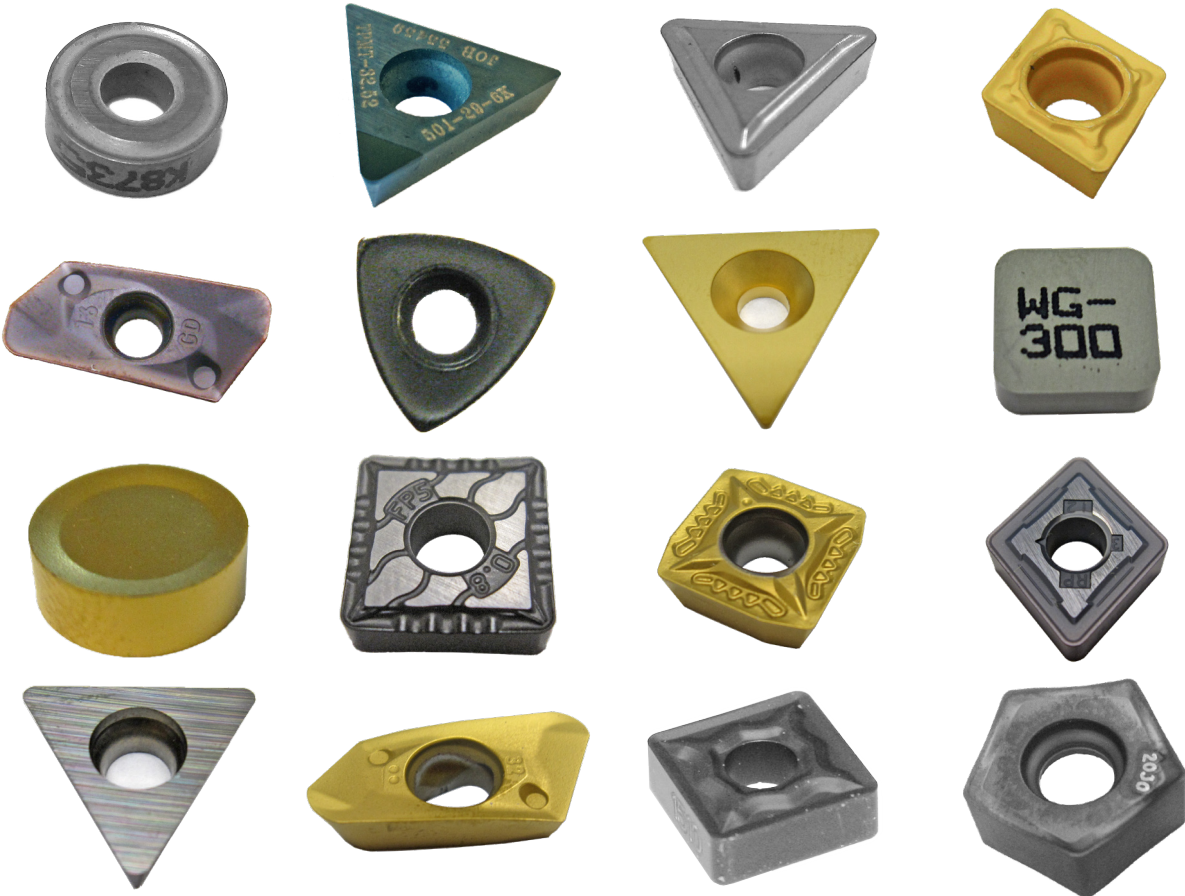


# ROTTLER

## BORING & SURFACING INSERTS

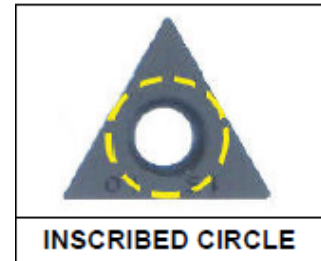


## GENERAL INFORMATION

Rottler CBN and PCD Inserts are laser marked with our part number on one side. On single sided inserts, the part number is on the back side of the insert.

Rottler surfacing insert toolholders are designed so they can hold square and round inserts that are of the same basic size. For example, a 3/8" (9.52 mm) IC round and 3/8" (9.52 mm) IC square insert will fit into the standard 3/8" (9.52 mm) IC Rottler toolholders. IC refers to inscribed circle.

