

X600⁺ Series

Mold Processing & Parts Processing

Best Seller IE Series
Variable Helix Angle & Uneven Flute
 High Speed Cutting, enable to reduce vibration and noise

Cutting edge with Gashland
 Enable to reduce chipping with longer tool life

Optional Coating
 Optional 3 types of selectable coating

TO TE TA

UMG Ultrafine Micro Grain Carbide
 Suitable for work material ~ HRC60

Types of Flute

Types of Uneven Flute

Optional DIN Weldon Shank

Honing Process

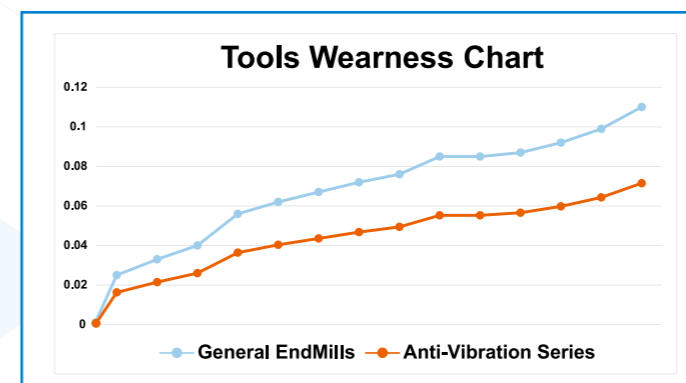
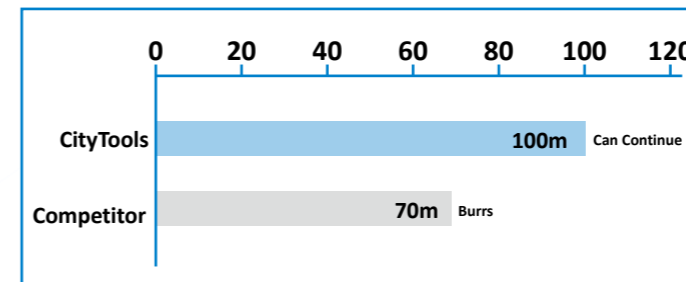
Special & Custom Tooling Services

Customized acceptable !
 From **Coating, flute, Helix angle, cutting length, to total length.**

Smooth cutting & Longer Tool Life

X600IE with Uneven Flute/Variable Helix angle geometry design, TO coating (AlTiCrSiN) layer with high temperature resistance and high hardness, resulting in better cutting stability and increasing longer tool life 30%.

Suitable for Mild steels, Cast Irons, Hardened steels with longer tool life.



Tool	X600IE ⁺ -11374TO
Tool Size	Ø10
Work Material	S50C
Milling Method	Side Milling
Cutting Speed	3870 rev/min
Feed Rate	850 (0.055 mm/t)
Depth of Cut	Ap=15mm, Ae=1mm
Coolant	Air Cooling
Machine	Vertical Machining Center

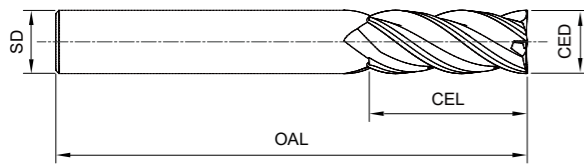
Unique heat resistance coating reduce wear reduction

Longer Tool life and Better Surface

Under the same condition of cutting, the wear resistance of X600IE+-11394TO is about 30% lower and get longer tool life comparing with competitor brand.

X600⁺ - 11374TO

- ◆ Square - 4-Flute x 2.5D
- ◆ Helix 37°



CED Tolerance(mm)	
1~3	0~-0.014
3~6	0~-0.018
6~10	0~-0.002
10~12	0~-0.025

h5 (unit : mm)

Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -11374TO	1	3	4	50	4
	2	5	4	50	
	3	8	4	50	
	4	10	4	50	
	5	13	6	50	
	6	15	6	50	
	8	20	8	60	
	10	25	10	75	
12	30	12	75		

Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -11374TO	EU 3	8	6	57	4
	EU 4	11	6	57	
	EU 5	13	6	57	
	EU 6	13	6	57	
	EU 8	19	8	63	
	EU 10	22	10	72	
	EU 12	26	12	83	

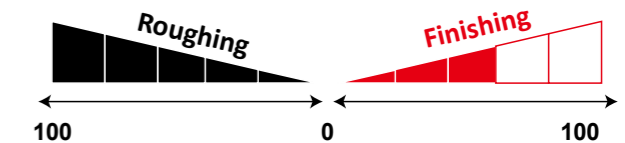
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
CED	$a_p: 1.5D$	$a_e: 0.2D$	$a_p: 1.5D$	$a_e: 0.1D$	$a_p: 1.5D$	$a_e: 0.05D$	$a_p: 1.5D$	$a_e: 0.03D$																
1	30,200	470	27,180	360	21,600	250	17,000	170																
2	18,600	580	16,740	440	12,240	210	9,700	150																
3	13,700	690	12,330	520	9,270	240	7,400	230																
4	10,300	740	9,270	560	6,900	360	5,500	250																
5	8,200	790	7,380	600	5,670	400	4,500	280																
6	5,900	990	5,310	750	4,590	480	3,600	340																
8	5,100	990	4,590	750	3,600	470	2,880	330																
10	4,100	880	3,690	670	2,880	450	2,300	320																
12	3,400	820	3,060	620	2,430	340	1,900	230																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	1.5D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	1.5D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.05D</td> </tr> </table>		a_p	a_e	1.5D	0.05D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>1.5D</td> <td>0.03D</td> </tr> </table>		a_p	a_e	1.5D	0.03D
a_p	a_e																							
1.5D	0.2D																							
a_p	a_e																							
1.5D	0.1D																							
a_p	a_e																							
1.5D	0.05D																							
a_p	a_e																							
1.5D	0.03D																							

Work Material

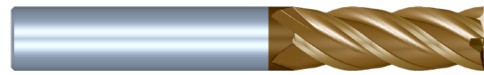
P			H		
G1	G2	G3	G14	G15	G16
●	●	●	●	●	●



