

For Swiss Type Automatic Lathes MS plus End Mill Series

MP2ES/3ES/4EC

New
Product

Fracture Resistance & Burr Reduction to Combat Problems Commonly Encountered with Small Swiss Type Automatic Lathes



For Swiss Type Automatic Lathes
MS plus End Mill Series

MP2ES/3ES/4EC

**Achieves Stable Machining without Chipping
Even when Machining Overuses the Cutting Edge**

Adoption of New High-Toughness Substrate

Fracture resistance is greatly improved and stable machining is accomplished by using a high-toughness carbide substrate.

Optimized Cutting Edge Shape

The optimized rake angle suppresses burrs.

Improved Cutting Edge Machining

To improve the fracture resistance of the cutting edge, a small gash land is used for $\varnothing 6\text{mm}$ or greater.

Optimization of Cutting Edge and Overall Tool Length

In order to take into account the protrusion of the small Swiss Type Automatic Lathes, the cutting edge and overall tool length have been optimized.

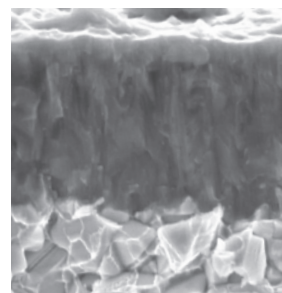
(Al, Ti, Cr)N Multilayer Coating (MS plus)

Suitable coating for a broad range of workpiece materials such as carbon steels and stainless steels.

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

Properties of MS plus coating

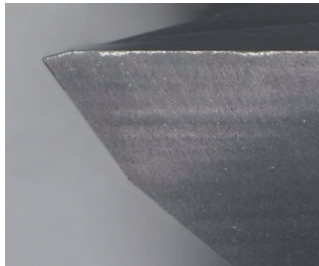
	(Al,Ti,Cr)N multilayer	(Al,Ti)N	(Al,Cr)N
Hardness (HV)	3200	2800	3100
Oxidation Temperature (F°)	2.012	1.472	2.012
Adhesion (N)	100	80	80



Cutting Performance

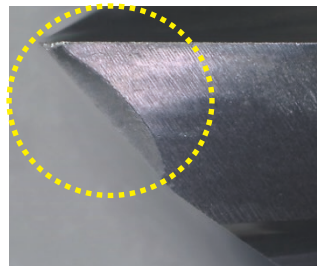
Machining 304 - Comparison of Fracture Resistance

The round, stainless steel bar is machined using a D-cut. The adoption of the high toughness cemented carbide and gash land provides highly improved fracture resistance.



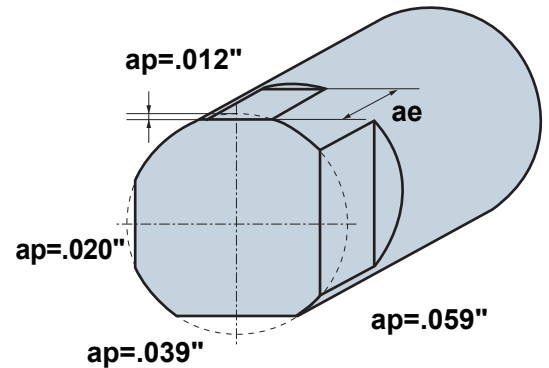
MP3ES

After machining of 2 pieces



Conventional

After machining 1 piece
Fracture of the tip of the tool.

