

# WAX Type



### General Features

SEC-WaveMill WAX type is a high speed and high efficiency cutter capable of rough milling to finishing of Non-Ferrous Metals such as Aluminium alloy.

### Characteristics

- For Ramping (Slant Milling)
- For Helical Milling
- Safety Design  
Prevents dislodging of inserts caused by centrifugal forces.

### Coolant Supply

Coolant holes are a standard feature for the whole series.

### Excellent Adhesion Resistance

- Top rake face of the insert is lapped finish.
- DLC Coat inserts are available for improved adhesion resistance.

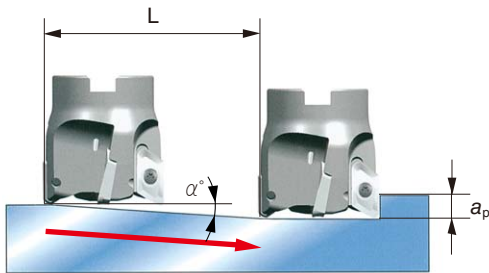
### Ramping (Slant Milling)

Maximum ramping angle ( $\alpha^\circ$  max.) depends on cutter diameter.

Minimum milling length (L min) is the ramping distance required to reach the maximum cutting depth ( $a_p$  max) at the maximum ramping angle of that cutter.

Minimum milling length (L) for any depth can be calculated by the equation below:

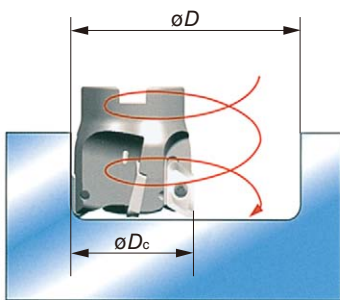
$$L = \frac{a_p}{\tan \alpha^\circ} \text{ (mm)}$$



### Ramping (Slant Milling) Angles

Cutter Diameter $\phi D_c$ (mm)	Max. Ramping Angle $\alpha^\circ$ max	
	WAX3000 Type	WAX4000 Type
20	28°	
25	17°	26°
32	12°	18°30'
40	9°	13°
50	7°	9°30'
63	5°	7°
80	3°	5°
100	3°	4°
125	2°	3°

### Helical Milling



### Helical Milling Diameter

Cutter Diameter $\phi D_c$ (mm)	WAX3000 Type		WAX4000 Type	
	Minimum Diameter	Maximum Diameter	Minimum Diameter	Maximum Diameter
20	22	33		
25	29	43	27	43
32	43	57	38	57
40	59	73	54	73
50	79	93	74	93
63	105	119	100	119
80	139	153	134	153
100	179	193	174	193
125	229	243	224	243

### Maximum Allowable Spindle Speed

Cutter Diameter $\phi D_c$ (mm)	WAX3000 Type		WAX4000 Type	
	n max(min <sup>-1</sup> )	$v_c$ (m/min)	n max(min <sup>-1</sup> )	$v_c$ (m/min)
20	14,000	880		
25	29,000	2,200	11,000	860
32	25,000	2,500	9,000	900
40	23,000	2,900	20,000	2,500
50	20,000	3,100	18,000	2,800
63	18,000	3,500	16,000	3,100
80	16,000	4,000	14,000	3,500
100	14,000	4,400	12,000	3,700
125	13,000	5,100	11,000	4,300

The n max speeds are set to prevent the inserts from dislodging by centrifugal forces.

### Recommended Cutting Conditions

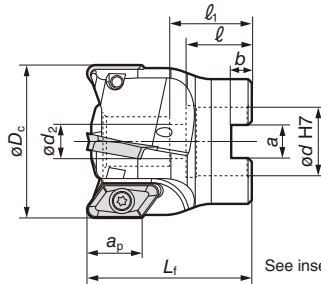
ISO	Work Material	Hardness	Cutting Speed $v_c$ (m/min) Min. - Optimum -Max.	Feed Rate $f_z$ (mm/t) Min. - Optimum -Max.	Grade
N	Aluminium Alloy	—	600-900-1200	0.05-0.15-0.25	DL1000

**Note** The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

# WAX 3000 Type

Rake Angle	Radial	6°	16 to 18mm	90°
	Axial	19° to 25°		

<b>P</b>	<b>M</b>	<b>K</b>	<b>N</b>	<b>N</b>	<b>S</b>	<b>H</b>
Steel	Stainless Steel	Cast Iron	Non-Ferrous Metal	Aluminum	Exotic Alloy	Hardened Steel
X	X	X	X	X	X	X



See insert table for "a<sub>p</sub>".

