900	6500	5400	4500	3370	2700	2160
				f _z	0.063	0.075	0.1	0.125	0.141	0.15	0.16	0.17	0.189	0.208
				f (mm/min)	2400	2400	2400	2200	1850	1620	1430	1760	1000	900
	40	Chilled Cast Iron		v _c (m/min)	180	180	180	168	152	161	168	151	161	162
				n	22900	19000	14300	10700	8000	6400	5300	4000	3200	2600
				f _z	0.066	0.083	0.111	0.138	0.153	0.164	0.174	0.188	0.206	0.227
				f (mm/min)	3000	3100	3200	2950	2400	2100	1860	1500	1320	1170
	41	Hardened Cast Iron		v _c (m/min)	151	151	151	141	124	136	141	127	136	136
				n	19200	16000	12000	8900	6500	5400	4500	3370	2700	2160
				f _z	0.063	0.075	0.1	0.125	0.141	0.15	0.16	0.17	0.189	0.208
				f (mm/min)	2400	2400	2400	2200	1850	1620	1430	1760	1000	900

0.03 x DC

0.05 x DC



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

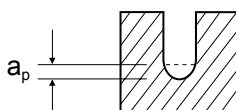
v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

102365 (2 Flute Extended Neck Ball Nose)													
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					0.2 LU=1.0	0.3 LU=1.0	0.4 LU=1.0	0.5 LU=4.0	0.6 LU=4.0	0.8 LU=4.0	1.0 LU=8.0	1.2 LU=8.0	1.5 LU=10.0
P	1-5	Non-alloy Steel	<25	a _p (mm)	0.013	0.019	0.036	0.018	0.022	0.05	0.036	0.043	0.054
				v _c (m/min)	31	47	52	48	58	86	87	89	101
				n	49300	49800	41300	30500	30700	34200	27600	23600	21400
				f _z	0.003	0.005	0.006	0.009	0.013	0.018	0.022	0.024	0.03
				f (mm/min)	295	495	495	550	800	1230	1210	1100	1250
	6-9	Low alloy Steel	25-35	a _p (mm)	0.01	0.015	0.028	0.014	0.017	0.039	0.028	0.034	0.042
				v _c (m/min)	31	47	49	46	55	81	82	84	96
				n	49300	49800	38900	29200	29100	32200	26100	22200	20300
				f _z	0.003	0.004	0.005	0.008	0.012	0.016	0.02	0.021	0.027
				f (mm/min)	295	395	390	470	700	1000	1000	930	1100
	10-11	High alloy Steel, Tool Steel	35-45	a _p (mm)	0.01	0.015	0.028	0.014	0.017	0.039	0.028	0.034	0.042
				v _c (m/min)	31	47	49	46	55	81	82	84	96
				n	49300	49800	38900	29200	29100	32200	26100	22200	20300
				f _z	0.003	0.004	0.005	0.008	0.012	0.016	0.02	0.021	0.027
				f (mm/min)	295	395	390	470	700	1000	1000	930	1100
K	15-20	Cast Iron	a _p (mm)	0.013	0.019	0.036	0.018	0.022	0.05	0.036	0.043	0.054	
			v _c (m/min)	31	47	52	48	58	86	87	89	101	
			n	49300	49800	41300	30500	30700	34200	27600	23600	21400	
			f _z	0.003	0.005	0.006	0.009	0.013	0.018	0.022	0.024	0.03	
			f (mm/min)	295	495	495	550	800	1230	1210	1100	1250	
H	38	Hardened Steel	45-55	a _p (mm)	0.007	0.011	0.02	0.01	0.012	0.028	0.02	0.024	0.03
				v _c (m/min)	27	40	43	40	48	72	73	74	85
				n	42900	42400	34200	25400	25400	28600	23200	19600	18000
				f _z	0.003	0.004	0.005	0.008	0.011	0.015	0.019	0.02	0.024
				f (mm/min)	260	340	340	400	560	850	880	785	860
	40	Chilled Cast Iron		a _p (mm)	0.01	0.015	0.028	0.014	0.017	0.039	0.028	0.034	0.042
				v _c (m/min)	31	47	49	46	55	81	82	84	96
				n	49300	49800	38900	29200	29100	32200	26100	22200	20300
				f _z	0.003	0.004	0.005	0.008	0.012	0.016	0.02	0.021	0.027
				f (mm/min)	295	395	390	470	700	1000	1000	930	1100
	41	Hardened Cast Iron		a _p (mm)	0.007	0.011	0.02	0.01	0.012	0.028	0.02	0.024	0.03
				v _c (m/min)	27	40	43	40	48	72	73	74	85
				n	42900	42400	34200	25400	25400	28600	23200	19600	18000
				f _z	0.003	0.004	0.005	0.008	0.011	0.015	0.019	0.02	0.024
				f (mm/min)	260	340	340	400	560	850	880	785	860

The diagram illustrates the depth of cut (a_p) for a ball nose end mill. It shows a cross-section of the tool's tip, which is a semi-circular ball. The depth of cut is indicated by a horizontal line with arrows at both ends, representing the distance from the uncut surface to the cut surface. The tool is shown in a hatched pattern, and the cut surface is indicated by a dashed line.



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

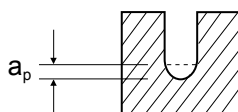
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

102365 (2 Flute Extended Neck Ball Nose)											
VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)							
				2.0 LU=12.0	3.0 LU=12.0	4.0 LU=16.0	5.0 LU=30.0	6.0 LU=20.0	8.0 LU=25.0	10.0 LU=30.0	12.0 LU=32.0
P	1-5	Non-alloy Steel	<25	a_p (mm)	0.072	0.189	0.252	0.18	0.378	0.504	1.08
				v_c (m/min)	102	129	123	109	123	122	121
				n	16200	13600	9700	6900	6500	4800	3200
				f_z	0.045	0.075	0.1	0.108	0.146	0.214	0.238
				f (mm/min)	1450	2053	1950	1500	1900	1800	1500
	6-9	Low alloy Steel	25-35	a_p (mm)	0.056	0.147	0.196	0.14	0.294	0.392	0.84
				v_c (m/min)	96	122	117	103	117	116	115
				n	15200	12900	9300	6500	6200	4600	3000
				f_z	0.04	0.067	0.09	0.108	0.129	0.163	0.213
				f (mm/min)	1200	1700	1670	1100	1600	1500	1300
	10-11	High alloy Steel, Tool Steel	35-45	a_p (mm)	0.056	0.147	0.196	0.14	0.294	0.392	0.84
				v_c (m/min)	96	122	117	103	117	116	115
				n	15200	12900	9300	6500	6200	4600	3000
				f_z	0.04	0.067	0.09	0.108	0.129	0.163	0.213
				f (mm/min)	1200	1700	1670	1100	1600	1500	1300
K	15-20	Cast Iron		a_p (mm)	0.072	0.189	0.252	0.18	0.378	0.504	1.08
				v_c (m/min)	102	129	123	109	123	122	121
				n	16200	13600	9700	6900	6500	4800	3200
				f_z	0.045	0.075	0.1	0.108	0.146	0.214	0.238
				f (mm/min)	1450	2053	1950	1500	1900	1800	1500
H	38	Hardened Steel	45-55	a_p (mm)	0.04	0.105	0.14	0.1	0.21	0.28	0.6
				v_c (m/min)	85	107	103	90	104	101	100
				n	13500	11300	8100	5700	5500	4000	2650
				f_z	0.039	0.063	0.09	0.09	0.121	0.16	0.188
				f (mm/min)	1050	1400	1670	1000	1300	1250	1100
	40	Chilled Cast Iron		a_p (mm)	0.056	0.147	0.196	0.14	0.294	0.392	0.84
				v_c (m/min)	96	122	117	103	117	116	115
				n	15200	12900	9300	6500	6200	4600	3000
				f_z	0.04	0.067	0.09	0.108	0.129	0.163	0.213
				f (mm/min)	1200	1700	1670	1100	1600	1500	1300
	41	Hardened Cast Iron		a_p (mm)	0.04	0.105	0.14	0.1	0.21	0.28	0.6
				v_c (m/min)	85	107	103	90	104	101	100
				n	13500	11300	8100	5700	5500	4000	2650
				f_z	0.039	0.063	0.09	0.09	0.121	0.16	0.188
				f (mm/min)	1050	1400	1670	1000	1300	1250	1100



