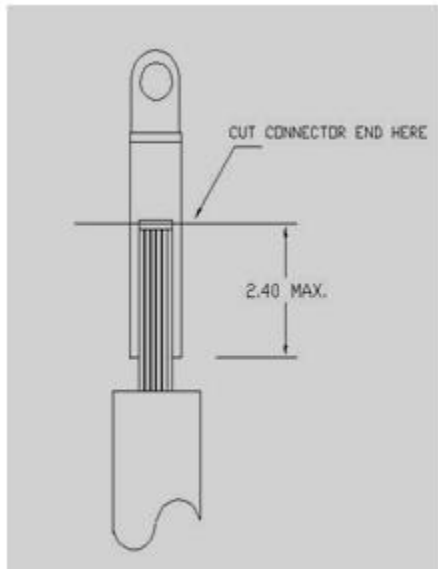


## Rejuvenation Instructions

### #511 – Cable Preparation – UPR



#### This NRI covers the following:

- The craftwork standards and suggested tools to use for UPR cable preparation.
- How to split and remove an existing lug using the connector cut-off tool.
- How to use the threading and shouldering tool to prepare a cable for a threaded seal kit.

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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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## Removing the Jacket

### 1. Requirements.

- The insulation shield and neutral wires must not be damaged during jacket removal.
- The Speed Systems LPW 1525/TK 120-N (p/n 818551) may be used on cables with concentric neutrals to helically cut the jacket for removal.
- Kevlar string (p/n 818763) may be used to create the circumferential cut for jacket removal.

### 2. Procedures.

- Mark the distance to which the jacket must be removed.
- Use the Kevlar string or other tool to make the square cut around the jacket.



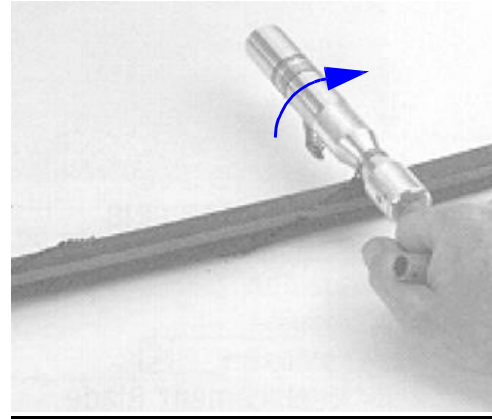
**Figure 1:** Kevlar string.

- Expose a single neutral wire at the jacket end.



**Figure 2:** Use pliers to start the concentric neutrals.

- d. Insert the neutral wire into the neutral winder of the Speed Systems tool and rotate.
  - Continue until the jacket has been torn to the square cut.
- e. Remove the jacket.



**Figure 3:** Use the Speed Systems tool to wind the concentric neutral back toward the square cut.

## Preparing the Insulation Shield

### 1. Requirements.

- The insulation shield must be finished circumferential and square cut.
- The insulation surface must be free of scoring.
- Any insulation that displays scoring or other damage must be removed and the work attempted again.
- The insulation shield **must** be completely removed from the insulation surface with no remnants or tears remaining.
- The Speed Systems 1700 SS is recommended (Novinium p/n 818546).

### 2. Procedures.

- a. Straighten the cable so that the tool can ride smoothly and evenly during operation.
- b. Mark the distance to the cutback according to the component installation instructions.
- c. Set the cutter depth to 3 mils less than the insulation shield thickness.
- d. Set the scorer to “square cut”.
- e. Place the scorer on the cable at the cutback mark (Figure 4).



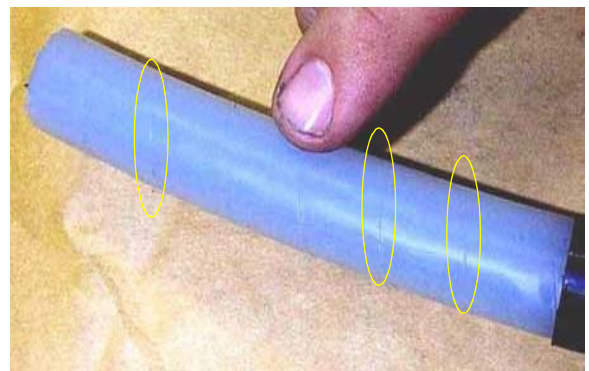
**Figure 4:** Rotate the tool around the cable to create the square cut first.

