



REACHING THE PARTS

Multi-grade oil classifications, as defined by ACEA (Association des Constructeurs Europeens d'Automobiles) throughout Europe and API/SAE (American Petroleum Institute/Society of Automotive Engineers) across North America, are moving on. Over here, although the ACEA E6, E7 and E9 low-SAPS (sulphated ash, phosphorus and sulphur) lubricant specifications remain the mainstays of heavy-duty diesel oil – including for Euro 6 engines – we can expect new categories within 18 months.

Why? The catalysts are twofold. On the one hand, the advent of Euro 6 has led manufacturers to more sophisticated engine designs, involving newer materials, tighter tolerances and higher operating pressures. On the other, the industry's ongoing desire for reduced fuel consumption has forced attention on everything with implications for frictional losses. And that includes oil.

Hence the engine manufacturers' own more exacting lubricant specifications – such as Daimler MB 228.51 and MAN 3477 – which demand better soot handling and piston cleanliness, as well as corrosion and wear protection. Their obvious focus has been primarily on ensuring engine reliability and longevity, while also responding to customers' fuel efficiency demands. But hence also moves by the oil processors – led by majors such as Castrol, ExxonMobil, Petro-Canada, Shell and Total, but also additive developers (Afton, Chevron, Infineum, Lubrizol, etc) – to engineer even lower viscosity grades. Witness the growing

list of 5W-30 engine oils, largely based on more highly refined mineral, or part- and fully-synthetic base oils, combined with upgraded additive packs.

However, the next generation of lubricants is being re-engineered to improve further on HTHS (high temperature, high shear) performance. That combination parameter – subtly different to raw viscosity – is deemed by the oil industry as critical because it best represents a lubricant's behaviour under real engine conditions. And, whereas state-of-the-art oils deliver HTHS of around 3.5 mPa.s, the goal is sub-3.0.

Richard Tucker, global manager for fuels and lubricants technology at Shell Lubricants, explains that it's all about going the extra mile with slipperiness while still guaranteeing premium engine protection. "HTHS matters because it accurately correlates to engine protection and fuel efficiency," he asserts. "There's no magic additive, though. To achieve lower HTHS, you need better quality base oils – not necessarily fully synthetic, but more highly refined."

In fact, Shell is among those leading work in the US and Europe with the API and ACEA, looking at new oil sequences, and Tucker is one of several now predicting two groups. "I expect to see a conventional evolution of the [API] CJ-4 and [ACEA] E6/9 categories, but also more revolutionary low-HTHS, reduced fuel types."

OEMs, he agrees, will soon need to assess which of their truck engines can use the new formulations, and which duty cycles will benefit. "Exactly how these will be

Lubricant specifications are about to witness some fundamental changes, reflecting the market's drive for fuel efficiency.

Brian Tinham reports

labelled is still being debated. There may, for example, be multiple HTHS classifications within the same viscosity class, and no one wants confusion that risks misapplication.”

Dave Spence, commercial sector marketing manager at Chevron, believes the newcomers will be described as ‘low SAPS with fuel economy’. “The specifications are not yet finalised, in terms of oxidation, soot control and the rest... Our view is that 5W-30 grades could achieve 2.9–3.2 mPa.s and some will be looking at 0W-20 with HTHS of 2.6–2.9.”

Unsurprisingly, he won't reveal details of the chemistry, simply advising that it's not just about beefing up the additive pack and viscosity index improver. However, he does warn fleet engineers and procurement managers not to fall into the trap of believing that all low-SAPS oils with the same viscosity grades and ACEA specification must be the same. “It's one thing achieving an

approval; it's quite another by how far you exceed the tests.”

And that observation has just as much relevance to the here and now. As Barnaby Ngai, portfolio manager for transportation oils at Petro-Canada, says: “If you want to protect your truck engines for the long term, and achieve consistent fuel efficiencies and long drain intervals, you need higher performing lubricant. Achieving that and matching or exceeding the ACEA or API specifications takes a significant investment, not only in formulating, but also testing and proving the new oils.”

