

COBALT MILLING CUTTER END MILLS

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Europa Tool 8TH EDITION

COBALT MILLING CUTTERS (Standard cobalt milling cutter range)



PRODUCTS	SERIES	DESCRIPTION	PAGE
2 FLUTE / DIN STANDARDS / 8% COBALT HSS			
	100102	SHORT LENGTH (DIN 327) WITH FLATTED SHANK	173/174
	101102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	175
	102102	EXTRA LONG LENGTH (DIN 844) WITH FLATTED SHANK	176
3 FLUTE / DIN STANDARDS / 8% COBALT HSS			
	103102	STUB LENGTH (DIN 327) WITH FLATTED SHANK	177
	104102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	178
	105102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	179
MULTI FLUTE / DIN STANDARDS / 8% COBALT HSS			
	107102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	180
	108102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	181
2 FLUTE BALL NOSE / DIN STANDARDS / 8% COBALT HSS			
	112102	SHORT LENGTH (DIN 327) WITH FLATTED SHANK	182
	113102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	183
	114102	EXTRA LONG LENGTH (DIN 844) WITH FLATTED SHANK	184
MULTI FLUTE BALL NOSE / DIN STANDARDS / 8% COBALT HSS			
	115102	SHORT LENGTH (DIN 1889) WITH FLATTED SHANK	185
	116102	LONG LENGTH (DIN 1889) WITH FLATTED SHANK	186
MULTI FLUTE 50° HELIX SHORT / 8% COBALT HSS			
	132102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	187

COBALT MILLING CUTTERS

(Standard cobalt milling cutter range)

PRODUCTS	SERIES	DESCRIPTION	PAGE
3 FLUTE / THROW AWAY TYPE / 8% COBALT HSS			
	128102	SHORT LENGTH WITH FLATTED SHANK	188
	129102	LONG LENGTH WITH FLATTED SHANK	189
	130102	SHORT LENGTH BALL NOSE WITH FLATTED SHANK	190


1 FLUTE FOR ALUMINIUM / 5% COBALT HSS

	135316	SHORT LENGTH WITH STRAIGHT SHANK	191
	136316	LONG LENGTH WITH STRAIGHT SHANK	192



2 FLUTE FOR ALUMINIUM / DIN STANDARDS / 8% COBALT HSS

	131102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	193
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MULTI FLUTE / COARSE PITCH ROUGHING END MILL / DIN STANDARDS / 8% COBALT HSS

	118102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	194
	119102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	195

3 FLUTE / COARSE PITCH ROUGHING END MILL / DIN STANDARDS / 8% COBALT HSS

	133102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	196
	134102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	197

3 FLUTE / COARSE PITCH ROUGHING END MILLS FOR ALUMINIUM / DIN STANDARDS / 8% COBALT HSS

	124102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	198
	125102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	199

COBALT MILLING CUTTERS

(Standard cobalt milling cutter range)

PRODUCTS	SERIES	DESCRIPTION	PAGE
MULTI FLUTE / COARSE PITCH ROUGHING BALL END MILLS / DIE SINKING CUTTERS / DIN STANDARDS / 8% COBALT HSS			
	127102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	200

MULTI FLUTE / FINE PITCH ROUGHING END MILLS / DIN STANDARDS / 8% COBALT HSS

	121102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	201
	122102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	202

MULTI FLUTE / COARSE PITCH ROUGHING & FINISHING / DIN STANDARDS / 8% COBALT HSS

	126102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	203
	137102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	204

3 FLUTE / COARSE PITCH ROUGHING & FINISHING / DIN STANDARDS / 8% COBALT HSS

	138102	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	205
	139102	LONG LENGTH (DIN 844) WITH FLATTED SHANK	206

MULTI FLUTE / DIN STANDARDS / ASP-52

	107113	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	207
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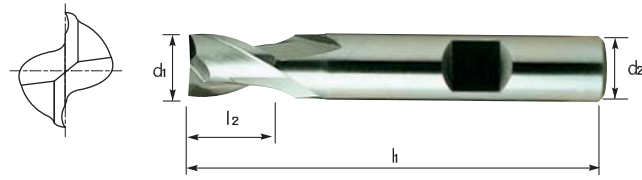
MULTI FLUTE / FINE PITCH END MILLS / DIN STANDARDS / ASP-52

	121113	SHORT LENGTH (DIN 844) WITH FLATTED SHANK	208
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CUTTING DATA

209
~ 220

2 FLUTE, SHORT LENGTH



Series No. 100102

TWO FLUTE END MILLS

Short Length, 2 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Kurze Ausführung, 2 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES À RAINURER

Série Courte, 2 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

TWEE GROEVEN VINGERFREZEN

Korte lengte, 2 groeven, centerfrees met geplette schacht

FRESE FRONTALE

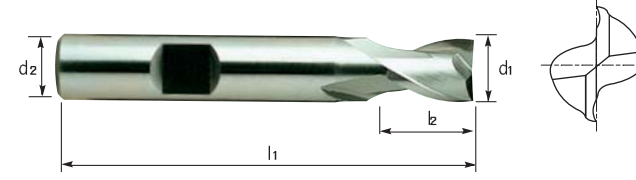
Serie Corta, 2 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
1.0	6.0	2.5	47.0	1001020100	1001210100	1001070100	
1.5		3.0		1001020150	1001210150	1001070150	
2.0		4.0		48.0	1001020200	1001210200	1001070200
2.5		5.0	49.0	1001020250	1001210250	1001070250	
2.8		5.0		1001020280	1001210280	1001070280	
3.0		5.0		1001020300	1001210300	1001070300	
3.5		6.0	50.0	1001020350	1001210350	1001070350	
3.8		7.0		1001020380	1001210380	1001070380	
4.0		7.0		51.0	1001020400	1001210400	1001070400
4.5		7.0	52.0	1001020450	1001210450	1001070450	
4.8		8.0		1001020480	1001210480	1001070480	
5.0		8.0		1001020500	1001210500	1001070500	
5.5		8.0	52.0	1001020550	1001210550	1001070550	
5.75		8.0		1001020575	1001210575	1001070575	
6.0		8.0		1001020600	1001210600	1001070600	
6.5	10.0	10.0	60.0	1001020650	1001210650	1001070650	
6.75		10.0		1001020675	1001210675	1001070675	
7.0		10.0		1001020700	1001210700	1001070700	
7.5		10.0	61.0	1001020750	1001210750	1001070750	
7.75		11.0		1001020775	1001210775	1001070775	
8.0		11.0		1001020800	1001210800	1001070800	
8.5		11.0	61.0	1001020850	1001210850	1001070850	
8.7		11.0		1001020870	1001210870	1001070870	
9.0		11.0		1001020900	1001210900	1001070900	
9.5		11.0	63.0	1001020950	1001210950	1001070950	
9.7		13.0		1001020970	1001210970	1001070970	
10.0		13.0		1001021000	1001211000	1001071000	
11.0		12.0	13.0	70.0	1001021100	1001211100	1001071100
11.7			16.0	73.0	1001021170	1001211170	1001071170

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, SHORT LENGTH



Series No. 100102

TWO FLUTE END MILLS

Short Length, 2 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Kurze Ausführung, 2 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES À RAINURER

Série Courte, 2 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

TWEE GROEVEN VINGERFREZEN

Korte lengte, 2 groeven, centerfrees met geplette schacht

FRESE FRONTALE

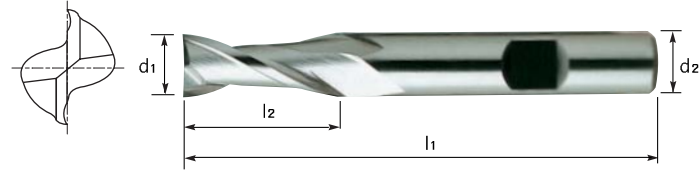
Serie Corta, 2 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
8.0	8.0	11.0	55.0	1001029002	1001219002	1001079002
8.0		11.0	61.0	1001029003	1001219003	1001079003
12.0	12.0	16.0	73.0	1001021200	1001211200	1001071200
13.0		16.0		1001021300	1001211300	1001071300
13.7		16.0		1001021370	1001211370	1001071370
14.0		16.0	1001021400	1001211400	1001071400	
15.0		16.0	1001021500	1001211500	1001071500	
15.7		16.0	19.0	79.0	1001021570	1001211570
16.0	19.0		1001021600		1001211600	1001071600
17.0	19.0		1001021700		1001211700	1001071700
17.7	19.0		1001021770		1001211770	1001071770
18.0	19.0		1001021800		1001211800	1001071800
19.0	19.0		1001021900		1001211900	1001071900
19.7	20.0	22.0	88.0	1001021970	1001211970	1001071970
20.0		22.0		1001022000	1001212000	1001072000
22.0		22.0		1001022200	1001212200	1001072200
24.0	25.0	26.0	102.0	1001022400	1001212400	1001072400
25.0		26.0		1001022500	1001212500	1001072500
26.0		26.0		1001022600	1001212600	1001072600
28.0		26.0		1001022800	1001212800	1001072800
30.0		26.0		1001023000	1001213000	1001073000
32.0		32.0		1001023200	1001213200	1001073200

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, LONG LENGTH



Series No. 101102

TWO FLUTE END MILLS

Long Length, 2 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Lange Ausführung, 2 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES À RAINURER

Série Longue, 2 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

TWEE GROEVEN VINGERFREZEN

Lange lengte, 2 groeven, centerfrees met geplette schacht

FRESE FRONTALE

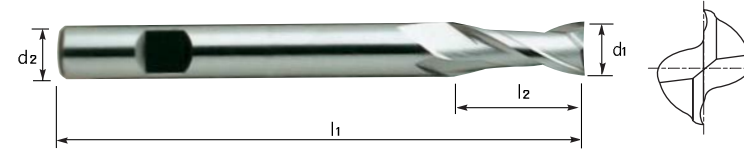
Serie Lunga, 2 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
2.0	6.0	7.0	51.0	1011020200	1011210200	1011070200
3.0		8.0	52.0	1011020300	1011210300	1011070300
4.0		11.0	55.0	1011020400	1011210400	1011070400
5.0		13.0	57.0	1011020500	1011210500	1011070500
6.0	13.0	1011020600		1011210600	1011070600	
7.0	10.0	16.0	66.0	1011020700	1011210700	1011070700
8.0		19.0	69.0	1011020800	1011210800	1011070800
10.0		22.0	72.0	1011021000	1011211000	1011071000
12.0	12.0	26.0	83.0	1011021200	1011211200	1011071200
14.0		26.0		1011021400	1011211400	1011071400
16.0	16.0	32.0	92.0	1011021600	1011211600	1011071600
18.0		32.0		1011021800	1011211800	1011071800
20.0	20.0	38.0	104.0	1011022000	1011212000	1011072000
22.0		38.0		1011022200	1011212200	1011072200
25.0	25.0	45.0	121.0	1011022500	1011212500	1011072500

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, EXTRA LONG LENGTH



Series No. 102102

TWO FLUTE END MILLS

Extra Long Length, 2 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Extra Lange Ausführung, 2 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES À RAINURER

Série Extra Longue, 2 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

TWEE GROEVEN VINGERFREZEN

Extra lang, 2 groeven, centerfrees met geplette schacht

FRESE FRONTALE

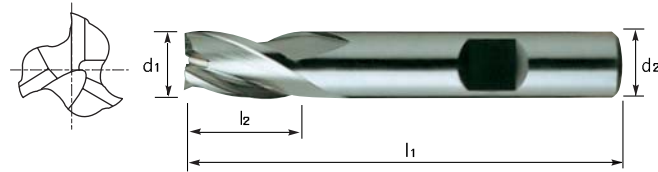
Serie Extra Lunga, 2 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
3.0	6.0	8.0	56.0	1021020300	1021210300	1021070300
3.5		10.0	59.0	1021020350	1021210350	1021070350
4.0		11.0	63.0	1021020400	1021210400	1021070400
4.5		11.0		1021020450	1021210450	1021070450
5.0		13.0	68.0	1021020500	1021210500	1021070500
5.5		13.0		1021020550	1021210550	1021070550
6.0	10.0	13.0	80.0	1021020600	1021210600	1021070600
6.5		16.0		1021020650	1021210650	1021070650
7.0		16.0	88.0	1021020700	1021210700	1021070700
8.0		19.0		1021020800	1021210800	1021070800
8.5		19.0	95.0	1021020850	1021210850	1021070850
9.0		19.0		1021020900	1021210900	1021070900
10.0	12.0	22.0	110.0	1021021000	1021211000	1021071000
12.0		26.0		1021021200	1021211200	1021071200
14.0		26.0	123.0	1021021400	1021211400	1021071400
16.0		32.0		1021021600	1021211600	1021071600
18.0	32.0	141.0	1021021800	1021211800	1021071800	
20.0	38.0		1021022000	1021212000	1021072000	
22.0	38.0	1021022200	1021212200	1021072200		
25.0	25.0	45.0	166.0	1021022500	1021212500	1021072500

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, STUB LENGTH



Series No. 103102

THREE FLUTE END MILLS

Stub Length, 3 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Kurze Ausführung, 3 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Courte, 3 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