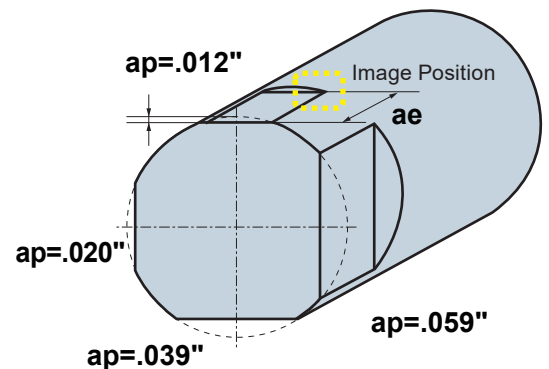
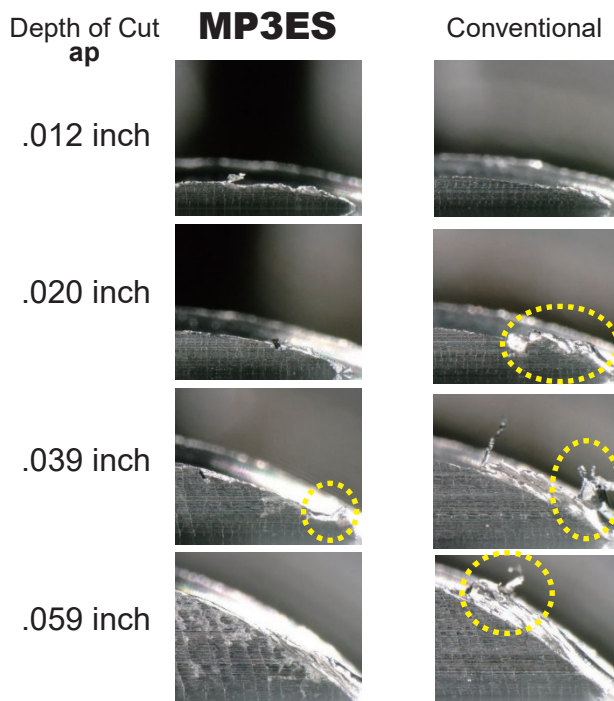


<Cutting Conditions>

Workpiece Material : AISI 304
 Tool : MP3ESD0800S08
 Cutting Speed : $vc = 165$ SFM
 Feed Rate : $f = 5.9$ IPM
 Feed per Tooth : $fr = .0010$ inch
 Depth of Cut : $ap = .012-.059$ inch
 $ae = .236$
 Cutting Mode : Wet Cutting (Oil)
 Machine : Small Automatic Lathe
 Tool Post : Gang Type Tool Post

Machined 304 - Comparison of Burr Generation

The optimized cutting edge shape suppresses the occurrence of burrs.



<Cutting Conditions>

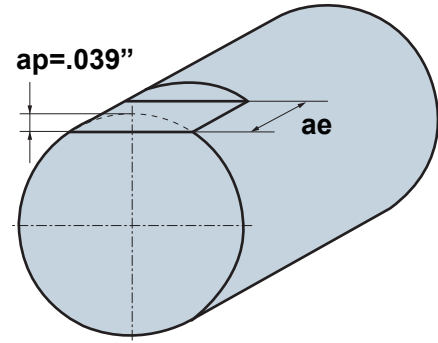
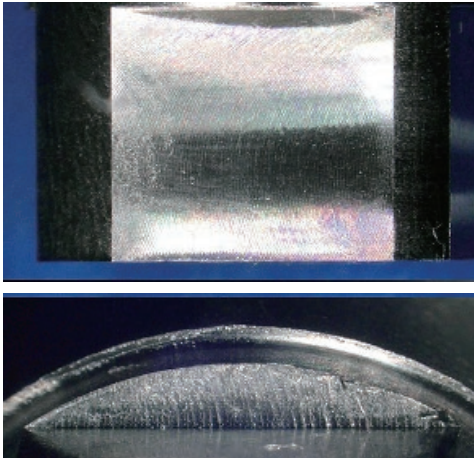
Workpiece Material : AISI 304
 Tool : MP3ESD0800S08
 Cutting Speed : $vc = 165$ SFM
 Feed Rate : $f = 5.9$ IPM
 Feed per Tooth : $fr = .0010$ inch
 Depth of Cut : $ap = .012-.059$ inch
 $ae = .236$
 Cutting Mode : Wet Cutting (Oil)
 Machine : Small Automatic Lathe
 Tool Post : Gang Type Tool Post

Cutting Performance

Machined 304 - Comparison of Surface Finishes

The surface finish is greatly improved due to the improved chatter resistance.

