Krytox™
Performance Lubricants

Aerospace Grade Oils and Greases

Product Information

Typical Properties of Krytox™ Aerospace Grade Fluorinated Oils*

				Aerospace Oil Grade				
Property	ASTM Test Method	Test Conditions	Units	143AZ	143AA	143AB	143AC	143AD
Average Molecular Weight	NMR			2060	2210	3800	5940	7480
Viscosity	ASTM D445	−32 °C (−25 °F)	cSt	7480	12,340	44,620	—	—
		0 °C (32 °F)		228	350	1070	3940	7500
		20 °C (68 °F)		60	88	240	800	1540
		38 °C (100 °F)		24.7	35	86	270	502
		40 °C (104 °F)		22.8	32	78	243	450
		99 °C (210 °F)		4.2	5.4	10.5	26	44
		100 °C (212 °F)		4.1	5.3	10.2	25.4	42.4
		204 °C (400 °F)		1.1	1.3	2.1	4.1	6.0
		260 °C (500 °F)		—	—	—	2.4	3.4
Viscosity Index	ASTM D2270			60	96	113	134	146
Pour Point	ASTM D97		°C	−55	−50	−40	−35	−30
			°F	−70	−60	−40	−30	−20
Distillation Range	ASTM D1160	53 Pa (0.4 torr)	°C	140/210	170/245	215/290	260/370	300/400+
			°F	285/410	340/475	420/555	500/700	570/750+
Oil Density		0 °C (32 °F)	g/mL	1.91	1.92	1.93	1.95	1.95
		100 °C (212 °F)		1.72	1.74	1.75	1.77	1.78
Vapor Pressure	Knudsen	38 °C (100 °F)	torr	4×10^{-4}	1×10^{-4}	5×10^{-6}	8×10^{-8}	6×10^{-9}
		260 °C (500 °F)	torr	1.5	0.8	3×10^{-2}	2×10^{-3}	3×10
		38 °C (100 °F)	KPa	5×10^{-5}	1×10^{-5}	7×10^{-7}	1×10^{-8}	8×10^{-10}
		260 °C (500 °F)	KPa	0.2	0.1	4×10^{-3}	3×10^{-4}	4×10^{-5}
Volatility	ASTM D2595	149 °C (300 °F)	wt% loss	18	15	1.9	—	—
		204 °C (400 °F)	in 22 hr	—	—	17.3	<1	—
		260 °C (500 °F)		—	—	76.2	4	2
Estimated Useful Range			°C	−57–149	−51–177	−40–232	−34–288	−29–316
			°F	−70–300	−60–350	−40–450	−30–550	−20–600

* This table gives typical properties (not specifications) based on historical production performance. Viscosity may vary within +10%. Chemours does not make any express or implied warranty that these products will continue to have these typical properties.

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Figure 1. Viscosity vs. Temperature of Krytox™ Aerospace Grade Fluorinated Oils

