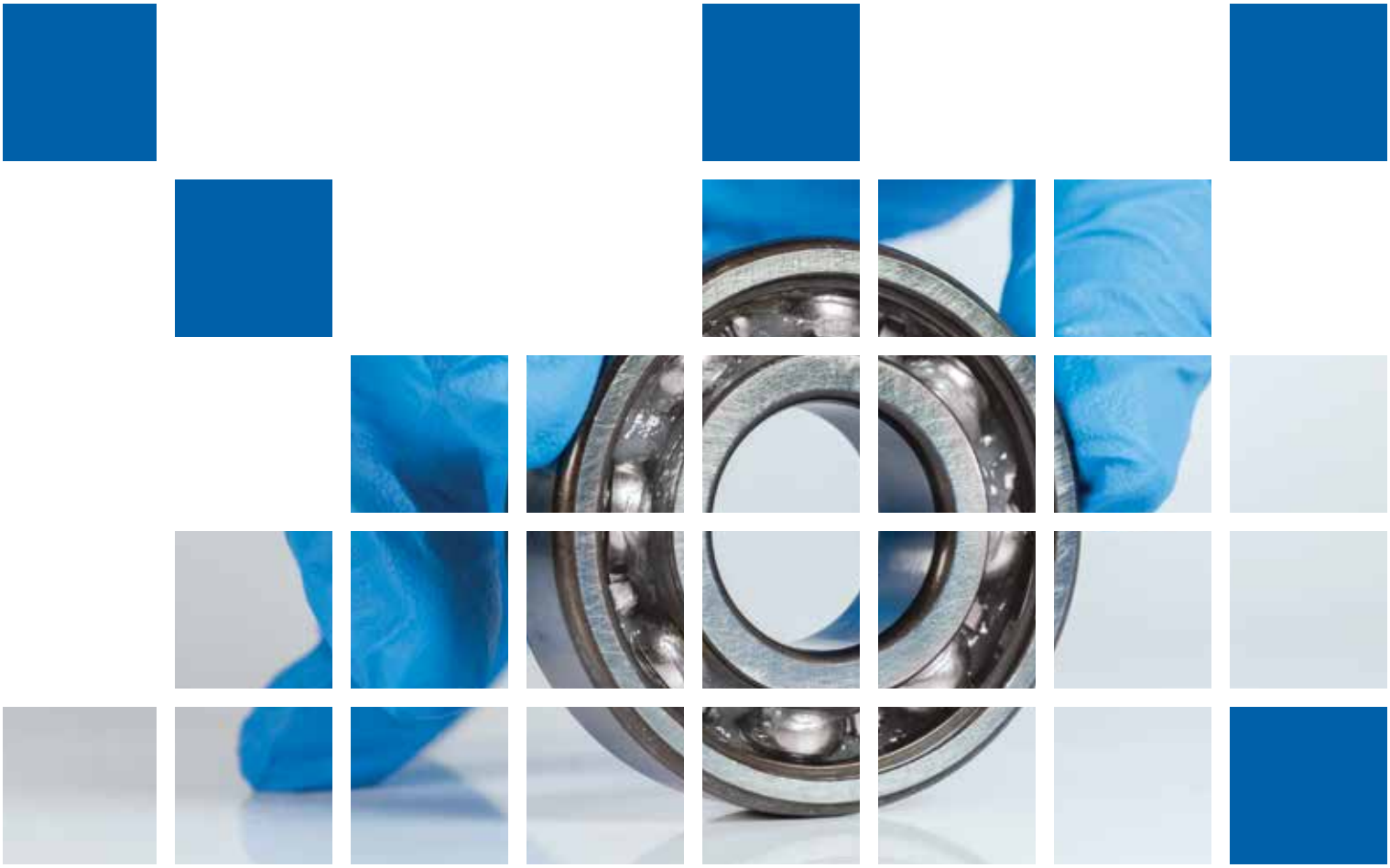


NYETORR® 6350EL & 6370EL

PFPE Ultra-High-Vacuum Semicon Greases

The highest load-carrying and life-endurance performance of any PFPE grease in the Semiconductor Industry.

