



Date: 05/01/2006

Technical Service Bulletin

Product Description: AMSOIL 10W-30/SAE 30 Motor Oil (ACD and ASE)

Subject: Viscosity of Monograde and Multigrade Oils

OBJECTIVE:

To explain how certain AMSOIL engine oils can qualify for both monograde and multigrade viscosity ratings.

TECHNICAL DISCUSSION:

Oil Classification System

In selecting a proper engine oil, the vehicle owner must consider both the oil viscosity and the lubricant service requirements for the vehicle. To enable the owner to identify a proper oil, the vehicle manufacturers and the lubricant industry have developed a lubricant classification system (1).

When automobiles first appeared, attempts were made to identify motor oils. Viscosity was known to be one of the most important characteristics of an oil, and it was simply classified as light, medium or heavy, depending on its viscosity.

When more advanced instruments were made available to measure viscosity, the Society of Automotive Engineers (SAE) developed a better oil classification system. This system, known as SAE J300 (1), was first related to the kinematic viscosity at 100 °C as shown in the following table I.

This classification system was used for oil differentiation until the late 1960s. During this period of time, the lubricant oils were mostly prepared with mineral base stocks and had a very limited range of operation temperature. This led to the development of multi-grade engine oils which can be operated in a much wider temperature range.

Table I. Classification of Monograde Viscosity

SAE Viscosity Grade	Viscosity (cSt) At 100° C	
	Min	Max
20	5.6	Less than 9.3
30	9.3	Less than 12.5
40	12.5	Less than 16.3
50	16.3	Less than 21.9
60	21.9	Less than 26.1

Another way to classify the oil is to add the letter “W” behind the number. The “W” stands for winter and indicates that an oil is suitable for use in colder temperatures. The lower the number in front of the “W,” the better the cold temperature protection. This service classification mainly looks at the low temperature viscosity of the oil. For example, the following table lists the requirements of the low temperature cranking viscosity at different temperatures:

Table II. Low Temperature Viscosity

SAE Viscosity Grade	Cranking (cP) Max at temp °C
0W	6200 at -35
5W	6600 at -30
10W	7000 at -25
15W	7000 at -20
20W	9500 at -15
25W	13,000 at -10

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SAE 20 and SAE 20W are two totally separate monograde classifications. SAE 20 describes the high temperature viscosity of the oil and SAE 20W describes the low temperature cranking capability of the oil.

In order to allow engines to start at low temperatures while providing sufficient viscosity at high temperatures to protect engines against wear, multigrade oils were developed. An oil can be classified as a multigrade SAE 20W-20 if the oil can meet both the low temperature cranking viscosity of 4500 cP at -15°C and the 100°C high temperature kinematic viscosity requirement between 5.6 and 9.3 cSt.

Typically, a type of additive called Viscosity Modifier (VM) or Viscosity Index Improver (VII) is added to the base oil to achieve multigrade performance.

These types of organic polymer additives thicken the oil at high temperatures while having a minimal thickening effect at low temperatures. The addition of a viscosity modifier allows for the use of lower viscosity base oils to achieve the cold temperature requirements. The use of light weight petroleum oils increases oil volatility (burn-off), contributing to excessive oil consumption and oil thickening.

AMSOIL Heavy Duty Diesel Oil (ACD) and Small Engine Oil (ASE) meet multigrade viscosity requirements without the use of viscosity modifiers. This is accomplished through the use of naturally high viscosity index, wax-free synthetic oils. These oils meet both the low temperature requirements of SAE 10W and the high temperature requirements of SAE 30. Thus the products are true SAE 10W-30 and SAE 30 oils.

RECOMMENDATIONS

AMSOIL ACD and ASE 10W-30/SAE 30 engine oils can be used in any applications requiring a monograde SAE 30 or multigrade SAE 10W-30 engine oil with the performance specifications listed for each product.

AMSOIL ACD has a performance emphasis on heavy duty on-road diesels with an API CI-4 Plus rating, while it is also applicable for gasoline engines with its API SL rating.

AMSOIL ASE has a performance emphasis on small gasoline and diesel engines used for commercial service or by the homeowner. AMSOIL ASE carries the API SL rating for gasoline and API CF/CD rating for off-road diesels.

REFERENCES

1. Society of Automotive Engineers, Publication J-300, December 1999.

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