

Smoothly does it

With a bewildering array of lubricants on offer and an ever-increasing range of sophisticated engines, which is the right oil for your vehicle? Keith Read investigates the issues for running costs and engine efficiency

Times are tough, and fleet operators are continually looking to reduce costs and lower exhaust emissions. So says Robert Mainwaring, technology manager at Shell Lubricants, and he maintains there is one sure-fire way to achieve both – use the right engine oil. By doing so, owners will protect engines and transmissions against wear, thereby reducing maintenance costs. In addition, he maintains that products in the higher tier of Shell's Rimula range can also help deliver lower exhaust emissions and cut costs through fuel savings.

When asked which oil is best, Mainwaring responds: "That's an extremely difficult question to answer. I can't give you a summary, but we have a website – Shell Lube Match – which allows you to plug in the type of vehicle, the make and the model, and it will tell you every type of lubricant – and other fluids – needed for that vehicle."

Such sites are particularly valuable tools for truck owners and operators. Shell's site is http://www.shell.com/home/page/lubes/lubematch/app_lubematch.html. Some other oil companies have similar websites, but, if they can't help, the vehicle handbook is the obvious place to seek guidance on the correct oil specification. This is also true for the latest trucks, although some manufacturers may work with specific oil companies and appear not to recommend products from other producers.

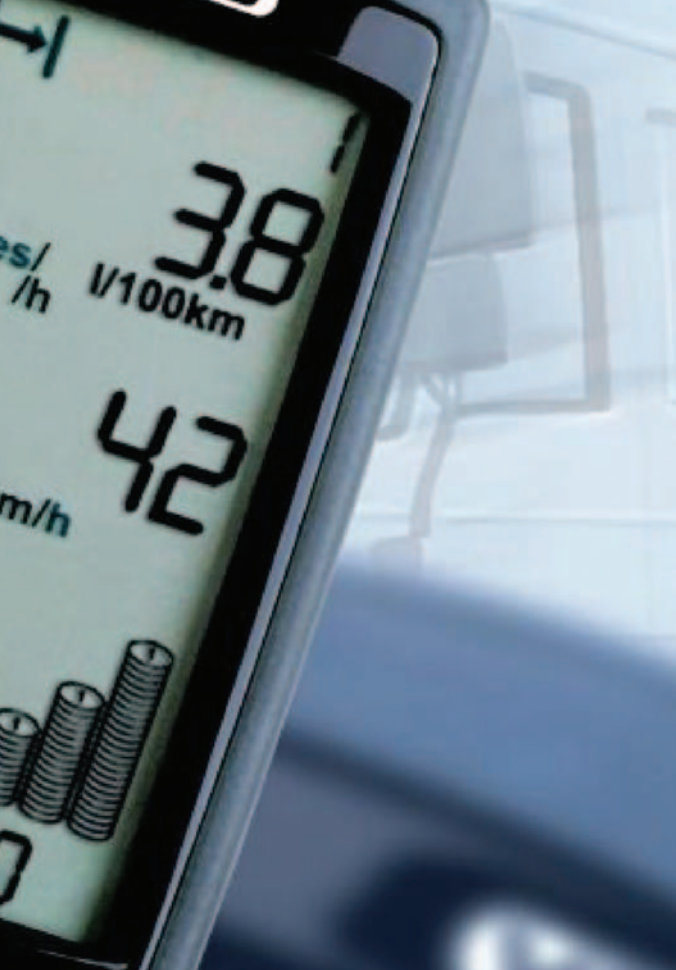
So what should operators look for when selecting heavy-duty diesel engine oils? In general, newer, more complex engines need the newer, more sophisticated lubricants, including fully synthetic oils. Older engines – especially those that pre-date the launch of synthetic lubes – tend to be perfectly

happy on conventional oils, although, plainly, the correct oil should always be used.

