

NYE



lubeletter

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

WINTER 1982

A CONCEPT

The Lubricant "Drugstore"

There is a natural tendency, surely understood by any marketing supervisor in a large corporation, to simplify or rationalize a company's product line. Pressures in this direction in the last few years have led major oil and chemical companies, manufacturing both petroleum-based and synthetic lubricants, to cut sharply the number of products they are selling. Many specialties are disappearing from industrial distribution. The multipurpose product is readily available - if you want enough of it.

Here at William F. Nye, Inc., there is also a constantly-felt pressure to establish a standard line of multi-purpose synthetic oils and greases for the specialty markets which we serve. Yet, a significant part of our day is spent responding to special customer needs for custom formulations which may not be sold to anyone else. In looking ahead, we feel we should accentuate the positive in this situation. There ought to be at least one lubricant "drugstore" in this country, and we are anxious to see how far we can go with this concept.

To begin with, we know there is a need for "service" in the area of specialty oils and greases. In an economic context, it should be a "value added" service. The product is being made more useful, through formulation, modification, special packaging or, in many cases, merely small volume availability.

Some of the services we are providing may be of specific interest to your operation and we will try to summarize them here.

- preparation of new or unusual lubricant formulations for "off-beat" applications, even where smaller volume needs are involved;
- use of a comprehensive variety of the synthetic fluid families as raw materials for problem-solving;
- use of most of the known techniques of gellation to produce unusual greases;
- concentration on specialties for use on fine instruments and delicate mechanisms; with special efforts in non-spreading oils, oil creep barrier films, damping greases and lubricants for electric contacts;
- production under license or royalty of critical products with small markets subject to discontinuance by larger manufacturers;
- repackaging and small container service for several widely-used synthetic lubricant lines, including Dow Corning's silicones and Tenneco Chemical's Anderol esters;
- a special concentration on small dispenser containers as needed for field service lubrication.

A special comment is in order regarding small volume availability. As Federal and State hazardous waste regulations become more restrictive on disposal of surplus or used lubricants, the opportunity to obtain only what you need takes on real value. The extra amount you may **have** to buy is not just an economic waste, but becomes a real physical problem. Although we have had to impose a \$20.00 minimum billing, we will always attempt to accommodate a customer confronting this problem.

FDA REGULATIONS

Synthetic Lubricants For Food Machinery

Synthetic hydrocarbons can be 'super-refined' to permit their use under the very strict regulations of the U.S. Food and Drug Administration (21CFR, Section 178.3570). Lubricants for food machinery, where any incidental contact with food is a possibility, must be prepared using a very restricted list of ingredients. Because of these regulations, petroleum-derived white oils have been the traditional base stocks for such lubricants.

By more intensive and thorough hydrogenation, synthetic hydrocarbon fluids can be upgraded in purity and quality to meet the requirements traditionally imposed on white oils. Oxidation stability testing of formulated oils based on these fluids has given us some of the most impressive 250°F. test data we've ever seen. In the 168 hour test at 250°F., similar to that required by MIL-L-6085A, these new oils show virtually no change in viscosity or neutralization number. Testing at higher temperatures is proceeding. These oils will be of special interest for situations requiring below zero usefulness. The lower viscosities will flow readily at -40°F. without compromising volatility at 200°F. or higher. The unique low temperature properties, superior viscosity-temperature relationships, and excellent film strength of the synthetic hydrocarbons combine to provide a significant new departure in lubricants for food machinery and related regulated applications.

We are introducing three of these new oils, involving a range of viscosities from 33 cs. (155 SUS) to 168 cs. (780 SUS) at 100°F. Intermediate and higher viscosities can also be made available. Write for a data sheet on Nye Synthetic Oils 269, 271 and 272.

