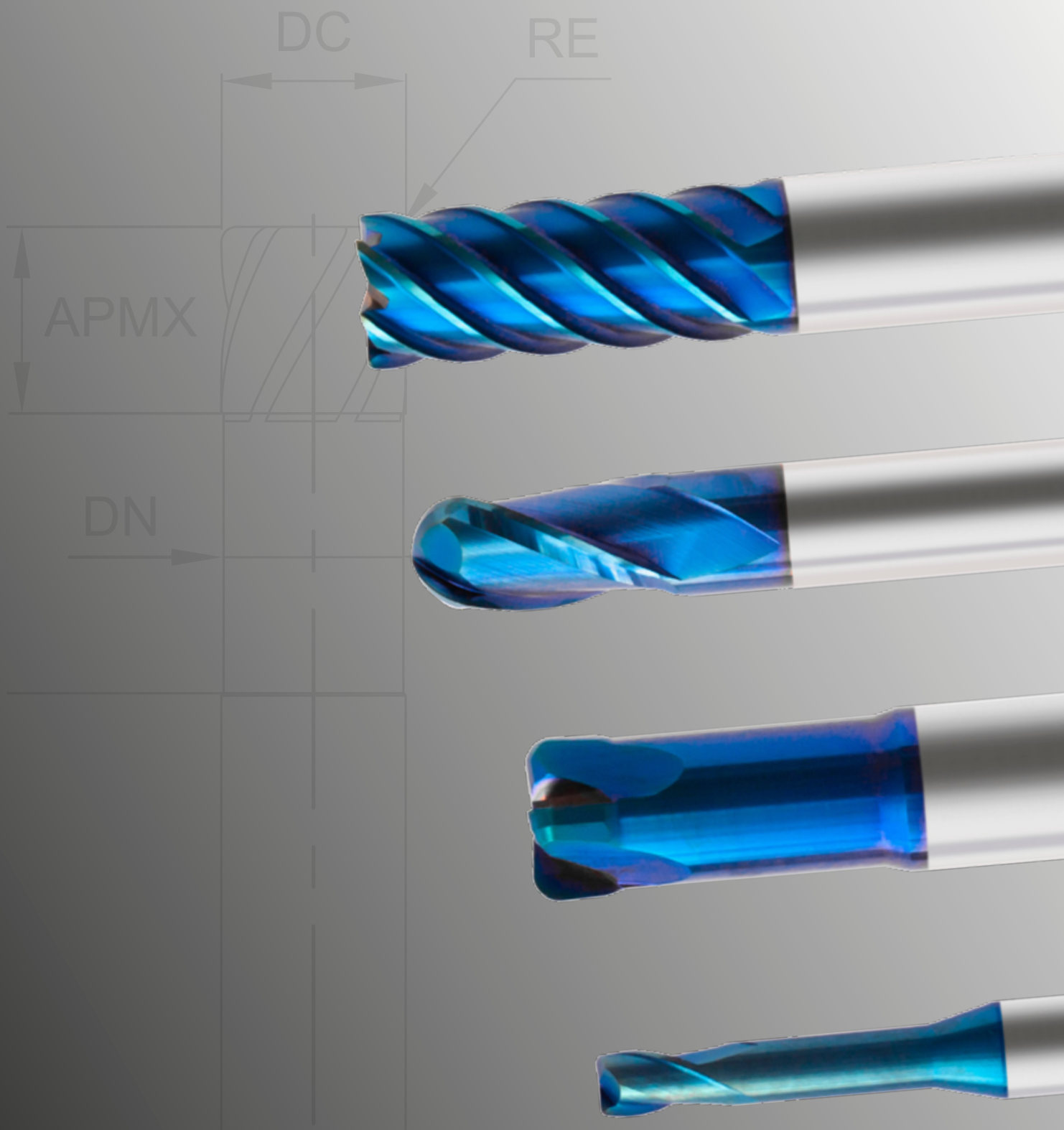
PULSAR BLUE

Designed specifically for use in dry cutting conditions for steels up to HRc70

EUROPA TOOL

Clarkson



HIGH FEED END MILLS

Code	Item	Description	Page No.
110350		Short Length 4 flute ø2.0mm - 12.0mm	P.3
111350		Long Length 4 Flute ø2.0mm - 16.0mm	P.4

2 FLUTE END MILLS

100450		Rib Processing ø0.1mm - 4.0mm	P.5-7
101850		Rib Processing Corner Radius ø1.0mm - 8.0mm	P.9-10
102350		Rib Processing Corner Radius ø0.5mm - 2.0mm	P.8
106350		Rib Processing Ball Nose, ø6.0 Shank ø0.5mm - 2.0mm	P.20
109350		Rib Processing Ball Nose ø0.1mm - 4.0mm	P.17-19
100350		Miniature ø0.3mm - 2.0mm	P.11
104350 112350		Miniature Ball Nose ø0.1mm - 2.0mm	P.14
101350		Extended Neck Stub Length ø0.3mm - 20.0mm	P.13
101450		Extended Neck Short Length ø0.1mm - 20.0mm	P.12
100550 105350		Extended Neck Ball Nose, Stub Length ø1.0mm - 25.0mm	P.15-16

3 FLUTE END MILLS

107350		Centre Match Ball Nose ø3.0mm - 20.0mm	P.21

4 FLUTE END MILLS

101550		Extended Neck ø1.0mm - 20.0mm	P.23
103350		Extended Neck Corner Radius, Stub ø1.0mm - 20.0mm	P.24
101650		Extended Neck Corner Radius, Short ø3.0mm - 12.0mm	P.25
101750		Extended Neck Corner Radius, Long ø6.0mm - 12.0mm	P.26
101950		Centre Match Ball Nose ø3.0mm - 20.0mm	P.22

MULTIFLUTE END MILLS

108350		Extended Neck Corner Rad, 45° Helix ø6.0mm - 20.0mm	P.27
102950		Long Series 45° Helix ø6.0mm - 25.0mm	P.28
103950		Extra Long Series 45° Helix ø6.0mm - 25.0mm	P.29
		Cutting Data	P.30-40

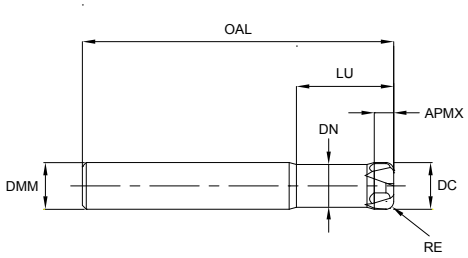
HIGH FEED CORNER RADIUS SHORT

NG HM | ZEFP 4 | RE | FHA 0° | DIN 6535HA

Series No. 110350

▸ cutting conditions : p.35-36

Excellent wear resistance at heavy feed rates on high hardened material.
Designed with reduced clearance angles and short flutes for strength.
High hardness & heat resistant coating for long life in dry applications.

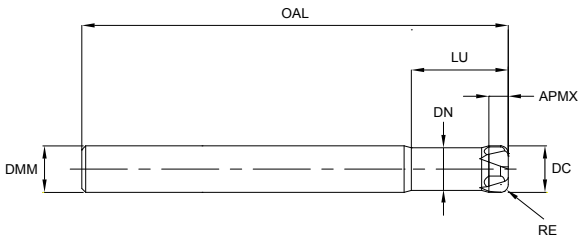


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1103500200	**2.0**	0.5	6	1.0	6.0	50	1.8
1103500300	**3.0**	0.5	6	1.2	8.0	50	2.8
1103500400	**4.0**	0.5	6	1.5	10.0	50	3.8
1103500600	**6.0**	0.5	6	2.5	12.0	60	5.4
1103500601	**6.0**	1.0	6	2.5	12.0	60	5.4
1103500800	**8.0**	1.0	8	3.5	16.0	60	7.2
1103500802	**8.0**	2.0	8	3.5	16.0	60	7.2
1103501000	**10.0**	1.0	10	4.0	20.0	70	9.0
1103501002	**10.0**	2.0	10	4.0	20.0	70	9.0
1103501200	**12.0**	2.0	12	5.0	25.0	80	11.0
1103501203	**12.0**	3.0	12	5.0	25.0	80	11.0

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.02	-0.005	+0.005	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			●												●	○

HIGH FEED CORNER RADIUS LONG



NG HM | ZEFP 4 | RE | FHA 0° | DIN 6535HA

Series No. 111350

▸ cutting conditions : p.35-36

Excellent wear resistance at heavy feed rates on high hardened material.
Designed with reduced clearance angles and short flutes for strength.
High hardness & heat resistant coating for long life in dry applications.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1113500200	**2.0**	0.5	6	1.0	6.0	70	1.8
1113500300	**3.0**	0.5	6	1.2	8.0	70	2.8
1113500400	**4.0**	0.5	6	1.5	10.0	70	3.8
1113500500	**5.0**	0.5	6	2.0	10.0	70	4.6
1113500600	**6.0**	0.5	6	2.5	12.0	90	5.4
1113500601	**6.0**	1.0	6	2.5	12.0	90	5.4
1113500800	**8.0**	1.0	8	3.5	16.0	100	7.2
1113500802	**8.0**	2.0	8	3.5	16.0	100	7.2
1113501000	**10.0**	1.0	10	4.0	20.0	100	9.0
1113501002	**10.0**	2.0	10	4.0	20.0	100	9.0
1113501200	**12.0**	2.0	12	5.0	25.0	110	11.0
1113501203	**12.0**	3.0	12	5.0	25.0	110	11.0
1113501600	**16.0**	3.0	16	6.5	30.0	110	15.0

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.02	-0.005	+0.005	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			●												●	○

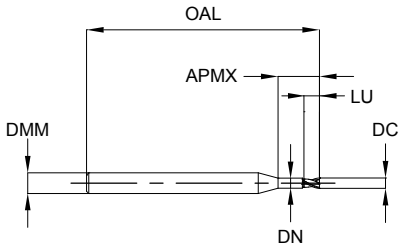
RIB PROCESSING

NG
HM

Series No. 100450

▸ cutting conditions : p.31-32

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

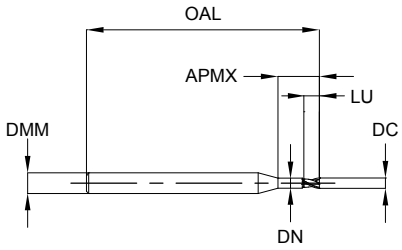


EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1004500010	**0.1**	4	0.15	0.3	45	0.085
1004500011	**0.1**	4	0.15	0.5	45	0.085
1004500020	**0.2**	4	0.3	0.5	45	0.17
1004500021	**0.2**	4	0.3	1.0	45	0.17
1004500022	**0.2**	4	0.3	1.5	45	0.17
1004500030	**0.3**	4	0.45	1.0	45	0.27
1004500031	**0.3**	4	0.45	1.5	45	0.27
1004500032	**0.3**	4	0.45	2.0	45	0.27
1004500033	**0.3**	4	0.45	3.0	45	0.27
1004500034	**0.3**	4	0.45	4.0	45	0.27
1004500040	**0.4**	4	0.6	1.0	45	0.37
1004500041	**0.4**	4	0.6	2.0	45	0.37
1004500042	**0.4**	4	0.6	3.0	45	0.37
1004500043	**0.4**	4	0.6	4.0	45	0.37
1004500044	**0.4**	4	0.6	5.0	45	0.37
1004500050	**0.5**	4	0.7	2.0	45	0.45
1004500051	**0.5**	4	0.7	2.5	45	0.45
1004500052	**0.5**	4	0.7	4.0	45	0.45
1004500053	**0.5**	4	0.7	6.0	45	0.45
1004500054	**0.5**	4	0.7	8.0	45	0.45
1004500060	**0.6**	4	0.9	2.0	45	0.55
1004500061	**0.6**	4	0.9	3.0	45	0.55
1004500062	**0.6**	4	0.9	4.0	45	0.55
1004500063	**0.6**	4	0.9	6.0	45	0.55
1004500065	**0.6**	4	0.9	10.0	45	0.55
1004500080	**0.8**	4	1.2	2.0	45	0.75
1004500081	**0.8**	4	1.2	4.0	45	0.75
1004500082	**0.8**	4	1.2	6.0	45	0.75

Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
0.00 / -0.012	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			●												●	○

RIB PROCESSING



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA | NECK

Series No. 100450

▸ cutting conditions : p.31-32

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1004500083	**0.8**	4	1.2	8.0	45	0.75
1004500084	**0.8**	4	1.2	10.0	45	0.75
1004500085	**0.8**	4	1.2	12.0	45	0.75
1004500100	**1.0**	4	1.5	4.0	45	0.95
1004500101	**1.0**	4	1.5	6.0	45	0.95
1004500102	**1.0**	4	1.5	8.0	45	0.95
1004500103	**1.0**	4	1.5	10.0	45	0.95
1004500104	**1.0**	4	1.5	12.0	45	0.95
1004500105	**1.0**	4	1.5	16.0	50	0.95
1004500106	**1.0**	4	1.5	20.0	55	0.95
1004500120	**1.2**	4	1.8	6.0	45	1.15
1004500121	**1.2**	4	1.8	8.0	45	1.15
1004500122	**1.2**	4	1.8	10.0	45	1.15
1004500123	**1.2**	4	1.8	12.0	45	1.15
1004500124	**1.2**	4	1.8	16.0	50	1.15
1004500150	**1.5**	4	2.3	6.0	45	1.45
1004500151	**1.5**	4	2.3	8.0	45	1.45
1004500152	**1.5**	4	2.3	10.0	45	1.45
1004500153	**1.5**	4	2.3	12.0	45	1.45
1004500154	**1.5**	4	2.3	14.0	50	1.45
1004500155	**1.5**	4	2.3	16.0	50	1.45
1004500156	**1.5**	4	2.3	18.0	55	1.45
1004500157	**1.5**	4	2.3	20.0	55	1.45
1004500200	**2.0**	4	3.0	6.0	45	1.95
1004500201	**2.0**	4	3.0	8.0	45	1.95
1004500202	**2.0**	4	3.0	10.0	45	1.95
1004500203	**2.0**	4	3.0	12.0	45	1.95
1004500204	**2.0**	4	3.0	14.0	50	1.95
1004500205	**2.0**	4	3.0	16.0	50	1.95

Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
0.00 / -0.012	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			●												●	○

