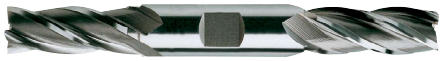
COBALT & HSS END MILLS

E2051 SERIES 8% COBALT (M42) FLAT SHANK

E1051 SERIES HSS (M2) FLAT SHANK

HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.



HSS Co8 | HSS | 4 | 30° | FLAT

P.883, 888, 892

Unit : Inch

EDP No. 8% COBALT (M42)	EDP No. HSS (M2)	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
12289	12039	1/8	3/8	3/8	3-1/16
12290	12040	9/64	3/8	7/16	3-1/8
12291	12041	5/32	3/8	7/16	3-1/8
12292	12042	11/64	3/8	1/2	3-1/4
12293	12043	3/16	3/8	1/2	3-1/4
12294	12044	13/64	3/8	9/16	3-1/4
12295	12045	7/32	3/8	9/16	3-1/4
12296	12046	15/64	3/8	5/8	3-3/8
12297	12047	1/4	3/8	5/8	3-3/8
12298	12048	17/64	3/8	11/16	3-3/8
12299	12049	9/32	3/8	11/16	3-3/8
12300	12050	19/64	3/8	3/4	3-1/2
12301	12051	5/16	3/8	3/4	3-1/2
12302	12052	21/64	3/8	3/4	3-1/2
12303	12053	11/32	3/8	3/4	3-1/2
12304	12054	23/64	3/8	3/4	3-1/2
12305	12055	3/8	3/8	3/4	3-1/2
12307	12057	25/64	1/2	1	4-1/8
12309	12059	13/32	1/2	1	4-1/8
12311	12061	27/64	1/2	1	4-1/8
12313	12063	7/16	1/2	1	4-1/8
12315	12065	29/64	1/2	1	4-1/8
12317	12067	15/32	1/2	1	4-1/8
12319	12069	31/64	1/2	1	4-1/8

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

◎ : Excellent ○ : Good

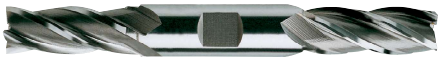
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel
~HRc20	HRc20~30	HRc30~40	HRc40~45	HRc45~55	HRc55~70							
◎	◎	○				○			○			

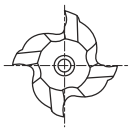
COBALT & HSS END MILLS

E2051 SERIES 8% COBALT (M42) FLAT SHANK
E1051 SERIES HSS (M2) FLAT SHANK

HSSCo8 & HSS, 4 FLUTE REGULAR LENGTH DOUBLE

▶ Series E2051 four flute end mills are the double-end version of E2031 four flute tools and are used for the same type of finishing operation. Two tools on one shank saves on sharpening set-up as well as on initial tool costs. Easy to regrind.





HSS Co8 | HSS | 4 | 30° | FLAT

P.883, 888, 892

Unit : Inch

EDP No. 8% COBALT (M42)	EDP No. HSS (M2)	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
12321	12071	1/2	1/2	1	4-1/8
12330	12080	9/16	5/8	1-3/8	5
12337	12087	5/8	5/8	1-3/8	5
12350	12100	11/16	3/4	1-5/8	5-5/8
12359	12109	3/4	3/4	1-5/8	5-5/8
12377	12127	13/16	7/8	1-7/8	6-1/8
12394	12144	7/8	7/8	1-7/8	6-1/8
12410	12160	15/16	1	1-7/8	6-3/8
12426	12176	1	1	1-7/8	6-3/8

■ The TiN coated, TiCN coated or TiAlN coated is available on your request.
■ Coating Codes for Cobalt
Uncoated EDP NO. + CN(TiN), CC(TiCN), CF(TiAlN F), CE(TiAlN E), CH(Hardslick)
■ Coating Codes for HSS
Uncoated EDP NO. + HN(TiN), HC(TiCN), HF(TiAlN F), HE(TiAlN E), HH(Hardslick)
▶ Coated Price Shown in Price List. Call for Availability.

Mill Dia. Tolerance (inch)	
0~—.0010	＊＊0~—.0020

＊＊The shank of end mills is the same diameter as the cutting portion.

