Carbide End Mills

MS plus End Mill Series

New Product

Tough applications require "Plus" performance.

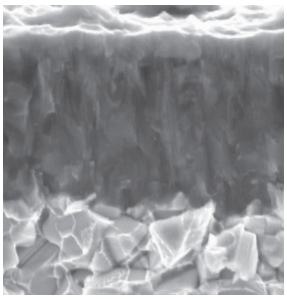
Carbide End Mills

MS plus

General purpose end mill optimized "plus" performance.

MS+ (Al,Ti,Cr)N Multilayer Coating (MS plus)

Our original coating technology enables a multilayer of (Al,Ti)N and (Al,Cr)N. It allows machining of a wide range of work materials.



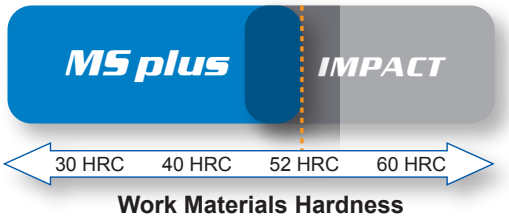
MIRACLE SIGMA

Properties of (Al,Ti,Cr)N Multilayer Coating (MS plus)

	(Al,Ti,Cr)N Multilayer	(Al,Ti)N	(Al,Cr)N
Hardness (HV)	**3200**	2800	3100
Oxidation Temperature (°F)	**2.012**	1.472	2.012
Adhesion (N)	**100**	80	80

MS plus provides long tool life on materials up to 52 HRC.

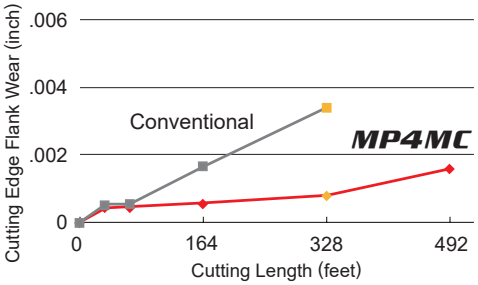
For steels harder than 52 HRC, IMPACT MIRACLE end mills are recommended. (TOOL NEWS B075)



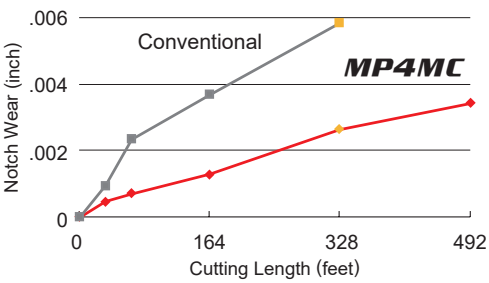
Cutting Performance

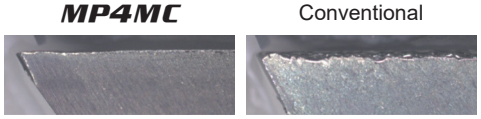
Carbon Steel AISI 1050

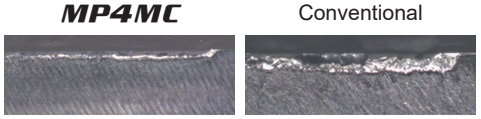
Cutting Edge Flank Wear

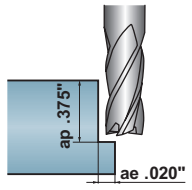


Notch Wear









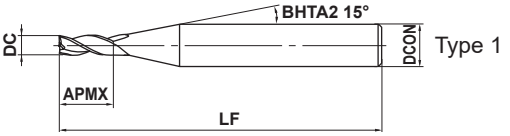
<Cutting Conditions>
Work Material : AISI 1050 (240 HB)
Tool : 4 flute end mill medium cut length DC= .3750"
Revolution : 3200 min-1
Cutting Speed : 315 SFM
Table Feed : 25.2 IPM
Depth of Cut : ae .020", ap .375"
Cutting Length : 1.181 inch
Cutting Mode : Down(Climb) Cut Air Blow
Machine : Horizontal MC (BT40)

Product Code	Shape	Size Range	Sizes	Work Material								Dimensions	Cutting Conditions
				P		H		M	S	N			
				Carbon Steel, Alloy Steel, Cast Iron	Tool Steel, Pre-hardened Steel, Hardened Steel	Hardened Steel(~55HRC)	Hardened Steel(55HRC-)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy		
Square End Mills													
NEW **MP3MC**	End mill, Medium cut length, 3 flute 	INCH DC .0312 – .5000	11	◎	◎	○		○	○			P3	P4
NEW **MP4MC**	End mill, Medium cut length, 4 flute 	INCH DC .0312 – .5000	11	◎	◎	○		○	○			P5	P6
NEW **MP4JC**	End mill, Semi long cut length, 4 flute 	INCH DC .0625 – .5000	8	◎	◎	○		○	○			P7	P8
Radius End Mills													
NEW **MP4MRB**	Corner radius, Medium cut length, 4 flute 	INCH DC .1250 – .5000	24	◎	◎	◎		○	○			P9	P10
Ball Nose End Mills													
MP2SSB	Ball nose, Short cut length, 2 flute, Short shank 	METRIC RE 0.1 – 6	16	◎	◎	◎		○	○	○		P13	P16
MP2SB	Ball nose, Short cut length, 2 flute 	METRIC RE 0.1 – 6	29	◎	◎	◎		○	○	○		P14	P16
NEW **MP2MB**	Ball nose, Medium cut length, 2 flute 	INCH RE .0156- .2500 METRIC RE 0.25 – 6	8 21	◎	◎	◎		○	○	○		P11 P15	P12 P16
MP2SDB	Ball nose, Short cut length, 2 flute, High strength 	METRIC RE 0.5 – 6	16	◎	◎	◎						P18	P19
MP2XLB	Ball nose, Short cut length, 2 flute, Long neck 	METRIC RE 0.05 – 3	232	◎	◎	◎		○	○	○		P20	P26

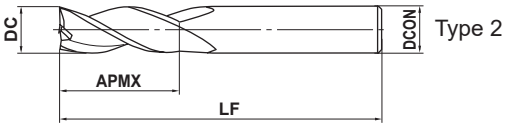
MP3MC - Inch Sizes NEW

End mill, Medium cut length, 3 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

h6

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP3MCD1/32	.0312	.0780	1.50	.1250	3	●	1
MP3MCD1/16	.0625	.1560	1.50	.1250	3	●	1
MP3MCD3/32	.0938	.2340	1.50	.1250	3	●	1
MP3MCD1/8	.1250	.3130	1.50	.1250	3	●	2
MP3MCD5/32	.1562	.3910	2.00	.2500	3	●	1
MP3MCD3/16	.1875	.4690	2.00	.2500	3	●	1
MP3MCD7/32	.2188	.5470	2.50	.2500	3	●	1
MP3MCD1/4	.2500	.6250	2.50	.2500	3	●	2
MP3MCD5/16	.3125	.7810	2.75	.3125	3	●	2
MP3MCD3/8	.3750	.9380	3.00	.3750	3	●	2
MP3MCD1/2	.5000	1.2500	3.50	.5000	3	●	2

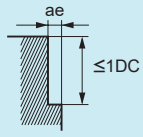
* Number of Flutes

● : **Inventory maintained.**

Recommended Cutting Conditions

Shoulder Milling

(inch)

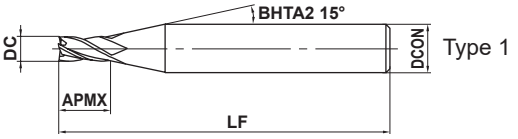
Work Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**
1/32	30000	53.1	.006	30000	53.1	.006	28000	49.6	.006	20000	35.4	.002
1/16	30000	70.9	.012	15000	35.4	.012	14000	33.1	.012	10000	23.6	.003
3/32	13400	31.7	.019	10000	23.6	.019	9400	22.2	.019	6700	15.8	.006
1/8	10000	35.4	.025	7500	26.6	.025	7000	24.8	.025	5000	17.7	.006
5/32	8000	33.1	.031	6000	24.8	.031	5600	23.1	.031	4000	16.5	.008
3/16	6700	31.7	.037	5000	23.6	.037	4700	22.2	.037	3300	15.6	.009
7/32	5700	26.9	.044	4300	20.3	.044	4000	18.9	.044	2900	13.7	.011
1/4	5000	26.6	.050	3800	20.2	.050	3500	18.6	.050	2500	13.3	.013
5/16	4000	23.6	.062	3000	17.7	.062	2800	16.5	.062	2000	11.8	.016
3/8	3300	23.4	.075	2500	17.7	.075	2300	16.3	.075	1700	12.0	.019
1/2	2500	17.7	.100	1900	13.5	.100	1800	12.8	.100	1300	9.2	.025
Depth of Cut	 DC : Dia											

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

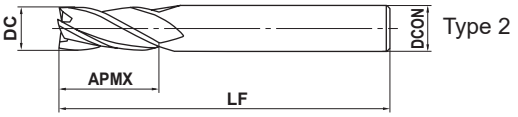
MP4MC - Inch Sizes NEW

End mill, Medium cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

h6

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP4MCD1/32	.0312	.0780	1.50	.1250	4	●	1
MP4MCD1/16	.0625	.1560	1.50	.1250	4	●	1
MP4MCD3/32	.0938	.2340	1.50	.1250	4	●	1
MP4MCD1/8	.1250	.3130	1.50	.1250	4	●	2
MP4MCD5/32	.1562	.3910	2.00	.2500	4	●	1
MP4MCD3/16	.1875	.4690	2.00	.2500	4	●	1
MP4MCD7/32	.2188	.5470	2.50	.2500	4	●	1
MP4MCD1/4	.2500	.6250	2.50	.2500	4	●	2
MP4MCD5/16	.3125	.7810	2.75	.3125	4	●	2
MP4MCD3/8	.3750	.9380	3.00	.3750	4	●	2
MP4MCD1/2	.5000	1.2500	3.50	.5000	4	●	2

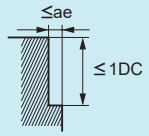
* Number of Flutes

● : **Inventory maintained.**

Recommended Cutting Conditions

Shoulder Milling

(inch)

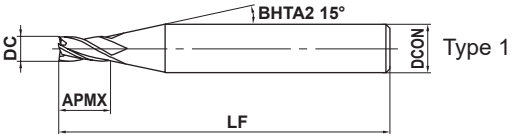
Work Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**	**n** (min-1)	**vf** (IPM)	**ae**
1/32	30000	70.9	.006	30000	70.9	.006	28000	66.1	.006	20000	47.2	.002
1/16	20100	63.3	.012	15000	47.2	.012	14000	44.1	.012	10000	31.5	.003
3/32	13400	42.2	.019	10000	31.5	.019	9400	29.6	.019	6700	21.1	.005
1/8	10000	47.2	.025	7500	35.4	.025	7000	33.1	.025	5000	23.6	.006
5/32	8000	44.1	.031	6000	33.1	.031	5600	30.9	.031	4000	22.0	.008
3/16	6700	42.2	.037	5000	31.5	.037	4700	29.6	.037	3300	20.8	.009
7/32	5700	35.9	.044	4300	27.1	.044	4000	25.2	.044	2900	18.3	.011
1/4	5000	35.4	.050	3800	26.9	.050	3500	24.8	.050	2500	17.7	.013
5/16	4000	31.5	.062	3000	23.6	.062	2800	22.0	.062	2000	15.7	.016
3/8	3300	31.2	.075	2500	23.6	.075	2300	21.7	.075	1700	16.1	.019
1/2	2500	23.6	.100	1900	18.0	.100	1800	17.0	.100	1300	12.3	.025
Depth of Cut	 DC : Dia											

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

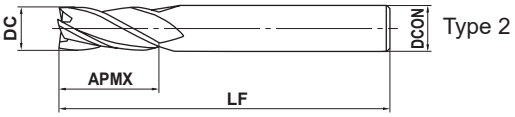
MP4JC - Inch Sizes NEW

End mill, Semi long cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	○		○	○		