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut

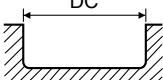


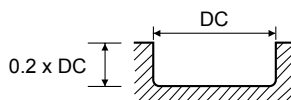
CUTTING DATA

108365 (2 Flute Corner Radius)													
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	113	125	135	144	149	151	158	155	156
				n	17900	13200	10700	9150	7900	6000	5000	4100	3100
				f _z	0.007	0.011	0.016	0.023	0.032	0.045	0.054	0.051	0.058
				f (mm/min)	250	290	340	420	500	540	540	420	360
	6-9	Low alloy Steel	25-35	v _c (m/min)	73	81	86	91	95	96	103	105	106
				n	11600	8500	6800	5700	5000	3800	3200	2780	2100
				f _z	0.005	0.008	0.012	0.017	0.025	0.033	0.038	0.041	0.04
				f (mm/min)	115	135	160	195	250	250	250	220	170
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	113	125	135	144	149	151	158	155	156
				n	17900	13200	10700	9150	7900	6000	5000	4100	3100
				f _z	0.007	0.011	0.016	0.023	0.032	0.045	0.054	0.051	0.058
				f (mm/min)	250	290	340	420	500	540	540	420	360
K	15-20	Cast Iron	v _c (m/min)	113	125	135	144	149	151	158	155	156	
			n	17900	13200	10700	9150	7900	6000	5000	4100	3100	
			f _z	0.007	0.011	0.016	0.023	0.032	0.045	0.054	0.051	0.058	
			f (mm/min)	250	290	340	420	500	540	540	420	360	
H	38	Hardened Steel	45-55	v _c (m/min)	45	50	54	60	62	63	63	63	64
				n	7100	5300	4300	3800	3200	2500	2000	1670	1270
				f _z	0.005	0.007	0.009	0.013	0.018	0.024	0.03	0.03	0.031
				f (mm/min)	70	75	75	100	110	120	120	100	80
	40	Chilled Cast Iron		v _c (m/min)	73	81	86	91	5000	96	103	105	106
				n	11600	8500	6800	5700	0.025	3800	3200	2780	2100
				f _z	0.005	0.008	0.012	0.017	250	0.033	0.038	0.041	0.04
				f (mm/min)	115	135	160	195	149	250	250	220	170
	41	Hardened Cast Iron		v _c (m/min)	45	50	54	60	62	63	63	63	64
				n	7100	5300	4300	3800	3200	2500	2000	1670	1270
				f _z	0.005	0.007	0.009	0.013	0.018	0.024	0.03	0.03	0.031
				f (mm/min)	70	75	75	100	110	120	120	100	80

0.2 x DC

DC





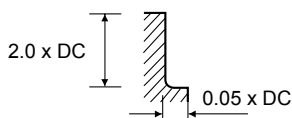
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

112365 (4 Flute Corner Radius)											
VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)							
				3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	1-5	Non-alloy Steel	<25	v_c (m/min)	125	135	144	149	151	158	155
				n	13200	10700	9150	7900	6000	5000	4100
				f_z	0.006	0.01	0.012	0.014	0.019	0.023	0.022
				f (mm/min)	315	430	440	440	460	460	360
	6-9	Low alloy Steel	25-35	v_c (m/min)	81	86	91	95	96	103	105
				n	8500	6800	5700	5000	3800	3280	2780
				f_z	0.008	0.011	0.016	0.018	0.024	0.027	0.029
				f (mm/min)	275	300	370	360	365	350	320
	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	125	135	144	149	151	158	155
				n	13200	10700	9150	7900	6000	5000	4100
				f_z	0.006	0.01	0.012	0.014	0.019	0.023	0.022
				f (mm/min)	315	430	440	440	460	460	360
K	15-20	Cast Iron		v_c (m/min)	125	135	144	149	151	158	155
				n	13200	10700	9150	7900	6000	5000	4100
				f_z	0.006	0.01	0.012	0.014	0.019	0.023	0.022
				f (mm/min)	315	430	440	440	460	460	360
H	38	Hardened Steel	45-55	v_c (m/min)	50	54	60	62	63	63	63
				n	5300	4300	3800	3200	2500	2000	1670
				f_z	0.006	0.008	0.011	0.013	0.017	0.021	0.021
				f (mm/min)	125	135	165	170	170	165	140
	40	Chilled Cast Iron		v_c (m/min)	81	86	91	95	96	103	105
				n	8500	6800	5700	5000	3800	3280	2780
				f_z	0.008	0.011	0.016	0.018	0.024	0.027	0.029
				f (mm/min)	275	300	370	360	365	350	320
	41	Hardened Cast Iron		v_c (m/min)	50	54	60	62	63	63	63
				n	5300	4300	3800	3200	2500	2000	1670
				f_z	0.006	0.008	0.011	0.013	0.017	0.021	0.021
				f (mm/min)	125	135	165	170	170	165	140



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

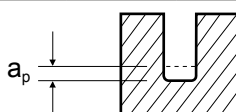
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

110365 (2 Flute Extended Neck Corner Radius)												
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					0.2 LU=1.0	0.3 LU=1.0	0.4 LU=2.0	0.5 LU=2.0	0.6 LU=4.0	0.8 LU=6.0	1.0 LU=6.0	1.2 LU=6.0
P	1-5	Non-alloy Steel	<25	a _p (mm)	0.028	0.042	0.056	0.07	0.048	0.064	0.08	0.168
				v _c (m/min)	31	47	63	68	62	82	94	112
				n	49300	49800	50100	43200	32800	32600	29900	29700
				f _z	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.005
				f (mm/min)	195	200	200	260	195	195	240	295
	6-9	Low alloy Steel	25-35	a _p (mm)	0.021	0.032	0.042	0.053	0.036	0.048	0.06	0.126
				v _c (m/min)	22	30	40	44	41	54	61	71
				n	35000	31800	31800	28000	21700	21400	19400	18800
				f _z	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
				f (mm/min)	70	65	65	110	85	85	78	110
	10-11	High alloy Steel, Tool Steel	35-45	a _p (mm)	0.021	0.032	0.042	0.053	0.036	0.048	0.06	0.126
				v _c (m/min)	22	30	40	44	41	54	61	71
				n	35000	31800	31800	28000	21700	21400	19400	18800
				f _z	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
				f (mm/min)	70	65	65	110	85	85	78	110
K	15-20	Cast Iron	a _p (mm)	0.028	0.042	0.056	0.07	0.048	0.064	0.08	0.168	
			v _c (m/min)	31	47	63	68	62	82	94	112	
			n	49300	49800	50100	43200	32800	32600	29900	29700	
			f _z	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.005	
			f (mm/min)	195	200	200	260	195	195	240	295	
H	38	Hardened Steel	45-55	a _p (mm)	0.017	0.025	0.034	0.042	0.029	0.038	0.048	0.101
				v _c (m/min)	13	19	25	27	25	33	37	44
				n	20600	20100	19800	17100	13200	13100	11700	11600
				f _z	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
				f (mm/min)	40	40	40	70	50	50	45	70
	40	Chilled Cast Iron		a _p (mm)	0.021	0.032	0.042	0.053	0.036	0.048	0.06	0.126
				v _c (m/min)	22	30	40	44	41	54	61	71
				n	35000	31800	31800	28000	21700	21400	19400	18800
				f _z	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
				f (mm/min)	70	65	65	110	85	85	78	110
	41	Hardened Cast Iron		a _p (mm)	0.017	0.025	0.034	0.042	0.029	0.038	0.048	0.101
				v _c (m/min)	13	19	25	27	25	33	37	44
				n	20600	20100	19800	17100	13200	13100	11700	11600
				f _z	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.003
				f (mm/min)	40	40	40	70	50	50	45	70



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v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

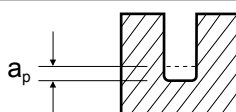
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

