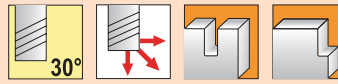


220RA - 2 Flute
230RA (830RA metric) - 4 Flute

Technical information:
 page 228, 230



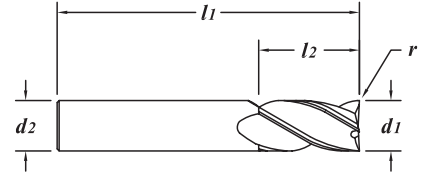
TOLERANCES

| | | |
|------|-------------------------------|-----------------------------------|
| $d1$ | +.000" -.002" (+.000 -.050mm) | |
| $d2$ | 3mm - 6mm | +.0000" -.0003" (-.0000 -.0075mm) |
| | 1/4" - 1" | -.0001" -.0004" (-.0025 -.0100mm) |
| r | +.001" -.001" (+.025 -.025mm) | |

.0625" - .3125"
 (1.588mm - 7.938mm)

Standard Length - Corner Radius - TiAlN Coated

- Solid submicron grain carbide end mill - center cutting
- Dry or semi-dry machining
- Up to 40% faster than uncoated
- For stronger corners and part radius
- Extremely versatile
- Uncoated - page 166



| 2 Flute EDP# | 4 Flute EDP# | $d1$ † Diameter | | $d2$ Shank Diameter | $l1$ Overall Length | $l2$ Flute Length | r Corner Radius | 1-11 | 12-24 | 25-49 | 50-100 | |
|-----------------|-----------------|--------------------|--------|---------------------------|---------------------------|-------------------------|-------------------------|-------|-------|-------|--------|-------|
| | | Decimal | Metric | | | | | | | | | |
| 79587 | 80587 | .0625 | 1/16" | 1.588 | 1/8" | 1-1/2" | 1/4" | .010" | 14.73 | 14.09 | 13.45 | 12.81 |
| 79597 | 80597 | .0625 | 1/16" | 1.588 | 1/8" | 1-1/2" | 1/4" | .015" | 14.73 | 14.09 | 13.45 | 12.81 |
| 79607 | 80607 | .0938 | 3/32" | 2.383 | 1/8" | 1-1/2" | 3/8" | .010" | 14.19 | 13.57 | 12.96 | 12.34 |
| 79617 | 80617 | .0938 | 3/32" | 2.383 | 1/8" | 1-1/2" | 3/8" | .015" | 14.19 | 13.57 | 12.96 | 12.34 |
| 79627 | 80627 | .0938 | 3/32" | 2.383 | 1/8" | 1-1/2" | 3/8" | .020" | 14.19 | 13.57 | 12.96 | 12.34 |
| - | 24077 | .1181 | | 3.000 | 3.0 | 38 | 12 | 0.2 | 13.13 | 12.56 | 11.99 | 11.42 |
| - | 24087 | .1181 | | 3.000 | 3.0 | 38 | 12 | 0.5 | 13.13 | 12.56 | 11.99 | 11.42 |
| 79007 | 80007 | .1250 | 1/8" | 3.175 | 1/8" | 1-1/2" | 1/2" | .010" | 13.11 | 12.54 | 11.97 | 11.40 |
| 79017 | 80017 | .1250 | 1/8" | 3.175 | 1/8" | 1-1/2" | 1/2" | .015" | 13.11 | 12.54 | 11.97 | 11.40 |
| 79027 | 80027 | .1250 | 1/8" | 3.175 | 1/8" | 1-1/2" | 1/2" | .020" | 13.11 | 12.54 | 11.97 | 11.40 |
| 79037 | 80037 | .1250 | 1/8" | 3.175 | 1/8" | 1-1/2" | 1/2" | .030" | 13.11 | 12.54 | 11.97 | 11.40 |
| - | 24097 | .1575 | | 4.000 | 4.0 | 50 | 14 | 0.3 | 17.19 | 16.45 | 15.70 | 14.95 |
