

Endmill series for stainless steel machining

# S<sup>+</sup> Endmill

**KORLOY**  
TECH-NEWS



- Various line-up of S<sup>+</sup> Endmill is in stock.
- S<sup>+</sup> Endmill ensures high performance in stainless steel, alloy, and HRSA machining due to its high rake angle and streamlined chip pocket.

Endmill series for stainless steel machining

# S<sup>+</sup> Endmill

Stainless steel with corrosion resistance and smooth surface is widely used in daily life and various industries.

High work hardening and shear resistance of stainless steel often making chip welding and fracture on cutting edge reduce tool life.

Therefore, exclusive tools for stainless steel machining are recommended for efficient performance.

**S<sup>+</sup> Endmill** with optimally designed cutting edges

effectively reduces fracture from unexpected chipping by minimizing cutting load and vibration in cutting.

In addition, its new substrate and coating layer ensure higher wear and welding resistance than existing tools.

Moreover, KORLOY recommends S<sup>+</sup> Endmill with increased welding and wear resistance from optimal substrate, layer, and shape for stainless steel machining to ensure customer's high productivity.



## Long tool life

- Strong cutting edge

## Special coating layer

- High welding and wear resistance due to good oxidation resistance of coating layer

## Improved chip control

- Good chip evacuation from high rake angle and streamlined chip pocket

## Special designed cutting edge

- Optimally designed cutting edge for stainless steel machining

## Code system

|                |  |                              |                               |          |                              |  |
|----------------|--|------------------------------|-------------------------------|----------|------------------------------|--|
| <b>S P</b>     | <b>F E</b>                                   | <b>4</b>                     | <b>120</b>                    | <b>-</b> | <b>075</b>                   | <b>R10</b>   |
| S Plus Endmill | Type<br>F: Flat Endmill<br>R: Radius Endmill | No. of flutes<br>4: 4 flutes | Cutting Dia.<br>120: Ø12.0 mm |          | Overall length<br>075: 75 mm | Corner R<br>10: 1.0 mm<br>05: 0.5 mm<br>01: 0.1 mm |

## Performance evaluation

### Wear resistance

- **Workpiece** X5CrNiMo17-12-2
- **Cutting conditions**  $v_c$  (m/min) = 50,  $f_z$  (mm/t) = 0.06,  $a_p$  (mm) = 10,  $a_e$  (mm) = 1, wet (70 bar)
- **Tool** SPFE4080-070



[S+ Endmill]

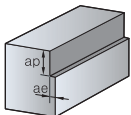


[Competitor]

## Recommended cutting conditions

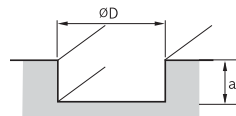
| Workpiece<br>Cutting<br>conditions<br>Tool diameter (Ø) | Stainless steel                 |                     | Titanium alloy/<br>Inconel      |                     | Common steel<br>(HRC25 below)   |                     | Stainless steel<br>(HRC25~35 below) |                     | Tool steel<br>(HRC40~50 below)  |                     |
|---|---------------------------------|---------------------|---------------------------------|---------------------|---------------------------------|---------------------|-------------------------------------|---------------------|---------------------------------|---------------------|
|   | R.P.M<br>n (min <sup>-1</sup> ) | Feed<br>vf (mm/min) | R.P.M<br>n (min <sup>-1</sup> ) | Feed<br>vf (mm/min) | R.P.M<br>n (min <sup>-1</sup> ) | Feed<br>vf (mm/min) | R.P.M<br>n (min <sup>-1</sup> )     | Feed<br>vf (mm/min) | R.P.M<br>n (min <sup>-1</sup> ) | Feed<br>vf (mm/min) |
| 2   | 5,500                           | 240                 | 2,600                           | 90                  | 9,000                           | 540                 | 6,000                               | 3,200               | 4,000                           | 240                 |
| 4   | 4,000                           | 260                 | 2,000                           | 90                  | 6,600                           | 600                 | 4,500                               | 340                 | 3,000                           | 280                 |
| 6   | 3,000                           | 360                 | 1,200                           | 90                  | 4,800                           | 720                 | 3,000                               | 360                 | 2,500                           | 280                 |
| 8   | 2,000                           | 390                 | 1,000                           | 100                 | 3,600                           | 750                 | 2,200                               | 460                 | 2,000                           | 300                 |
| 10  | 1,700                           | 410                 | 800                             | 120                 | 2,800                           | 750                 | 1,800                               | 460                 | 1,500                           | 300                 |
| 12  | 1,500                           | 380                 | 700                             | 100                 | 2,400                           | 710                 | 1,500                               | 410                 | 1,200                           | 280                 |
| 14  | 1,200                           | 320                 | 600                             | 95                  | 2,200                           | 660                 | 1,300                               | 370                 | 1,000                           | 270                 |
| 16  | 1,000                           | 270                 | 500                             | 90                  | 1,800                           | 490                 | 1,100                               | 320                 | 800                             | 230                 |
| 20  | 750                             | 250                 | 400                             | 85                  | 900                             | 270                 | 900                                 | 270                 | 600                             | 200                 |

