Nye® Synthetic Lubricants

SmartGrease™
Synthetic lubricants designed for your product

Test Method	Name and Description
CTM-003	**DENSITY AND SPECIFIC GRAVITY OF LUBRICATING GREASES** The procedure consists of filling a metal cup of a known volume with the test grease and determining its weight at 25°C.
CTM-007	**DETERMINATION OF BROOKFIELD APPARENT VISCOSITY OF DAMPING GREASES AT SUBZERO TEMPERATURES** This test method covers the determination of the apparent viscosity of lubricants by use of a Brookfield Viscometer.
CTM-009	**DIELECTRIC BREAKDOWN VOLTAGE** This method is used to determine the dielectric breakdown voltage of a grease or oil, which measures a lubricant's ability to withstand electrical stress without failure. It serves to indicate the presence of contaminating agents, such as water, dirt, moist cellulosic fibers, or conducting particles, one or more of which may be present in significant concentrations when low dielectric break down values are found by test.
CTM-011	**TEST FOR VAPOR PRESSURE OF GREASES AND OILS** This test method covers the determination of the vapor pressure of lubricating greases and oils. Vapor pressure readings are obtained at three temperatures from which vapor pressures at other temperatures may be obtained through extrapolation. This method may not be suitable for lubricants made with low viscosity base oils.
CTM-012	**ELECTRICAL CONDUCTIVITY MEASUREMENT FOR HIGHLY CONDUCTIVE LUBRICANTS** The electrical resistance through a measured thickness of grease is used to determine how well the grease is able to conduct or insulate electrical current through the connected parts. The term given this property is resistivity.
CTM-013	**THERMAL CONDUCTIVITY** This method is used to determine the thermal conductivity of a heat sink compound using DC-340 Compound as the reference material. The thermal conductivity of a substance is a measure of the ability of that substance to transfer energy as heat in the absence of mass transport phenomena. It is used in engineering calculations that relate to the manner in which a given system can react to thermal stresses.
CTM-014	**DETERMINATION OF BROOKFIELD APPARENT VISCOSITY (GENERAL)** This test method covers the determination of the apparent viscosity of lubricants by use of a Brookfield Viscometer.
ASTM D-92	**FLASH AND FIRE POINTS BY CLEVELAND OPEN CUP** This method is intended for fluids having a flash point of 79°C (175°F) and above. A fixed volume of fluid is heated at a uniform rate while open to the atmosphere at its surface. A small flame is passed over the surface at uniform temperature increments to determine the point at which vapors ignite (Flash Point). At a somewhat higher temperature, self sustained burning for at least 5 seconds, determines the Fire Point.
ASTM D-97	**POUR POINT OF PETROLEUM PRODUCTS** Sample is cooled and examined at intervals of 3°C for flow characteristics (held horizontal for 5 seconds). The lowest temperature at which movement is observed is the Pour Point.

Test Method	Name and Description
ASTM D-217	**CONE PENETRATION OF LUBRICATING GREASE** Grease is placed in a cup and a cone from a penatrometer and is dropped into the cup for 5 seconds. The distance the cone falls into the greases is correlated to NLGI standards of grades.
ASTM D-445	**KINEMATIC VISCOSITY OF TRANSPARENT AND OPAQUE LIQUIDS (THE CALCULATION OF DYNAMIC VISCOSITY)** The time is measured for a fixed volume of liquid to flow under gravity through the capillary of a calibrated viscometer. The Kinematic Viscosity is a product of the flow time and the calibration constant of the viscometer.
ASTM D-566	**DROPPING POINT OF LUBRICATING GREASE** A grease sample contained in a cup suspended in a test tube is heated in an oil bath at a prescribed rate. The temperature at which material falls through the hole in the bottom of the cup is averaged with the temperature of the oil bath and recorded as the Dropping Point.
ASTM D-664	**ACID NUMBER OF PETROLEUM PRODUCTS BY POTENTIOMETRIC TITRATION** The sample is dissolved in a mixture of tolune and propane with water. APH is titrated in (drop by drop) until and meter readings are taken against the amount titrated in. and then compared to readings of basic and acidic solutions.
ASTM D-942	**OXIDATION STABILITY OF LUBRICATING GREASES BY THE OXYGEN BOMB METHOD** A grease sample is oxidized in a bomb heated to 99°C and filled with O_2 at 110PSI. Pressure is observed and recorded at the stated intervals. The degree of oxidation after a given period of time is determined by the corresponding decrease in O_2 pressure.
ASTM D-972	**EVAPORATION LOSS OF LUBRICATING GREASES AND OILS** This method determines loss in mass of a grease or oil by passing heated air over the weighed sample for a fixed time (typically 22 hrs.). Because the air is heated by passing through a fixed length of tubing immersed in the same oil bath as the test cell, the actual temperature which the sample is subject to is less than the test temperature. The differential is significant (8, 10, 12°F or more) depending on test temperature. The highest test temperature is limited by the use of an oil bath (typically 300°F).
ASTM D-974	**ACID AND BASE NUMBER BY COLOR-INDICATOR TITRATION** A sample is dissolved in a mixture of tolune and IPA with water. Base or acid solution is titrated in (drop by drop) until the color change occurs.
ASTM D-1264	**DETERMINING THE WATER WASHOUT CHARACTERISTICS OF LUBRICATING GREASES** A standard ABEC 6204 test bearing is packed with 4 grams of the grease to be tested. The bearing is rotated at 600 rpm in the water spray chamber at 100°F (or 175°F) for one hour. 300 mls of water per minute are sprayed at the bearing assembly. The percent of weight loss of the grease carried away with the water is reported. This test is a relative measure of a grease's ability to resist removal by water.
ASTM D-1403	**CONE PENETRATION OF LUBRICATING GREASE USING ONE-QUARTER AND ONE-HALF SCALE CONE EQUIPMENT** This test is a small scale version of test method ASTM D-217 'Cone Penetration of Lubricating Grease'. The use of small scale equipment allows the operator to measure the penetration of grease samples as small as 2 or 3 grams in size.
ASTM D-1478	**LOW TEMPERATURE TORQUE OF BALL BEARING GREASE** The torque resulting from grease lubricated ball bearings rotated at one rpm is measured. The test is designed for temperatures of 0°F (-20°C) and below.

