

Some burners are adjusted for oil rate by means of a blind needle valve that can only be operated with a special wrench; others by changing the size of the orifice; others by a combination of orifice size and pressure. In any event, changes in the firing rate, involving careful air and draft adjustment to match the oil rate, should only be made by a trained man, preferably with the aid of an Orsat test set so that the degree of combustion efficiency can be determined. It is practically impossible to set a burner flame by eye, although that has been general practice in the past. The industry is turning to the Orsat and, as a result, more domestic burners are operating at from 9 per cent to 12 per cent CO_2 , representing a higher efficiency combustion than at 5 per cent to 8 per cent, as frequently is the case where the burner is adjusted by eye.

It is essential that the basement, or at least that portion used as a boiler room, be open to the outside air, in order that sufficient air be available for combustion. Frequently a case of poor operation will be found where a test with a draft gage made by inserting the tube through the keyhole of the outer door will show that there is a partial vacuum in the basement when the burner is running, all of the combustion air coming through the keyhole and minute cracks. A simple remedy is to cut an inch from the bottom of the outer door.

Service and Adjustment of Burner

In order to achieve satisfactory heating at the lowest cost, careful consideration should be given to oil, air and draft adjustment. The oil adjustment should be determined from the total heat requirements to be met. The heat loss of the building plus an allowance for piping plus 20 to 25 per cent for pick-up establishes the maximum output required from the boiler. Fig. 1 indicates the oil required in gallons. Piping allowances will usually vary between 25 and 10 per cent, decreasing with an increase in the size of the building.

With the oil rate thus fixed, the air and draft should be set to give efficient combustion (that is, 10 to 12 per cent CO_2). The furnace draft should be set reasonably low and should be maintained constant by means of an automatic draft regulator. Without this the air supply will fluctuate, causing uneven performance. A check should be made to insure that ignition will be satisfactory under all conditions. An oil burner of the continuous type might dispense with all or part of the pick-up allowance due to the nature of its operation. Careful adjustment will provide ample heat output under all conditions, will minimize the load on the boiler and will establish the most favorable conditions for intermittent operation.

An essential element in the satisfactory operation of domestic oil burners is the provision for maintenance and service for the burners. What might be called *emergency service* for mechanical or electrical failure of the burner has rapidly diminished during the last few years until a level has been reached where groups of 100 to 1000 burners in a community consistently will require an average of not more than one call per burner per heating season. Maintenance service is coming into general practice where, for a fixed annual payment, regular inspection is made of the burner, and faulty operation corrected before the burner becomes inoperative. This service may contemplate entire overhauling of the burner during the Summer,

and may include annual cleaning of the boiler flues with a specially designed vacuum cleaner.

COMMERCIAL OIL BURNERS

Liquid fuels are used for heating apartment buildings, hotels, public and office buildings, schools, churches, hospitals, department stores, as well as industrial plants of all kinds. Contrary to domestic heating, convenience seldom is a dominating factor, the actual net cost of heat production usually controlling the selection of fuel. Some of the largest office buildings have been using oil for many years. Many department stores have found that floor space in basements and sub-basements can be used

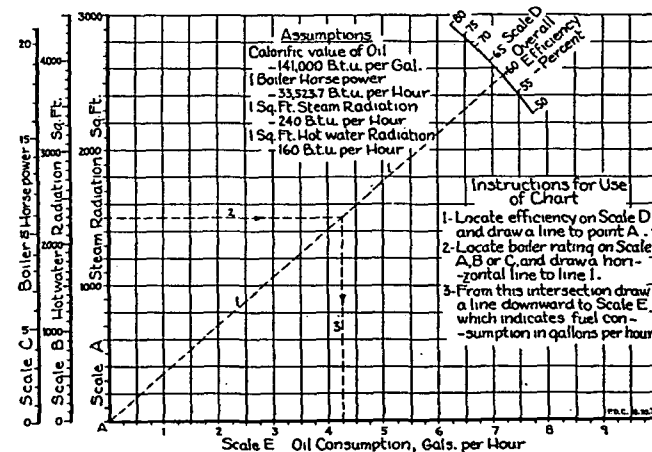


FIG. 1. FULL LOAD RATE OF OIL CONSUMPTION FOR HEATING BOILERS

to better advantage for merchandising wares, and credit the heat producing department with this saving.

Wherever possible, the boiler plant should be so arranged that either oil or solid fuel can be used at will, permitting the management to take advantage of changes in fuel costs if any occur. Each case should be considered solely in the light of local conditions and prices.

Burners for commercial heating may be either large models of types used in domestic heating, or special types developed to meet the conditions imposed by the boilers involved. Generally speaking, such burners are of the mechanical or pressure atomizing types, the former using rotating cups producing a horizontal torch-like flame. As much as 350 gal of oil per hour can be burned in these units, and frequently they are arranged in multiple on the boiler face, from two to five burners to each boiler.

The larger installations are nearly always started with a hand torch, and are manually controlled, but the use of automatic control is increasing and completely automatic burners are now available to burn the two