

METHOD STATEMENT

PVC Fitting Repair & Lamination Procedure

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Subject : Method Statement/PVC Fitting Repair & lamination Procedure

Designing the Laminate Overlay

The laminate overlay is constructed out of the same materials used in the manufacture of the GRP tank, as follows:

1. Liner resin – Specially-formulated resin
2. Liner reinforcement – “C” veil (0.030 g/m²)
3. Structural resin – Specially-formulated resin
4. Structural reinforcement – Chopped “E” glass in a form of mat (0.450 g/m²)

As per BS 4994 standard, the minimum lap shear strength of the laminate shall be minimum 7.0 N/mm². BS 4994 is a standard specification for GRP Tanks and Vessels. This specification shows designed strengths for GRP materials used under stringent conditions.

Verify Laminate Lap Shear Strength

To verify this lap shear strength property, a sample was constructed using the materials as described above and cut to specimen sizes according to BS 4994, B9. The specimen was loaded into a tensile testing machine.

The test results confirmed that the laminate overlay exceeds the 7.0 N/mm² requirement of BS 4994.

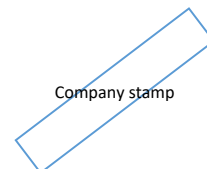
Preparing the PVC Fitting that Requires Repairing

1. Empty the tank, remove the PVC fitting that is leaking;
2. Prepare a new PVC pipe, cut to size. Abraid the new PVC fitting by grinding the full surface. To the abraded PVC fitting, pre-laminate 1 layer of CSM450 mat, making sure the laminate is free of air bubbles and voids;
3. Refer to the picture below for the PVC fitting pre-lamination work;
4. Install the pre-laminated PVC fitting into the right position in the tank.

PREPARATION OF RAW MATERIALS AND HANDTOOLS

Tools and Materials Needed:

1. Steel roller (screw-type) – for releasing air bubbles
2. Lamb wool roller – used for wetting out the glass reinforcements



Company stamp

3. Lamination brush – used to wet-out areas not accessible with lamb wool roller
4. Disc grinder – used to roughen surface for lamination
5. Putty knife – used to apply putty
6. Scissor – to cut glass fiber reinforcements
7. Plywood sheet about 500mm W x 500mm L – used as working bench
8. Resin mix bowl – used for catalyzing the resin
9. Chopped strand Mat 450 g/m²; woven roving 600 g/m²; C-veil 30 g/m²
10. Pre-mixed Liner resin; Pre-mixed Structural resin
11. MEKP – catalyst

All glass reinforcements should be pre-cut to the required width and length.

Building-up the Structural Laminate Between Pre-laminated PVC Fitting and the Tank Wall

1. Apply pack of CSM450& WR600 glass-reinforcements into the fitting to form a stack of overlays of laminate;
2. Minimum laminate thickness of 7mm for the exterior laminate and 5mm on the interior;
3. It is of utmost importance to insure that steel roller is used to squeeze-off air-bubbles;
4. Each laminate must be finished with 1 layer of C-glass surface tissue;
5. Allow the laminate to gel and to post cure;
6. QC technician must verify the laminate has fully cured when barcol hardness register in the impressor a value not less than 40.



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Impregnation of the laminate "pack" for pre-lamination of the PVC fitting. The purpose of this pre-lamination is to insure



uniform bonding all throughout the surface of the PVC fitting, which is otherwise difficult to visually



verify if the PVC fitting is already fixed into the tank.