



## Roughing End Mills - Speed & Feed Recommendations

| MATERIAL                                                                                                           |                      | CONDITIONS | STARTING<br>SFM | STARTING<br>SFM | CUTTING DIAMETER |        |        |        |        |        |       |
|--------------------------------------------------------------------------------------------------------------------|----------------------|------------|-----------------|-----------------|------------------|--------|--------|--------|--------|--------|-------|
|                                                                                                                    |                      |            |                 |                 | 1/4"             | 1/2"   | 3/4"   | 1.00"  | 1-1/4" | 1-1/2" | 2.00" |
|                                                                                                                    |                      |            | UNCOATED        | COATED          | CHIP PER TOOTH   |        |        |        |        |        |       |
| STAINLESS STEELS ISO-M                                                                                             |                      |            |                 |                 |                  |        |        |        |        |        |       |
| Precipitation<br>13-8, 15-5, 17-4PH                                                                                | Slotting Axial 1 x C | 60-80      | 100-15C         | 0.0015          | 0.0020           | 0.0026 | 0.0036 | 0.0046 | 0.0054 | 0.0070 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0015          | 0.0020           | 0.0029 | 0.0040 | 0.0050 | 0.0060 | 0.0075 |       |
| Austenitic<br>302, 303, 304L, 316L                                                                                 | Slotting 1 x D       | 60-80      | 100-15C         | 0.0015          | 0.0020           | 0.003  | 0.0045 | 0.0056 | 0.0067 | 0.0090 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0019          | 0.0025           | 0.0034 | 0.0049 | 0.0061 | 0.0074 | 0.0098 |       |
| Martensitic<br>403, 410, 416                                                                                       | Slotting Axial 1 x C | 60-100     | 100-17C         | 0.0015          | 0.0020           | 0.0030 | 0.0045 | 0.0056 | 0.0067 | 0.0090 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0019          | 0.0025           | 0.0034 | 0.0049 | 0.0061 | 0.0074 | 0.0098 |       |
| HIGH TEMP ALLOYS ISO-S                                                                                             |                      |            |                 |                 |                  |        |        |        |        |        |       |
| Cobalt Base<br>Stellite, Haynes 25, 188, X-40, L-605                                                               | Slotting 1 x D       | 5-25       | 10-40           | 0.0011          | 0.0014           | 0.0018 | 0.0026 | 0.0033 | 0.0040 | 0.0053 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0011          | 0.0014           | 0.0020 | 0.0029 | 0.0037 | 0.0045 | 0.0059 |       |
| Nickel Base<br>Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermaNickel 300, Incoly 600 | Slotting Axial 1 x C | 10-20      | 20-40           | 0.0011          | 0.0014           | 0.0018 | 0.0026 | 0.0033 | 0.0040 | 0.0053 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0011          | 0.0014           | 0.0020 | 0.0029 | 0.0037 | 0.0045 | 0.0059 |       |
| Iron Base<br>Incoloy 800-802, Multimet N-155, Timken 16-26-6                                                       | Slotting 1 x D       | 15-35      | 30-60           | 0.0011          | 0.0014           | 0.0018 | 0.0026 | 0.0033 | 0.0040 | 0.0053 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0011          | 0.0014           | 0.0020 | 0.0029 | 0.0037 | 0.0045 | 0.0059 |       |
| STEELS ISO-P                                                                                                       |                      |            |                 |                 |                  |        |        |        |        |        |       |
| High Strength Steels<br>4140, 4340, 52100                                                                          | Slotting Axial 1 x C | 50-80      | 100-15C         | 0.0015          | 0.0020           | 0.0025 | 0.0035 | 0.0045 | 0.0053 | 0.0071 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0015          | 0.0020           | 0.0028 | 0.0039 | 0.0050 | 0.0059 | 0.0079 |       |
| High Alloy Steels - Mold & Die<br>A-2, P20, 01, 02, D2, H-13                                                       | Slotting 1 x D       | 40-65      | 80-115          | 0.0015          | 0.0020           | 0.0025 | 0.0035 | 0.0045 | 0.0053 | 0.0071 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0015          | 0.0020           | 0.0028 | 0.0039 | 0.005  | 0.0059 | 0.0079 |       |
| Medium Alloy Steels<br>200, 250, 300                                                                               | Slotting Axial 1 x C | 60-120     | 100-18C         | 0.0016          | 0.0023           | 0.0033 | 0.0050 | 0.0062 | 0.0075 | 0.0093 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0020          | 0.0027           | 0.0040 | 0.0054 | 0.007  | 0.0082 | 0.0110 |       |
| Low Alloy Steels-Maraging<br>10XX, 11XX, 13XX                                                                      | Slotting 1 x D       | 70-150     | 130-20C         | 0.0018          | 0.0025           | 0.0037 | 0.0053 | 0.0068 | 0.0080 | 0.0100 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0022          | 0.0029           | 0.0042 | 0.0059 | 0.0074 | 0.0090 | 0.0115 |       |
| CAST IRONS ISO-K                                                                                                   |                      |            |                 |                 |                  |        |        |        |        |        |       |
| Ductile Iron<br>Ductile Cast Iron                                                                                  | Slotting Axial 1 x C | 40-80      | 70-13C          | 0.0015          | 0.0019           | 0.0030 | 0.0042 | 0.0056 | 0.0065 | 0.0087 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0018          | 0.0024           | 0.0034 | 0.0048 | 0.0061 | 0.0073 | 0.0093 |       |
| Cast Iron<br>Grey Cast Iron                                                                                        | Slotting 1 x D       | 60-150     | 120-20C         | 0.0014          | 0.0018           | 0.0024 | 0.0034 | 0.0044 | 0.0053 | 0.0070 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0014          | 0.0018           | 0.0027 | 0.0038 | 0.0050 | 0.0058 | 0.0078 |       |
| TITANIUMS ISO-S                                                                                                    |                      |            |                 |                 |                  |        |        |        |        |        |       |
| Titanium Alloys<br>6AL-4V, ASTM 1, 2, 3, 6AL-2S<br>For 5553, decrease SFM and IPM by 25%                           | Slotting Axial 1 x C | 50-90      | 75-15C          | 0.0015          | 0.0020           | 0.0028 | 0.0040 | 0.0052 | 0.0062 | 0.0080 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0017          | 0.0022           | 0.0032 | 0.0045 | 0.0057 | 0.0067 | 0.0090 |       |
| ALUMINUM ISO-N                                                                                                     |                      |            |                 |                 |                  |        |        |        |        |        |       |
| Aluminum Alloys<br>6061-T6, 7075                                                                                   | Slotting Axial 1 x C | 400-650    | 650-950         | 0.0024          | 0.0058           | 0.0067 | 0.0103 | 0.0112 | 0.0180 | 0.0210 |       |
|                                                                                                                    | Heavy Profiling      |            |                 | 0.0027          | 0.0058           | 0.0076 | 0.0110 | 0.0120 | 0.0205 | 0.0260 |       |
| For Light Periphery Profiling increase above profiling chip load by 25 - 35 %                                      |                      |            |                 |                 |                  |        |        |        |        |        |       |

**Note:** All technical data provided are suggested starting points. They may be increased or decreased depending on machine condition, depth of cut, finish required, coolant, etc.

