Bonny Doon™ Precision Die Forming System

Created by Phil Poirier © 2009
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The Precision Die Forming System consists of a Precision Containment kit(pusher and container), and three cylindrical urethanes; 60 durometer (soft, black) and two 95 durometer (hard, red) one flat and one domed. The pusher and container are a very tight fit and therefore when the urethane is compressed it has no where to go but into the die. The result is much more detail in thicker metal than you would get without this system.

Brass and steel dies for the system are sold separately. The brass dies in the photo are made with a rose engine from the 1880's at Bonny Doon's studio. Because the dies are handmade, each is slightly different. The dies are incredibly detailed and the Precision Containment kit makes it possible to bring out that detail in thicker gauge metal.

Precision Die Forming System clockwise from top right: pusher, container, 60 duro urethane, 95 duro urethane

Examples of brass and steel dies and pressed metal

GENERAL AND SAFETY NOTES

- 22-34 gauge metal works best, although 20 and 18 gauge is possible. Experiment.
- Annealing the metal before pressing provides the finest detail available from the precision dies.
- Always lubricate the metal before pressing to help the metal move evenly into the die and reduce the chance of it ripping. Lubricants such as Liquid Bur Life®, lard or liquid lanolin work well.
- Make sure tools are always CENTERED on the press steel platens before pressing. This step is critical for the Precision Containment kit because of the 10,000psi of pressure required to form the die details in the metal.
- CAUTION: always check to make sure the pusher is seated flat and plumb within the container.
- In case the metal or the pusher becomes stuck, the bottom of the container can be removed using a hex key (Allen) wrench.

INSTRUCTIONS

STEP 1 – Prepare the hydraulic press

Remove the Kevlar® and acrylic face plates, if installed. Failure to comply may result in the shattering of the Kevlar® or acrylic. The Precision Containment kit is pressed directly with the steel platens. The pusher and container do not have any sharp edges and will not damage the steel platens.

STEP 2 – Prepare the metal

Cut a piece of metal to fit into the container. You can use metal shears, a jeweler's saw or one of the large disc cutters designed for use in the hydraulic press. The metal does not have to be perfectly round and can be optimized for the size of the die cutout, especially when using expensive metals. However, make sure you have at enough metal around the die cutout to allow the metal to move into the die.

STEP 3 - Pre-form the metal

This step ensures that the metal moves evenly into the die and as a result reduces the thinning of the metal at the outer edges that may lead to the metal ripping. There are two options:

Option 1 – Pre-form using die and urethane

Option 2 – Pre-form using dap

OPTION 1 - Pre-form metal using the die and soft urethane

1. Assemble the system: the die (cutout facing up) in the bottom of the container, the metal (lubricated), the 60 duro yellow urethane, the metal and finally the pusher (see photo). Make sure that the pusher is properly centered and aligned in the container.
2. Center the assembled Precision Containment System on the lower platen of the press.
3. Press to 2000-4000psi to pre-form the metal. Remove pusher, urethane and the metal. Anneal the metal if necessary.

OPTION 2 - Pre-form metal into a dome using a Bonny Doon dap

1. Select the appropriate diameter dap by checking which dap fits best into the die cutout. NOTE: The die is used only to select the dap size and not when pre-forming the metal.

2. Attach the master die holder to the upper platen of the press. Insert the dap and tighten the set screw. Place the 95 duro urethane into the form box and then the metal onto the urethane. Center everything under the dap.

3. Press until the domed metal is approximately the depth of the die. The metal will curl up and deform around the edges (shown in photo), but this is not a concern because it will be flattened during Step 4. Anneal the metal if necessary.

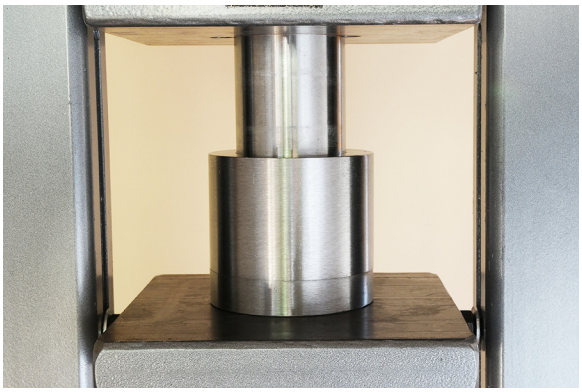
STEP 4 – Press the metal

1. Assemble the system: the die (cutout facing up) in the bottom of the container, the pre-formed metal (lubricated), the 95 duro red urethane domed side facing the metal, and finally the pusher (see photo). Make sure that the pusher is properly centered and aligned in the container.

2. Center the assembled Precision Containment kit on lower platen of the press.

3. Press to 10,000psi. Release the pressure and check the detail in the metal. You may need to press to 10,000psi more than once for more detail. How many times you press depends on the gauge of the metal and the details in the die. Anneal the metal in between pressing if necessary. If the metal is difficult to remove from the die, let it sit for a while until it releases.

Step 4 assembly – container, die, pre-formed metal, 95 duro urethane, pusher



Precision Containment kit assembled and ready to press.

Rio order number: PDF System 110-615 $225, Dies 110-617/x $65