

often important that direct air distribution does not impinge on the product. Cooling units are normally constructed of galvanized steel or non-ferrous material in order to reduce the corrosive effect of their constant wetted condition.

Ratings

Since cooling units are mostly used in low temperature applications, the standard basis of rating is different than for air conditioning units. The Standard for Rating and Testing Air Conditioning Equipment states that the standard rating shall be based on air entering the cooling unit at 45 F dry-bulb and 85 per cent relative humidity, and the suction saturated refrigeration temperature shall be 30 F for commercial cooling.

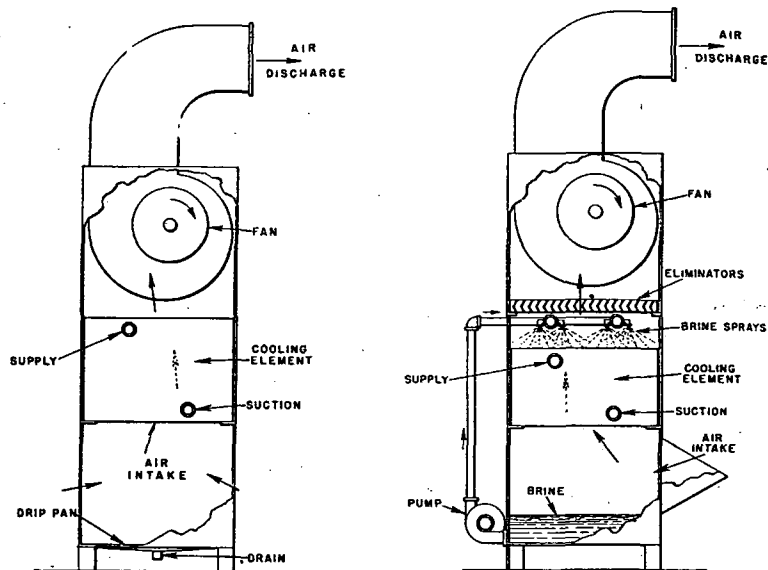


FIG. 10. SURFACE TYPE COOLING UNIT FIG. 11. BRINE SPRAY TYPE COOLING UNIT

Ratings of cooling units may be expressed in Btu per hour, or in tons of refrigeration. When ratings at other than standard conditions are given, the quantity, temperature, and relative humidity of the entering air should be specified, together with the refrigerant temperature within the coil. When chilled water or brine is used, the rate of circulation of the cooling media as well as its entering temperature should be given.

Defrosting

Cooling units are often called upon to operate in rooms where a temperature below freezing is maintained and low refrigerant temperatures are required. This results in the collection of frost on the heat transfer surface which in turn leads to a rapid loss in capacity and requires eventual defrosting. Such defrosting is accomplished by the following methods:

1. When the room is above freezing the source of refrigeration is cut off and the fan allowed to operate until the unit has defrosted.
2. A reversal of the refrigeration system may be provided and the so-called hot gas defrosting method used. This is accomplished by reversing the flow of the hot gas so that it is delivered directly from the compressor to the evaporator cooling unit. As soon as the ice and frost have been melted, the system is again returned to its normal cycle.
3. Where brine is used as a refrigerant, heated brine may be sent through the cooler to remove the ice.
4. When the room is at very low temperatures, warm air defrosting is sometimes used by providing for the admission and removal of warm air from outside the cooled space.
5. The surface may be sprayed with a strong brine solution.

In order to prevent the collection of frost in low temperature rooms where high latent heat loads are present, unit coolers equipped with a constant brine spray are frequently used. These are normally of the housed fan type similar to Fig. 10, but equipped with a pump for recirculating brine at intervals to maintain a non-freezing mixture as shown in Fig. 11.

COSTS

The following factors influence the cost of unit air conditioning installations:

1. Since the cost of the total job involves material cost plus installation labor and since through the use of unitary equipment, material costs can be kept to a minimum, every effort should be made to simplify installation.
2. Self-contained units in the small sizes now available, probably represent the lowest cost individual installations. They have, however, their limitations.
3. The floor type all-year-round air conditioning units for the occupied space with a remotely controlled compressor, heating sources being either the existing heat system or steam connections to the unit, probably afford the lowest cost all-year-round service for most individual rooms.
4. For multiple rooms or offices, the remotely located air conditioning unit with remote source of refrigeration probably represents the most economical installation. The larger self-contained air conditioners are particularly adaptable to stores, residences and small commercial installations.

Costs of operation vary widely depending upon the cost of power and water. Water costs in the larger installations are being materially reduced through the use of cooling towers and special types of condensers. It is difficult to make any comparison of operating costs of cooling as contrasted with heating equipment because the relative operating expense depends upon many factors including climatic conditions; i.e., in the South the cost of operating cooling equipment greatly exceeds the operating cost of heating equipment, whereas in colder climates where cooling equipment is used about two months per year, the heating costs are probably higher than those for cooling.

ATTIC FANS

Attic fans, used during the warm months of the year to draw large volumes of outside air through a house, offer a means of using the comparative coolness of outside evening and night air to bring down the inside temperature.