Helical

## HPCR

# SPEEDS AND FEEDS

Corner Rounding Mills - 3 & 5 Flute

## HPCR

| Material Guide | | Hardness | SFM | Inches Per Tooth (IPT) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Effective Cutting Diameter (Deff) | | | | | | |
| | | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 3/4 | 1 |
| WROUGHT ALIMINUM ALLOY | 2014, 5052, 6061, 7050, 7075, 7475 | < 120 HBS | 2200 | .0009 | .0018 | .0028 | .0045 | .0055 | .0090 | .0110 |
| | | ≥ 120 HBS | 2200 | .0006 | .0012 | .0018 | .0030 | .0035 | .0060 | .0070 |
| CAST ALUMINUM ALLOY | 319.0, 328.0, 355.0, 360.0, 380.0, 383.0, 390.0, 520.0, 535.0 | < 120 HBS | 1800 | .0012 | .0028 | .0040 | .0070 | .0080 | .0130 | .0180 |
| | | ≥ 120 HBS | 1600 | .0011 | .0022 | .0030 | .0055 | .0060 | .0110 | .0130 |
| COPPER ALLOY | Cu-ETP, CuBe2, CuZn30, CuZn36Pb3, CuZn10, CuSn5 | < 75 HRB | 600 | .0008 | .0015 | .0022 | .0040 | .0045 | .0080 | .0090 |
| | | 75 - 98 HRB | 450 | .0007 | .0015 | .0022 | .0035 | .0045 | .0070 | .0090 |
| CARBON STEEL | 10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36 | < 75 HRB | 455 | .0012 | .0018 | .0025 | .0036 | .0048 | .0068 | .0087 |
| | | 75 - 98 HRB | 445 | .0009 | .0013 | .0018 | .0026 | .0034 | .0049 | .0063 |
| | | 21 - 36 HRC | 400 | .0006 | .0009 | .0011 | .0018 | .0022 | .0032 | .0041 |
| LOW ALLOY STEEL | 13XX, 41XX, 43XX, 51XX, 86XX, 93XX | 75 - 98 HRB | 390 | .0008 | .0011 | .0016 | .0023 | .0030 | .0043 | .0055 |
| | | 21 - 36 HRC | 340 | .0006 | .0009 | .0011 | .0017 | .0022 | .0032 | .0041 |
| | | 36 - 50 HRC | 260 | .0005 | .0007 | .0010 | .0015 | .0019 | .0028 | .0036 |
| | | > 50 HRC | 155 | .0004 | .0006 | .0008 | .0011 | .0015 | .0022 | .0028 |
| TOOL STEEL | A2, H13, L6, P20, S7 | 75 - 98 HRB | 340 | .0008 | .0011 | .0016 | .0023 | .0030 | .0043 | .0055 |
| | | 21 - 36 HRC | 250 | .0006 | .0009 | .0012 | .0018 | .0024 | .0034 | .0044 |
| | | 36 - 50 HRC | 145 | .0005 | .0007 | .0010 | .0014 | .0018 | .0026 | .0034 |
| | | > 50 HRC | 85 | .0004 | .0006 | .0008 | .0011 | .0015 | .0022 | .0028 |
| SPECIALTY STEEL | 300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350 | < 75 HRB | 290 | .0011 | .0015 | .0020 | .0030 | .0040 | .0056 | .0072 |
| | | 75 - 98 HRB | 255 | .0007 | .0011 | .0014 | .0020 | .0027 | .0039 | .0049 |
| | | 21 - 36 HRC | 175 | .0006 | .0009 | .0012 | .0018 | .0024 | .0034 | .0045 |
| | | 36 - 50 HRC | 150 | .0005 | .0008 | .0011 | .0017 | .0022 | .0031 | .0040 |
| | | > 50 HRC | 55 | .0004 | .0005 | .0007 | .0011 | .0013 | .0019 | .0025 |
| AUSTENITIC STAINLESS STEEL | Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347 | 75 - 98 HRB | 265 | .0008 | .0011 | .0015 | .0022 | .0029 | .0042 | .0054 |
| | | 21 - 36 HRC | 225 | .0007 | .0010 | .0013 | .0020 | .0026 | .0038 | .0048 |
| | | 36 - 50 HRC | 180 | .0005 | .0008 | .0011 | .0016 | .0021 | .0030 | .0039 |
| MARTENSITIC & FERRITIC STAINLESS STEEL | 403, 410, 416, 420, 440, 430, 446 | 75 - 98 HRB | 300 | .0008 | .0011 | .0016 | .0023 | .0030 | .0043 | .0055 |
