

REPAIRS TO RUBBER LINED EQUIPMENT

Even in the best run and maintained manufacturing operation, it is inevitable that, at some time, a rubber lined piece of equipment will require repair. To cover such eventualities, proper repair practices are described on the following pages.

While repairs are necessary, they can vary from a tiny blister or crack to a major replacement of panels or an entire lining. When a major repair or complete relining is necessary, and the equipment is not too large for shipment, the best procedure is to remove it and send it to a tank lining shop. If it is too large for shipping, experienced tank lining applicators can do the work at your plant. In either case, years of life can be added to the rubber lined equipment through proper repair.

The method of repair is generally dictated by the type of the original lining, extent of repair, intended service and the facilities available. For these reasons, there are no standard methods of repair; especially when considering field jobs.

The only repairs that can be presumed to be equal to the original lining are those made with the same stock used in the original lining and given a full cure.

Rubber lined equipment should be repaired with the same type of lining that was used for the original installation. On occasion, it is not always possible to recure the vessel in the same original manner. When this is the case, alternate methods must be used. Such alternate methods are often satisfactory for the intended service and may be justified by cost and time consideration. In this repair section there are step-by-step procedures for different repairs. Basically, there are three types of repairs:

- A. Rubber-to-Rubber
- B. Rubber-to-Metal and Adjacent Rubber Tie-In
- C. Rubber-to-Metal similar to (B) except metal requires replacement.

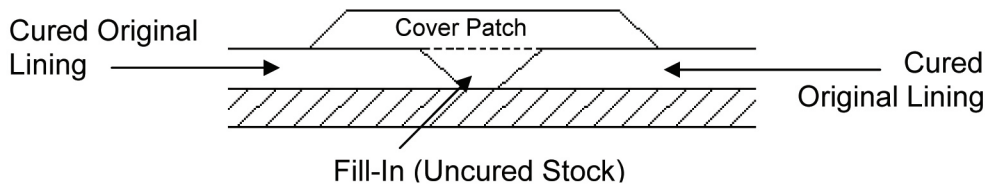
In general, the following standards have to be met, regardless of the type of repairs that are made:

1. The damaged metal and/or rubber must be properly prepared by buffing and grinding. The surface of the rubber adjacent to the repair area should be buffed back for a minimum of 4 inches.
2. Before cementing, the entire work area must be dry and clean. All buffing dust, moisture and acid fumes, etc. shall be removed not only from the direct area, but also the adjacent area where it might be carried or blown in.
3. Cements must be applied in the proper sequence on metal and/or buffed rubber and allowed to dry between coats.
4. The mating surfaces shall have a minimum of 30° skive and must be of the correct size for fill-in and/or overlay.
5. The repair lining must be carefully rolled and stitched down to remove any and all air.

LINING REPAIR METHODS

Rubber lined equipment should be repaired with the same type of lining as used for the original installation. The most commonly used lining constructions are soft single component, soft/semi-hard two component, and the three component soft/semi-hard/soft combination. The repair procedure for these different styles are outlined as follows:

A. ENDURAFLEX™ SOFT HOMOGENEOUS LININGS



1. Preparation of Repair Area
 - a. All surfaces must be dry. Remove all loose or defective rubber, cutting back to areas of good adhesion.
 - b. Buff rubber to be lined over and blast or grind the exposed metal surface.
 - c. Wash the surface with clean solvent.
 - d. Apply cements and stock, using standard RMA procedures.
2. Repair of Soft Natural Rubber Linings
 - a. Use stock indicated on rubber lining specification sheet.
 - b. Apply cement system to metal surface.
 - c. Apply tack cement to buffed cured rubber surface. This may require more than one coat.
 - d. Apply tack cement to uncured rubber stock and primed metal surface.
 - e. Cure per lining specification.
 - f. If a chemical cure lining is being used, apply a minimum of two coats of Chemcure™.
3. Repair of Synthetic Linings
 - a. Use same procedure as if repairing natural rubber, except use the appropriate primer and cements for the specific lining to be repaired.
 - b. See the lining specification for the correct repair materials.

B. ENDURAFLEX™ SEMI-HARD LININGS

1. Use stock indicated on rubber lining specification sheet for repairs.
2. Apply metal primers to both prepared metal and original cured lining.
3. Apply tack cement over primer and uncured rubber stock.
4. Cure per lining specification.

NOTE: Semi-hard linings being used for nuclear water or demineralized water treatment shall be vulcanized (10 hours at 250°F (121°C)) to maintain low sulfides. Reference article in section 11 of this manual for more details.

C. TRI-BOND™ 3-PLY CONSTRUCTION LININGS

1. Use stock indicated on rubber lining specification sheet for repairs.
2. Apply metal primer to both the prepared metal and the semi-hard center lining; treat hard rubber as metal.
3. On preparing the 3-ply lining construction, it is recommended to remove the soft rubber by buffing. Buffing down to the semi-hard or hard rubber should extend 4 inches into the good lining.
4. Apply tack cement over primed surfaces and uncured rubber stock.
5. Cure per lining specification.

NOTE: If lining is being employed for vacuum service, the lining shall be recurred under pressure using the vessel as it's own autoclave.

D. REPAIRS IN VACUUM SERVICE

1. Buff or blast metal area to a clean white surface.
2. Buff surrounding rubber areas to good rubber. Buffing should be in excess of 8" around repair area.
3. Apply metal primers.
4. Apply primers and tack cements, making certain that each is thoroughly dry before proceeding to next coat.
5. Fill in cut out area with uncured lining of appropriate gauge.
6. Apply tack cement over uncured fill-in lining and surrounding prepared rubber.
NOTE: Hard rubber must be treated like metal and requires primers.
7. Overlay uncured fill-in lining with uncured stock, lapping a minimum of 4" over the filled in lining.
8. Roll and stitch, very carefully, making certain that no air is trapped and skives are tightly stitched.
9. Apply air pressure a minimum of 20 psi prior to curing.

NOTE: See Blair Rubber Company's cure instructions for vacuum vessels in Section 14 "Curing Procedure".