SILVER & DEMING DRILLS



PLASTICS

# 

## **RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN**

HPD DRILLS

GOLD P-DRILLS			F										
CENTRE DRILLS								A			R		Ľ.
DREAM DRILLS GENERAL				7				V					_
DREAM DRILLS	Material	V	Ø≤ <b>10</b>	S Ø≤ 20	Ø≤ <b>30</b>	v	Ø≤ <b>10</b>	S Ø≤ 20	Ø≤ <b>30</b>	v	Ø≤ <b>10</b>	S Ø≤ 20	Ø≤ <b>30</b>
INOX	<b>STEELS</b> $\leq$ 500N/mm <sup>2</sup>	35-45	0.20	0.22	0.24	35-45	0.20	0.22	0.24	17-22	0.30	0.32	0.36
	STEELS 500~800N/mm <sup>2</sup>	20-30	0.14	0.17	0.20	20-30	0.14	0.17	0.20	10-15	0.28	0.30	0.31
GENERAL CARBIDE	STEELS 800~1000N/mm <sup>2</sup>	15-20	0.11	0.12	0.14	15-20	0.11	0.12	0.14	8-12	0.24	0.26	0.28
DRILLS	STEELS-STAINLESS STEEL 1000~1300N/mm <sup>2</sup>	12-15	0.10	0.12	0.15	12-15	0.10	0.12	0.15	6-8	0.20	0.20	0.22
MORSE TAPER	STAINLESS STEELS	6-8	0.07	0.08	0.09	6-8	0.07	0.08	0.09	4-6	0.08	0.09	0.10
SHANK	CAST IRON	20-40	0.15	0.24	0.28	20-40	0.15	0.24	0.28	15-25	0.13	0.19	0.24
DRILLS	ALUMINUM	50-60	0.22	0.25	0.27	50-60	0.22	0.25	0.27	35-45	0.27	0.30	0.35
1100	BRASS-BRONZE	30-40	0.23	0.25	0.28	30-40	0.23	0.25	0.28	20-30	0.30	0.30	0.31
HSS END MILLS	COPPER	20-30	0.22	0.25	0.27	20-30	0.22	0.25	0.27	10-15	0.29	0.30	0.31

 50-100
 0.50
 0.60
 0.65
 50-100
 0.50
 0.60
 0.65
 35-70
 0.40
 0.45
 0.50

 V : Cutting Speed(mm/min)

S: Feed per Revolution(mm/rev)

K-2 CARBIDE END MILLS

TANK POWER

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

SPIRAL POINT TAPS

COLD FORMING TAPS

REAMERS

COUNTER-BORES

COUNTER-SINK

MILLING CUTTERS





# MILLING CUTTER Fräser

- General Works. Available Dovetail, Woodruff Keyseat, T-slot, Side Milling Cutters and HSS (8% cobalt) Corner Rounding, Shell End Mills

 Für allgemeinen Einsatz. Winkelschaftfräser, Schlitzfräser, T-Nutenfräser, Konkavfräser, Scheibenfräser und HSSE-Co8 Walzenstirnfräser

# **SELECTION GUIDE**

	NODE	DECODIDATION (	SI	ZE	
ITEM	MODEL	DESCRIPTION	MIN	MAX	PAGE
ML012, ML022 ML112, ML122 ML212, ML222		HSS-E, DOVETAIL CUTTERS TYPE "A", "C", "E" HSS-E, WINKELFRÄSER FORM "A", "C", "E"	D16.0	D50.0	382
ML032, ML042 ML132, ML142 ML232, ML242		HSS-E, DOVETAIL CUTTERS TYPE "B", "D", "F" HSS-E, WINKELFRÄSER FORM "B", "D", "F"	D16.0	D38.0	383
ML062 ML162 ML262		HSS-E, WOODRUFF KEYSEAT CUTTERS TYPE "B", "D", "F" HSS-E, SCHLITZFRÄSER FORM "B", "D", "F"	D10.5	D45.5	384
ML072 ML172 ML272		HSS-E, T-SLOT CUTTERS TYPE "AA", "AB", "AD" HSS-E, SCHAFTERFRÄSER FÜR T-NUTEN FORM "AA", "AB", "AD"	D12.5	D40.0	386
ML092	On	HSS-E, SIDE AND FACE MILLING CUTTERS with STRAIGHT TEETH HSS-E, SCHEIBENFRÄSER mit GERADEVERZAHNT	D50.0	D125.0	387
ML102	(DANA)	HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT	D50.0	D200.0	388
E2675		HSSCo8, MULTI FLUTE SHELL END MILL HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER	D30.0	D160.0	392
E2676		HSSCo8, MULTI FLUTE SHELL END MILL for ALUMINUM HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER für ALUMINIUM	D30.0	D100.0	393
E2677		HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL - COARSE HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFRÄSER - GROBES	D40.0	D160.0	394
E2678		HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL - FINE HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFRÄSER - FEINES	D40.0	D160.0	395
E2679		HSSCo8, MULTI FLUTE ROUGHING & FINISHING SHELL END MILL HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPSCHLICHTFRÄSER	D40.0	D160.0	396
E2498		HSSCo8, 4 FLUTE CORNER ROUNDING CUTTERS HSSCo8, 4 SCHNEIDEN VIERTELKREISFRÄSER	D8.0	D56.0	397
		RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN			398

# MILLING CUTTER

												©∶Exce	llent O	: Good
Carbon Stee <b>l</b> s	Alloy Steels	Prehardened Steels	Hardene	ed Steels	High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stain <b>l</b> ess Steels	Titanium	Inconel	Acrylic	CFRP
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70					Steels				
0	0	0							0					
O	0	0							0					
O	0	0							0					
O	0								0					
0	0	0							0					
0	0	0							0					
0	O	$\bigcirc$												
0	0								0					
O	O	$\bigcirc$							0					
0	O	$\bigcirc$							0					
0	O	$\bigcirc$							0					
0	0	0							0					



SILVER & DEMING DRILLS





PLAIN SHANK GLATTER ZYLINDERSCHAFT FLAT SHANK SEITLICHEN MITNAHMEFLÄCHEN THREAD SHANK ANZUGSGEWINDE

#### GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE TAPER SHANK

HSS END MILLS

K-2 CARBID END MILLS

TANK POWER

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

SPIRAL

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

s			Nomina	I-Diameter in	mm / Nennma	Bbereich in m	n	
		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
			Toler	ance range ir	ı mm / Toleran:	zwerte in mm		
PS	js16	$\pm$ 0.375	$\pm$ 0.45	$\pm$ 0.55	$\pm$ 0.65	$\pm$ 0.80	$\pm$ 0.95	± 1.10
	js14	± 0.15	$\pm$ 0.18	$\pm$ 0.215	$\pm$ 0.26	$\pm$ 0.31	$\pm$ 0.37	$\pm$ 0.435
	js18	$\pm$ 0.90	± 1.10	± 1.35	± 1.65	± 1.95	± 2.30	$\pm$ 2.70
			Toler	ance range ir	ι μm / Toleran:	zwerte in µm		
	h6	0 - 8	- 9	0 - 11	0 - 13	0 - 16	0 - 19	0 - 22



UNTER-	
UNIER-	

BORES

FORMING

COUNTER-SINK

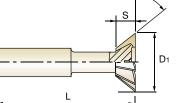
MILLING	
CUTTERS	

											O	Excelle	nt O	: Good
Carbon Steels	Alloy Steels	Prehardened Steels	Hardene	d Stee <b>l</b> s	High Hardened Stee <b>l</b> s	Copper	Graphite	Cast Iron	Aluminum	Stainless	Titanium	Inconel	Acrylic	CFRP
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70					Steels				
0	0	0							0					
382 🍼	G YG-1	CO., LTD.	• www.y	g1.co.za	+27(0) 87 16	0 0779								

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

WINKELFRASER FORM A, C,

Recommanded 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.





K S									Unit : mm
S		EDP No.		Cutter Diameter	Width of Face	Divergent Taper Angle	Shank Diameter	Overa <b>ll</b> Length	No <mark>.</mark> of Teeth
	PLAIN	FLAT	THREAD	D1(js16)	S(js14)	α(±15΄)	D2(h6)	L(js18)	Z
AILLS	ML01201601	ML11201601	ML21201601	16.0	4	45°	12	60	6
	ML01202001	ML11202001	ML21202001	20.0	5	45°	12	63	6
RBIDE	ML01202201	ML11202201	ML21202201	22.0	6	45°	12	67	6
IILLS	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
R	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
VER	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
TAPS	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
1	ML02205001	ML12205001	ML22205001	50 <u>.</u> 0	16	60°	25	100	16





PLAIN SHANK GLATTER ZYLINDERSCHAFT FLAT SHANK

STRAIGHT SHANK DRILLS

SILVER & DEMING DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE

TAPER SHANK DRILLS

HSS END MILLS

K-2 CARBIDE END MILLS

POWER

X-POWER

SPIRAL FLUTE TAPS

SPIRAL

SEITLICHEN MITNAHMEFLÄCHEN THREAD SHANK

Dı

s

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





								Unit : mm
	EDP No.		Cutter Diameter	Width of Face	Convergent Taper Angle	Shank Diameter	Overall Length	No. of Teeth
PLAIN	FLAT	THREAD	D1(js16)	S(js14)	α(±15΄)	D2(h6)	L(js18)	Z
ML03201601	ML13201601	ML23201601	16.0	4	45°	12	60	6
ML03202001	ML13202001	ML23202001	20.0	5	45°	12	63	6
ML03202201	ML13202201	ML23202201	22.0	6	45°	12	67	6
ML03202501	ML13202501	ML23202501	25.0	6.3	45°	16	67	8
ML03202801	ML13202801	ML23202801	28.0	7.5	45°	16	67	8
ML03203201	ML13203201	ML23203201	32.0	8	45°	16	71	10
ML03203801	ML13203801	ML23203801	38.0	10	45°	16	80	12
ML04201601	ML14201601	ML24201601	16.0	6.3	60°	12	60	6
ML04202001	ML14202001	ML24202001	20.0	8	60°	12	63	6
ML04202201	ML14202201	ML24202201	22.0	9	60°	12	67	6
ML04202501	ML14202501	ML24202501	25.0	10	60°	16	67	8
ML04202801	ML14202801	ML24202801	28.0	11	60°	16	67	8
ML04203201	ML14203201	ML24203201	32.0	12.5	60°	16	71	10
ML04203801	ML14203801	ML24203801	38.0	16	60°	16	80	12

High Hardened Steels

HRc55~70

#### 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					
		Toler	ance range ir	n mm / Toleran	zwerte in mm						
js16	$\pm$ 0.375	$\pm$ 0.45	$\pm$ 0.55	$\pm$ 0.65	$\pm$ 0.80	$\pm$ 0.95					
js14	± 0.15	$\pm$ 0.18	± 0.215	$\pm$ 0.26	± 0.31	$\pm$ 0.37					
js18	$\pm$ 0.90	± 1.10	± 1.35	± 1.65	± 1.95	$\pm$ 2.30					
		Toler	ance range ir	n "µm / Toleran	zwerte in µm						
h6	0 - 8	_ 0 _ 9	0 - 11	0 - 13	0 - 16	0 - 19					

