Nye® LUBRICANTS

LubeLetter

Volume 25 Number 1

Lifetime Solutions With Synthetic Lubricants

Manufacturers Tapping Benefits of Electrically Conductive Lubes

Electrically conductive greases aren't new to the marketplace, but recently Nye engineers have noticed a renewed interest in the ability of these lubricants to enhance the performance and extend the operating life of various devices.

One application involved static build-up in rolling element bearings in an electric motor. Nye developed its first conductive grease more than 10 years ago to address this problem. Traditional lubricants allow static discharges, or arcs, to pit the rolling elements, which accelerates wear. With a conductive grease, the charge passes through the bearing with minimal electrical damage, and motor life is extended.

A treadmill manufacturer also found a solution with a conductive grease. The treadmill's rubber belt generated static electricity which made its way to the bearing, arced, and fluted the raceway. A conductive grease helped to maintain the ground and extend bearing life. In a similar but more common application, conductive greases are used to bleed static electricity away from the toner cartridge toward the shell in laser printers and copiers.

Conductive greases can also be used to improve performance of single-conductor stationary separable electrical connectors (not sliding switches, which could malfunction if a conductive lubricant is applied.) For example, Nye recently custom-formulated a conductive, fluorinated grease for automotive battery lugs. It enhances conductivity over a wide temperature range when applied to battery terminals.

When the geometry of a connector design does not allow a tight fit, conductive greases can act as a bridge for the current. In another automotive application, Nye formulated a conductive grease that provides a ground return for rotating,

***NyoGel 753G**, an electrically conductive bearing grease, helps extend bearing life by allowing static discharge to pass through the bearing instead of pitting the rolling element or fluting the raceway.*

steering-column circuitry. A mechanical solution would have required more expensive slip-ring geometry, which would then pose reliability issues. Using a conductive grease to provide a current path between the two moving parts proved to be a much more reliable, cost-efficient approach.

Nye currently offers three standard conductive greases. For rolling element bearings, there are NyoGel 753G, a polyol ester grease, and NyoGel 756G, a synthetic hydrocarbon for use with ester-vulnerable plastics. These NyoGels offer a volume resistivity of approximately 30 ohm-cm. NyoGel 760H is recommended for stationary connectors. Its volume resistivity is 10,000 ohm-cm, higher than NyoGels designed for bearings because NyoGel 760H contains a greater percentage of hydrophobic thickener (and less conductive filler) to ensure water and salt-water resistance. However, in laboratory tests, its conductivity is still sufficient to turn on a 60-watt light bulb, rendering it an excellent conductivity enhancer for stationary connectors.

Of note, NyoGel 753G and NyoGel 756G do not have the paste-like quality of most conductive greases. Because they rely on a proprietary carbon filler, rather than metallic particles, they are more gel-like, and deliver channeling properties needed for rolling element bearings.

For the future, conductive oils for disk drive bearings are under development at Nye. A conductive oil will protect the miniature bearings from arcing damage, by continually bleeding charge across the bearing interface, to increase the drive's reliability and operating life.

Will a conductive lubricant improve the performance of your application? Technical Director Paul Bessette offers this rule of thumb. If static discharge poses a hazard to any application that requires a lubricant, consider a conductive lubricant.

New Regional Engineering Manager Named

John Graham, formerly the Corrugating Industry Manager at DuPont, became Nye's new Mid Atlantic Engineering Manager on November 1.

John held a variety of management positions in technical service, marketing, and sales at DuPont, the company he joined 31 years ago, after discharge from

John Graham

the US Air Force. For the last eight years, he was responsible for sales, service, and distribution of Krytox® lubricants to the US paper containerboard industry, a market segment that he developed for DuPont.

While at DuPont, John was the first Vice Chairman of the American Software Users Group, an organization formed to expand the commitment of software manufacturers to corporate customers. ASUG grew from two to 130 member companies during his tenure. For the last five years, John also directed the Krytox® group's sponsorship of NASCAR's Busch Grand National racing program with driver Ricky Craven.

"I enjoyed the NASCAR program," John said, "because I saw similarities between it and the people I worked with in the corrugating industry. You find the same kind of work ethic in both places. It's not unusual for the maintenance crew in a corrugating plant to work 16 hours a day, just like the maintenance crew on a race team. And finding the best lubricant is as important to a corrugating plant as it is to a NASCAR crew."