- f. Rotate the tool 360 degrees around the cable to score the insulation shield in one revolution.
- g. Set the scorer to “spiral cut”.
- h. Rotate the scorer around the cable until it advances to the end of the cable.
- i. Use pliers to remove the insulation shield.



**Figure 5:** Use pliers to remove the spiral-cut insulation shield.

- j. Inspect the insulation surface for any damage.
  - If scoring or other damage is found, the damaged section must be removed and the craftwork repeated.



**Figure 6:** Inspect the insulation for damage. Remove any damaged section of insulation prior to moving on.

## Insulation Cutback

### 1. Requirements.

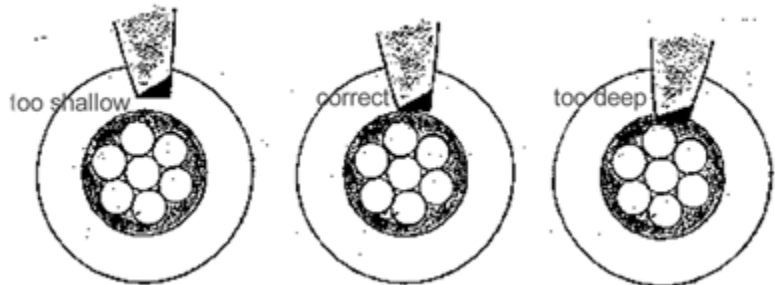
- The conductor must not be scored or damaged.
- The insulation cutback length must be within 1/16” of the manufacturer's specification unless stated otherwise.
- The insulation cutback must be square to within 1/16”.
- If the customer requires penciling the insulation,, contact Engineering as this may not be compatible with injection.
- The tools listed in Table 1 are recommended for insulation cutback.

Cable Size	Manufacturer & Part. No.	Novinium Part No.
URD and most Feeder	Ripley WS64-U-E	818935
URD and most Feeder	Speed Systems 1542-2CL	818547
Feeder	Speed Systems Mark I stripper & tool stop	--

**Table 1:** Recommended tools for insulation cutback.

## 2. Procedures.

- Clean the cable to 6" past the insulation shield cutback length.
- Lightly lubricate the surface of the cable to aid the tool's rotation.
- Set the gauge on the Speed Systems tool.
- Viewing from the end of the cable, set the blade depth of the insulation stripping tool so that it penetrates to the conductor shield and does not contact the conductors.



**Figure 7:** Set the blade depth on the insulation stripping tool so that it does not dig into the conductor.

## Preparing the Conductor

### 1. Requirements.

- Use wire brush (819362) to break up the corrosion that has developed on the surface of the conductor strands.
- Use corrosion inhibitor compound (819361) to create an oily layer on the strands that prevent aluminum oxide from reforming.

### 2. Procedures.

- Brush the conductor strands with a clean wire brush and wipe away any loose particles.

- b. Apply corrosion inhibitor compound to the conductor strands and use a second wire brush to scuff the surface of the aluminum strands.
  - Apply enough corrosion inhibitor so that it evenly coats the surface of the strands after brushing to prevent oxide from reforming.



**Figure 8:** Use wire brushing and corrosion inhibitor to prepare conductor strands for crimping.

- c. Ensure that the corrosion inhibitor that is already contained within the connector is evenly distributed around the surface before inserting over the conductor strands.

## Cutting off Connectors

### 1. Requirements.

- The connector cut-off tool is used to split the existing lug from a cable to preserve cable length.
- The conductor must be free of damage inflicted by the cut-off tool before continuing with re-termination the cable.
- The cut-off tool is available in two sizes for URD and feeder cables (Table 2). Both the cut-off tool kit and the hydraulic tool are required for operation.