Type 1



Type 2

h6

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP4JCD1/16	.0625	.2500	1.50	.1250	4	●	1
MP4JCD3/32	.0938	.3750	1.50	.1250	4	●	1
MP4JCD1/8	.1250	.5000	2.00	.1250	4	●	2
MP4JCD3/16	.1875	.7500	2.50	.2500	4	●	1
MP4JCD1/4	.2500	1.0000	2.50	.2500	4	●	2
MP4JCD5/16	.3125	1.2500	2.75	.3125	4	●	2
MP4JCD3/8	.3750	1.5000	3.50	.3750	4	●	2
MP4JCD1/2	.5000	2.0000	4.50	.5000	4	●	2

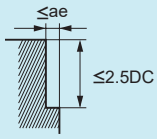
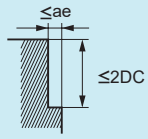
* Number of Flutes

● : **Inventory maintained.**

Recommended Cutting Conditions

Shoulder Milling

(inch)

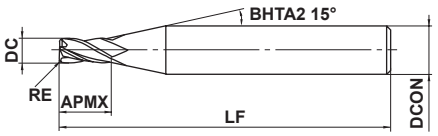
Work Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**
1/16	18100	39.9	.012	14000	30.9	.012	12000	26.5	.012	10000	22.0	.0010
3/32	12000	26.5	.019	9400	20.7	.019	8000	17.6	.019	6700	14.8	.0020
1/8	9000	29.8	.025	7000	23.1	.025	6000	19.8	.025	5000	16.5	.0030
3/16	6000	26.5	.037	4700	20.7	.037	4000	17.6	.037	3300	14.6	.0040
1/4	4500	22.7	.050	3500	17.6	.050	3000	15.1	.050	2500	12.6	.0050
5/16	3600	19.8	.062	2800	15.4	.062	2400	13.2	.062	2000	11.0	.0060
3/8	3000	19.8	.075	2300	15.2	.075	2000	13.2	.075	1700	11.3	.0080
1/2	2300	15.2	.100	1800	11.9	.100	1500	9.9	.100	1300	8.6	.0100
Depth of Cut										 DC : Dia		

(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

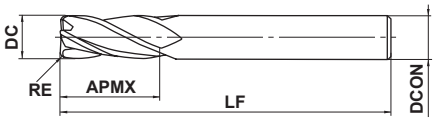
MP4MRB - Inch Sizes NEW

Corner radius, Medium cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○		



Type 1



Type 2

h6

DC<.5000"	DC=.5000"		
0 - .0008"	0 - .0012"		
DCON=.1250"	.250"≤DCON≤.375"	DCON=.500"	
0 - .00024"	0 - .00035"	0 - .00043"	

(inch)

Order Number	DC	RE	APMX	LF	DCON	* No.F	Stock	Type
MP4MRBD1/8R010	.1250	.0100	.3130	1.50	.1250	4	●	2
MP4MRBD1/8R015	.1250	.0150	.3130	1.50	.1250	4	●	2
MP4MRBD1/8R020	.1250	.0200	.3130	1.50	.1250	4	●	2
MP4MRBD3/16R010	.1875	.0100	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R015	.1875	.0150	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R020	.1875	.0200	.4690	2.00	.2500	4	●	1
MP4MRBD3/16R030	.1875	.0300	.4690	2.00	.2500	4	●	1
MP4MRBD1/4R010	.2500	.0100	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R015	.2500	.0150	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R020	.2500	.0200	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R030	.2500	.0300	.6250	2.50	.2500	4	●	2
MP4MRBD1/4R045	.2500	.0450	.6250	2.50	.2500	4	●	2
MP4MRBD5/16R015	.3125	.0150	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R020	.3125	.0200	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R030	.3125	.0300	.7810	2.75	.3125	4	●	2
MP4MRBD5/16R045	.3125	.0450	.7810	2.75	.3125	4	●	2
MP4MRBD3/8R015	.3750	.0150	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R020	.3750	.0200	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R030	.3750	.0300	.9380	3.00	.3750	4	●	2
MP4MRBD3/8R045	.3750	.0450	.9380	3.00	.3750	4	●	2
MP4MRBD1/2R015	.5000	.0150	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R020	.5000	.0200	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R030	.5000	.0300	1.2500	3.50	.5000	4	●	2
MP4MRBD1/2R045	.5000	.0450	1.2500	3.50	.5000	4	●	2

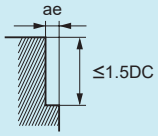
* Number of Flutes

● : **Inventory maintained.**

Recommended Cutting Conditions

Shoulder Milling

(inch)

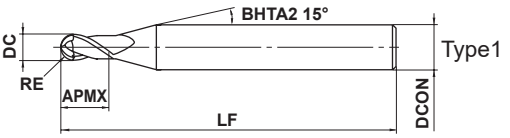
Work Material	Carbon Steel,Alloy Steel (≤280HB) Mild Steel			Carbon Steel,Alloy Steel (>280HB) Alloy Tool Steel Pre-hardened Steel			Austenitic Stainless Steels Titanium Alloys			Hardened Steel (40-55HRC)		
DC	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**	**n** (min^{-1})	**vf** (IPM)	**ae**
1/8	10000	47.2	.025	7500	8.9	.025	7000	8.3	.025	5000	5.9	.006
3/16	6700	42.2	.037	5000	7.9	.037	4700	7.4	.037	3300	5.2	.009
1/4	5000	35.4	.050	3800	6.7	.050	3500	6.2	.050	2500	4.4	.013
5/16	4000	31.5	.062	3000	5.9	.062	2800	5.5	.062	2000	3.9	.016
3/8	3300	31.2	.075	2500	5.9	.075	2300	5.4	.075	1700	4.0	.019
1/2	2500	23.6	.100	1900	4.5	.100	1800	4.3	.100	1300	3.1	.025
Depth of Cut	 DC : Dia											

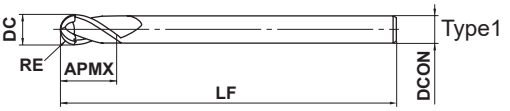
(Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is especially effective.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.

MP2MB - Inch Sizes NEW

Ball nose, Medium cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





R	.0312"≤DCON≤.5000"		
	±.0002"		
h5	DCON=.125"	.250"≤DCON≤.375"	DCON=.500"
	0 - .00020"	0 - .00024"	0 - .00031"

● 2 flute ball nose end mills with medium cutting edge length for general purpose. Excellent performance for a wide range of work materials such as carbon steel, alloy steel and hardened steel.

(inch)

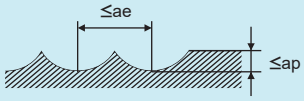
Order Number	RE	DC	APMX	LF	DCON	* No.F	Stock	Type
MP2MBD1/32	.0156	.0312	.0630	1.50	.1250	2	●	1
MP2MBD1/16	.0312	.0625	.1250	1.50	.1250	2	●	1
MP2MBD1/8	.0625	.1250	.2500	1.50	.1250	2	●	2
MP2MBD3/16	.0938	.1875	.3750	2.00	.2500	2	●	1
MP2MBD1/4	.1250	.2500	.5000	2.50	.2500	2	●	2
MP2MBD5/16	.1562	.3125	.6250	3.25	.3125	2	●	2
MP2MBD3/8	.1875	.3750	.7500	3.50	.3750	2	●	2
MP2MBD1/2	.2500	.5000	1.0000	4.00	.5000	2	●	2

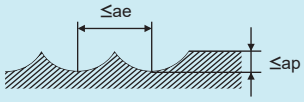
* Number of Flutes

● : **Inventory maintained.**

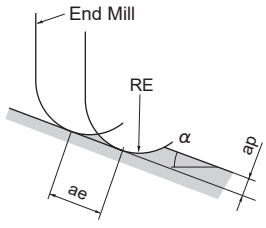
Recommended Cutting Conditions

(inch)

Work Material		Mild Steel, Carbon Steel (180-280HB) Alloy Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel (<450HB)						Austenitic Stainless Steels (≤200HB) Titanium Alloys					
DC	RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
		n (min-1)	vf (IPM)	n (min-1)	vf (IPM)			n (min-1)	vf (IPM)	n (min-1)	vf (IPM)		
1/32	0.397	40000	189.0	40000	189.0	.002	.003	40000	157.5	40000	74.8	.002	.003
1/16	0.794	40000	255.9	40000	255.9	.004	.006	40000	255.9	32000	126.0	.004	.006
1/8	1.588	40000	295.3	40000	295.3	.005	.012	32000	236.2	22000	133.9	.005	.012
3/16	2.381	25000	236.2	25000	236.2	.008	.020	20000	212.6	13000	90.6	.008	.020
1/4	3.175	21000	228.3	21000	228.3	.010	.024	17000	185.0	10000	78.7	.010	.024
5/16	3.969	16000	177.2	16000	177.2	.012	.032	13000	141.7	8000	59.1	.012	.032
3/8	4.763	13000	141.7	13000	141.7	.020	.039	10000	114.2	6400	47.2	.020	.039
1/2	6.35	9000	98.4	9000	98.4	.020	.047	8500	90.6	5300	43.3	.020	.047
Depth of Cut													

Work Material		Hardened Steel (40-55HRC)						Copper, Copper Alloys					
DC	RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
		n (min-1)	vf (IPM)	n (min-1)	vf (IPM)			n (min-1)	vf (IPM)	n (min-1)	vf (IPM)		
1/32	.397	40000	126.0	40000	59.8	.002	.003	40000	189.0	40000	189.0	.002	.003
1/16	.794	40000	204.7	32000	100.8	.004	.006	40000	255.9	40000	255.9	.004	.006
1/8	1.588	32000	189.0	22000	107.1	.005	.012	40000	295.3	40000	295.3	.005	.012
3/16	2.381	20000	170.1	13000	72.5	.008	.020	25000	236.2	25000	236.2	.008	.020
1/4	3.175	17000	148.0	10000	63.0	.010	.024	21000	228.3	21000	228.3	.010	.024
5/16	3.969	13000	113.4	8000	47.3	.012	.032	16000	177.2	16000	177.2	.012	.032
3/8	4.763	10000	91.4	6400	37.8	.020	.039	13000	141.7	13000	141.7	.020	.039
1/2	6.35	8500	72.5	5300	34.6	.020	.047	9000	98.4	9000	98.4	.020	.047
Depth of Cut													

(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) If the rigidity of the work materials installation is very low, or chattering and noise are generated, reduce the revolution and the feed rate proportionately.