DRIE GROEVEN VINGERFREZEN

Stomplengte, 3 groeven, centerrees met geplette schacht

FRESE FRONTALE

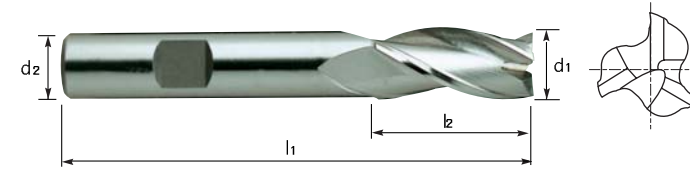
Serie Corta, 3 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut lz	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
2.0	6.0	4.0	48.0	1031020200	1031210200	1031070200
3.0		5.0	49.0	1031020300	1031210300	1031070300
4.0		7.0	51.0	1031020400	1031210400	1031070400
5.0		8.0	52.0	1031020500	1031210500	1031070500
6.0		8.0		1031020600	1031210600	1031070600
7.0	10.0	10.0	60.0	1031020700	1031210700	1031070700
8.0		11.0	61.0	1031020800	1031210800	1031070800
10.0		13.0	63.0	1031021000	1031211000	1031071000
12.0	12.0	16.0	73.0	1031021200	1031211200	1031071200
14.0		16.0		1031021400	1031211400	1031071400
16.0	16.0	19.0	79.0	1031021600	1031211600	1031071600
18.0		19.0		1031021800	1031211800	1031071800
20.0	20.0	22.0	88.0	1031022000	1031212000	1031072000
22.0		22.0		1031022200	1031212200	1031072200
25.0	25.0	26.0	102.0	1031022500	1031212500	1031072500

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, SHORT LENGTH



Series No. 104102

THREE FLUTE END MILLS

Short Length, 3 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Kurze Ausführung, 3 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Courte, 3 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

DRIE GROEVEN VINGERFREZEN

Korte lengte, 3 groeven, centerrees met geplette schacht

FRESE FRONTALE

Serie Corta, 3 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut lz	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
1.5	6.0	7.0	51.0	1041020150	1041210150	1041070150	
2.0		7.0		1041020200	1041210200	1041070200	
2.5		8.0	52.0	1041020250	1041210250	1041070250	
3.0		8.0		1041020300	1041210300	1041070300	
3.5		10.0	54.0	1041020350	1041210350	1041070350	
4.0		10.0	11.0	55.0	1041020400	1041210400	1041070400
4.5			11.0		1041020450	1041210450	1041070450
5.0			13.0	57.0	1041020500	1041210500	1041070500
5.5			13.0		1041020550	1041210550	1041070550
6.0		10.0	13.0	66.0	1041020600	1041210600	1041070600
6.5	16.0		1041020650		1041210650	1041070650	
7.0	16.0		69.0	1041020700	1041210700	1041070700	
7.5	16.0			1041020750	1041210750	1041070750	
8.0	19.0		72.0	1041020800	1041210800	1041070800	
8.5	19.0			1041020850	1041210850	1041070850	
9.0	12.0	19.0	73.0	1041020900	1041210900	1041070900	
10.0		22.0		1041021000	1041211000	1041071000	
12.0		26.0	83.0	1041021200	1041211200	1041071200	
14.0		26.0		1041021400	1041211400	1041071400	
16.0	16.0	32.0	92.0	1041021600	1041211600	1041071600	
18.0		32.0		1041021800	1041211800	1041071800	
20.0	20.0	38.0	104.0	1041022000	1041212000	1041072000	
22.0		38.0		1041022200	1041212200	1041072200	
25.0	25.0	45.0	121.0	1041022500	1041212500	1041072500	
28.0		45.0		1041022800	1041212800	1041072800	
30.0		45.0	1041023000	1041213000	1041073000		

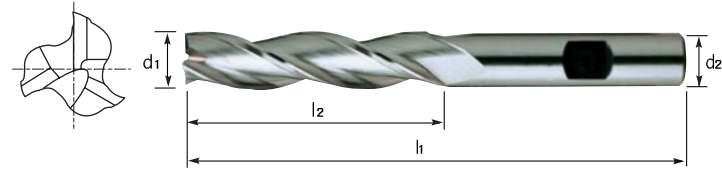
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, LONG LENGTH



Series No. 105102



THREE FLUTE END MILLS

Long Length, 3 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER

Lange Ausführung, 3 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Longue, 3 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

DRIE GROEVEN VINGERFREZEN

Lang, 3 groeven, centerfreest met geplette schacht

FRESE FRONTALE

Serie Lunga, 3 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
3.0	6.0	12.0	56.0	1051020300	1051210300	1051070300
4.0		19.0	63.0	1051020400	1051210400	1051070400
5.0		24.0	68.0	1051020500	1051210500	1051070500
6.0		24.0		1051020600	1051210600	1051070600
7.0	10.0	30.0	80.0	1051020700	1051210700	1051070700
8.0		38.0	88.0	1051020800	1051210800	1051070800
9.0		38.0		1051020900	1051210900	1051070900
10.0	12.0	45.0	95.0	1051021000	1051211000	1051071000
12.0		53.0	110.0	1051021200	1051211200	1051071200
14.0	53.0	1051021400		1051211400	1051071400	
16.0	16.0	63.0	123.0	1051021600	1051211600	1051071600
18.0		63.0		1051021800	1051211800	1051071800
20.0	20.0	75.0	141.0	1051022000	1051212000	1051072000
22.0		75.0		1051022200	1051212200	1051072200
25.0	25.0	90.0	166.0	1051022500	1051212500	1051072500

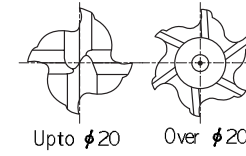
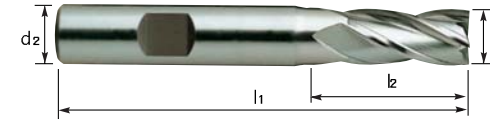
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

4&6 FLUTE, SHORT LENGTH



Series No. 107102



MULTI FLUTE END MILLS

Short Length, 4 & 6 Flute, with Flatted Shank

SCHAFTFRÄSER

Kurze Ausführung, 4 & 6 Schneiden, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Courte, 4 & 6 Dents, à Queue Cylindrique avec Plats

MEERGROEVIG VINGERFREZEN

Korte lengte, 4 & 6 groeven, met geplette schacht

FRESE FRONTALE

Serie Corta, 4 & 6 Taglienti, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. d1	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
2.0	6.0	7.0	51.0	4	1071020200	1071210200	1071070200
2.5		8.0	52.0	4	1071020250	1071210250	1071070250
3.0		8.0		4	1071020300	1071210300	1071070300
3.5		10.0	10.0	54.0	4	1071020350	1071210350
4.0	10.0	11.0	55.0	4	1071020400	1071210400	1071070400
5.0		13.0	57.0	4	1071020500	1071210500	1071070500
6.0		13.0		4	1071020600	1071210600	1071070600
7.0	10.0	16.0	66.0	4	1071020700	1071210700	1071070700
8.0		19.0	69.0	4	1071020800	1071210800	1071070800
9.0		19.0		4	1071020900	1071210900	1071070900
10.0		22.0	72.0	4	1071021000	1071211000	1071071000
11.0	12.0	22.0	79.0	4	1071021100	1071211100	1071071100
12.0		26.0	83.0	4	1071021200	1071211200	1071071200
13.0		26.0		4	1071021300	1071211300	1071071300
14.0	16.0	26.0	92.0	4	1071021400	1071211400	1071071400
16.0		32.0		4	1071021600	1071211600	1071071600
18.0	20.0	32.0	104.0	4	1071021800	1071211800	1071071800
20.0		38.0		4	1071022000	1071212000	1071072000
22.0	25.0	38.0	121.0	6	1071022200	1071212200	1071072200
25.0		45.0		6	1071022500	1071212500	1071072500
28.0		45.0	133.0	6	1071022800	1071212800	1071072800
30.0	45.0	6		1071023000	1071213000	1071073000	
32.0	32.0	53.0	6	1071023200	1071213200	1071073200	

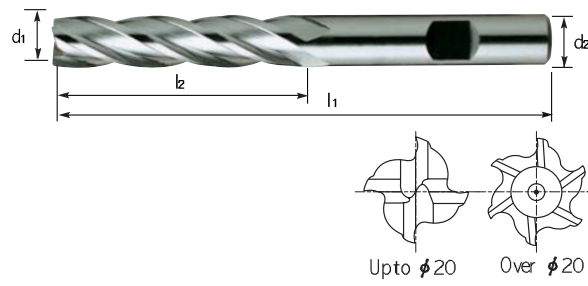
TOLERANCE

MILL DIA.	+0.040 -0
SHANK DIA.	h6

4&6 FLUTE, LONG LENGTH



Series No. 108102



MULTI FLUTE END MILLS

Long Length, 4 & 6 Flute, with Flatted Shank

SCHAFTFRÄSER

Lange Ausführung, 4 & 6 Schneiden, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Longue, 4 & 6 Dents, à Queue Cylindrique avec Plats

MEERGROEVIG VINGERFREZEN

Lange lengte, 4 & 6 groeven, met geplette schacht

FRESE FRONTALE

Serie Lunga, 4 & 6 Taglienti, Gambo Cilindrico con Trascinamento Laterale

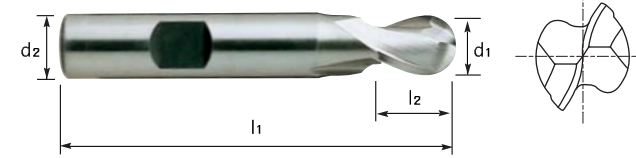
Mill Dia. d ₁	Shank Dia. h ₆ (d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
3.0	6.0	12.0	56.0	4	1081020300	1081210300	1081070300
3.5		15.0	59.0	4	1081020350	1081210350	1081070350
4.0		19.0	63.0	4	1081020400	1081210400	1081070400
4.5		19.0		4	1081020450	1081210450	1081070450
5.0		24.0	68.0	4	1081020500	1081210500	1081070500
6.0	24.0	4		1081020600	1081210600	1081070600	
7.0	10.0	30.0	80.0	4	1081020700	1081210700	1081070700
8.0		38.0	88.0	4	1081020800	1081210800	1081070800
9.0		38.0		4	1081020900	1081210900	1081070900
10.0		45.0	95.0	4	1081021000	1081211000	1081071000
11.0		45.0	102.0	4	1081021100	1081211100	1081071100
12.0	12.0	53.0	110.0	4	1081021200	1081211200	1081071200
14.0		53.0		4	1081021400	1081211400	1081071400
16.0	16.0	63.0	123.0	4	1081021600	1081211600	1081071600
18.0		63.0		4	1081021800	1081211800	1081071800
20.0	20.0	75.0	141.0	4	1081022000	1081212000	1081072000
22.0		75.0		6	1081022200	1081212200	1081072200
24.0	25.0	90.0	166.0	6	1081022400	1081212400	1081072400
25.0		90.0		6	1081022500	1081212500	1081072500

TOLERANCE		
MILL DIA.	φ2.0~φ6.0	+0.040 -0
	φ6.5~	+0.050 -0
SHANK DIA.	h6	

2 FLUTE, BALL NOSE, SHORT LENGTH



Series No. 112102



BALL END MILLS

Short Length, 2 Flute, Ball End, with Flatted Shank

RADIUSFRÄSER

Kurze Ausführung, 2 Schneiden, Runder Stirn, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE

Série Courte, 2 Dents, à Bout Spherique, à Queue Cylindrique avec Plats

KOGELVINGERFREZEN

Korte lengte, 2 groeven, kogel vinger, met geplette schacht

FRESE PER STAMPI

Serie Corta, 2 Taglienti, Per Stampi, Gambo Cilindrico con Trascinamento Laterale

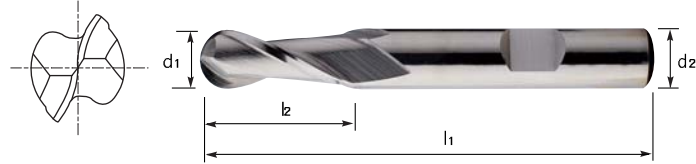
Mill Dia. e ₈ (d ₁)	Shank Dia. h ₆ (d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
3.0	6.0	5.0	49.0	1121020300	1121210300	1121070300
3.5		6.0	50.0	1121020350	1121210350	1121070350
4.0		7.0	51.0	1121020400	1121210400	1121070400
4.5		7.0		1121020450	1121210450	1121070450
5.0		8.0	52.0	1121020500	1121210500	1121070500
5.5	8.0	1121020550		1121210550	1121070550	
6.0	10.0	8.0	60.0	1121020600	1121210600	1121070600
7.0		10.0		1121020700	1121210700	1121070700
8.0		11.0	61.0	1121020800	1121210800	1121070800
9.0		11.0		1121020900	1121210900	1121070900
10.0		13.0	63.0	1121021000	1121211000	1121071000
12.0	12.0	16.0	73.0	1121021200	1121211200	1121071200
13.0		16.0		1121021300	1121211300	1121071300
14.0		16.0		1121021400	1121211400	1121071400
15.0		16.0		1121021500	1121211500	1121071500
16.0		19.0		79.0	1121021600	1121211600
17.0	19.0	1121021700	1121211700		1121071700	
18.0	19.0	1121021800	1121211800		1121071800	
19.0	19.0	1121021900	1121211900		1121071900	
20.0	22.0	88.0	1121022000		1121212000	1121072000
22.0	22.0		1121022200	1121212200	1121072200	
24.0	26.0		102.0	1121022400	1121212400	1121072400
25.0	26.0	1121022500		1121212500	1121072500	

Tolerances according to DIN 7160 & 7161

Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e ₈	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h ₆	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, BALL NOSE LONG LENGTH



Series No. 113102

BALL END MILLS

Long Length, 2 Flute, Ball End, with Flatted Shank

RADIUSFRÄSER

Lange Ausführung, 2 Schneiden, Runder Stirn, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE

