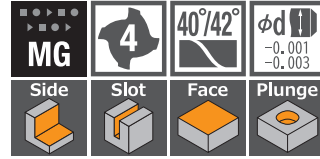


MUGEN COATING PREMIUM 4-Flute Long Neck High Efficient "Z" End Mill for Stainless Steels

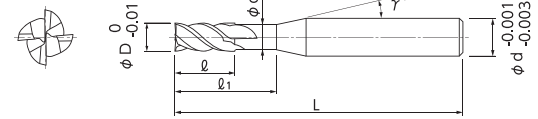
Total 33 sizes

Recommended Milling Conditions

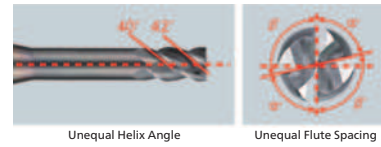
For machining on stainless steels and heat resistant alloy. Continuous machining from Plunging to slotting. Unequal flute spacing and unequal helix angle design.



Plunge depth is referred to recommended milling conditions



- Unequal flute spacing, unequal helix angle and high rigid end profile design to minimize chatter realize high efficient machining.
- New developed special edge profile realized multi-functional performance of side milling, slot milling and plunging approaches on stainless steel.
- Optimized high heat-resistance MUGEN COATING PREMIUM to realize stable long time machining.
- Long neck type prevent interference with work material, the Under Neck length lined up with L/D=3 to 5.

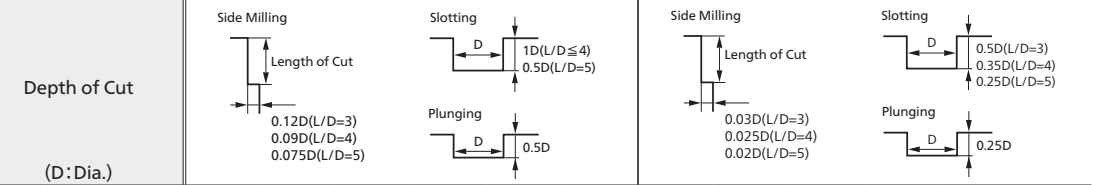


Unit : mm

| Code No.       | Dia. (D) | Length of Cut (l) | Under Neck Length (L1) | Neck Dia. (d2) | Neck Taper Angle (γ) | Shank Dia. (d) | Overall Length (L) |
|----------------|----------|-------------------|------------------------|----------------|----------------------|----------------|--------------------|
| 08-00153-01013 | 1        | 1.5               | 3                      | 0.95           | 12°                  | 4              | 50                 |
| 08-00153-01014 |          |                   | 4                      | 0.95           | 12°                  | 4              | 50                 |
| 08-00153-01015 |          |                   | 5                      | 0.95           | 12°                  | 4              | 50                 |
| 08-00153-01513 | 1.5      | 2.3               | 4.5                    | 1.45           | 12°                  | 4              | 50                 |
| 08-00153-01514 |          |                   | 6                      | 1.45           | 12°                  | 4              | 50                 |
| 08-00153-01515 |          |                   | 7.5                    | 1.45           | 12°                  | 4              | 50                 |
| 08-00153-02013 | 2        | 3                 | 6                      | 1.94           | 12°                  | 6              | 50                 |
| 08-00153-02014 |          |                   | 8                      | 1.94           | 12°                  | 6              | 50                 |
| 08-00153-02015 |          |                   | 10                     | 1.94           | 12°                  | 6              | 50                 |
| 08-00153-02513 | 2.5      | 3.8               | 7.5                    | 2.4            | 12°                  | 6              | 50                 |
| 08-00153-02514 |          |                   | 10                     | 2.4            | 12°                  | 6              | 50                 |
| 08-00153-02515 |          |                   | 12.5                   | 2.4            | 12°                  | 6              | 60                 |
| 08-00153-03013 | 3        | 4.5               | 9                      | 2.85           | 12°                  | 6              | 50                 |
| 08-00153-03014 |          |                   | 12                     | 2.85           | 12°                  | 6              | 50                 |
| 08-00153-03015 |          |                   | 15                     | 2.85           | 12°                  | 6              | 60                 |
| 08-00153-03513 | 3.5      | 5.3               | 10.5                   | 3.35           | 12°                  | 6              | 50                 |
| 08-00153-03514 |          |                   | 14                     | 3.35           | 12°                  | 6              | 60                 |
| 08-00153-03515 |          |                   | 17.5                   | 3.35           | 12°                  | 6              | 60                 |
| 08-00153-04013 | 4        | 6                 | 12                     | 3.8            | 12°                  | 6              | 50                 |
| 08-00153-04014 |          |                   | 16                     | 3.8            | 12°                  | 6              | 60                 |
| 08-00153-04015 |          |                   | 20                     | 3.8            | 12°                  | 6              | 60                 |
| 08-00153-04513 | 4.5      | 6.8               | 13.5                   | 4.3            | 12°                  | 6              | 50                 |
| 08-00153-04514 |          |                   | 18                     | 4.3            | 12°                  | 6              | 60                 |
| 08-00153-04515 |          |                   | 22.5                   | 4.3            | 12°                  | 6              | 60                 |
| 08-00153-05013 | 5        | 7.5               | 15                     | 4.8            | 12°                  | 6              | 50                 |
| 08-00153-05014 |          |                   | 20                     | 4.8            | 12°                  | 6              | 60                 |
| 08-00153-05015 |          |                   | 25                     | 4.8            | 12°                  | 6              | 60                 |
| 08-00153-05513 | 5.5      | 8.3               | 16.5                   | 5.3            | 12°                  | 6              | 50                 |
| 08-00153-05514 |          |                   | 22                     | 5.3            | 12°                  | 6              | 60                 |
| 08-00153-05515 |          |                   | 27.5                   | 5.3            | 12°                  | 6              | 60                 |
| 08-00153-06013 | 6        | 9                 | 18                     | 5.8            | -                    | 6              | 60                 |
| 08-00153-06014 |          |                   | 24                     | 5.8            | -                    | 6              | 60                 |
| 08-00153-06015 |          |                   | 30                     | 5.8            | -                    | 6              | 70                 |

