# Motor Oil Basics

## What a Motor Oil Must Do

- Aid Fuel Economy
- Permit Easy Start Up
- Lubricate and Prevent Wear
- Reduce Friction
- Protect Against Rust & Corrosion
- Keep Engine Parts Clean
- Cool Engine Parts
- Reduce Combustion Chamber Deposits
- Be Non-Foaming
- Seal Combustion Pressures

## How Motor Oil Becomes Contaminated

- Road Dust and Dirt
- Metal Particles
- Combustion Byproducts
    - Water
    - Acid
    - Soot and Carbon
    - Dilution from Unburned Fuel
    - Oxidation
    - Other Deposit Forming Substances

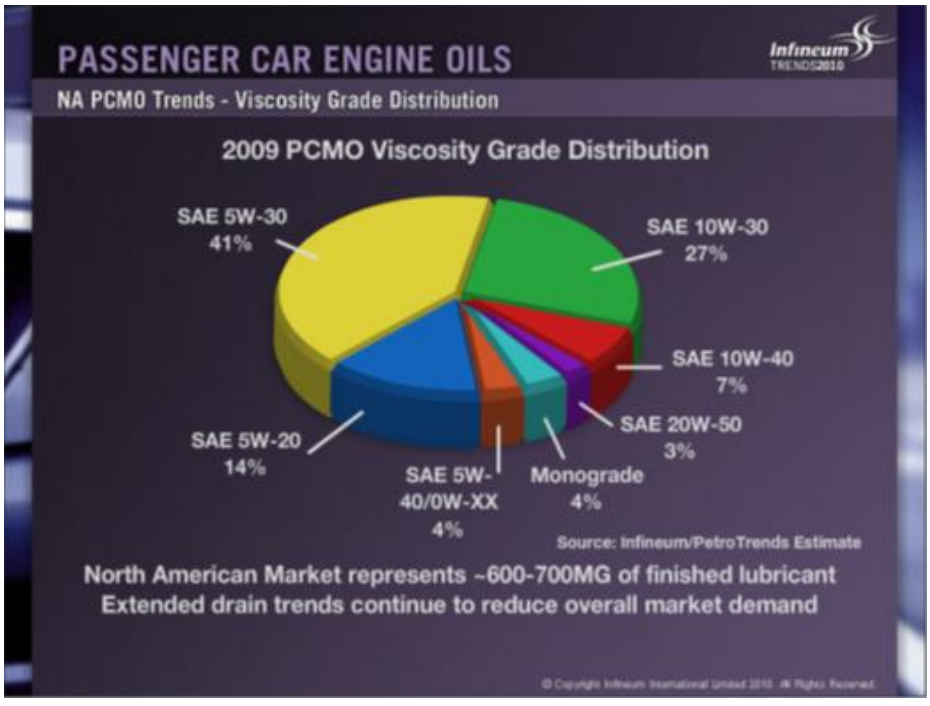

## Understanding a Motor Oil Label

The American Petroleum Institute Service Symbol “Donut”

- Divided into Three Parts
    - The top half describes the oil’s performance level
    - The center identifies the oil’s viscosity
    - The bottom half tells whether the oil has demonstrated resource conserving properties in a standard test in comparison to a reference oil.

# SAE Viscosity Grades

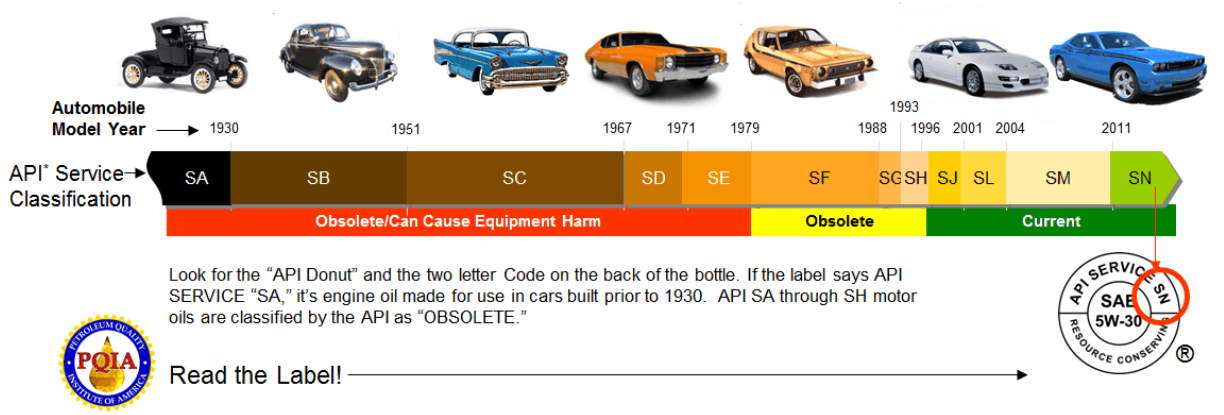
- One of the first steps in choosing a motor oil is to determine the appropriate SAE grade. The Society of Automotive Engineers (SAE) has devised a classification system based on viscosity measurement. Viscosity is the oil's ability to flow. When it is warm outside, the oil will flow more easily than when the outside temperature is cold – all oils thicken when the temperature drops. The proper viscosity ensures that the oil will flow to critical engine parts and reduce friction in the engine.
- The low-temperature viscosity (the first number or the 5W in a 5W-30 oil) indicates how quickly an engine will crank in the winter and how well the oil will flow to lubricate the engine parts in low temperatures. The lower the number, the more easily the engine will start in cold weather.
- The high-temperature viscosity (the second number or the 30 in a 5W-30) provides thickness, or body, for good lubrication at operating temperatures.
- The "W" stands for "winter" and indicates that the oil meets certain viscosity requirements for low temperature or winter operation.
- There are two types of SAE classifications: single-grade and multi-grade.
- A **single-grade** oil such as a SAE 30 has certain cold weather limitations. In very cold weather, it will not flow adequately to protect the engine.
- A **multi-grade** oil such as SAE 5W-30 can be used across a broad range of temperatures. These oils are widely used because they allow for easy starting and pumping at low temperatures; yet they are viscous enough at high temperatures to lubricate effectively. Most domestic, European and Japanese engine manufacturers recommend multi-grade oils. A multi-grade oil provides good flow capability for cold weather, but still retains thickness for high-temperature lubrication.



# Service Classifications

- The API Service Classification is a two-letter code starting with either an “S” for gasoline engines or a “C” for diesel engines. The second letter in the API service classification is very important as it effectively speaks to the model years the motor oil was formulated to serve. As an example, the very first classification was “SA” and these oils were designed to meet the requirements of cars built prior to 1930. The API “SA” service classification was followed by SB, SC, SD, SE, SF, SG, SH, SJ, SL, SM and the current level of API “SN”.

**API SERVICE CLASSIFICATION FOR PASSENGER CAR ENGINE OIL**






**Look for the API* “Donut” on the Label**

* American Petroleum Institute Service Classification

# ILSAC Rating

- In addition to an API Service Classification, an owner’s manual may also specify an International Standardization and Approval Committee (ILSAC) requirement such as GF-3, GF-4, and GF-5. ILSAC adds an extra requirement of fuel economy testing to its specifications. ILSAC GF-5 is the latest ILSAC standard. This standard applies to SAE 0W-20, 0W-30, 5W-20, 5W-30 and 10W30 viscosity grades