

1091.8 = enthalpy of saturated water vapor at a temperature of 70 F, Btu per pound.

M = humidity ratio of combustion air, pounds of water vapor per pound of dry air.

w_a = weight of combustion air per pound of fuel used, pounds, from Equations 1, 2, 8, and 9.

C = weight of carbon burned per pound of fuel corrected for carbon in ash, pounds.

$$C = \frac{WC_a - W_a C_a}{100W} \quad (15)$$

where

C_a = percentage of carbon in the fuel by weight from the ultimate analysis.

CO , CO_2 = percentages of CO , CO_2 in flue gases by volume.

W_a = weight of ash and refuse, pounds.

C_a = per cent of combustible in ash by weight (combustible in ash is usually considered to be carbon).

W = weight of fuel used, pounds.

The flue gas losses listed as items 2, 3, and 4 of the heat balance may be determined with considerable accuracy from the curves shown in Fig. 1² in many cases. The values of the losses plotted for fuel oil were computed from the ultimate analysis of a typical fuel oil used in domestic burners, while those plotted for the several ranks of coal were computed from the typical ultimate analyses shown in Table 1. The curves for medium volatile bituminous coal may be used for high volatile bituminous coal with negligible error. No curves are shown for gaseous fuel because various natural gases and manufactured gases vary considerably in their composition.

FIRING METHODS FOR ANTHRACITE

An anthracite fire should never be poked or disturbed, as this serves to bring ash to the surface of the fuel bed where it may melt into clinker.

Egg size is suitable for large fire-pots (grates 24 in. and over) if the fuel can be fired at least 16 in. deep. For best results this coal should be fired deeply.

Stove size coal is the proper size of anthracite for many boilers and furnaces used for heating buildings. It burns well on grates at least 16 in. in diameter and 12 in. deep. The fuel should be fired deeply and uniformly.

Chestnut size coal is in demand for fire-pots up to 20 in. in diameter, with a depth of from 10 to 15 in.

Pea size coal is often an economical fuel to burn. When fired carefully pea coal can be burned on standard grates. Care should be taken to shake the grates only until the first bright coals begin to fall through the grates. The fuel bed, after a new fire has been built, should be increased in thickness by the addition of small charges until it is at least level with the sill of the fire-door. A satisfactory method of firing pea coal consists of drawing the red coals toward the front end and piling fresh fuel toward the back of the fire-box.

Pea size coal requires a strong draft and therefore the best results generally will be obtained by keeping the choke damper open and regulating solely by means of the cold air check and the air inlet damper.

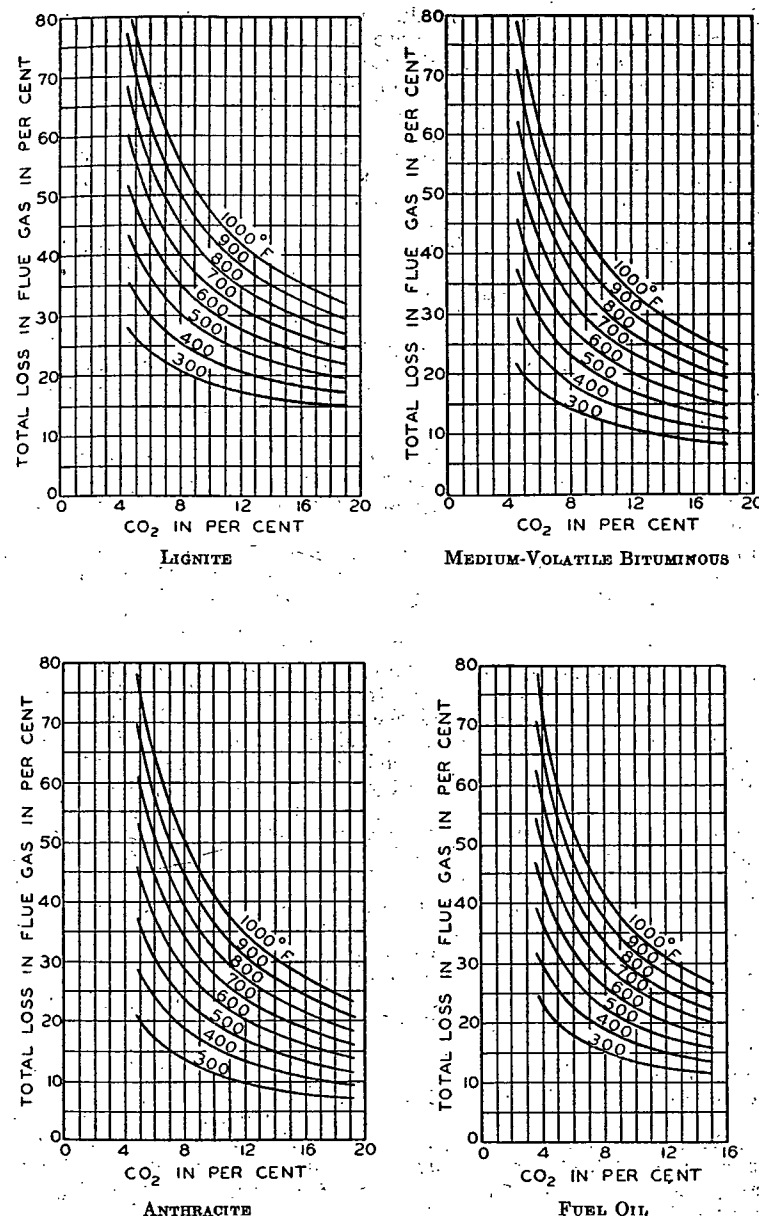


FIG. 1. FLUE GAS LOSSES WITH VARIOUS FUELS