### Application tip



#### Shouldering depth ( $a_p$ ) and radial depth ( $a_e$ )

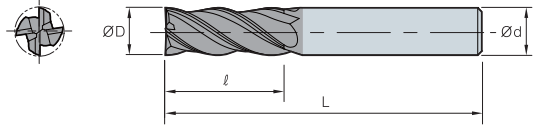
- Common steel, Alloy steel, Stainless steel:  
 $a_e = 0.1D$ ,  $a_p = 1.5D$
- Titanium alloy, Inconel, Hardening steel:  
 $a_e = 0.05D$ ,  $a_p = 1.5D$



#### Slotting depth ( $a_p$ )

- Common steel, Alloy steel:  $a_p = 1.0D$
- Stainless steel:  $a_p = 0.3D$
- Titanium alloy, Inconel, Hardening steel:  
 $a_p = 0.2D$

# SPFE4000 (Flat)



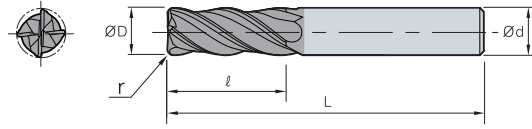
| ØD       | Tolerance of diameter |
|----------|-----------------------|
| Ø1 ~ Ø20 | 0.00 ~ -0.03          |



(mm)

| Designation  |              | ØD  | Ød | ℓ   | L  |
|--------------|--------------|-----|----|-----|----|
| SPFE         | 4010-050     | 1   | 6  | 2.5 | 50 |
|              | 4012-050     | 1.2 | 6  | 3   | 50 |
|              | 4015-050     | 1.5 | 6  | 4   | 50 |
|              | 4020-050     | 2   | 6  | 6   | 50 |
|              | 4025-050     | 2.5 | 6  | 7   | 50 |
|              | 4030-055     | 3   | 6  | 8   | 55 |
|              | 4030-060-V10 | 3   | 6  | 10  | 60 |
|              | 4035-055     | 3.5 | 6  | 10  | 55 |
|              | 4040-055     | 4   | 6  | 10  | 55 |
|              | 4040-060-V12 | 4   | 6  | 12  | 60 |
|              | 4045-055     | 4.5 | 6  | 12  | 55 |
|              | 4050-055     | 5   | 6  | 15  | 55 |
|              | 4055-060     | 5.5 | 6  | 15  | 60 |
|              | 4060-060     | 6   | 6  | 15  | 60 |
|              | 4060-065-V20 | 6   | 6  | 20  | 65 |
|              | 4065-060     | 6.5 | 8  | 15  | 60 |
|              | 4070-080     | 7   | 8  | 20  | 80 |
|              | 4080-070     | 8   | 8  | 20  | 70 |
|              | 4080-070-V25 | 8   | 8  | 25  | 70 |
|              | 4080-080-V30 | 8   | 8  | 30  | 80 |
| 4085-070     | 8.5          | 10  | 20 | 70  |    |
| 4090-080     | 9            | 10  | 25 | 80  |    |
| 4100-075     | 10           | 10  | 25 | 75  |    |
| 4100-085-V35 | 10           | 10  | 35 | 85  |    |
| 4120-080     | 12           | 12  | 30 | 80  |    |
| 4120-090-V40 | 12           | 12  | 40 | 90  |    |
| 4140-090     | 14           | 16  | 35 | 90  |    |
| 4160-100     | 16           | 16  | 42 | 100 |    |
| 4180-100     | 18           | 16  | 45 | 100 |    |
| 4200-100     | 20           | 20  | 48 | 100 |    |


