

ADVANCED PERFORMANCE

Solid Carbide End Mills For Stainless, Titanium, Steel And Other Ferrous Alloys



INTRO

MILLING

SPECIALTY

HOLEMAKING

THREADING

INSERTS



| FEATURES/DESCRIPTION | APPLICATION | FEATURES | | | | | | | | |
|--|-------------|--|---------|-----|-----|-----|----|----|------|-----|
| <h2>PYSTL</h2> <h3>Unequal Index End Mill</h3> <ul style="list-style-type: none"> Premium sub-micron grade carbide substrate for wear resistance Unequal index tool for Titanium, stainless and other gummy materials Ideal for HEM profiling milling operations Specialized edge honing SafeLock® shank available upon request | | <table border="1"> <tr> <td>CARBIDE</td> <td>VAR</td> </tr> <tr> <td>5FL</td> <td>RAD</td> </tr> <tr> <td>SQ</td> <td>h6</td> </tr> <tr> <td>P186</td> <td>FX3</td> </tr> </table> | CARBIDE | VAR | 5FL | RAD | SQ | h6 | P186 | FX3 |
| CARBIDE | VAR | | | | | | | | | |
| 5FL | RAD | | | | | | | | | |
| SQ | h6 | | | | | | | | | |
| P186 | FX3 | | | | | | | | | |

| STEEL | | | STAINLESS | | CAST IRON | | NON-FERROUS | | HBSA | | HARDENED STEEL | |
|-------|----|----|-----------|----|-----------|----|-------------|----|------|----|----------------|----|
| P1 | P2 | P3 | M1 | M2 | K1 | K2 | N1 | N2 | S1 | S2 | H1 | H2 |
| ● | ● | ○ | ○ | ● | ○ | ○ | | | | ● | | |

● Best ○ Good

Series 2205 **538 | 5FL | Square and Radius | PYSTL**

| Diameter(D ₁) | LOC(L ₁) | OAL(L) | Shank(D) | Radius(R) | EDP |
|---------------------------|----------------------|--------|----------|-----------|--------|
| 1/8 | 1/4 | 1-1/2 | 1/8 | - | 311348 |
| 1/8 | 1/4 | 1-1/2 | 1/8 | 0.010 | 311351 |
| 1/8 | 1/4 | 1-1/2 | 1/8 | 0.020 | 311353 |
| 1/8 | 1/4 | 1-1/2 | 1/8 | 0.030 | 311356 |
| 1/8 | 1/2 | 2 | 1/8 | - | 311358 |
| 1/8 | 1/2 | 2 | 1/8 | 0.010 | 311360 |
| 1/8 | 1/2 | 2 | 1/8 | 0.020 | 311362 |
| 1/8 | 1/2 | 2 | 1/8 | 0.030 | 311364 |
| 1/8 | 3/4 | 2-1/2 | 1/8 | - | 311367 |
| 1/8 | 3/4 | 2-1/2 | 1/8 | 0.010 | 311369 |
| 1/8 | 3/4 | 2-1/2 | 1/8 | 0.020 | 311371 |
| 3/16 | 5/16 | 2 | 3/16 | - | 311373 |
| 3/16 | 5/16 | 2 | 3/16 | 0.010 | 311375 |
| 3/16 | 5/16 | 2 | 3/16 | 0.020 | 311378 |
| 3/16 | 9/16 | 2 | 3/16 | - | 311381 |
| 3/16 | 9/16 | 2 | 3/16 | 0.010 | 311384 |
| 3/16 | 9/16 | 2 | 3/16 | 0.020 | 311388 |
| 3/16 | 9/16 | 2 | 3/16 | 0.030 | 311392 |
| 3/16 | 3/4 | 2-1/2 | 3/16 | - | 311395 |
| 3/16 | 3/4 | 2-1/2 | 3/16 | 0.010 | 311398 |
| 3/16 | 3/4 | 2-1/2 | 3/16 | 0.020 | 311401 |
| 3/16 | 3/4 | 2-1/2 | 3/16 | 0.030 | 311403 |
| 1/4 | 3/8 | 2 | 1/4 | - | 311405 |
| 1/4 | 3/8 | 2 | 1/4 | 0.010 | 311408 |
| 1/4 | 3/8 | 2 | 1/4 | 0.020 | 311410 |
| 1/4 | 3/8 | 2 | 1/4 | 0.030 | 311413 |
| 1/4 | 3/8 | 2 | 1/4 | 0.060 | 311417 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | - | 311421 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | 0.010 | 311423 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | 0.020 | 311425 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | 0.030 | 311427 |
| 1/4 | 1/2 | 2-1/2 | 1/4 | 0.060 | 311430 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | - | 311432 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 0.010 | 311434 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 0.020 | 311438 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 0.030 | 311440 |
| 1/4 | 3/4 | 2-1/2 | 1/4 | 0.060 | 311444 |
| 1/4 | 1 | 3 | 1/4 | - | 311446 |
| 1/4 | 1 | 3 | 1/4 | 0.010 | 311448 |
| 1/4 | 1 | 3 | 1/4 | 0.020 | 311452 |
| 1/4 | 1 | 3 | 1/4 | 0.030 | 311454 |
| 1/4 | 1 | 3 | 1/4 | 0.060 | 311458 |
| 1/4 | 1-1/4 | 3 | 1/4 | - | 311461 |
| 1/4 | 1-1/4 | 3 | 1/4 | 0.010 | 311464 |
| 1/4 | 1-1/4 | 3 | 1/4 | 0.020 | 311467 |

