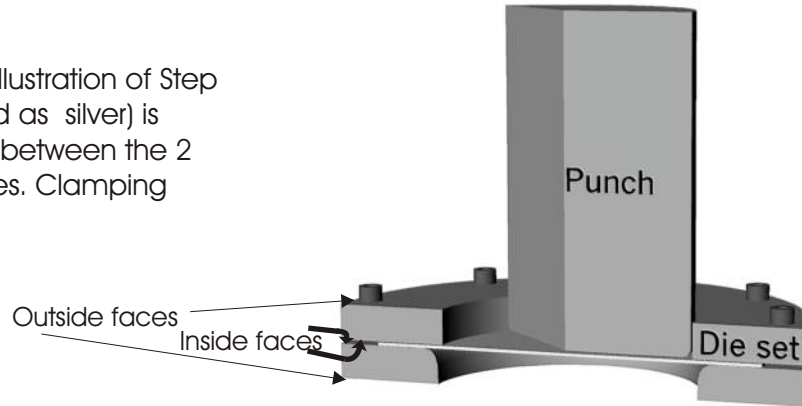


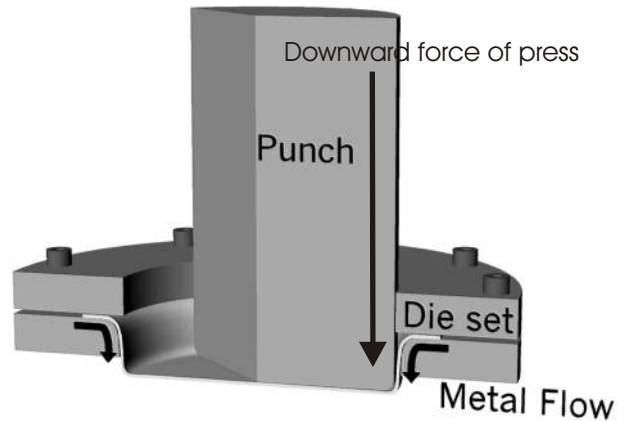
Understanding the Deep-Draw Process

The following instructions should be carefully read and fully understood before attempting to draw any metal through the dies. The dies and punches can be damaged if used incorrectly.

(Photo at right) Cutaway illustration of Step One, The metal (illustrated as silver) is sandwiched and captive between the 2 master die set (MDS) halves. Clamping bolts are hand tightened.

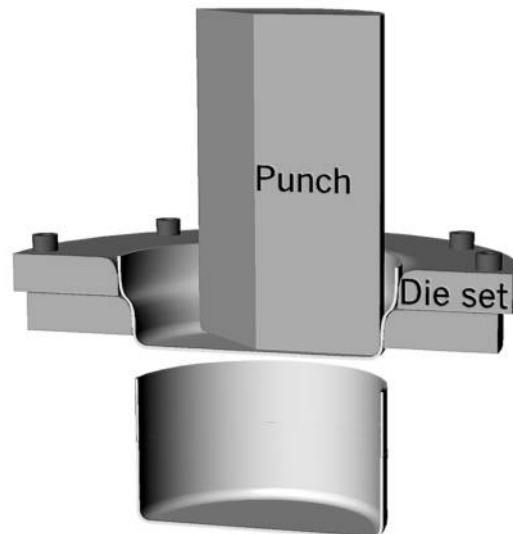


(Photo at right) The punch is then forced downward by the hydraulic press and draws the metal through the die set. If we stop at this point we have a dish or tray with a flange. If the punch is pushed all the way through the die a shallow cup is formed.

