

Engineered Fluids - Oils

Fluorinated Lubricants Engineered for Your Success

Fluorinated oils designed to provide excellent lubricity, reliability and safety to meet industry needs

The Halocarbon Engineered Fluids product line is composed of specialty, fluorinated oils that are made of PCTFE (polychlorotrifluoroethylene). This PCTFE technology is what allows Halocarbon Oils to be chemically inert and nonflammable lubricants with high thermal stability, good lubricity, high dielectric strength, and low compressibility. As the first company to commercially produce PCTFE-based lubricants over 65 years ago, Halocarbon has continued to develop new products and collaborate with customers in order to meet industry needs and create new breakthroughs. Halocarbon Engineered Fluids are **nontoxic, nonreactive, nonflammable** and **chemically inert**, making them ideally suited to meet the needs of a wide range of industries and provide advantages in many applications from lab-scale to the production plant.

Safe, Reliable and Long-Lasting Performance

The Oils in the Halocarbon Engineered Fluids product line are synthetic fluorinated oils that have been formulated to be hydrogen-free, inert toward practically all compounds and solutions, as well as miscible with a variety of typical organic materials.

All Halocarbon oils are intrinsically **nonflammable** and **nonreactive**. Unlike glycol-, alcohol-, hydrocarbon-, mineral oil-, or silicon-based lubricants, Halocarbon oils are **chemically inert**, making them ideally suited for use in applications that involve strong acids or bases, flammable solvents, hydrocarbons, corrosive chemicals, strong oxidizers, and reactive gasses.

Halocarbon Oils offer exceptional resistance to oxidation and the resulting shelf life for un-additized oils should be indefinite when stored indoors in the original unopened containers at typical ambient temperatures under reasonable housekeeping conditions. Additized oils will have a shelf life of approximately 5 years when stored under the same conditions.

Halocarbon Engineered Fluid Strengths

The PCTFE technology that makes up all Halocarbon oils not only allows you to achieve higher safety and reliability standards, but the way they are manufactured creates a chemical composition that is less complex and more cost-effective than other specialty fluorinated oils. The inherent simplicity of PCTFE chemistry produces oils that do not contain any oxygen atoms in their chemical structure. In addition, these fluids contain no carbon-hydrogen bonds, allowing them to be used with some of the more hazardous process fluids.

Halocarbon Oils are compatible with the following chemicals, as well as many others not as widely used:

- Hydrofluoric Acid (HF)
- Hydrochloric Acid (HCl)
- Sulfuric Acid (H₂SO₄)
- Nitric Acid (HNO₃)
- Phosphoric Acid (H₃PO₄)
- Silicon Tetrachloride (SiCl₄)
- Chlorine (Cl₂)
- Fluorine (F₂)
- Bromine (Br₂)
- Oxygen (O₂)
- Ammonia (NH₃)
- Hydrogen Peroxide
- Sodium Hydroxide (NaOH)
- Sodium Hypochlorite
- Potassium Hydroxide/Lye (KOH)
- Hydrocarbon Solvents
- Natural Gas
- Propane
- Petroleum
- Aluminum Trichloride (AlCl₃)
- Boron Trifluoride (BF₃)
- Arsenic Trifluoride (AsF₃)

Key Performance Characteristics

- Safe to handle, nontoxic
- Clean, no sludge formation
- Nonflammable
- Low temperature fluidity
- High thermal stability
- Low compressibility
- Compatible with most metals, plastics, and elastomers
- Good heat transfer properties
- Excellent sealing and lubricating properties

Typical Applications for Halocarbon Oils:

Halocarbon fluoropolymer oils are used in multiple applications ranging from aerospace and the military to chemical manufacturing and energy production. Some of the typical applications these fluorinated lubricants are used in are:

- Aerospace Lubricants
- Suspension Fluids in Analytical Labs
- Biological Staging Oils
- Chemical Manufacturing
- Hydraulic Fluids
- Instrument Fill Fluids
- Low Temperature Baths
- Metal Working Fluids
- Nuclear Industry
- Pulp and Paper Industry
- Reactive Gas Services
- Vacuum Pump Fluids

Interested in **Mechanical Seal Barrier Fluids, Metalworking Fluids, or Precision Vacuum Pump Fluids**? Halocarbon has three specifically engineered product lines to better serve the needs of these industries. Ask about our **NEW** information sheets for these products!

