



Krytox™ AUT U14

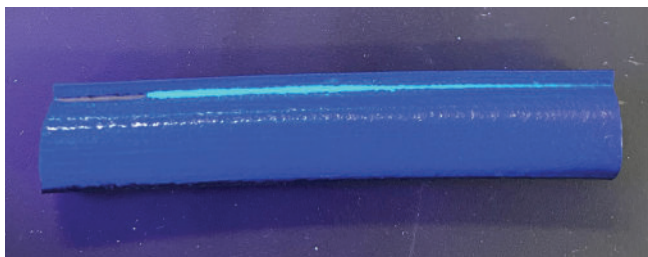
Performance Lubricants

Long-Lasting Oil for Smooth Operation and Noise Mitigation on EPDM Weatherstrips and Dynamic Seals

Product Information

Krytox™ AUT U14 is a high-performance perfluoropolyether (PFPE) oil formulated to meet the needs of the automotive industry. Designed to prevent noise, vibration and harshness (NVH) for the vehicle lifetime, Krytox™ AUT U14 has been used by automotive OEMs to resolve elastomer seal issues in sunroofs, doors, and windows. With excellent lubricating ability in the presence of contamination, extreme resistance to washout from water and other common automotive solvents, and enhanced protection against damaging ultraviolet (UV) light, Krytox™ AUT U14 will maintain lubrication in the most demanding conditions. Further benefits of Krytox™ AUT U14 include broad range temperature performance and an added soluble UV dye that allows for surface coverage visualization, as illustrated in Figure 1, for improved quality control in the production line.

Figure 1. Surface Coverage Visualization With and Without UV Light



Typical Properties¹

Properties	Krytox™ AUT U14 Oil
Estimated Useful Temperature Range °C (°F)	-36 to +204 (-33 to +400)
Oil Viscosity, cSt at 40 °C (104 °F)	50
Base Oil Density, g/mL	1.9
Risk Priority Number (RPN)*	
Materials: Slip-coated EPDM, painted metal, 2 g/m ² dust, 4 g/m ² oil	3 at 1 mm/s 1 at 5 mm/s
Test Conditions: 1 and 5 mm/s, 10N, 10000 km	
Ultraviolet (UV) Quality Control Dye	Yes

¹1-10 scale with lower value indicating lower risk of noise

²This 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.

For automotive assembly processes requiring a higher base oil viscosity, modified formulations are available upon request.

Applications

Krytox™ AUT U14 was engineered for weatherstrips and dynamic seals made of ethylene propylene diene monomer (EPDM) rubber. These seals, commonly used on vehicle doors and windows, frequently have NVH issues from buzz, squeak, and rattle (BSR) noises. Due to the high friction contact of rubber elastomer against glass or painted metal, they are susceptible to a noise-generating phenomenon called stick-slip, that occurs when driving conditions cause the body to twist or vibrate. To reduce stick-slip, elastomer seal manufacturers apply a dry slip-coat, which is often only moderately effective and rarely maintains lubrication in the presence of common dust or dirt contamination.

Krytox™ AUT U14 is specially formulated to protect against stick-slip related NVH issues on slip-coated EPDM weatherstrips and seals, even in the presence of contamination. With only a small amount (4 g/m²) of oil applied to the elastomer surface, Krytox™ AUT U14 brings several benefits:

- Reduce the risk of stick-slip noise with uniform surface coating
- Protect against elastomer cracking, shrinking, and swelling
- Minimize mechanical wear from high surface friction
- Improve quality control and application consistency with UV detectable additive

The PFPE chemistry of Krytox™ AUT U14 is ideally suited for the demands of automotive seal and weatherstrip applications. Key properties include:

- Compatibility with metals, plastics, elastomers, and paint
- Resistance to washout from all non-fluorinated solvents, including water, fuel, and alcohol
- Broad temperature range performance
- Extended lubricant life due to low volatility and outgassing
- Non-oxidizing

