NYE lubeletter

AUTUMN, 1976

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

Synthetic and Natural Alternatives to Whale Oils

Federal Law has ended an era for our small company. The Endangered Species Act and the Marine Mammal Protection Act prohibit the import of either sperm oil or dolphin head oil. Several years of research effort have been devoted to preparation for this loss of raw material, which we saw coming; and one result is a new synthetic-based line of delicate machinery oils.

JOJOBA OIL

A replacement for sperm oil proved easiest. By one of those weird, almost spooky, flukes of nature, there appeared from the Southwestern deserts the jojoba bean, Simmondsia Chinensis, from which can be expressed an oil virtually identical in molecular structure to sperm whale oil. The only difference we've been able to find in extensive testing is in odor; the vegetable oil doesn't smell. We have a variety of jojoba-based formulations to replace any sperm oil needs you may have.

SYNTHETIC HIGH-LUBRICITY OILS

A more formidable challenge was presented by the dolphin head oils. We could duplicate the molecular structure but were unable to achieve an oxidatively stable oil; the dolphin apparently metabolizes some unusual natural antioxidants which give the natural dolphin head oil its unusual stability. Therefore, we had to look to alternative structures to achieve the low viscosity, low pour point, high lubricity and stability of the natural oil. The answer lay in blending several unusual synthetic materials, some already commercial and some especially synthesized for this program. We can now offer Nye Delicate Machinery Oil 140, the higher-lubricity 140A and the tailored formulations Nye Clock Oil 140B and Nye Watch Oil 140C. Stability is sufficiently improved over the traditional watch and clock oils that a new range of applications is possible, and inquiries for special high-lubricity oils are invited.

A NEW LABEL FOR AN EXPANDING PRODUCT LINE

The FluoroGel Greases

The fastest-growing family of special lubricants in our stable is that of the FLUOROGEL Greases - a large variety of mostly synthetic lubricating fluids gelled solely with ultra-stable $(CF_2)_n$ polytetrafluoroethylene polymers which are excellent lubricants in their own right.

There are actually two groups of these greases. One - a relatively high priced group - uses a lower molecular weight polytetrafluoroethylene, roughly 25% by weight in the formulation, and provides extremely low apparent viscosities in the finished grease. Cold temperature bearing breakaway torques are exceptionally low. Representative greases in this group are FluoroGel 812 and 843, both used in delicate ordnance fuzing devices, and FluoroGel 813, finding increasingly successful use as a wide-temperature contact lubricant in potentiometers, despite the discrete particle size of the fluorocarbon polymer.

The second group uses a less costly form of the fluorocarbon gelling agent, although perhaps twice as much gellant is needed in the finished product. Applications for these high-lubricity products extend to appliances, surveying instruments, electrical controls and a variety of damping grease uses.

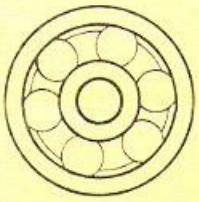
More recent additions include:

FluoroGel 877 - for an air pressure gauge assembly
FluoroGel 874 - for television tuner shaft damping
FluoroGel 865 - for an air conditioner switch
FluoroGel 805 - for high temperature release of guide pins on plastic molds

Unusual lubrication problems may be solved through use of one of these unusual new lubricants. Use the Lubricant Recommendation Questionnaire on Page 3 to advise us of your special need.

NEW LATITUDE FOR ELASTOHYDRODYNAMICS

Synthetic Hydrocarbons Provide Wide Range of Viscosities for Ball Bearings



The synthetic hydrocarbon oils - newest of the many families of synthetic functional fluids - are displaying impressive versatility in a critical lubricant application - the ball bearing. This is especially so where below zero start-up is essential - or where long-term, high speed operation is part of the requirement. The high viscosity index of these oils (meaning a minimum change in fluid viscosity as temperature varies), coupled with a stable molecular structure, readily susceptible to fortification with anti-oxidants, permits both lower and higher temperature operation than would be possible with petroleum oils of comparable room temperature viscosity. Impressive life tests have been reported to us by customers who have tried these oils in ball-bearing use in dental equipment, movie cameras, gyroscopes and other severe duty applications.

From inquiries we've received we know that both very low and very high viscosities can prove useful in unusual ball bearing applications. The great range of viscosities available in synthetic hydrocarbons - a range out-done only by the silicone polymers - now permits us to offer such unusual formulated bearing oils as:

Nye Synthetic Oil 167 —
7.3 centistokes at 77°F.

Nye Synthetic Oil 176A —
950 centistokes at 77°F.