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| Series 2205 | | 538 5FL Square and Radius PYSTL | | | |
|---------------------------|----------------------|---------------------------------------|----------|-----------|--------|
| Diameter(D ₁) | LOC(L ₁) | OAL(L) | Shank(D) | Radius(R) | EDP |
| 1/4 | 1-1/4 | 3 | 1/4 | 0.030 | 311469 |
| 1/4 | 1-1/4 | 3 | 1/4 | 0.060 | 311473 |
| 5/16 | 7/16 | 2 | 5/16 | - | 311477 |
| 5/16 | 7/16 | 2 | 5/16 | 0.010 | 311480 |
| 5/16 | 7/16 | 2 | 5/16 | 0.020 | 311484 |
| 5/16 | 7/16 | 2 | 5/16 | 0.030 | 311486 |
| 5/16 | 7/16 | 2 | 5/16 | 0.060 | 311489 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | - | 311491 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 0.010 | 311495 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 0.020 | 311499 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 0.030 | 311501 |
| 5/16 | 13/16 | 2-1/2 | 5/16 | 0.060 | 311503 |
| 5/16 | 1 | 3 | 5/16 | - | 311505 |
| 5/16 | 1 | 3 | 5/16 | 0.010 | 311509 |
| 5/16 | 1 | 3 | 5/16 | 0.020 | 311512 |
| 5/16 | 1 | 3 | 5/16 | 0.030 | 311514 |
| 5/16 | 1 | 3 | 5/16 | 0.060 | 311518 |
| 3/8 | 1/2 | 2 | 3/8 | - | 311522 |
| 3/8 | 1/2 | 2 | 3/8 | 0.010 | 311524 |
| 3/8 | 1/2 | 2 | 3/8 | 0.020 | 311528 |
| 3/8 | 1/2 | 2 | 3/8 | 0.030 | 311531 |
| 3/8 | 1/2 | 2 | 3/8 | 0.060 | 311535 |
| 3/8 | 1/2 | 2 | 3/8 | 0.090 | 311537 |
| 3/8 | 1 | 2-1/2 | 3/8 | - | 311540 |
| 3/8 | 1 | 2-1/2 | 3/8 | 0.010 | 311543 |
| 3/8 | 1 | 2-1/2 | 3/8 | 0.020 | 311547 |
| 3/8 | 1 | 2-1/2 | 3/8 | 0.030 | 311550 |
| 3/8 | 1 | 2-1/2 | 3/8 | 0.060 | 311553 |
| 3/8 | 1 | 2-1/2 | 3/8 | 0.090 | 311556 |
| 3/8 | 1-1/4 | 3 | 3/8 | - | 311558 |
| 3/8 | 1-1/4 | 3 | 3/8 | 0.010 | 311562 |
| 3/8 | 1-1/4 | 3 | 3/8 | 0.020 | 311566 |
| 3/8 | 1-1/4 | 3 | 3/8 | 0.030 | 311568 |
| 3/8 | 1-1/4 | 3 | 3/8 | 0.060 | 311570 |