Performance Testing

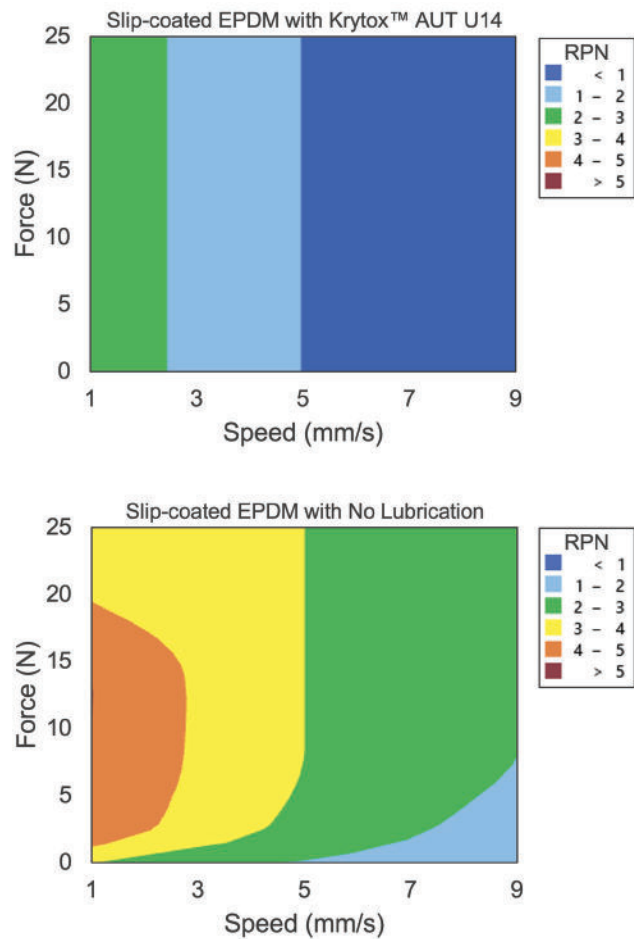
Reduced Risk of Noise in the Presence of Surface Contamination

Zins Ziegler (ZZ) is a standard automotive industry test apparatus for measuring the noise potential of different material pairings. By measuring the relative static and dynamic coefficients of friction between a pair of materials, the ZZ test calculates a risk priority number (RPN), with higher RPN indicating a greater risk of stick-slip noise occurring between the materials.

ZZ performance data in **Figure 2**, shows the benefit of Krytox™ AUT U14 for preventing stick-slip related noise. This ZZ test was performed on slip-coated EPDM, in the presence of environmental dust contamination, with and without Krytox™ AUT U14 and compared performance on different speed and force combinations. Samples treated with the Krytox™ oil had a lower RPN, which means a lower risk of noise, in more than 90% of the speed and force combinations tested.

Figure 2. Zins Ziegler (ZZ) Noise Analysis with China Dust

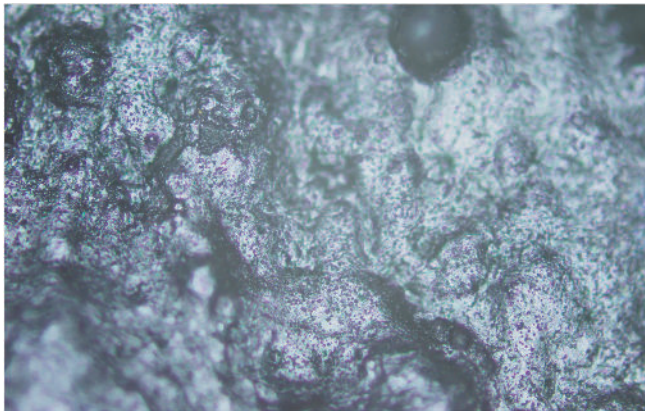
Slip-coated EPDM with Krytox™ AUT U14 vs. with No Lubrication



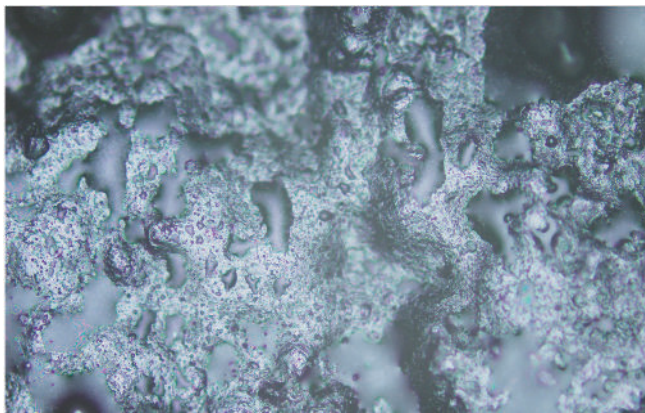
Minimize Noise with Uniform Surface Wetting

Uniform lubricant coverage is critical to achieve consistent stick-slip performance. Microscopic images of an EPDM surface that is untreated (Figure 3a), treated with a standard PFPE oil (Figure 3b), and treated with Krytox™ AUT U14 (Figure 3c) illustrate how AUT U14 coats automotive seals more uniformly than other offerings. This complete coverage ensures a consistent frictional profile over the entire surface, reducing the risk of stick-slip-generated noise.

