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SHERLINE
PRODUCTS
INCORPORATED 1974

Sherline 3.1" 4-Jaw Chuck with Pie Jaws as an alternative to a 6 jaw Maprox JF 6A 55 Chuck

We recently had a customer request that we make a 6 jaw chuck similar to the Maprox JF 6A 55 chuck (Maprox-Catalogue-E-Nov16.pdf - Google Drive).

This Maprox chuck retails for $976.00 in 2025.

We are not interested in making a 6-jaw self-centering chuck. However, an equivalent chuck (at a significantly lower cost) can be made from our SKU: 1076C-PIE Steel Jaws (3.1" 4-Jaw Chuck with Pie Jaws)

We made a set of OD clamping and a set of ID clamping Pie Jaws for one of our 1076C chucks.

We used the dimensions from the Maprox JF 6A 55 jaws to make our Pie Jaws.

This customer wanted his chuck to be mounted on one of our P/N 2090 WW Collet to ¾-16 Chuck Adapter. Therefore, we did all of the rough turning with the chuck mounted to our spindle using the ¾-16 thread, then we remounted the chuck to the spindle with the p/n 2090 arbor mounted to the chuck. This ensures that the pie jaws will run true when to chuck is mounted to the spindle using the P/N 2090 arbor.

Below are pictures of the finished chuck with the machined pie jaws.

ID Clamping Pie Jaws:
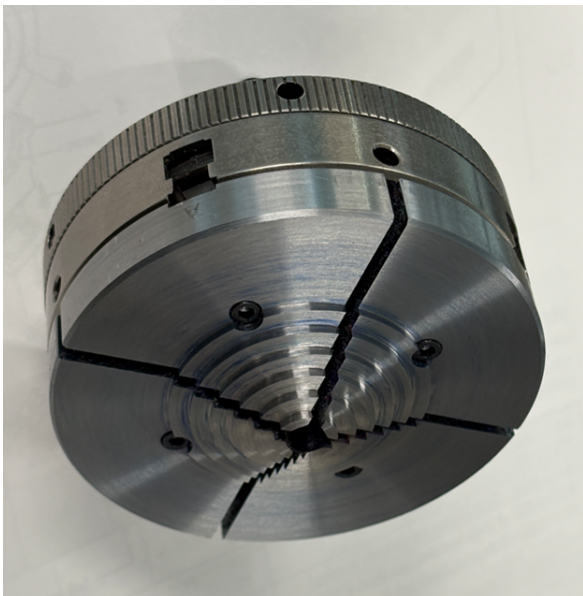
OD Clamping Pie Jaws:
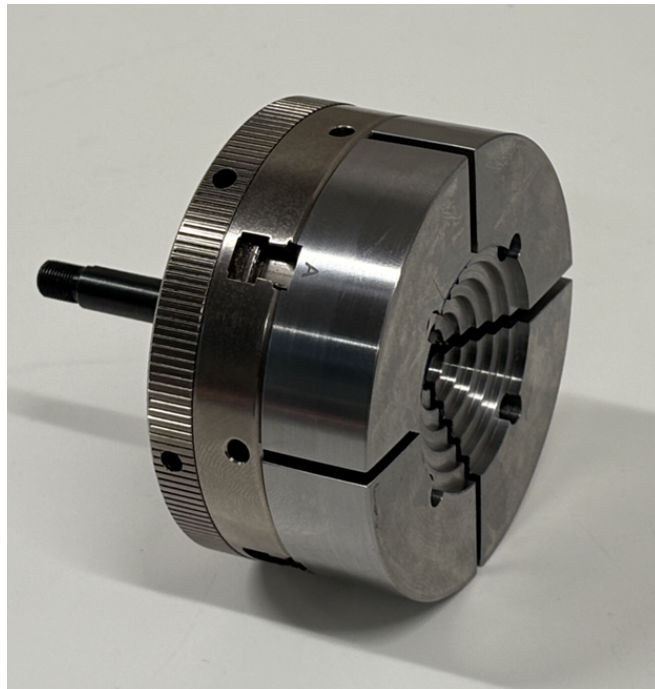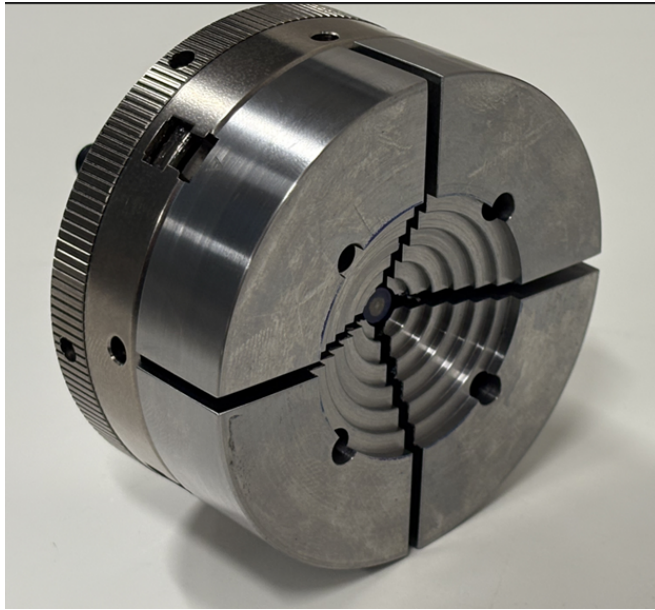
1. We machined the jaws on our Accu-Pro Lathe with the MASSO Touch control.