◎ : Excellent ○ : Good

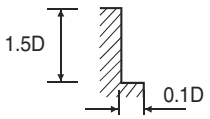
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Copper	Graphite	Cast Iron	Aluminum	Stainless Steels	Titanium	Inconel
~HRc20	HRc20~30	HRc30~40	HRc40~45	HRc45~55	HRc55~70							
◎	◎	○				○			○			

COBALT & HSS END MILLS

RECOMMENDED CUTTING CONDITIONS

HSSCo8 & HSS, MULTI FLUTE FINISH - SIDE CUTTING

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	
HARDNESS			~HRc20		HRc20~HRc30		HRc30~HRc40			
STRENGTH	~ 500N/mm²		500~800N/mm²		800~1000N/mm²		1000~1300N/mm²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	3500	4.3	3200	3.1	2500	2.4	1600	1.2	11000	15.0
1/4	1800	7.1	1600	5.7	1200	3.5	800	2.4	5600	18.5
3/8	1100	7.9	900	6.3	800	4.7	450	2.6	3100	23.6
1/2	900	8.7	800	7.1	630	4.7	400	3.0	2500	22.4
5/8	700	8.7	560	6.3	450	4.1	280	2.6	2000	20.9
3/4	630	7.9	500	6.3	400	4.1	250	2.6	1800	20.9
13/16	500	7.9	450	6.3	350	4.1	220	2.6	1400	17.7
15/16	500	7.9	450	6.3	350	4.1	220	2.6	1400	17.7
1	450	7.1	400	5.7	310	3.5	180	2.0	1200	16.5
1-1/2	310	4.7	250	3.5	200	2.4	120	1.4	900	13.0
1-3/4	280	4.7	220	3.5	150	2.4	110	1.4	800	11.8
2	280	4.7	190	3.5	110	1.8	80	1.0	630	11.8

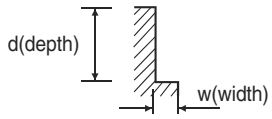


※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

HSSCo8, MULTI FLUTE 60° HELIX FINISH - SIDE CUTTING

MATERIAL		MILD STEELS		ALLOY STEELS		TOOL STEELS STAINLESS STEELS		CAST IRON	
HARDNESS		~HRc13		HRc13~HRc32		HRc25~HRc35		~HRc20	
DIAMETER	w×d	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/4	0.02 × 0.35	1840	3.6	1250	2.2	980	1.8	2050	4.8
1/4	0.08 × 0.35	1600	3.6	650	2.2	510	1.6	1100	4.5
5/8	0.02 × 1	750	2.9	460	2.0	390	1.4	840	4.1
5/8	0.18 × 1	650	2.9	400	2.0	340	1.4	730	4.1
3/4	0.02 × 1.2	520	2.5	370	1.8	300	1.4	630	4.1
3/4	0.26 × 1.2	450	2.5	320	1.8	260	1.4	550	4.1
1	0.02 × 1.6	460	2.9	290	1.8	240	1.4	510	4.3
1	0.30 × 1.6	400	2.9	250	1.8	210	1.4	440	4.3
1-1/2	0.02 × 1.6	280	2.5	170	1.4	150	1.3	320	3.6
1-1/2	0.80 × 1.6	240	2.5	150	1.4	130	1.3	280	3.6
2	0.02 × 2	220	2.2	140	1.3	115	1.1	260	2.9
2	1.60 × 2	190	2.2	120	1.3	100	1.1	225	2.9



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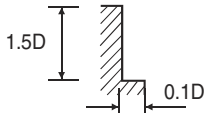
RPM = rev./min.
FEED = inch/min.

COBALT & HSS END MILLS

RECOMMENDED CUTTING CONDITIONS

HSSCo8 & HSS, 3 FLUTE FINISH TiN-COATED - SIDE CUTTING

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	
HARDNESS			~HRc20		HRc20~HRc30		HRc30~HRc40			
STRENGTH	~ 500N/mm²		500~800N/mm²		800~1000N/mm²		1000~1300N/mm²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3/32	6720	2.9	5400	1.9	4800	1.7	2640	0.7	14400	8.5
1/8	4200	3.7	3840	2.9	3000	2.2	1920	1.0	13200	13.2
1/4	2160	6.4	1920	5.2	1440	3.1	960	2.2	6720	16.6
3/8	1320	7.2	1080	5.6	960	4.2	540	2.4	3720	21.2
1/2	1080	7.8	960	6.4	756	4.2	480	2.6	3000	20.3
9/16	960	7.8	840	5.6	672	4.2	420	2.6	2640	19.0
5/8	840	7.8	672	5.6	540	3.7	336	2.4	2400	19.0
11/16	756	7.2	600	5.6	480	3.7	300	2.4	2160	19.0
7/8	600	7.2	540	5.6	420	3.7	264	2.4	1680	16.1
1	540	6.4	480	5.2	372	3.1	216	1.7	1440	15.1
1-1/8	430	5.6	420	4.4	336	2.9	192	1.4	1320	14.2



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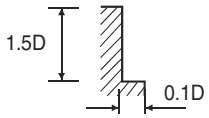
RPM = rev./min.
FEED = inch/min.

