

SPRING 1975

NYE *lubeletter*



FROM: WILLIAM F. NYE, INC., P.O. Box G-927, New Bedford, Mass.

SYNTHETIC OILS AND GREASES

The entire second page of this issue of the Nye Lubeletter summarizes ten years of effort developing two complete families of wide-temperature synthetic lubricants for highly-engineered devices requiring lifetime lubrication. Don't miss reading:

"A DOUBLE-TRACK MAIN LINE TO LUBRICANT EFFECTIVENESS" on Page 2.

Synthetic High-Temperature Gearmotor Grease

The lubrication of the gear teeth in a gear train not only exposes a lubricant to the high impact forces of meshing metal, but does so in a thin film such that a grease's resistance to oxidation can become the weak link in the complicated chain permitting long life without re-lubrication. This is especially so when operating temperatures exceed 200° F., an increasingly frequent design requirement.

Oxidative stability in thin film to 300° F., along with excellent anti-wear and lubricating capability, coupled with a shear-stable adherence to the gear metal—these qualities characterize a newly-upgraded formulation of our polyol ester-based gear train grease, Nye Rheolube 789AF.

This grease uses our polyol ester impregnating oil (Nye Synthetic Oil 623A) as its base fluid and contains the same antioxidant and anti-wear additive package. Because it is ester-based, care must be used in selecting any plastics or elastomers used around the grease; however, such ester-vulnerable materials are not usually found as gear motor components.

If operating temperatures for your gear train design are getting into the 250° F. or higher area, please write us for a sample of Nye Rheolube 789AF. A simple oven exposure test overnight at, say, 300° F. will convince you of its capability compared with traditional petroleum materials.

Fluorocarbon Flexibility

Just about every one of the dozen families of synthetic lubricating fluids with which we work has been used as a base oil in one of our fluorocarbon greases, a fast-growing series where the sole gelling agent is polytetrafluoroethylene. We'd like to share with you some of the interesting applications for these high lubricity, non-melting greases.

NyoGel 804 dimethyl silicone fluid
damping for an all-temperature surveying instrument

NyoGel 813 chlorinated silicone
high-temperature bearings in a jet engine accessory

NyoGel 850 fluorinated polyether oil
sliding parts in an SF6-filled circuit breaker

NyoGel 855 synthetic hydrocarbon oil
high lubricity for a low-power ball screw assembly

NyoGel 856 diester oil
wide temperature damping for camera lens threads

NyoGel 859 super-refined mineral oil
sliding pushbutton assembly in a telephone set

NyoGel 867A polyol ester oil
high-temperature oven chain fixtures

Write us about any problem applications and we'll recommend one of these unusual new lubricants.

new use for nyebar:

Protection for printed circuit boards.

PRINTED CIRCUITRY CAN BE COATED WITH THIS ULTRA-THIN, NON-INSULATIVE, NON-WETTABLE FILM TO REPEL OILS, MOISTURE, DUST AND OTHER ENVIRONMENTAL CONTAMINANTS.



Delicate circuitry on printed circuit boards can be affected by a variety of atmospheric and environmental contaminants, including plasticizer oils from nearby components, airborne oil pollutants, dust, atmospheric moisture, and oils from human skin. Relatively thick (5 mil) silicone or epoxy films are often used to protect printed circuitry, but these films are insulative and any electric contact points must be masked.

NyeBar - Type CT is a stable, fluorocarbon polymer with an extremely low surface energy such that, in a film as thin as 0.05 mils or less, it can effectively repel oil, moisture and preclude attendant dust entrapment.

Experiments by several printed circuit board users suggest that the coating of an entire printed circuit board with this ultra-low surface energy, non-wettable film produces an effective protective barrier, still sufficiently thin to permit current flow. Substantial production cost savings would be possible compared with traditional coating or potting techniques, especially when low concentration solutions of the polymer are used. The standard concentration is 2% by weight, and the standard solvent for NyeBar - Type CT is trichlorotrifluoroethane, although less volatile solvents can also be supplied.

Printed circuit boards can be coated by dipping in the NyeBar - Type CT solution and allowing the fluorocarbon solvent to evaporate. For evaluation purposes for possible field service use, a 6-ounce aerosol spray can containing a 0.2% concentration of the active NyeBar - Type CT polymer will be made available shortly.

If you are working with printed circuit boards intended for critical applications where moisture or airborne pollutants could affect board operation, you may want to evaluate NyeBar - Type CT. Write for our new Bulletin 7520 describing this new product. Information on dilution solvents and prices for sample quantities of NyeBar and the solvents are included on this bulletin.

now available:

A double-track main line to lubricant effectiveness using synthetic oils.

