

MOTOR OIL USER GUIDE



API classification

What is API?

The American Petroleum Institute is the national association that represents all the aspects of the American oil and natural gases industry. API ensures the licensing of motor oils and certification systems (EOLCS). It is a voluntary licensing and certification program, which authorizes motor oil producers and merchants that fulfill the needed requirements in order to be able to use the API quality certification.

What does API evaluation mean?

The API classification system provides information regarding the motor oil itself. The letter "S" (spark) followed by another letter (for example "SN") indicates the fact that this oil is indicated for engines with a spark ignition. The letter "C" followed by another letter and/or number (for example CI-4) indicates the fact that this oil is suitable for diesel engines (compression ignition). The second letters from the C and S categories are attributed in alphabetical order. The further down the alphabet the higher the quality of the oil is.

The classification of oils in accordance with API (follow automaker recommendations)

S series - gasoline engine motor oils

SN - Introduced in October 2010 for 2011 and older vehicles, designed to provide improved high temperature deposit protection for pistons, more stringent sludge control, and seal compatibility. API SN with Resource Conserving matches ILSAC GF-5 by combining API SN performance with improved fuel economy, turbocharger protection, emission control system compatibility, and protection of engines operating on ethanol-containing fuels up to E85.

SM - Category SM oils are designed, for vehicles produced in 2010 and older, to provide improved oxidation resistance, improved deposit protection, better wear protection, and better low-temperature performance over the life of the oil. Some SM oils may also meet the latest ILSAC specification and/or qualify as Energy Conserving. They may be used where API Service Category SJ and SL earlier categories are recommended.

SL - Category SL was adopted to describe engine oils for use in 2001. It can be used anywhere an oil which meets API SJ or older is recommended.

SJ - Category SJ was adopted in 1996 to describe engine oil first mandated in 1997. It can be used in any application where an API SH oil or older is recommended.

SH - Obsolete - For model year 1996 and older engines. Can be used when an API SG or previous specification is required. Starting with July 1, 1997 API SH can only be used together with API CF, CF-2, CF-4 or CG-4.

SG - Obsolete - For model year 1993 and older engines.

SF - Obsolete - For model year 1988 and older engines.

SE - Obsolete - For model year 1979 and older engines.

SD - Obsolete - For model year 1971 and older engines.

SC - Obsolete - For model year 1967 and older engines.

SN	CJ-4		GL-6
SM	CI-4 PLUS		GL-5 PLUS
SL	CI-4	TD	GL-5
SJ	CH-4		GL-4
SH	CG-4	TC	GL-3
SG	CF-2		GL-2
SF	CF	TB	GL-1
SE	CF-4		
SD	CE		
SC	CD-II		
	CD		
	CC	TA	
S Series	C Series	T Series	GL Series

C series - Diesel engine motor oils

CJ-4 - Designed for high-speed, four-stroke diesel engines to meet 2007 on-highway exhaust emission standards as well as Tier 4 non-road, along with previous diesel engines.

CI-4 Plus - Contains motor oils used in four-stroke diesel engines designed after 2004. This oil has good energy conserving properties.

CI-4 - Contains motor oils used in four-stroke diesel engines designed after 2002 that work in severe conditions. It can be applied also in cases where the oil recommended has to meet API CH-4, CG-4 and CF-4 requirements.

CH-4 - Contains motor oils used in four-stroke diesel engines designed after 1998 that work in severe conditions. It can be applied also in cases where the oil recommended has to meet API CF-4 and API CG-4 requirements.

CG-4 - Contains motor oils used in four-stroke diesel engines designed after 1994 that work in severe conditions. It can be applied also in cases where the oil recommended has to meet API CD, CE and CF-4 requirements.

CF-2 - Obsolete - Contains motor oils used in two stroke diesel engines designed after 1994. It can be applied in cases where the recommended oil is an API CD-2.

CF - Contains motor oils used in diesel engines with direct injection designed after 1994. Can also be used in applications where an API CD or previous oil is recommended.