Hardened Steels



◎:Excellent ○:Good



COLD FORMING TAPS

COUNTER-SINK

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Carbon Steels

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Alloy Steels

 $\bigcirc$ 

Prehardened Steels

 $\bigcirc$ 

~HB225 HB225~325 HRc30~40 HRc40~45 HRc45~55

SILVER & DEMING DRILLS



 $\bigcirc$ 

PLAIN SHANK GLATTER ZYLINDERSCHAFT FLAT SHANK SEITLICHEN MITNAHMEFLÄCHEN THREAD SHANK ANZUGSGEWINDE

HSS-E, W	OODRUFF	KEYSEAT (	CUTTE		PE "B",	"D", "F	.,,
HSS-E. SC	HLITZFRÄ	SER FORM	"B". "	D". "F	"		
,,,,,,,			. – ,	_ , -			
		8	s ta				
							D1
			I		L		
HSS-E DIN 850 N	10~12°	DIN 1835B	→	289			
							Unit : n
	EDP No.		Cutter	Width	Shank	Overall	No. of
							Teeth
			. ,	, ,	· · ·	<b>,</b>	Z
							8
	ML16210E02						8
ML06210E03	ML16210E03	ML26210E03		3			8
ML06213E01	ML16213E01	ML26213E01					8
ML06213E02	ML16213E02	ML26213E02	13.5	2.5	10		8
ML06213E03	ML16213E03	ML26213E03	13.5	3	10	56	8
ML06213E04	ML16213E04	ML26213E04	13.5	4	10	56	8
ML06216E01	ML16216E01	ML26216E01	16.5	2.5	10	56	8
ML06216E02	ML16216E02	ML26216E02	16.5	3	10	56	8
ML06216E03	ML16216E03	ML26216E03	16.5	4	10	56	8
ML06216E04	ML16216E04	ML26216E04	16.5	5	10	56	8
ML06219E01	ML16219E01	ML26219E01	19,5	З	10	56	8
ML06219E02	ML16219E02	ML26219E02	19.5	4	10	63	8
ML06219E03	ML16219E03	ML26219E03	19.5	5	10	63	8
ML06219E04	ML16219E04	ML26219E04	19.5	6	10	63	8
ML06222E01		ML26222E01	22.5	4	10	63	10
ML06222E02		ML26222E02	22.5	5	10		10
	ML16222E03	ML26222E03		6	10	63	10
							10
	ML16225E01	ML26225E01			10	63	10
ML06225E02	ML16225E02	ML26225E02		6	10	63	10
ML06225E03	ML16225E03	ML26225E03		7	10	63	10
ML06225E04	ML16225E04	ML26225E04	25.5		10	63	10
ML06228E01	ML16228E01	ML26228E01	28.5	5	10	63	10
ML06228E02	ML16228E02	ML26228E02	28.5	6	10	63	10
ML06228E03	ML16228E03	ML26228E03	28.5	7	10	63	10
IVILUOZZOEUN			·		. –		
ML06228E04	ML16228E04	ML26228E04	28.5	8	10	63	10
	PLAIN           ML06210E01           ML06210E02           ML06210E03           ML06213E01           ML06213E02           ML06213E03           ML06213E03           ML06213E03           ML06213E04           ML06216E01           ML06216E02           ML06216E03           ML06216E04           ML06219E01           ML06219E02           ML06219E03           ML06222E01           ML06222E02           ML06222E03           ML06225E03           ML06225E03           ML06225E03           ML06225E03	EDP No.           PLAIN         FLAT           ML06210E01         ML16210E01           ML06210E02         ML16210E02           ML06210E03         ML16210E03           ML06213E01         ML16213E01           ML06213E02         ML16213E02           ML06213E03         ML16213E02           ML06213E04         ML16213E03           ML06213E05         ML16213E04           ML06213E04         ML16216E01           ML06216E01         ML16216E02           ML06216E02         ML16216E02           ML06216E03         ML16216E03           ML06216E04         ML16216E03           ML06219E05         ML16219E01           ML06219E04         ML16219E02           ML06219E05         ML16219E03           ML06219E04         ML16219E03           ML06219E05         ML16219E03           ML06219E04         ML16222E01           ML06222E01         ML16222E03           ML06222E03         ML16222E03           ML06222E04         ML16222E03           ML06225E03         ML16225E01           ML06225E03         ML16225E03           ML06225E03         ML16225E03           ML06225E04         ML16225E04 </th <th>EDP No.           PLAIN         FLAT         THREAD           ML06210E01         ML16210E01         ML26210E01           ML06210E02         ML16210E02         ML26210E02           ML06210E02         ML16210E03         ML26210E02           ML06210E03         ML16210E03         ML26210E03           ML06213E01         ML16213E01         ML26213E02           ML06213E02         ML16213E03         ML26213E02           ML06213E02         ML16213E03         ML26213E03           ML06213E03         ML16213E04         ML26213E03           ML06213E04         ML16213E04         ML26213E03           ML06216E01         ML16216E01         ML26216E01           ML06216E02         ML16216E03         ML26216E02           ML06216E03         ML16216E04         ML26216E03           ML06219E01         ML16219E01         ML26219E01           ML06219E02         ML16219E03         ML26219E03           ML06219E03         ML16219E03         ML26219E03           ML06219E04         ML16219E04         ML262219E03           ML062219E03         ML16222E01         ML262219E03           ML06222E01         ML16222E03         ML26222E01           ML06222E03         ML1622</th> <th>EDP No.         Cutter Diameter           PLAIN         FLAT         THREAD         Di(h11)           ML06210E01         ML16210E01         ML26210E01         10.5           ML06210E02         ML16210E02         ML26210E02         10.5           ML06210E03         ML16210E03         ML26210E03         10.5           ML06213E01         ML16213E01         ML26213E02         13.5           ML06213E02         ML16213E02         ML26213E02         13.5           ML06213E03         ML16213E03         ML26213E03         13.5           ML06213E04         ML16213E03         ML26213E04         13.5           ML06213E04         ML16213E04         ML26213E04         13.5           ML06216E01         ML16216E01         ML26216E01         16.5           ML06216E03         ML16216E03         ML26216E03         16.5           ML06216E03         ML16216E04         ML26219E04         19.5           ML06219E01         ML16219E02         ML26219E03         19.5           ML06219E03         ML16219E03         ML26219E03         19.5           ML06219E03         ML16219E04         ML26219E03         19.5           ML06219E04         ML16219E04         ML262219E04         <t< th=""><th>EDP No.         Cutter         Width of Face           PLAIN         FLAT         THREAD         D1(n11)         S(8)           ML06210E01         ML16210E01         ML26210E02         10.5         2.5           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06213E03         ML16213E03         ML26213E02         13.5         2.5           ML06213E03         ML16213E03         ML26213E02         13.5         2           ML06213E03         ML16213E03         ML26213E03         13.5         3           ML06213E04         ML16213E03         ML26213E03         13.5         4           ML06216E01         ML16216E02         ML26216E02         16.5         3           ML06216E04         ML16216E02         ML26216E03         16.5         4           ML06216E04         ML16216E03         ML26216E03         16.5         4           ML06219E01         ML16219E01         ML26219E01         19.5         3           ML06219E01         ML16219E03         ML26219E03         19.5         5           ML06219E04         ML16219E04         M</th><th>EDP No.         Cutter         Width of Face         Shank Diameter           PLAIN         FLAT         THREAD         Di(111)         S(e8)         D2(h6)           ML06210E01         ML16210E01         ML26210E01         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E02         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E03         10.5         3         6           ML06213E02         ML16213E01         ML26210E03         10.5         3         6           ML06213E02         ML16213E03         ML26213E01         13.5         2         10           ML06213E02         ML16213E03         ML26213E03         13.5         3         10           ML06213E03         ML16213E03         ML26213E03         13.5         3         10           ML06213E04         ML16213E03         ML26218E03         16.5         4         10           ML06216E02         ML16216E03         ML26218E03         16.5         4         10           ML06216E03         ML16216E03         ML26218E03         16.5         4         10           ML06219E04         ML16219E03         ML26219E03         19.5<th>EDP No.         Cutter         Width of Face         Shank Diameter         Overall Length           PLAIN         FLAT         THREAD         Di(h11)         S(68)         D2(h6)         U(s18)           ML06210E01         ML16210E01         ML26210E02         10.5         2         6         50           ML06210E02         ML16210E02         ML26210E02         10.5         2.5         6         50           ML06210E02         ML16210E02         ML26213E01         10.5         3         6         50           ML06213E01         ML16213E02         ML26213E02         13.5         2         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E04         ML16213E04         ML26213E03         13.5         3         10         56           ML06216E03         ML16216E03         ML26216E03         16.5         4         10         56           ML06216E04         ML16216E03         ML26216E03         16.5         4         10         56           ML06219E03</th></th></t<></th>	EDP No.           PLAIN         FLAT         THREAD           ML06210E01         ML16210E01         ML26210E01           ML06210E02         ML16210E02         ML26210E02           ML06210E02         ML16210E03         ML26210E02           ML06210E03         ML16210E03         ML26210E03           ML06213E01         ML16213E01         ML26213E02           ML06213E02         ML16213E03         ML26213E02           ML06213E02         ML16213E03         ML26213E03           ML06213E03         ML16213E04         ML26213E03           ML06213E04         ML16213E04         ML26213E03           ML06216E01         ML16216E01         ML26216E01           ML06216E02         ML16216E03         ML26216E02           ML06216E03         ML16216E04         ML26216E03           ML06219E01         ML16219E01         ML26219E01           ML06219E02         ML16219E03         ML26219E03           ML06219E03         ML16219E03         ML26219E03           ML06219E04         ML16219E04         ML262219E03           ML062219E03         ML16222E01         ML262219E03           ML06222E01         ML16222E03         ML26222E01           ML06222E03         ML1622	EDP No.         Cutter Diameter           PLAIN         FLAT         THREAD         Di(h11)           ML06210E01         ML16210E01         ML26210E01         10.5           ML06210E02         ML16210E02         ML26210E02         10.5           ML06210E03         ML16210E03         ML26210E03         10.5           ML06213E01         ML16213E01         ML26213E02         13.5           ML06213E02         ML16213E02         ML26213E02         13.5           ML06213E03         ML16213E03         ML26213E03         13.5           ML06213E04         ML16213E03         ML26213E04         13.5           ML06213E04         ML16213E04         ML26213E04         13.5           ML06216E01         ML16216E01         ML26216E01         16.5           ML06216E03         ML16216E03         ML26216E03         16.5           ML06216E03         ML16216E04         ML26219E04         19.5           ML06219E01         ML16219E02         ML26219E03         19.5           ML06219E03         ML16219E03         ML26219E03         19.5           ML06219E03         ML16219E04         ML26219E03         19.5           ML06219E04         ML16219E04         ML262219E04 <t< th=""><th>EDP No.         Cutter         Width of Face           PLAIN         FLAT         THREAD         D1(n11)         S(8)           ML06210E01         ML16210E01         ML26210E02         10.5         2.5           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06213E03         ML16213E03         ML26213E02         13.5         2.5           ML06213E03         ML16213E03         ML26213E02         13.5         2           ML06213E03         ML16213E03         ML26213E03         13.5         3           ML06213E04         ML16213E03         ML26213E03         13.5         4           ML06216E01         ML16216E02         ML26216E02         16.5         3           ML06216E04         ML16216E02         ML26216E03         16.5         4           ML06216E04         ML16216E03         ML26216E03         16.5         4           ML06219E01         ML16219E01         ML26219E01         19.5         3           ML06219E01         ML16219E03         ML26219E03         19.5         5           ML06219E04         ML16219E04         M</th><th>EDP No.         Cutter         Width of Face         Shank Diameter           PLAIN         FLAT         THREAD         Di(111)         S(e8)         D2(h6)           ML06210E01         ML16210E01         ML26210E01         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E02         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E03         10.5         3         6           ML06213E02         ML16213E01         ML26210E03         10.5         3         6           ML06213E02         ML16213E03         ML26213E01         13.5         2         10           ML06213E02         ML16213E03         ML26213E03         13.5         3         10           ML06213E03         ML16213E03         ML26213E03         13.5         3         10           ML06213E04         ML16213E03         ML26218E03         16.5         4         10           ML06216E02         ML16216E03         ML26218E03         16.5         4         10           ML06216E03         ML16216E03         ML26218E03         16.5         4         10           ML06219E04         ML16219E03         ML26219E03         19.5<th>EDP No.         Cutter         Width of Face         Shank Diameter         Overall Length           PLAIN         FLAT         THREAD         Di(h11)         S(68)         D2(h6)         U(s18)           ML06210E01         ML16210E01         ML26210E02         10.5         2         6         50           ML06210E02         ML16210E02         ML26210E02         10.5         2.5         6         50           ML06210E02         ML16210E02         ML26213E01         10.5         3         6         50           ML06213E01         ML16213E02         ML26213E02         13.5         2         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E04         ML16213E04         ML26213E03         13.5         3         10         56           ML06216E03         ML16216E03         ML26216E03         16.5         4         10         56           ML06216E04         ML16216E03         ML26216E03         16.5         4         10         56           ML06219E03</th></th></t<>	EDP No.         Cutter         Width of Face           PLAIN         FLAT         THREAD         D1(n11)         S(8)           ML06210E01         ML16210E01         ML26210E02         10.5         2.5           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06210E03         ML16210E03         ML26210E02         10.5         3           ML06213E03         ML16213E03         ML26213E02         13.5         2.5           ML06213E03         ML16213E03         ML26213E02         13.5         2           ML06213E03         ML16213E03         ML26213E03         13.5         3           ML06213E04         ML16213E03         ML26213E03         13.5         4           ML06216E01         ML16216E02         ML26216E02         16.5         3           ML06216E04         ML16216E02         ML26216E03         16.5         4           ML06216E04         ML16216E03         ML26216E03         16.5         4           ML06219E01         ML16219E01         ML26219E01         19.5         3           ML06219E01         ML16219E03         ML26219E03         19.5         5           ML06219E04         ML16219E04         M	EDP No.         Cutter         Width of Face         Shank Diameter           PLAIN         FLAT         THREAD         Di(111)         S(e8)         D2(h6)           ML06210E01         ML16210E01         ML26210E01         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E02         10.5         2.5         6           ML06210E02         ML16210E03         ML26210E03         10.5         3         6           ML06213E02         ML16213E01         ML26210E03         10.5         3         6           ML06213E02         ML16213E03         ML26213E01         13.5         2         10           ML06213E02         ML16213E03         ML26213E03         13.5         3         10           ML06213E03         ML16213E03         ML26213E03         13.5         3         10           ML06213E04         ML16213E03         ML26218E03         16.5         4         10           ML06216E02         ML16216E03         ML26218E03         16.5         4         10           ML06216E03         ML16216E03         ML26218E03         16.5         4         10           ML06219E04         ML16219E03         ML26219E03         19.5 <th>EDP No.         Cutter         Width of Face         Shank Diameter         Overall Length           PLAIN         FLAT         THREAD         Di(h11)         S(68)         D2(h6)         U(s18)           ML06210E01         ML16210E01         ML26210E02         10.5         2         6         50           ML06210E02         ML16210E02         ML26210E02         10.5         2.5         6         50           ML06210E02         ML16210E02         ML26213E01         10.5         3         6         50           ML06213E01         ML16213E02         ML26213E02         13.5         2         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E04         ML16213E04         ML26213E03         13.5         3         10         56           ML06216E03         ML16216E03         ML26216E03         16.5         4         10         56           ML06216E04         ML16216E03         ML26216E03         16.5         4         10         56           ML06219E03</th>	EDP No.         Cutter         Width of Face         Shank Diameter         Overall Length           PLAIN         FLAT         THREAD         Di(h11)         S(68)         D2(h6)         U(s18)           ML06210E01         ML16210E01         ML26210E02         10.5         2         6         50           ML06210E02         ML16210E02         ML26210E02         10.5         2.5         6         50           ML06210E02         ML16210E02         ML26213E01         10.5         3         6         50           ML06213E01         ML16213E02         ML26213E02         13.5         2         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E03         ML16213E04         ML26213E03         13.5         3         10         56           ML06213E04         ML16213E04         ML26213E03         13.5         3         10         56           ML06216E03         ML16216E03         ML26216E03         16.5         4         10         56           ML06216E04         ML16216E03         ML26216E03         16.5         4         10         56           ML06219E03

