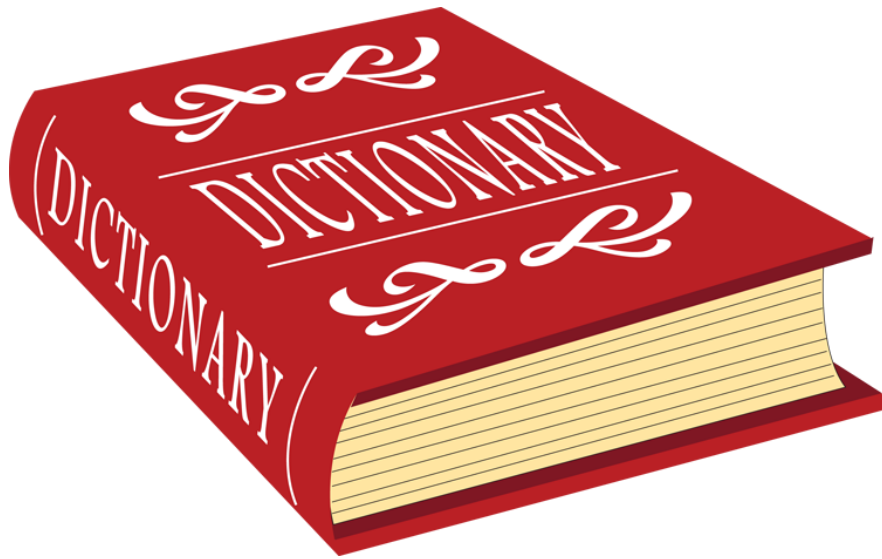


## Rejuvenation Instructions

### #110 – Cablecure Definitions & Acronyms



#### This NRI covers the following:

- The acronyms of the Novinium culture.
- Definitions of the acronyms.

Trademarks: <http://www.novinium.com/trademarks/>

Patents: <http://www.novinium.com/patents/>



**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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## Acronyms Definitions

Novinium provides the most advanced injection technology in the world. There are many gadgets and devices that perform specialized functions; therefore, we have a language of our own. This document is a dictionary of acronyms and special terms along with their definitions.

### AEIC

**The Association of Edison Illuminating Companies - [Website](#)**

One of the associations that has a cable manufacturing standard. The AEIC is a typical North American standard used in the United States. Cables created to this standard can be found in the Novinium Cable Table.

### AFP

**Adjusted Feed Pressure, Adjusted Flow Pressure**

The feed pressure used in Sustained Pressure Rejuvenation (SPR). It is the adjustment of the base Tailored Injection Pressure (TIP) depending on the temperature of the cable.

### AI

**Access Interface**

The fluid injection cap used to inject through an injection elbow for the Unsustained Pressure Rejuvenation (UPR) and Improved Unsustained Pressure Rejuvenation (iUPR) processes while the cable is energized. The AI can be removed from the cable without de-energizing the cable. See **FIG**.

### AIP

**Adjusted Injection Pressure**

The feed pressure used in Improved Unsustained Pressure Rejuvenation (iUPR). It is the adjusted injection pressure depending on the successful pressure test and elevation change of the cable.

### ANSI

**American National Standards Institute - [Website](#)**

Has a standard for electrical and other tests utilized in the certification of cable terminations and accessories.

### ATIP

**Adjusted Tailored Injection Pressure**

The pressure left inside the cable after the Injection Adapters (IAs) have been pinned during SPR. It is the adjustment of the base Tailored Injection Pressure (TIP) depending on the maximum expected temperature the cable will reach within 30 days.

**CC**

**Cubic Centimeter**

The unit of volume used for measuring fluid flow on the Liquid Flow meters and for calculating fluid volume. 1cc is equal to 1mL.

**CFR**

**Cable Field Report**

The cable field report is a summary of the injection details for a cable segment. It covers information about the customer, service type, testing done, equipment used, and injection data.

**CIA**

**Cable Injection Adapter**

The cable injection adapter slides over the cable and creates a seal to allow the fluid to enter the cable with the use of the Moderate Pressure Pump (MPP).