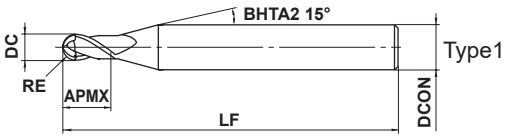


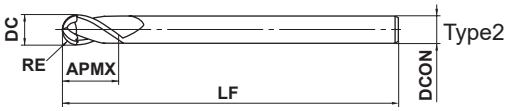
ae = Pick Feed

MP2SSB

Ball nose, Short cut length, 2 flute, Short shank

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





R					
	0.1≤RE≤6				
	±0.005				
h5	4≤DCON≤6	8≤DCON≤10	DCON=12		
	0 - 0.005	0 - 0.006	0 - 0.008		

(mm)

Order Number	RE	DC	APMX	LF	DCON	* No.F	Stock	Type
MP2SSBR0010	0.1	0.2	0.2	40	4	2	●	1
MP2SSBR0020	0.2	0.4	0.4	40	4	2	●	1
MP2SSBR0030	0.3	0.6	0.6	40	4	2	●	1
MP2SSBR0040	0.4	0.8	0.8	40	4	2	●	1
MP2SSBR0050	0.5	1	1	40	4	2	●	1
MP2SSBR0050S06	0.5	1	1	40	6	2	●	1
MP2SSBR0075	0.75	1.5	1.5	40	4	2	●	1
MP2SSBR0075S06	0.75	1.5	1.5	40	6	2	●	1
MP2SSBR0100	1	2	2	45	6	2	●	1
MP2SSBR0150	1.5	3	3	45	6	2	●	1
MP2SSBR0200	2	4	4	45	6	2	●	1
MP2SSBR0250	2.5	5	5	50	6	2	●	1
MP2SSBR0300	3	6	6	50	6	2	●	2
MP2SSBR0400	4	8	8	60	8	2	●	2
MP2SSBR0500	5	10	10	70	10	2	●	2
MP2SSBR0600	6	12	12	75	12	2	●	2

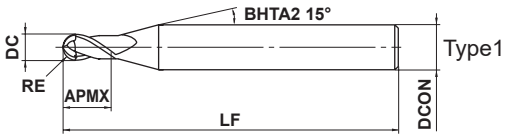
* Number of Flutes

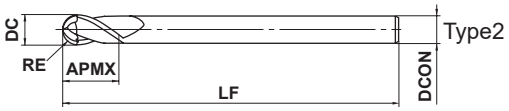
● : **Inventory maintained.**

MP2SB

Ball nose, Short cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





R					
	0.1≤RE≤6				
	±0.005				
h5	4≤DCON≤6	8≤DCON≤10	DCON=12		
	0 - 0.005	0 - 0.006	0 - 0.008		

(mm)

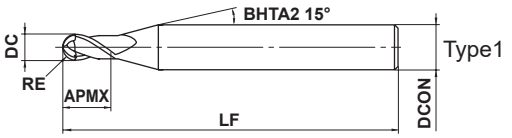
Order Number	RE	DC	APMX	LF	DCON	* No.F	Stock	Type
MP2SBR0010	0.1	0.2	0.3	45	4	2	●	1
MP2SBR0015	0.15	0.3	0.5	45	4	2	●	1
MP2SBR0020	0.2	0.4	0.6	45	4	2	●	1
MP2SBR0020S06	0.2	0.4	0.6	50	6	2	●	1
MP2SBR0025	0.25	0.5	0.8	45	4	2	●	1
MP2SBR0030	0.3	0.6	0.9	45	4	2	●	1
MP2SBR0030S06	0.3	0.6	0.9	50	6	2	●	1
MP2SBR0035	0.35	0.7	1.1	45	4	2	●	1
MP2SBR0040	0.4	0.8	1.2	45	4	2	●	1
MP2SBR0040S06	0.4	0.8	1.2	50	6	2	●	1
MP2SBR0045	0.45	0.9	1.4	45	4	2	●	1
MP2SBR0050	0.5	1	1.5	45	4	2	●	1
MP2SBR0050S06	0.5	1	1.5	50	6	2	●	1
MP2SBR0060	0.6	1.2	1.8	45	4	2	●	1
MP2SBR0070	0.7	1.4	2.1	45	4	2	●	1
MP2SBR0075	0.75	1.5	2.3	45	4	2	●	1
MP2SBR0075S06	0.75	1.5	2.3	50	6	2	●	1
MP2SBR0080	0.8	1.6	2.4	45	4	2	●	1
MP2SBR0090	0.9	1.8	2.7	45	4	2	●	1
MP2SBR0100	1	2	3	50	4	2	●	1
MP2SBR0100S06	1	2	3	50	6	2	●	1
MP2SBR0125	1.25	2.5	3.8	50	4	2	●	1
MP2SBR0150	1.5	3	4.5	70	6	2	●	1
MP2SBR0200	2	4	6	70	6	2	●	1
MP2SBR0250	2.5	5	7.5	80	6	2	●	1
MP2SBR0300	3	6	9	80	6	2	●	2
MP2SBR0400	4	8	12	90	8	2	●	2
MP2SBR0500	5	10	15	100	10	2	●	2
MP2SBR0600	6	12	18	110	12	2	●	2

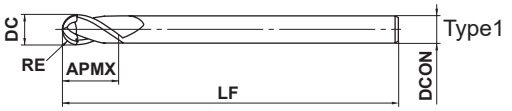
* Number of Flutes

MP2MB

Ball nose, Medium cut length, 2 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	





R					
	0.25≤RE≤6				
	±0.005				
h5	4≤DCON≤6	8≤DCON≤10	DCON=12		
	0 - 0.005	0 - 0.006	0 - 0.008		

(mm)

Order Number	RE	DC	APMX	LF	DCON	* No.F	Stock	Type
MP2MBR0025	0.25	0.5	1	45	4	2	●	1
MP2MBR0030	0.3	0.6	1.2	45	4	2	●	1
MP2MBR0040	0.4	0.8	1.6	45	4	2	●	1
MP2MBR0050	0.5	1	2.5	45	4	2	●	1
MP2MBR0060	0.6	1.2	2.5	45	4	2	●	1
MP2MBR0070	0.7	1.4	3	45	4	2	●	1
MP2MBR0075	0.75	1.5	4	45	4	2	●	1
MP2MBR0080	0.8	1.6	4	45	4	2	●	1
MP2MBR0090	0.9	1.8	5	45	4	2	●	1
MP2MBR0100	1	2	6	50	4	2	●	1
MP2MBR0125	1.25	2.5	6	50	4	2	●	1
MP2MBR0150S03	1.5	3	8	70	3	2	●	2
MP2MBR0150	1.5	3	8	70	6	2	●	1
MP2MBR0175	1.75	3.5	8	70	6	2	●	1
MP2MBR0200S04	2	4	8	70	4	2	●	2
MP2MBR0200	2	4	8	70	6	2	●	1
MP2MBR0250	2.5	5	12	80	6	2	●	1
MP2MBR0300	3	6	12	80	6	2	●	2
MP2MBR0400	4	8	14	90	8	2	●	2
MP2MBR0500	5	10	18	100	10	2	●	2
MP2MBR0600	6	12	22	110	12	2	●	2

* Number of Flutes

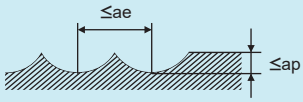
● : **Inventory maintained.**

Ball nose, Short cut length, 2 flute, Short shank **MP2SSB**

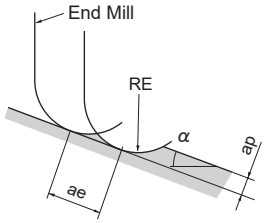
Ball nose, Short cut length, 2 flute **MP2SB** Ball nose, Medium cut length, 2 flute **MP2MB**

Recommended Cutting Conditions

(mm)

Work Material	Mild Steel,Carbon Steel (180—280HB), Alloy Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel (<450HB)						Austenitic Stainless Steels (≤200HB) Titanium Alloys					
RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
	n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)			n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)		
R0.1	40000	300	40000	250	0.003	0.02	40000	300	40000	250	0.003	0.02
R0.15	40000	500	40000	350	0.007	0.03	40000	500	40000	350	0.007	0.03
R0.2	40000	1600	40000	1200	0.02	0.04	40000	1500	40000	1000	0.015	0.04
R0.25	40000	2400	40000	1400	0.025	0.05	40000	2100	40000	1200	0.02	0.05
R0.3	40000	3200	40000	1600	0.03	0.06	40000	2800	40000	1400	0.03	0.06
R0.4	40000	4800	40000	2400	0.05	0.08	40000	4600	40000	2100	0.04	0.08
R0.5	40000	5600	40000	3200	0.06	0.1	40000	5600	40000	3400	0.05	0.1
R0.75	40000	6500	40000	4000	0.09	0.15	40000	6500	36000	3600	0.08	0.15
R1	40000	6500	39000	4700	0.11	0.2	40000	6500	35000	4000	0.11	0.2
R1.25	40000	7000	33000	4500	0.12	0.25	40000	7400	29000	4000	0.12	0.25
R1.5	40000	7500	27000	4300	0.13	0.3	36000	6900	24000	3900	0.13	0.3
R2	32000	7500	20000	3600	0.15	0.4	28000	6900	18000	3100	0.15	0.4
R2.5	25000	6000	16000	2900	0.2	0.5	22000	6200	14000	2600	0.2	0.5
R3	21000	5800	13000	2600	0.25	0.6	18000	5400	11000	2300	0.25	0.6
R4	16000	4500	10000	2000	0.3	0.8	14000	4100	9000	1700	0.3	0.8
R5	13000	3600	8000	1700	0.5	1.0	11000	3300	7200	1300	0.5	1.0
R6	9000	2500	6000	1300	0.5	1.2	8100	2300	5400	1100	0.5	1.2
Depth of Cut												

(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
(Note 3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.



ae = Pick Feed

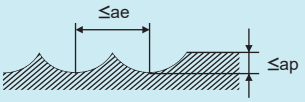
MS plus End Mill Series

Ball nose, Short cut length, 2 flute, Short shank **MP2SSB**

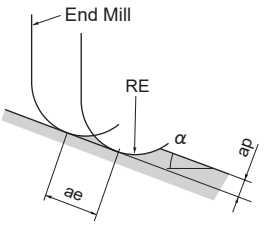
Ball nose, Short cut length, 2 flute **MP2SB** Ball nose, Medium cut length, 2 flute **MP2MB**

Recommended Cutting Conditions

(mm)

Work Material	Hardened Steel (45－55HRC)						Copper, Copper Alloys					
RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
	n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)			n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)		
R0.1	40000	300	40000	250	0.003	0.02	40000	300	40000	250	0.003	0.02
R0.15	40000	500	40000	350	0.007	0.03	40000	500	40000	350	0.007	0.03
R0.2	40000	1300	40000	950	0.015	0.04	40000	1300	40000	950	0.015	0.04
R0.25	40000	1900	40000	1100	0.02	0.05	40000	1900	40000	1100	0.02	0.05
R0.3	40000	2500	40000	1300	0.025	0.06	40000	2500	40000	1300	0.025	0.06
R0.4	40000	4000	40000	1900	0.04	0.08	40000	4000	40000	1900	0.04	0.08
R0.5	40000	5600	40000	3000	0.05	0.1	40000	5600	40000	3000	0.05	0.1
R0.75	40000	6500	32000	3200	0.08	0.15	40000	6500	32000	3200	0.08	0.15
R1	40000	6500	31000	3500	0.11	0.2	40000	6500	31000	3500	0.11	0.2
R1.25	36000	6500	26000	3500	0.12	0.25	36000	6500	26000	3500	0.12	0.25
R1.5	32000	6000	22000	3400	0.13	0.3	32000	6000	22000	3400	0.13	0.3
R2	25000	6000	16000	2700	0.15	0.4	25000	6000	16000	2700	0.15	0.6
R2.5	20000	5400	13000	2300	0.2	0.5	20000	5400	13000	2300	0.2	0.8
R3	17000	4700	10000	2000	0.25	0.6	17000	4700	10000	2000	0.25	0.9
R4	13000	3600	8000	1500	0.3	0.8	13000	3600	8000	1500	0.3	1.6
R5	10000	2900	6400	1200	0.5	1.0	10000	2900	6400	1200	0.5	2.0
R6	7200	2000	4800	1000	0.5	1.2	8500	2300	5300	1100	0.5	2.4
Depth of Cut												

(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
(Note 3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

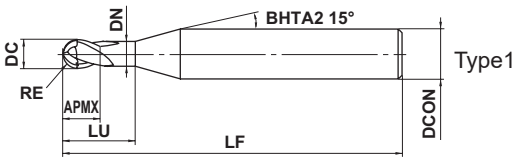


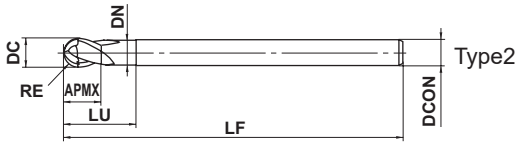
ae = Pick Feed

MP2SDB

Ball nose, Short cut length, 2 flute, High strength

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎					





R					
	0.5≤RE≤6				
	±0.01				
h5	4≤DCON≤6	DCON=8			
	0 - 0.005	0 - 0.006			
h6	DCON=10	DCON=12			
	0 - 0.009	0 - 0.011			

(mm)

Order Number	RE	DC	APMX	LU	DN	LF	DCON	* No.F	Stock	Type
MP2SDBR0050	0.5	1	1	2	0.96	50	4	2	●	1
MP2SDBR0075S06	0.75	1.5	1.5	3	1.46	50	6	2	●	1
MP2SDBR0100	1	2	2	4	1.90	50	4	2	●	1
MP2SDBR0100S06	1	2	2	4	1.90	60	6	2	●	1
MP2SDBR0150	1.5	3	3	6	2.90	70	6	2	●	1
MP2SDBR0200	2	4	4	8	3.90	60	4	2	●	2
MP2SDBR0200S06	2	4	4	8	3.90	70	6	2	●	1
MP2SDBR0250	2.5	5	5	10	4.90	80	6	2	●	1
MP2SDBR0300	3	6	12	18	5.85	80	6	2	●	2
MP2SDBR0300A120	3	6	12	18	5.85	120	6	2	●	2
MP2SDBR0400	4	8	14	24	7.85	90	8	2	●	2
MP2SDBR0400A130	4	8	14	24	7.85	130	8	2	●	2
MP2SDBR0500	5	10	18	30	9.70	100	10	2	●	2
MP2SDBR0500A140	5	10	18	30	9.70	140	10	2	●	2
MP2SDBR0600	6	12	22	36	11.70	110	12	2	●	2
MP2SDBR0600A140	6	12	22	36	11.70	140	12	2	●	2

* Number of Flutes

● : **Inventory maintained.**

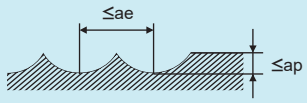
MP2SDB

Ball nose, Short cut length, 2 flute, High strength

Recommended Cutting Conditions

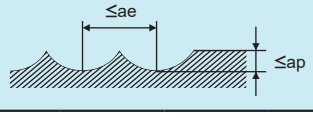
Overhang Below DC x 5 (DC : Dia.)

