Table 3. Commercial Standard Fuel Oil Specifications[a]

A. Detailed Requirements for Domestic Fuel Oils

Grade of Oil	Approx. Btu per Gal.[b]	Flash Point		Water and Sediment, Maximum	Pour Point,[c] Maximum	Distillation Test		Viscosity Maximum
		Min.	Max.			10% point, maximum	End point, maximum	
No. 1 Domestic Fuel Oil A light distillate oil for use in burners requiring a high grade fuel.	139,000	110 F or legal	165 F	0.05%	15 F	420 F	600 F	
No. 2 Domestic Fuel Oil A medium distillate oil for use in burners requiring a high grade fuel.	141,000	125 F or legal	190 F	0.05%	15 F	10% point, maximum 440 F	90% point, maximum 620 F	
No. 3 Domestic Fuel Oil A distillate fuel oil for use in burners where a low viscosity oil is required.	143,400	150 F or legal	200 F	0.1%	15 F	10% point, maximum 460 F	90% point, maximum 675 F	Saybolt Universal at 100 F 55 seconds

B. Detailed Requirements for Industrial Fuel Oils

Grade of Oil	Approx. Btu per Gal.[b]	Flash Point, Min. Max.	Water and Sediment, Maximum	Pour Point,[c] Maximum	Viscosity, Maximum
No. 4. Industrial Fuel Oil An oil known to the trade as a light fuel oil for use in burners where a low viscosity industrial fuel oil is required.	144,500	150 F. See Note[d]	1.0%	See Note[e]	Saybolt Universal at 100 F 125 seconds
No. 5 Industrial Fuel Oil Same as Federal Specifications Board specification for bunker oil "B" for burners adapted to the use of industrial fuel oil of medium viscosity.	146,000	150 F	1.0%		Saybolt Furol at 122 F 100 seconds
No. 6 Industrial Fuel Oil Same as Federal Specifications Board specification for bunker oil "C" for burners adapted to oil of high viscosity.	150,000	150 F	Water sediment 1.75% 0.25%		Saybolt Furol at 122 F 300 seconds

[a]Adapted from "Fuel Oils," p. 2, *U. S. Department of Commerce, Bureau of Standards, Commercial Standard CS12-33*, Washington, 1933.

[b]Government specifications do not give Btu per gallon, but they are noted here for information only.

[c]Lower or higher pour points may be specified whenever required by conditions of storage and use. However, these specifications shall not require a pour point less than 0 F under any conditions.

[d]Whenever required, as for example in burners with automatic ignition, a maximum flash point may be specified. However, these specifications shall not require a flash point less than 250 F under any conditions.

[e]Pour point may be specified whenever required by conditions of storage and use. However, these specifications shall not require a pour point less than 15 F under any conditions.

on a new set of specifications providing for definite limits for each grade. When these specifications are adopted, it is expected that the *National Board of Fire Underwriters* will retest all burners using oils of the maximum specifications for the grade so that if a burner is approved for a certain grade it will burn any oil meeting the specifications for that particular grade.

Several burners adapted to industrial use have recently been listed for automatic operation with No. 5 oil. Usually oils No. 5 or 6 require preheating for proper operation, but where conditions are favorable, No. 5 can be used without the equipment that this entails.

There are two reasons for the trend to lower grades of oil. While the lighter oils contain slightly more heat units per pound, the weight per gallon increases more rapidly than the decrease in heat units per pound, and oil is bought by the gallon. As a consequence, while a No. 1 oil may contain 139,000 Btu per gallon, oil No. 5 may test 146,000 Btu per gallon, or 6 per cent more. Usually there is a differential of 3 to 4 cents between the No. 1 and No. 5 oils, so that the economy of buying the heavier fuels is apparent; there remains the economic utilization of the heat content of the heavier oils.

The cost of oil fuel is dependent also upon the amount that can be delivered at one time, and the method of delivery. Common practice has split the tank of the truck delivering oils for domestic use into compartments of 150 to 500-gal capacity, and these *unit dumps* are made the basis of price. Where a truck can be connected to a storage-tank *fill* and quickly discharge its oil by pump, the price obviously can be less than where a smaller quantity must be drawn off in 5-gal cans and poured. For similar reasons an installation that can be supplied from a tank car on a siding provides for a lower unit fuel cost than one where the oil must be trucked, even in the large trucks holding 2,000 gal or more that are used for distributing the heavier oils.

GAS

Gas is broadly classified as being either *natural* or *manufactured*. Natural gas is a mechanical mixture of several combustible and inert gases rather than a chemical compound. Manufactured gas as distributed is usually a combination of certain proportions of gases produced by two or more processes, and is often designated as *city gas*.

When gas is burned a large amount of water vapor is produced as one of the products of combustion. This ordinarily escapes up the chimney, carrying away with it a certain amount of heat. However, when the heat value of gas is determined in an ordinary calorimeter, this water vapor is condensed and the latent heat of vaporization that is given up during the condensation is reported as a portion of the heat value of the gas. The heat value so determined is termed the *gross* or *higher* heat value and this is what is ordinarily meant when the heat value of gas is specified. The heat that is reclaimed by the condensation of the water vapor amounts to about 10 per cent of the total heat value. It is impractical to utilize the entire higher heat value of the gas in any house-heating appliance, because to do so it would be necessary to cool the products of