There are multiple dimensions to engine protection alone. They range from ensuring that oil films remain intact whatever the load, speed and temperature conditions, to protecting against dirt and deposits (through dispersant technology) and acids resulting from the combustion process (despite low-sulphur fuels), via antioxidants and detergent packages. So don't be penny wise, but pound foolish.

Fuel performance tests

Several of the major oil manufacturers and blenders have conducted tests on their oils that prove the benefits of paying that little bit more. Shell, for example, cites tests with supermarket Morrisons in which 10 identical vehicles were monitored: five using Shell Rimula R6 LME fully synthetic 5W-40 engine oil and five a reference 10W-40. The former showed a fuel improvement of 2% with no negative impact on engine performance or condition after 100,000km.

Just as convincing is another trial, concluded earlier this year, involving ExxonMobil and haulier SPF Danmark on one of its Scania Euro 4 trucks. Ahmet Aras, marketing supervisor for ExxonMobil, explains that the existing lubricants (SAE 15W-40 engine oil, 80W-90 gear oil and 80W-140 rear axle lube) were replaced with Mobil Delvac 1 LE 5W-30 engine oil, Mobilube 1 SHC 75W-90 gear oil and Mobil Delvac SGO 75W-90 rear axle oil.

“It was fully synthetic all the way along the drivetrain, and after eight months and 49,000km, SPF's onboard telematics indicated fuel savings of 3.4%,” says Aras. “That's 2,000 euros per annum fuel saving.”

SPF Danmark is now repeating the trial with five additional vehicles – a mix of Mercedes-Benz and Volvo trucks – with a view to making the business case for a fleet-wide oil change.



Mineral versus fully synthetic

That brings us neatly to the sometimes disingenuous debate around mineral versus fully-synthetic oils. There is no doubt that fully-synthetics form better base oils (some 75% of any lubricant) than moderately refined mineral oils, classified as Group 1 (higher sulphur). But you will find plenty of highly-refined mineral and part/fully-synthetic oils in Groups 2 and 3, with claims and counterclaims for their properties.

Fully-synthetic advocates argue that their products are built from the ground up with a tighter range of molecules, and link that to better oxidation properties, higher viscosity index and the rest. Equally, those wedded to mineral oils, such as Chevron and Petro-Canada, will insist that their lubricants are founded on good quality Group 2 or 3 oils, and then draw similar conclusions for their efficacy. Indeed Petro-Canada promotes its ultra-pure ‘Group 3-plus’ base oil as key to its latest Duron UHP 10W-40 (E6, E7 and E9 compatible) and Duron-e UHP 5W-30, due out later this year. Best advice: both can be right, so you need to read the small print.

Finally, for the vast majority of operators running mixed fleets, all this poses a problem: to keep costs down and minimise mistakes, is it reasonable to expect all, or at least most, of your vehicles to run on one engine oil? And the answer is yes, some premium brands offer cross-spec commonality – although you will need to ask questions to ensure that your choice complies with the OEMs' specifications and so preserve warranties.

Q8Oils' latest heavy-duty diesel oil (HDDO), for example, is essentially an upgrade of its Q8 T 910, originally formulated for ACEA E6 and E7, but now meeting E9, API CJ-4 and JASO DH-2 – as well as Mercedes 228.31, Volvo VDS-4, Renault RLD-3/RGD and Cummins CES 20081. Direct sales manager Jeremy Dineen says this oil “is a very attractive proposition for customers wanting to rationalise their HDDO range”.

And much the same goes for Total. “We offer a combination E6/E9 oil – Total Rubia TIR 9900 FE 5W-30 – that also meets the main OEMs' standard for Euro 6,” says Total technical consultant Geoff Briggs. And he cites one haulier running Mercedes-Benz Actros, DAF CF, MAN TGS and Iveco Stralis tractors, as well as Atego, DAF LF45, MAN TGL and Iveco Eurocargos, that is currently making the switch. **TE**