(mm)

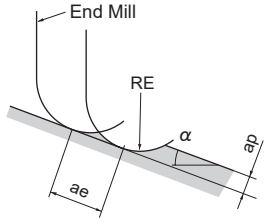
Work Material	Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Tool Steel, Pre-hardened Steel						Hardened Steel (45–55HRC)					
RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
	n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)			n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)		
R 0.5	40000	3900	36000	2100	0.1	0.25	40000	4300	36000	2200	0.1	0.25
R 0.75	40000	4200	36000	2600	0.15	0.35	40000	4700	36000	2700	0.15	0.35
R 1	40000	4500	36000	3100	0.2	0.5	40000	5000	36000	3300	0.2	0.5
R 1.5	37000	5300	24000	2700	0.3	0.75	37000	5800	24000	2800	0.3	0.75
R 2X4	24000	3200	15000	2000	0.25	0.7	19000	2800	13000	1600	0.25	0.7
R 2	30000	4900	19000	2500	0.4	1	28000	5000	19000	2400	0.4	1
R 2.5	25000	4500	16000	2300	0.5	1.3	22000	4200	16000	2200	0.5	1.25
R 3	22000	4300	14000	2200	0.6	1.8	18000	3800	12000	1800	0.6	1.5
R 4	19000	3900	12000	2000	0.8	2.4	15000	3200	9500	1600	0.8	2
R 5	15000	3300	9500	1800	1	3	11000	2500	7000	1400	1	2.5
R 6	12000	2550	8000	1600	1.2	3.6	9000	2000	6000	1300	1.2	3
Depth of Cut												

Overhang Below DC x 7 (DC : Dia.)

(mm)

Work Material	Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Tool Steel, Pre-hardened Steel						Hardened Steel (45–55HRC)					
RE	α≤15°		α>15°		ap	ae	α≤15°		α>15°		ap	ae
	n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)			n (min-1)	vf (mm/min)	n (min-1)	vf (mm/min)		
R 3	10000	1500	6900	1000	0.2	1	8000	1400	5300	770	0.2	0.8
R 4	8000	1400	5600	900	0.3	1.5	6400	1300	4000	650	0.3	1.2
R 5	6000	1200	4100	740	0.4	2	4800	1100	3200	580	0.4	1.6
R 6	5000	1000	3400	600	0.45	2.4	4000	900	2700	490	0.45	2
Depth of Cut												

(Note 1) α is the inclination angle of the machined surface.
(Note 2) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.



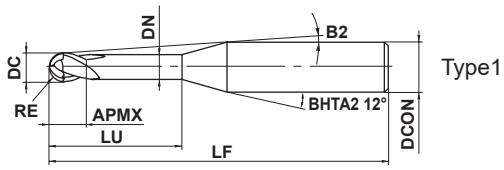
ae = Pick Feed

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

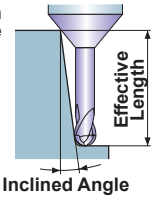
UWC MS+ 30°

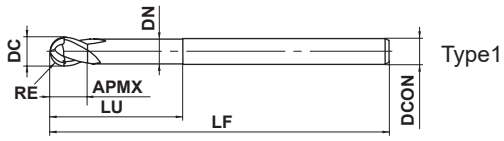
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		○	○	○	



Type1

Effective Length for Inclined Angle





Type1

R				
	0.05≤RE≤3			
	±0.005			
h5	4≤DCON≤6			
	0 - 0.005			

(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0005N003	0.05	0.1	0.08	0.3	0.085	11.6°	50	4	2	●	1	0.3	0.3	0.4	0.4
MP2XLBR0005N005	0.05	0.1	0.08	0.5	0.085	11.4°	50	4	2	●	1	0.5	0.5	0.6	0.7
MP2XLBR0010N005	0.1	0.2	0.15	0.5	0.18	11.5°	50	4	2	●	1	0.5	0.5	0.6	0.7
MP2XLBR0010N008	0.1	0.2	0.15	0.75	0.18	11.2°	50	4	2	●	1	0.8	0.8	0.9	1.0
MP2XLBR0010N010	0.1	0.2	0.15	1	0.18	10.9°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0010N013	0.1	0.2	0.15	1.25	0.18	10.6°	50	4	2	●	1	1.3	1.4	1.5	1.7
MP2XLBR0010N015	0.1	0.2	0.15	1.5	0.18	10.4°	50	4	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0010N018	0.1	0.2	0.15	1.75	0.18	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
MP2XLBR0010N020	0.1	0.2	0.15	2	0.18	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0010N025	0.1	0.2	0.15	2.5	0.18	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0015N005	0.15	0.3	0.24	0.5	0.28	11.5°	50	4	2	●	1	0.5	0.5	0.6	0.6
MP2XLBR0015N008	0.15	0.3	0.24	0.75	0.28	11.2°	50	4	2	●	1	0.8	0.8	0.9	1.0
MP2XLBR0015N010	0.15	0.3	0.24	1	0.28	10.9°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0015N010S06	0.15	0.3	0.24	1	0.28	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0015N013	0.15	0.3	0.24	1.25	0.28	10.7°	50	4	2	●	1	1.3	1.4	1.5	1.6
MP2XLBR0015N013S06	0.15	0.3	0.24	1.25	0.28	11.1°	50	6	2	●	1	1.3	1.4	1.5	1.6
MP2XLBR0015N015	0.15	0.3	0.24	1.5	0.28	10.4°	50	4	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0015N015S06	0.15	0.3	0.24	1.5	0.28	10.9°	50	6	2	●	1	1.6	1.6	1.8	2.0
MP2XLBR0015N018	0.15	0.3	0.24	1.75	0.28	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
MP2XLBR0015N020	0.15	0.3	0.24	2	0.28	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0015N025	0.15	0.3	0.24	2.5	0.28	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0015N030	0.15	0.3	0.24	3	0.28	9.1°	50	4	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0015N035	0.15	0.3	0.24	3.5	0.28	8.7°	50	4	2	●	1	3.7	3.8	4.2	4.6
MP2XLBR0015N040	0.15	0.3	0.24	4	0.28	8.4°	50	4	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0020N005	0.2	0.4	0.3	0.5	0.37	11.6°	50	4	2	●	1	0.5	0.5	0.5	0.6
MP2XLBR0020N008	0.2	0.4	0.3	0.75	0.37	11.3°	50	4	2	●	1	0.7	0.8	0.9	0.9
MP2XLBR0020N010	0.2	0.4	0.3	1	0.37	11°	50	4	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0020N010S06	0.2	0.4	0.3	1	0.37	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
MP2XLBR0020N015	0.2	0.4	0.3	1.5	0.37	10.4°	50	4	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0020N020	0.2	0.4	0.3	2	0.37	9.9°	50	4	2	●	1	2.1	2.2	2.3	2.6

* Number of Flutes

● : **Inventory maintained.**

MP2XLB

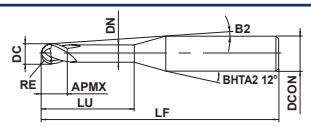
Ball nose, Short cut length, 2 flute, Long neck

(mm)

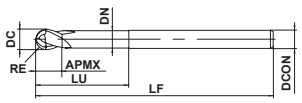
Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0020N020S06	0.2	0.4	0.3	2	0.37	10.6°	50	6	2	●	1	2.1	2.2	2.3	2.6
MP2XLBR0020N025	0.2	0.4	0.3	2.5	0.37	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.3
MP2XLBR0020N030	0.2	0.4	0.3	3	0.37	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0020N035	0.2	0.4	0.3	3.5	0.37	8.7°	50	4	2	●	1	3.6	3.8	4.1	4.6
MP2XLBR0020N040	0.2	0.4	0.3	4	0.37	8.4°	50	4	2	●	1	4.2	4.3	4.7	5.2
MP2XLBR0020N045	0.2	0.4	0.3	4.5	0.37	8°	50	4	2	●	1	4.7	4.9	5.3	5.9
MP2XLBR0020N050	0.2	0.4	0.3	5	0.37	7.7°	50	4	2	●	1	5.2	5.4	5.9	6.6
MP2XLBR0020N055	0.2	0.4	0.3	5.5	0.37	7.5°	50	4	2	●	1	5.7	6.0	6.5	7.2
MP2XLBR0020N060	0.2	0.4	0.3	6	0.37	7.2°	50	4	2	●	1	6.2	6.5	7.1	7.9
MP2XLBR0025N010	0.25	0.5	0.37	1	0.47	11°	50	4	2	●	1	1.0	1.0	1.1	1.2
MP2XLBR0025N015	0.25	0.5	0.37	1.5	0.47	10.4°	50	4	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0025N015S06	0.25	0.5	0.37	1.5	0.47	11°	50	6	2	●	1	1.5	1.6	1.7	1.9
MP2XLBR0025N020	0.25	0.5	0.37	2	0.47	9.9°	50	4	2	●	1	2.1	2.1	2.3	2.6
MP2XLBR0025N020S06	0.25	0.5	0.37	2	0.47	10.6°	50	6	2	●	1	2.1	2.1	2.3	2.6
MP2XLBR0025N025	0.25	0.5	0.37	2.5	0.47	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.2
MP2XLBR0025N025S06	0.25	0.5	0.37	2.5	0.47	10.3°	50	6	2	●	1	2.6	2.7	2.9	3.2
MP2XLBR0025N030	0.25	0.5	0.37	3	0.47	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0025N030S06	0.25	0.5	0.37	3	0.47	10°	50	6	2	●	1	3.1	3.2	3.5	3.9
MP2XLBR0025N035	0.25	0.5	0.37	3.5	0.47	8.7°	50	4	2	●	1	3.6	3.8	4.1	4.6
MP2XLBR0025N040	0.25	0.5	0.37	4	0.47	8.3°	50	4	2	●	1	4.1	4.3	4.7	5.2
MP2XLBR0025N045	0.25	0.5	0.37	4.5	0.47	8°	50	4	2	●	1	4.7	4.9	5.3	5.9
MP2XLBR0025N050	0.25	0.5	0.37	5	0.47	7.7°	50	4	2	●	1	5.2	5.4	5.9	6.6
MP2XLBR0025N055	0.25	0.5	0.37	5.5	0.47	7.4°	50	4	2	●	1	5.7	6.0	6.5	7.2
MP2XLBR0025N060	0.25	0.5	0.37	6	0.47	7.2°	50	4	2	●	1	6.2	6.5	7.1	7.9
MP2XLBR0025N070	0.25	0.5	0.37	7	0.47	6.7°	50	4	2	●	1	7.3	7.6	8.3	9.2
MP2XLBR0025N080	0.25	0.5	0.37	8	0.47	6.3°	50	4	2	●	1	8.3	8.7	9.5	10.5
MP2XLBR0025N090	0.25	0.5	0.37	9	0.47	5.9°	50	4	2	●	1	9.4	9.8	10.7	11.9
MP2XLBR0025N100	0.25	0.5	0.37	10	0.47	5.6°	50	4	2	●	1	10.4	10.9	11.9	13.2
MP2XLBR0030N015	0.3	0.6	0.45	1.5	0.57	10.4°	50	4	2	●	1	1.5	1.6	1.8	2.0
MP2XLBR0030N015S06	0.3	0.6	0.45	1.5	0.57	11°	50	6	2	●	1	1.5	1.6	1.8	2.0
MP2XLBR0030N020	0.3	0.6	0.45	2	0.57	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0030N020S06	0.3	0.6	0.45	2	0.57	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0030N025	0.3	0.6	0.45	2.5	0.57	9.4°	50	4	2	●	1	2.6	2.7	3.0	3.3
MP2XLBR0030N030	0.3	0.6	0.45	3	0.57	9°	50	4	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0030N030S06	0.3	0.6	0.45	3	0.57	9.9°	50	6	2	●	1	3.1	3.3	3.6	4.0
MP2XLBR0030N035	0.3	0.6	0.45	3.5	0.57	8.6°	50	4	2	●	1	3.7	3.8	4.2	4.6
MP2XLBR0030N040	0.3	0.6	0.45	4	0.57	8.2°	50	4	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0030N040S06	0.3	0.6	0.45	4	0.57	9.3°	50	6	2	●	1	4.2	4.4	4.8	5.3
MP2XLBR0030N045	0.3	0.6	0.45	4.5	0.57	7.9°	50	4	2	●	1	4.7	4.9	5.4	5.9
MP2XLBR0030N050	0.3	0.6	0.45	5	0.57	7.6°	50	4	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0030N050S06	0.3	0.6	0.45	5	0.57	8.8°	50	6	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0030N055	0.3	0.6	0.45	5.5	0.57	7.3°	50	4	2	●	1	5.8	6.0	6.6	7.3
MP2XLBR0030N060	0.3	0.6	0.45	6	0.57	7.1°	50	4	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0030N060S06	0.3	0.6	0.45	6	0.57	8.3°	50	6	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0030N065	0.3	0.6	0.45	6.5	0.57	6.8°	50	4	2	●	1	6.8	7.1	7.8	8.6
MP2XLBR0030N070	0.3	0.6	0.45	7	0.57	6.6°	50	4	2	●	1	7.3	7.6	8.4	9.3
MP2XLBR0030N080	0.3	0.6	0.45	8	0.57	6.2°	50	4	2	●	1	8.4	8.7	9.6	10.6
MP2XLBR0030N080S06	0.3	0.6	0.45	8	0.57	7.6°	50	6	2	●	1	8.4	8.7	9.6	10.6