Série Longue, 2 Dents, à Bout Spherique, à Queue Cylindrique avec Plats

KOGELVINGERFREZEN

Lange lengte, 2 groeven, kogel vinger, met geplette schacht

FRESE PER STAMPI

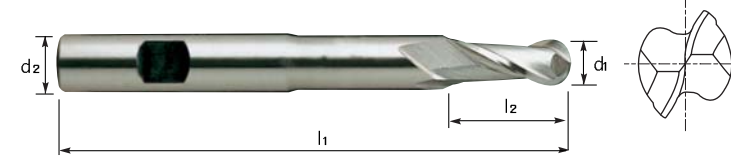
Serie Lunga, 2 Taglienti, Per Stampi, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
3.0	6.0	8.0	52.0	1131020300	1131210300	1131070300
4.0		11.0	55.0	1131020400	1131210400	1131070400
5.0		13.0	57.0	1131020500	1131210500	1131070500
6.0	13.0	1131020600		1131210600	1131070600	
8.0	10.0	19.0	69.0	1131020800	1131210800	1131070800
10.0		22.0	72.0	1131021000	1131211000	1131071000
12.0	12.0	26.0	83.0	1131021200	1131211200	1131071200
14.0		26.0		1131021400	1131211400	1131071400
16.0	16.0	32.0	92.0	1131021600	1131211600	1131071600
18.0		32.0		1131021800	1131211800	1131071800
20.0	20.0	38.0	98.0	1131022000	1131212000	1131072000
22.0		38.0	114.0	1131022200	1131212200	1131072200
25.0	25.0	45.0	121.0	1131022500	1131212500	1131072500

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

2 FLUTE, BALL NOSE LONG LENGTH



Series No. 114102

BALL END MILLS

Extra Long Length, 2 Flute, Ball End, with Flatted Shank

RADIUSFRÄSER

Extra Lange Ausführung, 2 Schneiden, Runder Stirn, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE

Série Extra Longue 2 Dents, à Bout Spherique, à Queue Cylindrique avec Plats

KOGELVINGERFREZEN

Extra Lange lengte, 2 groeven, kogel vinger, met geplette schacht

FRESE PER STAMPI

Serie Extra Lunga, 2 Taglienti, per Stampi, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
3.0	6.0	8.0	56.0	1141020300	1141210300	1141070300
4.0		11.0	63.0	1141020400	1141210400	1141070400
5.0		13.0	68.0	1141020500	1141210500	1141070500
6.0	13.0	1141020600		1141210600	1141070600	
8.0	10.0	19.0	88.0	1141020800	1141210800	1141070800
10.0		22.0	95.0	1141021000	1141211000	1141071000
12.0	12.0	26.0	110.0	1141021200	1141211200	1141071200
13.0		26.0		1141021300	1141211300	1141071300
14.0		26.0		1141021400	1141211400	1141071400
15.0	16.0	26.0	123.0	1141021500	1141211500	1141071500
16.0		32.0		1141021600	1141211600	1141071600
18.0	20.0	32.0	141.0	1141021800	1141211800	1141071800
20.0		38.0		1141022000	1141212000	1141072000
22.0	38.0	1141022200	1141212200	1141072200		
25.0	25.0	45.0	166.0	1141022500	1141212500	1141072500

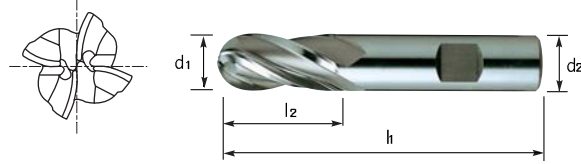
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

4&6 FLUTE, BALL NOSE SHORT LENGTH



Series No. 115102



BALL END MILLS

Short Length, Multi Flute, Ball End, with Flatted Shank

RADIUSFRÄSER

Kurze Ausführung, 2 Schneiden, Runder Strin, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE

Série Courte, 4 & 6 Dents, à Bout Spherique, à Queue Cylindrique avec Plats

KOGELVINGERFREZEN

Korte lengte, 4 & 6 groeven, kogel vinger, met geplette schacht

FRESE PER STAMPI

Serie Corta, 4 & 6 Taglienti, per Stampi, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
6.0	6.0	13.0	57.0	4	1151020600	1151210600	1151070600
8.0	10.0	19.0	69.0	4	1151020800	1151210800	1151070800
10.0		22.0	72.0	4	1151021000	1151211000	1151071000
12.0	12.0	26.0	83.0	4	1151021200	1151211200	1151071200
16.0	16.0	32.0	92.0	4	1151021600	1151211600	1151071600
20.0	20.0	38.0	104.0	4	1151022000	1151212000	1151072000
25.0	25.0	45.0	121.0	6	1151022500	1151212500	1151072500

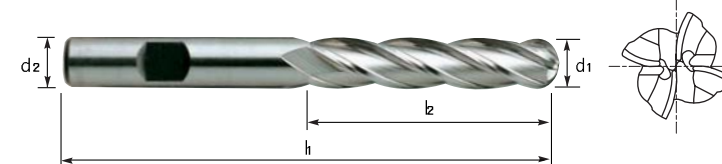
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

4&6 FLUTE, BALL NOSE LONG LENGTH



Series No. 116102



BALL END MILLS

Long Length, Multi Flute, Ball End, with Flatted Shank

RADIUSFRÄSER

Lange Ausführung, 4 & 6 Schneiden, Runder Strin, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE

Série Longue, 4 & 6 Dents, à Bout Spherique, à Queue Cylindrique avec Plats

KOGELVINGERFREZEN

Lange lengte, 4 & 6 groeven, kogel vinger, met geplette schacht

FRESE PER STAMPI

Serie Lunga, 4 & 6 Taglienti, per Stampi, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
10.0	10.0	45.0	95.0	4	1161021000	1161211000	1161071000
12.0	12.0	53.0	110.0	4	1161021200	1161211200	1161071200
16.0	16.0	63.0	123.0	4	1161021600	1161211600	1161071600
20.0	20.0	75.0	141.0	4	1161022000	1161212000	1161072000
25.0	25.0	90.0	166.0	6	1161022500	1161212500	1161072500

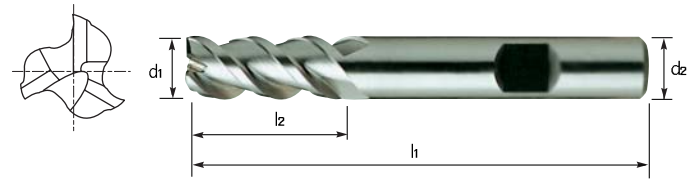
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

MULTI FLUTE, 50° HELIX SHORT LENGTH



Series No. 132102



END MILLS HIGH HELIX
Multi-Flute, High Helical 50°, Centre Cutting, with Flatted Shank

SCHAFTFRÄSER
Mehrschneidig, Rechtsspirale 50°, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES
Plusieurs Dents, Hélice 50°, Coupe au Centre, à Queue Cylindrique avec Plats

VINGERFREZEN HOGE HELIX
Meergroevig, hoge schroeflijn 50°, centerfrees, met geplette schacht

FRESE FRONTALE
Piu Taglienti, Elica 50°, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

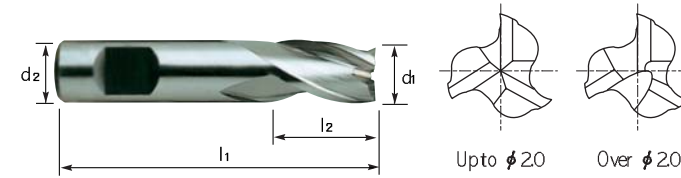
Mill Dia. d ₁	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
2.0	6.0	7.0	51.0	2	1321020200	1321210200	1321070200
3.0		8.0	52.0	2	1321020300	1321210300	1321070300
4.0		11.0	55.0	2	1321020400	1321210400	1321070400
5.0		13.0	57.0	2	1321020500	1321210500	1321070500
6.0		13.0		3	1321020600	1321210600	1321070600
7.0	10.0	16.0	66.0	3	1321020700	1321210700	1321070700
8.0		19.0	69.0	3	1321020800	1321210800	1321070800
9.0		19.0		3	1321020900	1321210900	1321070900
10.0	12.0	22.0	72.0	3	1321021000	1321211000	1321071000
12.0		26.0	83.0	3	1321021200	1321211200	1321071200
14.0		26.0		3	1321021400	1321211400	1321071400
15.0		26.0		3	1321021500	1321211500	1321071500
16.0	16.0	32.0	92.0	3	1321021600	1321211600	1321071600
18.0		32.0		3	1321021800	1321211800	1321071800
20.0	20.0	38.0	104.0	3	1321022000	1321212000	1321072000
25.0	25.0	45.0	121.0	4	1321022500	1321212500	1321072500
30.0		45.0		4	1321023000	1321213000	1321073000

TOLERANCE	
MILL DIA.	φ2.0~φ3.0 +0.040 -0
	φ4.0~φ6.0 +0.048 -0
	φ7.0~φ10.0 +0.058 -0
	φ10.5~φ18.0 +0.070 -0
	φ18.5~φ30.0 +0.084 -0
SHANK DIA.	h6

3 FLUTE, SHORT LENGTH, THROW AWAY



Series No. 128102



THREE FLUTE THROW AWAY END MILLS
Short Length, 3 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER
Kurze Ausführung, 3 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES
Série Courte, 3 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

DRIE GROEVEN WEGWERP VINGERFREZEN
Korte lengte, 3 groeven, centerfrees met geplette schacht

FRESE FRONTALE
Serie Corta, 3 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
1.0	6.0	2.0	34.0	1281020100	1281210100	1281070100
1.5		3.0		1281020150	1281210150	1281070150
1.8		3.0		1281020180	1281210180	1281070180
2.0		4.0	35.0	1281020200	1281210200	1281070200
2.3		4.0		1281020230	1281210230	1281070230
2.5		5.0	36.0	1281020250	1281210250	1281070250
2.8		5.0		1281020280	1281210280	1281070280
3.0		5.0		1281020300	1281210300	1281070300
3.3		6.0	37.0	1281020330	1281210330	1281070330
3.5		6.0		1281020350	1281210350	1281070350
3.8		7.0	38.0	1281020380	1281210380	1281070380
4.0		7.0		1281020400	1281210400	1281070400
4.3		7.0		1281020430	1281210430	1281070430
4.5		7.0		1281020450	1281210450	1281070450
4.8		8.0	39.0	1281020480	1281210480	1281070480
5.0	8.0	1281020500		1281210500	1281070500	
5.5	8.0	1281020550		1281210550	1281070550	
5.75	8.0	1281020575		1281210575	1281070575	
6.0	8.0	1281020600		1281210600	1281070600	
6.5	8.0	10.0	42.0	1281020650	1281210650	1281070650
7.0		10.0		1281020700	1281210700	1281070700
7.5		10.0		1281020750	1281210750	1281070750
8.0		11.0	43.0	1281020800	1281210800	1281070800
8.5		11.0	1281020850	1281210850	1281070850	
9.0	10.0	11.0	48.0	1281020900	1281210900	1281070900
9.5		11.0		1281020950	1281210950	1281070950
10.0		13.0	50.0	1281021000	1281211000	1281071000
12.0	12.0	16.0	58.0	1281021200	1281211200	1281071200
16.0	16.0	19.0	64.0	1281021600	1281211600	1281071600
20.0	20.0	22.0	78.0	1281022000	1281212000	1281072000

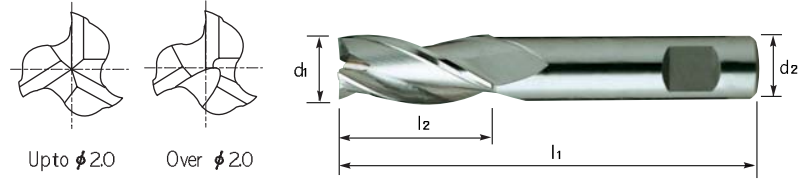
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, LONG LENGTH, THROW AWAY



Series No. 129102



**THREE FLUTE THROW AWAY
END MILLS**
Long Length, 3 Flute, Centre Cutting, with Flatted Shank

BOHRNUTENFRÄSER
Lange Ausführung, 3 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES
Série Longue, 3 Dents, Coupe au Centre, à Queue Cylindrique avec Plats

**DRIE GROEVEN WEGWERP
VINGERFREZEN**
Lange lengte, 3 groeven, centerfrees, met geplette schacht

FRESE FRONTALE
Serie Lunga, 3 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
2.0	6.0	7.0	38.0	1291020200	1291210200	1291070200	
2.5		8.0	39.0	1291020250	1291210250	1291070250	
3.0		8.0		1291020300	1291210300	1291070300	
3.5		10.0	41.0	1291020350	1291210350	1291070350	
4.0		11.0	42.0	1291020400	1291210400	1291070400	
4.5		11.0		1291020450	1291210450	1291070450	
5.0		8.0	13.0	44.0	1291020500	1291210500	1291070500
5.5			13.0		1291020550	1291210550	1291070550
6.0			13.0		1291020600	1291210600	1291070600
6.5			16.0	48.0	1291020650	1291210650	1291070650
7.0	16.0		1291020700		1291210700	1291070700	
7.5	16.0		1291020750		1291210750	1291070750	
8.0	19.0	51.0	1291020800	1291210800	1291070800		
8.5	10.0	19.0	56.0	1291020850	1291210850	1291070850	
9.0		19.0		1291020900	1291210900	1291070900	
10.0		22.0		1291021000	1291211000	1291071000	