| 3/8 | 1-1/4 | 3 | 3/8 | 0.090 | 311574 |
| 3/8 | 1-1/2 | 4 | 3/8 | - | 311576 |
| 3/8 | 1-1/2 | 4 | 3/8 | 0.010 | 311578 |
| 3/8 | 1-1/2 | 4 | 3/8 | 0.020 | 311582 |
| 3/8 | 1-1/2 | 4 | 3/8 | 0.030 | 311586 |
| 3/8 | 1-1/2 | 4 | 3/8 | 0.060 | 311588 |
| 3/8 | 1-1/2 | 4 | 3/8 | 0.090 | 311590 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | - | 311594 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 0.020 | 311597 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 0.030 | 311601 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 0.060 | 311604 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 0.090 | 311606 |
| 1/2 | 5/8 | 2-1/2 | 1/2 | 0.120 | 311610 |
| 1/2 | 1 | 3 | 1/2 | - | 311613 |
| 1/2 | 1 | 3 | 1/2 | 0.020 | 311615 |
| 1/2 | 1 | 3 | 1/2 | 0.030 | 311619 |
| 1/2 | 1 | 3 | 1/2 | 0.060 | 311622 |
| 1/2 | 1 | 3 | 1/2 | 0.090 | 311626 |
| 1/2 | 1 | 3 | 1/2 | 0.120 | 311630 |
| 1/2 | 1-1/4 | 3 | 1/2 | - | 311634 |
| 1/2 | 1-1/4 | 3 | 1/2 | 0.020 | 311637 |
| 1/2 | 1-1/4 | 3 | 1/2 | 0.030 | 311640 |
| 1/2 | 1-1/4 | 3 | 1/2 | 0.060 | 311642 |
| 1/2 | 1-1/4 | 3 | 1/2 | 0.090 | 311644 |
| 1/2 | 1-1/4 | 3 | 1/2 | 0.120 | 311648 |
| 1/2 | 1-5/8 | 4 | 1/2 | - | 311652 |
| 1/2 | 1-5/8 | 4 | 1/2 | 0.020 | 311654 |
| 1/2 | 1-5/8 | 4 | 1/2 | 0.030 | 311658 |
| 1/2 | 1-5/8 | 4 | 1/2 | 0.060 | 311660 |
| 1/2 | 1-5/8 | 4 | 1/2 | 0.090 | 311664 |
| 1/2 | 1-5/8 | 4 | 1/2 | 0.120 | 311666 |
| 1/2 | 2 | 4 | 1/2 | - | 311670 |
| 1/2 | 2 | 4 | 1/2 | 0.020 | 311674 |
| 1/2 | 2 | 4 | 1/2 | 0.030 | 311678 |
| 1/2 | 2 | 4 | 1/2 | 0.060 | 311681 |
| 1/2 | 2 | 4 | 1/2 | 0.090 | 311683 |
| 1/2 | 2 | 4 | 1/2 | 0.120 | 311687 |
| 5/8 | 3/4 | 3 | 5/8 | - | 311691 |
| 5/8 | 3/4 | 3 | 5/8 | 0.030 | 311695 |
| 5/8 | 3/4 | 3 | 5/8 | 0.060 | 311699 |
| 5/8 | 3/4 | 3 | 5/8 | 0.090 | 311703 |
| 5/8 | 3/4 | 3 | 5/8 | 0.120 | 311705 |

