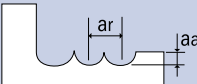




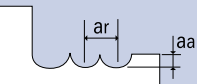
List HP419

Profiling Milling (Fractional)

| Hardness | – | | <20 HRC | | 20-30 HRC | | 30-38 HRC | | 38-45 HRC | | 45-55 HRC | | 55-60 HRC | |
|---------------|--|-------------|------------------------------|-------------|---|-------------|--|-------------|--|-------------|---------------------------|-------------|-----------------|-------------|
| Work Material | Cast Iron | | Mild Steels Carbon Steels | | Alloy Steels Tool Steels Ti Alloys (Annealed) | | Hardened Steels Pre-hardened Steels Ti Alloys (Solution Treated and Aged) | | Hardened Steels Pre-hardened Steels Stainless Steels Inconel Ni Based Alloys | | Hardened Steels | | Hardened Steels | |
| Cutting Speed | 574 SFM | | 460 SFM | | 377 SFM | | 295 SFM | | 262 SFM | | 230 SFM | | 164 SFM | |
| Depth of Cut | $a_a=0.1D$ $a_r=0.2D$  | | | | | | | | | | $a_a=0.05D$ $a_r=0.1D$ | | | |
| Mill Dia. | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min |
| 1/32 | 25,000 | 23.4 | 25,000 | 23.4 | 25,000 | 18.8 | 25,000 | 12.1 | 25,000 | 8.6 | 25,000 | 8.7 | 20,050 | 6.3 |
| 1/16 | 25,000 | 31.6 | 25,000 | 30.9 | 23,050 | 25.5 | 18,050 | 16.1 | 16,000 | 11.7 | 14,050 | 8.6 | 10,050 | 5.5 |
| 3/32 | 23,400 | 42.3 | 18,750 | 34.2 | 15,350 | 27.7 | 12,050 | 17.3 | 10,700 | 12.7 | 9,400 | 9.4 | 6,700 | 5.9 |
| 1/8 | 17,760 | 44.4 | 14,370 | 36.1 | 12,060 | 29.8 | 9,690 | 19.5 | 8,490 | 14.4 | 7,280 | 10.4 | 5,440 | 6.9 |
| 3/16 | 11,970 | 48.3 | 9,660 | 39.4 | 8,070 | 29.9 | 6,420 | 21.0 | 5,650 | 17.5 | 4,830 | 13.3 | 3,610 | 8.3 |

Reduce speeds and feeds 10% to 25% for Series HP419.

Profiling Milling (Metric)

| Hardness | – | | <20 HRC | | 20-30 HRC | | 30-38 HRC | | 38-45 HRC | | 45-55 HRC | | 55-60 HRC | |
|---------------|--|-------------|------------------------------|-------------|---|-------------|--|-------------|--|-------------|---------------------------|-------------|-----------------|-------------|
| Work Material | Cast Iron | | Mild Steels Carbon Steels | | Alloy Steels Tool Steels Ti Alloys (Annealed) | | Hardened Steels Pre-hardened Steels Ti Alloys (Solution Treated and Aged) | | Hardened Steels Pre-hardened Steels Stainless Steels Inconel Ni Based Alloys | | Hardened Steels | | Hardened Steels | |
| Cutting Speed | 574 SFM | | 460 SFM | | 377 SFM | | 295 SFM | | 262 SFM | | 230 SFM | | 164 SFM | |
| Depth of Cut | $a_a=0.1D$ $a_r=0.2D$  | | | | | | | | | | $a_a=0.05D$ $a_r=0.1D$ | | | |
| Mill Dia. | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min |
| 0.5 | 25,000 | 19.2 | 25,000 | 19.2 | 25,000 | 15.4 | 25,000 | 9.7 | 25,000 | 7.7 | 25,000 | 4.3 | 25,000 | 4.4 |
| 0.6 | 25,000 | 20.8 | 25,000 | 20.8 | 25,000 | 16.9 | 25,000 | 10.3 | 25,000 | 8.2 | 25,000 | 4.7 | 25,000 | 4.5 |
| 0.8 | 25,000 | 23.1 | 25,000 | 23.1 | 25,000 | 18.2 | 25,000 | 10.8 | 25,000 | 8.5 | 25,000 | 8.2 | 19,900 | 6.0 |
| 1.0 | 25,000 | 23.5 | 25,000 | 23.5 | 25,000 | 19.3 | 25,000 | 15.7 | 25,000 | 12.7 | 25,000 | 10.8 | 15,900 | 6.1 |
| 2.0 | 25,000 | 38.9 | 22,350 | 34.9 | 18,300 | 28.2 | 14,300 | 17.7 | 12,700 | 12.9 | 11,150 | 9.5 | 7,950 | 5.9 |
| 3.0 | 18,600 | 46.4 | 14,900 | 37.4 | 12,200 | 30.1 | 9,550 | 19.0 | 8,500 | 14.2 | 7,450 | 10.5 | 5,300 | 6.7 |
| 4.0 | 13,950 | 44.3 | 11,150 | 34.9 | 9,150 | 28.2 | 7,150 | 19.4 | 6,350 | 16.4 | 5,600 | 12.2 | 4,000 | 7.5 |
| 5.0 | 11,150 | 49.8 | 9,000 | 40.9 | 7,300 | 29.7 | 5,750 | 20.6 | 5,100 | 17.2 | 4,450 | 13.4 | 3,200 | 8.0 |
| 6.0 | 9,300 | 52.6 | 7,450 | 42.9 | 6,100 | 32.6 | 4,750 | 22.4 | 4,250 | 19.0 | 3,700 | 14.5 | 2,650 | 8.7 |
| 8.0 | 7,000 | 59.2 | 5,600 | 47.8 | 4,600 | 35.6 | 3,600 | 24.6 | 3,200 | 20.4 | 2,800 | 14.9 | 2,000 | 9.3 |
| 10.0 | 5,550 | 56.0 | 4,450 | 44.7 | 3,650 | 34.4 | 2,850 | 23.8 | 2,550 | 20.2 | 2,250 | 15.9 | 1,600 | 9.5 |
| 12.0 | 4,650 | 52.7 | 3,700 | 41.9 | 3,050 | 32.9 | 2,400 | 22.9 | 2,100 | 19.6 | 1,850 | 15.0 | 1,350 | 9.3 |