110365 (2 Flute Extended Neck Corner Radius)											
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					1.5 LU=6.0	2.0 LU=8.0	3.0 LU=12.0	4.0 LU=16.0	6.0 LU=20.0	8.0 LU=25.0	10.0 LU=30.0
P	1-5	Non-alloy Steel	<25	a _p (mm)	0.21	0.28	0.42	0.56	0.84	1.12	2.0
				v _c (m/min)	124	136	150	161	179	181	188
				n	26300	21600	15900	12800	9500	7200	5900
				f _z	0.006	0.007	0.01	0.016	0.032	0.044	0.053
				f (mm/min)	315	300	315	410	600	630	630
	6-9	Low alloy Steel	25-35	a _p (mm)	0.158	0.21	0.315	0.42	0.63	0.84	1.5
				v _c (m/min)	76	87	97	103	113	114	126
				n	16100	13800	10200	8200	6000	4500	4000
				f _z	0.004	0.005	0.008	0.012	0.025	0.033	0.038
				f (mm/min)	130	135	165	195	300	300	305
	10-11	High alloy Steel, Tool Steel	35-45	a _p (mm)	0.158	0.21	0.315	0.42	0.63	0.84	1.5
				v _c (m/min)	76	87	97	103	113	114	126
				n	16100	13800	10200	8200	6000	4500	4000
				f _z	0.004	0.005	0.008	0.012	0.025	0.033	0.038
				f (mm/min)	130	135	165	195	300	300	305
K	15-20	Cast Iron	a _p (mm)	0.21	0.28	0.42	0.56	0.84	1.12	2.0	
			v _c (m/min)	124	136	150	161	179	181	188	
			n	26300	21600	15900	12800	9500	7200	5900	
			f _z	0.006	0.007	0.01	0.016	0.032	0.044	0.053	
			f (mm/min)	315	300	315	410	600	630	630	
H	38	Hardened Steel	45-55	a _p (mm)	0.126	0.168	0.252	0.336	0.504	0.672	1.2
				v _c (m/min)	48	54	59	65	74	76	76
				n	10100	8600	6200	5100	3900	3000	2400
				f _z	0.003	0.005	0.006	0.009	0.018	0.023	0.029
				f (mm/min)	60	85	75	90	140	140	140
	40	Chilled Cast Iron		a _p (mm)	0.158	0.21	0.315	0.42	0.63	0.84	1.5
				v _c (m/min)	76	87	97	103	113	114	126
				n	16100	13800	10200	8200	6000	4500	4000
				f _z	0.004	0.005	0.008	0.012	0.025	0.033	0.038
				f (mm/min)	130	135	165	195	300	300	305
	41	Hardened Cast Iron		a _p (mm)	0.126	0.168	0.252	0.336	0.504	0.672	1.2
				v _c (m/min)	48	54	59	65	74	76	76
				n	10100	8600	6200	5100	3900	3000	2400
				f _z	0.003	0.005	0.006	0.009	0.018	0.023	0.029
				f (mm/min)	60	85	75	90	140	140	140



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

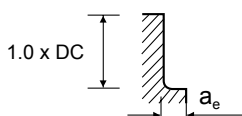
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

114365 (4 Flute Extended Neck Corner Radius)														
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)									
					1.0 LU=6.0	1.2 LU=6.0	1.5 LU=8.0	2.0 LU=8.0	3.0 LU=12.0	4.0 LU=16.0	6.0 LU=20.0	8.0 LU=25.0	10.0 LU=30.0	12.0 LU=32.0
P	1-5	Non-alloy Steel	<25	a _e (mm)	0.012	0.025	0.018	0.042	0.063	0.084	0.126	0.168	0.3	0.36
				v _c (m/min)	94	112	112	136	150	161	179	181	188	188
				n	29900	29700	23700	21600	15900	12800	9500	7200	5900	4900
				f _z	0.002	0.003	0.003	0.004	0.006	0.01	0.013	0.019	0.023	0.022
				f (mm/min)	240	350	285	340	380	500	490	545	550	440
	6-9	Low alloy Steel	25-35	a _e (mm)	0.009	0.019	0.014	0.032	0.047	0.063	0.095	0.126	0.225	0.27
				v _c (m/min)	61	71	69	87	97	103	113	114	126	126
				n	19400	18800	14600	13800	10300	8200	6000	4500	4000	3300
				f _z	0.003	0.004	0.004	0.005	0.008	0.011	0.018	0.024	0.027	0.028
				f (mm/min)	230	300	230	275	330	361	430	435	430	375
	10-11	High alloy Steel, Tool Steel	35-45	a _e (mm)	0.009	0.019	0.014	0.032	0.047	0.063	0.095	0.126	0.225	0.27
				v _c (m/min)	61	71	69	87	97	103	113	114	126	126
				n	19400	18800	14600	13800	10300	8200	6000	4500	4000	3300
				f _z	0.003	0.004	0.004	0.005	0.008	0.011	0.018	0.024	0.027	0.028
				f (mm/min)	230	300	230	275	330	361	430	435	430	375
K	15-20	Cast Iron	a _e (mm)	0.012	0.025	0.018	0.042	0.063	0.084	0.126	0.168	0.3	0.36	
			v _c (m/min)	94	112	112	136	150	161	179	181	188	188	
			n	29900	29700	23700	21600	15900	12800	9500	7200	5900	4900	
			f _z	0.002	0.003	0.003	0.004	0.006	0.01	0.013	0.019	0.023	0.022	
			f (mm/min)	240	350	285	340	380	500	490	545	550	440	
H	38	Hardened Steel	45-55	a _e (mm)	0.007	0.015	0.011	0.025	0.038	0.05	0.076	0.101	0.18	0.216
				v _c (m/min)	37	44	43	54	59	65	74	76	76	75
				n	11700	11600	9100	8500	6200	5100	3900	3000	2400	1950
				f _z	0.002	0.003	0.003	0.004	0.006	0.008	0.013	0.017	0.021	0.02
				f (mm/min)	95	140	105	135	150	166	200	205	200	160
	40	Chilled Cast Iron		a _e (mm)	0.009	0.019	0.014	0.032	0.047	0.063	0.095	0.126	0.225	0.27
				v _c (m/min)	61	71	69	87	97	103	113	114	126	126
				n	19400	18800	14600	13800	10300	8200	6000	4500	4000	3300
				f _z	0.003	0.004	0.004	0.005	0.008	0.011	0.018	0.024	0.027	0.028
				f (mm/min)	230	300	230	275	330	361	430	435	430	375
	41	Hardened Cast Iron		a _e (mm)	0.007	0.015	0.011	0.025	0.038	0.05	0.076	0.101	0.18	0.216
				v _c (m/min)	37	44	43	54	59	65	74	76	76	75
				n	11700	11600	9100	8500	6200	5100	3900	3000	2400	1950
				f _z	0.002	0.003	0.003	0.004	0.006	0.008	0.013	0.017	0.021	0.02
				f (mm/min)	95	140	105	135	150	166	200	205	200	160



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

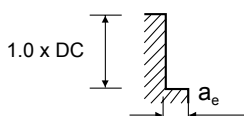
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

126365 (4 Flute Extended Neck)											
VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)							
				1.0 LU=5.0	1.5 LU=8.0	2.0 LU=10.0	3.0 LU=12.0	4.0 LU=16.0	5.0 LU=20.0	6.0 LU=25.0	10.0 LU=30.0
P	1-5	Non-alloy Steel	<25	a_e (mm)	0.015	0.013	0.029	0.044	0.059	0.074	0.126
				v_c (m/min)	69	72	87	101	114	119	126
				n	21900	15200	13800	10700	9000	7500	6600
				f_z	0.004	0.004	0.006	0.009	0.019	0.024	0.03
				f (mm/min)	350	240	330	385	690	720	800
	6-9	Low alloy Steel	25-35	a_e (mm)	0.011	0.009	0.022	0.033	0.044	0.055	0.095
				v_c (m/min)	42	45	57	63	70	71	76
				n	13300	9500	9000	6600	5500	4500	4000
				f_z	0.003	0.004	0.006	0.009	0.019	0.024	0.03
				f (mm/min)	160	150	220	240	420	430	480
	10-11	High alloy Steel, Tool Steel	35-45	a_e (mm)	0.011	0.009	0.022	0.033	0.044	0.055	0.095
				v_c (m/min)	42	45	57	63	70	71	76
				n	13300	9500	9000	6600	5500	4500	4000
				f_z	0.003	0.004	0.006	0.009	0.019	0.024	0.03
				f (mm/min)	160	150	220	240	420	430	480
K	15-20	Cast Iron		a_e (mm)	0.015	0.013	0.029	0.044	0.059	0.074	0.126
				v_c (m/min)	69	72	87	101	114	119	126
				n	21900	15200	13800	10700	9000	7500	6600
				f_z	0.004	0.004	0.006	0.009	0.019	0.024	0.03
				f (mm/min)	350	240	330	385	690	720	800
H	38	Hardened Steel	45-55	a_e (mm)	0.009	0.008	0.018	0.026	0.035	0.044	0.076
				v_c (m/min)	27	28	38	38	44	44	45
				n	8500	5900	6000	4000	3500	2800	2300
				f_z	0.001	0.002	0.003	0.004	0.005	0.008	0.01
				f (mm/min)	34	48	75	65	70	90	95
	40	Chilled Cast Iron		a_e (mm)	0.011	0.009	0.022	0.033	0.044	0.055	0.095
				v_c (m/min)	42	45	57	63	70	71	76
				n	13300	9500	9000	6600	5500	4500	4000
				f_z	0.003	0.004	0.006	0.009	0.019	0.024	0.03
				f (mm/min)	160	150	220	240	420	430	480
	41	Hardened Cast Iron		a_e (mm)	0.009	0.008	0.018	0.026	0.035	0.044	0.076
				v_c (m/min)	27	28	38	38	44	44	45
				n	8500	5900	6000	4000	3500	2800	2300
				f_z	0.001	0.002	0.003	0.004	0.005	0.008	0.01
				f (mm/min)	34	48	75	65	70	90	95