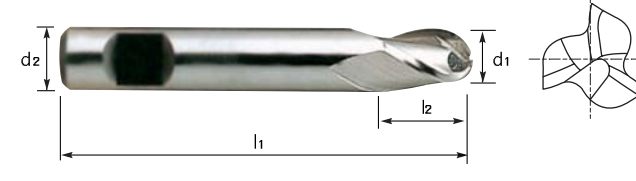
**Tolerances according to DIN 7160 & 7161
Toleranzen nach DIN 7160 & 7161**

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

3 FLUTE, BALL NOSE, SHORT LENGTH, THROW AWAY



Series No. 130102



**THREE FLUTE THROW AWAY
BALL END MILLS**
Short Length, 3 Flute, Ball End, with Flatted Shank

RADIUSFRÄSER
Kurze Ausführung, 3 Schneiden, Runder Stirn, Zylinderschaft mit Mitnahmefläche

FRAISES À BOUT SPHERIQUE
Série Courte, 3 Dents, à Bout Sphérique, à Queue Cylindrique avec Plats

**DRIE GROEVEN WEGWERP
KOGEL VINGERFREZEN**
Korte lengte, 3 groeven, kogel vinger met geplette schacht

FRESE PER STAMPI
Serie Corta, 3 Taglienti, per Stampi, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
2.0	6.0	4.0	35.0	2	1301020200	1301210200	1301070200
2.5		5.0	36.0	2	1301020250	1301210250	1301070250
3.0		5.0		3	1301020300	1301210300	1301070300
4.0		7.0	38.0	3	1301020400	1301210400	1301070400
5.0		8.0	39.0	3	1301020500	1301210500	1301070500
6.0		8.0		3	1301020600	1301210600	1301070600

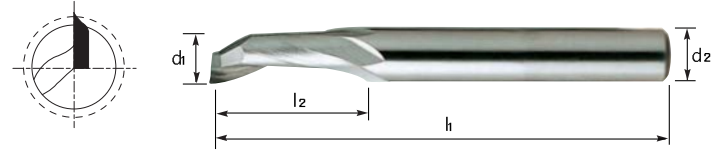
**Tolerances according to DIN 7160 & 7161
Toleranzen nach DIN 7160 & 7161**

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

1 FLUTE END MILLS



Series No. 135316



ONE FLUTE END MILLS

Short Length, 1 Flute, with Straight Shank for Aluminium Machining

EINZAHNFRÄSER

Kurze Ausführung, 1 Schneide mit Zylinderschaft für Alu. Maschinen

FRAISES À UNE DENT

Série Courte, 1 Dent, à Queue Cylindrique pour Machines ELU

EENGROEVIGE VINGERFREZEN

Korte lengte, 1 groef met rechte schacht voor machinale bewerking van aluminium

FRESE AD UN SOLO DENTE

Serie Corta, Taglienti, Gambo Cilindrico per Macchine ELU

Mill Dia. js14(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co5	TiAlN HSS Co5	TiCN HSS Co5
3.0	8.0	12.0	60.0	1353160300	1353270300	1353180300
4.0		12.0		1353160400	1353270400	1353180400
5.0		14.0		1353160500	1353270500	1353180500
6.0		14.0		1353160600	1353270600	1353180600
8.0		14.0	1353160800	1353270800	1353180800	
10.0		14.0	1353161000	80.0	1353271000	1353181000

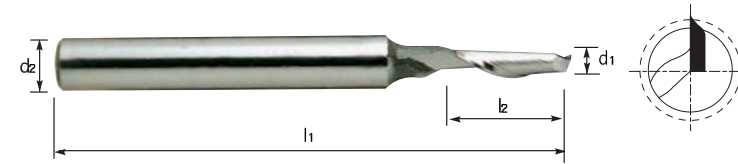
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 14	± 125	± 150	± 180	± 215	± 260	± 310
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

1 FLUTE END MILLS for ALUMINIUM



Series No. 136316



ONE FLUTE END MILLS

Short Length, 1 Flute, with Straight Shank for Aluminium Machining

EINZAHNFRÄSER

Kurze Ausführung, 1 Schneide mit Zylinderschaft für Alu. Maschinen

FRAISES À UNE DENT

Série Courte, 1 Dent, à Queue Cylindrique pour Machines ELU

EENGROEVIGE VINGERFREZEN

Korte lengte, 1 groef met rechte schacht voor machinale bewerking van aluminium

FRESE AD UN SOLO DENTE

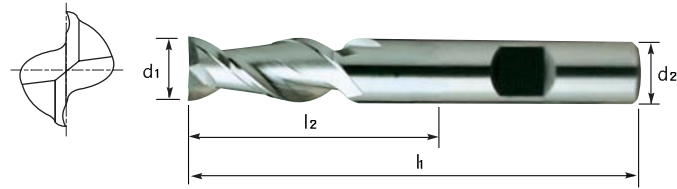
Serie Corta, Taglienti, Gambo Cilindrico per Macchine ELU

Mill Dia. js14(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co5	TiAlN HSS Co5	TiCN HSS Co5
5.0	8.0	18.0	80.0	1363160500	1363270500	1363180500
5.0		40.0	100.0	1363169001	1363279001	1363189001
8.0		14.0	120.0	1363160800	1363270800	1363180800

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 14	± 125	± 150	± 180	± 215	± 260	± 310
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

2 FLUTE, SHORT LENGTH, for ALUMINIUM



Series No. 131102

END MILLS FOR ALUMINIUM

Short Length, 2 Flute, Helix 42°, Centre Cutting, with Flatted Shank

FRASER FÜR ALUMINIUM

Kurze Ausführung, 2 Schneiden, Rechtsspirale 42°, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES POUR ALLAGES

Série Courte, 2 Dents, Hélice 42°, Coupe au Centre, à Queue Cylindrique avec Plats

VINGERFREZEN VOOR ALUMINIUM

Korte lengte, 2 groeven, Helix 42°, centerfrees met geplette schacht

FRESE PER MACCHINE ELU

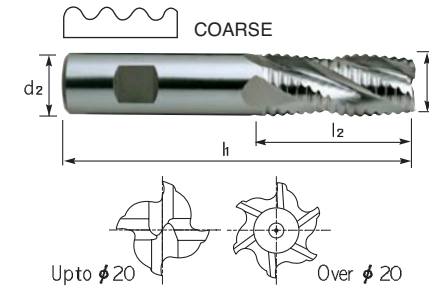
Serie Corta, 2 Taglienti, Elica 42°, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. e8(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
2.0	6.0	7.0	51.0	1311020200	1311210200	1311070200	
2.5		8.0	52.0	1311020250	1311210250	1311070250	
3.0		8.0		1311020300	1311210300	1311070300	
3.5		10.0	54.0	1311020350	1311210350	1311070350	
4.0		11.0	55.0	1311020400	1311210400	1311070400	
4.5		11.0		1311020450	1311210450	1311070450	
5.0		13.0	57.0	1311020500	1311210500	1311070500	
5.5		13.0		1311020550	1311210550	1311070550	
6.0		13.0		1311020600	1311210600	1311070600	
6.5		16.0		66.0	1311020650	1311210650	1311070650
7.0	16.0	1311020700	1311210700		1311070700		
7.5	16.0	1311020750	1311210750		1311070750		
8.0	10.0	19.0	69.0		1311020800	1311210800	1311070800
8.5		19.0		1311020850	1311210850	1311070850	
9.0		19.0		1311020900	1311210900	1311070900	
10.0		22.0		72.0	1311021000	1311211000	1311071000
11.0	12.0	22.0	79.0	1311021100	1311211100	1311071100	
12.0		26.0		83.0	1311021200	1311211200	1311071200
13.0		26.0			1311021300	1311211300	1311071300
14.0		26.0			1311021400	1311211400	1311071400
15.0	26.0	1311021500	1311211500		1311071500		
16.0	16.0	32.0	92.0	1311021600	1311211600	1311071600	
17.0		32.0		1311021700	1311211700	1311071700	
18.0		32.0		1311021800	1311211800	1311071800	
19.0		32.0		1311021900	1311211900	1311071900	
20.0	20.0	38.0	104.0	1311022000	1311212000	1311072000	
21.0		38.0		1311022100	1311212100	1311072100	
22.0		38.0		1311022200	1311212200	1311072200	
23.0		38.0		1311022300	1311212300	1311072300	
24.0	25.0	45.0	121.0	1311022400	1311212400	1311072400	
25.0		45.0		1311022500	1311212500	1311072500	

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

MULTI. FLUTE, ROUGHING, SHORT LENGTH



Series No. 118102

ROUGHING END MILLS

Short Length, Multi-Flute, Coarse Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Kurze Ausführung, Mehrschneidig, Schrupp-Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Courte, à Plusieurs Dents, Profil Ébauche, à Queue Cylindrique avec Plats

VOORDRAAIVINGERFREZEN

Korte lengte, meergroevig, grove steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Corta, a piu Taglienti, per Sgrossare, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
6.0	6.0	13.0	57.0	3	1181020600	1181210600	1181070600	
7.0	10.0	16.0	66.0	3	1181020700	1181210700	1181070700	
8.0		19.0	69.0	3	1181020800	1181210800	1181070800	
9.0		19.0		3	1181020900	1181210900	1181070900	
10.0	12.0	22.0	72.0	4	1181021000	1181211000	1181071000	
11.0		22.0	79.0	4	1181021100	1181211100	1181071100	
12.0		26.0	83.0	4	1181021200	1181211200	1181071200	
13.0		26.0		4	1181021300	1181211300	1181071300	
14.0	26.0	4		1181021400	1181211400	1181071400		
15.0	16.0	26.0	92.0	4	1181021500	1181211500	1181071500	
16.0		32.0		4	1181021600	1181211600	1181071600	
17.0		32.0		4	1181021700	1181211700	1181071700	
18.0		32.0		4	1181021800	1181211800	1181071800	
19.0	20.0	32.0	98.0	4	1181021900	1181211900	1181071900	
20.0		38.0		4	1181022000	1181212000	1181072000	
22.0		38.0		104.0	5	1181022200	1181212200	1181072200
22.0		38.0		114.0	5	1181029002	1181219002	1181079002
24.0	25.0	45.0	121.0	5	1181022400	1181212400	1181072400	
25.0		45.0		5	1181022500	1181212500	1181072500	
26.0		45.0		6	1181022600	1181212600	1181072600	
28.0		45.0		6	1181022800	1181212800	1181072800	
30.0	32.0	45.0	133.0	6	1181023000	1181213000	1181073000	
32.0		53.0		6	1181023200	1181213200	1181073200	
35.0		53.0		6	1181023500	1181213500	1181073500	
36.0		53.0		6	1181023600	1181213600	1181073600	
38.0	40.0	63.0	155.0	6	1181023800	1181213800	1181073800	
38.0		63.0		6	1181029003	1181219003	1181079003	
40.0		63.0		6	1181024000	1181214000	1181074000	
40.0		63.0		6	1181029004	1181219004	1181079004	
50.0	50.0	75.0	177.0	6	1181025000	1181215000	1181075000	

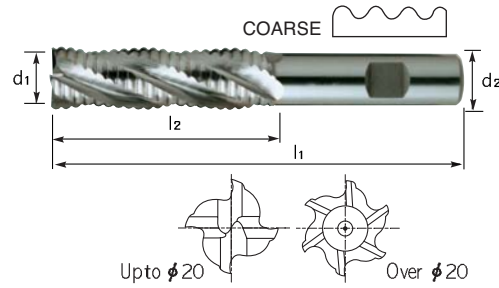
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

MULTI. FLUTE, ROUGHING, LONG LENGTH



Series No. 119102



ROUGHING END MILLS

Long Length, Multi-Flute, Coarse Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Lange Ausführung, Mehrschneidig, Schrupp-Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Longue, à Plusieurs Dents, Profil Ébauche, à Queue Cylindrique avec Plats

VOORDRAAIVINGERFREZEN

Lange lengte, meergroevig, grove steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Lunga, a piu Taglienti, per Sgrossare, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
6.0	6.0	24.0	68.0	3	1191020600	1191210600	1191070600
7.0	10.0	30.0	80.0	3	1191020700	1191210700	1191070700
8.0		38.0	88.0	3	1191020800	1191210800	1191070800
9.0		38.0		3	1191020900	1191210900	1191070900
10.0	12.0	45.0	95.0	4	1191021000	1191211000	1191071000
11.0		45.0	102.0	4	1191021100	1191211100	1191071100
12.0		53.0	110.0	4	1191021200	1191211200	1191071200
13.0		53.0		4	1191021300	1191211300	1191071300
14.0	53.0	4		1191021400	1191211400	1191071400	
15.0	16.0	53.0	123.0	4	1191021500	1191211500	1191071500
16.0		63.0		4	1191021600	1191211600	1191071600
17.0		63.0		4	1191021700	1191211700	1191071700
18.0		63.0		4	1191021800	1191211800	1191071800
19.0		63.0		4	1191021900	1191211900	1191071900
20.0	20.0	75.0	135.0	4	1191029001	1191219001	1191079001
20.0		75.0	141.0	4	1191022000	1191212000	1191072000
22.0		75.0		5	1191022200	1191212200	1191072200
22.0	25.0	75.0	151.0	5	1191029002	1191219002	1191079002
24.0		90.0	166.0	5	1191022400	1191212400	1191072400
25.0		90.0		5	1191022500	1191212500	1191072500
26.0		90.0		6	1191022600	1191212600	1191072600
28.0		90.0		6	1191022800	1191212800	1191072800
30.0	90.0	6		1191023000	1191213000	1191073000	
32.0	32.0	106.0	186.0	6	1191023200	1191213200	1191073200
35.0		106.0		6	1191023500	1191213500	1191073500
36.0		106.0		6	1191023600	1191213600	1191073600
38.0		125.0		6	1191023800	1191213800	1191073800
38.0	40.0	125.0	217.0	6	1191029003	1191219003	1191079003
40.0	32.0	125.0		6	1191024000	1191214000	1191074000
40.0	40.0	125.0		6	1191029004	1191219004	1191079004

