

SHERLINE
PRODUCTS
INCORPORATED 1974

INSERTED TIP CARBIDE TOOLS

P/N 2255, 2258, 2262

WARNING

Carbide cutting tips may chip or fragment in use. Always use machine guards, protective clothing and safety glasses to prevent burns or other injury to body or eyes from flying particles or chips. Grinding produces hazardous dust. To avoid adverse health effects, use adequate ventilation and read Material Safety Data Sheet for applicable carbide grade first.

For Data Sheet write to:
Valenite, 31100 Stephenson Hwy., Madison Heights, MI 48071

Design of the Sherline carbide tool holders

Recent increases in cost for commercial tool holders have made them very expensive for the hobbyist. We decided to make our own holders to help keep costs down. To further reduce costs and to increase the value, we designed them to be made in pairs with a "left" and a "right." The holders are case hardened and then given a black oxide finish.

The offset angle of the tip makes it easier to accomplish certain cuts. For example, by using the tool holder square with the crossslide, you can turn an O.D. up to a shoulder and then finish by backing the tool out while still maintaining the proper tool clearance. The tip of the cutting tool is .375" from the bottom of the holder, which is the industry standard.

Carbide tools vs. high speed steel

I would like to emphasize that I believe the prime method of cutting metals on a miniature metal cutting lathe should be high speed steel. It's inexpensive, easy to sharpen, and can be shaped to make "form" tools. Insert tooling is expensive and can't be resharpened or shaped, but it can be a lifesaver.

The obvious difference between brazed carbide tools and inserted carbide tools is the tip is held on with a screw rather than brazed on to a piece of steel. This fact has a lot to do with the success of insert tools in recent years. Steel and carbide have slightly different expansion rates which can cause premature failure of the carbide tip on brazed tools. It is surprising that a small screw will hold these inserts tight enough to accurately cut metal, but they do. We run 20-horsepower computer-controlled lathes at Sherline that can remove metal at a rate of 2 pounds (1 kilogram) a minute with these tools and have few failures.

NOTE: These tools accept P/N 7605 55° carbide inserts or P/N 7608 80° inserts. Extra inserts may be purchased individually or in sets of ten as P/N 7605B or P/N 7608B.

The reasons I believe insert tools should have a place in your shop is that they are ready to use, they hold their cutting edge when cutting exotic metals or abrasive materials, and they can speed up the cutting process.

Cutting speeds with carbide tools

Normal cutting speed rules don't have to be considered to the same extent as when using high speed steel. Stainless steel can be cut at triple the rate over high speed steel with these tools. This puts you in a better horsepower range on the Sherline motor. Another interesting fact is that you can get a better finish on some steels, such as cold rolled, by turning up the RPM. Insert tools don't need cutting oils to work well, but I still use a few drops now and then. This can be an important fact when working on your kitchen table.

Positive rake tools were chosen because they provide a better finish with lower cutting loads. Only tips with a positive cutting edge can be used in these holders. To get maximum life out of these tools, be sure to increase the "feed" as you increase the RPM. The chip should have a tight curl to it and break off into short lengths.

Another plus for insert tools is their ability to cut hard or abrasive materials. Don't plan on machining down the shanks on end mills with them, but you can cut through a work-hardened surface on stainless steel with ease. Carbide tools can simplify many machining operations, but will never solve problems caused by poor machining practices. As with all machining operations, ALWAYS WEAR EYE PROTECTION.

Choosing a cutting tip radius

Another choice I made was the .015" (.4 mm) radius on the tip. A large tool radius can give good finishes on a full-size machine, but it can cause havoc on small diameter parts or miniature machines. Large-radius tools create high tool loads because of their large cutting surface. On the other hand, a radius smaller than .015" will chip too easily.

Installing inserts

When installing an insert in the holder, push the insert down and back while you tighten the hold-down screw. After you tighten the screw, sight along the bottom of the insert from

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the side to assure it is seated flat in the holder and you can see no light underneath. If the insert is not fully seated, it can induce chatter which will chip the insert, making that cutting surface unusable.

