

DuPont™ Krytox®

LUBRICATION POINTS FOR NON-BEARING AUTOMOTIVE APPLICATIONS

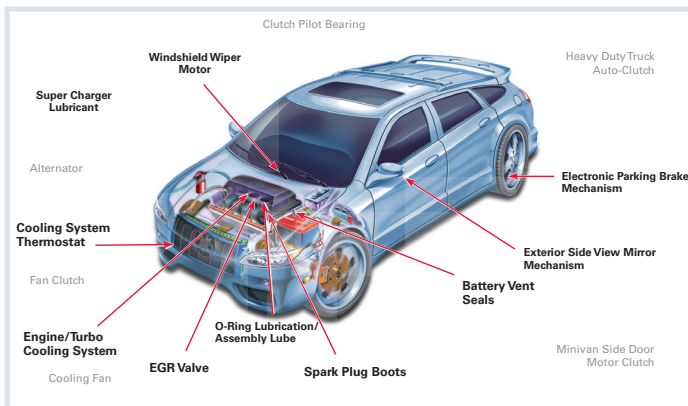
EXTREME CONDITIONS. EXTREME PERFORMANCE.

High Performance Lubricants that Work in Demanding Real-Life Applications

Reliable high-performance DuPont fluoropolymer lubricants can stand up to even extreme conditions. DuPont™ Krytox® oils and greases have proven scientific and technical properties to help solve the most critical issues in the automotive industry. Superior product performance, lower overall maintenance systems cost, and a lower environmental footprint help to meet rising consumer expectations. For automotive manufacturers, this provides the opportunity to offer extended warranties and enjoy improved productivity through reduced component failure.

Vehicle Applications

See the illustration below for the many applications where Krytox® has been proven effective. The non-bearing applications are shown in bold type.



DuPont™ Krytox® oils and greases are based on perfluoropolyether (PFPE) oils. These synthetic fluorinated lubricants are used in extreme conditions such as continuous high temperatures up to 288 °C (550 °F), and higher temperatures for shorter periods, depending on product grade limits. DuPont™ Krytox® oils and greases are exceptionally safe, reliable, and offer environmental benefits as well as longer lubricant life. These oils and greases will not burn or support combustion even in 100% liquid or gaseous oxygen, nor will they degrade or break down in the presence of aggressive chemicals. In automotive applications, Krytox® oils and greases deliver low temperature starting performance, while maintaining efficacy at higher temperatures. These oils and greases can increase service life of critical components, allowing them to run more quietly and last longer, for superior, reliable performance.

DuPont™ Krytox® — Products for the Automotive Industry

Several grades of DuPont™ Krytox® oil and grease are suitable for automotive use, depending on the application type and temperature range encountered. The table below lists the most common grades currently being used. More detailed data is available on the web at www.krytox.com.

DuPont™ Krytox® Oils and Greases	Viscosity, cSt	Temperature Range, °C
GPL 104, GPL 204, GPL 214, GPL 224, GPL 294, GPL 2E4, XP2A4	60	-51 to +179
AUT 1045, AUT 2E45, AUT 2245, AUT 2045, AUT 2A45	100	-40 to +200
GPL 105, GPL 205, GPL 215, GPL 225, GPL 295, GPL 2E5, XP2A5, XP2C5	160	-36 to +210