Reduce feeds 10% to 20% for Series HP419L.

ABOUT OSG

DRILLING

THREADING

MILLING

HOLDERS

INDEX

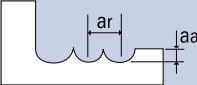
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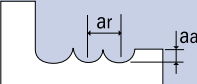
List HP419: (continued)

High Speed Light Milling (Fractional)

| Hardness | <20 HRC | | 20-30 HRC | | 30-38 HRC | | 38-45 HRC | | 45-55 HRC | | 55-60 HRC | | | | | | | | | | |
|---------------|--|----------------|---|-------------|--|-------------|--|-------------|-----------------|-------------|-----------------|-------------|-----|----------------|----------------|----------|-------|-------|----------|-------|-------|
| Work Material | Mild Steels Carbon Steels Cast Iron | | Alloy Steels Tool Steels Ti Alloys (Annealed) | | Hardened Steels Pre-hardened Steels Ti Alloys (Solution Treated and Aged) | | Hardened Steels Pre-hardened Steels Stainless Steels Inconel Ni Based Alloys | | Hardened Steels | | Hardened Steels | | | | | | | | | | |
| Cutting Speed | 951 SFM | | 820 SFM | | 722 SFM | | 574 SFM | | 574 SFM | | 394 SFM | | | | | | | | | | |
| Depth of Cut | $a_a=0.1D$ $a_r=0.2D$  | | | | | | <table border="1"> <thead> <tr> <th>Dia</th> <th>a_a</th> <th>a_r</th> </tr> </thead> <tbody> <tr> <td>D ≤ 5/32</td> <td>0.02D</td> <td>0.05D</td> </tr> <tr> <td>5/32 < D</td> <td>0.13D</td> <td>0.05D</td> </tr> </tbody> </table> | | | | | | Dia | a _a | a _r | D ≤ 5/32 | 0.02D | 0.05D | 5/32 < D | 0.13D | 0.05D |
| Dia | a _a | a _r | | | | | | | | | | | | | | | | | | | |
| D ≤ 5/32 | 0.02D | 0.05D | | | | | | | | | | | | | | | | | | | |
| 5/32 < D | 0.13D | 0.05D | | | | | | | | | | | | | | | | | | | |
| Mill Dia. | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | | | | | | | | | |
| 1/32 | 25,000 | 43.3 | 25,000 | 43.3 | 25,000 | 39.4 | 25,000 | 37.4 | 25,000 | 35.3 | 25,000 | 30.8 | | | | | | | | | |
| 1/16 | 25,000 | 80.8 | 25,000 | 78.1 | 25,000 | 70.3 | 25,000 | 66.3 | 25,000 | 64.0 | 24,060 | 53.6 | | | | | | | | | |
| 3/32 | 25,000 | 125.3 | 25,000 | 126.7 | 25,000 | 115.8 | 23,370 | 101.2 | 23,370 | 96.9 | 16,040 | 57.6 | | | | | | | | | |
| 1/8 | 25,000 | 169.9 | 25,000 | 175.1 | 22,050 | 139.5 | 17,530 | 104.1 | 17,530 | 101.1 | 12,030 | 57.6 | | | | | | | | | |
| 3/16 | 19,360 | 186.1 | 16,700 | 169.4 | 14,700 | 116.4 | 11,680 | 92.7 | 11,680 | 92.2 | 8,020 | 48.4 | | | | | | | | | |

Reduce speeds and feeds 10% to 25% for Series HP419.