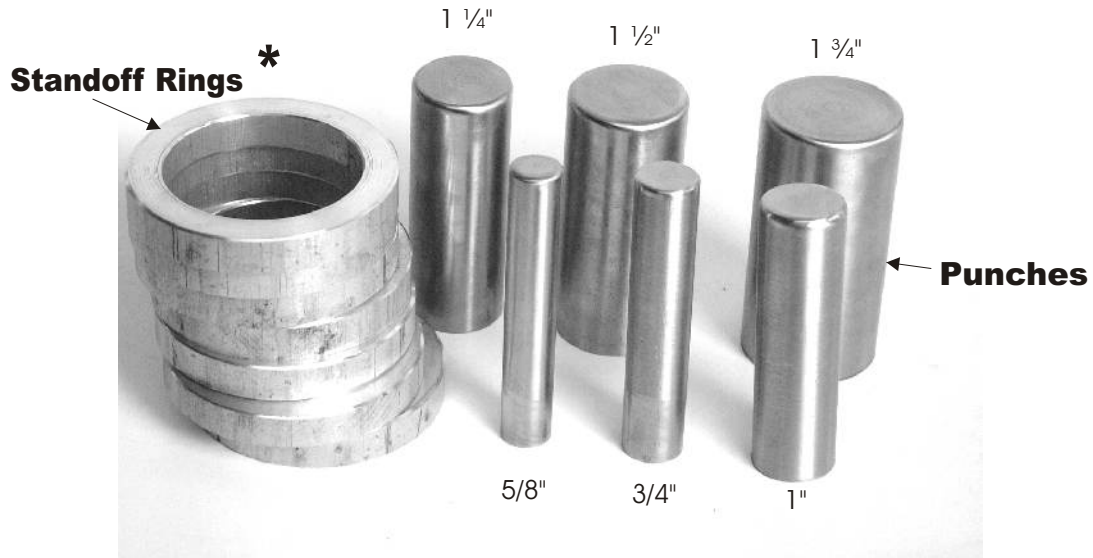


(Photo at right of the redraw) The drawing is done in a series of draws to get to the final diameter. The previous die is used here as a guide plate for the draw die in use.

For more detailed information on this process and technique read "Deep-Drawing for Metalsmiths" by G. Phil Poirier.



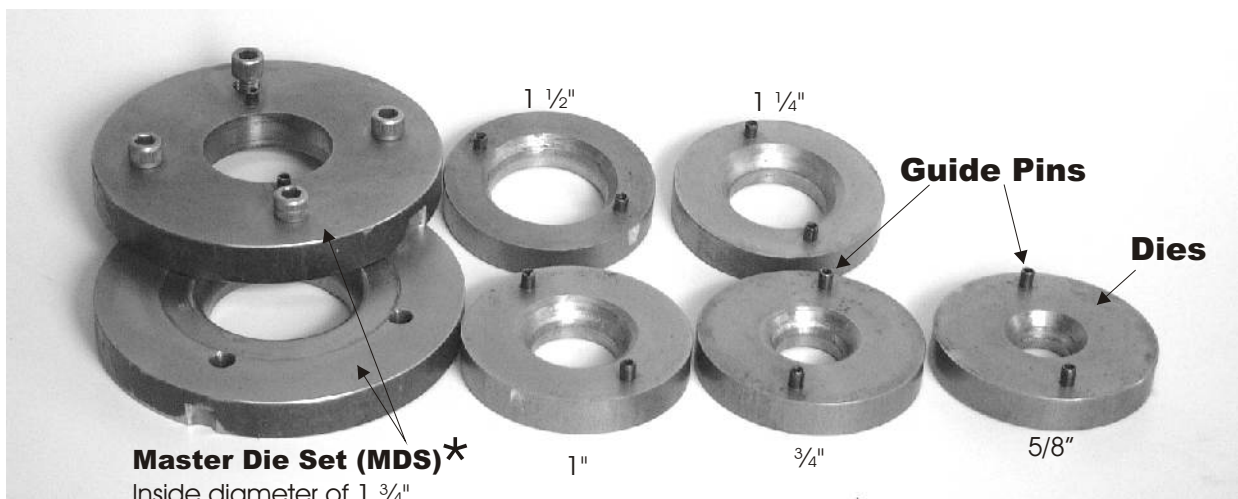
Identify all Parts



(Photo above) Identify all of the parts of the 3" deep-draw kit. Note that the 5/8" and 3/4" punches are 3 3/4" tall, and the 1", 1 1/4", 1 1/2", and 1 3/4" punches are all 3 1/2" tall.