MILLING CUTTERS  $\bigcirc$ 

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ML062 SERIES	PLAIN SHANK GLATTER ZYLINDER
ML162 SERIES	FLAT SHANK SEITLICHEN MITNAH
ML262 SERIES	THREAD SHANK ANZUGSGEWINDE

DERSCHAFT **IAHMEFLÄCHEN** 

D1

S

SILVER & DEMING DRILLS

STRAIGHT SHANK DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE TAPER SHANK DRILLS

HSS END MILLS

K-2 CARBIDE END MILLS

TANK POWER

X-POWER

SPIRAL FLUTE TAPS

SPIRAL

COLD FORMING TAPS

COUNTER-SINK

MILLING CUTTERS

	The second	

HSS-E, SCHLITZFRÄSER FORM "B", "D", "F"



							Unit : mm
	EDP No.		Cutter Diameter	Width of Face	Shank Diameter	Overall Length	No. of Teeth
PLAIN	FLAT	THREAD	D1(h11)	S(e8)	D2(h6)	L(js18)	Z
ML06232E01	ML16232E01	ML26232E01	32.5	5	12	71	12
ML06232E02	ML16232E02	ML26232E02	32.5	6	12	71	12
ML06232E03	ML16232E03	ML26232E03	32.5	7	12	71	12
ML06232E04	ML16232E04	ML26232E04	32.5	8	12	71	12
ML06232E05	ML16232E05	ML26232E05	32.5	10	12	71	12
ML06238E01	ML16238E01	ML26238E01	38.5	7	12	71	12
ML06238E02	ML16238E02	ML26238E02	38.5	8	12	71	12
ML06238E03	ML16238E03	ML26238E03	38.5	9	12	71	12
ML06238E04	ML16238E04	ML26238E04	38.5	10	12	71	12
ML06245E01	ML16245E01	ML26245E01	45.5	10	12	71	14

HSS-E, WOODRUFF KEYSEAT CUTTERS TYPE "B", "D", "F"

5

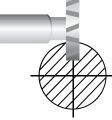
### Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

	Nominal-Diameter in mm / Nennmaßbereich in mm								
	from 1 to 3 von 1 bis 3	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		
	Tolerance range in mm / Toleranzwerte in mm								
js18		$\pm$ 0.90	± 1.10	± 1.35	± 1.65	± 1.95	$\pm$ 2.30		
	Tolerance range in  mum / Toleranzwerte in  mum								
h11	- 60	0 - 75	- 90	0 - 110	0 - 130	0 - 160	0 - 190		
e8	- 14 - 28	- 20 - 38	- 25 - 47	- 32 - 59	- 40 - 73	- 50 - 89	- 60 - 106		
h6	- 6	- 8	- 9	0 - 11	0 - 13	0 - 16	0 - 19		

Hardened Steels

High Hardened Steels

HRc55~70



Copper Graphite Cast Iron Aluminum Stainless Steels Titanium Inconel Acrylic CFRP

7/G YG-1 CO., LTD. 385

© : Excellent ○ : Good

Carbon Steels

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Alloy Steels

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Prehardened Steels

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~HB225 HB225~325 HRc30~40 HRc40~45 HRc45~55

DEMING DRILLS



ML072 SERIES	GLA
ML172 SERIES	FLA SEIT
ML272 SERIES	THR ANZ

PLAIN SHANK GLATTER ZYLINDERSCHAFT FLAT SHANK SEITLICHEN MITNAHMEFLÄCHEN THREAD SHANK ANZUGSGEWINDE

#### HSS-E, T-SLOT CUTTERS TYPE "AA", "AB", "AD" HSS-E, SCHAFTERFRÄSER FÜR T-NUTEN FORM "AA", "AB", "AD" GOLD P-DRILLS CENTRE DRILLS Dз D1 D2 DREAM DRILLS DREAM DRILLS INOX D ISS-F Ν 851 DRILLS 10<sup>°</sup> P.1289 MORSE TAPER Unit : mm Cutter Width Shank Neck Overall No. of EDP No. Diameter Diameter of Face Diameter Length Teeth PLAIN FLAT THREAD D1(d11) S(d11) D2(h6) D3(h12) L(js18) Ζ ML07212E01 ML17212E01 ML27212E01 12.5 5 57 6 HSS 6 10END MILLS 6.5 ML07201601 ML17201601 ML27201601 16.0 8 10 62 6 ML07201801 ML17201801 ML27201801 18.0 8 12 8 70 6 ML07201901 ML17201901 ML27201901 19.0 9 12 8 71 6 K-2 CARBIDE END MILLS ML07202101 ML17202101 ML27202101 21.0 9 12 10 74 6 ML07202201 ML17202201 ML27202201 22.0 10 12 10 75 6 ML07202501 ML17202501 ML27202501 25.0 11 16 12 82 6 16 ML07202801 ML17202801 ML27202801 28.0 12 13 83 6 ML07203201 ML17203201 32.0 14 16 15 90 8 ML27203201 ML07203601 ML17203601 ML27203601 16 17 103 36.0 25 8 ML07204001 ML17204001 ML27204001 25 19 108 40.0 18 8 X-POWER Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161 HAND TAPS Nominal-Diameter in mm / Nennmaßbereich in m over 3 to 6 over 10 to 18 over 18 to 30 over 30 to 50 over 50 to 80 over 80 to 120 over 6 to 10

erte in

- 0.25

± 1.95

- 80 - 240

> 0 16

- 0.30

± 2.30

- 100 - 290

> 0 19

- 0.35

± 2.70

- 120 - 340

> 0 22

FLUTE TAPS

- 0.12

± 0.90

- 30 - 105

0

- 0.15

± 1.10

- 40 - 130

> 0 9

h12

js18

d11

h6

SPIRAL

POINT TAPS

COMBO TAPS

COLD FORMING

REAMERS

COUNTER-BORES

© ∶Excellent	$\bigcirc$ : Good
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	Carbon Steels	Alloy Steels	Prehardened Steels	Hardene	ed Stee <b>l</b> s	High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless	Titanium	Inconel	Acrylic	CFRP
२-	~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70					Sieels				
	0	0								0					

MILLING CUTTERS

386

COUNTE SINK Tolerance range in mm / Toleranzy

- 0.18

± 1.35

- 50 - 160

0

-0.2

± 1.65

- 65 - 195

0

Tolerance range in µm / Toleranzwerte in





Diese Werkzeuge werden bei allgemeinen Seiten-und Breitfräsen

eingesetzt, wo Tiefschnitte nicht vorkommen.