Rottler SF, F60, F80 and F90 Series surfacing cutterheads are supplied standard with Rottler 3/8" (9.52 mm) IC toolholders fitted to our surfacing heads. Optional 1/2" (12.7 mm) toolholders are interchangeable with 3/8" (9.52 mm) toolholders.



Insert breaking or chipping can be caused by several things. It can be caused by not operating the insert at the correct RPM. It is very typical for an insert to break or chip when cutting too slow or too fast. Interrupted cuts can cause an insert to break as well. When making a heavy sleeve cut in a cylinder that has been cracked it is often required to slow the RPM down to 1/2 the normal operating speed to prevent chipping of the insert.

### Tool Nose Radius

The tool nose radius has an important effect on the cutting process. If you use the same feed rate per revolution on two different sized tool nose radius the larger tool radius will give a smoother finish. There are two other important characteristics of the tool radius. The larger the tool radius the stronger the cutting edge. The larger radius will hold up to interrupted cuts better than a smaller radius.

A disadvantage of a larger tool radius is that it creates more tool pressure than a smaller radius. When using long small diameter boring bars or large diameter milling cutterheads the high tool pressure of a large radius can cause chatter in the finish.

### Edge Preparation

Rottler inserts have edge preparations specifically designed for proper cutting performance. Some inserts have sharp edges, Some have a few ten thousandths of an inch honed edge. Others have a T land which is actually a beveled edge. Generally the sharp edge will require the minimum amount of cutting pressure but the edge will not be as strong and long lasting. The T land insert is at the opposite end of the spectrum. It generates a lot of cutting force and can create chatter. The advantage of a T land is that it is very tough. Most Rottler inserts have a honed edge which gives a good balance between cutting performance and tool life.

## Surfacing Inserts Cutting Speed Calculation

Inserts are designed to cut within a speed range – SFPM. In order to convert from cutting speed to RPM, use the following formula:

$$\text{RPM} = \frac{\text{SFPM} \times 3.82}{\text{DIAMETER}}$$

SFPM = Surface Feet per Minute  
RPM = Revolutions per Minute  
DIAMETER in Inches

The feed rate on most Rottler machines is designated in inches / revolution. The F65M and the SFM have feed rates designated in inches / minute. It is important to adjust the inches / minute rate to obtain the correct load (inches / revolution). Following are the formulas to use. You do not have to perform this calculation with an “A” model machine

If you know the RPM and the Feed Rate per Revolution you want, use the following formula to obtain the correct Feed Rate per minute.

**FRM = RPM X FRR**  
**FRM = Feed Rate Inches per Minute**  
**FRR = Feed Rate Inches per Revolution**  
**RPM = Spindle Revolutions per Minute**

METRIC CONVERSION
1 inch = 25.4mm = 2.54cm
1mm = .040 inches

## CYLINDER BORING INSERTS

Rottler has just completed the development of group of new triangular inserts for cylinder boring. Extensive trials were made to come up with new inserts that would outperform the older inserts. The result is a group of inserts that are the same unit cost but have 5 – 50% increased tool life. The increased tool life decreases overall operation cost to the end user.

Rottler offers either triangular or square inserts for cylinder boring, sleeving, and counter boring. Triangular inserts are excellent general purpose inserts for doing all boring, sleeving and counterboring operations..When doing counter boring operations it is important to use a tool nose radius small enough that it will not interfere with the mating corner on the part that is installed in the counterbore.

When removing less than .060” (1.50mm) on the diameter a square insert is the most economical insert to use. The square inserts Rottler offers have 8 cutting edges. A Triangular insert only has 3 cutting edges.

### RT321 (General purpose and sleeving)



A 3/8” (9.52 mm) IC triangular insert with a black ceramic coating and 1/64” (.4 mm) cutting radius. This insert is the best to use for counterboring when the small corner radius is required for clearance or when the machine is at its extended travel limits. The 1/64” (.4 mm) radius should be used when machining to a step where the mating part requires a smaller radius to eliminate an interference problem in the radius. If you are machining a long bore where the spindle must be extended towards the limits of its travel or if a long stub bar is being used, the 1/64” (.4 mm) radius will minimize the possibility of chatter. A feed rate of .002” - .005” (.05 mm - .12 mm) per revolution should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002” - .004”/rev (.02 mm-.1 mm/rev) should be used. When cutting gray cast iron use a speed in the 800 – 1200 SFPM area for best productivity and tool life.

