



Lubeletter

Synthetic Lubricant News from The SmartGrease Company™

NEWSClips

Two new Regional Engineering Managers joined the Nye team. Tony Dotson, based Statesville, NC, has a BSME, an MS, and 15 years experience in product and technology development. Brian Holtkamp holds a B.Sc. and an MBA. He's active in STLE, SAE, and ASTM, where he currently serves as chairperson of the ASTM G2 Wear and Erosion Committee. Brian joins Nye's Chicago office.

Mondipak Gauteng, a key player in the South African corrugating industry, reports, "We have been using NyeCorr® 140 and we have not lost or replaced a bearing so far." NyeCorr 140 was developed specifically for heated roll bearings in "single facers," which press flutes into corrugated paperboard.

TS-16949 enters its final stages at Nye. The registration audit was completed on January 26, 2005. TS-16949, is the international quality standard for automotive suppliers.

NSF International recently approved UniFlor™ 8622 for incidental food contact. UniFlor 8622 is a high viscosity, fluorinated grease with excellent high-temp performance (-15 to 250°C). The grease joins a broad family of Nye food-grade lubricants.

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Synthetic Lubricants Play a Vital Role in Airbag Performance and Life

As consumers and governmental safety agencies demand increased driver and passenger protection, industry watchers forecast a proliferation of airbags. Vehicles with six, eight or more airbags will likely be the rule, not the exception. One more rule: choose the right synthetic lubricant for these safety systems. Otherwise, airbag reliability and operating life will be compromised.

Lubricating Contacts. Focus on airbag connectors, which transfer electrical signals from sensors to airbag inflators. Electrical contacts — the pins or blades within the connector housing that carry the current — are subject to high humidity, temperature cycling, and micro motion due to vibration. These conditions can create resistive oxides that trigger the "Check Airbag" indicator light on the dashboard or, worse, prevent the sensor signal from activating the inflator.

A contact lubricant helps ensure connector integrity. Applied as a thin coating on contact surfaces, a lubricant prevents both environmental and fretting corrosion, the two most common causes of erratic operation and premature connector failure. Yes, even for the gold-plated connectors that are commonly used for airbags.

Contact manufacturers usually apply only a thin plating of gold on substrate metal to keep costs down. Consequently, the plating is usually microscopically porous. Though gold itself is not subject to corrosion, over time, oxides of the exposed substrate can "ooze" through the pores or scratches in unlubricated gold plating and cause "open circuit resistance" problems. A film of lubricant, which is much more economical than a thicker layer of gold, can seal those pores and also guard against scratches during mating and unmating. Importantly, the contacts on airbag cutoff switches,

often idle for long periods of time, should also be lubricated.

Chemistry 101. Several chemistries are used to formulate contact lubricants. Each has unique benefits. Synthetic hydrocarbons provide excellent film strength, broad temperature serviceability, and protection against environmental and fretting corrosion. Fluoroether lubricants withstand extreme temperatures and resist aggressive chemicals and solvents. Five and six-ring polyphenyl ethers, extremely stable in thin film, have an excellent track record on gold-plated connectors, but they do not always perform well at sub-zero temperatures.

Insertion Force. Lubricants also reduce the force it takes to mate connectors. Ergonomically, high insertion force can lead to repetitive strain injuries among assembly workers. It can also result in bent pins or blades, which may lead to performance problems. While all lubricants reduce insertion force to some extent, some are designed to meet recent USCAR standards that set maximum allowable connector insertion force to 75 Newtons (16 lbs). If reducing insertion force is a primary concern, connector lubricants, especially for multi-pin connectors, should be tested to USCAR standards. **MORE On-line**



SmartGrease™ for Airbags

Grease	Temp. Range (°C)	Notes
NyoGel® 760G	-40 to 125	Long term contact protection
UniFlor™ 8917	-70 to 225	Excellent insertion force reduction Meets USCAR standards
Fluorocarbon Gel 885ST	-50 to 200	Excellent for clock spring noise and wear
Fluorocarbon Gel 855D	-40 to 125	Broad temp PAO airbag cut-off switch grease
Rheolube™ 716A	-50 to 150	Wider-temp., ester airbag cut-off switch grease

All products listed here are specified by automotive OEMs or Tier One suppliers. Other products for these applications are available from Nye.