STRAIGHT SHANK DRILLS

SILVER & DEMING DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

TAPER SHANK DRILLS

HSS ND MILLS

END MILLS

TANK POWER

X-POWER

SPIRAL UTE TAPS

SPIRAL

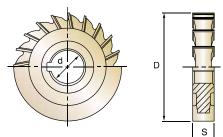
COLD FORMING TAPS

COUNTER-SINK

HSS-E, SIDE AND FACE MILLING CUTTERS with STRAIGHT TEETH HSS-E, SCHEIBENFRÄSER mit GERADEVERZAHNT

▶ The tools are used for general purpose side and straddle milling where deep cut is not required.







EDP No.	Cutter Diameter D(js14) 50.0	Width of Face S(k11)	Internal Diameter	No₊ of Teeth	
	<b>v</b> ,	S(k11)		reeur	
	50.0		d(H7)	Z	
ML09205001	JU.U	4	16	18	-
ML09205002	50.0	5	16	18	E
ML09205003	50.0	6	16	18	
ML09205004	50.0	8	16	16	
ML09205005	50.0	10	16	16	K-2
ML09206301	63.0	5	22	22	- E
ML09206302	63.0	6	22	22	
ML09206303	63.0	8	22	20	
ML09206304	63.0	10	22	20	
ML09206305	63.0	12	22	20	
ML09208001	80.0	6	22	24	
ML09208002	80.0	8	22	24	
ML09208003	80.0	10	22	24	>
ML09208004	80.0	12	22	20	_
ML09208005	80.0	6	27	24	
ML09208006	80.0	8	27	24	
ML09208007	80.0	10	27	24	— на
ML09208008	80.0	12	27	20	
ML09210001	100.0	6	27	26	
ML09210002	100.0	8	27	26	
ML09210003	100.0	10	27	22	FLU
ML09210004	100.0	6	32	26	
ML09210005	100.0	8	32	26	
ML09210006	100.0	10	32	22	
ML09210007	100.0	12	32	22	PC
ML09212501	125.0	8	32	30	
ML09212502	125.0	10	32	30	
ML09212503	125.0	12	32	24	COM
olerances according to DIN 7160 oleranzen nach DIN 7160 & 7161	8 7161				

over 50 to 80

over 80 to 120

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 über 50				
	Tolerance range in mm / Toleranzwerte mm									

js14	± 0.15	± 0.18	± 0.215	$\pm$ 0.26	± 0.31	$\pm$ 0.37	± 0.4	135	± 0.50		_			_
	Tolerance range in													
k11	+ 75 0	+ 90 0	+ 110	+ 130 0	+ 160 0	+ 190 0	+ 22	.0 -	+ 250 0				ᅯ出	
H7	+ 12	+ 15 0	+ 18 0	+ 21 0	+ 25 0	+ 30	+ 35	; -	+ 40 0		0	: Exce <b>ll</b> e	nt O	: Good
Carbor														
Steels		Prehardened Steels	Harden	ed Steels	High Hardened Steels		Graphite	Cast Iron	Aluminum	Stainless	Titanium	Incone	Acrylic	CFRP
Steels		Steels	Harden	ed Steels HRc45~55	Steels		Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel	Acrylic	CFRP

over 120 to 180



SILVER & DEMING DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS





## HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT

- The type of cutter is recommended for slotting operations. The alternate spiral effectively counteracts all tendency to chatter.
- Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende Spiral wirkt allen Schnatterbewegungen entgegen.

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MORSE TAPER					Unit : mm
SHANK DRILLS	EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
		D(js14)	S(k11)	d(H7)	Z
HSS	ML10205001	50.0	3	16	14
END MILLS	ML10205002	50.0	4	16	14
	ML10205003	50.0	5	16	14
K-2 CARBIDE	ML10205004	50.0	6	16	14
END MILLS	ML10205005	50.0	7	16	14
	ML10205006	50.0	8	16	14
	ML10205007	50.0	9	16	14
TANK POWER	ML10205008	50.0	10	16	14
TOWER	ML10206301	63.0	3	22	16
	ML10206302	63.0	4	22	16
X-POWER	ML10206303	63.0	5	22	16
	ML10206304	63.0	6	22	16
	ML10206305	63.0	7	22	16
	ML10206306	63.0	8	22	16
HAND TAPS	ML10206307	63.0	9	22	16
	ML10206308	63.0	10	22	16
	ML10206309	63.0	12	22	16
SPIRAL FLUTE TAPS	ML10206310	63.0	14	22	16
	ML10206311	63.0	16	22	16
	ML10206312	63.0	18	22	16
SPIRAL	ML10208001	80.0	3	22	18
POINT TAPS	ML10208002	80.0	4	22	18
	ML10208003	80.0	5	22	18
	ML10208004	80.0	6	22	18
COMBO TAPS	ML10208005	80.0	7	22	18
	ML10208006	80.0	8	22	18
COLD	ML10208007	80.0	9	22	18
FORMING	ML10208008	80.0	10	22	18

REAMERS

COUNTER-BORES

© : Excellent ○ : Good

Carbon Steels	Steels	Prehardened Steels	Hardene	ed 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				0					

MILLING CUTTERS

388

COUNTER SINK





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STRAIGHT SHANK DRILLS

SILVER & DEMING DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE TAPER SHANK DRILLS

HSS ND MILLS

2 CARBIDE END MILLS

TANK POWER

K-POWER

SPIRAL JTE TAPS

SPIRAL DINT TAPS

COLD ORMING TAPS

COUNTER-BORES

◎:Excellent ○:Good

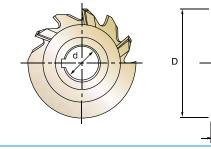
COUNTER-SINK

MILLING CUTTERS

HSS-E, SIDE AND FACE MILLING (	CUTTERS with STAGGERED TEETH
HSS-E, SCHEIBENFRÄSER mit K	REUZVERZAHNT
The type of cutter is recommended for slotting operations.	Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende
The alternate spiral effectively counteracts all tendency to chatter.	Spiral wirkt allen Schnatterbewegungen entgegen.

▶ The alternate spiral effectively counteracts all tendency to chatter.







				Unit : mm	
EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth	
	D(js14)	S(k11)	d(H7)	Z	
ML10208009	80.0	12	22	18	EN
ML10208010	80.0	14	22	18	EN
ML10208011	80.0	16	22	18	
ML10208012	80.0	18	22	18	K-2
ML10208013	80.0	20	22	18	E
ML10208014	80.0	4	27	18	
ML10208015	80.0	5	27	18	
ML10208016	80.0	6	27	18	
ML10208017	80.0	7	27	18	
ML10208018	80.0	8	27	18	
ML10208019	80.0	9	27	18	×
ML10208020	80.0	10	27	18	
ML10208021	80.0	12	27	18	
ML10208022	80.0	14	27	18	НА
ML10208023	80.0	16	27	18	
ML10208024	80.0	18	27	18	
ML10208025	80.0	20	27	18	
ML10210001	100.0	3	27	20	FLU
ML10210002	100.0	4	27	20	
ML10210003	100.0	5	27	20	
ML10210004	100.0	6	27	20	PC
ML10210005	100.0	7	27	20	
ML10210006	100.0	8	27	20	
ML10210007	100.0	9	27	20	СОМ
ML10210008	100.0	10	27	20	
ML10210009	100.0	12	27	20	
ML10210010	100.0	14	27	20	_
ML10210011	100.0	15	27	20	F

High Hardened Steels

HRc55~70

COLYG1CAT006	

Carbon Steels

 $\bigcirc$ 

Alloy Steels

 $\bigcirc$ 

Prehardened Steels

 $\bigcirc$ 

~HB225 HB225~325 HRc30~40 HRc40~45 HRc45~55

Hardened Steels

 $\bigcirc$ 

Copper Graphite Cast Iron Aluminum Stainless Steels Titanium Incone Acrylic CFRP

SILVER & DEMING DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS





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#### STAGGERED TEETH KREUZVERZAHNT

◎:Excellent ○:Good

# HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT

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- The type of cutter is recommended for slotting operations. The alternate spiral effectively counteracts all tendency to chatter.
- ► Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende Spiral wirkt allen Schnatterbewegungen entgegen.

D





TAPER										
SHANK DRILLS	EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth					
		D(js14)	S(k11)	d(H7)	Z					
HSS END MILLS	ML10210012	100.0	16	27	20					
END MILLS	ML10210013	100.0	18	27	20					
	ML10210014	100.0	20	27	20					
K-2 CARBIDE	ML10210015	100.0	4	32	20					
END MILLS	ML10210016	100.0	5	32	20					
TANK POWER	ML10210017	100.0	6	32	20					
TANK	ML10210018	100.0	7	32	20					
	ML10210019	100.0	8	32	20					
	ML10210020	100.0	9	32	20					
	ML10210021	100.0	10	32	20					
	ML10210022	100.0	12	32	20					
	ML10210023	100.0	14	32	20					
X-POWER	ML10210024	100.0	15	32	20					
	ML10210025	100.0	16	32	20					
	ML10210026	100.0	18	32	20					
	ML10210027	5         100.0         16         32           6         100.0         18         32           7         100.0         20         32		32	20					
SPIRAL	ML10212501	125.0	5	32	22					
	ML10212502	D(js14)         S(k11)         d(H7)           0012         100.0         16         27           0013         100.0         18         27           0014         100.0         20         27           0015         100.0         4         32           0016         100.0         5         32           0017         100.0         6         32           0018         100.0         7         32           0019         100.0         8         32           0020         100.0         10         32           0021         100.0         10         32           0020         100.0         12         32           0021         100.0         12         32           0022         100.0         14         32           0024         100.0         15         32           0025         100.0         18         32           0026         100.0         18         32           0026         125.0         6         32           0026         125.0         16         32           0250         125.0         12         3	22							
	ML10212503	125.0			22					
	ML10212504	125.0	10	32	22					
SPIRAL POINT TAPS	ML10212505				22					
	ML10212506	125.0		Diameter         Teeth           d(H7)         Z           27         20           27         20           27         20           27         20           32         22           32         22           32         22           32 <th></th>						
	ML10212507		-							
COMBO TAPS	ML10212508		18							
	ML10212509									
	ML10216001									
COLD FORMING	ML10216002									
TAPS	ML10216003	160.0	10	32	26					

REAMERS

COUNTER-BORES

COUNTER-SINK

Carbon     Alloy     Prenardened       Steels     Steels     Steels       ~HB225     HB225~325     HRc30~40       HRc40~45     HRc45~55       HRc55~70     HRc55~70	Steels	Steels	Prehardened Stee <b>l</b> s	Hardene	u Sleeis	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									
	0	0	0							0					

MILLING CUTTERS

390



SILVER & DEMING DRILLS

GOLD P-DRILLS

P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

> DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

DRILLS MORSE

Unit · mm

TAPER SHANK DRILLS

HSS END MILLS

(-2 CARBIDE END MILLS

> TANK POWER

X-POWER

IAND TAPS

SPIRAL FLUTE TAPS

SPIRAL POINT TAPS

COMBO TAPS

COLD FORMING TAPS

REAMERS

OUNTER-BORES

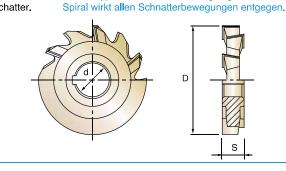
COUNTER-SINK

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MILLING CUTTERS

	SS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH SS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT				
The type of cutter is recommended for slotting operations.	Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende				
The alternate spiral effectively counteracts all tendency to chatter.	Spiral wirkt allen Schnatterbewegungen entgegen.				