2. We used an 80-degree carbide insert tool and a hand ground Boring/Turning tool to cut both the ID and OD clamping pie jaws (shown in the videos).

3. We used the low speed / high torque belt pulley grooves which limits the max rpm to about 1350.

4. In the program we used G96 / G97 for CSS (constant surface speed) which adjust the rpms in relation to the diameter that is being cut. As the cutter moves towards smaller diameters, the rpm's increase, and as the cutter moves to larger diameters, the rpm's decrease.

5. If you would like to cut your own jaws, the dimensional prints for the jaws are below.

Jaw dimensions are equivalent to the Maprox "JF 6A 55 Clamping Range".

Dimensions for OD Step for ID Chucking Jaws.
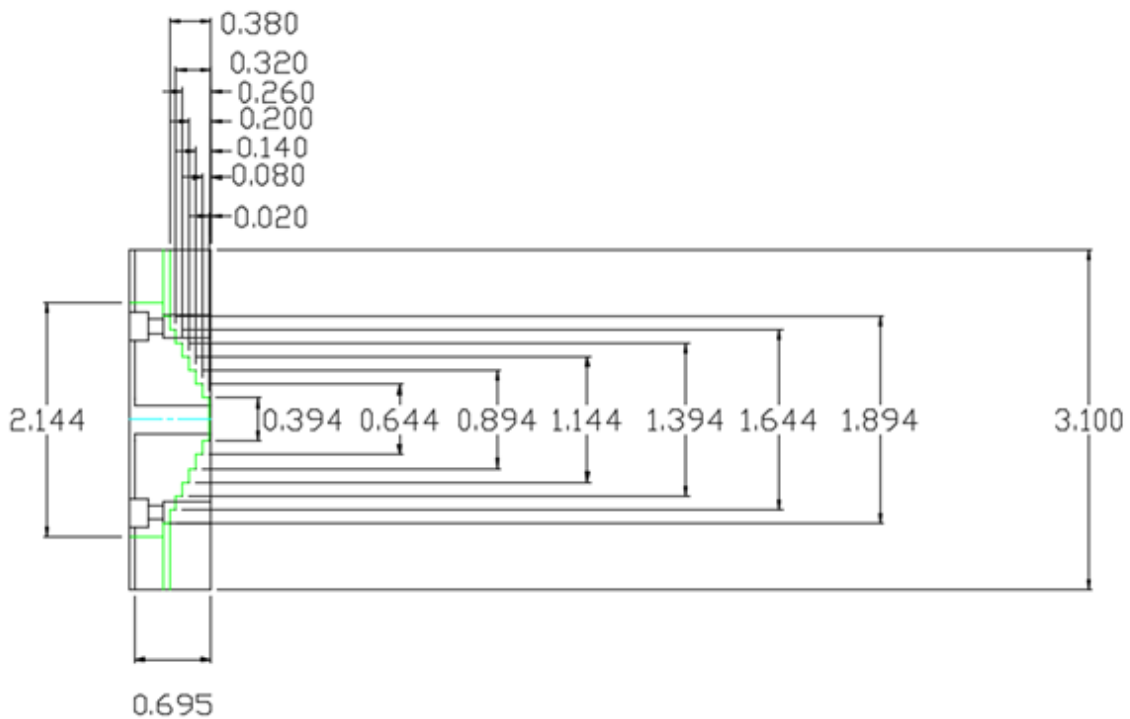
Dimensions for ID Steps for OD Chucking Jaws.


```
0.380
0.320
0.260
0.200
0.140
0.080
0.020
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0.394 0.644 0.894 1.144 1.394 1.644

0.695
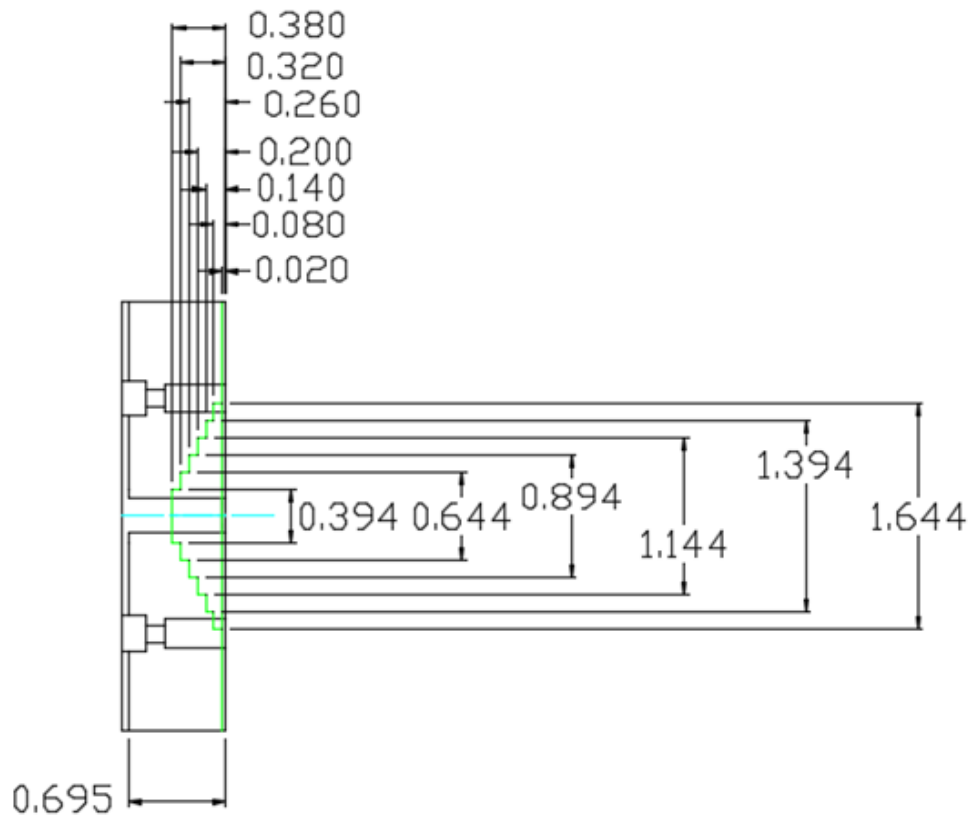
6. Before you cut the jaws for the OD steps (ID Chucking) do the following:

   A. Place a new set of jaws on the chuck.

   B. Place the ¼" dowel pin in the center of the jaws located .020 deeper than the face of the jaws.

   C. Close the jaws lightly with the mounting screws snug until the jaws close on the ¼" pin.

   D. Place a large hose clamp around the outside of the pie jaws in a position that is low enough so the clamp will not be cut when the jaw steps are turned.

Note: In our program, the deepest Z axis cut is Z-.440. If you bring your tool to the outer edge of the jaws (plus clearance), then jog the tool to Z-.440 and see if the tool is going to make contact with the hose clamp (or more specifically the clamp nut). If there is interference, you can move your clamp now to avoid crashing into it when you run your program.
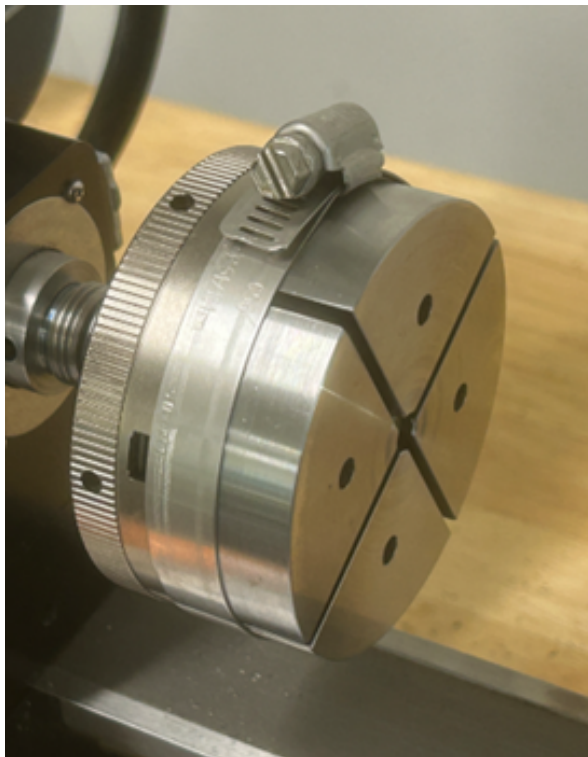
