Flow Calibration Tubes

Operation and Installation Manual

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INSTALLATION

- The Flow Calibration Tubes are designed to be installed between the resin or catalyst storage reservoir and the respective pump. As gravity fill is a prerequisite, the top of the Flow Calibration Tube should be no higher than the bottom of the reservoir.

- The Flow Calibration Tube is fitted with top and bottom mounting brackets. Each bracket has 5/16" diameter holes for mounting. The Flow Calibration Tube should be mounted in a true vertical position (use a level). Since the Flow Calibration Tube is glass, a location should be chosen that would minimize possible breakage.

- For non-corrosive resins, the Flow Calibration Tube is fitted with a brass valve. The bottom port is to be connected to the storage reservoir. The side port is to be connected to the mixer pump. ***See Drawing PS10031, Revision E, Page 10.***

- For an acid catalyst, the Flow Calibration Tube is fitted with a PVC Valve. The left port is to be connected to the storage reservoir. The right port is to be connected to the mixer pump. ***See Drawing PS10031, Revision E, Page 10.***

- **Caution: Care must be taken when installing lines to the PVC valve. Union style connections are provided for the three ports. If these connections are severely tightened, pressure against the "ball" of the valve will be increased. This will make the valve HARD TO TURN, and lead to breakage of the valve stem. Tighten the port connections just enough to prevent leakage. "Hand Tight" is usually sufficient.**

- The proper line size to run from the storage reservoir to the Flow Calibration Tube and from the Flow Calibration Tube to the mixer pump is dependent on the height of the reservoir, viscosity and temperature of the resin, and the flow rate required. Oversized lines will not cause problems, but undersized lines will. Most resin pumps "push" resins well, but "pull" resins poorly. They require "positive pressure" at the inlet. To test for positive pressure at the pump inlet, disconnect the hose or pipe at the pump inlet when the resin is at it's coldest storage temperature and the storage level is low. Flow by gravity through the lines at this point should be equal or greater than the normal resin delivery rate of the pump.

- The Flow Calibration Tube is provided with a vent plug at the top of the unit. This must be removed in order to fill the calibration tube, or to draw material from the tube when calibrating.

- **Caution: Before returning to normal mixer operation, the vent plug must be replaced after the valve is placed in the RUN position. With the venting arrangement provided, accidental spillage may occur if the vent plug is not replaced in normal operation and the valve is accidentally switched to the FILL position.**

- An alternative installation procedure to the provided vent plug is as follows: Remove the vent plug and replace with a ½" NPT to Hose Barb fitting. A small diameter hose can then be attached to this fitting and run upward to a height that is above the height of the reservoir.

- After the Flow Calibration Tube has been properly installed, the equipment is now ready for operation.

- **Caution: The Flow Calibration Tube is not a pressure rated device. It has been designed to accommodate pressures normally found in a gravity feed system (less than 8 PSI). Any modification to the recommended installation procedures, modification of operation, or use where the pressure would be found above 8 PSI is NOT RECOMMENDED. THE GLASS TUBE MAY SHATTER UNDER PRESSURE.**

OPERATION

- Calibration of resin or catalyst is accomplished in four step.

    1. Unscrew the vent plug located at the top of the Flow Calibration Tube.

    2. Turn valve to FILL position. When the level of the resin goes above the "0" line, turn valve to run position. Filling of the tube should only be done with the pump stopped.

    3. The pump is now ready to be calibrated. While the pump is running (i.e. while filling molds or cores), turn the valve to CALIBRATE. When the level of material descends back to the "0" line, start the stop watch. At the end of the chosen time increment (15, 30, or 60 seconds), turn the valve to the run position. Record the quantity of resin used (number is in milliliters). Flow rates of resin used can then be found by using the formulas provided in this manual or by calibration charts provided by Palmer Mfg. & Supply, Inc.

    4. Refill the Flow Calibration Tube by repeating step 2, and replace the vent plug. By keeping the Flow Calibration Tube filled above the "0" line during normal operation, any tendency to form a resin build-up in the tube will be minimized.

- The mixer pumps can now be recalibrated at any time by repeating steps 1,3, and 4.

