



## **API Classifications has been made by AMERICAN PETROLEUM INSTITUTE (API), ENGINE OIL LICENSING AND CERTIFICATION SYSTEM (EOLCS).**

### **Engine Oil Guide**

#### **1. Performance Level**

**API S:** Oils specifically designed for gasoline engines (such as passenger cars and light vans) are classified under the API classification "S" (Service).

**API C:** Oils specifically designed for diesel engines (such as trucks or diesel engines under the most severe conditions) are classified under the API classification "C" (Commercial). Exact descriptions of the current and obsolete API classes can be found in the charts for gasoline and diesel engines.

#### **2. Viscosity Grade**

Is a measure of viscosity and fluidity at certain temperatures. Vehicle requirements may vary. Manufacturer recommendations, according to the prescribed SAE viscosity grade, must be observed.

#### **3. Resource Conserving and Energy Conserving**

The terms „Resource Conserving“ (RC) and „Energy Conserving“ (EC) apply to vehicles gasoline engines in cars and light vans. The comprehensive use of these oils can lead to overarching fuel savings throughout the vehicle fleet.

#### **4. Multiple Performance Levels**

Lubricants developed for diesel engines may also be suitable for gasoline engines. For these oils the designation is "C" classification first followed by the "S" classification. Classification "C" oils have been formulated primarily for diesel engines and may not provide all of the performance requirements consistent with vehicle manufacturers' recommendations for gasoline fueled engines.

## **Guide to SAE VISCOSITY GRADES for PASSENGER CAR ENGINE OILS**

Multigrade oils of SAE 5W-30 and 10W-40 viscosity grades are widely used because they are thin enough to be flowable at low temperatures and thick enough to provide satisfactory high temperature performance.

Warning: Vehicle requirements may vary.

### **Follow your vehicle manufacturer's recommendations on SAE oil viscosity grade!**

The current and previous API classifications are listed on the following pages. Vehicle owners should refer to their owner's manuals before consulting these charts. Oils may have more than one performance level. For automotive gasoline engines, the latest engine oil service category includes the performance properties of each earlier category. If an automotive owner's manual calls for an oil with API SJ or SL, an API SM oil will provide full protection.

For diesel engines, the latest category usually – but not always – includes the performance properties of an earlier category.

<b>If lowest expected outdoor temperature is:</b>	<b>Typical SAE viscosity grades for cars:</b>
<b>0°C (32°F)</b>	0W-20 0W-30 5W-20 5W-30 10W-30 10W-40 20W-50
<b>-18°C (0°F)</b>	0W-20 0W-30 5W-20 5W-30 10W-30 10W-40
<b>Below -18°C (0°F)</b>	0W-20 0W-30 5W-20 5W-30

## API S for GASOLINE ENGINES in PASSENGER CARS (service-classification)

<b>SP</b>	<b>Valid</b>   Introduced in May 2020, designed to provide protection against low-speed pre-ignition (LSPI), timing chain wear protection, improved high temperature deposit protection for pistons and turbochargers and more stringent sludge and varnish control. API SP with Resource Conserving matches ILSAC GF-6A by combining API SP performance with improved fuel economy, emission control system protection and protection of engines operating on ethanol-containing fuels up to E85.
<b>SN</b>	<b>Valid</b>   Introduced in 2010, designed to provide improved high temperature deposit protection for pistons, more stringent sludge control, and seal compatibility. API SN with "Resource Conserving" RC" matches ILSAC GF-5 by combining API SN performance with improved fuel economy, turbocharger protection and emission control system compatibility. In addition, these oils provide good protection or engines that use ethanol-containing fuels up to E85.
<b>SM</b>	<b>Valid</b>   For 2010 and older automotive engines
<b>SL</b>	<b>Valid</b>   For 2004 and older automotive engines
<b>SJ</b>	<b>Valid</b>   For 2001 and older automotive engines
<b>SH</b>	<b>Obsolete</b>   For 1996 and older automotive engines
<b>SG</b> <b>SF</b>	<b>Obsolete</b>   CAUTION: not suitable for use in most gasoline-powered automotive engines built after 1993 (SG) or 1988 (SF). May not provide adequate protection against build-up of engine sludge.
<b>SE</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in gasoline-powered automotive engines built after 1979.
<b>SD</b> <b>SC</b> <b>SB</b> <b>SA</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in gasoline-powered automotive engines built after 1971 (SD), 1967 (SC), 1951 (SB) or 1930 (SA). Use in more modern engines may cause unsatisfactory performance or equipment harm.

