

Fig. 6.... Propeller Fan Unit Heater—Horizontal-Blow Type

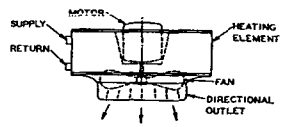


Fig. 7.... Propeller Fan Unit Heater—Down-Blow Type

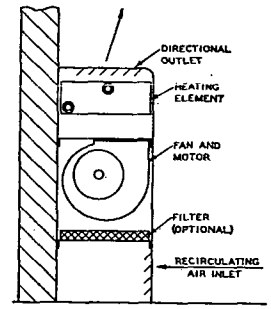


Fig. 8.... Floor-Mounted Centrifugal Unit Heater—Cabinet Type

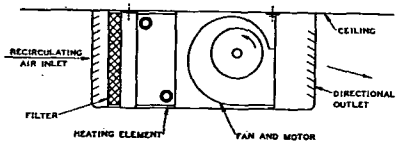


Fig. 9.... Suspended Centrifugal Unit Heater—Cabinet Type

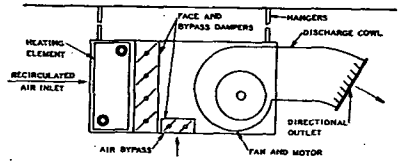


Fig. 10.... Suspended Centrifugal Unit Heater—Industrial Type—Bypass Controlled

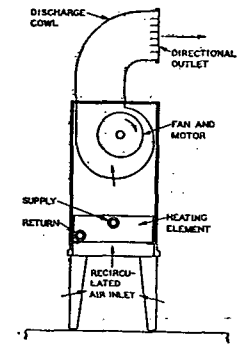


Fig. 11.... Floor-Mounted Centrifugal Unit Heater—Industrial Type—Valve Controlled

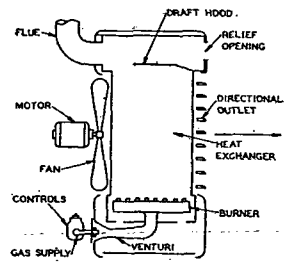


Fig. 12.... Gas-Fired Propeller Fan Unit Heater

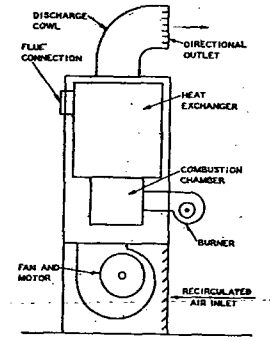


Fig. 13.... Oil-Fired Centrifugal Fan Unit Heater—Floor Mounted

ical applications are ticket booths, watchmen's offices, factory offices, locker rooms, and other isolated rooms scattered over large areas. Electric units are particularly useful in isolated and untended pumping stations or pits where they may be thermostatically controlled to prevent freezing temperatures.

Type of Unit

Propeller fan units are usually used in free-delivery applications where the heating capacity and distribution requirements can best be met by units of moderate output used singly or in multiples, and where filtration of the heated air is not required. *Horizontal-blow* units are usually associated with low to moderate ceiling heights. *Down-blow* units are employed in high-ceiling spaces, and where floor and wall space limitations dictate an out-of-the-way location for the heating equipment.

Industrial centrifugal fan units are applied where heating capacities and space volumes are large, or where filtration of the heated air, operation against static resistance, or the introduction of outdoor air are required. Down-blow or horizontal-blow units may be used, depending on the requirement.

Cabinet unit heaters are used for applications where a more attractive appearance is desired. They are suitable for free delivery or low static pressure duct applications, may be equipped with filters, and can be arranged to discharge either horizontally, or vertically up or down.

Location for Proper Heat Distribution

Location of the units for proper heat distribution is of utmost importance in the application of unit heaters. In general, the units must be selected, located, and arranged so as to provide complete heat coverage and at the same time maintain acceptable air motion and temperature in the working or occupied zone. Proper application depends on a number of factors: the size, number, type and direction of blow of the units, the mounting height, the outlet velocity, the outlet temperature, the air volume and the type of directional outlet employed. Many of these factors are interrelated, and manufacturers therefore publish data for specific units showing heat coverage and mounting heights for various outlet velocities and outlet arrangements. Such data should normally be consulted in selecting unit heaters for a particular application.

In general, however, *mounting height* and the area of heat coverage increase with increased air volume and outlet velocity, and decrease with increased final temperature. The mounting height may be governed by space limitations or by the presence of equipment such as display cases or machinery. Both noise and air velocity in the occupied zone generally increase with increased outlet velocities and must therefore be considered.

The blow is dependent to a marked degree on the *temperature of air leaving the heater* as well as upon its velocity and volume. Increased final temperature will reduce the area of heat coverage and the mounting height. Care must be exercised in the application of down-blow unit heaters. The higher the mounting height, the lower must be the outlet temperature of the air leaving the heater in order that the heated air will be forced down into the occupied zone.

Since the outlet temperature of air from a unit heater increases with the temperature of the heating medium, unit heaters for high-pressure steam or high-temperature hot water should be designed to produce approximately the same leaving air temperature as would be obtained from a lower temperature heating medium.

In order to obtain the desired air distribution and heat diffusion, unit heaters are commonly equipped with directional outlets, adjustable louvers, or fixed types of diffusers. For a given unit with a given discharge temperature and outlet velocity, the mounting height and heat coverage can vary widely with the type of directional outlet, adjustable louver, or diffuser employed.

Other factors which may influence the heat coverage must also be considered. Obstructions, such as columns, beams, partitions, or machinery, either in the discharge air stream or in the approach area to the unit, can reduce the heat coverage substantially. The presence of strong drafts or other air currents will also reduce the coverage. Exposures such as large glass areas, or outside doors, especially on the windward side of the building, require special attention, and units should be arranged so as to blanket such exposures with a curtain of heated air which will intercept the cold drafts.

For area heating, horizontal-blow unit heaters in exterior zones should be located so as to blow along the exposure or toward it at a slight angle. Where possible, multiple units should be arranged so that the discharge air streams support each other and create a general circulatory motion in the space. Interior zones under exposed roofs or skylights should be completely blanketed. Down-blow units should be arranged so that the heated areas from adjacent units overlap slightly so as to provide complete coverage.

For spot heating of individual spaces in larger unheated areas, single unit heaters may be employed, but allowance must be made for the inflow of unheated air from adjacent spaces and the consequent reduction in heat coverage. Isolation of such spaces by partitioning or enclosure is always desirable from a heating standpoint.

Horizontal unit heaters should have their discharge outlets located well above the head level, and both horizontal and vertical units should be so applied that the heated air stream will be delivered to the occupied zone at temperatures and velocities which are not objectionable. Where possible, units should be so located that the discharge air flow is into open spaces such as aisles and not directly on the occupants.

Manufacturers' catalogs usually give suggestions for the best arrangements of various unit heaters, recommended mounting heights, heat coverages for various outlet velocities, final temperatures, and directional outlets.

Sound Level

Consideration must be given to the problem of noise generated by unit heaters if they are applied in spaces having a requirement for low sound levels. All unit heaters generate some noise, and whether or not that noise will be acceptable depends upon the type of space in which it is applied. For example, units with noise levels acceptable in a manufacturing plant might be too noisy for use in a show-room. A unit heater for a particular application must therefore be selected for satisfactory sound level as well as for adequate heating capacity and proper heat distribution.

Ratings of Unit Heaters

It is standard practice to rate all types of unit heaters on the basis of the amount of heat delivered by the air in Btu per hour above an entering air temperature of 60 F.

Steam. Rating of steam unit heaters has been standard-