



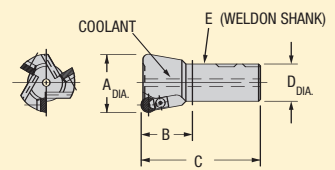
# Excelerator™ Mill

Greenleaf's new line of small-diameter end mills are designed for high-performance milling in difficult-to-machine materials using Greenleaf's advanced ceramic inserts.

The cutter bodies, shanks, and insert clamps have been developed to offer outstanding performance at elevated spindle speeds on the most demanding materials.

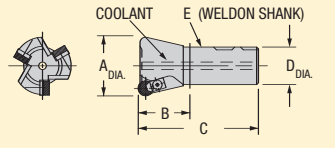
Typical application areas include most hardened materials above 40 R/c, and nickel and cobalt-based super alloys.

Hard milling applications in the Moldmaking and Tool & Die industries, pocket milling, ramping, and helical milling are now possible using indexable ceramic inserts.



## WSRP End Mill: Round Positive Inserts

| Cutter Order Number | Insert    | No. of Inserts | A     | B     | C     | D     | E | Furnished Components |                   |        |                  | Screw Torque Setting | Max RPM Carbide | Max RPM Ceramic |
|---------------------|-----------|----------------|-------|-------|-------|-------|---|----------------------|-------------------|--------|------------------|----------------------|-----------------|-----------------|
|                     |           |                |       |       |       |       |   | Clamp                | Clamp Screw       | Anvil  | Anvil Screw      |                      |                 |                 |
| WSRP-60000.6-RH     | RPGN-21.5 | 2              | 0.625 | 1.250 | 3.160 | 0.625 | - | 423978               | #3-48 x 1/4 SHCS  | -      | -                | 15 In/lbs.           | 15,000          | 40,000          |
| WSRP-60000.7-RH     | RPGN-2.52 | 2              | 0.750 | 1.250 | 3.280 | 0.750 | - | 429323               | SE02-01           | -      | -                | 30 In/lbs.           | 12,500          | 35,000          |
| WSRP-60001A-RH      | RPGN-2.52 | 3              | 1.000 | 1.250 | 3.280 | 0.750 | - | 429323               | SE02-01           | -      | -                | 30 In/lbs.           | 9,500           | 26,000          |
| WSRP-60001-RH       | RPGN-32   | 3              | 1.000 | 1.250 | 3.280 | 0.750 | - | 425716               | SE02-01           | -      | -                | 30 In/lbs.           | 9,500           | 26,000          |
| WSRP-60001.2-RH     | RPGN-32   | 3              | 1.250 | 1.250 | 3.530 | 1.000 | 7 | 425716               | SE02-01           | -      | -                | 30 In/lbs.           | 7,500           | 21,000          |
| WSRP-60001.5-RH     | RPGN-43   | 3              | 1.500 | 1.720 | 4.000 | 1.250 | 8 | 3025-1               | #10-32 x 1/2 LHCS | -      | -                | 30 In/lbs.           | 6,200           | 19,500          |
| WSRP-60002-RH       | RPGN-43   | 3              | 2.000 | 1.720 | 4.000 | 1.250 | 8 | 3025-1               | #10-32 x 1/2 LHCS | 308341 | #4-40 x 1/4 FHCS | 30 In/lbs.           | 4,600           | 13,000          |
| WSRP-60002.5-RH     | RPGN-43   | 4              | 2.500 | 1.750 | 4.000 | 1.250 | 8 | 3025-1               | #10-32 x 1/2 SHCS | 308341 | #4-40 x 1/4 FHCS | 120 In/lbs.          | 3,800           | 10,000          |