When cutting nodular, ductile, or compacted graphite cast iron the speed should be in the 200 – 400 SFPM area – 300 RPM on a 4" (100 mm) diameter bore. Nodular, ductile, or compacted graphite cast irons, is found most often in high performance and diesel engine blocks or sleeves. When cutting these tough cast irons it is best to use a feed rate of between .002 and .005 (.05 mm and .13 mm) per revolution.

### RT322 (General purpose and sleeving)



This is the same insert as RT321, except it has a 1/32" (.8 mm) radius. This insert is the best to use for heavy sleeve cutting and can also be used for general machining and counterboring. This larger radius insert will give a smoother finish for a given feed rate when sleeve cutting to allow easier sleeve fitting and closer metal to metal contact for heat transfer. It is possible to use a feed rate that is 30% faster with the RT322 compared with the RT321 and still obtain the same finish. The 1/32" (.8 mm) radius is stronger than the 1/64 (.4mm) radius of the RT321. The RT322 should always be used for heavy sleeve cuts unless the finish part requires the smaller radius for clearance or you are cutting a long bore. The larger radius creates more tool pressure than the small radius. The increased tool pressure may cause chatter in the finish if machining very long bores. A feed rate of .006" - .012" (.15 mm - .3 mm) per revolution should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel bocks, a feed rate of .002" - .004"/rev (.05 mm-.1 mm/rev) should be used. When cutting gray cast iron use a speed in the 800 – 1200 SFPM area for best productivity and tool life.

When cutting nodular, ductile, or compacted graphite cast iron the speed should be in the 200 – 400 SFPM area – 300 RPM on a 4" (100 mm) diameter bore. Nodular, ductile, or compacted graphite cast irons, is found most often in high performance and diesel engine blocks or sleeves. When cutting these tough cast irons it is best to use a feed rate of between .006" and .010" (.15 mm and .25 mm) per revolution.

### RTS321 (Steel Cutting)



A 3/8" (9.52 mm) IC triangular insert with a grey ceramic coating and 1/64" (.4 mm) cutting radius. This insert is the best to for cutting steel. It has a chip breaker to break steel chips. If you are machining a long bore where the spindle must be extended towards the limits of its travel or if a long stub bar is being used, the 1/64" (.4 mm) radius will minimize the possibility of chatter. A feed rate of .002" - .005" (.05 mm - .12 mm) per revolution should be used to obtain a typical surface finish. When cutting mild steel use a speed in the 400 – 1000 SFPM area for best productivity and tool life. This insert should not be used for cutting cast iron.

**Note: When using this insert it is required to use a "0" degree rake cartridge.**

### RTS322 (Steel Cutting)



A 3/8" (9.52 mm) IC triangular insert with a grey ceramic coating and 1/32" (.8 mm) cutting radius. This insert is the best to for cutting steel. It has a chip breaker to break steel chips. A feed rate of .003" - .008" (.05 mm - .12 mm) per revolution should be used to obtain a typical surface finish. When cutting mild steel use a speed in the 400 – 1000 SFPM area for best productivity and tool life. This insert should not be used for cutting cast iron.

**Note: When using this insert it is required to use a "0" degree rake cartridge.**

**RT211 (General purpose and sleeving)**

A 1/4" (6.35 mm) IC triangular insert with a black ceramic coating and 1/64" (.4 mm) cutting radius. The 1/64" (.4 mm) radius should be used when machining to a step where the mating part requires a smaller radius to eliminate an interference problem. If you are machining a long bore where the spindle must be extended towards the limits of its travel or if a long stub bar is being used, the 1/64" (.4 mm) radius will minimize the possibility of chatter. A feed rate of .002" - .005" (.05 mm - .12 mm) should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002" - .004"/rev. (.05 mm - .1 mm/rev) should be used. When cutting gray cast iron use a speed in the 800 – 1200 SFPM area for best productivity and tool life.

