Lubricants for Sliding Contacts in Electric Switches

Greases for sliding electric switch contacts must meet the same demands of any mechanical sliding: film strength, appropriate low and high temperature fluid range, and stay-in-place capability. In particular, a switch grease's ability to prevent wear is critical. Wear debris creates two problems. It can inhibit current flow when the contact is closed, increasing millivolt (mV) drop. When the contact is open, conductive wear debris can cause open circuit resistance (OCR) problems. In either case, switch performance is compromised. When selecting a switch grease, also note that the viscosity of the base oil should complement the contact force of the switch. Low current/low contact force applications require lighter base oils. High current/high contact force applications benefit from more viscous base oils.

Lubricants for arcing contacts. Because the temperatures reached in an electric arc are sufficiently high to degrade any organic molecule, a lubricant's tendency to "burn cleanly" is a definite advantage. Greases for arcing contacts should be formulated with fluids and thickeners that degrade with fewer by-products than traditional greases.

New non-burning switch lubricant technology. Greases that oxidize under arcing conditions pose a special problem for low load/low current applications. Traditionally, cleaner burning glycols were used to minimize carbon build-up. A new approach to eliminating problems associated with oxidation is to use non-burning perfluoropolyether-based greases. Dispersed in a non-flammable, ozone-safe, fluorinated solvent, these greases leave a thin film of lubricant, ideal for low load/low current applications. An additional benefit, this thin film does not attract dust and debris.

Lubricants for distribution switchgear. Lubricants for distribution switchgear, which may remain unactuated for long periods, serve a protective as well as a lubricating role. They should be oxidatively stable over time, water-resistant, and non-migrating. Because high temperatures may be induced by high current flow or high-temperature industrial conditions, wide temperature capability can be important.

A note about damping greases. Nye Damping Greases are widely used on the mechanical elements of many switch assemblies. They serve to reduce friction and wear, quiet detents, and give a smooth controlled "feel" to switch operation. See our application summary on Damping Greases for details.

Making your selection. Selecting the proper grease for a specific switch application is the real challenge. Very subtle differences in grease formulations, which are sometimes counter-intuitive, can result in dramatic performance improvements. Each grease listed below was custom-formulated for a particular application. Additional Nye greases are available to meet a wide range of application requirements. For technical specifications, evaluation samples, or questions about any Nye products — or to discuss a lubricant custom-designed for your application — call us at (508) 996-6721. Nye is ready to work with you to ensure you make the best possible lubricant choice.

Lube*notes:*

Lubricants for Sliding Contacts in Electric Switches

General Purpose Lubricants	Temp Range (°C)	Recommended Contact Force (g)#	Low Current < 1 amp	Medium Current 1-10 amps	High Current > 10 amps	Salt Water Resistance	Plastic Compatible
Rheolube 737S	-60 to 120	20	●			●	●
Rheolube 716A*	-54 to 150	20	●	●			
Instrument Grease 732C*	-54 to 150	20	●	●		●	
Rheolube 362HT	-54 to 125	50	●	●			●
Rheolube 789DM*	-40 to 150	80		●	●	●	
Rheolube 798*	-40 to 150	120		●	●		
Rheolube 368	-40 to 125	150			●		●

** Use with caution around polycarbonate, a-b-s resins, Buna N and other ester-vulnerable plastics and elastomers.*

 # Minimum contact force (g) that must be available for serviceability at -40° C.

Lubricants for Arcing Contacts	Temp Range (°C)	Low Contact Force < 100g	High Contact Force > 250g	Plastic Compatible
NyoGel 782G*	-40 to 100	●		
Rheolube 748LT	-40 to 100		●	●
Rheolube 731	-15 to 100		●	
UniFlor™ 8512	-50 to 225	●	●	●

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New Non-Burning Switch Lubricant Technology	Temp Range (°C)	Characteristics
NyeTact 570H-10	-30 to 225	Non-burning grease dispersion for all contacts where mV drop and Open Circuit Resistance can be a problem.
NyeTact 571H-10	-54 to 225	Lower-temp version of NyeTact 570H-10.
UniFlor™ 8923	-54 to 250	Extreme-environment, non-burning grease for medium-to-low current switches.

Lubricants for Distribution Switch Gear	Temp Range (°C)	High Contact Force > 250g	Salt Water Resistance	Plastic Compatible
Rheolube 368	-40 to 125			●
NyoGel 760D	-40 to 125		●	●
Rheolube 786B*	-30 to 150	●		

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