

Pipe Trades Workshop

SOLDERING INSTRUCTIONS

Step One- Planning: Once you have selected your project, use the diagram and the take off calculation sheet to determine the number and lengths of copper pipe and the fittings you will require to complete the project.

Step Two - Measuring: Using your stick rule, measure and mark the lengths of tube according to your cut list. Precision is critical for a strong joint, so double check your measurements before you cut.



Step Three – Cutting: Place the pipe in the tube cutter and align the cutting wheel with your mark. Turn the knob to tighten the cutting wheel around the pipe, being careful not to over-tighten, which can misshape the pipe. Holding the pipe still, turn the tube cutters around the pipe to cut.



Step Four – Reaming: Begin preparing the pipe for soldering by removing any burrs resulting from your cut. This can be accomplished by using the reaming tool attached to the tube cutter.

Step Five – Mechanical Cleaning: Once the end of the pipe is smooth, all areas to be joined must be cleaned and free of oil, grease and heavy oxides in preparation for soldering. That means that the inside of all the fittings and outside ends of the pipe must be cleaned, using a wire brush to reach inside the socket and sand cloth to clean the ends of the pipe. The ends of the pipe should be sanded at least $\frac{1}{4}$ inch below the point where the fitting will end when connected. Clean areas will be bright and shiny in contrast to the rest of the pipe.



Step Six – Fluxing: Next, chemically clean the joint by brushing on a thin and even layer of flux to all of the areas that you have just cleaned, the fitting sockets and the outside ends of the pipe. Be careful not to leave excess flux inside the joint.



Step Seven – Connecting: Assemble your project as shown on the diagram, making sure when inserting the pipe into the fitting that it meets the end of the socket. Then twist the pipe in the fitting to spread the flux evenly throughout the connection. Be sure to remove any excess flux from the outside of the joint with a rag before soldering.



Step Eight – Soldering: Using a vise to support your project, open the valve on the propane torch to begin releasing propane gas in the direction of your striker. Squeeze the striker to produce a spark and ignite the propane gas. Then adjust to a thin, focused, blue flame. Begin heating the project by moving the flame back and forth across the joint, being careful to avoid pointing the flame directly into the fitting. When it has reached the proper temperature, remove the torch and apply the solder directly into the joint. If the temperature is correct, the solder will be drawn quickly into the joint by capillary action. If not, remove the solder and continue heating. Be careful not to overheat, which will require you to disassemble and re-prepare the project for soldering. The joint is complete when a ring of solder is visible. The process is not affected by the position of the pipe or the angle at which the solder is applied.



Step nine – Cooling and QC: Using a damp rag, remove excess solder. After it has cooled, place it in the jig to determine if your measurements were correct.



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