|  |      |                 |        |        |        |        | Hardn        | ess: ≤ 2   | 8 Rc (≤   | 271 HBI | n)     |        |        |        |           |           |
|--|------|-----------------|--------|--------|--------|--------|--------------|------------|-----------|---------|--------|--------|--------|--------|-----------|-----------|
| MATERIAL   | SFM  |                 |        |        |        | C      | hip Load (IF | T) By Cutt | er Diamet | er      |        |        |        |        | Depth     | of Cut    |
|  | SFW  |                 | .062   | .078   | .093   | .125   | .187         | .250       | .312      | .375    | .500   | .625   | .750   | 1.000  | Radial    | Axial     |
| ALUMINUM ALLOYS  |      | Slotting        | .00187 | .00235 | .00280 | .00376 | .00563       | .00752     | .00939    | .01129  | .01505 | .01881 | .02257 | .03010 | .65 x Dia | .45 x Dia |
| Casting (2xx, 5xx, 7xx, 8xx)   | 750  | Roughing        | .00315 | .00396 | .00473 | .00635 | .00950       | .01271     | .01586    | .01906  | .02541 | .03176 | .03812 | .05082 | .65 x Dia | .45 x Dia |
| Wrought (1xxx, 2xxx, 3xxx, 5xxx, 6xxx,<br>7xxx, 8xxx)                | 1000 | Finishing       | .00502 | .00631 | .00753 | .01012 | .01513       | .02023     | .02525    | .03035  | .04046 | .05058 | .06069 | .08092 | .65 x Dia | .45 x Dia |
| Casting - 3%-5% Si (3xx, A3xx, C3xx,<br>4xx, A4xx, B4xx)             | 750  | Slotting        | .00168 | .00211 | .00252 | .00339 | .00507       | .00677     | .00845    | .01016  | .01354 | .01693 | .02031 | .02709 | .65 x Dia | .45 x Dia |
| Casting - 5%-8% Si (3xx, A3xx, C3xx,<br>4xx, A4xx, B4xx)             | 700  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| Casting - 8%-12% Si (3xx, A3xx, C3xx,<br>4xx, A4xx, B4xx)            | 650  | Roughing        | .00284 | .00357 | .00425 | .00572 | .00855       | .01143     | .01427    | .01715  | .02287 | .02859 | .03430 | .04574 | .65 x Dia | .45 x Dia |
| Casting - 12%-16% Si (3xx, A3xx, C3xx,<br>4xx, A4xx, B4xx)           | 475  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| Wrought - 5%-8% Si (4xxx)  | 1000 | Finishing       | .00452 | .00568 | .00677 | .00910 | .01362       | .01821     | .02272    | .02731  | .03641 | .04552 | .05462 | .07283 | .65 x Dia | .45 x Dia |
| Wrought - 8%-12% Si (4xxx)   | 800  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| MAGNESIUM ALLOYS   | 1500 | Slotting        | .00187 | .00235 | .00280 | .00376 | .00563       | .00752     | .00939    | .01129  | .01505 | .01881 | .02257 | .03010 | .65 x Dia | .45 x Dia |
|  |      | Roughing        | .00315 | .00396 | .00473 | .00635 | .00950       | .01271     | .01586    | .01906  | .02541 | .03176 | .03812 | .05082 | .65 x Dia | .45 x Dia |
| ZINC ALLOYS  | 800  | Finishing       | .00502 | .00631 | .00753 | .01012 | .01513       | .02023     | .02525    | .03035  | .04046 | .05058 | .06069 | .08092 | .65 x Dia | .45 x Dia |
| COPPER ALLOYS  |      |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| High Coppers - 90%+ (C1xxxx)   | 225  | Slotting        | .00149 | 00188  | .00224 | .00301 | .00450       | .00602     | 00751     | 00903   | .01204 | .01505 | 01806  | 02408  | .65 x Dia | .45 x Dia |
| Brass (Copper Zinc alloys, C2xxxx,<br>C3xxxx, C4xxxx, C66400-C69800) | 500  | Slotting        | .00149 | .00100 | .00224 | .00301 | .00450       | .00602     | .00731    | .00903  | .01204 | .01303 | .01000 | .02400 | .05 x Dia | .45 X Dia |
| Phosphor Bronzes (Copper Tin alloys,                                 | 225  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| C5xxx)<br>Aluminum Bronzes (Copper Aluminum                          |      |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| allovs, C60600-C64200)   | 500  | Roughing .00252 | 00050  | .00317 | .00378 | .00508 | .00760       | .01016     | .01268    | 04505   | 00000  | 00544  | .03049 | .04066 | .65 x Dia | .45 x Dia |
| Silicon Bronzes (Copper Silicon alloys,<br>C64700-C66100)            | 500  |                 | .00252 | .00317 | .00378 | .00508 | .00760       | .01016     | .01268    | .01525  | .02033 | .02541 | .03049 | .04066 | .65 X DIA | .45 X DIA |
| Copper Nickels, Nickel Silvers (Copper                               | 225  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| Nickel alloys, C7xxxx)   | 223  |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |
| Cast Copper Alloys (C83300-C86200,<br>C86400-C87900, C92200-C95800,  | 550  | Finishing       | .00401 | .00505 | .00602 | .00809 | .01211       | .01618     | .02428    | .02428  | .03237 | .04046 | .04855 | .06474 | .65 x Dia | .45 x Dia |
| C97300-C97800, C99400-C99700)  |      |                 |        |        |        |        |              |            |           |         |        |        |        |        |           |           |