# SPRE4000 (Radius)



| ØD       | Tolerance of diameter |
|----------|-----------------------|
| Ø1 ~ Ø20 | 0.00 ~ -0.03          |



(mm)

| Designation   | ØD            | Ød  | ℓ  | L   | R   |     |
|---|---------------|-----|----|-----|-----|-----|
| SPRE<br> | 4010-050-R0.1 | 1   | 6  | 2.5 | 50  | 0.1 |
|   | 4010-050-R0.2 | 1   | 6  | 2.5 | 50  | 0.2 |
|   | 4012-050-R0.1 | 1.2 | 6  | 3   | 50  | 0.1 |
|   | 4015-050-R0.1 | 1.5 | 6  | 4   | 50  | 0.1 |
|   | 4015-050-R0.2 | 1.5 | 6  | 4   | 50  | 0.2 |
|   | 4020-050-R0.1 | 2   | 6  | 6   | 50  | 0.1 |
|   | 4020-050-R0.2 | 2   | 6  | 6   | 50  | 0.2 |
|   | 4025-050-R0.2 | 2.5 | 6  | 7   | 50  | 0.2 |
|   | 4030-055-R0.2 | 3   | 6  | 8   | 55  | 0.2 |
|   | 4030-055-R0.3 | 3   | 6  | 8   | 55  | 0.3 |
|   | 4030-055-R0.5 | 3   | 6  | 8   | 55  | 0.5 |
|   | 4040-055-R0.2 | 4   | 6  | 10  | 55  | 0.2 |
|   | 4040-055-R0.3 | 4   | 6  | 10  | 55  | 0.3 |
|   | 4040-055-R0.5 | 4   | 6  | 10  | 55  | 0.5 |
|   | 4050-055-R0.2 | 5   | 6  | 15  | 55  | 0.2 |
|   | 4050-055-R0.3 | 5   | 6  | 15  | 55  | 0.3 |
|   | 4050-055-R0.5 | 5   | 6  | 15  | 55  | 0.5 |
|   | 4060-060-R0.3 | 6   | 6  | 15  | 60  | 0.3 |
|   | 4060-060-R0.5 | 6   | 6  | 15  | 60  | 0.5 |
|   | 4060-060-R1.0 | 6   | 6  | 15  | 60  | 1   |
|   | 4080-070-R0.3 | 8   | 8  | 20  | 70  | 0.3 |
|   | 4080-070-R0.5 | 8   | 8  | 20  | 70  | 0.5 |
|   | 4080-070-R1.0 | 8   | 8  | 20  | 70  | 1   |
|   | 4100-075-R0.3 | 10  | 10 | 25  | 75  | 0.3 |
|   | 4100-075-R0.5 | 10  | 10 | 25  | 75  | 0.5 |
|   | 4100-075-R1.0 | 10  | 10 | 25  | 75  | 1   |
|   | 4100-075-R1.5 | 10  | 10 | 25  | 75  | 1.5 |
|   | 4100-075-R2.0 | 10  | 10 | 25  | 75  | 2   |
|   | 4100-075-R3.0 | 10  | 10 | 25  | 75  | 3   |
|   | 4120-080-R0.5 | 12  | 12 | 30  | 80  | 0.5 |
|   | 4120-080-R1.0 | 12  | 12 | 30  | 80  | 1   |
|   | 4120-080-R1.5 | 12  | 12 | 30  | 80  | 1.5 |
|   | 4120-080-R2.0 | 12  | 12 | 30  | 80  | 2   |
|   | 4120-080-R3.0 | 12  | 12 | 30  | 80  | 3   |
|   | 4120-080-R4.0 | 12  | 12 | 30  | 80  | 4   |
|   | 4140-090-R0.5 | 14  | 16 | 35  | 90  | 0.5 |
|   | 4140-090-R1.0 | 14  | 16 | 35  | 90  | 1   |
|   | 4160-100-R0.5 | 16  | 16 | 42  | 100 | 0.5 |
|   | 4160-100-R1.0 | 16  | 16 | 42  | 100 | 1   |
|   | 4180-100-R0.5 | 18  | 16 | 45  | 100 | 0.5 |
|   | 4200-100-R0.5 | 20  | 20 | 48  | 100 | 0.5 |
|   | 4200-100-R1.0 | 20  | 20 | 48  | 100 | 1   |