Since 1844 Nye® Lubricants

NYETORR® 6350EL & 6370EL

THE SEMICON INDUSTRY'S MOST ADVANCED SYNTHETIC PFPE GREASES

GRAPH KEY: Heritage PFPE | NyeTorr® 6350EL | NyeTorr® 6370EL

Lubricating Semiconductor & In-Vacuum Components

Nye Lubricants developed new PFPE ultra-high-vacuum greases, **NyeTorr® 6350EL & 6370EL,** for the Semiconductor Industry. When compared with the top-performing PFPE lubricants on the market, NyeTorr® 6350EL & 6370EL demonstrate a significant improvement in friction, wear and durability, thus extending the life of bearings and other vacuum, cleanroom & semicon components.

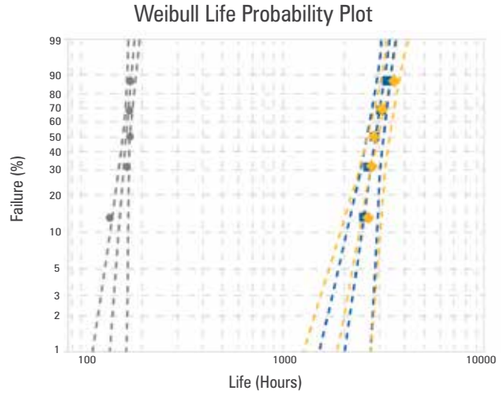
NyeTorr® 6350EL & 6370EL have shown greater than a 12x improvement in the life of rolling element bearings over traditional vacuum lubricants, while also demonstrating excellent performance in both boundary and mixed-lubrication regimes. The outgassing of these new greases demonstrates less than half the mass loss when compared with any other available PFPE greases on the market.

NyeTorr® 6350EL & 6370EL provide:

- very low particle generation
- the lowest level of outgassing
- the highest load-carrying & life-endurance performance

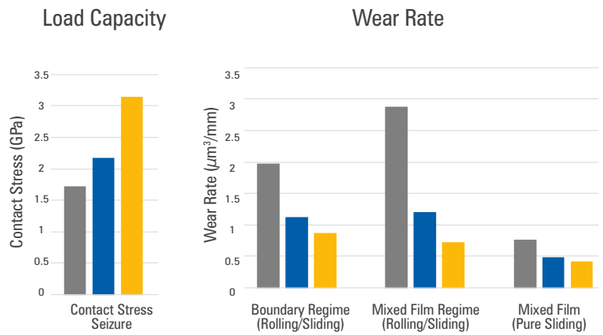
The introduction of NyeTorr® 6350EL & 6370EL marks a leap forward in PFPE lubricant technology. These greases increase the durability, functionality and reliability of any rolling or sliding mechanism to prolong the life of components and outlast life requirements.

Component Life



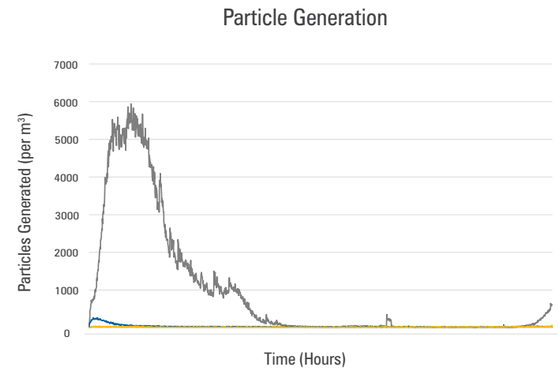
Test Details: R0F+ Deep Groove Ball Bearing Life (Fr = 100N, Fa = 200N, 230°C, 10,000 RPM)

Load Capacity & Wear



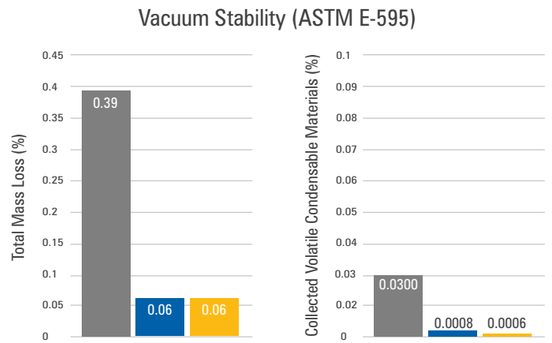
Test Details: Tested using a SRV Reciprocating Tribometer & Mini Traction Machine

Particle Generation



Test Details: 2400 RPM &1.2 m/s Air Speed

Outgassing



Test Details: 125°C, 24 Hours, 8.0 x 10^{-6} Torr

NyeTorr® 6350EL vs. 6370EL

The NyeTorr Extended Life series is comprised of two versions, 6350EL and 6370EL. These two greases were developed as part of a series to offer flexibility in lubrication of high-vacuum mechanisms.