How to Order When you order, indicate MSUSZ440-LN (D)×(l)×(L1). ※(γ) is reference value.

| Work Material     | Stainless Steels SUS304 |                   |        |                   |        |                   | Titanium Alloy Ti-6Al-4V |                   |        |                   |        |                   |        |                   |        |
|-------------------|-------------------------|-------------------|--------|-------------------|--------|-------------------|--------------------------|-------------------|--------|-------------------|--------|-------------------|--------|-------------------|--------|
|                   | Dia.                    | Under Neck Length | L/D    | Side Milling      |        | Slotting          |                          | Plunging          |        | Side Milling      |        | Slotting          |        | Plunging          |        |
|                   |                         |                   |        | Spindle Speed     | Feed   | Spindle Speed     | Feed                     | Spindle Speed     | Feed   | Spindle Speed     | Feed   | Spindle Speed     | Feed   | Spindle Speed     | Feed   |
| min <sup>-1</sup> | mm/min                  | min <sup>-1</sup> | mm/min | min <sup>-1</sup> | mm/min | min <sup>-1</sup> | mm/min                   | min <sup>-1</sup> | mm/min | min <sup>-1</sup> | mm/min | min <sup>-1</sup> | mm/min | min <sup>-1</sup> | mm/min |
| 1                 | 3                       | 3                 | 17,000 | 600               | 14,000 | 180               | 14,000                   | 30                | 15,300 | 600               | 12,600 | 180               | 12,600 | 30                |        |
|                   | 4                       | 4                 | 15,000 | 450               | 12,000 | 150               | 12,000                   | 20                | 13,500 | 450               | 10,800 | 150               | 10,800 | 20                |        |
|                   | 5                       | 5                 | 12,000 | 200               | 10,000 | 110               | 10,000                   | 20                | 10,800 | 200               | 9,000  | 110               | 9,000  | 20                |        |
| 1.5               | 4.5                     | 3                 | 12,000 | 650               | 9,600  | 200               | 9,600                    | 30                | 10,800 | 650               | 8,700  | 200               | 8,700  | 30                |        |
|                   | 6                       | 4                 | 10,300 | 480               | 8,500  | 160               | 8,500                    | 20                | 9,300  | 480               | 7,700  | 160               | 7,700  | 20                |        |
| 2                 | 7.5                     | 5                 | 8,500  | 250               | 7,300  | 120               | 7,300                    | 20                | 7,700  | 250               | 6,600  | 120               | 6,600  | 20                |        |
|                   | 6                       | 3                 | 9,400  | 780               | 8,000  | 210               | 8,000                    | 30                | 8,500  | 780               | 7,200  | 210               | 7,200  | 30                |        |
|                   | 8                       | 4                 | 8,000  | 520               | 7,200  | 170               | 7,200                    | 20                | 7,200  | 520               | 6,500  | 170               | 6,500  | 20                |        |
| 2.5               | 10                      | 5                 | 7,000  | 280               | 6,000  | 140               | 6,000                    | 20                | 6,300  | 280               | 5,400  | 140               | 5,400  | 20                |        |
|                   | 7.5                     | 3                 | 7,700  | 900               | 6,800  | 240               | 6,800                    | 30                | 7,000  | 900               | 6,100  | 240               | 6,100  | 30                |        |
| 3                 | 10                      | 4                 | 6,500  | 580               | 6,100  | 180               | 6,100                    | 20                | 5,900  | 580               | 5,500  | 180               | 5,500  | 20                |        |
|                   | 12.5                    | 5                 | 5,800  | 330               | 5,200  | 140               | 5,200                    | 20                | 5,200  | 330               | 4,700  | 140               | 4,700  | 20                |        |
| 3.5               | 9                       | 3                 | 6,500  | 950               | 6,200  | 270               | 6,200                    | 30                | 5,900  | 950               | 5,600  | 270               | 5,600  | 30                |        |
|                   | 12                      | 4                 | 5,500  | 650               | 5,200  | 200               | 5,200                    | 20                | 5,000  | 650               | 4,700  | 200               | 4,700  | 20                |        |
| 4                 | 15                      | 5                 | 5,000  | 350               | 4,400  | 150               | 4,400                    | 20                | 4,500  | 350               | 4,000  | 150               | 4,000  | 20                |        |