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

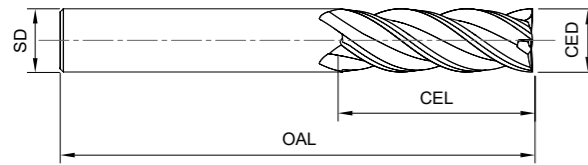
X600⁺ - 11374TO

- ◆ Square - 4-Flute x 3D
- ◆ Helix 37°



CED Tolerance(mm)	
1~3	0~-0.014
3~6	0~-0.018
6~10	0~-0.02
10~18	0~-0.025
18~20	0~-0.03

h5 (unit : mm)



Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -11374TO	1	3	4	50	4
	2	6	4	50	
	3	9	4	50	
	4	12	4	50	
	5	15	6	50	
	6	18	6	50	
	8	24	8	65	
	10	30	10	75	
	12	36	12	80	
	16	48	16	100	
20	60	20	125		

Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -11374TO	EU 3	9	6	57	4
	EU 4	12	6	65	
	EU 5	15	6	65	
	EU 6	18	6	65	
	EU 8	24	8	75	
	EU 10	30	10	80	
	EU 12	36	12	93	

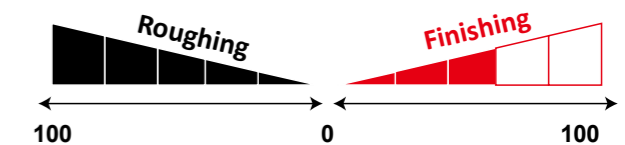
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min
CED	$a_p: 1.5D$	$a_e: 0.2D$	$a_p: 1.5D$	$a_e: 0.1D$	$a_p: 1.5D$	$a_e: 0.05D$	$a_p: 1.5D$	$a_e: 0.03D$
1	30,200	470	27,180	360	21,600	250	17,000	170
2	18,600	580	16,740	440	12,240	210	9,700	150
3	13,700	690	12,330	520	9,270	240	7,400	230
4	10,300	740	9,270	560	6,900	360	5,500	250
5	8,200	790	7,380	600	5,670	400	4,500	280
6	5,900	990	5,310	750	4,590	480	3,600	340
8	5,100	990	4,590	750	3,600	470	2,880	330
10	4,100	880	3,690	670	2,880	450	2,300	320
12	3,400	820	3,060	620	2,430	340	1,900	230
16	2,600	610	2,340	460	1,890	270	1,500	190
20	2,050	490	1,840	370	1,500	190	1,200	140
Depth of cut								

Work Material

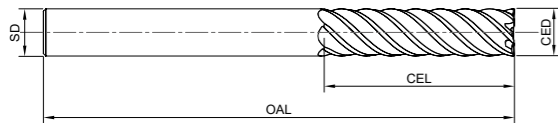
P			H		
G1	G2	G3	G14	G15	G16
●	●	●	●	●	●



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 12466TO

- ◆ Square - 6-Flute x 4D / Long Flute
- ◆ Helix 46°



CED Tolerance(mm)	
6~10	0~-0.02
10~16	0~-0.025
16~20	0~-0.03

h5 (unit : mm)

Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -12466TO	6	24	6	65	6
	8	32	8	90	
	10	40	10	100	
	12	48	12	110	
	16	64	16	140	
	20	80	20	160	

Code No.	CED	CEL	SD	OAL	Flute
X600 ⁺ -12466TO	EU 6	24	6	65	6
	EU 8	32	8	80	
	EU 10	40	10	90	
	EU 12	48	12	100	

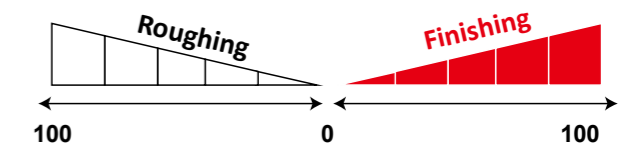
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
CED	$a_p: 2.5D$	$a_e: 0.05D$	$a_p: 2.5D$	$a_e: 0.03D$	$a_p: 2.5D$	$a_e: 0.02D$	$a_p: 2.5D$	$a_e: 0.01D$																
6	6,400	1,200	5,760	1,080	4,300	910	4,300	450																
8	4,800	1,400	4,000	1,190	3,200	910	2,900	450																
10	3,400	1,300	2,800	1,170	2,500	910	2,600	450																
12	2,900	1,250	2,750	1,100	2,100	880	2,190	450																
16	2,100	1,150	1,800	1,000	1,620	800	1,600	430																
20	1,900	1,100	1,600	990	1,300	780	1,300	480																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>2.5D</td> <td>0.05D</td> </tr> </table>		a_p	a_e	2.5D	0.05D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>2.5D</td> <td>0.03D</td> </tr> </table>		a_p	a_e	2.5D	0.03D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>2.5D</td> <td>0.02D</td> </tr> </table>		a_p	a_e	2.5D	0.02D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>2.5D</td> <td>0.01D</td> </tr> </table>		a_p	a_e	2.5D	0.01D
a_p	a_e																							
2.5D	0.05D																							
a_p	a_e																							
2.5D	0.03D																							
a_p	a_e																							
2.5D	0.02D																							
a_p	a_e																							
2.5D	0.01D																							

Work Material

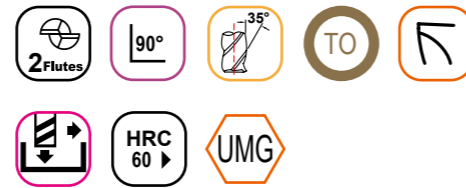
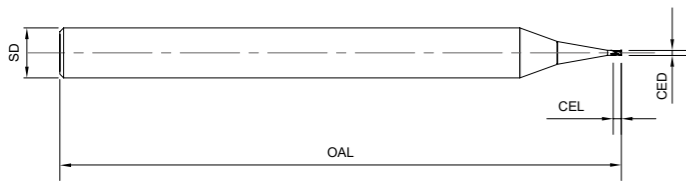
P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600M⁺ - 14352TO

- ◆ Square - 2-Flute x 1D / Miniature
- ◆ Helix 35°



CED Tolerance(mm)	
0.2~0.9	0~-0.014

h5 (unit : mm)

Code No.	CED	CEL	SD	OAL	Flute
X600M ⁺ -14352TO	0.2	0.2	4	45	2
	0.3	0.3	4	45	
	0.4	0.4	4	45	
	0.5	0.5	4	45	
	0.6	0.6	4	45	
	0.7	0.7	4	45	
	0.8	0.8	4	45	
	0.9	0.9	4	45	