Two types of companion greases for food machinery are also being introduced. One, Nye FluorocarbonGel 807, uses a fluorinated polymer as gelling agent, and has good prospects both as a non-melting lubricant and as a sealant with excellent lubricity and water resistance. The other, NyoGel 670, uses a more traditional, non-melting gelling agent for larger-volume needs where price is a factor. It is not intended as a water-resistant grease, but can serve a wider range of lubricating functions. Either of these greases can be modified to use more viscous base oils to produce damping greases for food machinery applications. In fact, we see this new base stock availability as opening up unusual possibilities for special-purpose formulations for food machinery manufacturers and users. If you have any needs in this direction, please describe your application on the bottom of page 3 and return the Response Coupon to us here. We will send samples and data.

Synergistic Antioxidants Improve New Oils For Higher Temperatures

A new combination of antioxidants has opened up exciting new possibilities for ball bearing, instrument and impregnating oils for wide temperature use, including needs to 350°F. or higher.

The primary mode of lubricant degradation is oxidation. This is an autocatalytic process, a mini-chain reaction which, once begun, can transform a lubricating fluid into various non-lubricating species. For every ten degree Centigrade increase in temperature, the rate of oxidation can nearly double. Continued oxidation eventually produces a three-dimensional molecular network, which we know better as varnish or sludge.

Some lubricants are inherently more oxidatively stable than others. Silicones and polyphenyl ethers are noted for excellent stability at elevated temperatures. However, these are costly fluids; and considerable research has been devoted to improving the stability of the more readily available mineral oils, synthetic esters and, more recently, synthetic hydrocarbons. This research has concentrated on special additives-antioxidants - which can either delay the onset of oxidation or, like control rods in a nuclear pile, interfere with the normal progression of the oxidative chain reaction.

Here at Nye we have been involved in a twenty year confrontation with an extremely broad range of antioxidant candidates. These additives can often act synergistically with a combination of two or more giving far better results than either alone. The single bench test we have most frequently used is Federal Test Method 5308, also the standard test for synthetic jet engine oils. In our test, a tube containing the formulated oil is immersed in a heating bath for 72 hours at 347°F. (175°C.) while air is bubbled through the test oil. Small squares of selected test metals are suspended in the oil during the tests to evaluate catalytic activity or corrosion potential.

There have been a lot of ups and downs in this effort over the years, and this experience made even more exciting a recent test with a new combination of antioxidants which has produced some really startling test results. Compare the following, involving a formulated light synthetic ester, with any similar oil test data you may have at hand:

Test Conditions: FTM 5308, 72 hours at 347°F.

Change in viscosity during test: -0.1%

Change in neutralization number during test: +0.11 mg KOH/g

Appearance after test: Clear, no precipitate

Loss of weight among six different test metals: Nil

Copper corrosion: None (moderate tarnish only -2a)

Keep in mind that this is a 175°C. excursion and that this oil is a light ester, not a polyphenyl ether or an ultra-stable silicone.

The commercial result of the above is Nye Synthetic Oil 230, the first of a forthcoming series of oils which will incorporate this new antioxidant package. It is a low viscosity, low volatility, ester-based oil with an operating temperature range of -65°F. to +350°F., sufficiently wide to make it of real interest in lubrication of new designs for automotive underhood accessories. We would be glad to send evaluation samples and data, along with background on newly-emerging impregnating oils for porous metal bearings which will use the same additive system.

THINGS TO COME

Low Vapor Pressure Oils and Vacuum Greases

We hope that our next Lubeletter will headline a new product area for us - lubricants and sealants for vacuum equipment use. By special refining treatments, certain higher viscosity synthetic hydrocarbons can be transformed into oils of unusually low vapor pressure, better than alternatives now on the market. We have long seen the need for an American source for improved hydrocarbon-based greases and sealants for vacuum service. Greases based on these new oils would be excellent lubricants, damping greases or sealants. Our production capability is temporarily limited, and as yet we can furnish only preliminary data sheets. We can send samples, however, and in preparation for full development of this new product line, we ask for advice on your specific needs in this area. Please use the Response Coupon on page 3.

