1 Purpose

1.1 To establish a standard procedure for assembling double containment piping fabrication run for bulk chemical distribution system (BCDS).

2 Scope

2.1 This procedure applies to any piping system which utilizes a flexible plastic tubing (Teflon, PE, etc.) coaxially piped inside another rigid pipe.

3 Responsibility

3.1 Therma's foreman is responsible for ensuring that journeymen are performing the following procedures.

4 Reference

4.1 Project specifications, "Execution" portion of the project's piping specification section.

5 Procedures

5.1 Use Form FN 5.034.1 to gather the necessary materials.

5.2 Install outer containment piping. All fittings should only consist of sweep bends created under SOP 5.035 (Bending Procedure for Rigid PVC), couplings, and miscellaneous bulkhead fittings for termination of the runs. Cut piping using a saw or roller cutter. Don't use snap or pinch type cutters as they leave stress cracks in the piping. When marking the piping for bends, cuts etc., use red felt tip pens only. This color will be removed easily by Isopropyl Alcohol (IPA).

5.3 Pressure test the piping by inserting plugs and pneumatically testing to not more than 5 PSIG using SOP 6.005 (Pneumatic Pressure Testing).

5.4 Attach a vacuum cleaner hose to the end of the pipe locked in the mechanical support area (typically sub-fab or service aisle). Attach a wadded up disposable cleanroom bootie to a nylon string.

Note: This step and subsequent steps have been designed to have the particulate generating operations performed in the non-critical areas.

5.5 Using the suction of the vacuum cleaner, draw the wad and pull string through the pipe. As the pull string is fed into the piping, wipe on a thin film of approved lubricant (glycerin recommended).

5.6 Attach a 3/8 " nylon rope to the Sub-Fab (or service aisle) end of the cord. Pull the rope through the pipe and up to the cleanroom area. Lubricate the rope as it is fed into the piping.

5.7 Verify that the inner tubing coil has enough length to make it all the way to the other end of the run without splices. If the total length of runs exceed 200', investigate using reels. These will be much easier to feed and keep the tubing from getting tangled up during the feed.

5.8 Cap the end of the tubing which will be pulled through. Always keep the flexible tube capped if it is used for high purity liquids.

5.9 Attach the Kellem gripping device to the rope and inner tube.

5.9.1 If using kellum grip, wrap with clean room tape so that the metal wires don't drag on plastic pipe.

5.9.2 If not using grip (preferred), bend back one foot of tubing and attach rope loop on the bite (kink point). Insert the tubing into the outer containment pipe.

5.10 Attach the pulling winch (if necessary) in the support area, and position in such a manner as not to put any unnecessary torque on the outer containment pipe.

5.11 Pull the inner tube into the containment pipe. Establish good communications between the feeding and pulling end. Make sure that there are enough people at both ends (see "Roles" in form xxxxx).The tube must not be kinked. If the tubing is kinked or damaged in any way, remove the tubing, cut off the damage material, and start over.

5.12 Pull the tubing 10' past the end of the outer containment tubing. Cut off the excess tubing in the cleanroom end of the run, leaving 10' of extra tubing exposed. Cap both ends.

5.13 For runs longer than 200', the drag may be excessive. Partial pulls may be necessary in order to not break the rope. To perform this task do steps 5.1 through 5.13, with addition of the following steps.

5.13.1 Pull the tube through the first 200' and stop pulling when tube reaches the end. Now prepare the next 200' section pipe and reconnect tubing to rope.

5.13.2 Be sure you have a dry fitted coupling on section before reattaching rope to tube.

5.13.3 Do not pull excess tubing out between sections, because you can kink the tube while refeeding the tube into the pipe.

5.13.4 Repeat as needed.

5.14 Perform the termination connections per the design. If not specified, use SOP 5.036, (PFA Flaretek tube fitting assembly).

6 Review and Approval

Document Approval

Field Operations Manager — Date: 8.4.03

Engineering Manager — Date: 8-4-03

Quality Control Manager — Date: 8.5.03

Quality Assurance Manager — Date: 8-5-03