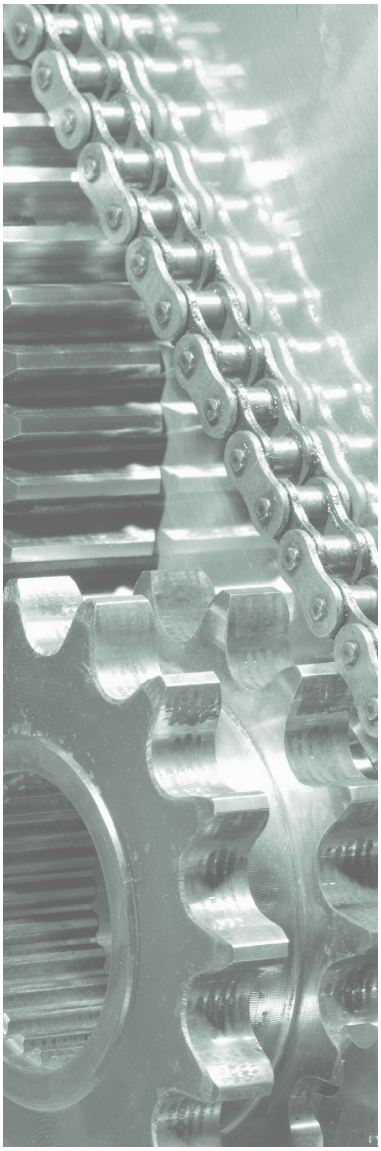
Lubenotes:

Design Engineer's Guide to Selecting a Lubricant

Lubricants for Slides,Cams, Detents and Instrument Gear Trains



Sliding parts present a challenge to lubricants. The combination of speeds and loads do not reach a point where a fluid film is created, as with ball bearings, and reversal of motion, which results in loss of the fluid film even in a ball bearing, is also much more common. This means that with slides, cams or detents, there is a propensity for mating parts to come into physical contact, to create friction and wear. Gears present a combination of rolling and sliding motion, with the latter being more difficult to lubricate effectively.

With the variety of synthetic oils, functional fluids, gellants, gelation processes and additives now available, the challenge can be met very effectively. Lubricants can be formulated to minimize friction; inhibit wear, rust, and corrosion; stay in place; enhance lubricity; damp noise; control free motion; meet broad temperature requirements without oxidizing or evaporating — or any combination of these qualities.

While oils are still used to lubricate small delicate mechanisms in watches, micrometers, and precision instruments, greases are the lubricant of choice for most sliding parts since they offer a basic stay-in-place capability. Greases are also quite effective for low-power devices. Light, low-shear greases are used successfully in computer peripherals, telecommunications equipment, and appliance timer motors. Some of these products approach a semi-fluid state. For applications powered by greater motive forces, greases can do more than lubricate and prevent wear. Heavier consistency greases offer proportionally more noise damping, motion control, and sealant qualities. *(See Lubenotes: Damping Greases)*

Specifying a lubricant. Lubricants for sliding parts must perform at least two functions: reduce friction and prevent wear over the life of the device. Temperature is key. Just as low and high operating temperatures impact the choice of design materials, seals and other components, they also should drive the selection of the lubricant. Film strength, a function of molecular architecture and viscosity, is also an important factor. It is the "film" of lubricant on a sliding or rotating part that reduces friction and prevents wear. A lubricant's ability to retain its film strength or viscosity over a broad temperature range is also important, since lubricants can become decidedly less viscous as temperatures increase. Finally consider a lubricant's compatibility with structural materials. Some plastics can be attacked by ester or polyether fluids. Natural and many synthetic rubbers are much less forgiving with oils and greases, and special care is needed when specifying lubricants which will contact elastomers.

Selecting the right lubricant for your application. Following is a partial list of popular Nye lubricants for critical mechanical applications. Additional oils and greases are available to meet a wide range of application requirements. For technical specifications, evaluation samples, questions about any Nye products, or to discuss a lubricant *custom-designed* for your application — call us at +1.508.996.6721 or visit our website at NyeLubricants.com.

Contact Nye at +1.508.996.6721
or contact@nyelubricants.com

Greases for Slides, Cams, Detents and Instrument Gear Trains

Greases for Slides, Cams, Detents and Instrument Gear Trains	Temp. Range (°C)	NLGI Grade	Load	Application Focus
Rheolube® 719M	-65 to 120	2	Ultra-light	Low-temperature instrument grease.
Rheolube® 723GR	-40 to 125	0.5	Light	General purpose gear train grease.
Rheolube® 362HM	-40 to 125	3	Light	Adhering grease for plastic parts.
Rheolube® 363F	-50 to 125	2	Medium	General purpose gear train grease; excellent noise-reduction and low torque properties.
Rheolube® 380*	-50 to 130	2	Medium	Wide-temperature grease with molybdenum disulfide for moderate to heavy-load gear trains.
NyoGel® 741E	-50 to 200	00	Ultra-light	Wide-temperature, semi-fluid phenylmethyl silicone grease for various instruments.
NyoGel® 759T	-40 to 125	1	Ultra-light	Medium viscosity grease to reduce noise, wear, starting torque. Good water resistance.
NyoGel® 779	-40 to 125	2	Light	Light viscosity grease intended for mechanical components that need light level of noise and motion control.
NyoGel® 744F-MS	-50 to 125	1	Medium	EP-fortified grease with molybdenum disulfide for heavily loaded metal gears.
Fluorocarbon Gel 880	-40 to 200	2	Heavy	Wide-temperature, dust and salt-water resistant slide and track lubricant. Good adherence.
UniFlor™ 8512S	-50 to 225	0	Medium	High-temperature, chemically resistant grease for extreme environments.

**Ester-based oils may adversely affect plastics such as ABS, polycarbonate and polyphenylene oxides.*

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