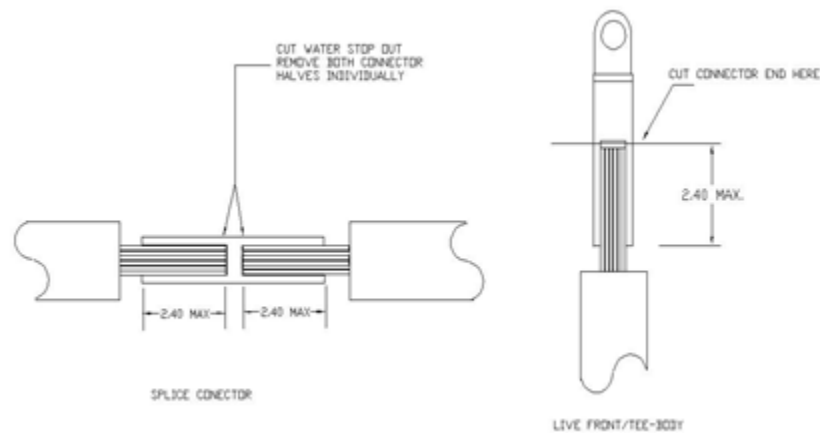
Cable Size	Cut-off Tool Kit	Hydraulic Tool	Hydraulic Hose
#2awg - 4/0awg	11473-1	11664-1	--
250kcmil – 1,000kcmil	11284-1	11663-1	819693

**Table 2:** Novinium part numbers for the connector cut-off tool.

### 2. Procedures.

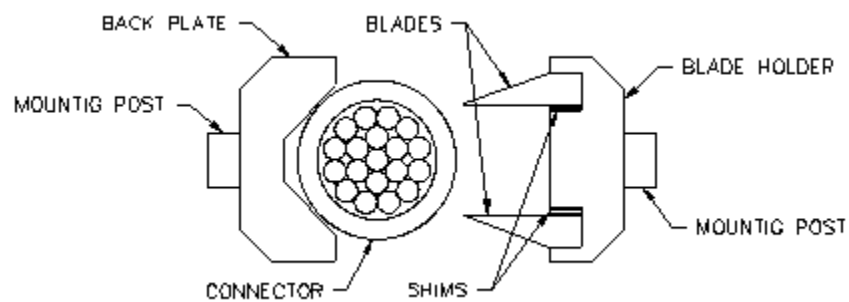
- a. Prepare the connector for removal by trimming the crimped barrel.
  - For a termination, cut just above the leading crimp.
  - For a splice, cut on both sides of the water stop.





**Figure 9:** Prepare the connector for removal.

- b. Measure the cable's conductor diameter using a set of calipers.
  - c. Select the blade holder that most closely matches the conductor diameter of the cable and install the appropriate shims to create a gap between the blades about .050" greater than the cable's conductor diameter.
- **NOTE:** Shims should be applied symmetrically so that the blades are equally spaced and the cutting force remains centered about the tool.



**Figure 10:** Blade holder and shims.

- d. Install the blade holder into the ram side of the compression head.
  - e. Select the back plate that best supports the connector and install into the stationary side of the compression head.
  - f. Nest the connector in the V of the back plate and slowly advance the ram so that the blades cut evenly into the connector and cleanly pass the conductor.
  - g. If necessary, remove the blade holder from the hydraulic tool and use the jacking screws to push out the section of severed connector.
- **NOTE:** Since most cables and connectors on a job will be similar, adjust the shims as necessary to optimize the cutting configuration.



- h. Considerable judgment is required by the craft person to assess the condition of the conductor after the connector has been removed.
  - If a conductor strand has been severed or the cumulative damage on the strands appears excessive, you must cut the cable end below the damage.