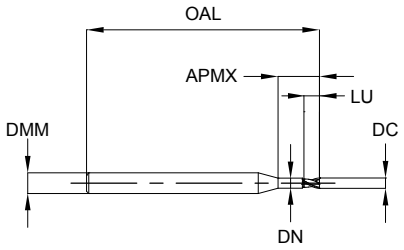
RIB PROCESSING

NG
HM

Series No. 100450

▸ cutting conditions : p.31-32

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

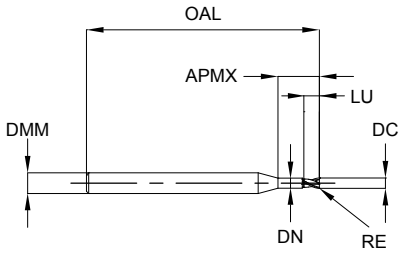


EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1004500206	**2.0**	4	3.0	18.0	55	1.95
1004500207	**2.0**	4	3.0	20.0	55	1.95
1004500208	**2.0**	4	3.0	25.0	60	1.95
1004500209	**2.0**	4	3.0	30.0	70	1.95
1004500300	**3.0**	6	4.5	10.0	45	2.85
1004500301	**3.0**	6	4.5	12.0	45	2.85
1004500302	**3.0**	6	4.5	14.0	50	2.85
1004500303	**3.0**	6	4.5	16.0	55	2.85
1004500304	**3.0**	6	4.5	18.0	55	2.85
1004500305	**3.0**	6	4.5	20.0	60	2.85
1004500306	**3.0**	6	4.5	25.0	65	2.85
1004500307	**3.0**	6	4.5	30.0	70	2.85
1004500308	**3.0**	6	4.5	35.0	80	2.85
1004500309	**3.0**	6	4.5	40.0	90	2.85
1004500400	**4.0**	6	6.0	12.0	50	3.85
1004500401	**4.0**	6	6.0	16.0	60	3.85
1004500402	**4.0**	6	6.0	20.0	60	3.85
1004500403	**4.0**	6	6.0	25.0	70	3.85
1004500404	**4.0**	6	6.0	30.0	70	3.85
1004500405	**4.0**	6	6.0	35.0	80	3.85
1004500406	**4.0**	6	6.0	40.0	90	3.85
1004500407	**4.0**	6	6.0	45.0	90	3.85
1004500408	**4.0**	6	6.0	50.0	100	3.85

Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
0.00 / -0.012	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			●												●	○

RIB PROCESSING CORNER RADIUS



NG HM | ZEFP 2 | RE | FHA 30° | DIN 6535HA | NECK

Series No. 102350

▸ cutting conditions : p.41-42

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1023500050	**0.5**	0.05	6	0.7	1.5	50	0.45
1023500901	**0.5**	0.05	6	0.7	3.3	50	0.45
1023500060	**0.6**	0.05	6	0.9	2.0	50	0.55
1023500902	**0.6**	0.05	6	0.9	4.0	50	0.55
1023500080	**0.8**	0.05	6	1.2	2.5	50	0.75
1023500903	**0.8**	0.05	6	1.2	5.5	50	0.75
1023500100	**1.0**	0.10	6	1.5	3.3	50	0.95
1023500904	**1.0**	0.10	6	1.5	6.7	50	0.95
1023500120	**1.2**	0.10	6	1.8	4.4	50	1.15
1023500905	**1.2**	0.10	6	1.8	8.0	50	1.15
1023500150	**1.5**	0.15	6	2.2	5.0	50	1.40
1023500906	**1.5**	0.15	6	2.2	9.7	50	1.40
1023500200	**2.0**	0.15	6	2.2	6.0	50	1.90
1023500907	**2.0**	0.15	6	2.2	13.0	50	1.90

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.010	+0.010	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																○

RIB PROCESSING CORNER RADIUS

NG
HM


ZEFP 2


RE


FHA 30°

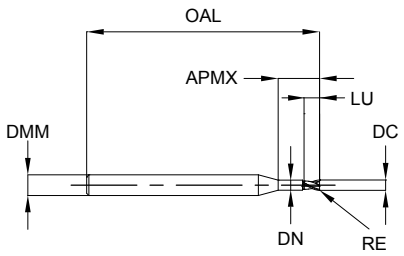

DIN
6535HA


NECK

Series No. 101850

▸ cutting conditions : p.41-42

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

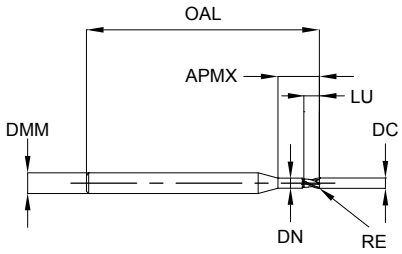


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1018500926	**1.0**	0.1	6	1.5	6	50	0.95
1018500100	**1.0**	0.2	6	1.5	4	50	0.95
1018500910	**1.0**	0.2	6	1.5	6	50	0.95
1018500911	**1.0**	0.2	6	1.5	8	50	0.95
1018500102	**1.0**	0.3	6	1.5	8	50	0.95
1018500152	**1.5**	0.2	6	2.5	6	50	1.45
1018500153	**1.5**	0.2	6	2.5	8	50	1.45
1018500913	**1.5**	0.2	6	2.5	10	50	1.45
1018500914	**1.5**	0.2	6	2.5	12	50	1.45
1018500927	**2.0**	0.2	6	3.0	6	50	1.95
1018500201	**2.0**	0.2	6	3.0	8	50	1.95
1018500203	**2.0**	0.2	6	3.0	10	55	1.95
1018500205	**2.0**	0.3	6	3.0	10	55	1.95
1018500206	**2.0**	0.3	6	3.0	12	55	1.95
1018500207	**2.0**	0.3	6	3.0	16	55	1.95
1018500917	**2.0**	0.5	6	3.0	6	50	1.95
1018500918	**2.0**	0.5	6	3.0	12	55	1.95
1018500301	**3.0**	0.2	6	4.0	8	55	2.85
1018500303	**3.0**	0.2	6	4.0	12	55	2.85
1018500304	**3.0**	0.2	6	4.0	16	55	2.85
1018500305	**3.0**	0.3	6	4.0	8	55	2.85
1018500919	**3.0**	0.3	6	4.0	10	55	2.85
1018500307	**3.0**	0.3	6	4.0	16	55	2.85
1018500901	**3.0**	0.5	6	4.0	16	55	2.85
1018500403	**4.0**	0.2	6	4.0	12	55	3.85
1018500400	**4.0**	0.5	6	4.0	12	55	3.85
1018500903	**4.0**	0.5	6	4.0	16	55	3.85
1018500904	**4.0**	0.5	6	4.0	20	55	3.85
1018501012	**4.0**	1.0	6	4.0	12	55	3.85
1018501016	**4.0**	1.0	6	4.0	16	55	3.85

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.010	+0.010	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			●												●	○

RIB PROCESSING CORNER RADIUS



NG HM | ZEFP 2 | RE | FHA 30° | DIN 6535HA | NECK

Series No. 101850

▸ cutting conditions : p.41-42

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1018500921	**6.0**	0.3	6	7.0	20	60	5.85
1018500600	**6.0**	0.5	6	7.0	20	60	5.85
1018500905	**6.0**	1.0	6	7.0	20	60	5.85
1018500906	**6.0**	1.5	6	7.0	20	60	5.85
1018502020	**6.0**	2.0	6	7.0	20	60	5.85
1018500922	**8.0**	0.3	6	9.0	25	60	7.70
1018500929	**8.0**	0.5	6	9.0	25	60	7.70
1018500800	**8.0**	1.0	6	9.0	25	60	7.70
1018500907	**8.0**	1.5	6	9.0	25	60	7.70
1018502025	**8.0**	2.0	6	9.0	25	60	7.70
1018500923	**10.0**	0.3	10	11.0	32	60	9.70
1018500532	**10.0**	0.5	10	11.0	32	60	9.70
1018501000	**10.0**	1.0	10	11.0	32	60	9.70
1018500908	**10.0**	1.5	10	11.0	32	60	9.70
1018502032	**10.0**	2.0	10	11.0	32	60	9.70
1018500538	**12.0**	0.5	12	12.0	38	80	11.70
1018501200	**12.0**	1.0	12	12.0	38	80	11.70
1018501909	**12.0**	1.5	12	12.0	38	80	11.70
1018502038	**12.0**	2.0	12	12.0	38	80	11.70

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.010	+0.010	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			●												●	○

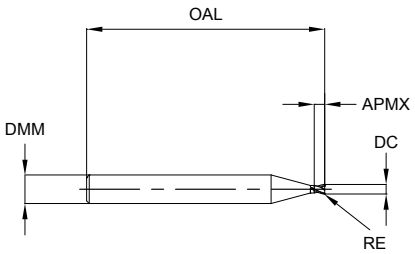
MINIATURE

NG HM | ZEFP 2 | RE | FHA 30° | DIN 6535HA

Series No. 100350

▸ cutting conditions : p.43

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

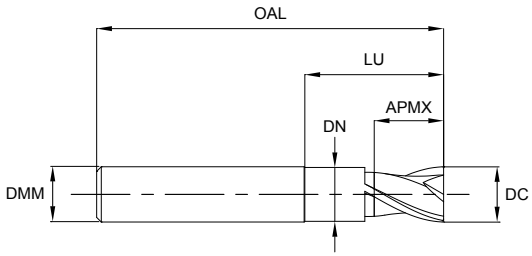


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**
1003500030	**0.3**	-	6	0.45	50
1003500040	**0.4**	-	6	0.6	50
1003500050	**0.5**	0.05	6	0.7	50
1003500060	**0.6**	0.05	6	0.9	50
1003500080	**0.8**	0.05	6	1.2	50
1003500100	**1.0**	0.10	6	1.5	50
1003500120	**1.2**	0.10	6	1.8	50
1003500150	**1.5**	0.15	6	2.2	50
1003500200	**2.0**	0.15	6	2.2	50

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.010	+0.010	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 SHORT LENGTH



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA | NECK

Series No. 101450

▸ cutting conditions : p.45-48

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

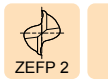
EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1014500010	**0.1**	4	0.2	-	40	-
1014500020	**0.2**	4	0.4	-	40	-
1014500030	**0.3**	4	0.6	-	40	-
1014500040	**0.4**	4	0.8	-	40	-
1014500050	**0.5**	4	1.0	-	40	-
1014500060	**0.6**	4	1.2	-	40	-
1014500070	**0.7**	4	1.4	-	40	-
1014500080	**0.8**	4	1.6	-	40	-
1014500090	**0.9**	4	2.0	-	40	-
1014500100	**1.0**	6	1.5	3.0	50	0.95
1014500150	**1.5**	6	1.7	4.0	50	1.45
1014500200	**2.0**	6	2.0	5.0	50	1.95
1014500250	**2.5**	6	2.5	6.0	55	2.4
1014500300	**3.0**	6	3.0	8.0	55	2.85
1014500350	**3.5**	6	3.5	9.0	55	3.35
1014500400	**4.0**	6	4.0	10.0	55	3.85
1014500500	**5.0**	6	5.0	13.0	55	4.85
1014500600	**6.0**	6	6.0	15.0	55	5.85
1014500800	**8.0**	8	8.0	20.0	65	7.7
1014501000	**10.0**	10	10.0	25.0	75	9.7
1014501200	**12.0**	12	12.0	28.0	85	11.7
1014501600	**16.0**	16	16.0	32.0	90	15.7
1014502000	**20.0**	20	20.0	40.0	105	19.7

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
0.3 - 6.0	0.00 / -0.012	h6
8.0 - 20.0	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 STUB LENGTH CORNER RADIUS

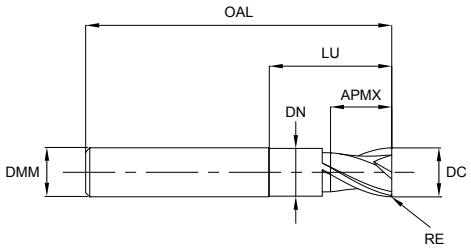
NG
HM



Series No. 101350

▸ cutting conditions : p.45-48

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

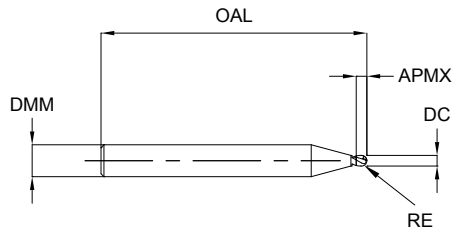


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1013500030	**0.3**	-	3	0.45	-	40	-
1013500040	**0.4**	-	3	0.6	-	40	-
1013500050	**0.5**	0.05	3	0.7	-	40	-
1013500907	**0.5**	0.05	4	0.7	-	40	-
1013500060	**0.6**	0.05	3	0.9	-	40	-
1013500908	**0.6**	0.05	4	0.9	-	40	-
1013500909	**0.7**	0.05	3	0.9	-	40	-
1013500080	**0.8**	0.05	3	1.2	-	40	-
1013500910	**0.8**	0.05	4	1.2	-	40	-
1013500911	**0.9**	0.05	4	1.2	-	40	-
1013500100	**1.0**	0.10	3	1.5	-	40	-
1013500901	**1.0**	0.10	4	1.5	-	40	-
1013500903	**1.0**	0.10	6	1.5	-	40	-
1013500150	**1.5**	0.10	3	2.2	-	40	-
1013500904	**1.5**	0.10	6	2.2	-	40	-
1013500200	**2.0**	0.10	3	3.0	6.0	40	1.9
1013500902	**2.0**	0.10	4	3.0	6.0	40	1.9
1013500905	**2.0**	0.10	6	3.0	6.0	40	1.9
1013500250	**2.5**	0.10	3	4.0	6.0	40	2.4
1013500906	**2.5**	0.10	6	4.0	6.0	40	2.4
1013500300	**3.0**	0.10	6	4.0	7.0	45	2.9
1013500350	**3.5**	0.10	6	5.0	9.0	45	3.3
1013500400	**4.0**	0.10	6	5.0	9.0	45	3.8
1013500450	**4.5**	0.10	6	6.0	10.0	45	4.3
1013500500	**5.0**	0.20	6	6.0	11.0	50	4.8
1013500600	**6.0**	0.20	6	7.0	14.0	50	5.8
1013500800	**8.0**	0.20	8	9.0	18.0	60	7.8
1013501000	**10.0**	0.20	10	12.0	25.0	75	9.7
1013501200	**12.0**	0.30	12	15.0	30.0	75	11.7
1013501600	**16.0**	0.30	16	18.0	38.0	90	15.7
1013502000	**20.0**	0.30	20	24.0	45.0	100	19.7

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
0.3 - 6.0	0.00 / -0.012	-0.010	+0.010	h6
8.0 - 20.0	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			●												●	○