At Nye, John will serve customers in New Jersey, Delaware, Maryland, and Eastern Pennsylvania. He can be reached at (609) 384-0150. His fax is (609) 384-1220.

Nye Expands Small Volume, Specialty Packaging Services

To meet increased customer demand, Nye has relocated its packaging and shipping departments to a new 18,000 square-foot facility that offers a variety of specialty packaging services, as well as fast-turn sampling of Nye's more than 400 synthetic oils and greases.

The new facility houses automated oil and grease packaging equipment, warehouse space, and workstations for filling containers by hand, for very small orders and sample requests.

"We have a growing number of customers from a variety of industries who want oils and greases packaged in small, ready-to-use dispensers, " Vice President George Mock said. "Many customers use them to ship factory-authorized lubricants for field maintenance or conversions. A good number of manufacturers rely on us for pre-filled grease cartridges and syringes, which are used in automated dispensing equipment. Others incorporate our smaller dispensers into maintenance kits for their service technicians, or sell them with their products for maintenance by the end-user. This new facility is dedicated to offering these specialty packaging services."

Nye stocks a broad array of standard, small containers. For oils, they include stationary and pop-up tip vials, PVC bottles, and "hypo" oilers. Grease dispensers include polypropylene jars, pipettes, squeeze tubes, plastic syringes, aluminum foil blister packs, fiberboard grease gun cartridges, and Semco® plastic cartridges and EFD syringes for automated grease dispensing. Applicator-cap glass bottles and three styles of spray containers — aerosol cans, pump sprayers, and shop-air containers — round out the dispenser categories.

In addition, Nye custom-designs and assembles lubricant kits, offers private labeling services, including label and kit design, and custom packaging solutions for applications where standard containers do not meet a customer's dispensing requirements.

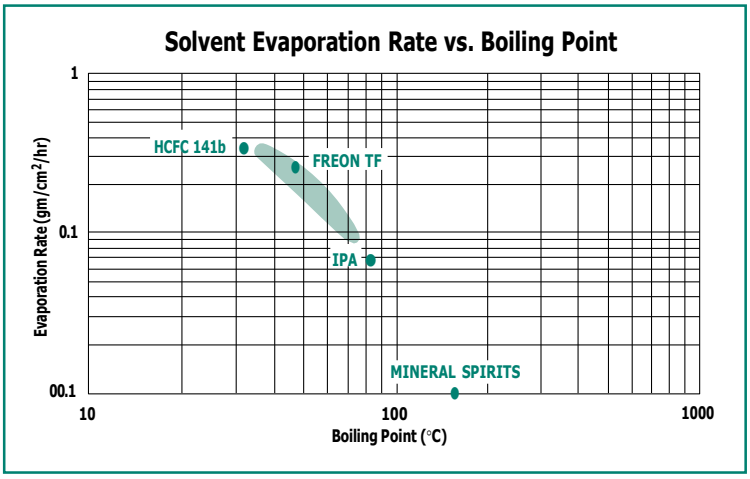
The new packaging facility has also enhanced Nye's ability to fulfill sample requests from customers and prospective customers.

"In the last quarter of 1996 alone, we shipped well over 300 samples," said Materials Manager Skip Pierce. "93 percent were shipped the same day the request arrived. With our new facility, we could easily double or triple that volume, and still maintain same-day turn-around."

Nye recently published a new brochure that describes its specialty packaging services. To receive your copy — or a lubricant sample from Nye — return the Sample/Literature Request card, or call Nye at 508•996•6721.

New Solvents Usher In Next Generation of Electrical Connector Lubes

Since the demise of ozone-depleting Freon and methyl chloroform, it has been extremely difficult to find solvents that are both safe and suitable for dispersing contact lubricants. Now, that conundrum has a solution, literally. Nye engineers have formulated a new family of nonflammable NyeTact lubricants carried in solvents that match the evaporation rate of Freon TF — without the ozone depleting potential.



Shaded area shows range of evaporation rates for Nye's new halogenated solvent blends.

