

High Tech Greases Offer Creative Engineering Solutions

Life's far from simple for automotive design engineers. To meet the growing demand for 10-year, 150,000-mile components, they often turn to durable but expensive metals and engineered plastics, only to find themselves caught between the proverbial rock and hard place as they strive to minimize design and production costs.

More and more design engineers, however, are realizing there is a proven, less expensive route to longer component life. Synthetic lubricants, custom-designed for specific highly engineered components, not only extend operating life, they can also cut costs by reducing reliance on exotic metals and glass-reinforced and other specialty plastics.

Making the switch. A leading Japanese switch manufacturer saw the light when they decided to test a custom-designed perfluorinated polyether (PFPE) grease from Nye on a new ignition switch. They had tested a standard, off-the-shelf grease, but the switch failed at 6,000 cycles, far below their 10,000 cycle target. When they replaced the standard grease with NyeTact 571 H-10 by Nye, the switch was still functioning "like new" at 55,000 cycles.

"We developed a related lubricant, NyeTact 570 H, three years ago for gold telecommunication connectors, and it has since become the standard in the Telecom industry," explained Brian Holley, Nye Lubricant's National Engineering Manager. "While NyeTact 570 H was formulated for temperatures as low as -30°C, it didn't quite meet the automotive benchmark of -40°C. So we reformulated 570 H to meet automotive standards. The result was NyeTact 571 H-10, a new PFPE-based lubricant with an operating temperature range of -60° to +250°C."

NyeTact 571 H-10 is a 10 percent dispersion of our NyoGel 717D (the base grease) in an ozone-safe solvent. It can be applied to contacts by brushing, spraying, or dipping. The solvent evaporates leaving a thin, durable lubricant film.

Improved performance of the Japanese ignition switch is attributed primarily to PFPE's "non-burning" characteristic. In sliding



Two automotive success stories. NyeTact 571 H-10 and Fluorocarbon Gel 880 and other custom-formulated synthetic lubricants from Nye are delivering extended life and smooth performance for a wide variety of critical automotive components, including motor bearings, ignition switches, fuel level sensors, and ball joints.

switches, there can be some degree of arcing, which causes traditional contact greases to decompose, leaving resistive carbon debris on the contacts. This debris increases contact resistance, accelerates wear and, in turn, compromises the life of the switch. In contrast, fluoroether greases leave no residue upon decomposition; so, they minimize wear and extend operating life.

Sensing a better lube. NyeTact 571 H-10 may also find its way into the gas tank. Discussions are underway with manufacturers of fuel level sensors, who now rely only on gasoline to lubricate in-tank potentiometers, which electrically record and transmit to the fuel gauge how much gasoline is in the tank. Traditionally, these manufacturers have sidestepped more effective lubricants to avoid the possibility of a glob of grease washing off the sensor, and clogging the fuel injector. Unfortunately, without a good "resistive ink" lubricant, incorrect information sent to the fuel gauge is a frequent complaint.

"NyeTact 571 H-10 can be used inside the gas tank," Brian said. "First, PFPE is fuel and chemical-resistant. Further, because NyeTact 571 H-10 leaves a very thin, durable film of lubricant over the contact surface, there is no clogging hazard. More importantly, the lubricant film extends the life of the resistive ink, to ensure the right information is sent to the fuel gauge."

Preliminary tests by one customer have confirmed that NyeTact 571

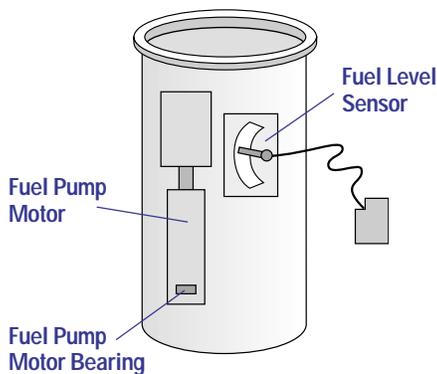
H-10 does reduce electrical noise and extend the life of fuel level sensors.