When cutting nodular, ductile, or compacted graphite cast iron the speed should be in the 200 – 400 SFPM area – 300 RPM on a 4" (100 mm) diameter bore. Nodular, ductile, or compacted graphite cast irons, is found most often in high performance and diesel engine blocks or sleeves. When cutting these tough cast irons it is best to use a feed rate of between .002 and .005 (.05 mm and .13 mm) per revolution.

**RT212 (General purpose and sleeving)**

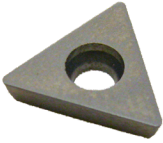
This is the same insert as RT212, except it has a 1/32" (.8 mm) radius. This larger radius insert will give a smoother finish when sleeve cutting to allow easier sleeve fitting and closer metal to metal contact for heat transfer. The 1/32" (.8 mm) radius is stronger than the 1/64 (.4 mm) radius of the RT321. The RT322 should always be used for sleeve cuts unless the finish part requires the smaller radius for clearance or you are cutting a long bore. The larger radius creates more tool pressure than the small tool radius. The increased tool pressure will create chatter in the finish. A feed rate of .006" - .012" (.15 mm - .3 mm) per revolution should be used to obtain a typical surface finish. When machining large counter bores typically found in Cummins or Cat Blocks, a feed rate of .002" - .004"/rev. (.05 mm - .1 mm/rev) should be used. When cutting gray cast iron use a speed in the 800 – 1200 SFPM area for best productivity and tool life. When cutting nodular, ductile, or compacted graphite cast iron the speed should be in the 200 – 400 SFPM area – 300 RPM on a 4" (100 mm) diameter bore. Nodular, ductile, or compacted graphite cast iron is found most often in high performance engine and diesel blocks or sleeves. When cutting these tuff cast irons it is best to use a feed rate of between .006" and .010" (.15 mm and .25 mm) per revolution.

**RT321F (Precision Counterboring and Finishing)**

A 3/8" (9.52 mm) IC triangular, uncoated insert with a 1/64" (.4 mm) cutting radius. Gives the best finish results when machining precision counter bores often machined in diesel engine blocks. The 1/64" (.4 mm) radius should be used when machining to a step where the mating part requires a smaller radius to eliminate an interference problem. If you are machining a long bore where the spindle must be extended towards the limits of its travel or if a long stub bar is being used, the 1/64" (.4 mm) radius will minimize the possibility of chatter. A feed rate of .002" - .005" (.05 mm - .12 mm) should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002 - .004/rev. (.05 mm - .1 mm/rev) should be used.

**RT322F (Precision Counterboring and Finishing)**

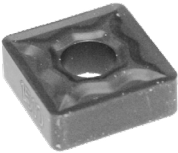
A 3/8" (9.52 mm) IC triangular, uncoated insert with a 1/32" (1.6 mm) cutting radius. Gives the best finish results when machining precision counter bores often machined in diesel engine blocks. A feed rate of .004" - .008" (.05 mm - .1 mm) should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002 - .004/rev. (.05 mm - .1 mm/rev) should be used. When cutting gray cast iron use a speed in the 300 - 600 SFPM area for best productivity and tool life. Tool life of this insert is significantly less than the RT322.

**RT211F (Precision Counterboring and Finishing)**

A 1/4" (6.35 mm) IC triangular, uncoated insert with a 1/64" (.8 mm) cutting radius. Gives the best finish results when machining precision counter bores often machined in diesel engine blocks. The 1/64" (.8 mm) radius should be used when machining to a step where the mating part requires a smaller radius to eliminate an interference problem. If you are machining a long bore where the spindle must be extended towards the limits of its travel or if a long stub bar is being used, the 1/64" (.8 mm) radius will minimize the possibility of chatter. A feed rate of .002 - .005 (.05 mm - .12 mm) should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002 - .004/rev. (.05 mm - .1 mm) should be used. When cutting gray cast iron use a speed in the 300 - 600 SFPM area for best productivity and tool life. Tool life of this insert is significantly less than the RT211

**RT212F (Precision Counterboring and Finishing)**

A 1/4" (6.35 mm) IC triangular insert with a gold coating and 1/32" (1.6 mm) cutting radius. The coating gives the best finish results when machining precision counter bores often machined in diesel engine blocks. A feed rate of .002 - .005 (.05 mm - .12 mm) should be used to obtain a typical surface finish. When machining large counter bores typically found in heavy duty diesel blocks, a feed rate of .002 - .004/rev. (.05 mm - .1 mm/rev.) should be used. When cutting gray cast iron use a speed in the 300 - 800 SFPM area for best productivity and tool life. Tool life of this insert is significantly less than the RT211. RS322 (High speed oversize through boring)