* Number of Flutes

Type1



Type2



(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0030N085	0.3	0.6	0.45	8.5	0.57	6°	50	4	2	●	1	8.9	9.3	10.2	11.3
MP2XLBR0030N090	0.3	0.6	0.45	9	0.57	5.8°	50	4	2	●	1	9.4	9.8	10.8	11.9
MP2XLBR0030N095	0.3	0.6	0.45	9.5	0.57	5.7°	50	4	2	●	1	9.9	10.4	11.4	12.6
MP2XLBR0030N100	0.3	0.6	0.45	10	0.57	5.5°	50	4	2	●	1	10.5	10.9	12.0	13.2
MP2XLBR0030N110	0.3	0.6	0.45	11	0.57	5.2°	50	4	2	●	1	11.5	12.0	13.2	14.6
MP2XLBR0030N120	0.3	0.6	0.45	12	0.57	5°	50	4	2	●	1	12.5	13.1	14.4	15.9
MP2XLBR0040N020	0.4	0.8	0.6	2	0.77	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0040N020S06	0.4	0.8	0.6	2	0.77	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
MP2XLBR0040N024S06	0.4	0.8	0.6	2.4	0.77	10.3°	50	6	2	●	1	2.5	2.6	2.8	3.1
MP2XLBR0040N030	0.4	0.8	0.6	3	0.77	8.9°	50	4	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0040N030S06	0.4	0.8	0.6	3	0.77	9.9°	50	6	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0040N040	0.4	0.8	0.6	4	0.77	8.2°	50	4	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0040N040S06	0.4	0.8	0.6	4	0.77	9.3°	50	6	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0040N050	0.4	0.8	0.6	5	0.77	7.5°	50	4	2	●	1	5.2	5.5	6.0	6.6
MP2XLBR0040N060	0.4	0.8	0.6	6	0.77	6.9°	50	4	2	●	1	6.3	6.5	7.2	7.9
MP2XLBR0040N070	0.4	0.8	0.6	7	0.77	6.5°	50	4	2	●	1	7.3	7.6	8.4	9.2
MP2XLBR0040N080	0.4	0.8	0.6	8	0.77	6°	50	4	2	●	1	8.4	8.7	9.5	10.6
MP2XLBR0040N090	0.4	0.8	0.6	9	0.77	5.7°	50	4	2	●	1	9.4	9.8	10.7	11.9
MP2XLBR0040N100	0.4	0.8	0.6	10	0.77	5.4°	50	4	2	●	1	10.5	10.9	11.9	13.2
MP2XLBR0040N120	0.4	0.8	0.6	12	0.77	4.8°	50	4	2	●	1	12.5	13.1	14.3	15.9
MP2XLBR0050N030	0.5	1	0.75	3	0.96	8.7°	50	4	2	●	1	3.2	3.4	3.7	4.1
MP2XLBR0050N030S06	0.5	1	0.75	3	0.96	9.8°	50	6	2	●	1	3.2	3.4	3.7	4.1
MP2XLBR0050N040	0.5	1	0.75	4	0.96	7.9°	50	4	2	●	1	4.3	4.5	4.9	5.4
MP2XLBR0050N040S06	0.5	1	0.75	4	0.96	9.2°	50	6	2	●	1	4.3	4.5	4.9	5.4
MP2XLBR0050N050	0.5	1	0.75	5	0.96	7.3°	50	4	2	●	1	5.3	5.6	6.1	6.7
MP2XLBR0050N050S06	0.5	1	0.75	5	0.96	8.6°	50	6	2	●	1	5.3	5.6	6.1	6.7
MP2XLBR0050N060	0.5	1	0.75	6	0.96	6.7°	50	4	2	●	1	6.4	6.7	7.3	8.1
MP2XLBR0050N060S06	0.5	1	0.75	6	0.96	8.2°	50	6	2	●	1	6.4	6.7	7.3	8.1
MP2XLBR0050N070	0.5	1	0.75	7	0.96	6.2°	50	4	2	●	1	7.4	7.8	8.5	9.4
MP2XLBR0050N080	0.5	1	0.75	8	0.96	5.8°	50	4	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0050N080S06	0.5	1	0.75	8	0.96	7.3°	50	6	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0050N090	0.5	1	0.75	9	0.96	5.5°	50	4	2	●	1	9.5	10.0	10.9	12.0
MP2XLBR0050N100	0.5	1	0.75	10	0.96	5.1°	50	4	2	●	1	10.6	11.1	12.1	13.4
MP2XLBR0050N100S06	0.5	1	0.75	10	0.96	6.7°	60	6	2	●	1	10.6	11.1	12.1	13.4
MP2XLBR0050N120	0.5	1	0.75	12	0.96	4.6°	50	4	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0050N120S06	0.5	1	0.75	12	0.96	6.1°	60	6	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0050N140	0.5	1	0.75	14	0.96	4.2°	55	4	2	●	1	14.8	15.4	16.9	18.7
MP2XLBR0050N160	0.5	1	0.75	16	0.96	3.8°	55	4	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0050N160S06	0.5	1	0.75	16	0.96	5.2°	65	6	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0050N180	0.5	1	0.75	18	0.96	3.5°	55	4	2	●	1	18.9	19.8	21.7	24.0
MP2XLBR0050N200	0.5	1	0.75	20	0.96	3.3°	55	4	2	●	1	21.0	22.0	24.1	26.6
MP2XLBR0050N200S06	0.5	1	0.75	20	0.96	4.6°	65	6	2	●	1	21.0	22.0	24.1	26.6
MP2XLBR0060N060	0.6	1.2	0.9	6	1.16	6.6°	50	4	2	●	1	6.4	6.7	7.3	8.0
MP2XLBR0060N060S06	0.6	1.2	0.9	6	1.16	8.1°	55	6	2	●	1	6.4	6.7	7.3	8.0
MP2XLBR0060N080	0.6	1.2	0.9	8	1.16	5.7°	50	4	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0060N080S06	0.6	1.2	0.9	8	1.16	7.3°	55	6	2	●	1	8.5	8.9	9.7	10.7
MP2XLBR0060N100	0.6	1.2	0.9	10	1.16	5°	50	4	2	●	1	10.6	11.0	12.1	13.3
MP2XLBR0060N100S06	0.6	1.2	0.9	10	1.16	6.6°	55	6	2	●	1	10.6	11.0	12.1	13.3

* Number of Flutes

● : **Inventory maintained.**

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

(mm)

