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SHERLINE PRODUCTS
INCORPORATED 1974

Truing the Spindle Shoulder Face

True Cutting the Spindle Shoulder on the Mill

All of our threaded accessories especially our chucks and end mill holder locate on both the threads and the shoulder face of the headstock spindle. The accuracy of these two surfaces dictate how true the accessories will run. Any damage, wear, or surface deviation to these surfaces will cause your accessory to run out.

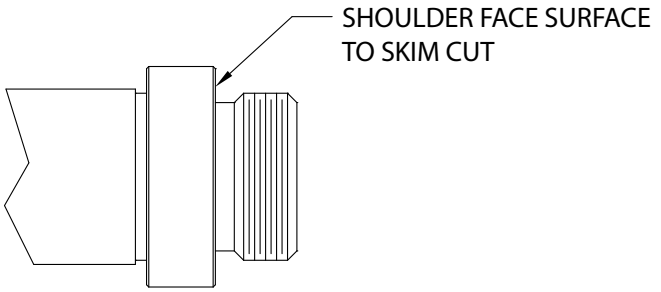

FIGURE 1

We strive to hold the tightest tolerances possible on all of our machines and accessories. The run out of the spindle shoulder face is generally .0005" (.0127mm) or less.

The truer and flatter the shoulder face is, the truer your accessories will run. By taking a light skim cut on the shoulder face, you can machine the shoulder face flat and dead true to the headstock spindle to achieve the absolute least amount of run out on your accessories. The instructions below will show you how to make this skim cut on your mill.

1. We use an HSS tool with a cutting point that is ground to about 30 degrees so it can get all the way into the undercut behind the threads without cutting the threads (see Figure 2).

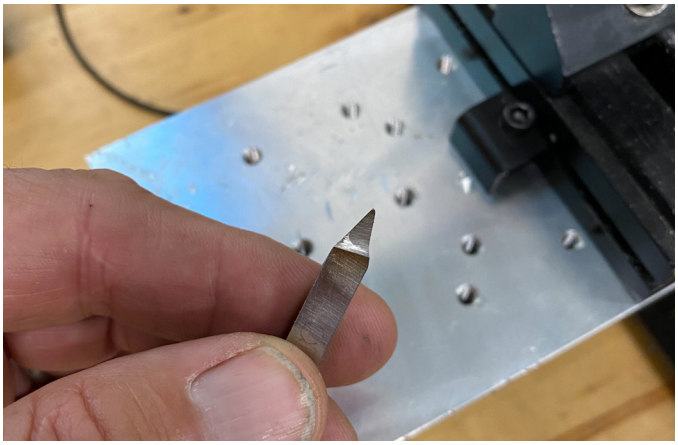

FIGURE 2—Showing the HSS cutting point ground to 30°.

2. We hold the cutter in a mill vise at an angle that will cut the shoulder face of the spindle without cutting the threads (see Figure 3). The easiest way to get the proper angle is to clamp the cutter lightly in the vise at the approximate angle.

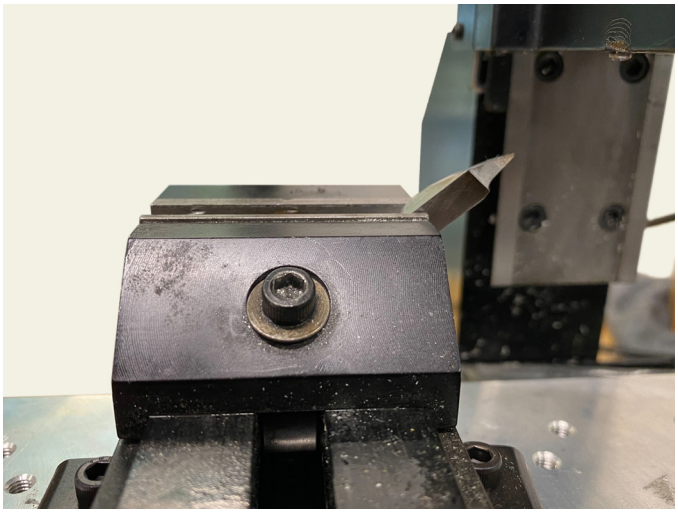

FIGURE 3—The HSS cutting tool held in the mill vise.

3. Mark the shoulder face with a magic marker so you will be able to see if your skim cut cleans the entire face. Then move the cutter in the Y-axis so it is on the centerline of the spindle (by eye is fine). Then move the X-axis until the tip of the cutter is almost touching the threads on the spindle. Then lower the Z-axis until the tip of the cutter touches the shoulder face. At this point you can loosen the vise and adjust your angle (see Figure 4).