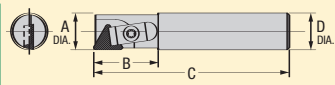


## WSRN End Mill: Round Negative Inserts

| Cutter Order Number | Insert  | No. of Inserts | A     | B     | C     | D    | E | Furnished Components |                   |        |            | Screw Torque Setting | Max RPM Carbide | Max RPM Ceramic |
|---------------------|---------|----------------|-------|-------|-------|------|---|----------------------|-------------------|--------|------------|----------------------|-----------------|-----------------|
|                     |         |                |       |       |       |      |   | Clamp                | Clamp Screw       | Shim   | Dowel Pin  |                      |                 |                 |
| WSRN-60001-RH       | RNGN-32 | 2              | 1.000 | 1.250 | 3.280 | 0.75 | - | 425716               | SE02-01           | -      | -          | 30 In/lbs.           | 9,500           | 26,000          |
| WSRN-60001.2-RH     | RNGN-32 | 3              | 1.250 | 1.250 | 3.530 | 1.00 | 7 | 425716               | SE02-01           | -      | -          | 30 In/lbs.           | 7,500           | 21,000          |
| WSRN-60001.5-RH     | RNGN-43 | 3              | 1.500 | 1.720 | 4.000 | 1.25 | 8 | 3025-1               | #10-32 x 1/2 LHCS | -      | -          | 120 In/lbs.          | 6,200           | 16,500          |
| WSRN-60002-RH       | RNGN-43 | 3              | 2.000 | 1.720 | 4.000 | 1.25 | 8 | 3025-1               | #10-32 x 1/2 SHCS | 303724 | 1/8" X 3/8 | 120 In/lbs.          | 4,600           | 13,000          |
| WSRN-60002.5-RH     | RNGN-43 | 4              | 2.500 | 1.750 | 4.000 | 1.25 | 8 | 3025-1               | #10-32 x 1/2 SHCS | 303724 | 1/8" X 3/8 | 120 In/lbs.          | 3,800           | 10,000          |

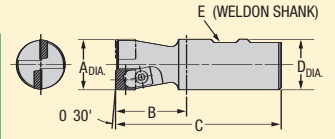
## WSTP Positive Rake End Mill: Triangle Inserts

| Cutter Order Number | Insert   | No. of Inserts | A     | B     | C     | D     | Furnished Components |             | Screw Torque Setting | Max RPM Carbide | Max RPM Ceramic |
|---------------------|----------|----------------|-------|-------|-------|-------|----------------------|-------------|----------------------|-----------------|-----------------|
|                     |          |                |       |       |       |       | Clamp                | Clamp Screw |                      |                 |                 |
| WSTP-70.50 RH       | TPGN-222 | 1              | 0.500 | 0.875 | 2.660 | 0.500 | 429871               | PT-317T     | 20 In/lbs.           | 19,000          | 35,000          |
| WSTP-70.56 RH       | TPGN-222 | 1              | 0.562 | 1.000 | 2.780 | 0.500 | 429871               | PT-317T     | 20 In/lbs.           | 17,000          | 35,000          |
| WSTP-70.62 RH       | TPGN-222 | 1              | 0.625 | 1.000 | 2.910 | 0.625 | 429871               | PT-317T     | 20 In/lbs.           | 15,000          | 35,000          |



## WSSP End Mill: Square Positive Inserts

| Cutter Order Number | Insert     | No. of Inserts | A     | B     | C     | D     | E | Furnished Components |                   | Screw Torque Setting | Max RPM Carbide | Max RPM Ceramic |
|---------------------|------------|----------------|-------|-------|-------|-------|---|----------------------|-------------------|----------------------|-----------------|-----------------|
|                     |            |                |       |       |       |       |   | Clamp                | Clamp Screw       |                      |                 |                 |
| WSSP-70000.3-RH     | SPGN-21.52 | 1              | 0.375 | 0.750 | 2.310 | 0.375 | - | 429871               | PT-317T           | 20 In/lbs.           | 25,000          | 40,000          |
| WSSP-70000.5-RH     | SPGN-21.52 | 1              | 0.500 | 0.875 | 2.660 | 0.500 | - | 429871               | PT-317T           | 20 In/lbs.           | 19,000          | 40,000          |
| WSSP-70000.6-RH     | SPGN-222   | 2              | 0.625 | 1.000 | 2.910 | 0.625 | - | 423978               | #3-48 x 3/16 SHCS | 15 In/lbs.           | 15,000          | 40,000          |
| WSSP-70000.7-RH     | SPGN-222   | 2              | 0.750 | 1.000 | 3.030 | 0.750 | - | 423978               | #3-48 x 3/16 SHCS | 15 In/lbs.           | 12,500          | 35,000          |
| WSSP-70001-RH       | SPGN-322   | 2              | 1.000 | 1.250 | 3.280 | 0.750 | - | 429706               | SE02-01           | 30 In/lbs.           | 9,500           | 26,000          |
| WSSP-70001.2-RH     | SPGN-322   | 3              | 1.250 | 1.750 | 4.030 | 1.000 | 7 | 429706               | SE02-01           | 30 In/lbs.           | 7,500           | 21,000          |
| WSSP-70001.5-RH     | SPGN-432   | 3              | 1.500 | 1.750 | 4.030 | 1.250 | 8 | 3127-C               | #10-32 x 1/2 SHCS | 120 In/lbs.          | 6,200           | 16,500          |