See the picture below as a reference for the location of our hose clamp.

E. Tighten the hose clamp until it is snug.

F. Now open the jaws outward against the hose clamp so the jaws are loaded in the open direction.

G. Now tighten the mounting screws a bit more, and open the jaws more.

H. Finally tighten the mounting screws to full torque and open the jaws to maximum tightness.

Note: Because of the clamp nut on the hose clamp, your chuck is no longer balanced and your machine will vibrate at higher rpms.

7. Instructions for turning the ID chucking jaws using CNC:

You can either write your own program to cut the jaws using the dimensional print above, or you can purchase the programs that we used for ($25.00).

Our Programs are:

(1143-4P TURN OD STEPS .0125 DOC G96 G97) for rough turning.

(1143-4P TURN OD STEPS FINISH TURN G96 G97) for finish turning.

Notes:

A. Set tool offset at Z.010 and X.020. This will cut your jaws oversize so you can creep in with your finish tool to achieve the correct diameters and depths for your jaw steps.

B. Run Roughing tool with the chuck threaded onto the spindle using the ¾-16 thread.

C. Then remove the chuck. Insert the WW Collet Adapter. Rebore the 40 degree taper so the adapter taper is dead true. Mount the chuck onto a p/n 2090 8mm to ¾-16 chuck adapter. Then mount the chuck assembly into the spindle and do the finish turning operation.

2. Run program (1143-4P TURN OD STEPS FINISH TURN G96 G97) to do the finish turn with the chuck mounted on a P/N 2090. Start with the tool offsets at X.020 and Z.010. Run the program and adjust the tool offsets in small increments until the finish dimension are achieved.

Notes:

1. Remember that the entire chuck is now mounted to a "Wimpy" 8mm arbor. Heavy cuts will result in tool breakage or poor finish on the jaws (or Scrap).