The main difference between these two greases is the kinematic viscosity. The 6350EL is a lighter version that is aligned with legacy or "heritage PFPE" lubricants. 6350EL allows for direct replacement of heritage greases with the added benefits of improved life, reliability, and reduced wear. The 6350EL grease is ideal for most semicon & in-vacuum applications.

Due to its higher viscosity and molecular structure, 6370EL is the ideal grease for extreme application requirements. These requirements include high contact stresses, loads or additional needs in performance at high & low temperatures.

NyeTorr® 6350EL and 6370EL will provide improved mechanism life, extremely low outgassing & particle generation and improved reliability over any PFPE vacuum lubricant in today's semiconductor market.

What can NyeTorr® 6350EL & 6370EL do for your application?

- Extend functional life of components
- Reduce friction & wear
- Increase load-carrying capabilities
- Improve durability and reliability of mechanisms
- Ensure extremely low outgassing
- Provide excellent corrosion protection

Precision Bearings

Gears/Actuators

Ball/Lead Screws

Properties of Heritage PFPE and NyeTorr® 6350EL & 6370EL

LUBRICANT PROPERTIES		Heritage PFPE	NyeTorr® 6350EL	NyeTorr® 6370EL	Test Method
Base Oil		PFPE	PFPE	PFPE	
Temperature Range		-80 to 204°C	-80 to 250°C	-90 to 250°C	
Kinematic Viscosity	40°C	148 cSt	200 cSt	362 cSt	ASTM D-445
	100°C	45 cSt	48 cSt	103 cSt	
Worked Penetration (P60)		288	281	285	ASTM D-1403
Oil Separation (24h, 100°C)		6.24%	6.30%	4.73%	ASTM D-6184
Particulate Count (10 - 34 microns)		<1,000/cc	<400/cc	<400/cc	FED-STD-791D
4 Ball-Wear (40-kg load, 1200RPM, 1 hr, 75°C)		0.91 mm	0.74 mm	0.67 mm	ASTM D-2266
Vacuum Stability	TML	0.39	0.06	0.06	ASTM E-595
	CVCM	0.0300	0.0008	0.0006	NASA SP-R-0022A
ROF+ Bearing Life L_{50} (Fr=100N, Fa=200N, 230°C, 10,000RPM)		167 Hours	>2,400 Hours	>2,200 Hours	CTM
Bearing Corrosion (96h, 52°C, Distilled Water)		Fail	No Corrosion	No Corrosion	ASTM D-1743
Knudsen Vapor Pressure	25°C	5.28 E^{-08}	7.05 E^{-16}	6.29 E^{-16}	CTM
	200°C	2.12 E^{-05}	2.92 E^{-06}	2.96 E^{-06}	
Dynamic Particle Generation		ISO 5	ISO 4	ISO 4	CTM

Nye Today: Our performance is reflected in the value we bring to our customers.

Nye Lubricants is a leader in the innovation, formulation and provision of synthetic lubricants, enabling and improving breakthrough products and critical new technologies. We bring proven experience, deep technical knowledge and intense customer focus to solve our customers' toughest challenges, adding tangible value to products in a wide range of industries and applications.

For more than 65 years, Nye has been working with NASA and leaders in the commercial aerospace industry to address problems like outgassing & contamination. Much of this research is now paying off for the semiconductor industry, where Nye is applying this technology to design lubricants for uses in both in-vacuum and non-vacuum applications. NyeTorr® & NyeClean® are designed for vacuum semiconductor and cleanroom environments: such as wafer fabrication equipment, flat panel displays, and LCD manufacturing equipment. These chemically stable, low-vapor-pressure synthetic lubricants improve the performance and extend the operating life of vacuum components, while ensuring cleanliness.

Nye Lubricants, Inc.

12 Howland Road
Fairhaven, MA 02719 USA
Ph: +1.508.996.6721
Email: contact@nyelubricants.com

Since 1844 Nye® Lubricants

NyeLubricants.com

ISO 9001:2015
IATF 16949:2016
ISO 14001:2015
ISO 13485: 2016
AS 9001D

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