

# GUHRING

The Tool Company

## Expanded Diameter Range

For extreme process reliability

From hole diameter 11 to 40.0 mm (0.433 - 1.575 in.)

For drilling depths 1.5xD, 3xD, 5xD, 7xD and 10xD

With interchangeable inserts for steel, stainless steel, cast iron and Al

Holders/interchangeable inserts for pilot drilling/countersinking



## HT 800 WP

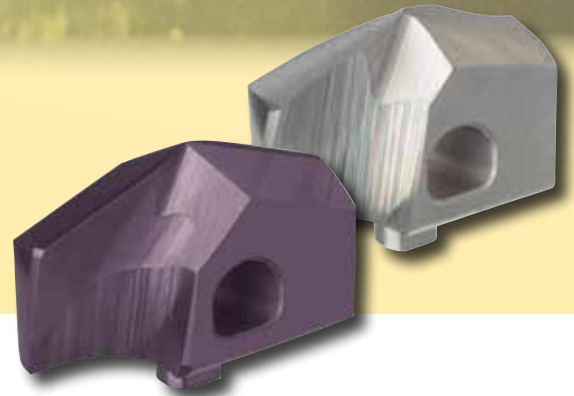
The interchangeable insert drilling system



# Now get the EXACT diameter you need!

## Reduce your insert diameter by up to 0.20mm

Guhring can grind down HT 800 WP inserts by as much as 0.20mm in diameter to allow you an even more extensive range of sizes.



# HT 800 WP

Insert modification

## Can't find the exact drill size you're looking for? Problem solved!

Guhring now has the capability to modify our standard HT 800 replaceable tip drill inserts by grinding the diameters down by as much as .20mm (.0079") and recoating them with their original PVD coating. This service is provided through our manufacturing facility in Brookfield, WI.

The HT 800 drill bodies recommended for each insert size have sufficient clearance to accommodate for the maximum allowable insert diameter reduction, so there is no need to modify the body. Our comprehensive selection of drill body lengths – 1xD, 1.5xD, 3xD, 5xD, 7xD, and 10xD – paired with the flexibility of modifying the insert diameters provides a vast array of replaceable tip drill options.

Contact Guhring's Reconditioning division for details at (800) 776-6170.

INSERTS

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TROUBLESHOOTING

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With the new HT 800WP interchangeable drilling system Guhring provides high-performance and cost-efficient holders for holes in diameters 11.00 to 40.0 mm (0.433 - 1.575 in.) These drills excel thanks to the following advantages:

**A Extended tool life**

Thanks to special, micro-machined cutting edges and the application oriented surface finish the interchangeable inserts of the HT 800 WP drilling system are especially wear resistant.

The holders of the HT 800 WP drilling system also possess a very high wear resistance. This is based on the optimized holder material with nickel plated surface as well as incremental holder sizes in steps of 0.5 mm up to diameter 31.99 mm and in steps of 1.0 mm above diameter 32.00 mm. This leads to less wear on the holder body.

**B Optimized chip flow**

Thanks to their flute cross section the holders of the HT 800 WP drilling system ensure optimal chip evacuation from the hole even with larger drilling depths.

**C Perfect cooling lubrication**

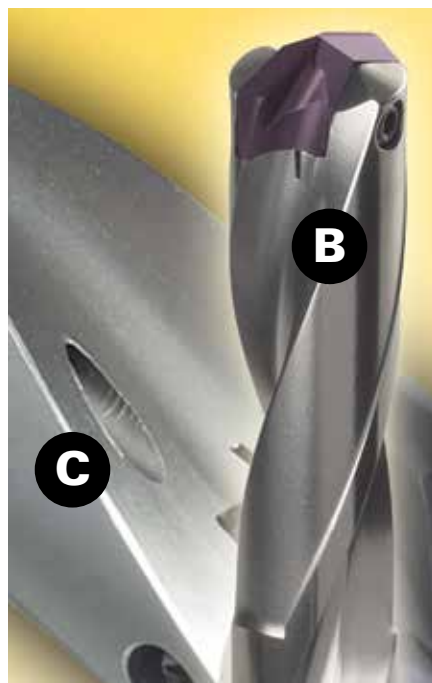
A perfect cooling lubrication is ensured by coolant ducts with maximum cross section, exiting in the flute. This enables an optimal cooling lubrication of the cutting edges and additionally supports chip evacuation from the hole.

**D Highly accurate and rigid insert seat**

The accurate insert seat enables the insert change in the machine in only a few, simple steps with a standard Torx screw driver. Thanks to the optimized material for the holders of the HT 800 WP drilling system, the insert can be changed more frequently than with conventional systems before the holder needs to be replaced due to wear of the insert seat. The clamping screws with screw lock ensure a secure holding of the interchangeable insert in the holder even with machines subject to high levels of vibrations.

### Rigid holders

The close stepped diameter jumps with the holder sizes do more than simply reducing wear. Through the better guidance of the tool in the hole they also increase the rigidity of the HT 800 WP drilling system. Subsequently, resulting in longer tool life as well as improved workpiece surfaces.



## HT 800 WP - Application Tips

Please observe the following notes and recommendations for the application of Guhring's HT 800 WP tools:

We recommend replacing the clamping screw when changing the insert.

Therefore, every holder is supplied with a clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612. Every interchangeable insert is also supplied with a clamping screw, Guhring no. 4071.

When changing the insert please observe the following tightening torques for the clamping screw. Adhering to them is absolutely necessary for optimal machining results!

| Diameter range (mm)    | 11.0 - 12.99 | 13.0 - 13.99 | 14.0 - 15.99 | 16.0 - 17.99 | 18.0 - 19.99 | 20.0 - 21.99 | 22.0 - 25.99 | 30.0 - 40.00 |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Thread                 | M2.2         | M2.5         | M3           | M3.5         | M4           | M4.5         | M5           | M6           |
| Torx size              | T7           | T8           | T9           | T10          | T15          | T15          | T20          | T25          |
| Tightening torque [Nm] | 0.80         | 1.00         | 1.70         | 2.70         | 4.00         | 6.0          | 8.00         | 14.0         |

Details apply to thread locking (Loctite)!

## Examples of the HT800 WP extended tool life

|                      |                              |                              |                           |                  |                  |
|----------------------|------------------------------|------------------------------|---------------------------|------------------|------------------|
| Guhring no.          | 4107 + 4112                  | 4109 + 4112                  | 4109 + 4112               | 4107 + 4113      | 4108 + 4113      |
| Diameter             | 17.5                         | 17.5                         | 17.5                      | 17.5             | 14.1             |
| Coating              | nanoFIREX®                   | nanoFIREX®                   | nanoFIREX®                | FIREX®           | FIREX®           |
| Material group       | alloyed heat-treatable steel | alloyed heat-treatable steel | general structural steels | cast iron        | cast iron        |
| Material description | 42CrMo4/<br>1.7275           | 42CrMo4/<br>1.7275           | St52-3/<br>1.0570         | GG25/<br>0.6025  | GGG40/<br>0.7040 |
| Drill. depth [mm]    | 50                           | 122.5                        | 122.5                     | 50               | 70               |
| Hole type            | blind hole                   | blind hole                   | blind hole                | blind hole       | blind hole       |
| Cooling              | IC 40 bar                    | IC 40 bar                    | IC 40 bar                 | IC 40 bar        | IC 55 bar        |
| Coolant              | soluble oil                  | soluble oil                  | soluble oil               | soluble oil      | soluble oil      |
| Machine type         | machining center             | machining center             | machining center          | machining center | machining center |
| $v_c$ [m/min]        | 100                          | 85                           | 130                       | 80               | 160              |
| $f_z$ [mm]           | 0.28                         | 0.25                         | 0.15                      | 0.30             | 0.60             |
| Tool life [m]        | 50                           | 30                           | 35                        | 250              | 120              |



## HT 800 WP Interchangeable Inserts

HT 800 WP interchangeable inserts are a synergy of tool material, geometry and coating perfectly adapted to your specific range of application. Subsequently, you will always achieve optimal machining results with maximum performance and highest economic efficiency. The insert change with HT 800 WP can be performed in the machine problem-free, the interchangeable insert always sits perfectly clamped and positioned in the holder.

### Technical features and application recommendations

|                   |                                                                     | Guhring no. | 4112                                                                              | 4115                                                                               | 4113                                                                                | 4114                                                                                | 4111                                                                                |
|-------------------|---------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Tool material     |                                                                     |             | solid carbide                                                                     | solid carbide                                                                      | solid carbide                                                                       | solid carbide                                                                       | solid carbide                                                                       |
| Surface           |                                                                     |             | nanoFIREX®                                                                        | nanoA                                                                              | FIREX®                                                                              | bright                                                                              | nanoA                                                                               |
| Point geometry    |                                                                     |             | 2-facet                                                                           | relieved cone                                                                      | 2-facet                                                                             | relieved cone                                                                       | 2-facet                                                                             |
| Point angle       |                                                                     |             | 140°                                                                              | 140°                                                                               | 140°                                                                                | 140°                                                                                | 145°                                                                                |
| Tolerance         |                                                                     |             | h7                                                                                | h7                                                                                 | m7                                                                                  | h7                                                                                  | m7                                                                                  |
| Diameter          |                                                                     |             | 11.0 - 40.0                                                                       | 11.0 - 40.0                                                                        | 11.0 - 40.0                                                                         | 11.0 - 40.0                                                                         | 11.0 - 40.0                                                                         |
| Application       |                                                                     |             | steel                                                                             | stainl. steel                                                                      | cast iron                                                                           | aluminium                                                                           | pilot drilling                                                                      |
|                   |                                                                     |             |  |  |  |  |  |
| Application group | Material examples                                                   |             |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| <b>P</b>          | steel, cast steel, stainless steel (ferritic and martensitic)       |             | ●                                                                                 | ○                                                                                  | ○                                                                                   |                                                                                     | ○                                                                                   |
| <b>M</b>          | stainless steel and cast steel (austenitic and austenitic/ferritic) |             | ○                                                                                 | ●                                                                                  |                                                                                     |                                                                                     | ○                                                                                   |
| <b>K</b>          | grey cast iron, spheroidal graphite and malleable cast iron         |             | ○                                                                                 |                                                                                    | ●                                                                                   |                                                                                     | ○                                                                                   |
| <b>N</b>          | aluminium and other non-ferrous metals                              |             |                                                                                   |                                                                                    |                                                                                     | ●                                                                                   | ○                                                                                   |
| <b>S</b>          | Special, Super- and Ti-alloys                                       |             |                                                                                   | ○                                                                                  |                                                                                     |                                                                                     | ○                                                                                   |
| <b>H</b>          | Hardened steels and chilled cast iron                               |             |                                                                                   | ○                                                                                  |                                                                                     |                                                                                     | ○                                                                                   |

● optimal suitability

○ limited suitability

### Complete compatibility

The new interchangeable inserts as well as the new holders of the HT 800 WP system are fully compatible with the conventional HT 800 WP interchangeable inserts and holders. You can, therefore, apply the new interchangeable inserts in the already existing HT 800 WP holders or combine new holders with existing interchangeable inserts. Drilling tests with both combination possibilities have shown that the efficiency of each package lies above the values of the old HT 800 WP system. You will definitely benefit!

The pilot insert 4111 can be combined with any holder, if the application requires a 145° point angle.

|                   |                                                                     | Guhring no. | 7645                                                                                | 7632                                                                                  | 7635                                                                                  |
|-------------------|---------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Tool material     |                                                                     |             | solid carbide                                                                       | solid carbide                                                                         | solid carbide                                                                         |
| Surface           |                                                                     |             | TiN                                                                                 | TiAlN                                                                                 | bright                                                                                |
| Type              |                                                                     |             | CPGT ... R                                                                          | CPGW ...                                                                              | CPGT ... R                                                                            |
| Application       |                                                                     |             | steel                                                                               | cast iron                                                                             | aluminium                                                                             |
|                   |                                                                     |             |  |  |  |
| Application group | Material examples                                                   |             |                                                                                     |                                                                                       |                                                                                       |
| <b>P</b>          | steel, cast steel, stainless steel (ferritic and martensitic)       |             | ●                                                                                   | ○                                                                                     |                                                                                       |
| <b>M</b>          | stainless steel and cast steel (austenitic and austenitic/ferritic) |             | ○                                                                                   |                                                                                       |                                                                                       |
| <b>K</b>          | grey cast iron, spheroidal graphite and malleable cast iron         |             | ○                                                                                   | ●                                                                                     |                                                                                       |
| <b>N</b>          | aluminium and other non-ferrous metals                              |             |                                                                                     |                                                                                       | ●                                                                                     |
| <b>S</b>          | Special, Super- and Ti-alloys                                       |             | ○                                                                                   |                                                                                       |                                                                                       |
| <b>H</b>          | Hardened steels and chilled cast iron                               |             | ○                                                                                   |                                                                                       |                                                                                       |

● optimal suitability

○ limited suitability

## HT 800 WP Interchangeable Insert Holders

HT 800 WP holders offer highest accuracy and rigidity. The open flute together with internal cooling guarantees an optimal chip evacuation particularly from deeper holes. The reinforced shank to DIN 6535 HE ensures the strong and accurate clamping of the holder in the tool holder. As it meets the DIN standard for solid carbide monoblock tools, a problem-free changeover to the HT 800 WP system in production is possible at any time.

| Guhring no.    | 4105                                                                                | 4106                                                                                | 4107                                                                               | 4108                                                                               | 4109                                                                                 | 4110                                                                                 |
|----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Drilling depth | 1 x D                                                                               | 1.5 x D                                                                             | 3 x D                                                                              | 5 x D                                                                              | 7 x D                                                                                | 10 x D                                                                               |
| Diameter       | 11.0 - 40.00                                                                        | 11.0 - 40.00                                                                        | 11.0 - 40.00                                                                       | 11.0 - 40.00                                                                       | 11.0 - 31.99                                                                         | 11.0 - 31.99                                                                         |
| Shank          | DIN 6535-HE                                                                         | DIN 6535-HE                                                                         | DIN 6535-HE                                                                        | DIN 6535-HE                                                                        | DIN 6535-HE                                                                          | DIN 6535-HE                                                                          |
| Page #         | 14                                                                                  | 15 - 17                                                                             | 15 - 17                                                                            | 15 - 17                                                                            | 18 - 20                                                                              | 18 - 20                                                                              |
|                | 45° pilot drilling/<br>countersinking                                               |                                                                                     |                                                                                    |                                                                                    |                                                                                      |                                                                                      |
|                |  |  |  |  |  |  |

### Special tools

In addition to our HT 800 WP standard tools we also supply HT 800 WP stepped tools as well as alternative coatings for HT 800 WP interchangeable inserts as special solutions. Special sizes are available on request.



## Carbide inserts with material-specific attributes

Four distinct geometries are available with the HT 800 WP drilling system, and they are completely interchangeable with any style drill body. The unique locating post and set screw design assures quick and accurate tool changes. The high performance insert designs allow for maximum penetration rates that far exceed conventional spade drills or dual insert drill designs.

① Choose your diameter  
(metric or inch)

② Choose the appropriate insert for  
your workpiece material

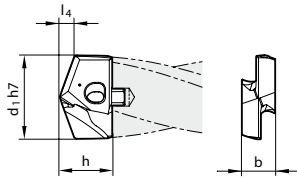
③ Note the holder size for that  
insert diameter; select a holder  
(1.5xD to 10xD) from the  
holder pages.

| ①             |           |         |         |          | ②                                |                                  |                                  |                                       | ③                    |                            |
|---------------|-----------|---------|---------|----------|----------------------------------|----------------------------------|----------------------------------|---------------------------------------|----------------------|----------------------------|
| Dia<br>fract. | Dia<br>mm | h<br>mm | b<br>mm | l4<br>mm | Series 4115<br>nano-A<br>EDP No. | Series 4114<br>bright<br>EDP No. | Series 4113<br>FIREX®<br>EDP No. | Series 4112<br>nano-FIREX®<br>EDP No. | Drill<br>Holder Size | Pilot Drill<br>Holder Size |
| 29/64         | 11.00     | 7.5     | 4.5     | 2.1      | 9041150110000                    | 9041140110000                    | 9041130110000                    | 9041120110000                         | 110                  | 110                        |
|               | 11.20     |         |         | 2.1      | 9041150112000                    | 9041140112000                    | 9041130112000                    | 9041120112000                         |                      |                            |
|               | 11.50     |         |         | 2.1      | 9041150115000                    | 9041140115000                    | 9041130115000                    | 9041120115000                         |                      |                            |
|               | 11.51     |         |         | 2.1      | 9041150115100                    | 9041140115100                    | 9041130115100                    | 9041120115100                         |                      |                            |
|               | 11.70     |         |         | 2.1      | 9041150117000                    | 9041140117000                    | 9041130117000                    | 9041120117000                         | 115                  | 110                        |
| 15/32         | 11.80     |         |         | 2.1      | 9041150118000                    | 9041140118000                    | 9041130118000                    | 9041120118000                         |                      |                            |
|               | 11.91     |         |         | 2.2      | 9041150119100                    | 9041140119100                    | 9041130119100                    | 9041120119100                         |                      |                            |
|               | 12.00     |         |         | 2.2      | 9041150120000                    | 9041140120000                    | 9041130120000                    | 9041120120000                         |                      |                            |
| 31/64         | 12.10     | 7.7     | 5.0     | 2.2      | 9041150121000                    | 9041140121000                    | 9041130121000                    | 9041120121000                         | 120                  | 120                        |
|               | 12.20     |         |         | 2.2      | 9041150122000                    | 9041140122000                    | 9041130122000                    | 9041120122000                         |                      |                            |
|               | 12.30     |         |         | 2.2      | 9041150123000                    | 9041140123000                    | 9041130123000                    | 9041120123000                         |                      |                            |
|               | 12.50     |         |         | 2.3      | 9041150125000                    | 9041140125000                    | 9041130125000                    | 9041120125000                         |                      |                            |
| 1/2           | 12.60     | 7.7     | 5.0     | 2.3      | 9041150126000                    | 9041140126000                    | 9041130126000                    | 9041120126000                         | 125                  | 120                        |
|               | 12.70     |         |         | 2.3      | 9041150127000                    | 9041140127000                    | 9041130127000                    | 9041120127000                         |                      |                            |
|               | 12.80     |         |         | 2.3      | 9041150128000                    | 9041140128000                    | 9041130128000                    | 9041120128000                         |                      |                            |
|               | 12.90     |         |         | 2.3      | 9041150129000                    | 9041140129000                    | 9041130129000                    | 9041120129000                         |                      |                            |
| 33/64         | 13.00     | 8.5     | 5.5     | 2.4      | 9041150130000                    | 9041140130000                    | 9041130130000                    | 9041120130000                         | 130                  | 130                        |
|               | 13.10     |         |         | 2.4      | 9041150131000                    | 9041140131000                    | 9041130131000                    | 9041120131000                         |                      |                            |
|               | 13.49     |         |         | 2.4      | 9041150134900                    | 9041140134900                    | 9041130134900                    | 9041120134900                         |                      |                            |
| 35/64         | 13.50     | 8.5     | 5.5     | 2.4      | 9041150135000                    | 9041140135000                    | 9041130135000                    | 9041120135000                         | 135                  | 130                        |
|               | 13.60     |         |         | 2.4      | 9041150136000                    | 9041140136000                    | 9041130136000                    | 9041120136000                         |                      |                            |
|               | 13.70     |         |         | 2.4      | 9041150137000                    | 9041140137000                    | 9041130137000                    | 9041120137000                         |                      |                            |
|               | 13.80     |         |         | 2.5      | 9041150138000                    | 9041140138000                    | 9041130138000                    | 9041120138000                         |                      |                            |
|               | 13.89     |         |         | 2.5      | 9041150138900                    | 9041140138900                    | 9041130138900                    | 9041120138900                         |                      |                            |
| 9/16          | 14.00     | 9.6     | 6.0     | 2.5      | 9041150140000                    | 9041140140000                    | 9041130140000                    | 9041120140000                         | 140                  | 140                        |
|               | 14.10     |         |         | 2.5      | 9041150141000                    | 9041140141000                    | 9041130141000                    | 9041120141000                         |                      |                            |
|               | 14.29     |         |         | 2.6      | 9041150142900                    | 9041140142900                    | 9041130142900                    | 9041120142900                         |                      |                            |
|               | 14.40     |         |         | 2.6      | 9041150144000                    | 9041140144000                    | 9041130144000                    | 9041120144000                         |                      |                            |
| 37/64         | 14.50     | 9.6     | 6.0     | 2.6      | 9041150145000                    | 9041140145000                    | 9041130145000                    | 9041120145000                         | 145                  | 140                        |
|               | 14.60     |         |         | 2.7      | 9041150146000                    | 9041140146000                    | 9041130146000                    | 9041120146000                         |                      |                            |
|               | 14.68     |         |         | 2.7      | 9041150146800                    | 9041140146800                    | 9041130146800                    | 9041120146800                         |                      |                            |
|               | 14.70     |         |         | 2.7      | 9041150147000                    | 9041140147000                    | 9041130147000                    | 9041120147000                         |                      |                            |
|               | 14.80     |         |         | 2.7      | 9041150148000                    | 9041140148000                    | 9041130148000                    | 9041120148000                         |                      |                            |
| 19/32         | 15.00     | 9.8     | 6.0     | 2.7      | 9041150150000                    | 9041140150000                    | 9041130150000                    | 9041120150000                         | 150                  | 140                        |
|               | 15.08     |         |         | 2.7      | 9041150150800                    | 9041140150800                    | 9041130150800                    | 9041120150800                         |                      |                            |
|               | 15.10     |         |         | 2.7      | 9041150151000                    | 9041140151000                    | 9041130151000                    | 9041120151000                         |                      |                            |
|               | 15.20     |         |         | 2.8      | 9041150152000                    | 9041140152000                    | 9041130152000                    | 9041120152000                         |                      |                            |
|               | 15.30     |         |         | 2.8      | 9041150153000                    | 9041140153000                    | 9041130153000                    | 9041120153000                         |                      |                            |
| 39/64         | 15.48     |         |         | 2.8      | 9041150154800                    | 9041140154800                    | 9041130154800                    | 9041120154800                         |                      |                            |
|               | 15.50     | 9.8     | 6.0     | 2.8      | 9041150155000                    | 9041140155000                    | 9041130155000                    | 9041120155000                         | 155                  | 140                        |
|               | 15.60     |         |         | 2.9      | 9041150156000                    | 9041140156000                    | 9041130156000                    | 9041120156000                         |                      |                            |
|               | 15.70     |         |         | 2.9      | 9041150157000                    | 9041140157000                    | 9041130157000                    | 9041120157000                         |                      |                            |
|               | 15.80     |         |         | 2.9      | 9041150158000                    | 9041140158000                    | 9041130158000                    | 9041120158000                         |                      |                            |
| 5/8           | 15.87     |         |         | 2.9      | 9041150158700                    | 9041140158700                    | 9041130158700                    | 9041120158700                         |                      |                            |
|               | 16.00     | 11.0    | 7.0     | 2.9      | 9041150160000                    | 9041140160000                    | 9041130160000                    | 9041120160000                         | 160                  | 160                        |
| 41/64         | 16.27     |         |         | 3.0      | 9041150162700                    | 9041140162700                    | 9041130162700                    | 9041120162700                         |                      |                            |