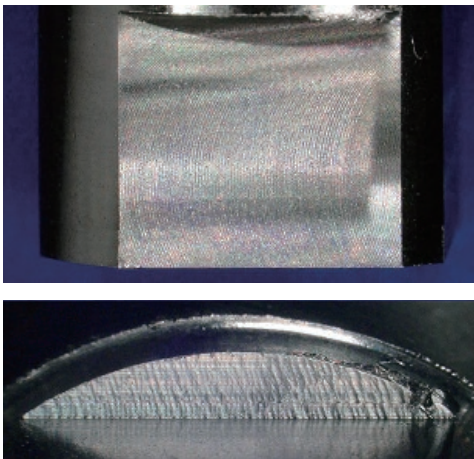
MP3ES
Ra .008 μ -inch



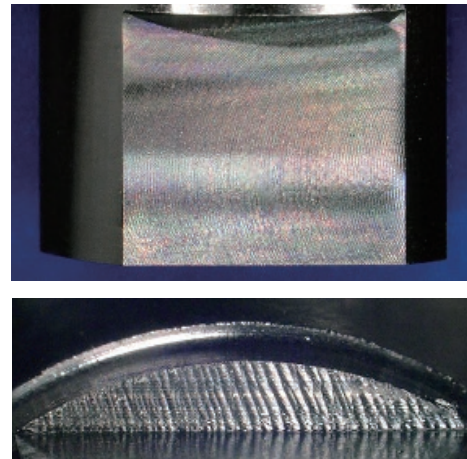
<Cutting Conditions>

Workpiece Material : JIS SUS304
Tool : MP3ESD0800S08
Cutting Speed : $vc = 165$ SFM
Feed Rate : $f = 5.9$ IPM
Feed per Tooth : $fr = .0010$ inch
Depth of Cut : $ap = .039$ inch
 $ae = .236$
Cutting Mode : Wet Cutting (Oil)
Machine : Small Automatic Lathe
Tool Post : Gang Type Tool Post

Conventional A
Ra .024 μ -inch

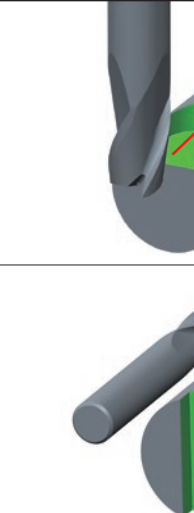


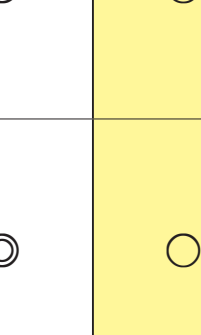


Conventional B
Ra .030 μ -inch



Selection of End Mill for Swiss Type Lathe

① The number of Flutes must be selected according to the type of machining.

Cuttig Mode	Type	MP2ES	MP3ES	MP4EC
	Flutes	2 Flute	3 Flute	4 Flute
Slotting of External		◎	○	×
Slotting of Facing		◎	○	×
Face Milling		△	◎	○
Shoulder Milling		△	○	◎

② Selecting Tools Other Than Small Swiss Type Automatic Lathe End Mills

End Mills with an overall tool length of LF=50 mm or less can be used even with small Swiss Type automatic lathe end mills. Select the necessary tools according to the workpiece material and machining method (such as every 0.1 or radius).

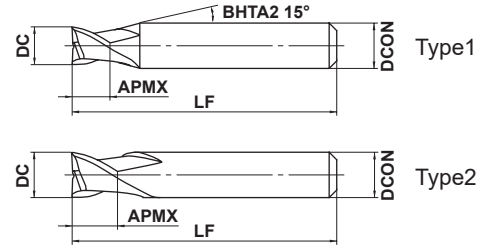
For Swiss Type Automatic Lathes MS plus End Mill Series

MP2ES NEW

End mill, 2 flute, For swiss type lathe



Carbon Steel, Alloy Steel, Cast Iron ($<30\text{HRC}$)	Tool Steel, Pre-hardened Steel, Hardened Steel ($\leq 45\text{HRC}$)	Hardened Steel ($\leq 55\text{HRC}$)	Hardened Steel ($>55\text{HRC}$)	Austenitic Stainless Steel	Titanium Alloy	Copper Alloy	Aluminum Alloy
○	○	○		○	○	○	



	$3 \leq \text{DC} \leq 10$				
	- 0.010 - 0.030				
	$4 \leq \text{DCON} \leq 6$	$7 \leq \text{DCON} \leq 10$			
	0 - 0.008	0 - 0.009			

● 2 flute end mill.