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

116365 (2 Flute)													
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	26	37	49	57	60	62	63	66	68
				n	41000	39200	39000	36200	31800	28100	25000	23300	21600
				f _z	0.001	0.004	0.001	0.002	0.002	0.003	0.003	0.004	0.004
				f (mm/min)	80	80	75	145	125	170	150	185	170
	6-9	Low alloy Steel	25-35	v _c (m/min)	16	22	29	34	36	37	38	40	41
				n	25000	23300	23000	21600	19000	16800	15100	14100	13000
				f _z	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.004
				f (mm/min)	50	45	45	85	75	100	90	85	100
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	16	22	29	34	36	37	38	40	41
				n	25000	23300	23000	21600	19000	16800	15100	14100	13000
				f _z	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.004
				f (mm/min)	50	45	45	85	75	100	90	85	100
M	14	Austenitic Stainless Steel	v _c (m/min)	13	18	25	28	30	31	31	33	34	
			n	20000	19000	19800	17800	15900	14000	12300	11600	10800	
			f _z	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.004	
			f (mm/min)	40	35	40	70	65	85	75	70	85	
K	15-20	Cast Iron	v _c (m/min)	26	37	49	57	60	62	63	66	68	
			n	41000	39200	39000	36200	31800	28100	25000	23300	21600	
			f _z	0.001	0.004	0.001	0.002	0.002	0.003	0.003	0.004	0.004	
			f (mm/min)	80	80	75	145	125	170	150	185	170	
H	38	Hardened Steel	45-55	v _c (m/min)	11	15	20	23	24	25	25	27	27
				n	17500	15900	15900	14600	12700	11300	9900	9500	8500
				f _z	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002
				f (mm/min)	35	30	30	30	25	20	40	35	30
	40	Chilled Cast Iron		v _c (m/min)	16	22	29	34	36	37	38	40	41
				n	25000	23300	23000	21600	19000	16800	15100	14100	13000
				f _z	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.004
				f (mm/min)	50	45	45	85	75	100	90	85	100
	41	Hardened Cast Iron		v _c (m/min)	11	15	20	23	24	25	25	27	27
				n	17500	15900	15900	14600	12700	11300	9900	9500	8500
				f _z	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002
				f (mm/min)	35	30	30	30	25	20	40	35	30
MATERIAL GROUP P, K					MATERIAL GROUP M, H								
a_p DC a_p : ø0.2mm - ø1.0mm = 0.15 x DC a_p : ø1.5mm - ø3.0mm = 0.2 x DC a_p : ø3.5mm - ø20.0mm = 0.5 x DC					a_p DC a_p : ø0.2mm - ø1.0mm = 0.02 x DC a_p : ø1.5mm - ø20.0mm = 0.05 x DC								

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

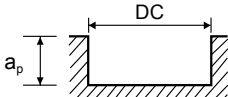
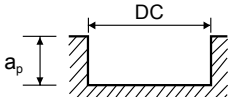
f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

116365 (2 Flute)													
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					1.2	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	68	71	73	80	84	91	95	98	99
				n	18000	15000	11600	10100	8900	8200	7500	6900	6300
				f _z	0.005	0.006	0.009	0.01	0.012	0.06	0.021	0.023	0.027
				f (mm/min)	180	180	200	200	210	265	310	320	340
	6-9	Low alloy Steel	25-35	v _c (m/min)	41	42	48	52	52	56	58	59	59
				n	10800	8900	7600	6600	5500	5000	4600	4100	3700
				f _z	0.005	0.006	0.008	0.01	0.013	0.017	0.021	0.023	0.026
				f (mm/min)	110	105	120	130	140	170	190	190	195
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	41	42	48	52	52	56	58	59	59
				n	10800	8900	7600	6600	5500	5000	4600	4100	3700
				f _z	0.005	0.006	0.008	0.01	0.013	0.017	0.021	0.023	0.026
				f (mm/min)	110	105	120	130	140	170	190	190	195
M	14	Austenitic Stainless Steel	v _c (m/min)	34	35	40	43	44	47	49	50	50	
			n	9000	7400	6300	5400	4600	4200	3900	3500	3100	
			f _z	0.005	0.006	0.008	0.01	0.014	0.016	0.021	0.023	0.027	
			f (mm/min)	90	90	100	100	130	130	130	160	170	
K	15-20	Cast Iron	v _c (m/min)	68	71	73	80	84	91	95	98	99	
			n	18000	15000	11600	10100	8900	8200	7500	6900	6300	
			f _z	0.005	0.006	0.009	0.01	0.012	0.06	0.021	0.023	0.027	
			f (mm/min)	180	180	200	200	210	265	310	320	340	
H	38	Hardened Steel	45-55	v _c (m/min)	27	28	32	33	32	35	37	37	36
				n	7100	5900	5000	4200	3400	3100	2900	2600	2200
				f _z	0.002	0.003	0.004	0.005	0.006	0.007	0.007	0.009	0.011
				f (mm/min)	30	35	40	40	40	45	40	45	50
	40	Chilled Cast Iron		v _c (m/min)	41	42	48	52	52	56	58	59	59
				n	10800	8900	7600	6600	5500	5000	4600	4100	3700
				f _z	0.005	0.006	0.008	0.01	0.013	0.017	0.021	0.023	0.026
				f (mm/min)	110	105	120	130	140	170	190	190	195
	41	Hardened Cast Iron		v _c (m/min)	27	28	32	33	32	35	37	37	36
				n	7100	5900	5000	4200	3400	3100	2900	2600	2200
				f _z	0.002	0.003	0.004	0.005	0.006	0.007	0.007	0.009	0.011
				f (mm/min)	30	35	40	40	40	45	40	45	50
MATERIAL GROUP P, K					MATERIAL GROUP M, H								
a_p : ø0.2mm - ø1.0mm = 0.15 x DC a_p : ø1.5mm - ø3.0mm = 0.2 x DC a_p : ø3.5mm - ø20.0mm = 0.5 x DC 					a_p : ø0.2mm - ø1.0mm = 0.02 x DC a_p : ø1.5mm - ø20.0mm = 0.05 x DC 								