|                   | 10.5                    | 3                 | 6,000  | 1,000             | 5,400  | 300               | 5,400                    | 30                | 5,400  | 1,000             | 4,900  | 300               | 4,900  | 30                |        |
| 4.5               | 14                      | 4                 | 5,000  | 700               | 4,500  | 210               | 4,500                    | 20                | 4,500  | 700               | 4,000  | 210               | 4,000  | 20                |        |
|                   | 17.5                    | 5                 | 4,500  | 350               | 3,800  | 150               | 3,800                    | 20                | 4,100  | 350               | 3,400  | 150               | 3,400  | 20                |        |
| 5                 | 12                      | 3                 | 5,800  | 1,050             | 4,800  | 300               | 4,800                    | 30                | 5,300  | 1,050             | 4,300  | 300               | 4,300  | 30                |        |
|                   | 16                      | 4                 | 4,600  | 700               | 4,000  | 210               | 4,000                    | 20                | 4,200  | 700               | 3,600  | 210               | 3,600  | 20                |        |
| 5.5               | 20                      | 5                 | 4,200  | 380               | 3,400  | 150               | 3,400                    | 20                | 6,800  | 380               | 3,100  | 150               | 3,100  | 20                |        |
|                   | 13.5                    | 3                 | 5,600  | 1,100             | 4,500  | 300               | 4,500                    | 30                | 5,000  | 1,100             | 4,000  | 300               | 4,000  | 30                |        |
| 6                 | 18                      | 4                 | 4,400  | 720               | 3,600  | 220               | 3,600                    | 20                | 4,000  | 720               | 3,200  | 220               | 3,200  | 20                |        |
|                   | 22.5                    | 5                 | 4,000  | 380               | 3,100  | 150               | 3,100                    | 20                | 3,600  | 380               | 2,800  | 150               | 2,800  | 20                |        |
| 6                 | 15                      | 3                 | 5,400  | 1,100             | 4,100  | 300               | 4,100                    | 30                | 4,900  | 1,100             | 3,700  | 300               | 3,700  | 30                |        |
|                   | 20                      | 4                 | 4,300  | 720               | 3,300  | 220               | 3,300                    | 20                | 3,900  | 720               | 3,000  | 220               | 3,000  | 20                |        |
| 6                 | 25                      | 5                 | 3,900  | 400               | 2,800  | 150               | 2,800                    | 20                | 3,500  | 400               | 2,500  | 150               | 2,500  | 20                |        |
|                   | 16.5                    | 3                 | 5,100  | 1,100             | 3,900  | 300               | 3,900                    | 30                | 4,600  | 1,100             | 3,500  | 300               | 3,500  | 30                |        |
| 6                 | 22                      | 4                 | 4,200  | 750               | 3,000  | 220               | 3,000                    | 20                | 3,800  | 750               | 2,700  | 220               | 2,700  | 20                |        |
|                   | 27.5                    | 5                 | 3,700  | 400               | 2,600  | 150               | 2,600                    | 20                | 3,300  | 400               | 2,300  | 150               | 2,300  | 20                |        |
| 6                 | 18                      | 3                 | 4,800  | 1,100             | 3,600  | 300               | 3,600                    | 30                | 4,300  | 1,100             | 3,200  | 300               | 3,200  | 30                |        |
|                   | 24                      | 4                 | 4,000  | 750               | 2,800  | 220               | 2,800                    | 20                | 3,600  | 750               | 2,500  | 220               | 2,500  | 20                |        |
| 6                 | 30                      | 5                 | 3,600  | 400               | 2,400  | 150               | 2,400                    | 20                | 3,200  | 400               | 2,200  | 150               | 2,200  | 20                |        |



- Notes
- ※1 Please choose the short end tooth when measure the tool length.
  - ※2 Adjust milling condition conforming with machine rigidity and clamping condition. Final milling conditions are subject to machining profile, purpose and machine status.
  - ※3 Adjust both Spindle Speed and Feed at the same rate.
  - ※4 Water-soluble fluid is recommended.
  - ※5 Please increasing the coolant flow rate and pressure as much as possible, and supply it sufficiently to the machining point and flute.
  - ※6 Please change the Depth of Cut or Feed when chips could not remove smoothly during plunging.
  - ※7 Please be noted there would be a possible tool chipping or breakage when the chip removal is insufficient.
  - ※8 Use a rigid and precise machine and chuck holder.
  - ※9 Overhang of end mill should be as short as possible from spindle nose.

