Nye®

Lubenotes:

Design Engineers' Guide to Selecting a Lubricant

Lubricants for Ball Screws and Lead Screws

Many factors must be considered when designing or selecting a linear positioning device. Operating load, speed, accuracy, environment, and power requirements all play major roles in the design decision. Whether the engineer selects a rolled ball screw, precision ground ball screw, or an Acme lead screw, the lubricant should also be carefully considered. A properly selected lubricant minimizes friction, reduces torque, increases the screw's efficiency, and extends performance life.

Enhanced performance. High quality synthetic greases offer many performance advantages over mineral-based lubricants. Synthetic lubricants function over wider temperature ranges; they offer greater thermooxidative stability and lower volatility; and they retain the viscosity needed to provide an adequate film thickness through a specified range of operating temperatures, speeds and loads. Special additive packages can further improve a grease's natural ability to resist water wash-out and reduce wear in the presence of shock-loading and vibration. Other additives can improve lubricity, to further reduce friction.

Specifying a lubricant. Proper lubrication plays an especially vital role in the performance and life of Acme lead screws with bronze or polymer nuts, because they are subject to higher friction and greater wear than ball screws. Even with self-lubricated nuts, lead screw performance can be significantly enhanced with light greases. Additional lubrication can also reduce heat in these units. Polymer or plastic nuts benefit from silicone-based greases and PTFE additives, which lower friction, increase efficiency and prolong performance life. Solid lubricants such as PTFE may also improve the roughness associated with the increased pre-loads of anti-backlash nuts.
Precision ground ball screws, where precise motion and smooth, quiet operation are desired, can take advantage of ultrafiltration technology . Pioneered by Nye Lubricants, ultrafiltration of grease and oil results in lubricants with unsurpassed cleanliness. For greases, ultrafiltration also improves the homogeneity of the thickening agent.

Selecting the right lubricant for your application. Following is a partial list of popular Nye lubricants used on tracks of potentiometers and other sliding position sensors. Additional oils and 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 Ball Screws and Lead Screws

Greases for Light Duty Ball and Lead Screws	Temp Range (C°)	Applications
Rheolube 362F	-54 to 125	Light, lithium-thickened, synthetic hydrocarbon grease, PTFE-fortified for low starting torque.
NyoGel® 744	-40 to 125	Fortified, synthetic hydrocarbon grease with tacktifier for improved adherence.
UniFlor™ 8512	-50 to 200	Chemically resistant, soft, wide-temperature grease for extreme conditions.

Greases for Medium to Heavy Duty Ball Screws	Temp Range (C°)	Applications
Rheolube 380	-50 to 130	Soft, lubricious, lithium-gelled, synthetic hydrocarbon and ester formulation.
Rheolube 363	-54 to 125	A medium-consistency, multi-purpose synthetic hydrocarbon grease.
NyoGel® 744F-MS	-40 to 125	Medium-consistency, synthetic hydrocarbon grease fortified with molybdenum disulfide. Recommended for heavily loaded applications.
UniFlor™ 8511R	-50 to 225	Chemically resistant, rust-inhibited, wide-temperature grease for extreme conditions.

Greases for Precision Ground and High Speed Ball Screws	Temp Range (C°)	Applications
Rheolube 733F, Ultrafiltered	-54 to 130	Ultrafiltered, medium-consistency, PTFE-fortified grease for medium-duty precision ball screws, where smooth, precise motion is needed. Good low-temperature, low-noise properties.
Nye Instrument Grease 732C	-54 to 150	Ester-based grease for high-speed, wide-temperature, light-to-medium duty applications.
Rheoplex 6000HT	-40 to 180	Ester-based grease for high-speed, high-temperature, medium-duty applications.

Lead Screws with Polymer Nuts	Temp Range (C°)	Applications
Rheosil 500F	-40 to 175	Soft, light-duty, silicone grease.

Greases for Vacuum Applications	Temp Range (C°)	Applications
Rheolube 2000F	-50 to 125	Ultrafiltered, medium-consistency grease with good load-carrying capability and low vapor pressure (better than 10^{-9} torr @ 25°C). Fortified with PTFE to enhance low-temperature performance and reduce noise.
UniFlor™ 8981	-65 to 250	Ultrafiltered, chemically resistant, wide-temperature grease for extreme conditions. Vapor pressire is better than 10-9 torr @ 25°C

Nye Lubricants, Inc.	12 Howland Rd.	Fairhaven, MA 02719	Phone: 508-996-6721	Fax: 508-997-5285

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