

Dualoy™ and Red Thread™ IIA Repair Coupling for UL-Listed Buried Fiberglass Piping Systems

General

Although most properly installed Dualoy and Red Thread IIA piping systems provide years of trouble-free service, repairs on existing systems are occasionally required as the result of damage incurred during excavation or paving. Until now, the only UL-listed repair method for existing lines required the in-trench use of tapering tools: a procedure that was not only cumbersome at best, but which also could require substantial excavation to allow access to the affected lengths of pipe.

NOV Fiber Glass Systems produces repair couplings in 2 through 4-inch sizes for use in Dualoy and Red Thread IIA petroleum piping systems. These couplings are listed by Underwriters' Laboratories, Inc. for use in buried fuel systems and can be installed without in-trench tapering.

When installing the repair coupling, any of our Fuel Handling adhesives are acceptable. If using a PSX adhesive, PSX-20 is recommended for cold weather installations, while PSX-34 is more suitable for warm weather installations. Series 8000 adhesive can be used at any temperature as long as the fiberglass filler is added to the adhesive. Filler is available from Fiber Glass Systems.

Minor Damage

Minor damage is typically caused by impact and is apparent in the form of a discoloration or small circumferential crack (Figure 1). Minor repairs can be made using half-couplings or full couplings. See below for procedures to follow when cutting couplings.

Small Delaminated Areas

Use a hole saw to remove the affected area, then clean the edge of the hole to remove all loose material (Figures 2 and 3).

Note: A hole need only be created for Dualoy repairs. When repairing Red Thread IIA a hole is not needed.

When repairing lines that have already been placed in service and that may contain fumes, do not use electric drills or other tools that may constitute a spark hazard near the pipe. Use only air driven or manual tools for cutting and sanding.

Figure 1



Fig. 1. Impact damage is generally apparent as a whitish discoloration.

Figure 2



Fig. 2. Delaminated areas must be removed from the pipe. Small delaminations can be removed with a hole saw.

Figure 3



Fig. 3. Clean cut edges thoroughly and remove any loose material.

Using a flapper sander or the emery cloth provided in the adhesive kit, abrade the surface of the pipe where it will be covered by the repair coupling and the inside of the coupling itself (Figures 4 and 5). Apply adhesive to the cut edge of the hole, the sanded area of the pipe, the inside of the coupling and the flanges of the coupling (Figure 6). Position the coupling so that the hole in the pipe is centered in one half of the coupling (Figure 7) and bolt the coupling together (Figure 8). Allow the adhesive to cure before pressurizing the system.

Cracks and large delaminated areas.

More extensive damage may require the removal of a short section of pipe. If the entire damaged area can be removed by cutting out a section of pipe three inches or less in length, a coupling alone can be used to effect the repair (Figure 9).

The ends of the pipe must be within 3 inches of each other for this repair procedure to maintain the UL listing (Figure 10). Similarly, a pipe insertion of at least 2 inches in the coupling must be maintained.

Abrade all bonding surfaces before applying adhesive. Coat the cut ends of the pipe and bonding surfaces with adhesive. A half-coupling may be used, but it must be precisely aligned to maintain spacing requirements. The use of a full coupling is recommended (Figure 11). Center the coupling around the area from which the pipe has been removed.

Major Damage

Any damage in which more than three inches of pipe must be removed is considered major. Major damage is typically caused by excavation equipment or large objects which impact the pipe. Major damage is repaired using a length of replacement pipe and one or more repair couplings.

When replacing a damaged section less than 10 inches in length, a single full-size coupling can be used. A full coupling is 14 inches long. Thus, the required 2-inch insertion at each end can be maintained when replacing a section 10 inches or less in length (Figure 12).

When replacing longer sections, use two full-size or half-couplings to join the replacement section with the existing line (Figure 13). Follow the guidelines given above for minor damage. Take care to abrade all bonding surfaces, to coat all cut pipe ends with adhesive and to observe spacing and insertion depth requirements.