### Body (For inserts with nose radius 3.2mm and below)

Metric	Cat. No.	Stock	Dimensions (mm)								No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi d$	$L_f$	$\phi d_2$	a	b	$\ell$	$\ell_1$		
	<b>WAX 3050-3.2</b>	●	50	22	50	11	10.4	6.3	21	26	4	0.34
	<b>3063-3.2</b>	●	63	22	50	11	10.4	6.3	21	26	5	0.6
	<b>WAX 3080-3.2</b>	●	80	25.4	50	14	9.5	6	25	31	5	1.0
Inch	<b>3100-3.2</b>	●	100	31.75	63	17	12.7	8	32	39	6	2.2
	<b>3125-3.2</b>	●	125	38.1	63	21	15.9	10	35	40	7	3.5

### Body (For inserts with nose radius 4.0mm and above)

Metric	Cat. No.	Stock	Dimensions (mm)								No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi d$	$L_f$	$\phi d_2$	a	b	$\ell$	$\ell_1$		
	<b>WAX 3050-4.0</b>	●	50	22	50	11	10.4	6.3	21	26	4	0.34
	<b>3063-4.0</b>	●	63	22	50	11	10.4	6.3	21	26	4	0.6
	<b>WAX 3080-4.0</b>	●	80	25.4	50	14	9.5	6	25	31	5	1.0
Inch	<b>3100-4.0</b>	●	100	31.75	63	17	12.7	8	32	39	6	2.2
	<b>3125-4.0</b>	●	125	38.1	63	21	15.9	10	35	40	7	3.5

Inserts are not included.

### Spare Parts (3000 Type common)

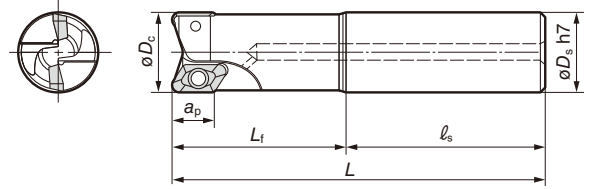
Screw	Spanner	Anti-seizure Cream	Applicable Endmill
BFTX0408	3.0	TRD15	SUMI-P

Recommended Tightening Torque (N·m)

# WAX 3000E / 3000EL Type

Rake Angle	Radial	6°	16 to 18mm	90°
	Axial	19° to 25°		

<b>P</b>	<b>M</b>	<b>K</b>	<b>N</b>	<b>N</b>	<b>S</b>	<b>H</b>
Steel	Stainless Steel	Cast Iron	Non-Ferrous Metal	Aluminum	Exotic Alloy	Hardened Steel
X	X	X	X	X	X	X



See insert table for "a<sub>p</sub>".

### Body (For inserts with nose radius 3.2mm and below)

Metric	Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi D_s$	L	$L_f$	$\ell_s$		
	<b>WAX 3020E -3.2</b>	●	20	20	130	60	70	1	0.25
	<b>WAX 3025E -3.2</b>	●	25	25	140	60	80	2	0.42
	<b>WAX 3025EL-3.2</b>	●	25	25	200	60	140	2	0.63
	<b>3032E -3.2</b>	●	32	32	150	70	80	2	0.75
	<b>3032EL-3.2</b>	●	32	32	220	70	150	2	1.2
	<b>WAX 3040E -3.2</b>	●	40	32	160	70	90	3	1.0
	<b>3040EL-3.2</b>	●	40	32	220	70	150	3	1.4