Inserts are supplied with clamping screw, Guhring no. 4071.

# HT 800 WP Interchangeable Inserts For Machining Stainless Steel

②



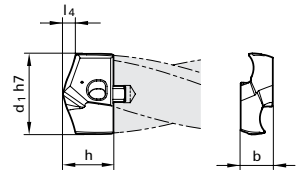
Series 4115



Application Materials:



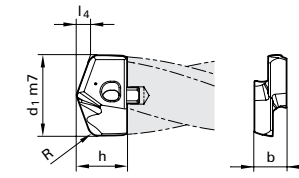
Stainless Steels



Series 4114



Aluminum & Aluminum Alloys



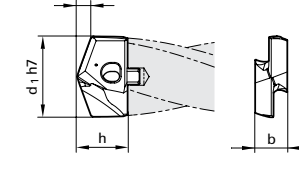
Series 4113



Application Materials:



Cast Iron



Series 4112



General Steels/  
Brass  
Universal Steels  
Stainless Steels  
Hardened  
Materials

①

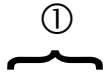
②

③

| Dia<br>fract.  | Dia<br>mm | h<br>mm | b<br>mm | l4<br>mm | Series 4115<br>nano-A<br>EDP No. | Series 4114<br>bright<br>EDP No. | Series 4113<br>FIREX®<br>EDP No. | Series 4112<br>nano-FIREX®<br>EDP No. | Drill<br>Holder Size | Pilot Drill<br>Holder Size |
|----------------|-----------|---------|---------|----------|----------------------------------|----------------------------------|----------------------------------|---------------------------------------|----------------------|----------------------------|
| 21/32          | 16.50     | 11.0    | 7.0     | 3.0      | 9041150165000                    | 9041140165000                    | 9041130165000                    | 9041120165000                         | 165                  | 160                        |
|                | 16.67     |         |         | 3.0      | 9041150166700                    | 9041140166700                    | 9041130166700                    | 9041120166700                         |                      |                            |
| 43/64<br>11/16 | 17.00     | 11.0    | 7.0     | 3.1      | 9041150170000                    | 9041140170000                    | 9041130170000                    | 9041120170000                         | 170                  | 160                        |
|                | 17.07     |         |         | 3.1      | 9041150170700                    | 9041140170700                    | 9041130170700                    | 9041120170700                         |                      |                            |
|                | 17.46     |         |         | 3.1      | 9041150174600                    | 9041140174600                    | 9041130174600                    | 9041120174600                         |                      |                            |
| 45/64          | 17.50     | 11.0    | 7.0     | 3.2      | 9041150175000                    | 9041140175000                    | 9041130175000                    | 9041120175000                         | 175                  | 160                        |
|                | 17.60     |         |         | 3.2      | 9041150176000                    | 9041140176000                    | 9041130176000                    | 9041120176000                         |                      |                            |
|                | 17.86     |         |         | 3.3      | 9041150178600                    | 9041140178600                    | 9041130178600                    | 9041120178600                         |                      |                            |
| 23/32          | 18.00     | 12.6    | 8.0     | 3.3      | 9041150180000                    | 9041140180000                    | 9041130180000                    | 9041120180000                         | 180                  | 180                        |
|                | 18.26     |         |         | 3.3      | 9041150182600                    | 9041140182600                    | 9041130182600                    | 9041120182600                         |                      |                            |
| 47/64          | 18.50     | 12.6    | 8.0     | 3.4      | 9041150185000                    | 9041140185000                    | 9041130185000                    | 9041120185000                         | 185                  | 180                        |
|                | 18.65     |         |         | 3.4      | 9041150186500                    | 9041140186500                    | 9041130186500                    | 9041120186500                         |                      |                            |
|                | 19.00     |         |         | 3.5      | 9041150190000                    | 9041140190000                    | 9041130190000                    | 9041120190000                         |                      |                            |
| 3/4<br>49/64   | 19.05     | 12.6    | 8.0     | 3.5      | 9041150190500                    | 9041140190500                    | 9041130190500                    | 9041120190500                         | 190                  | 180                        |
|                | 19.45     |         |         | 3.5      | 9041150194500                    | 9041140194500                    | 9041130194500                    | 9041120194500                         |                      |                            |
|                | 19.50     |         |         | 3.5      | 9041150195000                    | 9041140195000                    | 9041130195000                    | 9041120195000                         |                      |                            |
| 25/32          | 19.60     | 12.6    | 8.0     | 3.6      | 9041150196000                    | 9041140196000                    | 9041130196000                    | 9041120196000                         | 195                  | 180                        |
|                | 19.84     |         |         | 3.6      | 9041150198400                    | 9041140198400                    | 9041130198400                    | 9041120198400                         |                      |                            |
|                | 20.00     |         |         | 3.6      | 9041150200000                    | 9041140200000                    | 9041130200000                    | 9041120200000                         |                      |                            |
| 51/64          | 20.24     | 13.9    | 9.0     | 3.6      | 9041150202400                    | 9041140202400                    | 9041130202400                    | 9041120202400                         | 200                  | 200                        |
|                | 20.50     |         |         | 3.7      | 9041150205000                    | 9041140205000                    | 9041130205000                    | 9041120205000                         |                      |                            |
| 13/16          | 20.64     | 13.9    | 9.0     | 3.8      | 9041150206400                    | 9041140206400                    | 9041130206400                    | 9041120206400                         | 205                  | 200                        |
|                | 21.00     |         |         | 3.8      | 9041150210000                    | 9041140210000                    | 9041130210000                    | 9041120210000                         |                      |                            |
| 53/64          | 21.03     | 13.9    | 9.0     | 3.8      | 9041150210300                    | 9041140210300                    | 9041130210300                    | 9041120210300                         | 210                  | 200                        |
|                | 21.10     |         |         | 3.9      | 9041150211000                    | 9041140211000                    | 9041130211000                    | 9041120211000                         |                      |                            |
|                | 21.43     |         |         | 3.9      | 9041150214300                    | 9041140214300                    | 9041130214300                    | 9041120214300                         |                      |                            |
| 27/32          | 21.50     | 13.9    | 9.0     | 3.9      | 9041150215000                    | 9041140215000                    | 9041130215000                    | 9041120215000                         | 215                  | 200                        |
|                | 21.83     |         |         | 4.0      | 9041150218300                    | 9041140218300                    | 9041130218300                    | 9041120218300                         |                      |                            |
|                | 22.00     |         |         | 4.0      | 9041150220000                    | 9041140220000                    | 9041130220000                    | 9041120220000                         |                      |                            |
| 7/8            | 22.22     | 15.3    | 10.0    | 4.0      | 9041150222200                    | 9041140222200                    | 9041130222200                    | 9041120222200                         | 220                  | 220                        |
|                | 22.50     |         |         | 4.1      | 9041150225000                    | 9041140225000                    | 9041130225000                    | 9041120225000                         |                      |                            |
| 57/64          | 22.62     | 15.3    | 10.0    | 4.1      | 9041150226200                    | 9041140226200                    | 9041130226200                    | 9041120226200                         | 225                  | 220                        |
|                | 23.00     |         |         | 4.2      | 9041150230000                    | 9041140230000                    | 9041130230000                    | 9041120230000                         |                      |                            |
| 29/32<br>59/64 | 23.02     | 15.3    | 10.0    | 4.2      | 9041150230200                    | 9041140230200                    | 9041130230200                    | 9041120230200                         | 230                  | 220                        |
|                | 23.42     |         |         | 4.3      | 9041150234200                    | 9041140234200                    | 9041130234200                    | 9041120234200                         |                      |                            |
|                | 23.50     |         |         | 4.3      | 9041150235000                    | 9041140235000                    | 9041130235000                    | 9041120235000                         |                      |                            |
| 15/16          | 23.81     | 15.3    | 10.0    | 4.3      | 9041150238100                    | 9041140238100                    | 9041130238100                    | 9041120238100                         | 235                  | 220                        |
|                | 24.00     |         |         | 4.4      | 9041150240000                    | 9041140240000                    | 9041130240000                    | 9041120240000                         |                      |                            |
| 61/64          | 24.10     | 15.8    | 11.0    | 4.4      | 9041150241000                    | 9041140241000                    | 9041130241000                    | 9041120241000                         | 240                  | 240                        |
|                | 24.21     |         |         | 4.4      | 9041150242100                    | 9041140242100                    | 9041130242100                    | 9041120242100                         |                      |                            |
|                | 24.50     |         |         | 4.5      | 9041150245000                    | 9041140245000                    | 9041130245000                    | 9041120245000                         |                      |                            |
| 31/32          | 24.61     | 15.8    | 11.0    | 4.5      | 9041150246100                    | 9041140246100                    | 9041130246100                    | 9041120246100                         | 245                  | 240                        |
|                | 25.00     |         |         | 4.5      | 9041150250000                    | 9041140250000                    | 9041130250000                    | 9041120250000                         |                      |                            |
| 1              | 25.40     | 15.8    | 11.0    | 4.6      | 9041150254000                    | 9041140254000                    | 9041130254000                    | 9041120254000                         | 250                  | 240                        |
|                | 25.50     |         |         | 4.6      | 9041150255000                    | 9041140255000                    | 9041130255000                    | 9041120255000                         |                      |                            |
|                | 25.50     |         |         | 4.6      | 9041150255000                    | 9041140255000                    | 9041130255000                    | 9041120255000                         |                      |                            |

Inserts are supplied with clamping screw, Guhring no. 4071.

# Carbide inserts with material-specific attributes



| Dia<br>fract. | Dia<br>mm | h<br>mm | b<br>mm | l4<br>mm | Series 4115<br>nano-A<br>EDP No. | Series 4114<br>bright<br>EDP No. | Series 4113<br>FIREX®<br>EDP No. | Series 4112<br>nano-FIREX®<br>EDP No. | Drill<br>Holder Size | Pilot Drill<br>Holder Size |
|---------------|-----------|---------|---------|----------|----------------------------------|----------------------------------|----------------------------------|---------------------------------------|----------------------|----------------------------|
| 1 1/32        | 26.00     | 20.00   | 12.00   | 4.80     | 9041150260000                    | 9041140260000                    | 9041130260000                    | 9041120260000                         | 260                  | 260                        |
|               | 26.19     | 20.00   | 12.00   | 4.80     | 9041150261900                    | 9041140261900                    | 9041130261900                    | 9041120261900                         |                      |                            |
| 1 3/64        | 26.50     | 20.00   | 12.00   | 4.90     | 9041150265000                    | 9041140265000                    | 9041130265000                    | 9041120265000                         | 265                  | 260                        |
|               | 26.59     | 20.00   | 12.00   | 4.90     | 9041150265900                    | 9041140265900                    | 9041130265900                    | 9041120265900                         |                      |                            |
| 1 3/32        | 27.00     | 20.00   | 12.00   | 5.00     | 9041150270000                    | 9041140270000                    | 9041130270000                    | 9041120270000                         | 270                  | 260                        |
|               | 27.50     | 20.00   | 12.00   | 5.10     | 9041150275000                    | 9041140275000                    | 9041130275000                    | 9041120275000                         |                      |                            |
| 1 7/64        | 27.70     | 20.00   | 12.00   | 5.10     | 9041150277000                    | 9041140277000                    | 9041130277000                    | 9041120277000                         | 275                  | 260                        |
|               | 27.78     | 20.00   | 12.00   | 5.10     | 9041150277800                    | 9041140277800                    | 9041130277800                    | 9041120277800                         |                      |                            |
| 1 1/8         | 28.00     | 20.70   | 13.00   | 5.10     | 9041150280000                    | 9041140280000                    | 9041130280000                    | 9041120280000                         | 280                  | 280                        |
|               | 28.18     | 20.70   | 13.00   | 5.20     | 9041150281800                    | 9041140281800                    | 9041130281800                    | 9041120281800                         |                      |                            |
| 1 5/32        | 28.50     | 20.70   | 13.00   | 5.20     | 9041150285000                    | 9041140285000                    | 9041130285000                    | 9041120285000                         | 285                  | 280                        |
|               | 28.58     | 20.70   | 13.00   | 5.30     | 9041150285800                    | 9041140285800                    | 9041130285800                    | 9041120285800                         |                      |                            |
| 1 11/64       | 29.00     | 20.70   | 13.00   | 5.30     | 9041150290000                    | 9041140290000                    | 9041130290000                    | 9041120290000                         | 290                  | 280                        |
|               | 29.37     | 20.70   | 13.00   | 5.40     | 9041150293700                    | 9041140293700                    | 9041130293700                    | 9041120293700                         |                      |                            |
| 1 3/16        | 29.50     | 20.70   | 13.00   | 5.40     | 9041150295000                    | 9041140295000                    | 9041130295000                    | 9041120295000                         | 295                  | 280                        |
|               | 29.60     | 20.70   | 13.00   | 5.50     | 9041150296000                    | 9041140296000                    | 9041130296000                    | 9041120296000                         |                      |                            |
| 1 7/32        | 29.77     | 20.70   | 13.00   | 5.50     | 9041150297700                    | 9041140297700                    | 9041130297700                    | 9041120297700                         | 300                  | 300                        |
|               | 30.00     | 22.30   | 14.00   | 5.50     | 9041150300000                    | 9041140300000                    | 9041130300000                    | 9041120300000                         |                      |                            |
| 1 1/4         | 30.16     | 22.30   | 14.00   | 5.60     | 9041150301600                    | 9041140301600                    | 9041130301600                    | 9041120301600                         | 305                  | 300                        |
|               | 30.50     | 22.30   | 14.00   | 5.70     | 9041150305000                    | 9041140305000                    | 9041130305000                    | 9041120305000                         |                      |                            |
| 1 9/32        | 30.96     | 22.30   | 14.00   | 5.70     | 9041150309600                    | 9041140309600                    | 9041130309600                    | 9041120309600                         | 310                  | 300                        |
|               | 31.00     | 22.30   | 14.00   | 5.80     | 9041150310000                    | 9041140310000                    | 9041130310000                    | 9041120310000                         |                      |                            |
| 1 19/64       | 31.50     | 22.30   | 14.00   | 5.80     | 9041150315000                    | 9041140315000                    | 9041130315000                    | 9041120315000                         | 315                  | 320                        |
|               | 31.75     | 22.30   | 14.00   | 5.90     | 9041150317500                    | 9041140317500                    | 9041130317500                    | 9041120317500                         |                      |                            |
| 1 5/16        | 32.00     | 23.10   | 15.00   | 6.00     | 9041150320000                    | 9041140320000                    | 9041130320000                    | 9041120320000                         | 320                  | 320                        |
|               | 32.50     | 23.10   | 15.00   | 6.00     | 9041150325000                    | 9041140325000                    | 9041130325000                    | 9041120325000                         |                      |                            |
| 1 11/32       | 32.54     | 23.10   | 15.00   | 6.00     | 9041150325400                    | 9041140325400                    | 9041130325400                    | 9041120325400                         | 330                  | 320                        |
|               | 32.94     | 23.10   | 15.00   | 6.10     | 9041150329400                    | 9041140329400                    | 9041130329400                    | 9041120329400                         |                      |                            |
| 1 3/8         | 33.00     | 23.10   | 15.00   | 6.10     | 9041150330000                    | 9041140330000                    | 9041130330000                    | 9041120330000                         | 340                  | 320                        |
|               | 33.34     | 23.10   | 15.00   | 6.10     | 9041150333400                    | 9041140333400                    | 9041130333400                    | 9041120333400                         |                      |                            |
| 1 13/32       | 33.50     | 23.10   | 15.00   | 6.20     | 9041150335000                    | 9041140335000                    | 9041130335000                    | 9041120335000                         | 350                  | 320                        |
|               | 34.00     | 23.10   | 15.00   | 6.30     | 9041150340000                    | 9041140340000                    | 9041130340000                    | 9041120340000                         |                      |                            |
| 1 7/16        | 34.13     | 23.10   | 15.00   | 6.30     | 9041150341300                    | 9041140341300                    | 9041130341300                    | 9041120341300                         | 360                  | 360                        |
|               | 34.50     | 23.10   | 15.00   | 6.40     | 9041150345000                    | 9041140345000                    | 9041130345000                    | 9041120345000                         |                      |                            |
| 1 15/32       | 34.93     | 23.10   | 15.00   | 6.40     | 9041150349300                    | 9041140349300                    | 9041130349300                    | 9041120349300                         | 370                  | 360                        |
|               | 35.00     | 23.10   | 15.00   | 6.50     | 9041150350000                    | 9041140350000                    | 9041130350000                    | 9041120350000                         |                      |                            |
| 1 1/2         | 35.50     | 23.10   | 15.00   | 6.60     | 9041150355000                    | 9041140355000                    | 9041130355000                    | 9041120355000                         | 380                  | 360                        |
|               | 35.72     | 23.10   | 15.00   | 6.60     | 9041150357200                    | 9041140357200                    | 9041130357200                    | 9041120357200                         |                      |                            |
| 1 33/64       | 36.00     | 23.90   | 16.00   | 6.70     | 9041150360000                    | 9041140360000                    | 9041130360000                    | 9041120360000                         | 390                  | 360                        |
|               | 36.50     | 23.90   | 16.00   | 6.70     | 9041150365000                    | 9041140365000                    | 9041130365000                    | 9041120365000                         |                      |                            |
| 1 1/2         | 36.51     | 23.90   | 16.00   | 6.80     | 9041150365100                    | 9041140365100                    | 9041130365100                    | 9041120365100                         | 390                  | 360                        |
|               | 37.00     | 23.90   | 16.00   | 6.80     | 9041150370000                    | 9041140370000                    | 9041130370000                    | 9041120370000                         |                      |                            |
| 1 33/64       | 37.31     | 23.90   | 16.00   | 6.90     | 9041150373100                    | 9041140373100                    | 9041130373100                    | 9041120373100                         | 390                  | 360                        |
|               | 37.50     | 23.90   | 16.00   | 7.00     | 9041150375000                    | 9041140375000                    | 9041130375000                    | 9041120375000                         |                      |                            |
| 1 33/64       | 38.00     | 23.90   | 16.00   | 7.00     | 9041150380000                    | 9041140380000                    | 9041130380000                    | 9041120380000                         | 390                  | 360                        |
|               | 38.10     | 23.90   | 16.00   | 7.00     | 9041150381000                    | 9041140381000                    | 9041130381000                    | 9041120381000                         |                      |                            |
| 1 33/64       | 38.50     | 23.90   | 16.00   | 7.10     | 9041150385000                    | 9041140385000                    | 9041130385000                    | 9041120385000                         | 390                  | 360                        |
|               | 39.00     | 23.90   | 16.00   | 7.10     | 9041150390000                    | 9041140390000                    | 9041130390000                    | 9041120390000                         |                      |                            |
| 1 33/64       | 39.50     | 23.90   | 16.00   | 7.20     | 9041150395000                    | 9041140395000                    | 9041130395000                    | 9041120395000                         | 390                  | 360                        |
|               | 40.00     | 23.90   | 16.00   | 7.30     | 9041150400000                    | 9041140400000                    | 9041130400000                    | 9041120400000                         |                      |                            |

Inserts are supplied with clamping screw, Guhring no. 4071.