NyeTacts, oils and greases dispersed in solvents, are used throughout the telecommunication industry to apply a thin film of lubricant to prevent wear and corrosion of noble metal, tin, and tin-lead connectors. Formerly, NyeTacts were formulated with Freon. When CFCs were banned, Nye converted to ozone-safe but expensive perfluorinated solvents for fluoroether NyeTacts. Synthetic hydrocarbon and polyphenyl ether NyeTacts were dispersed in HCFC-141b or mineral spirits.

"Those interim products were quite functional," Nye Vice President George B. Mock, III, said, "but we all recognized the need to find a long-term, environmentally friendly alternative to HCFCs and a cost-efficient alternative to perfluorinated solvents. We began to experiment with several new halogenated solvents, and this new generation of NyeTacts is the result."

Besides being nonflammable, ozone-safe, and relatively inexpensive, the halogenated solvents offer an added advantage. They allow the reintroduction of UV or colored dyes to NyeTact solvent dispersions. The dyes are used to identify lubricants on contact surfaces, but were not soluble in perfluorinated solvents or HCFCs.

Further, these new halogenated solvents again allow the addition of UV dyes to NyeBar, Nye's fluorocarbon barrier film, which is used to control oil creep and to protect printed circuit boards by repelling moisture, oil, and attendant dust entrapment. A new felt-tip dispenser for NyeBar, about the size of a Magic Marker®, will be introduced in 1997.

"For more than a year, Nye has worked closely with chemical companies that are developing halogenated solvents," explained David Stone, who focuses on new product development at Nye. "We conducted blending experiments, measuring the solubility characteristics of our base oils, gellants, and additives, and resolved key co-solvency issues. Now, we can blend various solvents, lubricants, additives, and dyes in such a way that they remain a solution. That's where the magic comes in — in the formulation."

A full range of halogenated-solvent NyeTacts, with and without UV dyes, are now available. The amount of oil or grease in a NyeTact dispersion ranges from two to 20 percent by weight, depending on the thickness of the film desired. HCFC and mineral spirit versions of NyeTacts are also available.

Suitable for both dip and spray methods, NyeTacts can be supplied in bulk; in handheld, refillable metal containers, pressurized with plant air; in small brush-applicator bottles; and in new, non-aerosol "pump-up" spray bottles. For other packaging options, contact Nye.

New Lube Kit For OEM Engineers

In a departure from its business of formulating custom lubricants for OEMs, Nye is offering a "tool kit" to introduce its capabilities to design and manufacturing engineers.

The Nye Lubricant Kit contains four synthetic lubricants. NyeFilm Dry 100 is recommended for mold release applications. NyeFilm Wet 200 is a penetrating, anti-corrosion lubricant dispersion for metal parts. NyeFilm Grease 300T is a stainless, general-purpose grease in a four-ounce dispenser tube. NyeFilm Oil 400, packaged in a 1/2-ounce "hypo" oiler, is a precision instrument oil with lubricity and anti-corrosion additives.

The Kit can be purchased from Nye's authorized, small volume distributor, TAI Lubricants, Inc., by calling (302) 326-0200.

Nye Publishes Chapters on Lubes

An excellent addition to an engineer's reference shelf is *Synthetic Lubricants and High Performance Functional Fluids* (Marcel Dekker, Inc., New York, 1993), written by 37 recognized experts. Paul Bessette, Nye's Technical Director, wrote the chapter on synthetic grease applications in the first edition. David Stone, Ph.D., Nye's Engineering Manager for New Products, has collaborated with Paul on the grease chapter for the second edition, updated with the latest information on grease solvent dispersions, packaging, analytical testing methods, and technical references.

Paul and David also completed a chapter on aerospace lubricants for *Space Vehicle Mechanisms: Elements of Successful Design*, edited by Peter Conley, due to be published in 1997 by John Wiley, Inc.

Nye Publishes History of Its First 150 Years

The Last American Whale-Oil Company, A History of Nye Lubricants, Inc., 1844-1994. was publicly introduced at a lecture by the author, Ed Parr, at The New Bedford Whaling Museum on September 12, 1996.

Published by Nye, the 103-page, illustrated book traces the Company's gradual transformation from a whale-oil refinery in the nineteenth century to a manufacturer of synthetic lubricants. The book is sold through The Whaling Museum, 18 Johnny Cake Hill, New Bedford, MA 02740, Telephone: (508) 997-0046.