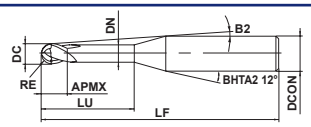
Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0060N120	0.6	1.2	0.9	12	1.16	4.4°	50	4	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0060N120S06	0.6	1.2	0.9	12	1.16	6°	65	6	2	●	1	12.7	13.2	14.5	16.0
MP2XLBR0060N140	0.6	1.2	0.9	14	1.16	4°	55	4	2	●	1	14.8	15.4	16.9	18.7
MP2XLBR0060N160	0.6	1.2	0.9	16	1.16	3.7°	55	4	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0060N160S06	0.6	1.2	0.9	16	1.16	5.1°	65	6	2	●	1	16.9	17.6	19.3	21.3
MP2XLBR0060N180	0.6	1.2	0.9	18	1.16	3.4°	60	4	2	●	1	18.9	19.8	21.7	24.0
MP2XLBR0060N200	0.6	1.2	0.9	20	1.16	3.1°	60	4	2	●	1	21.0	21.9	24.0	26.6
MP2XLBR0060N240	0.6	1.2	0.9	24	1.16	2.7°	60	4	2	●	1	25.2	26.3	28.8	*
MP2XLBR0070N080	0.7	1.4	1.05	8	1.34	5.5°	50	4	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0070N120	0.7	1.4	1.05	12	1.34	4.3°	50	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0070N160	0.7	1.4	1.05	16	1.34	3.5°	50	4	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N030	0.75	1.5	1.1	3	1.44	8.6°	50	4	2	●	1	3.1	3.3	3.6	3.9
MP2XLBR0075N040	0.75	1.5	1.1	4	1.44	7.7°	50	4	2	●	1	4.2	4.4	4.8	5.2
MP2XLBR0075N060	0.75	1.5	1.1	6	1.44	6.3°	50	4	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0075N060S06	0.75	1.5	1.1	6	1.44	8°	50	6	2	●	1	6.3	6.6	7.2	7.9
MP2XLBR0075N080	0.75	1.5	1.1	8	1.44	5.4°	50	4	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0075N080S06	0.75	1.5	1.1	8	1.44	7.2°	60	6	2	●	1	8.4	8.8	9.6	10.6
MP2XLBR0075N100	0.75	1.5	1.1	10	1.44	4.7°	50	4	2	●	1	10.5	11.0	12.0	13.2
MP2XLBR0075N100S06	0.75	1.5	1.1	10	1.44	6.5°	60	6	2	●	1	10.5	11.0	12.0	13.2
MP2XLBR0075N120	0.75	1.5	1.1	12	1.44	4.2°	50	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0075N120S06	0.75	1.5	1.1	12	1.44	5.9°	60	6	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0075N140	0.75	1.5	1.1	14	1.44	3.8°	55	4	2	●	1	14.7	15.3	16.8	18.5
MP2XLBR0075N160	0.75	1.5	1.1	16	1.44	3.4°	55	4	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N160S06	0.75	1.5	1.1	16	1.44	5°	60	6	2	●	1	16.8	17.5	19.2	21.2
MP2XLBR0075N180	0.75	1.5	1.1	18	1.44	3.1°	60	4	2	●	1	18.9	19.7	21.6	23.8
MP2XLBR0075N200	0.75	1.5	1.1	20	1.44	2.9°	60	4	2	●	1	21.0	21.9	23.9	*
MP2XLBR0075N220	0.75	1.5	1.1	22	1.44	2.7°	60	4	2	●	1	23.0	24.0	26.3	*
MP2XLBR0080N080	0.8	1.6	1.2	8	1.54	5.3°	55	4	2	●	1	8.4	8.8	9.6	10.5
MP2XLBR0080N120	0.8	1.6	1.2	12	1.54	4.1°	55	4	2	●	1	12.6	13.1	14.4	15.9
MP2XLBR0080N160	0.8	1.6	1.2	16	1.54	3.3°	55	4	2	●	1	16.8	17.5	19.1	21.2
MP2XLBR0080N200	0.8	1.6	1.2	20	1.54	2.8°	55	4	2	●	1	21.0	21.9	23.9	*
MP2XLBR0090N080	0.9	1.8	1.4	8	1.74	5.1°	55	4	2	●	1	8.4	8.8	9.6	10.5
MP2XLBR0090N120	0.9	1.8	1.4	12	1.74	3.9°	55	4	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0090N160	0.9	1.8	1.4	16	1.74	3.1°	55	4	2	●	1	16.8	17.5	19.1	21.1
MP2XLBR0090N200	0.9	1.8	1.4	20	1.74	2.6°	55	4	2	●	1	20.9	21.8	23.9	*
MP2XLBR0100N040	1	2	1.5	4	1.94	7.2°	50	4	2	●	1	4.2	4.4	4.7	5.2
MP2XLBR0100N040S06	1	2	1.5	4	1.94	9°	50	6	2	●	1	4.2	4.4	4.7	5.2
MP2XLBR0100N060	1	2	1.5	6	1.94	5.8°	50	4	2	●	1	6.3	6.6	7.1	7.8
MP2XLBR0100N060S06	1	2	1.5	6	1.94	7.8°	50	6	2	●	1	6.3	6.6	7.1	7.8
MP2XLBR0100N080	1	2	1.5	8	1.94	4.8°	50	4	2	●	1	8.4	8.8	9.5	10.5
MP2XLBR0100N080S06	1	2	1.5	8	1.94	6.9°	50	6	2	●	1	8.4	8.8	9.5	10.5
MP2XLBR0100N100	1	2	1.5	10	1.94	4.2°	50	4	2	●	1	10.5	10.9	11.9	13.1
MP2XLBR0100N100S06	1	2	1.5	10	1.94	6.2°	50	6	2	●	1	10.5	10.9	11.9	13.1
MP2XLBR0100N120	1	2	1.5	12	1.94	3.6°	50	4	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0100N120S06	1	2	1.5	12	1.94	5.6°	60	6	2	●	1	12.6	13.1	14.3	15.8
MP2XLBR0100N140	1	2	1.5	14	1.94	3.2°	55	4	2	●	1	14.7	15.3	16.7	18.4
MP2XLBR0100N140S06	1	2	1.5	14	1.94	5.1°	60	6	2	●	1	14.7	15.3	16.7	18.4
MP2XLBR0100N160	1	2	1.5	16	1.94	2.9°	55	4	2	●	1	16.8	17.5	19.1	*

* Number of Flutes

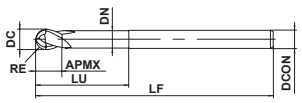
* No Interference

● : **Inventory maintained.**

Type1



Type2



(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0100N160S06	1	2	1.5	16	1.94	4.7°	65	6	2	●	1	16.8	17.5	19.1	21.1
MP2XLBR0100N180	1	2	1.5	18	1.94	2.7°	55	4	2	●	1	18.9	19.7	21.5	*
MP2XLBR0100N180S06	1	2	1.5	18	1.94	4.3°	65	6	2	●	1	18.9	19.7	21.5	23.8
MP2XLBR0100N200	1	2	1.5	20	1.94	2.4°	65	4	2	●	1	20.9	21.8	23.9	*
MP2XLBR0100N200S06	1	2	1.5	20	1.94	4°	65	6	2	●	1	20.9	21.8	23.9	26.4
MP2XLBR0100N220	1	2	1.5	22	1.94	2.3°	65	4	2	●	1	23.0	24.0	26.3	*
MP2XLBR0100N250	1	2	1.5	25	1.94	2°	65	4	2	●	1	26.2	27.3	*	*
MP2XLBR0100N250S06	1	2	1.5	25	1.94	3.5°	90	6	2	●	1	26.2	27.3	29.9	33
MP2XLBR0100N300	1	2	1.5	30	1.94	1.7°	80	4	2	●	1	31.4	32.7	*	*
MP2XLBR0100N300S06	1	2	1.5	30	1.94	3°	90	6	2	●	1	31.4	32.7	35.9	*
MP2XLBR0100N350	1	2	1.5	35	1.94	1.5°	80	4	2	●	1	36.6	38.2	*	*
MP2XLBR0100N350S06	1	2	1.5	35	1.94	2.7°	90	6	2	●	1	36.6	38.2	41.8	*
MP2XLBR0100N400	1	2	1.5	40	1.94	1.4°	80	4	2	●	1	41.8	43.6	*	*
MP2XLBR0100N400S06	1	2	1.5	40	1.94	2.4°	90	6	2	●	1	41.8	43.6	47.8	*
MP2XLBR0125N100	1.25	2.5	1.9	10	2.4	3.5°	55	4	2	●	1	10.4	10.8	11.8	12.9
MP2XLBR0125N150	1.25	2.5	1.9	15	2.4	2.5°	55	4	2	●	1	15.6	16.3	17.8	*
MP2XLBR0125N200	1.25	2.5	1.9	20	2.4	2°	55	4	2	●	1	20.8	21.7	*	*
MP2XLBR0125N250	1.25	2.5	1.9	25	2.4	1.6°	70	4	2	●	1	26.1	27.2	*	*
MP2XLBR0125N300	1.25	2.5	1.9	30	2.4	1.4°	70	4	2	●	1	31.3	32.6	*	*
MP2XLBR0125N350	1.25	2.5	1.9	35	2.4	1.2°	70	4	2	●	1	36.5	38.1	*	*
MP2XLBR0150N060S03	1.5	3	2.3	6	2.9	—	60	3	2	●	1	*	*	*	*
MP2XLBR0150N080	1.5	3	2.3	8	2.9	6.3°	60	6	2	●	1	8.3	8.6	9.3	10.2
MP2XLBR0150N100	1.5	3	2.3	10	2.9	5.5°	60	6	2	●	1	10.4	10.8	11.7	12.9
MP2XLBR0150N120	1.5	3	2.3	12	2.9	4.9°	60	6	2	●	1	12.5	13.0	14.1	15.5
MP2XLBR0150N140	1.5	3	2.3	14	2.9	4.4°	60	6	2	●	1	14.6	15.2	16.5	18.2
MP2XLBR0150N160	1.5	3	2.3	16	2.9	4°	70	6	2	●	1	16.7	17.3	18.9	20.8
MP2XLBR0150N200	1.5	3	2.3	20	2.9	3.4°	70	6	2	●	1	20.8	21.7	23.7	26.1
MP2XLBR0150N250	1.5	3	2.3	25	2.9	2.8°	70	6	2	●	1	26.1	27.2	29.7	*
MP2XLBR0150N300	1.5	3	2.3	30	2.9	2.5°	70	6	2	●	1	31.3	32.6	35.7	*
MP2XLBR0150N350	1.5	3	2.3	35	2.9	2.2°	90	6	2	●	1	36.5	38.0	41.7	*
MP2XLBR0150N400	1.5	3	2.3	40	2.9	1.9°	90	6	2	●	1	41.7	43.5	*	*
MP2XLBR0175N150	1.75	3.5	2.6	15	3.4	3.8°	65	6	2	●	1	15.6	16.2	17.7	19.4
MP2XLBR0175N250	1.75	3.5	2.6	25	3.4	2.5°	65	6	2	●	1	26.0	27.1	29.6	*
MP2XLBR0175N350	1.75	3.5	2.6	35	3.4	1.9°	90	6	2	●	1	36.5	38.0	*	*
MP2XLBR0175N450	1.75	3.5	2.6	45	3.4	1.5°	90	6	2	●	1	46.9	48.9	*	*
MP2XLBR0200N080S04	2	4	3	8	3.9	—	65	4	2	●	2	*	*	*	*
MP2XLBR0200N100	2	4	3	10	3.9	4.5°	65	6	2	●	1	10.4	10.8	11.6	12.7
MP2XLBR0200N120	2	4	3	12	3.9	3.9°	65	6	2	●	1	12.5	12.9	14.0	15.4
MP2XLBR0200N140	2	4	3	14	3.9	3.4°	65	6	2	●	1	14.6	15.1	16.4	18.0
MP2XLBR0200N160	2	4	3	16	3.9	3.1°	70	6	2	●	1	16.6	17.3	18.8	20.7
MP2XLBR0200N200	2	4	3	20	3.9	2.6°	70	6	2	●	1	20.8	21.7	23.6	*
MP2XLBR0200N250	2	4	3	25	3.9	2.1°	70	6	2	●	1	26.0	27.1	29.6	*
MP2XLBR0200N300	2	4	3	30	3.9	1.8°	80	6	2	●	1	31.2	32.6	*	*
MP2XLBR0200N350	2	4	3	35	3.9	1.6°	80	6	2	●	1	36.5	38.0	*	*
MP2XLBR0200N400	2	4	3	40	3.9	1.4°	90	6	2	●	1	41.7	43.5	*	*
MP2XLBR0200N450	2	4	3	45	3.9	1.2°	90	6	2	●	1	46.9	48.9	*	*
MP2XLBR0200N500	2	4	3	50	3.9	1.1°	100	6	2	●	1	52.1	54.3	*	*
MP2XLBR0250N150	2.5	5	3.8	15	4.9	2°	70	6	2	●	1	15.6	16.2	*	*

* Number of Flutes

* No Interference

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

(mm)

Order Number	RE	DC	APMX	LU	DN	B2	LF	DCON	No.F *	Stock	Type	Effective Length for Inclined Angle			
												30'	1°	2°	3°
MP2XLBR0250N200	2.5	5	3.8	20	4.9	1.5°	70	6	2	●	1	20.8	21.6	*	*
MP2XLBR0250N250	2.5	5	3.8	25	4.9	1.2°	70	6	2	●	1	26.0	27.1	*	*
MP2XLBR0250N300	2.5	5	3.8	30	4.9	1°	80	6	2	●	1	31.2	*	*	*
MP2XLBR0250N350	2.5	5	3.8	35	4.9	0.9°	80	6	2	●	1	36.4	*	*	*
MP2XLBR0250N400	2.5	5	3.8	40	4.9	0.8°	90	6	2	●	1	41.7	*	*	*
MP2XLBR0300N200	3	6	6	20	5.85	—	70	6	2	●	2	*	*	*	*
MP2XLBR0300N250	3	6	6	25	5.85	—	70	6	2	●	2	*	*	*	*
MP2XLBR0300N300	3	6	6	30	5.85	—	80	6	2	●	2	*	*	*	*
MP2XLBR0300N400	3	6	6	40	5.85	—	90	6	2	●	2	*	*	*	*
MP2XLBR0300N500	3	6	6	50	5.85	—	100	6	2	●	2	*	*	*	*

* Number of Flutes

* No Interference

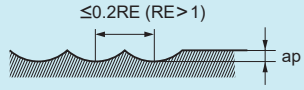
● : **Inventory maintained.**

Recommended Cutting Conditions

(mm)