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

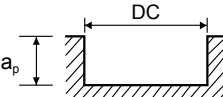
116365 (2 Flute)													
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	105	107	107	107	106	106	105	104	102
				n	5500	5200	4800	4500	4200	3950	3700	3480	3240
				f _z	0.033	0.036	0.039	0.043	0.018	0.049	0.05	0.051	0.053
				f (mm/min)	365	375	380	390	400	390	370	355	345
	6-9	Low alloy Steel	25-35	v _c (m/min)	63	64	65	64	63	64	64	64	63
				n	3300	3100	2950	2700	2500	2400	2200	2100	2000
				f _z	0.034	0.036	0.037	0.039	0.042	0.042	0.042	0.042	0.043
				f (mm/min)	220	220	215	210	210	200	190	180	170
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	63	64	65	64	63	64	64	64	63
				n	3300	3100	2950	2700	2500	2400	2200	2100	2000
				f _z	0.034	0.036	0.037	0.039	0.042	0.042	0.042	0.042	0.043
				f (mm/min)	220	220	215	210	210	200	190	180	170
M	14	Austenitic Stainless Steel	v _c (m/min)	54	54	54	54	53	53	53	53	53	
			n	2800	2600	2450	2300	2100	1980	1870	1770	1680	
			f _z	0.033	0.036	0.038	0.042	0.045	0.046	0.048	0.049	0.051	
			f (mm/min)	190	190	185	190	190	180	180	175	170	
K	15-20	Cast Iron	v _c (m/min)	105	107	107	107	106	106	105	104	102	
			n	5500	5200	4800	4500	4200	3950	3700	3480	3240	
			f _z	0.033	0.036	0.039	0.043	0.018	0.049	0.05	0.051	0.053	
			f (mm/min)	365	375	380	390	400	390	370	355	345	
H	38	Hardened Steel	45-55	v _c (m/min)	38	39	40	41	42	43	43	43	43
				n	2000	1900	1800	1740	1670	1610	1520	1440	1370
				f _z	0.015	0.016	0.018	0.021	0.024	0.023	0.022	0.022	0.023
				f (mm/min)	60	60	65	70	80	75	65	60	60
	40	Chilled Cast Iron		v _c (m/min)	63	64	65	64	63	64	64	64	63
				n	3300	3100	2950	2700	2500	2400	2200	2100	2000
				f _z	0.034	0.036	0.037	0.039	0.042	0.042	0.042	0.042	0.043
				f (mm/min)	220	220	215	210	210	200	190	180	170
	41	Hardened Cast Iron		v _c (m/min)	38	39	40	41	42	43	43	43	43
				n	2000	1900	1800	1740	1670	1610	1520	1440	1370
				f _z	0.015	0.016	0.018	0.021	0.024	0.023	0.022	0.022	0.023
				f (mm/min)	60	60	65	70	80	75	65	60	60

MATERIAL GROUP P, K

a_p : ø0.2mm - ø1.0mm = 0.15 x DC

a_p : ø1.5mm - ø3.0mm = 0.2 x DC

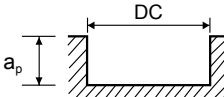
a_p : ø3.5mm - ø20.0mm = 0.5 x DC



MATERIAL GROUP M, H

a_p : ø0.2mm - ø1.0mm = 0.02 x DC

a_p : ø1.5mm - ø20.0mm = 0.05 x DC

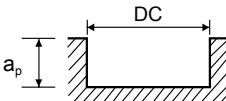
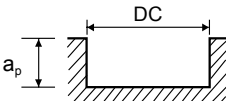


Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

116365 (2 Flute)												
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					10.5	11.0	12.0	13.0	14.0	15.0	16.0	20.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	103	104	103	106	109	110	111	106
				n	3100	3000	2700	2500	2470	2330	2200	1680
				f _z	0.053	0.053	0.054	0.054	0.054	0.052	0.052	0.054
				f (mm/min)	330	320	295	280	265	240	230	180
	6-9	Low alloy Steel	25-35	v _c (m/min)	63	64	63	65	67	68	68	67
				n	1910	1850	1670	1590	1520	1440	1350	1060
				f _z	0.042	0.041	0.04	0.041	0.041	0.042	0.042	0.04
				f (mm/min)	160	150	130	130	125	120	115	85
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	63	64	63	65	67	68	68	67
				n	1910	1850	1670	1590	1520	1440	1350	1060
				f _z	0.042	0.041	0.04	0.041	0.041	0.042	0.042	0.04
				f (mm/min)	160	150	130	130	125	120	115	85
M	14	Austenitic Stainless Steel	v _c (m/min)	53	53	51	52	53	53	53	53	
			n	1600	1530	1350	1270	1200	1120	1050	840	
			f _z	0.05	0.049	0.05	0.051	0.052	0.053	0.054	0.05	
			f (mm/min)	160	150	135	130	125	120	115	85	
K	15-20	Cast Iron	v _c (m/min)	103	104	103	106	109	110	111	106	
			n	3100	3000	2700	2500	2470	2330	2200	1680	
			f _z	0.053	0.053	0.054	0.054	0.054	0.052	0.052	0.054	
			f (mm/min)	330	320	295	280	265	240	230	180	
H	38	Hardened Steel	45-55	v _c (m/min)	43	44	44	45	45	45	45	43
				n	1300	1270	1160	1100	1020	955	895	680
				f _z	0.023	0.023	0.025	0.025	0.024	0.023	0.023	0.024
				f (mm/min)	60	60	55	55	50	45	40	35
	40	Chilled Cast Iron		v _c (m/min)	63	64	63	65	67	68	68	67
				n	1910	1850	1670	1590	1520	1440	1350	1060
				f _z	0.042	0.041	0.04	0.041	0.041	0.042	0.042	0.04
				f (mm/min)	160	150	130	130	125	120	115	85
	41	Hardened Cast Iron		v _c (m/min)	43	44	44	45	45	45	45	43
				n	1300	1270	1160	1100	1020	955	895	680
				f _z	0.023	0.023	0.025	0.025	0.024	0.023	0.023	0.024
				f (mm/min)	60	60	55	55	50	45	40	35
MATERIAL GROUP P, K					MATERIAL GROUP M, H							
a _p : ø0.2mm - ø1.0mm = 0.15 x DC a _p : ø1.5mm - ø3.0mm = 0.2 x DC a _p : ø3.5mm - ø20.0mm = 0.5 x DC					a _p : ø0.2mm - ø1.0mm = 0.02 x DC a _p : ø1.5mm - ø20.0mm = 0.05 x DC							
												

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

118365 (2 Flute Long Length)														
VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)										
				1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	1-5	Non-alloy Steel	<25	v_c (m/min)	45	48	57	54	54	65	69	72	72	77
				n	14320	10100	9100	6800	5700	5170	4390	3820	2860	1990
				f_z	0.002	0.003	0.005	0.005	0.008	0.012	0.017	0.002	0.028	0.039
				f (mm/min)	55	60	90	70	90	125	150	150	160	190
	6-9	Low alloy Steel	25-35	v_c (m/min)	36	38	46	44	44	52	55	57	57	63
				n	11450	8000	7300	5600	4670	4130	3500	3020	2260	1670
				f_z	0.002	0.003	0.005	0.005	0.008	0.012	0.018	0.021	0.027	0.039
				f (mm/min)	45	50	70	70	75	100	125	130	120	150
	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	36	38	46	44	44	52	55	57	57	63
				n	11450	8000	7300	5600	4670	4130	3500	3020	2260	1670
				f_z	0.002	0.003	0.005	0.005	0.008	0.012	0.018	0.021	0.027	0.039
				f (mm/min)	45	50	70	70	75	100	125	130	120	150
K	15-20	Cast Iron		v_c (m/min)	45	48	57	54	54	65	69	72	72	77
				n	14320	10100	9100	6800	5700	5170	4390	3820	2860	1990
				f_z	0.002	0.003	0.005	0.005	0.008	0.012	0.017	0.002	0.028	0.039
				f (mm/min)	55	60	90	70	90	125	150	150	160	190
H	38	Hardened Steel	45-55	v_c (m/min)	23	24	29	27	27	32	36	37	38	38
				n	7300	5100	4610	3400	2860	2540	2290	1960	1510	1000
				f_z	0.002	0.002	0.004	0.004	0.007	0.01	0.012	0.015	0.02	0.029
				f (mm/min)	30	20	35	25	40	50	55	60	60	70
	40	Chilled Cast Iron		v_c (m/min)	36	38	46	44	44	52	55	57	57	63
				n	11450	8000	7300	5600	4670	4130	3500	3020	2260	1670
				f_z	0.002	0.003	0.005	0.005	0.008	0.012	0.018	0.021	0.027	0.039
				f (mm/min)	45	50	70	70	75	100	125	130	120	150
	41	Hardened Cast Iron		v_c (m/min)	23	24	29	27	27	32	36	37	38	38
				n	7300	5100	4610	3400	2860	2540	2290	1960	1510	1000
				f_z	0.002	0.002	0.004	0.004	0.007	0.01	0.012	0.015	0.02	0.029
				f (mm/min)	30	20	35	25	40	50	55	60	60	70

MATERIAL GROUP P, K, H40

a_p : $\varnothing 1.0\text{mm} - \varnothing 3.0\text{mm} = 0.4\text{mm}$
 a_p : $\varnothing 4.0\text{mm} - \varnothing 12.0\text{mm} = 0.3 \times DC$

MATERIAL GROUP H38, H41

$0.05 \times DC$

► The data given is based on medium flute length tools. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

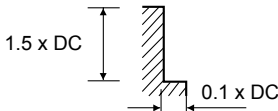
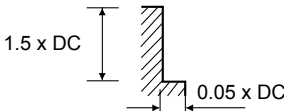
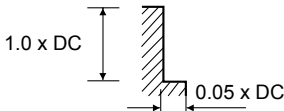
f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

