

Castrol Braycote® 601 EF



Technical Data Sheet

Description

Castrol Braycote® 601 EF is a smooth, buttery, translucent, off-white, NLGI #2 grease. Its base oil (Castrol Brayco® 815Z) is a perfluorinated polyether, with exceptional chemical resistance, extremely low volatility, and a wide temperature service range. The grease is non-toxic, nonflammable, and does not use any chlorofluorocarbons (CFC's) during product manufacture. Castrol Braycote® 601 EF exhibits unusually high load-carrying capabilities as measured by the Four-Ball EP Test, and contains a rust and corrosion inhibitor for extra component protection. Castrol Fluoroclean™ X100 or Castrol Fluoroclean™ HE can be used to remove this lubricant. Refer to the data sheets for Castrol Fluoroclean™ X100 and Castrol Fluoroclean™ HE for information regarding these products. Castrol Braycote® 601 EF with molybdenum disulfide is also available for applications requiring both corrosion and extreme pressure additives.

Temperature Range

-80°C to 204°C (-112°F to 400°F)

Uses

Castrol Braycote® 601 EF is designed to operate in the presence of rocket fuels and oxidizers and high vacuum. Castrol Braycote® 601 EF is frequently used in space applications including the Space Shuttle and satellites. It should also be considered in any application where a hostile chemical or extreme environmental conditions would preclude the use of an ordinary grease. Typical applications include ball and roller bearings, gears, and as an assembly lubricant for O-rings and elastomers. Perfluorinated greases, such as Castrol Braycote® 601 EF, exhibit excellent shelf life due to their intrinsic inertness.

Limitations

Castrol Braycote® 601 EF is compatible with most commonly utilized materials, plastics, and elastomers. Castrol Braycote® 601 EF may be adversely affected by Lewis Acid Catalysts such as aluminum chloride, at elevated temperatures. Newly exposed rubbing surfaces of aluminum,

magnesium and titanium alloys may react with Castrol Braycote® 601 EF under certain conditions. Such systems should be thoroughly evaluated. Surfaces must be well cleaned of organic rust inhibitors prior to grease application to insure proper lubrication. This product is not recommended for use in applications under high vacuum with loads exceeding 100,000 psi for extended periods of time.

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TEST METHOD	DESCRIPTION	RESULT
D 1403	Penetration, (77°F), mm ⁻¹ Unworked Worked, 60 strokes	288 290
FTM 321	Oil Separation, % wt 30 hrs, 204°C (400°F) Evaporation Loss, % wt	10.53 0.54
D 1743	Rust Prevention	1,1,1,Pass
FTM 5309	Copper Strip Corrosion, 24 hrs, 100°C (212°F)	1b
D 2266	Four-Ball Wear-Test, AWSD, mm 1200 rpm, 40 kgf, 1 hr, 75°C (167°F)	0.82
D 2265	Dropping Point, °F (°C)	208 (407)
D 2596	Four-Ball Extreme-Pressure Weld Point, kgf	800+
E 595 NASA SP-R-0022A	Vacuum Stability Test 24 hrs, 125°C (257°F), 10 ⁻⁶ , torr Total Weight Loss(TWL), % wt Volatile Condensable Material(VCM), % wt	0.39 0.03
D 1478	Low-Temperature Torque, g.cm @ -62°C (-80°F) Starting Running, 1 hr @ -73°C (-100°F) Starting Running, 1 hr Low-temperature Torque, N-m @-73°C (-100°F) Starting Running, 1 hr	585 228 1430 637 0.05 0.02
D 2512 (MSFC 106)	LOX Impact Sensitivity 1100 mm, 20 drops	Pass
D 2595	Evaporation Loss, % wt, 22 hrs, 204°C (400°F)	0.87
	Pounds per gallon @ 16°C (60°F)	16.17
	Grams per milliliter @ 16°C (60°F)	1.94

Base Oil Characteristics		
D 287	Specific Gravity @ 16/16°C (60/60°F) Pounds per gallon @ 16°C (60°F)	1.8531 15.430
D 445	Kinematic Viscosity, cSt @ 99°C (210°F) @ 38°C (100°F) @ -54°C (-65°F)	45 148 10,855
D 2270	Viscosity Index	350
D 97	Pour Point, °C (°F)	-72 (-100)
Knudsen	Vapor Pressure, torr @ 20°C (68°F) @ 100°C (212°F) @ 200°C (392°F)	4×10^{-13} 2×10^{-9} 2×10^{-6}

Perfluoropolyether Lubricants

Chemical Resistance

CLASS OF PRODUCT	CHEMICAL PRODUCT	TEMPERATURE AT WHICH FLUORINATED FLUIDS RESIST ON CONTACT (°C)
Organic solvents	All products in this class	300 ⁽¹⁾
Organic acids	All products in this class	300 ⁽¹⁾
Organic bases ⁽²⁾	Tributylamine Quinoline ⁽⁵⁾	200 200
Inorganic acids ⁽²⁾	Potassium hydroxide ⁽⁵⁾ Sodium hydroxide Sodium carbonate	200 200 200
Inorganic salts ⁽³⁾	Potassium chloride	250
Inorganic oxidizing agents ⁽³⁾	Fluorine Chlorine Bromine Potassium permanganate Potassium dichromate ⁽⁵⁾	250 250 250 200 200
Inorganic acids ⁽³⁾	Hydrochloric acid Hydrofluoric acid Orthophosphoric acid Sulfuric acid ⁽⁵⁾ Nitric acid	250 250 200 200 200
Lewis acids ⁽⁴⁾	Ferric chloride FeCl ₃ ⁽⁵⁾	200 200 200
Other	Silicon tetrachloride Trichlorosilane Phosphorous tribromide Phosphorous pentachloride	150 150 150 150

1. Fluorinated fluids are soluble in highly fluorinated products.
2. The table lists some products of this class which have been laboratory tested and gives the results obtained; for other products, differing from those listed, compatibility test should be performed under the expected contact conditions.
3. Fluorinated fluids are completely inert with regard to chemical products belonging to this class.
4. Some members of this class are reactive with regard to fluorinated fluids since they catalyze their decomposition but only at relatively high temperatures.
5. In the tests performed with these substances, no marked alterations were recorded at the temperature indicated in the tables and even for longer times (up to 1 month).