



| Series<br>140 8D<br>Fractional | Hardness<br>BRINELL                                                                                                              | Vc<br>(SFM)                 |            | Diameter (D <sub>1</sub> )<br>(inch) |        |        |        |        |        |        |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------|--------------------------------------|--------|--------|--------|--------|--------|--------|
|                                |                                                                                                                                  |                             |            | 1/8                                  | 3/16   | 1/4    | 3/8    | 1/2    | 5/8    | 3/4    |
| <b>M</b>                       | <b>STAINLESS STEELS<br/>(DIFFICULT)<br/>304, 316, 321, 13-8 PH,<br/>15-5PH, 17-4 PH,<br/>Custom 450</b>                          | 130                         | RPM        | 3973                                 | 2649   | 1986   | 1324   | 993    | 795    | 662    |
|                                |                                                                                                                                  | > 270<br>(104-156)          | Fr         | 0.0015                               | 0.0023 | 0.0030 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 6.0                                  | 6.1    | 6.0    | 6.0    | 6.0    | 6.0    | 6.0    |
|                                |                                                                                                                                  | 100                         | RPM        | 3056                                 | 2037   | 1528   | 1019   | 764    | 611    | 509    |
|                                |                                                                                                                                  | > 270<br>≤ 370<br>(80-120)  | Fr         | 0.0015                               | 0.0023 | 0.0030 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 4.6                                  | 4.7    | 4.6    | 4.6    | 4.6    | 4.6    | 4.6    |
| <b>S</b>                       | <b>SUPER ALLOYS<br/>(NICKEL, COBALT,<br/>IRON BASE)<br/>Inconel 601, 617, 625,<br/>Incoly 800, Monel 400,<br/>Rene, Waspaloy</b> | 80                          | RPM        | 2445                                 | 1630   | 1222   | 815    | 611    | 489    | 407    |
|                                |                                                                                                                                  | ≤ 220<br>(64-96)            | Fr         | 0.0008                               | 0.0013 | 0.0015 | 0.0025 | 0.0030 | 0.0040 | 0.0045 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 2.0                                  | 2.1    | 1.8    | 2.0    | 1.8    | 2.0    | 1.8    |
|                                |                                                                                                                                  | 50                          | RPM        | 1528                                 | 1019   | 764    | 509    | 382    | 306    | 255    |
|                                |                                                                                                                                  | > 220<br>≤ 330<br>(40-60)   | Fr         | 0.0005                               | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 0.8                                  | 0.8    | 0.8    | 0.8    | 0.8    | 0.8    | 0.8    |
|                                |                                                                                                                                  | 35                          | RPM        | 1070                                 | 713    | 535    | 357    | 267    | 214    | 178    |
|                                |                                                                                                                                  | > 330<br>≤ 420<br>(28-42)   | Fr         | 0.0005                               | 0.0008 | 0.0010 | 0.0015 | 0.0020 | 0.0025 | 0.0030 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 0.5                                  | 0.6    | 0.5    | 0.5    | 0.5    | 0.5    | 0.5    |
|                                |                                                                                                                                  | 180                         | RPM        | 5501                                 | 3667   | 2750   | 1834   | 1375   | 1100   | 917    |
|                                |                                                                                                                                  | ≤ 280<br>(144-216)          | Fr         | 0.0015                               | 0.0023 | 0.0030 | 0.0045 | 0.0060 | 0.0075 | 0.0090 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 8.3                                  | 8.4    | 8.3    | 8.3    | 8.3    | 8.3    | 8.3    |
| <b>S</b>                       | <b>TITANIUM ALLOYS<br/>(DIFFICULT)<br/>Pure Titanium, Ti6Al4V,<br/>Ti6Al2Sn4Zr2Mo,<br/>Ti4Al4Mo2Sn0.5Si,<br/>Ti-6Al4V</b>        | 140                         | RPM        | 4278                                 | 2852   | 2139   | 1426   | 1070   | 856    | 713    |
|                                |                                                                                                                                  | > 280<br>≤ 350<br>(112-168) | Fr         | 0.0013                               | 0.0020 | 0.0025 | 0.0040 | 0.0050 | 0.0065 | 0.0080 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 5.6                                  | 5.7    | 5.3    | 5.7    | 5.3    | 5.6    | 5.7    |
|                                |                                                                                                                                  | 110                         | RPM        | 3362                                 | 2241   | 1681   | 1121   | 840    | 672    | 560    |
|                                |                                                                                                                                  | > 350<br>≤ 440<br>(88-132)  | Fr         | 0.0013                               | 0.0020 | 0.0025 | 0.0040 | 0.0050 | 0.0065 | 0.0080 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 4.4                                  | 4.5    | 4.2    | 4.5    | 4.2    | 4.4    | 4.5    |
| <b>N</b>                       | <b>ALUMINUM ALLOYS<br/>2017, 2024, 356,<br/>6061, 7075</b>                                                                       | 730                         | RPM        | 22309                                | 14873  | 11154  | 7436   | 5577   | 4462   | 3718   |
|                                |                                                                                                                                  | ≤ 80<br>(584-876)           | Fr         | 0.0050                               | 0.0075 | 0.0100 | 0.0150 | 0.0200 | 0.0250 | 0.0300 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 111.5                                | 111.5  | 111.5  | 111.5  | 111.5  | 111.5  | 111.5  |
|                                |                                                                                                                                  | 630                         | RPM        | 19253                                | 12835  | 9626   | 6418   | 4813   | 3851   | 3209   |
|                                |                                                                                                                                  | > 80<br>(504-756)           | Fr         | 0.0045                               | 0.0068 | 0.0090 | 0.0135 | 0.0180 | 0.0225 | 0.0270 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 86.6                                 | 87.3   | 86.6   | 86.6   | 86.6   | 86.6   | 86.6   |
| <b>N</b>                       | <b>COPPER ALLOYS<br/>Alum Bronze, C110,<br/>Muntz Brass</b>                                                                      | 520                         | RPM        | 15891                                | 10594  | 7946   | 5297   | 3973   | 3178   | 2649   |
|                                |                                                                                                                                  | ≤ 140<br>(416-624)          | Fr         | 0.0018                               | 0.0028 | 0.0035 | 0.0055 | 0.0070 | 0.0090 | 0.0105 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 28.6                                 | 29.7   | 27.8   | 29.1   | 27.8   | 28.6   | 27.8   |
|                                |                                                                                                                                  | 420                         | RPM        | 12835                                | 8557   | 6418   | 4278   | 3209   | 2567   | 2139   |
|                                |                                                                                                                                  | > 140<br>(336-504)          | Fr         | 0.0018                               | 0.0028 | 0.0035 | 0.0055 | 0.0070 | 0.0090 | 0.0105 |
|                                |                                                                                                                                  |                             | Feed (IPM) | 23.1                                 | 24.0   | 22.5   | 23.5   | 22.5   | 23.1   | 22.5   |

rpm = sfm x 3.82 / D<sub>1</sub>

ipm = (inch / revolution) x rpm

reduce speed and feed for materials harder than listed

refer to the SGS Tool Wizard for complete technical information ()