Liquid GOLD

Synthetic fluids, manufactured by chemically reformulating a range of feedstocks, are now offering significant advances over diesel lubricants and fuels. Brian Tinham explains

Last May's launch of Shell Rimula Ultra 5W-30 HDDEO (heavy-duty diesel engine oil) and, three weeks earlier, CEN's (European Committee for Standardisation) ratification of the EN 15940 paraffinic diesel fuels standard shared a significance beyond the immediately obvious. Taken together, they represent a milestone that may yet help keep the wheels of transport turning smoothly for years to come.

Yes, the former signalled the arrival of the first European ACEA E6 and E9 specification-compliant premium ultra-low-viscosity lubricant. And it already boasts wide truck OEM approvals. Meanwhile, EN 15940 finally confirmed a technical platform for markets to develop paraffinic fuels (derived from feedstocks such as natural gas, biomass, coal or from hydro-treating vegetable oil), claimed to offer a cleaner burn.

But what binds these two developments together is synthetic fluid manufacturing – in Shell's case, using GTL (gas to liquid) technology. It's the greatest acknowledgment yet of the power of chemically modifying fluids over mineral oil extraction and cracking.

For lubricants, this may not be such a big deal: we've been familiar with synthetic engine oils, and their enhanced properties, for years. However, for paraffinic fuels this has been a very long time in the making. Indeed, Shell started the standards consultation nine years ago, having first proposed a specification in 2007, before the largest GTL facility in the world – Pearl GTL, in Ras Laffan, Qatar – even came on stream. That plant now produces 140,000 barrels per day.

Michael Flynn, general manager for GTL products at Shell, explains that paraffinic diesel fuels can be used as 'drop-in' fuels for heavy-duty diesels. That means diversity of supply and a way to decouple fuel prices from crude. Furthermore, it signifies an opportunity to improve local air quality, in terms of NOx and particulates, without any need for engine modifications or changes to the fuel infrastructure.

"EN 15940 will now become the fuel standard referred to when manufacturers and legislators stipulate conditions concerning use of paraffinic fuels," explains Flynn. And he adds that GTL fuel will play an increasingly important role in the energy mix driving heavy-duty transport, particularly in regions where governments are keen to improve local air quality fast.

What about that Shell Rimula Ultra 5W-30 lubricant? Well, the advances speak for themselves. The oil giant is claiming up to 2% fuel savings and 56% better engine wear protection, as well as longer oil drain intervals, up to 150,000km, compared to typical 10W-40 engine oils (and not just those based on mineral base oil). Shell is also recommending its new lubricant for Euro 5, not just Euro 6, truck and bus engines – stating that it contributes to warranty compliance and means that mixed fleet operators can reduce the ranges of grades they need.

Andrew Gibson, Shell's UK marketing manager, explains that its new oil is based on Dynamic Protection Plus technology, which combines Shell's PurePlus lubricant production process with its Adaptive Additive technology. The former is used for all Shell Rimula top-tier oils, harnessing GTL to deliver ultra-pure base oil with virtually none of the impurities in crude. That, he says, results in optimised viscosity, friction and stability properties. Meanwhile, its additive pack has been designed to prevent build-up of acids and deposits on engine components, including the sump, cylinder head gasket, cylinder sleeve and valvetrain.

If you're in any doubt about such claims, here's what Richard Adams, business development manager at independent testing specialist Horiba MIRA, has to say. "You won't believe how much R&D effort goes into engine lube packs, matching oil formulations' properties to meet performance and longevity requirements – including as they change over time."

He should know: Horiba MIRA's laboratories are widely used to prove those formulations – running engines under representative duty cycles and periodically stripping them down to check for wear. Incidentally, Adams also states that operators with mixed fleets should heed the OEM's recommendations for the lubricant pack and seek advice from oil blenders over backward compatibility. TE

PC-11 lubricant specification

The North American PC-11 specification for lubricants – due to be mandated over the pond in December and widely acknowledged as being among the biggest changes the US HDDEO (heavy-duty diesel engine oil) market will have experienced – is likely to affect fleet operators worldwide. So says Petro-Canada Lubricants, which last month revealed its awareness campaign under the catch-line 'The tougher, the better'.

As the company explains, PC-11 raises the bar on industry standards for lubricants in the face of increasingly stringent worldwide engine exhaust emissions regulations. They are intended to meet the requirements of future (and current) engine hardware, and are founded on high-purity, lower viscosity grades. As a result, protagonists also expect PC-11 compliant lubricants to offer enhanced fuel economy.

Howard McIntyre, vice president for lubricants at Petro-Canada parent company Suncor, says the new lubricants will also enable extended oil drain intervals, in turn meaning somewhat reduced operational costs as well as truck downtime.

"OEMs [are] taking more proactive approaches to deliver and sustain optimum fuel economy throughout a vehicle's lifetime," comments Karl Rudman, business development manager at Petro-Canada Europe Lubricants. "This has resulted in the development of high performance, low viscosity lubricants that provide greater durability to support engine protection, while allowing engines to run more efficiently and use less fuel."

The new category will include two tiers of engine oils. First is PC-11A (API CK-4), which is effectively an upgrade to the current lubricant specification and backwards-compatible with older diesel engine oil categories. Second is PC-11B (FA-4), which will have limited backwards compatibility, due to its focus on a lower HTHS (high-temperature, high shear) range – enabling "major fuel economy benefits without sacrificing engine protection".

Rudman says there is still a need for heavier lube grades, such as SAE 15W-40 engine oils, to meet the needs of older vehicles. In line with virtually all lubricant specialists and truck OEMs, he also warns that it is "critical" to identify the right lubricant for each road transport application. "Online tools such as Petro-Canada's Lube360 product selector can identify the correct choice for the engine or driveline of most commercial vehicles," he suggests.

McIntyre says that Petro-Canada has been developing PC-11 engine oils for some time, including in Canada's harshest environments, stating that they will meet and exceed the standards. "We are scheduled imminently to reveal our PC-11 ready product line, which we believe is set to be the world's toughest range of heavy duty engine oils."