## Threading and Shouldering

### 1. Requirements.

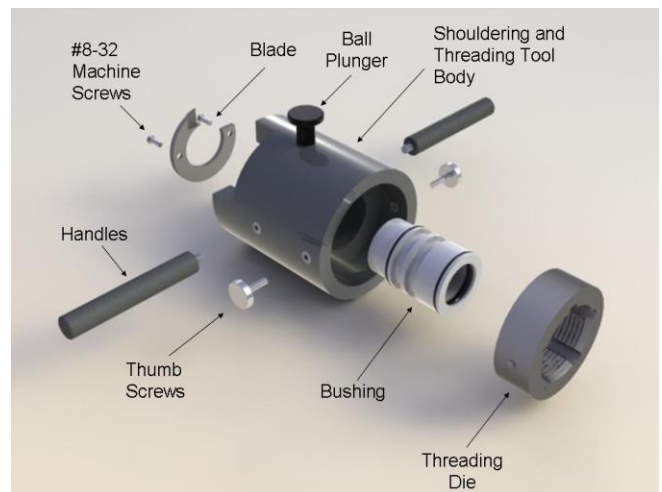
- The connector cut-off tool is used to prepare the cable insulation to install the threaded seal kit.
- The finished thread must have well-formed threads that are concentric to the conductor.
- The thread and shoulder cutting tool is available in two sizes.

Cable Size	Cut-off Tool Kit
#2awg – 350kcmil	11582-2
350kcmil – 1,000kcmil	11582-1

**Table 3:** Novinium part numbers for the threading and shouldering tool.

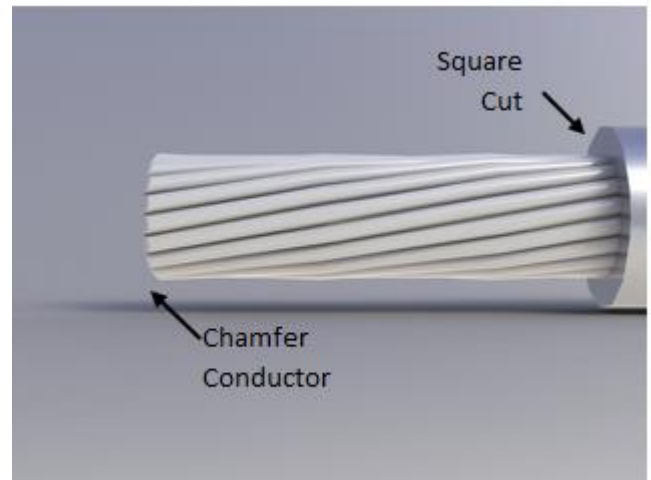
### 2. Procedures.

- a. Select the bushing that best fits the cable’s conductor diameter. This should be size where the internal o-rings can slip over the conductor strands without shearing.
- b. Assemble the tool with the bushing, cutting blade, and threading die as specified in the threaded seal-kit instructions (Figure 11).



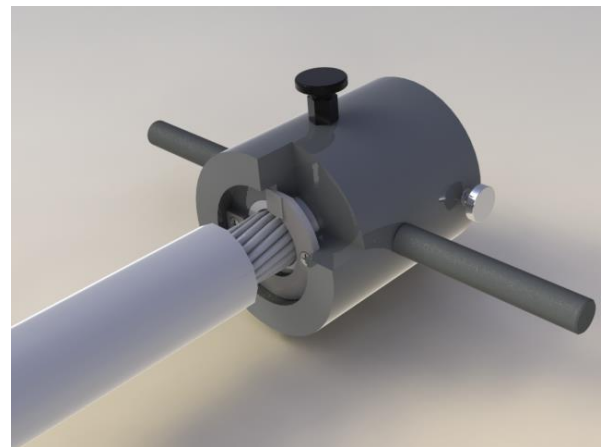
**Figure 11:** Thread and shoulder cutting tool assembly.

- c. Prepare the cable as specified in the assembly instructions for the Threaded Seal Kit.
  - The insulation cutback should be completed with a square edge that will be used for sealing (Figure 12).
  - It is important that this face be smooth and free of burrs.
- d. Squarely cut the conductors and file the edges to remove burrs and slightly chamfer the edges.
  - This will help the bushing slide onto the conductors and increase the life of the o-rings in the bushing.



