

Member IMC Group  
**Ingersoll**  
Cutting Tools

• **UPDATED** •

**FORMMASTER<sup>WAVE</sup>**

**BUTTON  
CUTTERS**

Part of the  
**Ingersoll**  
**D & M** line

## FORMMASTER<sup>WAVE</sup> FACE MILL, .500 I.C. BUTTON

### Diameters

2.000" to 6.000"



Facing



Ramping



Pocketing



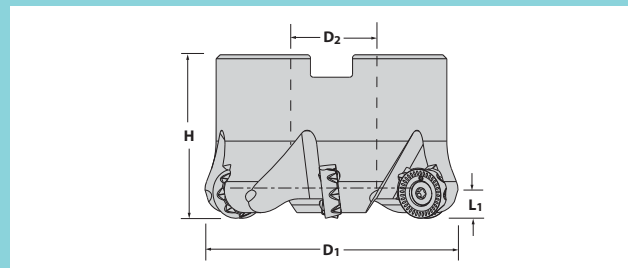
Corkscrew



Contouring



Coolant Thru



| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number | L <sub>1</sub><br>Cutting Edge<br>Length | H<br>Height | Number of<br>Inserts | D <sub>2</sub><br>Bore<br>Diameter | Keyway<br>Dimensions | Retention<br>Bolt |
|---------------------------------------|------------------|------------------------------------------|-------------|----------------------|------------------------------------|----------------------|-------------------|
| 2.00                                  | 5W6J-20R01       | 0.25                                     | 1.57        | 5                    | 0.75                               | 0.32                 | SD06-46           |
| 2.00                                  | 5W6J-20R10       | 0.25                                     | 1.57        | 3                    | 0.75                               | 0.32                 | SD06-46           |
| 2.00                                  | 5W6J-20R12*      | 0.25                                     | 2.00        | 3                    | -                                  | -                    | -                 |
| 3.00                                  | 5W6J-30R01       | 0.25                                     | 1.75        | 6                    | 1.00                               | 0.38                 | SD08-46           |
| 4.00                                  | 5W6J-40R01       | 0.25                                     | 2.50        | 7                    | 1.50                               | 0.64                 | SD12-82           |
| 5.00                                  | 5W6J-50R01       | 0.25                                     | 2.50        | 8                    | 1.50                               | 0.64                 | SD12-82           |
| 6.00                                  | 5W6J-60R01       | 0.25                                     | 2.50        | 9                    | 1.50                               | 0.64                 | SD12-82           |

\* HI-TORQ™ STYLE, Precision Components

## FORMMASTER<sup>WAVE</sup> FACE MILL, .750 I.C. BUTTON

### Diameters

3.000" to 6.000"



Facing



Ramping



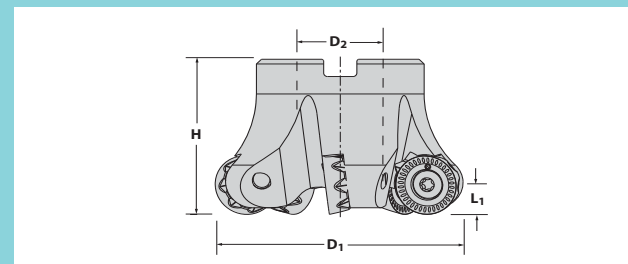
Pocketing



Corkscrew



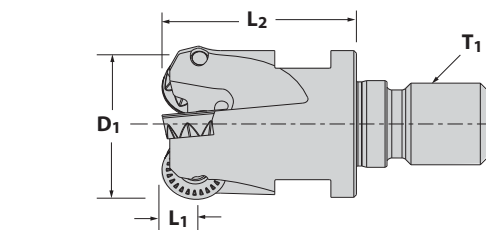
Contouring



| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number | L <sub>1</sub><br>Cutting Edge<br>Length | H<br>Height | Number of<br>Inserts | D <sub>2</sub><br>Bore<br>Diameter | Keyway<br>Dimensions | Retention<br>Bolt |
|---------------------------------------|------------------|------------------------------------------|-------------|----------------------|------------------------------------|----------------------|-------------------|
| 3.00                                  | 5W6N-30R01       | 0.375                                    | 1.975       | 5                    | 1.000                              | 0.380                | SD08-46           |
| 4.00                                  | 5W6N-40R01       | 0.375                                    | 2.480       | 6                    | 1.500                              | 0.620                | SD12-82           |
| 6.00                                  | 5W6N-60R01       | 0.375                                    | 2.375       | 8                    | 1.500                              | 0.620                | -                 |