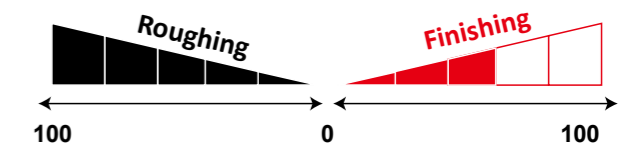
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
CED	$a_p: 0.05D$	$a_e: 0.6D$	$a_p: 0.04D$	$a_e: 0.5D$	$a_p: 0.03D$	$a_e: 0.4D$	$a_p: 0.02D$	$a_e: 0.2D$																
0.2	40,000	300	38,000	270	33,700	215	31,500	190																
0.3	36,000	400	34,000	360	30,000	285	28,000	220																
0.4	28,000	420	27,000	378	24,000	300	22,400	240																
0.5	28,000	520	27,000	440	24,000	350	22,400	280																
0.6	28,000	600	27,000	570	24,000	450	22,400	360																
0.7	28,000	600	27,000	570	24,000	450	22,400	360																
0.8	28,000	680	27,000	610	24,000	480	22,400	380																
0.9	28,000	700	27,000	620	24,000	550	22,400	450																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.6D</td> </tr> </table>		a_p	a_e	0.05D	0.6D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.04D</td> <td>0.5D</td> </tr> </table>		a_p	a_e	0.04D	0.5D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.4D</td> </tr> </table>		a_p	a_e	0.03D	0.4D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.02D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.02D	0.2D
a_p	a_e																							
0.05D	0.6D																							
a_p	a_e																							
0.04D	0.5D																							
a_p	a_e																							
0.03D	0.4D																							
a_p	a_e																							
0.02D	0.2D																							

Work Material

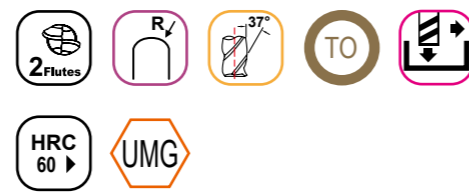
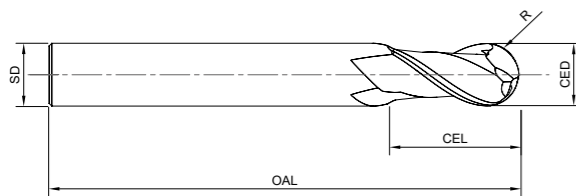
P			H		
G1	G2	G3	G14	G15	G16
●	●	●	●	●	●



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 81372TO

- ♦ Ball Nose - 2-Flute x 2D
- ♦ Helix 37°



CED Tolerance(mm)	
R	±0.02

h5 (unit : mm)

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -81372TO	0.5R	2	4	50	2
	1R	4	4	50	
	1.5R	6	4	50	
	2R	8	4	50	
	2.5R	10	6	50	
	3R	12	6	50	
	4R	16	8	60	
	5R	20	10	75	
6R	24	12	75		

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -81372TO	EU 1.5R	6	6	57	2
	EU 2R	8	6	57	
	EU 2.5R	10	6	57	
	EU 3R	12	6	57	
	EU 4R	16	8	63	
	EU 5R	20	10	72	
	EU 6R	24	12	83	

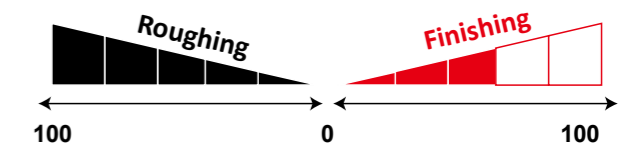
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	$a_p: 0.1D$	$a_e: 0.2D$	$a_p: 0.08D$	$a_e: 0.2D$	$a_p: 0.05D$	$a_e: 0.1D$	$a_p: 0.03D$	$a_e: 0.1D$																
0.5R	29,000	590	28,000	350	23,000	290	20,000	220																
1.0R	21,000	850	17,000	520	13,800	350	12,420	260																
1.5R	14,000	840	11,700	540	10,000	430	9,000	310																
2R	10,000	840	9,000	520	7,700	410	6,930	320																
2.5R	8,600	830	7,200	510	6,100	470	5,490	360																
3R	7,200	830	5,800	490	5,100	390	4,590	430																
4R	5,400	810	4,400	490	3,800	550	3,420	430																
5R	4,300	810	3,500	490	3,000	390	2,700	400																
6R	3,600	810	2,900	490	2,500	390	2,250	310																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.1D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.1D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.08D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.08D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.03D	0.1D
a_p	a_e																							
0.1D	0.2D																							
a_p	a_e																							
0.08D	0.2D																							
a_p	a_e																							
0.05D	0.1D																							
a_p	a_e																							
0.03D	0.1D																							

Work Material

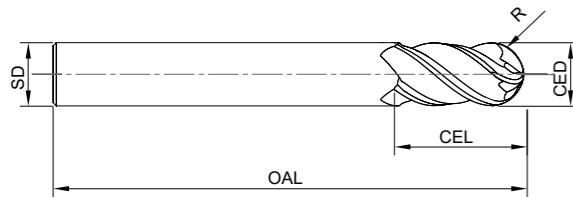
P			H		
G1	G2	G3	G14	G15	G16
•	•	•	•	•	•



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 81404TO

- ♦ Ball Nose - 4-Flute x 2D
- ♦ Helix 40°



CED Tolerance(mm)	
R	±0.02

h5 (unit : mm)

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -81404TO	3R	12	6	50	4
	4R	16	8	60	
	5R	20	10	75	
	6R	24	12	75	
	8R	32	16	100	
	10R	40	20	100	

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -81404TO	EU 3R	12	6	57	4
	EU 4R	16	8	63	
	EU 5R	20	10	72	
	EU 6R	24	12	83	

