8 ● What is the purpose of atomization?

Atomization is used to increase the surface area of the oil in order to facilitate putting it into a vaporous state so it may burn.

9 ● Is the furnace of much importance in oil burning?

In most cases it is very important. It is the function of the oil burner to supply the air and fuel in correct proportions; the furnace must provide heated space for proper mixing and combustion.

10 ● Which flame is considered better, the luminous or the non-luminous?

Laboratory tests show that they are equally efficient in the usual installation.

11 ● What main precaution is necessary in choosing a boiler for an oil burner?

Since the burner output is usually varied through a wide range under control of the thermostat, a boiler should be provided with enough indirect heating surface to absorb the heat as it is released. The combustion space must be large enough, and have correct proportions for mixing fuel and air at high temperatures. If oil is used inefficiently high heating costs will result.

12 ● How should oil burner adjustments be made?

Adjustments should be made by an experienced man who uses a gas analysis apparatus to determine the CO_2 content.

13 ● What CO_2 content should be attained in oil burning?

Ten per cent CO_2 is considered good practice, for it indicates the supplying of 50 per cent excess air.

14 ● What maximum heat release is considered good practice in oil burning?

A heat release of 38,000 Btu per cubic foot per hour is considered to be the maximum for average large installations. This figure has been greatly exceeded in some cases. The design of the combustion chamber, as to impingement of flame and as to proper mixing at high temperatures, has much to do with the attainable heat release.

15 ● Name five types of gas-fired space heaters.

a. Parlor furnaces or circulators.
b. Radiant heaters.
c. Gas-fired steam or hot water radiators.
d. Warm air radiators.
e. Garage heaters.

16 ● How are gas heating units rated?

Gas-fired units are rated on the basis of output in Btu per hour.

17 ● What safety consideration is noted in establishing the ratings of gas-fired units?

The rating is limited by the amount of gas that can be burned without the liberation of harmful amounts of carbon monoxide.

18 ● List some factors which might account for possible economies of stoker firing over hand firing.

a. The regular feed of coal instead of the intermittent feed.
b. The use of cheaper sizes and grades of fuel.
c. The absence of door openings for firing purposes, which avoids the admission of cold excess air.
d. The avoidance of overheating because the stoker responds quickly to automatic equipment controlled by the heat demand.

Chapter 29

HEAT AND FUEL UTILIZATION

Total Heat Loss Requirements, Utilization Factors, Degree-Day Methods, Base Temperature Determinations, Steam Consumption of Buildings, Fuel Consumption, Maximum Demands, Load Factors

THE hourly heat loss (H) is equal to the sum of the transmission losses (H_t) and the infiltration losses (H_i) of the rooms or spaces to be heated. The total equivalent heating surface required is equal to $\frac{H}{240}$ sq ft.

In estimating the fuel consumption of a building of more than one room divided by walls or partitions, it is not correct to use the calculated heat loss of the building without making the proper allowances for the fact that the heating load at any time does not involve the sum of the infiltration losses of all the heated spaces of the building but only part of the infiltration losses. This is explained in Chapter 6.

It is sufficiently accurate in most cases to consider only half of the total infiltration losses of a building having interior walls and partitions. The value of H in Equation 1 would, under these conditions, be equal to $H_t + \frac{H_i}{2}$. In some cases, where the building has no interior walls or partitions, the infiltration losses are calculated by using only half of the total crack. In this case the entire infiltration loss should be considered.

The heat required to warm the cold building and contents is a factor to be considered. Under certain conditions the cooling of the structure and contents will, to some extent, compensate for the heat required to rewarm the building. For example, if the building is under thermostatic control and the day and night temperatures are, 70 F and 50 F respectively, there will be a period during which no heat will be added while the building is cooling to 50 F, and the saving resulting therefrom will correspond to the additional heat required to bring the building and contents back to the daytime temperature.

ESTIMATING FUEL CONSUMPTION

There are two methods in use for estimating heat or fuel consumption. One method is theoretical, based on a calculated heat loss and assuming absolute constant temperatures for very definite hours each day throughout the entire heating season. It does not take into account factors which are difficult to evaluate such as opening of windows, abnormal heating of the building, sun effect, poor heating systems, etc.