Understanding Engine Oil Designations

The engine oils specified for the vast majority of vehicles sold in Australia are covered by either the SAE / API or ACEA oil classification systems, though there are other systems in use as well.

The following is a brief explanation of these classification systems.

SAE viscosity ratings

Oil Viscosity

SAE (Society of Automotive Engineers) ratings designate the oil's viscosity; simply put, how thick or thin an oil is at a certain temperature.

- For example, SAE 30 oil is "thinner" (less viscous) than SAE 50 oil at a given temperature.

The vast majority of carmakers specify multi-grade oils which are designed to act like a thin oil when cold so that they can circulate through the engine quickly on start up, and like a thicker oil when hot, to provide the necessary engine protection.

- An example of a multi-grade oil designation is 10W-40. The 10W (W = winter) indicates how the oil would behave when cold, while the 40 is how it acts when hot.

Mono-Grade Oil

However, some special applications may require a mono-grade oil such as SAE 30. Many older vehicles will also specify a mono-grade oil because they were built at a time when these were the only oils available. Some may accept modern multi-grade oils however you should discuss this with an oil manufacturer first.

API service classifications

American Petroleum Institute service classifications are a two-letter rating beginning with "S" for petrol engine oils and "C" for diesel engine oils. The second letter designates the oil's quality standard, beginning with the letter "A".

- The further along the alphabet, the higher the oil's 'quality' or ability to withstand increasing service severity.

Many oils meet standards for both petrol and diesel engines and will be marked with a dual service classification, for example SH/CD. However, this is not universal and it is becoming more common for oils to be specified for only one type of engine.

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Selecting the correct oil for your car
The viscosity rating and the classification system when combined generally give the information needed to select the correct oil for your car. Your car's handbook will specify the manufacturer's recommendations.

- For example, SH 10W - 30.

Some handbooks also have temperature charts so you can select the correct grade of oil for the climatic conditions the vehicle is likely to operate in.

Superseded API standards

If you have an older vehicle you may find the handbook specifies a superseded service rating, such as SE. Where a vehicle's handbook lists oils that are no longer readily available, you should discuss appropriate replacements with a lubricant manufacturer.

ACEA service classifications

ACEA stands for the Association des Constructeurs Europeens d'Automobiles, the association of European automobile manufacturers.

Like the API service classifications that have been used in the US and Australia for many years, the European ACEA system is the accepted standard in Europe, and is appearing more frequently in Australia.

ACEA Standards
ACEA standards recognise that European engines differ from US (style) engines in both their design and operating conditions and that the demands on their oils are also different. This requires the oils used in European engines to be unique and consequently, the classification system for them also needs to be unique. For this reason, it is difficult to compare the common API classification and ACEA standards, as the test sequences for them are quite different.

Some ACEA standards also take into account the effect the oil has on engine emissions and emission control systems. This is very much more important for engines that need to meet the much tighter Euro emission standards now applicable in Europe and Australia.

- An example of a typical ACEA oil specification is 0W – 40 A3.

ACEA Categories

Major oil companies are providing ACEA classifications on the packaging of compliant oils. Generally, only the higher quality synthetic or part synthetic oils will meet ACEA standards.

- Oils that do not carry ACEA classifications should be regarded as not meeting these standards.

These oils are not suitable for all engines and it is important to follow the vehicle manufacturer's recommendations at all times. If there is any doubt about the appropriateness of an oil for a particular application, it is wise to check its suitability with the oil's manufacturer.

All major oil companies operate technical help lines and websites that can provide technical information on their range of lubricants, including product recommendations for most vehicles / models.

The following information is intended to be a brief explanation only. It should not be used as a guide to selecting a suitable oil.

ACEA categories

A / B / C / E – Petrol and diesel engine oils

(A = petrol engines, B = light duty diesel engines, C= catalyst compatible oils, E = heavy duty diesel engines)

A1 / B1

Oils intended for use in petrol and diesel car and light commercial vehicles specifically capable of using low friction, low viscosity oils with high temperature / high shear characteristics.

A3 / B3

For use in high performance petrol and diesel cars and light commercials where extended drain intervals are specified by the vehicle manufacturer and / or for year-round use of low viscosity oils and / or for use in severe operating conditions as defined by the vehicle manufacturer.

A3 / B4

For use in high performance petrol and direct injection diesel engines. Also suitable for applications described under B3.

A5 / B5

For use in high performance car and light commercial petrol and diesel engines designed for low viscosity oils where extended oil change intervals are specified by the vehicle manufacturer.

C - Catalyst compatible oils

C1, C2, C3 and C4

For use in high performance car and light commercial petrol and diesel engines, with diesel particulate filter, three-way catalyst and / or requiring low viscosity, low friction, catalyst-compatible oils.

