



# Krytox™

## Performance Lubricants

### High Performance Lubricants for Hinges in Advanced Electronics

## Product Information

As the advanced consumer electronics market continues to adapt to customer needs and desires, many designers are discovering the value of Krytox™ high performance synthetic lubricants from Chemours. Next generation electronic hinge technology enables device designers to create slimmer devices with greater portability while maintaining large screens. There is an increased adoption of hinged devices in the marketplace that require increasingly demanding performance. Krytox™ lubricants provide torque stability, corrosion protection, and superior water compatibility for materials typically used in electronic hinges and consumer electronics. These attributes enable manufacturers to meet the high performance needs of the consumer electronics hinge applications.



Foldable Smartphone

### Applications

Krytox™ lubricants are used for hinge lubrication and torque stability in the following applications:

- Folding cell phones
- Laptops
- Charging cases for earphones
- Game systems
- Headphones
- E-readers

### Design Advantages with Krytox™ Lubricants

- Non-volatile
- Non-toxic
- Nonflammable
- Compatibility with elastomers, plastics and rubber commonly used in consumer electronics
- High temperature stability
- Minimal water washout
- Indefinite shelf life
- Anti-staining
- Chemically inert and non-reactive
  - Does not harm vulnerable amorphous thermoplastics
  - Usable with most metals up to 288 °C (550 °F)

ASTM D1264 Water Washout	
Temp °C	Results
38	<1%
79	<1%

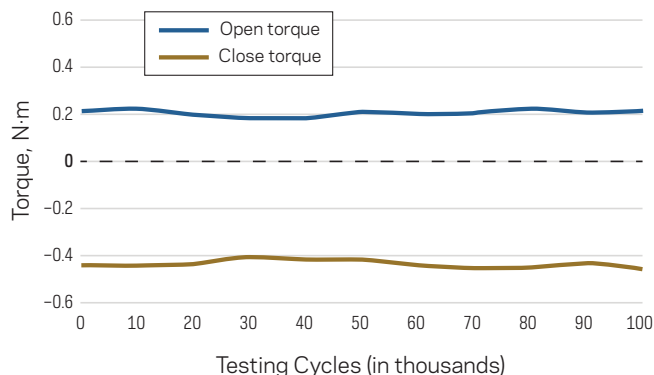
Today's electronic devices are continually exposed to a variety of humid and wet conditions. Krytox™ greases demonstrate minimal water wash-out and bring the moisture resistance needed to meet the stringent performance requirements that ensure a device operates like new even in the most extreme conditions.

### Torque Stability During Hinge Life

Smooth operation of hinges is an important performance feature when considering the usage and durability of a consumer electronic device. From the constant opening and shutting of a laptop to instantaneously opening a foldable cellphone to expand your screen size, consumers have come to expect seamless and consistent performance when using their devices. Hinges lubricated with Krytox™ greases demonstrate outstanding torque performance even after 100,000 opening and closing cycles. Lubricating with Krytox™ branded products ensures that it is as easy to open and close a device at the end of its life as it was when it was just out of the box.

- PFPE based lubricants reduce wear and tear
- Meets life testing requirement with stable torque

#### Hinge Life Test



Torque performance (Newton-meters) of a Krytox™ GPL 2XX grease over the course of 100k cycles. The measured hinge torque remains constant over 100k cycles indicating smooth hinge operation for the life of the device.

### Corrosion Protection

Exposure to the elements creates a potential for corrosion on metal surfaces. Corrosion can hinder the performance of hinges which detrimentally impacts the user experience. PFPE lubricants provide superior protection against corrosion, allowing for extended use in a variety of environments. Additionally, they are not sensitive to variable global weather conditions.

ASTM Method	Conditons	Result
D1743	52 °C, 100% Humidity	Pass
D4048	100 °C, 24 hrs	1b
D6138	Distilled Water	0,0
D6138	Synthetic Sea Water	1,0



Laptop Hinges

### Materials of Construction Compatibility and Anti-Staining

Krytox™ oils and greases are inert and do not react with elastomers or plastics commonly used in the fabrication of consumer electronics. These oils and greases will not cause elastomers or plastics to swell, shrink, or crack. Krytox™ lubricants do not impact the performance of the elastomer, nor improve the upper temperature capabilities of the material—the thermal stability of the elastomer or plastic itself constitutes any limitation.

#### Material Compatibility Performance of Lubricants used in Electronics

		Krytox™	Silicone-Based	PAO-Based
Plastics	ABS*	✓	✓	✓
	Polyamide	✓	✓	✓
	Polycarbonate*	✓	✓	✓
	Polypropylene	✓	✓	✓
Elastomers	EPDM	✓	✓	✗
	Natural Rubber	✓	✓	✗
	Silicone*	✓	✗	✗
	TPU*	✓	✓	✓

\*Material of construction commonly used in consumer electronic devices.

Krytox™ lubricants are inherently inert and resistant to oxidation. Krytox™ oils and greases do not cause oxidation or product discoloration during service life leading to minimal impact on device aesthetics.

Most Petroleum-Based Products	
Maximum temperature severely limited by oxidation stability and oil volatility	
Krytox™ Synthetic Lubricants	
Offer operating ranges from <-70 to 400 °C	
Include extra-high-temperature (XHT) oils and greases that excel in the 200 to 400 °C temperature range	

Several grades of Krytox™ greases are suitable for electronic hinges, depending on the application type and temperature range encountered. The table below lists the recommended greases by application:

	Krytox™ Grade				
	GPL 205	GPL 224	GPL 226	GPL 295	XHT-BD
Appearance	White, buttery grease	White, buttery grease	White, buttery grease	White, buttery grease	Black grease
Anti-Corrosion Additive	No	Yes	Yes	Yes	No
Extreme Pressure Additive	No	No	No	Yes	No
NLGI Grade	2	2	2	2	1.5
Oil Viscosity (40 °C, cSt)	160	60	243	160	500
Application	Consumer Electronics	Laptop and Cell Phone Hinges	Laptop and Cell Phone Hinges	Consumer Electronics	Laptop and Cell Phone Hinges



Foldable Headphones

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