

It should be noted that the figures in Table 3 are for the heating season only and include steam for heating domestic water.

Example 1 solved by the degree-day method and using values taken from Table 3 would show a higher steam consumption.

Example 2. Factor for steam consumption for a manufacturing building per M Btu per hour heat loss per degree-day = 0.283; total number of degree-days per year (Table 1) = 4855; heat loss = 500,000 Btu per hour.

Solution. $0.283 \times 4855 \times 500 = 686,982$ lb of steam per year. This calculation results in an estimate 36 per cent higher than the previous calculation and one which would be more nearly correct for actual practice.

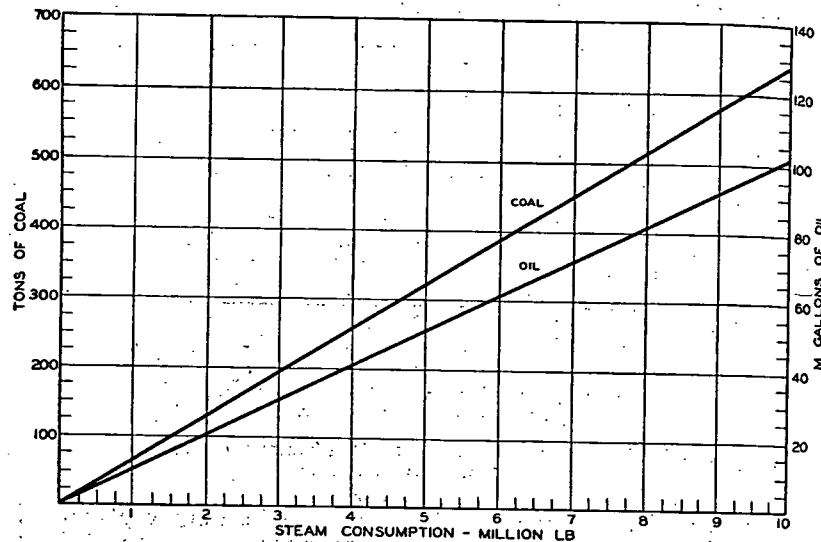


FIG. 2: CURVE FOR ESTIMATING FUEL CONSUMPTION FOR VARIOUS KNOWN STEAM CONSUMPTION^a

^aThis curve is based on heating efficiencies of 60 to 70 per cent for coal and oil, respectively, a calorific value of coal of 13,000 Btu per pound, a calorific value of oil of 140,000 Btu per gallon.

In case the heat loss figure is not known this method of estimating heat or steam consumption can also be applied if the net heated space figure is available.

CALCULATION OF FUEL CONSUMPTION

After the heat and steam consumption of the building have been calculated, the corresponding fuel requirements may also be estimated by assuming the correct boiler and furnace efficiencies. If the building is to be supplied with steam from a district heating company, the steam consumptions as calculated by the two Methods are generally assumed to be correct. However, if the steam is to be supplied from an individual boiler

unit, the consumption should be assumed as from 10 to 20 per cent greater. One reason for this difference in steam consumption is that district steam is a metered service, and building managers are therefore more conscious of their heating costs, which generally results in better maintained heating systems. Also, the district steam service is usually installed with thermostatic control which reduces overheating to a minimum.

Fig. 2 shows the amount of coal or oil that may be estimated when the steam consumption is known. Assuming the steam consumption that

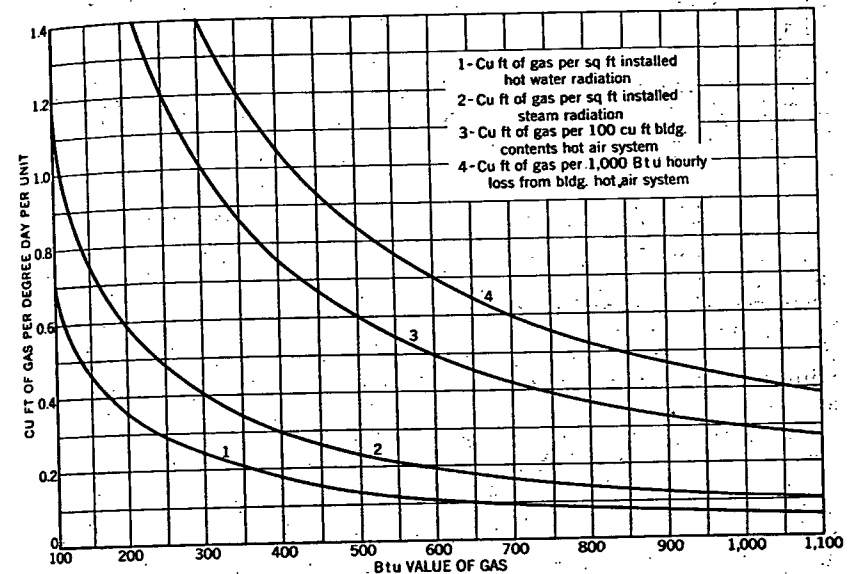


FIG. 3. CHART GIVING GAS REQUIREMENTS PER DEGREE-DAY FOR VARIOUS CALORIFIC VALUES OF GAS AND FOR DIFFERENT HEATING SYSTEMS^a

^aThis chart is based on an inside temperature of 70 F and an outside temperature of zero. If the radiation is installed on the basis of any other temperature difference, multiply the result obtained from this chart by 70, and divide by the actual temperature difference. From *Industrial Gas Series House Heating* (third edition) published by the American Gas Association.

was calculated in Example 2, 686,982 lb, the corresponding coal consumption, from the curve, is 44 tons and the oil consumption 6000 gal.

Fig. 3 indicates the average gas consumption per degree-day for various heat contents. While the fuel consumption in individual cases may vary somewhat from the curve values, these average values are sufficiently accurate for estimating purposes and give satisfactory results.

The value generally used in the manufactured gas industry for residences is 0.21 cu ft per degree-day per square foot of equivalent steam radiation (240 Btu) based on the theoretical requirements. A correction for warmer climates is necessary and it is customary to gradually increase the relative fuel consumption below 3000 degree-days to about 20 per cent more at 1000 degree-days.