**CPR**

**Cooper Industries - [Website](#)**

Manufacturer of cable accessories.

**CSA**

**Canadian Standards Association - [Website](#)**

Holds a cable construction standard used in Canada. Cables of this standard can be found in the Novinium Cable Table.

**CTA**

**Cable Testing Assembly, Cable Test Adapter**

A CTA provides a temporary leak-tight connection to a cable end without the need to apply a permanent injection fitting. It is commonly used for air flow testing.



**Figure 1:** Cable testing assembly, cable test adapter.

## CWD – JACO Valve Assembly

### Cold Weather Disconnect

In colder climates, O-ring performance can degrade, leading to leaks in tubing assemblies. Quick Disconnect (QD) fittings can be substituted with the JACO valve assembly, which uses a ball valve to seal.

## EMD

### Elastimold – Thomas & Betts -[Website](#)

Manufacturer of cable accessories.

## EPR

### Ethylene Propylene Rubber

A type of insulation material. Typical colors of this insulation are pink and black. At this moment, it is advised to **not** use Cablecure 733 when injecting these cable types.



**Figure 2:** Ethylene propylene rubber.

## EPRI

### Electric Power Research Institute

An independent non-profit organization that conducts research and development, and demonstrates how to generate, deliver, and use electricity for public use.

## FDE

### Field Data Entry

The data entry function of the NITS program. It allows remote access and updating the injection database by syncing with the system.

## **FIC**

### **Fluid Injection Cap**

The alternative to the Access Interface (AI). It has a JACO fitting that allows a hook up to tubing and is part of the Improved Unsustained Pressure Rejuvenation (iUPR) process.



**Figure 3:** Fluid injection cap.

## **FOSH**

### **Field Operations Safety Handbook**

The go-to resource for safety procedures for Novinium’s Operations teams.

## **FTS**

### **Flow Thru Splice**

A flow thru splice connector has channels through the connector walls that allow fluid to flow through the connector for Sustained Pressure Rejuvenation (SPR) injection. These connectors are mainly utilized for locations where open pits cannot remain for long. The cable is spliced using Injection Adapters (IAs) and the flow thru splice connector, and it can be injected at a later time.

## **FWT**

### **Flux Weighted Temperature**

This number is calculated based upon the circuit loading information. It determines what the Novinium Fluid Flavor Number of fluid injected into the cable will be.

## **HLFA**

### **Heat Shrink Live-Front Injection Adapter**

See Terminator Fluid Injection Cap (TFIC).

## **HVFI**

### **High Voltage Fluidic Interface**

It is used to isolate fluid supply equipment from energized injection devices for very long periods of time.



## IA

### Injection Adapter

IAs provide a fluid-tight seal to the cable and the attached compression connector. The IA has a hole that allows an Injection Tool (IT) to supply or withdraw fluid from a cable.



**Figure 4:** Injection adapters.

## ICEA

### Insulated Cable Engineers Association - [Website](#)

Holds a cable construction standard used in North America. Cables of this ICEA standard can be found in the Novinium Cable Table.

## ID

### Inside Diameter

IDs are typically relevant for selecting connectors and Injection Adapters (IAs). The ID of a connector is the diameter of the machined-out hole, and the ID of an IA is the diameter inside the end sections.

## IEC

### International Electrotechnical Commission - [Website](#)

Holds an international standard for cable construction. Cables of this standard can be found in the Novinium Cable Table.

## IP

### Injection Pressure

The pressure that Novinium fluid is injected at. iUPR and SPR have different pressure ranges.

## IPD

### Impulse Phase Device

The IPD is used to identify cables in trenches or vaults. It adds another layer of safety into the process of cutting and spiking, as well as replacing splices.

**IS**

**Feeder Impedance Streamliner**

A tool that provides for a smooth impedance transition from the small coaxial Time Domain Reflectometer (TDR) connection to the larger coaxial cable connection. The construction of the Feeder Streamliner allows connection to the larger feeder sized cables.



**Figure 5:** Feeder impedance streamliner.

**IT**

**Injection Tool, Injector Tool**

An Injection Tool provides temporary fluid access to an IA and includes a method to permanently seal an IA by inserting a plug pin into the fluid access hole of an IA.



