METHOD OF APPLICATION

In order that ozone may be made from properly conditioned air it becomes necessary to produce it in relatively high concentrations, which are introduced into the fan intake where mixing and dilution to proper strength is accomplished. The highly concentrated ozonized air is conducted in either brass or aluminum pipe from the ozone generators to the ventilating fan, the pressure required for delivering it being supplied by the blower furnished with the ozone machine. It is best to locate the ozone machine as near the ventilating fan as practical and in no case should the friction of the ozone delivery pipe exceed one pound per square inch. For typical layout, floor space, electric service, etc., covering general ventilating practice, refer to the catalog data section. It is frequently advisable to interlock the operation of the ozone machine with the ventilating fan so that the starting and stopping of the fan also starts and stops the ozone machine automatically. When the respiratory load (*i.e.* number of people occupying the ventilated spaces) is subject to wide and rapid variation, it is advisable to provide means for both observing and controlling the quantity of ozone being produced, at some point convenient to the ventilated spaces, so that an attendant can synchronize the ozone production with the respiratory duty of the system. This is particularly advisable for restaurants, theaters, dance halls and the like.

When a number of ventilating fans in one building are grouped so that all may be supplied from one ozone machine, a multi-unit ozonizer should be employed, thus centralizing the equipment and permitting the use of a common air drying plant. These multi-unit assemblies should be so designed that each unit can be controlled independently and remote control of ozone output as well as automatic synchronism with the operation of the ventilating fan can be provided for each unit of the assembly.

Ozone machines should be provided with an indicating ozone meter for registering the quantity of ozone being produced at any instant. This meter should be operated by the net electrical energy input, as meters operating on pressure or current are unreliable and frequently misleading.

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CHAPTER 31

SPECIAL HEATING AND VENTILATING APPLICATIONS

Brief Summary of Special Factors to be Considered for Greenhouse Heating; Barn Ventilation; Government Buildings; Cold Storage Warehouses; Schoolhouses; Spray Booths; Pressing Rooms and Libraries.

GREENHOUSE HEATING

It is important that the heat shall be defused evenly, that there shall be no high-velocity air currents, especially for flowers, and that no rapid temperature fluctuation shall be permitted.

Steam and hot water systems both are used in greenhouse heating. Electrically propelled unit heaters have been used with good results. Unfortunate results occasionally are encountered with all of these different kinds of apparatuses.

Table 1 gives the usual temperatures required in greenhouses. The heat losses from greenhouses are computed the same as are the heat losses from other types of building. The service is for 24 hours per day, and the peak demand occurs when the weather is cold and there is no sunshine, as at night. Leakage of air through cracks in the glass frames is not serious since in cold weather these freeze due to condensation, and seal tightly with ice. The boiler in a greenhouse must always be selected on the basis of the heat demand and will seem large in proportion to the square feet of radiation, since greenhouse radiators or convectors usually are highly efficient. The piping, where direct heaters are used, is designed usually with a view to the kind of plants to be grown, though there is some tendency to use side wall and free hanging overhead heating surface in preference to piping under the plant benches.

It is probable that there are more low-pressure steam heating systems in greenhouses than any other kind of system. It is highly desirable that with such plants there shall be vacuum pump returns, with thermostatic heater traps. It is important, whatever the type of system, that the heating surface or out-put be well subdivided, so that no matter how much or how little heat shall be needed, just enough and no more than enough can be delivered. The heat must be distributed just as evenly over the whole area of the greenhouse as though all of the output were being delivered. One recommendation is that the heating surface be subdivided and provided with valves in increments of not exceeding 10 per cent.

The openings in the roof of a greenhouse which serve for ventilation are arranged in a row along the ridge and are spaced uniformly. If pipe