Work Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45–55HRC)			Copper, Copper Alloys		
RE	**LU**	**n** (min^{-1})	**vf** (mm/min)	**ap**	**n** (min^{-1})	**vf** (mm/min)	**ap**	**n** (min^{-1})	**vf** (mm/min)	**ap**
0.05	**0.3**	50000	200	0.002	50000	200	0.002	50000	200	0.004
	0.5	50000	200	0.001	50000	200	0.002	50000	200	0.002
0.1	**0.5**	50000	400	0.003	50000	320	0.003	50000	320	0.006
	1	50000	400	0.002	50000	320	0.002	50000	320	0.004
	1.5	40000	300	0.001	40000	240	0.001	40000	240	0.002
	2	40000	200	0.001	40000	160	0.001	40000	160	0.002
	2.5	40000	100	0.001	40000	80	0.001	40000	80	0.002
0.15	**1**	50000	600	0.007	50000	480	0.007	50000	480	0.014
	1.5	50000	600	0.005	50000	480	0.005	50000	480	0.01
	2	50000	600	0.003	50000	480	0.003	50000	480	0.006
	2.5	40000	400	0.003	40000	320	0.003	40000	320	0.006
	3	40000	300	0.002	40000	240	0.002	40000	240	0.004
	3.5	30000	250	0.002	30000	200	0.002	30000	200	0.004
	4	30000	200	0.002	30000	160	0.002	30000	160	0.004
0.2	**1**	50000	1800	0.015	50000	1400	0.015	50000	1400	0.03
	2	50000	1300	0.01	50000	1000	0.01	50000	1000	0.02
	3	50000	900	0.005	50000	700	0.005	50000	700	0.01
	4	40000	600	0.004	40000	480	0.004	40000	480	0.008
	5	40000	400	0.003	40000	320	0.003	40000	320	0.006
	6	30000	200	0.002	30000	160	0.002	30000	160	0.004
0.25	**2**	50000	2500	0.02	50000	2000	0.02	50000	2000	0.04
	3	50000	1500	0.015	50000	1200	0.015	50000	1200	0.03
	4	45000	1200	0.01	45000	950	0.01	45000	950	0.02
	5	45000	900	0.007	45000	700	0.007	45000	700	0.014
	6	36000	600	0.006	36000	480	0.006	36000	480	0.012
	7	32000	400	0.005	32000	320	0.005	32000	320	0.01
	8	32000	300	0.003	32000	240	0.003	32000	240	0.006
	10	26000	200	0.002	26000	160	0.002	26000	160	0.004
0.3	**2**	50000	3500	0.03	50000	2800	0.03	50000	2800	0.06
	3	50000	3500	0.03	50000	2800	0.03	50000	2800	0.06
	4	44000	2500	0.02	44000	2000	0.02	44000	2000	0.04
	5	37000	1200	0.01	37000	950	0.01	37000	950	0.02
	6	37000	1000	0.008	37000	800	0.008	37000	800	0.016
	7	35000	750	0.008	35000	600	0.008	35000	600	0.016
	8	35000	600	0.006	35000	480	0.006	35000	480	0.012
	9	30000	500	0.004	30000	400	0.004	30000	400	0.008
	10	30000	500	0.003	30000	400	0.003	30000	400	0.006
	11	22000	300	0.002	22000	240	0.002	22000	240	0.004
	12	22000	200	0.002	22000	160	0.002	22000	160	0.004
0.4	**2**	50000	4400	0.04	50000	3500	0.04	50000	3500	0.08
	3	50000	4000	0.04	50000	3200	0.04	50000	3200	0.08
	4	50000	4000	0.02	50000	3200	0.02	50000	3200	0.04
	5	35000	2400	0.02	35000	1900	0.02	35000	1900	0.04
	6	35000	2400	0.02	35000	1900	0.02	35000	1900	0.04
	7	30000	1500	0.015	30000	1200	0.015	30000	1200	0.03
	8	30000	1500	0.01	30000	1200	0.01	30000	1200	0.02
	10	30000	700	0.008	30000	560	0.008	30000	560	0.016
	12	22000	500	0.006	22000	400	0.006	22000	400	0.012

Depth of Cut



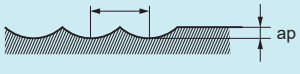
RE : Radius

MP2XLB

Ball nose, Short cut length, 2 flute, Long neck

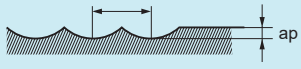
Recommended Cutting Conditions

(mm)

Work Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45–55HRC)			Copper, Copper Alloys		
RE	LU	n (min^{-1})	vf (mm/min)	ap	n (min^{-1})	vf (mm/min)	ap	n (min^{-1})	vf (mm/min)	ap
0.5	3	40000	4000	0.05	40000	3200	0.05	40000	3200	0.1
	4	40000	4000	0.05	40000	3200	0.05	40000	3200	0.1
	6	35000	3000	0.03	35000	2400	0.03	35000	2400	0.06
	8	30000	2000	0.02	30000	1600	0.02	30000	1600	0.04
	10	20000	1000	0.01	20000	800	0.01	20000	800	0.02
	12	20000	1000	0.01	20000	800	0.01	20000	800	0.02
	14	18000	600	0.008	18000	480	0.008	18000	480	0.016
	16	18000	500	0.008	18000	400	0.008	18000	400	0.016
	18	13000	300	0.005	13000	240	0.005	13000	240	0.01
	20	13000	250	0.005	13000	200	0.005	13000	200	0.01
0.6	6	40000	4400	0.04	40000	3500	0.04	40000	3500	0.08
	8	40000	4000	0.04	40000	3200	0.04	40000	3200	0.08
	10	27000	1900	0.02	27000	1500	0.02	27000	1500	0.04
	12	16000	1400	0.02	16000	1100	0.02	16000	1100	0.04
	18	15000	700	0.008	15000	560	0.008	15000	560	0.016
	24	11000	300	0.006	11000	240	0.006	11000	240	0.012
0.7	8	40000	4000	0.05	40000	3200	0.05	40000	2560	0.1
	12	26000	2000	0.04	26000	1600	0.04	26000	1280	0.08
	16	17000	1400	0.03	17000	1120	0.03	17000	896	0.06
0.75	6	40000	6000	0.07	36000	4300	0.07	36000	4300	0.14
	8	40000	6000	0.07	36000	4300	0.07	36000	4300	0.14
	10	40000	5000	0.06	36000	3600	0.06	36000	3600	0.12
	12	32000	3400	0.04	29000	2400	0.04	29000	2400	0.08
	16	15000	1400	0.03	15000	1100	0.03	15000	1100	0.06
	20	12000	900	0.02	12000	720	0.02	12000	720	0.04
	30	9000	400	0.01	9000	320	0.01	9000	320	0.02
0.8	8	40000	6000	0.08	32000	3800	0.08	32000	3800	0.16
	12	36000	4500	0.06	29000	2800	0.06	29000	2800	0.12
	16	14000	1400	0.04	14000	1100	0.04	14000	1100	0.08
	20	12000	1000	0.03	12000	800	0.03	12000	800	0.06
0.9	8	40000	6600	0.09	32000	4200	0.09	32000	4200	0.18
	12	40000	5000	0.07	32000	3200	0.07	32000	3200	0.14
	16	28000	2800	0.04	22000	1800	0.04	22000	1800	0.08
	20	10000	800	0.03	10000	640	0.03	10000	640	0.06
1	4	40000	8000	0.1	32000	5000	0.1	32000	5000	0.2
	6	40000	8000	0.1	32000	5000	0.1	32000	5000	0.2
	8	40000	6000	0.1	32000	3800	0.1	32000	3800	0.2
	10	40000	5000	0.08	32000	3200	0.08	32000	3200	0.16
	12	40000	5000	0.08	32000	3200	0.08	32000	3200	0.16
	16	32000	3500	0.05	26000	2200	0.05	26000	2200	0.1
	20	10000	1000	0.04	10000	800	0.04	10000	800	0.08
	25	10000	1000	0.04	10000	800	0.04	10000	800	0.08
	30	10000	800	0.02	10000	640	0.02	10000	640	0.04
	35	10000	600	0.02	10000	480	0.02	10000	480	0.04
	40	8000	400	0.01	8000	320	0.01	8000	320	0.02
Depth of Cut		≤0.1RE (RE≤1) ≤0.2RE (RE>1) 								

RE : Radius

(mm)

Work Material		Carbon Steel, Alloy Steel (180–280HB) Alloy Tool Steel, Pre-hardened Steel, Precipitation Hardening Stainless Steel			Hardened Steel (45–55HRC)			Copper, Copper Alloys		
RE	**LU**	**n** (min^{-1})	**vf** (mm/min)	**ap**	**n** (min^{-1})	**vf** (mm/min)	**ap**	**n** (min^{-1})	**vf** (mm/min)	**ap**
1.25	**10**	36000	6000	0.12	29000	3800	0.12	29000	3800	0.24
	15	32000	4500	0.1	26000	2900	0.1	26000	2900	0.2
	20	26000	3200	0.07	21000	2000	0.07	21000	2000	0.14
	25	12000	1400	0.06	8000	720	0.06	8000	720	0.12
	30	8000	900	0.04	8000	700	0.04	8000	700	0.08
	35	8000	800	0.02	8000	640	0.02	8000	510	0.04
1.5	**6**	32000	7000	0.15	26000	4500	0.15	22000	3800	0.3
	10	32000	7000	0.15	26000	4500	0.15	22000	3800	0.3
	16	32000	5000	0.1	26000	3200	0.1	22000	2700	0.2
	20	27000	3800	0.1	22000	2400	0.1	22000	2400	0.2
	25	21000	2700	0.08	17000	1700	0.08	17000	1700	0.16
	30	10000	700	0.08	6000	560	0.08	6000	560	0.16
	35	6000	700	0.06	6000	560	0.06	6000	560	0.12
	40	6000	600	0.04	6000	480	0.04	6000	480	0.08
1.75	**15**	27500	4400	0.13	22000	2800	0.13	18000	2300	0.26
	25	23000	3600	0.1	18000	2200	0.1	18000	2200	0.2
	35	10000	1400	0.08	10000	1100	0.08	10000	1100	0.16
	45	7500	900	0.04	7500	720	0.04	7500	720	0.08
2	**10**	24000	6000	0.2	19000	3800	0.2	16000	3200	0.4
	20	24000	3800	0.15	19000	2400	0.15	16000	2000	0.3
	30	20000	3000	0.1	16000	1900	0.1	16000	1900	0.2
	40	12000	1700	0.1	12000	1400	0.1	12000	1400	0.2
	50	8000	1000	0.05	8000	800	0.05	8000	800	0.1
2.5	**20**	22000	6000	0.2	18000	3800	0.2	13000	2800	0.4
	25	22000	4400	0.2	18000	2800	0.2	13000	2000	0.4
	30	22000	3800	0.15	18000	2400	0.15	13000	1700	0.3
	40	22000	3600	0.1	18000	2300	0.1	13000	1600	0.2
3	**20**	20000	6000	0.2	16000	3800	0.2	11000	2600	0.4
	30	20000	6000	0.2	16000	3800	0.2	11000	2600	0.4
	40	20000	4500	0.15	16000	2800	0.15	11000	2000	0.3
	50	20000	3000	0.15	16000	1900	0.15	11000	1300	0.3
Depth of Cut		≤0.1RE (RE≤1) ≤0.2RE (RE>1)  RE : Radius								

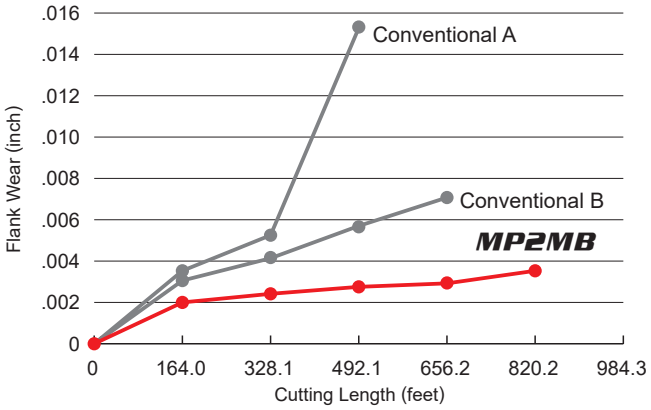
(Note 1) When the inclination angle of machined surface is high, or when machining at high loads; such as in corners, reduce the revolution and feed rate.
(Note 2) The use of oil mist is effective when machining with small diameter.
(Note 3) If the depth of cut is smaller than this table, feed rate can be increased.
(Note 4) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
(Note 5) For hardened steel over 55 HRC, use VF2XLB.
(Note 6) For cutting conditions for austenitic stainless steel and titanium alloy, use the high hardness steel (45-55 HRC) table but reduce the spindle speed by 40% and the feed rate by 55%.