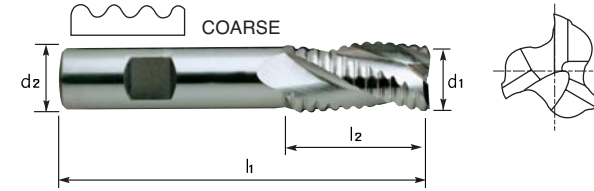
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING, SHORT LENGTH



Series No. 133102



ROUGHING END MILLS

Short Length, 3 Flute, Coarse Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Kurze Ausführung, 3 Schneiden, Schrupp-Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Courte, 3 Dents, avec Profil Ébauche, à Queue Cylindrique avec Plats

VOORDRAAIVINGERFREZEN

Korte lengte, 3 groeven, grove steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Corta, 3 Taglienti, per Sgrossare, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
10.0	10.0	22.0	72.0	1331021000	1331211000	1331071000
12.0	12.0	26.0	83.0	1331021200	1331211200	1331071200
14.0		26.0		1331021400	1331211400	1331071400
16.0	16.0	32.0	92.0	1331021600	1331211600	1331071600
18.0		32.0		1331021800	1331211800	1331071800
20.0	20.0	38.0	104.0	1331022000	1331212000	1331072000
22.0		38.0		1331022200	1331212200	1331072200
25.0	25.0	45.0	121.0	1331022500	1331212500	1331072500
28.0		45.0		1331022800	1331212800	1331072800
30.0		45.0		1331023000	1331213000	1331073000
32.0	32.0	53.0	133.0	1331023200	1331213200	1331073200
36.0		53.0		1331023600	1331213600	1331073600
40.0		63.0		1331024000	1331214000	1331074000

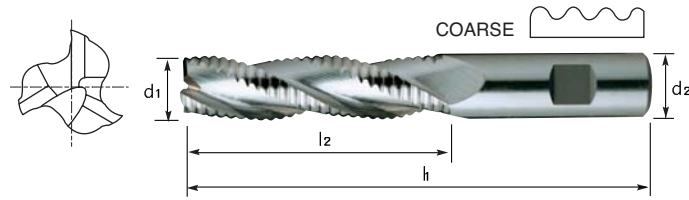
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING, LONG LENGTH



Series No. 134102



ROUGHING END MILLS

Long Length, 3 Flute, Coarse Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Lange Ausführung, 3 Schneiden, Schrupp-Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Longue, 3 Dents, avec Profil Ébauche, à Queue Cylindrique avec Plats

VOORDRAAVINGERFREZEN

Lange lengte, 3 groeven, grove steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Lunga, 3 Taglienti, per Sgrossare, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
10.0	10.0	45.0	95.0	1341021000	1341211000	1341071000
12.0	12.0	53.0	110.0	1341021200	1341211200	1341071200
14.0		53.0		1341021400	1341211400	1341071400
16.0	16.0	63.0	123.0	1341021600	1341211600	1341071600
18.0		63.0		1341021800	1341211800	1341071800
20.0	20.0	75.0	141.0	1341022000	1341212000	1341072000
22.0		75.0		1341022200	1341212200	1341072200
25.0	25.0	90.0	166.0	1341022500	1341212500	1341072500
28.0		90.0		1341022800	1341212800	1341072800
30.0		90.0		1341023000	1341213000	1341073000
36.0	32.0	106.0	186.0	1341023600	1341213600	1341073600
40.0		125.0		217.0	1341024000	1341214000

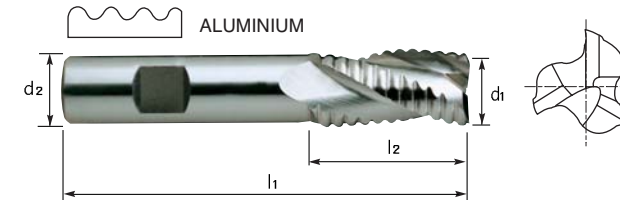
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING, SHORT LENGTH for ALUMINIUM



Series No. 124102



ROUGHING END MILLS FOR ALUMINIUM

Short Length, 3 Flute, Coarse Pitch, Helix 37°, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER FÜR ALUMINIUM

Kurze Ausführung, 3 Schneiden, Schrupp-Profil, Rechtsspirale 37°, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES POUR ALLAGES

Série Courte, 3 Dents, avec Profil Ébauche, Hélice 37°, à Queue Cylindrique avec Plats

VOORDRAAVINGERFREZEN VOOR ALUMINIUM

Korte lengte, 3 groeven, grove steek, helix 37°, rond profiel, met geplette schacht

FRESE FRONTALE PER MACCHINE ELU

Serie Corta, 3 Taglienti, Per Sgrossare Elica 37°, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
6.0	6.0	13.0	57.0	1241020600	1241210600	1241070600
8.0	10.0	19.0	69.0	1241020800	1241210800	1241070800
10.0		22.0	72.0	1241021000	1241211000	1241071000
12.0	12.0	26.0	83.0	1241021200	1241211200	1241071200
14.0		26.0		1241021400	1241211400	1241071400
16.0	16.0	32.0	92.0	1241021600	1241211600	1241071600
18.0		32.0		1241021800	1241211800	1241071800
20.0	20.0	38.0	104.0	1241022000	1241212000	1241072000
22.0		38.0		1241022200	1241212200	1241072200
25.0	25.0	45.0	121.0	1241022500	1241212500	1241072500
30.0		45.0		1241023000	1241213000	1241073000

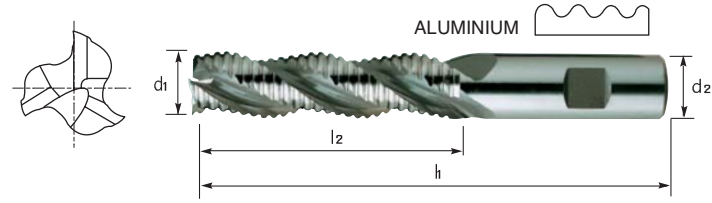
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING, LONG LENGTH for ALUMINIUM



Series No. 125102



ROUGHING END MILLS FOR ALUMINIUM

Long Length, 3 Flute, Coarse Pitch, Helix 37°, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER FÜR ALUMINIUM

Lange Ausführung, 3 Schneiden, Schrupp-Profil, Rechtsspirale 37°, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES POUR ALLAGES

Série Courte, 3 Dents, avec Profil Ébauche, Hélice 37°, à Queue Cylindrique avec Plats

VOORDRAAVINGFREZEN VOOR ALUMINIUM

Lange lengte, 3 groeven, gorve steek, helix 37°, rond profiel, met geplette schacht

FRESE FRONTALE PER MACCHINE ELU

Serie Lunga, 3 Taglienti, per Sgrossare Elica 37°, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
10.0	10.0	45.0	95.0	1251021000	1251211000	1251071000
12.0	12.0	53.0	110.0	1251021200	1251211200	1251071200
14.0		53.0		1251021400	1251211400	1251071400
16.0	16.0	63.0	123.0	1251021600	1251211600	1251071600
18.0		63.0		1251021800	1251211800	1251071800
20.0	20.0	75.0	141.0	1251022000	1251212000	1251072000
22.0		75.0		1251022200	1251212200	1251072200
25.0	25.0	90.0	166.0	1251022500	1251212500	1251072500
30.0		90.0		1251023000	1251213000	1251073000

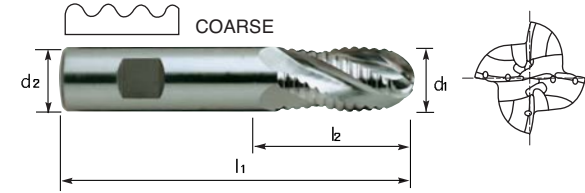
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3&4 FLUTE, BALL NOSE ROUGHING SHORT LENGTH



Series No. 127102



ROUGHING DIE-SINKING CUTTERS
Short Length, Multi-Flute Coarse Pitch, Round Profile, Ball End Centre Cutting, with Flatted Shank

SCHRUPP-GESENKFRÄSER
Kurze Ausführung, Mehrschneidig & mit runder stirn, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES POUR MATRICES
Série Courte, à Plusieurs Dents avec Profil Ébauche, à Bout Spherique Coupe au Centre, à Queue Cylindrique avec Plats

VOORDRAAI MATRIJZENFREZEN
Korte lengte, meergroevig, fijne steek, rond profiel, met geplette schacht

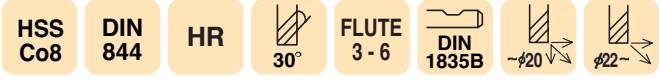
FRESE FRONTALE PER STAMPI
Serie Corta, a piu Taglienti, per Sgrossare, stampi Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
8.0	10.0	19.0	69.0	3	1271020800	1271210800	1271070800
10.0		22.0	72.0	3	1271021000	1271211000	1271071000
12.0		26.0	83.0	4	1271021200	1271211200	1271071200
16.0	16.0	32.0	92.0	4	1271021600	1271211600	1271071600
20.0	20.0	38.0	104.0	4	1271022000	1271212000	1271072000
25.0	25.0	45.0	121.0	4	1271022500	1271212500	1271072500
32.0	32.0	53.0	133.0	4	1271023200	1271213200	1271073200
40.0		63.0	155.0	4	1271024000	1271214000	1271074000

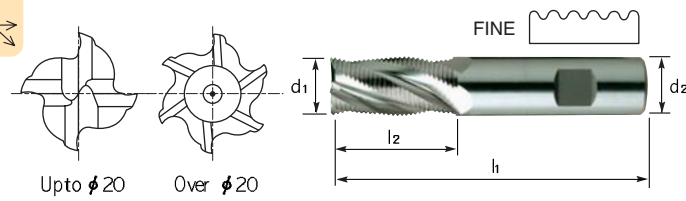
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING, SHORT LENGTH



Series No. 121102



FINE PITCH ROUGHING END MILLS

Short Length, Multi-Flute, Fine Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Kurze Ausführung, Mehrscheidig, Schrupp-Profil, Feine Rillenteilung, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Courte, à Plusieurs Dents avec Profil Ébauche, à Bout Spherique Coupe au Centre, à Queue Cylindrique avec Plats

FIJNE STEEK

Korte lengte, meergroevig, fijne steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Corta, a piu Taglienti, per Sgrossare, per Profilo Fine, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
6.0	6.0	13.0	57.0	3	1211020600	1211210600	1211070600
8.0	10.0	19.0	69.0	3	1211020800	1211210800	1211070800
10.0		22.0	72.0	4	1211021000	1211211000	1211071000
12.0	12.0	26.0	83.0	4	1211021200	1211211200	1211071200
14.0		26.0		4	1211021400	1211211400	1211071400
16.0	16.0	32.0	92.0	4	1211021600	1211211600	1211071600
18.0		32.0		4	1211021800	1211211800	1211071800
20.0	20.0	38.0	104.0	4	1211022000	1211212000	1211072000
25.0	25.0	45.0	121.0	5	1211022500	1211212500	1211072500
30.0		45.0		6	1211023000	1211213000	1211073000
32.0	32.0	53.0	133.0	6	1211023200	1211213200	1211073200

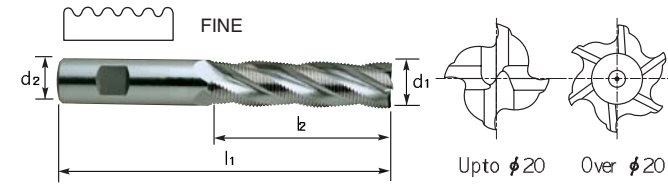
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING, LONG LENGTH



Series No. 122102



FINE PITCH ROUGHING END MILLS

Long Length, Multi-Flute, Fine Pitch, Round Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Lange Ausführung, Mehrscheidig, Schrupp-Profil, Feine Rillenteilung, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Longue, à Plusieurs Dents, avec Profil Ébauche, Profil Fin, à Queue Cylindrique avec Plats

