In selecting burner sizes the total load imposed upon the boiler and thence upon the burner should be carefully determined. This load should be determined in accordance with the method for determining the load on any boiler as outlined in preceding chapters.

The same allowance for hot water heaters should be made as for ordinary boiler practice and the same precaution should be followed in insulating the boiler and piping.

Draft is a matter of importance, since the quantity of air introduced by the very essential motor driven burner fan, must have adequate opportunity to pass freely into the stack. The standard practice of assigning an individual flue to the heating boiler should be strictly adhered to.

Oil burners with their frequent periods of idleness, and the consequent elimination of needless fuel consumption, do not always impart sufficient heat to ordinary water coils in the fire-pot of heating boilers.

Where vapor or steam is used, any of the boiler water-heating units that connect into the boiler below the water-line, thus heating the storage tank, should be used. In hot water heating plants, larger coils are necessary.

In studying the burner equipment itself, attention should be given to the stability of the burner manufacturer and that of his local distributor. The reputation of the burner in past performance is of equal importance. The simplicity and quality of the mechanical construction should be studied and the element of noise, must be given attention.

A burner listed as standard by the Underwriters' Laboratories, may be considered as having been built-up standards.

The problem of oil storage is relatively simple, since all the fuel may be stored in tanks buried outside. One-thousand gallon tanks of 3/16 in. steel seem to be most popular although the two and three thousand gallon sizes are coming into considerable favor. In estimating the size of storage tank it is well to remember that 170 gal. of oil is approximately equivalent to 1 ton of coal.

Inquiry should be made as to the available truck capacities before selecting tank sizes, as the tank should be large enough to accommodate an entire truck-load of oil, while still containing a "working balance."

Local ordinances should be strictly adhered to. Some cities require that a buried tank shall be at least 2 ft. beneath the surface of the ground and at least five feet from a building wall. Others provide that a line drawn at 45 degrees from the junction of the basement floor and the building wall, shall not touch the tank.

The tappings, 2½ in. fill, 1 in. vent and 1 in. oil suction, should all be in the top of the tank. Manholes, oil return lines and steam coils are unnecessary in tanks for the kind of oil suitable for residential work.

In the low-priced burners utilizing basement auxiliary tanks, such tanks should be at least 10 ft. from the nearest fire; they should be replenished by hand pumps connected to the main oil tank buried outside. Where no outside storage is provided, these auxiliary tanks should be filled and vented outside, and should also be provided with a tight-fitting, float gage, so that if the tanks are over-filled, there can be no spilling of oil in the basement.

CHAPTER XII

GAS HEATING

THE increase in the use of gas for house heating has been a great stimulus to the development of highly efficient gas burning appliances. Gas-burning heating installations as the sole source of heat for residences, factories, and public buildings (formerly limited to those localities where there was an abundant supply of cheap gas) are taking a more prominent place in coal-burning regions.

Gas-burning heating appliances present an opportunity for the realization of nearly ideal efficiencies in combustion and heat transmission. Full advantage must, however, be taken of the inherent efficiency of such appliances and every effort made to retain this efficiency, for it is only on this basis that gas can compete with coal.

TYPES OF GAS HEATING APPLIANCES

Gas-burning heating appliances may be classified as those for heating individual rooms; and central heating plants, heating an entire residence or other building. Each classification may be subdivided as follows:

1. Room Heaters
   - *a* Reflector Heaters (luminous flame)
   - *b* Radiant Heaters (blue flame)
   - *c* Gas Logs (blue flame)
   - *d* Tubular and Cylindrical Radiators
     - (a) Floor Furnaces
   - *e* Gas Fired Steam Radiators
     - (a) Bungalow type hot water systems

2. Central Heating plants
   - *a* Warm Air Furnaces
   - *b* Steam Heating plants
   - *c* Water Heating plants

COMBUSTION OF GAS

In the above classification it will be seen that some heaters are designated as *luminous flame* or *blue flame*. This distinction comes from the type of burner used. Gas burners are of two general types: Luminous flame burners, and the more widely used Bunsen or blue flame type. Each type of flame has its own field of usefulness; and if combustion is complete, and the flame properly applied, each will deliver the same amount of heat from a given quantity of gas. Gas requires for complete combustion air in the proportion of about 1 cu. ft. for each 110 B.t.u. of gross heat value. The two flames differ in the manner in which this air is supplied for combustion. If gas is forced directly into the atmosphere through a small hole, the air required for combustion is drawn into the

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