

Why Grease?

Facts & Myths about lubricating electrical connectors

Wondering if you need grease for electrical contacts and connectors? Here are some facts and myths to help you make your design decision. If added cost is a major concern, keep in mind that lubricating a large 6.35mm terminal with a premium synthetic grease costs only a penny.

Myth #1 Grease attracts dirt

Magnets attract, greases don't. Dirt does stick to grease, but that means the grease is doing its job. Connector lubricants create an environmental barrier, so dirt, dust, and moisture stay away from the contact surface. Without this protection, contact metals oxidize more quickly.

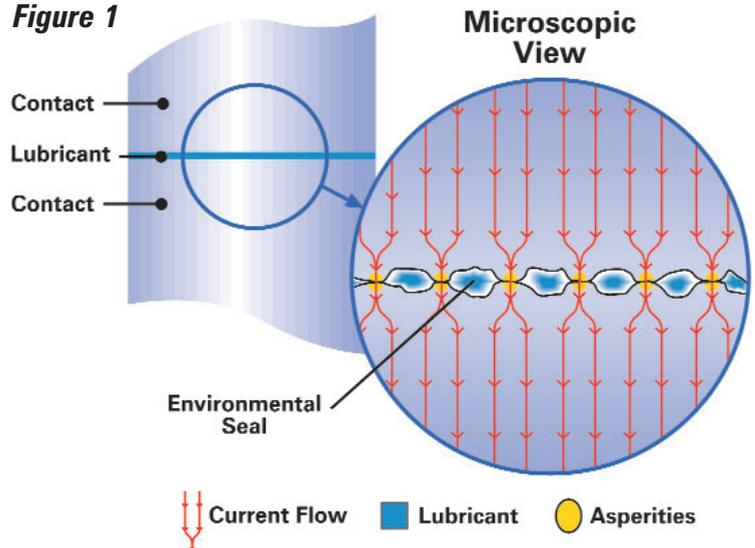
Myth #2 Lubricants interfere with conductivity

Tests on lubricated and unlubricated connectors show virtually no difference in contact resistance. A contact surface is a series of microscopic peaks and valleys. Current only flows through the asperities (Figure 1). A contact lubricant fills in the valleys, protecting the metal from oxidation, and is squeezed out of the asperities, allowing the current to flow.

Myth #3 Gold-plated contacts don't need grease

Contact manufacturers typically apply a thin gold plating on a substrate metal. The plating is microscopically porous and can easily be compromised, even during initial mating. Over time, oxides of the exposed substrate can "ooze" through the pores of unlubricated gold plating and cause open circuit resistance. A thin film of lubricant, which costs far less than a thicker layer of gold, seals those pores and guards against scratches and substrate oxidation.

Figure 1



Fact #1 Lubricants prevent corrosion

Without lubricant protection, contact metals are extremely susceptible to corrosion. Lubricants seal contacts from oxygen, moisture, aggressive gasses and other hostile elements. In applications where the connector is exposed to the elements, filling the connector housing with grease before mating is also recommended. The grease acts as a back-up environmental seal.

Fact #2 Lubricants lower insertion force

A thin film of lubricant reduces mating force by as much as 80 percent. For multi-pin connectors or connectors in hard-to-reach places, low insertion force ensures solid connections and efficient assembly. Lubricants can also bring connectors into compliance with USCAR insertion force standards.

Insertion Force Data on Field-Proven Nye Connector Greases*

Insertion force required to mate a 6.35 mm connector was measured on an Instron 5566. An unlubricated connector was tested as the control. As seen in the graph, all lubricants reduced insertion force. PFPE-based lubricants showed the most dramatic reductions.

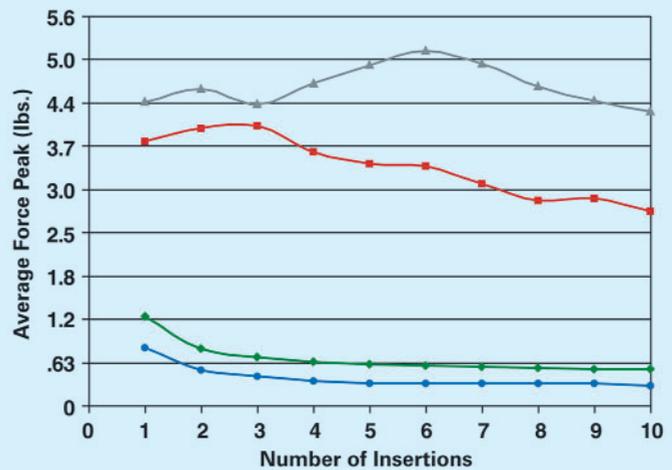
Control represents an unlubricated connector.

NyoGel® 760G is a synthetic hydrocarbon grease for tin-lead connectors, useful from -40°C to 130°C.

UniFlor™ 8511 is a completely fluorinated grease, compatible with any contact or housing material. It is useful from -50°C to 225°C.

UniFlor™ 8917 is a completely fluorinated grease that has been used to bring connectors into compliance with USCAR insertion force standards. It is useful from -70°C to 225°C.

* Information taken from "Development a New Synthetic Grease to Reduce Insertion Force for Separable Connectors," White Paper, ©2004, Nye Lubricants.



Fact #3 Lubricants dissipate the effects of micro-motion

Contact metals are subject to "fretting corrosion" — abrasion resulting from low amplitude vibration caused by motion or thermal expansion and contraction. Abraded metal can build up and break the connection. A lubricant minimizes metal-to-metal wear, protecting the contact from fretting corrosion.

Fact #4 Lubricants save money

Lubricants improve the performance and extend the operating life of electrical contacts. Consequently, lubricants reduce warranty costs, and improve a brand's quality image.

For more information

Contact Nye Lubricants for information about connector lubricants, including a custom-designed lubricant for your application. Call (508) 996-6721 or log-on to SmartGrease.com.



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