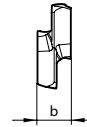
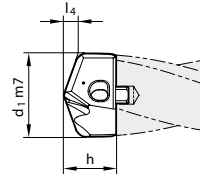
# HT 800 WP Interchangeable Insert Drills

## Drill inserts for pilot drilling - Series 4111

**Carbide, nano-A™ coated**

**145° point angle, m7 tolerance on diameter**

The Series 4105 is a pilot and chamfering tool specifically designed for pilot drilling 7xD and especially 10xD deep hole applications. The Series 4111 insert has a 145° point angle which is required for proper application of a pre-drill pilot operation. This pilot drilling insert is also interchangeable with all other HT 800 WP body series.



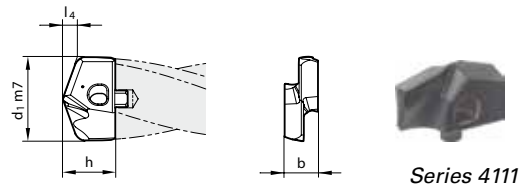
Series 4111

|        |       | Series 4111 nano-A insert |     |     |               | Drill Holder Size | Pilot Drill Holder Size |
|--------|-------|---------------------------|-----|-----|---------------|-------------------|-------------------------|
| Dia    | Dia   | h                         | b   | l4  | EDP No.       |                   |                         |
| fract. | mm    | mm                        | mm  | mm  |               |                   |                         |
| 29/64  | 11.00 | 6.9                       | 4.5 | 1.5 | 9041110110000 | 110               | 110                     |
|        | 11.20 | 6.9                       | 4.5 | 1.5 | 9041110112000 |                   |                         |
|        | 11.50 | 6.9                       | 4.5 | 1.5 | 9041110115000 |                   |                         |
|        | 11.51 | 6.9                       | 4.5 | 1.5 | 9041110115100 | 115               | 110                     |
|        | 11.70 | 6.9                       | 4.5 | 1.6 | 9041110117000 |                   |                         |
| 15/32  | 11.80 | 6.9                       | 4.5 | 1.6 | 9041110118000 |                   |                         |
|        | 11.91 | 6.9                       | 4.5 | 1.6 | 9041110119100 |                   |                         |
|        | 12.00 | 7.1                       | 5.0 | 1.6 | 9041110120000 | 120               | 120                     |
| 31/64  | 12.10 | 7.1                       | 5.0 | 1.6 | 9041110121000 |                   |                         |
|        | 12.20 | 7.1                       | 5.0 | 1.6 | 9041110122000 |                   |                         |
|        | 12.30 | 7.1                       | 5.0 | 1.6 | 9041110123000 |                   |                         |
|        | 12.50 | 7.1                       | 5.0 | 1.7 | 9041110125000 | 125               | 120                     |
|        | 12.60 | 7.1                       | 5.0 | 1.7 | 9041110126000 |                   |                         |
| 1/2    | 12.70 | 7.1                       | 5.0 | 1.7 | 9041110127000 |                   |                         |
|        | 12.80 | 7.1                       | 5.0 | 1.7 | 9041110128000 |                   |                         |
|        | 12.90 | 7.1                       | 5.0 | 1.7 | 9041110129000 |                   |                         |
|        | 13.00 | 7.9                       | 5.5 | 1.7 | 9041110130000 | 130               | 130                     |
|        | 13.10 | 7.9                       | 5.5 | 1.7 | 9041110131000 |                   |                         |
| 33/64  | 13.49 | 7.9                       | 5.5 | 1.8 | 9041110134900 |                   |                         |
|        | 13.50 | 7.9                       | 5.5 | 1.8 | 9041110135000 | 135               | 130                     |
|        | 13.60 | 7.9                       | 5.5 | 1.8 | 9041110136000 |                   |                         |
|        | 13.70 | 7.9                       | 5.5 | 1.8 | 9041110137000 |                   |                         |
|        | 13.80 | 7.9                       | 5.5 | 1.9 | 9041110138000 |                   |                         |
| 35/64  | 13.89 | 7.9                       | 5.5 | 1.9 | 9041110138900 |                   |                         |
|        | 14.00 | 9.1                       | 6.0 | 1.9 | 9041110140000 | 140               | 140                     |
|        | 14.10 | 9.1                       | 6.0 | 1.9 | 9041110141000 |                   |                         |
|        | 14.29 | 9.1                       | 6.0 | 1.9 | 9041110142900 |                   |                         |
|        | 14.40 | 9.1                       | 6.0 | 1.9 | 9041110144000 |                   |                         |
| 37/64  | 14.50 | 9.1                       | 6.0 | 1.9 | 9041110145000 | 145               | 140                     |
|        | 14.60 | 9.1                       | 6.0 | 2.0 | 9041110146000 |                   |                         |
|        | 14.68 | 9.1                       | 6.0 | 2.0 | 9041110146800 |                   |                         |
|        | 14.70 | 9.1                       | 6.0 | 2.0 | 9041110147000 |                   |                         |
|        | 14.80 | 9.1                       | 6.0 | 2.0 | 9041110148000 |                   |                         |
| 19/32  | 15.00 | 9.1                       | 6.0 | 2.0 | 9041110150000 | 150               | 140                     |
|        | 15.08 | 9.1                       | 6.0 | 2.0 | 9041110150800 |                   |                         |
|        | 15.10 | 9.1                       | 6.0 | 2.0 | 9041110151000 |                   |                         |
|        | 15.20 | 9.1                       | 6.0 | 2.0 | 9041110152000 |                   |                         |
|        | 15.30 | 9.1                       | 6.0 | 2.1 | 9041110153000 |                   |                         |
| 39/64  | 15.48 | 9.1                       | 6.0 | 2.1 | 9041110154800 |                   |                         |
|        | 15.50 | 9.1                       | 6.0 | 2.1 | 9041110155000 | 155               | 140                     |
|        | 15.60 | 9.1                       | 6.0 | 2.1 | 9041110156000 |                   |                         |
|        | 15.70 | 9.1                       | 6.0 | 2.1 | 9041110157000 |                   |                         |
|        | 15.80 | 9.1                       | 6.0 | 2.1 | 9041110158000 |                   |                         |
| 5/8    | 15.87 | 9.1                       | 6.0 | 2.1 | 9041110158700 |                   |                         |
|        | 16.00 | 10.2                      | 7.0 | 2.1 | 9041110160000 | 160               | 160                     |
|        | 16.27 | 10.2                      | 7.0 | 2.2 | 9041110162700 |                   |                         |
| 41/64  | 16.50 | 10.2                      | 7.0 | 2.2 | 9041110165000 | 165               | 160                     |
|        | 16.67 | 10.2                      | 7.0 | 2.2 | 9041110166700 |                   |                         |

|        |       | Series 4111 nano-A insert |       |      |               | Drill Holder Size | Pilot Drill Holder Size |
|--------|-------|---------------------------|-------|------|---------------|-------------------|-------------------------|
| Dia    | Dia   | h                         | b     | l4   | EDP No.       |                   |                         |
| fract. | mm    | mm                        | mm    | mm   |               |                   |                         |
| 43/64  | 17.00 | 10.2                      | 7.0   | 2.3  | 9041110170000 | 170               | 160                     |
|        | 17.07 | 10.2                      | 7.0   | 2.3  | 9041110170700 |                   |                         |
|        | 17.46 | 10.2                      | 7.0   | 2.3  | 9041110174600 |                   |                         |
| 11/16  | 17.50 | 10.2                      | 7.0   | 2.3  | 9041110175000 | 175               | 160                     |
|        | 17.60 | 10.2                      | 7.0   | 2.3  | 9041110176000 |                   |                         |
|        | 17.86 | 10.2                      | 7.0   | 2.4  | 9041110178600 |                   |                         |
| 45/64  | 18.00 | 11.7                      | 8.0   | 2.4  | 9041110180000 | 180               | 180                     |
|        | 18.26 | 11.7                      | 8.0   | 2.4  | 9041110182600 |                   |                         |
| 23/32  | 18.50 | 11.7                      | 8.0   | 2.5  | 9041110185000 | 185               | 180                     |
|        | 18.65 | 11.7                      | 8.0   | 2.5  | 9041110186500 |                   |                         |
|        | 19.00 | 11.7                      | 8.0   | 2.5  | 9041110190000 | 190               | 180                     |
| 3/4    | 19.05 | 11.7                      | 8.0   | 2.5  | 9041110190500 |                   |                         |
|        | 19.45 | 11.7                      | 8.0   | 2.6  | 9041110194500 |                   |                         |
|        | 19.50 | 11.7                      | 8.0   | 2.6  | 9041110195000 | 195               | 180                     |
| 25/32  | 19.60 | 11.7                      | 8.0   | 2.6  | 9041110196000 |                   |                         |
|        | 19.84 | 11.7                      | 8.0   | 2.7  | 9041110198400 |                   |                         |
|        | 20.00 | 12.9                      | 9.0   | 2.7  | 9041110200000 | 200               | 200                     |
| 51/64  | 20.24 | 12.9                      | 9.0   | 2.7  | 9041110202400 |                   |                         |
|        | 20.50 | 12.9                      | 9.0   | 2.7  | 9041110205000 | 205               | 200                     |
|        | 20.64 | 12.9                      | 9.0   | 2.8  | 9041110206400 |                   |                         |
| 13/16  | 21.00 | 12.9                      | 9.0   | 2.8  | 9041110210000 | 210               | 200                     |
|        | 21.03 | 12.9                      | 9.0   | 2.8  | 9041110210300 |                   |                         |
|        | 21.10 | 12.9                      | 9.0   | 2.8  | 9041110211000 |                   |                         |
| 27/32  | 21.43 | 12.9                      | 9.0   | 2.9  | 9041110214300 |                   |                         |
|        | 21.50 | 13.9                      | 9.0   | 3.9  | 9041110215000 | 215               | 200                     |
|        | 21.83 | 13.9                      | 9.0   | 4.0  | 9041110218300 |                   |                         |
| 55/64  | 22.00 | 14.3                      | 10.0  | 3.0  | 9041110220000 | 220               | 220                     |
|        | 22.22 | 14.3                      | 10.0  | 3.0  | 9041110222200 |                   |                         |
|        | 22.50 | 14.3                      | 10.0  | 3.0  | 9041110225000 | 225               | 220                     |
| 57/64  | 22.62 | 14.3                      | 10.0  | 3.0  | 9041110226200 |                   |                         |
|        | 23.00 | 14.3                      | 10.0  | 3.1  | 9041110230000 | 230               | 220                     |
|        | 23.02 | 14.3                      | 10.0  | 3.1  | 9041110230200 |                   |                         |
| 29/32  | 23.42 | 14.3                      | 10.0  | 3.1  | 9041110234200 |                   |                         |
|        | 23.50 | 14.3                      | 10.0  | 3.1  | 9041110235000 | 235               | 220                     |
|        | 23.81 | 14.3                      | 10.0  | 3.2  | 9041110238100 |                   |                         |
| 15/16  | 24.00 | 14.7                      | 11.0  | 3.2  | 9041110240000 | 240               | 240                     |
|        | 24.10 | 14.7                      | 11.0  | 3.2  | 9041110241000 |                   |                         |
|        | 24.21 | 14.7                      | 11.0  | 3.2  | 9041110242100 |                   |                         |
| 61/64  | 24.50 | 14.7                      | 11.0  | 3.3  | 9041110245000 | 245               | 240                     |
|        | 24.61 | 14.7                      | 11.0  | 3.3  | 9041110246100 |                   |                         |
|        | 25.00 | 14.7                      | 11.0  | 3.4  | 9041110250000 | 250               | 240                     |
| 1      | 25.40 | 14.7                      | 11.0  | 3.4  | 9041110254000 |                   |                         |
|        | 25.50 | 14.7                      | 11.0  | 3.4  | 9041110255000 | 255               | 240                     |
|        | 26.00 | 19.40                     | 12.00 | 4.10 | 9041110260000 | 260               | 260                     |
| 1 1/32 | 26.19 | 19.40                     | 12.00 | 4.10 | 9041110261900 |                   |                         |
|        | 26.50 | 19.40                     | 12.00 | 4.10 | 9041110265000 | 265               | 260                     |
|        | 26.59 | 19.40                     | 12.00 | 4.20 | 9041110265900 |                   |                         |
| 1 3/64 | 27.00 | 19.40                     | 12.00 | 4.20 | 9041110270000 | 270               | 260                     |

Inserts are supplied with clamping screw, Guhring no. 4071.

# HT 800 WP Interchangeable Insert Drills



| Dia<br>fract. | Dia<br>mm | h<br>mm | b<br>mm | l4<br>mm | Series 4111<br>nano-A insert<br>EDP No. | Drill<br>Holder<br>Size | Pilot Drill<br>Holder<br>Size |
|---------------|-----------|---------|---------|----------|-----------------------------------------|-------------------------|-------------------------------|
| 1 3/32        | 27.50     | 19.40   | 12.00   | 4.30     | 9041110275000                           | 275                     | 260                           |
|               | 27.70     | 19.40   | 12.00   | 4.30     | 9041110277000                           |                         |                               |
|               | 27.78     | 19.40   | 12.00   | 4.30     | 9041110277800                           |                         |                               |
|               | 28.00     | 20.10   | 13.00   | 4.40     | 9041110280000                           | 280                     | 280                           |
|               | 28.18     | 20.10   | 13.00   | 4.40     | 9041110281800                           |                         |                               |
|               | 28.50     | 20.10   | 13.00   | 4.50     | 9041110285000                           | 285                     | 280                           |
|               | 28.58     | 20.10   | 13.00   | 4.50     | 9041110285800                           |                         |                               |
|               | 29.00     | 20.10   | 13.00   | 4.60     | 9041110290000                           | 290                     | 280                           |
| 1 5/32        | 29.37     | 20.10   | 13.00   | 4.60     | 9041110293700                           |                         |                               |
|               | 29.50     | 20.10   | 13.00   | 4.60     | 9041110295000                           | 295                     | 280                           |
|               | 30.00     | 21.70   | 14.00   | 4.70     | 9041110300000                           |                         |                               |
|               | 30.16     | 21.70   | 14.00   | 4.70     | 9041110301600                           | 300                     | 300                           |
|               | 30.50     | 21.70   | 14.00   | 4.80     | 9041110305000                           |                         |                               |
|               | 30.96     | 21.70   | 14.00   | 4.80     | 9041110309600                           | 305                     | 300                           |
|               | 31.00     | 21.70   | 14.00   | 4.90     | 9041110310000                           |                         |                               |
|               | 31.50     | 21.70   | 14.00   | 4.90     | 9041110315000                           | 310                     | 300                           |
| 1 1/4         | 31.75     | 21.70   | 14.00   | 4.90     | 9041110317500                           |                         |                               |
|               | 32.00     | 22.40   | 15.00   | 5.00     | 9041110320000                           | 315                     | 300                           |
|               | 32.50     | 22.40   | 15.00   | 5.10     | 9041110325000                           |                         |                               |
| 1 9/32        | 32.54     | 22.40   | 15.00   | 5.10     | 9041110325400                           |                         |                               |
|               | 33.00     | 22.40   | 15.00   | 5.20     | 9041110330000                           | 320                     | 320                           |
|               | 33.34     | 22.40   | 15.00   | 5.20     | 9041110333400                           |                         |                               |
| 1 5/16        | 33.50     | 22.40   | 15.00   | 5.30     | 9041110335000                           | 330                     | 320                           |
|               | 34.00     | 22.40   | 15.00   | 5.40     | 9041110340000                           |                         |                               |
|               | 34.13     | 22.40   | 15.00   | 5.40     | 9041110341300                           | 340                     | 320                           |
| 1 11/32       | 34.50     | 22.40   | 15.00   | 5.40     | 9041110345000                           |                         |                               |
|               | 34.93     | 22.40   | 15.00   | 5.40     | 9041110349300                           |                         |                               |
|               | 35.00     | 22.40   | 15.00   | 5.50     | 9041110350000                           | 350                     | 320                           |
|               | 35.50     | 22.40   | 15.00   | 5.60     | 9041110355000                           |                         |                               |
|               | 35.72     | 22.40   | 15.00   | 5.60     | 9041110357200                           | 360                     | 360                           |
|               | 36.00     | 23.20   | 16.00   | 5.70     | 9041110360000                           |                         |                               |
|               | 36.50     | 23.20   | 16.00   | 5.70     | 9041110365000                           |                         |                               |
|               | 36.51     | 23.20   | 16.00   | 5.70     | 9041110365100                           | 370                     | 360                           |
| 1 15/32       | 37.00     | 23.20   | 16.00   | 5.80     | 9041110370000                           |                         |                               |
|               | 37.31     | 23.20   | 16.00   | 5.80     | 9041110373100                           |                         |                               |
|               | 37.50     | 23.20   | 16.00   | 5.90     | 9041110375000                           | 380                     | 360                           |
| 1 1/2         | 38.00     | 23.20   | 16.00   | 6.00     | 9041110380000                           |                         |                               |
|               | 38.10     | 23.20   | 16.00   | 6.00     | 9041110381000                           |                         |                               |
|               | 38.50     | 23.20   | 16.00   | 6.10     | 9041110385000                           | 390                     | 360                           |
| 1 33/64       | 39.00     | 23.20   | 16.00   | 6.20     | 9041110390000                           |                         |                               |
|               | 39.50     | 23.20   | 16.00   | 6.20     | 9041110395000                           |                         |                               |
|               | 40.00     | 23.20   | 16.00   | 6.20     | 9041110400000                           |                         |                               |

Inserts are supplied with clamping screw, Guhring no. 4071.