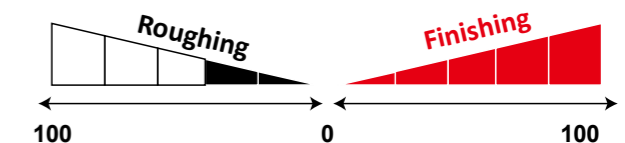
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	$a_p: 0.1D$	$a_e: 0.2D$	$a_p: 0.08D$	$a_e: 0.2D$	$a_p: 0.05D$	$a_e: 0.1D$	$a_p: 0.03D$	$a_e: 0.1D$																
3R	7,980	1,400	1,780	1,120	6,000	780	4,800	540																
4R	5,900	1,400	5,300	1,120	4,500	780	3,600	540																
5R	4,700	1,400	4,200	1,120	3,360	780	2,600	540																
6R	4,000	1,400	5,900	1,120	3,000	780	2,400	540																
8R	2,900	1,400	2,650	1,120	2,200	780	1,760	540																
10R	2,300	1,200	2,130	960	1,700	670	1,360	470																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.1D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.1D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.08D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.08D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.03D	0.1D
a_p	a_e																							
0.1D	0.2D																							
a_p	a_e																							
0.08D	0.2D																							
a_p	a_e																							
0.05D	0.1D																							
a_p	a_e																							
0.03D	0.1D																							

Work Material

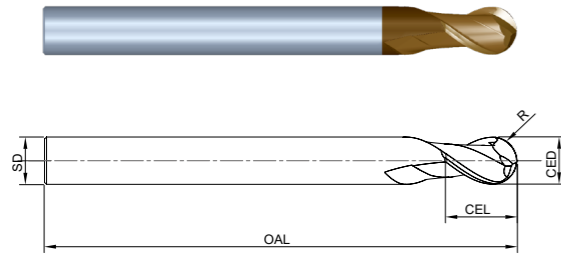
P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 83372TO

- ♦ Ball Nose - 2-Flute x 1D / Long Shank
- ♦ Helix 37°



Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -83372TO	0.5R	1	4	75	2
	1R	2	4	75	
	1.5R	3	4	75	
	2R	4	4	75	
	2.5R	5	6	75	
	3R	6	6	75	
	4R	8	8	100	
	5R	10	10	100	
6R	12	12	100		

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -83372TO	EU 1.5R	3	6	80	2
	EU 2R	4	6	80	
	EU 2.5R	5	6	80	
	EU 3R	6	6	80	
	EU 4R	8	8	90	
	EU 5R	10	10	100	
	EU 6R	12	12	120	

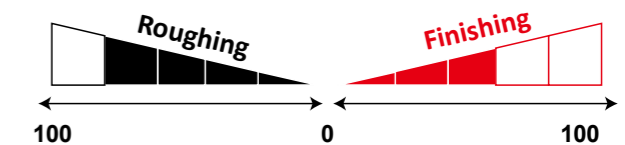
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	a _p : 0.1D	a _e : 0.2D	a _p : 0.08D	a _e : 0.2D	a _p : 0.05D	a _e : 0.1D	a _p : 0.03D	a _e : 0.1D																
0.5R	34,000	670	33,600	400	27,600	320	25,000	240																
1.0R	25,000	890	20,400	530	16,560	380	14,900	280																
1.5R	16,000	900	14,040	550	12,000	470	10,900	340																
2R	12,000	920	10,800	550	9,240	450	8,300	360																
2.5R	9,600	930	8,640	540	7,320	510	6,500	400																
3R	8,640	910	6,960	540	6,120	430	5,500	470																
4R	6,480	890	5,280	530	4,560	430	4,100	470																
5R	5,160	890	4,200	530	3,600	430	3,200	440																
6R	4,320	890	3,480	530	3,000	430	2,700	340																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.1D</td> <td>0.2D</td> </tr> </table>		a _p	a _e	0.1D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.08D</td> <td>0.2D</td> </tr> </table>		a _p	a _e	0.08D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a _p	a _e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.1D</td> </tr> </table>		a _p	a _e	0.03D	0.1D
a _p	a _e																							
0.1D	0.2D																							
a _p	a _e																							
0.08D	0.2D																							
a _p	a _e																							
0.05D	0.1D																							
a _p	a _e																							
0.03D	0.1D																							

Work Material

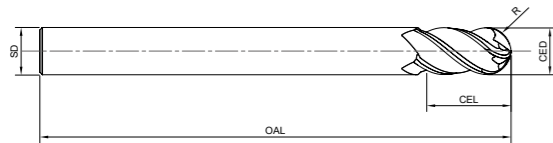
P			H		
G1	G2	G3	G14	G15	G16
•	•	•	•	•	•



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 83404TO

- ♦ Ball Nose - 4-Flute x 2D / Long Shank
- ♦ Helix 40°



CED Tolerance(mm)	
R	±0.02

h5 (unit : mm)

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -83404TO	3R	12	6	75	4
	4R	16	8	100	
	5R	20	10	100	
	6R	24	12	100	
	8R	32	16	150	
	10R	40	20	150	

Code No.	Radius	CEL	SD	OAL	Flute
X600 ⁺ -83404TO	EU 3R	12	6	100	4
	EU 4R	16	8	100	
	EU 5R	20	10	100	
	EU 6R	24	12	150	

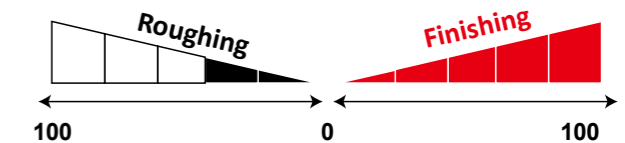
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	$a_p: 0.1D$	$a_e: 0.2D$	$a_p: 0.08D$	$a_e: 0.2D$	$a_p: 0.05D$	$a_e: 0.1D$	$a_p: 0.03D$	$a_e: 0.1D$																
3R	7,980	1,400	1,780	1,120	6,000	780	4,800	540																
4R	5,900	1,400	5,300	1,120	4,500	780	3,600	540																
5R	4,700	1,400	4,200	1,120	3,360	780	2,600	540																
6R	4,000	1,400	5,900	1,120	3,000	780	2,400	540																
8R	2,900	1,400	2,650	1,120	2,200	780	1,760	540																
10R	2,300	1,200	2,130	960	1,700	670	1,360	470																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.1D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.1D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.08D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.08D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.03D	0.1D
a_p	a_e																							
0.1D	0.2D																							
a_p	a_e																							
0.08D	0.2D																							
a_p	a_e																							
0.05D	0.1D																							
a_p	a_e																							
0.03D	0.1D																							