New Literature

WATCH AND CLOCK OILS

Nye's standard watch and clock oils for over one hundred years were refined from the unusual dolphin head or "porpoise jaw" oils. These natural oils are no longer articles of commerce. The traditional Nye "Superior" Watch and Clock Oils have been replaced by two high-lubricity synthetic-natural oil blends, Nye Watch Oil 140C and Nye Clock Oil 140B. A new bulletin notes the impressive oxidation stability of these two newer oils.

NON-SPREADING OILS

The ability of a light oil to stay in place on a metal or jewel surface is critical in timepiece and fine instrument lubrication. We have combined into a single two-page bulletin background and bench test data on Nye's several nonspreading oils. These include the ultra-light Nye Astro Oil, with its excellent cold temperature capability and the several PML-brand oils.

HIGH-SPEED BEARING GREASE

Nye Rheotemp 500 possesses a long-term track record of successful use in both low and high-speed wide-temperature ball bearing applications. It is widely accepted for the small high speed fans used to cool computers and other electronic equipment. It is based on a synthetic ester with an unusual combination of gelling agents and is best recognized in the trade by its dark blue color and relatively soft worked consistency. A newly-printed bulletin lists bearing life data.

DAMPING GREASES

A degree of "tackiness" intentionally introduced into a stable, non-melting, wide temperature grease can broaden its usefulness into the expanding universe of "damping greases". These specialty gels can quiet noise, smoothe free motion, ease assembly and serve as sealants for moisture or chemicals. Data on a family of homologous Nye damping greases has been assembled on a single new two-page bulletin.

'MOLY-FILLED' SYNTHETIC GREASE

The combination of good plastic compatibility, wide temperature usefulness (-40°F. to +250°F.), good oxidation stability, and the singular enhancement of lubricating ability under load, provided by its molybdenum disulfide content, has made Rheolube 723-MS one of our most widely-sold greases, worthy of a new bulletin which gives full data both on the synthetic hydrocarbon base oil and the grease itself.

Serendipity Section

CASE HISTORIES

Our stock in trade is "the unusual in lubrication".

The easy problems we usually never hear about, but we hear plenty about tough ones, some of which are sufficiently unusual and the resulting lubricants of sufficient interest that we ask you to indulge four case histories, each involving a special synthetic oil or grease. Let us know if any of these suggest applications to your problem.

NYEFILM 553

A customer manufacturing liquid level indicators found that the submerged sleeve bearing supporting the indicator float arm was not satisfactorily lubricated by the liquids being measured, which were often lighter petroleum fractions. In fact, these liquids, being solvents, dissolved any lubricant he had tried to apply. Because of the large quantity of indicators handled every day, a lubricant which could be applied by dipping was deemed necessary. Success was achieved with our NyeFilm 553, a dilute solution of a petroleum-insoluble fluorinated oil kept in place as a thin film by gelation with an equally insoluble fluorocarbon polymer. This ultra-light grease could be applied in thin film from dilute solution in a fast-evaporating solvent.

NYE SYNTHETIC OIL 334

An apparel manufacturer used a mechanized high-speed reciprocating knife to cut fabric. The knife heated up in operation causing the plastic fabric to fuse. Any lubricant to reduce this frictional heat could not be of such a nature that it would soil or stain the fabric. Several candidate oils were tried and the final selection was a water-soluble, non-corrosive synthetic polyether oil. Should this oil inadvertently reach the fabric, it could be removed readily by flushing with water. This is our Nye Synthetic Oil 334 which may find other unusual uses because of its tendency to volatilize at extreme temperatures without forming sludge, varnish or ash.

NYOGEL 769

A manufacturer of gearmotors needed a material to reduce or prevent fretting corrosion of a special drive coupling connecting the motor to the gearbox. Fretting of the mild steel shaft of either the motor output or gearbox input could result in damage preventing disassembly. A light synthetic hydrocarbon oil fortified with polar fluids without using any chemically sacrificial anti-wear additives showed considerable promise. The final solution to the problem proved to be NyoGel 769, an inorganically-gelled grease version of this oil.