HSSCo8 & HSS, MULTI FLUTE FINISH TiN-COATED - SIDE CUTTING

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	
HARDNESS			~HRc20		HRc20~HRc30		HRc30~HRc40			
STRENGTH	~ 500N/mm²		500~800N/mm²		800~1000N/mm²		1000~1300N/mm²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	4200	5.2	3840	3.7	3000	2.9	1920	1.4	13200	18.0
1/4	2640	8.5	1920	6.8	1440	4.2	960	2.9	6720	22.2
3/8	1320	9.5	1080	7.6	960	5.6	540	3.1	3700	28.3
1/2	1080	10.4	960	8.5	756	5.6	480	3.6	3000	26.9
5/8	840	10.4	672	7.6	540	4.9	336	3.1	2400	25.1
3/4	756	9.5	600	7.6	480	4.9	300	3.1	2160	25.1
7/8	600	9.5	540	7.6	420	4.9	264	3.1	1680	21.2
15/16	600	9.5	540	7.6	420	4.9	264	3.1	1680	21.2
1	540	8.5	480	6.8	372	4.2	216	2.4	1440	19.8
1-1/2	372	5.6	300	4.2	240	2.9	144	1.7	1080	15.6
1-3/4	336	5.6	264	4.2	216	2.9	132	1.7	960	14.2
2	336	5.6	264	4.2	168	2.2	96	1.2	960	14.2



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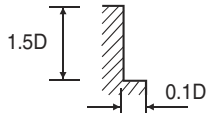
RPM = rev./min.
FEED = inch/min.

COBALT & HSS END MILLS

RECOMMENDED CUTTING CONDITIONS

HSSCo8 & HSS, 3 FLUTE FINISH TiCN-COATED - SIDE CUTTING

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	
HARDNESS			~HRc20		HRc20~HRc30		HRc30~HRc40			
STRENGTH	~ 500N/mm²		500~800N/mm²		800~1000N/mm²		1000~1300N/mm²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3/32	7280	3.1	5850	2.1	5200	1.8	2860	0.8	15600	9.2
1/8	4550	4.0	4160	3.1	3250	2.3	2080	1.0	14300	14.3
1/4	2240	6.9	2080	5.6	1560	3.4	1040	2.3	7280	17.9
5/16	1820	7.8	1430	5.1	1170	4.0	728	2.6	5200	22.5
1/2	1170	8.5	1040	6.9	819	4.6	520	2.9	3250	22.0
9/16	1040	8.5	910	6.1	728	4.6	455	2.9	2860	20.5
5/8	910	8.5	728	6.1	585	4.6	364	2.6	2600	20.5
11/16	819	7.8	650	6.1	520	4.0	325	2.6	2340	20.5
7/8	650	7.8	585	6.1	455	4.0	286	2.6	1820	17.4
1	585	6.9	520	5.6	403	3.4	234	1.8	1560	16.4
1-1/8	520	6.1	455	4.8	362	3.1	208	1.6	1430	15.3

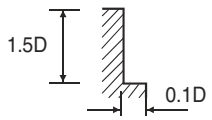


※ The Feed, in long & extra long types, should be reduced by around 50%.

RPM = rev./min.
FEED = inch/min.

HSSCo8 & HSS, MULTI FLUTE FINISH TiCN-COATED - SIDE CUTTING

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	
HARDNESS			~HRc20		HRc20~HRc30		HRc30~HRc40			
STRENGTH	~ 500N/mm²		500~800N/mm²		800~1000N/mm²		1000~1300N/mm²			
DIAMETER	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1/8	4550	5.6	4160	4.0	3250	3.1	22080	1.6	14300	19.5
1/4	2340	9.2	2090	8.4	1560	4.6	1040	3.1	7280	24.1
3/8	1430	10.3	1170	8.2	1040	6.1	585	3.4	4030	30.7
1/2	1170	11.3	1040	9.2	818	6.1	520	3.9	3250	29.1
5/8	910	11.3	728	8.2	585	5.3	364	3.4	2600	27.2
3/4	819	10.3	650	8.2	520	5.3	325	3.4	2340	27.2
7/8	650	10.3	585	8.2	455	5.3	286	3.4	1820	23.0
15/16	650	10.3	585	8.2	455	5.3	234	3.4	1820	23.0
1	585	9.2	520	8.4	403	4.6	208	2.6	1560	21.9
1-1/2	403	6.1	325	4.6	260	3.1	156	1.8	1170	16.9
1-3/4	364	6.1	286	4.6	234	3.1	143	1.8	1040	15.3
2	364	6.1	286	4.6	182	2.3	104	1.3	1040	15.3



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RPM = rev./min.
FEED = inch/min.