# Countersink inserts for pilot and countersink holes



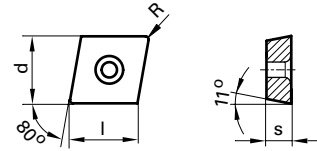
**Series 7645 for steels**



**Series 7632 for cast iron**



**Series 7635 for aluminum**



| Type        | d<br>mm | s<br>mm | R<br>mm | l<br>mm | Series 7645<br>TiN coated | Series 7632<br>TiAlN coated | Series 7635<br>Bright finish | Drill<br>Holder Size |
|-------------|---------|---------|---------|---------|---------------------------|-----------------------------|------------------------------|----------------------|
|             |         |         |         |         | EDP No.                   | EDP No.                     | EDP No.                      |                      |
| CPGT050204R | 5.56    | 2.38    | 0.4     | 5.64    | 9076450520400             |                             | 9076350520400                | 110-140              |
| CPGT060204R | 6.35    | 2.38    | 0.4     | 6.45    | 9076450620400             |                             | 9076350620400                | 160-280              |
| CPGT09T308R | 9.53    | 3.97    | 0.8     | 9.67    | 9076450930800             |                             | 9076350930800                | 300-360              |
| CPGW050204  | 5.56    | 2.38    | 0.4     | 5.60    |                           | 9076320520400               |                              | 110-140              |
| CPGW060204  | 6.35    | 2.38    | 0.4     | 6.40    |                           | 9076320620400               |                              | 160-280              |
| CPGT09T308  | 9.53    | 3.97    | 0.8     | 9.67    |                           | 9076320930800               |                              | 300-360              |

Slashing Cycle Time:

Guhring HT 800 WP replaceable tip drill vs. a competitor's 2-insert drill

Material: Low alloy steel 1008

Hole diameter: 1.220"

Hole depth: 4.00"

# of holes to produce: 6,000

Machine tool: Vertical CNC Mill

Objective: Reduce cycle time

Results:

Spindle Speed

HT 800 drill

2,050 RPM

2-insert drill

935 RPM

Feed rate (IPM)

36.77

11.24

Cycle Time

9.6 seconds

24.6 seconds

Cost per Hole

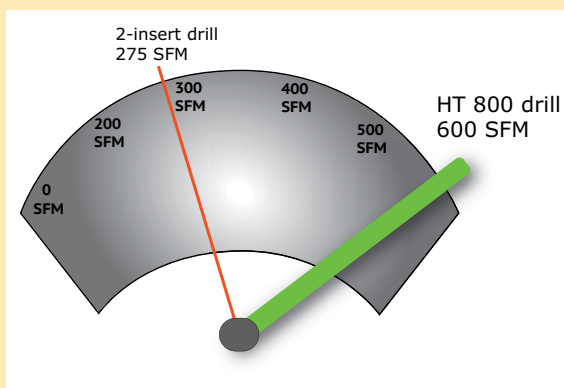
\$0.28

\$0.51

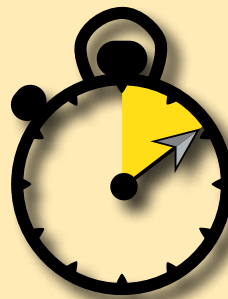
**SAVINGS:**

**44.65%**

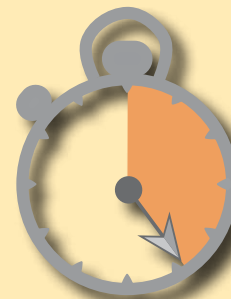
## Surface Footage



## Cycle Time, in seconds



HT800 drill  
10 seconds

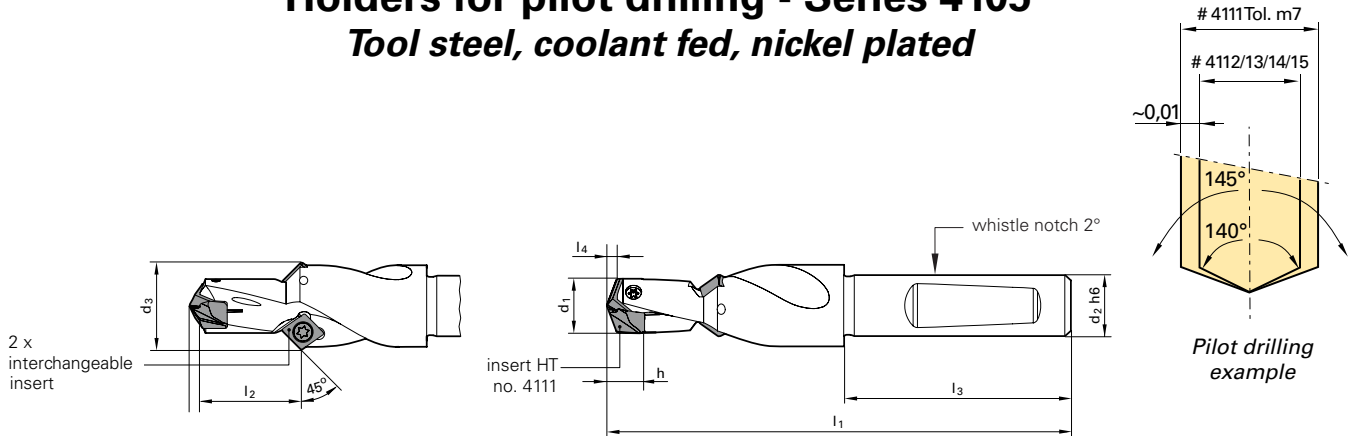


2-insert drill  
25 seconds

# 1 x D for Pilot Drilling and Countersinking

## Holders for pilot drilling - Series 4105

*Tool steel, coolant fed, nickel plated*

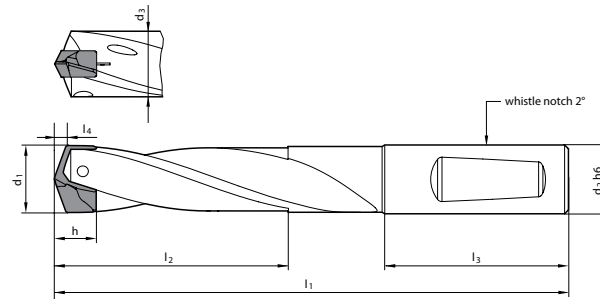


| Holder Size | EDP No.       | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | Series 4105 Holder<br>(1xD w/countersink) |          |          |
|-------------|---------------|--------------------------|----------|----------|----------|-------------------------------------------|----------|----------|
|             |               |                          |          |          |          | l1<br>mm                                  | l2<br>mm | l3<br>mm |
| 110         | 9041050110000 | 11.00-11.99              | 12.00    |          | 17.00    | 81.00                                     | 14.80    | 45.00    |
|             | 9041050110050 | 11.00-11.99              | 12.70    | 1/2      | 17.00    |                                           |          |          |
| 120         | 9041050120000 | 12.00-12.99              | 12.00    |          | 18.00    | 84.00                                     | 15.80    | 45.00    |
|             | 9041050120050 | 12.00-12.99              | 12.70    | 1/2      | 18.00    |                                           |          |          |
| 130         | 9041050130000 | 13.00-13.99              | 14.00    |          | 18.00    | 86.00                                     | 16.30    | 45.00    |
|             | 9041050130050 | 13.00-13.99              | 15.875   | 5/8      | 18.00    |                                           |          |          |
| 140         | 9041050140000 | 14.00-15.99              | 16.00    |          | 18.00    | 93.00                                     | 17.40    | 48.00    |
|             | 9041050140050 | 14.00-15.99              | 15.875   | 5/8      | 18.00    |                                           |          |          |
| 160         | 9041050160000 | 16.00-17.99              | 18.00    |          | 20.00    | 99.00                                     | 19.40    | 48.00    |
|             | 9041050160050 | 16.00-17.99              | 19.05    | 3/4      | 20.00    |                                           |          |          |
| 180         | 9041050180000 | 18.00-19.99              | 20.00    |          | 22.00    | 106.00                                    | 21.40    | 50.00    |
|             | 9041050180050 | 18.00-19.99              | 19.05    | 3/4      | 22.00    |                                           |          |          |
| 200         | 9041050200000 | 20.00-21.99              | 25.00    |          | 24.00    | 117.00                                    | 23.40    | 56.00    |
|             | 9041050200050 | 20.00-21.99              | 25.40    | 1        | 24.00    |                                           |          |          |
| 220         | 9041050220000 | 22.00-23.99              | 25.00    |          | 26.00    | 122.00                                    | 25.40    | 56.00    |
|             | 9041050220050 | 22.00-23.99              | 25.40    | 1        | 26.00    |                                           |          |          |
| 240         | 9041050240000 | 24.00-25.99              | 25.00    |          | 28.00    | 128.00                                    | 27.40    | 56.00    |
|             | 9041050240050 | 24.00-25.99              | 25.40    | 1        | 28.00    |                                           |          |          |
| 260         | 9041050260000 | 26.00 - 27.99            | 32.00    |          | 32.00    | 142.00                                    | 28.00    | 60.00    |
|             | 9041050260050 | 26.00 - 27.99            | 31.75    | 1 1/4    | 32.00    |                                           |          |          |
| 280         | 9041050280000 | 28.00 - 29.99            | 32.00    |          | 34.00    | 147.00                                    | 30.00    | 60.00    |
|             | 9041050280050 | 28.00 - 29.99            | 31.75    | 1 1/4    | 34.00    |                                           |          |          |
| 300         | 9041050300000 | 30.00 - 31.99            | 32.00    |          | 38.00    | 152.00                                    | 32.00    | 60.00    |
|             | 9041050300050 | 30.00 - 31.99            | 31.75    | 1 1/4    | 38.00    |                                           |          |          |
| 320         | 9041050320000 | 32.00 - 35.99            | 32.00    |          | 42.00    | 163.00                                    | 36.00    | 60.00    |
|             | 9041050320050 | 32.00 - 35.99            | 31.75    | 1 1/4    | 42.00    |                                           |          |          |
| 360         | 9041050360000 | 36.00 - 40.00            | 32.00    |          | 46.00    | 173.00                                    | 40.00    | 60.00    |
|             | 9041050360050 | 36.00 - 40.00            | 31.75    | 1 1/4    | 46.00    |                                           |          |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# HT 800 WP Interchangeable Insert Drills

## Holders for drilling - Series 4106 (1.5xD), 4107 (3xD) and 4108 (5xD) Tool steel, coolant fed, nickel plated



③ \*l1 dimensions listed include insert series 4112, 4113, 4114, and 4115 only. Pilot insert series 4111 has different h and l4 dimensions

| Holder Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4106 (1.5xD) |           |          | Series 4107 (3xD) |           |          | Series 4108 (5xD) |           |          |
|-------------|--------------------------|----------|----------|----------|----------|---------------------|-----------|----------|-------------------|-----------|----------|-------------------|-----------|----------|
|             |                          |          |          |          |          | EDP No.             | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm |
| 110         | 11.00-11.49              | 12.00    |          | 10.70    | 45.00    | 9041060110000       | 84.00     | 19.30    | 9041070110000     | 101.00    | 36.60    | 9041080110000     | 124.00    | 59.60    |
|             | 11.00-11.49              | 12.70    | 1/2      | 10.70    | 45.00    | 9041060110050       |           |          | 9041070110050     |           |          | 9041080110050     |           |          |
| 115         | 11.50-11.99              | 12.00    |          | 11.20    | 45.00    | 9041060115000       | 85.00     | 20.10    | 9041070115000     | 103.00    | 38.10    | 9041080115000     | 127.00    | 62.10    |
|             | 11.50-11.99              | 12.70    | 1/2      | 11.20    | 45.00    | 9041060115050       |           |          | 9041070115050     |           |          | 9041080115050     |           |          |
| 120         | 12.00-12.49              | 12.00    |          | 11.70    | 45.00    | 9041060120000       | 87.00     | 21.00    | 9041070120000     | 106.00    | 39.70    | 9041080120000     | 131.00    | 64.70    |
|             | 12.00-12.49              | 12.70    | 1/2      | 11.70    | 45.00    | 9041060120050       |           |          | 9041070120050     |           |          | 9041080120050     |           |          |
| 125         | 12.50-12.99              | 14.00    |          | 12.20    | 45.00    | 9041060125000       | 89.00     | 21.90    | 9041070125000     | 108.00    | 41.30    | 9041080125000     | 134.00    | 67.30    |
|             | 12.50-12.99              | 15.875   | 5/8      | 12.20    | 45.00    | 9041060125050       |           |          | 9041070125050     |           |          | 9041080125050     |           |          |
| 130         | 13.00-13.49              | 14.00    |          | 12.70    | 45.00    | 9041060130000       | 90.00     | 22.60    | 9041070130000     | 110.00    | 42.90    | 9041080130000     | 137.00    | 69.90    |
|             | 13.00-13.49              | 15.875   | 5/8      | 12.70    | 45.00    | 9041060130050       |           |          | 9041070130050     |           |          | 9041080130050     |           |          |
| 135         | 13.50-13.99              | 14.00    |          | 13.20    | 45.00    | 9041060135000       | 92.00     | 23.60    | 9041070135000     | 113.00    | 44.60    | 9041080135000     | 141.00    | 72.60    |
|             | 13.50-13.99              | 15.875   | 5/8      | 13.20    | 45.00    | 9041060135050       |           |          | 9041070135050     |           |          | 9041080135050     |           |          |
| 140         | 14.00-14.49              | 14.00    |          | 13.70    | 45.00    | 9041060140000       | 93.00     | 24.50    | 9041070140000     | 115.00    | 46.20    | 9041080140000     | 144.00    | 75.20    |
|             | 14.00-14.49              | 15.875   | 5/8      | 13.70    | 45.00    | 9041060140050       |           |          | 9041070140050     |           |          | 9041080140050     |           |          |
| 145         | 14.50-14.99              | 16.00    |          | 14.20    | 48.00    | 9041060145000       | 98.00     | 25.30    | 9041070145000     | 120.00    | 47.80    | 9041080145000     | 150.00    | 77.80    |
|             | 14.50-14.99              | 15.875   | 5/8      | 14.20    | 48.00    | 9041060145050       |           |          | 9041070145050     |           |          | 9041080145050     |           |          |
| 150         | 15.00-15.49              | 16.00    |          | 14.70    | 48.00    | 9041060150000       | 100.00    | 26.10    | 9041070150000     | 123.00    | 49.30    | 9041080150000     | 154.00    | 80.30    |
|             | 15.00-15.49              | 15.875   | 5/8      | 14.70    | 48.00    | 9041060150050       |           |          | 9041070150050     |           |          | 9041080150050     |           |          |
| 155         | 15.50-15.99              | 16.00    |          | 15.20    | 48.00    | 9041060155000       | 101.00    | 27.00    | 9041070155000     | 125.00    | 50.90    | 9041080155000     | 157.00    | 82.90    |
|             | 15.50-15.99              | 15.875   | 5/8      | 15.20    | 48.00    | 9041060155050       |           |          | 9041070155050     |           |          | 9041080155050     |           |          |
| 160         | 16.00-16.49              | 16.00    |          | 15.70    | 48.00    | 9041060160000       | 102.00    | 27.80    | 9041070160000     | 127.00    | 52.90    | 9041080160000     | 160.00    | 85.90    |
|             | 16.00-16.49              | 15.875   | 5/8      | 15.70    | 48.00    | 9041060160050       |           |          | 9041070160050     |           |          | 9041080160050     |           |          |
| 165         | 16.50-16.99              | 18.00    |          | 16.20    | 48.00    | 9041060165000       | 105.00    | 28.70    | 9041070165000     | 130.00    | 54.10    | 9041080165000     | 164.00    | 88.10    |
|             | 16.50-16.99              | 19.05    | 3/4      | 16.20    | 48.00    | 9041060165050       |           |          | 9041070165050     |           |          | 9041080165050     |           |          |
| 170         | 17.00-17.49              | 18.00    |          | 16.70    | 48.00    | 9041060170000       | 106.00    | 29.60    | 9041070170000     | 132.00    | 55.80    | 9041080170000     | 167.00    | 90.80    |
|             | 17.00-17.49              | 19.05    | 3/4      | 16.70    | 48.00    | 9041060170050       |           |          | 9041070170050     |           |          | 9041080170050     |           |          |
| 175         | 17.50-17.99              | 18.00    |          | 17.20    | 48.00    | 9041060175000       | 107.00    | 30.40    | 9041070175000     | 134.00    | 57.40    | 9041080175000     | 170.00    | 93.40    |
|             | 17.50-17.99              | 19.05    | 3/4      | 17.20    | 48.00    | 9041060175050       |           |          | 9041070175050     |           |          | 9041080175050     |           |          |
| 180         | 18.00-18.49              | 18.00    |          | 17.70    | 48.00    | 9041060180000       | 109.00    | 31.20    | 9041070180000     | 137.00    | 58.90    | 9041080180000     | 174.00    | 95.90    |
|             | 18.00-18.49              | 19.05    | 3/4      | 17.70    | 48.00    | 9041060180050       |           |          | 9041070180050     |           |          | 9041080180050     |           |          |
| 185         | 18.50-18.99              | 20.00    |          | 18.20    | 50.00    | 9041060185000       | 113.00    | 32.10    | 9041070185000     | 141.00    | 60.50    | 9041080185000     | 179.00    | 98.50    |
|             | 18.50-18.99              | 19.05    | 3/4      | 18.20    | 50.00    | 9041060185050       |           |          | 9041070185050     |           |          | 9041080185050     |           |          |
| 190         | 19.00-19.49              | 20.00    |          | 18.70    | 50.00    | 9041060190000       | 114.00    | 32.90    | 9041070190000     | 143.00    | 62.10    | 9041080190000     | 182.00    | 101.10   |
|             | 19.00-19.49              | 19.05    | 3/4      | 18.70    | 50.00    | 9041060190050       |           |          | 9041070190050     |           |          | 9041080190050     |           |          |
| 195         | 19.50-19.99              | 20.00    |          | 19.20    | 50.00    | 9041060195000       | 116.00    | 33.70    | 9041070195000     | 146.00    | 63.70    | 9041080195000     | 186.00    | 103.70   |
|             | 19.50-19.99              | 19.05    | 3/4      | 19.20    | 50.00    | 9041060195050       |           |          | 9041070195050     |           |          | 9041080195050     |           |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# Holders