Right and Left-hand tools offered with two different insert shapes

Sherline now offers RH and LH holders for either 55° or 80° inserts. Generally, the stronger shape of the 80° holders makes them good for removing metal quickly. The 55° holders are often used for finishing cuts. Remember that "Right-hand" as it relates to cutting tools means that the cutting edge is on the left side. Tools are named according to the direction the chip comes off, so on a right-hand tool the chip comes off to the right. There is also a straight 55° holder that is not offset to either side for general use.

Tool posts to hold these tools

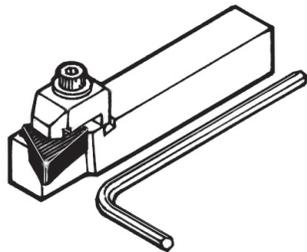
Sherline offers several tool posts that will hold these 3/8" shank tools. The P/N 7600 tool post holds both a 3/8" square and a 3/8" round tool holder. The P/N 3008 two-position tool post holds a 3/8" tool shank on one side and a 5/16" tool on the other side.

If you prefer to use the P/N 2250 quick-change tool post system, there is now a quick-change holder made to accept 3/8" shank tools. It is P/N 2282. There is also a fixed offset 55° quick-change holder (right hand only) as P/N 2295.

Joe Martin, President and Owner
Sherline Products Inc.

PARTS LISTING, 3/8" CARBIDE INSERT HOLDERS

- 22531 *Right-hand 80° tool holder body*
- 22541 *Left-hand 80° tool holder body*
- 22561 *Right-hand 55° tool holder body*
- 22571 *Left-hand 55° tool holder body*
- 22621 *Straight 55° tool holder body*
- 7605 *55° carbide insert (2) (DPMT 21.51 2A VC29)*
- 7608 *80° carbide insert (2) (CPMT 21.21 2A VC29)*
- 76230 *Torx screw (2)*
- 76770 *Torx driver*



Ceramic Holder and Inserts, P/N 2265

Sherline now offers a holder for ceramic inserts as P/N 2265. This negative rake holder secures three-sided ceramic inserts using a small clamp and screw. Because

of the negative rake you actually get six potential cutting surfaces on each insert, making them quite economical. Ceramic is a relatively new addition to the machinist's arsenal of tools. It is capable of doing many of the jobs that diamond cutters used to be used for, like cutting hard tool steel and abrasive materials. Ceramic inserts cost less per side than even carbide inserts, and they are far less costly than diamond inserts. Diamond is still an excellent choice, however, if you want to put a mirror finish on copper.

Tough extremely hard, ceramic inserts are brittle and will easily chip if used in an interrupted cut, such as cutting over a groove or flat spot. They work well at higher speeds than used for HSS or even carbide cutters.

Diamond-tipped 55° Inserts, P/N 7611

Several years ago Valenite discontinued their diamond insert tool holder that we used to carry. We can still offer the small 4-sided diamond inserts that go in that holder, but if you don't already have the holder you would not be able to use these inserts. We recently located a 55° insert that will fit in a holder made for standard 55° carbide inserts but has a diamond tip. The insert costs as much as the old 4-sided diamond but it only has one cutting tip, making it fairly costly. The advantage, however, is that it will fit in a standard holder you may already have. We offer the inserts as P/N 7611, and they will fit the P/N 2256 and 2257 LH and RH insert holders, the 2262 straight holder and also the P/N 2260 boring bar should you have a job that requires a diamond cutter.

These polycrystalline diamond (PCD) inserts should not be used to cut ferrous metals. Diamond is still the best choice for cutting copper, however, and does work well on aluminum alloys containing less than 16% silicon. They are also a good choice for abrasive materials like fiberglass, carbon epoxies, chipboard and wood composites. Like ceramic inserts, they should not be used for interrupted cuts. This does not apply when cutting copper motor commutators, though, because copper is soft enough not to cause chipping. Coolant is not needed when using diamond cutters.

CAUTION: HOT CHIPS!

The chips produced by carbide insert tools can be very HOT! Remember, your hands are closer to the cutting edge when using miniature machine tools, so use caution.