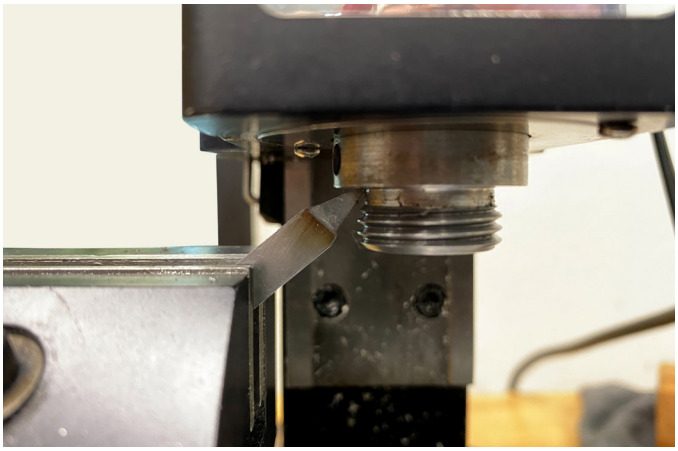

FIGURE 4

4. Move the Z-axis up and the X-axis away from the cutter. Turn the spindle on at about 1000 rpm. Now move the X-axis in until the cutter cuts the undercut area behind the threads (shown in blue in Figure 5). Write down you X-axis position.

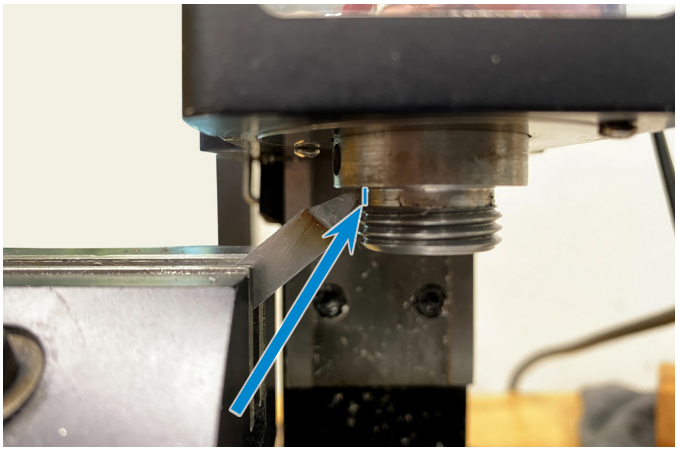

FIGURE 5

5. Leave the spindle on. Move the X-axis away from the spindle about .050" (1.27mm). Then lower the Z-axis slowly until you hear the cutter cut the face of the shoulder. Write down the Z-axis position. Move the X-axis into the cutting position that you wrote down. Now feed the Z-axis down .001" (,0254mm). Now feed the X-axis away from the spindle. Move slow with an even feed rate all the way past the edge of the shoulder (see Figure 6).

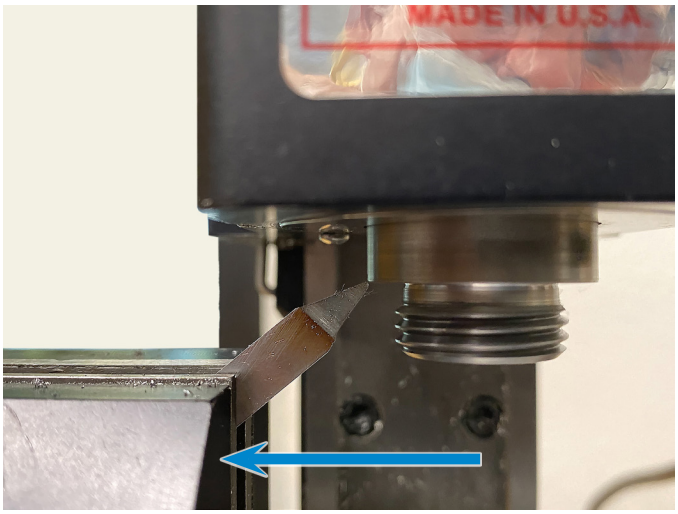

FIGURE 6—Move the X-axis away from the spindle in the direction of the blue arrow.

6. Move the Z-axis up so you can see the shoulder face. Make sure that the entire face has been cleaned up and the finish is nice and smooth (see Figure 7).

FIGURE 7—This image shows the newly machined finish on the spindle shoulder.

7. Your shoulder face is now cut dead true to the machine. This will offer you the absolute best possible run out on your accessories.

Note for the Lathe

Truing the spindle shoulder face is a much easier process on the lathe. Just mount the HSS cutter in one of your tool posts. Position it so it will not cut the backside of the threads. Mark the shoulder face, and then turn the face of the shoulder.

Thank you,
Sherline Products Inc.