Application Note - End-Plate Port Tubing and Flow Field Alignment Tubing Preparation

These instructions describe preparation of the port tubing pieces for cell fixtures with blue end-plates as well as tubing pieces that are the flow field alignment pins for all cell fixtures.

A. Materials Required
1. Clean, sharp knife (X-Acto knife) or razor blade
2. A metric ruler
3. Teflon FEP tubing, 3 mm OD for flow field alignment pins – Scribner part number (p/n) 1809, McMaster-Carr p/n 5557K37
4. Teflon FEP tubing, 3/16 in. OD for 25 cm$^2$ ports – Scribner p/n 1819, Cole-Parmer p/n K-06406-64, McMaster-Carr p/n 52355K41
5. Teflon FEP tubing, 1/8 in. OD for 5 cm$^2$ ports – Scribner p/n 1820, Cole-Parmer p/n EW-06406-62, McMaster-Carr p/n 52355K12
6. Small rubber mallet (recommended)

Figure 1. Detail of Scribner Associates’ dual-size fixture end-plates designed for gases or non-corrosive fuels. Ports for 5 (yellow) and 25 (red) cm$^2$ cells are shown. Inactive gas ports must be sealed with short tube pieces (7 mm each) and o-rings. Active gas ports must have longer tube pieces (10 mm each) and o-rings.

Figure 2. Detail of Scribner Associates flow fields. The green circles highlight the alignment pin tubing positions.
B. Tubing Preparation Procedure

1. On a clean work surface, place tubing next to ruler and cut to appropriate length with a clean, sharp knife.

2. For a cell with 5 cm² flow fields
   i. Cut 4 pieces of the 1/8 in. (OD) tubing, each 10 mm length. See Figure 3. Place these pieces in the yellow positions shown in Figure 1.
   ii. Cut 4 pieces of the 3/16 in. (OD) tubing, each 7 mm length. See Figure 4. Place these pieces in the red positions shown in Figure 1.
   iii. It might be necessary to gently tap the tubing pieces into the port of the end-plates by using a rubber mallet. Because the thickness of the tubing varies, the tubing pieces will not always slide easily into the port positions.

3. For a cell with 25 cm² flow fields
   i. Cut 4 pieces of the 3/16 in. (OD) tubing, each 10 mm length. See Figure 5. Place these pieces in the red positions shown in Figure 1.
   ii. Cut 4 pieces of the 1/8 in. (OD) tubing, each 7 mm length. See Figure 6. Place these pieces in the yellow positions shown in Figure 1.
   iii. It might be necessary to gently tap the tubing pieces into the port of the end plates by using a rubber mallet. Because the thickness of the tubing varies, the tubing pieces will not always slide easily into the port positions.
4. For flow field alignment pin tubing
   i. Cut 2 pieces of the 3 mm OD tubing, each 10 mm length. See Figure 7. Place these pieces in the green positions shown in Figure 2.
   ii. If the cell build includes Teflon flow frames (only used with red/liquid end plates), the alignment pin tubing pieces will have to be cut to about 15 mm length each. See Figure 8.
   iii. Do not use a rubber mallet on the alignment pin tubing – they should be slightly loose when in position. Do not risk damaging the flow fields!
Figure 8. Preparation of 3 mm OD alignment pin tubing for use with a cell that incorporates flow frames.