

Rejuvenation Instructions

#532 – 200A Splices – iUPR



This NRI covers the following:

- How to crimp connectors for the iUPR process.
- How to prepare 200amp splices for injection.

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WARNING: It is dangerous working around energized high-voltage systems, pressurized systems, and chemicals. Always work in accordance to the Novinium Field Operations Safety Handbook (FOSH) or other local governing safety standards.

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Introduction

This NRI describes how to install new 200A splices used for the Improved Unsustained Pressure Rejuvenation (iUPR) process. The iUPR process allows for fluid to flow through existing or new splices.

Any molded EPDM rubber splice may be used for the iUPR process, as long as the conductive insert is at least 1-5/8" longer than the connector going to be used.

Checking the Splice Body

iUPR injection pushes fluid through the splice body. The splice body must meet the requirements detailed below:

- a. Make sure the splice body is molded EPDM.
 - Only EPDM components may be used for direct fluid contact applications.
 - Cooper® brand splice bodies are not recommended for iUPR.
- b. Cut a molded splice body in half, the long way.
- c. Measure the length of the conductive insert

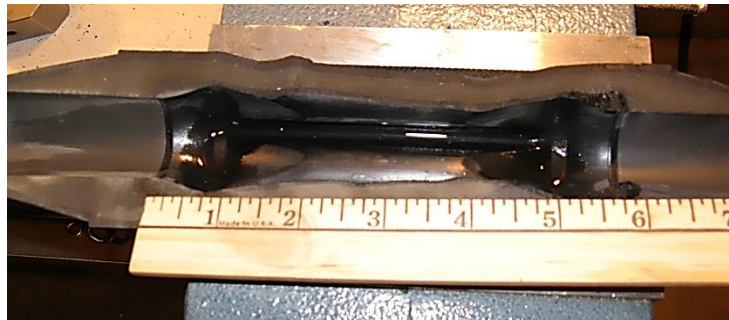


Figure 1: Measure the conductive insert length.

- d. Measure the length of the conductor to be used.
 - The conductive insert must be at least 1-5/8" longer than the connector used.



Figure 2: Conductive insert is 1-5/8" longer than the connector.

Positioning Molded Items

Slide any molded items, including the splice body, onto the cable.

- Follow any manufacturer's directions for initial positioning of molded items.
- Follow any directions related to cleaning surfaces when sliding components on.

Selecting URD Crimp Dies

For iUPR installations, fit as many crimps within the crimping region of the connector as possible.

The additional crimps will improve the conductor compression and reduce resistance between the connector and conductor.

- Measure the outside diameter of the connector with a digital caliper. Manufacturers have a sizing pattern to their connectors.
- Use the manufacturer's specified crimping die, or refer to **NRI 442** for crimp dies based on connectors with a given outside diameter.
- Test the die on the connector. If the die does not appear to crimp the connector correctly, contact Engineering for assistance.

Crimping the Connector

Crimp the connector barrel as many times as possible in the connector's crimping region. Follow IEEE® P1816™ guidelines on how to install the connector.

- Begin crimping the connector at the "no crimp" line.
- Rotate the crimping tool for each crimp to avoid curving the connector.
- Crimp the connector as many times as possible, each time moving towards the cable.



Figure 3: Place the maximum amount of crimps possible.

- Check to make sure a ¼" to ½" gap between the connector and insulation is present after crimping. The gap allows for thermal expansion and fluid flow.

Quality Check

1. Check connector crimps.

- a. Occasionally, crimped connectors will have sharp edges or “ears.”
 - Smooth these sharp edges with a file, a 3M® Scotch-brite™ pad, or a 120 grit sandpaper.
 - Flatten any “ears” and smooth any resulting sharp edges
 - Smoothing these edges helps prevent interior damage to component bodies.
- b. Check for overly bent connectors. Redo as needed.
 - The crimping action can bend connectors. Rotate the crimping tool 180° each time to reduce this effect.
 - Bent connectors can potentially block flow through the splice.

2. Compare the cable to the template.

- a. Lay the crimped cable length next to the post-crimp portion of the template.