High Speed Light Milling (Metric)

| Hardness | <20 HRC | | 20-30 HRC | | 30-38 HRC | | 38-45 HRC | | 45-55 HRC | | 55-60 HRC | | | | | | | | | | |
|---------------|--|----------------|---|-------------|--|-------------|--|-------------|-----------------|-------------|-----------------|-------------|-----|----------------|----------------|-------|-------|-------|-------|-------|-------|
| Work Material | Mild Steels Carbon Steels | | Alloy Steels Tool Steels Ti Alloys (Annealed) | | Hardened Steels Pre-hardened Steels Ti Alloys (Solution Treated and Aged) | | Hardened Steels Pre-hardened Steels Stainless Steels Inconel Ni Based Alloys | | Hardened Steels | | Hardened Steels | | | | | | | | | | |
| Cutting Speed | 951 SFM | | 820 SFM | | 722 SFM | | 574 SFM | | 574 SFM | | 394 SFM | | | | | | | | | | |
| Depth of Cut | $a_a=0.1D$ $a_r=0.2D$  | | | | | | <table border="1"> <thead> <tr> <th>Dia</th> <th>a_a</th> <th>a_r</th> </tr> </thead> <tbody> <tr> <td>D ≤ 8</td> <td>0.02D</td> <td>0.05D</td> </tr> <tr> <td>8 < D</td> <td>0.13D</td> <td>0.05D</td> </tr> </tbody> </table> | | | | | | Dia | a _a | a _r | D ≤ 8 | 0.02D | 0.05D | 8 < D | 0.13D | 0.05D |
| Dia | a _a | a _r | | | | | | | | | | | | | | | | | | | |
| D ≤ 8 | 0.02D | 0.05D | | | | | | | | | | | | | | | | | | | |
| 8 < D | 0.13D | 0.05D | | | | | | | | | | | | | | | | | | | |
| Mill Dia. | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | Speed RPM | Feed in/min | | | | | | | | | |
| 0.5 | 25,000 | 28.5 | 25,000 | 27.6 | 25,000 | 27.6 | 25,000 | 23.6 | 25,000 | 22.6 | 25,000 | 22.6 | | | | | | | | | |
| 0.6 | 25,000 | 32.5 | 25,000 | 32.5 | 25,000 | 32.5 | 25,000 | 27.6 | 25,000 | 27.1 | 25,000 | 27.1 | | | | | | | | | |
| 0.8 | 25,000 | 43.3 | 25,000 | 43.3 | 25,000 | 39.4 | 25,000 | 37.4 | 25,000 | 35.4 | 25,000 | 30.8 | | | | | | | | | |
| 1.0 | 25,000 | 55.1 | 25,000 | 55.1 | 25,000 | 49.2 | 25,000 | 46.6 | 25,000 | 44.6 | 25,000 | 39.4 | | | | | | | | | |
| 2.0 | 25,000 | 108.1 | 25,000 | 108.6 | 25,000 | 98.9 | 25,000 | 92.8 | 25,000 | 88.5 | 19,100 | 59.3 | | | | | | | | | |
| 3.0 | 25,000 | 169.9 | 25,000 | 175.1 | 23,330 | 147.6 | 18,550 | 110.1 | 18,550 | 107.0 | 12,730 | 61.0 | | | | | | | | | |
| 4.0 | 23,050 | 185.3 | 19,870 | 170.4 | 17,500 | 125.7 | 13,910 | 98.7 | 13,910 | 94.0 | 9,550 | 51.8 | | | | | | | | | |
| 5.0 | 18,440 | 194.4 | 15,900 | 173.5 | 14,000 | 116.6 | 11,130 | 93.4 | 11,130 | 93.8 | 7,640 | 48.2 | | | | | | | | | |
| 6.0 | 15,360 | 193.4 | 13,250 | 166.3 | 11,670 | 109.6 | 9,280 | 86.6 | 9,280 | 86.6 | 6,370 | 43.9 | | | | | | | | | |
| 8.0 | 11,530 | 144.2 | 9,940 | 125.3 | 8,750 | 80.9 | 6,960 | 65.2 | 6,960 | 65.2 | 4,780 | 33.8 | | | | | | | | | |
| 10.0 | 9,220 | 114.6 | 7,950 | 98.6 | 7,000 | 65.5 | 5,570 | 51.9 | 5,570 | 51.9 | 3,820 | 27.0 | | | | | | | | | |
| 12.0 | 7,680 | 95.3 | 6,630 | 82.0 | 5,830 | 54.0 | 4,640 | 42.8 | 4,640 | 42.8 | 3,180 | 22.4 | | | | | | | | | |

Reduce feeds 10% to 20% for Series HP419L.