Charged-up PFPE. Fuel pumps also can make good use of a custom-designed PFPE grease. Now under discussion with an automotive supplier is an electrically conductive PFPE grease for bearings in the fuel pump motor. All motor bearings generate static electricity, which poses a serious potential hazard in fuel tanks. By using an electrically conductive, fuel-resistant PFPE grease in fuel pump motor bearings, the charge dissipates, and the safety hazard is reduced.

From cables to ball joints. Sometimes the creative solution to improved performance lies in trying lubricants already specified for other components in new applications. Case in point: Nye Fluorocarbon Gel 880, a high viscosity, synthetic grease thickened with fluorocarbon solids.

Fluorocarbon Gel 880, which is specified by Ford, General Motors, and Chrysler, was originally developed for parking brake cables

Fuel Delivery System



Lubricating fuel pump motor bearings with an electrically conductive PFPE grease reduces in-tank safety hazards by dissipating static electricity. A thin film of PFPE grease on the resistive ink of the fuel level sensor extends operating life and ensures the integrity of information transmitted to the fuel gauge.

nearly 10 years ago. Now a staple for that application, it was later successfully tested on disk brake calipers and rubber suspension parts. Most recently, a supplier of ball joints to Ford switched to 880. With its former grease, the manufacturer's ball joints achieved 800,000 cycles before catastrophic failure. Using the same durability test with Fluorocarbon Gel 880, the manufacturer stopped the test at 4.5 million cycles, and reported that "the ball joint felt very similar to the day the test was started."

Suitable for temperatures of -40° to +200°C, Fluorocarbon Gel 880 is water and salt-water resistant and compatible with underhood rubber and plastic components. Its high viscosity base oil coupled with the PTFE thickener insures smooth operation, even under start/stop conditions.

"For many years, design engineers considered lubricants almost as an afterthought," Brian observed, "something to be added after the component was designed. Today, custom-designed lubricants are increasingly seen as a design material. Rigorous testing by manufacturers has repeatedly identified the lubricant as one of the fastest, most cost-efficient ways to smoother performance, longer life, and high quality standards."

Third Engineer Joins Detroit Staff

Derrick R. Black became Nye's eighth Regional Engineering Manager on April 2. Hired to ensure continued, high level service to Nye's growing automotive customer base, Derrick joined two other Nye engineers, Brian Holley and Roger Cady, at the Company's Detroit office.

A degree candidate in mechanical engineering from Lawrence Technological University, Derrick brings a portfolio of hands-on experience to his new position at Nye. He has conducted research on vehicle dynamics and mechanical vibration, and designed automated and manual machinery using AutoCAD software. He is also adept at board drafting.

A "third generation engineer," Derrick notes that his grandfather designed battleships for Great Lakes Engineering Works. His father currently designs and maintains heating, cooling, and ventilating systems for a major US corporation.



Derrick Black

"I was attracted to Nye by the variety of applications they get involved in," Derrick commented, "which include every automotive device that uses a lubricant. When Brian said I may be working with motor, switch, ball joint, underhood component, steering, sensor, and power train engineers all in the same week, I knew this was the kind of challenging, service-oriented working environment I wanted."

General Motors and its component suppliers will comprise Derrick's primary customer group at Nye. Brian Holley works primarily with Ford products; Roger Cady, with Chrysler.



Cold Temp Hooting: A Word To The Wise

If you're having a problem with noisy bearings in underhood motors, take a closer look at your bearing grease. At -40°C, improperly formulated greases are too stiff to ensure smooth, quiet start-up. Bearings will skid along the raceway and "hoot" until the resultant friction softens the grease to lubricating consistency. On the other hand, bearing greases formulated specifically for low-temp start-up can replace that nettlesome hoot with the gentle purr of a top quality motor.

For more information about cold-temperature bearing greases, give us a hoot — so your underhood motors don't have to.

Nye Receives ISO 9002 Registration

On June 12, Nye Lubricants passed its final ISO 9002 registration audit. Registered by British Standards Institution, Inc., of the UK, Nye expects to receive its registration certificate by mid August 1997.

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