Work Material

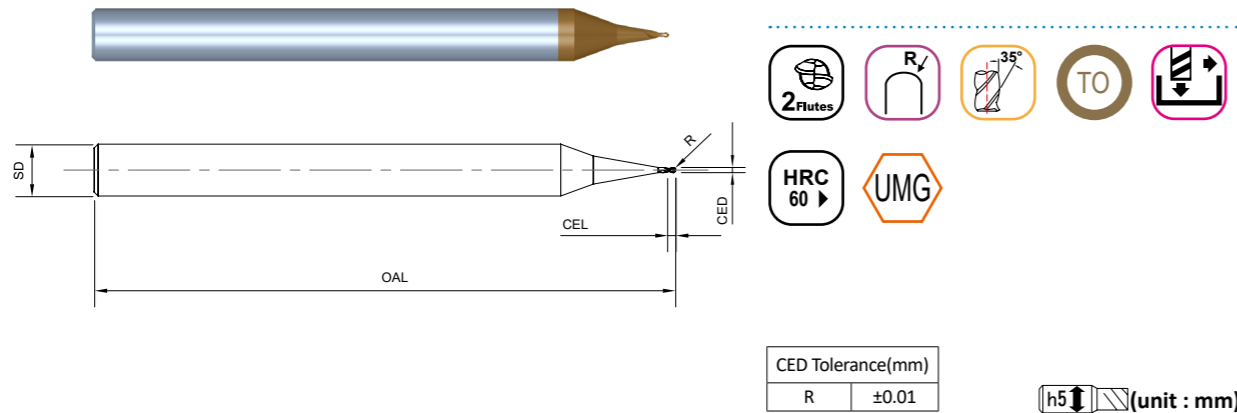
P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600M⁺ - 84352TO

- ♦ Ball Nose - 2-Flute x 1D / Miniature
- ♦ Helix 35°



CED Tolerance(mm)	
R	±0.01

h5 (unit : mm)

Code No.	Radius	CEL	SD	OAL	Flute
X600M ⁺ -84352TO	0.1R	0.2	4	45	2
	0.15R	0.3	4	45	
	0.2R	0.4	4	45	
	0.25R	0.5	4	45	
	0.3R	0.6	4	45	
	0.35R	0.7	4	45	
	0.4R	0.8	4	45	
	0.45R	0.9	4	45	

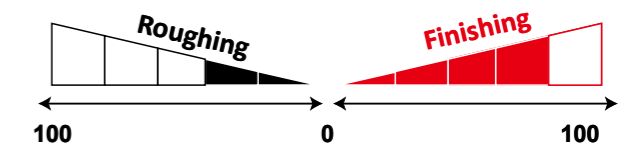
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	$a_p: 0.05D$	$a_e: 0.1D$	$a_p: 0.04D$	$a_e: 0.05D$	$a_p: 0.03D$	$a_e: 0.03D$	$a_p: 0.02D$	$a_e: 0.02D$																
0.1R	20,000	540	20,000	375	20,000	215	20,000	160																
0.15R	20,000	1,000	20,000	700	20,000	400	20,000	300																
0.2R	20,000	1,400	20,000	980	20,000	560	20,000	420																
0.25R	20,000	1,600	20,000	1,120	20,000	640	20,000	480																
0.3R	20,000	1,800	20,000	1,260	20,000	720	20,000	540																
0.35R	20,000	1,900	20,000	1,330	20,000	760	20,000	570																
0.4R	20,000	2,000	20,000	1,400	20,000	800	20,000	600																
0.45R	20,000	2,200	20,000	1,540	20,000	880	20,000	660																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.04D</td> <td>0.05D</td> </tr> </table>		a_p	a_e	0.04D	0.05D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.03D</td> </tr> </table>		a_p	a_e	0.03D	0.03D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.02D</td> <td>0.02D</td> </tr> </table>		a_p	a_e	0.02D	0.02D
a_p	a_e																							
0.05D	0.1D																							
a_p	a_e																							
0.04D	0.05D																							
a_p	a_e																							
0.03D	0.03D																							
a_p	a_e																							
0.02D	0.02D																							

Work Material

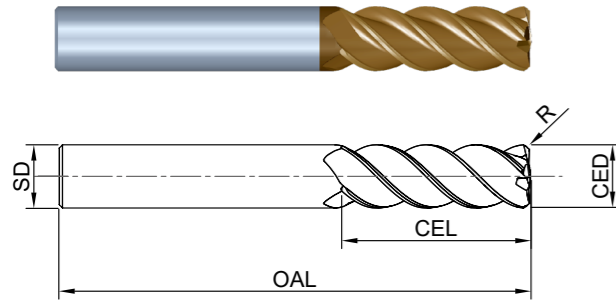
P			H		
G1	G2	G3	G14	G15	G16
•	•	•	•	•	•



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600⁺ - 21454TO

- ◆ Corner Radius - 4-Flute x 3D
- ◆ Helix 45°



CED Tolerance(mm)	
1~3	0~-0.014
3~6	0~-0.018
6~10	0~-0.02
10~12	0~-0.025

h5 (unit : mm)

Code No.	CED	CEL	SD	OAL	Radius	Flute
X600 ⁺ -21454TO	1	3	4	50	0.2R	4
	2	6	4	50	0.2R	
	3	9	4	50	0.2R	
	4	12	4	50	0.2R	
	5	15	6	50	0.2R	
	6	18	6	50	0.2R	
	8	24	8	65	0.2R 0.5R	
	10	30	10	75	0.2R 0.5R	
	12	36	12	80	0.2R 0.5R	

Code No.	CED	CEL	SD	OAL	Radius	Flute
X600 ⁺ -21454TO	EU 3	9	6	57	0.2R	4
	EU 4	12	6	65	0.2R	
	EU 5	15	6	65	0.2R	
	EU 6	18	6	65	0.2R	
	EU 8	24	8	75	0.2R 0.5R	
	EU 10	30	10	80	0.2R 0.5R	
	EU 12	36	12	93	0.2R 0.5R	