MINIATURE BALL NOSE



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA

Series No. 104350, 112350

▸ cutting conditions : p.39-40

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**
1123500010	**0.1**	0.05	4	0.2	40
1123500020	**0.2**	0.10	4	0.3	40
1123500030	**0.3**	0.15	4	0.5	40
1043500040	**0.4**	0.20	6	0.4	50
1123500040	**0.4**	0.20	4	0.6	40
1043500050	**0.5**	0.25	6	0.5	50
1123500050	**0.5**	0.25	4	0.7	40
1043500060	**0.6**	0.30	6	0.6	50
1123500060	**0.6**	0.30	4	0.9	40
1123500070	**0.7**	0.35	4	1.1	40
1043500080	**0.8**	0.40	6	0.8	50
1123500080	**0.8**	0.40	4	1.2	40
1123500090	**0.9**	0.45	4	1.4	40
1043500100	**1.0**	0.50	6	1.0	50
1043500120	**1.2**	0.60	6	1.2	50
1043500150	**1.5**	0.75	6	1.5	50
1043500200	**2.0**	1.00	6	2.0	50

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.005	+0.005	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			●												●	○

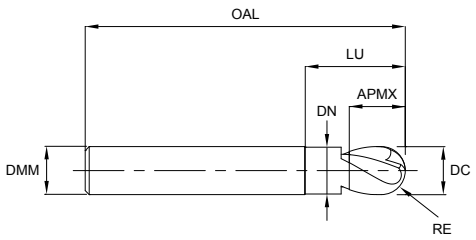
EXTENDED NECK BALL NOSE

NG
HM

Series No. 100550, 105350

▸ cutting conditions : p.39-40

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

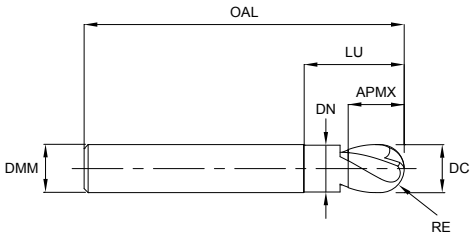


EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1053500100	**1.0**	0.50	4	1.0	2.2	50	0.95
1005500100	**1.0**	0.50	6	1.5	3.0	50	0.95
1053500120	**1.2**	0.60	4	1.2	2.6	50	1.10
1053500150	**1.5**	0.75	4	1.5	3.0	50	1.45
1005500150	**1.5**	0.75	6	2.0	4.0	50	1.45
1053500200	**2.0**	1.00	6	2.0	4.0	50	1.95
1005500200	**2.0**	1.00	6	2.5	5.0	50	1.95
1005500250	**2.5**	1.25	6	3.0	7.0	50	2.40
1053500300	**3.0**	1.50	6	3.0	6.0	60	2.85
1005500300	**3.0**	1.50	6	4.0	10.0	60	2.85
1005500350	**3.5**	1.75	6	4.5	10.0	60	3.35
1005500400	**4.0**	2.00	6	5.0	10.0	60	3.85
1053500400	**4.0**	2.00	6	4.0	8.0	70	3.85
1005500450	**4.5**	2.25	6	5.5	10.0	60	4.35
1005500500	**5.0**	2.50	6	6.0	12.0	60	4.85
1053500500	**5.0**	2.50	6	5.0	10.0	80	4.85
1005500550	**5.5**	2.75	6	6.5	12.0	60	5.35
1005500600	**6.0**	3.00	6	7.0	15.0	60	5.85
1053500600	**6.0**	3.00	6	6.0	12.0	90	5.85
1005500903	**6.0**	3.00	6	9.0	30.0	90	5.85
1053500700	**7.0**	3.50	8	7.0	14.0	90	6.85
1005500901	**8.0**	4.00	8	9.0	15.0	60	7.70
1005500800	**8.0**	4.00	8	9.0	15.0	80	7.70
1053500800	**8.0**	4.00	8	8.0	16.0	100	7.70
1005500904	**8.0**	4.00	8	12.0	30.0	100	7.70

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
1.0 - 6.0	0.00 / -0.012	-0.005	+0.005	h6
7.0 - 25.0	0.00 / -0.012	-0.010	+0.010	

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



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA | NECK

Series No. 100550, 105350

▸ cutting conditions : p.39-40

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1053500900	**9.0**	4.50	10	9.0	18.0	100	8.70
1005500902	**10.0**	5.00	10	11.0	25.0	60	9.70
1005501000	**10.0**	5.00	10	11.0	25.0	80	9.70
1053501000	**10.0**	5.00	10	10.0	20.0	100	9.70
1005500905	**10.0**	5.00	10	15.0	30.0	100	9.70
1005501200	**12.0**	6.00	12	14.0	25.0	80	11.70
1053501200	**12.0**	6.00	12	12.0	24.0	110	11.70
1053501400	**14.0**	7.00	14	14.0	28.0	110	13.80
1053501600	**16.0**	8.00	16	16.0	32.0	140	15.80
1053501800	**18.0**	9.00	18	18.0	36.0	140	17.80
1053502000	**20.0**	10.00	20	20.0	40.0	160	19.80
1053502500	**25.0**	12.50	25	25.0	50.0	180	24.80

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
1.0 - 6.0	0.00 / -0.012	-0.005	+0.005	h6
7.0 - 25.0	0.00 / -0.012	-0.010	+0.010	

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			●												●	○

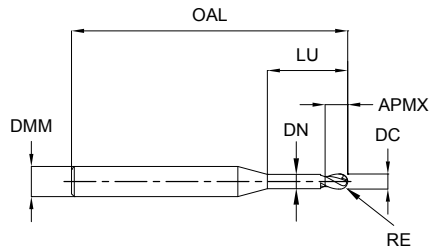
RIB PROCESSING BALL NOSE

NG
HM

Series No. 109350

▸ cutting conditions : p.33-34

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

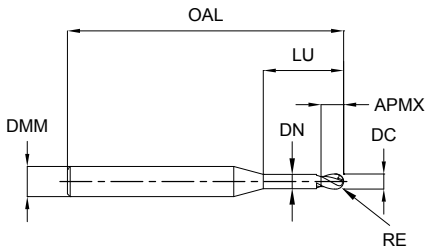


EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1093500010	**0.1**	0.05	4	0.1	0.3	45	0.085
1093500011	**0.1**	0.05	4	0.1	0.5	45	0.085
1093500020	**0.2**	0.1	4	0.2	0.5	45	0.17
1093500021	**0.2**	0.1	4	0.2	1.0	45	0.17
1093500022	**0.2**	0.1	4	0.2	1.5	45	0.17
1093500030	**0.3**	0.15	4	0.3	1.0	45	0.27
1093500031	**0.3**	0.15	4	0.3	2.0	45	0.27
1093500032	**0.3**	0.15	4	0.3	3.0	45	0.27
1093500040	**0.4**	0.2	4	0.4	1.0	45	0.37
1093500041	**0.4**	0.2	4	0.4	2.0	45	0.37
1093500042	**0.4**	0.2	4	0.4	3.0	45	0.37
1093500043	**0.4**	0.2	4	0.4	4.0	45	0.37
1093500044	**0.4**	0.2	4	0.4	5.0	45	0.37
1093500050	**0.5**	0.25	4	0.4	2.0	45	0.45
1093500051	**0.5**	0.25	4	0.4	2.5	45	0.45
1093500052	**0.5**	0.25	4	0.4	4.0	45	0.45
1093500053	**0.5**	0.25	4	0.4	6.0	45	0.45
1093500054	**0.5**	0.25	4	0.4	8.0	45	0.45
1093500060	**0.6**	0.3	4	0.5	2.0	45	0.55
1093500061	**0.6**	0.3	4	0.5	3.0	45	0.55
1093500062	**0.6**	0.3	4	0.5	4.0	45	0.55
1093500063	**0.6**	0.3	4	0.5	5.0	45	0.55
1093500064	**0.6**	0.3	4	0.5	6.0	45	0.55
1093500065	**0.6**	0.3	4	0.5	8.0	45	0.55
1093500066	**0.6**	0.3	4	0.5	10.0	45	0.55
1093500080	**0.8**	0.4	4	0.6	2.0	45	0.75
1093500081	**0.8**	0.4	4	0.6	4.0	45	0.75
1093500082	**0.8**	0.4	4	0.6	6.0	45	0.75
1093500083	**0.8**	0.4	4	0.6	8.0	45	0.75

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.005	+0.005	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			●												●	○

RIB PROCESSING BALL NOSE



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA | NECK

Series No. 109350

▸ cutting conditions : p.33-34

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1093500084	**0.8**	0.4	4	0.6	10.0	45	0.75
1093500100	**1.0**	0.5	4	0.8	3.0	45	0.95
1093500101	**1.0**	0.5	4	0.8	4.0	45	0.95
1093500102	**1.0**	0.5	4	0.8	5.0	45	0.95
1093500103	**1.0**	0.5	4	0.8	6.0	45	0.95
1093500104	**1.0**	0.5	4	0.8	7.0	45	0.95
1093500105	**1.0**	0.5	4	0.8	8.0	45	0.95
1093500106	**1.0**	0.5	4	0.8	9.0	45	0.95
1093500107	**1.0**	0.5	4	0.8	10.0	45	0.95
1093500108	**1.0**	0.5	4	0.8	12.0	45	0.95
1093500109	**1.0**	0.5	4	0.8	14.0	50	0.95
1093500110	**1.0**	0.5	4	0.8	16.0	50	0.95
1093500112	**1.0**	0.5	4	0.8	20.0	55	0.95
1093500120	**1.2**	0.6	4	1.0	6.0	45	1.15
1093500121	**1.2**	0.6	4	1.0	8.0	45	1.15
1093500122	**1.2**	0.6	4	1.0	10.0	45	1.15
1093500123	**1.2**	0.6	4	1.0	12.0	45	1.15
1093500150	**1.5**	0.75	4	1.2	6.0	45	1.45
1093500151	**1.5**	0.75	4	1.2	8.0	45	1.45
1093500152	**1.5**	0.75	4	1.2	10.0	45	1.45
1093500153	**1.5**	0.75	4	1.2	12.0	45	1.45
1093500154	**1.5**	0.75	4	1.2	14.0	50	1.45
1093500155	**1.5**	0.75	4	1.2	16.0	50	1.45
1093500156	**1.5**	0.75	4	1.2	20.0	55	1.45
1093500200	**2.0**	1.0	4	1.6	4.0	45	1.95
1093500201	**2.0**	1.0	4	1.6	6.0	45	1.95
1093500202	**2.0**	1.0	4	1.6	8.0	45	1.95
1093500203	**2.0**	1.0	4	1.6	10.0	45	1.95
1093500204	**2.0**	1.0	4	1.6	12.0	50	1.95

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.005	+0.005	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			●												●	○

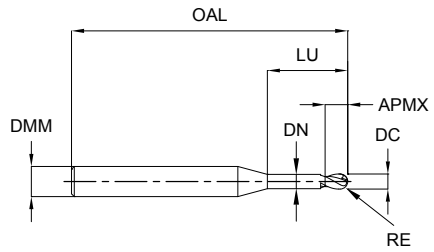
RIB PROCESSING BALL NOSE

NG
HM

Series No. 109350

▸ cutting conditions : p.33-34

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

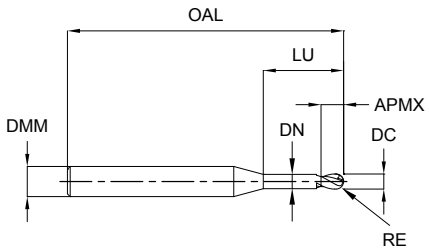


EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1093500205	**2.0**	1.0	4	1.6	14.0	50	1.95
1093500206	**2.0**	1.0	4	1.6	16.0	50	1.95
1093500207	**2.0**	1.0	4	1.6	18.0	55	1.95
1093500208	**2.0**	1.0	4	1.6	20.0	55	1.95
1093500209	**2.0**	1.0	4	1.6	22.0	60	1.95
1093500210	**2.0**	1.0	4	1.6	25.0	60	1.95
1093500211	**2.0**	1.0	4	1.6	30.0	70	1.95
1093500300	**3.0**	1.5	6	2.4	12.0	50	2.85
1093500301	**3.0**	1.5	6	2.4	14.0	55	2.85
1093500302	**3.0**	1.5	6	2.4	16.0	55	2.85
1093500303	**3.0**	1.5	6	2.4	18.0	60	2.85
1093500304	**3.0**	1.5	6	2.4	20.0	60	2.85
1093500305	**3.0**	1.5	6	2.4	25.0	65	2.85
1093500306	**3.0**	1.5	6	2.4	30.0	70	2.85
1093500307	**3.0**	1.5	6	2.4	35.0	80	2.85
1093500400	**4.0**	2.0	6	3.2	12.0	60	3.85
1093500401	**4.0**	2.0	6	3.2	16.0	60	3.85
1093500402	**4.0**	2.0	6	3.2	20.0	65	3.85
1093500403	**4.0**	2.0	6	3.2	25.0	70	3.85
1093500404	**4.0**	2.0	6	3.2	30.0	70	3.85
1093500405	**4.0**	2.0	6	3.2	35.0	80	3.85
1093500406	**4.0**	2.0	6	3.2	40.0	90	3.85
1093500407	**4.0**	2.0	6	3.2	45.0	90	3.85
1093500408	**4.0**	2.0	6	3.2	50.0	100	3.85

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.005	+0.005	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			●												●	○

RIB PROCESSING BALL NOSE



NG HM | ZEFP 2 | FHA 30° | DIN 6535HA | NECK

Series No. 106350

▸ cutting conditions : p.33-34

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1063500050	**0.5**	0.25	6	0.5	1.5	50	0.45
1063500901	**0.5**	0.25	6	0.5	3.3	50	0.45
1063500060	**0.6**	0.3	6	0.6	2.0	50	0.55
1063500902	**0.6**	0.3	6	0.6	4.0	50	0.55
1063500080	**0.8**	0.4	6	0.8	2.5	50	0.75
1063500903	**0.8**	0.4	6	0.8	5.5	50	0.75
1063500100	**1.0**	0.5	6	1.0	3.3	50	0.95
1063500904	**1.0**	0.5	6	1.0	6.7	50	0.95
1063500905	**1.0**	0.5	6	1.0	12.0	50	0.95
1063500120	**1.2**	0.6	6	1.2	4.4	50	1.15
1063500906	**1.2**	0.6	6	1.2	8.0	50	1.15
1063500150	**1.5**	0.75	6	1.5	5.0	50	1.45
1063500907	**1.5**	0.75	6	1.5	9.7	50	1.45
1063500908	**1.5**	0.75	6	1.5	15.0	50	1.45
1063500200	**2.0**	1.0	6	2.0	6.0	50	1.95
1063500909	**2.0**	1.0	6	2.0	13.0	50	1.95
1063500910	**2.0**	1.0	6	2.0	20.0	60	1.95

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.012	-0.005	+0.005	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			●												●	○

