

## SAE Grade

The Society of Automotive Engineers (SAE) Viscosity Grade is a system based on viscosity measures taken from a variety of tests. It developed 11 distinct motor oil viscosity classifications or grades: SAE 0W, SAE 5W, SAE 10W, SAE 15W, SAE 20W, SAE 25W, SAE 30, SAE 40, SAE 50 and SAE 60. These are single-grade or single-viscosity oils.

These grades designate the specific ranges that the particular oil falls into. The “W” indicates the grade is suitable for use in cold temperatures. (Think of the “W” as meaning “Winter.”) The classifications increase numerically, readily indicating the difference between them and what the difference means. Simply put, the lower the number, the lower the temperature at which the oil can be used for safe and effective protection. The higher numbers reflect better protection for high-heat and high-load situations.

**Think of the “W” in a motor oil’s classification as meaning “Winter.”**

Single-grade oils have a limited range of protection and, therefore, a limited number of uses.

With today’s well-refined, high viscosity index oils, however, an SAE 20 oil usually will meet the viscosity requirements of SAE 20W and vice versa. Those that do are classified SAE 20W-20.

This multi-grade or multi-viscosity ability increases an oil’s usefulness, because it meets the requirements of two or more classifications.

Examples of multi-viscosity oils are SAE 5W-30, SAE 10W-30, SAE 15W-40 and SAE 20W-50. The number with the “W” designates the oil’s properties at low temperatures. The other number characterizes properties at high temperatures. For instance, a multi-viscosity or multi-grade oil such as 10W-30 meets the 10W criteria when cold and the 30 criteria once hot. SAE 10W-30 and SAE 5W-30 are widely used because under all but extremely hot or cold conditions, they are light

enough for easy engine cranking at low temperatures and heavy enough to protect at high temperatures.

## API Class

The American Petroleum Institute (API) developed a classification system to identify oils formulated to meet the operating requirements of various engines. The API system has two general categories: S-series and C-series.

The **S-series service classification** emphasizes oil properties critical to gasoline- or propane-fueled engines. If an oil passes a series of tests in specific engines (API Sequence tests), the oil can be sold bearing the applicable API service classification. The classifications progress alphabetically as the level of lubricant performance increases. Each classification replaces those before it. SM oil may be used in any engine, unless the engine manufacturer specifies a “non-detergent” oil.

SA and SB are non-detergent oils and are not recommended for use unless specified.

Cars from model-years 1980 to 1989 require SF oils, while cars from model-years 1990 to 1993 require SG oils.

New cars beginning with the 1994 model year require oils with an API SH performance rating. Beginning with model-year 1997, new cars require an API SJ oil. The year 2001 brought the introduction of SL oils. SM category is the most recent classification. It was introduced Nov. 30, 2004. SM oils are designed to provide improved oxidation resistance, improved deposit protection, better wear protection and better low-temperature performance over the life of the oil.

SJ, SL and SM are the current API classes. SJ, SL and SM oils are widely available and ensure the best engine protection available.

**C-series classifications** pertain to diesel engines. They are: CA, CB, CC, CD, CD-II, CE, CF, CF-2, CF-4, CG-4, CH-4, CI-4, CI-4 PLUS and CJ-4. All are obsolete except CF, CF-2, CH-4, CI-4, CI-4 PLUS and CJ-4 performance rated oils.

Not all C-series classifications supersede one another. The current classifications, CF and CF-2 are specified for different applications.

**CF for Indirect-Injected Diesel Engine Service.** Service category CF denotes service typical of indirect-injected diesel engines and other diesel engines that use a broad range of diesel fuels in off-road applications, including diesel fuel with greater than 0.5 percent sulfur by weight. CF oils may be used in place of CD oils.

**CF-2 for Two-Stroke Diesel Engine Service.** This service category is typical of two-stroke engines requiring highly effective control over cylinder and ring-face scuffing and deposits. CF-2 oils may be used in engines for which CD-II oils are recommended.

**CH-4 for Four-Stroke Diesel Engine Service.** CH-4 is required for high-speed, four-stroke 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.

**CI-4 PLUS for Severe-Duty Diesel Engine Service.** CI-4 PLUS typically is required in high-speed four-stroke diesel engines used in heavy-duty on- and off-highway applications. CI-4 PLUS oils are especially effective in engines designed to meet 2002 exhaust emission standards. CI-4 PLUS oils may be used in place of CD, CE, CF, CF-4, CG-4, CH-4 and CI-4 oils.

**CJ-4 for 2007 and newer diesel Engines.** CJ-4 was developed to address special concerns about emission control engines and their operation on ultra-low-sulfur diesel fuel (ULSD).

These classification systems aim to help motorists choose the right oil for their needs. The choice depends on the engine, the outdoor temperature and the type of driving the engine must withstand.