



Coffee Break Training - Fire Protection Series

Hazardous Materials: Fuel Oil Grades

No. FP-2011-39 September 27, 2011

Learning Objective: The student shall be able to explain the differences among the six grade designations of fuel oils.

Petroleum products are common fuel sources, but they are not necessarily interchangeable in oil-burning equipment. The fuel oil grade used in a burner must match the burner's rating and comply with the burner manufacturers' specifications.

The American Society for Testing and Materials (ASTM) prepared specifications for six grades of fuel oil. This classification system originally was based on early refining techniques and combustion engineering practices. Some specifications have changed over the years to reflect new refining practices and refinery byproducts.

The following table summarizes some of the characteristics of the different grades.



This protected aboveground tank in a parking garage contains diesel fuel, also known as Fuel Oil No. 2.

Fuel Oil No.	Characteristics
1	A volatile distillate oil intended for vaporizing pot-type burners. It is the refined kerosene fraction that boils off right after the heavy naphtha fraction used for gasoline. Other names include coal oil, stove oil, and range oil.
2	A distillate used for home heating oil, trucks, and some cars.
3	A distillate oil formerly used for burners requiring low-viscosity fuel. ASTM merged this grade into the Number 2 specification, and the term has been rarely used since the mid-20th century.
4	A commercial heating oil for burner installations not equipped with preheaters. It may be obtained from the heavy gas oil fraction during distillation.
5	A residual-type industrial heating oil requiring preheating to between 170 and 220 °F (77 to 104 °C) for proper atomization at the burners. This fuel is sometimes known as Bunker B.
6	A high-viscosity residual oil requiring preheating to between 220 and 260 °F (104 to 127 °C). Residual means the material remaining after the more valuable cuts of crude oil have boiled off. The residue may contain various undesirable impurities including 2 percent water and 0.5 percent mineral soil. This fuel may be known as residual fuel oil (RFO), by the U.S. Navy specification of Bunker C, or by the Pacific Specification of PS-400.



Eligible for Continuing Education Units (CEUs)
at www.nfaonline.dhs.gov

For archived downloads, go to:
www.usfa.dhs.gov/nfa/coffee-break/