# Excelerator™ Mill

## Hard-Milling Application Data

| Insert     | Recommended Axial Depth | 45-55 R/c      |               | 55-60 R/c      |                | 60-62 R/c      |                |
|------------|-------------------------|----------------|---------------|----------------|----------------|----------------|----------------|
|            |                         | 700-1200 SFM   | .003-.006 IPT | 500-900 SFM    | .0025-.004 IPT | 400-700 SFM    | .002-.0035 IPT |
|            |                         | Starting Speed | Starting Feed | Starting Speed | Starting Feed  | Starting Speed | Starting Feed  |
| RPGN-21.5  | 0.031                   | 850            | 0.0040        | 700            | 0.0030         | 550            | 0.0025         |
| RPGN-2.52  | 0.040                   | 850            | 0.0040        | 700            | 0.0030         | 550            | 0.0025         |
| RPGN-32    | 0.045                   | 850            | 0.0045        | 700            | 0.0030         | 550            | 0.0025         |
| RPGN-43    | 0.050                   | 850            | 0.0050        | 700            | 0.0035         | 550            | 0.0030         |
| RNGN-32    | 0.045                   | 850            | 0.0045        | 700            | 0.0030         | 550            | 0.0025         |
| RNGN-43    | 0.050                   | 850            | 0.0050        | 700            | 0.0035         | 550            | 0.0030         |
| SPGN-21.52 | 0.030                   | 850            | 0.0032        | 700            | 0.0025         | 550            | 0.0022         |
| SPGN-222   | 0.035                   | 850            | 0.0035        | 700            | 0.0025         | 550            | 0.0025         |
| SPGN-322   | 0.035                   | 850            | 0.0035        | 700            | 0.0025         | 550            | 0.0025         |
| SPGN-432   | 0.040                   | 850            | 0.0035        | 700            | 0.0030         | 550            | 0.0025         |
| TPGN-222   | 0.030                   | 850            | 0.0032        | 700            | 0.0025         | 550            | 0.0022         |

### Application Tips

- Air blast is highly recommended for hard milling applications.
- Maximum insert life can be achieved at a radial width of cut based on 40-60 percent of cutter diameter.
- As the width-of-cut ratio decreases, feed should be increased to maintain acceptable average chip thickness.
- Balanced toolholders are critical when operating at 10,000 RPM and higher.
- Keep tool length overhang as short as possible.
- Ramping or helical interpolation are the preferred methods of entry into the cut.
- Maintain cutter engagement as much as possible; frequent entry and exit into cuts can decrease insert life.
- When using round insert cutters, the effective cutting diameter depends on the actual depth of cut.
- **Do not exceed recommended maximum RPM.**  
Maximum RPMs for all Excelerator™ Mills can be found in Engineering Bulletin EM605. Contact Greenleaf for Engineering Bulletin EM605 at 1-800-458-1850.

### Formulas

$$\text{RPM} = 3.82 \times \text{SFM} / \text{effective dia.}$$

$$\text{SFM} = \text{Effective dia.} \times \text{RPM} / 3.82$$

$$\text{IPM} = \text{RPM} \times \text{no. of teeth} \times \text{chip load}$$

$$\text{IPT} = \text{IPM} / (\text{RPM} \times \text{no. of teeth})$$

Formula to Determine Eff. Cutting Dia.

$$Dw = 2 \times \sqrt{R^2 - (R - Ap)^2} + (D - 2R)$$

D = Cutter Diameter

R = Insert Radius

Ap = Depth of Cut

Dw = Eff. Cutting Dia.



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