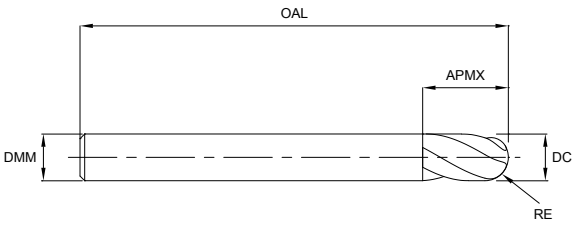
BALL NOSE CENTRE MATCHED

NG
HM
ZEFP 3
FHA 30°
DIN 6535HA

Series No. 107350

▸ cutting conditions : p.37

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

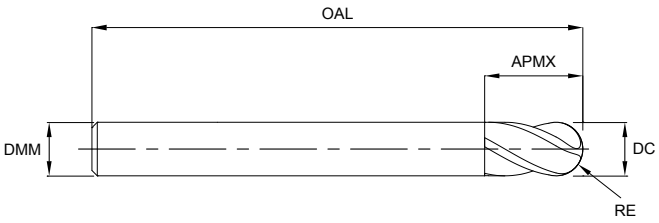


EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**
1073500300	**3.0**	1.5	6	8.0	60
1073500400	**4.0**	2.0	6	8.0	70
1073500500	**5.0**	2.5	6	10.0	80
1073500600	**6.0**	3.0	6	12.0	90
1073500800	**8.0**	4.0	8	14.0	100
1073501000	**10.0**	5.0	10	18.0	100
1073501200	**12.0**	6.0	12	22.0	110
1073501600	**16.0**	8.0	16	30.0	140
1073502000	**20.0**	10.0	20	38.0	160

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
3.0 - 6.0	0.00 / -0.012	-0.005	+0.005	h6
8.0 - 20.0	0.00 / -0.012	-0.010	+0.010	

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			●												●	○

BALL NOSE CENTRE MATCHED



NG
HM


ZEFP 4


FHA 30°


DIN
6535HA

Series No. 101950

▸ cutting conditions : p.38

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**
1019500300	**3.0**	1.5	6	8	60
1019500400	**4.0**	2.0	6	8	70
1019500500	**5.0**	2.5	6	10	80
1019500600	**6.0**	3.0	6	12	90
1019500800	**8.0**	4.0	8	14	100
1019501000	**10.0**	5.0	10	18	100
1019501200	**12.0**	6.0	12	22	110
1019501600	**16.0**	8.0	16	30	140
1019502000	**20.0**	10.0	20	38	160

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
3.0 - 6.0	0.00 / -0.012	-0.005	+0.005	h6
8.0 - 20.0	0.00 / -0.012	-0.010	+0.010	

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																○

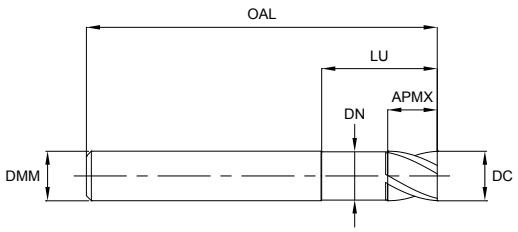
EXTENDED NECK

NG
HM
ZEFP 4
FHA 30°
DIN 6535HA
NECK

Series No. 101550

▸ cutting conditions : p.49-50

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for high precision milling operation.
Higher wear-resistance.

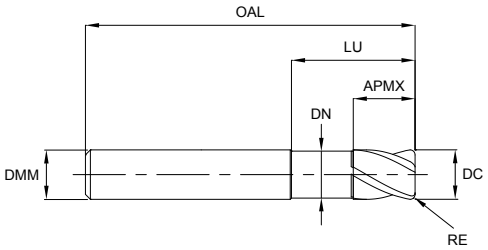


EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1015500100	**1.0**	6	1.5	3.0	50	0.95
1015500200	**2.0**	6	2.0	5.0	50	1.95
1015500300	**3.0**	6	3.0	8.0	55	2.85
1015500400	**4.0**	6	4.0	10.0	55	3.85
1015500500	**5.0**	6	5.0	13.0	55	4.85
1015500600	**6.0**	6	6.0	15.0	55	5.85
1015500800	**8.0**	8	8.0	20.0	65	7.7
1015501000	**10.0**	10	10.0	25.0	75	9.7
1015501200	**12.0**	12	12.0	28.0	85	11.7
1015501600	**16.0**	16	16.0	32.0	90	15.7
1015502000	**20.0**	20	20.0	40.0	105	19.7

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
1.0 - 6.0	0.00 / -0.012	h6
8.0 - 20.0	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 STUB LENGTH



NG HM | ZEFP 4 | RE | FHA 30° | DIN 6535HA | NECK

Series No. 103350

▸ cutting conditions : p.49-50

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for deep slotting.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1033500100	**1.0**	0.10	3	1.5	-	40	-
1033500901	**1.0**	0.10	6	1.5	-	40	-
1033500150	**1.5**	0.10	3	2.2	-	40	-
1033500902	**1.5**	0.10	6	2.2	-	40	-
1033500200	**2.0**	0.10	3	3.0	6.0	40	1.9
1033500903	**2.0**	0.10	6	3.0	6.0	40	1.9
1033500250	**2.5**	0.10	3	4.0	6.0	40	2.4
1033500904	**2.5**	0.10	6	4.0	6.0	40	2.4
1033500300	**3.0**	0.10	6	4.0	7.0	45	2.9
1033500350	**3.5**	0.10	6	5.0	9.0	45	3.3
1033500400	**4.0**	0.10	6	5.0	9.0	45	3.8
1033500450	**4.5**	0.10	6	6.0	10.0	45	4.3
1033500500	**5.0**	0.20	6	6.0	11.0	50	4.8
1033500600	**6.0**	0.20	6	7.0	14.0	50	5.8
1033500800	**8.0**	0.20	8	9.0	18.0	60	7.8
1033501000	**10.0**	0.20	10	12.0	25.0	75	9.7
1033501200	**12.0**	0.30	12	15.0	30.0	75	11.7
1033501600	**16.0**	0.30	16	18.0	38.0	90	15.7
1033502000	**20.0**	0.30	20	24.0	45.0	100	19.7

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm) **RETOLL**	**RETOLU**	Shank Dia. Tolerance **TCDMM**
1.0 - 6.0	0.00 / -0.012	-0.010	+0.010	h6
8.0 - 20.0	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			●												●	○

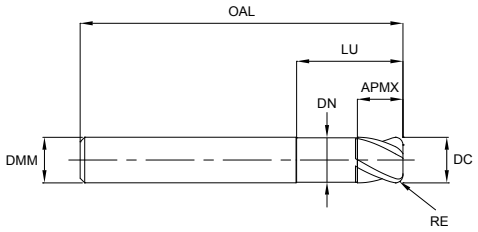
EXTENDED NECK CORNER RADIUS SHORT LENGTH

NG HM | ZEFP 4 | RE | FHA 30° | DIN 6535HA | NECK

Series No. 101650

▸ cutting conditions : p.44

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for deep slotting.
Higher wear-resistance.

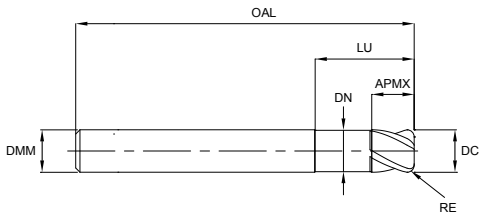


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1016500300	**3.0**	0.3	6	4.0	12.0	55	2.85
1016500901	**3.0**	0.3	6	4.0	16.0	55	2.85
1016500902	**3.0**	0.3	6	4.0	20.0	55	2.85
1016500903	**3.0**	0.5	6	4.0	10.0	55	2.85
1016500904	**3.0**	0.5	6	4.0	16.0	55	2.85
1016500905	**3.0**	0.5	6	4.0	20.0	55	2.85
1016500400	**4.0**	0.3	6	5.0	12.0	55	3.85
1016500906	**4.0**	0.3	6	5.0	16.0	55	3.85
1016500907	**4.0**	0.3	6	5.0	20.0	55	3.85
1016500908	**4.0**	0.5	6	5.0	12.0	55	3.85
1016500909	**4.0**	0.5	6	5.0	16.0	55	3.85
1016500910	**4.0**	0.5	6	5.0	20.0	55	3.85
1016500911	**4.0**	1.0	6	5.0	12.0	55	3.85
1016500600	**6.0**	0.5	6	7.0	20.0	60	5.85
1016500601	**6.0**	1.0	6	7.0	20.0	60	5.85
1016500912	**6.0**	1.5	6	7.0	20.0	60	5.85
1016500800	**8.0**	0.5	8	9.0	25.0	60	7.7
1016500913	**8.0**	1.0	8	9.0	25.0	60	7.7
1016500914	**8.0**	1.5	8	9.0	25.0	60	7.7
1016500915	**8.0**	2.0	8	9.0	25.0	60	7.7
1016501000	**10.0**	0.5	10	11.0	32.0	70	9.7
1016500916	**10.0**	1.0	10	11.0	32.0	70	9.7
1016500917	**10.0**	1.5	10	11.0	32.0	70	9.7
1016500918	**10.0**	2.0	10	11.0	32.0	70	9.7
1016501200	**12.0**	0.5	12	12.0	38.0	80	11.7
1016500919	**12.0**	1.0	12	12.0	38.0	80	11.7
1016500920	**12.0**	1.5	12	12.0	38.0	80	11.7
1016500921	**12.0**	2.0	12	12.0	38.0	80	11.7

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
		RETOLL	**RETOLU**	
3.0 - 6.0	0.00 / -0.012	-0.010	+0.010	h6
8.0 - 12.0	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 LONG LENGTH



NG HM | ZEFP 4 | RE | FHA 30° | DIN 6535HA | NECK

Series No. 101750

▸ cutting conditions : p.44

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for deep slotting.
Higher wear-resistance.

EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1017500605	**6.0**	0.5	6	9.0	20.0	90	5.85
1017500601	**6.0**	1.0	6	9.0	20.0	90	5.85
1017500805	**8.0**	0.5	8	12.0	25.0	100	7.7
1017500801	**8.0**	1.0	8	12.0	25.0	100	7.7
1017501005	**10.0**	0.5	10	15.0	32.0	100	9.7
1017501001	**10.0**	1.0	10	15.0	32.0	100	9.7
1017501002	**10.0**	2.0	10	15.0	32.0	100	9.7
1017501205	**12.0**	0.5	12	18.0	38.0	110	11.7
1017501201	**12.0**	1.0	12	18.0	38.0	110	11.7
1017501202	**12.0**	2.0	12	18.0	38.0	110	11.7

Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm)		Shank Dia. Tolerance **TCDMM**
	RETOLL	**RETOLU**	
0.00 / -0.015	-0.015	+0.015	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 FINISHING

NG
HM


ZEFP 6


RE


FHA 45°

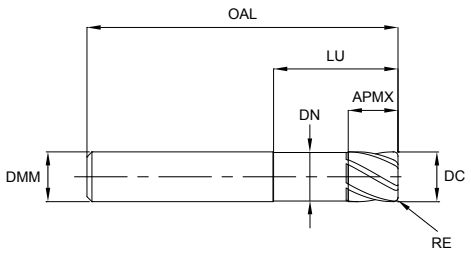

DIN
6535HA


NECK

Series No. 108350

▸ cutting conditions : p.51

Designed to machine high hardened materials
Suitable for dry cutting, high speed cutting.
Excellent workpiece finish.
Designed for deep slotting.
Higher wear-resistance.

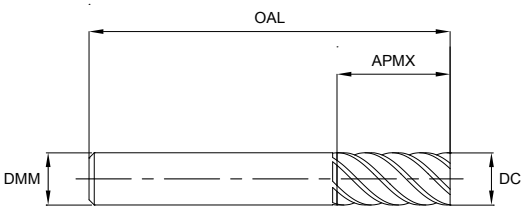


EUROPA CODE **ORDCODE**	DIAMETER **DC**	CORNER RADIUS **RE**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	EFFECTIVE LENGTH **LU**	OVERALL LENGTH **OAL**	NECK DIAMETER **DN**
1083500916	**6.0**	0.25	6	6.0	14.0	50	5.7
1083500600	**6.0**	0.5	6	6.0	14.0	50	5.7
1083500901	**6.0**	0.5	6	13.0	-	70	-
1083500910	**6.0**	0.5	6	26.0	-	70	-
1083500800	**8.0**	0.5	8	8.0	24.0	60	7.65
1083500902	**8.0**	0.5	8	19.0	-	90	-
1083500911	**8.0**	0.5	8	36.0	-	90	-
1083501000	**10.0**	1.0	10	10.0	30.0	70	9.65
1083500903	**10.0**	0.5	10	22.0	-	100	-
1083500904	**10.0**	1.0	10	22.0	-	100	-
1083500912	**10.0**	1.0	10	46.0	-	100	-
1083501200	**12.0**	1.0	12	12.0	30.0	75	11.6
1083500905	**12.0**	0.5	12	26.0	-	110	-
1083500906	**12.0**	1.0	12	26.0	-	110	-
1083500913	**12.0**	1.0	12	56.0	-	110	-
1083501600	**16.0**	1.0	16	32.0	-	130	-
1083500907	**16.0**	1.5	16	32.0	-	130	-
1083500914	**16.0**	1.5	16	66.0	-	130	-
1083502000	**20.0**	1.0	20	38.0	-	140	-
1083500908	**20.0**	1.5	20	38.0	-	140	-
1083500909	**20.0**	2.0	20	38.0	-	140	-
1083500915	**20.0**	2.0	20	76.0	-	140	-

Mill Dia. **DC**	Mill Dia. Tolerance **TCDC**(mm)	Radius Tolerance (mm) **RETOLL**	**RETOLU**	Shank Dia. Tolerance **TCDMM**
6.0	0.00 / -0.02	-0.010	+0.010	h6
8.0 - 20.0	0.00 / -0.02	-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			●												●	○

LONG SERIES FINISHING



NG HM | ZEFP 6 | ZEFP 8 | FHA 45° | DIN 6535HA

Series No. 102950

▸ cutting conditions : p.52

Designed to machine high hardened materials.
Negative rake angle for high abrasion resistance.
Excellent side-cutting of press mould field

EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**	NO. OF FLUTES **ZEFP**
1029500600	**6.0**	6	13.0	57	6
1029500800	**8.0**	8	19.0	63	6
1029501000	**10.0**	10	22.0	72	6
1029501200	**12.0**	12	26.0	83	6
1029501400	**14.0**	14	26.0	83	6
1029501600	**16.0**	16	32.0	92	6
1029501800	**18.0**	18	32.0	92	8
1029502000	**20.0**	20	38.0	104	8
1029502500	**25.0**	25	44.0	104	8

Mill Dia. Tolerance **TCDC**(mm)	Shank Dia. Tolerance **TCDMM**
0.00 / -0.02	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			●												●	○

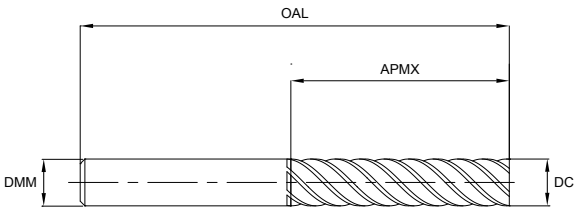
EXTRA LENGTH FINISHING

NG
HM
ZEFP 6
ZEFP 8
FHA 45°
DIN 6535HA

Series No. 103950

▸ cutting conditions : p.53

Designed to machine high hardened materials.
Negative rake angle for high abrasion resistance.
Excellent side-cutting of press mould field.