**RS322 (High speed oversize through boring)**

A 3/8" (9.52 mm) IC, square insert with a black ceramic coating. It is used on Rottler boring machines for through boring when removing .010" - .060" (.25 mm - 1.5 mm) on the diameter. A very economical insert as it has 8 cutting edges. On a 4" (100mm) bore use 1000 - 1200 RPM and a feed rate of .008" - .012" (.2 mm - .3 mm) per rev feed rate to obtain the typical surface finish. The insert can also be used for sleeve cuts when a square step is not required. For example, when used on an F80 or F5 machine it can be run at 1000 - 1200 RPM and .005/rev (.12 mm/rev) feed rate to remove up to .200" (5 mm) on the diameter from a 4.200" (106 mm) bore.

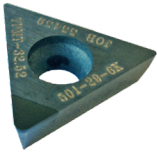
When cutting nodular, ductile, or compacted graphite cast iron the speed should be in the 200 - 400 SFPM area - 300 RPM on a 4" (100 mm) diameter bore. Nodular, ductile, or compacted graphite cast iron is found most often in high performance engine blocks or sleeves. When cutting these tuff cast irons it is best to use a feed rate of between .006" and .010" (.15 mm and .25 mm) per revolution.

**RSS322**

A square 3/8" (9.52mm) black insert with a ceramic coating. This carbide insert is normally the best for cutting steel. The square surfacing insert is intended for F79/F100 applications where it may encounter heavier cuts and greater interrupted cuts. When using an 18" (457mm) head, cutter speeds range from 600-800 RPM, and with a 14" (355.6mm) head, cutter speeds range from 900-1200 RPM.

**6301E (High speed oversize through boring)**

This is a square 3/8" (9.52 mm) IC, 1/32" (1.6 mm) radius, double sided, CBN Insert. These inserts are intended for use on high speed boring on Rottler F80 and F60 series machines. On common cast iron blocks the RPM should be set to achieve 1000 – 2200 SFPM. On harder cast irons the RPM should be reduced to obtain acceptable tool life. A feed rate of .010" - .014" (.25 mm - .36 mm) per revolution. They have exceptional long life when removing up to .040" (1.02 mm) on the diameter. They do not give good tool life on some cast irons with high sulfur content.

**501-29-6K (High speed aluminum boring)**

This is a 3/8" (9.52 mm) IC, triangle insert with a black diamond tip. It has a 1/32" (1.6 mm) radius. This insert is used to bore aluminum cylinders. It cannot be used to bore any other material. It is the best insert for finishing aluminum. For best tool life and finish the insert can be run from 400 – 4000 SFPM. Feed rates between .004" and .010" (.1 mm and .25 mm) should be used.

**511-29-20E (Steel boring)**

A 3/8" (9.52 mm) IC triangular insert with a gold coating and 1/32" (1.6 mm) cutting radius. This insert is for boring steel and ductile iron. It features a chip breaker to break-up the "string" of metal that can often form when boring steel.

**SURFACING INSERTS**

Rottler offers a wide variety of inserts used for surfacing. There are many applications in surfacing that include a variety of materials to be surfaced. Cylinder heads with pre-combustion chambers are particularly challenging because there are such a variety of materials used by the different cylinder head manufactures. One of the latest inserts we have tested for cutting cylinder heads with pre-combustion chambers is the 7202Z. It is probably the best for cutting a wide variety of heads with pre-combustion chambers. The 6303B is our standard for cutting a wide variety of cast iron heads. The 6303B will cut aluminum but is not ideal. The best insert for cutting aluminum is the 6303M which is a diamond insert.

When machining large cylinder blocks with larger precision depth counter bores using a 18" (450mm) or larger diameter fly cutter it is important to use a square 6301J insert. The smaller radius minimizes cutter deflection and will result in more accurate counterbore depths.

Below are the inserts commonly used on Rottler machines in surfacing/milling applications. Please read carefully..