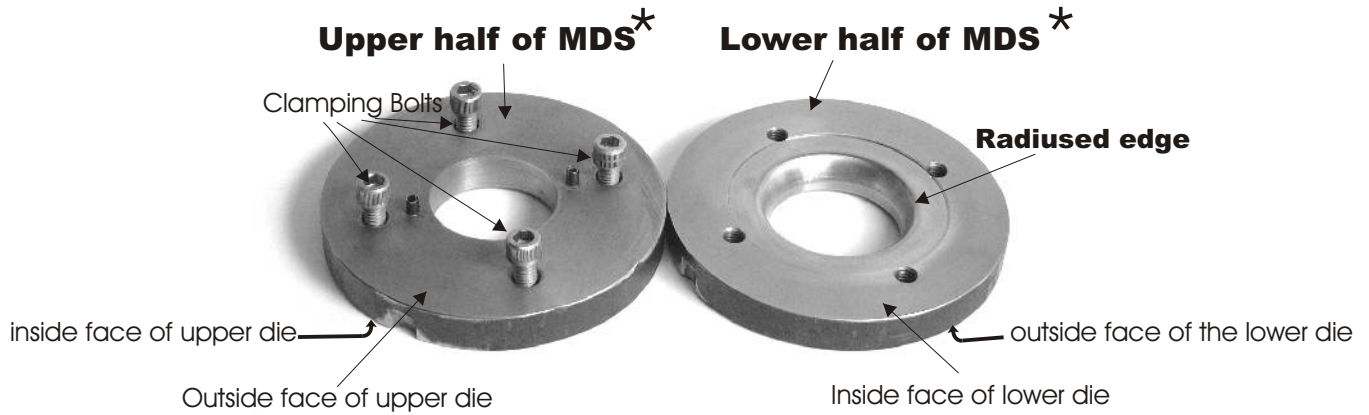
(Photo below) Identify the Master Die Set (MDS) and the 5 smaller dies. It is prudent to mark on the sides of the dies their respective sizes, you can also color code the dies and the corresponding punches. If you choose to mark the punches mark them on the ends where the bolt hole is located, do not mark on the sides of the punches.

Always test the fit of the punch and its corresponding die. The punch should slip through the die, if you use a punch that is too large to slip through the die you will damage your tooling.

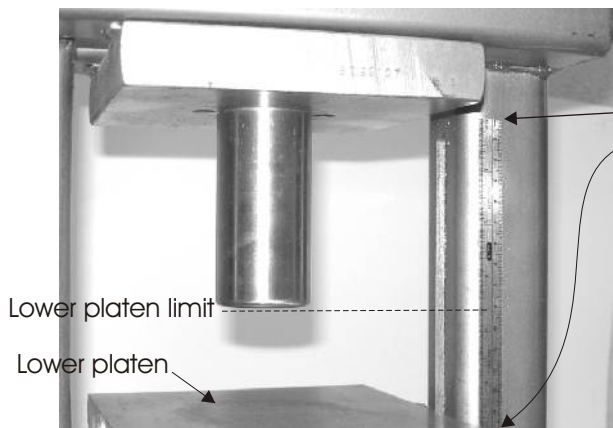


The punches and dies can be kept in good shape by cleaning and polishing often. When not in use a rust inhibitor should be used to protect the steel, WD40 is good for short term storage, LPS3 is best for long term storage.

*** Newer kits will differ slightly from these images. The number and sizes of standoff rings have changed and the Master die no longer has the 3" recess or guide line to be more capable of drawing other sizes/shapes.**

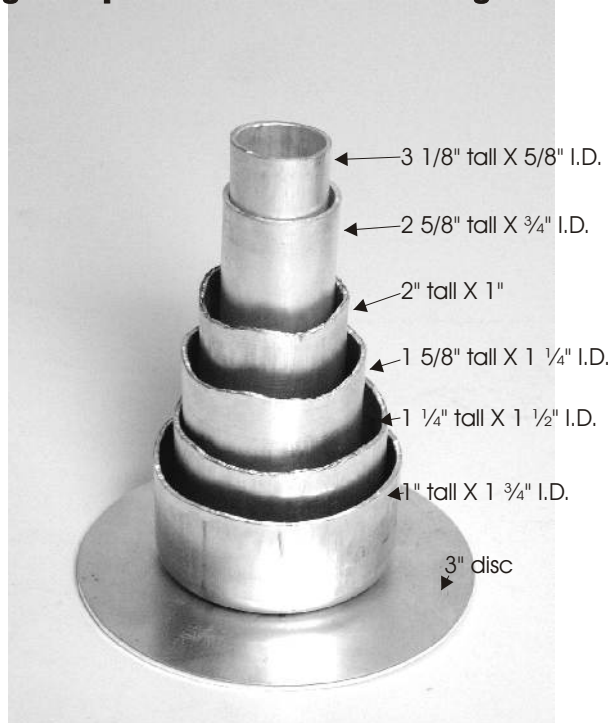
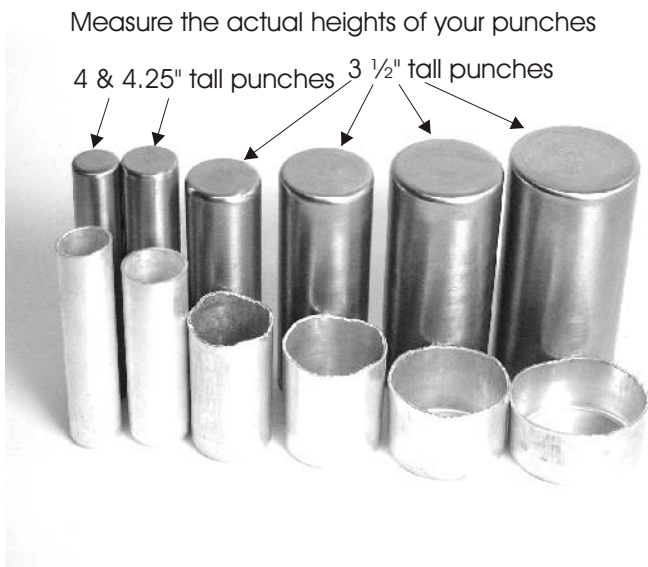


