



## NEWSClips

For the third year in a row, Nye exhibited at **SemiconWest 2011** in San Francisco, CA, from July 12-14. Several engineers from Nye introduced Nye's latest breakthrough in ultra low outgassing lubricants: NyeTorr® 6200 & 6300.

Last June, Nye released a new piece of literature for the Appliance industry. Nye has been working for years with household equipment manufacturers on lubricants for applications such as connectors, electrical switches, pumps, hinges and handles, seals, etc.

### Product Releases:

**NyeTorr® 6301** - A heavy viscosity, perfluoropolyether oil intended for high vacuum and clean room applications, spacecraft and semiconductor manufacturing equipment. Benefits include very low vapor pressure.

**NyeTorr® 5386** - A thermally conductive lubricant thickened with metal oxide. It is used as a heat transfer medium in areas where high vacuum, low outgassing and thermal transfer are required. The 5386 does not contain silicone and its benefits include very low vapor pressure.

**NyeTact® 561J-35-AG** - A 35% dispersion of a synthetic hydrocarbon lubricant in an isoparaffinic solvent intended for electrical connectors with silver plating.

**Rheolube™ 393MS** - A lithium soap thickened, heavy viscosity synthetic hydrocarbon grease for ball joint and CV joint applications.

**Rheolube™ 363HT** - A lithium soap thickened, light viscosity, synthetic hydrocarbon grease intended for bearings, sliding surfaces, gear trains, and switchgear. 363HT is rust inhibited and excellent for wide temperature performance.

**Rheolube™ 368HF** - A lithium soap thickened PAO grease fortified with PTFE to reduce friction. It is intended for sliding surfaces, switchgear and gear train applications.

**NyoGel® 7792C-BK** - A PAO grease intended for mechanical components that require a light level of damping. It contains special additives for reducing wear of aluminum surfaces.

## Nye Lubricants Laboratory – New Additions!

Each year, Nye Lubricants strives to enhance our technical capabilities through investment in new laboratory equipment.... and 2011 is no exception. This year we have recently added two new pieces of laboratory equipment; a TA Instruments AR1500ex Rheometer and a Malvern Particle Size Analyzer. In addition, we expect delivery of an ASTM E-595 Outgassing Test Rig early this fall.

Our new **TA INSTRUMENTS AR1500EX RHEOMETER** is a controlled stress, strain, and rate rheometer with a torque range of 0.1  $\mu$ N.m to 150 mN.m. A Peltier plate allows testing to be done from -10°C to 200°C. The unit contains a standard 2°, 40 mm cone geometry. This new Rheometer joins our other TA AR1500ex Rheometer to allow us to perform flow, creep and stress relaxation and oscillation experiments with enhanced efficiency. It will be a valuable asset to our Technical Support efforts and R&D programs.

Our new **MALVERN PARTICLE SIZE ANALYZER** uses laser diffraction capable of measuring particle sizes in the range of 0.02 to 2000  $\mu$ m. It contains a 632.8 nm HeNe laser (red laser) and 466 nm blue light laser and measures dry powders, emulsions,

and suspensions. This instrument will be a real asset to our R&D efforts as it will allow us to look at the effects of different processing equipment on the particle size of the thickening systems utilized in our grease formulations and the effects on grease performance.



Picture: Nye's Particle Size Analyzer

Our new **ASTM E-595 OUTGASSING TEST RIG** (Estimated Time of Arrival: September 2011) will be capable of measuring Total Mass Loss (TML) and Collected Volatile Condensable Materials (CVCM). In this test, a sample is heated to 125°C at less than  $1 \times 10^{-5}$  torr for 24 hours and the TML and CVCM is measured. This rig will allow us to develop critical data for our entire Semicon product line as well as evaluating out-gassing properties of various base oils, greases and new products.



Picture: Nye's ASTM E-595 Outgassing Test Rig

## FAQ: Nye General Storage Guideline for Oils and Greases

Nye Lubricants greases should be stored in a cool and dry indoor area. The indoor temperature should not exceed 30°C (86°F), and should remain above 0°C (32°F). Do not put the grease directly near a heat source and avoid exposure to direct sunlight.

Nye Lubricants grease should be stored in its original packing. The packing should not show any signs of damage like severe denting, corrosion, or moisture attack. The grease packing should be kept closed until the grease is needed for use. After use the packing should be closed immediately, and kept closed.

When opening the grease package, do not let any dust, dirt or moisture enter the grease package! Even a small amount of dust or moisture can affect the grease quality. Wipe lid or cover clean before opening. Use clean tools and equipment when handling or pumping the greases. Put lid or cover on a clean and dust free place.

If a small amount of oil has separated, it is advised to pour this oil off. It is also possible to mix the oil back into the grease, but take utmost care to apply a clean practice.

## Two New Certifications for Nye Clean Rooms

Recently, Nye Lubricants has qualified two clean rooms.

