

SPECIFICATIONS



Having managed to measure and rate viscosity at different temperatures there needed to be other questions answered in relation to the effectiveness of the oils.

To do this there are two main specifications that you should look for on any oil bottle and these are API (American Petroleum Institute) and ACEA (Association des Constructeurs Europeens d'Automobiles) all good oils should contain both of these, and an understanding of what they mean is important. JASO is another newer specification introduced by the

Japanese Automotive Standards Organization

API

This is the more basic as it is split (for passenger cars) into two categories. S = Petrol (Spark ignition) and C = Diesel (Compression ignition) most oils carry both petrol (S) and diesel (C) specifications.

The following table shows the progress made in formulating oils and how to date the specifications of the oils.

PETROL ENGINES

SG - Introduced 1989 - has much more active dispersant to combat black sludge.

SH - Introduced 1993 - has same engine tests as SG, but includes phosphorus limit 0.12%, together with control of foam, volatility and shear stability.

SJ - Introduced 1996 - has the same engine tests as SG/SH, but phosphorus limit 0.10% together with variation on volatility limits

SL - Introduced 2001 - all new engine tests reflective of modern engine designs meeting current emissions standards

SM - Introduced November 2004 - improved oxidation resistance, deposit protection and wear protection, also better low temperature performance over the life of the oil compared to previous categories.

SN - In 2010 the American Petroleum Institute introduced a new engine oil category under the name **API SN** and a new supplemental category called **Resource**

Conserving.

The API SN category is an improvement over the API SM category in the following areas:

- High temperature deposit protection for pistons
- Better sludge control
- Better seal compatibility
- After-treatment compatibility

Note:

All specifications prior to SL are now superseded and, although suitable for some older vehicles, are more than 10 years old, and do not provide the same level of performance or protection as the more up to date SL and SM specifications.

ACEA

This is the European equivalent of API (US) and is more specific in what the performance of the oil actually is. A = Petrol, B = Diesel and C = Catalyst compatible or low SAPS (Sulphated Ash, Phosphorus and Sulphur).

Unlike API the ACEA specs are split into performance/application categories as follows:

A1 Fuel economy petrol

A2 Standard performance level (now superseded)

A3 High performance and/or extended drain

A4 Reserved for future use in certain direct injection engines

A5 Combines A1 fuel economy with A3 performance

B1 Fuel economy diesel

B2 Standard performance level (now obsolete)

B3 High performance and/or extended drain

B4 For direct injection car diesel engines

B5 Combines B1 fuel economy with B3/B4 performance

C1-04 Petrol and light duty Diesel engines, based on A5/B5-04 low SAPS, two way catalyst compatible.

C2-04 Petrol and light duty Diesel engines, based on A5/B5-04 mid SAPS, two way catalyst compatible.

C3-04 Petrol and light duty Diesel engines, based on A5/B5-04 mid SAPS, two way catalyst compatible, higher performance levels due to higher HTHS

CH-4 was introduced for use in high speed four-stroke diesel & petrol engines and meets 1998 exhaust emission limits, using fuel with sulphur levels of up to 0.5%. These oils offer several additional performance attributes including:

- Oxidation control
- Dispersancy
- Soot handling
- Cylinder and valve train wear protection

Note: SAPS = Sulphated Ash, Phosphorous and Sulphur.

Put simply, A3/B3, A5/B5 and C3 oils are the better quality, stay in grade performance oils.

JASO & Four Stroke Oils (Japanese Automotive Standards Organization)

Modern passenger car engine oils contain more and more friction modifiers. While this is a good thing for those segments (reduces wear and fuel consumption) it's bad for motorcycle engines. At least for those motorcycles which use engine oil to lubricate their transmission and wet clutch. JASO introduced the MA and MB specification to distinguish between friction modified and non friction modified engine oils. Most four-stroke motorcycles with wet clutches need a JASO MA oil.

JASO MA

Japanese standard for special oil which can be used in 4-stroke motorcycle engine with one oil system for engine, gearbox and wet clutch system. Fluid is non-friction modified.

JASO MB

MB grade oils are classified as the lowest friction oils among motorcycle four-cycle oils. Not to be used where a JASO MA grade oil is required unless MA is already assigned. The classification is based on the results of the JASO T 904:2006 clutch system friction test.

In order for a motor oil to meet any of the above mentioned JASO standards it must be at least one of the following quality levels:

- **API** SG, SH, SJ, SL, SM
- **ACEA** A1/B1, A3/B3, A3/B4, A5/B5, C2, C3

JASO & TWO STROKE OILS

Japanese motorcycle manufacturers found the limits demanded by the API TC specifications too loose. Oils meeting the API TC standard still produced excessive smoke and could not prevent exhaust blocking. Therefore the Japanese Engine Oil Standards Implementation Panel (JASO) introduced the following specifications

- FA was the original spec established regulating lubricity, detergency, initial torque, exhaust smoke and exhaust system blocking.
- FB corresponds to high lubricity performance but without any low-smoke technology.
- FC meets the FB lubricity standards but also is a low-smoke lubricant.
- FD corresponds to higher detergency properties than the other two grades, meets the lubricity requirements and has low smoke requirements.