Identify the differences between the two die halves of the master die set (MDS). The upper die (left in photo) has clearance holes for the clamping bolts and two alignment pins. The lower die (right in photo) has four tapped holes, the 1 3/4" hole is radiused on the upper edge. Also understand the inside and outside faces of the MDS. The inside faces are the faces in contact with the metal to be drawn.



Before Starting:

Tape a 6" ruler to one of the uprights of the press frame. Orient it with the 0" mark even with the lower edge of the upper platen, and the 6" mark at the bottom. This will give you a visual indication of the location of the end of the punch when drawing. Do not raise the lower platen higher than the depth of the punch plus one thickness of metal. Example: if the punch is 3.500" tall and 18 gauge (.040") is being used, do not raise the platen higher than 3.540". 3 5/8" is a safe distance for the 4 largest diameter punches, 3 7/8" is a safe distance for the two smallest diameter punches. **If you raise the lower platen higher than this amount you will damage the punch and the metal being drawn.**



Two photos of the punches and the results of each punch.

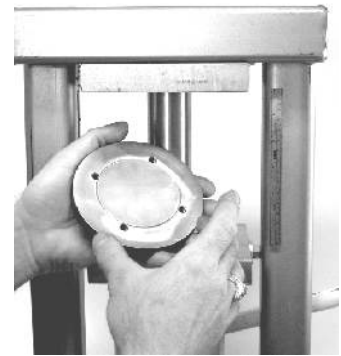
Procedure



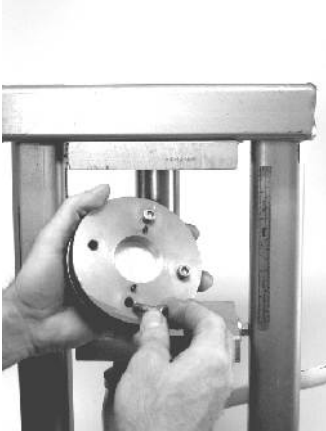
1) Spread lard on the two *inside* faces of the master die set. Mount the punch to the upper platen. Lightly lubricate the punch (WD40 or similar)



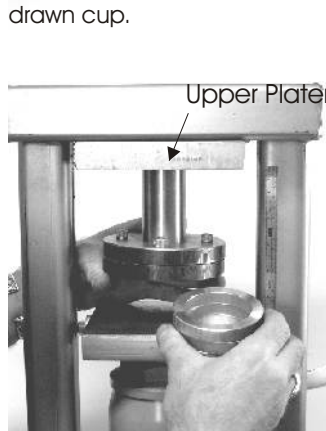
2) Place a 3" X 18 gauge disc of annealed metal on the lower die of the MDS. Do not apply lard to the punch as this will inhibit removal of the drawn cup.



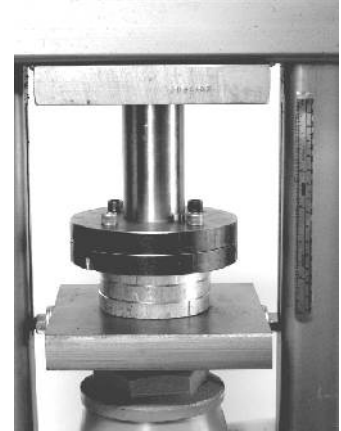
3) Center the disc over the die.