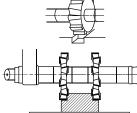




				Unit : mm
EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
	D(js14)	S(k11)	d(H7)	Z
ML10216004	160.0	12	32	26
ML10216005	160.0	14	32	26
ML10216006	160.0	16	32	26
ML10216007	160.0	18	32	26
ML10216008	160.0	20	32	26
ML10216009	160.0	6	40	26
ML10216010	160.0	8	40	26
ML10216011	160.0	10	40	26
ML10216012	160.0	12	40	26
ML10216013	160.0	14	40	26
ML10216014	160.0	16	40	26
ML10216015	160.0	18	40	26
ML10216016	160.0	20	40	26
ML10220001	200.0	10	40	30
ML10220002	200.0	12	40	30
ML10220003	200.0	14	40	30
ML10220004	200.0	16	40	30
ML10220005	200.0	18	40	30
ML10220006	200.0	20	40	30
ML10220007	200.0	22	40	30
ML10220008	200.0	25	40	30

#### 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												
± 0.15	± 0.18	± 0.215	± 0 <b>.</b> 26	$\pm$ 0.31	$\pm$ 0.37	$\pm$ 0.435	$\pm$ 0.50	$\pm$ 0.575				
		Tolera	nce range in	μm / Toleran	zwerte in μm							
+ 75 0	+ 90 0	+ 110	+ 130 0	+ 160 0	+ 190 0	+ 220	+ 250	+ 290				
+ 12	+ 15	+ 18	+ 21	+ 25	+ 30	+ 35	+ 40	+ 46				
	<u>über 3 bis 6</u> ± 0.15 + 75 0	über 3 bis 6         über 6 bis 10           ± 0.15         ± 0.18           + 75         + 90           0         0	over 3 to 6 über 3 bis 6         over 6 to 10 über 6 bis 10         over 10 to 18 über 10 bis 18           ± 0.15         ± 0.18         ± 0.215           Toleral         + 75         + 90           0         0         0	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	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           Tolerance range in mm / Toleran           ± 0.15         ± 0.18         ± 0.215         ± 0.26         ± 0.31           Tolerance range in µm / Toleran           + 75           0         0         110         + 130         + 160           0         0         0         0         0         0	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	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           ± 0.15         ± 0.18         ± 0.215         ± 0.26         ± 0.31         ± 0.37         ± 0.435           Tolerance range in µm / Toleranzwerte in µm           + 75         + 90         + 110         + 130         - 160         + 190         + 220         0	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 80 to 120 über 80 bis 120         over 120 to 180 über 120 bis 180           Tolerance range in mm / Toleranzwerte in mm           ± 0.15         ± 0.18         ± 0.215         ± 0.26         ± 0.31         ± 0.37         ± 0.435         ± 0.50           Tolerance range in µm / Toleranzwerte in µm           + 75         + 90         + 110         + 130         + 160         + 190         + 220         + 250           0         0         0         0         0         0         0         0				



© : Excellent

⊖ : Good



 Carbon Steels
 Alloy Steels
 Prehardened Steels
 Hardened Steels
 High Hardened Steels
 Copper
 Graphite
 Cast Iron
 Aluminum
 Stainless Steels
 Titanium
 Acrylic
 Acrylic
 CFRP

 ~HB225
 HB25~325
 HRc30~40
 HRc40~45
 HRc45~55
 HRc55~70
 Graphite
 Graphite

SILVER & DEMING DRILLS





# HSSCo8, MULTI FLUTE SHELL END MILL HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER

P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

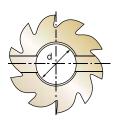
DREAM DRILLS INOX

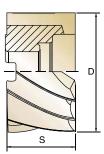
GENERAL CARBIDE DRILLS

MODOL

HAND TAPS









MORSE TAPER					Unit : mm
SHANK DRILLS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
		D	S	d	Z
HSS	E2675300	30.0	30	<b>e</b> 13	6
END MILLS	E2675350	35.0	35	<b>1</b> 6	6
	E2675400	40.0	20	<b>1</b> 6	8
K-2 CARBIDE END MILLS	E2675402	40.0	40	<b>6</b> 16	8
	E2675500	50.0	25	22	8
	E2675502	50.0	50	22	8
	E2675600	60.0	30	27	8
END MILLS K-2 CARBIDE	E2675601	60.0	60	27	8
	E2675750	75.0	35	27	10
	E2675751	75.0	75	27	10
X-POWER	E2675900	90.0	35	27	10
	E2675902	110.0	35	32	10

Tolerance of Internal Diameter = +0.018 ~ 0

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.



					Unit : mm
SPIRAL POINT TAPS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
COMBO TAPS		D	S	d	Z
	E2675401	40.0	32	<b>6</b> 16	8
COMBO TAPS	E2675501	50.0	36	22	8
	E2675630	63.0	40	27	8
	E2675800	80.0	45	27	10
	E2675901	100.0	50	32	10
TAPS	E2675903	125.0	56	40	12
	E2675904	160.0	63	50	14

S	Mill Dia.	Width of Face	Internal Dia.
	Tolerance(mm)	Tolerance(mm)	Tolerance(mm)
	+ 0.25	+ 0.5	+ 0.02
	- 0.15	- 0	- 0
R-			

Tolerance of Internal Diameter = +0.018 ~ 0

▶ TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

0		Excellent	O : Good	4
U	•	EXCELENT	- · G000	1

TED	Carbon Steels	Alloy Steels	Prehardened Steels	Hardene	u Sleels	High Hardened Stee <b>l</b> s	Copper G	oper Graphite (	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel	Acrylic	CFRP
ITER-	~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70									
	O	0	0												

COUNTE BORES

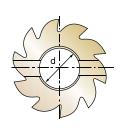
COUN SINK

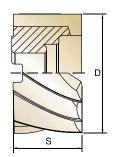




# HSSCo8, MULTI FLUTE SHELL END MILL for ALUMINUM HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER für ALUMINIUM







STRAIGHT SHANK DRILLS

> SILVER & DEMING DRILLS

PD DRILLS

GOLD P-DRILLS

> CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

> MORSE TAPER SHANK DRILLS

11.9

HSS END MILLS

K-2 CARBIDE END MILLS

> TANK POWER

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

> SPIRAL POINT TAPS

COMBO TAPS

COLD FORMING TAPS

REAMERS

OUNTER-BORES

⊖ : Good

© : Excellent

Titanium Inconel Acrylic CFRP

. . . . . . . . . . . .

COUNTER-SINK

MILLING CUTTERS



				Unit : mm
EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2676300	30.0	30	• 13	4
E2676400	40.0	20	<b>•</b> 16	4
E2676402	40.0	40	<b>•</b> 16	4
E2676500	50.0	25	22	6
E2676502	50.0	50	22	6
E2676600	60.0	30	27	6
E2676601	60.0	60	27	6
E2676750	75.0	75	27	6

Tolerance of Internal Diameter = +0.018 ~ 0

 $\blacktriangleright$  TiN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

HSS DIN Co8 1880 W 44		P.1292
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				Unit : mm
EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2676401	40.0	32	<b>1</b> 6	4
E2676501	50.0	36	22	6
E2676630	63.0	40	27	6
E2676800	80.0	45	27	6
E2676901	100.0	50	32	6

High Hardened Steels

HRc55~70

Tolerance of Internal Diameter = +0.018 ~ 0

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

Hardened Steels

HRc40~45 HRc45~55

Mi <b>ll</b> Dia <b>.</b>	Width of Face	Internal Dia.
Tolerance(mm)	Tolerance(mm)	Tolerance(mm)
+ 0.25	+ 0.5	+ 0.02
- 0.15	- 0	- 0

Prehardened Steels

HRc30~40

Carbon Steels

 $\bigcirc$ 

Alloy Steels

 $\bigcirc$ 

~HB225 HB225~325

0

Copper Graphite Cast Iron Aluminum Stainless

SILVER & DEMING DRILLS





D

Unit : mm

No. of Teeth Ζ 6

> 8 8 8

S

# HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL - COARSE HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFRÄSER - GROBES

P.1293

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

HSS Co8

DIN

841

NR

MOR: TAPE SHAN

HSS END M

K-2 CA END M

R NK LS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	
		D	S	d	
	E2677401	40.0	40	• 16	
MILLS	E2677501	50.0	50	22	
	E2677600	60.0	30	27	
ARBIDE	E2677601	60.0	60	27	
MILLS	E2677750	75.0	35	27	
	E2677751	75.0	75	27	
	E2677900	90.0	35	27	
FR	E2677902	110.0	35	32	

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X-POWER

• Tolerance of Internal Diameter =  $+0.018 \sim 0$ 

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

HSS DIN Co8 1880 NR	COARSE 6-12	30°	P.1293
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6-12

30

					Unit : mm
SPIRAL FLUTE TAPS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
		D	S	d	Z
	E2677400	40.0	32	<b>1</b> 6	6
SPIRAL	E2677500	50.0	36	22	8
POINT TAPS	E2677630	63.0	40	27	8
	E2677800	80.0	45	27	10
	E2677901	100.0	50	32	10
COMBO TAPS	E2677903	125.0	56	40	12
	E2677904	160.0	63	50	12

Tolerance of Internal Diameter = +0.018 ~ 0

TAPS

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

_			
	Mill Dia.	Width of Face	Internal Dia.
	Tolerance(mm)	Tolerance(mm)	Tolerance(mm)
	+ 0.25	+ 0.5	+ 0.02
	- 0.15	- 0	- 0

COUNTER-BORES

© : Excellent ○ : Good														
Carbon Steels	Alloy Steels	Prehardened Steels	Hardene	ed Stee <b>l</b> s	High Hardened Stee <b>l</b> s		Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel	Acrvlic	CFRP
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70					Steels				
0	0	0							0					

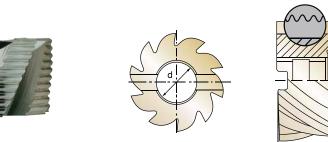
MILLING CUTTERS

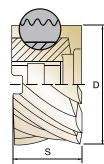
COUNTER-SINK





# HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL - FINE HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFRÄSER - FEINES





STRAIGHT SHANK DRILLS

SILVER & DEMING DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

....

