

Proprietary Additive



DUOLEC®

Liquid • Dual-Acting AW & EP • Thermally Activated

Duolec® dual-acting additive imparts synergistic properties to lubricants, providing both anti-wear (AW) and extreme pressure (EP) protection. The result of revolutionary technology designed specifically for use in LE gear lubricants, Duolec increases oil film strength and is temperature-activated to provide a protective layer that smooths metal surfaces and minimizes the effects of any contact, thereby reducing friction and preventing surface wear.

Beneficial Qualities

- Designed specifically for use in gear lubricants
- Provides dual layer of AW and EP protection
- Activates in stages, as loads and temperatures increase
- Forms solid-like protective layer on metal surfaces
- Improves oil film strength
- Reduces friction and prevents surface wear
- Will not build up or fall out of suspension, and will not be filtered out
- Acts synergistically to improve performance qualities of other components

How It Works

- Under normal conditions of speed and load, two metal surfaces are separated by a lubricant film known as hydrodynamic lubrication. An increase in load or decrease in speed reduces the film, allowing metal-to-metal contact and raising the temperature of the contact zone due to friction. The heat causes the lubricant to lose viscosity, which weakens its film strength and its ability to minimize contact. Under these conditions, lubrication changes from hydrodynamic to elasto-hydro-dynamic (EHD) to mixed film to boundary lubrication.



- Duolec continues to provide protection when EHD, mixed and boundary conditions are present. As heat increases, Duolec is activated, working in stages to provide a dual layer of AW and EP protection. In EHD and mixed film conditions, the AW components of Duolec kick in. After loads become even greater, the EP performance is activated. When incorporated into gear oils, Duolec reacts quickly with the changing conditions to provide protection. The friction- and wear-reducing capabilities of Duolec can be seen in the test results on the next page.

Proprietary

- Duolec additive technology is used exclusively in LE lubricants, helping our customers worldwide protect their gearboxes and experience longer lubricant intervals, fewer part replacements and less downtime.

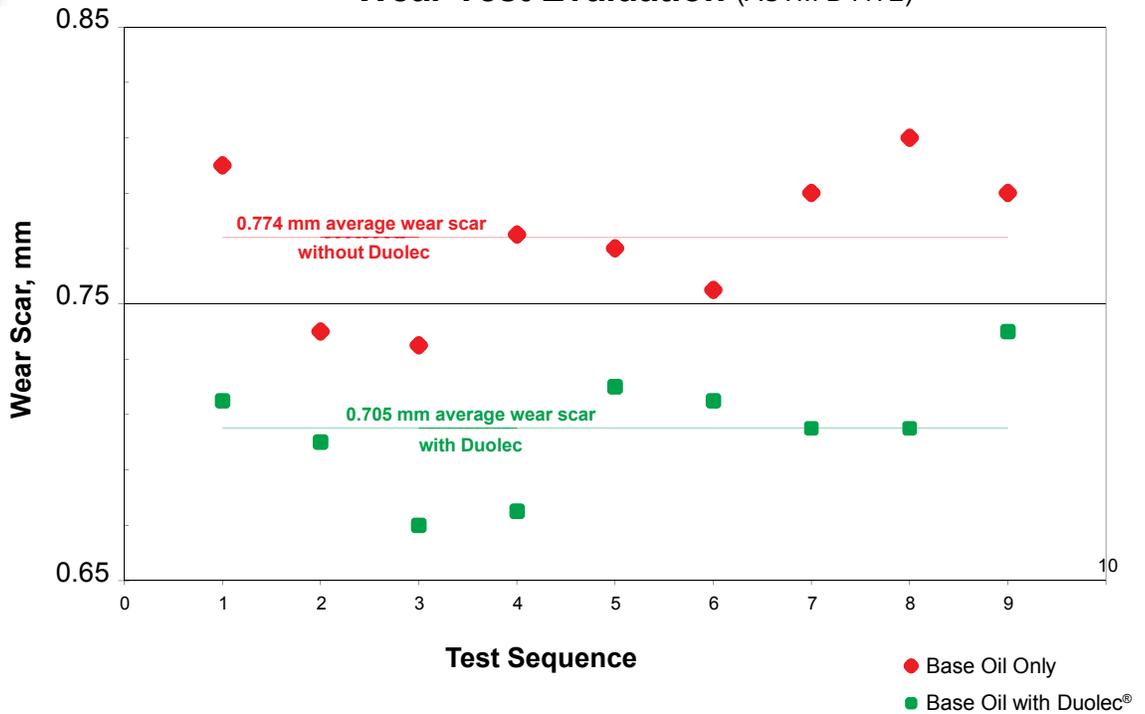


The Lubrication Reliability Source™

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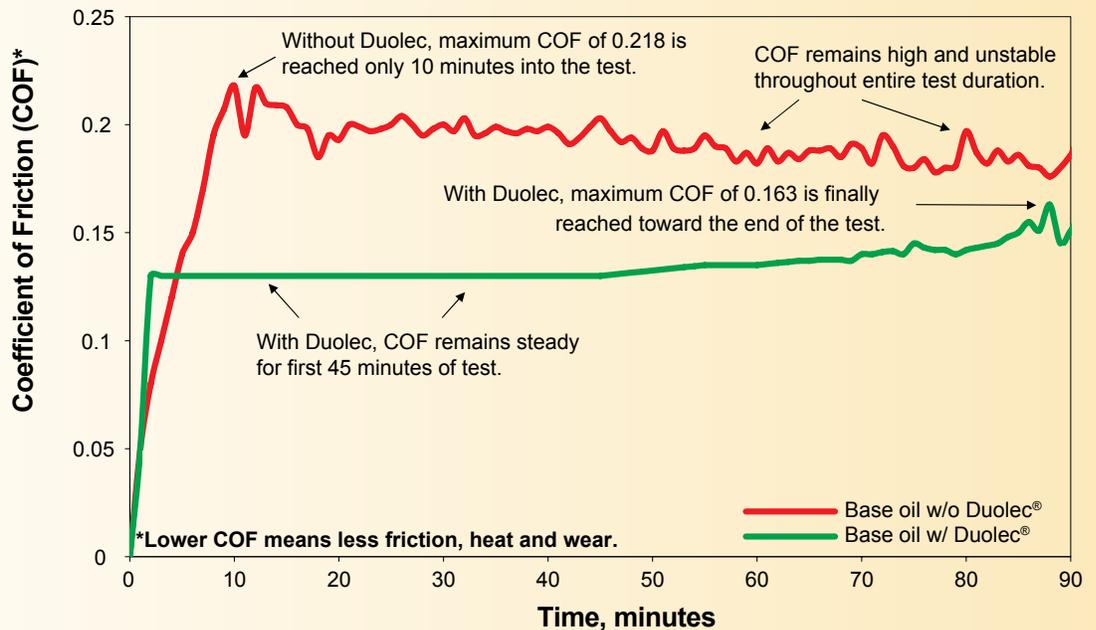


4-Ball EP Wear Test Evaluation Wear Test Evaluation (ASTM D4172)



Measurement of Friction

Measurements of Friction (SRV Test: T = 50 degrees C, Load = 100 N)
(SRV Wear, 50°C, Test Load 100N, ASTM D6425 Modified)



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