4) Place the upper die over the disc and lower die, hand tighten the four clamping bolts



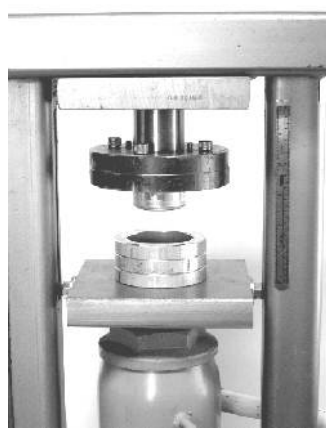
5) With the punch secured into the upper platen of the press, place the MDS under the end of the punch, and place standoff rings under the MDS.



6) Center all dies and rings. Your die stack should look like this photo before drawing.



7) Pump the press to force the MDS up onto the punch. This action draws the metal through the die. Stop before the lower platen reaches the 3 5/8" mark or you will damage your work and tools.



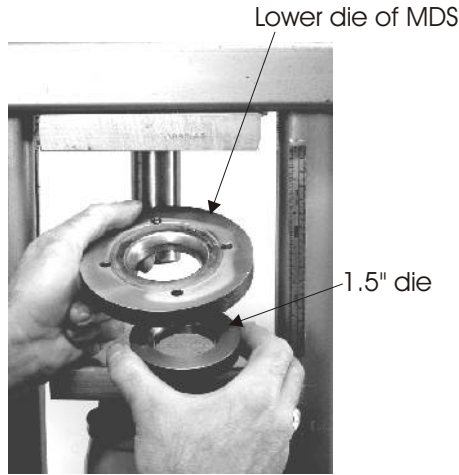
8) Photo of completed draw with lower platen retracted.



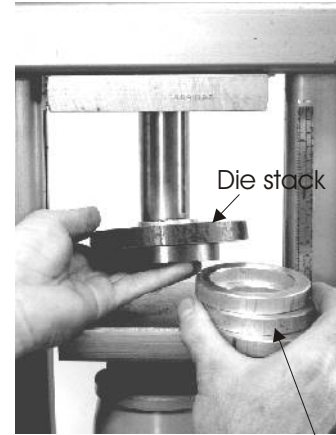
9) Unscrew the punch and remove assembly.



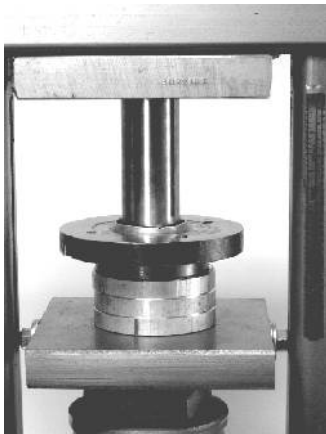
10) Planish or Extract with the extraction kit as shown on the final page.



11) Place the lower die of the MDS on top of the 1 1/2" die using the alignment pins to center the two. The upper die is used to center the cup over the lower die.



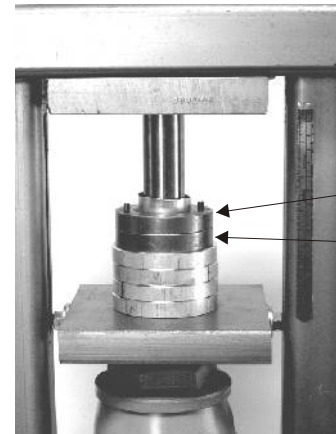
12) Place standoff rings under the die stack.



13) Photo of die stack ready to draw a 1 3/4" cup into a 1 1/2" cup. Draw, being careful to stop before the lower platen reaches the 3 5/8" mark.



14) Photo of the result after the second draw. Unscrew punch and remove assembly, planish cup off punch.



15) The 1 1/2" die is then placed on top of the 1 1/4" die to center the cup over the 1 1/4" die. 4 standoff rings are placed under the die stack. Draw.

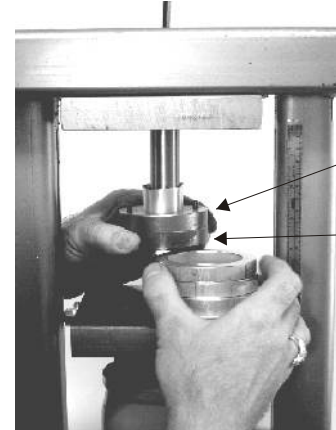


16) Photo of the result of the third draw. The cup should now be about 1 1/4" inside diameter and 1 5/8" tall.