- The Technical Products team is now working in a certified [Class 100,000 Clean Room](#). This team produces ultrafiltered grease and oil products for a variety of industries. In order to certify a Class 100,000 clean room to ISO Class 7 standards, fourteen locations were mapped out on a grid of the room and monitored in the room during working hours and at rest. The air was passed through a filter at an average flowrate of 1 cubic ft/min and particles were collected and sized. Our Technical Products production area had less than 20,000 particles > 0.5 micron per cubic foot of air, meeting the Class 100,000 specification of less than 100,000 particles > 0.5 micron per cubic foot of air.

- Our Pennzane® room has been tested and certified to a [Class 10,000 Clean Room](#), testing to ISO Class 8 room with an average particle count of less than 2,000 particles > 0.5 micron per cubic foot of air during normal production hours. All the equipment in the Pennzane room is dedicated to Pennzane, preventing any possibilities of cross contamination.

When visiting Nye's Clean Room facilities, one will notice that special garments are in place for production employees and visitors. All of our employees that access the room have been trained on special procedures for gowning. Hair nets, booties, gloves, and gowning are all required to ensure the materials produced and filtered in these rooms meet the stringent ISO and customer requirements.



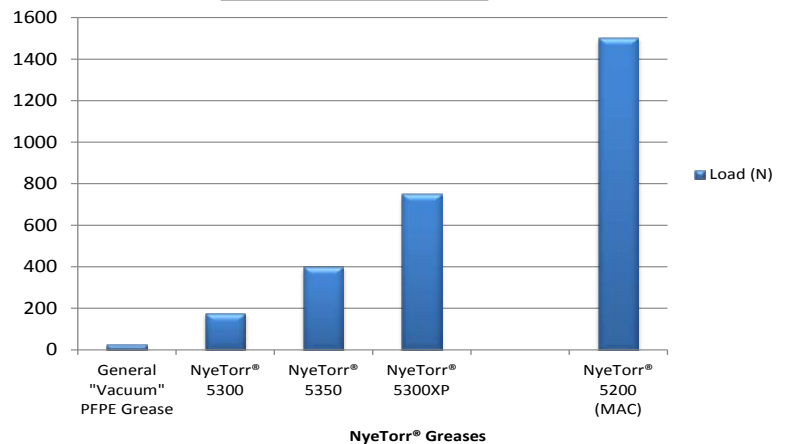
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## Product Development Update: Increasing PFPE's Load Characteristics

Perfluoropolyethers (PFPE) are widely known in the Aerospace and Semiconductor industry to offer many benefits like heat resistance, vacuum stability, and inertness. The main weakness of the PFPE molecule is that it does not support high loads and extreme pressure (EP) very well. This has meant that PFPE's have required more frequent lubrication intervals in order to provide long life in vacuum applications.

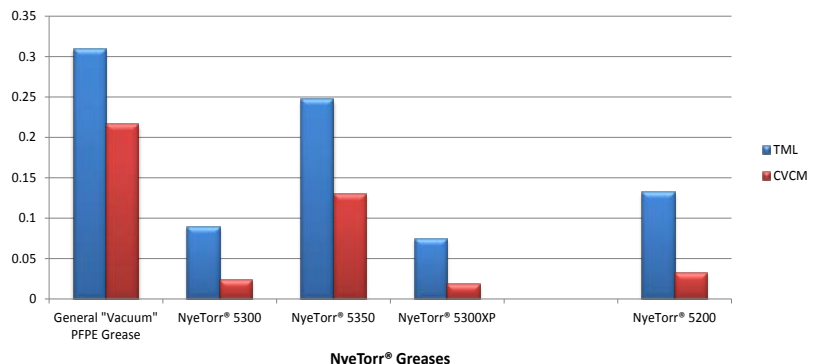
At Nye Lubricants, we have been working to develop new and innovative products for the Vacuum Industry that would allow for longer lubrication cycles, longer endurance, and trouble free maintenance while maintaining the high temperature stability and low outgassing requirements. Two years ago we released the NyeTorr® 5350 which doubled the EP loading capacity of our legacy NyeTorr® 5300 product. Below are comparative results on several vacuum lubricants from an EP load test done using a silicon nitride ball on a 52100 steel disc.

### EP Load Test with Silicon Nitride Ball on 52100 Steel Disc



While the improvement seen by the NyeTorr® 5350 is strong compared to the 5300 and standard PFPE greases, we wanted to develop a product that would take PFPE's to the next level. Another challenge with this development project was that many additives are not soluble in PFPE's and some of the traditional EP additives may include contaminants which would outgas and condense. With our goal set to improve the EP load capability of a PFPE grease while maintaining the low outgassing features, we developed the NyeTorr® 5300XP which features the use of a proprietary functional Alkylated Additive.

### ASTM E-595 Vacuum Stability Test



We are proud to introduce the NyeTorr® 5300XP as this is an exciting new product in the NyeTorr® line that has High Temperature Stability, Low Outgassing (E-595), and EP Load capabilities.