## API C DIESEL ENGINES (commercial-classification)

<p><b>FA-4</b></p>	<p><b>Valid</b>   Describes certain xW-30 oils specifically formulated for use in selected high-speed 4-stroke diesel engines. API FA-4 oils are formulated in an HTHS range of 2.9 to 3.2 mPa*s to support the reduction of greenhouse gas emissions and to meet the corresponding limits as of model year 2017. These oils are particularly effective in the permanent maintenance of emission control systems, where particulate filters and other modern exhaust aftertreatment systems are used. API FA-4 oils are not backward compatible with API CK-4, CJ-4, CI-4 PLUS, CI-4 and CH-4 oils. Refer to engine manufacturer recommendations to determine if API FA-4 oils are suitable for use. API FA-4 oils are not recommended for use with fuels having greater than 15 ppm sulfur. For fuels with sulfur contents greater the 15 ppm, refer to engine manufacturer recommendations.</p>
<p><b>CK-4</b></p>	<p><b>Valid</b>   Describes oils for use in high-speed 4-stroke cycle diesel engines designed to meet 2017 model year on-highway and tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm. However, the use of these oils with greater than 15 ppm sulfur fuel may impact exhaust aftertreatment system durability and/or oil drain interval. API CK-4 oils are especially effective at sustaining emission control system durability where particulate filters and other advanced aftertreatment systems are used. In addition, these oils exceed the performance criteria API CJ-4, CI-4 PLUS, CI-4 and CH-4 performance characteristics and provide good lubricity of engines requiring these API service categories. When using CK-4 oils with higher than ppm sulfur fuel, consult the engine manufacturer for service interval recommendations.</p>
<p><b>CJ-4</b></p>	<p><b>Valid</b>   For high-speed 4-stroke cycle diesel engines designed to meet 2010 model year on-highway and tier 4 non-road exhaust emission standards as well as for previous model year diesel engines. These oils are formulated for use in all applications with diesel fuels ranging in sulfur content up to 500 ppm (0.05% by weight). However, the use of these oils with grater than 15 ppm (0.0015% by weight) sulfur fuel may impact exhaust aftertreatment system durability and/or drain interval. CJ-4 oils are especially effective at sustaining emission control system durability where particulate filters and other advanced aftertreatment systems are used. API CJ-4 oils exceed the performance criteria of API CI-4 PLUS, CI-4, CH-4, CG-4 and CF-4 and also provide very good lubricity for engines that require these API service categories. When using CJ-4 oil with higher than 15 ppm sulfur fuel, consult the engine manufacturer for service interval.</p>
<p><b>CI-4</b></p>	<p><b>Valid</b>   Introduced in 2002. For high-speed 4-stroke diesel engines that meet the 2004 emissions standard. CI-4 oils have been developed to ensure engine durability when using exhaust gas recirculation (EGR). Furthermore, they are suitable for the use of diesel fuels with sulfur content up to 0.5 %. They can be used instead of API CD, CE, CF-4, CG-4 and CH-4 oils. Some CI-4 oils are also suitable for the CI-4 PLUS specification.</p>

<b>CH-4</b>	<b>Valid</b>   Introduced in 1998. For high-speed 4-stroke diesel engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0,5% weight. Can be used in place of CD, CE, CF-4 and CG-4 oils.
<b>CG-4</b>	<b>Obsolete</b>   Introduced in 1995. For severe duty, high-speed 4-stroke diesel engines using fuel with less than 0,5 % weight sulfur. CG-4 oils are required for engines meeting 1994 emission standards. Can be used in place of CD, CE and CF-4 oils.
<b>CF-4</b>	<b>Obsolete</b>   Introduced in 1990. For high-speed 4-stroke diesel engines, naturally aspirated and turbocharged engines. Can be used in place for CD and CE oils.
<b>CF-2</b>	<b>Obsolete</b>   Introduced in 1994. For severe duty, 2-stroke cycle engines. Can be used in place of CD-II oils.
<b>CF</b>	<b>Obsolete</b>   Introduced in 1994. For off-road, indirect-injected and other diesel engines including those using fuel with over 0,5 % weight sulfur. Can be used in place of CD oils.
<b>CE</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1994.
<b>CD-II</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1994
<b>CD</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1994.
<b>CC</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1990.
<b>CB</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1961.
<b>CA</b>	<b>Obsolete</b>   CAUTION: Not suitable for use in diesel-powered engines built after 1959.

## API EC Energy Conserving

<b>EC-I</b>	Min. 1,5 % fuel savings compared to a SAE 20W-30 reference oil in a 82'er Buick-gasoline engine VG, 3.8 L., SEQ VI-Test
<b>EC-II</b>	AS API EC-I, but min. 2,7 % fuel savings
<b>EC</b>	Replaces API EC-I & EC-II. Only in conjunction with API SJ. Fuel savings: 0W-20, 5W-20 >1,4 %, 0W-XX, 5W-XX > 1.1 %, 10W-XX, other > 0,5% SEQ VI A-Test: 93'er Ford V8, 4,6 L., reference oil 5W-30.