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Series 2205 538 | 5FL | Square and Radius | PYSTL

| Diameter(D ₁) | LOC(L ₁) | OAL(L) | Shank(D) | Radius(R) | EDP |
|---------------------------|----------------------|--------|----------|-----------|--------|
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | - | 311708 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 0.030 | 311712 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 0.060 | 311715 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 0.090 | 311719 |
| 5/8 | 1-1/4 | 3-1/2 | 5/8 | 0.120 | 311723 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | - | 311725 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | 0.030 | 311727 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | 0.060 | 311730 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | 0.090 | 311734 |
| 5/8 | 1-5/8 | 3-1/2 | 5/8 | 0.120 | 311737 |
| 5/8 | 2-1/8 | 4 | 5/8 | - | 311741 |
| 5/8 | 2-1/8 | 4 | 5/8 | 0.030 | 311743 |
| 5/8 | 2-1/8 | 4 | 5/8 | 0.060 | 311745 |
| 5/8 | 2-1/8 | 4 | 5/8 | 0.090 | 311748 |
| 5/8 | 2-1/8 | 4 | 5/8 | 0.120 | 311750 |
| 5/8 | 2-1/2 | 5 | 5/8 | - | 311754 |
| 5/8 | 2-1/2 | 5 | 5/8 | 0.030 | 311756 |
| 5/8 | 2-1/2 | 5 | 5/8 | 0.060 | 311759 |
| 5/8 | 2-1/2 | 5 | 5/8 | 0.090 | 311761 |
| 5/8 | 2-1/2 | 5 | 5/8 | 0.120 | 311764 |
| 3/4 | 1 | 3 | 3/4 | - | 311767 |
| 3/4 | 1 | 3 | 3/4 | 0.030 | 311771 |
| 3/4 | 1 | 3 | 3/4 | 0.060 | 311773 |
| 3/4 | 1 | 3 | 3/4 | 0.090 | 311776 |
| 3/4 | 1 | 3 | 3/4 | 0.120 | 311778 |
| 3/4 | 1 | 3 | 3/4 | 0.250 | 311780 |
| 3/4 | 1-5/8 | 4 | 3/4 | - | 311782 |
| 3/4 | 1-5/8 | 4 | 3/4 | 0.030 | 311785 |
| 3/4 | 1-5/8 | 4 | 3/4 | 0.060 | 311787 |
| 3/4 | 1-5/8 | 4 | 3/4 | 0.090 | 311789 |
| 3/4 | 1-5/8 | 4 | 3/4 | 0.120 | 311793 |
| 3/4 | 1-5/8 | 4 | 3/4 | 0.250 | 311796 |
| 3/4 | 2-1/4 | 5 | 3/4 | - | 311800 |
| 3/4 | 2-1/4 | 5 | 3/4 | 0.030 | 311804 |
| 3/4 | 2-1/4 | 5 | 3/4 | 0.060 | 311808 |
| 3/4 | 2-1/4 | 5 | 3/4 | 0.090 | 311810 |
| 3/4 | 2-1/4 | 5 | 3/4 | 0.120 | 311812 |
| 3/4 | 2-1/4 | 5 | 3/4 | 0.250 | 311814 |
| 3/4 | 2-3/4 | 5 | 3/4 | - | 311818 |
| 3/4 | 2-3/4 | 5 | 3/4 | 0.030 | 311820 |
| 3/4 | 2-3/4 | 5 | 3/4 | 0.060 | 311824 |
| 3/4 | 2-3/4 | 5 | 3/4 | 0.090 | 311826 |
| 3/4 | 2-3/4 | 5 | 3/4 | 0.120 | 311828 |
| 3/4 | 2-3/4 | 5 | 3/4 | 0.250 | 311831 |
| 3/4 | 3-1/4 | 6 | 3/4 | - | 311833 |
| 3/4 | 3-1/4 | 6 | 3/4 | 0.030 | 311837 |
| 3/4 | 3-1/4 | 6 | 3/4 | 0.060 | 311839 |
| 3/4 | 3-1/4 | 6 | 3/4 | 0.090 | 311842 |
| 3/4 | 3-1/4 | 6 | 3/4 | 0.120 | 311846 |
| 3/4 | 3-1/4 | 6 | 3/4 | 0.250 | 311848 |
| 1 | 1-1/4 | 4 | 1 | - | 311852 |
| 1 | 1-1/4 | 4 | 1 | 0.030 | 311855 |
| 1 | 1-1/4 | 4 | 1 | 0.060 | 311857 |
| 1 | 1-1/4 | 4 | 1 | 0.090 | 311860 |
| 1 | 1-1/4 | 4 | 1 | 0.120 | 311864 |
| 1 | 1-1/4 | 4 | 1 | 0.250 | 311868 |
| 1 | 2 | 4 | 1 | - | 311872 |
| 1 | 2 | 4 | 1 | 0.030 | 311876 |
| 1 | 2 | 4 | 1 | 0.060 | 311878 |
| 1 | 2 | 4 | 1 | 0.090 | 311881 |
| 1 | 2 | 4 | 1 | 0.120 | 311884 |
| 1 | 2 | 4 | 1 | 0.250 | 311888 |
| 1 | 2-5/8 | 5 | 1 | - | 311890 |
| 1 | 2-5/8 | 5 | 1 | 0.030 | 311893 |
| 1 | 2-5/8 | 5 | 1 | 0.060 | 311896 |
| 1 | 2-5/8 | 5 | 1 | 0.090 | 311900 |
| 1 | 2-5/8 | 5 | 1 | 0.120 | 311902 |
| 1 | 2-5/8 | 5 | 1 | 0.250 | 311905 |
| 1 | 3-1/4 | 6 | 1 | - | 311909 |
| 1 | 3-1/4 | 6 | 1 | 0.030 | 311913 |
| 1 | 3-1/4 | 6 | 1 | 0.060 | 311915 |
| 1 | 3-1/4 | 6 | 1 | 0.090 | 311918 |
| 1 | 3-1/4 | 6 | 1 | 0.120 | 311920 |
| 1 | 3-1/4 | 6 | 1 | 0.250 | 311924 |
| 1 | 4-1/4 | 7 | 1 | - | 311927 |
| 1 | 4-1/4 | 7 | 1 | 0.030 | 311931 |

