

Since 1844 Nye® LubeLetter

August 2020



Lubrication



Collaboration



Innovation

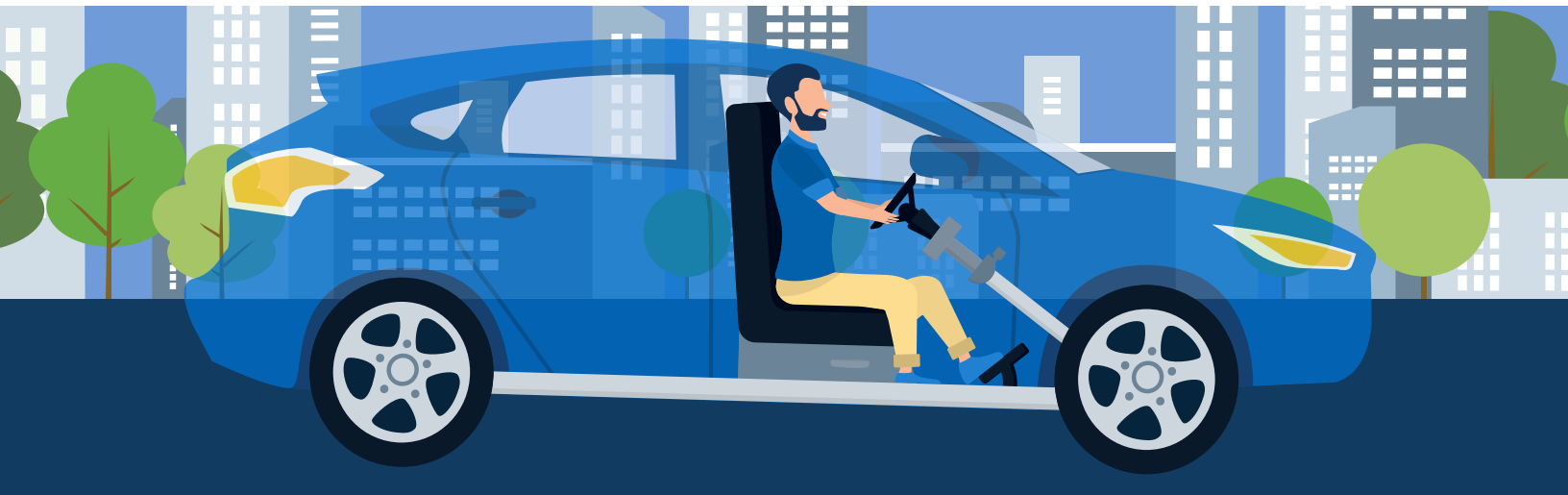




Lubricants for Steering Systems

Steering systems are becoming increasingly more advanced as OEMs designing the next generation of electric and autonomous vehicles prioritize safety, efficiency, and precision. Lubricants play an important role in increasing the life, performance, and reliability of the entire steering system. Lubricants reduce friction which in turn reduces heat and the amount of power draw on assist motors, extending the drivable range of the vehicle. Grease also protects and prolongs the life of components, making them less susceptible to failure, warranty claims, and safety related issues.

Nye's lubricants for steering systems were designed to lengthen operating life and improve the reliability of various components, including bearings, bushings, gears, housings, seals, shafts, and more.



Steering Column

If not properly lubricated, ball bearings located at the end of the steering column can negatively impact steering responsiveness and transfer noise and vibration through the steering column up to the driver. In addition, couplings within the steering column must be free to move but must produce no noise or vibration as it would lower the perceived quality of the end vehicle. Greases can effectively quiet these applications while also providing durability and wear protection. As each system is different, load should be considered when selecting a grease. Heavily loaded designs require a heavy viscosity grease to ensure the proper wear prevention and mechanical damping properties.

Telescope & Tilt Steering Column

Steering column mechanisms call for motion control greases, which are engineered to prevent wear and inhibit unwanted motion, noise and vibrations. These greases provide reliable, smooth, low-friction motion for high-shear mechanisms. Motion control greases provide lifetime lubrication within the gearbox and other pivoting and sliding components.

Electric Power Steering

With the heavy push from automakers towards electric and electric-hybrid vehicles, every milli-amp of power that can be saved translates into extended driving range. Light weight synthetic hydrocarbon greases with advanced additive packages greatly reduce frictional torque between the gearing components within the EPS system. This allows for lower current draw over extended periods of use. Additionally, these products improve low temperature torque performance, while also providing wear protection and vibrational damping. These synthetic hydrocarbon greases can also be used as an environmental seal due to their superior water washout/spray-off characteristics, corrosion protection, and wear mitigating capabilities.

Intermediate Shaft

Intermediate shafts, sometimes known as spline shafts, are a popular method used to enable telescoping steering columns to function while absorbing vibration and shock. For plastic-to-metal interfaces, a medium-viscosity, synthetic hydrocarbon grease enhanced by PTFE ensures good slip and low "stiction." For metal-to-metal interfaces, a heavier synthetic hydrocarbon grease is recommended. A lighter grease designed for sliding surfaces is recommended for tight tolerances between telescoping shafts.

