

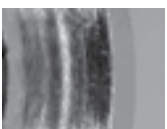
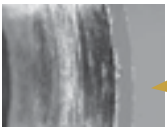
Surface finish oriented

# 2/ 3/ 4FESW

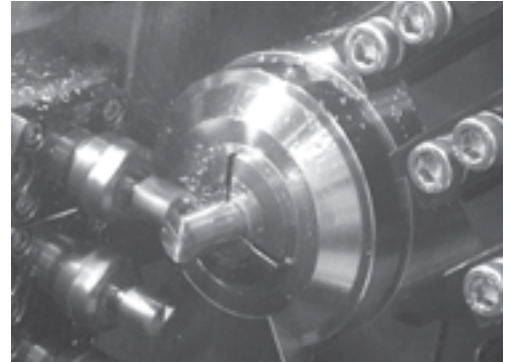
Surface finish oriented, for automatic lathes



MEGACOAT is applied

Workpiece Material: Ni-Co alloy		
<p>2FES (<math>\phi 3</math>, 2flutes) Excellent surface finish</p> 		<p>Facing of machine parts</p> <p><math>\cdot n=2,150\text{min}^{-1}</math> (<math>V_c=20\text{m/min}</math>) <math>\cdot V_f=100\text{mm/min}</math> (<math>f_z=0.023\text{mm/t}</math>)</p>
<p>Competitor A (<math>\phi 3</math>, 2flutes) X Large burrs</p> 		<p>Large burrs (Internal evaluation)</p>

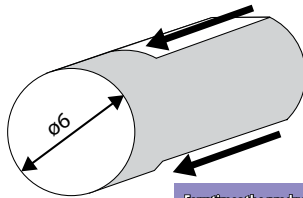
Comparison with competitor's end mill after 600 passes



## Case Studies

### Machine parts S45C

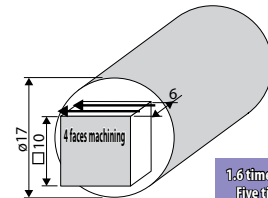
$n=3,980\text{min}^{-1}$   
( $V_c=100\text{m/min}$ )  
 $V_f=800\text{mm/min}$   
( $f_z=0.05\text{mm/t}$ )  
 $a_p=0.45\text{mm}$ , Wet  
4FESW080-080-08 ( $\phi 8$ , 4 flutes)



Four times the productivity!

### Machine parts SUM

$n=3,200\text{min}^{-1}$   
( $V_c=100\text{m/min}$ )  
 $V_f=640\text{mm/min}$   
( $f_z=0.05\text{mm/t}$ )  
 $a_p \times a_e=3.5 \times 3.0\text{mm}$ , Wet  
4FESW100-080-10 ( $\phi 10$ , 4 flutes)



1.6 times the productivity!  
Five times the tool life!

4FESW080-080-08

$V_f=800\text{mm/min}$

Competitor Coated Carbide B

$V_f=200\text{mm/min}$

[Competitor Coated Carbide B]  
 $\phi 8$ , 4 flutes  
 $n=2,508\text{min}^{-1}$   
( $V_c=63\text{m/min}$ )  
 $V_f=200\text{mm/min}$   
( $f_z=0.02\text{mm/t}$ )  
 $a_p=0.45\text{mm}$

Both cutting speed and table feed rate were improved. Despite the increase in cutting conditions, burr formation decreased.

(User Evaluation)

4FESW100-080-10

$V_f=640\text{mm/min}$

Competitor Coated Carbide C

$V_f=400\text{mm/min}$

[Competitor Coated Carbide C]  
 $\phi 7$ , 4 flutes  
 $n=2,000\text{min}^{-1}$   
( $V_c=44\text{m/min}$ )  
 $V_f=400\text{mm/min}$   
( $f_z=0.05\text{mm/t}$ )  
 $a_p \times a_e=3.5 \times 3.0\text{mm}$

