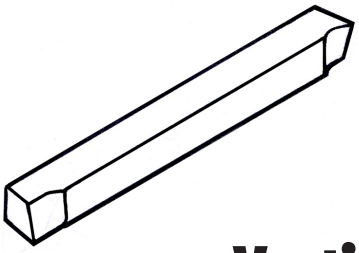
NOTE: Because the #11975 Vertical Sheer Bit is specifically designed to NOT cut on center-line, it is not compatible with standard Sherline tool holders. To function properly the Vertical Sheer Bit should be used in conjunction with the Sherline Quick-Change Tool Post (#2250).



SHERLINE PRODUCTS
INCORPORATED 1974

Vertical Sheer Bit
P/N 11975

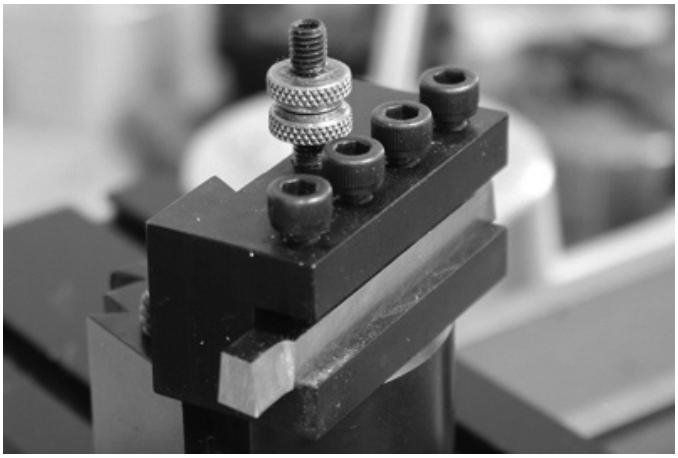


Figure 1—The vertical sheer bit held in the 1/4" tool holder on the P/N 2250 quick-change tool post.

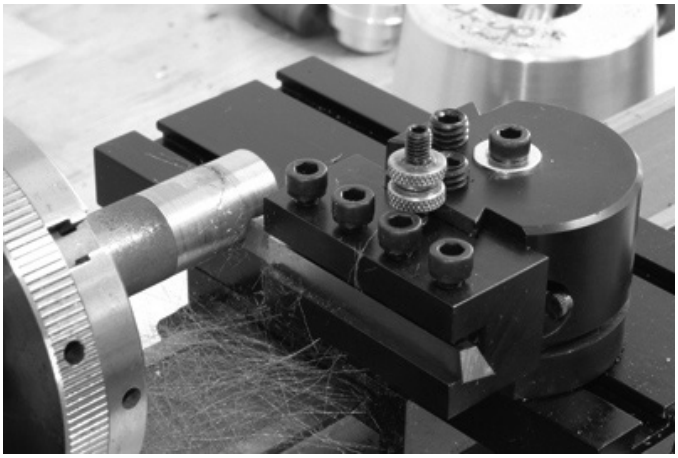


Figure 2—The vertical Sheer Bit making a cut.

Use of the Vertical Sheer Bit

The vertical sheer tool bit is similar to a finishing tool that is used on shapers. This tool is used for finish turning only. You use this tool after you have rough turned your parts to .003” to .010” oversize. The recommended depth of cut for this style of cutting tool is .001" to .003". If you leave more than .003” for your finish cut, you will need to take several finish passes with this tool.

With other turning tools you need to have .010, .020, or .030 of material left for the finish cut, in order to take a cut that is deeper than the nose radius of the tool (especially true with insert tools). If you take a light cut (especially on tougher materials) these other cutter have a tendency to rub the material instead of cutting the material. The vertical sheer tool is designed to take much smaller cuts and leave an excellent finish.

The other difference between the vertical sheer tool and other cutting tools is that the vertical sheer tool does not have a cutting tip that needs to be on the centerline of the part. It is used with any area of the vertical cutting edge on centerline. Because of this relationship between the cutting edge and the part centerline, if the area of the vertical cutting edge that you are using gets dull, you can adjust your tool up or down to a sharper area of the cutting edge and continue to turn your parts. On other tools, when the cutting edge gets dull, you need to resharpen the tool bit, or index the insert to a new edge.

This cutter creates a very fine hair like chip which is unlike any other cutter that I have used. We suggest that you keep your spindle speed at the lower end of the SFM range for the material that you are using. We also recommend fine constant feed rates.

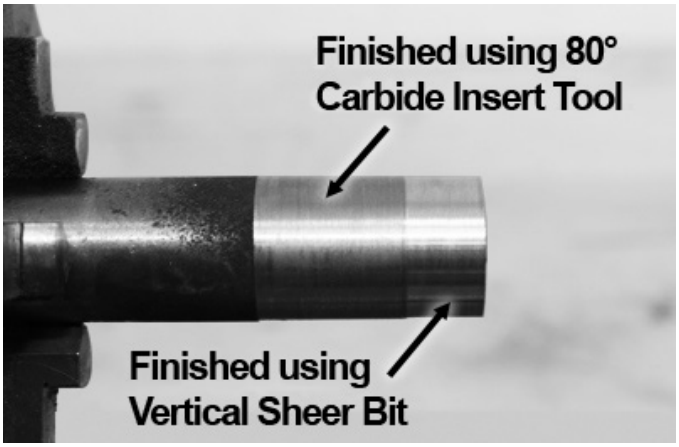


Figure 3—The Vertical Sheer Bit provides a smoother surface finish on most materials compared to an 80° carbide insert tool as seen here.