Product	Chemistry	Temperature Range °C	Product Description	Application Notes
RHEOLUBE 363F	PAO/Lithium Soap	-50 to 125 °C	Medium viscosity, lithium soap, synthetic hydrocarbon grease fortified with PTFE. Intended for bearings, gears and slides that require low friction.	Steering Column Bearings EPS worm gears
RHEOLUBE 462CF	PAO/Lithium Soap	-54 to 130 °C	Next generation technology in a lithium soap thickened synthetic hydrocarbon grease.	EPS Gear
RHEOTEMP 662	PAO/ Calcium Sulfonate	-60 to 175 °C	Multi-purpose calcium sulfinate thickened, light viscosity, synthetic hydrocarbon grease. Superior water resistance.	EPS Housing Environmental Seal
RHEOLUBE 362HB	PAO/Lithium Soap	-40 to 125 °C	Lithium soap thickened, light viscosity, synthetic hydrocarbon grease. Fortified with PTFE, tackifier, rust inhibitor and UV tracer	Telescoping Steering Column
FLUOROCARBON GEL 868MS-X	PAO/PTFE	-40 to 80 °C	PTFE thickened, medium viscosity, synthetic hydrocarbon grease. Additives for EP and rust prevention.	Tilt Steering Column
NYOGEL 774VLF	PAO/Silica	-50 to 120 °C	Silica thickened, light viscosity, synthetic hydrocarbon grease containing a PTFE additive. Good water resistance and damping qualities.	Column Shaft/Seals
PG-44A	Polybutene/Silica	20 to 120 °C	Extremely stiff, silica soap thickened, heavy viscosity, synthetic hydrocarbon grease intended for applications that require a high degree of damping.	Steering Gear Shaft
FLUOROCARBON GEL 866	PAO/PTFE	-54 to 125 °C	PTFE thickened, light viscosity, synthetic hydrocarbon grease. Rust inhibited.	Intermediate Shaft Spline, telescope bushings
FLUOROCARBON GEL 875MS	PAO/PTFE	-20 to 125 °C	PTFE thickened, heavy viscosity, synthetic hydrocarbon grease. Fortified with EP and rust inhibiting additives.	Steering Gear/Yoke

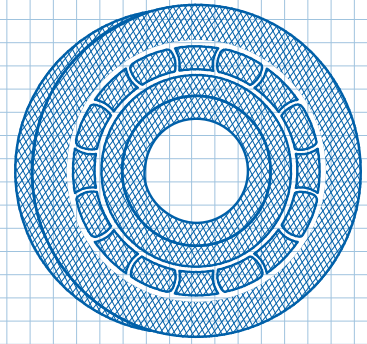


NyeClean® 5057

Semiconductor, clean-room, and in-vacuum manufacturing environments utilize robots for the handling and transfer of wafers, flat panel displays and other materials. Robots are often exposed to high vacuum, high temperature conditions, and are occasionally in contact with aggressive chemicals. These extreme conditions require a fluorinated lubricant to ensure the stable performance of the robots' precision metal bearings.

Advantages:

- Offers low outgassing, particle generation, & vapor pressure
- Complies with REACH PFOA regulations
- Reduces friction & wear
- Extends bearing life



Properties	Test Conditions	NyeClean® 5057	Test Method
Chemistry	–	PFPE / PTFE	–
Temperature Range	–	-50 to 250 °C	–
Kinematic Viscosity	40 °C	192 cSt	ASTM D445
	100 °C	35 cSt	
NLGI Grade	–	2	ASTM D1403
Oil Separation	24 h, 100 °C	6 wt%	ASTM D6184
Evaporation	24 h, 100 °C	0 wt%	CTM*
4-Ball Wear	1 h, 1200 rpm, 75 °C	20 kgf = 0.44 mm 40 kgf = 1.15 mm	ASTM D2266
Microscopic Particulate Contamination	10-34 µm	< 250 particles/cc	FED-STD-791 Method 3005.4
	35+ µm	0 particles/mL	
Knudsen Vapor Pressure	150 °C	1.24E-08 Torr	CTM*
	200 °C	2.66E-08 Torr	

*CTM: Nye Company Test Method

Packaging Options

NyeClean® 5057 is available in a variety of packaging options. If your application requires a specific container, please contact us for custom packaging.

Want to learn more? [Contact Us](#) or [Request a Quote](#)



Case Study: Reliable, Quality Feel for E-Brake Switch

Background

As vehicles incorporate increasingly sophisticated electric component designs, more lubrication points are required to ensure lasting, trouble-free operation. An Automotive Tier 1 Supplier came to Nye's European Channel Partner, Newgate Simms, in search of a lubricant for their Electronic Parking Brake (EPB) switch. The supplier needed a plastic-compatible grease that would prevent wear, reduce noise, and convey a quality feel within their switch's mechanical design.

Challenge

- Can the lubricant extend the life of the switch while imparting a quality feel to improve the driving experience?