EUROPA CODE **ORDCODE**	DIAMETER **DC**	SHANK DIAMETER **DMM**	LENGTH OF CUT **APMX**	OVERALL LENGTH **OAL**	NO. OF FLUTES **ZEFP**
1039500600	**6.0**	6	26.0	70	6
1039500800	**8.0**	8	36.0	90	6
1039501000	**10.0**	10	46.0	100	6
1039501200	**12.0**	12	56.0	110	6
1039501600	**16.0**	16	66.0	130	6
1039502000	**20.0**	20	76.0	140	8
1039502500	**25.0**	25	92.0	180	8

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

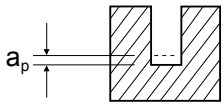
ISO		P			M		K		N					S		H	
VDI GROUP		1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	○ Secondary			●												●	○

PULSAR BLUE
CUTTING DATA

CUTTING DATA

100450 (2 Flute Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					0.1 LU=0.3	**0.2** LU=1.0	**0.3** LU=2.0	**0.4** LU=3.0	**0.5** LU=4.0	**0.6** LU=4.0	**0.8** LU=6.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.006	0.01	0.01	0.016	0.018	0.021	0.024
				v_c (m/min)	15	31	44	45	46	52	54
				n	47770	49360	46700	35800	29200	27600	21490
				f_z	0.0025	0.0035	0.004	0.006	0.007	0.008	0.011
				f (mm/min)	240	345	375	430	410	440	470
H	38	Hardened Steel	**45-55**	a_p (mm)	0.007	0.007	0.009	0.011	0.013	0.014	0.017
				v_c (m/min)	15	31	41	41	39	40	40
				n	47770	49360	43520	32640	24840	21230	15920
				f_z	0.002	0.003	0.003	0.005	0.006	0.007	0.009
				f (mm/min)	190	295	260	320	295	295	285
	39	Hardened Steel	**55-70**	a_p (mm)	0.005	0.005	0.007	0.008	0.008	0.009	0.01
				v_c (m/min)	15	31	26	27	25	26	27
				n	47770	49360	27600	21490	15920	13800	10740
				f_z	0.001	0.002	0.003	0.004	0.005	0.006	0.007
				f (mm/min)	95	195	165	170	160	165	150
	40	Chilled Cast Iron		a_p (mm)	0.006	0.01	0.01	0.016	0.018	0.021	0.024
				v_c (m/min)	15	31	44	45	46	52	54
				n	47770	49360	46700	35800	29200	27600	21490
				f_z	0.0025	0.0035	0.004	0.006	0.007	0.008	0.011
				f (mm/min)	240	345	375	430	410	440	470
	41	Hardened Cast Iron		a_p (mm)	0.007	0.007	0.009	0.011	0.013	0.014	0.017
				v_c (m/min)	15	31	41	41	39	40	40
				n	47770	49360	43520	32640	24840	21230	15920
				f_z	0.002	0.003	0.003	0.005	0.006	0.007	0.009
				f (mm/min)	190	295	260	320	295	295	285



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

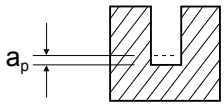
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce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

100450 (2 Flute Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					1.0 LU=10.0	**1.2** LU=10.0	**1.5** LU=12.0	**2.0** LU=14.0	**3.0** LU=18.0	**4.0** LU=30.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.02	0.047	0.047	0.08	0.13	0.17
				v_c (m/min)	49	52	53	53	53	54
				n	15600	13800	11250	8435	5620	4295
				f_z	0.014	0.017	0.024	0.027	0.063	0.064
				f (mm/min)	435	465	540	455	705	550
H	38	Hardened Steel	**45-55**	a_p (mm)	0.014	0.028	0.033	0.057	0.095	0.12
				v_c (m/min)	34	35	36	40	41	41
				n	10800	9280	7640	6365	4350	3260
				f_z	0.012	0.014	0.018	0.022	0.056	0.056
				f (mm/min)	260	260	275	280	485	365
	39	Hardened Steel	**55-70**	a_p (mm)	0.008	0.017	0.02	0.034	0.057	0.076
				v_c (m/min)	22	23	23	26	26	26
				n	7000	6100	4880	4140	2760	2070
				f_z	0.007	0.008	0.011	0.013	0.035	0.035
				f (mm/min)	95	95	105	105	190	145
	40	Chilled Cast Iron		a_p (mm)	0.02	0.047	0.047	0.08	0.13	0.17
				v_c (m/min)	49	52	53	53	53	54
				n	15600	13800	11250	8435	5620	4295
				f_z	0.014	0.017	0.024	0.027	0.063	0.064
				f (mm/min)	435	465	540	455	705	550
	41	Hardened Cast Iron		a_p (mm)	0.014	0.028	0.033	0.057	0.095	0.12
				v_c (m/min)	34	35	36	40	41	41
				n	10800	9280	7640	6365	4350	3260
				f_z	0.012	0.014	0.018	0.022	0.056	0.056
				f (mm/min)	260	260	275	280	485	365



▸ The data given is based on LU length shown. Please adust machining conditions according to length.

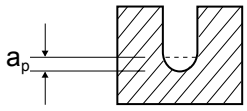
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce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

106350, 109350 (2 Flute B/N Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					0.1 LU=0.3	**0.2** LU=1.0	**0.3** LU=2.0	**0.4** LU=3.0	**0.5** LU=4.0	**0.6** LU=5.0	**0.8** LU=6.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.01	0.01	0.013	0.022	0.017	0.02	0.04
				v_c (m/min)	15	31	46	61	65	65	66
				n	47770	49360	48830	48560	41400	34500	26270
				f_z	0.007	0.013	0.021	0.031	0.035	0.041	0.058
				f (mm/min)	665	1280	2050	3010	2895	2825	3045
H	38	Hardened Steel	**45-55**	a_p (mm)	0.009	0.009	0.011	0.018	0.014	0.017	0.032
				v_c (m/min)	15	31	46	51	52	53	53
				n	47770	49360	48830	40600	33120	28130	21095
				f_z	0.006	0.012	0.018	0.02	0.031	0.036	0.05
				f (mm/min)	570	1185	1755	1620	2050	2025	2110
	39	Hardened Steel	**55-70**	a_p (mm)	0.008	0.008	0.01	0.017	0.013	0.015	0.03
				v_c (m/min)	15	31	45	60	52	52	53
				n	47770	49360	47770	47770	33120	27600	21100
				f_z	0.005	0.01	0.017	0.018	0.027	0.03	0.044
				f (mm/min)	475	985	1620	1720	1785	1655	1855
	40	Chilled Cast Iron		a_p (mm)	0.01	0.01	0.013	0.022	0.017	0.02	0.04
				v_c (m/min)	15	31	46	61	65	65	66
				n	47770	49360	48830	48560	41400	34500	26270
				f_z	0.007	0.013	0.021	0.031	0.035	0.041	0.058
				f (mm/min)	665	1280	2050	3010	2895	2825	3045
	41	Hardened Cast Iron		a_p (mm)	0.009	0.009	0.011	0.018	0.014	0.017	0.032
				v_c (m/min)	15	31	46	51	52	53	53
				n	47770	49360	48830	40600	33120	28130	21095
				f_z	0.006	0.012	0.018	0.02	0.031	0.036	0.05
				f (mm/min)	570	1185	1755	1620	2050	2025	2110



▸ The data given is based on LU length shown. Please adust machining conditions according to length.

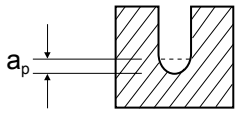
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce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

106350, 109350 (2 Flute B/N Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					1.0 LU=8.0	**1.2** LU=8.0	**1.5** LU=12.0	**2.0** LU=14.0	**3.0** LU=18.0	**4.0** LU=30.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.044	0.028	0.039	0.087	0.15	0.2
				v_c (m/min)	66	62	59	61	65	66
				n	21010	16450	12520	9710	6900	5250
				f_z	0.07	0.083	0.105	0.14	0.244	0.318
				f (mm/min)	2940	2730	2630	2720	3365	3340
H	38	Hardened Steel	**45-55**	a_p (mm)	0.036	0.023	0.032	0.075	0.12	0.16
				v_c (m/min)	51	49	50	52	52	52
				n	16240	13000	10615	8280	5520	4140
				f_z	0.061	0.078	0.095	0.12	0.223	0.29
				f (mm/min)	1980	2025	2015	1985	2460	2400
	39	Hardened Steel	**55-70**	a_p (mm)	0.033	0.021	0.029	0.069	0.084	0.15
				v_c (m/min)	51	49	50	52	52	51
				n	16240	13000	10610	8280	5520	4060
				f_z	0.057	0.07	0.084	0.1	0.21	0.265
				f (mm/min)	1850	1820	1780	1655	2315	2150
	40	Chilled Cast Iron		a_p (mm)	0.044	0.028	0.039	0.087	0.15	0.2
				v_c (m/min)	66	62	59	61	65	66
				n	21010	16450	12520	9710	6900	5250
				f_z	0.07	0.083	0.105	0.14	0.244	0.318
				f (mm/min)	2940	2730	2630	2720	3365	3340
	41	Hardened Cast Iron		a_p (mm)	0.036	0.023	0.032	0.075	0.12	0.16
				v_c (m/min)	51	49	50	52	52	52
				n	16240	13000	10615	8280	5520	4140
				f_z	0.061	0.078	0.095	0.12	0.223	0.29
				f (mm/min)	1980	2025	2015	1985	2460	2400



▸ The data given is based on LU length shown. Please adust 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%.

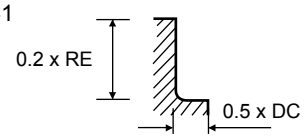
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

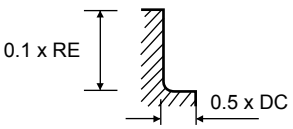
110350, 111350 (4 Flute High Feed)

VDI MATERIAL GROUP		MATERIAL	HRc	NORMAL SPEED	Size (mm)								
					2.0	**3.0**	**4.0**	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	60	65	70	75	75	75	75	75	80
				n	9550	6900	5570	4775	3980	2985	2385	1990	1590
				f_z	0.099	0.15	0.2	0.25	0.3	0.4	0.5	0.598	0.79
				f (mm/min)	3780	4140	4455	4775	4775	4775	4775	4760	5030
H	38	Hardened Steel	**40-50**	v_c (m/min)	60	65	70	75	75	75	75	75	80
				n	9550	6900	5570	4775	3980	2985	2385	1990	1590
				f_z	0.099	0.15	0.2	0.25	0.3	0.4	0.5	0.598	0.79
				f (mm/min)	3780	4140	4455	4775	4775	4775	4775	4760	5030
		Hardened Steel	**50-55**	v_c (m/min)	35	45	50	55	55	55	55	55	55
				n	5570	4775	3980	3500	2915	2185	1750	1460	1095
				f_z	0.1	0.15	0.2	0.235	0.302	0.398	0.5	0.603	0.795
				f (mm/min)	2225	2865	3185	3290	3525	3485	3500	3520	3480
	39	Hardened Steel	**55-65**	v_c (m/min)	20	25	30	35	35	35	35	35	35
				n	3185	2650	2385	2225	1855	1390	1115	925	695
				f_z	0.078	0.101	0.132	0.182	0.25	0.33	0.42	0.5	0.61
				f (mm/min)	990	1070	1260	1620	1855	1835	1870	1855	1700
		Hardened Steel	**65-70**	v_c (m/min)	15	20	20	25	25	25	25	25	25
				n	2385	2120	1590	1590	1325	995	795	660	495
				f_z	0.063	0.08	0.1	0.117	0.147	0.2	0.25	0.299	0.398
				f (mm/min)	600	675	635	745	780	795	795	790	790
	40	Chilled Cast Iron		v_c (m/min)	85	90	100	100	110	110	110	110	110
				n	13530	9550	7960	6365	5835	4375	3500	2915	2185
				f_z	0.12	0.14	0.22	0.28	0.33	0.44	0.546	0.659	0.869
				f (mm/min)	6495	5350	7000	7130	7700	7700	7650	7695	7610
	41	Hardened Cast Iron		v_c (m/min)	60	65	70	75	75	75	75	75	80
				n	9554	6900	5570	4775	3980	2985	2385	1990	1590
				f_z	0.099	0.15	0.2	0.25	0.3	0.4	0.5	0.598	0.79
				f (mm/min)	3780	4140	4455	4775	4775	4775	4775	4760	5030

MATERIAL GROUP
P, H38, H40-41



MATERIAL GROUP
H39



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

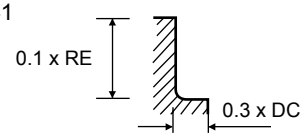
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

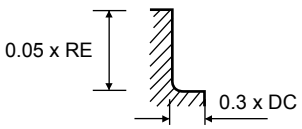
110350, 111350 (4 Flute High Feed)