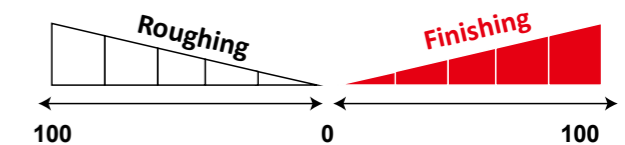
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min
CED	a _p : 1.5D	a _e : 0.2D	a _p : 1.5D	a _e : 0.1D	a _p : 1.5D	a _e : 0.05D	a _p : 1.5D	a _e : 0.03D
1	30,200	470	27,180	360	21,600	250	17,000	170
2	18,600	580	16,740	440	12,240	210	9,700	150
3	13,700	690	12,330	520	9,270	240	7,400	230
4	10,300	740	9,270	560	6,900	360	5,500	250
5	8,200	790	7,380	600	5,670	400	4,500	280
6	5,900	990	5,310	750	4,590	480	3,600	340
8	5,100	990	4,590	750	3,600	470	2,880	330
10	4,100	880	3,690	670	2,880	450	2,300	320
12	3,400	820	3,060	620	2,430	340	1,900	230
Depth of cut								

Work Material

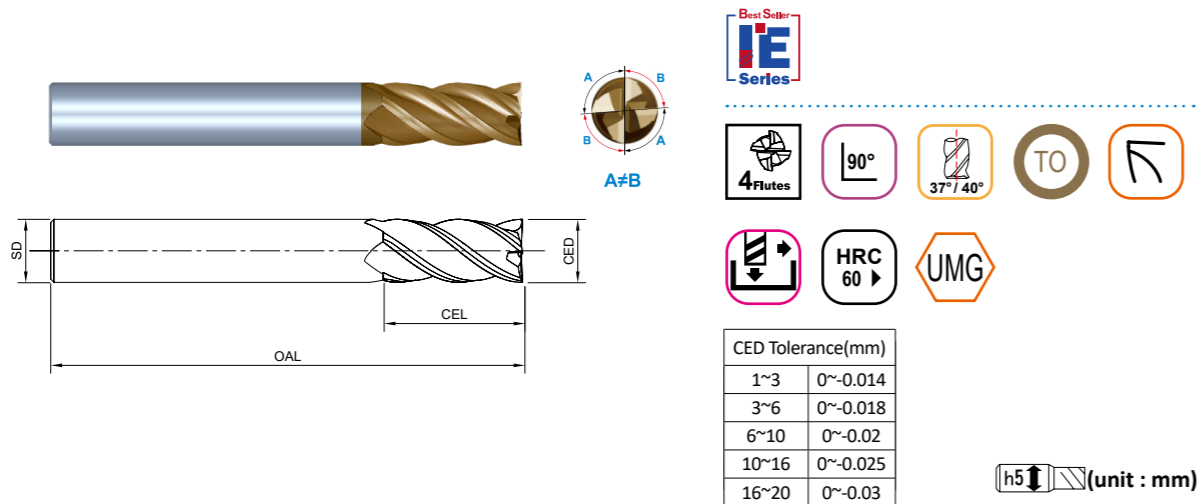
P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600IE⁺ - 11374TO

- ◆ Square - 4-Flute x 2.5D
- ◆ Uneven Flute / Variable Helix 37° / 40°



Code No.	CED	CEL	SD	OAL	Flute
X600IE ⁺ -11374TO	1	3	4	50	4
	2	5	4	50	
	3	8	4	50	
	4	10	4	50	
	5	13	6	50	
	6	15	6	50	
	8	20	8	65	
	10	25	10	75	
	12	30	12	75	
	16	40	16	100	
20	50	20	100		

Code No.	CED	CEL	SD	OAL	Flute
X600IE ⁺ -11374TO	EU 3	8	6	57	4
	EU 4	11	6	57	
	EU 5	13	6	57	
	EU 6	13	6	57	
	EU 8	19	8	63	
	EU 10	22	10	72	
	EU 12	26	12	83	

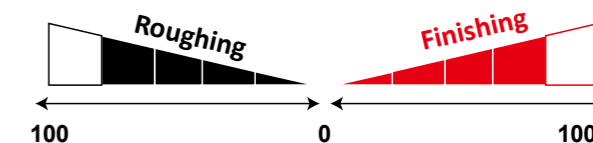
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min
CED	$a_p: 1.5D$	$a_e: 0.2D$	$a_p: 1.5D$	$a_e: 0.1D$	$a_p: 1.5D$	$a_e: 0.05D$	$a_p: 1.5D$	$a_e: 0.03D$
1	38,700	480	32,850	400	29,000	310	26,500	190
2	19,350	570	16,380	480	14,600	360	13,200	220
3	12,870	808	10,890	680	9,720	510	8,700	230
4	9,600	950	8,190	800	7,290	610	6,500	380
5	7,700	1,280	6,570	1,090	5,850	810	5,200	510
6	6,400	1,400	5,400	1,200	4,860	900	4,300	580
8	4,800	1,520	4,050	1,290	3,600	970	3,240	610
10	3,870	1,400	3,200	1,200	2,880	910	2,600	580
12	3,240	1,370	2,700	1,140	2,430	880	2,200	550
16	2,430	1,330	2,070	1,140	1,800	850	1,600	540
20	1,900	1,280	1,600	1,090	1,440	820	1,300	510
Depth of cut	 a_p a_e 1.5D 0.2D		a_p a_e 1.5D 0.1D		a_p a_e 1.5D 0.05D		a_p a_e 1.5D 0.03D	

Work Material

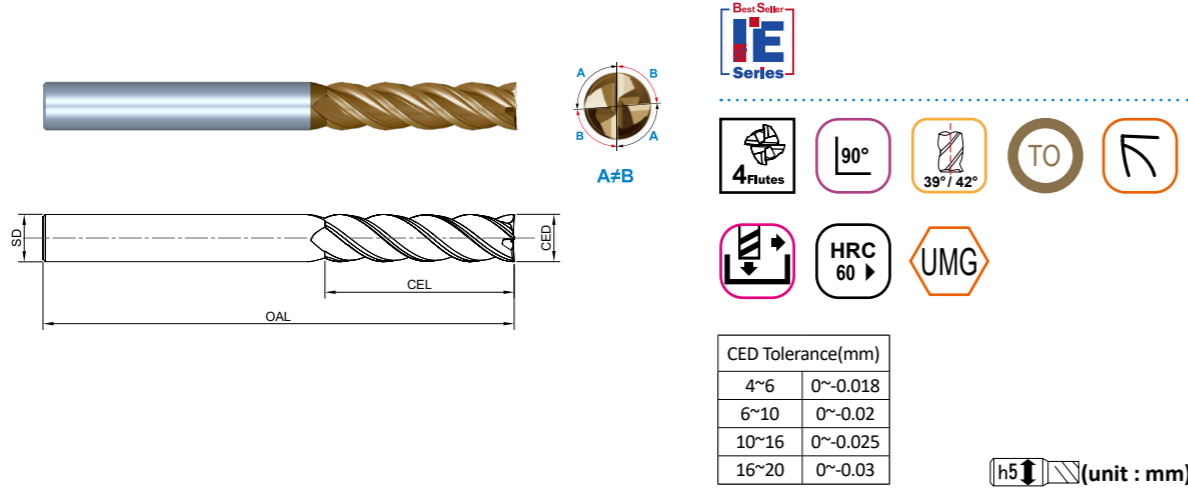
P			H		
G1	G2	G3	G14	G15	G16
●	●	●	●	●	●