106365 (6 Flute 45° Helix)										
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					6.0	8.0	10.0	12.0	16.0	20.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	110	111	111	112	111	111
				n	5800	4400	3500	2970	2200	1760
				f _z	0.03	0.079	0.099	0.099	0.1	0.1
				f (mm/min)	2100	2100	2100	1765	1325	1060
	6-9	Low alloy Steel	25-35	v _c (m/min)	77	78	76	79	78	77
				n	4080	3100	2400	2100	1550	1220
				f _z	0.059	0.078	0.099	0.097	0.099	0.099
				f (mm/min)	1440	1450	1430	1220	920	730
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	77	78	76	79	78	77
				n	4080	3100	2400	2100	1550	1220
				f _z	0.059	0.078	0.099	0.097	0.099	0.099
				f (mm/min)	1440	1450	1430	1220	920	730
K	15-20	Cast Iron	v _c (m/min)	110	111	111	112	111	111	
			n	5800	4400	3500	2970	2200	1760	
			f _z	0.03	0.079	0.099	0.099	0.1	0.1	
			f (mm/min)	2100	2100	2100	1765	1325	1060	
H	38	Hardened Steel	45-55	v _c (m/min)	31	31	33	33	34	33
				n	1640	1230	1050	875	675	525
				f _z	0.022	0.03	0.035	0.036	0.034	0.037
				f (mm/min)	215	220	220	190	135	115
	40	Chilled Cast Iron		v _c (m/min)	77	78	76	79	78	77
				n	4080	3100	2400	2100	1550	1220
				f _z	0.059	0.078	0.099	0.097	0.099	0.099
				f (mm/min)	1440	1450	1430	1220	920	730
	41	Hardened Cast Iron		v _c (m/min)	31	31	33	33	34	33
				n	1640	1230	1050	875	675	525
				f _z	0.022	0.03	0.035	0.036	0.034	0.037
				f (mm/min)	215	220	220	190	135	115
MATERIAL GROUP P1-5, K				MATERIAL GROUP P6-11, H40				MATERIAL GROUP H38, H41		
										

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

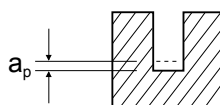
v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

120365 (2 Flute Extended Neck)												
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					0.4 LU=3.0	0.5 LU=4.0	0.6 LU=4.0	0.8 LU=4.0	1.0 LU=10.0	1.2 LU=6.0	1.4 LU=6.0	1.5 LU=10.0
P	1-5	Non-alloy Steel	<25	a _p (mm)	0.014	0.018	0.022	0.05	0.023	0.076	0.088	0.054
				v _c (m/min)	31	39	46	69	70	83	84	81
				n	24670	24800	24400	27450	22280	22000	19100	17180
				f _z	0.009	0.009	0.013	0.014	0.019	0.021	0.021	0.054
				f (mm/min)	445	445	635	770	845	925	800	720
	6-9	Low alloy Steel	25-35	a _p (mm)	0.011	0.014	0.017	0.039	0.018	0.059	0.069	0.042
				v _c (m/min)	29	36	44	65	66	78	80	77
				n	23070	22900	23300	25860	21000	20690	18180	16340
				f _z	0.007	0.007	0.009	0.012	0.017	0.017	0.016	0.016
				f (mm/min)	320	320	420	620	715	700	580	520
	10-11	High alloy Steel, Tool Steel	35-45	a _p (mm)	0.011	0.014	0.017	0.039	0.018	0.059	0.069	0.042
				v _c (m/min)	29	36	44	65	66	78	80	77
				n	23070	22900	23300	25860	21000	20690	18180	16340
				f _z	0.007	0.007	0.009	0.012	0.017	0.017	0.016	0.016
				f (mm/min)	320	320	420	620	715	700	580	520
K	15-20	Cast Iron	a _p (mm)	0.014	0.018	0.022	0.05	0.023	0.076	0.088	0.054	
			v _c (m/min)	31	39	46	69	70	83	84	81	
			n	24670	24800	24400	27450	22280	22000	19100	17180	
			f _z	0.009	0.009	0.013	0.014	0.019	0.021	0.021	0.054	
			f (mm/min)	445	445	635	770	845	925	800	720	
H	38	Hardened Steel	45-55	a _p (mm)	0.008	0.01	0.012	0.028	0.013	0.042	0.049	0.03
				v _c (m/min)	26	32	39	57	58	69	70	68
				n	20700	20370	20690	22680	18460	18300	15910	14430
				f _z	0.005	0.01	0.008	0.04	0.015	0.013	0.013	0.013
				f (mm/min)	205	245	330	450	550	475	415	375
	40	Chilled Cast Iron		a _p (mm)	0.011	0.014	0.017	0.039	0.018	0.059	0.069	0.042
				v _c (m/min)	29	36	44	65	66	78	80	77
				n	23070	22900	23300	25860	21000	20690	18180	16340
				f _z	0.007	0.007	0.009	0.012	0.017	0.017	0.016	0.016
				f (mm/min)	320	320	420	620	715	700	580	520
	41	Hardened Cast Iron		a _p (mm)	0.008	0.01	0.012	0.028	0.013	0.042	0.049	0.03
				v _c (m/min)	26	32	39	57	58	69	70	68
				n	20700	20370	20690	22680	18460	18300	15910	14430
				f _z	0.005	0.01	0.008	0.04	0.015	0.013	0.013	0.013
				f (mm/min)	205	245	330	450	550	475	415	375

The diagram illustrates a 2-flute extended neck tool. A horizontal line represents the cutting edge, with a vertical double-headed arrow labeled a_p indicating the depth of cut. The tool's profile is shown in cross-section with hatching, featuring two flutes. A dashed line indicates the internal structure of the tool.



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

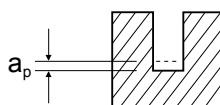
a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

120365 (2 Flute Extended Neck)									
VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)					
				1.8 LU=10.0	2.0 LU=12.0	2.5 LU=12.0	3.0 LU=16.0	4.0 LU=20.0	5.0 LU=35.0
P	1-5	Non-alloy Steel	<25	a_p (mm)	0.065	0.072	0.158	0.108	0.252
				v_c (m/min)	91	81	97	92	101
				n	16090	12900	12350	9760	8030
				f_z	0.021	0.026	0.039	0.035	0.081
				f (mm/min)	675	670	960	680	1300
	6-9	Low alloy Steel	25-35	a_p (mm)	0.05	0.056	0.123	0.084	0.196
				v_c (m/min)	86	77	991	87	96
				n	15200	12250	11580	9230	7640
				f_z	0.018	0.02	0.029	0.026	0.076
				f (mm/min)	545	490	670	480	1160
	10-11	High alloy Steel, Tool Steel	35-45	a_p (mm)	0.05	0.056	0.123	0.084	0.196
				v_c (m/min)	86	77	991	87	96
				n	15200	12250	11580	9230	7640
				f_z	0.018	0.02	0.029	0.026	0.076
				f (mm/min)	545	490	670	480	1160
K	15-20	Cast Iron		a_p (mm)	0.065	0.072	0.158	0.108	0.252
				v_c (m/min)	91	81	97	92	101
				n	16090	12900	12350	9760	8030
				f_z	0.021	0.026	0.039	0.035	0.081
				f (mm/min)	675	670	960	680	1300
H	38	Hardened Steel	45-55	a_p (mm)	0.036	0.04	0.088	0.06	0.14
				v_c (m/min)	75	68	81	56	84
				n	13260	10820	10310	5940	6680
				f_z	0.015	0.018	0.025	0.031	0.057
				f (mm/min)	395	390	515	365	760
	40	Chilled Cast Iron		a_p (mm)	0.05	0.056	0.123	0.084	0.196
				v_c (m/min)	86	77	991	87	96
				n	15200	12250	11580	9230	7640
				f_z	0.018	0.02	0.029	0.026	0.076
				f (mm/min)	545	490	670	480	1160
	41	Hardened Cast Iron		a_p (mm)	0.036	0.04	0.088	0.06	0.14
				v_c (m/min)	75	68	81	56	84
				n	13260	10820	10310	5940	6680
				f_z	0.015	0.018	0.025	0.031	0.057
				f (mm/min)	395	390	515	365	760



► The data given is based on LU length shown. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