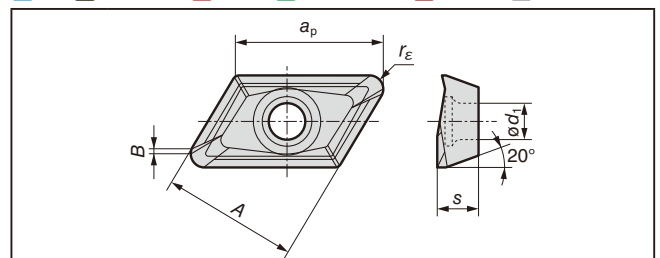
### Body (For inserts with nose radius 4.0mm and above)

Metric	Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi D_s$	L	$L_f$	$\ell_s$		
	<b>WAX 3020E -4.0</b>	●	20	20	130	60	70	1	0.25
	<b>WAX 3025E -4.0</b>	●	25	25	140	60	80	2	0.42
	<b>3025EL-4.0</b>	●	25	25	200	60	140	2	0.63
	<b>3032E -4.0</b>	●	32	32	150	70	80	2	0.75
	<b>3032EL-4.0</b>	●	32	32	220	70	150	2	1.2
	<b>WAX 3040E -4.0</b>	●	40	32	160	70	90	3	1.0
	<b>3040EL-4.0</b>	●	40	32	220	70	150	3	1.4

Inserts are not included.

### Inserts (3000 Type common)

**P** Steel **M** Stainless Steel **K** Cast Iron **N** Non-Ferrous Metal **S** Exotic Alloy **H** Hardened Steel

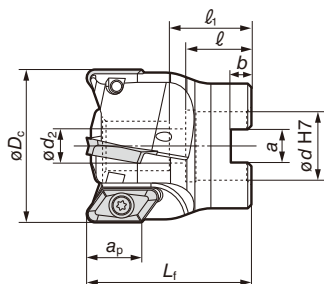
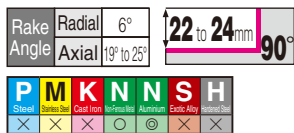


Application	Grade		Dimensions (mm)					
	Carbide		$a_p$	A	B	$r_\epsilon$	s	$\phi d_1$
	DLC	N						
High Speed/Light	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
General Purpose	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Roughing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Cat. No.	H1	DL1000	$a_p$	A	B	$r_\epsilon$	s	$\phi d_1$
<b>AECT 160404PEFRA</b>	●	●	18	16.4	1.4	0.4	5	4.4
<b>160408PEFRA</b>	●	●	18	16.4	1.0	0.8	5	4.4
<b>160412PEFRA</b>	●	●	18	16.4	0.6	1.2	5	4.4
<b>160416PEFRA</b>	●	●	17.5	16.4	0.5	1.6	5	4.4
<b>160420PEFRA</b>	●	●	17.5	16.4	0.5	2.0	5	4.4
<b>160430PEFRA</b>	●	●	17	16.4	0.7	3.0	5	4.4
<b>160432PEFRA</b>	●	●	17	16.4	0.5	3.2	5	4.4
<b>AECT 160440PEFRA</b>	●	●	16.5	16.4	0.5	4.0	5	4.4
<b>160450PEFRA</b>	●	●	16	16.4	0.4	5.0	5	4.4

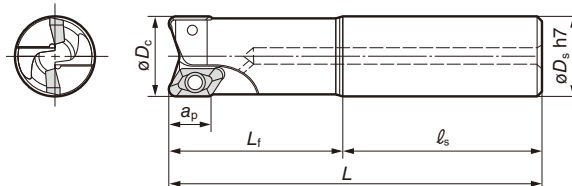
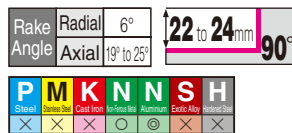
$r_\epsilon = 4.0$  or greater are for use with bodies that have a -4.0 cat. no. suffix.

# WAX 4000 Type

# WAX 4000E/4000EL Type



See insert table for "a<sub>p</sub>".



See insert table for "a<sub>p</sub>".