Failure to maintain the maximum 3-inch gap between pipe ends and the minimum 2-inch insertion depth nullifies the Underwriters Laboratories Listing Mark.

Repair of Contained Lines

Follow the procedures given above for repair of the primary piping. The two-inch repair coupling has been sized so that it can be contained within 4-inch Dualoy 3000/L and Red Thread IIA pipe. Thus, when repairing a 3 over 2 contained line, it is necessary to replace 3-inch containment with 4-inch pipe (Figure 14). Join the 4-inch replacement containment to the existing containment by means of the appropriate reducing couplings.

When using bolts to close primary repair couplings, it is essential to align the wing-nuts exactly parallel with the line to maintain the clearance necessary to permit the 4-inch pipe to slip over the coupling. Make this alignment before the adhesive cures.

Cutting Repair Couplings

When cutting full-size couplings, position the cut so that all bolt holes on resulting half-couplings are equally distant from the end.

Two-Inch Couplings

A single cut will suffice when cutting 2-inch couplings since the two center holes have been located near the middle of the coupling. Locate the cut exactly between these two holes. The resulting half-couplings will be 7 inches long.

Three and Four-inch Couplings

On 3 and 4-inch couplings the bolt holes are evenly spaced along the flange, thus two cuts will be necessary when making half-couplings. Locate each cut $\frac{1}{2}$ -inch from the edge of the hole. The resulting half-couplings will be $5\frac{1}{2}$ inches long.



Fig. 4. Abrade all bonding surfaces on the pipe with emery cloth or a flapper sander.



Fig. 5. Abrade the inside radius and the flanges of the coupling.



Fig. 6. Apply adhesive to the rim of the hole and to all bonding surfaces.



Fig. 7. Center the coupling directly over the hole. The edge of the hole must be at least two inches from the ends of the coupling.



Fig. 8. Join the coupling halves. Tighten bolts evenly. A bead of adhesive should be visible between the pipe and the ends of the coupling and between the flanges.

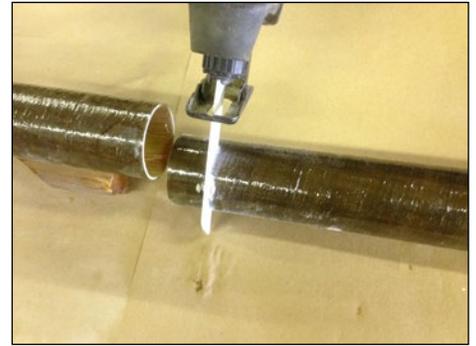


Fig. 9. If the delamination cannot be encompassed with a hole saw, remove the entire area of affected pipe.



Fig. 10. Damaged areas up to 3 inches in length can be repaired simply by removing the affected pipe and enclosing the gap with a coupling.

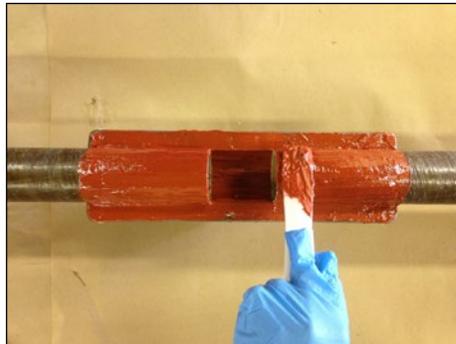


Fig. 11. Apply adhesive to the cut ends of the pipe and to all bonding surfaces.



Fig. 12. Damaged areas over 3 inches in length are repaired by replacing the affected pipe with a nipple of appropriate length.



Fig. 13. For damaged areas over 10 inches in length, join the replacement nipple to the existing line with either full-size couplings or half-couplings.



Fig. 14. When repairing contained lines, use containment pipe one size larger than usual. Align the wing-nuts parallel to the pipe axis to permit the containment to slip over the repair coupling.



Fig. 15. Cut half-couplings so that all bolt holes are equidistant from the ends. Half-couplings are 7 inches long in 2-inch sizes, and 5½ inches long in 3 and 4-inch sizes.

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