- The milliliters used, as recorded in Step 3 can be converted to weight/minute (oz./min.), percent resin based on the weight of sand, and percent catalyst based on weight of binder by using the following formulas:

    $W = (2.115 \times V \times S) / T$

    $Pr = (6.25 \times Wr) / F$

    $Pc = (Wc / Wr) \times 100$ *

    Where:

    W = oz./min. of resin or catalyst

V = milliliters of resin or catalyst
S = specific gravity of resin or catalyst
T = time of calibration in seconds
Pr = % resin based on flow rate of sand
Wr = weight of resin
Wc = weight of catalyst
F = flow rates of sand in pounds/minute
Pc = % catalyst based on resin

* This formula is used mainly on furan systems, where catalyst is usually shown as a percent of resin.

- Calibration charts can be provided by Palmer Mfg. & Supply, Inc., if the following information is given or the information sheet in this manual is filled out:

1. Name & Specific Gravity of Binder
2. Normal percentage of resin used
3. Flow rate of sand through mixer
4. Type of resin system

CLEANING/REPLACING SIGHT GAUGE

Disassembling the Flow Calibration Tube:

Remove the tie-rod nuts and washers. Pull the tie rods out of the end caps. Gentle outward pressure and light rapping will release the end caps from the sight gauge. The Teflon/silicone rubber seal should remain adhered to the sight gauge.

Cleaning Sight Gauge:

Clean sight gauge with solvent recommended by the resin manufacturer.

Reassembling the Flow Calibration Tube:

If the Teflon/silicone seal has received little or no damage, a fine bead (1/16" to 1/8" diameter) of silicone rubber should be placed in the groove of the end caps before assembling.

If the seal is damaged, the old seal should be removed. Next, a bead of 3/16" Teflon or equivalent bead should be placed on each edge of the sight gauge. Then place a 3/16" bead of Silicone Rubber in the groove of each end cap.

Set sight gauge in bottom end cap. Set top end cap on sight gauge. Set entire assembly on a flat surface. Align mounting brackets with end caps and run tie rods through. Replace lock washers and nuts. When tightening nuts, be sure to tighten evenly. DO NOT USE UNDUE OR UNEVEN PRESSURE, as breakage of the gauge may result. Pressure should be just enough for lock washers to compress about 90%.

REPLACEMENT PARTS

Sight Gauge for 1/2L	005142
Sight Gauge for 2L	005140
Sight Gauge for 4L	005141
3/16" Tape Sealant	005540 (Sold by the inch)
1/2L	Requires 15"
2L	Requires 22"
4L	Requires 30"
Ball Valve for 1/2L-R	005064

Ball Valve for 2L-R & 4L-R	005063
Ball Valve for 1/2L-A, 2L-A & 4L-A	005514

PALMER MANUFACTURING AND SUPPLY, INC. EQUIPMENT LIMITED WARRANTY

Palmer Manufacturing and Supply, Inc., the manufacturer, warrants to the original purchaser of each new Palmer Manufacturing and Supply, Inc., machine, including all equipment and accessories thereon (except hoses, electrical switches, mixing blades, bearings, and wear parts) supplied or manufactured by Palmer Manufacturing and Supply, Inc., to be free from defect in material and workmanship under normal use and service during the time limits and subject to the limits and exclusions herein after set forth.

LIMITATIONS ON WARRANTY

Time

The above limited warranty applies to the Palmer Manufacturing and Supply, Inc., equipment (except hoses, pumps, and electrical switches) for one month after date of purchase and delivery to the original purchaser.

Manufacturer's Obligation

Palmer Manufacturing and Supply, Inc.'s, obligation under this limited warranty is limited to repairing and/or replacing, at its option, any part or parts defective in material or workmanship, and which are returned to the principle place of business or Palmer Manufacturing and Supply, Inc., in Springfield, Clark County, Ohio, U.S.A.

Exclusions

This limited warranty shall not apply to:

- Any Palmer Manufacturing and Supply, Inc., machine and/or equipment not owned by the original purchaser.

- Any part of the Palmer Manufacturing and Supply, Inc., machine that has been damaged and/or subject to any misuse, alteration, accident, damage, or other than normal and customary use of said machine and/or equipment., which, in the reasonable judgment of Palmer

Manufacturing and Supply, Inc., affected adversely its normal and intended use.

