

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) 0 °C (32 °F) 20 °C (68 °F) 38 °C (100 °F) 40 °C (104 °F) 99 °C (210 °F) 100 °C (212 °F) 204 °C (400 °F) 260 °C (500 °F)	cSt	7480 228 60 24.7 22.8 4.2 4.1 1.1 	12,340 350 88 35 32 5.4 5.3 1.3 —	44,620 1070 240 86 78 10.5 10.2 2.1 —			
Viscosity Index	ASTM D2270			60	96	113	134	146	
Pour Point	ASTM D97		°C °F	-55 -70	-50 -60	-40 -40	-35 -30	-30 -20	
Distillation Range	ASTM D1160	53 Pa (0.4 torr)	°C °F	140/210 285/410	170/245 340/475	215/290 420/555	260/370 500/700	300/400+ 570/750+	
Oil Density		0 °C (32 °F) 100 °C (212 °F)	g/mL	1.91 1.72	1.92 1.74	1.93 1.75	1.95 1.77	1.95 1.78	
Vapor Pressure	Knudsen	38 °C (100 °F) 260 °C (500 °F) 38 °C (100 °F) 260 °C (500 °F)	torr torr KPa KPa	4 x 10 ⁻⁴ 1.5 5 x 10 ⁻⁵ 0.2	$\begin{array}{c} 1 \times 10^{-4} \\ 0.8 \\ 1 \times 10^{-5} \\ 0.1 \end{array}$	5 x 10 ⁻⁶ 3 x 10 ⁻² 7 x 10 ⁻⁷ 4 x 10 ⁻³	8 x 10 ⁻⁸ 2 x 10 ⁻³ 1 x 10 ⁻⁸ 3 x 10 ⁻⁴	6 x 10 ⁻⁹ 3 x 10 8 x 10 ⁻¹⁰ 4 x 10 ⁻⁵	
Volatility	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	
Estimated Useful Range			°C °F	-57-149 -70-300	-51-177 -60-350	-40-232 -40-450	-34-288 -30-550	-29-316 -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.





Figure 1. Viscosity vs. Temperature of Krytox[®] Aerospace Grade Fluorinated Oils





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 x 10 ⁻⁴ 1.5	1 x 10 ⁻⁴ 0.8	5 x 10 ⁻⁶ 3 x 10 ⁻²	8 x 10 ⁻⁸ 2 x 10 ⁻³	6 x 10 ⁻⁹ 3 x 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)		O 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+	

Typical Properties of Krytox[®] Aerospace Grade Fluorinated Greases*

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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:

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 $(CF_2-CF_2)_n$. 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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