NYETORR® 6350EL & 6370EL
PFPE Ultra-High-Vacuum Aerospace Greases

The highest load-carrying and life-endurance performance of any available PFPE greases for the Aerospace Industry.
**NYETORR® 6350EL & 6370EL**

THE AEROSPACE INDUSTRY’S MOST ADVANCED SYNTHETIC PFPE GREASES

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**Lubricating Space Mechanisms**

Nye Lubricants has developed new PFPE ultra-high-vacuum greases, NYETORR® 6350EL & 6370EL, for the Aerospace 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 space mechanisms.

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:

- excellent low-temperature performance
- 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 space mechanism to prolong the life of components and outlast your mission life requirements.

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**Component Life**

Weibull Life Probability Plot

**Bearing Corrosion**

Corrosion Performance (ASTM D-1743)

**Load Capacity & Wear**

Load Capacity & Wear Rate

**Outgassing**

Vacuum Stability (ASTM E-595)

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

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

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**The Future of Space**

The future of space exploration and the mechanisms that make it possible will require even more protection from the exposure to a variety of extreme conditions. The durability and reliability of all the mechanisms, including the lubrication, will need to be improved for long range space exploration missions to be possible. These missions will include exposure to ultra-high vacuum, radiation and temperature extremes (both hot & cold); thus making higher performance and extended life lubricants a requirement.

First and foremost, the future of lubricants for space mechanisms will require a longer expected life and ensuring that the ability to service or replace components during extended voyages will be very limited or non-existent. Low outgassing materials to prevent contamination of any critical system on the vessel will also be a requirement. Finally, the environmental durability of a lubricant will be important for the extreme temperatures of deep space, as well as possible exposure to ozone, radiation, or other corrosive gases.

Whatever trials lie ahead, Nye Lubricants and our Research & Development team is ready to meet the challenges and make it possible to conduct extended life lubricants a requirement.
### Properties of Heritage PFPE and NyeTorr® 6350EL & 6370EL

<table>
<thead>
<tr>
<th>LUBRICANT PROPERTIES</th>
<th>Heritage PFPE</th>
<th>NyeTorr® 6350EL</th>
<th>NyeTorr® 6370EL</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Oil</td>
<td>PFPE</td>
<td>PFPE</td>
<td>PFPE</td>
<td></td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-80 to 204°C</td>
<td>-80 to 250°C</td>
<td>-90 to 250°C</td>
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<tr>
<td>Kinematic Viscosity</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>40°C</td>
<td>148 cSt</td>
<td>200 cSt</td>
<td>362 cSt</td>
<td>ASTM D-445</td>
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<tr>
<td>100°C</td>
<td>45 cSt</td>
<td>48 cSt</td>
<td>103 cSt</td>
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<tr>
<td>Worked Penetration (P60)</td>
<td>288</td>
<td>281</td>
<td>285</td>
<td>ASTM D-1403</td>
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<tr>
<td>Oil Separation (24h, 100°C)</td>
<td>6.24%</td>
<td>6.30%</td>
<td>4.73%</td>
<td>ASTM D-6184</td>
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<tr>
<td>Particulate Count (10 - 34 microns)</td>
<td>&lt;1,000/cc</td>
<td>&lt;400/cc</td>
<td>&lt;400/cc</td>
<td>ED-STD-791D</td>
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<tr>
<td>4 Ball-Wear (40-kg load, 1200RPM, 1 hr, 75°C)</td>
<td>0.91 mm</td>
<td>0.74 mm</td>
<td>0.67 mm</td>
<td>ASTM D-2266</td>
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<tr>
<td>Vacuum Stability</td>
<td>TML</td>
<td>0.39</td>
<td>0.06</td>
<td>ASTM E-595</td>
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<tr>
<td></td>
<td>CVCM</td>
<td>0.0300</td>
<td>0.0008</td>
<td>NASA SP-R-0022A</td>
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<tr>
<td>ROF+ Bearing Life (Fr=100N, Fa=200N, 230°C, 10,000RPM)</td>
<td>167 Hours</td>
<td>&gt;2,300 Hours</td>
<td>&gt;1,800 Hours</td>
<td>CTM-059</td>
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<tr>
<td>Bearing Corrosion</td>
<td>Fail</td>
<td>No Corrosion</td>
<td>No Corrosion</td>
<td>ASTM D-1743</td>
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<tr>
<td>Knudsen Vapor Pressure</td>
<td>25°C</td>
<td>5.28 E-08</td>
<td>5.76 E-12</td>
<td>CTM-99</td>
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<tr>
<td></td>
<td>200°C</td>
<td>2.12 E-05</td>
<td>1.12 E-03</td>
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<tr>
<td>Dynamic Particle Generation</td>
<td>ISO 5</td>
<td>ISO 4</td>
<td>ISO 4</td>
<td>CTM</td>
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</table>

**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.

We have been designing high-quality, synthetic lubricants for leaders in the Aerospace industry for more than 65 years. Nye works with design engineers in the private, government, and defense sectors to formulate new synthetic lubricants that will take off with next-generation spacecraft. From the Mercury Mission, to the Mars Curiosity Rover and the International Space Station, Nye’s space heritage includes lubricating important applications that must survive the severe conditions of the space environment and the mission requirements.

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