FIJNE STEEK

Lange lengte, meergroevig, fijne steek, rond profiel, met geplette schacht

FRESE FRONTALE

Serie Lunga, a piu Taglienti, per Sgrossare, per Profilo Fine, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d ₁)	Shank Dia. h6(d ₂)	Length of Cut l ₂	Overall Length l ₁	No. of Flute	HSS Co8	TiAIN HSS Co8	TiCN HSS Co8
6.0	6.0	24.0	68.0	3	1221020600	1221210600	1221070600
7.0	10.0	30.0	80.0	3	1221020700	1221210700	1221070700
8.0		38.0	88.0	3	1221020800	1221210800	1221070800
9.0		38.0		3	1221020900	1221210900	1221070900
10.0	12.0	45.0	95.0	4	1221021000	1221211000	1221071000
11.0		45.0	102.0	4	1221021100	1221211100	1221071100
12.0		53.0		4	1221021200	1221211200	1221071200
13.0	16.0	53.0	110.0	4	1221021300	1221211300	1221071300
14.0		53.0		4	1221021400	1221211400	1221071400
15.0		53.0		4	1221021500	1221211500	1221071500
16.0	20.0	63.0	123.0	4	1221021600	1221211600	1221071600
17.0		63.0		4	1221021700	1221211700	1221071700
18.0		63.0		4	1221021800	1221211800	1221071800
19.0	25.0	63.0	141.0	4	1221021900	1221211900	1221071900
20.0		75.0		4	1221022000	1221212000	1221072000
22.0		75.0		5	1221022200	1221212200	1221072200
24.0	32.0	90.0	166.0	5	1221022400	1221212400	1221072400
25.0		90.0		5	1221022500	1221212500	1221072500
26.0		90.0		6	1221022600	1221212600	1221072600
28.0	40.0	90.0	186.0	6	1221022800	1221212800	1221072800
30.0		90.0		6	1221023000	1221213000	1221073000
32.0		106.0		6	1221023200	1221213200	1221073200
35.0	32.0	106.0	217.0	6	1221023500	1221213500	1221073500
36.0		106.0		6	1221023600	1221213600	1221073600
38.0		125.0		6	1221023800	1221213800	1221073800
38.0	40.0	125.0	217.0	6	1221029001	1221219001	1221079001
40.0	32.0	125.0		6	1221024000	1221214000	1221074000
40.0	40.0	125.0		6	1221029002	1221219002	1221079002

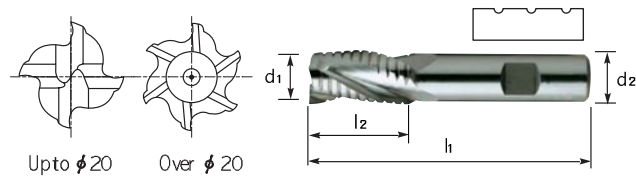
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING & FINISHING, SHORT LENGTH



Series No. 126102



ROUGHING-FINISHING END MILLS
Short Length, Multi-Flute, Rough-Finishing Profile, with Flatted Shank

SCHRUPP-SCHAFTFRÄSER
Kurze Ausführung, Mehrscheidig mit Schruppschicht Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT SEMI-FINITION
Série Courte, à Plusieurs Dents avec Semi-Finition, à Queue Cylindrique avec Plats

VOORDRAAI-NADRAAI VINGERFREZEN
Korte lengte, meergroevig, ruw polijstprofiel, met geplette schacht

FRESE FRONTALE PER SEMI-SGROSSAMENTO
Serie Corta, a piu Taglienti, per Semi-Sgrossamento, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8	
6.0	6.0	13.0	57.0	3	1261020600	1261210600	1261070600	
7.0	10.0	16.0	66.0	3	1261020700	1261210700	1261070700	
8.0		19.0	69.0	4	1261020800	1261210800	1261070800	
9.0		19.0		4	1261020900	1261210900	1261070900	
10.0	12.0	22.0	72.0	4	1261021000	1261211000	1261071000	
11.0		22.0	79.0	4	1261021100	1261211100	1261071100	
12.0		26.0	83.0	4	1261021200	1261211200	1261071200	
13.0		26.0		4	1261021300	1261211300	1261071300	
14.0	26.0	4		1261021400	1261211400	1261071400		
16.0	16.0	32.0	92.0	4	1261021600	1261211600	1261071600	
18.0		32.0		4	1261021800	1261211800	1261071800	
20.0	20.0	38.0	104.0	4	1261022000	1261212000	1261072000	
22.0		38.0		5	1261022200	1261212200	1261072200	
25.0	25.0	45.0	121.0	5	1261022500	1261212500	1261072500	
28.0		45.0		5	1261022800	1261212800	1261072800	
30.0		45.0		5	1261023000	1261213000	1261073000	
32.0	32.0	53.0	133.0	5	1261023200	1261213200	1261073200	
36.0		53.0		6	1261023600	1261213600	1261073600	
40.0		63.0		155.0	6	1261024000	1261214000	1261074000

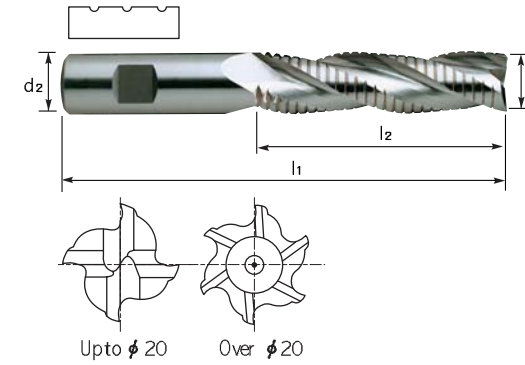
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

MULTI. FLUTE, ROUGHING & FINISHING, LONG LENGTH



Series No. 137102



ROUGHING-FINISHING END MILLS
Long Length, Multi-Flute, Rough-Finishing Profile, with Flatted Shank

SCHRUPPSCHLICHT-SCHAFTFRÄSER
Lange Ausführung, Mehrscheidig mit Schruppschicht Profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT SEMI-FINITION
Série Longue, à Plusieurs Dents avec Profil Semi-Finition, à Queue Cylindrique avec Plats

VOORDRAAI-NADRAAI VINGERFREZEN
Lange lengte, meergroevig, ruw polijstprofiel, met geplette schacht

FRESE FRONTALE PER SEMI-SGROSSAMENTO
Serie Lunga, a piu Taglienti, per Semi-Sgrossamento, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
6.0	6.0	24.0	68.0	3	1371020600	1371210600	1371070600
8.0	10.0	38.0	88.0	4	1371020800	1371210800	1371070800
10.0		45.0	95.0	4	1371021000	1371211000	1371071000
12.0	12.0	53.0	110.0	4	1371021200	1371211200	1371071200
14.0		53.0		4	1371021400	1371211400	1371071400
16.0	16.0	63.0	123.0	4	1371021600	1371211600	1371071600
18.0		63.0		4	1371021800	1371211800	1371071800
20.0	20.0	75.0	141.0	4	1371022000	1371212000	1371072000
22.0		75.0		5	1371022200	1371212200	1371072200
25.0	25.0	90.0	166.0	5	1371022500	1371212500	1371072500
30.0		90.0		5	1371023000	1371213000	1371073000
32.0	32.0	106.0	186.0	5	1371023200	1371213200	1371073200

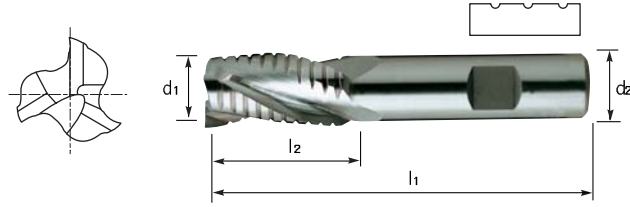
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js 12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16

3 FLUTE, ROUGHING & FINISHING SHORT LENGTH



Series No. 138102



ROUGHING-FINISHING END MILLS

Short Length, 3 Flute, Rough-Finishing Profile, with Flatted Shank

SCHRUPPSCHLICHT-SCHAFTFRÄSER

Kurze Ausführung, 3 Schneiden, mit Schruppschlicht profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT SEMI-FINITION

Série Courte, 3 Dents avec Profil Semi-Finition, à Queue Cylindrique avec Plats

VOORDRAAI-NADRAAI VINGERFREZEN

Korte lengte, 3 groeven, ruw polijstprofiel, met geplette schacht

FRESE FRONTALE PER SEMI-SGROSSAMENTO

Serie Corta, a piu Taglienti, per Semi-Sgrossare, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
6.0	6.0	13.0	57.0	1381020600	1381210600	1381070600
8.0	10.0	19.0	69.0	1381020800	1381210800	1381070800
10.0		22.0	72.0	1381021000	1381211000	1381071000
12.0	12.0	26.0	83.0	1381021200	1381211200	1381071200
14.0		26.0		1381021400	1381211400	1381071400
16.0	16.0	32.0	92.0	1381021600	1381211600	1381071600
18.0		32.0		1381021800	1381211800	1381071800
20.0	20.0	38.0	104.0	1381022000	1381212000	1381072000
22.0		38.0		1381022200	1381212200	1381072200
25.0	25.0	45.0	121.0	1381022500	1381212500	1381072500
28.0		45.0		1381022800	1381212800	1381072800
30.0		45.0		1381023000	1381213000	1381073000
32.0	32.0	53.0	133.0	1381023200	1381213200	1381073200
36.0		53.0		1381023600	1381213600	1381073600
40.0		63.0		1381024000	1381214000	1381074000

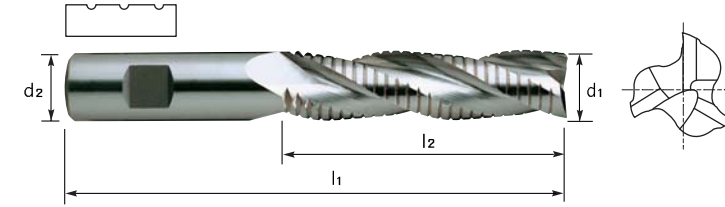
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0	0	0	0	0	0
	- 6	- 8	- 9	- 11	- 13	- 16

3 FLUTE, ROUGHING & FINISHING LONG LENGTH



Series No. 139102



ROUGHING-FINISHING END MILLS

Long Length, 3 Flute, Rough-Finishing Profile, with Flatted Shank

SCHRUPPSCHLICHT-SCHAFTFRÄSER

Lange Ausführung, 3 Schneiden, mit Schruppschlicht profil, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT SEMI-FINITION

Série Longue, 3 Dents avec Profil Semi-Finition, à Queue Cylindrique avec Plats

VOORDRAAI-NADRAAI VINGERFREZEN

Lange lengte, 3 groeven, ruw polijstprofiel, met geplette schacht

FRESE FRONTALE PER SEMI-SGROSSAMENTO

Serie Lunga, a piu Taglienti, per Semi-Sgrossamento, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	HSS Co8	TiAlN HSS Co8	TiCN HSS Co8
6.0	6.0	24.0	68.0	1391020600	1391210600	1391070600
8.0	10.0	38.0	88.0	1391020800	1391210800	1391070800
10.0		45.0	95.0	1391021000	1391211000	1391071000
12.0	12.0	53.0	110.0	1391021200	1391211200	1391071200
14.0		53.0		1391021400	1391211400	1391071400
16.0	16.0	63.0	123.0	1391021600	1391211600	1391071600
18.0		63.0		1391021800	1391211800	1391071800
20.0	20.0	75.0	141.0	1391022000	1391212000	1391072000
22.0		75.0		1391022200	1391212200	1391072200
25.0	25.0	90.0	166.0	1391022500	1391212500	1391072500
28.0		90.0		1391022800	1391212800	1391072800
30.0		90.0		1391023000	1391213000	1391073000
36.0	32.0	106.0	186.0	1391023600	1391213600	1391073600
40.0		125.0	217.0	1391024000	1391214000	1391074000

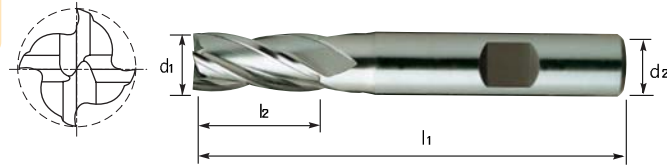
Tolerances according to DIN 7160 & 7161 Toleranzen nach DIN 7160 & 7161

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0	0	0	0	0	0
	- 6	- 8	- 9	- 11	- 13	- 16

4&6 FLUTE, SHORT LENGTH



Series No. 107113



MULTIPLE FLUTE END MILLS

Short Length, 4 & 6 Flute, Centre Cutting, with Flatted Shank

SCHAFTFRÄSER

Kurze Ausführung, 4 & 6 Schneiden, Zentrumschneidend, Zylinderschaft mit Mitnahmefläche

FRAISES

Série Courte, 4 & 6 Dents, Coupe au Centre, Queue Cylindrique avec Plats

MEERGROEVIG VINGERFREZEN

Korte lengte, 4 & 6 groeven, centerfrees, met geplette schacht

FRESE FRONTALE

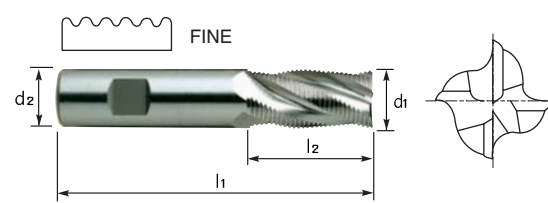
Serie Corta, 4 & 6 Taglienti, Tagliente al Centro, Gambo Cilindrico con Trascinamento Laterale

Mill Dia. k10(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	ASP-60	TiAlN ASP-60	TiCN ASP-60
3.0	6.0	8.0	52.0	4	1071130300	1071220300	1071150300
4.0		11.0	55.0	4	1071130400	1071220400	1071150400
5.0		13.0	57.0	4	1071130500	1071220500	1071150500
6.0	13.0	4		1071130600	1071220600	1071150600	
8.0	10.0	19.0	69.0	4	1071130800	1071220800	1071150800
10.0		22.0	72.0	4	1071131000	1071221000	1071151000
12.0	12.0	26.0	83.0	4	1071131200	1071221200	1071151200
14.0		26.0		4	1071131400	1071221400	1071151400
16.0	16.0	32.0	92.0	6	1071131600	1071221600	1071151600
18.0		32.0		6	1071131800	1071221800	1071151800
20.0	20.0	38.0	104.0	6	1071132000	1071222000	1071152000
25.0	25.0	45.0	121.0	6	1071132500	1071222500	1071152500

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
k10	+40 0	+48 0	+58 0	+70 0	+84 0	+100 0
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

