

# Innovative Lubricants

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Improved efficiency and lower emissions continue to be delivered through changes to almost every aspect of a vehicle's design. Hardware changes typically result in engine lubricants working in hotter and more severe operating environments, and performing for longer periods between service intervals.

For passenger and commercial vehicles alike, advanced internal combustion engine hardware and state-of-the-art aftertreatment systems are being enabled by some of the highest-performing engine lubricants the industry has ever seen. Today's lubricants have to perform in an ever-tighter operating window, satisfying the simultaneous and sometimes competing demands for lower emissions, increased efficiency and enhanced durability.

Cleanliness of components and minimized deposits remain key for high-performing engine lubricants. Piston cleanliness, for example, is critical in a vehicle's engine regardless of its age. Clean pistons minimize cylinder wear, provide smooth engine operation, keep emission levels low and enable the engine to stay within the fuel efficiency parameters set by the OEM.

For commercial vehicle applications, changes in piston design and the widespread adoption of steel pistons actively contribute to reducing the levels of CO<sub>2</sub> produced by engines. Higher top-ring designs, smaller crevice volumes and hollow piston construction mean heavy-duty engine lubricants are subjected to much higher temperatures. As a result, it is vital that modern engine lubricants be correctly formulated with enhanced antioxidant and thermal stability to address these ever-challenging operating conditions, negating an increase in piston deposits, stuck piston rings, engine wear, blow-by and, ultimately, costly engine failure.

For passenger vehicles, lighter-weight pistons are supporting the drive for CO<sub>2</sub> and emission reductions, while also causing challenges for the lubricant due to increased piston temperatures. The extensive and growing use of exhaust gas recirculation (EGR) in modern engines means the lubricant must also be formulated to deliver high levels of piston cleanliness where increased soot levels are derived from extensive use.

## Key Deliverable

Turbo cleanliness remains another key deliverable, especially for today's high-performance passenger vehicle engine lubricants. Increased power densities, downsizing, higher boost pressures and increased temperatures lead to deposits in the compressor housing, which ultimately disturb and restrict airflow, and reduce efficiency and performance. It is critical the lubricant be formulated to have a high resistance to oxidation and not break down in high temperatures.

The demand for advanced engine lubricants that deliver the latest performance requirements, including cleanliness of components, is being reflected in upgraded OEM and industry service-fill engine lubricant specifications, including [ACEA 2021](#). Specification upgrades continue the path to reduced emissions, higher efficiency and enhanced hardware durability, requiring lubricants to be correctly formulated to ensure they deliver the performance and protection needed in today's modern engines and aftertreatment systems.

Such upgrades bring opportunities throughout the supply chain, giving confidence to both the OEM and end user alike that the vehicle will perform as intended throughout its life. Upgraded service-fill lubricant specifications enable oil makers to deliver notably higher-performing engine lubricants that exceed the new specifications, providing additional protection and performance benefits to vehicles around the world.

The demand for correctly formulated performance additive technology and base oils working in harmony with today's advanced engine hardware systems has never been higher. Equally, the benefits they deliver have never been greater.

*(Content pulled from original article in [Engine Technology International](#).)* [<https://www.ukimediaevents.com/publication/c840c039/70>]

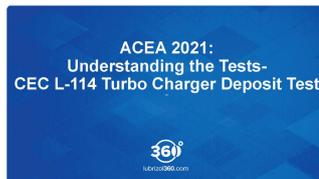
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