CF-4 - Contains motor oils used in diesel engines designed after 1990. It ensures the maintenance of high-speed, four-stroke engines. These oils can also replace API CE and are adequate for heavy trucks. They can also be combined with applications from the S category (gasoline oils).

CE - Obsolete - Contains oils used in diesel engines designed after 1983. Can also be used in applications where an API CD or previous oil is recommended.

CD II - Obsolete - Contains motor oils used for two-stroke diesel engines that work in severe conditions and require protection against deposits and wear and tear.

CD - Obsolete - Contains oils used in naturally aspirated or turbo diesel engines, which use a lot of fuel (including fuels high in sulfur). This type of oil has been introduced in 1955.

CC - Obsolete - Contains oils used in diesel engines. This series of oils should never be used in diesel engines produced after 1990.

T series - oils for two-stroke engines

TA - This specification is used for extremely small two-stroke engines used in mopeds.

TB - This specification is used for scooters and motorcycles with two-stroke engines.

TC - This specification is used for high performance engines with high fuel-oil ratio. Oils with this specification use metal-based additives that produce ash.

TD - This specification is used for water-cooled outboard two-stroke engines with separate oil container or mixed (oil with fuel).

GL series - gear oils

GL-1 - Denotes lubricants intended for manual transmissions operating under such mild conditions that straight petroleum or refined petroleum oil may be used satisfactorily. Oxidation and rust inhibitors, defoamers and pour depressants may be added to improve the characteristics. Friction modifiers and extreme pressure additives shall not be used.

GL-2 - Denotes lubricants intended for automotive worm-gear axles operating under such conditions of load and temperature that lubricants satisfactory for API GL-1 service will not suffice.

GL-3 - Denotes lubricants intended for manual transmissions operating under moderate to severe conditions and spiral-bevel axles operating under mild to moderate conditions.

GL-4 - Denotes lubricants intended for axles with spiral bevel gears operating under moderate to severe conditions of speed and load or axles with hypoid gears operating under moderate speeds and loads. These oils may be used in selected manual transmission and transaxle applications where MT-1 lubricants are unsuitable. The manufacturer's specific lubricant quality recommendations should be followed.

GL-5 - Denotes lubricants intended for gears, particularly hypoid gears, in axles operating under various combinations of high-speed/shock load and low-speed/high-torque conditions.

GL-6 - Denotes lubricants intended for gears designed with a very high pinion offset. Such designs typically require protection from gear scoring in excess of that provided by API GL-5 gear oils.

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ACEA Classification

What is ACEA?

Association des Constructeurs Européens d'Automobiles - The European Automobile Manufacturers Association (ACEA), founded in 1991, represents the interests of the fifteen European car, truck and bus manufacturers at EU level. Through its specialist working groups and an extensive network of individual experts from Member Companies at all levels of the industry, ACEA has access to a wealth of expertise and applied technical experience. ACEA oil sequences define the minimum quality level of a product for presentation to ACEA members.

What is the ACEA classification?

Category A/B - gasoline and diesel engines

Category C - catalyst compatible oils

Category E - heavy truck diesel engines

ACEA Category A/B

ACEA A1/B1 - For gasoline vehicle engines and for light truck diesel engines that require oil with low viscosity and reduced friction

ACEA A3/B3 - stable oils used in gasoline and diesel engines. They are replaced at higher intervals and can be used in older engines.

ACEA A3/B4 - higher quality, very stable motor oils used in both high performing gasoline engines and direct injection diesel engines produced more recently.

ACEA A5/B5 - Stable, stay-in-grade oil intended for use at extended drain intervals in high performance gasoline engine cars & light van diesel engines

ACEA Category C

ACEA C2 - Stable, stay-in-grade oil intended to be used in engines with three-way catalyst in vehicles with DPF and TWC, which have low viscosity in High temperatures.

ACEA C3 - Oils used in diesel engines that are equipped with particle filters and three-way catalysts as well as high performing gasoline engines.

ACEA C4 - Oils used in diesel engines that are equipped with particle filters and three-way catalysts requiring a low SAPS level smaller or equal to 0.5% and a minimum HTHS viscosity of 3.5 MPa.s.