[www.korloy.com](http://www.korloy.com)



Holystar B/D, 1350, Nambusunhwan-ro, Geumcheon-gu, Seoul, 08536, Korea  
Tel : +82-2-522-3181 Fax : +82-2-522-3184, +82-2-3474-4744 Web : [www.korloy.com](http://www.korloy.com) E-mail : [export@korloy.com](mailto:export@korloy.com)

#### **KORLOY AMERICA**

620 Maple Avenue, Torrance, CA 90503, USA  
Tel : +1-310-782-3800 Toll Free : +1-888-711-0001 Fax : +1-310-782-3885  
E-mail : [sales.kai@korloy.com](mailto:sales.kai@korloy.com)

#### **KORLOY INDIA**

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India  
Tel : +91-124-4391790 Fax : +91-124-4050032  
E-mail : [sales.kip@korloy.com](mailto:sales.kip@korloy.com)

#### **KORLOY TURKEY**

Orucreis Mah. Vadi Cad. No: 108 Istanbul Ticaret Sarayi  
Kat 5 No: 318 Giyimkent Sitesi-Esenler/Istanbul, Turkey  
Tel : +90-212-438-5197 E-mail : [sales.ktl@korloy.com](mailto:sales.ktl@korloy.com)

#### **KORLOY RUSSIA**

KRASIVY DOM office No. 305, Bld. 5, Novovladykinskiy proezd 8,  
127106, Moscow, Russia  
E-mail : [sales.krc@korloy.com](mailto:sales.krc@korloy.com)

#### **KORLOY EUROPE**

Gablonzer Str. 25-27, 61440 Oberursel, Germany  
Tel : +49-6171-277-83-0 Fax : +49-6171-277-83-59  
E-mail : [sales.keg@korloy.com](mailto:sales.keg@korloy.com)

#### **KORLOY BRASIL**

Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,  
CEP06460-010, SP, Brasil  
Tel : +55-11-4193-3810 E-mail : [sales.kbl@korloy.com](mailto:sales.kbl@korloy.com)

#### **KORLOY CHILE**

Av. Providencia 1650, Office 1009, 7500027  
Providencia-Santiago, Chile  
Tel : +56-229-295-490 E-mail : [sales.kcs@korloy.com](mailto:sales.kcs@korloy.com)

#### **KORLOY MEXICO**

Queretaro, Mexico  
E-mail : [sales.kml@korloy.com](mailto:sales.kml@korloy.com)

#### **KORLOY FACTORY QINGDAO**

Ground Dongjing Road 56(B) District Free Trade Zone. Qingdao, China  
Tel : +86-532-86959880 Fax : +86-532-86760651  
E-mail : [pro.kfq@korloy.com](mailto:pro.kfq@korloy.com)

#### **KORLOY FACTORY INDIA**

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India  
Tel : +91-124-4391790 Fax : +91-124-4050032  
E-mail : [pro.kim@korloy.com](mailto:pro.kim@korloy.com)