124365 (4 Flute Long Length)												
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	60	65	66	71	63	75	80	83
				n	19100	13800	10500	9040	6680	5970	5100	4400
				f _z	0.002	0.004	0.006	0.007	0.009	0.014	0.021	0.025
				f (mm/min)	150	220	250	250	240	330	430	440
	6-9	Low alloy Steel	25-35	v _c (m/min)	34	37	38	41	36	43	46	48
				n	10800	7850	6040	5220	3820	3420	2930	2540
				f _z	0.002	0.003	0.004	0.005	0.007	0.01	0.015	0.018
				f (mm/min)	85	95	100	105	105	135	175	180
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	34	37	38	41	36	43	46	48
				n	10800	7850	6040	5220	3820	3420	2930	2540
				f _z	0.002	0.003	0.004	0.005	0.007	0.01	0.015	0.018
				f (mm/min)	85	95	100	105	105	135	175	180
K	15-20	Cast Iron		v _c (m/min)	60	65	66	71	63	75	80	83
				n	19100	13800	10500	9040	6680	5970	5100	4400
				f _z	0.002	0.004	0.006	0.007	0.009	0.014	0.021	0.025
				f (mm/min)	150	220	250	250	240	330	430	440
H	38	Hardened Steel	45-55	v _c (m/min)	21	23	24	25	22	27	30	31
				n	6685	4880	3820	3180	2330	2150	1910	1640
				f _z	0.001	0.002	0.004	0.005	0.006	0.008	0.011	0.014
				f (mm/min)	25	40	60	65	55	70	85	90
	40	Chilled Cast Iron		v _c (m/min)	34	37	38	41	36	43	46	48
				n	10800	7850	6040	5220	3820	3420	2930	2540
				f _z	0.002	0.003	0.004	0.005	0.007	0.01	0.015	0.018
				f (mm/min)	85	95	100	105	105	135	175	180
	41	Hardened Cast Iron		v _c (m/min)	21	23	24	25	22	27	30	31
				n	6685	4880	3820	3180	2330	2150	1910	1640
				f _z	0.001	0.002	0.004	0.005	0.006	0.008	0.011	0.014
				f (mm/min)	25	40	60	65	55	70	85	90

MATERIAL GROUP P, K, H40

MATERIAL GROUP H38, H41

► The data given is based on medium flute length tools. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

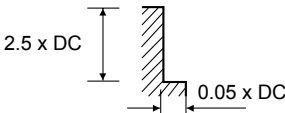
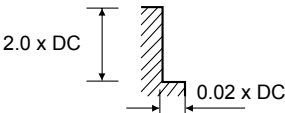
f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut



CUTTING DATA

124365 (4 Flute Long Length)											
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					8.0	10.0	12.0	14.0	16.0	20.0	25.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	84	89	87	93	98	89	86
				n	3340	2830	2300	2110	1950	1410	1090
				f _z	0.041	0.049	0.04	0.041	0.042	0.048	0.042
				f (mm/min)	550	555	370	345	330	270	185
	6-9	Low alloy Steel	25-35	v _c (m/min)	48	52	52	54	54	52	64
				n	1910	1650	1380	1230	1070	830	810
				f _z	0.028	0.033	0.03	0.029	0.03	0.034	0.027
				f (mm/min)	215	220	165	140	130	115	90
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	48	52	52	54	54	52	64
				n	1910	1650	1380	1230	1070	830	810
				f _z	0.028	0.033	0.03	0.029	0.03	0.034	0.027
				f (mm/min)	215	220	165	140	130	115	90
K	15-20	Cast Iron		v _c (m/min)	84	89	87	93	98	89	86
				n	3340	2830	2300	2110	1950	1410	1090
				f _z	0.041	0.049	0.04	0.041	0.042	0.048	0.042
				f (mm/min)	550	555	370	345	330	270	185
H	38	Hardened Steel	45-55	v _c (m/min)	32	32	32	33	34	31	39
				n	1270	1020	850	750	675	495	500
				f _z	0.022	0.027	0.021	0.021	0.022	0.028	0.023
				f (mm/min)	110	110	70	65	60	55	45
	40	Chilled Cast Iron		v _c (m/min)	48	52	52	54	54	52	64
				n	1910	1650	1380	1230	1070	830	810
				f _z	0.028	0.033	0.03	0.029	0.03	0.034	0.027
				f (mm/min)	215	220	165	140	130	115	90
	41	Hardened Cast Iron		v _c (m/min)	32	32	32	33	34	31	39
				n	1270	1020	850	750	675	495	500
				f _z	0.022	0.027	0.021	0.021	0.022	0.028	0.023
				f (mm/min)	110	110	70	65	60	55	45
MATERIAL GROUP P, K, H40					MATERIAL GROUP H38, H41						
											

► The data given is based on medium flute length tools. Please adjust machining conditions according to length.

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

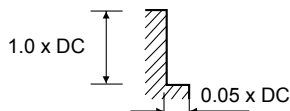
a_e - radial depth of cut



CUTTING DATA

104365, 122365 (4 Flute Standard & Heavy Cut)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					1.0	1.2	1.5	2.0	2.5	3.0	3.5	4.0	4.5
P	1-5	Non-alloy Steel	<25	v _c (m/min)	84	85	88	91	101	105	113	119	122
				n	26730	22540	18670	14480	12860	11140	10280	9470	8630
				f _z	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.016	0.018
				f (mm/min)	215	270	300	290	310	360	450	605	620
	6-9	Low alloy Steel	25-35	v _c (m/min)	51	51	53	59	64	66	70	73	74
				n	16230	13520	11240	9390	8150	7000	6360	5810	5230
				f _z	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.016	0.018
				f (mm/min)	130	160	180	190	195	225	280	370	375
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	51	51	53	59	64	66	70	73	74
				n	16230	13520	11240	9390	8150	7000	6360	5810	5230
				f _z	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.016	0.018
				f (mm/min)	130	160	180	190	195	225	280	370	375
M	14	Austenitic Stainless Steel	v _c (m/min)	42	42	44	50	54	54	58	61	62	
			n	13360	11140	9330	7960	6870	5730	5275	4850	4385	
			f _z	0.005	0.003	0.004	0.005	0.006	0.008	0.011	0.015	0.017	
			f (mm/min)	105	135	150	160	165	185	230	290	300	
K	15-20	Cast Iron	v _c (m/min)	84	85	88	91	101	105	113	119	122	
			n	26730	22540	18670	14480	12860	11140	10280	9470	8630	
			f _z	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.016	0.018	
			f (mm/min)	215	270	300	290	310	360	450	605	620	
H	38	Hardened Steel	45-55	v _c (m/min)	34	34	35	40	41	40	43	46	47
				n	10820	9010	7420	6360	5220	4240	3910	3660	3325
				f _z	0.001	0.001	0.002	0.002	0.006	0.004	0.004	0.004	0.005
				f (mm/min)	45	35	60	50	60	70	65	60	65
	40	Chilled Cast Iron		v _c (m/min)	51	51	53	59	64	66	70	73	74
				n	16230	13520	11240	9390	8150	7000	6360	5810	5230
				f _z	0.002	0.003	0.004	0.005	0.006	0.008	0.011	0.016	0.018
				f (mm/min)	130	160	180	190	195	225	280	370	375
	41	Hardened Cast Iron		v _c (m/min)	34	34	35	40	41	40	43	46	47
				n	10820	9010	7420	6360	5220	4240	3910	3660	3325
				f _z	0.001	0.001	0.002	0.002	0.006	0.004	0.004	0.004	0.005
				f (mm/min)	45	35	60	50	60	70	65	60	65



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

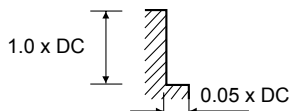
a_e - radial depth of cut



CUTTING DATA

104365, 122365 (4 Flute Standard & Heavy Cut)