Never wanting to put all our eggs in one basket we've put together over the past ten years, not one, but two separate families of superior wide-temperature synthetic oils and companion greases, each of which offers unusual advantages for severe service "lubed-for-life" applications.

- BALL BEARINGS
- SLEEVE BEARINGS
- IMPREGNATED SINTERED BEARINGS
- GEAR TRAINS
- SLIDING PARTS
- CAMS AND FOLLOWERS

SYNTHETIC HYDROCARBONS

This newest family of synthetic lubricants provides the film strength of natural paraffinic petroleums in wide-temperature, non-volatile plastic-compatible lubricants.

FOR LOW TEMPERATURE NEEDS:

Nye Synthetic Oil 132C

With a -65° F. viscosity of less than 16,000 centistokes, this oil presents a hydrocarbon-based alternative to the low viscosity ester-based aircraft instrument oils. The excellent film strength and low volatility of its synthetic iso-paraffin structure has led to uses in aircraft instruments, cameras, projectors and small motors where ester-vulnerable plastics such as polycarbonates, polysulfones, or a-b-s resins are present. Operating temperature range: -65° F. to $+250^{\circ}$ F.

Nye Rheolube 719A

Using the 132C oil as its base fluid, this relatively soft, lithium soap-gelled synthetic hydrocarbon grease offers a plastic-compatible lubricant for low-torque applications involving very low temperatures. The 17.2 centistoke (at 100° F.) base oil provides a -65° F. breakaway torque of only 1003 gm.cm. An excellent grease for wide temperature use in ball bearings and on small gear trains. Operating temperature range: -65° F. to $+250^{\circ}$ F.

FOR WIDE TEMPERATURE NEEDS:

Nye Synthetic Oil 181

Where both below-zero usefulness and excursions to 300° F. or above are required, this medium viscosity synthetic hydrocarbon oil formulation provides high film strength lubrication without use of chemically-sacrificial anti-wear or load-carrying additives. Appliances have been the major market for this oil, especially for designs using ester-vulnerable plastics in wide-temperature applications. Operating temperature range: -30° F. to $+300^{\circ}$ F.

Nye Rheolube 723 Series

This grease series includes a variety of specially-fortified synthetic hydrocarbon formulations, all gelled with lithium stearate and using a medium viscosity synthetic hydrocarbon as base oil. Rheolube 723F6 uses a fluorocarbon polymer for more heavily-loaded applications involving non-ferrous metals, while an EP-variation is available for steel-on-steel. Successful applications include a variety of gear train, cam, actuator and reciprocating sliding part assemblies. Operating temperature range: -40° F. to 300° F.

POLYOL ESTERS

These complex esters possess excellent thermal stability and wide-temperature fluidity, along with exceptional low volatility and oxidation stability in thin-film.

FOR LOW AND HIGH TEMPERATURE NEEDS:

Nye Synthetic Oil 220

An extra 50 degrees (F.) of high temperature usefulness can be obtained from this low viscosity polyol ester-based oil. Thin film oxidation stability is especially critical in many highly-engineered small devices, and the traditional diesters have been poor performers at 250° F. and higher. This oil is intended as a new generation successor to the traditional diester-based instrument oils. Operating temperature range: -70° F. to $+300^{\circ}$ F.

Nye Instrument Grease 706A

Using a low viscosity polyol ester as base oil, this grease is fortified with anti-oxidants, rust inhibitor and anti-wear agent to provide an improved alternative to the diester greases so long used in instrument ball bearings. Already proven in long-term use in aircraft instruments, this lithium soap-gelled grease can provide a new lease on life to mechanisms where alternative petroleum or synthetic greases are marginal performers. Operating temperature range: -70° F. to $+300^{\circ}$ F.

FOR HIGH TEMPERATURE NEEDS:

Nye Synthetic Oil 623A

Especially formulated as an impregnating oil for the sintered metal bearings widely used in appliances, this complex ester fluid is stabilized for long life at the 300° F. temperature level increasingly confronted by appliance motor designers. This lubricant involves a single fluid component with no-shear-vulnerable polymer thickeners. A novel anti-wear system permits good lubrication at high loads. Operating temperature range: -20° F. to $+350^{\circ}$ F.

Nye Rheolube 713

A new dimension in wide temperature grease lubrication is apparent in the temperature range of this new grease. The base oil is a high viscosity polyol ester with an unusual complex gelling agent and a sophisticated additive system. High temperature bearing life of 400 hours at 400° F. and over 800 hours at 375° F. suggest use of this grease as an alternative where heretofore low-film-strength silicones have been the only available lubricants. Operating temperature range: -40° F. to $+400^{\circ}$ F.