ACEA Category E

ACEA E2 - standard quality oil for use with naturally aspirated or turbo diesel engines

ACEA E4 - Stable, stay-in-grade oil providing excellent control of piston cleanliness, wear, soot handling and lubricant stability. It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under very severe conditions. It is suitable for engines without particulate filters, and for some EGR engines and some engines fitted with SCR NOx reduction systems.

ACEA E5 - It is suitable for diesel engines meeting Euro I, Euro II, Euro III, Euro IV emission requirements.

ACEA E6 - It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV, Euro V and Euro VI emission requirements and running under very severe conditions. It is suitable for EGR engines, with or without particulate filters, and for engines fitted with SCR NOx reduction systems. E6 quality is strongly recommended for engines fitted with particulate filters and is designed for use in combination with low sulfur diesel fuel.

ACEA E7 - It is recommended for highly rated diesel engines meeting Euro I, Euro II, Euro III, Euro IV and Euro V emission requirements and running under severe conditions. It is suitable for engines without particulate filters, and for most EGR engines and most engines fitted with SCR NOx reduction systems.

ACEA E9 - It is recommended for highly rated diesel engines meeting Euro V and Euro VI emission requirements with DPF.

The DEXRON classification for ATF Automatic Transmission Fluid

Type A - introduced by Ford (GM) in 1949

Type A Suffix A - introduced by Ford (GM) in 1957 and replaced Type A

Dexron B - introduced by Ford (GM) in 1967

Dexron II - the same GM formula enhanced with better viscosity control

Dexron IIE - oil for electronic transmissions

Dexron III (F) - replaces Dexron IIE and has increased anticorrosive properties

Dexron III (H) - the enhanced version of the Dexron III that was introduced in 2003

Dexron III/Saturn - oil specially created for Saturn cars

Dexron VI - introduced in 2006 for GM hydromatic 6L80 vehicles, replacing Dexron II and III

SAE Clasification Society of Automotive Engineers

This classification has at its basis the measurement of viscosity at various temperatures both high and low. The values registered at high temperatures are determined in accordance with the ASTM D445 method. Values at low temperatures are determined in accordance with the ASTM D2983 method. The apparent viscosity is measured using a Brookfield viscometer and is measured in mPa.s (c.P). Multigrade oils satisfy a certain requirement in low temperatures marked with a "W" (for winter) and different requirement for a non-W category at high temperatures. Also important to note that there is no correlation between the SAE classification of motor oils and that of transmission oils.

LOWEST AMBIENTAL TEMPERATURE	SAE VISCOSITY GRADE RECOMMENDED FOR PASSENGER CARS
0°C (32°F)	0W-20, 0W-30, 5W-20, 5W-30, 10W-30, 10W-40, 20W50
-18° (0°F)	0W-20, 0W-30, 5W-20, 5W-30, 10W-30, 10W-40
Sub -18°C (0°F)	0W-20, 0W-30, 5W-20, 5W-30

NLGI Greases Clasification

National Lubricating Grease Institute

NLGI is a non-profit organization formed by companies that produce and market all types of greases. The Objectives of the NLGI are that of accumulating as much information as possible leading to the development of the industry both from a consumer's and a producer's perspective. In 1993 the institute has elaborated a classification system for greases based on its consistency from NLGI 000 to 6, NLGI 2 being the most commonplace. To more easily distinguish greases the NLGI has created a symbol for chassis grease (LB) and another one for bearings grease (GC-LB).

NLGI Grade	Penetration after 60 beats @ 25°C	Aspect	Consistecy
000	445 - 475	Fluid	Cooking oil
00	400 - 430	Semy-fluid	Apple souce
0	355 - 385	Very soft	Brown mustard
1	310 - 340	Soft	Tomato paste
2	265 - 295	Normal	Peanut butter
3	220 - 250	Ferm	Vegetal fat
4	175 - 205	Very ferm	Frozen yogurt
5	130 - 160	Hard	Fine pate
6	85 - 115	Very hard	Cedar cheese