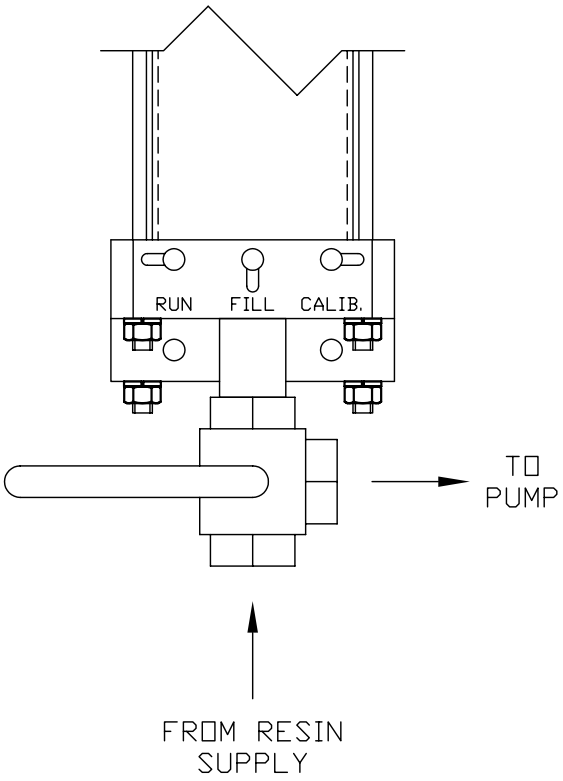
- Any part of the Palmer Manufacturing and Supply, Inc., machine and/or equipment, which shall have been repaired or altered outside of any authorized Palmer Manufacturing and supply, Inc., repair facility, which in any way in the reasonable judgment of Palmer Manufacturing and Supply, Inc., affected adversely its normal or intended use.

- Damage incurred due to improper installation and use of the machine and/or equipment.

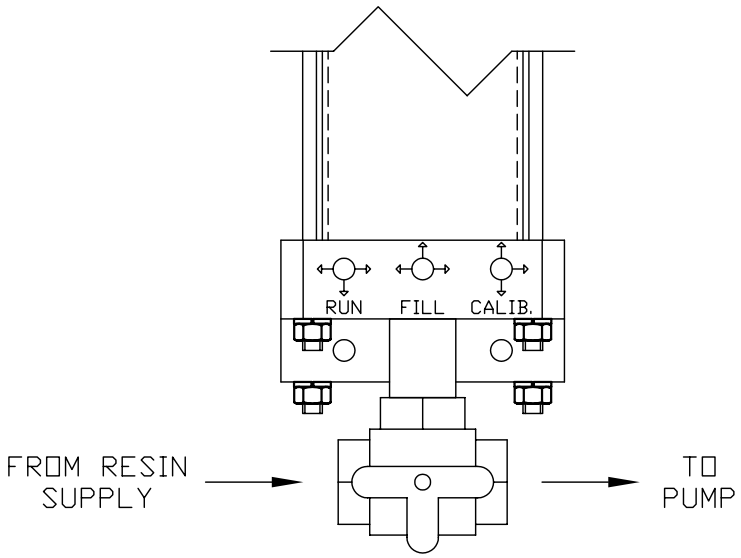
- Machines from which the serial number plate is missing.

GENERAL STATEMENT

This limited warranty is the only warranty applicable to the Palmer Manufacturing and Supply, Inc., machines and is expressly in lieu of all other warranties—expressed or implied—including any implied warranty of merchantability or fitness for a particular purpose.



PROPER CONNECTIONS FOR XL-R FLOW CALIBRATION TUBES



PROPER CONNECTIONS FOR XL-A FLOW CALIBRATION TUBES

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1-800-457-5456

SCALE: NONE	APPROVED BY:	DRAWN BY: R. MCNEELY
DATE: 07-01-03		

TITLE: FLOW CALIBRATION TUBE

PREVIOUS DWG. #:	DWG. #:	REV:
N/A	PS10031	E

NOTE: PLUMBING CONNECTION DIAGRAM

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