MS plus Provides Superior Cost Performance

Cutting Performance

Carbon Steel AISI 1050

MS plus gives excellent wear resistance and significantly longer tool life compared to conventional products when machining carbon steel.

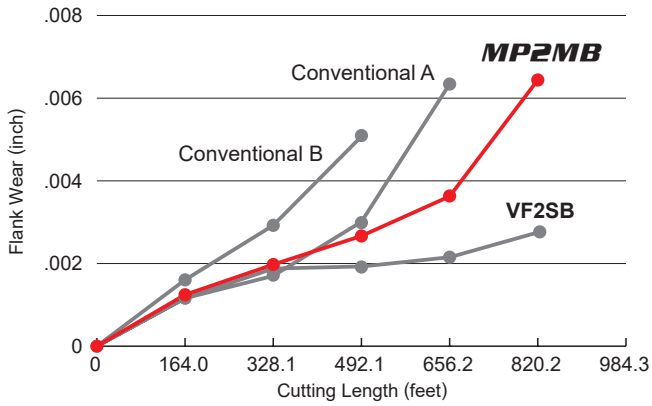


<Cutting Conditions>

Work Material	: AISI 1050 (220 HB)
Tool	: 2 flute ball nose end mill R3
Revolution	: 16000 min-1
Cutting Speed	: 930 SFM
Table Feed	: 78.4 IPM
Feed per Tooth	: .0024 IPT
Depth of Cut	: ap .079 inch, ae .012 inch
Overhang Length	: .787 inch
Cutting Mode	: Air Bow
Machine	: Horizontal MC (BT40)

Alloy Steel, Tool Steel AISI H13 (52 HRC)

MS plus shows higher wear resistance than conventional products when machining AISI H13(52 HRC).
IMPACT MIRACLE is suitable when even longer tool life is required.

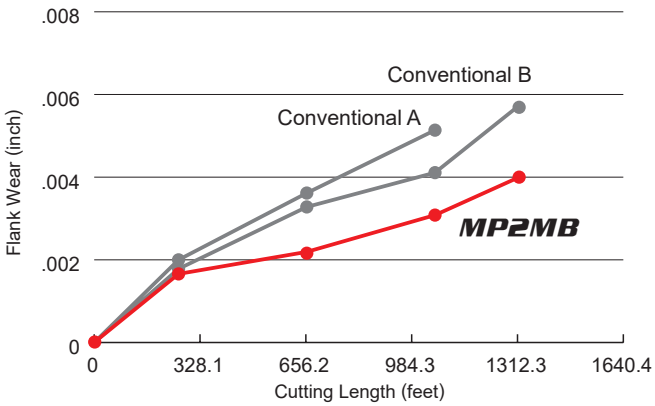


<Cutting Conditions>

Work Material	: AISI H13 (52 HRC)
Tool	: 2 flute ball nose end mill R3
Revolution	: 17000 min-1
Cutting Speed	: 985 SFM
Table Feed	: 66.9 IPM
Feed per Tooth	: .0020 IPT
Depth of Cut	: ap .079 inch, ae .012 inch
Overhang Length	: .787 inch
Cutting Mode	: Air Blow
Machine	: Horizontal MC (BT40)

Stainless Steel STAVAX (52 HRC)

MS plus shows higher wear resistance compared to conventional products when machining stainless steel.

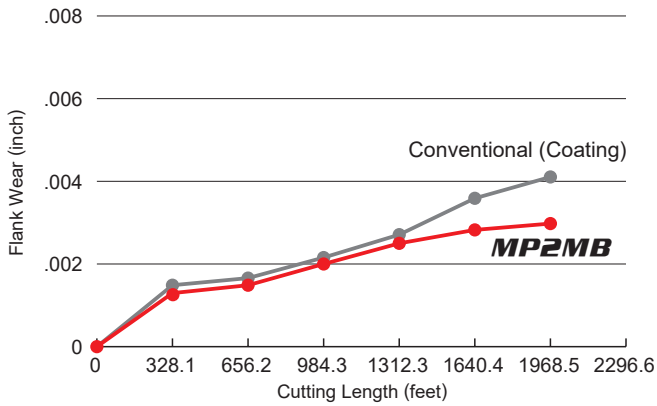


<Cutting Conditions>

Work Material	: STAVAX (52 HRC)
Tool	: 2 flute ball nose end mill R3
Revolution	: 18000 min-1
Cutting Speed	: 555 SFM
Table Feed	: 141.7 IPM
Feed per Tooth	: .0039 IPT
Depth of Cut	: ap .016 inch, ae .039 inch
Overhang Length	: .787 inch
Cutting Mode	: Air Blow
Machine	: Horizontal MC (BT40)

Copper

MS plus shows excellent wear resistance and provides a significantly longer tool life compared to conventional products when machining copper.



<Cutting Conditions>

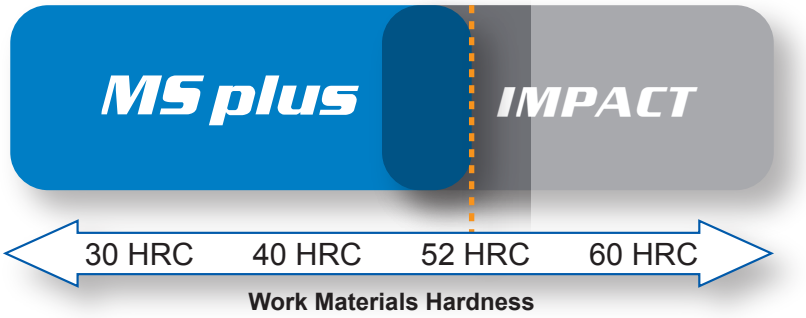
Work Material	: Copper
Tool	: 2 flute ball nose end mill R3
Revolution	: 15000 min-1
Cutting Speed	: 875 SFM
Table Feed	: 59.1 IPM
Feed per Tooth	: .0020 IPT
Depth of Cut	: ap .079 inch, ae .008 inch
Overhang Length	: .787 inch
Cutting Mode	: Emulsion
Machine	: Vertical MC (BT40)

MP2SSB/MP2SB/MP2MB/MP2XLB

Greatly improved wear resistance even when machining hardened materials.

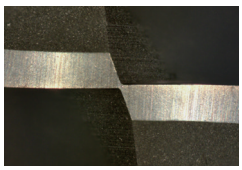
MS plus provides long tool life on materials up to 52 HRC.

For steels harder than 52 HRC, IMPACT MIRACLE end mills are recommended. (TOOLS NEWS B075)

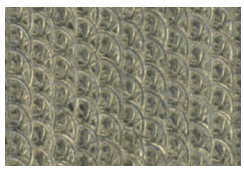


End Cutting Edge Geometry

MS plus

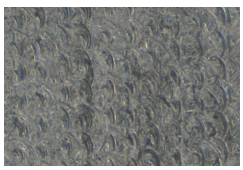


Sharp but strong cutting edge enables good surface finishes.

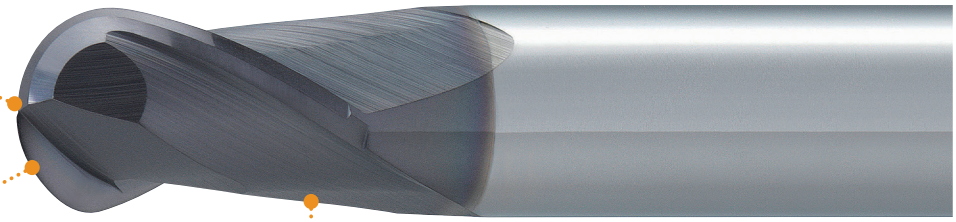


Sharp edges leave a uniform finish.

Conventional



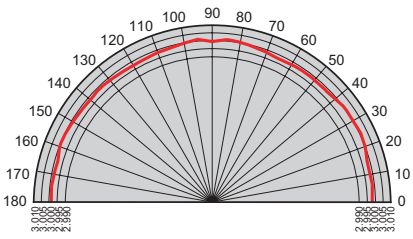
A dull edge leaves an undefined finish.



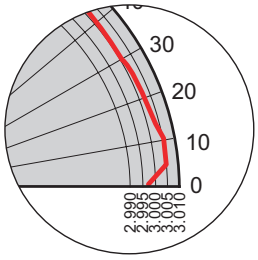
Seamless Cutting Edge

Radius tolerance R ±196.9 µ-inch.

MS plus



Conventional



Good surface finishes possible even when simultaneously cutting with end and side edges; for example on drafts of dies and molds.

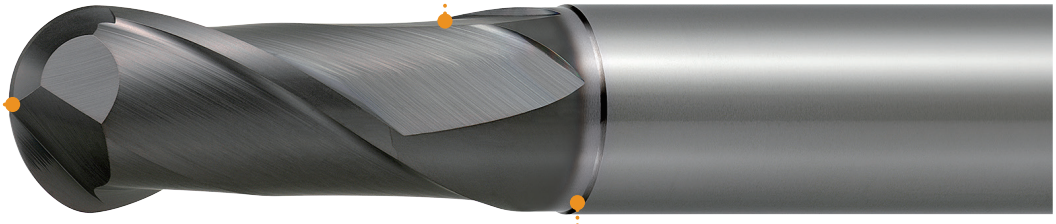
Micro-grain Cemented Carbide Substrate

Higher wear resistance than conventional products.

MP2SDB

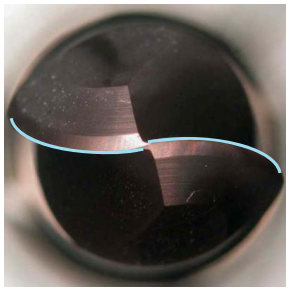
Tough carbide substrate with high chipping resistance.
Ideal for semi-finishing of forging dies.

Tough Carbide
Tough carbide substrate with high resistance to chipping.



Strong S Curve
Strong S curve with negative rake enables high efficiency machining.

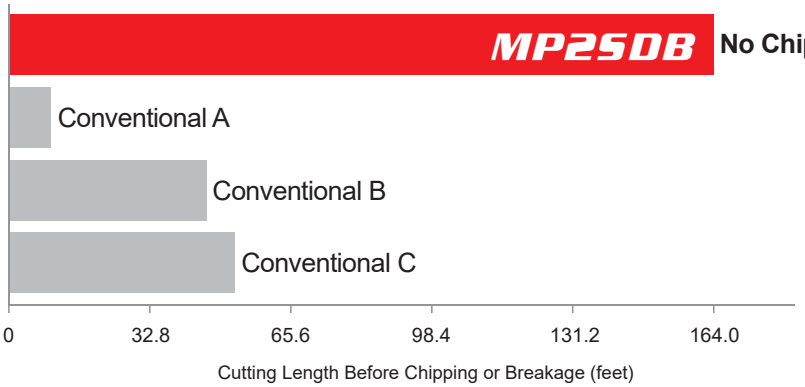
Neck Recess

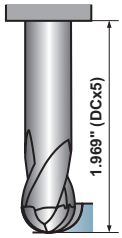


Conventional MP2SDB

Resistance to Chipping

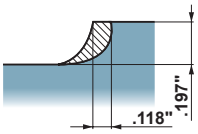
MP2SDB shows excellent chipping resistance even at large depths of cut, high feed rates and long overhang applications.





<Cutting Conditions>

Work Material	: AISI H13 (52 HRC)
Tool	: MP2SDBR0500
Revolution	: 5000 min^{-1}
Cutting Speed	: 515 SFM
Table Feed	: 39.4 IPM
Feed per Tooth	: .0039 IPT
Depth of Cut	: ap .197 inch, ae .118 inch
Overhang Length	: 1.969 inch
Cutting Mode	: Down (Climb) Cut Air Blow
Machine	: Vertical MC (BT50)



For your safety
●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching inserts or spare parts, please use the attached wrench or driver. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

URL : http://www.mitsubishicarbide.com
(Tools specifications subject to change without notice.)

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