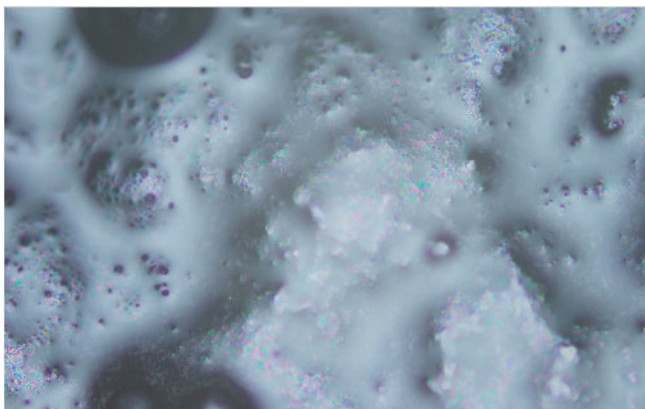
Figure 3.



a. EPDM with no lubricant: No coverage



b. EPDM with standard PFPE: Inconsistent coverage

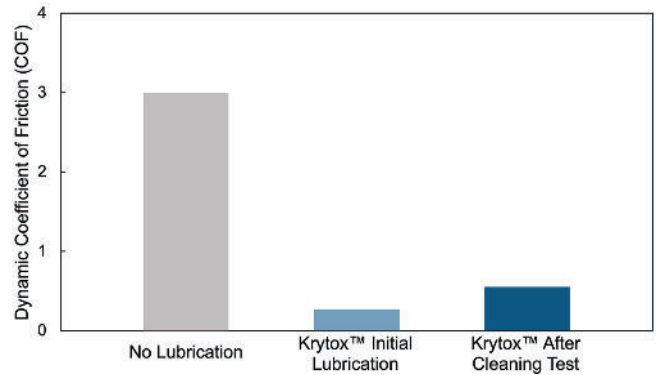


c. EPDM with AUT U14: Uniform coverage

Extreme Washout Resistance Keeps Lubricant in Place

Krytox™ PFPE oils have a chemically inert, fluorinated polymer structure that is extremely resistant to moisture, so oil stays in place through cleaning or rain exposure. This washout resistance was confirmed by an independent laboratory measuring coefficient of friction (COF) between EPDM rubber and a metal plate. COF was measured without lubrication, after lubricating the EPDM with Krytox™ oil, and after washing the lubricated surface with fuel, alcohol, heptane, and soap water. Figure 4 shows that the initial lubrication resulted in a 90% reduction in COF and that nearly all of this COF improvement was maintained after an aggressive washout.

Figure 4. EPDM Dynamic Coefficient of Friction (COF)

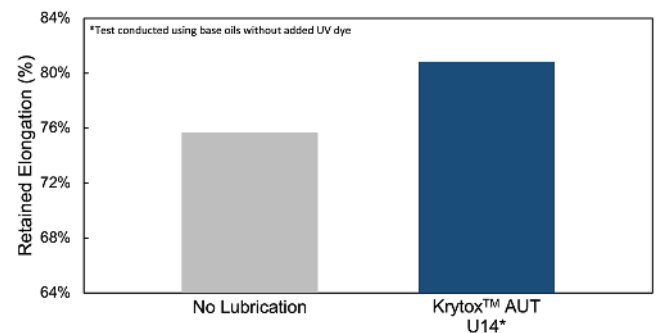


Materials used: EPDM rubber, metal plate, Krytox™ GPL 105. Test Conditions: Rubber pulled over metal plate at 50 mm/min. Cleaning method: Washed with fuel, heptane, alcohol and soap water.

Enhanced Protection Against Ultraviolet (UV) Light

Ultraviolet (UV) light exposure can cause degradation of EPDM seals, but the application of Krytox™ PFPE oil on slip-coated EPDM can provide added protection against this failure mechanism. The impact of this UV protection is observed in Figure 5, which shows, after 3000 hours of UV exposure, that samples coated with Krytox™ AUT U14 base oil retained greater elongation than those only having slip-coat.

Figure 5. Surface Coating Impact on EPDM Retained Elongation Percentage



Materials tested: slip-coated EPDM with no-lubrication and with Krytox™ AUT U14. Test conditions: SAE J1960 3000 hr Accelerated Xenon Arc Exposure

Compatibility

Krytox™ lubricants are chemically inert and compatible with most automotive construction materials, including paint finishes, seal materials, glass, plastics, and metals. While Krytox™ oils are non-reactive, they have different chemistries than standard lubricants and should not be mixed with other non-PFPE lubricants. They are nonflammable and contain no hazardous volatile organic compounds (VOCs). Because of the non-reactivity of Krytox™ lubricants and the many possible product combinations, Chemours does not test individual formulations for compatibility.

Using Krytox™ Performance Lubricants

Krytox™ lubricants are non-migrating and will not degrade. This means you can lubricate without worrying about re-applying. The PFPE lubricants help improve the performance stability of parts, reducing complaints and repairs during a vehicle's warranty period. When you choose Krytox™ oils and greases, you choose the confidence that comes with a best-in-class supplier and industry leader for over 50 years. With access to our team of experienced service representatives around the world, you can feel secure knowing that we are ready to address your lubrication needs. We are the perfect partner for whatever is next.

Together, let's reconsider possible.



Stop the noise.

From eliminating NVH issues to maintaining component performance in extreme conditions, Krytox™ high performance lubricants redefine what's possible. We're ready to help you solve your toughest engineering challenges. Learn more at krytox.com/nvh.

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