VDI MATERIAL GROUP	MATERIAL	HRc		Size (mm)								
				5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
P	1-5	Non-alloy Steel	<25	v_c (m/min)	124	128	131	133	134	134	132	132
				n	7890	7410	6950	6510	6090	5685	5250	4940
				f_z	0.02	0.022	0.025	0.027	0.03	0.032	0.035	0.036
				f (mm/min)	630	650	695	700	730	730	735	710
	6-9	Low alloy Steel	25-35	v_c (m/min)	74	77	79	80	81	80	79	80
				n	4710	4455	4190	3920	3680	3395	3140	2995
				f_z	0.02	0.023	0.026	0.027	0.028	0.03	0.032	0.032
				f (mm/min)	375	410	435	425	410	405	400	380
	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	74	77	79	80	81	80	79	80
				n	4710	4455	4190	3920	3680	3395	3140	2995
				f_z	0.02	0.023	0.026	0.027	0.028	0.03	0.032	0.032
				f (mm/min)	375	410	435	425	410	405	400	380
M	14	Austenitic Stainless Steel		v_c (m/min)	62	65	67	68	68	67	66	66
				n	3945	3760	3550	3330	3090	2845	2625	2470
				f_z	0.02	0.022	0.024	0.026	0.029	0.031	0.035	0.036
				f (mm/min)	315	330	340	345	360	350	370	355
K	15-20	Cast Iron		v_c (m/min)	124	128	131	133	134	134	132	132
				n	7890	7410	6950	6510	6090	5685	5250	4940
				f_z	0.02	0.022	0.025	0.027	0.03	0.032	0.035	0.036
				f (mm/min)	630	650	695	700	730	730	735	710
H	38	Hardened Steel	45-55	v_c (m/min)	46	47	47	49	51	52	53	53
				n	2930	2720	2490	2400	2320	2205	2110	1985
				f_z	0.006	0.007	0.009	0.01	0.011	0.013	0.014	0.014
				f (mm/min)	70	75	90	95	100	115	120	110
	40	Chilled Cast Iron		v_c (m/min)	74	77	79	80	81	80	79	80
				n	4710	4455	4190	3920	3680	3395	3140	2995
				f_z	0.02	0.023	0.026	0.027	0.028	0.03	0.032	0.032
				f (mm/min)	375	410	435	425	410	405	400	380
	41	Hardened Cast Iron		v_c (m/min)	46	47	47	49	51	52	53	53
				n	2930	2720	2490	2400	2320	2205	2110	1985
				f_z	0.006	0.007	0.009	0.01	0.011	0.013	0.014	0.014
				f (mm/min)	70	75	90	95	100	115	120	110



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.

For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)

n - RPM (rev/min)

f_z - feed per tooth (mm)

f - feed rate (mm/min)

a_p - axial depth of cut

a_e - radial depth of cut

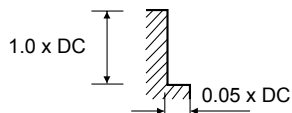


CUTTING DATA

104365, 122365 (4 Flute Standard & Heavy Cut)												
VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					9.5	10.0	11.0	12.0	14.0	16.0	18.0	20.0
P	1-5	Non-alloy Steel	<25	v _c (m/min)	130	128	130	129	136	138	137	132
				n	4355	4075	3760	3420	3090	2745	2420	2100
				f _z	0.038	0.039	0.04	0.04	0.04	0.04	0.04	0.04
				f (mm/min)	660	635	600	545	495	440	390	335
	6-9	Low alloy Steel	25-35	v _c (m/min)	79	79	79	79	84	85	85	84
				n	2645	2515	2285	2095	1910	1690	1500	1335
				f _z	0.031	0.032	0.032	0.032	0.031	0.032	0.031	0.032
				f (mm/min)	330	320	290	270	235	215	185	170
	10-11	High alloy Steel, Tool Steel	35-45	v _c (m/min)	79	79	79	79	84	85	85	84
				n	2645	2515	2285	2095	1910	1690	1500	1335
				f _z	0.031	0.032	0.032	0.032	0.031	0.032	0.031	0.032
				f (mm/min)	330	320	290	270	235	215	185	170
M	14	Austenitic Stainless Steel		v _c (m/min)	67	66	66	64	68	69	68	66
				n	2245	2100	1910	1700	1545	1370	1200	1050
				f _z	0.037	0.038	0.038	0.037	0.037	0.038	0.038	0.038
				f (mm/min)	330	320	290	250	230	210	180	160
K	15-20	Cast Iron		v _c (m/min)	130	128	130	129	136	138	137	132
				n	4355	4075	3760	3420	3090	2745	2420	2100
				f _z	0.038	0.039	0.04	0.04	0.04	0.04	0.04	0.04
				f (mm/min)	660	635	600	545	495	440	390	335
H	38	Hardened Steel	45-55	v _c (m/min)	54	53	55	55	57	57	56	53
				n	1910	1685	1590	1460	1295	1135	990	845
				f _z	0.014	0.014	0.014	0.015	0.15	0.014	0.014	0.012
				f (mm/min)	100	95	90	90	80	65	55	40
	40	Chilled Cast Iron		v _c (m/min)	79	79	79	79	84	85	85	84
				n	2645	2515	2285	2095	1910	1690	1500	1335
				f _z	0.031	0.032	0.032	0.032	0.031	0.032	0.031	0.032
				f (mm/min)	330	320	290	270	235	215	185	170
	41	Hardened Cast Iron		v _c (m/min)	54	53	55	55	57	57	56	53
				n	1910	1685	1590	1460	1295	1135	990	845
				f _z	0.014	0.014	0.014	0.015	0.15	0.014	0.014	0.012
				f (mm/min)	100	95	90	90	80	65	55	40

1.0 x DC

0.05 x DC



Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

167123, 167323, 168123, 168323, 169123, 169323 (4&5 Flute Roughing)									
VDI MATERIAL GROUP		HRc	SLOTTING	Size (mm)					
				6.0	8.0	10.0	12.0	16.0	20.0
P	1-5	Non-alloy Steel	<25	v_c (m/min)	225	225	225	225	225
				n	12000	9000	7200	6000	4500
				f_z	0.032	0.046	0.057	0.064	0.067
				f (mm/min)	1550	1650	1650	1540	1500
	6-9	Low alloy Steel	25-35	v_c (m/min)	200	205	200	205	205
				n	10600	8100	6400	5400	4100
				f_z	0.026	0.036	0.046	0.053	0.051
				f (mm/min)	1100	1180	1180	1140	1050
	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	200	205	200	205	205
				n	10600	8100	6400	5400	4100
				f_z	0.026	0.036	0.046	0.053	0.051
				f (mm/min)	1100	1180	1180	1140	1050
K	15-16	Grey Cast Iron		v_c (m/min)	225	225	225	225	225
				n	12000	9000	7200	6000	4500
				f_z	0.032	0.046	0.057	0.064	0.067
				f (mm/min)	1550	1650	1650	1540	1500
	17-20	Nodular/Malleable Cast Iron		v_c (m/min)	200	205	200	205	205
				n	10600	8100	6400	5400	4100
				f_z	0.026	0.036	0.046	0.053	0.051
				f (mm/min)	1100	1180	1180	1140	1050

MATERIAL GROUP P1-5	MATERIAL GROUP P6-11, K

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut



CUTTING DATA

167123, 167323, 168123, 168323, 169123, 169323 (4&5 Flute Roughing)									
VDI MATERIAL GROUP		HRc	SIDE CUTTING	Size (mm)					
				6.0	8.0	10.0	12.0	16.0	20.0
P	1-5	Non-alloy Steel	<25	v_c (m/min)	300	300	300	300	300
				n	15800	11900	9500	8000	4800
				f_z	0.041	0.057	0.071	0.08	0.089
				f (mm/min)	2570	2700	2700	2570	2140
	6-9	Low alloy Steel	25-35	v_c (m/min)	270	270	270	270	270
				n	14300	10700	8500	7100	4300
				f_z	0.032	0.046	0.057	0.065	0.07
				f (mm/min)	1850	1950	1950	1850	1500
	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	270	270	265	270	270
				n	14300	10700	8400	77100	5300
				f_z	0.032	0.046	0.057	0.065	0.07
				f (mm/min)	1850	1950	1950	1850	1500
K	15-16	Grey Cast Iron		v_c (m/min)	300	300	300	300	300
				n	15800	11900	9500	8000	4800
				f_z	0.041	0.057	0.071	0.08	0.089
				f (mm/min)	2570	2700	2700	2570	2140
	17-20	Nodular/ Malleable Cast Iron		v_c (m/min)	270	270	270	270	270
				n	14300	10700	8500	7100	4300
				f_z	0.032	0.046	0.057	0.065	0.07
				f (mm/min)	1850	1950	1950	1850	1500

MATERIAL GROUP P1-5	MATERIAL GROUP P6-11, K

Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
 All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

v_c - cutting speed (m/min)
 n - RPM (rev/min)
 f_z - feed per tooth (mm)
 f - feed rate (mm/min)
 a_p - axial depth of cut
 a_e - radial depth of cut