Order Number	DC	APMX	LF	DCON	(mm)		
					* No.F	Stock	Type
MP2ESD0300S04	3	4.5	50	4	2	●	1
MP2ESD0400S04	4	6	50	4	2	●	2
MP2ESD0500S06	5	7.5	50	6	2	●	1
MP2ESD0600S06	6	9	50	6	2	★	2
MP2ESD0700S07	7	10.5	50	7	2	★	2
MP2ESD0800S08	8	12	50	8	2	★	2
MP2ESD1000S10	10	15	50	10	2	●	2

* Number of Flutes

DC = Dia.
APMX = Length of Cut

LF = Overall Length
DCON = Shank Dia.

● : USA Stock ★ : Stocked in Japan

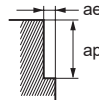
Recommended Cutting Conditions

Side Milling

(inch)

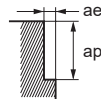
Dia. DC (mm) (inch)		Carbon steel, Cast iron, Alloy steel (-30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	10000	23.6	.118	.024	7000	15.7	.118	.024	6000	11.8	.118	.024
4	.157	7500	23.6	.157	.024	5200	15.7	.157	.024	4500	11.8	.157	.024
5	.197	6000	23.6	.197	.024	4200	15.7	.197	.024	3600	11.8	.197	.024
6	.236	5000	23.6	.236	.024	3500	15.7	.236	.024	3000	11.8	.236	.024
7	.276	4500	22.0	.276	.024	3200	14.2	.276	.024	2700	11.0	.276	.024
8	.315	4000	20.5	.315	.024	2800	13.8	.315	.024	2400	10.2	.315	.024
10	.394	3200	17.7	.394	.024	2200	11.8	.394	.024	1900	9.1	.394	.024

Depth of Cut



Dia. DC (mm) (inch)		Hardened steel (45-55HRC) AISI H13				Copper, Copper Alloy			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	5000	4.7	.118	.008	13000	30.7	.118	.024
4	.157	4000	4.7	.157	.008	9500	29.9	.157	.024
5	.197	3200	4.7	.197	.008	7600	29.9	.197	.024
6	.236	2700	4.7	.236	.008	6400	30.3	.236	.024
7	.276	2300	4.3	.276	.008	5500	26.8	.276	.024
8	.315	2000	4.3	.315	.008	4800	24.4	.315	.024
10	.394	1600	3.9	.394	.008	3800	20.9	.394	.024

Depth of Cut



Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.

Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.

Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

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.

For Swiss Type Automatic Lathes MS plus End Mill Series

MP2ES

End mill, 2 flute, For swiss type lathe

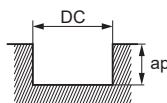
Recommended Cutting Conditions

Slotting

(inch)

Workpiece Material		Carbon steel, Cast iron, Alloy steel (–30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V		
Dia. DC		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
(mm)	(inch)									
3	.118	10000	23.6	.024	7000	15.7	.024	6000	11.8	.024
4	.157	7500	23.6	.024	5200	15.7	.024	4500	11.8	.024
5	.197	6000	23.6	.024	4200	15.7	.024	3600	11.8	.024
6	.236	5000	23.6	.024	3500	15.7	.024	3000	11.8	.024
7	.276	4500	22.0	.024	3200	14.2	.024	2700	11.0	.024
8	.315	4000	20.5	.024	2800	13.8	.024	2400	10.2	.024
10	.394	3200	17.7	.024	2200	11.8	.024	1900	9.1	.024

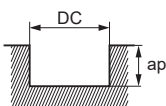
Depth of Cut



DC: Dia.