| - | 24107 | .1575 | | 4.000 | 4.0 | 50 | 14 | 0.5 | 17.19 | 16.45 | 15.70 | 14.95 |
| 79047 | 80047 | .1875 | 3/16" | 4.763 | 3/16" | 2" | 5/8" | .010" | 16.49 | 15.77 | 15.06 | 14.34 |
| 79057 | 80057 | .1875 | 3/16" | 4.763 | 3/16" | 2" | 5/8" | .015" | 16.49 | 15.77 | 15.06 | 14.34 |
| 79067 | 80067 | .1875 | 3/16" | 4.763 | 3/16" | 2" | 5/8" | .020" | 16.49 | 15.77 | 15.06 | 14.34 |
| 79077 | 80077 | .1875 | 3/16" | 4.763 | 3/16" | 2" | 5/8" | .030" | 16.49 | 15.77 | 15.06 | 14.34 |
| - | 24117 | .1969 | | 5.000 | 5.0 | 50 | 16 | 0.3 | 22.94 | 21.95 | 20.95 | 19.95 |
| - | 24127 | .1969 | | 5.000 | 5.0 | 65 | 16 | 0.5 | 22.94 | 21.95 | 20.95 | 19.95 |
| - | 24177 | .2362 | | 6.000 | 6.0 | 65 | 19 | 0.5 | 23.39 | 22.37 | 21.36 | 20.34 |
| - | 24187 | .2362 | | 6.000 | 6.0 | 65 | 19 | 0.8 | 23.39 | 22.37 | 21.36 | 20.34 |
| - | 24197 | .2362 | | 6.000 | 6.0 | 65 | 19 | 1.0 | 23.39 | 22.37 | 21.36 | 20.34 |
| - | 24207 | .2362 | | 6.000 | 6.0 | 65 | 19 | 1.5 | 23.39 | 22.37 | 21.36 | 20.34 |
| - | 24217 | .2362 | | 6.000 | 6.0 | 65 | 19 | 2.0 | 23.39 | 22.37 | 21.36 | 20.34 |
| - | 80097 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .010" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79107 | 80107 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .015" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79117 | 80117 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .020" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79127 | 80127 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .030" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79137 | 80137 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .045" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79147 | 80147 | .2500 | 1/4" | 6.350 | 1/4" | 2-1/2" | 3/4" | .060" | 22.49 | 21.52 | 20.54 | 19.56 |
| 79167 | 80167 | .3125 | 5/16" | 7.938 | 5/16" | 2-1/2" | 7/8" | .015" | 30.49 | 29.16 | 27.84 | 26.51 |
| 79177 | 80177 | .3125 | 5/16" | 7.938 | 5/16" | 2-1/2" | 7/8" | .020" | 30.49 | 29.16 | 27.84 | 26.51 |
| 79187 | 80187 | .3125 | 5/16" | 7.938 | 5/16" | 2-1/2" | 7/8" | .030" | 30.49 | 29.16 | 27.84 | 26.51 |
| 79197 | 80197 | .3125 | 5/16" | 7.938 | 5/16" | 2-1/2" | 7/8" | .045" | 30.49 | 29.16 | 27.84 | 26.51 |
| 79207 | 80207 | .3125 | 5/16" | 7.938 | 5/16" | 2-1/2" | 7/8" | .060" | 30.49 | 29.16 | 27.84 | 26.51 |

220RA - 2 Flute (continued)
230RA (830RA metric) - 4 Flute (continued)

.3150" - .6299"
 (8.000mm - 16.000mm)