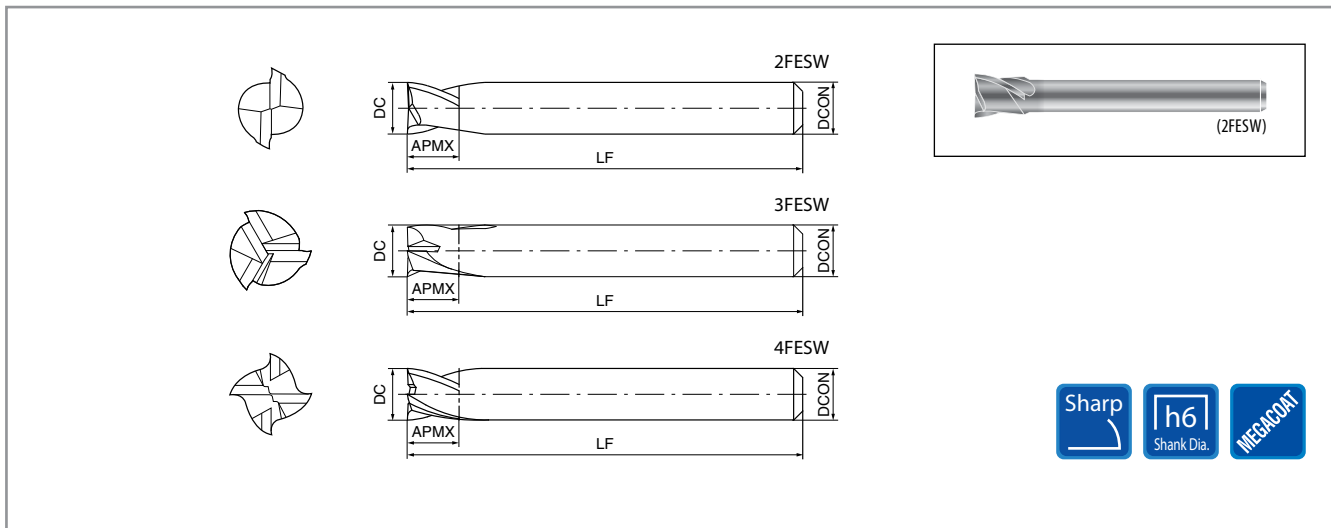
4FESW has a shorter edge length with improved rigidity, which enabled an increase from conventional  $\phi 7$  to  $\phi 10$ , thus improving cutting conditions. Compared to conventional tools, tool life improved five times.

(User Evaluation)

### Recommended Workpiece Materials

★ 1st Choice





2FESW

Shouldering Slotting

(Unit : mm)

Description	Availability	DC	Mill Dia. tolerance	APMX	DCON	LF	ZEPF
2FESW050-050-05A	●	5	0 -0.020	5	5	35	2
2FESW060-060-05A	●	6	0 -0.020	6	5	35	2
2FESW030-030-04	●	3	0 -0.020	3	4	45	2
2FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	2
2FESW040-040-04	●	4	0 -0.020	4	4	45	2
2FESW050-050-06	●	5	0 -0.020	5	6	45	2
2FESW060-060-06	●	6	0 -0.020	6	6	45	2
2FESW070-070-07	●	7	0 -0.025	7	7	45	2
2FESW080-080-07	●	8	0 -0.025	8	7	45	2
2FESW080-080-08	●	8	0 -0.025	8	8	45	2
2FESW100-080-07	●	10	0 -0.025	8	7	45	2
2FESW100-080-10	●	10	0 -0.025	8	10	45	2
2FESW120-080-10	●	12	0 -0.025	8	10	45	2
2FESW120-080-12	●	12	0 -0.030	8	12	45	2
2FESW130-080-13	●	13	0 -0.030	8	13	45	2

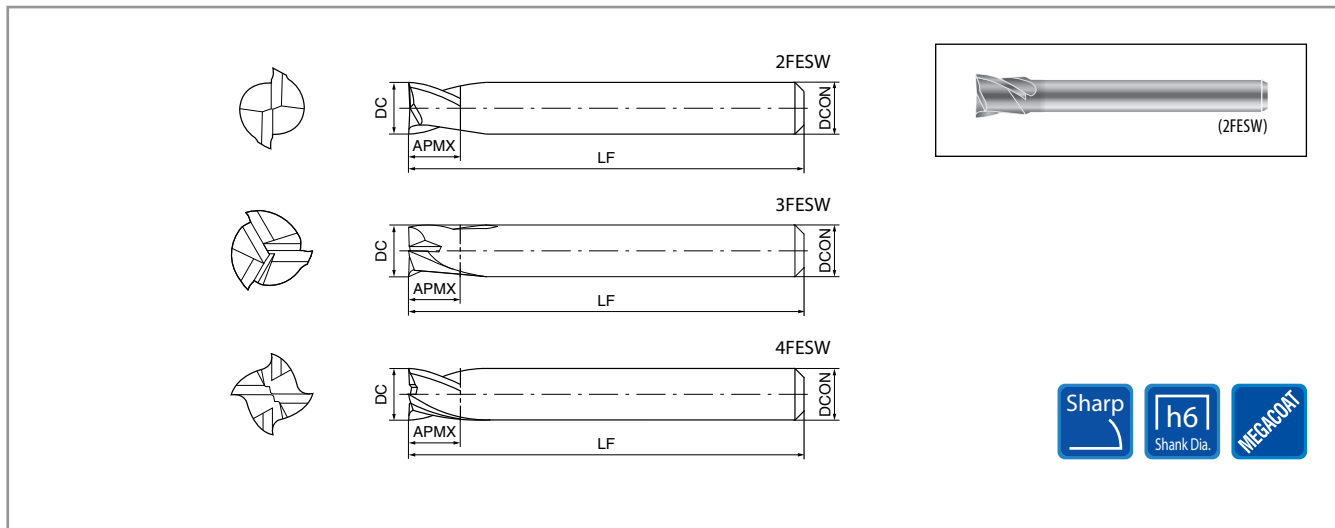
3FESW

Shouldering Slotting

(Unit : mm)