Workpiece Material		Hardened steel (45–55HRC) AISI H13			Copper, Copper Alloy		
Dia. DC		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
(mm)	(inch)						
3	.118	5000	4.7	.008	13000	30.7	.024
4	.157	4000	4.7	.008	9500	29.9	.024
5	.197	3200	4.7	.008	7600	29.9	.024
6	.236	2700	4.7	.008	6400	30.3	.024
7	.276	2300	4.3	.008	5500	26.8	.024
8	.315	2000	4.3	.008	4800	24.4	.024
10	.394	1600	3.9	.008	3800	20.9	.024

Depth of Cut



DC: Dia.

Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.

Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.

Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

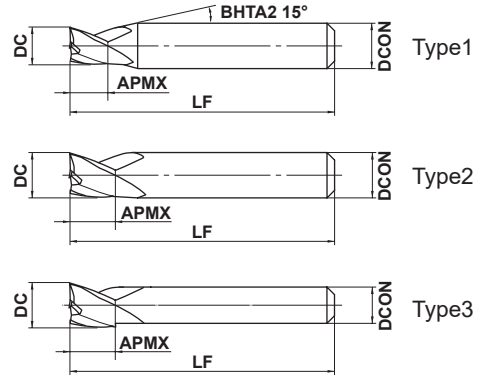
Note 4) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

MP3ES NEW

End mill, 3 flute, For swiss type lathe



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



3 ≤ DC ≤ 12				
- 0.010				
- 0.030				



4 ≤ DCON ≤ 6	7 ≤ DCON ≤ 10	DCON = 12		
0	0	0		
- 0.008	- 0.009	- 0.011		

● 3 flute end mill.

(mm)

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP3ESD0300S04	3	4.5	50	4	3	●	1
MP3ESD0400S04	4	6	50	4	3	★	2
MP3ESD0500S06	5	7.5	50	6	3	●	1
MP3ESD0600S06	6	9	50	6	3	★	2
MP3ESD0700S07	7	10.5	50	7	3	●	2
MP3ESD0800S08	8	12	50	8	3	★	2
MP3ESD0900S10	9	13.5	50	10	3	★	1
MP3ESD1000S10	10	15	50	10	3	●	2
MP3ESD1200S10	12	15	50	10	3	●	3
MP3ESD1200S12	12	15	50	12	3	★	2

* Number of Flutes

DC = Dia.
APMX = Length of Cut

LF = Overall Length
DCON = Shank Dia.

● : USA Stock ★ : Stocked in Japan

For Swiss Type Automatic Lathes MS plus End Mill Series

MP3ES

End mill, 3 flute, For swiss type lathe

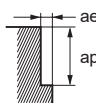
Recommended Cutting Conditions

Side Milling

(inch)

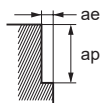
Dia. DC (mm) (inch)		Carbon steel, Cast iron, Alloy steel (-30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	10000	28.3	.118	.024	7000	18.9	.118	.024	6000	14.2	.118	.024
4	.157	7500	28.3	.157	.024	5200	18.9	.157	.024	4500	14.2	.157	.024
5	.197	6000	28.3	.197	.024	4200	18.9	.197	.024	3600	14.2	.197	.024
6	.236	5000	28.3	.236	.024	3500	18.9	.236	.024	3000	14.2	.236	.024
7	.276	4500	26.4	.276	.024	3200	17.3	.276	.024	2700	13.4	.276	.024
8	.315	4000	24.4	.315	.024	2800	16.5	.315	.024	2400	12.2	.315	.024
9	.354	3500	22.8	.354	.024	2500	15.0	.354	.024	2100	11.4	.354	.024
10	.394	3200	21.3	.394	.024	2200	14.2	.394	.024	1900	11.0	.394	.024
12	.472	2700	19.3	.472	.024	1900	12.6	.472	.024	1600	9.8	.472	.024

Depth of Cut



Dia. DC (mm) (inch)		Hardened steel (45-55HRC) AISI H13				Copper, Copper Alloy			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	5000	5.5	.118	.008	13000	37.0	.118	.024
4	.157	4000	5.5	.157	.008	9500	35.8	.157	.024
5	.197	3200	5.5	.197	.008	7600	35.8	.197	.024
6	.236	2700	5.5	.236	.008	6400	36.2	.236	.024
7	.276	2300	5.1	.276	.008	5500	32.3	.276	.024
8	.315	2000	5.1	.315	.008	4800	29.1	.315	.024
9	.354	1800	5.1	.354	.008	4200	27.6	.354	.024
10	.394	1600	4.7	.394	.008	3800	25.2	.394	.024
12	.472	1300	4.7	.472	.008	3200	22.8	.472	.024

Depth of Cut



Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.

Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.

Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

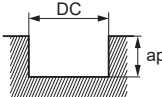
Note 4) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

Slotting

(inch)

Workpiece Material		Carbon steel, Cast iron, Alloy steel (–30HRC) AISI 1050, AISI No 35 B, AISI P20			Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21			Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V		
Dia. DC		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
(mm)	(inch)									
3	.118	10000	28.3	.024	7000	18.9	.024	6000	14.2	.024
4	.157	7500	28.3	.024	5200	18.9	.024	4500	14.2	.024
5	.197	6000	28.3	.024	4200	18.9	.024	3600	14.2	.024
6	.236	5000	28.3	.024	3500	18.9	.024	3000	14.2	.024
7	.276	4500	26.4	.024	3200	17.3	.024	2700	13.4	.024
8	.315	4000	24.4	.024	2800	16.5	.024	2400	12.2	.024
9	.354	3500	22.8	.024	2500	15.0	.024	2100	11.4	.024
10	.394	3200	21.3	.024	2200	14.2	.024	1900	11.0	.024
12	.472	2700	19.3	.024	1900	12.6	.024	1600	9.8	.024

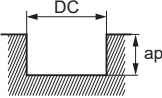
Depth of Cut



DC:Dia.

Workpiece Material		Hardened steel (45–55HRC) AISI H13			Copper, Copper Alloy		
Dia. DC		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
(mm)	(inch)						
3	.118	5000	5.5	.008	13000	37.0	.024
4	.157	4000	5.5	.008	9500	35.8	.024
5	.197	3200	5.5	.008	7600	35.8	.024
6	.236	2700	5.5	.008	6400	36.2	.024
7	.276	2300	5.1	.008	5500	32.3	.024
8	.315	2000	5.1	.008	4800	29.1	.024
9	.354	1800	5.1	.008	4200	27.6	.024
10	.394	1600	4.7	.008	3800	25.2	.024
12	.472	1300	4.7	.008	3200	22.8	.024

Depth of Cut



DC:Dia.

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Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.

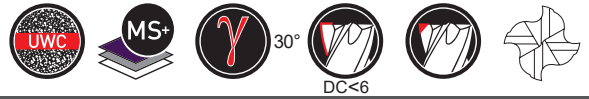
Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

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.

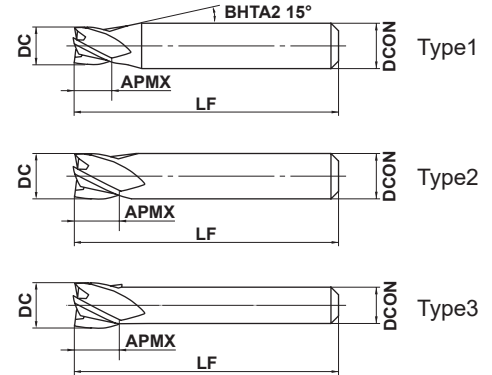
For Swiss Type Automatic Lathes MS plus End Mill Series

MP4EC NEW

End mill, 4 flute, For swiss type lathe



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	Copper Alloy	Aluminum Alloy
○	○	○		○	○	○	



	3 ≤ DC ≤ 12	DC = 14			
	- 0.010 - 0.030	- 0.010 - 0.040			
	4 ≤ DCON ≤ 6	7 ≤ DCON ≤ 10	DCON = 12		
	0 - 0.008	0 - 0.009	0 - 0.011		

● 4 flute end mill.

