Introduction

- ILSAC defines lubrication specifications and licensing standards to meet the needs and requirements of the automotive industry and legislative bodies.
- ILSAC GF-6 is the upcoming engine oil standard for passenger vehicles and light trucks.
- ILSAC GF-6 has been pushed back several times, but first acceptable usage is expected to be in 2020.

The Need for ILSAC GF-6

- Corporate Average Fuel Economy (CAFE) requires passenger cars and light trucks to attain an average fuel economy of 54.5 mpg.
- Reducing greenhouse gas (GHG) emissions is a primary concern for legislators and car manufacturers.
- Lubricants tend to improve fuel economy by up to 3%, but with light-duty vehicles producing 60% of GHG emissions from the U.S. transportation sector, there is huge GHG emission reduction potential.
- Turbocharged/gasoline direct injection (T/GDI) engines have grown in popularity.
- Low speed pre-ignition is very common in T/GDI engines.
- Piston cleanliness and particulate matter reduction for overall longevity.

History of ILSAC

- Prior to ILSAC’s formation in 1992, engine oil standards were issued under the Tripartite System headed by the following organizations: API, SAE, and ASTM.
- The AAMA and the JASO founded the ILSAC in 1992 to meet industry needs in a timely manner.
- Tripartite System and ILSAC merged to form the Engine Oil Licensing and Certification System (EOCLS).
- Each member of EOCLS has different functions:
  - ILSAC sets minimum performance standards
  - SAE determines the needs of engine oil specifications based on automaker inputs and market trends
  - ASTM develops tests and parameters for each specification provided by SAE
  - API licenses and certifies the engine oil.

ILSAC GF-1

The ILSAC GF-1 standard indicates the oil meets both API SL and the Energy Conserving (EC) II requirements. It was created in 1996 and upgraded in 2000 and became the minimum requirement for oil in American and Japanese automobiles.

ILSAC GF-2

ILSAC GF-2 replaced GF-1 in 1999. The oil must meet both API SJ and EC II requirements. The GF-2 standard requires a minimum of 5,000 miles before the oil must be changed, low temperature operation, high temperature deposits and drain control.

ILSAC GF-3

An GF-3 oil on an oil must meet both API SL and the EC III requirements. The GF-3 standard has more stringent parameters regarding long-term effects of the oil on the vehicle emissions system, improved fuel economy and improved volatility, deposit control and viscosity performance. The standard also sets new additive degradation and corrosion rates over the service life at the oil.

ILSAC GF-4

ILSAC GF-4 is similar to the API SP service category, but it requires an additional Sequence VB fuel economy test (ASTM D4741).

ILSAC GF-5

Issued in October 2013 for 2014 and older vehicles, designed to provide improved performance of the engine and other systems, reduced engine oil control, improved fuel economy, extended emission control system compatibility, seal compatibility, and protection of engines operating on ethanol containing fuels up to 10%.

The Future of Lubricants

- First acceptable use of ILSAC GF-6 is expected in 2020.
- New lubricants are needed for changing engine technology.
- Solid-state lubricants may be an alternative to thining engine oils.

References


Future of Lubricants

- The two subcategories are intended to cover a wide range of vehicles including future ones.