Typical Properties: Halocarbon Oils¹

Oil	0.8	1.8	4.2	6.3	27	56	95	200	400	700	1000N
Flash and Fire Points	None										
Pour Point² °F (±10°F) °C (±5°C)	-200 -129	-135 -93	-100 -73	-95 -71	-40 -40	-30 -34	-15 -26	10 -12	15 -9	40 5	50 10
Cloud Point³ °F (±10°F) °C (±5°C)	<-200 <-129	<-135 <-93	<-125 <-87	<-125 <-87	<-95 <-71	-30 -34	-5 -21	35 2	50 10	55 13	65 18
Viscosity⁴ (±10%)											
@ -65°F (-54°C)											
Centistokes	5.7	143	---	---	---	---	---	---	---	---	---
Centipoises	10	271	---	---	---	---	---	---	---	---	---
@ 100°F (37.8°C)											
Centistokes	0.8	1.8	4.2	6.3	27	56	95	200	400	700	1000
Centipoises	1.3	3.5	7.8	12	51	108	182	390	780	1365	1950
@ 160°F (71.1°C)											
Centistokes	0.54	1.1	1.9	2.6	6.8	11	16	26	40	62	83
Centipoises	0.89	1.9	3.4	4.7	13	21	30	49	75	118	158
@ 210°F (99°C)											
Centistokes	---	0.8	1.2	1.6	3.1	4.9	6.3	9	12	17	22
Centipoises	---	1.4	2.1	2.8	5.6	8.9	12	16	22	32	41
Density⁵ (±0.01 g/mL)											
100°F (37.8°C)	1.71	1.82	1.85	1.87	1.90	1.92	1.92	1.95	1.95	1.95	1.95
160°F (71.1°C)	1.65	1.76	1.80	1.82	1.85	1.87	1.87	1.89	1.89	1.90	1.90
210°F (99°C)	1.60	1.71	1.75	1.77	1.81	1.82	1.82	1.85	1.85	1.86	1.86
Refractive Index n_D^{20} (typical)	1.383	1.395	1.401	1.403	1.407	1.409	1.411	1.412	1.412	1.414	1.415

1. Same oil grades followed by "S" indicate rust inhibitor has been added. Oil is still oxygen compatible.

2. ASTM D97
3. ASTM D2500

4. ASTM D445
5. Gay-Lussac pycnometers or equivalent

Thermal Stability: The thermal stability of Halocarbon oils extends up to the decomposition temperature of the carbon chain. These compounds are subject to thermal cracking above 580°F (304°C) with rapid breakdown occurring above 620°F (327°C) into volatile compounds. The maximum recommended safe operating temperature is 400°F (204°C). Applications above 300°F (150°C) should be evaluated prior to use.

Caution: Halocarbon Engineered Fluids should not be used in contact with sodium or potassium metal, amines, amine additives (antioxidants, etc.), liquid fluorine, or liquid bromine trifluoride. Caution should be used with aluminum, magnesium, and their alloys under conditions of significant tribological contact.



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The information provided herein is based on technical tests conducted by Halocarbon and is believed to be correct. It is intended for use by persons trained in the proper use of these and related materials. Always refer to the appropriate Safety Data Sheets (SDSs) prior to using any product. Please contact our customer service department to obtain SDSs. Since actual use conditions may differ from those used in the generation of the data provided herein, Halocarbon cannot guarantee the accuracy of this information or be held responsible for loss or damage that results from the use of this information. Nothing in this document is intended or should be construed as a recommendation to infringe on any existing patents.