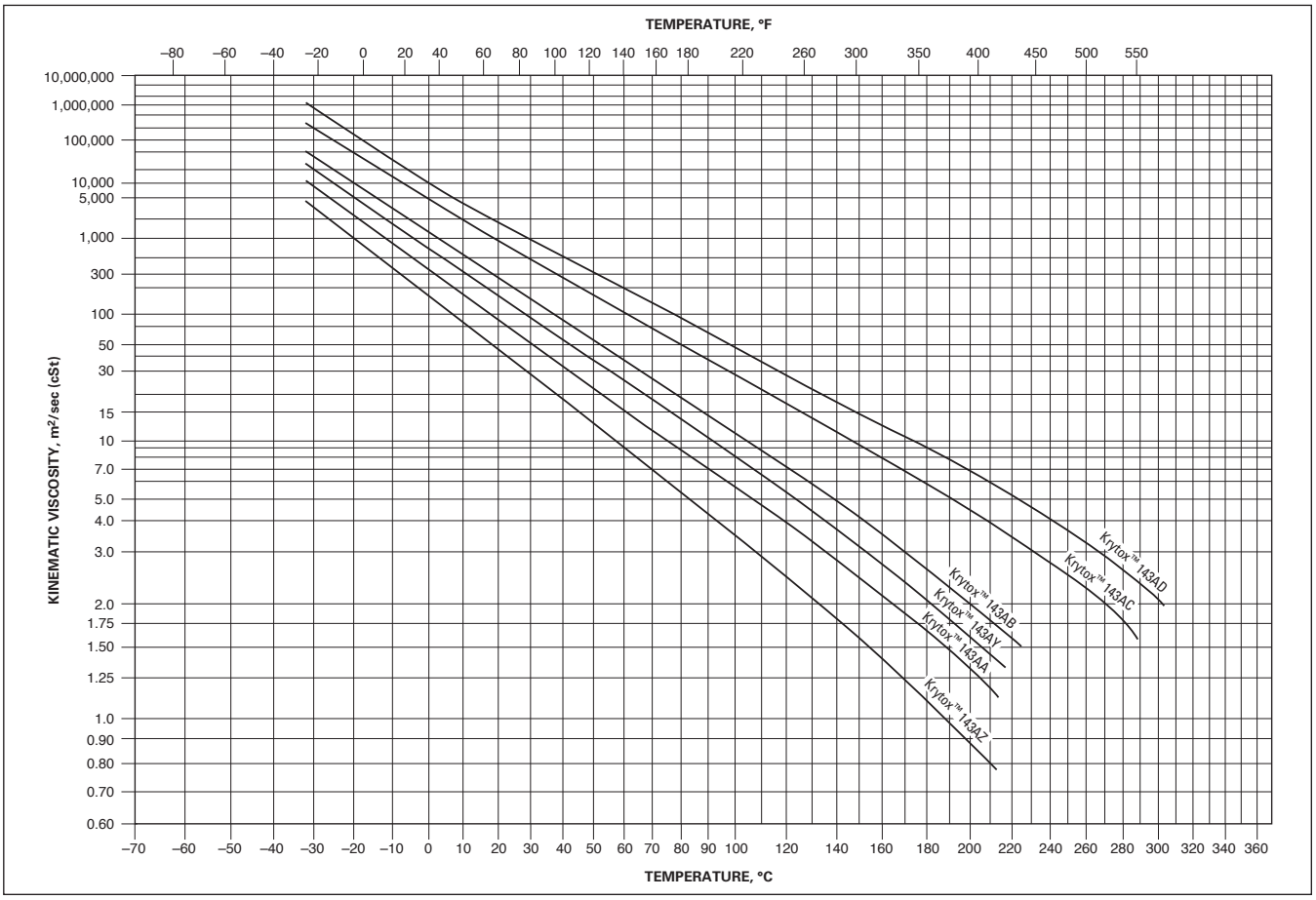
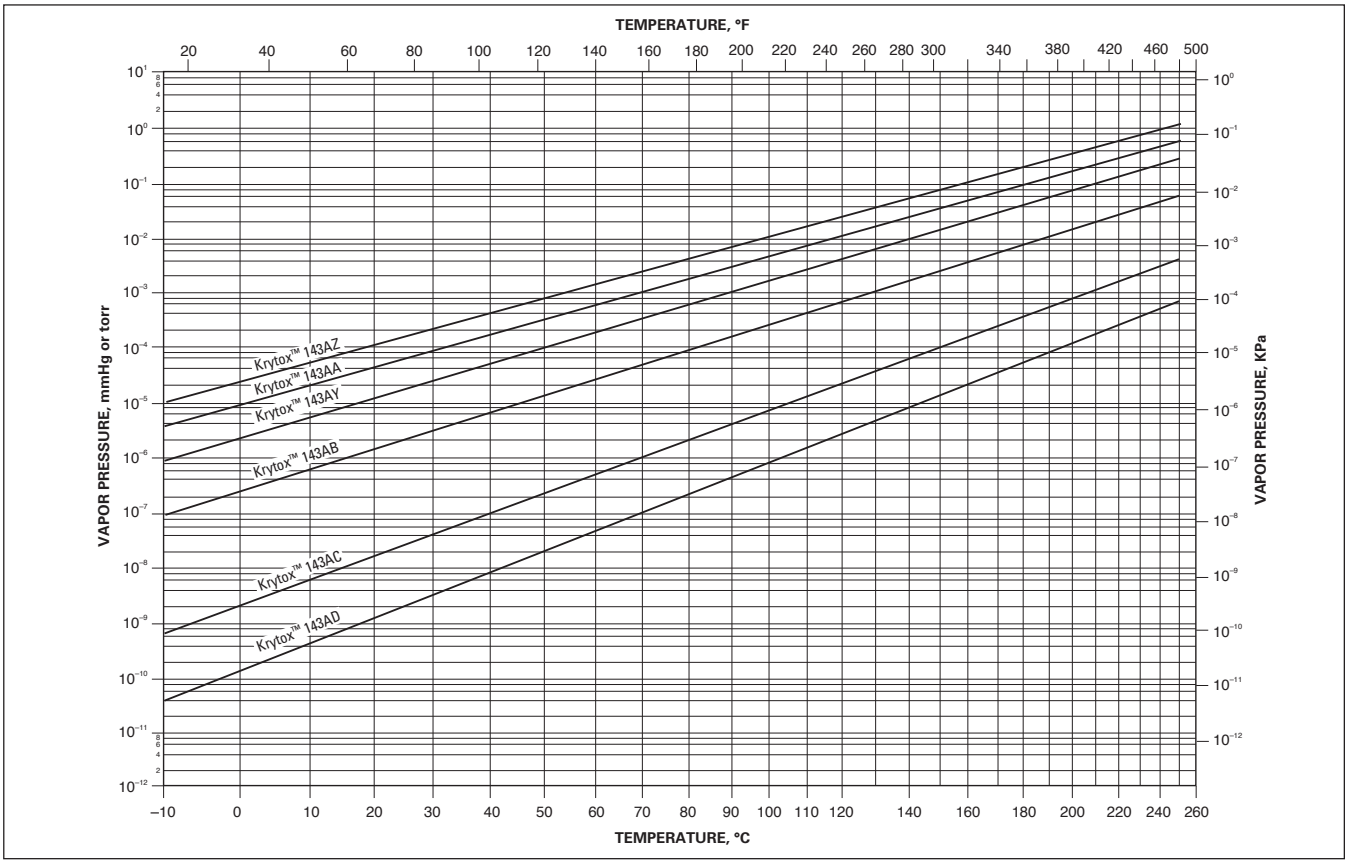