Description	Availability	DC	Mill Dia. tolerance	APMX	DCON	LF	ZEPF
3FESW050-050-05A	●	5	0 -0.020	5	5	35	3
3FESW060-060-05A	●	6	0 -0.020	6	5	35	3
3FESW030-030-04	●	3	0 -0.020	3	4	45	3
3FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	3
3FESW040-040-04	●	4	0 -0.020	4	4	45	3
3FESW050-050-06	●	5	0 -0.020	5	6	45	3
3FESW060-060-06	●	6	0 -0.020	6	6	45	3
3FESW070-070-07	●	7	0 -0.025	7	7	45	3
3FESW080-080-07	●	8	0 -0.025	8	7	45	3
3FESW080-080-08	●	8	0 -0.025	8	8	45	3
3FESW100-080-07	●	10	0 -0.025	8	7	45	3
3FESW100-080-10	●	10	0 -0.025	8	10	45	3
3FESW120-080-10	●	12	0 -0.025	8	10	45	3
3FESW120-080-12	●	12	0 -0.030	8	12	45	3
3FESW130-080-13	●	13	0 -0.030	8	13	45	3

● : Available



4FESW

Shouldering Slotting

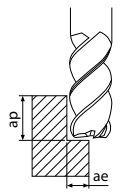
(Unit : mm)

Description	Availability	DC	Mill Dia. tolerance	APMX	DCON	LF	ZEFP
4FESW030-030-04	●	3	0 -0.020	3	4	45	4
4FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	4
4FESW040-040-04	●	4	0 -0.020	4	4	45	4
4FESW050-050-06	●	5	0 -0.020	5	6	45	4
4FESW060-060-06	●	6	0 -0.020	6	6	45	4
4FESW070-070-07	●	7	0 -0.025	7	7	45	4
4FESW080-080-07	●	8	0 -0.025	8	7	45	4
4FESW080-080-08	●	8	0 -0.025	8	8	45	4
4FESW100-080-07	●	10	0 -0.025	8	7	45	4
4FESW100-080-10	●	10	0 -0.025	8	10	45	4
4FESW120-080-10	●	12	0 -0.025	8	10	45	4
4FESW120-080-12	●	12	0 -0.030	8	12	45	4
4FESW130-080-13	●	13	0 -0.030	8	13	45	4

● : Available

## 2/ 3/ 4FESW Cutting conditions

### 2FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 <p>Shouldering</p> <p>Depth of Cut (ap x ae) (mm)</p> <p>1DC x 0.2DC</p>	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	660	640	640	640	520	450	410	400
		Slotting	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	550	480	510	530	480	440	410	400
	Alloy Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	420	430	430	430	350	300	270	260
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	340	360	370	340	310	270	260
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	160	160	140	140	140	140
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	110	110	120	120	120	120	120	120
Stainless Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	180	240	240	240	200	170	160	160	
	Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	120	120	130	130	130	130	130	130	

\* Machining with water soluble coolant is recommended for stainless steel.

### 3FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 <p>Shouldering</p> <p>Depth of Cut (ap x ae) (mm)</p> <p>1DC x 0.2DC</p>	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
		Slotting	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
	Alloy Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	200	200	200	200	180	180	180	180
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	140	140	150	150	150	150	150	150
Stainless Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	300	300	300	300	240	210	200	200	
	Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	150	150	160	160	160	160	160	160	

\* Machining with water soluble coolant is recommended for stainless steel.

### 4FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 <p>Shouldering</p> <p>Depth of Cut (ap x ae) (mm)</p> <p>1DC x 0.2DC</p>	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
		Slotting	Spindle Revolution (min-1)	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
	Alloy Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	240	240	240	240	210	210	210	210
		Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	180	180	180	180	180	180
Stainless Steel	Shouldering	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	360	360	360	360	300	260	240	240	
	Slotting	Spindle Revolution (min-1)	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800	
		Feed Rate (mm/min)	180	180	200	200	200	200	200	200	

\* Machining with water soluble coolant is recommended for stainless steel.