E- Heavy duty diesel engine oils

E4

Recommended for highly rated diesel engines meeting Euro 1, 2, 3, 4 and 5 emission standards and running under very severe conditions (i.e. extended oil drain intervals as specified by the vehicle manufacturer) It is suitable for engines without particulate filters, and for some EGR (exhaust gas recirculation) engines and some engines fitted with SCR (selective catalyst reduction) NOx (oxides of nitrogen) reduction systems.

E6

Recommended for highly rated diesel engines meeting Euro 1, 2, 3, 4 and 5 emission standards and running under very severe conditions, (e.g. extended oil drain intervals as specified by the vehicle manufacturer) It is suitable for EGR (exhaust gas recirculation) engines with or without particulate filters, and for engines fitted with SCR (selective catalyst reduction) NOx (oxides of nitrogen) reduction systems. E6 is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulphur diesel fuel.

E7

Recommended for highly rated diesel engines meeting Euro 1, 2, 3, 4 and 5 emission standards and running under severe conditions, (e.g. extended oil drain intervals as specified by the vehicle manufacturer) It is suitable for engines without particulate filters, and for most EGR (exhaust gas recirculation) engines and most engines fitted with SCR (selective catalyst reduction) NOx (oxides of nitrogen) reduction systems. It further provides excellent wear control, soot handling and lubricant stability, and effective control with respect to piston cleanliness and bore polishing.

E9

Recommended for highly rated diesel engines meeting Euro 1, 2, 3, 4 and 5 emission standards and running under severe conditions, (e.g. extended oil drain intervals as specified by the vehicle manufacturer) It is suitable for most EGR (exhaust gas recirculation) engines with or without particulate filters, and for most engines fitted with SCR (selective catalyst reduction) NOx (oxides of nitrogen) reduction systems. E9 is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulphur diesel fuel. It further provides excellent wear control, soot handling and lubricant stability, and effective control with respect to piston cleanliness and bore polishing.

Superseded ACEA standards

As demands on engines change, oil specifications also need to change. This means that oil specifications become out dated and such oils are no longer produced. Some examples of superseded specifications include E1, E2, E3 and E5. Where a vehicle's handbook lists oils that are no longer readily available, you should discuss appropriate replacements with a lubricant manufacturer.

ILSAC ratings

Oils carrying the ILSAC rating must meet the oil standards set by the International Lubricant Standardization and Approval Committee (ILSAC). They are denoted by a GF rating prefix (such as GF3, GF 4 etc). For oils to carry a GF rating they must meet the standard specified by ILSAC for minimum performance requirements (both engine sequence and bench tests) plus physical and chemical properties. ILSAC also requires specific testing to prove improved engine energy efficiency. Typically, ILSAC ratings are applied to low viscosity oils such as 0W-20, 5W-20, 0W-30, 5W-30 and 10W-30.

ILSAC GF3 was introduced into Australia in 2001, GF4 in 2004 and GF5 in about 2011. Generally speaking, each change in rating requires significantly more severe test conditions to be met. Thus, later (higher) ratings will typically outperform earlier ILSAC rated oils.

Some oils will be specified as meeting ILSAC as well as other standards, such as API. For more information on ILSAC ratings and other low viscosity oils see our fact sheet on Low Viscosity Engine Oils.

Japanese Automotive Standards Organisation oil specifications

While it is common for Japanese vehicle manufacturers to specify engine oils in terms of API oil service classifications, some applications use JASO ratings. This is because API rated oils are not always applicable to Japanese engines, due to variations in engine design and exhaust emission requirements compared to the American engines for which API oils were originally developed. JASO DH-2 and DL-1 are typical examples of diesel engine oil specifications.

JASO also provides specifications for petrol engine oils which are particularly relevant to motorcycles and other small engines. There are specific standards for two stroke engines, for example JASO FC or FD, and for four stroke engines (JASO MA and MA2), such as those used in motorcycles which have a clutch and gearbox that are also lubricated by the engine oil.

If in doubt about the suitability of an oil for a particular application, we strongly recommend seeking advice from an oil manufacturer.

Specific vehicle manufacturer oil specifications

It is common for vehicle and engine manufacturers to define a particular oil specification for their product. This is very common with European vehicle manufacturers and heavy diesel engine manufacturers. VW 503.0, VW 508.00, Cummins CES 20081 and Detroit Diesel DDC PGOS 93K218 are a few examples. Usually there is no way for an end user to easily align these requirements to the more commonly used specifications, so unless the particular specification you require is mentioned in the oils spec sheet your selection should be guided by an oil manufacturer.

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