Bulletins and evaluation samples are available to anyone with an unusual ball bearing need.

More generally useful would be a series of precision bearing oils, beginning with Oil 132 (18 cs. at 100°F.), designed as an alternative to the MIL-L-6085A - type diester-based instrument oils, and ranging in viscosity to Oil 186 (119 cs. at 100°F.), proven as a successor to the well-known KG-80 oil, a standard for gyroscope bearing lubrication. A series of companion greases is under development.

OIL CREEP CORNER:

Economics of Non-Wettability

New Applications Benefit from Economics of Dilute Nyebar Solutions

Nye's several NyeBar products contain fluorinated resins which can render a surface non-wettable. These NyeBar films have for some years solved a variety of bearing and machine design problems involving oil creep and fluid control. More recent applications afford non-wettability and protection to electric contacts and printed circuit boards.

We had to change solvents in our premium NyeBar product last year - Type C used the erratically available xylene hexafluoride; Type CT, the present product, uses the much-faster-evaporating trichlorotrifluoroethane (DuPont's Freon TF), the process fluid in which the active resin is synthesized. Many application techniques were based on the particular evaporation pattern of xylene hexafluoride, and for some customers, the new solvent proved impracticably volatile. Although we can replace some of the Freon TF with higher-boiling, completely fluorinated solvents, many customers have found it more economical merely to dilute the 2 percent (solids content) NyeBar Type CT product with one of these slower-evaporating fluorinated solvents (which, by the way, we are set up to supply). Concentrations of 1 percent have proved quite useful; and even lower concentrations, in one case down to as low as 0.1 percent, are being actively used. We are glad to prepare special blends or concentrations as you may direct.

A new product label, NyeBar Type W, has just been introduced at the Navy's suggestion, containing 0.18 percent of the non-wettable, fluorinated NyeBar resin in a slow-evaporating fluorinated solvent. An 8-ounce bottle is available for $18.75.

SERVICES SECTION:

Distillation to Order

The most essential step in preparation of certain synthetic oils is the leap to purity, utilizing a "molecular still", a high-vacuum, spinning-disk instrument which produces highly-purified fractions from complex molecular mixtures. The growth of our special synthetic oil business has necessitated the addition of new equipment, and it has left us sufficiently flexible to invite inquiries from both lubricant and functional fluid users for any special needs for high purity fluids. We are convinced that there is a need for a "molecular still service", providing custom distillation in small volumes for specialty applications, whether for lubrication or other purposes. Your inquiries are invited.

Silicones Service

Dow-Corning Corporation, Midland, Mich., produces the well-known DC200, DC510, DC550 and DC710 silicone fluids utilized throughout U.S. industry in an appalling variety of lubricant and functional fluid applications. William F. Nye, Inc., is now stocking a comprehensive range of all of these materials, providing a small-order, small-container service both to Dow-Corning's and to our own customers. We have a price list offering containers down to 8 ounce capacity for silicones ranging in viscosity (at 77°F.) from 0.65 to 1,000,000 centistokes. Shipment within 24 hours of order placement can usually be provided. Inquiries for special silicone blends, applicator containers or special greases are welcomed.

Diester Distribution

A pioneer manufacturer of the diester-based synthetic oils and greases was Lehigh Chemical Co. in Chestertown, Md., now absorbed into Tenneco Chemicals, Inc., which markets an impressive array of wide-temperature, special-duty diester oils and companion greases under the trade-name Anderol. Many of the smaller users of the Anderol lubricants were on our own customer list for delicate mechanism specialty lubes, and a natural service has developed whereby we stock and ship on short notice any one of Tenneco's Anderol products in small or large containers. Our minimum billing is $10.00, while Tenneco's is $100.00, and we have enjoyed a steady growth in both sales and inventory of these widely-accepted and proven synthetic oils and greases. We do not yet handle all Anderol greases in tubes, but pounds and pails are in stock. A two-page price list is available.

Ideas & Applications:

SHHH! QUIET GREASES AT WORK

Damping greases can not only damp free motion; they can also damp noise. A high proportion of our damping grease customers use them for just that purpose. A small, noisy motor or gear train, placed near metal which can act as a sounding board, can produce a din that rivals Chinese water torture. Among our noise dampers are NyoGel 779, used in a can opener and Nye Thixo Grease 780 in an automobile clock. Even the very light fluorocarbon grease NyoGel 855B serves this purpose well in a tiny new personal care appliance product.