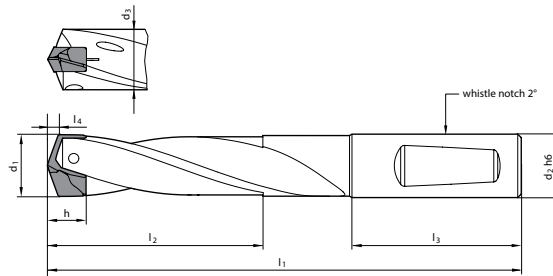
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| Holder<br>Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4106 (1.5xD) |           |          | Series 4107 (3xD) |           |          | Series 4108 (5xD) |           |          |
|----------------|--------------------------|----------|----------|----------|----------|---------------------|-----------|----------|-------------------|-----------|----------|-------------------|-----------|----------|
|                |                          |          |          |          |          | EDP No.             | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm |
| 200            | 20.00-20.49              | 20.00    |          | 19.70    | 50.00    | 9041060200000       | 117.00    | 34.60    | 9041070200000     | 148.00    | 65.30    | 9041080200000     | 189.00    | 106.30   |
|                | 20.00-20.49              | 19.05    | 3/4      | 19.70    |          | 9041060200050       |           |          | 9041070200050     |           |          | 9041080200050     |           |          |
| 205            | 20.50-20.99              | 25.00    |          | 20.20    | 56.00    | 9041060205000       | 128.00    | 35.50    | 9041070205000     | 159.00    | 67.00    | 9041080205000     | 201.00    | 109.00   |
|                | 20.50-20.99              | 25.40    | 1        | 20.20    |          | 9041060205050       |           |          | 9041070205050     |           |          | 9041080205050     |           |          |
| 210            | 21.00-21.49              | 25.00    |          | 20.70    | 56.00    | 9041060210000       | 129.00    | 36.40    | 9041070210000     | 161.00    | 68.60    | 9041080210000     | 204.00    | 111.60   |
|                | 21.00-21.49              | 25.40    | 1        | 20.70    |          | 9041060210050       |           |          | 9041070210050     |           |          | 9041080210050     |           |          |
| 215            | 21.50-21.99              | 25.00    |          | 21.20    | 56.00    | 9041060215000       | 130.00    | 37.20    | 9041070215000     | 163.00    | 70.10    | 9041080215000     | 207.00    | 114.10   |
|                | 21.50-21.99              | 25.40    | 1        | 21.20    |          | 9041060215050       |           |          | 9041070215050     |           |          | 9041080215050     |           |          |
| 220            | 22.00-22.49              | 25.00    |          | 21.70    | 56.00    | 9041060220000       | 131.00    | 38.00    | 9041070220000     | 165.00    | 71.70    | 9041080220000     | 210.00    | 116.70   |
|                | 22.00-22.49              | 25.40    | 1        | 21.70    |          | 9041060220050       |           |          | 9041070220050     |           |          | 9041080220050     |           |          |
| 225            | 22.50-22.99              | 25.00    |          | 22.20    | 56.00    | 9041060225000       | 134.00    | 38.90    | 9041070225000     | 168.00    | 73.30    | 9041080225000     | 214.00    | 119.30   |
|                | 22.50-22.99              | 25.40    | 1        | 22.20    |          | 9041060225050       |           |          | 9041070225050     |           |          | 9041080225050     |           |          |
| 230            | 23.00-23.49              | 25.00    |          | 22.70    | 56.00    | 9041060230000       | 135.00    | 39.80    | 9041070230000     | 170.00    | 74.90    | 9041080230000     | 217.00    | 121.90   |
|                | 23.00-23.49              | 25.40    | 1        | 22.70    |          | 9041060230050       |           |          | 9041070230050     |           |          | 9041080230050     |           |          |
| 235            | 23.50-23.99              | 25.00    |          | 23.20    | 56.00    | 9041060235000       | 137.00    | 40.60    | 9041070235000     | 173.00    | 76.50    | 9041080235000     | 221.00    | 124.50   |
|                | 23.50-23.99              | 25.40    | 1        | 23.20    |          | 9041060235050       |           |          | 9041070235050     |           |          | 9041080235050     |           |          |
| 240            | 24.00-24.49              | 25.00    |          | 23.70    | 56.00    | 9041060240000       | 138.00    | 41.50    | 9041070240000     | 175.00    | 78.10    | 9041080240000     | 224.00    | 127.10   |
|                | 24.00-24.49              | 25.40    | 1        | 23.70    |          | 9041060240050       |           |          | 9041070240050     |           |          | 9041080240050     |           |          |
| 245            | 24.50-24.99              | 25.00    |          | 24.20    | 56.00    | 9041060245000       | 140.00    | 42.30    | 9041070245000     | 177.00    | 79.70    | 9041080245000     | 227.00    | 129.70   |
|                | 24.50-24.99              | 25.40    | 1        | 24.20    |          | 9041060245050       |           |          | 9041070245050     |           |          | 9041080245050     |           |          |
| 250            | 25.00-25.49              | 25.00    |          | 24.70    | 56.00    | 9041060250000       | 142.00    | 43.20    | 9041070250000     | 180.00    | 81.30    | 9041080250000     | 231.00    | 132.30   |
|                | 25.00-25.49              | 25.40    | 1        | 24.70    |          | 9041060250050       |           |          | 9041070250050     |           |          | 9041080250050     |           |          |
| 255            | 25.50-25.99              | 32.00    |          | 25.20    | 60.00    | 9041060255000       | 148.00    | 44.00    | 9041070255000     | 187.00    | 82.90    | 9041080255000     | 239.00    | 134.90   |
|                | 25.50-25.99              | 31.75    | 1 1/4    | 25.20    |          | 9041060255050       |           |          | 9041070255050     |           |          | 9041080255050     |           |          |
| 260            | 26.00-26.49              | 32.00    |          | 25.70    | 60.00    | 9041060260000       | 151.00    | 44.30    | 9041070260000     | 191.00    | 84.00    | 9041080260000     | 244.00    | 137.00   |
|                | 26.00-26.49              | 31.75    | 1 1/4    | 25.70    |          | 9041060260050       |           |          | 9041070260050     |           |          | 9041080260050     |           |          |
| 265            | 26.50-26.99              | 32.00    |          | 26.20    | 60.00    | 9041060265000       | 153.00    | 45.10    | 9041070265000     | 193.00    | 86.10    | 9041080265000     | 247.00    | 140.00   |
|                | 26.50-26.99              | 31.75    | 1 1/4    | 26.20    |          | 9041060265050       |           |          | 9041070265050     |           |          | 9041080265050     |           |          |
| 270            | 27.00-27.49              | 32.00    |          | 26.70    | 60.00    | 9041060270000       | 155.00    | 46.00    | 9041070270000     | 196.00    | 87.20    | 9041080270000     | 251.00    | 142.00   |
|                | 27.00-27.49              | 31.75    | 1 1/4    | 26.70    |          | 9041060270050       |           |          | 9041070270050     |           |          | 9041080270050     |           |          |
| 275            | 27.50-27.99              | 32.00    |          | 27.20    | 60.00    | 9041060275000       | 156.00    | 46.80    | 9041070275000     | 198.00    | 88.90    | 9041080275000     | 254.00    | 144.80   |
|                | 27.50-27.99              | 31.75    | 1 1/4    | 27.20    |          | 9041060275050       |           |          | 9041070275050     |           |          | 9041080275050     |           |          |
| 280            | 28.00-28.49              | 32.00    |          | 27.70    | 60.00    | 9041060280000       | 157.00    | 47.70    | 9041070280000     | 200.00    | 90.50    | 9041080280000     | 257.00    | 147.40   |
|                | 28.00-28.49              | 31.75    | 1 1/4    | 27.70    |          | 9041060280050       |           |          | 9041070280050     |           |          | 9041080280050     |           |          |
| 285            | 28.50-28.99              | 32.00    |          | 28.20    | 60.00    | 9041060285000       | 159.00    | 48.50    | 9041070285000     | 202.00    | 92.50    | 9041080285000     | 260.00    | 150.40   |
|                | 28.50-28.99              | 31.75    | 1 1/4    | 28.20    |          | 9041060285050       |           |          | 9041070285050     |           |          | 9041080285050     |           |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# HT 800 WP Interchangeable Insert Drills



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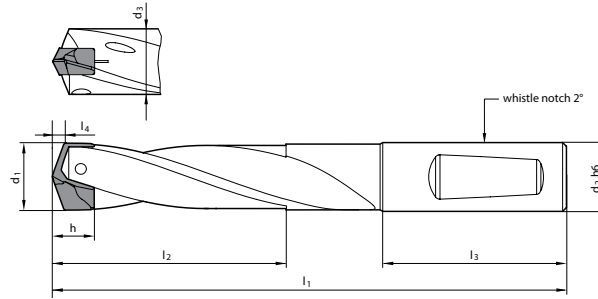
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| Holder Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4106 (1.5xD) |           |          | Series 4107 (3xD) |           |          | Series 4108 (5xD) |           |          |
|-------------|--------------------------|----------|----------|----------|----------|---------------------|-----------|----------|-------------------|-----------|----------|-------------------|-----------|----------|
|             |                          |          |          |          |          | EDP No.             | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.           | l1*<br>mm | l2<br>mm |
| 290         | 29.00-29.49              | 32.00    |          | 28.70    | 60.00    | 9041060290000       | 161.00    | 49.40    | 9041070290000     | 205.00    | 94.60    | 9041080290000     | 264.00    | 153.50   |
|             | 29.00-29.49              | 31.75    | 1 1/4    | 28.70    | 60.00    | 9041060290050       |           |          | 9041070290050     |           |          | 9041080290050     |           |          |
| 295         | 29.50-29.99              | 32.00    |          | 29.20    | 60.00    | 9041060295000       | 162.00    | 50.20    | 9041070295000     | 207.00    | 95.10    | 9041080295000     | 267.00    | 155.10   |
|             | 29.50-29.99              | 31.75    | 1 1/4    | 29.20    | 60.00    | 9041060295050       |           |          | 9041070295050     |           |          | 9041080295050     |           |          |
| 300         | 30.00-30.49              | 32.00    |          | 29.70    | 60.00    | 9041060300000       | 164.00    | 50.90    | 9041070300000     | 210.00    | 96.70    | 9041080300000     | 271.00    | 157.60   |
|             | 30.00-30.49              | 31.75    | 1 1/4    | 29.70    | 60.00    | 9041060300050       |           |          | 9041070300050     |           |          | 9041080300050     |           |          |
| 305         | 30.50-30.99              | 32.00    |          | 30.20    | 60.00    | 9041060305000       | 166.00    | 51.70    | 9041070305000     | 212.00    | 98.30    | 9041080305000     | 274.00    | 160.20   |
|             | 30.50-30.99              | 31.75    | 1 1/4    | 30.20    | 60.00    | 9041060305050       |           |          | 9041070305050     |           |          | 9041080305050     |           |          |
| 310         | 31.00-31.49              | 32.00    |          | 30.70    | 60.00    | 9041060310000       | 167.00    | 52.60    | 9041070310000     | 214.00    | 99.80    | 9041080310000     | 277.00    | 162.80   |
|             | 31.00-31.49              | 31.75    | 1 1/4    | 30.70    | 60.00    | 9041060310050       |           |          | 9041070310050     |           |          | 9041080310050     |           |          |
| 315         | 31.50-31.99              | 32.00    |          | 31.20    | 60.00    | 9041060315000       | 168.00    | 53.40    | 9041070315000     | 216.00    | 101.40   | 9041080315000     | 280.00    | 165.40   |
|             | 31.50-31.99              | 31.75    | 1 1/4    | 31.20    | 60.00    | 9041060315050       |           |          | 9041070315050     |           |          | 9041080315050     |           |          |
| 320         | 32.00-32.99              | 32.00    |          | 31.70    | 60.00    | 9041060320000       | 172.00    | 55.10    | 9041070320000     | 221.00    | 104.60   | 9041080320000     | 287.00    | 170.60   |
|             | 32.00-32.99              | 31.75    | 1 1/4    | 31.70    | 60.00    | 9041060320050       |           |          | 9041070320050     |           |          | 9041080320050     |           |          |
| 330         | 33.00-33.99              | 32.00    |          | 32.70    | 60.00    | 9041060330000       | 175.00    | 56.80    | 9041070330000     | 226.00    | 107.80   | 9041080330000     | 294.00    | 175.80   |
|             | 33.00-33.99              | 31.75    | 1 1/4    | 32.70    | 60.00    | 9041060330050       |           |          | 9041070330050     |           |          | 9041080330050     |           |          |
| 340         | 34.00-34.99              | 32.00    |          | 33.70    | 60.00    | 9041060340050       | 178.00    | 58.50    | 9041070340050     | 230.00    | 111.00   | 9041080340050     | 300.00    | 181.00   |
|             | 34.00-34.99              | 31.75    | 1 1/4    | 33.70    | 60.00    | 9041060340050       |           |          | 9041070340050     |           |          | 9041080340050     |           |          |
| 350         | 35.00-35.99              | 32.00    |          | 34.70    | 60.00    | 9041060350000       | 181.00    | 60.20    | 9041070350000     | 235.00    | 114.20   | 9041080350000     | 307.00    | 186.20   |
|             | 35.00-35.99              | 31.75    | 1 1/4    | 34.70    | 60.00    | 9041060350050       |           |          | 9041070350050     |           |          | 9041080350050     |           |          |
| 360         | 36.00-36.99              | 32.00    |          | 35.70    | 60.00    | 9041060360000       | 184.00    | 61.80    | 9041070360000     | 240.00    | 117.30   | 9041080360000     | 314.00    | 191.30   |
|             | 36.00-36.99              | 31.75    | 1 1/4    | 35.70    | 60.00    | 9041060360050       |           |          | 9041070360050     |           |          | 9041080360050     |           |          |
| 370         | 37.00-37.99              | 32.00    |          | 36.70    | 60.00    | 9041060370000       | 188.00    | 63.50    | 9041070370000     | 245.00    | 120.50   | 9041080370000     | 321.00    | 196.50   |
|             | 37.00-37.99              | 31.75    | 1 1/4    | 36.70    | 60.00    | 9041060370050       |           |          | 9041070370050     |           |          | 9041080370050     |           |          |
| 380         | 38.00-38.99              | 32.00    |          | 37.70    | 60.00    | 9041060380000       | 191.00    | 65.20    | 9041070380000     | 249.00    | 123.70   | 9041080380000     | 327.00    | 201.70   |
|             | 38.00-38.99              | 31.75    | 1 1/4    | 37.70    | 60.00    | 9041060380050       |           |          | 9041070380050     |           |          | 9041080380050     |           |          |
| 390         | 39.00-40.00              | 32.00    |          | 38.70    | 60.00    | 9041060390000       | 194.00    | 66.90    | 9041070390000     | 254.00    | 126.90   | 9041080390000     | 334.00    | 206.90   |
|             | 39.00-40.00              | 31.75    | 1 1/4    | 38.70    | 60.00    | 9041060390050       |           |          | 9041070390050     |           |          | 9041080390050     |           |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# HT 800 WP Interchangeable Insert Drills

## Extra length holders for drilling - Series 4109 (7xD) and 4110 (10xD) *Tool steel, coolant fed, nickel plated*



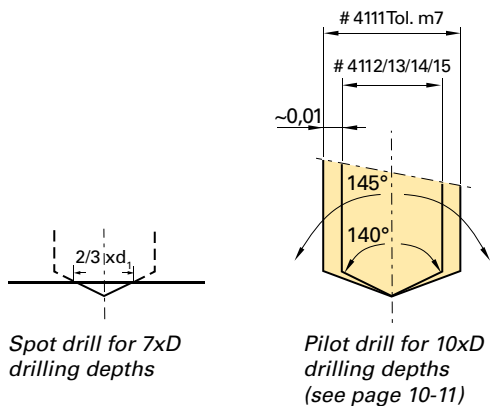
③ \*l1 dimensions listed include insert series 4112, 4113, 4114, and 4115 only. Pilot insert series 4111 has different h and l4 dimensions

| Holder Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4109 (7xD) |           |          | Series 4110 (10xD) |           |          |
|-------------|--------------------------|----------|----------|----------|----------|-------------------|-----------|----------|--------------------|-----------|----------|
|             |                          |          |          |          |          | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.            | l1*<br>mm | l2<br>mm |
| 110         | 11.00-11.49              | 12.00    |          | 10.70    | 45.00    | 9041090110000     | 147.00    | 82.60    | 9041100110000      | 182.00    | 117.10   |
|             | 11.00-11.49              | 12.70    | 1/2      | 10.70    | 45.00    | 9041090110050     |           |          | 9041100110050      |           |          |
| 115         | 11.50-11.99              | 12.00    |          | 11.20    | 45.00    | 9041090115000     | 151.00    | 86.10    | 9041100115000      | 187.00    | 122.10   |
|             | 11.50-11.99              | 12.70    | 1/2      | 11.20    | 45.00    | 9041090115050     |           |          | 9041100115050      |           |          |
| 120         | 12.00-12.49              | 12.00    |          | 11.70    | 45.00    | 9041090120000     | 156.00    | 89.70    | 9041100120000      | 194.00    | 127.20   |
|             | 12.00-12.49              | 12.70    | 1/2      | 11.70    | 45.00    | 9041090120050     |           |          | 9041100120050      |           |          |
| 125         | 12.50-12.99              | 14.00    |          | 12.20    | 45.00    | 9041090125000     | 160.00    | 93.30    | 9041100125000      | 199.00    | 132.30   |
|             | 12.50-12.99              | 15.875   | 5/8      | 12.20    | 45.00    | 9041090125050     |           |          | 9041100125050      |           |          |
| 130         | 13.00-13.49              | 14.00    |          | 12.70    | 45.00    | 9041090130000     | 164.00    | 96.90    | 9041100130000      | 205.00    | 137.50   |
|             | 13.00-13.49              | 15.875   | 5/8      | 12.70    | 45.00    | 9041090130050     |           |          | 9041100130050      |           |          |
| 135         | 13.50-13.99              | 14.00    |          | 13.20    | 45.00    | 9041090135000     | 169.00    | 100.60   | 9041100135000      | 211.00    | 142.50   |
|             | 13.50-13.99              | 15.875   | 5/8      | 13.20    | 45.00    | 9041090135050     |           |          | 9041100135050      |           |          |
| 140         | 14.00-14.49              | 14.00    |          | 13.70    | 45.00    | 9041090140000     | 173.00    | 104.20   | 9041100140000      | 217.00    | 147.70   |
|             | 14.00-14.49              | 15.875   | 5/8      | 13.70    | 45.00    | 9041090140050     |           |          | 9041100140050      |           |          |
| 145         | 14.50-14.99              | 16.00    |          | 14.20    | 48.00    | 9041090145000     | 180.00    | 107.80   | 9041100145000      | 225.00    | 152.80   |
|             | 14.50-14.99              | 15.875   | 5/8      | 14.20    | 48.00    | 9041090145050     |           |          | 9041100145050      |           |          |
| 150         | 15.00-15.49              | 16.00    |          | 14.70    | 48.00    | 9041090150000     | 185.00    | 111.30   | 9041100150000      | 232.00    | 157.80   |
|             | 15.00-15.49              | 15.875   | 5/8      | 14.70    | 48.00    | 9041090150050     |           |          | 9041100150050      |           |          |
| 155         | 15.50-15.99              | 16.00    |          | 15.20    | 48.00    | 9041090155000     | 189.00    | 114.90   | 9041100155000      | 237.00    | 162.90   |
|             | 15.50-15.99              | 15.875   | 5/8      | 15.20    | 48.00    | 9041090155050     |           |          | 9041100155050      |           |          |
| 160         | 16.00-16.49              | 16.00    |          | 15.70    | 48.00    | 9041090160000     | 193.00    | 118.90   | 9041100160000      | 243.00    | 168.00   |
|             | 16.00-16.49              | 15.875   | 5/8      | 15.70    | 48.00    | 9041090160050     |           |          | 9041100160050      |           |          |
| 165         | 16.50-16.99              | 18.00    |          | 16.20    | 48.00    | 9041090165000     | 198.00    | 122.10   | 9041100165000      | 249.00    | 173.10   |
|             | 16.50-16.99              | 19.05    | 3/4      | 16.20    | 48.00    | 9041090165050     |           |          | 9041100165050      |           |          |
| 170         | 17.00-17.49              | 18.00    |          | 16.70    | 48.00    | 9041090170000     | 202.00    | 125.80   | 9041100170000      | 255.00    | 178.30   |
|             | 17.00-17.49              | 19.05    | 3/4      | 16.70    | 48.00    | 9041090170050     |           |          | 9041100170050      |           |          |
| 175         | 17.50-17.99              | 18.00    |          | 17.20    | 48.00    | 9041090175000     | 206.00    | 129.40   | 9041100175000      | 260.00    | 183.50   |
|             | 17.50-17.99              | 19.05    | 3/4      | 17.20    | 48.00    | 9041090175050     |           |          | 9041100175050      |           |          |
| 180         | 18.00-18.49              | 18.00    |          | 17.70    | 48.00    | 9041090180000     | 211.00    | 132.90   | 9041100180000      | 267.00    | 188.40   |
|             | 18.00-18.49              | 19.05    | 3/4      | 17.70    | 48.00    | 9041090180050     |           |          | 9041100180050      |           |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# Holders

For drilling depths over 5xD, we generally recommend spot drilling prior to finish drilling to depth. Drilling depths over 7xD will typically require use of a series 4105 pilot drill with a series 4111 (145°) insert.