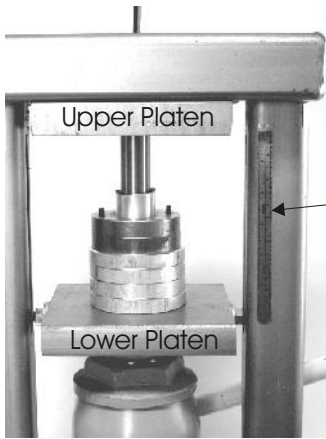


17) Anneal at this point if using sterling.

Note: some metals may need more or less frequent annealing.

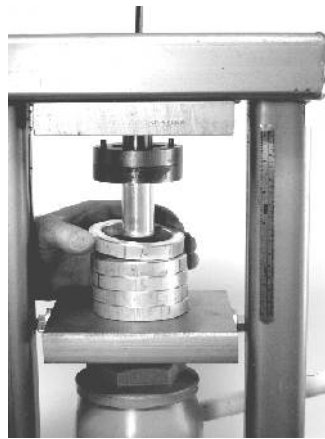


18) The 1 1/4" die is placed on top of the 1" die with standoff rings under the die stack.

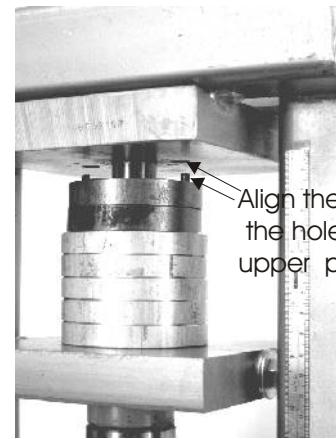


Ruler taped to Press

19) Ready to draw a fourth time. Do not raise the lower platen more than the height of the punch plus one thickness of metal. (about 3 5/8")



20) When the lower platen has reached its correct height lower the platen and add 2 standoff rings.



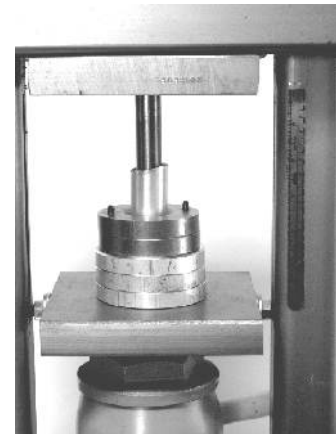
21) Align the two guide pins to the two tooling holes of the upper platen. Continue pressing.



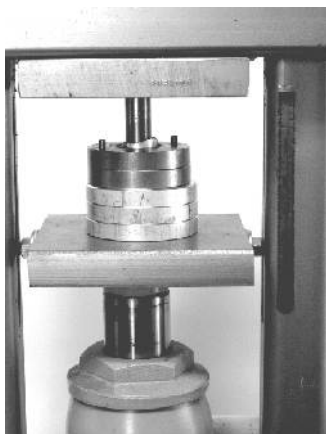
22) The result of the fourth draw.



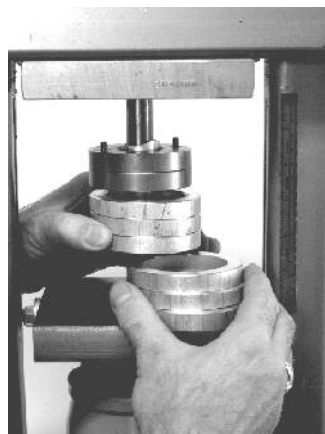
23) The 1" die is placed on top of the 3/4" die. Add standoff rings under the die stack.



24) Ready to draw a 1" diameter cup into a 3/4" diameter cup.

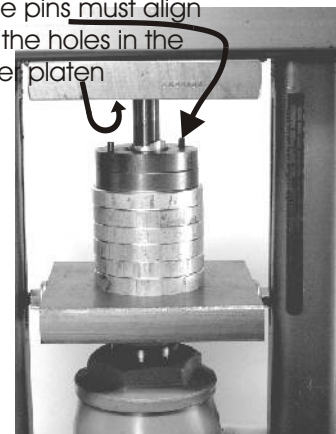


25) Stop when the lower platen reaches the 3 7/8" mark. Lower the platen all the way down.