Order Number	DC	APMX	LF	DCON	* No.F	Stock	Type
MP4ECD0300S04	3	4.5	50	4	4	●	1
MP4ECD0350S04	3.5	5	50	4	4	★	1
MP4ECD0400S04	4	6	50	4	4	●	2
MP4ECD0500S06	5	7.5	50	6	4	●	1
MP4ECD0600S06	6	9	50	6	4	●	2
MP4ECD0700S07	7	10.5	50	7	4	★	2
MP4ECD0800S07	8	12	50	7	4	★	3
MP4ECD0800S08	8	12	50	8	4	●	2
MP4ECD0900S10	9	13.5	50	10	4	●	1
MP4ECD1000S07	10	15	50	7	4	★	3
MP4ECD1000S10	10	15	50	10	4	●	2
MP4ECD1200S10	12	15	50	10	4	●	3
MP4ECD1200S12	12	15	50	12	4	★	2
MP4ECD1400S10	14	15	50	10	4	●	3

* Number of Flutes

DC = Dia. LF = Overall Length
APMX = Length of Cut DCON = Shank Dia.

● : USA Stock ★ : Stocked in Japan

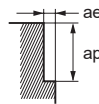
Recommended Cutting Conditions

Side Milling

(inch)

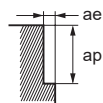
Dia. DC (mm) (inch)		Carbon steel, Cast iron, Alloy steel (–30HRC) AISI 1050, AISI No 35 B, AISI P20				Alloy steel, Tool steel, Pre-hardened steel AISI H13, AISI W1-10, AISI P21				Austenitic stainless steel, Titanium alloy AISI 304, AISI 306, Ti-6Al-4V			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	10000	35.4	.118	.024	7000	23.6	.118	.024	6000	17.7	.118	.024
3.5	.138	8500	35.4	.138	.024	6000	23.6	.138	.024	5100	17.7	.138	.024
4	.157	7500	35.4	.157	.024	5200	23.6	.157	.024	4500	17.7	.157	.024
5	.197	6000	35.4	.197	.024	4200	23.6	.197	.024	3600	17.7	.197	.024
6	.236	5000	35.4	.236	.024	3500	23.6	.236	.024	3000	17.7	.236	.024
7	.276	4500	33.1	.276	.024	3200	21.3	.276	.024	2700	16.5	.276	.024
8	.315	4000	30.7	.315	.024	2800	20.5	.315	.024	2400	15.4	.315	.024
9	.354	3500	28.3	.354	.024	2500	18.9	.354	.024	2100	14.2	.354	.024
10	.394	3200	26.8	.394	.024	2200	17.7	.394	.024	1900	13.4	.394	.024
12	.472	2700	24.4	.472	.024	1900	16.1	.472	.024	1600	12.2	.472	.024
14	.551	2300	21.7	.551	.024	1600	13.8	.551	.024	1400	11.0	.551	.024

Depth of cut



Dia. DC (mm) (inch)		Hardened steel (45–55HRC) AISI H13				Copper, Copper Alloy			
		Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Width of Cut ae
3	.118	5000	7.1	.118	.008	13000	47.2	.118	.024
3.5	.138	4500	7.1	.138	.008	11000	47.2	.138	.024
4	.157	4000	7.1	.157	.008	9500	43.3	.157	.024
5	.197	3200	7.1	.197	.008	7600	43.3	.197	.024
6	.236	2700	7.1	.236	.008	6400	43.3	.236	.024
7	.276	2300	6.3	.276	.008	5500	39.4	.276	.024
8	.315	2000	6.3	.315	.008	4800	37.0	.315	.024
9	.354	1800	5.9	.354	.008	4200	33.9	.354	.024
10	.394	1600	5.5	.394	.008	3800	31.9	.394	.024
12	.472	1300	4.7	.472	.008	3200	28.7	.472	.024
14	.551	1200	4.7	.551	.008	2700	25.6	.551	.024

Depth of cut



Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.

Note 2) If the depth of cut is shallow, the revolution and feed rate can be increased.

Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

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.

