

CARBIDE

HSS

CBN  
END MILLS

i-Xmill  
END MILLS

i-HS mill  
END MILLS

X5070  
END MILLS

4G MILL  
END MILLS

X-SPEED  
ROUGHER  
END MILLS

X-POWER  
END MILLS

JET-POWER  
END MILLS

TN MILL  
END MILLS

V7 Mill  
END MILLS

ALU-POWER  
END MILLS

CRX S  
END MILLS

D-POWER  
GRAPHITE  
END MILLS

D-POWER  
CFRP  
END MILLS

ROUTERS

K-2 CARBIDE  
END MILLS

GENERAL  
CARBIDE  
END MILLS

TANK-POWER  
END MILLS

GENERAL  
HSS  
END MILLS

MILLING  
CUTTERS

TECHNICAL  
DATA



ML012, ML022 SERIES

ML112, ML122 SERIES

ML212, ML222 SERIES

PLAIN SHANK  
GLATTER ZYLINDERSCHAFT

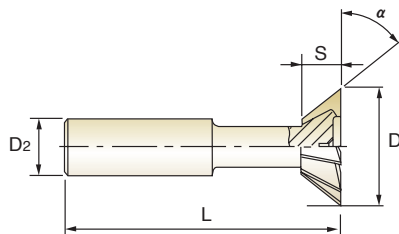
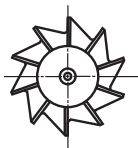
FLAT SHANK  
SEITLICHEN MITNAHMEFLÄCHEN

THREAD SHANK  
ANZUGSGEWINDE

## HSS-E, DOVETAIL CUTTERS TYPE "A", "C", "E" HSS-E, WINKELFRÄSER FORM "A", "C", "E"

▶ Recommended for use in place of arbor and threaded hole type cutters to reduce set time and facilitate handling.

▶ Empfohlen zur Nutzung anstelle von Arbor und threaded hole type Cutters um Montierzeit zu verkürzen und Handhabung zu erleichtern.

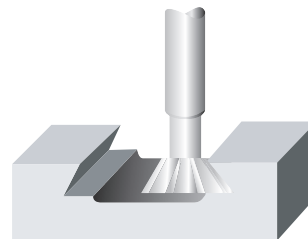


Unit : mm

EDP No.			Cutter Diameter	Width of Face	Divergent Taper Angle	Shank Diameter	Overall Length	No. of Teeth
PLAIN	FLAT	THREAD	D <sub>1</sub> (js16)	S(js14)	α(± 15')	D <sub>2</sub> (h6)	L(js18)	Z
ML01201601	ML11201601	ML21201601	16.0	4	45°	12	60	6
ML01202001	ML11202001	ML21202001	20.0	5	45°	12	63	6
ML01202201	ML11202201	ML21202201	22.0	6	45°	12	67	6
ML01202501	ML11202501	ML21202501	25.0	6.3	45°	16	67	8
ML01202801	ML11202801	ML21202801	28.0	7.5	45°	16	67	8
ML01203201	ML11203201	ML21203201	32.0	8	45°	16	71	10
ML01203801	ML11203801	ML21203801	38.0	10	45°	16	80	12
ML02201601	ML12201601	ML22201601	16.0	6.3	60°	12	60	6
ML02202001	ML12202001	ML22202001	20.0	8	60°	12	63	6
ML02202201	ML12202201	ML22202201	22.0	9	60°	12	67	6
ML02202501	ML12202501	ML22202501	25.0	10	60°	16	67	8
ML02202801	ML12202801	ML22202801	28.0	11	60°	16	67	8
ML02203201	ML12203201	ML22203201	32.0	12.5	60°	16	71	10
ML02203801	ML12203801	ML22203801	38.0	16	60°	16	80	12
ML02204001	ML12204001	ML22204001	40.0	13	60°	25	85	12
ML02205001	ML12205001	ML22205001	50.0	16	60°	25	100	16

### Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

	Nominal-Diameter in mm / Nennmaßbereich in mm						
	over 3 to 6 über 3 bis 6	over 6 to 10 über 6 bis 10	over 10 to 18 über 10 bis 18	over 18 to 30 über 18 bis 30	over 30 to 50 über 30 bis 50	over 50 to 80 über 50 bis 80	over 80 to 120 über 80 bis 120
Tolerance range in mm / Toleranzwerte in mm							
js16	± 0.375	± 0.45	± 0.55	± 0.65	± 0.80	± 0.95	± 1.10
js14	± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435
js18	± 0.90	± 1.10	± 1.35	± 1.65	± 1.95	± 2.30	± 2.70
Tolerance range in μm / Toleranzwerte in μm							
h6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16	0 - 19	0 - 22



◎ : Excellent ○ : Good

Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel	Acrylic	CFRP
~HB225	HB225~325	HRC30~40	HRc40~45	HRc45~55	HRc55~70									
◎	◎	○							○					



**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDKONDITIONEN**

**HSS-E, DOVETAIL CUTTERS TYPE "A", "C", "E"**  
**HSS-E, WINKELFRÄSER FORM "A", "C", "E"**

**ML012, ML112, ML022, ML122, ML212, ML222 SERIES**

MATERIAL	CARBON STEELS ALLOY STEELS				CARBON STEELS ALLOY STEELS TOOL STEELS				CARBON STEELS ALLOY STEELS TOOL STEELS			
HARDNESS					~ HRc20				HRc20 ~ HRc30			
STRENGTH	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
16.0	615	110	30	0.030	305	57	15	0.031	215	40	10	0.031
20.0	500	110	30	0.037	255	55	15	0.036	180	38	10	0.035
25.0	380	80	30	0.026	190	47	15	0.031	135	30	10	0.028
32.0	300	125	30	0.042	155	64	15	0.041	100	40	10	0.040
40.0	250	130	30	0.043	125	64	15	0.043	90	45	10	0.042
50.0	190	90	30	0.030	100	42	15	0.026	75	36	10	0.030
63.0	150	75	30	0.031	80	40	15	0.031	60	32	10	0.033

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM & ALUMINUM ALLOYS			
HARDNESS	HRc30 ~ HRc40							
STRENGTH	1000 ~ 1300N/mm <sup>2</sup>							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
16.0	160	20	10	0.021	1850	336	95	0.030
20.0	125	15	10	0.020	1350	324	85	0.040
25.0	100	16	10	0.020	1150	270	90	0.029
32.0	80	16	10	0.020	920	375	90	0.041
40.0	60	16	10	0.022	765	387	95	0.042
50.0	50	16	10	0.020	550	265	85	0.030
63.0	40	15	10	0.023	450	240	90	0.033

RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
fz = mm/t

**HSS-E, DOVETAIL CUTTERS TYPE "B", "D", "F"**  
**HSS-E, WINKELFRÄSER FORM "B", "D", "F"**

**ML032, ML132, ML042, ML142, ML232, ML242 SERIES**

MATERIAL	CARBON STEELS ALLOY STEELS				CARBON STEELS ALLOY STEELS TOOL STEELS				CARBON STEELS ALLOY STEELS TOOL STEELS			
HARDNESS					~ HRc20				HRc20 ~ HRc30			
STRENGTH	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>			
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
16.0	615	110	30	0.030	305	57	15	0.031	215	40	10	0.031
20.0	500	110	30	0.037	255	55	15	0.036	180	38	10	0.035
25.0	380	80	30	0.026	190	47	15	0.031	135	30	10	0.028
32.0	300	125	30	0.042	155	64	15	0.041	100	40	10	0.040

MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS				ALUMINUM & ALUMINUM ALLOYS			
HARDNESS	HRc30 ~ HRc40							
STRENGTH	1000 ~ 1300N/mm <sup>2</sup>							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
16.0	160	20	10	0.021	1850	336	95	0.030
20.0	125	15	10	0.020	1350	324	85	0.040
25.0	100	16	10	0.020	1150	270	90	0.029
32.0	80	16	10	0.020	920	375	90	0.041

RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
fz = mm/t