Small Volume Orders Made Easy

Nye recently named TAI Lubricants, Inc., its authorized distributor in North America for product orders under $250. Technical support is still provided by Nye engineers.

TAI has no minimum-order policy. Customers can order any Nye product by phone or fax, and stocked items are shipped by UPS within 24 hours. For customer convenience, TAI accepts Visa and Master Card.

Contact TAI Lubricants by telephone at (302) 326-0200 or by fax at (302) 326-0400.

New Energy-Saving Lubricants for Power Tool Manufacturers

To offer power tool manufacturers a way to dramatically improve the efficiency of their battery-powered product lines, Nye recently added Santotrac® traction lubricants to its extensive family of synthetic oils and greases

Traction lubricants, available as oils and greases, are designed for traction drives, common in battery-powered hand tools. These drives work on the principal that rotary motion, torque, and power are transferred by smooth rolling elements loaded against each other. They offer several advantages over power transmission to design engineers, including precise speed control, low maintenance, constant power transmission, low vibration levels, and economical cost.

Traction lubricants have been shown to increase significantly the energy efficiency of traction drives. Under elastohydrodynamic (EHD) conditions, the lubricant regime where contact pressures are high enough to transform lubricants into quasi-solids, the unique molecular structure of traction lubricants enables them to solidify more quickly and at lower contact stresses than conventional lubricants. Under stress, they form a "pad" of lubricant between the rolling elements. This "pad" not only reduces metal wear, it provides traction which reduces slip and enhances the tangential force of the rolling elements.

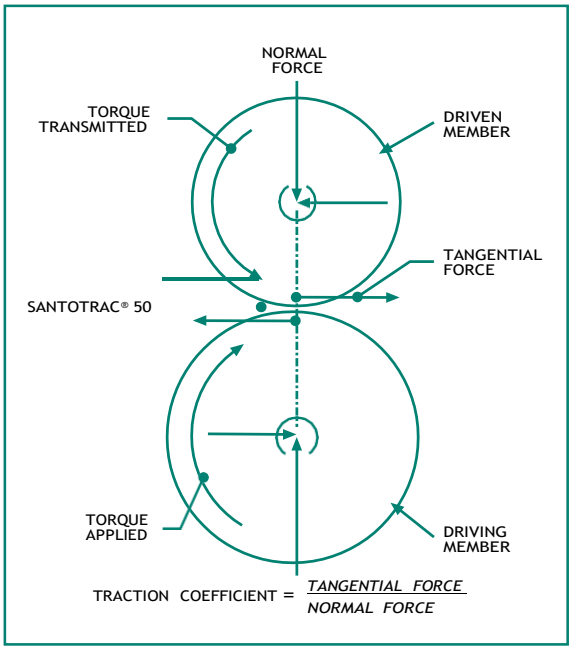
"While designed primarily for traction drives, traction lubricants can also improve the energy efficiency of more traditional gear drives," Nye Technical Director Paul Bessette said. "In either case, design engineers want to extend service life and maximize stored energy. Switching to a traction lubricant is an easy, cost-effective way to accomplish these objectives."

Traction lubricants may even lower the production cost of power tools, offering additional profit margins to manufacturers.

"Because they become quasi-solid under lower contact stresses than traditional lubricants, traction lubricants allow a design engineer to consider smaller, lighter-weight, lower cost drives for battery-powered tools — without reducing the efficiency of the end-product," Paul added.

Other potential uses for traction lubricants include rolling contact bearings, journal and sliding bearings, hydraulic fluids, and automatic transmission fluids.

Santotrac® traction lubricants are manufactured by Findett Corporation of St. Charles, Missouri. Findett named Nye an authorized repackager of its traction lubricants, and exclusive distributor for the New England and Mid-Atlantic regions. Samples and technical data are available from Nye.



***Santotrac® Traction Lubricants** not only protect rolling elements from wear, they reduce slip, thereby improving drive efficiency and maximizing the stored energy in battery-powered tools.*

Nye LUBRICANTS P.O. Box 8927 New Bedford, MA 02742-8927 Phone 508-996-6721 Fax 508-997-5285 E-Mail techhelp@nyelubricants.com

Dulub Co., Ltd. www.dulub.com.tw tel : 886-7-536 5500

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