| | | 21 - 36 HRC | 280 | .0007 | .0010 | .0013 | .0020 | .0026 | .0038 | .0048 |
| PH STAINLESS STEEL | 15-5, 17-4, Carpenter 450, Carpenter 465 | 21 - 36 HRC | 200 | .0006 | .0009 | .0011 | .0017 | .0022 | .0032 | .0041 |
| | | 36 - 50 HRC | 145 | .0005 | .0007 | .0010 | .0015 | .0019 | .0027 | .0035 |
| GRAY CAST IRON | SAE J431, ASTM A48 | 75 - 98 HRB | 410 | .0012 | .0018 | .0026 | .0037 | .0048 | .0070 | .0090 |
| | | 21 - 36 HRC | 370 | .0007 | .0010 | .0013 | .0020 | .0026 | .0038 | .0048 |
| MALLEABLE CAST IRON | ASTM A47, ASTM A220, ASTM A602 | 75 - 98 HRB | 345 | .0008 | .0011 | .0016 | .0024 | .0031 | .0044 | .0057 |
| | | 21 - 36 HRC | 335 | .0007 | .0010 | .0014 | .0020 | .0026 | .0038 | .0049 |
| NODULAR (DUCTILE) CAST IRON | ASTM A536, ASTM 897 | 75 - 98 HRB | 310 | .0008 | .0012 | .0017 | .0025 | .0032 | .0046 | .0059 |
| | | 21 - 36 HRC | 260 | .0005 | .0008 | .0011 | .0017 | .0021 | .0031 | .0039 |
| | | 36 - 50 HRC | 135 | .0004 | .0005 | .0007 | .0011 | .0013 | .0019 | .0025 |
| PURE NICKEL | Nickel 200, Nickel 201 | < 75 HRB | 285 | .0011 | .0016 | .0021 | .0032 | .0041 | .0059 | .0076 |
| | | 75 - 98 HRB | 250 | .0009 | .0013 | .0018 | .0026 | .0034 | .0049 | .0063 |
| NICKEL ALLOY | Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20 | 75 - 98 HRB | 80 | .0005 | .0008 | .0011 | .0016 | .0021 | .0030 | .0039 |
| | | 21 - 36 HRC | 75 | .0005 | .0008 | .0011 | .0015 | .0020 | .0029 | .0037 |
| | | 36 - 50 HRC | 70 | .0004 | .0006 | .0009 | .0013 | .0018 | .0025 | .0032 |
| PURE TITANIUM | Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12 | < 75 HRB | 300 | .0015 | .0021 | .0029 | .0043 | .0057 | .0082 | .0105 |
| | | 75 - 98 HRB | 275 | .0012 | .0018 | .0025 | .0036 | .0048 | .0069 | .0088 |
| | | 21 - 36 HRC | 250 | .0010 | .0013 | .0018 | .0027 | .0036 | .0051 | .0066 |
| TITANIUM ALLOY | Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al | 21 - 36 HRC | 180 | .0008 | .0011 | .0015 | .0021 | .0028 | .0041 | .0052 |
| | | 36 - 50 HRC | 160 | .0007 | .0010 | .0013 | .0019 | .0026 | .0037 | .0048 |
| COBALT ALLOY | ASTM F562, ASTM F90, ASTM F75, ASTM F799 | 75 - 98 HRB | 210 | .0006 | .0009 | .0012 | .0018 | .0024 | .0034 | .0044 |
| | | 21 - 36 HRC | 170 | .0006 | .0009 | .0012 | .0018 | .0023 | .0033 | .0042 |
| | | 36 - 50 HRC | 65 | .0004 | .0006 | .0008 | .0012 | .0016 | .0022 | .0029 |

| MILLING PROCESS | HARDNESS | ADOC | RDOC |
|---|---|---|---|
| Non-Ferrous Corner Rounding | n/a | 100% | 1 Pass at Full Depth |
| Ferrous Corner Rounding | < 35 HRC | 100% | 1 Pass at Full Depth |
| | ≥ 35 HRC | 100% | 2 Passes to Full Depth |

NOTES:

Speed (SFM) numbers shown in table above are considered to be average values. Use a tolerance of +/-25% as needed

Feed (IPT) numbers shown in table above are considered to be starting values and may be increased given optimal sonditions

Effective cutter diameter should be used to calculate RPM and to select the proper chipload per tooth

Effective Cutter Diameter = Pilot Diameter + Radius