## SHARVEY TOOL

Speeds & Feeds

Product Table: End Mills - Ball - Reduced Shank Characteristics: 4 Flutes Series: 8042xx

## Product Notes:

Reduced shank end mills can be chucked at a variety of reach lengths. Posted values reflect a 3x reach length (ex. a 1/8 diameter mill chucked at a 3/8 reach). When chucking at longer reach lengths, use the table below for Chip Load and Depth of Cut adjustment <u>multipliers</u>.

|          |      | Slotting     |       | -    | Roughin | g      |      | Finishing | 3      |      |
|----------|------|--------------|-------|------|---------|--------|------|-----------|--------|------|
| Reach    | Chip | Depth of Cut |       | Chip | Depth   | of Cut | Chip | Depth     | of Cut |      |
| Multiple | Load | Radial       | Axial | Load | Radial  | Axial  | Load | Radial    | Axial  |      |
| 3x       | 100% | 100%         | 100%  | 100% | 100%    | 100%   | 100% | 100%      | 100%   | 0-0  |
| 5x       | 83%  | 100%         | 57%   | 83%  | 92%     | 78%    | 86%  | 100%      | 100%   |      |
| 8x       | 63%  | 100%         | 51%   | 63%  | 85%     | 67%    | 71%  | 67%       | 100%   |      |
| 12x      | 50%  | 100%         | 43%   | 50%  | 69%     | 56%    | 64%  | 67%       | 100%   | 0-0- |
| 15x      | 42%  | 100%         | 43%   | 42%  | 46%     | 56%    | 57%  | 53%       | 100%   |      |
| 18x      | 38%  | 100%         | 34%   | 38%  | 46%     | 44%    | 54%  | 40%       | 100%   |      |
| 20x      | 33%  | 100%         | 29%   | 33%  | 38%     | 44%    | 50%  | 33%       | 100%   |      |

## General Notes:

All posted speed and feed parameters are suggested starting values that may be increased given optimal setup conditions. Chip loads reflect uncoated cutters and may be increased 10%-20% if coated. For ferrous materials with hardness  $\leq$  28 Rc, chip loads can be increased 10%-20%.

If you require additional information, Harvey Tool has a team of technical experts available to assist you through even the most challenging applications. Please contact us at **800-645-5609** or **Harveytech@harveyperformance.com**.

## narveytecn@narveyperformance.com

WARNING: Cutting tools may shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment in the vicinity of use.