VDI MATERIAL GROUP		MATERIAL	HRc	HIGH SPEED	Size (mm)								
					2.0	**3.0**	**4.0**	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	140	160	165	175	200	200	200	200	195
				n	22290	16985	13135	11145	10615	7960	6365	5305	3880
				f_z	0.111	0.147	0.231	0.284	0.329	0.438	0.547	0.66	0.897
				f (mm/min)	9895	9985	12135	12660	13970	13945	13935	14010	13925
H	38	Hardened Steel	**40-50**	v_c (m/min)	140	160	165	175	200	200	200	200	195
				n	22290	16985	13135	11145	10615	7960	6365	5305	3880
				f_z	0.111	0.147	0.231	0.284	0.329	0.438	0.547	0.66	0.897
				f (mm/min)	9895	9985	12135	12660	13970	13945	13935	14010	13925
		Hardened Steel	**50-55**	v_c (m/min)	95	200	140	155	170	170	170	170	165
				n	15125	21230	11145	9870	9020	6765	5410	4510	3280
				f_z	0.131	0.16	0.209	0.25	0.306	0.404	0.509	0.611	0.833
				f (mm/min)	7925	13585	9315	9870	11045	10935	11020	11025	10940
	39	Hardened Steel	**55-65**	v_c (m/min)	70	90	100	110	120	120	120	120	120
				n	11145	9550	7960	7005	6365	4775	3820	3185	2385
				f_z	0.101	0.121	0.172	0.214	0.25	0.349	0.447	0.547	0.729
				f (mm/min)	4500	4620	5475	5995	6365	6665	6830	6965	6965
		Hardened Steel	**65-70**	v_c (m/min)	55	65	70	75	85	85	85	85	85
				n	8755	6900	5570	4775	4510	3380	2705	2255	1690
				f_z	0.07	0.091	0.129	0.158	0.2	0.301	0.352	0.4	0.5
				f (mm/min)	2450	2510	2875	3015	3605	4070	3810	3605	3380
	40	Chilled Cast Iron		v_c (m/min)	180	205	215	235	255	250	250	250	250
				n	28660	21760	17110	14965	13530	9950	7960	6635	4975
				f_z	0.129	0.182	0.257	0.3	0.343	0.463	0.578	0.701	0.925
				f (mm/min)	14790	15840	17595	17960	18570	18430	18405	18600	18410
	41	Hardened Cast Iron		v_c (m/min)	140	160	165	175	200	200	200	200	195
				n	22290	16985	13135	11145	10615	7960	6365	5305	3880
				f_z	0.111	0.147	0.231	0.284	0.329	0.438	0.547	0.66	0.897
				f (mm/min)	9895	9985	12135	12660	13970	13945	13935	14010	13925

MATERIAL GROUP
P, H38, H40-41



MATERIAL GROUP
H39



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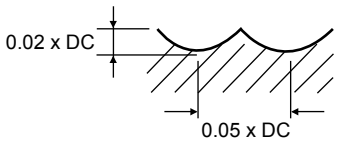
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

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

107350 (3 Flute B/N centre match)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					3.0	**4.0**	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	300	305	315	340	340	340	340	340	340
				n	31845	24280	20060	18045	13535	10825	9020	6765	5410
				f_z	0.09	0.107	0.121	0.159	0.181	0.202	0.225	0.229	0.222
				f (mm/min)	8595	7795	7280	8605	7350	6560	6090	4645	3600
H	38	Hardened Steel	**40-50**	v_c (m/min)	255	255	265	285	285	285	285	285	285
				n	27070	20300	16875	15125	11345	9075	7560	5670	4535
				f_z	0.072	0.09	0.108	0.136	0.155	0.168	0.187	0.19	0.192
				f (mm/min)	5845	5480	5465	6170	5275	4575	4240	3230	2610
		Hardened Steel	**50-55**	v_c (m/min)	185	185	195	230	230	230	230	230	230
				n	19635	14725	12420	12205	9155	7325	6100	4575	3660
				f_z	0.072	0.087	0.099	0.123	0.144	0.156	0.173	0.18	0.18
				f (mm/min)	4240	3840	3685	4505	3955	3425	3165	2470	1975
	39	Hardened Steel	**55-65**	v_c (m/min)	175	180	185	210	210	210	210	210	210
				n	18575	14330	11780	11145	8360	6685	5570	4180	3340
				f_z	0.072	0.086	0.099	0.115	0.134	0.144	0.145	0.144	0.145
				f (mm/min)	4010	3695	3500	3845	3360	2885	2420	1805	1455
		Hardened Steel	**65-70**	v_c (m/min)	120	120	125	145	145	145	145	145	145
				n	12735	9550	7960	7695	5770	4615	3845	2885	2305
				f_z	0.072	0.087	0.099	0.108	0.125	0.144	0.144	0.144	0.144
				f (mm/min)	2750	2490	2365	2490	2165	1995	1660	1245	995
	40	Chilled Cast Iron		v_c (m/min)	300	305	315	340	340	340	340	340	340
				n	31845	24280	20060	18045	13535	10825	9020	6765	5410
				f_z	0.09	0.107	0.121	0.159	0.181	0.202	0.225	0.229	0.222
				f (mm/min)	8595	7795	7280	8605	7350	6560	6090	4645	3600
	41	Hardened Cast Iron		v_c (m/min)	255	255	265	285	285	285	285	285	285
				n	27070	20300	16875	15125	11345	9075	7560	5670	4535
				f_z	0.072	0.09	0.108	0.136	0.155	0.168	0.187	0.19	0.192
				f (mm/min)	5845	5480	5465	6170	5275	4575	4240	3230	2610



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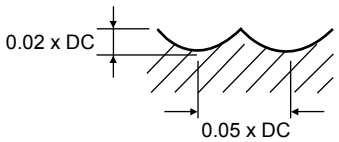
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101950 (4 Flute B/N centre match)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					3.0	**4.0**	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	340	340	340	340	340	340	340	340	340
				n	36090	27070	21655	18045	13535	10825	9020	6765	5410
				f_z	0.071	0.08	0.09	0.101	0.116	0.128	0.144	0.144	0.145
				f (mm/min)	10250	8660	7795	7290	6280	5540	5195	3895	3140
H	38	Hardened Steel	**40-50**	v_c (m/min)	285	285	285	285	285	285	285	285	285
				n	30255	22690	18150	15125	11345	9075	7560	5670	4535
				f_z	0.06	0.07	0.081	0.092	0.103	0.111	0.125	0.126	0.129
				f (mm/min)	7260	6350	5880	5565	4670	4030	3780	2855	2340
		Hardened Steel	**50-55**	v_c (m/min)	230	230	230	230	230	230	230	230	230
				n	24415	18310	14650	12205	9155	7325	6100	4575	3660
				f_z	0.05	0.06	0.071	0.082	0.093	0.104	0.115	0.119	0.119
				f (mm/min)	4880	4395	4160	4000	3405	3045	2805	2175	1740
	39	Hardened Steel	**55-65**	v_c (m/min)	210	210	210	210	210	210	210	210	210
				n	22290	16720	13375	11145	8360	6685	5570	4180	3340
				f_z	0.045	0.055	0.067	0.077	0.089	0.095	0.096	0.096	0.097
				f (mm/min)	4010	3675	3585	3430	2975	2540	2140	1605	1295
		Hardened Steel	**65-70**	v_c (m/min)	145	145	145	145	145	145	145	145	145
				n	15390	11545	9235	7695	5770	4615	3845	2885	2305
				f_z	0.04	0.05	0.062	0.072	0.082	0.094	0.096	0.096	0.097
				f (mm/min)	2460	2305	2290	2215	1890	1735	1475	1105	895
	40	Chilled Cast Iron		v_c (m/min)	340	340	340	340	340	340	340	340	340
				n	36090	27070	21655	18045	13535	10825	9020	6765	5410
				f_z	0.071	0.08	0.09	0.101	0.116	0.128	0.144	0.144	0.145
				f (mm/min)	10250	8660	7795	7290	6280	5540	5195	3895	3140
	41	Hardened Cast Iron		v_c (m/min)	285	285	285	285	285	285	285	285	285
				n	30255	22690	18150	15125	11345	9075	7560	5670	4535
				f_z	0.06	0.07	0.081	0.092	0.103	0.111	0.125	0.126	0.129
				f (mm/min)	7260	6350	5880	5565	4670	4030	3780	2855	2340



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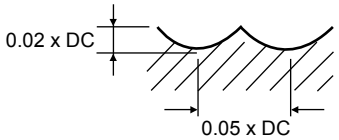
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

100550, 104350, 105350, 112350 (2 Flute B/N)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					0.4	**0.5**	**0.6**	**0.8**	**1.0**	**1.2**	**1.5**	**2.0**	**3.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	65	80	95	125	155	180	225	300	300
				n	51750	50955	50425	49760	49360	47770	47770	47770	31845
				f_z	0.017	0.021	0.025	0.033	0.042	0.045	0.047	0.05	0.083
				f (mm/min)	1760	2140	2520	3280	4145	4295	4490	4775	5285
H	38	Hardened Steel	**40-50**	v_c (m/min)	65	80	95	125	155	180	225	300	300
				n	51750	50955	50425	49760	49360	47770	47770	47770	31845
				f_z	0.017	0.021	0.025	0.033	0.042	0.045	0.047	0.05	0.083
				f (mm/min)	1760	2140	2520	3280	4145	4295	4490	4775	5285
		Hardened Steel	**50-55**	v_c (m/min)	55	70	85	115	140	160	205	250	250
				n	43790	44585	45115	45780	44585	42460	43520	39805	26535
				f_z	0.017	0.021	0.024	0.033	0.042	0.045	0.047	0.05	0.075
				f (mm/min)	1485	1870	2165	3020	3745	3820	4090	3980	3980
	39	Hardened Steel	**55-65**	v_c (m/min)	50	65	75	100	125	145	175	220	220
				n	39805	41400	39805	39805	39805	38480	37155	35030	23355
				f_z	0.015	0.019	0.023	0.03	0.038	0.039	0.042	0.045	0.067
				f (mm/min)	1190	1570	1830	2385	3025	3000	3120	3150	3130
		Hardened Steel	**65-70**	v_c (m/min)	40	50	60	80	110	115	140	180	180
				n	31845	31845	31845	31845	35030	30520	29720	28660	19105
				f_z	0.014	0.017	0.022	0.029	0.033	0.038	0.039	0.04	0.061
				f (mm/min)	890	1080	1400	1845	2310	2320	2315	2290	2330
	40	Chilled Cast Iron		v_c (m/min)	65	80	95	125	155	190	235	310	310
				n	51750	50955	50425	49760	49360	50425	49890	49360	32905
				f_z	0.019	0.024	0.029	0.039	0.048	0.051	0.054	0.057	0.091
				f (mm/min)	1965	2445	2925	3880	4735	5140	5385	5625	5985
	41	Hardened Cast Iron		v_c (m/min)	65	80	95	125	155	180	225	300	300
				n	51750	50955	50425	49760	49360	47770	47770	47770	31845
				f_z	0.017	0.021	0.025	0.033	0.042	0.045	0.047	0.05	0.083
				f (mm/min)	1760	2140	2520	3280	4145	4295	4490	4775	5285



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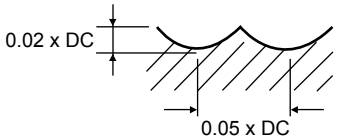
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

100550, 104350, 105350, 112350 (2 Flute B/N)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					4.0	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	300	280	255	270	280	250	270	270
				n	23885	17830	13535	10745	8915	6635	5370	4295
				f_z	0.111	0.138	0.153	0.164	0.174	0.187	0.206	0.227
				f (mm/min)	5300	4920	4140	3525	3100	2480	2210	1950
H	38	Hardened Steel	**40-50**	v_c (m/min)	300	280	255	270	280	250	270	270
				n	23885	17830	13535	10745	8915	6635	5370	4295
				f_z	0.111	0.138	0.153	0.164	0.174	0.187	0.206	0.227
				f (mm/min)	5300	4920	4140	3525	3100	2480	2210	1950
		Hardened Steel	**50-55**	v_c (m/min)	250	235	205	225	235	210	225	225
				n	19900	14965	10880	8955	7480	5570	4475	3580
				f_z	0.1	0.125	0.141	0.15	0.16	0.17	0.189	0.208
				f (mm/min)	3980	3740	3065	2685	2395	1895	1690	1490
	39	Hardened Steel	**55-65**	v_c (m/min)	220	210	190	200	205	190	200	200
				n	17515	13375	10085	7960	6525	5040	3980	3185
				f_z	0.09	0.113	0.125	0.134	0.144	0.155	0.169	0.188
				f (mm/min)	3150	3020	2520	2130	1880	1560	1345	1195
		Hardened Steel	**65-70**	v_c (m/min)	180	165	150	165	165	150	160	160
				n	14330	10510	7960	6565	5255	3980	3185	2545
				f_z	0.079	0.1	0.109	0.119	0.13	0.131	0.133	0.129
				f (mm/min)	2260	2100	1735	1560	1365	1040	845	655
	40	Chilled Cast Iron		v_c (m/min)	315	290	260	280	290	260	280	280
				n	25080	18470	13800	11145	9235	6900	5570	4455
				f_z	0.12	0.156	0.174	0.189	0.199	0.212	0.238	0.264
				f (mm/min)	6015	5760	4800	4210	3675	2925	2650	2350
	41	Hardened Cast Iron		v_c (m/min)	65	80	95	125	155	180	225	300
				n	51750	50955	50425	49760	49360	47770	47770	47770
				f_z	0.017	0.021	0.025	0.033	0.042	0.045	0.047	0.05
				f (mm/min)	1760	2140	2520	3280	4145	4295	4490	4775



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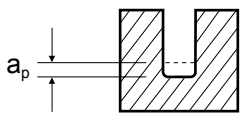
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101850, 102350 (2 Flute Crn Rad Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					0.5 LU=1.5	**0.6** LU=2.0	**0.8** LU=2.5	**1.0** LU=6.0	**1.2** LU=4.4	**1.5** LU=8.0	**2.0** LU=12.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.0203	0.0179	0.0238	0.0193	0.0473	0.0609	0.0805
				v_c (m/min)	46	52	53	49	52	63	53
				n	29295	27600	21095	15605	13800	13375	8435
				f_z	0.028	0.032	0.045	0.057	0.067	0.094	0.107
				f (mm/min)	7555	1765	1895	1775	1845	2515	1805
H	38	Hardened Steel	**45-55**	a_p (mm)	0.013	0.0145	0.0143	0.0138	0.0285	0.0332	0.0575
				v_c (m/min)	39	40	40	35	36	36	40
				n	24840	21230	15920	11145	9550	7640	6365
				f_z	0.024	0.026	0.037	0.048	0.055	0.07	0.089
				f (mm/min)	1190	1100	1175	1070	1050	1070	1130
	39	Hardened Steel	**55-70**	a_p (mm)	0.0077	0.0087	0.0083	0.0102	0.0171	0.0199	0.0345
				v_c (m/min)	25	26	26	22	23	23	26
				n	15920	13800	10350	7005	6100	4880	4140
				f_z	0.015	0.016	0.022	0.03	0.035	0.044	0.053
				f (mm/min)	475	440	455	420	425	430	435
	40	Chilled Cast Iron		a_p (mm)	0.0203	0.0179	0.0238	0.0193	0.0473	0.0609	0.0805
				v_c (m/min)	46	52	53	49	52	63	53
				n	29295	27600	21095	15605	13800	13375	8435
				f_z	0.028	0.032	0.045	0.057	0.067	0.094	0.107
				f (mm/min)	7555	1765	1895	1775	1845	2515	1805
	41	Hardened Cast Iron		a_p (mm)	0.013	0.0145	0.0143	0.0138	0.0285	0.0332	0.0575
				v_c (m/min)	39	40	40	35	36	36	40
				n	24840	21230	15920	11145	9550	7640	6365
				f_z	0.024	0.026	0.037	0.048	0.055	0.07	0.089
				f (mm/min)	1190	1100	1175	1070	1050	1070	1130



▸ The data given is based on LU length shown. Please adust machining conditions according to length.

