



# Lubene*notes*:

**Design Engineer's 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.

**Enhancing grease 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.

**Ultrafiltration.** Ultrafiltration removes virtually all particulate matter from grease and oil. For greases, it also improves the homogeneity of the thickening agent. Nye will ultrafilter any oil or grease and typically will recommend this service for precision bearing and ball screw applications to extend the bearing life.

**Selecting the right lubricant for your application.** Following is a partial list of popular Nye lubricants for ball screws and lead screws. 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 (508) 996-6721 or visit our web site at [www.nyelubricants.com](http://www.nyelubricants.com).

Contact Nye at 1.508.996.6721  
or [techhelp@nyelubricants.com](mailto:techhelp@nyelubricants.com)

The SmartGrease Company®

<b>Greases for Light Duty Ball and Lead Screws</b>	<b>Temp Range (C°)</b>	<b>Applications</b>
Rheolube™ 362F	-54 to 125	A light viscosity, lithium-thickened, synthetic hydrocarbon grease, PTFE-fortified for low starting torque.
NyoGel® 744	-40 to 125	PTFE-fortified, synthetic hydrocarbon grease, tackifier for improved adherence.
UniFlor™ 8512	-50 to 225	Chemically resistant, fluorinated, wide-temp. grease for extreme conditions.

<b>Greases for Medium to Heavy Duty Ball Screws</b>	<b>Temp Range (C°)</b>	<b>Applications</b>
Rheolube™ 380	-50 to 130	EP-fortified, 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	A soft, 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.

<b>Greases for Precision Ground and High Speed Ball Screws</b>	<b>Temp Range (C°)</b>	<b>Applications</b>
Rheolube™ 733F, Ultrafiltered	-54 to 125	A medium-consistency, EP- and 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.
Rheolube™ 374C	-40 to 150	Lithium-thickened, synthetic hydrocarbon grease for high-speed applications, developed as a synthetic replacement for Exxon's discontinued Andok®C.

<b>Lead Screws with Polymer Nuts</b>	<b>Temp Range (C°)</b>	<b>Applications</b>
Rheosil 500F	-40 to 200	Soft, light-duty, silicone grease. PTFE-fortified.
UniFlor™ 8192R	-20 to 250	High-viscosity, PFPE grease. Excellent plastic and elastomer compatibility.

<b>Greases for Vacuum Applications</b>	<b>Temp Range (C°)</b>	<b>Applications</b>
NyeTorr® 5200	-45 to 125	Ultrafiltered, soft-consistency grease with good load-carrying capability and very low vapor pressure characteristics for high-vacuum applications. PTFE-thickened to enhance low-temperature performance and reduce noise.
NyeTorr® 5300	-65 to 250	Ultrafiltered, chemically resistant, wide-temp. grease for extreme conditions. Low vapor pressure.