

18 • What control equipment is essential in the usual oil burner installation?

See Chapter 14. Usually a room thermostat, a limiting device to prevent the pressure or temperature from exceeding a desirable limit, a shut-off device to guard against failure of flame ignition, and in steam or hot water boilers a low water protective device.

19 • In the construction of gas-fired garage space heaters, what special precaution must be taken?

A safety screen must be placed over each opening into the combustion chamber to prevent explosions of any possible gasoline vapors.

20 • List some factors which might account for possible economies of stoker firing over hand firing.

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

Chapter 29

FUEL UTILIZATION

Heat Loss, Calorific Values, Heating Efficiencies, Non-Heating Periods, Heat Capacity of Buildings, Miscellaneous Factors, Degree-Day Method, Rough Approximations, Relative Heating Costs

TO predict the amount of fuel likely to be consumed in heating a building during a normal heating season, it is necessary to know the total heat requirements of the building and the utilization factor of the fuel. The accuracy of the estimate will depend on the ability to select these values and on the care taken in making allowances for other variable factors.

Fuel requirements¹ are given by the following general equation:

$$F = \frac{H \times (t - t_a) \times N}{(t - t_o) \times C \times E} \quad (1)$$

where

F = quantity of fuel required for a heating season.

N = number of hours of heating season.

t = inside temperature, degrees Fahrenheit.

t_a = average outside temperature, degrees Fahrenheit.

t_o = outside design temperature, degrees Fahrenheit.

H = calculated heat loss of building based on outside temperature of t_o , Btu per hour.

C = calorific value of one unit of fuel, the unit being the same as that on which F is based.

E = efficiency of utilization of fuel, per cent.

HEAT LOSS

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, and 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 allowance for the fact that the heating load at any time does not involve the sum of the infiltration losses of all of 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, and the value of H in Equation 1 would, under these conditions, be equal to

¹For further information on this subject see Estimating Fuel Consumption, by Paul D. Close, (*Heating Piping and Air Conditioning*, May, 1931).