For Swiss Type Automatic Lathes MS plus End Mill Series

MP4EC

End mill, 4 flute, For small automatic lathes

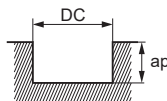
Recommended Cutting Conditions

Slotting

(inch)

Dia. DC		Carbon steel, Cast iron, Alloy steel (–30HRC)			Alloy steel, Tool steel, Pre-hardened steel			Austenitic stainless steel, Titanium alloy		
		AISI 1050, AISI No 35 B, AISI P20			AISI H13, AISI W1-10, AISI P21			AISI 304, AISI 306, Ti-6Al-4V		
(mm)	(inch)	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
3	.118	10000	35.4	.024	7000	23.6	.024	6000	17.7	.024
3.5	.138	8500	35.4	.024	6000	23.6	.024	5100	17.7	.024
4	.157	7500	35.4	.024	5200	23.6	.024	4500	17.7	.024
5	.197	6000	35.4	.024	4200	23.6	.024	3600	17.7	.024
6	.236	5000	35.4	.024	3500	23.6	.024	3000	17.7	.024
7	.276	4500	33.1	.024	3200	21.3	.024	2700	16.5	.024
8	.315	4000	30.7	.024	2800	20.5	.024	2400	15.4	.024
9	.354	3500	28.3	.024	2500	18.9	.024	2100	14.2	.024
10	.394	3200	26.8	.024	2200	17.7	.024	1900	13.4	.024
12	.472	2700	24.4	.024	1900	16.1	.024	1600	12.2	.024
14	.551	2300	21.7	.024	1600	13.8	.024	1400	11.0	.024

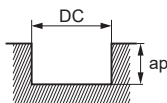
Depth of Cut



DC:Dia.

Dia. DC		Hardened steel (45–55HRC)			Copper, Copper Alloy		
		AISI H13					
(mm)	(inch)	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap	Revolution (min ⁻¹)	Feed rate (IPM)	Depth of Cut ap
3	.118	5000	7.1	.008	13000	47.2	.024
3.5	.138	4500	7.1	.008	11000	47.2	.024
4	.157	4000	7.1	.008	9500	43.3	.024
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6	.236	2700	7.1	.008	6400	43.3	.024
7	.276	2300	6.3	.008	5500	39.4	.024
8	.315	2000	6.3	.008	4800	37.0	.024
9	.354	1800	5.9	.008	4200	33.9	.024
10	.394	1600	5.5	.008	3800	31.9	.024
12	.472	1300	4.7	.008	3200	28.7	.024
14	.551	1200	4.7	.008	2700	25.6	.024

Depth of Cut



DC:Dia.

Note 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.

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Note 3) When drilling, please set the feed rate at 1/3 or below the values above.

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Memo

A series of horizontal dashed lines for writing, spanning the width of the page.



For Swiss Type Automatic Lathes
MS plus End Mill Series

MP2ES/3ES/4EC

For your safety

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

 **MITSUBISHI MATERIALS U.S.A. CORPORATION**

Customer Service : 800-523-0800
Technical Service : 800-486-2341

LOS ANGELES HEAD OFFICE
3535 Hyland Avenue, Suite 200, Costa Mesa, CA 92626
TEL : 714-352-6100 FAX : 714-668-1320

NORTH CAROLINA OFFICE
105 Corporate Center Drive Suite A, Mooresville, NC 28117
TEL : 980-312-3100 FAX : 704-746-9292

CHICAGO OFFICE
1314B North Plum Grove Road, Schaumburg, IL 60173
TEL : 847-252-6300 FAX : 847-519-1732

TORONTO OFFICE
3535 Laird Road, Units 15 & 16, Mississauga, Ontario, L5L 5Y7, Canada
TEL : 905-814-0240 FAX : 905-814-0245

MMC METAL DE MEXICO, S.A. DE C.V.
Av. La Cañada No.16, Parque Industrial Bernardo Quintana,
El Marques, Queretaro, CP76246, Mexico
TEL : +52-442-221-6136 FAX : +52-442-221-6134

URL : <http://www.mmus-carbide.com>
(Tool specifications subject to change without notice.)

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