**6303B**

A round 3/8" (9.52 mm) IC, double sided, CBN Insert. An excellent, long life insert for surfacing cast iron heads and blocks - round shape gives many cutting edges on each side of insert. When using a 14" (355.6 mm) cutterhead (SF, F65, F80) speeds range from 900-1200 RPM. When using an 18" (457 mm) cutterhead speeds range from 600-800 RPM.

**6303M**

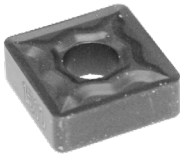
A round 3/8" (9.52 mm) IC, single sided, PCD Insert. For use on aluminum only - heads and blocks without liners. This insert has a thin layer of PCD applied to a carbide disk. The diamond appears to be a shiny black wafer. The hardness of the diamond resists the abrasive nature of the silica in aluminum heads and blocks. RPM speeds with a 14" (355.6 mm) cutter range from 900-2000 RPM.

**6303U**

A round 3/8" (9.52 mm) IC, single sided, CBN Insert. This insert does an excellent job when cutting hard cast iron blocks and heads of a single material or bi-metal. This insert is the best to use when machining compacted graphite cast iron heads and blocks often found in the diesel and performance industry. RPM speeds with a 14" (355.6 mm) cutter range from 650-750 RPM.

**6303K**

A round, gold-colored, 3/8" (9.52 mm) IC, single sided, coated carbide insert. This is a very economical, general purpose insert for surfacing aluminum. It is advisable to use this insert for rough cutting to remove welding or contaminants before. A PCD insert should be used for the final cut to give the super fine finish required for MLS (multi layer steel) head gaskets. RPM speeds with a 14" (355.6 mm) cutterhead range from 600-1000 RPM.

**RS322**

A square 3/8" (9.52 mm) IC carbide insert with a very dark purple ceramic coating. This carbide insert is normally used for high speed boring. It works well as an economical insert for rough surfacing or heavy stock removal of cast iron. A CBN insert should be used for the final finish cut.

**RSS322**

A square 3/8" (9.52mm) black insert with a ceramic coating. This carbide insert is normally the best for cutting steel. The square surfacing insert is intended for F79/F100 applications where it may encounter heavier cuts and greater interrupted cuts. When using an 18" (457mm) head, cutter speeds range from 600-800 RPM, and with a 14" (355.6mm) head, cutter speeds range from 900-1200 RPM.

**6301J**

A square 3/8" (9.52 mm) IC, 1/16" (.0039 mm) radius, double sided, CBN Insert. The 1/16" (.0039 mm) radius of this insert will produce a more accurate (flatter) finish than a round insert typically used for surfacing on F80/F90 Series machines when surfacing large diesel blocks and heads which are high in nickel. The square surfacing insert is intended for F79/F100 applications where it may encounter heavier cuts and greater interrupted cuts. When using an 18" (457 mm) cutter speeds range from 600-800 RPM, and with a 14" (355.6 mm) cutter speeds range from 900-1200 RPM.



**6303V**

An octagonal 3/8" (9.52 mm) IC, .094" (2.4 mm) corner radius, double sided, solid CBN Insert with 16 cutting corners. The .094" (2.4mm) corner radius of this insert will produce a more accurate (flatter) finish than a round 3/8" (.52mm) or square 1/16" (1.6mm) corner radius insert typically used for surfacing on F70/F80/F90/F100 Series machines when surfacing large diesel blocks and heads which are high in nickel.

The octagonal surfacing insert is intended for applications where it may encounter interrupted cuts. When using an 18" (457 mm) cutterhead, speeds range from 600-800 RPM, and with a 14" (355.6 mm) cutter speeds range from 900-1200 RPM. The .094" (2.4mm) corner radius will allow faster feed rates compared to the 6301J square insert.

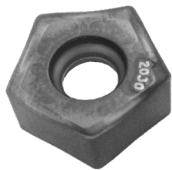
**1/2" (12.70mm) SURFACING INSERTS****6303P**

A round 1/2" (12.7 mm) IC, single sided, PCD Insert. For use on aluminum only - heads and blocks without liners. This insert has a thin layer of PCD applied to the top of a carbide disk. The diamond appears to be a shiny black wafer. The hardness of the diamond resists the abrasive nature of the silica in aluminum heads and blocks.