"When engines started to become more sophisticated, oil companies saw an opportunity. Also, in talking to OEMs, we realised that additional vehicle features – such as longer oil drain intervals – could become a possibility," says Mainwaring. "Collaboration between oil companies and OEMs has been a major driver for improvement. For example, it was the development of low-SAPS [low sulphated ash, phosphorous and sulphur content] oils that provided the enabler for the after-treatment

Robert Mainwaring:
"Using the right engine oil can slash costs and exhaust emissions"





equipment required to meet lower emissions targets. Low SAPS ensures that the oil does not poison sophisticated catalysts and impede the performance of exhaust filters found in Euro 4 and Euro 5 trucks.”

However, some things don't change, and most agree that the first aspect any operator or workshop needs to look for, when selecting a heavy-duty diesel engine oil, is whether or not it will protect the vehicle equipment. “Protection is the number one function for heavy-duty diesel engine oil, and operators need to look for a lubricant that offers combined acid, deposit and wear control,” suggests Mainwaring.

If unstoppable, acids – mainly by-products of combustion or oil breakdown – can attack and corrode parts of the engine. “High-quality, heavy-duty diesel engine oil contains neutralising agents that are released to protect the engine when the acids come in contact with the oil. Controlling acids can also facilitate extended oil-drain intervals,” he says.

Deposit control is also important. “Piston and general engine cleanliness are critical to ensure proper operation and long life,” he advises. “Any build-up of excessive piston deposits can result in ring sticking, abrasion and wear of the cylinder, shortening engine life and increasing oil consumption. To combat this, heavy-duty diesel engine oil must contain molecules that block or carry away particles that can cause deposits.”

And then there is wear control: the business of keeping moving metal surfaces separated to avoid hotspots and ensuing damage and poor performance. “High-quality heavy-duty diesel engine

oils contain molecules that effectively sense extreme heat and pressure, and transform to produce protective films that keep the metal surfaces apart,” explains Mainwaring.

Together, these prevent wear, deliver longer and more reliable engine life, help to avoid unplanned maintenance costs and reduce operational costs.

Right specification

Formulating the right oil specifications involves committees comprising representatives from OEMs, the oil companies and the additives industry. In Europe, the tripartite is known as Triple-A, with the three As representing ACEA (Association des Constructeurs Europeens d'Automobiles) for the engine manufacturers, ATIEL for the oil companies and ATC (Technical Committee of Petroleum Additive Manufacturers in Europe) for the additives industry.

Between them, they examine what's required and what's feasible, in terms of engine design and suitable lubricants, and come up with a consensus of what can be achieved technically – and hence the appropriate standards. Similar parallel committees operate in the US and Japan.

To help meet all the requirements and challenges of modern engines, Shell developed its Rimula line-up including Rimula R4L, the semi-synthetic Rimula R5 LE and the flagship Shell Rimula R6 LME. In developing the latter, the company says it took the evolution of its engine lubricants to the next level and developed a fully synthetic heavy-duty diesel engine oil that not only exceeds vehicle requirements for protection and compatibility with after-treatment devices, but also has the capability to offer fuel savings.

That was a breakthrough, says Mainwaring.

“Collaboration between oil companies and OEMs has been a major driver for improvement”

Robert Mainwaring

“Combining low-SAPS content with longer drain intervals and fuel economy poses real technical challenges – including the fact that the low viscosity normally associated with fuel economy typically compromises protection against engine wear. To overcome

this, our scientists developed a product based on synthetic technology base oils with anti-wear boosters to deliver the optimum balance between fuel efficiency and protection.”

Anti-wear boosters, he explains, help maintain protective oil films, while synthetic technology base oils are more resistant to thinning at high temperatures. “Rimula R6 LME uses a technology that adapts chemically and physically to meet the changing needs of engines. It has been developed in close collaboration with truck and engine manufacturers, and addresses the needs of both today's and future engine and vehicle technologies, and specifically fuel economy,” he says.

