

Tables 1 and 2 are based on the house being of ordinary sound construction and tightly glazed with double thick glass.

POSITION OF RADIATION

Greenhouses are piped in all sorts of ways to suit the great number of different ideas of greenhouse owners and operators; the location and arrangement of the piping are governed largely by the plant bench or plant bed arrangement, suiting the special requirements of the plants or flowers to be grown in the houses. In houses for vegetable growing, where planting is directly on the floor of the greenhouse, piping should be mainly, and if possible, entirely, on the sides so as to provide the maximum growing surface. For rose growing the piping should be more scattered or distributed than for any other purpose—if there are raised benches, some heating surface must be under every bench; if there are solid beds, some radiating surface must be in every walk.

The bulk of the piping for all purposes, however, should be on the side walls, or just inside the outer walls of the greenhouse. For sweet pea growing, most of the pipe surface should be on the side walls and some on the pipe columns, generally high enough to permit walking under. There is much latitude, however, in the placing of pipe coils.

AIR CIRCULATION

Recent experience shows that proper air circulation and conditioning greatly accelerates the growth of most plants and also prevents the growth of spores and moulds. This is accomplished by the use of proper mechanical apparatus for supplying and exhausting the air and for controlling its temperature and humidity.

CHAPTER XIII

DOMESTIC AND INDUSTRIAL OIL BURNING

Data on Fuel Oils, Types of Burners, Automatic Control, Installation Data, Costs to Operate, Domestic Heating, Industrial Heating.

IT is the purpose of this chapter to give the essential data on the equipment and methods to be employed in the use of oil as a fuel for heating and industrial services.

There is claimed for liquid fuel, the advantages of space for storage, simplicity in location of storage adjacent to boilers and means of transportation from the remote points of storage to boiler, reduction in labor and handling of fuel, the elimination of ash removal, ease of control of furnace temperatures, and the elimination of the expense of banked fires. Each case, however, where the liquid fuel is contemplated, will have, of necessity, to stand on its merit. The operating cost both with oil and other fuels must be figured and the user will have to evaluate the extra convenience, after which a decision can be made as to what type of fuel should be used.

In the selection of burner equipment and in the determination of storage facilities, it is well to decide what grade of oil is to be used, its Baume' gravity, viscosity, flash point, and cold test, or temperature at which it will cease to be fluid.

The uniform fuel oil specifications of the *American Oil Burner Association* classify fuel oils according to Table 1.

The furnace oils are used primarily for domestic purposes and do not require pre-heating. The fuel oils with the exception of No. 4 are viscous at normal temperatures and require pre-heating for satisfactory operation. For commercial oil burning oil No. 6 is used when available because of its higher heat content and lower price. Installations for the heavy oil and the labor to operate cost more than those for furnace oils but the lower price and higher heat contents frequently justify their use.

Fig. 1 gives the heat contents of various quality oils, per pound and per gallon.

DOMESTIC OIL HEATING

With the large number of domestic oil heating units that are available, it is important to look into the construction of the burner as to design, workmanship and materials, but one of the most important points to be kept in mind is the ability of the man making the installation and adjusting the burner to meet the needs of each application and to give the proper service to the installation. Further considerations in making a choice are the adaptability of the particular burner to the boiler, its

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