2. If you are not going to be using the 8mm arbor and you will be using the ¾-16 thread to mount your chuck to the spindle, you will leave the chuck on the spindle and run (1143-4P TURN OD STEPS FINISH TURN G96 G97). This is a more rigid setup and there will be less chance of chatter on the larger OD surfaces.

3. Because there are 4 pie jaws on the chuck, it is very easy to measure the step diameters.

8. Instructions for turning the OD chucking jaws:

1. Place a new set of jaws on the chuck. Place the ¼" dowel pin in the center of the jaws located deeper than .380 final bore depth. Close the jaws lightly with the mounting screws snug until the jaws close on the ¼" pin. Now tighten the mounting screws a bit more, and close the jaws more. Finally tighten the mounting screws to full torque and close the jaws to maximum tightness.

Our Programs are:

(1143-4P BORE ID STEPS .0125 DOC G96 G97) to rough bore.

(1143-4P BORE ID STEPS FINISH ONLY) to finish bore.

Note: In these programs we are using the same Turning / Boring tool to do both the rough and finish boring operations.

A. Set tool offset at Z.010 and X-.020.

B. Run Roughing tool with the chuck threaded onto the spindle using the ¾-16 thread.

C. Then remove the chuck. Insert the WW Collet Adapter. Rebore the 40 degree taper so the adapter taper is dead true (If Needed, otherwise indicate it to check the run out). Mount the chuck onto a P/N 2090 8mm to ¾-16 chuck adapter. Then mount the chuck assembly into the spindle and do the finish turning operation.

2. Run program (1143-4P BORE ID STEPS FINISH ONLY) to do the finish bore with the chuck mounted on a P/N 2090. Start with the tool offsets at X-.020 and Z.010. Run the program and adjust the tool offsets in small increments until the finish dimension are achieved.

See demo videos of the ID & OD Jaws being cut -

https://www.youtube.com/watch?v=vwClpcciEmw

https://www.youtube.com/watch?v=EmLmrDsJIeU