END MILLS

| 2 Flute EDP# | 4 Flute EDP# | $d1$ † Diameter | | $d2$ Shank Diameter | $l1$ Overall Length | $l2$ Flute Length | r Corner Radius | 1-11 | 12-24 | 25-49 | 50-100 | | |
|-----------------|-----------------|--------------------|--------|---------------------------|---------------------------|-------------------------|-------------------------|-------|--------|-------|--------|-------|-------|
| | | Decimal | Metric | | | | | | | | | | |
| - | 24227 | .3150 | 8.000 | 8.0 | 65 | 22 | 0.5 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24237 | .3150 | 8.000 | 8.0 | 65 | 22 | 0.8 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24247 | .3150 | 8.000 | 8.0 | 65 | 22 | 1.0 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24257 | .3150 | 8.000 | 8.0 | 65 | 22 | 1.5 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24267 | .3150 | 8.000 | 8.0 | 65 | 22 | 2.0 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24277 | .3150 | 8.000 | 8.0 | 65 | 22 | 2.5 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 24287 | .3150 | 8.000 | 8.0 | 65 | 22 | 3.0 | 31.63 | 30.25 | 28.88 | 27.50 | | |
| - | 80227 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .010" | 35.60 | 34.06 | 32.51 | 30.96 | |
| 79237 | 80237 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .015" | 35.60 | 34.06 | 32.51 | 30.96 | |
| 79247 | 80247 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .020" | 35.60 | 34.06 | 32.51 | 30.96 | |
| 79257 | 80257 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .030" | 35.60 | 34.06 | 32.51 | 30.96 | |
| 79267 | 80267 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .045" | 35.60 | 34.06 | 32.51 | 30.96 | |
| 79277 | 80277 | .3750 | 3/8" | 9.525 | 3/8" | 2-1/2" | 7/8" | .060" | 35.60 | 34.06 | 32.51 | 30.96 | |
| - | 24297 | .3937 | | 10.000 | 10.0 | 70 | 25 | 0.5 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24307 | .3937 | | 10.000 | 10.0 | 70 | 25 | 0.8 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24317 | .3937 | | 10.000 | 10.0 | 70 | 25 | 1.0 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24327 | .3937 | | 10.000 | 10.0 | 70 | 25 | 1.5 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24337 | .3937 | | 10.000 | 10.0 | 70 | 25 | 2.0 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24347 | .3937 | | 10.000 | 10.0 | 70 | 25 | 2.5 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24357 | .3937 | | 10.000 | 10.0 | 70 | 25 | 3.0 | 42.99 | 41.12 | 39.25 | 37.38 | |
| - | 24367 | .3937 | | 10.000 | 10.0 | 70 | 25 | 3.2 | 42.99 | 41.12 | 39.25 | 37.38 | |
| NEW | - | 80279 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .010" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80281 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .015" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80283 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .020" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80285 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .030" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80287 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .045" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80289 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .060" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80291 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .090" | 43.06 | 41.19 | 39.32 | 37.44 |
| NEW | - | 80293 | .4375 | 7/16" | 11.113 | 7/16" | 2-3/4" | 1" | .125" | 43.06 | 41.19 | 39.32 | 37.44 |
| - | 24377 | .4724 | | 12.000 | 12.0 | 75 | 25 | 0.5 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24387 | .4724 | | 12.000 | 12.0 | 75 | 25 | 0.8 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24397 | .4724 | | 12.000 | 12.0 | 75 | 25 | 1.0 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24407 | .4724 | | 12.000 | 12.0 | 75 | 25 | 1.5 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24417 | .4724 | | 12.000 | 12.0 | 75 | 25 | 2.0 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24427 | .4724 | | 12.000 | 12.0 | 75 | 25 | 2.5 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24437 | .4724 | | 12.000 | 12.0 | 75 | 25 | 3.0 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 24447 | .4724 | | 12.000 | 12.0 | 75 | 25 | 3.2 | 63.31 | 60.56 | 57.80 | 55.05 | |
| - | 80297 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .010" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79307 | 80307 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .015" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79317 | 80317 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .020" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79327 | 80327 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .030" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79337 | 80337 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .045" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79347 | 80347 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .060" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79357 | 80357 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .090" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79367 | 80367 | .5000 | 1/2" | 12.700 | 1/2" | 3" | 1" | .125" | 60.73 | 58.09 | 55.45 | 52.81 | |
| 79377 | 80377 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .015" | 96.69 | 92.49 | 88.28 | 84.08 | |
| 79387 | 80387 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .020" | 96.69 | 92.49 | 88.28 | 84.08 | |
| 79397 | 80397 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .030" | 96.69 | 92.49 | 88.28 | 84.08 | |
| 79407 | 80407 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .045" | 96.69 | 92.49 | 88.28 | 84.08 | |
| 79417 | 80417 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .060" | 96.69 | 92.49 | 88.28 | 84.08 | |
| 79427 | 80427 | .6250 | 5/8" | 15.875 | 5/8" | 3-1/2" | 1-1/4" | .090" | 96.69 | 92.49 | 88.28 | 84.08 | |
| - | 24457 | .6299 | | 16.000 | 16.0 | 88 | 38 | 0.5 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24467 | .6299 | | 16.000 | 16.0 | 88 | 38 | 1.0 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24477 | .6299 | | 16.000 | 16.0 | 88 | 38 | 2.0 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24487 | .6299 | | 16.000 | 16.0 | 88 | 38 | 2.5 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24497 | .6299 | | 16.000 | 16.0 | 88 | 38 | 3.0 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24507 | .6299 | | 16.000 | 16.0 | 88 | 38 | 4.0 | 100.89 | 96.50 | 92.12 | 87.73 | |
| - | 24517 | .6299 | | 16.000 | 16.0 | 88 | 38 | 5.0 | 100.89 | 96.50 | 92.12 | 87.73 | |