|  | Hardness: 29-37 Rc (279-344 HBn)       |                      |        |        |        |        |        |        |        |                                |        |        | 10     | Hardness: 38-45 Rc (353-421 HBn) |                        |           |       |           |        |                      |                     |            |        |        |        |             | 10.1   |                 |                   |          |           |           |
|--|--|----------------------|--------|--------|--------|--------|--------|--------|--------|--------------------------------|--------|--------|--------|----------------------------------|------------------------|-----------|-------|-----------|--------|----------------------|---------------------|------------|--------|--------|--------|-------------|--------|-----------------|-------------------|----------|-----------|-----------|
| MATERIAL   | SFM Chip Load (IPT) By Cutter Diameter |                      |        |        |        |        |        |        | 0.500  | 0.625 0.750 1.000 Radial Axial |        |        |        | SFN                              | ı ———                  | 0.062     | 0.078 | 0.093     | 0.125  | hip Load (I<br>0.187 | PT) By Cut<br>0.250 | ter Diamet |        |        |        | 0.750 1.000 |        | Depth<br>Radial | n of Cut<br>Axial |          |           |           |
| CARBON STEELS  | _                                      | Slotting             | .00064 | .00081 | .00096 |        |        | .00259 | .00323 | .00388                         | .00517 | .00646 | .00776 | .01034                           |                        | .45 x Dia |       | -         | 0.002  | 0.078                | 0.093               | 0.125      | 0.107  | 0.230  | 0.312  | 0.375       | 0.000  | 0.025           | 0.750             | 1.000    | Kaulai    | мліаі     |
| Free-Machining/Low Carbon steels, 10xx   | 600                                    | Roughing             | .00084 | .00123 | .00096 | .00129 | .00193 | .00259 | .00323 | .00589                         | .00517 | .00982 | .01179 | .01034                           | .65 x Dia<br>.65 x Dia | .45 x Dia |       | -         | -      | -                    | -                   | -          | -      | -      | -      | -           | -      | -               | -                 |          |           | -         |
| - 1029 & all 10Lxx, 11xx - 1139 & all<br>11Lxx, 12xx - 1215 & all 12Lxx          |  | Finishing            | .00057 | .00123 | .00140 | .00316 | .00234 | .00632 | .00490 | .00309                         | .01265 | .01581 | .01897 | .02530                           | .65 x Dia              | .45 x Dia | -     |           |        |                      | -                   |            | -      | -      | -      | -           |        |                 | -                 | <u> </u> | <u> </u>  | -         |
| 11EAX, 12AX = 1210 & all 12EAX   |  | -                    | .00059 | .00074 | .00233 | .00310 | .00473 | .00032 | .00789 | .00345                         | .00473 | .00591 | .00709 | .02330                           | .65 x Dia              | .45 x Dia | _     | -         |        |                      | -                   |            |        |        |        | -           |        |                 | -                 | <u> </u> | <u> </u>  | -         |
| 1030 - 1095, 1140 - 1151, 13xx, 15xx,<br>2xxx, 3xxx, 4xxx & 4xLxx, 5xxx & 5xLxx, | 200                                    | Slotting<br>Roughing | .00039 | .00074 | .00000 | .00180 | .00269 | .00230 | .00295 | .00539                         | .00473 | .00391 | .01078 | .01437                           | .65 x Dia              | .45 x Dia |       | -         |        |                      | -                   |            |        |        |        |             |        |                 | -                 | $\vdash$ |           | -         |
| 50xxx & 50Lxxx, 51xxx & 51Lxxx, 52xxx<br>& 52Lxxx, 6xxx, 8xxx, 9xxx              | 200                                    | Finishing            | .00143 | .00180 | .00215 | .00289 | .00203 | .00578 | .00722 | .00867                         | .01157 | .01446 | .01735 | .02313                           | .65 x Dia              | .45 x Dia |       |           |        |                      |                     |            |        |        |        |             |        |                 |                   | <u> </u> | <u> </u>  |           |
| STAINLESS STEELS   |  | Slotting             | .00064 | .00081 | .00096 | .00129 | .00193 | .00259 | .00323 | .00388                         | .00517 | .00646 | .00776 | .01034                           | .65 x Dia              | .45 x Dia |       | -         | -      | -                    | -                   | -          | -      | -      | -      | -           | -      |                 | -                 |          | <u> </u>  | -         |