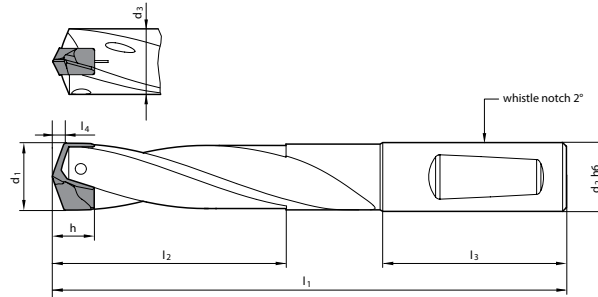


| Holder Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4109 (7xD) |           |          | Series 4110 (10xD) |           |          |
|-------------|--------------------------|----------|----------|----------|----------|-------------------|-----------|----------|--------------------|-----------|----------|
|             |                          |          |          |          |          | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.            | l1*<br>mm | l2<br>mm |
| 185         | 18.50-18.99              | 20.00    |          | 18.20    | 50.00    | 9041090185000     | 217.00    | 136.50   | 9041100185000      | 274.00    | 193.50   |
|             | 18.50-18.99              | 19.05    | 3/4      | 18.20    |          | 9041090185050     |           |          | 9041100185050      |           |          |
| 190         | 19.00-19.49              | 20.00    |          | 18.70    | 50.00    | 9041090190000     | 221.00    | 140.10   | 9041100190000      | 280.00    | 198.70   |
|             | 19.00-19.49              | 19.05    | 3/4      | 18.70    |          | 9041090190050     |           |          | 9041100190050      |           |          |
| 195         | 19.50-19.99              | 20.00    |          | 19.20    | 50.00    | 9041090195000     | 226.00    | 143.70   | 9041100195000      | 286.00    | 203.70   |
|             | 19.50-19.99              | 19.05    | 3/4      | 19.20    |          | 9041090195050     |           |          | 9041100195050      |           |          |
| 200         | 20.00-20.49              | 20.00    |          | 19.70    | 50.00    | 9041090200000     | 230.00    | 147.30   | 9041100200000      | 292.00    | 208.90   |
|             | 20.00-20.49              | 19.05    | 3/4      | 19.70    |          | 9041090200050     |           |          | 9041100200050      |           |          |
| 205         | 20.50-20.99              | 25.00    |          | 20.20    | 56.00    | 9041090205000     | 243.00    | 151.00   | 9041100205000      | 306.00    | 214.00   |
|             | 20.50-20.99              | 25.40    | 1        | 20.20    |          | 9041090205050     |           |          | 9041100205050      |           |          |
| 210         | 21.00-21.49              | 25.00    |          | 20.70    | 56.00    | 9041090210000     | 247.00    | 154.60   | 9041100210000      | 312.00    | 219.10   |
|             | 21.00-21.49              | 25.40    | 1        | 20.70    |          | 9041090210050     |           |          | 9041100210050      |           |          |
| 215         | 21.50-21.99              | 25.00    |          | 21.20    | 56.00    | 9041090215000     | 251.00    | 158.10   | 9041100215000      | 317.00    | 224.20   |
|             | 21.50-21.99              | 25.40    | 1        | 21.20    |          | 9041090215050     |           |          | 9041100215050      |           |          |
| 220         | 22.00-22.49              | 25.00    |          | 21.70    | 56.00    | 9041090220000     | 255.00    | 161.70   | 9041100220000      | 323.00    | 229.30   |
|             | 22.00-22.49              | 25.40    | 1        | 21.70    |          | 9041090220050     |           |          | 9041100220050      |           |          |
| 225         | 22.50-22.99              | 25.00    |          | 22.20    | 56.00    | 9041090225000     | 260.00    | 165.30   | 9041100225000      | 329.00    | 234.40   |
|             | 22.50-22.99              | 25.40    | 1        | 22.20    |          | 9041090225050     |           |          | 9041100225050      |           |          |
| 230         | 23.00-23.49              | 25.00    |          | 22.70    | 56.00    | 9041090230000     | 264.00    | 168.90   | 9041100230000      | 335.00    | 239.50   |
|             | 23.00-23.49              | 25.40    | 1        | 22.70    |          | 9041090230050     |           |          | 9041100230050      |           |          |
| 235         | 23.50-23.99              | 25.00    |          | 23.20    | 56.00    | 9041090235000     | 269.00    | 172.50   | 9041100235000      | 341.00    | 244.60   |
|             | 23.50-23.99              | 25.40    | 1        | 23.20    |          | 9041090235050     |           |          | 9041100235050      |           |          |
| 240         | 24.00-24.49              | 25.00    |          | 23.70    | 56.00    | 9041090240000     | 273.00    | 176.10   | 9041100240000      | 347.00    | 249.70   |
|             | 24.00-24.49              | 25.40    | 1        | 23.70    |          | 9041090240050     |           |          | 9041100240050      |           |          |
| 245         | 24.50-24.99              | 25.00    |          | 24.20    | 56.00    | 9041090245000     | 277.00    | 179.70   | 9041100245000      | 352.00    | 254.80   |
|             | 24.50-24.99              | 25.40    | 1        | 24.20    |          | 9041090245050     |           |          | 9041100245050      |           |          |
| 250         | 25.00-25.49              | 25.00    |          | 24.70    | 56.00    | 9041090250000     | 282.00    | 183.30   | 9041100250000      | 359.00    | 259.90   |
|             | 25.00-25.49              | 25.40    | 1        | 24.70    |          | 9041090250050     |           |          | 9041100250050      |           |          |
| 255         | 25.50-25.99              | 32.00    |          | 25.20    | 60.00    | 9041090255000     | 291.00    | 186.90   | 9041100255000      | 369.00    | 265.00   |
|             | 25.50-25.99              | 31.75    | 1 1/4    | 25.20    |          | 9041090255050     |           |          | 9041100255050      |           |          |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

# HT 800 WP Interchangeable Insert Drills

## Extra length holders for drilling - Series 4109 (7xD) and 4110 (10xD) *Tool steel, coolant fed, nickel plated*

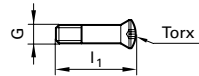


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| Holder Size | d1<br>Insert Range<br>mm | d2<br>mm | d2<br>in | d3<br>mm | l3<br>mm | Series 4109 (7xD) |           |          | Series 4110 (10xD) |           |          |
|-------------|--------------------------|----------|----------|----------|----------|-------------------|-----------|----------|--------------------|-----------|----------|
|             |                          |          |          |          |          | EDP No.           | l1*<br>mm | l2<br>mm | EDP No.            | l1*<br>mm | l2<br>mm |
| 260         | 26.00 - 26.49            | 32.00    |          | 25.70    |          | 9041090260000     |           |          | 9041100260000      |           |          |
|             | 26.00 - 26.49            | 31.75    | 1 1/4    | 25.70    | 60.00    | 9041090260050     | 297.00    | 190.00   | 9041100260050      | 377.00    | 270.00   |
| 265         | 26.50 - 26.99            | 32.00    |          | 26.20    |          | 9041090265000     |           |          | 9041100265000      |           |          |
|             | 26.50 - 26.99            | 31.75    | 1 1/4    | 26.20    | 60.00    | 9041090265050     | 301.00    | 194.00   | 9041100265050      | 382.00    | 275.00   |
| 270         | 27.00 - 27.49            | 32.00    |          | 26.70    |          | 9041090270000     |           |          | 9041100270000      |           |          |
|             | 27.00 - 27.49            | 31.75    | 1 1/4    | 26.70    | 60.00    | 9041090270050     | 306.00    | 197.20   | 9041100270050      | 388.00    | 280.10   |
| 275         | 27.50 - 27.99            | 32.00    |          | 27.20    |          | 9041090275000     |           |          | 9041100275000      |           |          |
|             | 27.50 - 27.99            | 31.75    | 1 1/4    | 27.20    | 60.00    | 9041090275050     | 310.00    | 200.80   | 9041100275050      | 394.00    | 285.20   |
| 280         | 28.00 - 28.49            | 32.00    |          | 27.70    |          | 9041090280000     |           |          | 9041100280000      |           |          |
|             | 28.00 - 28.49            | 31.75    | 1 1/4    | 27.70    | 60.00    | 9041090280050     | 314.00    | 204.40   | 9041100280050      | 400.00    | 290.30   |
| 285         | 28.50 - 28.99            | 32.00    |          | 28.20    |          | 9041090285000     |           |          | 9041100285000      |           |          |
|             | 28.50 - 28.99            | 31.75    | 1 1/4    | 28.20    | 60.00    | 9041090285050     | 318.00    | 208.40   | 9041100285050      | 405.00    | 295.40   |
| 290         | 29.00 - 29.49            | 32.00    |          | 28.70    |          | 9041090290000     |           |          | 9041100290000      |           |          |
|             | 29.00 - 29.49            | 31.75    | 1 1/4    | 28.70    | 60.00    | 9041090290050     | 323.00    | 212.50   | 9041100290050      | 412.00    | 300.50   |
| 295         | 29.50 - 29.99            | 32.00    |          | 29.20    |          | 9041090295000     |           |          | 9041100295000      |           |          |
|             | 29.50 - 29.99            | 31.75    | 1 1/4    | 29.20    | 60.00    | 9041090295050     | 327.00    | 215.10   | 9041100295050      | 418.00    | 305.60   |
| 300         | 30.00 - 30.49            | 32.00    |          | 29.70    |          | 9041090300000     |           |          | 9041100300000      |           |          |
|             | 30.00 - 30.49            | 31.75    | 1 1/4    | 29.70    | 60.00    | 9041090300050     | 332.00    | 218.60   | 9041100300050      | 424.00    | 310.60   |
| 305         | 30.50 - 30.99            | 32.00    |          | 30.20    |          | 9041090305000     |           |          | 9041100305000      |           |          |
|             | 30.50 - 30.99            | 31.75    | 1 1/4    | 30.20    | 60.00    | 9041090305050     | 336.00    | 222.20   | 9041100305050      | 429.00    | 315.70   |
| 310         | 31.00 - 31.49            | 32.00    |          | 30.70    |          | 9041090310000     |           |          | 9041100310000      |           |          |
|             | 31.00 - 31.49            | 31.75    | 1 1/4    | 30.70    | 60.00    | 9041090310050     | 340.00    | 225.80   | 9041100310050      | 435.00    | 320.80   |
| 315         | 31.50 - 31.99            | 32.00    |          | 31.20    |          | 9041090315000     |           |          | 9041100315000      |           |          |
|             | 31.50 - 31.99            | 31.75    | 1 1/4    | 31.20    | 60.00    | 9041090315050     | 344.00    | 229.40   | 9041100315050      | 441.00    | 325.90   |

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

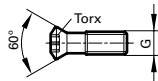
**Clamping screws  
for HT 800 inserts**



**Series 4071**

| For holder size | Size | OAL   | with Torx | EDP No.       |
|-----------------|------|-------|-----------|---------------|
| 110/115         | M2.2 | 9.50  | T7        | 9040710022000 |
| 120/125         | M2.2 | 10.50 | T7        | 9040710022010 |
| 130/135         | M2.5 | 11.40 | T8        | 9040710025000 |
| 140/145         | M3   | 12.10 | T9        | 9040710030000 |
| 150/155         | M3   | 13.10 | T9        | 9040710030010 |
| 160 - 175       | M3.5 | 14.25 | T10       | 9040710035000 |
| 180 - 195       | M4   | 16.00 | T15       | 9040710040000 |
| 200 - 215       | M4.5 | 18.00 | T15       | 9040710045000 |
| 220 - 235       | M5   | 19.75 | T20       | 9040710050000 |
| 240 - 255       | M5   | 21.75 | T20       | 9040710050010 |
| 260 - 295       | M5   | 23.40 | T20       | 9040710050030 |
| 300 - 315       | M6   | 27.00 | T25       | 9040710060000 |
| 320 - 350       | M6   | 28.50 | T25       | 9040710060010 |
| 360 - 390       | M6   | 32.50 | T25       | 9040710060020 |

**Clamping screws  
for chamfering inserts**



**Series 6128**

| For holder size | Size | OAL | with Torx | EDP No.       |
|-----------------|------|-----|-----------|---------------|
| 110 - 140       | M2.0 | 5.5 | T6        | 9061280020000 |
| 160 - 240       | M2.5 | 5.3 | T7        | 9061280025000 |
| 300 - 360       | M4.0 | 9.5 | T15       | 9061280040000 |

**Torx driver**

**Series 4915**



| Type | Drive | l1 mm  | Tightening torque (Nm) | EDP No.       |
|------|-------|--------|------------------------|---------------|
| A    | 1/4"  | 160.00 | 0.8 - 2                | 9049150020000 |
| A    | 1/4"  | 160.00 | 2 - 8                  | 9049150080000 |
| A    | 1/4"  | 200.00 | 5 - 14                 | 9049150140000 |

**Screw driver**

**Series 1612**



| For holder size        | for Torx | EDP No.       |
|------------------------|----------|---------------|
| Pilot holder 110 - 140 | T6       | 9016120060000 |
| Pilot holder 160 - 280 | T7       | 9016120070000 |
| 110 - 125              | T7       | 9016120070010 |
| 130/135                | T8       | 9016120080010 |
| 140 - 155              | T9       | 9016120090010 |
| 160 - 175              | T10      | 9016120100010 |
| Pilot holder 300 - 360 | T15      | 9016120150000 |
| 180 - 215              | T15      | 9016120150010 |
| 220-295                | T20      | 9016120200010 |
| 300 - 390              | T25      | 9016120250000 |

**Torx Bits**

**Series 4917**



| for Torx | Drive | l1 mm | EDP No.       |
|----------|-------|-------|---------------|
| T7       | 1/4"  | 25    | 9049170070000 |
| T8       | 1/4"  | 25    | 9049170080000 |
| T9       | 1/4"  | 25    | 9049170090000 |
| T10      | 1/4"  | 25    | 9049170100000 |
| T15      | 1/4"  | 25    | 9049170150000 |
| T20      | 1/4"  | 25    | 9049170200000 |
| T25      | 1/4"  | 25    | 9049170250000 |

**Torque values for clamping screws**

| Diameter range (mm)    | 11.0 - 12.99 | 13.0 - 13.99 | 14.0 - 15.99 | 16.0 - 17.99 | 18.0 - 19.99 | 20.0 - 21.99 | 22.0 - 25.99 | 30.0 - 40.00 |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Thread                 | M2.2         | M2.5         | M3           | M3.5         | M4           | M4.5         | M5           | M6           |
| Torx size              | T7           | T8           | T9           | T10          | T15          | T15          | T20          | T25          |
| Tightening torque [Nm] | 0.80         | 1.00         | 1.70         | 2.70         | 4.00         | 6.0          | 8.00         | 14.0         |

Details apply to thread locking (Loctite).

Holders are supplied with clamping screw, Guhring no. 4071, and screwdriver, Guhring no. 1612.

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

## Series # 4105/4106 body (1xD/1.5xD) with # 4111 insert

| Material group                                   | Hardness                           | SFM               | Feed Rate - IPR      |                     |                     |                     |                         |                         |                         |                         |                         |                         |
|--------------------------------------------------|------------------------------------|-------------------|----------------------|---------------------|---------------------|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                                                  |                                    |                   | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm     | 5/8 in.<br>15.870mm     | 3/4 in.<br>19.050mm     | 1 in.<br>25.400mm       | 1 1/4 in.<br>31.75mm    | 1 1/2 in.<br>38.10mm    |
| Common structural steels                         | ≤ 100 BHN<br>100-260 BHN           | 425<br>360        | •                    | •                   | •                   | •                   | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |
| Free-cutting steels                              | ≤ 24 HRC<br>24-30 HRC              | 425<br>360        | •                    | •                   | •                   | •                   | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.025<br>0.020          | 0.025<br>0.020          | 0.031<br>0.025          |
| Unalloyed heat-treatable steels                  | ≤ 16 HRC<br>16-24 HRC<br>24-30 HRC | 425<br>410<br>360 | •                    | •                   | •                   | •                   | 0.010<br>0.010<br>0.008 | 0.012<br>0.012<br>0.010 | 0.016<br>0.016<br>0.012 | 0.020<br>0.020<br>0.016 | 0.020<br>0.020<br>0.016 | 0.025<br>0.025<br>0.020 |
| Alloyed heat-treatable steels                    | 24-30 HRC<br>30-38 HRC             | 360<br>295        | •                    | •                   | •                   | •                   | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |
| Unalloyed case hardened steels                   | ≤ 230 BHN                          | 425               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Alloyed case hardened steels                     | 24-30 HRC<br>30-38 HRC             | 360<br>230        | •                    | •                   | •                   | •                   | 0.010<br>0.006          | 0.012<br>0.008          | 0.016<br>0.010          | 0.020<br>0.012          | 0.020<br>0.012          | 0.025<br>0.016          |
| Nitriding steels                                 | 24-30 HRC<br>30-38 HRC             | 345<br>230        | •                    | •                   | •                   | •                   | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| Tool steels                                      | ≤ 24 HRC<br>24-30 HRC              | 195<br>180        | •                    | •                   | •                   | •                   | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| High speed steels                                | 14-30 HRC                          | 180               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Spring steels                                    | ≤ 330 BHN                          | 165               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Stainless steels, sulphured                      | ≤ 24 HRC                           | 180               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Stainless steels, austenitic                     | ≤ 24 HRC                           | 130               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Stainless steels, martensitic                    | ≤ 24 HRC                           | 115               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Hardened steels                                  | 40-48 HRC<br>48-60 HRC             | 80<br>•           | •                    | •                   | •                   | •                   | 0.004<br>•              | 0.005<br>•              | 0.006<br>•              | 0.008<br>•              | 0.008<br>•              | 0.010<br>•              |
| Special alloys                                   | ≤ 38 HRC                           | 80                | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Cast iron                                        | ≤ 240 BHN<br>240-300 BHN           | 330<br>295        | •                    | •                   | •                   | •                   | 0.010<br>0.010          | 0.012<br>0.012          | 0.016<br>0.016          | 0.020<br>0.020          | 0.020<br>0.020          | 0.025<br>0.025          |
| New Cast Materials CGI & ADI                     | 220-300 BHN                        | 260               | •                    | •                   | •                   | •                   | 0.008                   | 0.010                   | 0.012                   | 0.016                   | 0.016                   | 0.020                   |
| New Cast Materials CGI & ADI                     | 350-410 BHN                        | 260               | •                    | •                   | •                   | •                   | 0.008                   | 0.010                   | 0.012                   | 0.016                   | 0.016                   | 0.020                   |
| Spheroidal graphite iron and malleable cast iron | ≤ 240 BHN                          | 395               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Chilled cast iron                                | 240-300 BHN<br>≤ 350 BHN           | 330<br>295        | •                    | •                   | •                   | •                   | 0.010<br>0.010          | 0.012<br>0.012          | 0.016<br>0.016          | 0.020<br>0.020          | 0.020<br>0.020          | 0.025<br>0.025          |
| Ti and Ti-alloys                                 | ≤ 24 HRC<br>24-38 HRC              | 130<br>115        | •                    | •                   | •                   | •                   | 0.005<br>0.004          | 0.006<br>0.005          | 0.008<br>0.006          | 0.010<br>0.008          | 0.010<br>0.008          | 0.012<br>0.010          |
| Aluminum and Al-alloys                           | ≤ 120 BHN                          | 655               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Al wrought alloys                                | ≤ 150 BHN                          | 590               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Al cast alloys                                   | ≤ 10% Si<br>≤ 24% Si               | 490<br>395        | •                    | •                   | •                   | •                   | 0.012<br>0.012          | 0.016<br>0.016          | 0.020<br>0.020          | 0.025<br>0.025          | 0.025<br>0.025          | 0.031<br>0.031          |
| Magnesium alloys                                 | ≤ 150 BHN                          | 590               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Copper, low-alloyed                              | ≤ 120 BHN                          | 230               | •                    | •                   | •                   | •                   | 0.010                   | 0.012                   | 0.016                   | 0.020                   | 0.020                   | 0.025                   |
| Brass, short-chipping                            | ≤ 200 BHN                          | 590               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Brass, long-chipping                             | ≤ 200 BHN                          | 395               | •                    | •                   | •                   | •                   | 0.010                   | 0.012                   | 0.016                   | 0.020                   | 0.020                   | 0.025                   |
| Bronze, short-chipping                           | ≤ 200 BHN                          | 230               | •                    | •                   | •                   | •                   | 0.010                   | 0.012                   | 0.016                   | 0.020                   | 0.020                   | 0.025                   |
| Bronze, long-chipping                            | 200-260 BHN                        | 165               | •                    | •                   | •                   | •                   | 0.010                   | 0.012                   | 0.016                   | 0.020                   | 0.020                   | 0.025                   |
| Bronze, long-chipping                            | ≤ 24 HRC<br>24-30 HRC              | 150<br>115        | •                    | •                   | •                   | •                   | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |

## Series # 4105/4106 body (1xD/1.5xD) with # 4112 insert

| Material group                  | Hardness                           | SFM               | Feed Rate - IPR      |                     |                     |                     |                         |                         |                         |                         |                         |                         |
|---------------------------------|------------------------------------|-------------------|----------------------|---------------------|---------------------|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                                 |                                    |                   | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm     | 5/8 in.<br>15.870mm     | 3/4 in.<br>19.050mm     | 1 in.<br>25.400mm       | 1 1/4 in.<br>31.75mm    | 1 1/2 in.<br>38.10mm    |
| Common structural steels        | ≤ 100 BHN<br>100-260 BHN           | 425<br>360        | •                    | •                   | •                   | •                   | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |
| Free-cutting steels             | ≤ 24 HRC<br>24-30 HRC              | 425<br>360        | •                    | •                   | •                   | •                   | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.025<br>0.020          | 0.025<br>0.020          | 0.031<br>0.025          |
| Unalloyed heat-treatable steels | ≤ 16 HRC<br>16-24 HRC<br>24-30 HRC | 425<br>410<br>360 | •                    | •                   | •                   | •                   | 0.010<br>0.010<br>0.008 | 0.012<br>0.012<br>0.010 | 0.016<br>0.016<br>0.012 | 0.020<br>0.020<br>0.016 | 0.020<br>0.020<br>0.016 | 0.025<br>0.025<br>0.020 |
| Alloyed heat-treatable steels   | 24-30 HRC<br>30-38 HRC             | 360<br>295        | •                    | •                   | •                   | •                   | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |
| Unalloyed case hardened steels  | ≤ 230 BHN                          | 425               | •                    | •                   | •                   | •                   | 0.012                   | 0.016                   | 0.020                   | 0.025                   | 0.025                   | 0.031                   |
| Alloyed case hardened steels    | 24-30 HRC<br>30-38 HRC             | 360<br>230        | •                    | •                   | •                   | •                   | 0.010<br>0.006          | 0.012<br>0.008          | 0.016<br>0.010          | 0.020<br>0.012          | 0.020<br>0.012          | 0.025<br>0.016          |
| Nitriding steels                | 24-30 HRC<br>30-38 HRC             | 345<br>230        | •                    | •                   | •                   | •                   | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| Tool steels                     | ≤ 24 HRC<br>24-30 HRC              | 195<br>180        | •                    | •                   | •                   | •                   | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| High speed steels               | 14-30 HRC                          | 180               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Spring steels                   | ≤ 330 BHN                          | 165               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Stainless steels, sulphured     | ≤ 24 HRC                           | 180               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Stainless steels, austenitic    | ≤ 24 HRC                           | 130               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Stainless steels, martensitic   | ≤ 24 HRC                           | 115               | •                    | •                   | •                   | •                   | 0.005                   | 0.006                   | 0.008                   | 0.010                   | 0.010                   | 0.012                   |
| Hardened steels                 | 40-48 HRC<br>48-60 HRC             | 80<br>•           | •                    | •                   | •                   | •                   | 0.004<br>•              | 0.005<br>•              | 0.006<br>•              | 0.008<br>•              | 0.008<br>•              | 0.010<br>•              |
| Special alloys                  | ≤ 38 HRC                           | 80                | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Ti and Ti-alloys                | ≤ 24 HRC<br>24-38 HRC              | 130<br>115        | •                    | •                   | •                   | •                   | 0.005<br>0.004          | 0.006<br>0.005          | 0.008<br>0.006          | 0.010<br>0.008          | 0.010<br>0.008          | 0.012<br>0.010          |

$$\text{RPM} = \frac{\text{SFM}}{\text{DIAM. in.}} \times 3.82$$

$$\text{IPM} = \text{IPR} \times \text{RPM}$$

$$\frac{\text{HOLE DEPTH in.}}{\text{IPM}} \times 60 = \text{Cut Time}$$

$$\text{mm} = \text{in.} \times 25.40$$

$$\text{m/min.} = \text{SFM} \div 3.28$$

$$\text{mm/rev.} = \text{IPR} \times 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

## Series # 4105/4106 body (1xD/1.5xD) with # 4113 insert

| Material group                                   | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                     |                     |                     |                   |                      |                      |
|--------------------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|----------------------|----------------------|
|                                                  |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm | 5/8 in.<br>15.870mm | 3/4 in.<br>19.050mm | 1 in.<br>25.400mm | 1 1/4 in.<br>31.75mm | 1 1/2 in.<br>38.10mm |
| Cast iron                                        | ≤240 Bhn    | 330 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                                  | 240-300 Bhn | 295 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| New Cast Materials CGI & ADI                     | 220-300 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| New Cast Materials CGI & ADI                     | 350-410 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| Spheroidal graphite iron and malleable cast iron | ≤240 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
|                                                  | 240-300 Bhn | 330 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |

## Series # 4105/4106 body (1xD/1.5xD) with #4114 insert

| Material group          | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                     |                     |                     |                   |                      |                      |
|-------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|----------------------|----------------------|
|                         |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm | 5/8 in.<br>15.870mm | 3/4 in.<br>19.050mm | 1 in.<br>25.400mm | 1 1/4 in.<br>31.75mm | 1 1/2 in.<br>38.10mm |
| Aluminium and Al-alloys | ≤120 Bhn    | 655 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| Al wrought alloys       | ≤150 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| Al cast alloys ≤ 10% Si | ≤200 Bhn    | 490 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| ≤ 24% Si                | ≤200 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| Magnesium alloys        | ≤150 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| Copper, low-alloyed     | ≤120 Bhn    | 230 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| Brass, short-chipping   | ≤200 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| long-chipping           | 200-260 Bhn | 395 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| Bronze, long-chipping   | ≤24 Bhn     | 230 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                         | 24-30 Bhn   | 165 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |

## Series # 4105/4106 body (1xD/1.5xD) with # 4115 insert

| Material group              | Hardness  | SFM | Feed Rate - IPR      |                     |                     |                     |                     |                     |                     |                   |                      |                      |
|-----------------------------|-----------|-----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|----------------------|----------------------|
|                             |           |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm | 5/8 in.<br>15.870mm | 3/4 in.<br>19.050mm | 1 in.<br>25.400mm | 1 1/4 in.<br>31.75mm | 1 1/2 in.<br>38.10mm |
| Stainless steels, sulphured | ≤24 Rc    | 180 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| austenitic                  | ≤24 Rc    | 130 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| martensitic                 | ≤24 Rc    | 115 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| Hardened steels             | 40-48     | 80  | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
|                             | 48-60     | •   | •                    | •                   | •                   | •                   | •                   | •                   | •                   | •                 | •                    | •                    |
| Special alloys              | ≤38       | 80  | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Chilled cast iron           | ≤350 Bhn  | 295 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| Ti and Ti-alloys            | ≤24 Rc    | 130 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
|                             | >24-38 Rc | 115 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

## Series # 4107 body (3xD) with # 4112 insert

| Material group                  | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                     |                     |                     |                   |                      |                      |
|---------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|----------------------|----------------------|
|                                 |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm | 5/8 in.<br>15.870mm | 3/4 in.<br>19.050mm | 1 in.<br>25.400mm | 1 1/4 in.<br>31.75mm | 1 1/2 in.<br>38.10mm |
| Common structural steels        | ≤ 100 BHN   | 425 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 100-260 BHN | 360 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| Free-cutting steels             | ≤ 24 HRC    | 425 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
|                                 | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| Unalloyed heat-treatable steels | ≤ 16 HRC    | 425 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 16-24 HRC   | 410 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| Alloyed heat-treatable steels   | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 30-38 HRC   | 295 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| Unalloyed case hardened steels  | ≤ 230 BHN   | 425 | •                    | •                   | •                   | •                   | 0.012               | 0.016               | 0.020               | 0.025             | 0.025                | 0.031                |
| Alloyed case hardened steels    | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Nitriding steels                | 24-30 HRC   | 345 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Tool steels                     | ≤ 24 HRC    | 195 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 24-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| High speed steels               | 14-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| Spring steels                   | ≤ 330 BHN   | 165 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Stainless steels                | ≤ 24 HRC    | 180 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
|                                 | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
|                                 | ≤ 24 HRC    | 115 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| Hardened steels                 | 40-48 HRC   | 80  | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
|                                 | 48-60 HRC   | •   | •                    | •                   | •                   | •                   | •                   | •                   | •                   | •                 | •                    | •                    |
| Special alloys                  | ≤ 38 HRC    | 80  | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Ti and Ti-alloys                | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
|                                 | 24-38 HRC   | 115 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |

## Series # 4107 body (3xD) with # 4113 insert

| Material group                                   | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|--------------------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                  |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Cast iron                                        | ≤240 Bhn    | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                                                  | 240-300 Bhn | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| New Cast Materials CGI & ADI                     | 220-300 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| New Cast Materials CGI & ADI                     | 350-410 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Spheroidal graphite iron and malleable cast iron | ≤240 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                                                  | 240-300 Bhn | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |

## Series # 4107 body (3xD) with # 4114 insert

| Material group          | Hardness      | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-------------------------|---------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                         |               |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Aluminium and Al-alloys | ≤120 Bhn      | 655 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Al wrought alloys       | ≤150 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Al cast alloys ≤ 10% Si | ≤200 Bhn      | 490 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                         | ≤ 24% Si      | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Magnesium alloys        | ≤150 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Copper, low-alloyed     | ≤120 Bhn      | 230 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Brass, short-chipping   | ≤200 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                         | long-chipping | 395 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Bronze, short-chipping  | ≤200 Bhn      | 230 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | >200-260 Bhn  | 165 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Bronze, long-chipping   | ≤24 Hrc       | 150 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | 24-30 Hrc     | 115 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |

## Series # 4107 body (3xD) with # 4115 insert

| Material group              | Hardness   | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-----------------------------|------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                             |            |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Stainless steels, sulphured | ≤24 hrc    | 180 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
|                             | ≤24 hrc    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
|                             | ≤24 hrc    | 115 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
| Hardened steels             | >40-48 hrc | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                             | >48-60 hrc | •   | •                    | •                   | •                   | •                   | •                    | •                    | •                    | •                  | •                      | •                      |
| Special alloys              | ≤38 hrc    | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
| Chilled cast iron           | ≤350 Bhn   | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Ti and Ti-alloys            | ≤24 hrc    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
|                             | >24-38 hrc | 115 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |

$$\text{RPM} = \frac{\text{SFM}}{\text{DIAM. in.}} \times 3.82 \quad \text{IPM} = \text{IPR} \times \text{RPM}$$

$$\frac{\text{HOLE DEPTH in.}}{\text{IPM}} \times 60 = \text{Cut Time}$$

$$\text{mm} = \text{in.} \times 25.40$$

$$\text{m/min.} = \text{SFM} \div 3.28$$

$$\text{mm/rev.} = \text{IPR} \times 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

## Series # 4108 body (5xD) with # 4112 insert

| Material group                         | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                       |                       |
|----------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|-----------------------|-----------------------|
|                                        |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.75 mm | 1 1/2 in.<br>38.10 mm |
| Common structural steels               | ≤ 100 BHN   | 425 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
|                                        | 100-260 BHN | 360 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                 | 0.020                 |
| Free-cutting steels                    | ≤ 24 HRC    | 425 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                 | 0.031                 |
|                                        | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
| Unalloyed heat-treatable steels        | ≤ 16 HRC    | 425 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
|                                        | 16-24 HRC   | 410 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
|                                        | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                 | 0.020                 |
| Alloyed heat-treatable steels          | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
|                                        | 30-38 HRC   | 295 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                 | 0.020                 |
| Unalloyed case hardened steels         | ≤ 230 BHN   | 425 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                 | 0.031                 |
| Alloyed case hardened steels           | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                 | 0.025                 |
|                                        | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.006                | 0.008                | 0.010                | 0.012              | 0.012                 | 0.016                 |
| Nitriding steels                       | 24-30 HRC   | 345 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                 | 0.020                 |
|                                        | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.006                | 0.008                | 0.010                | 0.012              | 0.012                 | 0.016                 |
| Tool steels                            | ≤ 24 HRC    | 195 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                 | 0.020                 |
|                                        | 24-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.006                | 0.008                | 0.010                | 0.012              | 0.012                 | 0.016                 |
| High speed steels                      | 14-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                 | 0.012                 |
| Spring steels                          | ≤ 330 BHN   | 165 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                 | 0.010                 |
| Stainless steels                       | ≤ 24 HRC    | 180 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                 | 0.012                 |
| sulphured<br>austenitic<br>martensitic | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                 | 0.012                 |
|                                        | ≤ 24 HRC    | 115 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                 | 0.012                 |
| Hardened steels                        | 40-48 HRC   | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                 | 0.010                 |
|                                        | 48-60 HRC   | •   | •                    | •                   | •                   | •                   | •                    | •                    | •                    | •                  | •                     | •                     |
| Special alloys                         | ≤ 38 HRC    | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                 | 0.010                 |
| Ti and Ti-alloys                       | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                 | 0.012                 |
|                                        | 24-38 HRC   | 115 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                 | 0.010                 |

## Series # 4108 body (5xD) with # 4113 insert

| Material group                                   | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|--------------------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                  |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Cast iron                                        | ≤240 Bhn    | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                                                  | 240-300 Bhn | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| New Cast Materials CGI & ADI                     | 220-300 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| New Cast Materials CGI & ADI                     | 350-410 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Spheroidal graphite iron and malleable cast iron | ≤240 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                                                  | 240-300 Bhn | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |

## Series # 4108 body (5xD) with # 4114 insert

| Material group          | Hardness | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-------------------------|----------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                         |          |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Aluminium and Al-alloys | ≤120 Bhn | 655 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Al wrought alloys       | ≤150 Bhn | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Al cast alloys ≤ 10% Si | ≤200 Bhn | 490 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| ≤ 24% Si                | ≤200 Bhn | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Magnesium alloys        | ≤150 Bhn | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| Copper, low-alloyed     | ≤120 Bhn | 230 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Brass, short-chipping   | ≤200 Bhn | 590 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
| long-chipping           | ≤200 Bhn | 395 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Bronze, short-chipping  | ≤200 Bhn | 230 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| >200-260 Bhn            | 165      | •   | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Bronze, long-chipping   | ≤24 Rc   | 150 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | 24-30 Rc | 115 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |

## Series # 4108 body (5xD) with # 4115 insert

| Material group              | Hardness  | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-----------------------------|-----------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                             |           |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Stainless steels, sulphured | ≤24 Rc    | 180 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
| austenitic                  | ≤24 Rc    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
| martensitic                 | ≤24 Rc    | 115 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
| Hardened steels             | 40-48 Rc  | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                             | 48-60 Rc  | •   | •                    | •                   | •                   | •                   | •                    | •                    | •                    | •                  | •                      | •                      |
| Special alloys              | ≤38 Rc    | 80  | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
| Chilled cast iron           | ≤350 Bhn  | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Ti and Ti-alloys            | ≤24 Rc    | 130 | •                    | •                   | •                   | •                   | 0.005                | 0.006                | 0.008                | 0.010              | 0.010                  | 0.012                  |
|                             | >24-38 Rc | 115 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |

Using These Tables. The Speeds & Feeds listed below are conservative recommendations for initial setup. In actual use, depending on the machining environment and workpiece material, significantly higher speeds and feeds may be achievable. Using the below as a starting point, cutting speed/feed can be gradually adjusted upwards until the optimum settings per application are found. Questions? Contact us by telephone at (800) 776-6170.

## Series # 4109 body (7xD) with # 4112 insert

| Material group                  | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                     |                     |                     |                   |                      |                      |
|---------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|----------------------|----------------------|
|                                 |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm | 5/8 in.<br>15.870mm | 3/4 in.<br>19.050mm | 1 in.<br>25.400mm | 1 1/4 in.<br>31.75mm | 1 1/2 in.<br>38.10mm |
| Common structural steels        | ≤ 100 BHN   | 425 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 100-260 BHN | 360 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Free-cutting steels             | ≤ 24 HRC    | 425 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
|                                 | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
| Unalloyed heat-treatable steels | ≤ 16 HRC    | 425 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 16-24 HRC   | 410 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Alloyed heat-treatable steels   | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 30-38 HRC   | 295 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Unalloyed case hardened steels  | ≤ 230 BHN   | 425 | •                    | •                   | •                   | •                   | 0.010               | 0.012               | 0.016               | 0.020             | 0.020                | 0.025                |
| Alloyed case hardened steels    | 24-30 HRC   | 360 | •                    | •                   | •                   | •                   | 0.008               | 0.010               | 0.012               | 0.016             | 0.016                | 0.020                |
|                                 | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
| Nitriding steels                | 24-30 HRC   | 345 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
|                                 | 30-38 HRC   | 230 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| Tool steels                     | ≤ 24 HRC    | 195 | •                    | •                   | •                   | •                   | 0.006               | 0.008               | 0.010               | 0.012             | 0.012                | 0.016                |
|                                 | 24-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.005               | 0.006               | 0.008               | 0.010             | 0.010                | 0.012                |
| High speed steels               | 14-30 HRC   | 180 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Spring steels                   | ≤ 330 BHN   | 165 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Stainless steels                | ≤ 24 HRC    | 180 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
|                                 | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
|                                 | ≤ 24 HRC    | 115 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
| Hardened steels                 | 40-48 HRC   | 80  | •                    | •                   | •                   | •                   | 0.003               | 0.004               | 0.005               | 0.006             | 0.006                | 0.008                |
|                                 | 48-60 HRC   | •   | •                    | •                   | •                   | •                   | •                   | •                   | •                   | •                 | •                    | •                    |
| Special alloys                  | ≤ 38 HRC    | 80  | •                    | •                   | •                   | •                   | 0.003               | 0.004               | 0.005               | 0.006             | 0.006                | 0.008                |
| Ti and Ti-alloys                | ≤ 24 HRC    | 130 | •                    | •                   | •                   | •                   | 0.004               | 0.005               | 0.006               | 0.008             | 0.008                | 0.010                |
|                                 | 24-38 HRC   | 115 | •                    | •                   | •                   | •                   | 0.003               | 0.004               | 0.005               | 0.006             | 0.006                | 0.008                |

## Series # 4109 body (7xD) with # 4113 insert

| Material group                                   | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|--------------------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                  |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Cast iron                                        | ≤240 Bhn    | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                                                  | 240-300 Bhn | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| New Cast Materials CGI & ADI                     | 240-300 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| New Cast Materials CGI & ADI                     | 350-410 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Spheroidal graphite iron and malleable cast iron | ≤240 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                                                  | 240-300 Bhn | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |

## Series # 4109 body (7xD) with # 4114 insert

| Material group          | Hardness      | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-------------------------|---------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                         |               |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Aluminium and Al-alloys | ≤120 Bhn      | 655 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Al wrought alloys       | ≤150 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Al cast alloys ≤ 10% Si | ≤200 Bhn      | 490 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | ≤24% Si       | 395 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Magnesium alloys        | ≤150 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Copper, low-alloyed     | ≤120 Bhn      | 230 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Brass, short-chipping   | ≤200 Bhn      | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | long-chipping | 395 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Bronze, short-chipping  | ≤200 Bhn      | 230 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
|                         | 200-260 Bhn   | 165 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Bronze, long-chipping   | 24 Hrc        | 150 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
|                         | 24-30 Hrc     | 115 | •                    | •                   | •                   | •                   | 0.006                | 0.008                | 0.010                | 0.012              | 0.012                  | 0.016                  |