Grinding and sharpening the Vertical Sheer Bit

The vertical sheer tool is also the easiest tool to grind when it comes time to re-sharpen it. There are only two surfaces to grind; the "primary" edge which is facing the headstock and the "secondary" edge which if facing the material. Neither of these edges is a cutting edge. The cutting edge is the new edge that is created where these two edges meet. Visualize a "cutting corner." It is this corner that becomes the cutting edge of the tool. For those of you who have ground tools before, this tool will look like a left hand cutting tool that is mounted in the tool holder "upside down."

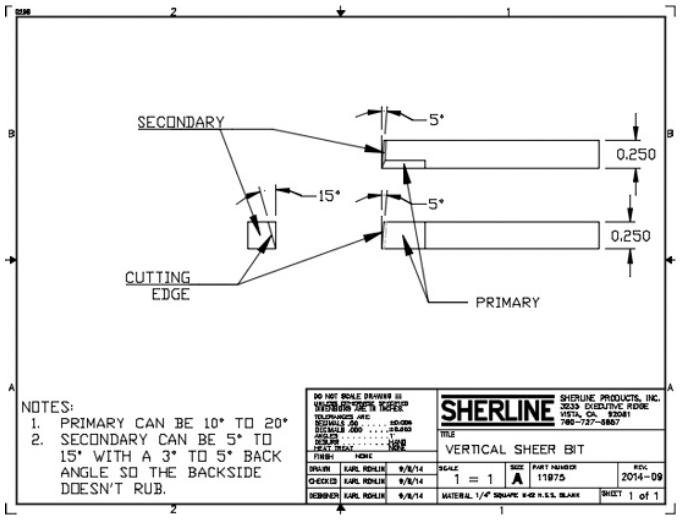


Figure 4—Angles to use when sharpening the Vertical Sheer Bit.

To grind or re-sharpen this tool, first you grind the primary side. This can be done simply by using the radius of your grinding wheel to give you a sufficient relief angle. Push the side of the cutter bit squarely into the face of the grinding wheel. The relief angle for the primary side works best at 15 degrees. However, an angle of 10 to 20 degrees will work. Grind it until you see sparks coming off of the top edge of the tool bit. The secondary side should be 5 degrees. An angle of 5° to 15° will work.

To grind the secondary side all you have to do is turn the bit 93° so the end of the tool bit is facing the front of the grinding wheel. We grind it at 93° to the primary side to give us 3° to 5° of backside relief. This will keep the backside from rubbing the part when you make a cut.

Note: We found that when we ground the bit with smaller relief angles, it cut better. The smaller relief angles will also allow you to cut closer to a shoulder.

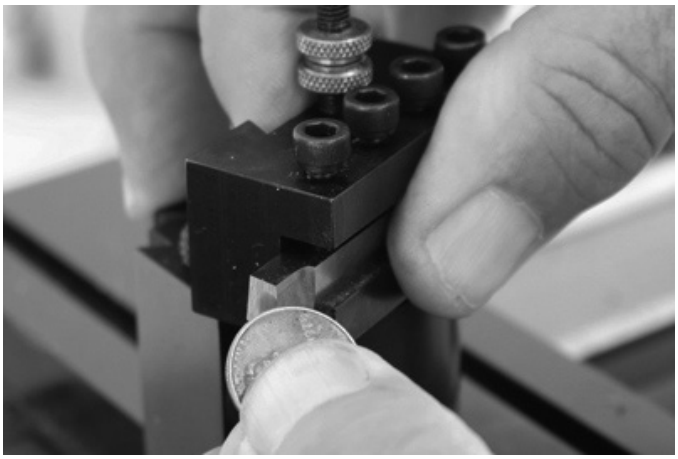


Figure 5—Using a copper penny to hone the cutting edge.

Honing the cutting edge

To finish this tool, all you have to do is hone the cutting edge. This can be done with a honing stone. However, an easier method for preparing the cutting edge is an old school method that we use on new end mills. Take a copper Penney (1981 or older, as new pennies aren't copper, they are copper plated zinc). Then run the edge of the penny down the entire length of the cutting edge. The copper is hard enough to hone the cutting edge and soft enough to avoid dulling the cutting edge.

We hope that you are as intrigued by this different style of cutter as we are, and that it will produce finishes that are beyond your expectations.

Karl Rohlin, VP of Production
Sherline Products Inc.

Note: We would like to give a special thanks to David Tisdel for bringing the Vertical Sheer Bit to our attention here at Sherline. We are sure that many Sherline machining enthusiasts will find this simple tool to be of great use in bringing a higher level of quality to their finished projects. Thank you David!

Watch YouTube videos of the Vertical Sheer Bit in action

Video 1—Cutting 01 steel
https://www.youtube.com/watch?v=NLQHbuVxN-rQ&feature=player_embedded

Video 2—Cutting stainless steel
https://www.youtube.com/watch?v=2IjFX8EX4uc&-feature=player_embedded