Figure 2. Vapor Pressure vs. Temperature of Krytox™ Aerospace Grade Fluorinated Oils



Typical Properties of Krytox™ Aerospace Grade Fluorinated Greases*

Property	ASTM Test Method	Test Conditions	Units	Aerospace Grade				
Aerospace Grease Grade				240AZ (H-1)	240AA	240AB (H-1)	240AC (H-1)	240AD
Extreme Pressure Grade				250AZ	—	—	250AC	250AD
Rust Inhibited Grade				—	—	280AB	280AC	—
Rust Inhibited Grade				283AZ	283AA	283AB	283AC	283AD
Viscosity of Base Oil	ASTM D445	20 °C (68 °F) 38 °C (100 °F) 99 °C (210 °F) 204 °C (400 °F)	cSt	60 24.7 4.2 1.08	88 35 5.4 1.3	240 86 10.5 2.1	800 270 26 4.1	1540 502 44 6.0
Vapor Pressure of Base Oil	Knudsen	38 °C (100 °F) 260 °C (500 °F)	torr torr	4×10^{-4} 1.5	1×10^{-4} 0.8	5×10^{-6} 3×10^{-2}	8×10^{-8} 2×10^{-3}	6×10^{-9} 3×10^{-4}
Volatility of Base Oil	ASTM D2595	149 °C (300 °F) 204 °C (400 °F) 260 °C (500 °F)	wt% loss in 22 hr	18 — —	15 — —	1.9 17.3 76.2	— <1 4	— — 2
Pour Point of Base Oil	ASTM D97		°C °F	−55 −70	−50 −60	−40 −40	−35 −30	−30 −20
Texture				Buttery				
Penetration	ASTM D217	60 Strokes		265–295				
Mechanical Stability	ASTM D217	10,000 and 100,000 Strokes		No change from original grade				
Oxidation Stability	ASTM D942	99 °C (210 °F)		0 psig O_2 pressure drop after 600 hr				
Liquid Oxygen Impact	ASTM D2512, NASA MSFC 106B			Pass				
Grease Density		25 °C (77 °F)	g/mL	1.89	1.91	1.92	1.93	1.93
Oil Separation	ASTM D6184	99 °C (210 °F) 204 °C (400 °F)	wt% loss in 30 hr	6 —	5 20	4 12	3 11	3 10
Estimated Useful Range			°C °F	−57–149 −70–300	−51–177 −60–350	−40–232 −40–450	−34–288 −30–550	−29–316 −20–550+

* This table gives typical properties (not specifications) based on historical production performance. Viscosity may vary within +10%. Chemours does not make any express or implied warranty that these products will continue to have these typical properties.

Krytox™ 143 series oils are clear, colorless, fluorinated synthetic oils that are non-reactive, nonflammable, safe in chemical and oxygen service, and are long-lasting. Krytox™ is a perfluoropolyether (PFPE)—also called perfluoroalkylether (PFAE) or perfluoropolyalkylether (PFPAE)—with the following chemical structure:

$$F\text{-}(CF\text{-}CF_2\text{-}O)_n\text{-}CF_2CF_3$$
$$\quad\;\; |$$
$$\quad\;\; CF_3$$

where n = 10–60

The polymer chain is completely saturated and contains only carbon, oxygen, and fluorine. On a weight basis, a typical Krytox™ oil contains 21.6% carbon, 9.4% oxygen, and 69.0% fluorine.

All standard grades of grease are thickened with high efficiency PTFE, whose formula is $(CF_2\text{-}CF_2)_n$. This special high efficiency thickener has a melting point of 325 °C (617 °F), and has low molecular weight and submicron (0.2 µ) particle size for higher performance in bearings.

Krytox™ 240 series greases are white buttery greases with all of the same properties as our 143 series oils that they are made from, but they are in grease form.

Krytox™ 250 series EP greases are black greases that contain molybdenum disulfide added as an extreme pressure additive for highly loaded gears and bearings.

Krytox™ 283 series anticorrosion greases are white greases that contain sodium nitrite. These grades provide rust protection at ambient temperatures, corrosion protection at high temperatures, and antiwear protection.

Krytox™ 240 AC, 240 AB, and 240 AZ Grade 1 greases now have NSF approval for incidental food contact (H-1) in and around food processing areas. These three products meet the requirements of Mil Spec PRF 27617, Types 1, 2, and 3.

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For product information, industry applications, technical assistance, or global distributor contacts, visit krytox.com or within the U.S. and Canada, call 1-844-773-CHEM/2436 or outside of the U.S., call 1-302-773-1000.

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