⊖ : Good

© : Excellent

Titanium Inconel Acrylic CFRP

TAPER SHANK DRILLS

HSS END MILLS

-2 CARBIDE END MILLS

POWER

X-POWER

SPIRAL FLUTE TAPS

SPIRAL

COLD FORMING TAPS

COUNTER-SINK

MILLING

HSS Co8 DIN ĘŌ HR 6-12 30° 841 FINF P.1293

EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2678401	40.0	40	<b>0</b> 16	6
E2678501	50.0	50	22	8
E2678600	60.0	30	27	8
E2678601	60 <u>.</u> 0	60	27	8
E2678750	75.0	35	27	10
E2678751	75.0	75	27	10
E2678900	90.0	35	27	10
E2678902	110.0	35	32	12

Tolerance of Internal Diameter = +0.018 ~ 0

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

				Unit : mm
EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2678400	40.0	32	<b>•</b> 16	6
E2678500	50.0	36	22	8
E2678630	63.0	40	27	8
E2678800	80.0	45	27	10
E2678901	100.0	50	32	10
E2678903	125.0	56	40	12
E2678904	160.0	63	50	12

High Hardened Steels

HRc55~70

• Tolerance of Internal Diameter =  $+0.018 \sim 0$ 

Alloy Steels

0

~HB225 HB225~325

 $\bigcirc$ 

▶ TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

Hardened Steels

HRc30~40 HRc40~45 HRc45~55

Mi <b>l</b> Dia <b>.</b>	Width of Face	Internal Dia.
Tolerance(mm)	Tolerance(mm)	Tolerance(mm)
+ 0.25	+ 0.5	+ 0.02
- 0.15	- 0	- 0

Prehardened Steels

 $\bigcirc$ 

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 $\bigcirc$ 

Copper Graphite Cast Iron Aluminum Stainless

CUTTERS



Carbon Steels

SILVER & DEMING DRILLS





D

Unit : mm

12

s

32

## HSSCo8, MULTI FLUTE ROUGHING & FINISHING SHELL END MILL HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPSCHLICHTFRÄSER GOLD P-DRILLS

P.1293

35

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

HSS Co8

DIN

841

NF

MC TAI SH DR

EN

K-2 ENI

ORSE APER					L
HANK RILLS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
		D	S	d	Z
SS	E2679401	40.0	40	<b>1</b> 6	6
ND MILLS	E2679501	50.0	50	22	8
	E2679600	60.0	30	27	8
2 CARBIDE	E2679601	60.0	60	27	8
ND MILLS	E2679750	75.0	35	27	10
	E2679751	75.0	75	27	10
	E2679900	90.0	35	27	10

110.0

E C F

TANK POWER

X-POWER

• Tolerance of Internal Diameter =  $+0.018 \sim 0$ 

E2679902

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

HSS DIN Co8 1880		6-12 30°			P.1293
---------------------	--	----------	--	--	--------

6-12

30

					Unit : mm
SPIRAL FLUTE TAPS	EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
ILUIL IAFS		D	S	d	Z
	E2679400	40.0	32	<b>1</b> 6	6
SPIRAL	E2679500	50.0	36	22	8
POINT TAPS	E2679630	63.0	40	27	8
	E2679800	80.0	45	27	10
	E2679901	100.0	50	32	10
COMBO TAPS	E2679903	125.0	56	40	12
	E2679904	160.0	63	50	12

Tolerance of Internal Diameter = +0.018 ~ 0

FORMING TAPS

► TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

Mill Dia.	Width of Face	Internal Dia.				
Tolerance(mm)	Tolerance(mm)	Tolerance(mm)				
+ 0.25	+ 0.5	+ 0.02				
- 0.15	- 0	- 0				

COUNTER-BORES

											0	Excelle	nt O	: Good		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Stee <b>l</b> s		opper Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel	Acrylic	CFRP		
~HB225	HB225~325	HRc30~40	HRc40~45	HRc45~55	HRc55~70							Steels			· · · · <b>,</b> · ·	
0	0	0							0							

MILLING CUTTERS

COUNTER-SINK



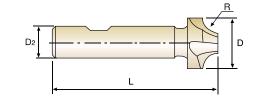


FLAT SHANK SEITLICHEN MITNAHMEFLÄCHEN

## HSSCo8, 4 FLUTE CORNER ROUNDING CUTTERS HSSCo8, 4 SCHNEIDEN VIERTELKREISFRÄSER

- ▶ These tools can be adapted for many screw machine applications as end formming tools to form a specific radius.
- Dieses Werkzeug kann an vielen Scrow maschine als Finishingtool für spezielle Radien montiert werden.







	Unit : mm				
	Overall Length	Shank Diameter	Outside Diameter	Radius	EDP No.
	L	D2(h6)	D	R(H11)	FLAT
	60	10	8.0	R1.0	E2498010
EN	60	10	9.0	R1.5	E2498015
	60	10	10.0	R2.0	E2498020
	60	10	11.0	R2.5	E2498025
K-2 (	60	12	12.0	R3.0	E2498030
EN	60	12	13.0	R3.5	E2498035
	60	12	14.0	R4.0	E2498040
	60	12	15.0	R4.5	E2498045
	60	12	16.0	R5.0	E2498050
	67	16	19.0	R5.5	E2498055
	67	16	20.0	R6.0	E2498060
X-	71	16	21.0	R6.5	E2498065
	71	16	22.0	R7.0	E2498070
	71	16	23.0	R7.5	E2498075
	71	16	24.0	R8.0	E2498080
IAH	85	25	25.0	R8.5	E2498085
	85	25	26.0	R9.0	E2498090
	85	25	27.0	R9.5	E2498095
	85	25	28.0	R10.0	E2498100
FLUT	90	25	31.0	R10.5	E2498105
	90	25	32.0	R11.0	E2498110
	90	25	34.0	R12.0	E2498120
	100	25	41.0	R12.5	E2498125
PO	100	25	42.0	R13.0	E2498130
	100	25	44 <u>.</u> 0	R14.0	E2498140
	100	25	46.0	R15.0	E2498150
COME	100	25	48.0	R16.0	E2498160
	112	32	52.0	R18.0	E2498180
	112	32	56.0	R20.0	E2498200

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

Prehardened Steels

 $\bigcirc$ 

	Nominal-Diameter in mm / Nennmaßbereich in mm												
	from 1 to 3 over 3 to 6 over 6 to 10 over 10 to 18 over 18 to 30 over 30 to 50 von 1 bis 3 über 3 bis 6 über 6 bis 10 über 10 bis 18 über 18 bis 30 über 30 bis 50												
Tolerance range in  mum / Toleranzwerte in  mum													
H11	+ 60 0	+ 75 0	+ 90 0	+ 110	+ 130	+ 160 0							
h6	- 6	- 8	_ 0 _ 9	0 - 11	0 - 13	0 - 16							

HRc30~40 HRc40~45 HRc45~55

Hardened Steels

High Hardened Steels

HRc55~70

#### ▶ TIN-COATING, TICN-COATING & TIAIN-COATING is available on your request.

© ∶ Excellent

Titanium Inconel Acrylic CFRP

⊖∶Good

COUNTER-
SINK

 $\bigcirc$ 

Carbon Steels

0

COLYG1CAT006

 $\bigcirc$ 

Copper Graphite Cast Iron Aluminum Stainless

# SILVER & DEMING DRILLS

STRAIGHT SHANK DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

TAPER SHANK DRILLS

. . ..

ID MILLS

ND MILLS

POWER

-POWER

SPIRAL TE TAPS

SPIRAL

COLD FORMING TAPS

MILLING

SILVER & DEMING DRILLS

HPD DRILLS

GOLD P-DRILLS

CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE TAPER SHANK

HSS END MILLS

K-2 CARBIDE END MILLS

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

SPIRAL

COMBO TAPS

COLD FORMING TAPS

REAMERS

COUNTER-

COUNTER-SINK

MILLING CUTTERS



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						ALLOY TOOL S	I STEELS STEELS STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS				
HARDNESS						~ HR				HRc20 ~			
STRENGTH		~ 5001	v/mm²			500 ~ 80	UN/mm <sup>2</sup>			800 ~ 100	UN/mm²		
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		ALLOY	I STEELS STEELS STEELS		ALUMINUM & ALUMINUM ALLOYS				
HARDNESS		HRc30 ~	HRc40						
STRENGTH		1000 ~ 13	00N/mm²						
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
16.0	160	20	10	0.021	1850	336	95	0.030	1
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	

 $\begin{array}{l} \mathsf{RPM} = \mathsf{rev./min.} \\ \mathsf{FEED} = \mathsf{mm/min.} \\ \mathsf{Vc} = \mathsf{m/min.} \\ \mathsf{fz} = \mathsf{mm/t} \end{array}$ 

## 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						ALLOY	I STEELS STEELS STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS			
PS	HARDNESS					~ HRc20				HRc20 ~ HRc30			
	STRENGTH		~ 500	N/mm²			500 ~ 80	0N/mm²		800 ~ 1000N/mm²			
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
APS	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

5	MATERIAL		ALLOY	STEELS			ALUMI ALUMINUI	NUM & M ALLOYS	
=	HARDNESS		HRc30 ~	HRc40					
2-	STRENGTH		1000 ~ 13	00N/mm²					
	DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
	16.0	160	20	10	0.021	1850	336	95	0.030
۲_	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



## RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN

## HSS-E, WOODRUFF KEYSEAT CUTTERS TYPE "B", "D", "F" HSS-E, SCHLITZFRÄSER FORM "B", "D", "F"

# ML062, ML162, ML262 SERIES

MATERIAL		CARBON ALLOY TOOL S	STEELS			ALLOY	I STEELS STEELS STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS				
HARDNESS						~ HR	c20		HRc20 ~ HRc30				
STRENGTH		~ 5001	V/mm²			500 ~ 800	0N/mm²		800 ~ 1000N/mm²				
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
10.5	900	72	30	0.010	600	48	20	0.010	480	38	15	0.010	
13.5	700	56	30	0.010	470	38	20	0.010	370	30	15	0.010	
16.5	570	114	30	0.025	380	76	20	0.025	300	60	15	0.025	
19.5	480	134	30	0.035	320	90	20	0.035	260	73	15	0.035	
22.5	420	168	30	0.040	280	112	20	0.040	220	88	15	0.040	
28.5	330	165	30	0.050	220	110	20	0.050	180	90	15	0.050	
32.5	290	209	30	0.060	190	137	20	0.060	155	112	15	0.060	
45.5	210	206	30	0.070	130	127	20	0.070	110	108	15	0.070	

MATERIAL		ALLOY	I STEELS STEELS STEELS		ALUMINUM & ALUMINUM ALLOYS					
HARDNESS		HRc30 ~	HRc40							
STRENGTH		1000 ~ 13	00N/mm²							
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz		
10.5	300	24	10	0.010	3000	240	100	0.010		
13.5	230	18	10	0.010	2300	184	100	0.010		
16.5	190	38	10	0.025	1900	380	100	0.025		
19.5	160	45	10	0.035	1600	448	100	0.035		
22.5	140	56	10	0.040	1400	560	100	0.040		
28.5	110	55	10	0.050	1100	550	100	0.050		
32.5	90	65	10	0.060	900	648	90	0.060		
45.5	70	69	10	0.070	700	686	100	0.070		

# HSS-E, T-SLOT CUTTERS TYPE "AA", "AB", "AD" HSS-E, SCHAFTERFRÄSER FÜR T-NUTEN FORM "AA", "AB", "AD"

# ML072, ML172, ML272 SERIES

MATERIAL	ALLOY STEELS					ARBON ALLOY TOOL S	STEEL	S		ARBON	STEEL	S	ALUMINUM & ALUMINUM ALLOYS				
HARDNESS						~ HF	Rc20			HRc20 -	HRc3	0					
STRENGTH		~ 5001	V/mm²			500 ~ 80	0N/mr	n²	8	300 ~ 10	00N/mi	m²					
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
12.5	770	38	30	800.0	380	16	15	0.007	270	8	10	0.005	2350	110	90	0.008	
16.0	600	45	30	0.013	300	19	15	0.011	210	9	10	0.007	1830	140	90	0.013	
18.0	550	47	30	0.014	270	20	15	0.012	195	12	10	0.010	1680	150	95	0.015	
19.0	500	50	30	0.017	250	20	15	0.013	180 15 10 0.014				1540	160	90	0.017	
21.0	470	52	52 30 0.018 230 22 15 0.016 160 16 10 0.017							0.017	1430	165	95	0.019			
22.0	440	55	30	0.021	220	25	15	0.019	150	17	10	0.019	1330	170	90	0.021	
25.0	390	65	30	0.028	190	30	15	0.026	135	18	10	0.022	1170	180	90	0.026	
28.0	345	75	30	0.036	170	38	15	0.037	120	20	10	0.028	1040	210	90	0.034	
<b>32.0</b> 310 90 30 0.036 150 42 15 0.035 100 20 10 0.025 910 250 90 0									0.034								
50.0	270	80	40	0.037	135	40	20	0.037	90	20	15	0.028	800	230	125	0.036	
63.0	240	70	50	0.036	120	38	25	0.040	85	20	15	0.029	730	210	145	0.036	
														= rev./min = mm/mii		c = m/min. : = mm/t	

SILVER & DEMING DRILLS

HPD DRILLS

GOLD P-DRILLS

> CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

> MORSE TAPER SHANK DRILLS

HSS END MILLS

K-2 CARBIDE END MILLS

> TANK POWER

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

> SPIRAL POINT TAPS

OMBO TAPS

COLD FORMING TAPS

REAMERS

UNTER-BORES

COUNTER-SINK

MILLING CUTTERS

RPM = rev./min.

