

DuPont™ Krytox® Lubricants

Chemical Stability

DuPont™ Krytox® PFPE¹ oils and greases thickened with PTFE² exhibit exceptional chemical stability.

Chemical stability and inertness are critical characteristics of DuPont™ Krytox® perfluorinated lubricants (PFPE). Krytox® oils and greases will not react with most chemicals³ and other lubricants, nor cause them to degrade. In addition, as a result of their solubility characteristics and density, Krytox® lubricants do not mix well with most chemicals and other hydrocarbon-based lubricants and will separate out. Krytox® oils and greases are completely insoluble in water.

Krytox® PFPE oils are essentially inert to most chemicals. No reaction is observed with boiling sulfuric acid, fluorine gas at 200 °C, molten sodium hydroxide, chlorine trifluoride at 10-50 °C, uranium hexafluoride gas at 50 °C, or any of the following materials at room temperature: JP-4 turbine fuel, unsymmetrical dimethyl hydrazine, hydrazine, diethylenetriamine, ethyl alcohol, aniline, 90% hydrogen peroxide, red fuming nitric acid or nitrogen tetroxide. Krytox® oils are slightly soluble in hydrazine and have moderate (25 to 30 percent) solubility in nitrogen tetroxide.

Krytox® oils are not soluble in common organic solvents, acids and bases, but some solvents will dissolve PFPE oils. Krytox® oils are completely miscible in highly fluorinated solvents and refrigerant gases, such as:

- Trichlorotrifluoroethane (Freon 113),
- Hexafluorobenzene,
- 2,3-dihydrodecafluoropentane (Vertrel® XF)
- Perfluorooctane
- Perfluorohexane
- Perfluorodimethylcyclobutane isomers
- 1,1 dichloro-1-fluoroethane.

These fluorinated solvents will not react with PFPE oils, but the oils will be carried away from the lubricating point. PFPEs are freely soluble in supercritical CO₂.

DuPont™ Krytox® lubricants have also been tested and used in the presence of gaseous and liquid oxygen and chlorine with no reactivity noted.

Krytox® lubricants are safe for use with rubber, elastomers, plastics and metals commonly used as seals and bearings.

A type of chemical known as a Lewis acid (electron pair acceptor) can react with PFPE oils and will limit the temperature at which they can be used. Typical Lewis acids are boron trifluoride, aluminum chloride, iron (III) chloride, and titanium tetrachloride. At elevated temperatures, these materials can lead to decomposition of any PFPE.

Caution should be taken with metallic alkalis such as sodium and lithium metals as reactions could occur readily.

Some grease grades contain additives for anti-corrosion or extreme pressure and these additives do not have the same chemical stability as the oils and thickeners. In chemical contact applications, it is typically common to use greases without additives.

DuPont™ Krytox® performance lubricants are not only resistant to oxygen and reactive gases, but they are inert to virtually all chemicals commonly used in most industries.




The miracles of science™

¹ Perfluoropolyether

² Polytetrafluoroethylene

³ Exceptions include Lewis acids and metallic alkalis.



DuPont™ Krytox® lubricants have been used in contact with the following chemicals, in addition to many others not listed:

Acetone	Fluorine	Nitrogen trifluoride
Acrylonitrile	Formaldehyde	Nitrotrifluorine
Alcohol	Gasoline	Nitrous oxide (anesthesia)
Acetylene	Helium	Organic acids
Hydrocarbon oils	Heptane	Oxygen, liquid or gas
Ammonia	Hexafluoropropylene	Ozone
Ammonium nitrate	Hexane	Polyalphaolefin
Aniline	Hydrobromic acid	Potassium chloride
Aqueous caustic	Hydrocyanic acid	Potassium hydroxide
Benzene	Hydrochloric acid	Perchloroethylene
Boiling sulfuric acid	Hydrofluoric acid	Phosphoric acids
Brake fluids	Hydrogen	Phosgene
Bromine	Hydrogen bromide	Polyalkylene glycols
Butadiene	Hydrogen chloride	PolyAlphOlefins
Butane	Hydrogen peroxide	Polyol ester oils
Butylene	Hydrogen sulfide	Polyphenyleneoxide (PPO)
Carbon dioxide	Iodine	Potassium hydroxide
Carbon monoxide	Isopropyl alcohol	Potassium permanganate
Carbon tetrachloride	JP 4 & 8 turbine fuel	Propane
Chlorine, liquid or gas	Lithium glycol	Propylene
Chlorine trifluoride	Methane	Red fuming nitric acid
Chloroform	Methanol	Silicone products
Compressed air	Methylamine	Sodium hydroxide
Dichlorosilane	Methylchloride	Sulfur hexafluoride
Dimethylether	Methylbromide	Sulfuric acid
Diesel fuel	Methylmercaptan	Sulfur oxides
Diethylenetriamine	Methylsilane	Unsymmetrical dimethy
Ester oils	Methylene oxide	Hydrazine
Ethane	Monosilane	Uranium hexafluoride
Ethanol	Molten caustic	Trifluoroacetylchloride
Ethyl alcohol	Natural gas	Trimethylamine
Ethyl chloride	Nitric acid	Vinyl chloride
Ethylene	Nitrogen	Vinyl bromide
Ethylene glycol	Nitrogen oxide	Vinyl fluoride
Ethylene oxide	Nitrogen oxides	Water, steam

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DuPont Performance Lubricants
Extreme Conditions. Extreme Performance.

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