| 203 EZ, 303 (all types), 416, 416Se, 416   | 450                                    | Roughing             | .00097 | .00123 | .00146 | .00196 | .00294 | .00393 | .00490 | .00589                         | .00786 | .00982 | .01179 | .01572                           | .65 x Dia              | .45 x Dia |       | -         |        |                      |                     |            |        |        |        |             |        |                 | -                 |          |           | _         |
| Plus X, 420F, 420FSe, 430F, 430FSe, 440F, 440FSe                                 |  | Finishing            | .00157 | .00197 | .00235 | .00316 | .00473 | .00632 | .00789 | .00949                         | .01265 | .01581 | .01897 | .02530                           | .65 x Dia              | .45 x Dia | -     | -         | -      | -                    | -                   | -          | -      | -      | -      | -           |        |                 | -                 | -        |           | -         |
| 201, 202, 203, 205, 301, 302, 304,   |  | Slotting             | .00059 | .00074 | .00088 | .00118 | .00177 | .00236 | .00295 | .00355                         | .00473 | .00591 | .00709 | .00946                           | .65 x Dia              | .45 x Dia |       | Slotting  | .00029 | .00037               | .00044              | .00059     | .00088 | .00118 | .00148 | .00177      | .00236 | .00295          | .00355            | .00473   | .65 x Dia | .45 x Dia |
| 304L, 308, 309, 310, 314, 316, 316L,<br>317, 321, 329, 330, 347, 348, 385, 403,  | 200                                    | Roughing             | .00089 | .00112 | .00134 | .00180 | .00269 | .00359 | .00448 | .00539                         | .00719 | .00898 | .01078 | .01437                           | .65 x Dia              | .45 x Dia | 100   | Roughing  | .00045 | .00056               | .00067              | .00090     | .00134 | .00180 | .00224 | .00269      | .00359 | .00449          | .00539            | .00719   | .65 x Dia | .45 x Dia |
| 405, 409, 410, 413, 420, 429, 430, 434, 436, 442, 446, 501, 502                  |  | Finishing            | .00143 | .00180 | .00215 | .00289 | .00433 | .00578 | .00722 | .00867                         | .01157 | .01446 | .01735 | .02313                           | .65 x Dia              | .45 x Dia |       | Finishing | .00072 | .00091               | .00108              | .00146     | .00218 | .00292 | .00364 | .00437      | .00583 | .00729          | .00875            | .01167   | .65 x Dia | .45 x Dia |
|  |  | Slotting             | .00037 | .00046 | .00055 | .00074 | .00111 | .00148 | .00184 | .00222                         | .00295 | .00369 | .00443 | .00591                           | .65 x Dia              | .45 x Dia |       | Slotting  | .00018 | .00023               | .00027              | .00037     | .00055 | .00074 | .00092 | .00111      | .00148 | .00185          | .00222            | .00295   | .65 x Dia | .45 x Dia |
| 414, 431, 440A, 440B, 440C,<br>13-8, 15-5, 15-7, 17-4, 17-7                      | 150                                    | Roughing             | .00056 | .00070 | .00084 | .00112 | .00168 | .00225 | .00280 | .00337                         | .00449 | .00561 | .00674 | .00898                           | .65 x Dia              | .45 x Dia | 90    | Roughing  | .00028 | .00035               | .00042              | .00056     | .00084 | .00112 | .00140 | .00168      | .00225 | .00281          | .00337            | .00449   | .65 x Dia | .45 x Dia |
|  |  | Finishing            | .00090 | .00113 | .00134 | .00181 | .00270 | .00361 | .00451 | .00542                         | .00723 | .00904 | .01084 | .01446                           | .65 x Dia              | .45 x Dia |       | Finishing | .00045 | .00057               | .00068              | .00091     | .00136 | .00182 | .00227 | .00273      | .00365 | .00456          | .00547            | .00729   | .65 x Dia | .45 x Dia |
| TOOL STEELS  |  | Slotting             | .00059 | .00074 | .00088 | .00118 | .00177 | .00236 | .00295 | .00355                         | .00473 | .00591 | .00709 | .00946                           | .65 x Dia              | .45 x Dia |       | Slotting  | .00029 | .00037               | .00044              | .00059     | .00088 | .00118 | .00148 | .00177      | .00236 | .00295          | .00355            | .00473   | .65 x Dia | .45 x Dia |
| A, L, O, P, W series   | 200                                    | Roughing             | .00089 | .00112 | .00134 | .00180 | .00269 | .00359 | .00448 | .00539                         | .00719 | .00898 | .01078 | .01437                           | .65 x Dia              | .45 x Dia | 100   | Roughing  | .00045 | .00056               | .00067              | .00090     | .00134 | .00180 | .00224 | .00269      | .00359 | .00449          | .00539            | .00719   | .65 x Dia | .45 x Dia |