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

SILVER & DEMING DRILLS



## RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN

GOLD P-DRILLS

#### CENTRE DRILLS

DREAM DRILLS GENERAI

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

125.0

MATERIAL

HARDNESS

STRENGTH

DIAMETER

50.0

63.0

80.0

100.0

125.0

63

RPM

76

60

47

38

30

100

FEED

42

38

34

30

26

25

Vc

10

10

10

10

10

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

HRc30 ~ HRc40

1000 ~ 1300N/mm<sup>2</sup>

DRILLS

MORSE TAPER SHANK

DRILLS

HSS END MILLS

K-2 CARBIDE

END MILLS



X-POWER

MILLING DEPTH P = WIDTH OF FACES

SPIRAL FLUTE TAPS

SPIRAL POINT TAPS

COLD FORMING TAPS

REAMERS

COUNTER-BORES

COUNTER-SINK

MILLING CUTTERS ML092 SERIES **CARBON STEELS** CARBON STEELS CARBON STEELS MATERIAL ALLOY STEELS TOOL STEELS ALLOY STEELS TOOL STEELS **ALLOY STEELS** HARDNESS ~ HRc20 HRc20 ~ HRc30 ~ 500N/mm<sup>2</sup> 500 ~ 800N/mm<sup>2</sup> 800 ~ 1000N/mm<sup>2</sup> STRENGTH DIAMETER RPM FEED Vc fz RPM FEED Vc fz RPM FEED Vc fz 50.0 160 130 25 0.045 115 82 20 0.040 95 58 15 0.034 63.0 125 160 25 0.058 90 72 20 0.036 75 51 15 0.031 80.0 100 145 25 0.060 70 69 20 0.041 60 48 15 0.033 100.0 80 130 25 0.063 60 60 20 0.038 47 41 15 0.034

54

FEED

200

250

250

200

200

ALUMINUM &

ALUMINUM ALLOYS

20

Vc

100

100

100

100

100

0.050

fz

0.018

0.023

0.026

0.024

0 0.033 RPM = rev./min. FEED = mm/min. Vc = m/min. fz = mm/t 38

38

15

0.042

HSS-E, SIDE AND FACE MILLING CUTTERS WITH STRAIGHT TEETH

HSS-E, SCHEIBENFRÄSER mit GERADEVERZAHNT

0.066

fz

0.031

0.029

0.030

0.030

0.036

45

RPM

630

500

400

320

250

## RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN

## HSS-E, SIDE AND FACE MILLING CUTTERS WITH STAGGERED TEETH HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT

# ML102 SERIES

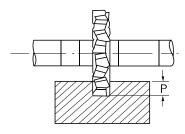
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MILLING

**CUTTERS** 

MATERIAL						CARBON ALLOY TOOL S	STEELS STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS HRc20 ~ HRc30				
STRENGTH		~ 5001	V/mm <sup>2</sup>			- FIK 500 ~ 80			800 ~ 1000N/mm <sup>2</sup>				
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
50.0	160	130	25	0.058	115	85	20	0.053	95	58	15	0.044	
63.0	125	160	25	0.080	90	75	20	0.052	75	51	15	0.043	
80.0	100	145	25	0.081	70	69	20	0.055	60	48	15	0.044	
100.0	80	130	25	0.081	60	60	20	0.050	47	41	15	0.044	
125.0	63	100	25	0.072	45	54	20	0.055	38	38	15	0.045	
160.0	50 105 25 0.081				37	48	20	0.050	30	34	15	0.044	
200.0	40 95 25 0.079			0.079	31 45 20 0.048			25	31	15	0.041		

MATERIAL		ALLOY	I STEELS STEELS STEELS		ALUMINUM & ALUMINUM ALLOYS						
HARDNESS		HRc30 ~	HRc40								
STRENGTH		1000 ~ 13	00N/mm²								
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz			
50.0	76	42	10	0.039	630	200	100	0.023			
63.0	60	38	10	0.040	500	250	100	0.031			
80.0	47	34	10	0.040	400	250	100	0.035			
100.0	38	30	10	0.039	320	200	100	0.031			
125.0	30	26	10	0.039	250	200	100	0.036			
160.0	23	24	10	0.040	200	150	100	0.029			
200.0	19	22	10	0.039	160	150	100	0.031			
							RPN	/I = rev./min.			



MILLING DEPTH P = WIDTH OF FACES

# COLYG1CAT006



SILVER & DEMING DRILLS

HPD DRILLS

GOLD P-DRILLS

> CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

> MORSE TAPER SHANK DRILLS

HSS END MILLS

K-2 CARBIDE END MILLS

> TANK POWER

X-POWER

HAND TAPS

SPIRAL FLUTE TAPS

SPIRAL POINT TAPS

COMBO TAPS

COLD FORMING TAPS

REAMERS

OUNTER-BORES

COUNTER-SINK

> MILLING CUTTERS

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





E2675 SERIES

RPM

240

200

150

120

100

80

60

E2676 SERIES

MATERIAL

HARDNESS

STRENGTH

DIAMETER

40.0

50.0

63.0

80.0

100.0

125.0

160.0

HSSCo8, MULTI FLUTE SHELL END MILL

fz

0.070

0.078

0.092

0.100

0.115

30 0.120

30 0.131

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

~ HRc20

~ 800N/mm<sup>2</sup>

30

30

30

30

30

FEED Vc

135

125

110

120

115

115

110

HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER

RPM

200

170

130

100

80

70

60

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

HRc20 ~ HRc28

800 ~ 900N/mm<sup>2</sup>

FEED Vc

120

105

95

100

95

95

100

RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN

RPM

140

120

90

80

60

50

40

fz

0.077

0.091

0.100

0.119

0.75D

25 0.113

30 0.119

25 0.075

25

25

25

25

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

HRc28 ~ HRc35

900 ~ 1100N/mm<sup>2</sup>

FEED Vc

20

20

20

20

80

75

65

75

70

65

65

0.25D

#### HPD DRILLS

GOLD P-DRILLS

### CENTRE DRILLS

DREAM DRILLS GENERAL

DREAM DRILLS INOX

GENERAL CARBIDE DRILLS

MORSE TAPER SHANK



K-2 CARBIDE END MILLS



X-POWER

# HSSCo8, MULTI FLUTE SHELL END MILL for ALUMINUM HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER für ALUMINIUM

HAND TAPS

SF FL

		SERIES			
PIRAL UTE TAPS	MATERIAL		ALUN NONFERRO	IINUM US METALS	3
	DIAMETER	RPM	FEED	Vc	fz
PIRAL	30.0	1050	210	100	0.050
	40.0	840	200	105	0.060
	50.0	600	250	95	0.069
	60.0	500	300	95	0.100
OMBO TAPS	63.0	480	330	95	0.115
	75.0	450	350	105	0.130
OLD	80.0	390	300	100	0.128
ORMING	100.0	320	290	100	0.151
PS			0.75D	0.25D	
EAMERS		-//////////////////////////////////////			
DUNTER- DRES					RPM = rev./min. FEED = mm/min. Vc = m/min. fz = mm/t

MILLING CUTTERS

COUNTER-SINK  $\begin{array}{l} \text{RPM} = \text{rev./min.} \\ \text{FEED} = \text{mm/min.} \\ \text{Vc} = \text{m/min.} \\ \text{fz} = \text{mm/t} \end{array}$ 

fz

0.080

0.100

0.100

0.117

0.146

0.125

10 0.078

10

10

10

10

10

10

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

HRc35 ~ HRc40

1100 ~ 1300N/mm<sup>2</sup>

FEED Vc

50

45

40

40

35

35

35

RPM

80

70

50

40

30

20

20

fz

0.078

0.090

0.094

0.117

20 0.108

20 0.116

20 0.071

## HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFRÄSER

# E2677, E2678 series

E2679 SERIES

RPM

240

200

150

120

100

80

60

MATERIAL

HARDNESS

STRENGTH

DIAMETER

40.0

50.0

63.0

80.0

100.0

125.0

160.0

CARBON STEELS

ALLOY STEELS TOOL STEELS

 $\sim HRc20$ 

~ 800N/mm<sup>2</sup>

FEED Vc

30

30

30

30

30

30

30

100

125

110

120

115

115

110

fz

0.069

0.078

0.092

0.100

0.115

0.120

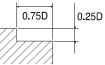
0.153

**7//C** 

**MILLING** 

**CUTTERS** 

MATERIAL		CARBON STEELS ALLOY STEELS TOOL STEELS ~ HRc20				CARBON STEELS ALLOY STEELS TOOL STEELS HRc20 ~ HRc28				ARBON ALLOY TOOL S	STEEL	.S	CARBON STEELS ALLOY STEELS TOOL STEELS				
HARDNESS		~ HF	Rc20			HRc20 ~	HRc2	8	HRc28 ~ HRc35				HRc35 ~ HRc40				
STRENGTH		~ 8001	V/mm²		800 ~ 900N/mm <sup>2</sup>			900 ~ 1100N/mm²				1100 ~ 1300N/mm²					
DIAMETER	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	
40.0	240	100	30	0.069	200	85	25	0.071	140	60	20	0.071	80	35	10	0.073	
50.0	200	125	30	0.078	170	105	25	0.077	120	75	20	0.078	70	45	10	0.080	
63.0	150	110	30	0.092	130	95	25	0.091	90	65	20	0.090	50	40	10	0.100	
80.0	120	120	30	0.100	100	100	25	0.100	80	75	20	0.094	40	40	10	0.100	
100.0	100	115	30	0.115	80	95	25	0.119	60	70	20	0.117	30	35	10	0.117	
125.0	80	115	30	0.120	70	95	25	0.113	50	65	20	0.108	20	35	10	0.146	
160.0	60	110	30	0.153	60	100	30	0.139	40	65	20	0.135	20	35	10	0.146	



HSSCo8, MULTI FLUTE ROUGHING & FINISHING SHELL END MILL

CARBON STEELS

ALLOY STEELS TOOL STEELS

 $HRc20 \sim HRc28$ 

800 ~ 900N/mm<sup>2</sup>

Vc

25

25

25

25

25

30

FEED

85

105

95

100

95

95

100

RPM

200

170

130

100

80

70

60

HSSCo8. MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPSCHLICHTFRÄSER

fz

0.077

0.091

0.100

0.119

0.113

0.139

25 0.071

RPM

140

120

90

80

60

50

40

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS

HRc28 ~ HRc35

900 ~ 1100N/mm<sup>2</sup>

fz

0.078

20 0.071

20 0.090

20 0.094

20 0.117

20 0.108

20 0.135

20

RPM

80

70

50

40

30

20

20

FEED Vc

60

75

65

75

70

65

65

# K-2 CARBIDE

Vc = m/min. fz = mm/tEND MILLS

RPM = rev./min. FEED = mm/min.

