

## Conserving Supplies

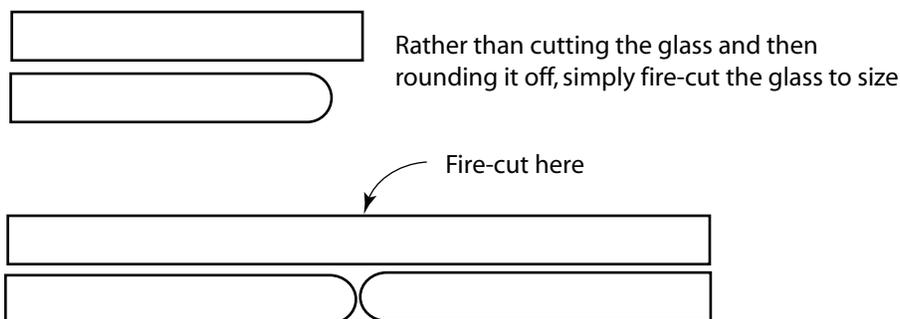
You are not being charged for supplies in this class. That notwithstanding, you are expected to make the most out of all the glass you will be working with. Please be considerate on how you use the glass so as to not waste anything. Keep in mind that all tubing in this class is from four foot lengths. (European lengths are 1.5 meters.)

To obtain the most efficient and convenient sizes for rods and tubing in this class, please use the following lengths for constructing glass items:

1. Rods and Tubing are best cut into 5 equal pieces, of about 9  $\frac{3}{8}$  inches. If you measure out one such length and cut it off, this can be used as a “measure length” for subsequent pieces. This length is a compromise that allows you to both easily handle the glass and having enough glass for multiple re-use.
2. Occasionally you may need to cut tubing into 2 pieces of 24 inches in length, or 4 equal pieces of about 12 inches each. This is easily done w/o measuring by finding the middle of a full length piece by balancing the item on your finger, find the balance point (which is the middle), cut there and if necessary repeat for the remaining halves. Suggestion: Take one of the quarter pieces and place it against the other half length to locate the middle of that side. This is easily accurate to about  $\frac{1}{2}$  inch.

After cutting tubing to length, keep in mind that the outer two pieces should already be fire-polished from the factory. The inner three pieces do not have fire-polished edges and **one** edge should be fire-polished immediately. As they cool, you can be using the outer two pieces—efficiency of time. Note: do not seal onto a factory edge.

If you are going to be making test tubes or working with capillary tubing, there is no reason to cut pieces if they are going to be rounded off anyway. Let me demonstrate:



By cutting the 4 foot tube into two pieces of about 19 inches (plus what's left over as a fifth piece), then flame-cut each 19 inch piece in half with the torch, you are half-way to making your test tube. Not only have you saved some time, but you also have saved about an inch or so of tubing. This does make a difference over the course of a whole quarter in this class.

To improve efficiency, remember that one end of one of the 19 inch pieces and the 9  $\frac{3}{8}$  inch piece already have a firepolished end. This means that just after firepolishing the other three ends of the 19 inch pieces, you can start using the pieces that already had the firepolished ends while letting the ones you just firepolished cool. Using a glass rod, you can close the end of the not fire-polished end. There is no need to fire-polish what will be tossed.

### Make yourself a “quick-measure”

Take a glass rod and cut off a piece 9  $\frac{3}{8}$ ". Lightly fire-polish the ends. After the glass has cooled, take some masking tape and wrap the ends to help mark that this is your “quick-measure.” In the future, when you need to cut up a tube into uniform lengths, you can use your “quick-measure” to easily mark up the tubing before cutting.

### Fire-polishing

Fire-polishing is the act of placing the end of a tube or rod into the torch's flame just long enough to melt the edge and cause it to round over—not to change the diameter of the tubing. You are best off with a soft or medium flame, not a hissy flame. A hissy flame makes it hard to obtain a uniformly rounded edge. Either way, you **MUST** rotate the glass in the flame to prevent fire-polishing one side and leaving the other side unaffected.

There are two reasons for fire-polishing glass: to protect your lips so that you do not cut them, and to better receive a cork so that the cork is properly squeezed into the end of the glass. A sharp edge on a glass end tends to cut into a cork preventing the cork from squeezing into the glass tube.

Each end of a tube is fire-polished from the factory. A “factory end” should never be used to seal onto another tube. The glass in factory ends tend to be dirty and/or overheated and are not acceptable for a good clean seal. Factory ends can be blown into, or for shoving a cork into, but should not be used for sealing.