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600IE⁺ - 12394TO

- ◆ Square - 4-Flute x 4D / Long Flute
- ◆ Uneven Flute / Variable Helix 39° / 42°



Code No.	CED	CEL	SD	OAL	Flute
X600IE ⁺ -12394TO	4	16	4	60	4
	5	20	6	60	
	6	24	6	65	
	8	32	8	90	
	10	40	10	100	
	12	48	12	110	
	16	64	16	140	
	20	80	20	160	

Code No.	CED	CEL	SD	OAL	Flute
X600IE ⁺ -12394TO	EU 4	16	6	65	4
	EU 5	20	6	65	
	EU 6	24	6	65	
	EU 8	32	8	80	
	EU 10	40	10	90	
	EU 12	48	12	100	

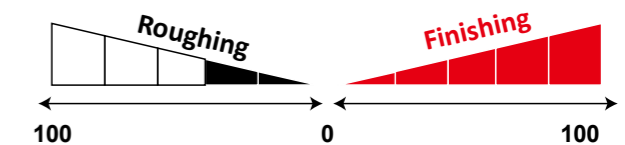
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min
CED	$a_p: 2.5D$	$a_e: 0.05D$	$a_p: 2.5D$	$a_e: 0.03D$	$a_p: 2.5D$	$a_e: 0.02D$	$a_p: 2.5D$	$a_e: 0.01D$
4	8,600	900	7,740	810	6,500	610	6,500	450
5	7,000	1,100	6,300	990	5,200	810	5,200	450
6	6,400	1,200	5,760	1,080	4,300	910	4,300	450
8	4,800	1,400	4,000	1,190	3,200	910	2,900	450
10	3,400	1,300	2,800	1,170	2,500	910	2,600	450
12	2,900	1,250	2,750	1,100	2,100	880	2,190	450
16	2,100	1,150	1,800	1,000	1,620	800	1,600	430
20	1,900	1,100	1,600	990	1,300	780	1,300	480
Depth of cut								

Work Material

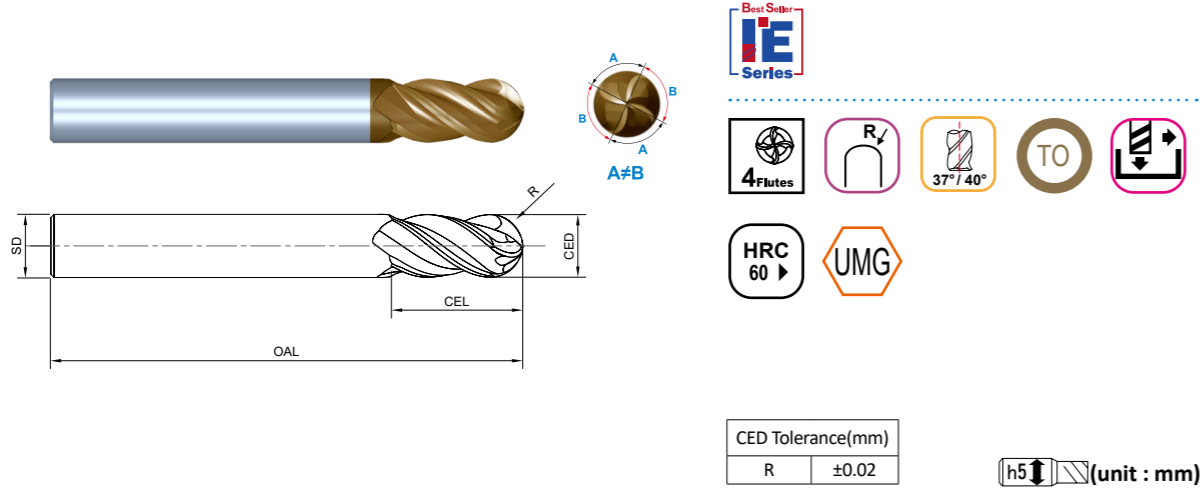
P			H		
G1	G2	G3	G14	G15	G16
●	●	●	●	●	●



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600IE⁺ - 81374TO

- ♦ Ball Nose - 4-Flute x 2D
- ♦ Uneven Flute / Variable Helix 37° / 40°



Code No.	Radius	CEL	SD	OAL	Flute
X600IE ⁺ -81374TO	3R	12	6	50	4
	4R	16	8	60	
	5R	20	10	75	
	6R	24	12	75	
	8R	32	16	100	
	10R	40	20	100	

Code No.	Radius	CEL	SD	OAL	Flute
X600IE ⁺ -81374TO	EU 3R	12	6	57	4
	EU 4R	16	8	63	
	EU 5R	20	10	72	
	EU 6R	24	12	83	

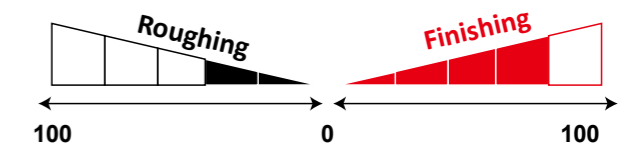
※ Customized Special sizes, Coating type and Inches are available to order.

General Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC																	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min																
R	$a_p: 0.1D$	$a_e: 0.2D$	$a_p: 0.08D$	$a_e: 0.2D$	$a_p: 0.05D$	$a_e: 0.1D$	$a_p: 0.03D$	$a_e: 0.1D$																
3R	10,080	1,820	9,000	1,400	7,200	1,000	5,760	700																
4R	7,560	1,820	6,800	1,400	5,400	1,000	4,320	700																
5R	6,000	1,820	5,400	1,400	4,320	1,000	3,400	700																
6R	5,040	1,820	4,500	1,400	3,600	1,000	2,880	700																
8R	3,720	1,820	3,300	1,400	2,640	1,000	2,100	700																
10R	3,000	1,560	2,700	1,250	2,160	870	1,700	610																
Depth of cut	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.1D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.1D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.08D</td> <td>0.2D</td> </tr> </table>		a_p	a_e	0.08D	0.2D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.05D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.05D	0.1D	<table border="1"> <tr> <td>a_p</td> <td>a_e</td> </tr> <tr> <td>0.03D</td> <td>0.1D</td> </tr> </table>		a_p	a_e	0.03D	0.1D
a_p	a_e																							
0.1D	0.2D																							
a_p	a_e																							
0.08D	0.2D																							
a_p	a_e																							
0.05D	0.1D																							
a_p	a_e																							
0.03D	0.1D																							

Work Material

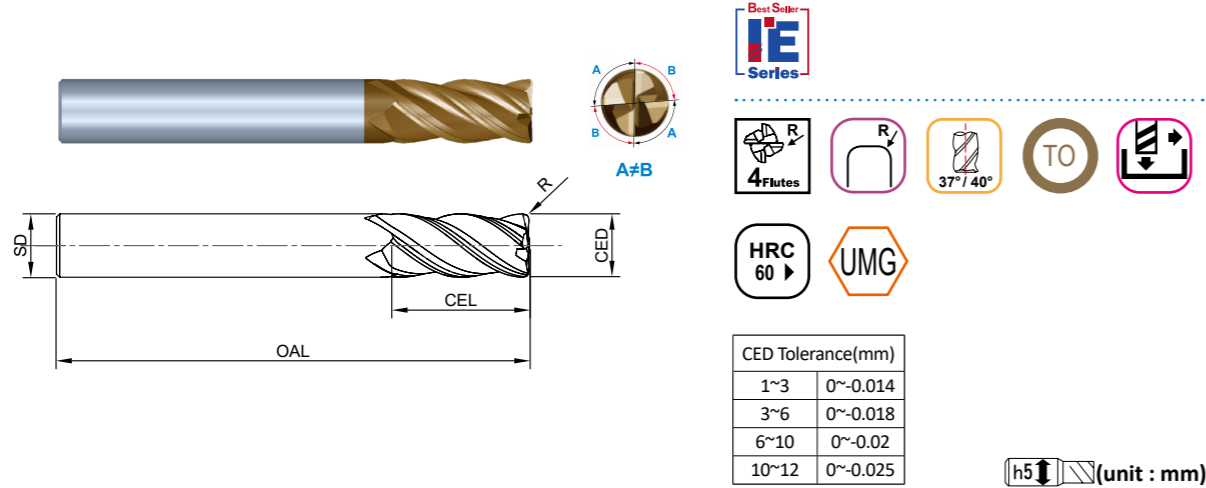
P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.

X600IE⁺ - 21374TO

- ◆ Corner Radius - 4-Flute x 2.5D
- ◆ Uneven Flute / Variable Helix 37° / 40°



CED Tolerance(mm)	
1~3	0~-0.014
3~6	0~-0.018
6~10	0~-0.02
10~12	0~-0.025

h5 (unit : mm)

Code No.	CED	CEL	SD	OAL	Radius	Flute
X600IE ⁺ -21374TO	1	3	4	50	0.2R	4
	2	5	4	50	0.2R	
	3	8	4	50	0.2R	
	4	10	4	50	0.2R	
	5	13	6	50	0.2R	
	6	15	6	50	0.2R	
	8	20	8	60	0.2R 0.5R	
	10	25	10	75	0.2R 0.5R	
	12	30	12	75	0.2R 0.5R	

Code No.	CED	CEL	SD	OAL	Radius	Flute
X600IE ⁺ -21374TO	EU 3	8	6	57	0.2R	4
	EU 4	11	6	57	0.2R	
	EU 5	13	6	57	0.2R	
	EU 6	13	6	57	0.2R	
	EU 8	19	8	63	0.2R 0.5R	
	EU 10	22	10	72	0.2R 0.5R	
	EU 12	26	12	83	0.2R 0.5R	

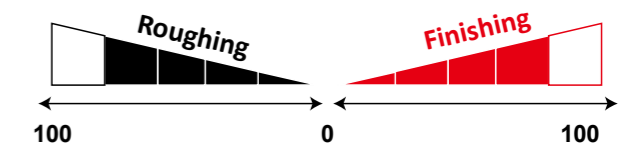
※ Customized Special sizes, Coating type and Inches are available to order.

Side Milling

Work Material	Alloyed Steel 25~35HRC		Hardened Steel 35~45HRC		Hardened Steel 45~55HRC		Hardened Steel 55~60HRC	
	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min	RPM/min	FEED mm/min
CED	$a_p: 1.5D$	$a_e: 0.2D$	$a_p: 1.5D$	$a_e: 0.1D$	$a_p: 1.5D$	$a_e: 0.05D$	$a_p: 1.5D$	$a_e: 0.03D$
1	38,700	480	32,850	400	29,000	310	26,500	190
2	19,350	570	16,380	480	14,600	360	13,200	220
3	12,870	808	10,890	680	9,720	510	8,700	230
4	9,600	950	8,190	800	7,290	610	6,500	380
5	7,700	1,280	6,570	1,090	5,850	810	5,200	510
6	6,400	1,400	5,400	1,200	4,860	900	4,300	580
8	4,800	1,520	4,050	1,290	3,600	970	3,240	610
10	3,870	1,400	3,200	1,200	2,880	910	2,600	580
12	3,240	1,370	2,700	1,140	2,430	880	2,200	550
Depth of cut								

Work Material

P			H			
G1	G2	G3	G14	G15	G16	G17
●	●	●	●	●	●	○



1. Please select high rigid tool holder and collet chuck during machining.
2. Please select the suitable coolant fluid.
3. For dry cutting, please use air blow for chip removal and cooling.
4. These cutting data are for reference only. Please adjust the cutting speed according to machine capability and working conditions.
5. If vibrations occur during cutting process, adjust and reduce the cutting speed.