



# Squishing the Ends

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**WHILE BUILDING A TUBE** and fabric airplane, you will encounter quite a few parts that require making round steel tubing with squished ends (“squished” is an advanced engineering term). There are two types of squished ends. One is symmetrical, where both sides of the tube are flattened an equal amount. The other is asymmetrical, where only one side of the tubing is flattened. I’ll describe both of them here. Inexperienced builders will find that the tubes can be flattened by simply heating them to cherry red color and then, using a sturdy bench vise, squish the ends together. You will find that this makes sharp mark-off creases left by the jaws of the vise during the forming operation. Often one side of the tube will flatten more than the other as well.

To ensure good *symmetrical* squishing, first construct the two simple steel curved forming blocks as shown by the drawing. I used two 6-inch long pieces of old bed frame angle iron (it’s cheap and available). The radius of the tapered end is not critical in any way; just make it look about right with a curved end. I made mine with perhaps a 2.5-inch radius. Be sure the two forming steel jigs have the same curve to press the flat

section to the center of the tube. I use duct tape to hold the jigs in place in the vise.

During *asymmetrical* squishing, use only one of the curved jigs in the vise. On the other side, use a straight piece of the same angle iron as a backup that goes out a few inches on the tubing to ensure the new squish will only take place on the one side of the tube, and the new flat section is in line with the top of the tube.

Now it’s time to heat the tubing to a cherry red color with your torch. Don’t try to squish the tubing in one pass as it will cool quickly. Reheat and keep squishing until it is flat. It seems that the closer it gets to flat, the quicker it seems to lose its heat, so don’t be afraid to reheat often. Cold working can lead to significant cracking on the edges of the new flat section.

Trim and weld the ends as necessary, then reheat to a cherry red color, and finish weld the ends as needed. Finally, reheat the tubing to a cherry red color one more time, and allow to cool in still air to normalize the tubing to prevent cracking. When it has cooled, you can drill your holes in the flattened section. **EAA**