The ILSAC (International Lubricants Standardization and Approval Committee) uses together with another American Institute and the JAMA (Japan Automobile Manufacturers Association) the API classifications for an individual ILSAC standard:

<b>GF-6</b>	<b>Valid</b>   Provide protection against low-speed pre-ignition (LSP), timing chain wear protection, improved high temperature deposit protection for pistons and turbochargers, more stringent sludge and varnish control, improved fuel economy, enhanced emission control system protection and protection of engines operating on ethanol-containing fuels up to E85. GF-6A for viscosities up to 0W-20. GF-6B for engines that require a 0W-16 oil.
<b>GF-5</b>	<b>Valid</b>   Introduced in October 2010 to better protect pistons and turbochargers from high temperature deposits. It also ensures stricter sludge control, compatibility of seals, reduces fuel consumption and contributes to the improvement of the emission control system. Very good protection for engines that run on fuels containing ethanol up to E85.
<b>GF-1-4</b>	<b>Obsolete</b>   Use GF-5 where GF-4/GF-3/GF-2/GF-1 is recommended.

## MIL-Specifications (Military Standard in USA)

<b>MIL-L</b>	Lubricants
<b>MIL-G</b>	Greases, Hydraulic fluids

## SAE viscosity classes according to SAE J306

SAE-Class	Min. temperature at dynamic viscosity		Kinematic viscosity at 100°C, mm <sup>2</sup> /s	
	150 Pa·s, °C	Min	Max	
<b>Winter</b>				
<b>70W</b>	<b>-55</b>	<b>4,1</b>		<b>-</b>
<b>75W</b>	<b>-40</b>	<b>4,1</b>		<b>-</b>
<b>80W</b>	<b>-26</b>	<b>7,0</b>		<b>-</b>
<b>85W</b>	<b>-12</b>	<b>11,0</b>		<b>-</b>
<b>Summer</b>				
<b>90</b>	<b>-</b>	<b>13,5</b>		<b>24,0</b>
<b>140</b>	<b>-</b>	<b>24,0</b>		<b>41,0</b>
<b>250</b>	<b>-</b>	<b>41,0</b>		<b>-</b>

In addition to the factory standards of the relevant motor vehicle industry, the guidelines for gear oils with the American Petroleum Institute (API) are relevant. However, the API classifications can only provide a rough classification, as the requirements are very complex to modern gear oils

<b>GL-1</b>	<b>Obsolete<sup>1)</sup></b>   Designates the type of service characteristic of manual transmissions operating under such mild conditions of low unit pressures and minimum sliding velocities, that untreated oil may be used satisfactorily. Oxidation and rust inhibitors, defoamers and pour depressants may be used to improve the characteristics of lubricants intended for this service. Friction modifiers and extreme pressure additives shall not be used.
<b>GL-2</b>	<b>Obsolete<sup>1)</sup></b>   Designates the type of service characteristic of automotive type worm-gear axles operating under such conditions of load, temperature and sliding velocities, that lubricants satisfactory for API GL-1 service will not suffice.
<b>GL-3</b>	<b>Obsolete<sup>1)</sup></b>   Designates the type of service characteristic of manual transmissions and spiral-bevel axles operating under mild to moderate to severe conditions of speed and load. These service conditions require a lubricant having load-carrying capacities greater than those that will satisfy APL-GL-1 service, but below the requirements of lubricants satisfying the API GL-4 service.
<b>GL-4</b>	Designates the type of service characteristic of spiral-bevel and hypoid gears in automotive axles operated under moderate speeds and loads. These oils may be used in selected manual transmission and transaxles applications.
<b>GL-5</b>	Designates the type of service characteristic of gears, particularly hypoids in automotive axles under high-speed and / or lowspeed, high-torque conditions. Lubricants qualified under U.S. Military specification MIL-L-2105 D (formerly MIL-PRF-2105 E and SAE J2360 satisfy the requirements of the API GL-5 service designation.
<b>GL-6</b>	<b>Obsolete<sup>1)</sup></b>   Designates the type of service characteristic of gears designed with a very high pinion offset. Such designs typically require (gear) score protection in excess of that provided by API GL-5 gear oils. The original API GL-6 test equipment is obsolete.
<b>MT-1</b>	Designates lubricants intended for non-synchronized manual transmissions used in buses and heavy-duty trucks. Lubricants meeting API MT-1 provide protection against the combination of thermal degradation, component wear, and oil seal deterioration which is not provided by lubricants meeting only the requirements of API GL-4 and API GL-5.

<sup>1)</sup> API categories GL-1, GL-2, GL-3 and GL-6 have been declared obsolete by the SAE Technical Committee 3 since 1995, yet lubricants of these varieties are still on the market.

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