| A, L, O, P, W series   |  | Finishing            | .00143 | .00180 | .00215 | .00289 | .00433 | .00578 | .00722 | .00867                         | .01157 | .01446 | .01735 | .02313                           | .65 x Dia              | .45 x Dia |       | Finishing | .00072 | .00091               | .00108              | .00146     | .00218 | .00292 | .00364 | .00437      | .00583 | .00729          | .00875            | .01167   | .65 x Dia | .45 x Dia |
|  |  | Slotting             | .00037 | .00046 | .00055 | .00074 | .00111 | .00148 | .00184 | .00222                         | .00295 | .00369 | .00443 | .00591                           | .65 x Dia              | .45 x Dia |       | Slotting  | .00018 | .00023               | .00027              | .00037     | .00055 | .00074 | .00092 | .00111      | .00148 | .00185          | .00222            | .00295   | .65 x Dia | .45 x Dia |
| D, H, M, T, S series   | 150                                    | Roughing             | .00056 | .00070 | .00084 | .00112 | .00168 | .00225 | .00280 | .00337                         | .00449 | .00561 | .00674 | .00898                           | .65 x Dia              | .45 x Dia | 90    | Roughing  | .00028 | .00035               | .00042              | .00056     | .00084 | .00112 | .00140 | .00168      | .00225 | .00281          | .00337            | .00449   | .65 x Dia | .45 x Dia |
|  |  | Finishing            | .00090 | .00113 | .00134 | .00181 | .00270 | .00361 | .00451 | .00542                         | .00723 | .00904 | .01084 | .01446                           | .65 x Dia              | .45 x Dia |       | Finishing | .00045 | .00057               | .00068              | .00091     | .00136 | .00182 | .00227 | .00273      | .00365 | .00456          | .00547            | .00729   | .65 x Dia | .45 x Dia |
|  |  | Slotting             | .00037 | .00046 | .00055 | .00074 | .00111 | .00148 | .00184 | .00222                         | .00295 | .00369 | .00443 | .00591                           | .65 x Dia              | .45 x Dia |       | Slotting  | .00018 | .00023               | .00027              | .00037     | .00055 | .00074 | .00092 | .00111      | .00148 | .00185          | .00222            | .00295   | .65 x Dia | .45 x Dia |
| TITANIUM ALLOYS  | 150                                    | Roughing             | .00056 | .00070 | .00084 | .00112 | .00168 | .00225 | .00280 | .00337                         | .00449 | .00561 | .00674 | .00898                           | .65 x Dia              | .45 x Dia | 75    | Roughing  | .00028 | .00035               | .00042              | .00056     | .00084 | .00112 | .00140 | .00168      | .00225 | .00281          | .00337            | .00449   | .65 x Dia | .45 x Dia |
|  |  | Finishing            | .00090 | .00113 | .00134 | .00181 | .00270 | .00361 | .00451 | .00542                         | .00723 | .00904 | .01084 | .01446                           | .65 x Dia              | .45 x Dia |       | Finishing | .00045 | .00057               | .00068              | .00091     | .00136 | .00182 | .00227 | .00273      | .00365 | .00456          | .00547            | .00729   | .65 x Dia | .45 x Dia |
| HIGH TEMP ALLOYS   |  | Slotting             | .00037 | .00046 | .00055 | .00074 | .00111 | .00148 | .00222 | .00295                         | .00369 | .00443 | .00591 | .00591                           | .65 x Dia              | .45 x Dia | 1     | Slotting  | .00018 | .00023               | .00027              | .00037     | .00055 | .00074 | .00092 | .00111      | .00148 | .00185          | .00222            | .00295   | .65 x Dia | .45 x Dia |
| Inconel, Hastelloy, Waspalloy, Monel,<br>Nimonic, Haynes, Discoloy, Incoloy      | 70                                     | Roughing             | .00056 | .00070 | .00084 | .00112 | .00168 | .00225 | .00280 | .00337                         | .00449 | .00561 | .00674 | .00898                           | .65 x Dia              | .45 x Dia | 50    | Roughing  | .00028 | .00035               | .00042              | .00056     | .00084 | .00112 | .00140 | .00168      | .00225 | .00281          | .00337            | .00449   | .65 x Dia | .45 x Dia |
| Nimonio, Haynes, Discoloy, Incoloy   |  | Finishing            | .00090 | .00113 | .00134 | .00181 | .00270 | .00361 | .00451 | .00542                         | .00723 | .00904 | .01084 | .01446                           | .65 x Dia              | .45 x Dia |       | Finishing | .00045 | .00057               | .00068              | .00091     | .00136 | .00182 | .00227 | .00273      | .00365 | .00456          | .00547            | .00729   | .65 x Dia | .45 x Dia |