

Chapter 1 | Introduction

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ASTM International Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants is responsible for standards for petroleum specifications and test methods [1]. The D02 committee and its various subcommittees have authored more than 800 standards and have developed specifications that provide for fuels with improved performance and environmental quality. A large number of parties and groups are interested in or affected by the specifications. These parties include regulators, producers, and users including:

- Federal and state regulators
- Producers, such as individual refiners
- Trade associations, such as the American Petroleum Institute, the American Fuels and Petroleum Manufacturers, and the Western States Petroleum Association
- Petroleum marketing organizations
- Additive suppliers
- Pipeline companies
- Vehicle and engine manufacturers using gasoline, diesel, aviation, and marine fuels
- General interest groups, consumer groups, and consultants

The focus of this manual is ASTM fuel specifications—the intent of the specification and the effect of fuel properties on performance and use. Many other countries have similar organizations that develop specifications—such as the Canadian General Standards Board (CGSB) with CGSB 3.5-2011 for gasoline, and CGSB 3.511-2011 and CGSB 3.512-2013 for ethanol blends, including subsequent amendments; and the European Committee for Standardization (CEN), the specifications of which are translated by country, including British Adopted European Standard BS EN 228 (UK, NF EN 228 [French equivalent of BS EN 228]) and others. These non-ASTM standards and similar international standards for gasoline, diesel, aviation fuel, and other petroleum products will not be discussed in this publication, except to make note of the intent.

Each product has a history of development for its intended use. Liquid hydrocarbons offer the best combination of energy content, availability, and price. The internal combustion engine of Nicolaus Otto that was built in 1876 used a fuel that predates the primary distillation product of crude oil, which was kerosine or coal oil for lamps. Electricity diminished the need for lamp oil, but Ford's Model T automobile

dramatically increased the demand for gasoline. Early aircraft engines were similar to those of automobiles and used the same fuels. By the early 1940s, turbine engines provided more power and required special aviation turbine fuels.

The expected performance of a fuel is achieved when the characteristics of the fuel match the fuel requirements for engines. Producers and engine manufacturers are mutually dependent partners. This relationship drove the fuels specifications until the later part of the twentieth century, when environmental requirements became a consideration in fuel characteristics for gasoline and diesel fuels and their respective engine designs. Producers and users of a product identify and control the properties necessary for satisfactory and reliable performance, particularly in aviation fuels. Diesel engines are used worldwide for transportation, manufacturing, power generation, construction, and farming. These engines vary in size and use. New environmental regulations have impacted the fuel, its distribution, and the respective engines in which the fuel is used.

Specifications represent the needs of the producer, user, and regulator for performance characteristics and environmentally friendly fuels. Specifications are constantly being updated to improve performance and to reflect changing environmental regulations. Committee D02 may have as many as 100 new standards registered as work items under development and additional standards registered for updates or revision. The information in this manual may be superseded by new regulations or advances in fuels or engine technology as new developments are introduced.

References

- [1] Earls, A., “Taking Fossil Fuels to the Next Level,” *ASTM Standardization News*, September/October 2014, pp. 30–34.