**Figure 6:** Injection tool, injector tool.

**ITD**

**Impedance Transition Device**

A tool that provides a smooth impedance transition from the small coaxial Time Domain Reflectometer (TDR) connection to the larger coaxial cable connection. Using accessories, the ITD can be used on both Underground Residential Distribution (URD) and Feeder sized cables.



**Figure 7:** Impedance transition device.

## **iUPR**

### **Improved Unsustained Pressure Rejuvenation**

Novinium uses the latest technology to deliver low pressure improved rejuvenation capabilities beyond basic UPR methods. iUPR offers many improved safety features to protect people during injection on energized cables.

## **KCM, KCMIL**

### **Thousand Circular Mils**

A measurement of conductor size for power cables. This naming convention is usually used for larger cable sizes, starting around 250 kcmil.

## **kV**

### **Kilovolts**

1 kV equals 1000 volts. Typical power cables that Novinium rejuvenates include the 15kV, 25kV, and 35kV varieties. However, these are not the only ones that can be rejuvenated. Make sure any accessories used on the cables are rated for that application.

## **LFAI**

### **Live-Front Access Interface**

When using the Terminator Fluid Injection Cap (TFIC), this acts as the interface to inject Novinium fluid into the cables during live-front applications. It can be removed without de-energizing the cable.



**Figure 8:** Live-front access interface.

## **LFFM**

### **Low-Flow Flow Meter**

An air flow meter that is more sensitive to the low air flows. It is used to differentiate between a blocked or restricted cable.

## LIS

### Linear Impedance Streamliner for URD cables

A tool that provides a smooth impedance transition from the small coaxial Time Domain Reflectometer (TDR) connection to the large coaxial cable connection. The LIS is designed for use on Underground Residential Distribution (URD) cables.



**Figure 9:** Linear impedance streamliner for URD cables.

## MCM

### Thousand Circular Mils

See Thousand Circular Mils (KCMIL).

## MPP

### Moderate Pressure Pump

A UPR injection pump used with a fluid supply tank and CIA to deliver fluid to the cable at up to 360 psig.

## NC

### Neutral Corrosion

Corrosion that occurs on the neutral conductor and inhibits the readings of the Time Domain Reflectometer (TDR) at high enough levels and degrades the ability for the neutrals to perform their function. It is created when there is a potential difference around a section of cable in a suitable medium that allows the flow of electrons.

## NEMA

### National Electrical Manufacturers Association - [Website](#)

NEMA develops standards for the electrical manufacturing industry. In the Novinium injection application, NEMA can be found in the compression lugs we use.

## NN

### Novinium Fluid Flavor Number

The NN is calculated from the Flux Weighted Temperature (FWT) of the circuit. It indicates how much of the active ingredients are present in the fluid. A higher number means more ingredients.

## **NPN**

### **Novinium Part Number**

The NPN is the part number of each Novinium item that appears on the picklist. Use these numbers to order the items you need for your job from Supply Chain.

## **N-Rex™**

### **Novinium Radial Exclusion**

It is a patent pending process used to inject very long cables.

## **NRI**

### **Novinium Rejuvenation Instructions - [Website](#)**

NRIs provide step-by-step instructions for rejuvenating cables. NRIs cover the Unsustained Pressure Rejuvenation (UPR), Improved Unsustained Pressure Rejuvenation (iUPR), and Sustained Pressure Rejuvenation (SPR) injection processes.

## **ns**

### **Nanosecond**

It is a measurement of time. A nanosecond is 0.000000001th of a second. The Time Domain Reflectometer (TDR) uses nanoseconds to determine how far away an anomaly in a cable is when looking for the reflection of the pulse it sends out to the cable.

## **N-Ter™**

### **Novinium Thermally Enhanced Rejuvenation**

Novinium Thermally Enhanced Rejuvenation is a patent pending process that allows cables to be injected more quickly and completely. It also allows reinjecting previously injected segments.

## **OD**

### **Outside Diameter**

OD is typically relevant for selecting connectors, IAs, and cable accessories. ODs are important for cable accessories because they depend on having intimate contact with the various parts of a cable in order to function. They also tell you whether a conductor or insulation will fit inside a connector or IA.