Solution

Rheolube® 362HB

A lithium soap thickened, light viscosity, synthetic hydrocarbon grease.

- Reduces noise, vibration, and harshness for a quality feel
- Stable over a wide temperature range, -40 to 125 °C
- Compatible with most plastics and elastomers
- Ideal for sliding or rolling components

Product	Chemistry	Temperature Range	Oil Separation (ASTM D6184)	Evaporation (CTM*)
Rheolube® 362HB	PAO/Lithium Soap	-40 to 125 °C	2.2%	0.1%

*CTM: Nye Company Test Method

Results

After in-house testing, the automotive tier supplier was pleased that Rheolube® 362HB reduced surface wear during EPB operation and met the functional life requirements of the OEM. The supplier was also pleased with the improved tactile feel provided by the grease.

Want to learn more? [Contact Us](#) or [Request a Quote](#)



How Does Nye Qualify Our Lubricants?

Why Qualify?

What does it mean to qualify a lubricant? In order to be a qualified lubricant supplier, manufacturers must go through several steps to ensure that a lubricant can be manufactured the exact same way, every time, with minimal variations in the end-product. This process verifies that formulated lubricants can be manufactured reliably without encountering any unknown variables that may change products in a way that would pose risk to a customer's application. This is particularly important in industries such as automotive, medical and aerospace where failure comes at the cost of safety. There are three steps to achieve full qualification: installation, operational, and process qualification.



Installation Qualification

During installation qualification, time is taken to ensure that the equipment requirements for production are understood and documented. Once these requirements have been identified, the equipment must be run to test if it is setup correctly. An example of a requirement that would need to be validated would be the power and voltage requirements for the process.

Operational Qualification

After the installation requirements have been documented and validated, operational qualification can begin. During operational qualification, processes involved in manufacturing the lubricant are run at both the high and low end of the operating spectrum. Examples of process variables would be temperature, mixing speed, and time. Nye then determines the acceptable range of variation for these process factors.

Process Qualification

Once the equipment and operating parameters have been decided, Nye runs the manufacturing process as documented three times from start to finish. Each batch of the lubricant is tested after each run to make sure that any variances are within the specified range.

Qualified lubricants are lubricants you can trust. Documentation at Nye helps provide reassurance that our lubricants are produced reliably and to standard. To learn more about our Quality Management System and ISO Certifications, visit our [Quality Page](#).



Meet Nye - Joe Sahl

Meet Joe Sahl, Nye's Medical Industry Leader. Joe came to Nye in 2019 with more than 12 years of Engineering experience at prominent metal working, aviation, and medical device companies. Residing in Boston, Joe helps our customers in the Northeast United States find lubricants for demanding and sensitive mechanisms. As the new Medical Industry leader, Joe will investigate new lubrication trends and solutions for pharmaceutical manufacturing, medical devices, and surgical tools. Joe holds a bachelor's degree in Materials



Joe Sahl
Medical Industry Leader

◆ How has the Nye medical team worked to address some of the logistical issues surrounding medical device production during the COVID-19 pandemic?

Nye was able to remain open and operating through the pandemic, which allowed us to continue to serve many of our customers – medical among them – who were deemed essential businesses. Thanks to modern connectivity tools, our medical team was able to continue to virtually support efforts in this market. We've also been doing our part to ensure the supply chain for life-saving applications like ventilators remains uninterrupted by fast-tracking them when necessary.

◆ What are the lubrication requirements for ventilators?

Depending on the application, the requirements vary. For plastic/elastomer components, such as valves and seals, it's crucial that the lubricants be neutral in color, and avoid reacting with polymers like polycarbonate. PFPEs like our NyeMed® 7477 work well in these applications. For gearing applications, a lubricant must be able to handle moderate to heavy loading making PAOs like NyeMed® 7630 a good choice. The common thread through these applications is biocompatibility. It is critical that incidental contact with a lubricant or possible off-gassing not present a health threat to the patient. Our certification to [ISO 10993](#) provides this assurance.

◆ **What lasting impact will COVID-19 have on the medical device and diagnostic industry?**

Clinical work is critical to the development of medical devices. As employees worked remotely during COVID-19, labs ran with reduced workforces or closed entirely; this resulted in a temporary slowing of the development cycle. The backlog from this slowdown will probably persist for a while, as companies ramp back up. Additionally, the tide really went out with COVID. Those companies that survive - especially the larger ones with cash on hand – will likely be looking to make acquisitions of smaller companies and startups.

◆ **What role will lubricants play in the future of surgical technology?**

We're still exploring this space, however on the surface, I'd say complexity and sophistication in design is growing as surgical devices become more effective. Developers are targeting specific applications, new usage situations, and often utilizing new materials of construction. If we can help simplify the design by removing a mechanical element and allowing a lubricant to do the work, that's one less component to worry about.

◆ **What is your favorite part about working at Nye?**

No day is the same. Working every day to help our customers solve their design issues is a very satisfying feeling. I also enjoy learning about interesting new technologies and identifying potential new uses for our products.



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more updates
next month!**

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