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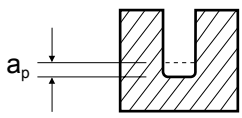
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101850, 102350 (2 Flute Crn Rad Rib Processing)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					3.0 LU=8.0	**4.0** LU=16.0	**6.0** LU=20.0	**8.0** LU=25.0	**10.0** LU=32.0	**12.0** LU=38.0
P	10-11	High alloy Steel, Tool Steel	**35-45**	a_p (mm)	0.08	0.09	0.1	0.1	0.14	0.18
				v_c (m/min)	65	70	85	100	109	120
				n	6900	5570	4510	3980	3470	3200
				f_z	0.114	0.12	0.16	0.19	0.22	0.26
				f (mm/min)	1570	1335	1440	1510	1530	1650
H	38	Hardened Steel	**45-55**	a_p (mm)	0.05	0.06	0.07	0.07	0.08	0.08
				v_c (m/min)	45	50	65	80	90	100
				n	4775	3980	3450	3185	2865	2650
				f_z	0.08	0.09	0.12	0.14	0.16	0.19
				f (mm/min)	760	715	825	890	915	1000
	39	Hardened Steel	**55-70**	a_p (mm)	0.03	0.04	0.05	0.05	0.06	0.06
				v_c (m/min)	30	35	45	60	65	75
				n	3185	2785	2385	2385	2070	1990
				f_z	0.06	0.07	0.09	0.12	0.14	0.16
				f (mm/min)	380	390	430	570	580	635
	40	Chilled Cast Iron		a_p (mm)	0.08	0.09	0.1	0.1	0.14	0.18
				v_c (m/min)	65	70	85	100	109	120
				n	6900	5570	4510	3980	3470	3200
				f_z	0.114	0.12	0.16	0.19	0.22	0.26
				f (mm/min)	1570	1335	1440	1510	1530	1650
	41	Hardened Cast Iron		a_p (mm)	0.05	0.06	0.07	0.07	0.08	0.08
				v_c (m/min)	45	50	65	80	90	100
				n	4775	3980	3450	3185	2865	2650
				f_z	0.08	0.09	0.12	0.14	0.16	0.19
				f (mm/min)	760	715	825	890	915	1000



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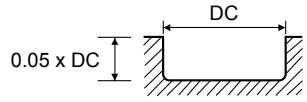
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

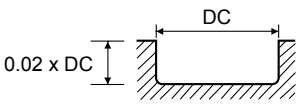
100350 (2 Flute Miniature)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					0.3	**0.4**	**0.5**	**0.6**	**0.8**	**1.0**	**1.2**	**1.5**	**2.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	40	55	70	85	100	120	130	145	165
				n	42460	43790	44585	45115	39805	38215	34500	30785	26270
				f_z	0.002	0.002	0.003	0.004	0.006	0.008	0.009	0.011	0.013
				f (mm/min)	170	175	265	360	475	610	620	675	680
H	38	Hardened Steel	**40-50**	v_c (m/min)	40	55	70	85	100	120	130	145	165
				n	42460	43790	44585	45115	39805	38215	34500	30785	26270
				f_z	0.002	0.002	0.003	0.004	0.006	0.008	0.009	0.011	0.013
				f (mm/min)	170	175	265	360	475	610	620	675	680
		Hardened Steel	**50-55**	v_c (m/min)	40	50	65	75	75	80	85	100	110
				n	42460	39805	41400	39805	29855	25475	22555	21230	17515
				f_z	0.001	0.002	0.003	0.004	0.005	0.007	0.008	0.01	0.012
				f (mm/min)	85	155	245	315	295	355	360	425	420
	39	Hardened Steel	**55-65**	v_c (m/min)	30	40	50	55	65	65	75	80	90
				n	31845	31845	31845	29190	25875	20700	19900	16985	14330
				f_z	0.001	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.009
				f (mm/min)	60	60	125	175	205	205	235	235	255
		Hardened Steel	**65-70**	v_c (m/min)	25	30	40	45	50	50	55	60	70
				n	26535	23885	25475	23885	19900	15920	14595	12735	11145
				f_z	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007
				f (mm/min)	50	45	100	95	115	125	145	150	155
	40	Chilled Cast Iron		v_c (m/min)	45	65	80	95	125	150	160	175	210
				n	47770	51750	50955	50425	49760	47770	42460	37155	33435
				f_z	0.002	0.002	0.004	0.005	0.006	0.008	0.009	0.011	0.013
				f (mm/min)	190	205	405	500	595	760	760	815	865
	41	Hardened Cast Iron		v_c (m/min)	40	55	70	85	100	120	130	145	165
				n	42460	43790	44585	45115	39805	38215	34500	30785	26270
				f_z	0.002	0.002	0.003	0.004	0.006	0.008	0.009	0.011	0.013
				f (mm/min)	170	175	265	360	475	610	620	675	680

MATERIAL GROUP
P, H38, H40-41



MATERIAL GROUP
H39



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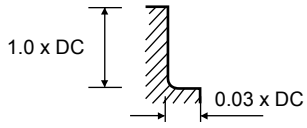
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101650, 101750 (4 Flute Crn Rad Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					3.0	**4.0**	**6.0**	**8.0**	**10.0**	**12.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	165	165	195	195	195	200
				n	17515	13135	10350	7760	6210	5305
				f_z	0.014	0.02	0.027	0.035	0.041	0.048
				f (mm/min)	980	1050	1115	1085	1015	1015
H	38	Hardened Steel	**40-50**	v_c (m/min)	165	165	195	195	195	200
				n	17515	13135	10350	7760	6210	5305
				f_z	0.014	0.02	0.027	0.035	0.041	0.048
				f (mm/min)	980	1050	1115	1085	1015	1015
		Hardened Steel	**50-55**	v_c (m/min)	110	110	130	130	130	130
				n	11675	8755	6900	5175	4140	3450
				f_z	0.015	0.02	0.028	0.035	0.041	0.048
				f (mm/min)	700	700	770	525	675	660
	39	Hardened Steel	**55-65**	v_c (m/min)	70	70	80	80	80	80
				n	7430	5570	4245	3185	2545	2120
				f_z	0.009	0.012	0.017	0.021	0.024	0.029
				f (mm/min)	265	265	285	265	245	245
		Hardened Steel	**65-70**	v_c (m/min)	60	60	70	70	70	70
				n	6365	4775	3715	2785	2225	1855
				f_z	0.007	0.01	0.014	0.017	0.02	0.023
				f (mm/min)	175	190	205	185	175	170
	40	Chilled Cast Iron		v_c (m/min)	205	210	245	250	245	250
				n	21760	16720	13000	9950	7800	6635
				f_z	0.016	0.022	0.03	0.038	0.045	0.053
				f (mm/min)	1390	1470	1560	1510	1400	1405
	41	Hardened Cast Iron		v_c (m/min)	165	165	195	195	195	200
				n	17515	13135	10350	7760	6210	5305
				f_z	0.014	0.02	0.027	0.035	0.041	0.048
				f (mm/min)	980	1050	1115	1085	1015	1015



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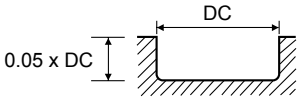
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

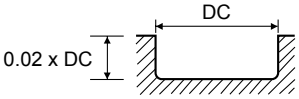
101350, 101450 (2 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc	SLOTTING	Size (mm)											
					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5	2.0
P	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	15	30	40	55	70	85	90	100	110	120	140	165
				n	47770	47770	42460	43790	44580	45115	40945	39805	38920	38215	29720	26270
				f_z	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.011	0.013
				f (mm/min)	95	95	170	175	265	360	405	475	540	610	650	680
H	38	Hardened Steel	40-50	v_c (m/min)	12	25	40	50	65	75	75	75	80	80	95	110
				n	47770	47770	42460	43790	44580	45115	40945	39805	38920	38215	29720	26270
				f_z	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.011	0.013
				f (mm/min)	95	95	170	175	265	360	405	475	540	610	650	680
		Hardened Steel	50-55	v_c (m/min)	12	25	40	50	65	75	75	75	80	80	95	110
				n	38215	39805	42460	39805	41400	39805	34120	29855	28305	25475	20170	17515
				f_z	0.001	0.001	0.001	0.002	0.003	0.004	0.005	0.005	0.006	0.007	0.009	0.012
				f (mm/min)	75	80	85	155	245	315	340	295	340	355	360	420
	39	Hardened Steel	55-65	v_c (m/min)	10	20	25	30	40	45	45	50	50	50	60	70
				n	31845	31845	26530	23885	25475	23885	20470	19900	17690	15920	12735	11145
				f_z	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.007
				f (mm/min)	60	60	50	45	100	95	120	115	140	125	125	155
		Hardened Steel	65-70	v_c (m/min)	10	15	20	25	30	40	40	40	40	40	50	60
				n	31845	23885	21230	19900	19105	21230	18195	15920	14150	12735	10615	9550
				f_z	0.0006	0.0006	0.0006	0.0006	0.0008	0.001	0.002	0.002	0.003	0.003	0.003	0.003
				f (mm/min)	35	25	25	20	30	40	70	60	85	75	60	55
	40	Chilled Cast Iron		v_c (m/min)	15	30	45	65	80	95	100	125	140	150	180	210
				n	47770	47770	47770	51750	50955	50425	45495	49760	49540	47770	38215	33435
				f_z	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.006	0.007	0.008	0.011	0.013
				f (mm/min)	95	95	190	205	405	500	545	595	690	760	840	865
	41	Hardened Cast Iron		v_c (m/min)	15	30	40	55	70	85	90	100	110	120	140	165
				n	47770	47770	42460	43790	44580	45115	40945	39805	38920	38215	29720	26270
				f_z	0.001	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.011	0.013
				f (mm/min)	95	95	170	175	265	360	405	475	540	610	650	680

MATERIAL GROUP
P, H38, H40-41



MATERIAL GROUP
H39



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

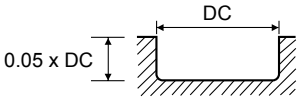
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

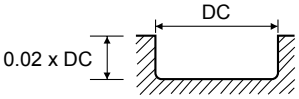
101350, 101450 (2 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc	SLOTTING	Size (mm)										
					2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0
P	10-11	High alloy Steel, Tool Steel	35-45	v_c (m/min)	165	165	165	165	195	195	195	195	190	195	195
				n	21015	17515	15010	13135	12420	10350	7760	6210	5040	3880	3105
				f_z	0.016	0.02	0.023	0.027	0.032	0.037	0.046	0.055	0.065	0.074	0.085
				f (mm/min)	670	700	690	705	795	765	710	680	655	570	525
H	38	Hardened Steel	40-50	v_c (m/min)	165	165	165	165	195	195	195	195	190	195	195
				n	21015	17515	15010	13135	12420	10350	7760	6210	5040	3880	3105
				f_z	0.016	0.02	0.023	0.027	0.032	0.037	0.046	0.055	0.065	0.074	0.085
				f (mm/min)	670	700	690	705	795	765	710	680	655	570	525
		Hardened Steel	50-55	v_c (m/min)	110	110	110	110	130	130	130	130	130	130	130
				n	14010	11675	10005	8755	8280	6900	5175	4140	3450	2585	2070
				f_z	0.015	0.018	0.021	0.025	0.03	0.035	0.043	0.051	0.059	0.07	0.082
				f (mm/min)	420	420	420	435	495	480	445	420	405	360	335
	39	Hardened Steel	55-65	v_c (m/min)	70	70	75	80	80	80	80	80	80	80	80
				n	8915	7430	6820	6365	5095	4245	3185	2545	2120	1590	1270
				f_z	0.009	0.011	0.013	0.015	0.018	0.021	0.026	0.03	0.037	0.042	0.048
				f (mm/min)	160	160	175	190	180	175	165	150	155	130	120
		Hardened Steel	65-70	v_c (m/min)	60	60	60	60	70	70	70	70	70	70	70
				n	7640	6365	5460	4775	4455	3715	2785	2225	1855	1390	1115
				f_z	0.005	0.008	0.01	0.012	0.014	0.017	0.02	0.025	0.03	0.034	0.038
				f (mm/min)	75	100	105	115	125	125	110	110	110	95	85
	40	Chilled Cast Iron		v_c (m/min)	205	205	210	210	245	245	245	245	245	245	245
				n	26115	21760	19105	16720	15605	13000	9750	7800	6500	4875	3900
				f_z	0.016	0.019	0.022	0.026	0.032	0.036	0.047	0.054	0.064	0.074	0.085
				f (mm/min)	835	820	840	865	995	935	915	840	830	720	660
	41	Hardened Cast Iron		v_c (m/min)	165	165	165	165	195	195	195	195	190	195	195
				n	21015	17515	15010	13135	12420	10350	7760	6210	5040	3880	3105
				f_z	0.016	0.02	0.023	0.027	0.032	0.037	0.046	0.055	0.065	0.074	0.085
				f (mm/min)	670	700	690	705	795	765	710	680	655	570	525

MATERIAL GROUP
P, H38, H40-41



MATERIAL GROUP
H39



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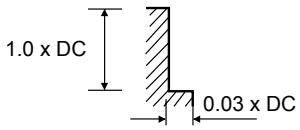
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101350, 101450 (2 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc	SIDE CUTTING	Size (mm)						
					1.0	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	120	140	165	165	165	165	165
				n	38215	29720	26270	21015	17515	15010	13135
				f_z	0.011	0.015	0.019	0.023	0.028	0.033	0.038
				f (mm/min)	840	890	995	965	980	990	995
H	38	Hardened Steel	**40-50**	v_c (m/min)	120	140	165	165	165	165	165
				n	38215	29720	26270	21015	17515	15010	13135
				f_z	0.011	0.015	0.019	0.023	0.028	0.033	0.038
				f (mm/min)	840	890	995	965	980	990	995
		Hardened Steel	**50-55**	v_c (m/min)	80	95	110	110	110	110	110
				n	25475	20170	17515	14010	11675	10005	8755
				f_z	0.01	0.013	0.017	0.021	0.026	0.031	0.036
				f (mm/min)	510	520	595	585	605	620	630
	39	Hardened Steel	**55-65**	v_c (m/min)	50	60	70	70	70	75	80
				n	15920	12735	11145	8915	7430	6820	6365
				f_z	0.006	0.008	0.01	0.012	0.015	0.018	0.021
				f (mm/min)	190	200	220	210	220	245	265
		Hardened Steel	**65-70**	v_c (m/min)	40	50	60	60	60	60	60
				n	12735	10615	9550	7640	6365	5460	4775
				f_z	0.005	0.006	0.008	0.01	0.012	0.014	0.017
				f (mm/min)	125	125	150	150	150	150	160
	40	Chilled Cast Iron		v_c (m/min)	150	180	210	205	205	210	210
				n	47770	38215	33435	26115	21760	19105	16720
				f_z	0.011	0.014	0.018	0.023	0.028	0.032	0.037
				f (mm/min)	1050	1070	1200	1200	1215	1220	1235
	41	Hardened Cast Iron		v_c (m/min)	120	140	165	165	165	165	165
				n	38215	29720	26270	21015	17515	15010	13135
				f_z	0.011	0.015	0.019	0.023	0.028	0.033	0.038
				f (mm/min)	840	890	995	965	980	990	995