NOOKS AND CRANNIES

LOW-VISCOSITY SYNTHETIC HYDRAULIC OIL

Hydraulic equipment operating out-of-doors in the wintertime can require a hydraulic fluid of such low viscosity that the oil's flash point becomes a concern. This is especially true when the hydraulic equipment is involved with electrical apparatus, as in the "cherry pickers" used for repair of overhead power lines.

Synthetic hydrocarbon fluids have relatively high flash points, and we've put together a hydraulic fluid formulation with a 0° F. viscosity of less than 100 centistokes with a flash point of 355° F. Compare this with any material you're using now. If your application can support a \$13 per gallon price, we would like to hear from you. Samples of Nye Synthetic Oil 172 can be made available at no charge.

AUTO RADIO PUSHBUTTON TUNER GREASES

When you change stations on your auto radio, you are actuating a rather complex cam assembly presenting some relatively heavy loads to sliding non-ferrous metal components. Lubrication of these sliding parts must consider that they should not freeze up at 1 a.m. in a Yukon February, and not bleed or creep at noon on July 4 in a Texas sun. Using a special combination of synthetic hydrocarbon oils, fluorocarbon polymers, and a surprisingly low percentage of a couple of unusual gelling agents, we have a couple of very successful formulations for auto radio pushbutton tuner assemblies. They can operate over a temperature range of -40° F. to 200° F., and oil bleed is lower than found with other candidate materials. Write for data and samples on NyoGels 744 and 746A.

NON-SLING SYNTHETIC GREASE FOR WORM GEARS

Sometimes we think we're in the adhesives business, what with the many ultra-high viscosity modifiers used in damping greases and similar products. Such materials are also needed to prepare greases with superior surface retention properties as in worm gears, but an additional requirement imposed by such an application is shear stability. A new type of shear-stable polyester polymer has been developed for this need, and we can offer a synthetic, wide-temperature, non-sling, adhering grease with excellent lubricating properties. This is our NyoGel 870. It is gelled with a fluorocarbon polymer and its projected operating temperature range is -20° F. to +300° F. Samples can be supplied on request. Please specify the types of metals involved, as steel-on-steel would require an additional additive.

HI-TEMP GREASE FOR PLASTICS MOLDING MACHINES

The very high temperatures encountered in plastics molding create a critical lubrication problem on the guide pins which serve to lock mold halves into proper position. Temperature during molding can exceed 450° F. on these pins, and a lubricant is necessary to avoid seize-up. A grease which would degrade during molding would be all right so long as it doesn't degrade to gum and seizure is avoided. However, even this would mean costly relubrication on each mold cycle and the target is long life—many mold cycles—before regreasing is needed. Good results and extended life have been obtained in field trials with a new fluorocarbon-gelled silicone grease fortified with molybdenum disulfide. This is our NyoGel 805, and we can supply a small sample to any molders who'd like to try it.

MOLD RELEASE LUBRICANT FOR ZINC DIE CASTING

An unusual application for formulated diester synthetic oils has proved to be in molding of white metals, as zinc. By using the synthetic oil as a mold release agent, smooth, clean, detailed, clear castings free from gas or air holes can be obtained. The ester oil is usually diluted up to 50% with mineral spirits or Stoddard solvent depending upon the heat and rate of flow of the molten metal. The resulting mold release oil can out-perform by a wide margin a variety of traditional mold release compounds. The somewhat higher price is readily justified by reduced rejection rate for castings. Our material is labeled Nye Synthetic Oil 256, and a one-pint sample can be supplied at no charge on letterhead request.

SEMI-FLUID GREASES FOR LOW POWER DEVICES

The double track we've followed in developing synthetic lubricants has led us also to a pair of the special "soupy" greases which have proven so useful in low-torque "flea-power" devices needing grease lubrication. Nye Rheolube 791B is a polyol ester-based product of this type, while Nye Rheolube 728F6 presents the same properties in an elastomer-compatible synthetic hydrocarbon. The greatest number of applications for these semi-fluid greases are in small timing motors, but they should be considered wherever a stay-in-place lubricant is essential, but where moving forces are sufficiently small that they could be stifled or stalled out by a standard consistency grease.

RESPONSE COUPON

CUT ALONG THE ABOVE LINE AND MAIL IN YOUR COMPANY ENVELOPE TO:

WILLIAM F. NYE, INC. - P. O. BOX G-927, NEW BEDFORD, MASSACHUSETTS 02742, Tel. (617)996-6721

(Make Sure Your Correct Address Appears On The Reverse Of This Coupon)

SEND LITERATURE ON THE FOLLOWING:

Send at no charge or obligation a lubricant sample especially selected to meet the following need.