NYOGEL 755E

A powder paint line in a large appliance manufacturer's operation needed lubrication of the hanger bars from which the conveyor line was suspended. An electrical potential must be maintained through these hanger bars which also moved through a curing oven at 350°F. A conductive grease with 350°F capability was needed. Silicones were inadmissible because of their effects on paint adhesion. We produced NyoGel 755E, a low volatility, oxidation stable polyol ester, gelled with a conductive carbon.

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 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. If an electric contact,

Highest Operating Temperature _____ °C/°F. is arcing expected? _____

Desired Life at High Temperature _____

Present Lube _____

If unsatisfactory, in what way? _____

SEND LITERATURE ON THE FOLLOWING:

SPECIAL REQUESTS OR COMMENTS:

Plastic Compatibility

The chemical resistance of plastics is a design factor where lubricants are to be used. Oils and greases are chemicals, of course, and certain plastics may be sensitive to lubricant attack, some much more than others. Resistance to any specific oil or grease is highly dependent on the stress level molded into a plastic part; the higher the stress the less the resistance to crazing or cracking. Temperature is also a factor, as is the time of exposure. When we advise a customer on plastic compatibility we are relying principally on testing done by the plastic manufacturers. These can really only be guidelines, since as a practical matter, testing can involve only a limited range of temperatures and limited time of exposure. The standard temperature is +73°F. to +185°F.; standard test times are three to five days.

Test data recently provided to us for polycarbonate, one of the more widely used thermoplastics, is summarized here on several Nye synthetic hydrocarbon lubricants. Several of these oils and greases are now being widely used around such plastics as polycarbonate, polysulfone, polyphenylene oxide and a-b-s resins.

PRODUCT	Compatible Stress Level, psi			
	73°F.	120°F.	158°F.	185°F.
Nye Rheolube 723G (switch contact grease)	3400	3400	2500	2500
Nye NyoGel 795A (light damping grease)	3400	3400	2500	2000
Nye NyoGel 788 (wormgear grease)	3400	3400	3400	1700
Nye Rheolube 368 (ball bearing grease)	3400	2500	2500	2000
Nye Synthetic Oil 181 (porous bearing impregnant)	3400	3400	3400	1700

Please write to us if you are working with plastics with questionable lubricant resistance. One of the above may help. Use the Response Coupon on page 3.

Non-Spreading Oil For Miniature Gear-Trains

Some devices are so delicate that the usual lubricants can slow them down rather than speed them up. In the small, fine gear trains found in cameras or timing mechanisms, a damping grease could serve a needed noise-quieting function, yet even the lightest grease would quickly stall out the delicate flea-power forces moving the mechanism.

An alternative is presented by a new addition to our small stable of non-spreading oils, Nye Special Instrument Oil 341. This is a variation on our non-spreading Nye Instrument Oil 3000 and is sufficiently viscous to serve a damping fluid function on the gear teeth and pinions in a tiny gear train. The viscosity of this oil at 100°F. is only 163 centistokes, hardly out of the medium range as oils usually go, but a truly high viscosity among the limited number of "non-spreads".

A lubricant which stays in place is necessary for any long-term damping effect. This would normally mean using a grease, but a grease sufficiently light would go beyond the "semi-fluid" and would likely show over an extended period some degree of syneresis, or oil bleed. The separated oil would creep away; the remaining grease would slowly become stiffer and soon too stiff.

A non-migrating oil would possess none of these disadvantages. Further, it has the needed qualities of oxidative stability and negligible volatility within its intended operating temperature range. The 341 oil thus fills another special niche in the interesting world of specialty lubricants. Evaluation samples are available at no charge on request.

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**New Developments in
 Specialty Lubricants**