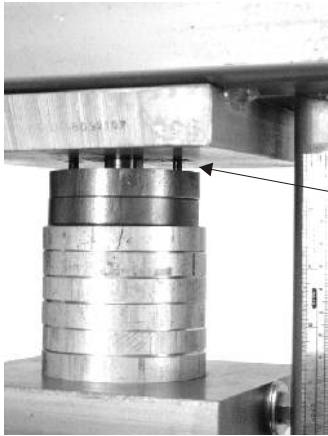


26) Add more standoff rings under the die stack as necessary.

These pins must align with the holes in the upper platen

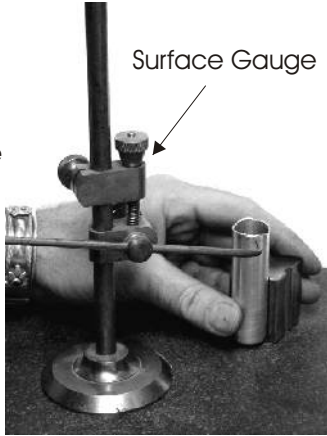


27) Ready to continue drawing. Be prepared to stop and align the die pins with the holes in the upper platen.



Pins must be aligned with platen holes

28) *Be very careful not to drive the alignment pins into the upper platen.*

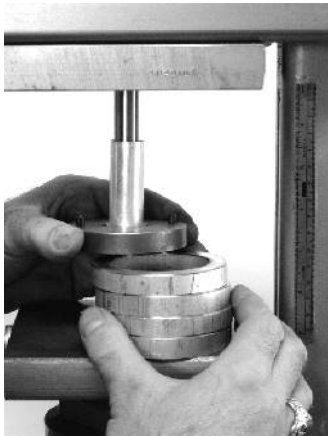


Surface Gauge

29) To clean up the top edge scribe a line around the top of the vessel.



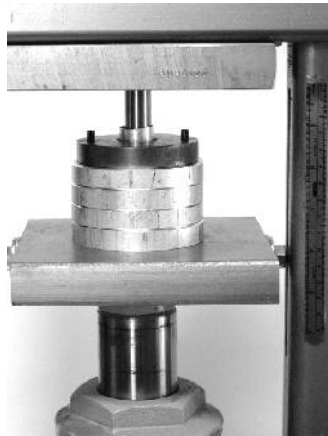
30) Trim away the uneven end of the vessel.



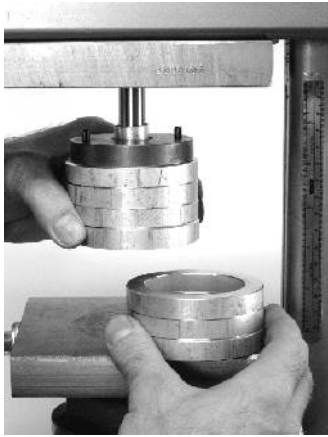
31) Place the 5/8" die on top of standoff rings. A guide die is not used on this step.



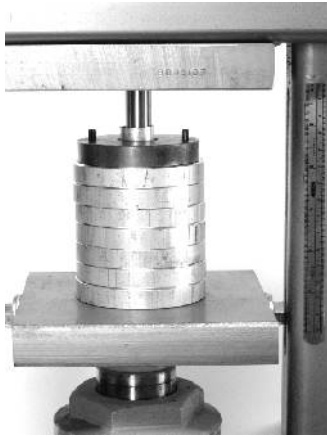
32) Draw, stopping when the lower platen reaches the 3 7/8" mark on the ruler.



33) Photo showing the lower platen at its highest point (3 7/8" on the ruler) during drawing. Stop at this point and retract the platen.