Shell Multiplies Pennzane® Fluids

Responding to market demand for a broader range of viscosities, *Shell Global Solutions* moved *Pennzane X-1000* and *Pennzane X-3000* from experimental status to commercially available products in December 2004.

Pennzane fluids are multiply alkylated cyclopentanes. MACs are synthetic hydrocarbon fluids that combine excellent wear protection and low vapor pressure — critical characteristics for lubricating components in space and other vacuum environments.

Pennzane X-2000, which has a viscosity of 14.5 centistokes (cs) at 100°C, was introduced more than 12 years ago. The subject of many tribological studies, including joint studies by NASA and Nye, it is now used extensively in satellites, space vehicles, and space suits. It is also used in semiconductor manufacturing systems and other vacuum environments. Vacuum applications demand lubricants with very low vapor pressure because “outgassing” depletes lubricant supply and, worse, can contaminate products or nearby components — wafers or satellite optics, for example.

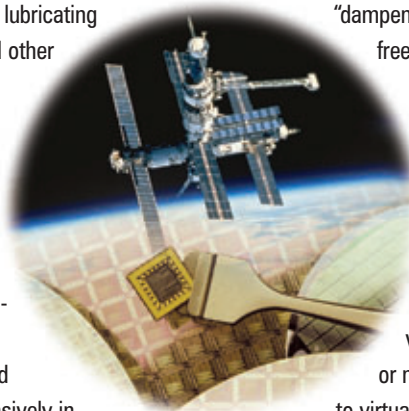
Pennzane X-1000 has a viscosity of <10cs at 100°C. It can lubricate mechanisms with

very low starting torque, even at very low temperatures. *Pennzane X-1000* remains fluid between -50 and -60°C, compared to *Pennzane X-2000*'s low temperature rating of -45°C.

Pennzane X-3000's viscosity is 200cs at 100°C. This heavier viscosity offers better wear protection, especially for higher loads. *Pennzane X-3000* is also viscous enough to act as a “damping fluid,” that is, a fluid that “dampens” noise and unwanted free motion.

In addition to broader temperature ranges and heavier loads, Shell's commercialization of these two products enables Nye to formulate a full range of Pennzane viscosities by blending two or more of the Pennzane fluids to virtually any viscosity between 8cs and 200cs (at 100°C). That's good news for customers, who can now get a Pennzane oil or grease that more precisely matches the requirements of their applications.

Nye has a 10-year contract with Shell for the distribution of Pennzane in the United States. Nye was the first company to commercialize and sell Pennzane-based lubricants and has a broad family of oils and greases made with Pennzane fluids. [MORE On-line](#)



If you want to know how long a lubricant is likely to last, it's important to ask the right question. This may help: Shelf life is not the same as functional life.

Shelf life is the period following the lubricant's manufacture during which it is deemed suitable for use without re-testing its physical characteristics. Functional life is determined by durability or accelerated life testing of a lubricant in a component under expected operating conditions.

Synthetic oils are inherently stable materials. Generally, they are not expected to oxidize, polymerize or volatilize at room temperature for 10 years or more. For example, we have regularly conducted ASTM tests to check the quality of certain very delicate synthetic hydrocarbon precision bearing oils five years after manufacture and have detected no degradation.

Fluorinated oils and silicones are not likely to be affected by simple aging. Ester oils, where the ester linkage may be subject to a minute degree of hydrolysis in the presence of moisture, could become more acidic if moisture is present.

Greases can “age” in more complicated ways. Grease quality could be affected by a change in the gel structure. If the gel contracts, significant oil bleed would be evident, and the remaining grease would stiffen. The gel structure may also become softer over a period of time. In both cases, however, a visual inspection of the grease should suggest retesting before use.

The “shelf life” of most oils and greases manufactured by Nye is four years from date of shipment, provided that the oils and greases are properly stored in their original, unopened containers. It should be noted, however, that most lubricants manufactured at Nye are designed for lifetime component lubrication, which means their “functional life” often exceeds 10 years in extreme operating conditions. [MORE On-line](#)



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