**Diameters**  
1.00" to 1.50"

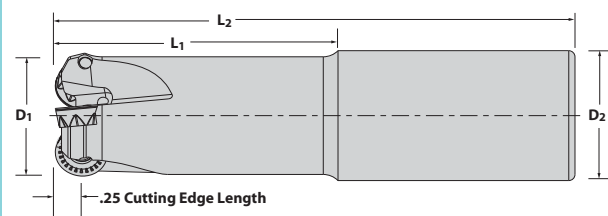
**Cutting Edge Radius**  
.250"



| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number  | L <sub>1</sub><br>Cutting Edge<br>Length | Number of<br>Inserts | L <sub>2</sub><br>Extension<br>From Holder | T <sub>1</sub><br>Thread<br>Size | Coolant<br>Thru |
|---------------------------------------|-------------------|------------------------------------------|----------------------|--------------------------------------------|----------------------------------|-----------------|
| 1.000                                 | *15B4J-10015X7R01 | 0.25                                     | 2                    | 1.500                                      | M12                              | No              |
| 1.250                                 | 15B4J-12017X8R01  | 0.25                                     | 3                    | 1.500                                      | M16                              | Yes             |
| 1.500                                 | 15B4J-15017X8R01  | 0.25                                     | 3                    | 1.500                                      | M16                              | Yes             |

\* 1.00 diameter end mills have a neutral axial insert orientation, max ramp .5 degrees.

**Diameters**  
1.000" to 1.500"



| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number  | L <sub>1</sub><br>Extension | Number of<br>Inserts | L <sub>2</sub><br>Overall<br>Leigh | D <sub>2</sub><br>Shank<br>Style | Coolant<br>Thru |
|---------------------------------------|-------------------|-----------------------------|----------------------|------------------------------------|----------------------------------|-----------------|
| 1.00                                  | *15B4H-1002280R01 | 1.750                       | 2                    | 4.500                              | 1.00 weldon                      | No              |
| 1.00                                  | *15B4H-10037S1R01 | 2.000                       | 2                    | 6.000                              | 1.00 straight                    | No              |
| 1.25                                  | 15B4H-1252781R01  | 2.750                       | 3                    | 5.000                              | 1.25 weldon                      | Yes             |
| 1.25                                  | 15B4H-12537S9R01  | 2.000                       | 3                    | 6.000                              | 1.25 straight                    | Yes             |
| 1.50                                  | 15B4H-1502386R01  | 2.340                       | 4                    | 5.000                              | 1.50 weldon                      | Yes             |
| 1.50                                  | 15B4H-15033S5R01  | 2.000                       | 4                    | 6.000                              | 1.50 straight                    | Yes             |

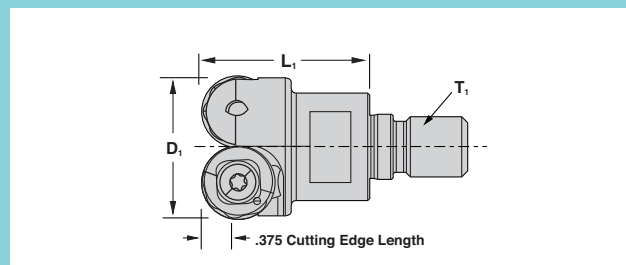
\* 1.00 diameter end mills have a neutral axial insert orientation, max ramp .5 degrees.



## FORMMASTER<sup>WAVE</sup> TOP•ON, .750 I.C. BUTTON

Diameters  
1.500"

Cutting Edge Radius  
.375"

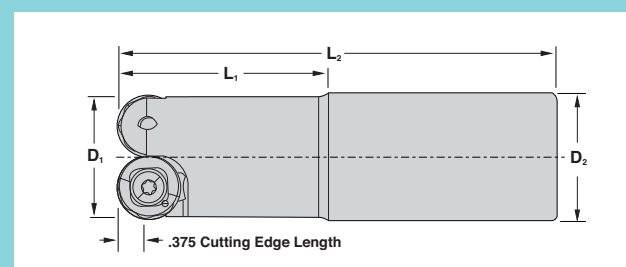


| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number | L <sub>1</sub><br>Cutting Edge<br>Length | Number of<br>Inserts | L <sub>2</sub><br>Extension<br>Length | T <sub>1</sub><br>Thread<br>Size | Coolant<br>Thru |
|---------------------------------------|------------------|------------------------------------------|----------------------|---------------------------------------|----------------------------------|-----------------|
| 1.500                                 | 15B4M-15017X8R01 | 2                                        | 1.750                | 5                                     | M16                              | NO              |
|                                       |                  |                                          |                      |                                       |                                  |                 |
|                                       |                  |                                          |                      |                                       |                                  |                 |
|                                       |                  |                                          |                      |                                       |                                  |                 |

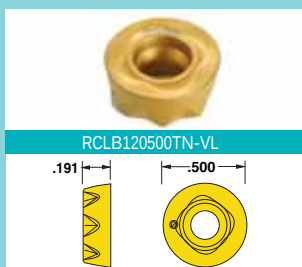
## FORMMASTER<sup>WAVE</sup> END MILL, .750 I.C. BUTTON

