

TABLE 4. COMMERCIAL STANDARD FUEL OIL SPECIFICATIONS

A. Detailed Requirements for Domestic Fuel Oils

GRADE OF OIL	APPROX. B.T.U. PER GAL.	FLASH POINT, MIN. MAX.	WATER AND SEDIMENT, MAXIMUM	* POUR POINT, MAXIMUM	DISTILLATION TEST		VISCOSITY MAXIMUM
No. 1 Light Domestic Fuel Oil A light distillate oil for use in burners requir- ing a high grade fuel.	139,000	110°F 165°F or legal	0.05%	15°F	10% point, maximum 420°F	End point, maximum 600°F	
No. 2 Medium Domestic Fuel Oil A medium distil- late oil for use in burners requir- ing a high grade fuel.	141,000	125°F 190°F or legal	0.05%	15°F	10% point, maximum 440°F	90% point, maximum 620°F	
No. 3 Heavy Domestic Fuel Oil A distillate fuel oil for use in burners where a low viscosity oil is required.	143,400	150°F 200°F or legal	0.1%	15°F	10% point, maximum 460°F	90% point, maximum 675°F	Saybolt Universal at 100°F 55 seconds

*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 deg. Fahr. under any conditions.

B. Detailed Requirements for Industrial Fuel Oils

GRADE OF OIL	APPROX. B.T.U. PER GAL.	FLASH POINT, MIN. MAX.	WATER AND SEDIMENT, MAXIMUM	POUR POINT, MAXIMUM	VISCOSITY, MAXIMUM
No. 4. Light Industrial Fuel Oil An oil known to the trade as a light fuel oil for use in burners where a low vis- cosity industrial fuel oil is required.	144,500	150°F. See Note b	1.0%	See Note c	Saybolt Universal at 100°F 125 seconds
No. 5 Medium Industrial Fuel Oil Same as Federal Specifications Board Specification for Bunker Oil "B" for burners adapted to the use of indus- trial fuel oil of medium viscosity.	146,000	150°F	1.0%		Saybolt Furol at 122°F 100 seconds
No. 6 Heavy 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

bWhenever 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 deg. Fahr. under any conditions.

cPour point may be specified whenever required by conditions of storage and use. However, these specifications shall not require a pour point less than 15 deg. Fahr. under any conditions.

monly of 550-gal, 1000-gal and 1500-gal capacities, and the proper size is largely a matter of local conditions. Usually liquid fuel can be bought in 500-gal *dumps* or 1000-gal *dumps* at a saving of $\frac{1}{2}\text{¢}$ to 1¢ over the price for deliveries of lots under 500 gal. The annual saving easily can be estimated and can be used to determine the desirability of the larger and more expensive tank. Another factor is the ease with which oil can be obtained. In and near the larger centers oil trucks are passing many homes daily, and there is not the necessity for maintaining a large reserve that exists where the home is in a rural district with the possibility of material delay due to distance from fuel station or road conditions.

Copper tubing, varying in diameter from $\frac{1}{2}$ in. to 1 in. is coming into use for connecting the burner and tank. The essential advantage is that a single length can be used, practically eliminating the possibility of air or oil leakage, the former perhaps, of more importance than the latter. Newly developed and extremely rugged compression fittings are used at the ends of the tubing. The cost of using this tubing is approximately the same as where iron pipe is used, the difference in material cost of the copper being neutralized by the reduced labor cost.

Oil Burners

For information on oil burners, refer to Chapter 18.

GASEOUS FUELS

Gas is a desirable fuel because of the ease with which it can be handled and controlled, but its use has been limited on account of its higher cost. Gaseous fuels are broadly divided into *natural* and *manufactured*.

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 combustion down below their dew-point, which is ordinarily in the neighborhood of 130 F.

Natural Gas is becoming increasingly available, and is also being used to enrich manufactured gas, with or without undergoing treatment to render it best suited for that purpose. Table 5 shows typical values for the three main fields, although that from any one field varies materially.

Manufactured Gas. Table 5 also lists the more common manufactured gas as made by various processes. 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*. Most states have legislation which controls the distribution and fixes a minimum limit to the heat content. This gross or high calorific value usually ranges between