MULTI. FLUTE, ROUGHING SHORT LENGTH



Series No. 121113

FINE PITCH ROUGHING END MILLS

Short Length, Multi-Flute, Centre Cutting, 1 Tooth Over Centre, Fine Pitch, Round Profile with Flatted Shank

SCHRUPP-SCHAFTFRÄSER

Kurze Ausführung, Mehrschneidig, Zentrumschneidend, Ein Zahn bis Mitte Schneidend Schrump-profil, Feine Rillenteilung, Zylinderschaft mit Mitnahmefläche

FRAISES EN BOUT RAVAGEUSES

Série Courte, à Plusieurs Dents, Coupe au Centre, Une Dent Coupante Jusqu'au Centre, avec Profil Ébauche Profil Fin, a Queue Cylindrique avec Plats

FRESE FRONTALE

Serie Corta, a piu Taglienti, Tagliente al Centro, Un Dents Frontale Tagliente Fino al Centro, per Sgrossare per Profilo Fine, Gambo Cilindrico con Trascinamento Laterale

FIJNE STEEK

VOORDRAAIVINGERFREZEN
Korte lengte, meergroevig, centerfrees, 1 tand over center, met geplette schacht

Mill Dia. js12(d1)	Shank Dia. h6(d2)	Length of Cut l2	Overall Length l1	No. of Flute	ASP-60	TiAlN ASP-60	TiCN ASP-60
6.0	6.0	13.0	57.0	4	1211130600	1211220600	1211150600
7.0	10.0	16.0	66.0	4	1211130700	1211220700	1211150700
8.0		19.0	69.0	4	1211130800	1211220800	1211150800
9.0		19.0		5	1211130900	1211220900	1211150900
10.0	12.0	22.0	72.0	5	1211131000	1211221000	1211151000
11.0		22.0	79.0	5	1211131100	1211221100	1211151100
12.0		26.0	83.0	5	1211131200	1211221200	1211151200
13.0		26.0		5	1211131300	1211221300	1211151300
14.0		26.0		5	1211131400	1211221400	1211151400
15.0	16.0	26.0	92.0	5	1211131500	1211221500	1211151500
16.0		32.0		5	1211131600	1211221600	1211151600
18.0		32.0		5	1211131800	1211221800	1211151800
20.0	20.0	38.0	104.0	5	1211132000	1211222000	1211152000
22.0		38.0		5	1211132200	1211222200	1211152200
25.0	25.0	45.0	121.0	6	1211132500	1211222500	1211152500
30.0		45.0		6	1211133000	1211223000	1211153000

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

Toleranzwerte in µm / Tolerance range in µm						
Nennmaßbereich in mm / Nominal-Diameter in mm						
	von 1 bis 3 from 1 to 3	über 3 bis 6 over 3 to 6	über 6 bis 10 over 6 to 10	über 10 bis 18 over 10 to 18	über 18 bis 30 over 18 to 30	über 30 bis 50 over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

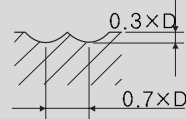
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

2 FLUTE BALL NOSE, SHORT LENGTH

115102, 116102, 114102, 130102, 112102, 113102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R 1.5 × 3.0	4500	95	3400	70	2000	30	1400	20	11000	230
R 2.0 × 4.0	3200	115	2400	80	1400	35	1000	25	8000	260
R 3.0 × 6.0	2200	135	1700	90	1000	45	700	25	5600	280
R 4.0 × 8.0	1600	160	1200	105	700	50	500	30	4000	350
R 5.0 × 10.0	1300	180	1000	120	560	60	400	35	3200	360
R 6.0 × 12.0	1000	170	800	105	450	55	320	35	2500	340
R 8.0 × 16.0	800	150	600	100	350	55	250	35	2000	300
R 10.0 × 20.0	600	140	500	85	300	50	200	35	1600	280
R 12.5 × 25.0	500	130	400	70	220	40	160	30	1300	250



*The FEED, in long & extra long types, should be reduced by around 50%

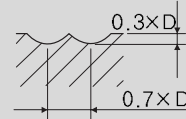
RPM=REVOLUTION PER MIN.
FEED=mm/min.

2 FLUTE BALL NOSE, SHORT LENGTH, TiCN-COATED

115102, 116102, 114102, 130102, 112102, 113102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R 1.5 × 3.0	6000	125	4400	90	2600	40	1800	25	14000	300
R 2.0 × 4.0	4000	150	3100	105	1800	45	1300	30	10000	340
R 3.0 × 6.0	3000	175	2200	115	1300	60	900	30	7300	360
R 4.0 × 8.0	2000	210	1600	135	900	65	650	40	5000	450
R 5.0 × 10.0	1700	235	1300	155	730	80	500	45	4000	470
R 6.0 × 12.0	1300	220	1000	135	600	70	400	45	3300	440
R 8.0 × 16.0	1000	200	800	130	450	70	300	45	2600	390
R 10.0 × 20.0	800	180	650	110	400	65	250	45	2000	360
R 12.5 × 25.0	650	170	500	90	300	50	200	40	1700	330



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

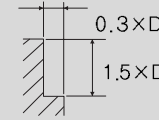
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

MULTI FLUTE, 50° HELIX SHORT LENGTH

132102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS	
	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40	
STRENGTH	500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²	
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED
2	5000	35	4500	25	2500	10
3	3500	50	2800	35	1800	20
4	2500	60	2000	40	1200	25
5	2000	75	1800	55	1000	30
6	1800	85	1300	55	900	35
8	1200	95	1000	65	600	40
10	1000	95	900	70	500	40
12	900	110	700	70	450	45
14	800	95	600	70	400	45
16	600	95	500	65	300	40
18	550	95	450	65	280	40
20	500	95	450	65	250	40
22	500	95	400	65	250	40
25	450	85	350	55	200	30
28	400	75	300	50	180	25
30	350	65	280	45	180	25



RPM=REVOLUTION PER MIN.
FEED=mm/min.

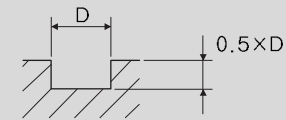
2 FLUTE, SHORT LENGTH, FOR ALUMINIUM

131102



<Slotting>

MATERIAL	ALUMINUM NONFERROUS METALS	
	RPM	FEED
DIAMETER		
3	8000	560
6	7000	700
8	6000	850
10	5000	1200
12	5000	1200
14	3500	1240
16	3500	1240
18	2300	1300
20	2300	1300

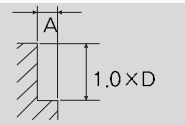


RPM=REVOLUTION PER MIN.
FEED=mm/min.

<Side Cutting>

MATERIAL	ALUMINUM NONFERROUS METALS	
	RPM	FEED
DIAMETER		
3	8000	730
6	7000	900
8	6000	1100
10	5000	1500
12	5000	1500
14	3500	1600
16	3500	1600
18	2300	1700
20	2300	1700

A : φ3 ~ φ10 = 0.25xD
φ12 ~ φ20 = 0.5xD



RPM=REVOLUTION PER MIN.
FEED=mm/min.

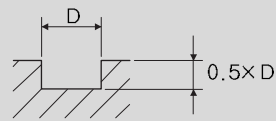
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

2FLUTE, EXTRA LONG LENGTH

102102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 1000N/mm ²		HRc30 ~ HRc40 1000 ~ 1300N/mm ²		RPM	FEED
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	40	4500	30	4000	30	2200	15	12000	160
3	3500	55	3200	45	2500	40	1600	20	11000	250
4	2800	70	2200	55	1800	45	1100	30	8000	290
5	2200	90	1800	70	1600	60	900	35	6300	310
6	1800	90	1600	80	1200	60	800	40	5600	310
8	1400	100	1100	90	900	70	560	45	4000	390
10	1100	100	900	90	800	80	450	45	3100	400
12	900	110	800	100	630	80	400	50	2500	380
14	800	110	700	90	560	80	350	50	2200	350
16	700	110	560	90	450	70	280	45	2000	350
18	630	100	500	90	400	70	250	45	1800	350
20	560	100	450	90	400	70	220	45	1600	320
22	500	100	450	90	350	70	220	45	1400	300
25	450	90	400	80	310	60	180	35	1200	280
28	400	80	350	70	280	55	160	30	1100	270
30	350	70	310	60	250	50	160	30	1100	270
32	350	70	280	55	220	45	140	30	1000	240
36	310	60	250	50	200	40	120	25	900	220
40	280	60	220	50	180	40	110	25	800	200



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN. FEED=mm/min.

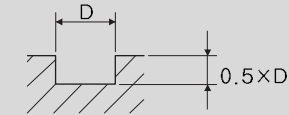
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

2FLUTE, EXTRA LONG LENGTH, TiCN-COATED

102102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 1000N/mm ²		HRc30 ~ HRc40 1000 ~ 1300N/mm ²		RPM	FEED
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	7300	50	6000	40	5000	40	2900	20	16000	210
3	4500	70	4200	60	3300	50	2100	25	14000	330
4	3600	90	2900	70	2300	60	1400	40	10000	380
5	2900	115	2300	90	2100	80	1200	45	8200	400
6	2300	115	2000	105	1600	80	1000	50	7300	400
8	1800	130	1400	115	1200	90	730	60	5000	510
10	1400	130	1200	115	1000	105	600	60	4000	520
12	1200	145	1000	130	800	105	500	65	3300	500
14	1000	145	900	115	700	105	450	65	2800	450
16	900	145	700	115	600	90	360	60	2600	450
18	800	130	650	115	500	90	320	60	2300	450
20	730	130	600	115	500	90	300	60	2100	420
22	650	130	600	115	450	90	280	60	1800	390
25	600	120	500	105	400	80	230	48	1600	360
28	500	105	450	90	350	70	210	40	1400	350
30	450	90	400	80	320	65	210	40	1400	350
32	450	90	360	70	280	60	180	40	1300	310
36	400	80	320	65	260	50	160	30	1200	280
40	360	80	280	65	230	50	140	30	1000	260



*The FEED, in long & extra long types, should be reduced by around 50%

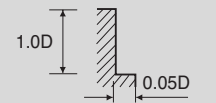
RPM=REVOLUTION PER MIN. FEED=mm/min.

4&6 FLUTE, SHORT LENGTH

107113



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS ~HRc30		CARBON STEELS ALLOY STEELS TOOL STEELS HRc30 ~ HRc45		STAINLESS STEELS TITANIUM ALLOY		INCONEL	
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	4400	185	1100	23	2200	110	880	28
4	3600	210	900	31	1800	125	720	37
5	3000	225	750	30	1500	135	600	36
6	2600	235	600	29	1300	140	480	35
8	2000	250	500	28	1000	150	400	34
10	1600	285	410	30	800	170	330	36
12	1320	250	340	29	660	150	270	35
14	1160	235	290	27	580	140	230	32
16	1000	225	250	26	500	135	200	31
18	900	210	225	23	450	125	180	28
20	800	200	200	17	400	120	160	21
25	640	165	165	15	320	100	130	18



RPM=REVOLUTION PER MIN. FEED=mm/min.

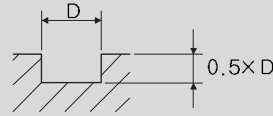
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

3 FLUTE SLOTING

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	60	4500	45	4000	45	2200	20	12000	240
3	3500	80	3200	65	2500	60	1600	30	11000	380
4	2800	105	2200	80	1800	65	1100	45	8000	440
5	2200	135	1800	105	1600	90	900	50	6300	470
6	1800	135	1600	120	1200	90	800	60	5600	470
8	1400	150	1100	135	900	105	560	65	4000	580
10	1100	150	900	135	800	120	450	65	3100	600
12	900	165	800	150	630	120	400	75	2500	570
14	800	165	700	135	560	120	350	75	2200	530
16	700	165	560	135	450	105	280	65	2000	530
18	630	150	500	135	400	105	250	65	1800	530
20	560	150	450	135	400	105	220	65	1600	480
22	500	150	450	135	350	105	220	65	1400	450
25	450	135	400	120	310	90	180	50	1200	420
28	400	120	350	105	280	80	160	45	1100	400
30	350	105	310	90	250	75	160	45	1100	400



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

3 FLUTE FINISH SIDE CUTTING

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	60	4500	40	4000	35	2200	15	12000	180
3	3500	80	3200	60	2500	45	1600	20	11000	280
4	2800	105	2200	75	1800	50	1100	30	8000	330
5	2200	135	1800	95	1600	65	900	35	6300	350
6	1800	135	1600	110	1200	65	800	45	5600	350
8	1400	150	1100	120	900	80	560	50	4000	440
10	1100	150	900	120	800	90	450	50	3100	450
12	900	165	800	135	630	90	400	55	2500	430
14	800	165	700	120	560	90	350	55	2200	400
16	700	165	560	120	450	80	280	50	2000	400
18	630	150	500	120	400	80	250	50	1800	400
20	560	150	450	120	400	80	220	50	1600	360
22	500	150	450	120	350	80	220	50	1400	340
25	450	135	400	110	310	65	180	35	1200	320
28	400	120	350	95	280	60	160	30	1100	300
30	350	105	310	80	250	55	160	30	1100	300

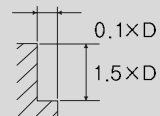


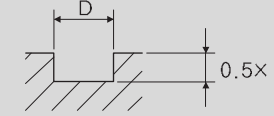
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

3 FLUTE SLOTING, TiCN-COATED

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	7300	80	6000	60	5000	60	2900	25	16000	310
3	4500	105	4200	85	3300	80	2100	40	14000	500
4	3600	135	2900	105	2300	85	1400	60	10000	570
5	2900	175	2300	135	2100	115	1200	65	8200	610
6	2300	175	2000	155	1600	115	1000	80	7300	610
8	1800	195	1400	175	1200	135	730	85	5000	750
10	1400	195	1200	175	1000	155	600	85	4000	780
12	1200	215	1000	195	800	155	500	95	3300	740
14	1000	215	900	175	700	155	450	95	2800	690
16	900	215	700	175	600	135	360	85	2600	690
18	800	195	650	175	500	135	320	85	2300	690
20	730	195	600	175	500	135	300	85	2100	620
22	650	195	600	175	450	135	280	85	1800	580
25	600	175	500	155	400	115	230	65	1600	550
28	500	155	450	135	350	105	210	60	1400	520
30	450	135	400	115	320	95	210	60	1400	520



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN. FEED=mm/min.