Diameters  
1.500"

Cutting Edge Radius  
.375"



| D <sub>1</sub><br>Nominal<br>Diameter | Cutter<br>Number | L <sub>1</sub><br>Extension | Number of<br>Inserts | L <sub>2</sub><br>Overall<br>Legth | D <sub>2</sub><br>Shank<br>Style | Coolant<br>Thru |
|---------------------------------------|------------------|-----------------------------|----------------------|------------------------------------|----------------------------------|-----------------|
| 1.50                                  | 15B4M-1502586r01 | 2.50                        | 2                    | 5.16                               | 1.50 weldon                      | No              |
| 1.50                                  | 15B4M-15035S5R01 | 3.50                        | 2                    | 7.50                               | 1.50 straight                    | No              |
|                                       |                  |                             |                      |                                    |                                  |                 |
|                                       |                  |                             |                      |                                    |                                  |                 |

**INSERTS**


| Insert Number   | Application | D<br>Insert Diameter | Corner Radius | Cutting Edge Configuration | Indexes per Insert | Grade |      |      |      |      |      |
|-----------------|-------------|----------------------|---------------|----------------------------|--------------------|-------|------|------|------|------|------|
|                 |             |                      |               |                            |                    | IN    | 2005 | 2030 | 2040 | 5515 | 6530 |
| RCLB120500TN-VL | Heavy Duty  | .500                 | .250          | Variable Land              | 4*                 | ■     |      |      | ■    |      | ■    |
| RCKX120400TN-M  | STD.        | .500                 | .250          | Positive                   | 8                  | ■     | ■    |      |      | ■    |      |
| RCLB19T600TN-VL | Heavy Duty  | .750                 | .375          | Variable Land              | 4*                 | ■     |      |      | ■    |      | ■    |
| RCLT190600N-HR  | STD.        | .750                 | .375          | Positive                   | 8                  | ■     | ■    | ■    |      |      |      |

\* 4 indexes when maximizing wave. Benefits, see next page.

**HARDWARE**

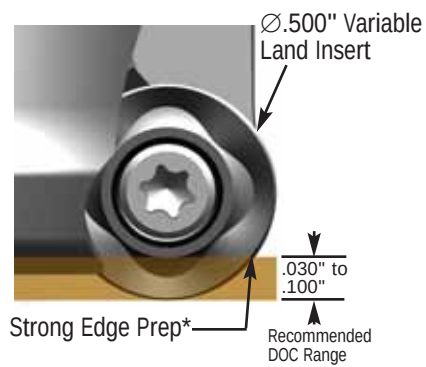
| Insert Diameter | Insert Screw Part No. | Torque       | Driver Part No. |
|-----------------|-----------------------|--------------|-----------------|
| .500            | SM35-110-00           | 25-30 IN LBS | DS-T15T (TX-15) |
| .750            | SM60-150-00           | 72-77 IN LBS | DS-T25T (TX-25) |

**PRODUCTIVITY TIPS**

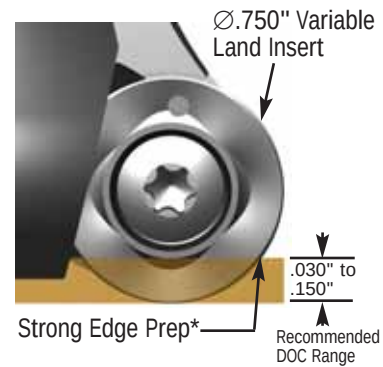
- During setup, maximize rigidity of tool assembly and piece part fixturing.
- Always minimize length to diameter ratio of the tool when possible.
- Maximize use of all CAM features and machine tool control features to create toolpath that provides constant chip load and predictability.
- Climb cut whenever possible
- If available utilize through spindle air, unless coolant is required.
- Eliminate interrupted cuts and abusive cutting conditions, when possible.

**BENEFITS**

**.500 Variable Land Insert**



**.750 Variable Land Insert**

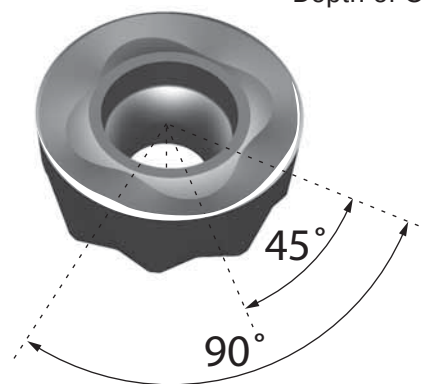
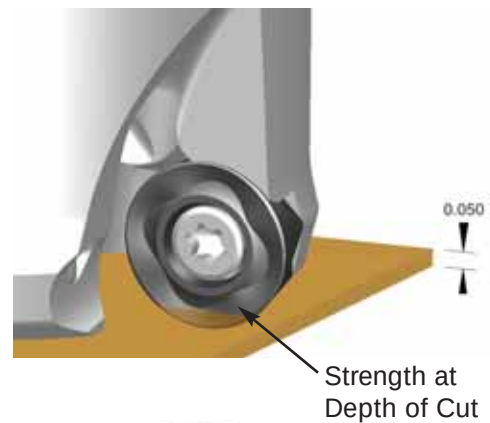


\* Cross sectional area increases as depth of cut increases, providing greater strength where and when needed.