**CARBON STEELS** 

ALLOY STEELS TOOL STEELS HRc35 ~ HRc40

1100 ~ 1300N/mm<sup>2</sup>

fz

10 0.073

10 0.080

10 0.100

10 0.100

10 0.117

10 0.146

10 0.146

RPM = rev./min.

FEED = mm/min. Vc = m/min.  $f_{z} = mm/t$ 

FEED Vc

35

45

40

40

35

35

35

TANK POWER

X-POWER

HAND TAPS

SPIRAL

SPIRAL

COMBO TAPS

MILLING CUTTERS

COLYG1CAT006

DEMING DRILLS

# GOLD P-DRILLS

CENTRE DRILLS

DRILLS

DREAM DRILLS INOX

ARBIDE DRILLS

TAPER SHANK DRILLS

HSS END MILLS





RECOMMENDED CUTTING CONDITIONS EMPFOHLENE SCHNEIDKONDITIONEN

HPD DRILLS

GOLD

CENTF DRILLS

DREAI DRILL GENE

DREAI DRILL INOX

GENEI CARBI DRILL

MORS TAPEI SHAN DRILL

HSS END M

## HSSCo8, 4 FLUTE CORNER ROUNDING CUTTERS HSSCo8, 4 SCHNEIDEN VIERTELKREISFRÄSER

# E2498 SERIES

RE .S	MATE	RIAL		ALUMI ALUMINUI	NUM & M ALLOYS		CARBON STEELS ALLOY STEELS					
M	HARD	NESS										
.S RAL	STRE	NGTH						~ 5001	N/mm²			
	OUTSIDE DIAMETER	CORNER RADIUS	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz		
M S	8.0	R1	3500	245	90	0.018	800	55	20	0.017		
	9.0	R1.5	2800	230	80	0.021	630	55	20	0.022		
	10.0	R2	2800	220	90	0.020	630	50	20	0.020		
RAL IDE	11.0	R2.5	2400	220	85	0.023	530	45	20	0.021		
S	12.0	R3	2400	210	90	0.022	530	45	20	0.021		
	14.0	R4	2000	200	90	0.025	450	45	20	0.025		
SE   R	16.0	R5	1600	200	80	0.031	350	40	20	0.029		
К	20.0	R6	1400	190	90	0.034	310	40	20	0.032		
S	24.0	R8	1200	180	90	0.038	260	40	20	0.038		
	28.0	R10	950	170	85	0.045	210	35	20	0.042		
<b>AILLS</b>	34.0	R12	800	160	85	0.050	180	35	20	0.049		
	48.0	R16	600	140	90	0.058	130	30	20	0.058		

HARDVES $- HR20 - FR20 -$	K-2 CARBIDE END MILLS	МАТЕ	RIAL		ALLOY	I STEELS STEELS STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS					
POWER         STRENGTH         STOR 800N/mm²         800 ~ 1100N/mm²           OUTSIDE DIAMETER         CORNER RADIUS         RPM         FEED         Vc         fz         RPM         FEED         Vc         fz           8.0         R1         600         35         15         0.015         480         35         10         0.018           9.0         R1.5         470         30         15         0.016         380         35         10         0.023           10.0         R2         470         30         15         0.016         380         30         10         0.024           11.0         R2.5         390         30         15         0.019         315         30         10         0.024           11.0         R2.5         390         30         15         0.019         315         30         10         0.024           12.0         R3         390         30         15         0.023         270         25         10         0.023           14.0         R4         330         30         15         0.023         270         25         10         0.030           SPIRAL         20.0		HARD	NESS		~ HF	Rc20		HRc20 ~ HRc35					
OUTSIDE DIAMETERCORNER RADUSRPMFEEDVcfzRPMFEEDVcfz8.0R160035150.015480351000.0189.0R1.5470300150.0163803551000.02310.0R2470300150.0163803001000.02011.0R2.5390300150.0193153001000.02414.0R4330300150.0232702551000.02314.0R4330300150.0292102551000.030SPIRAL FLUTE TAPS20.0R62303001550.0331852551000.040SPIRAL FLUTE TAPS34.0R101552551550.0401252551000.040		STRE	NGTH		500 ~ 80	)0N/mm²		800 ~ 1100N/mm²					
POWER         9.0         R1.5         470         30         15         0.016         380         35         10         0.023           10.0         R2         470         30         15         0.016         380         30         10         0.023           10.0         R2         470         30         15         0.016         380         30         10         0.020           11.0         R2.5         390         30         15         0.019         315         30         10         0.024           14.0         R3         390         30         15         0.019         315         30         10         0.024           14.0         R4         330         30         15         0.023         270         25         10         0.023           SPIRAL         R6         230         30         15         0.023         270         25         10         0.030           SPIRAL         FLUTE TAPS         20.0         R6         230         30         15         0.033         185         25         10         0.034           20.0         R8         190         30         15         0.040 <th></th> <th></th> <th></th> <th>RPM</th> <th>FEED</th> <th>Vc</th> <th>fz</th> <th>RPM</th> <th>FEED</th> <th>Vc</th> <th>fz</th>				RPM	FEED	Vc	fz	RPM	FEED	Vc	fz		
9.0         R1.5         470         30         15         0.016         380         35         10         0.023           10.0         R2         470         30         15         0.016         380         30         10         0.023           10.0         R2         470         30         15         0.016         380         30         10         0.020           11.0         R2.5         390         30         15         0.019         315         30         10         0.024           12.0         R3         390         30         15         0.019         315         30         10         0.024           14.0         R4         330         30         15         0.023         270         25         10         0.023           16.0         R5         260         30         15         0.029         210         25         10         0.030           16.0         R6         230         30         15         0.033         185         25         10         0.034           20.0         R6         230         30         15         0.039         155         25         10         0		8.0	R1	600	35	15	0.015	480	35	10	0.018		
HAND TAPS         11.0         R2.5         390         30         15         0.019         315         30         10         0.024           12.0         R3         390         30         15         0.019         315         30         10         0.024           14.0         R4         330         30         15         0.019         315         30         10         0.024           14.0         R4         330         30         15         0.023         270         25         10         0.023           SPIRAL FLUTE TAPS         20.0         R6         230         30         15         0.023         185         25         10         0.030           20.0         R6         230         30         15         0.033         185         25         10         0.034           20.0         R8         190         30         15         0.039         155         25         10         0.040           28.0         R10         155         25         15         0.040         125         25         10         0.050           SPIRAL         34.0         R12         130         25         15 <t< th=""><th>A-POWER</th><th>9.0</th><th>R1.5</th><th>470</th><th>30</th><th>15</th><th>0.016</th><th>380</th><th>35</th><th>10</th><th>0.023</th></t<>	A-POWER	9.0	R1.5	470	30	15	0.016	380	35	10	0.023		
HAND TAPS         12.0         R3         390         30         15         0.019         315         30         10         0.024           14.0         R4         330         30         15         0.023         270         25         10         0.023           SPIRAL FLUTE TAPS         R6         230         30         15         0.029         210         25         10         0.030           SPIRAL FLUTE TAPS         R6         230         30         15         0.033         185         25         10         0.034           20.0         R6         230         30         15         0.033         185         25         10         0.034           20.0         R6         230         30         15         0.033         185         25         10         0.034           24.0         R8         190         30         15         0.039         155         25         10         0.040           28.0         R10         155         25         15         0.040         125         25         10         0.048           SPIRAL         34.0         R12         130         25         15         0.048 <th></th> <th>10.0</th> <th>R2</th> <th>470</th> <th>30</th> <th>15</th> <th>0.016</th> <th>380</th> <th>30</th> <th>10</th> <th>0.020</th>		10.0	R2	470	30	15	0.016	380	30	10	0.020		
PIRAL         PIRAL <th< th=""><th></th><th>11.0</th><th>R2.5</th><th>390</th><th>30</th><th>15</th><th>0.019</th><th>315</th><th>30</th><th>10</th><th>0.024</th></th<>		11.0	R2.5	390	30	15	0.019	315	30	10	0.024		
SPIRAL FLUTE TAPS         16.0         R5         260         30         15         0.029         210         25         10         0.030           20.0         R6         230         30         15         0.033         185         25         10         0.034           24.0         R8         190         30         15         0.039         155         25         10         0.040           28.0         R10         155         25         15         0.040         125         25         10         0.050           SPIRAL         34.0         R12         130         25         15         0.048         105         20         10         0.048	HAND TAPS	12.0	R3	390	30	15	0.019	315	30	10	0.024		
SPIRAL FLUTE TAPS         20.0         R6         230         30         15         0.033         185         25         10         0.034           24.0         R8         190         30         15         0.039         155         25         10         0.040           28.0         R10         155         25         15         0.040         125         25         10         0.050           SPIRAL         34.0         R12         130         25         15         0.048         105         20         10         0.048		14.0	R4	330	30	15	0.023	270	25	10	0.023		
PLUTE TAPS         PLOS		16.0	R5	260	30	15	0.029	210	25	10	0.030		
24.0         R8         190         30         15         0.039         155         25         10         0.040           28.0         R10         155         25         15         0.040         125         25         10         0.040           SPIRAL         34.0         R12         130         25         15         0.048         105         20         10         0.048		20.0	R6	230	30	15	0.033	185	25	10	0.034		
SPIRAL         34.0         R12         130         25         15         0.048         105         20         10         0.048	FLUTE TAPS	24.0	R8	190	30	15	0.039	155	25	10	0.040		
		28.0	R10	155	25	15	0.040	125	25	10	0.050		
POINT TAPS 48.0 B16 95 20 15 0.053 75 15 10 0.050	SPIRAL	34.0	R12	130	25	15	0.048	105	20	10	0.048		
	POINT TAPS	48.0	R16	95	20	15	0.053	75	15	10	0.050		

COLD FORMING TAPS

REAMERS

COUNTER-BORES

COUNTER-SINK

MILLING CUTTERS  $\begin{array}{l} \mathsf{RPM} = \mathsf{rev./min.}\\ \mathsf{FEED} = \mathsf{mm/min.}\\ \mathsf{Vc} = \mathsf{m/min.}\\ \mathsf{fz} = \mathsf{mm/t} \end{array}$ 

## **DRILLING TOOLS**



## **THREADING TOOLS**



## **MILLING TOOLS**





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