Test Method	Name and Description
ASTM D-1480	**DENSITY AND RELATIVE DENSITY (SPECIFIC GRAVITY) OF VISCOUS MATERIALS BY BINGHAM PYCONOMETER** Liquid is introduced into a pyconometer equilbrated to the desired temperature and weighed. The density is then calculated from this weight.
ASTM D-2265	**DROPPING POINT OF LUBRICATING GREASE OVER WIDE TEMPERATURE RANGE** A sample of grease is heated in the drop point cup until the sample melts or separates and runs out a small hole in the bottom of the cup. This test may indicate the temperature at which a change in state may be anticipated under similar operating conditions.
ASTM D-2266	**WEAR PREVENTIVE CHARACTERISTICS OF LUBRICATING GREASE (FOUR-BALL METHOD)** Three 12.7mm diameter balls are clamped together and covered with the lubricant to be evaluated. A fourth ball is pressed with 40kg into the cavity formed by the three clamped balls. Temperature is kept at 75°C and the top ball is spun at 1200 RPM. Lubricants are compared by measuring the average diameter of the wear scar on the clamped balls.
ASTM D-2270	**CALCULATING VISCOSITY INDEX FROM KINEMATIC VISCOSITY AT 40°C AND 100°C** Viscosity Index is a measure of the variation in Kinematic viscosity due to changes in temperature. A low V.I. signifies a relatively large change of viscosity with changes of temperature while a high V.I. signifies relatively little change in viscosity over a wide temperature range.
ASTM D-2595	**EVAPORATION LOSS OF LUBRICATING GREASE OVER WIDE-TEMPERATURE RANGE** This method eliminates the limitations of ASTM D-972 by employing an aluminum block for heating the test cell and an air preheater so that the sample is subject to air at the same temperature as the test temperature.
ASTM D-4048	**DETECTION OF COPPER CORROSION FROM LUBRICATING GREASE** A variety of hydrocarbon products including oils, hydraulic fluids, fuel, solvents, etc., can be tested for corrosivity to copper by use of this test. It is limited to products with Ried Vapor pressure no greater than 18 psi (124 kPa). A polished copper strip is immersed in the fluid and heated for a specified time and temperature after which the corrosion is rated by visual comparison to the ASTM Copper Strip Corrosion Standards. The most typical test run is for 24 hours @ 100°C. However, time and temperature can vary according to product type and specification. Results are reported as a number followed by a letter according to the following scheme: 1) slight tarnish a. light orange, almost the same as a freshly polished strip b. dark orange 2) moderate tarnish a. claret red b. lavender c. multi colored with lavender blue or silver, or both, overlaid on claret red d. silvery e. brassy or gold 3) dark tarnish a. magenta overcast on brassy strip b. multi-colored with red and green showing (peacock), but no gray 4) corrosion a. transparent black, dark gray or brown with peacock green barley showing b. graphite or lusterless black c. glossy or jet black
ASTM D-4172	**WEAR PREVENTION CHARACTERISTICS OF LUBRICATING FLUID (FOUR BALL METHOD)** Three 12.7mm diameter balls are clamped together and covered with the lubricant to be evaluated. A fourth ball is pressed with 40kg into the cavity formed by the three clamped balls. Temperature is kept at 75°C and the top ball is spun at 1200 RPM. Lubricants are compared by measuring the average diameter of the wear scar on the clamped balls.
FTM 321.2	**OIL SEPARATION FROM LUBRICATING GREASE (STATIC TECHNIQUE)** The bleeding of oil from grease under static conditions and elevated temperatures is measured. Temperatures from 150°F to 450°F can be used. 30 hours is the usual test period but may be extended or shortened as necessary. The tendency of oil to separate either during storage or when idle in a hot bearing can be an important property. This test can distinguish between greases that will either promote or prevent oil separation according to the demands of the application. API Bulletin 5A2 (A.3) substitutes a nickel cone with 1.0 mm holes for the wire screen used in ASTM D-6184 and FTM-321. This technique may simulate oil losses expected through the grease seals typically used on machines and tools used in “Lubricated for Life” bearings.