### PE, XLPE, HMWPE, TR-XLPE

#### Polyethylene, Cross-Linked Polyethylene, High-Molecular-Weight Polyethylene, Tree-Retardant Cross-Linked Polyethylene

Various types of Cross-Linked Polyethylene insulation extruded over the conductor and conductor shield layer. Each type brings some benefit reinforcing the integrity of the power cable, from a higher density to an additive meant to resist water tree degradation and growth.



**Figure 10:** PE, XLPE, HMWPE, TR-XLPE.

### PSI

#### Pounds per Square Inch

PSI is a unit of pressure and it commonly refers to the gas pressure used during the rejuvenation process.

### PSIG

#### Pounds per Square Inch Gage

PSIG is similar to PSI except that the pressure is relative to atmospheric pressure. The pressure displayed is above the atmospheric pressure of 14.7 psi.

### QDIA

#### Quick Disconnect Injection Adapter

An IA that has been fitted with a spring valve to allow injection into an energized cable and the ability to disconnect mating injection equipment safely from afar using a hot stick.



**Figure 11:** Quick disconnect injection adapter.

## QDIT

### Quick Disconnect Injection Tool

QDITs allow injection of an energized cable and can be removed without de-energizing the cable.



**Figure 12:** Quick disconnect injection tool.

## RCH

Richards Manufacturing - [Website](#)

A manufacturer of cable accessories.

## RF

### Radio Frequency

An RF transmitter imparts a high frequency signal on a cable and a receiver allows the cable path, the location of splices, and the location of neutral corrosion to be pinpointed.

## RFP

### Reticular Flash Preventer, Reticulated Flash Protector

An RFP is a safety device used with the UPR process and is inserted into the bore of an injection elbow. The RFP holds dielectric fluid in a sponge-like matrix to prevent flashover through an open port when an AI is swapped with a permanent cap or plug.



**Figure 13:** Reticular flash preventer, reticulated flash protector.

## SPR

### Sustained Pressure Rejuvenation

SPR is Novinium’s patented injection paradigm where the injection pressure is left on the cable and allowed to decay naturally. This paradigm provides the highest level of post-injection reliability.

## TDR

### Time Domain Reflectometer

A TDR or cable radar is an instrument used to locate splices, neutral corrosion, and other impedance changes along a cable length.

## TFIC

### Terminator Fluid Injection Cap

A cable accessory that is used during live-front applications and enables injection to occur while the cable is energized.



**Figure 14:** Terminator fluid injection cap.

## TIP

### Tailored Injection Pressure

The TIP is the optimum injection pressure for maximum post-injection reliability.

## UPQD

### Unsustained Pressure Quick Disconnect

Quick disconnect fittings that are used with the iUPR and UPR injection processes. They allow quick connecting and disconnecting of injection equipment. Novinium’s fittings are colored orange to signify our custom fittings.



**Figure 15:** Unsustained pressure quick disconnect.



## **UPR**

### **Unsustained Pressure Rejuvenation**

UPR is the original rejuvenation process. This injection process uses low to moderate pressure to deliver Cablecure fluids to the cable. It can be used on small to large cable sizes.

## **UP-RCVR**

### **Unsustained Pressure Receiver Tank**

The vacuum tank used in iUPR injection. It acts as the catch bottle once fluid exits the injected cable and allows a greater pressure gradient on the cable, pushing and pulling the fluid at the same time.

## **UP-REL**

### **Unsustained Pressure Relief Bottle**

UP-REL acts as the catch bottle once fluid exits the injected cable during iUPR injection.

## **URD**

### **Underground Residential Distribution**

Typically the cable conductor sizes from 250MCM and below. URD is meant to feed residential areas with electricity. The amount of demand placed on these cables is usually lower than their larger Feeder cable counterparts.

## **VOP**

### **Velocity of Propagation**

VOP refers to the speed of an energy pulse through a cable. The TDR uses this value to calculate the distance to impedance changes. Different cables have different materials in their construction, which slows the speed of the energy pulse. Typical power cable VOPs range from 48% to 55%.