**Figure 12:** Chamfer the conductor and finish the insulation with a square cut.

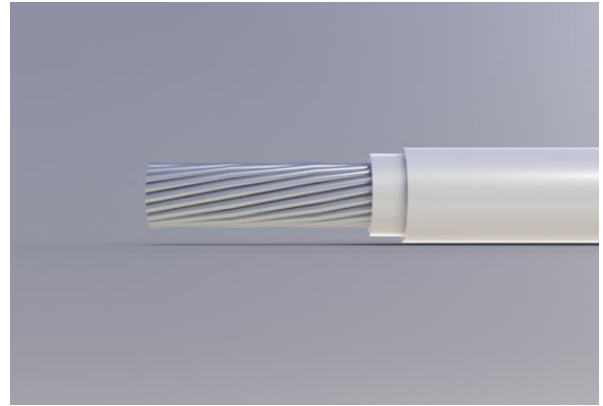
- e. Once the threading die has been installed, there are two positions that the bushing may be in.
  - The first position is used when shouldering material and is closer to the blade end of the tool.
  - The second position is used when threading material and is closer to the threading end of the tool.
  - The position is changed by pulling up on the spring plunger and twisting. This will unlock the bushing and allow it to move within the tool.
- f. Lubricate the internal o-rings of the bushing prior to use. This will ease operation and limit damage.
- g. Ensure that the bushing is aligned with the face and that the ball plunger is in the locked position (Figure 13).
- h. Gently rock the tool from side to side to help the internal o-rings climb onto the conductor.



**Figure 13:** Rock the tool onto the conductor.

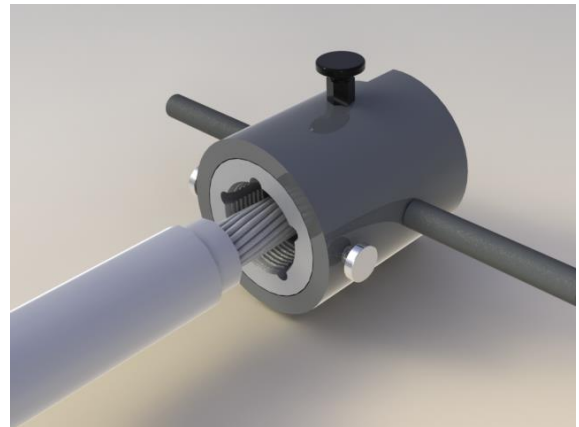
- i. When removing insulation, constant pressure is required so that the blade will continue advancing along the cable.
- j. After the blade has begun removing insulation, lift and twist the ball plunger to unlock the bushing and allow it to slide within the tool body.

- k. When the blade stops advancing into the cable, back the tool off and check the shoulder for concentricity.
  - The end result can be seen in Figure 14.
- l. Lubricate the o-rings if necessary.



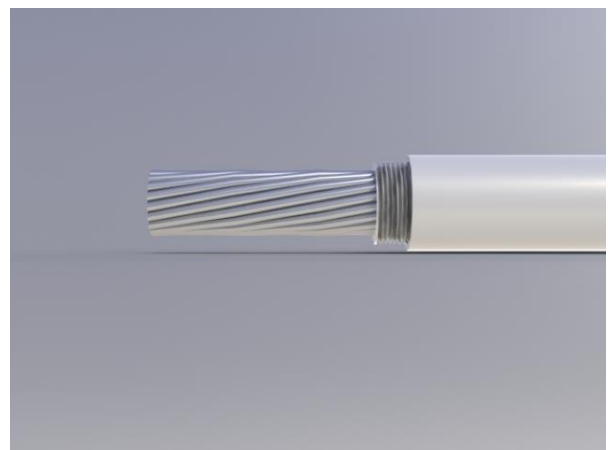
**Figure 14:** Inspect the shoulder and verify that it is concentric in the conductor.

- m. Use the threading end of the Shouldering and Threading Tool to thread the shoulder (Figure 15).
- n. When starting to cut a thread, a small amount of pressure on the threading die may be necessary.
- o. The bushing should be locked in place closest to the threading die when beginning a threading procedure and unlocked when the threading tool begins to grip the insulation.



**Figure 15:** Slide the tool onto the conductor and cut the threads.

- p. Thread only as far as the die readily advances into the cable.
  - Do **NOT** overturn as this may strip the threads.
  - The end result can be seen in Figure 16.



**Figure 16:** Inspect the threads and verify that they are well formed and concentric to the conductor.