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| Diameter(D ₁) | LOC(L ₁) | OAL(L) | Shank(D) | Radius(R) | EDP |
|---------------------------|----------------------|--------|----------|-----------|---------------|
| 1 | 4-1/4 | 7 | 1 | 0.060 | 311933 |
| 1 | 4-1/4 | 7 | 1 | 0.090 | 311935 |
| 1 | 4-1/4 | 7 | 1 | 0.120 | 311937 |
| 1 | 4-1/4 | 7 | 1 | 0.250 | 311940 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | - | 311943 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | 0.030 | 311947 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | 0.060 | 311949 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | 0.090 | 311951 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | 0.120 | 311955 |
| 1-1/4 | 1-1/2 | 4-1/2 | 1-1/4 | 0.250 | 311957 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | - | 311961 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | 0.030 | 311964 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | 0.060 | 311966 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | 0.090 | 311968 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | 0.120 | 311971 |
| 1-1/4 | 2 | 4-1/2 | 1-1/4 | 0.250 | 311975 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | - | 311977 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | 0.030 | 311979 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | 0.060 | 311983 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | 0.090 | 311985 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | 0.120 | 311987 |
| 1-1/4 | 2-5/8 | 6 | 1-1/4 | 0.250 | 311991 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | - | 311993 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | 0.030 | 311995 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | 0.060 | 311998 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | 0.090 | 312001 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | 0.120 | 312003 |
| 1-1/4 | 4-1/2 | 7 | 1-1/4 | 0.250 | 312005 |

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Popular Custom Milling Options

- Proprietary GWS tool coatings
- Longer lengths
- Enhanced geometry
- Special shank modifications like **SAFE-LOCK**®

