

MYTHS AND LEGENDS 1

ZINC, DIESEL OILS AND API

IMPACT FOR OLDER CARS

There have been a number of articles and we have heard comments from various “expert” commentators regarding the more recent API specifications and their impact on older petrol engined vehicles. Unfortunately there is a lot of mis-information out there and also contradictory information as to what can and cannot be used in older vehicles.

The focus has been on zinc, or more correctly, ZDTP (zinc di-thiophosphate). For many years this has been the anti wear additive of choice as it is the most cost effective (and one of the most effective) chemistry to use. Also incorrectly described as an extreme pressure additive, its primary role is to prevent wear in the rings and in the valve train (cams, tappets, valve stems etc) of the engine.

When you add ZDTP you also add phosphorus. This is a catalyst poison and there have been limits on it since the days of API SH (1994) when a 0.12% limit was imposed. Prior to that, in the days of API SG (1989) many manufacturers already had put a 0.10% limit on phosphorus. So, “low” phosphorus has been with us for quite some time.

In effect, an engine oil that contains about 0.1% phosphorus or higher, will easily provide the required anti wear properties for older engines.

The step from API SH to API SL was accomplished by a combination of new additives or adding additional anti wear and anti oxidant to existing blends. As an example, the Penrite HPR petrol oils and Pro upgrades from API SJ to API SL required the addition of these components to pass the relevant engines tests. These were not phosphorus based, but used organic molybdenum additives (**not** molybdenum disulphide – we do not recommend that for any engine), to keep phosphorus levels at 0.1%. Many other companies followed similar routes but there was certainly no loss of protection, even if they started from scratch.

Within these changes was the incorporation of friction modifiers. The early ones were very active and did cause oil consumption in older engines. These days, technology is well advanced and this no longer is the case. HPR oils are not friction modified as they also go into motorcycles – wet clutches can still have issues.

Now we have API SM – for the first time, the limit on phosphorus is from 0.06-0.08%. There are industry concerns about the applicability of these oils in older engines. However, the limit only applies to 0W-20, 0W-30, 5W-20, 5W-30 and 10W-30 oils (so called “ILSAC” grades). Any other grades are exempt from this. Hence Penrite Synthetic 5, which is already API SM, has phosphorus content of 0.12%. When HPR 10, 15 and 30 went to API SM technology, they maintained their phosphorus levels of about 0.1%. None of the viscosity grades for these products are bound by the 0.08% upper limit.

Therefore even blanket statements about API SM oils will be incorrect and further research will be needed by the end user.

There is one other factor with non-ILSAC oil grades. If they also have the European ACEA A2/A3 with B2/B3 or B4 performance levels, phosphorus levels will also be at 0.10 % to 0.12% as their tests have been more severe than the API for some time. Hence an oil that is SL (SM)/CF/A3/B3 also well exceeds the anti-wear requirements for older engines.

The irony is that API SF and SG oils formulated in recent years usually have phosphorus contents of around 0.08% (usually 0.1% maximum) anyway due to other advances in technology, unless the blender chooses to add extra additive.

This brings us to diesel oils.

Currently, they have no phosphorus limits – as such many people recommend them for older cars, even though many others say that the detergent levels are too high and the engine will use oil. Well, you cannot have it both ways. This one originated from the USA and hence did not take into account European ACEA standard petrol engine oils, which are easy to find in Australia, NZ and Europe, but a lot harder to find in North America.

Yes, it may use oil, but only until the cleaning period is complete – unless you are unlucky enough to move a deposit that is stopping oil leaks that is. However, an engine in good internal condition will run quite happily on diesel oils as long as the SAE viscosity is correct.

If you do want to use a modern higher zinc/phosphorus oil in your older car, then use Penrite HPR Gas 20W-60, which is at 0.12% phosphorus and less aggressive than a diesel oil. However, we do have range of oils (Shelsley, Classic, Heritage) that are designed specifically for pre 1970 motor vehicles.

We note that there is no current limit on phosphorus for diesel oils - in 2006/7 this is expected to change as heavy duty diesel emissions requirements drive down the levels.

This leaves Synthetic oils. Many people say they are too “slippery” for older cars, and can cause wear and oil consumption. Well, wear protection has little to do with the base oil type and everything to do with the additive (all else being equal). If the wrong anti wear additive is used (and this did inflict a brand of synthetic oil not that long ago) then it does not matter how good the rest of the oil is, wear will occur. Hence, a synthetic oil is quite OK in an older car, but unless it is fully reconditioned and then correctly run in, then there is no real benefit to the end user. It is true that synthetic oils (especially the PAO type) have lower friction, as their chemical structure allows the molecules to slide over one another more easily than a mineral oil, but if the correct additives are used, then this becomes a benefit, not a detriment.

The choice of the correct oil for older cars comes down to various factors such as:

- Original Viscosity Specified
- Condition of engine (leaks, sludge)
- How often the engine is run
- How the vehicle is to be used
- Oil consumption
- Current oil used

Blanket statements are not useful to anyone, be it the vehicle owner or the oil industry. If you have any doubt as to what oil you should use, contact your preferred supplier – preferably Penrite of course. On our web pages (www.penriteoil.com) are listings for both post 1970 vehicles and also another section for pre 1970. In both cases, we have chosen the correct oil in our range that would suit the vehicle shown, basis the condition we would expect the vehicle to be in and how we expect it to be operated.