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Proven Applications

Battery Vent Seals	Lead acid batteries provide a dependable, rechargeable source of electricity for engine start-up. As the battery recharges, hydrogen gas is produced which is then safely released through sliding vents in the battery. These vents are designed to allow the release of gas pressure without the excessive evaporation of water. The ability of the vent to slide freely is crucial to ensuring the safe release of hydrogen pressure without compromising performance through excess water evaporation. DuPont™ Krytox® lubricants have a very low coefficient of friction, leading to excellent control and smoother gliding of the vents. Furthermore, Krytox® products are compatible with the plastic in the battery housing, and do not degrade in the corrosive, acidic environment of the battery.
Spark Plug Boots	The spark plug boot protects the spark plug from weather and prevents the unintentional grounding of the spark energy. The boot is made of a silicone rubber, which, over time, can bond with the silicon ceramic of the spark plug, fusing the boot and the spark plug together. Once this occurs, the only way to remove the boot is by force, which can cause enough damage to require replacement of the entire assembly. DuPont™ Krytox® lubricants can prevent this fusion from taking place, and are ideal in this application because they are stable, non-reactive, and are long-lasting. Krytox® lubricants can also withstand the high temperatures and energies of the spark plug environment.
Cooling System Thermostat	The automobile's cooling system allows the engine to warm up quickly, and also helps maintain its optimal operating temperature by removing heat as necessary. The system is controlled by a thermostat that determines whether coolant flows through the radiator (removing heat and allowing for optimal temperature maintenance), or is diverted back to the pump (allowing the engine to warm up more quickly). Coolant flow is controlled by a temperature-dependent valve (or thermostat) that either opens or closes, depending on need. The valve that allows coolant to flow through the radiator is opened by an actuator rod that must be able to slide without resistance. Increased friction reduces the thermostat's ability to regulate an engine's temperature and can result in longer warm-up time and higher engine temperatures, which will decrease performance and can lead to engine damage or failure. Proper lubrication of this rod with DuPont™ Krytox® high-performance lubricant ensures long-term optimal engine performance and gas mileage.
O-Ring Lubrication/ Assembly Lube	O-rings effectively seal many interfaces in an automobile. A lubricant is often applied to keep seals in place during assembly, and to allow them to assemble without damage. Choice of lubricant is critical: if the wrong lubricant is used for a given seal material, the seal could degrade prematurely causing serious damage. DuPont™ Krytox® lubricants are the preferred choice because they are compatible with all seal materials. Furthermore, DuPont™ Krytox® lubricants do not contribute to seal degradation because they do not oxidize and they have greater temperature stability than the seals.
EGR Valve	The exhaust gas re-circulating (EGR) valve reduces NO _x formation by re-circulating some of the exhausted gas back into the engine cylinders. This lowers the peak temperatures inside the cylinder, thus reducing the rate of NO _x formation. If the valve does not open enough, insufficient re-circulation takes place, and excess pollution is created. If, however, the valve sticks open, the temperature inside the cylinder can drop too much, decreasing engine performance and fuel mileage. DuPont™ Krytox® lubricants are an ideal choice, since they withstand the high temperatures and exhaust fumes experienced by the EGR valve.
Engine/Turbo Cooling System	Slip fittings and lube assemblies are difficult to assemble and remove for maintenance or replacement. DuPont™ Krytox® can solve the problem. Krytox® products are compatible with most metal, plastic, and rubber interfaces, and they can reduce the friction in the assemblies, ultimately decreasing the time and effort needed to assemble parts. Furthermore, DuPont™ Krytox® lubricants are long-lasting, ensuring that the parts will be much easier to disassemble and service throughout the lifetime of the vehicle.
Windshield Wiper Motor	Failure of the windshield wiper motor is a dangerous situation that can be avoided by the application of a small amount of DuPont™ Krytox® on the bushings. DuPont™ Krytox® has a very low coefficient of friction on start-up, so a small amount leads to a significant reduction in friction. This translates into less work for the windshield wiper motor, giving it a much longer life.
Super Charger Lubricant	Krytox® grease is applied to a spring-loaded engineered plastic bushing to remove any backlash from the supercharger dual rotor drive train. The thermal and oxidative stability properties of Krytox® lubricants, as well as their unique frictional characteristics, make them ideal for this type of application, delivering very long life and incredibly smooth, stick-slip free performance.
Exterior Side View Mirror Mechanism	The angle of the exterior side view mirror is adjusted using small plastic gears which can easily crack or break if even minor binding occurs. The application of DuPont™ Krytox® grease provides long-lasting lubrication, eliminating the need for regular maintenance, and ensuring continuous, reliable operation of the mirror for the life of the vehicle.
Electronic Parking Brake Mechanism	Some vehicle manufacturers are replacing the conventional mechanical parking brake with an electronic one, where a simple push button assisted by a small plastic gearbox engages the brake. Failure of this mechanism could be serious. DuPont™ Krytox® can carry the gear load, won't evaporate or oxidize, and is compatible with all plastics. As a result of these excellent lubricant properties, it is expected to work for the lifetime of the car and can reduce both safety issues and warranty claims.
Minivan Side Door Motor Clutch	This is an application requiring very specific frictional characteristics as well as performance over a long warranty life. Resistance to lubricant washout, as well as tolerance to dirt, are important lubricant characteristics. Krytox® has once again excelled in performance in a unique and very challenging application where traditional lubricants simply can't meet the performance demands and extended warranty requirements.

DuPont Performance Lubricants

Extreme Conditions. Extreme Performance.

For product information, industry applications, technical assistance, or global distributor

contacts, visit krytox.com or within the U.S. and Canada, call 1-800-424-7502.

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