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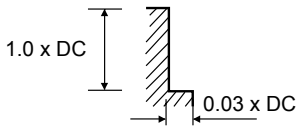
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

101350, 101450 (2 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc	SIDE CUTTING	Size (mm)						
					5.0	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	195	195	195	195	190	195	195
				n	12420	10350	7760	6210	5040	3880	3105
				f_z	0.046	0.053	0.066	0.079	0.092	0.108	0.121
				f (mm/min)	1140	1095	1025	980	925	835	750
H	38	Hardened Steel	**40-50**	v_c (m/min)	195	195	195	195	190	195	195
				n	12420	10350	7760	6210	5040	3880	3105
				f_z	0.046	0.053	0.066	0.079	0.092	0.108	0.121
				f (mm/min)	1140	1095	1025	980	925	835	750
		Hardened Steel	**50-55**	v_c (m/min)	130	130	130	130	130	130	130
				n	8280	6900	5175	4140	3450	2585	2070
				f_z	0.043	0.05	0.061	0.072	0.084	0.1	0.116
				f (mm/min)	710	690	630	595	580	515	480
	39	Hardened Steel	**55-65**	v_c (m/min)	80	80	80	80	80	80	80
				n	5095	4245	3185	2545	2120	1590	1270
				f_z	0.025	0.03	0.037	0.043	0.052	0.059	0.067
				f (mm/min)	255	255	235	215	220	185	170
		Hardened Steel	**65-70**	v_c (m/min)	70	70	70	70	70	70	70
				n	4455	3715	2785	2225	1855	1390	1115
				f_z	0.021	0.025	0.03	0.033	0.043	0.05	0.056
				f (mm/min)	185	185	165	145	160	135	125
	40	Chilled Cast Iron		v_c (m/min)	245	245	245	245	245	245	245
				n	15605	13000	9750	7800	6500	4875	3900
				f_z	0.046	0.052	0.067	0.077	0.09	0.107	0.122
				f (mm/min)	1430	1350	1305	1200	1170	1040	950
	41	Hardened Cast Iron		v_c (m/min)	195	195	195	195	190	195	195
				n	12420	10350	7760	6210	5040	3880	3105
				f_z	0.046	0.053	0.066	0.079	0.092	0.108	0.121
				f (mm/min)	1140	1095	1025	980	925	835	750



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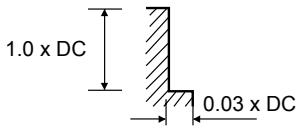
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

103350, 101550 (4 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)							
					1.0	**1.5**	**2.0**	**2.5**	**3.0**	**3.5**	**4.0**	**4.5**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	120	140	165	165	165	165	165	180
				n	38215	29720	26270	21015	17515	15010	13135	12735
				f_z	0.007	0.009	0.012	0.015	0.018	0.021	0.025	0.028
				f (mm/min)	1070	1070	1260	1260	1260	1260	1310	1425
H	38	Hardened Steel	**40-50**	v_c (m/min)	120	140	165	165	165	165	165	180
				n	38215	29720	26270	21015	17515	15010	13135	12735
				f_z	0.007	0.009	0.012	0.015	0.018	0.021	0.025	0.028
				f (mm/min)	1070	1070	1260	1260	1260	1260	1310	1425
		Hardened Steel	**50-55**	v_c (m/min)	80	95	110	110	110	110	110	120
				n	25475	20170	17515	14010	11675	10005	8755	8490
				f_z	0.007	0.009	0.012	0.015	0.018	0.021	0.025	0.028
				f (mm/min)	710	725	840	840	840	840	875	950
	39	Hardened Steel	**55-65**	v_c (m/min)	50	60	70	70	70	70	70	75
				n	15920	12735	11145	8915	7430	6365	5570	5305
				f_z	0.004	0.005	0.007	0.009	0.011	0.013	0.015	0.016
				f (mm/min)	255	255	310	320	325	330	330	340
		Hardened Steel	**65-70**	v_c (m/min)	40	50	60	60	60	60	60	65
				n	12735	10615	9550	7640	6365	5460	4775	4600
				f_z	0.002	0.003	0.005	0.007	0.009	0.011	0.013	0.014
				f (mm/min)	100	125	190	210	225	240	245	255
	40	Chilled Cast Iron		v_c (m/min)	150	180	210	210	210	210	210	225
				n	47770	38215	33435	26750	22290	19105	16720	15920
				f_z	0.008	0.01	0.013	0.016	0.02	0.023	0.027	0.029
				f (mm/min)	1525	1525	1735	1710	1780	1755	1805	1845
	41	Hardened Cast Iron		v_c (m/min)	120	140	165	165	165	165	165	180
				n	38215	29720	26270	21015	17515	15010	13135	12735
				f_z	0.007	0.009	0.012	0.015	0.018	0.021	0.025	0.028
				f (mm/min)	1070	1070	1260	1260	1260	1260	1310	1425



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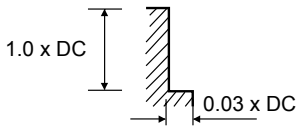
For long series and long necked tools it may be necessary to reduce feed rate by up to 50%.

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

103350, 101550 (4 Flute Extended Neck)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					5.0	**6.0**	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	195	195	195	195	195	195	195
				n	12420	10350	7760	6210	5175	3880	3105
				f_z	0.03	0.034	0.043	0.051	0.06	0.071	0.078
				f (mm/min)	1490	1405	1335	1265	1240	1100	965
H	38	Hardened Steel	**40-50**	v_c (m/min)	195	195	195	195	195	195	195
				n	12420	10350	7760	6210	5175	3880	3105
				f_z	0.03	0.034	0.043	0.051	0.06	0.071	0.078
				f (mm/min)	1490	1405	1335	1265	1240	1100	965
		Hardened Steel	**50-55**	v_c (m/min)	130	130	130	130	130	130	130
				n	8280	6900	5175	4140	3450	2585	2070
				f_z	0.03	0.034	0.043	0.051	0.06	0.07	0.079
				f (mm/min)	990	935	890	845	825	725	650
	39	Hardened Steel	**55-65**	v_c (m/min)	80	80	80	80	80	80	80
				n	5095	4245	3185	2545	2120	1590	1270
				f_z	0.018	0.021	0.026	0.03	0.036	0.042	0.048
				f (mm/min)	365	355	330	305	305	265	245
		Hardened Steel	**65-70**	v_c (m/min)	70	70	70	70	70	70	70
				n	4455	3715	2785	2225	1855	1390	1115
				f_z	0.016	0.019	0.024	0.028	0.033	0.038	0.044
				f (mm/min)	285	280	265	250	245	210	195
	40	Chilled Cast Iron		v_c (m/min)	245	245	245	250	250	250	250
				n	15605	13000	9750	7965	6635	4975	3980
				f_z	0.032	0.037	0.048	0.056	0.066	0.077	0.083
				f (mm/min)	1995	1925	1870	1780	1750	1530	1320
	41	Hardened Cast Iron		v_c (m/min)	195	195	195	195	195	195	195
				n	12420	10350	7760	6210	5175	3880	3105
				f_z	0.03	0.034	0.043	0.051	0.06	0.071	0.078
				f (mm/min)	1490	1405	1335	1265	1240	1100	965



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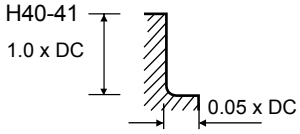
v_c - cutting speed (m/min)
n - RPM (rev/min)
f_z - feed per tooth (mm)
f - feed rate (mm/min)
a_p - axial depth of cut
a_e - radial depth of cut

CUTTING DATA

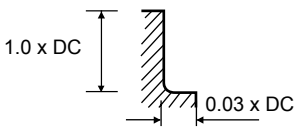
108350 (6 Flute 45° Corner Radius)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)					
					6.0	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	106	108	106	106	108	110
				n	5620	4295	3375	2810	2150	1750
				f_z	0.036	0.049	0.058	0.065	0.083	0.095
				f (mm/min)	1215	1260	1175	1095	1070	995
H	38	Hardened Steel	**40-50**	v_c (m/min)	106	108	106	106	108	110
				n	5620	4295	3375	2810	2150	1750
				f_z	0.036	0.049	0.058	0.065	0.083	0.095
				f (mm/min)	1215	1260	1175	1095	1070	995
		Hardened Steel	**50-55**	v_c (m/min)	95	97	94	95	97	98
				n	5040	3860	2990	2520	1930	1560
				f_z	0.035	0.046	0.055	0.062	0.079	0.091
				f (mm/min)	1055	1065	985	935	915	850
	39	Hardened Steel	**55-65**	v_c (m/min)	83	83	82	83	83	87
				n	4400	3300	2610	2200	1650	1385
				f_z	0.033	0.044	0.053	0.059	0.076	0.072
				f (mm/min)	870	870	830	780	750	595
		Hardened Steel	**65-70**	v_c (m/min)	48	48	49	50	48	45
				n	2545	1910	1560	1325	955	715
				f_z	0.028	0.037	0.045	0.05	0.064	0.071
				f (mm/min)	430	425	420	395	365	305
	40	Chilled Cast Iron		v_c (m/min)	106	108	106	106	108	110
				n	5620	4295	3375	2810	2150	1750
				f_z	0.036	0.049	0.058	0.065	0.083	0.095
				f (mm/min)	1215	1260	1175	1095	1070	995
	41	Hardened Cast Iron		v_c (m/min)	95	97	94	95	97	98
				n	5040	3860	2990	2520	1930	1560
				f_z	0.035	0.046	0.055	0.062	0.079	0.091
				f (mm/min)	1055	1065	985	935	915	850

MATERIAL GROUP
P10-11, H38, H40-41



MATERIAL GROUP
H39



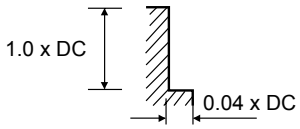
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce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

102950 (6 Flute 45° Long Length)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)								
					6.0	**8.0**	**10.0**	**12.0**	**14.0**	**16.0**	**18.0**	**20.0**	**25.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	95	95	95	95	95	95	95	95	100
				n	5040	3780	3025	2520	2160	1890	1680	1510	1270
				f_z	0.035	0.046	0.055	0.062	0.07	0.079	0.08	0.091	0.096
				f (mm/min)	1055	1040	995	935	905	895	1075	1100	975
H	38	Hardened Steel	**40-55**	v_c (m/min)	95	95	95	95	95	95	95	95	100
				n	5040	3780	3025	2520	2160	1890	1680	1510	1270
				f_z	0.035	0.046	0.055	0.062	0.07	0.079	0.08	0.091	0.096
				f (mm/min)	1055	1040	995	935	905	895	1075	1100	975
	39	Hardened Steel	**55-65**	v_c (m/min)	70	70	70	70	70	70	70	70	75
				n	3715	2785	2225	1855	1590	1390	1235	1115	955
				f_z	0.031	0.042	0.05	0.056	0.066	0.072	0.073	0.079	0.087
				f (mm/min)	690	700	665	620	630	600	720	700	665
		Hardened Steel	**65-70**	v_c (m/min)	50	50	50	50	50	50	50	50	55
				n	2650	1990	1590	1325	1135	995	885	795	700
				f_z	0.028	0.037	0.045	0.05	0.051	0.064	0.066	0.071	0.079
				f (mm/min)	445	440	430	395	345	380	465	450	440
	40	Chilled Cast Iron		v_c (m/min)	120	120	120	120	120	120	120	120	125
				n	6365	4775	3820	3185	2730	2385	2120	1910	1590
				f_z	0.039	0.052	0.063	0.07	0.081	0.09	0.095	0.099	0.11
				f (mm/min)	1490	1490	1440	1335	1325	1290	1610	1510	1400
	41	Hardened Cast Iron		v_c (m/min)	95	95	95	95	95	95	95	95	100
				n	5040	3780	3025	2520	2160	1890	1680	1510	1270
				f_z	0.035	0.046	0.055	0.062	0.07	0.079	0.08	0.091	0.096
				f (mm/min)	1055	1040	995	935	905	895	1075	1100	975



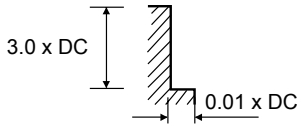
Recommended cutting depths are **maximum** depths, and **speeds and feeds are a starting point** based on these depths.
All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up.
For long series and long necked tools it may be necessary to reduce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

103950 (6 Flute 45° Extra Length)

VDI MATERIAL GROUP		MATERIAL	HRc		Size (mm)						
					6.0	**8.0**	**10.0**	**12.0**	**16.0**	**20.0**	**25.0**
P	10-11	High alloy Steel, Tool Steel	**35-45**	v_c (m/min)	60	60	60	60	60	60	60
				n	3185	2385	1910	1590	1190	955	760
				f_z	0.03	0.04	0.05	0.061	0.071	0.08	0.08
				f (mm/min)	570	570	570	580	505	610	485
H	38	Hardened Steel	**40-55**	v_c (m/min)	60	60	60	60	60	60	60
				n	3185	2385	1910	1590	1190	955	760
				f_z	0.03	0.04	0.05	0.061	0.071	0.08	0.08
				f (mm/min)	570	570	570	580	505	610	485
	39	Hardened Steel	**55-70**	v_c (m/min)	50	50	50	50	50	50	50
				n	2650	1990	1590	1325	995	795	635
				f_z	0.03	0.04	0.05	0.06	0.07	0.08	0.08
				f (mm/min)	475	475	475	475	415	510	405
	40	Chilled Cast Iron		v_c (m/min)	60	60	60	60	60	60	60
				n	3185	2385	1910	1590	1190	955	760
				f_z	0.04	0.05	0.06	0.07	0.081	0.086	0.089
				f (mm/min)	760	715	685	665	580	655	540
	41	Hardened Cast Iron		v_c (m/min)	60	60	60	60	60	60	60
				n	3185	2385	1910	1590	1190	955	760
				f_z	0.03	0.04	0.05	0.061	0.071	0.08	0.08
				f (mm/min)	570	570	570	580	505	610	485



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