Type of Mechanism _____

Components to be Lubed _____

Materials of Construction _____

Ball or Sleeve Bearing (if either)? _____ Sintered Metal? _____

Preference for Oil _____ Grease _____ Dry-Film _____

Is Oil Creep a Problem? _____

Will Lube Touch Plastics? _____ Type: _____

Elastomers? _____ Type: _____

Lowest Operating Temperature _____ °C/°F.

Highest Operating Temperature _____ °C/°F.

Desired Life at High Temperature _____

Present Lube _____

If unsatisfactory, in what way? _____

SPECIAL REQUESTS OR COMMENTS:

ELECTRIC CONTACT LUBRICATION

A GENERAL-PURPOSE LUBE FOR LOW-LEVEL LOADS

A look around at the broad spectrum of industrial and appliance switches and contacts reveals a lot of petrolatum being used as a general-purpose electric contact lubricant, at least for dry circuit and low level load conditions. A temperature range of -10°C . to $+80^{\circ}\text{C}$. would satisfy most customers, and this permits a great deal of flexibility in lubricant composition.

Basic film strength in contact situations can derive more from viscosity than from polar attraction of molecules to the contact metals, many of which are either non-reactive or over-reactive to lubricant additives. Stability in thin film against oxidation or gumming is essential. Migration of lubricant is also of concern. Our target thus took shape—we wanted to construct a wide-temperature, oxidation-stable, non-melting, high-film-strength "synthetic petrolatum". The result is our Nye Rheolube 796, actually a soft, but stable grease, which we recommend for sliding contacts wherever contact wear presents a problem. It is based on a high viscosity synthetic hydrocarbon, gelled with low percentages of two different gelling agents. Melting point is 180°F . We'd be glad to send a sample at no charge to anyone on the grim edge of petrolatum's usefulness.

FOR ARCING CONDITIONS

Where arcing conditions exist, a proven material for lower voltages and currents is our Nye NyoGel 730. A newer formulation which is now being evaluated for severe service appliance switches is Rheolube 752, a very soft, almost semi-fluid material (to permit replenishment in an arc track). Anyone testing switch lubricants where arcing is a problem can have a sample of Rheolube 752 (or NyoGel 730) free for the asking.

PACKAGING NOTES

BODINE'S "LO-17" ELECTRIC MOTOR OIL

Bodine Motor Company, Chicago, at one time provided their "LO-17" electric motor bearing oil in a plastic applicator vial; and many of their motor customers eventually became regular distributors of LO-17 oil in this small applicator container. Bodine has discontinued packaging and handling of the oil—many of their newer designs have grease-lubricated ball bearings—and we have built up a significant volume in an oil equivalent to LO-17 in a very useful $1\frac{1}{2}$ fluid ounce plastic squeeze bottle with a dispenser tip. Anyone needing to supply a high-grade maintenance oil for small motors with their machine or instrument will find this oil package a good solution. They are available at 40¢ each, and on orders of 1 gross or more, this price includes application of a label individually printed for each customer listing his part number, instructions or other data. Inquiries are invited.

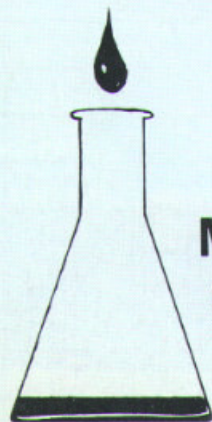
COMPUTER PRINTER LUBE KITS

A computer printer is a complex mechanism with many moving parts needing special lubrication. Several printer manufacturers and large users have asked us to assemble special "lube kits" incorporating several oils and greases as needed for field servicing of the various printer designs. The lubricants are provided in small quantities in applicator containers, one of which has proved particularly interesting for getting into the relatively inaccessible interior of the printer. It is a 2 fluid ounce plastic squeeze bottle with a push-pull valve on the cap connecting to a thin $5\frac{1}{2}$ " long tube which can be inserted deep into the mechanism for oiling. To assemble these kits, we do not insist on use of our own lubricant formulations, but use lubricants from any source as called out by the printer manufacturer. Inquiries would be welcome from any computer field service personnel who are interested in a kit assembly for their particular needs.

from: **WILLIAM F. NYE, INC.**
P. O. BOX G-927
NEW BEDFORD
MASSACHUSETTS 02742
Return Postage Guaranteed

a new

NYE *lubeletter*



**New Developments in
Specialty Lubricants**