As the movement of air draws the condensate or excess humidification water toward the fan, drain connections are usually located on the exit side of the coil. The advantages of quick drainage are lost if improperly supported coils distort drain pans and cause water to accumulate in the center or back of the pan.

When the fans of vertical units are stopped, condensate that has been held up in the coils by fan suction drops into the drain pan and splashes against the casing. If water damage is to be avoided, flashings should be provided to prevent this water from running out of the unit at the seams.

When locating unitary equipment, floor and beam loadings should be carefully checked. Suspended horizontal units can add 50 to 100 lb per square foot to the loading on the floor above. Should this floor be already heavily loaded, or be a roof structure designed for a 40 lb per square foot snow load, excess beam deflection may occur and cause cracking of plaster or concrete fire-proofing. A small fire, normally of little consequence, may cause a rupture of a heavily loaded structure and permit the equipment to drop with extensive property damage. Self-contained units should be carefully installed since their weights run as high as 200 lb per square foot. When they are installed in street floor shops, the extra precaution of placing a column beneath them in the basement is an inexpensive method of reducing vibration as well as providing insurance against overloaded floor beams.

The services required for operation of unitary equipment should conform to the many restrictive, but necessary, local municipal codes. Existing buildings seldom are wired adequately for the electrical load imposed by the starting of an air conditioning compressor on any branch circuit. Even the smallest room cooler can draw enough current to reduce the voltage of a lighting circuit to the point where it is visibly apparent. This voltage drop may even affect the life of the unit due to the relatively slow starting. The cost of a separate electrical circuit of adequate capacity from the main panel is more than justified; it is a necessary expense in the majority of installations.

A water supply of adequate capacity and pressure is necessary to prevent overloading of electrical equipment by high head pressures. The average city water supply pressure is adequate for installations up to the third floor. Since most water cooled units require about 20 lb pressure, including control valve losses, it is important that any units served by gravity from roof tanks be checked carefully if located less than 40 ft below the tank.

Drain connections from condensers should flow to an open and properly trapped sink as required by most city codes. This prevents back pressures on the city water system in the event of condenser failure. A check valve should also be installed in the water supply as a further precaution against contamination.

When installing small remote or self-contained units with outside air connections in buildings more than 6 stories high, the effect of wintertime stack action in elevator and stairwells requires special attention. This stack action is the cause of negative pressures on the lower floors, tending to draw cold air through the units, and positive pressures on the upper floors preventing adequate ventilation and disrupting air distribution. It can also cause annoying whistling at door openings that is a serious source of complaint in hotels and offices. Wherever the removal of such

units is impractical, it is important that carefully fitted, felt-edged dampers be installed in the outside air intakes with adequate locking devices.

One further consideration when installing self-contained units in conditioned areas is that any maintenance or repairs to be required in future years must be carried on in occupied space. If this is kept in mind in locating units, much inconvenience can be avoided.

UNIT AIR COOLERS

This type of unit is primarily intended to perform the main function of cooling air, with humidity control a secondary function within the limitations of the design. The main application of this equipment is in process and product refrigeration, such as cold storage warehousing, fruit and vegetable packing, in breweries, and in wholesale and retail food markets.

Application of the unit method of air cooling with mechanical circulation is comparatively recent, being an improvement over the pipe or finned coil, which depended on gravity for circulation. Bunkers were sometimes constructed around the coils to direct the air flow and sometimes fans were used for forcing air over the coils. The location of the unit air cooler is usually within the refrigerated area, but the larger, blower type models may be remotely located.

Design and Performance. Greater application and use of commercial refrigeration have resulted from the development of the unit air cooler. Flexibility of design has permitted almost any condition to be met. Finned type coils are usually employed, with continuous fan operation. By varying such physical features as tube size, fin spacing, refrigerant circuiting, the depth of coil rows, and air volume over the coils, the designer is able to produce a wide range of performances and to offer many desirable features not obtainable with the coil and bunker method. Higher suction temperature operation, more uniform temperatures, higher relative humidities with the defrosting cycle, moderate first cost, and a minimum of installation expense are likewise factors in their development.

New uses have appeared for unit air cooler application in industrial and commercial processes involving both the raw materials and finished product, where the maintenance of low temperatures is a necessary part of these processes. Of particular interest is the new field of extreme low temperature application where many new uses for refrigeration are being found.

Types of Units. The two standard types are the suspended or ceiling type, and the vertical or floor mounted type. There are variations of these such as the panel type which is wall mounted and arranged to take in air from the lower section and discharge it from the upper section.

The ceiling type has the appearance of a unit heater, with its propeller type fan blowing air through a bank of coils. Singly or in combination, they are easily installed and occupy little or no useful space. Alterations may be accomplished with little cost by relocating units or adding additional ones for increased capacity.

The floor mounted types employ blower type fans, as their air deliveries are higher and their locations may be remote from the space to be refrigerated. Air velocities and volumes must be designed for the individual application. Due to the small temperature difference between coil and air, the air volumes handled are many times greater than in comfort air conditioning work. Where a defrosting cycle is not practical, this type of