**CUSTOM
COMES
STANDARD**

Series 2205, 2213

538 | 5 FL | Square & Radius | PYSTL

| Material | Axial ↓ | Radial → | SFM | 1/8 | | 1/4 | | 3/8 | | 1/2 | | 5/8 | | 3/4 | |
|---|------------|-------------|------------|-------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| | | | | RPM | IPM | RPM | IPM | RPM | IPM | RPM | IPM | RPM | IPM | RPM | IPM |
| P Carbon Steel 10XX, 11XX, 12XX, 13XX Alloy Steel 4140, 8620 Tool Steel A2 ,A3, D2, H11, H13 | 1 x D | 1 x D | 220 | 6723 | 17 | 3362 | 17 | 2241 | 20 | 1681 | 21 | 1345 | 20 | 1121 | 19 |
| | 1.25 x D | .3 x D | 264 | 8068 | 24 | 4034 | 24 | 2689 | 29 | 2017 | 30 | 1614 | 29 | 1345 | 27 |
| | 1.5 X D | .1 x D | 343 | 10488 | 52 | 5244 | 52 | 3496 | 63 | 2622 | 66 | 2098 | 63 | 1748 | 58 |
| | 1 x D | 1 x D | 180 | 5501 | 16 | 2750 | 20 | 1834 | 16 | 1375 | 16 | 1100 | 16 | 917 | 14 |
| | 1.25 x D | .3 x D | 225 | 6876 | 24 | 3438 | 29 | 2292 | 24 | 1719 | 25 | 1375 | 24 | 1146 | 22 |
| | 1.5 X D | .1 x D | 270 | 8251 | 47 | 4126 | 59 | 2750 | 47 | 2063 | 49 | 1650 | 47 | 1375 | 43 |
| | 1 x D | .5 x D | 180 | 5501 | 13 | 2750 | 13 | 1834 | 16 | 1375 | 16 | 1100 | 16 | 917 | 14 |
| | 1.25 x D | .3 x D | 225 | 6876 | 20 | 3438 | 20 | 2292 | 24 | 1719 | 25 | 1375 | 24 | 1146 | 22 |
| | 1.5 X D | .1 x D | 270 | 8251 | 39 | 4126 | 39 | 2750 | 47 | 2063 | 49 | 1650 | 47 | 1375 | 43 |
| M SS 300 & 400 Series 303, 304, 316, 420, 416 Precipitation SS 15-5, 16-6, 17-4, 17-5 | .75 x D | 1 x D | 140 | 4278 | 9 | 2139 | 9 | 1426 | 10 | 1070 | 11 | 856 | 11 | 713 | 10 |
| | 1.25 x D | .3 x D | 185 | 5654 | 14 | 2827 | 14 | 1885 | 17 | 1413 | 17 | 1131 | 17 | 942 | 15 |
| | 1.5 x D | .1 x D | 230 | 7039 | 29 | 3519 | 29 | 2346 | 34 | 1760 | 36 | 1408 | 35 | 1173 | 32 |
| | 0.5 | 1 x D | 115 | 3514 | 7 | 1757 | 7 | 1171 | 8 | 879 | 9 | 703 | 8 | 586 | 8 |
| | 1.25 x D | .3 x D | 180 | 5501 | 13 | 2750 | 13 | 1834 | 15 | 1375 | 16 | 1100 | 15 | 917 | 14 |
| | 1.5 x D | .1 x D | 250 | 7640 | 30 | 3820 | 30 | 2547 | 35 | 1910 | 37 | 1528 | 36 | 1273 | 33 |
| K Cast Iron - Grey GG-10 to GG-40 Cast Iron- Ductile GGG-40, to GGG-70 | 1 x D | 1 x D | 100 | 3056 | 7 | 1528 | 7 | 1019 | 8 | 764 | 9 | 611 | 8 | 509 | 8 |
| | 1.25 x D | .3 x D | 125 | 3820 | 10 | 1910 | 10 | 1273 | 12 | 955 | 13 | 764 | 13 | 637 | 11 |
| | 1.5 X D | .1 x D | 163 | 4966 | 22 | 2483 | 22 | 1655 | 27 | 1242 | 28 | 993 | 27 | 828 | 25 |
| | .75 x D | 1 x D | 155 | 4737 | 10 | 2368 | 10 | 1579 | 12 | 1184 | 13 | 947 | 12 | 789 | 11 |
| | 1.25 x D | .3 x D | 180 | 5501 | 14 | 2750 | 14 | 1834 | 17 | 1375 | 18 | 1100 | 17 | 917 | 16 |
| | 1.5 x D | .1 x D | 216 | 6601 | 28 | 3300 | 28 | 2200 | 34 | 1650 | 36 | 1320 | 34 | 1100 | 31 |
| S High Temp Alloys Inconel 718, Hastalloy, Waspalloy, A286, CoCr Titanium Alloy Ti-6Al4V Grades (5-38) | .25 x D | .4 x D | 70 | 2139 | 4 | 1070 | 4 | 713 | 5 | 535 | 5 | 428 | 5 | 357 | 4 |
| | 1.25 x D | .2 x D | 80 | 2445 | 5 | 1222 | 5 | 815 | 6 | 611 | 7 | 489 | 7 | 407 | 6 |
| | 1.5 x D | .07 x D | 125 | 3820 | 14 | 1910 | 14 | 1273 | 17 | 955 | 18 | 764 | 17 | 637 | 16 |
| | 0.5 | 1 x D | 180 | 5501 | 10 | 2750 | 10 | 1834 | 12 | 1375 | 12 | 1100 | 12 | 917 | 11 |
| | 1.25 x D | .3 x D | 225 | 6876 | 14 | 3438 | 14 | 2292 | 17 | 1719 | 18 | 1375 | 17 | 1146 | 16 |
| | 1.5 x D | .1 x D | 360 | 11002 | 38 | 5501 | 38 | 3667 | 46 | 2750 | 48 | 2200 | 46 | 1834 | 43 |