## Series # 4109 body (7xD) with # 4115 insert

| Material group                                     | Hardness  | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|----------------------------------------------------|-----------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                    |           |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Stainless steels, sulphured austenitic martensitic | ≤24 Hrc   | 180 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | ≤24 Hrc   | 130 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | ≤24 Hrc   | 115 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
| Hardened steels                                    | 40-48 Hrc | 80  | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |
|                                                    | 48-60 Hrc | •   | •                    | •                   | •                   | •                   | •                    | •                    | •                    | •                  | •                      | •                      |
| Special alloys                                     | ≤38 Hrc   | 80  | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |
| Chilled cast iron                                  | ≤350 Bhn  | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Ti and Ti-alloys                                   | ≤24 Hrc   | 130 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | 24-38 Hrc | 115 | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |

$$\text{RPM} = \frac{\text{SFM}}{\text{DIAM. in.}} \times 3.82 \quad \text{IPM} = \text{IPR} \times \text{RPM}$$

$$\frac{\text{HOLE DEPTH in.}}{\text{IPM}} \times 60 = \text{Cut Time}$$

$$\text{mm} = \text{in.} \times 25.40$$

$$\text{m/min.} = \text{SFM} \div 3.28$$

$$\text{mm/rev.} = \text{IPR} \times 25.40$$

$$\text{Bar} = \text{PSI} \div 14.50$$

$$\text{Liter} = \text{Gal.} \div 3.79$$

## Series # 4110 body (10xD) with # 4112 insert

| Material group                  | Hardness                           | SFM               | Feed Rate - IPR      |                     |                     |                     |                         |                         |                         |                         |                         |                         |
|---------------------------------|------------------------------------|-------------------|----------------------|---------------------|---------------------|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                                 |                                    |                   | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700mm     | 5/8 in.<br>15.870mm     | 3/4 in.<br>19.050mm     | 1 in.<br>25.400mm       | 1 1/4 in.<br>31.75mm    | 1 1/2 in.<br>38.10mm    |
| Common structural steels        | ≤ 100 BHN<br>100-260 BHN           | 425<br>360        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| Free-cutting steels             | ≤ 24 HRC<br>24-30 HRC              | 425<br>360        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.020<br>0.016          | 0.020<br>0.016          | 0.025<br>0.020          |
| Unalloyed heat-treatable steels | ≤ 16 HRC<br>16-24 HRC<br>24-30 HRC | 425<br>410<br>360 | •<br>•<br>•          | •<br>•<br>•         | •<br>•<br>•         | •<br>•<br>•         | 0.008<br>0.008<br>0.006 | 0.010<br>0.010<br>0.008 | 0.012<br>0.012<br>0.010 | 0.016<br>0.016<br>0.012 | 0.016<br>0.016<br>0.012 | 0.020<br>0.020<br>0.016 |
| Alloyed heat-treatable steels   | 24-30 HRC<br>30-38 HRC             | 360<br>295        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| Unalloyed case hardened steels  | ≤ 230 BHN                          | 425               | •                    | •                   | •                   | •                   | 0.010                   | 0.012                   | 0.016                   | 0.020                   | 0.020                   | 0.025                   |
| Alloyed case hardened steels    | 24-30 HRC<br>30-38 HRC             | 360<br>230        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.016<br>0.012          | 0.016<br>0.012          | 0.020<br>0.016          |
| Nitriding steels                | 24-30 HRC<br>30-38 HRC             | 345<br>230        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.006<br>0.005          | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.012<br>0.010          | 0.016<br>0.012          |
| Tool steels                     | ≤ 24 HRC<br>24-30 HRC              | 195<br>180        | •<br>•               | •<br>•              | •<br>•              | •<br>•              | 0.006<br>0.005          | 0.008<br>0.006          | 0.010<br>0.008          | 0.012<br>0.010          | 0.012<br>0.010          | 0.016<br>0.012          |
| High speed steels               | 14-30 HRC                          | 180               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Spring steels                   | ≤ 330 BHN                          | 165               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Stainless steels                | ≤ 24 HRC                           | 180               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
|                                 | ≤ 24 HRC                           | 130               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
|                                 | ≤ 24 HRC                           | 115               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
| Hardened steels                 | 40-48 HRC                          | 80                | •                    | •                   | •                   | •                   | 0.003                   | 0.004                   | 0.005                   | 0.006                   | 0.006                   | 0.008                   |
|                                 | 48-60 HRC                          | •                 | •                    | •                   | •                   | •                   | •                       | •                       | •                       | •                       | •                       | •                       |
| Special alloys                  | ≤ 38 HRC                           | 80                | •                    | •                   | •                   | •                   | 0.003                   | 0.004                   | 0.005                   | 0.006                   | 0.006                   | 0.008                   |
| Ti and Ti-alloys                | ≤ 24 HRC                           | 130               | •                    | •                   | •                   | •                   | 0.004                   | 0.005                   | 0.006                   | 0.008                   | 0.008                   | 0.010                   |
|                                 | 24-38 HRC                          | 115               | •                    | •                   | •                   | •                   | 0.003                   | 0.004                   | 0.005                   | 0.006                   | 0.006                   | 0.008                   |

## Series # 4110 body (10xD) with # 4113 insert

| Material group                                   | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|--------------------------------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                  |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Cast iron                                        | ≤240 Bhn    | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                                                  | 240-300 Bhn | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| New Cast Materials CGI & ADI                     | 220-300 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| New Cast Materials CGI & ADI                     | 350-410 Bhn | 260 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Spheroidal graphite iron and malleable cast iron | ≤240 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.012                | 0.016                | 0.020                | 0.025              | 0.025                  | 0.031                  |
|                                                  | 240-300 Bhn | 330 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |

## Series # 4110 body (10xD) with # 4114 insert

| Material group          | Hardness    | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|-------------------------|-------------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                         |             |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Aluminium and Al-alloys | ≤120 Bhn    | 655 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Al wrought alloys       | ≤150 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Al cast alloys ≤ 10% Si | ≤200 Bhn    | 490 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | ≤ 24% Si    | 395 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Magnesium alloys        | ≤150 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Copper, low-alloyed     | ≤120 Bhn    | 230 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Brass, short-chipping   | ≤200 Bhn    | 590 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
|                         | ≤200 Bhn    | 395 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Bronze, short-chipping  | ≤200 Bhn    | 230 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
|                         | 200-260 Bhn | 165 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
| Bronze, long-chipping   | ≤24 Hrc     | 150 | •                    | •                   | •                   | •                   | 0.008                | 0.010                | 0.012                | 0.016              | 0.016                  | 0.020                  |
|                         | 24-30 Hrc   | 115 | •                    | •                   | •                   | •                   | 0.006                | 0.008                | 0.010                | 0.012              | 0.012                  | 0.016                  |

## Series # 4110 body (10xD) with # 4115 insert

| Material group                                     | Hardness  | SFM | Feed Rate - IPR      |                     |                     |                     |                      |                      |                      |                    |                        |                        |
|----------------------------------------------------|-----------|-----|----------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------|------------------------|------------------------|
|                                                    |           |     | 1/16 in.<br>1.590 mm | 1/8 in.<br>3.170 mm | 1/4 in.<br>6.350 mm | 3/8 in.<br>9.520 mm | 1/2 in.<br>12.700 mm | 5/8 in.<br>15.870 mm | 3/4 in.<br>19.050 mm | 1 in.<br>25.400 mm | 1 1/4 in.<br>31.750 mm | 1 1/2 in.<br>38.100 mm |
| Stainless steels, sulphured austenitic martensitic | ≤24 Hrc   | 180 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | ≤24 Hrc   | 130 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | ≤24 Hrc   | 115 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
| Hardened steels                                    | 40-48 Hrc | 80  | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |
|                                                    | 48-60 Hrc | •   | •                    | •                   | •                   | •                   | •                    | •                    | •                    | •                  | •                      | •                      |
| Special alloys                                     | ≤38 Hrc   | 80  | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |
| Chilled cast iron                                  | ≤350 Bhn  | 295 | •                    | •                   | •                   | •                   | 0.010                | 0.012                | 0.016                | 0.020              | 0.020                  | 0.025                  |
| Ti and Ti-alloys                                   | ≤24 Rc    | 130 | •                    | •                   | •                   | •                   | 0.004                | 0.005                | 0.006                | 0.008              | 0.008                  | 0.010                  |
|                                                    | 24-38 Rc  | 115 | •                    | •                   | •                   | •                   | 0.003                | 0.004                | 0.005                | 0.006              | 0.006                  | 0.008                  |

## Surface Refining Processes, Coatings For HT 800 WP Interchangeable Inserts

### **FIREX®/nanoFIREX®**

Coating color: violet

This TiAlN/TiN multi-layer coating is applied to HSS and carbide drills. It offers outstanding heat and wear resistance in drilling applications, and is an excellent general purpose coating.

### **nanoA™**

Coating color: grey-violet

Multi-layer coating that combines TiAlN and AlTiN coatings in a micro-layer structure that is harder and more wear resistant. This coating achieves optimal results when machining stainless steels.

### **TiAlN**

Coating color: violet

The mono-layer TiAlN coating is suited for abrasive operations with carbide tools because of its high hardness and chemical resistance, e.g. hard machining and high speed cutting (HSC).

### **nano-Si™**

Coating color: bronze

HT800 inserts can be modified by adding our nano-Si coating for prolonged tool life in nickel alloys, hardened steels, and abrasive materials.

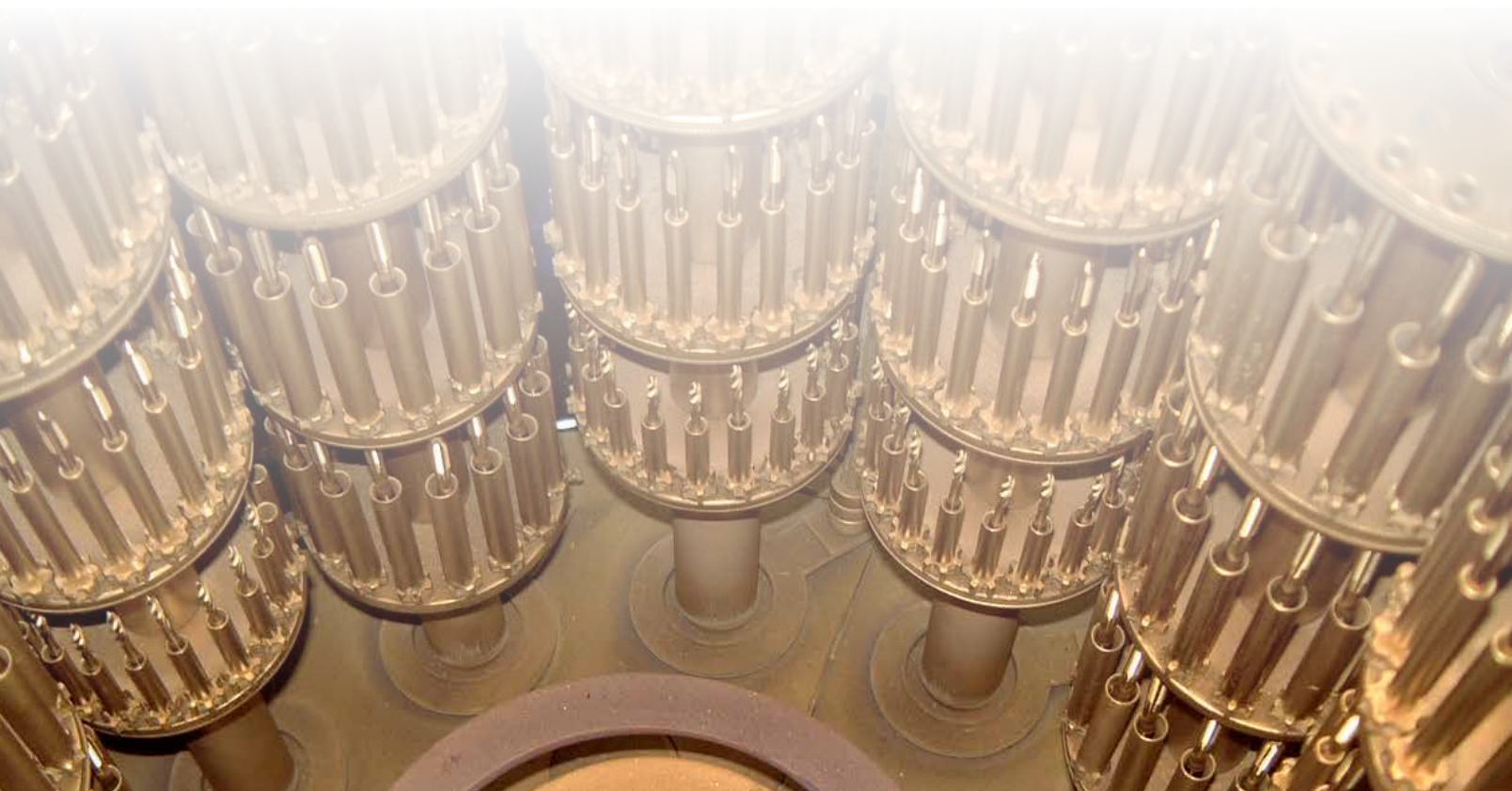
### **Zenit**

Coating color: light golden

The series 4114 HT800 insert can be modified by adding our Zenit coating for prolonged tool life when drilling in titanium and aluminum alloys. Zenit coating prevents built-up-edge from occurring in these materials.

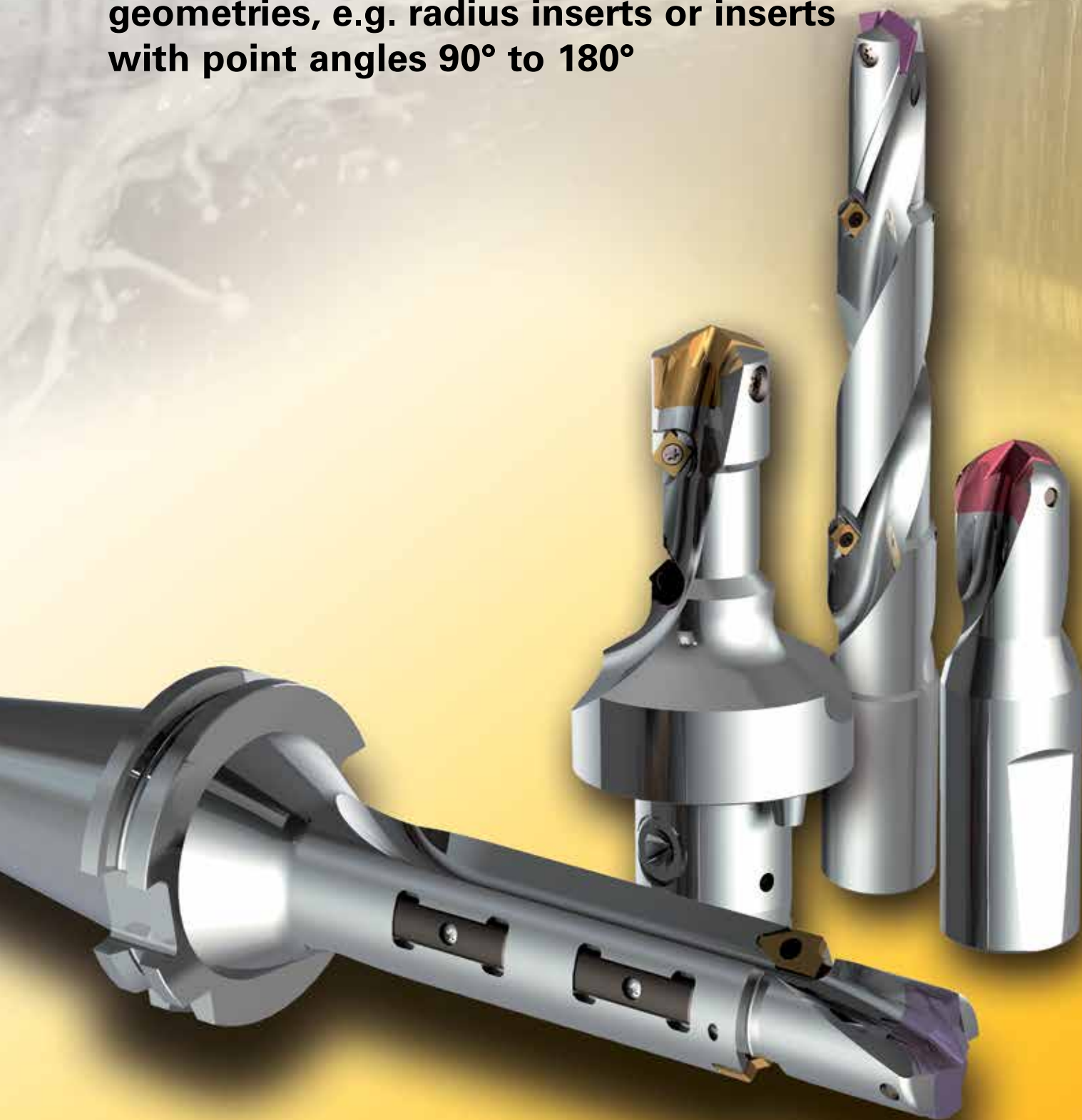
### **bright**

Within the HT800 offering, Guhring recommends our bright finish inserts for the machining of aluminum alloys. The highly polished surfaces helps prevent material build-up during the drilling process.

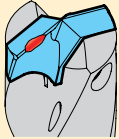
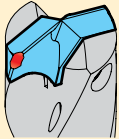
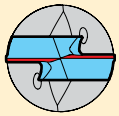
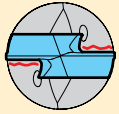
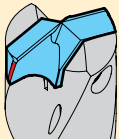
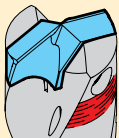


# HT 800 WP Special Solutions

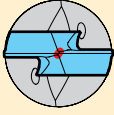
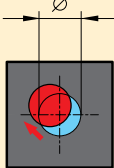
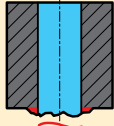
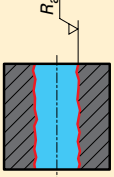
- stepped holders
- special clamping chucks
- inserts with special coatings and geometries, e.g. radius inserts or inserts with point angles  $90^\circ$  to  $180^\circ$



# 12 tips to help diagnose problems

| Problem                                                                                                                | Cause                                                                                                                                                                                                                                    | Remedy                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Cutting edge build up</b>        | <ul style="list-style-type: none"> <li>low cutting speed</li> <li>excessive honing of cutting lip</li> <li>bright finish cutting lip</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>increase cutting speed</li> <li>reduce cutting lip honing</li> <li>have tool coated</li> </ul>                                                                                 |
| <b>2 Crumbling of outer corners</b>   | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>deviation from concentricity too large</li> <li>interrupted cut</li> </ul>                                                         | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>check and correct concentricity if possible</li> <li>reduce feed</li> </ul>                                                               |
| <b>3 Heavy wear at flank</b>         | <ul style="list-style-type: none"> <li>cutting speed too high</li> <li>feed too low</li> <li>clearance angle too small</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>reduce cutting speed</li> <li>increase feed</li> <li>increase clearance angle</li> </ul>                                                                                       |
| <b>4 Crumbling on cutting lips</b>  | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>interrupted cut</li> <li>max. wear values exceeded</li> <li>incorrect tool type</li> </ul>                                         | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>reduce feed</li> <li>reduce tool change intervals</li> <li>apply suitable tool</li> </ul>                                                 |
| <b>5 Land wear</b>                  | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>deviation from concentricity too large</li> <li>back taper too small</li> <li>incorrect coolant (oil), coolant too weak</li> </ul> | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>check and correct concentricity if possible</li> <li>increase back taper</li> <li>increase strength of coolant or use neat oil</li> </ul> |
| <b>6 Scoring on tool body</b>       | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>deviation from concentricity too large</li> <li>interrupted cut</li> <li>abrasive workpiece material</li> </ul>                    | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>check and correct concentricity if possible</li> <li>reduce feed</li> <li>increase strength of coolant or use neat oil</li> </ul>         |

# 12 tips to help diagnose problems

| Problem                                                                                                                                            | Cause                                                                                                                                                                                                                    | Remedy                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7 Heavy chisel edge wear</b>                                   | <ul style="list-style-type: none"> <li>cutting speed too low</li> <li>feed too high</li> <li>excessive honing of cutting lip</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>increase cutting speed</li> <li>reduce feed</li> <li>reduce cutting lip honing</li> </ul>                                                                                   |
| <b>8 Crumbling at intersection, web thinning and cutting lip</b>  | <ul style="list-style-type: none"> <li>clearance angle too small</li> <li>excessive honing of cutting lip</li> <li>incorrect tool type</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>increase clearance angle</li> <li>reduce cutting lip honing</li> <li>apply suitable tool</li> </ul>                                                                         |
| <b>9 Plastic deformation of outer corner</b>                     | <ul style="list-style-type: none"> <li>cutting speed too high</li> <li>insufficient coolant volume</li> <li>incorrect or no honing at corner</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>reduce cutting speed</li> <li>increase volume/pressure</li> <li>correct honing</li> </ul>                                                                                   |
| <b>10 Misalignment</b>                                          | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>deviation from concentricity too large</li> <li>spotting area transverse</li> <li>chisel edge too large</li> </ul> | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>check and correct concentricity if possible</li> <li>use milling cutter (2-fluted) for spotting</li> <li>reduce chisel edge</li> </ul> |
| <b>11 Heavy burring on break-through</b>                        | <ul style="list-style-type: none"> <li>feed too high</li> <li>max. wear values exceeded</li> <li>excessive honing of cutting lip</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>reduce feed</li> <li>reduce tool change intervals</li> <li>reduce cutting lip honing</li> </ul>                                                                             |
| <b>12 Unsatisfactory surface quality</b>                        | <ul style="list-style-type: none"> <li>non rigid conditions, insufficient workpiece clamping</li> <li>deviation from concentricity too large</li> <li>insufficient coolant volume</li> </ul>                             | <ul style="list-style-type: none"> <li>rigid clamping of workpiece</li> <li>check and correct concentricity if possible</li> <li>increase volume/pressure</li> </ul>                                               |

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