### Body (For inserts with nose radius 3.2mm and below)

	Cat. No.	Stock	Dimensions (mm)							No. of Teeth	Weight (kg)	
			$\phi D_c$	$\phi d$	$L_f$	$\phi d_2$	a	b	$\ell$			$\ell_1$
Metric	WAX 4050-3.2	●	50	16	50	9	8.4	5.6	18	23	2	0.37
	4063-3.2	●	63	22	50	11	10.4	6.3	21	26	3	0.54
Inch	WAX 4080-3.2	●	80	25.4	50	14	9.5	6	25	31	4	0.81
	4100-3.2	●	100	31.75	63	17	12.7	8	32	39	5	1.7
	4125-3.2	●	125	38.1	63	21	15.9	10	35	40	6	2.6

### Body (For inserts with nose radius 3.2mm and below)

	Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi D_s$	L	$L_f$	$\ell_s$		
Metric	WAX 4025E -3.2	●	25	25	140	60	80	1	0.41
	4025EL-3.2	●	25	25	200	60	140	1	0.63
Inch	4032E -3.2	●	32	32	150	70	80	1	0.72
	4032EL-3.2	●	32	32	220	70	150	1	1.2
Metric	WAX 4040E -3.2	●	40	32	160	70	90	2	0.88
	4040EL-3.2	●	40	32	220	70	150	2	1.2

### Body (For inserts with nose radius 4.0mm and below)

	Cat. No.	Stock	Dimensions (mm)							No. of Teeth	Weight (kg)	
			$\phi D_c$	$\phi d$	$L_f$	$\phi d_2$	a	b	$\ell$			$\ell_1$
Metric	WAX 4050-4.0	●	50	16	50	9	8.4	5.6	18	23	2	0.37
	4063-4.0	●	63	22	50	11	10.4	6.3	21	26	3	0.54
Inch	WAX 4080-4.0	●	80	25.4	50	14	9.5	6	25	31	4	0.81
	4100-4.0	●	100	31.75	63	17	12.7	8	32	39	5	1.7
	4125-4.0	●	125	38.1	63	21	15.9	10	35	40	6	2.6

Inserts are not included.

### Body (For inserts with nose radius 4.0mm and below)

	Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
			$\phi D_c$	$\phi D_s$	L	$L_f$	$\ell_s$		
Metric	WAX 4025E -4.0	●	25	25	140	60	80	1	0.41
	4025EL-4.0	●	25	25	200	60	140	1	0.63
Inch	4032E -4.0	●	32	32	150	70	80	1	0.72
	4032EL-4.0	●	32	32	220	70	150	1	1.2
Metric	WAX 4040E -4.0	●	40	32	160	70	90	2	0.88
	4040EL-4.0	●	40	32	220	70	150	2	1.2

Inserts are not included.

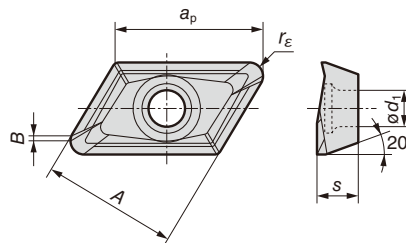
### Spare Parts (4000 Type common)

Screw	Spanner	Anti-seizure Cream	Applicable Endmill	
BFTX0509N	5.0	TRD20	SUMI-P	$\phi 25$ to $\phi 32$
BFTX0511N	5.0	TRD20	SUMI-P	$\phi 40$ to $\phi 125$

Recommended Tightening Torque (N·m)

### Inserts (4000 Type common)

**P** Steel **M** Stainless Steel **K** Cast Iron **N** Non-Ferrous Metal **S** Exotic Alloy **H** Hardened Steel



Application	Grade		DLC		Dimensions (mm)								
	High Speed/Light	General Purpose	Carbide	DLC	Cat. No	H	DL1000	$a_p$	A	B	$r_\epsilon$	s	$\phi d_1$
		Roughing											
Application													

$r_\epsilon = 4.0$  or greater are for use with bodies that have a -4.0 cat. no. suffix.