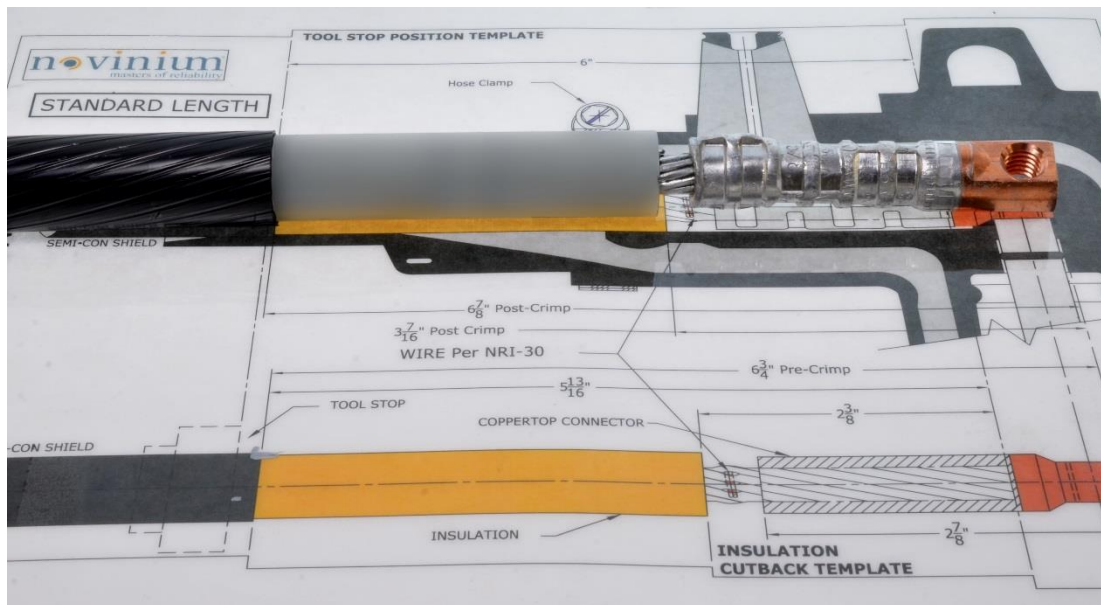


Figure 4: Check the cable against the template.

- b. Confirm that all cutbacks and post-crimp lengths are within the required ranges.
- c. Adjust or redo any, if necessary.
- d. Check the insulation and semi-con for cracks, gouges, ripples, scratches, dirt, or other defects.

Splice Bodies for iUPR Injection

1. Apply lubricating grease.

- a. Apply the supplied grease to the cable. Avoid putting too much grease.
- b. Keep the strands free of grease while applying.
- c. Some components require a specific grease to function properly.
 - In this case, **DO NOT SUBSTITUTE THE SUPPLIED GREASE.**
 - Call Engineering with any questions regarding grease.

2. Install splice body.

Install the splice by the more stringent of manufacturer's installation instructions or circuit owner's standards.

- a. Avoid getting silicone grease on the exposed conductor strands.
- b. The body of the splice **must** be centered between the marking tapes and within $\frac{1}{4}$ " of the inner edges of both marks.
 - Apply marking tape over any place holding silver marks for marking tape positioning.
 - Do not remove marking tape.



Figure 5: Splice body centered between marking tapes.

- c. Wipe off all excess grease.
- d. Place hose clamps so that they are centered over the ends of the conductive insert (within $\frac{1}{4}$ ").

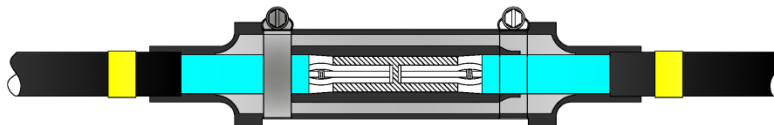


Figure 6: Hose clamps seal fluid into conductive insert.

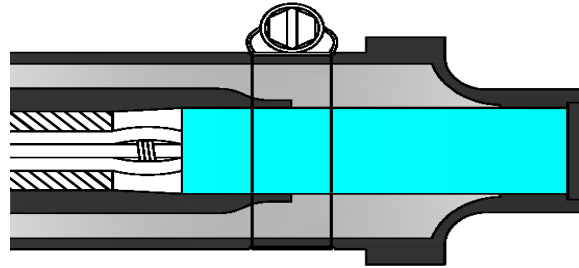


Figure 7: Clamp positioned over conductive insert.

- e. Tighten the hose clamps until they are even with the body of the splice.
 - **DO NOT** over tighten!
 - This will prevent fluid and contaminants from leaking out of the conductive insert, which could create a conductive path.



Figure 8: Clamp body even with splice body.

- f. Install a third hose clamp near the center of the splice to maintain electrical contact between the metal portions of the cable and the conductive insert. More hose clamps can be used if needed.



Figure 9: Third clamp maintains contact between conductor and conductive insert.

- g. **OPTIONAL:** Flow and pressure test the splice at the adjusted injection pressure. Refer to **NRI 282** for flow and pressure testing procedures.
- h. Apply four to five wraps of self-vulcanizing rubber tape over the hose clamps to remove sharp edges, if re-jacketing the cable.



Figure 10: Self-vulcanizing rubber tape wrapped over hose clamps.

3. Connect concentric neutrals.

- a. Neutrals from each cable must extend to within 1" from the end of the splice body. The only exceptions are the drain wires.
- b. The bond wires must connect to the bonding points on the splice.
 - Insert an end of No. 14 AWG (2.5mm) copper wire or equivalent through the ground eye on the splice.
 - Twist tight but do not damage the eye.
 - This is true for multiple splice, "Dutchman," installations, as well.



Figure 11: Bond wires and neutrals in their proper locations.

- c. Use a rated connector to connect together all neutrals from both cables, excluding the bond wires. The bonding jumper between cables may be removed when this is done.

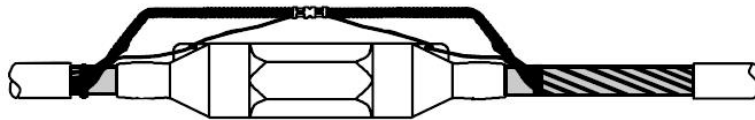


Figure 12: Use the correct rated neutral connector.

- d. Perform any other installation steps described in the manufacturer's instructions.

4. Begin iUPR injection.

- Once iUPR installation is complete, begin the iUPR injection process using the procedure in **NRI 602 Small Diameter Cables (URD) – iUPR**.