GAS VALVE SEALANTS

In designing a lubricant for a gas regulating valve, the sealant aspects of the lubricant are, of course, critical and become even more so when temperature extremes are imposed. A grease rather than an oil is usually required to prevent migration over a long valve life. The grease must permit free movement of the valve without imposing high torque in cold weather, and it must at the same time provide a barrier to gas leakage under pressure over a very wide temperature range. New specifications for gas valve operation require -40°F. to +350°F. capability. We have prepared a special silicone-based grease for this demanding application and would be pleased to send evaluation samples. Ask for NyoGel 908.

SPREADING USES FOR 'NON-SPREADS'

The watch industry is changing and with it the need for watch lubricants. The familiar watch escapement mechanism will be around for a long time, of course, but future growth doubtless lies with solid state timepieces without hands and with digital displays. The oils used in traditional watches are among the most unusual of lubricants - synthetic, high surface-tension oils with excellent film strength. They have the unique quality of staying in place; they do not creep or migrate. Nye's "non-spread" line is the PML series, originally developed by Hamilton Watch Co. Although our sales to the watch market are declining, we've recently doubled our production capacity for these unusual oils to meet developing needs in cameras, small motors and computer printer mechanisms. One large new customer uses PML 79 in a digital clock. Don't count the "non-spreads" out; they could solve your problem, whether or not it goes tick-tock.

AN EXTRA (GREASY) THUMB

An oil or grease, ordinarily looked upon as a lubricant, may be needed for very different reasons in production line assembly of certain complicated small devices. By spotting a small dot of grease or oil at an appropriate point, one component may be held in place by the surface tension of the lubricant just long enough to permit its attachment either by hand or mechanically, to another component. The lubricant acts as a temporary adhesive - an "extra thumb" for the production line worker. Sometimes the lubricant is removed by solvent rinse; often it remains in the device. We can recommend materials for either situation if you can advise us of your specific assembly problems.

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:

SPECIAL REQUESTS OR COMMENTS:

Send at no charge or obligation a lubricant sample especially selected to meet the following needs:

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? _____

Electric Contact Lubrication

LUBRICANTS FOR ELECTRIC SWITCHES

At one time we had the thought of producing a couple of special greases specifically for electrical switches - thinking of one for low-load, non-arcing situations and a second for switches subject to arcing. Switches turned out to be more complicated than two greases could serve. Temperature extremes, both low and high, special metals, plastics, and even rubber seals, all had to be considered; and we've ended up with a new 22-page catalog, actually an assembly of data sheets on special oils, greases and several other things. Each product in this catalog has found successful use in electrical switches. The best success has usually been based on a consideration of the specifics of each switch application, and we invite your use of the Lubricant Recommendation Questionnaire Card on page 3. A copy of the switch lubricant catalog is available on request.

A SOLUTION FOR "IMPACT INSTABILITY"

Lubricants are taking on an increasing importance in the electrical connector field as less expensive contact materials are introduced to replace the increasingly costly noble metals traditionally used for stationary separable contacts and edge board connectors. Bright tin-lead is one of the more promising of this new generation of contact plating materials. Lubricants have been shown to be essential to good contact operation with bright tin-lead. A special problem with such contact materials can occur when any vibration affects the device housing the connector. Even the slamming of a cabinet door can induce a phenomenon known as "impact instability", a form of fretting corrosion resulting in increased contact resistance. One of our synthetic hydrocarbon greases, a thixotropic gel of near semi-fluid consistency in bulk, has proved useful as a contact lubricant. In thin film on the contact, it becomes a stable, self-healing protective lubricant which can damp out the onset of fretting. Its thixotropic nature permits flow under agitation and re-gelling when the energy of agitation is dissipated. The label is NyoGel 759M and we will gladly sample any interested evaluators.

CONNECTOR LUBES - A NEW PRODUCT

Our NyeTact 510 was one of the early victims of the energy crisis. This was a protective lubricant applied from a solvent solution to provide tarnish prevention and wear reduction for stationary separable electrical connectors. A principal component was a super refined, ultra-high-viscosity hydrocarbon, produced from a Pennsylvania crude oil which was diverted to less exotic and more lucrative markets in 1974. We have since then examined several options to replace this contact lubricant, and we can now offer NyeTact 515, based entirely on synthetically-derived polymeric materials, with equally-good protective qualities against the tarnishing effect of airborne pollution and superior wide temperature capability, especially on the cold side, for minimizing the wear attendant to frequent insertion and de-sertion of separable electrical connectors. The product, as with its predecessor, is supplied as a 2% solution in a chlorinated solvent. Write for a new bulletin and sample of NyeTact 515.

from: **WILLIAM F. NYE, INC.**
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MASSACHUSETTS 02742
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