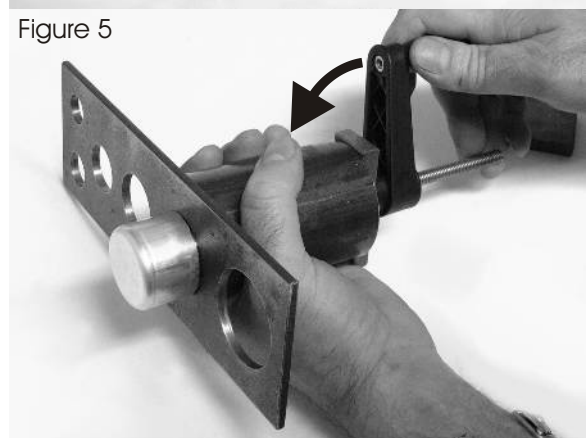
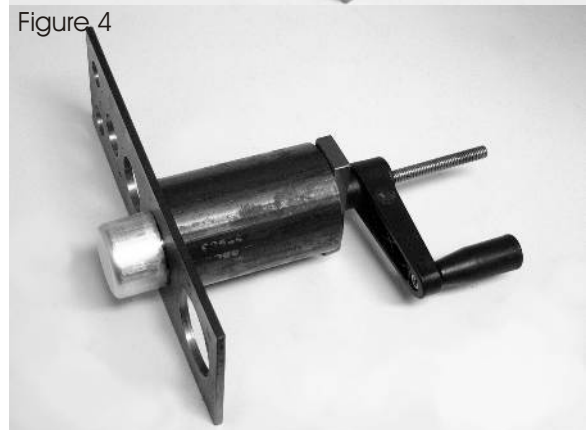
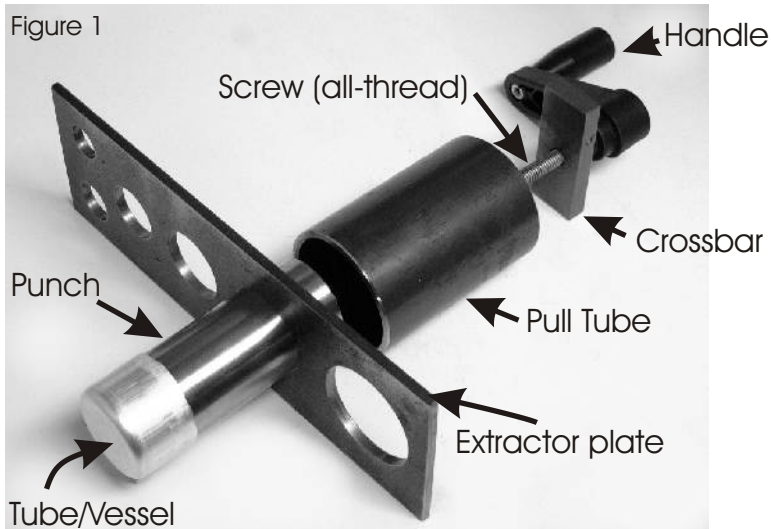
34) Add the remaining standoff rings under the die stack.



35) Continue the draw



36) the result should be about 3" tall and 5/8" inside diameter.



Using the Extractor

To extract a tube or vessel off the punch:

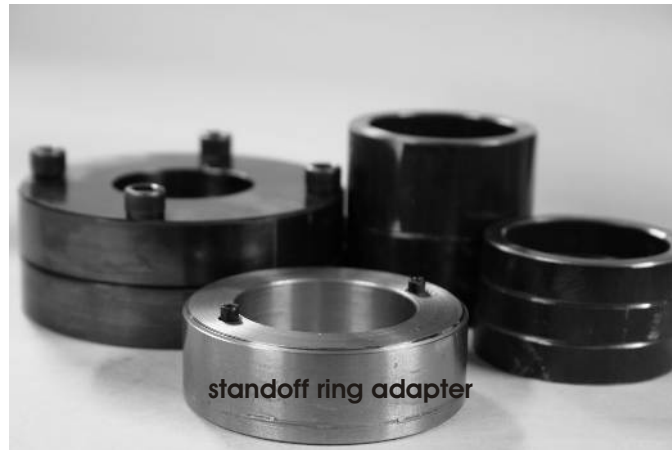
1. Identify all parts in Figure 1.
2. Place the Extractor Plate on the punch (Figure 2).
3. Place the Pull Tube on top of the plate over the punch (Figure 3).
4. Thread the screw (all-thread) through the crossbar and Pull Tube and into the end of the punch (Figure 4).
5. Turn the handle clockwise (when looking from the handle end of the assembly) as shown in Figure 5.

As the handle is turned the punch is pulled out of the tube.

Remember to keep the punch lightly lubricated (WD-40) ***BEFORE*** you draw the tube down in size. This helps to minimize the friction when extracting.

Addendum

New developments have improved the usability of the deep-draw system. Read and understand the following developments before using your deep-draw kit.



Note the standoff ring adapter, it indexes into the bottom of the draw dies and keeps the uppermost standoff ring aligned.



Shown above is the standoff ring adapter below the master die set and above the standoff rings.



Shown above is the standoff ring adapter below the redraw dies and above the standoff rings.