3 FLUTE SIDE CUTTING, TiCN-COATED

105102, 128102, 129102, 103102, 104102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ HRc20		HRc20 ~ HRc30		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	7300	80	6000	50	5000	45	2900	20	16000	230
3	4500	105	4200	80	3300	60	2100	25	14000	360
4	3600	135	2900	95	2300	65	1400	40	10000	430
5	2900	175	2300	125	2100	85	1200	45	8200	450
6	2300	175	2000	145	1600	85	1000	60	7300	450
8	1800	195	1400	155	1200	105	730	65	5000	570
10	1400	195	1200	155	1000	115	600	65	4000	590
12	1200	215	1000	175	800	115	500	70	3300	560
14	1000	215	900	155	700	115	450	70	2800	520
16	900	215	700	155	600	105	360	65	2600	520
18	800	195	650	155	500	105	320	65	2300	520
20	730	195	600	155	500	105	300	65	2100	470
22	650	195	600	155	450	105	280	65	1800	440
25	600	175	500	145	400	85	230	45	1600	420
28	500	155	450	125	350	80	210	40	1400	390
30	450	135	400	105	320	70	210	40	1400	390

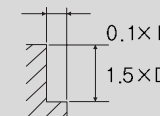


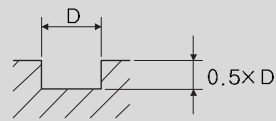
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

2 FLUTE SLOTING

100102, 101102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²		RPM	FEED
HARDNESS			~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	40	4500	30	4000	30	2200	15	12000	160
3	3500	55	3200	45	2500	40	1600	20	11000	250
4	2800	70	2200	55	1800	45	1100	30	8000	290
5	2200	90	1800	70	1600	60	900	35	6300	310
6	1800	90	1600	80	1200	60	800	40	5600	310
8	1400	100	1100	90	900	70	560	45	4000	390
10	1100	100	900	90	800	80	450	45	3100	400
12	900	110	800	100	630	80	400	50	2500	380
14	800	110	700	90	560	80	350	50	2200	350
16	700	110	560	90	450	70	280	45	2000	350
18	630	100	500	90	400	70	250	45	1800	350
20	560	100	450	90	400	70	220	45	1600	320
22	500	100	450	90	350	70	220	45	1400	300
25	450	90	400	80	310	60	180	35	1200	280
28	400	80	350	70	280	55	160	30	1100	270
30	350	70	310	60	250	50	160	30	1100	270
32	350	70	280	55	220	45	140	30	1000	240
36	310	60	250	50	200	40	120	25	900	220
40	280	60	220	50	180	40	110	25	800	200



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN. FEED=mm/min.

TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

4&6 FLUTE, FINISH SIDE CUTTING

107102, 108102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²		RPM	FEED
HARDNESS			~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	5600	80	4500	55	4000	45	2200	20	12000	240
3	3500	110	3200	80	2500	60	1600	30	11000	380
4	2800	140	2200	100	1800	65	1100	45	8000	440
5	2200	180	1800	125	1600	90	900	50	6300	470
6	1800	180	1600	145	1200	90	800	60	5600	470
8	1400	200	1100	160	900	105	560	65	4000	580
10	1100	200	900	160	800	120	450	65	3100	600
12	900	220	800	180	630	120	400	75	2500	570
14	800	220	700	160	560	120	350	75	2200	530
16	700	220	560	160	450	105	280	65	2000	530
18	630	200	500	160	400	105	250	65	1800	530
20	560	200	450	160	400	105	220	65	1600	480
22	500	200	450	160	350	105	220	65	1400	450
25	450	180	400	145	310	90	180	50	1200	420
28	400	160	350	125	280	80	160	45	1100	400
30	350	140	310	110	250	75	160	45	1100	400
32	350	140	280	100	220	65	140	45	1000	360
36	310	120	250	90	200	60	120	35	900	330
40	280	120	220	90	180	60	110	35	800	300

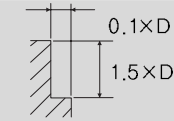


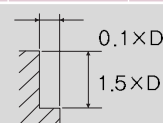
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

2 FLUTE SLOTING, TiCN-COATED

100102, 101102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 1000N/mm ²		HRc30 ~ HRc40 1000 ~ 1300N/mm ²			
HARDNESS										
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	6700	70	5400	50	5000	40	2600	20	14000	220
3	4200	95	3800	70	3000	55	1900	25	13000	340
4	3400	125	2600	90	2200	60	1300	35	9500	400
5	2600	160	2200	115	1900	80	1100	40	7500	420
6	2200	160	1900	130	1400	80	950	55	6700	420
8	1700	180	1300	145	1100	95	670	60	5000	530
10	1300	180	1100	145	950	110	550	60	3700	540
12	1100	200	950	160	750	110	500	65	3000	520
14	950	200	850	145	670	110	400	65	2600	480
16	850	200	670	145	550	95	340	60	2400	480
18	750	180	600	145	500	95	300	60	2200	480
20	670	180	550	145	500	95	260	60	1900	430
22	600	180	550	145	400	95	260	60	1700	410
25	550	160	500	130	370	80	220	40	1400	380
28	500	145	400	115	340	70	190	35	1300	360
30	400	125	370	95	300	65	190	35	1300	360



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN. FEED=mm/min.

MULTI FLUTE, SIDE CUTTING, ROUGHING

118102, 119102, 121102, 124102, 125102, 122102, 133102, 134102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 1000N/mm ²		HRc30 ~ HRc40 1000 ~ 1300N/mm ²			
HARDNESS										
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	1800	80	1600	60	1200	55	800	30	4500	200
8	1400	105	1100	75	900	65	560	35	3100	230
10	1100	150	900	120	800	110	450	60	2500	350
12	900	180	800	140	630	110	400	70	2000	400
14	800	180	700	140	560	110	350	70	1800	420
16	700	180	560	140	450	110	280	70	1600	450
18	630	180	500	140	400	110	250	70	1400	470
20	560	180	450	140	400	110	220	70	1200	500
22	500	220	450	170	350	140	220	85	1100	470
25	450	220	400	170	310	140	180	85	1000	450
28	400	210	350	160	280	130	160	85	900	510
30	350	210	310	160	250	130	160	85	900	530
32	350	210	280	160	220	130	140	85	800	500
36	310	210	250	160	200	130	120	85	700	470
40	280	200	220	150	180	120	110	80	630	450
50	220	200	180	170	160	140	90	80	500	370

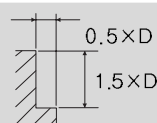


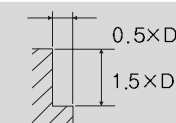
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

MULTI FLUTE, SIDE CUTTING, ROUGHING, TiCN-COATED

118102, 119102, 121102, 124102, 125102, 122102, 133102, 134102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 1000N/mm ²		HRc30 ~ HRc40 1000 ~ 1300N/mm ²			
HARDNESS										
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	2300	105	2000	80	1600	70	1000	40	6000	260
8	1800	135	1400	95	1200	85	700	45	4000	300
10	1400	195	1200	155	1000	145	600	80	3200	450
12	1200	235	1000	180	800	145	500	90	2600	520
14	1000	235	900	180	700	145	450	90	2300	550
16	900	235	700	180	600	145	350	90	2100	580
18	800	235	650	180	500	145	320	90	1800	610
20	700	235	600	180	500	145	300	90	1600	650
22	650	285	600	220	450	180	300	110	1400	610
25	600	285	500	220	400	180	230	110	1300	580
28	500	275	450	210	350	170	210	110	1200	660
30	450	275	400	210	320	170	210	110	1200	690
36	450	275	350	210	300	170	180	110	1000	650
39	400	275	320	210	250	170	150	110	900	610
40	350	260	300	195	230	155	140	105	800	280
50	300	260	230	220	200	180	120	105	650	480



*The FEED, in long & extra long types, should be reduced by around 50%

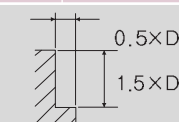
RPM=REVOLUTION PER MIN. FEED=mm/min.

MULTI FLUTE, ROUGHING SHORT LENGTH

121113



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS	
	~ HRc20 500 ~ 800N/mm ²		HRc20 ~ HRc30 800 ~ 900N/mm ²		HRc30 ~ HRc40 900 ~ 1100N/mm ²		HRc30 ~ HRc40 1100 ~ 1300N/mm ²	
HARDNESS								
STRENGTH								
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	2300	100	2000	75	1500	70	1000	35
8	1800	130	1400	95	1100	80	700	45
10	1400	190	1100	150	1000	140	560	75
12	1100	230	1000	180	800	140	500	85
14	1000	230	900	180	700	140	450	85
16	900	230	700	180	560	140	350	85
18	800	230	600	180	500	140	300	85
20	700	230	560	180	500	140	300	85
22	600	280	560	210	450	180	300	105
25	560	280	500	210	400	180	230	105
28	500	260	450	200	350	160	200	105
30	450	260	400	200	300	160	200	105



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

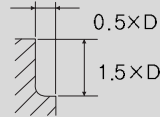
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

3&4 FLUTE, BALL LOSE ROUGHING SHORT LENGTH

127102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
HARDNESS			~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R 4.0 × 8.0	1400	105	1100	75	900	65	560	35	3100	230
R 5.0 × 10.0	1100	150	900	120	800	110	450	60	2500	250
R 6.0 × 12.0	900	180	800	140	630	110	400	70	2000	400
R 8.0 × 16.0	700	180	560	140	450	110	280	70	1600	450
R 10.0 × 20.0	560	180	450	140	400	110	220	70	1200	500
R 12.5 × 25.0	450	220	400	170	310	140	180	85	1000	450
R 16.0 × 32.0	350	210	280	160	220	130	140	85	800	500
R 20.0 × 40.0	280	200	220	150	180	120	110	80	630	450



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN.
FEED=mm/min.

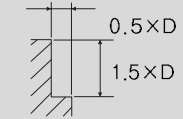
TABLE OF CUTTING CONDITION (8% Co HSS, Short Type*)

MULTI FLUTE SIDE CUTTING, ROUGHING & FINISHING, TiCN-COATED

126102, 138102, 139102, 137102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
HARDNESS			~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	2300	85	2000	65	1600	60	1000	30	6000	210
8	1800	110	1400	80	1200	65	700	40	4000	240
10	1400	155	1200	125	1000	115	600	65	3200	360
12	1200	190	1000	145	800	115	500	70	2600	420
14	1000	190	900	145	700	115	450	70	2300	440
16	900	190	700	145	600	115	350	70	2100	470
18	800	190	650	145	500	115	320	70	1800	500
20	700	190	600	145	500	115	300	70	1600	520
22	650	230	600	175	450	145	300	90	1400	500
25	600	230	500	175	400	145	230	90	1300	470
28	500	220	450	170	350	135	210	90	1200	530
30	450	220	400	170	320	135	210	90	1200	550
32	450	220	350	170	300	135	180	90	1000	520
36	400	220	320	170	250	135	150	90	900	500
40	350	210	300	155	230	125	140	85	800	470



*The FEED, in long & extra long types, should be reduced by around 50%

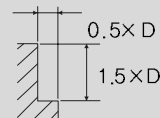
RPM=REVOLUTION PER MIN. FEED=mm/min.

MULTI FLUTE SIDE CUTTING, ROUGHING & FINISHING

126102, 138102, 139102, 137102



MATERIAL	CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		CARBON STEELS ALLOY STEELS TOOL STEELS		ALUMINUM ALUMINUM ALLOYS	
	~ 500N/mm ²		500 ~ 800N/mm ²		800 ~ 1000N/mm ²		1000 ~ 1300N/mm ²			
HARDNESS			~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc40			
STRENGTH										
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	1800	65	1600	50	1200	45	800	25	4500	160
8	1400	85	1100	60	900	50	560	30	3100	185
10	1100	120	900	95	800	90	450	50	2500	280
12	900	145	800	110	630	90	400	55	2000	320
14	800	145	700	110	560	90	350	55	1800	340
16	700	145	560	110	450	90	280	55	1600	360
18	630	145	500	110	400	90	250	55	1400	380
20	560	145	450	110	400	90	220	55	1200	400
22	500	175	450	135	350	110	220	70	1100	380
25	450	175	400	135	310	110	180	70	1000	360
28	400	170	350	130	280	105	160	70	900	410
30	350	170	310	130	250	105	160	70	900	420
32	350	170	280	130	220	105	140	70	800	400
36	310	170	250	130	200	105	120	70	700	380
40	280	160	220	120	180	95	110	65	630	360



*The FEED, in long & extra long types, should be reduced by around 50%

RPM=REVOLUTION PER MIN. FEED=mm/min.