RPM speeds with a 14" (355.6 mm) cutter range from 1000-2000 RPM. Requires the purchase of 1/2" (12.7 mm) negative rake tool holders. The standard Rottler 3/8" (9.52 mm) IC tool holders will not hold this insert.

**6303Q**

A round 1/2" (12.7 mm) IC double sided, CBN Insert. An excellent insert for machining cast iron heads and blocks. Round shape gives many cutting edges on each side of insert. Requires the purchase of 1/2" (12.7 mm) negative rake tool holders. The standard Rottler 3/8" (9.52 mm) IC tool holders will not hold this insert.

**6864E**

A five sided / five cornered insert coated carbide insert. There are a total of ten cutting corners on this inserts. This is the best insert for roughing and finishing spray weld. This is used in Rottler milling heads that are designed specifically for cutting spray weld. Currently they cannot be used in Rottler's common "flycutter" style surfacing cutterheads.

**Bi-metal Surfacing**

Cylinder Heads with Pre-combustion Chambers and Aluminum Blocks with Hard Sleeves

Cylinder heads with pre-combustion chambers or aluminum engine blocks with cast iron or steel cylinder sleeves are a challenge to cut and most often require a special cutting insert and special cutting technique. There are many different material combinations so there is not one insert that works the best on all applications. Below is information to use as a guide to the best insert to use and some of the required cutting parameters.

Generally the tool life when using any of these inserts in the cutting of bi-metal surfaces will be short when compared to cutting a single material. The cost of the insert per surfacing job will be higher compared with cutting single materials. The customer must incorporate the higher insert cost into the

price charged for the surfacing job.

Another excellent alternative to cutting cylinder heads with pre-combustion chambers is to remove the combustion chamber from the head, surface the cylinder head, then use the Rottler Pre-combustion Chamber Re-seating Tool to machine the combustion chamber counterbore back to OEM specification depth. It is fast and economical to use. See Instruction Bulletin 141.

#### Cylinder Heads with Protruding Valve Seats

Some cylinder heads have valve seats that protrude into the head gasket surface. Valve seats are made out of a wide variety of material. Some are very hard or difficult to cut when compared with the aluminum or cast iron head surface. In many cases it is best to cut the valve seat down below the head surface in a seat and guide machine. This takes a few more minutes when cutting the valve seats but it can save a lot of time and minimize tooling cost when surfacing the head.

The following inserts use Rottler 3/8" (9.52mm) Toolholders supplied with Rottler Surfacing Cutterheads;

#### 6303S



A round 3/8" (9.52 mm) IC, single sided, CBN Insert. For use on aluminum blocks with iron liners and aluminum heads with steel pre-combustion chambers. RPM speeds with a 14" (355.6 mm) cutter range from 650-750 RPM.

#### 6303U



A round 3/8" (9.52 mm) IC, single sided, CBN Insert. This insert does an excellent job when cutting hard cast iron blocks and heads of a single material or bi-metal. This insert is the best to use when machining compacted graphite cast iron heads and blocks often found in the performance industry. RPM speeds with a 14" (355.6 mm) cutter range from 650-750 RPM.

#### 6303R



A round 3/8" (9.52 mm) IC, single sided, CBN Insert. For use on cast iron heads with steel pre-combustion chambers. RPM speed with a 14" (355.6 mm) cutter range from 600-700 RPM and with an 18" (457 mm) cutter range from 500-600 RPM.

#### 6301I



A square 3/8" (9.52 mm) IC, double sided, ceramic insert. For use on cast iron heads with pre-combustion chambers. You can make one finish cut and two rough cuts with each new cutting edge. Always use a new edge when making a finish cut. Use 350-500 RPM on a 14" (355.6 mm) diameter cutterhead. See Bulletin C49.

#### 6301V



A round 3/8" (9.52 mm) IC, double sided, ceramic insert. For use on cast iron heads with pre-combustion chambers. You can make one finish cut and two rough cuts with each new cutting edge. Always use a new edge when making a finish cut. Use 350-500 RPM on a 14" (355.6 mm) diameter cutterhead. See Bulletin C49.

