

In the electrical utility industry, inhibitors combat the detrimental effects of aluminum or copper oxide by preventing oxide from forming on the metal, current-carrying surfaces of an electrical connection. If oxide forms, it can inhibit electrical conductivity. **As a result, utilities and connector manufacturers use inhibitors to increase and preserve overall connector capacity.**

Two main ingredients make up inhibitors:

- **Petroleum or synthetic bases** to seal out oxygen.
- **Suspended or emulsified additives** to increase conductivity.

It is important to use inhibitors that are best suited to your specific electrical connections, which vary greatly in both their approaches and environments. For optimal performance of electrical connections, CPI strongly recommends using inhibitors for the applications and environments for which they are designed.

The main factors contributing to inhibitor composition include:

- **Temperature**
- **Environmental exposure**
- **Mechanical conditions**
- **Types of conductive materials**

Temperature

The drip point is essentially the temperature at which the inhibitor melts and drips away from the connection. Generally, temperature increases as more current is passed through the connection so it is important to use an inhibitor that is rated above the highest connector operating temperature.

Environmental Exposure

Inhibitors used outdoors need to withstand elements such as sunlight, water and sub-freezing temperatures. Some general purpose inhibitors might have a wax base that will dissolve in water or a petroleum base that could deteriorate when exposed to the UV rays of the sun. Another environmental factor is human interaction. Some inhibitors may be hazardous if exposed to human skin or protective clothing. For example, certain petroleum base inhibitors can deteriorate line workers' rubber gloves.

Mechanical Conditions

The forces used to apply and maintain a connection, along with the size and shape of items being connected, greatly influence the type of inhibitor that should be used. A grit inhibitor designed for round, field-aged overhead conductor can be detrimental if used in a flat to flat moving connection such as a switch.

Types of Conductive Materials

Inhibitors must be compatible with various types of conductive materials such as aluminum and copper. This is especially important when selecting grit inhibitors because some types of grit could have reactions with the conductors. For this reason it is important to examine the specifications of a grit inhibitor closely before making a selection for a specific application.

About Grit Inhibitors

Grit inhibitors are designed to puncture through highly resistive oxide layers to improve the connections. This is done by suspending fine grit particles, which are harder than the oxide, in the inhibitors. When pressure is applied the grit will break through the oxide layer.

Because aluminum oxide is an extremely hard substance, it is difficult to find grit particles that are electrically conductive and hard enough to puncture the oxide. Some common particles used in grit inhibitors are glass, silicon dioxide, carbide or even aluminum oxide, which are relatively inexpensive. Also, the size of the particle is important to the performance of the inhibitor. If the particle is too small it will not be able to effectively puncture the oxide layer.

It is important to remember that using a grit inhibitor is never a substitute for properly cleaning a field-aged conductor before connector installation. Rather, grit inhibitor functions as a tremendous complement to the conductor preparation process. It penetrates oxides that remain on the conductors after cleaning or form immediately after cleaning. **Because of the complexity of choosing the right inhibitor, Connector Products has formulated a special compound that is applied to all connectors directly at the factory.**

The exclusive CPI Grit Inhibitor is made using the best materials available on the market. This inhibitor is designed for use on aluminum or copper overhead conductors in a compression type connection.

What makes CPI's grit inhibitor effective?

- **Synthetic:** This fully synthetic (non-petroleum based) compound is safer for line workers' gloves, rubber sleeves and other safety equipment and better for the environment.
- **Size:** It consists of extra large and conductive aluminum/nickel alloy grit particles. Unlike silicon dioxide or carbide, Al/Ni alloy has the unique ability to puncture oxide and conduct electricity. Other grits use fine, dust-like particles that are less effective.
- **Non-melting:** There's no drip point.
- Will maintain integrity well above 500 degrees F
- Water repellent and weather resistant corrosion inhibitor.
- Will adhere to sub-freezing metal components and remains workable in freezing conditions.
- Compatible with aluminum, copper, zinc, tin, cadmium and steel.