continued →

220RA - 2 Flute (continued)
230RA (830RA metric) - 4 Flute (continued)

.7500" - 1.000"
 (19.050mm - 25.400mm)

| 2 Flute EDP# | 4 Flute EDP# | $d1$ † Diameter | | $d2$ Shank Diameter | $l1$ Overall Length | $l2$ Flute Length | r Corner Radius | 1-11 | 12-24 | 25-49 | 50-100 | |
|-----------------|-----------------|--------------------|--------|---------------------------|---------------------------|-------------------------|-------------------------|-------|--------|--------|--------|--------|
| | | Decimal | Metric | | | | | | | | | |
| 79447 | 80447 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .015" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79457 | 80457 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .020" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79467 | 80467 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .030" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79477 | 80477 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .045" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79487 | 80487 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .060" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79497 | 80497 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .090" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79507 | 80507 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .125" | 138.66 | 132.63 | 126.60 | 120.57 |
| 79637 | 80637 | .7500 | 3/4" | 19.050 | 3/4" | 4" | 1-1/2" | .250" | 138.66 | 132.63 | 126.60 | 120.57 |
| - | 24527 | .7874 | | 20.000 | 20.0 | 100 | 38 | 0.5 | 196.24 | 187.70 | 179.17 | 170.64 |
| - | 24537 | .7874 | | 20.000 | 20.0 | 100 | 38 | 1.0 | 196.24 | 187.70 | 179.17 | 170.64 |
| - | 24547 | .7874 | | 20.000 | 20.0 | 100 | 38 | 2.0 | 196.24 | 187.70 | 179.17 | 170.64 |
| - | 24557 | .7874 | | 20.000 | 20.0 | 100 | 38 | 3.0 | 196.24 | 187.70 | 179.17 | 170.64 |
| - | 24567 | .7874 | | 20.000 | 20.0 | 100 | 38 | 5.0 | 196.24 | 187.70 | 179.17 | 170.64 |
| 79517 | 80517 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .015" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79527 | 80527 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .020" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79537 | 80537 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .030" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79547 | 80547 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .045" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79557 | 80557 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .060" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79567 | 80567 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .090" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79577 | 80577 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .125" | 236.72 | 226.42 | 216.13 | 205.84 |
| 79647 | 80647 | 1.000 | 1" | 25.400 | 1" | 4" | 1-1/2" | .250" | 236.72 | 226.42 | 216.13 | 205.84 |