**VARIABLE LAND INSERT TECHNOLOGY ( .500 I.C. INSERT SHOWN)**



Designed for Aggressive Machining



| Material        |                             | Brinell Hardness | SFM       | Feed per Insert | Grades |        |        |        |        | Coolant |
|-----------------|-----------------------------|------------------|-----------|-----------------|--------|--------|--------|--------|--------|---------|
|                 |                             |                  |           |                 | IN2005 | IN5515 | IN2030 | IN2040 | IN6530 |         |
| Aluminum        | 6061 T-6, 7075 T-6          | -                | 1500-3000 | .010-.025       |        |        |        |        |        | Yes     |
| Cast Iron       | Gray                        | 150-250          | 250-800   | .008-.025       | 2      | 3      |        |        | 1      | No      |
|                 | Nodular                     |                  | 200-800   |                 |        |        |        |        |        |         |
|                 | GM190                       | -                | 200-800   | .008-.025       | 2      |        |        | 1      |        | No      |
| Steel           | Armor Plate                 | -                | 200-800   | .008-.025       | 2      |        |        | 1      |        | No      |
|                 | Low Carbon 1018-8620        | 150-250          | 250-1000  | .008-.025       | 1      | 3      |        |        | 2      | No      |
|                 | High Carbon F-6180          | 250-400          | 200-750   | .008-.025       |        |        |        |        |        |         |
|                 | Alloyed Steel 4140,         | 150-300          | 150-300   |                 | 2      | 3      |        |        | 1      |         |
|                 | Tool Steel P20-H13          | Up to 300        | Up to 300 |                 |        |        |        |        |        |         |
| Stainless Steel | 300 Series, 304, 316        | -                | 250-750   | .007-.018       |        |        |        |        |        | Yes     |
|                 | 400 Series 15-5 PH, 17-4 PH | Up to 320        | 300-800   |                 | 2      | 4      | 1      |        | 3      |         |
|                 | 13-8 PH                     | -                | 200-600   |                 |        |        |        |        |        |         |
| Nickel Alloys   | Inconel 600, 706, 718,      | -                | 75-120    | .005-.015       | 2      | 1      | 3      |        |        | Yes     |
|                 | 903, Hastelloy              |                  |           |                 |        |        |        |        |        |         |
| Titanium        | 6AL-4V                      | -                | 100-150   | .004-.008       | 1      | 2      |        | 3      |        | Yes     |

FEEDS & SPEED recommendations are starting operating parameters. They are guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tool's performance.

## Ingersoll Cutting Tools for the Americas

### **Marketing & Technology Center**

845 S. Lyford Road  
Rockford, IL 61108-2749 U.S.A.  
Tel: 815.387.6600  
Fax: 815.387.6968  
Email: [info@ingersoll-imc.com](mailto:info@ingersoll-imc.com)  
Internet: [www.ingersoll-imc.com](http://www.ingersoll-imc.com)

### **Ingersoll Cutting Tools de México S.A. de C.V.**

Carr. Saltillo Monterrey Km. 5.5, Local 2 y 3  
Saltillo, Coahuila C.P. 25200, México  
Tel: (844) 432.2546, (844) 432.2547  
Fax: (844) 432.2544

## Ingersoll Cutting Tools for Europe

### **Marketing & Technology Center**

Ingersoll Werkzeuge GmbH  
Kalteiche-Ring 21-25  
35708 Haiger, Germany  
Tel: 02773.742 0  
Fax: 02773.742 812/814  
Email: [info@ingersoll-imc.de](mailto:info@ingersoll-imc.de)  
Internet: [www.ingersoll-imc.de](http://www.ingersoll-imc.de)

### **Ingersoll France s.a.r.l.**

21, rue Galilée  
F-77420 CHAMPS-sur-MARNE  
Telefon: +33 (0)1 64 68 45 36  
Telefax: +33 (0)1 64 68 45 24  
e-mail: [info@ingersoll-imc.fr](mailto:info@ingersoll-imc.fr)

### **Ingersoll Italien**

Via Monte Grappa, 78  
20020 Arese (Milano)  
Telefon: +39 02 99 76 67 00  
Telefax: +39 02 99 76 67 10  
e-mail: [crespi@taegutec.it](mailto:crespi@taegutec.it)