## SPECIAL TOOLHOLDER AND INSERT FOR SURFACING DIESEL ALUMINUM HEADS WITH STEEL PRE-CHAMBERS

### 7202X



Fly Cutter Tool Holder Assembly uses special 7202Z insert for surfacing aluminum cylinder heads with steel pre-combustion chambers.

### 7202Z



Round Insert, 3/8" (9.52 mm) IC gold coated for aluminum cylinder heads with steel pre-combustion chamber. For use with 7202X tool holder only. RPM speeds with 14" (355.6 mm) cutter range from 450-550 RPM and with a 16" (406.4 mm) cutter, 400-500 RPM. Requires very slow feed rate. Surfacing these heads is a difficult operation and only the minimum amount of material can be removed per pass. For best results, rotating the insert so that a new 'corner' is used for the final pass should give good results.

## INSERTS FOR SHELL MILLING CUTTERHEADS

### 6514T



Parallelogram configuration, carbide material. Special insert used with the Rottler 650-2-44P 4" (101.6 mm) shell mills only. Designed for general purpose applications.

### 650-2-45B



Parallelogram configuration, insert precision pressed carbide material and sintered to size. 1/16" (1.6 mm) cutting radius, used with the Rottler shell mills like 650-2-44P 4" (101.6 mm). Designed specifically for heavy machining conditions of steel and cast iron. Feeds and speeds vary with the number of teeth on the shell mill.

### 650-2-45D



Parallelogram configuration, insert precision pressed carbide material and sintered to size. 1/16" (1.6 mm) cutting radius, used with the Rottler shell mills like 650-2-44P 4" (101.6 mm). Designed for steel, stainless steel, cast iron, and high temp alloys. Feeds and speeds vary with the number of teeth on the shell mill.

### 650-2-40K



Parallelogram configuration, with a gold coating insert precision pressed carbide material and sintered to size. 3/32" (2.4 mm) cutting radius, used with the Rottler shell mills. Designed for general cutting use on Rottler right angle drives. Feeds and speeds vary with the number of teeth on the shell mill.

## MAIN LINE BORING INSERTS

Use the same RT series inserts as defined under cylinder boring. Depending on type of toolholder, either 1/4" (6.35 mm) IC or 3/8" (9.52 mm) IC inserts will be required. Commonly 1/64" (.8 mm) radius inserts are used for rough or heavy cutting, and 1/32" (.4 mm) radius inserts are used for finish boring for a smooth surface finish. In extreme conditions where the material is hard or the tool is extended and prone to chatter, use the 1/64" (.8 mm) inserts.

## CONNECTING ROD INSERTS

### RTCR321



A 3/8" (9.52 mm) IC triangular insert with a Gold coating for boring connecting rods has a 1/64" (.4 mm) cutting radius. This insert is the best to for boring small end bearings made of bronze. It has a chip breaker to break metal chips. A feed rate of .002" - .005", per revolution should be used to obtain a typical surface finish. When cutting using a speed in the 400 – 1000 SFPM area for best productivity and tool life

### RTCR322



A 3/8" (9.52 mm) IC triangular insert with a Gold coating and 1/32" (.8 mm) cutting radius. This insert is the best to for cutting steel. It has a chip breaker to break metal chips. A feed rate of .003" - .008" (.05 mm - .12 mm) per revolution should be used to obtain a typical surface finish. When cutting use a speed in the 400–1000 SFPM area for best productivity and tool life.

## VERTICAL LATHE INSERTS

### 10400G



A 3/8" (9.52 mm) IC Diamond insert with a grey ceramic coating and 80° cutting radius. This insert is a finishing insert with medium geometry with positive rake face chip breaker to control chips. A feed rate of .015" - .020" per revolution should be used to obtain a typical surface finish. When cutting mild steel use a speed of 450-550 SFPM area for best productivity and tool life. This insert is for cutting steel and should not be used for cutting cast iron.

### 10400H



A 3/8" (9.52 mm) IC Diamond insert with a grey ceramic coating and 80° cutting radius. This insert is used for roughing; it has medium geometry with positive rake face chip breaker to control chips. A feed rate of .010" - .015" per revolution should be used to obtain a typical surface finish. When cutting mild steel use a speed of 450-550 SFPM area for best productivity and tool life. This insert is for cutting steel and should not be used for cutting cast iron.