When testing the product, Shell worked with

Delphi's fuel analyser kit is portable, and costs £1,400

Daimler, for example, which used the oil when it set a new world record in truck fuel efficiency. In a seven-day, around-the-clock marathon at the Nardò test track in Italy, Daimler's new 40-tonne Mercedes Benz Actros 3 consumed exactly 19.44 litres of diesel per 100km (14.53mpg) over 12,728.94km (almost 8,000 miles). This record-breaking result was achieved under strictly defined test conditions and has resulted in a new entry in the Guinness Book of Records.

Trials with a fleet of trucks using another OEM's equipment and operating for a leading supermarket in the UK, achieved fuel savings of up to 2% over a 62,500-mile drain interval, also with Shell Rimula R6 LME, as compared against a typical 10W-40 oil.

Importance of additives

Meanwhile, it is generally accepted that additives play an important part in improving both lubricants and fuels. Germany's Liqui Moly, founded 50 years ago, has seen meteoric increases in its product range and turnover in recent years, as more customers pour additives into engine oil and fuel tanks. Indeed, the firm has become a lubricants producer, too, although it sees itself as somewhat of a David among the oil company Goliaths.

Reiner Schönfelder is Liqui Moly's chief applications engineer. "Motor oil consists of up to 30% additives," he says. "Without additives, no motor oil would be able to do its job in modern engines." And he also refers to wear protection, fuel economy and improved engine lifespan.

Schönfelder concedes that calculating a payback from using the wide range of additives on the market in oils, but also in fuels, is not easy, because some factors, such as longer engine life, are difficult to quantify. However, in Ulm – the city where Liqui Moly is headquartered – field tests of its Proline Super diesel fuel additive in seven city buses saw a reduction in fuel consumption of 3.2%. The tests ran over 275,000 miles, using a dosage regime of 1:300.

"Fuel costs reduced after taking into account the cost of the additive, which cleans the fuel system, mainly the injectors," says Schönfelder. "Extrapolating this to their entire fleet, the local transportation authority calculated that there would have been an annual cost saving – after paying for the additives – of nearly €95,000 [almost



£80,000].” And, given that, for every litre of fuel saved, CO₂ emissions are reduced by 2.62kg, that sounds even more attractive.

But there is a limit and, for the oil giants, that limit is reached particularly with their lubricants. "Oil is very carefully formulated and balanced to confer the performance it needs.

Abusing that by adding extra additives is not a clever thing to do," warns Shell's Mainwaring.


What about fuel?

One decision that might not be so difficult is to invest in a new product from Delphi: the YDT553 fuel analyser, which has been developed in the UK over the past 12 months and was released for sale in August.

With up to 80% of diesel engine problems stemming from poor fuel quality or contamination, the advantages of enabling checks in the workshop, in terms of avoiding costly engine damage, are obvious. However, until now that would have required a hefty piece of kit costing between £7,000 and £8,000 or sending samples to a lab for testing at up to £1,000 a time – and having to wait several days for the results.

"Our hand-held analyser is portable and costs £1,400," says Julian Goulding, UK marketing manager for Delphi's diesel aftermarket division. "In terms of contamination and misfuelling, there's a lot of damage that can be done to the pump and the fuel injection system, which can corrode and start to break up, causing thousands of pounds worth of damage. So the earlier that any fuelling problems are caught, the more chance of avoiding serious costs – and not only in repairs, but in downtime, too."

One of the main sources of contamination is excessive biodiesel content or traces of other vegetable oils. "The pressures that diesel systems now work at mean that any impurities in the fuel really do cause knock-on problems," warns Goulding. "We see the problem when we get fuel injection equipment back within the warranty period. Obviously, we carry out tests and analysis to see what's caused the problems and that's where we've seen such a high percentage that can be traced back to problems within the fuel itself. Hence our move to develop a low-cost portable analyser that gives you an instant result."

Goulding also suggests that buyers of the analyser could offer analysis services to others, with any fee charged initially helping to offset the capital investment. Subsequently, those fees would become additional earned income. 

Julian Goulding: "Catching fuelling problems early can save thousands of pounds in damage"

