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Air Distribution

Standards for Satisfactory Conditions, Definitions, Mechanics of Air Distribution, Types of Supply and Return Openings, Outlet Locations, Return and Exhaust Intakes, Specific Applications, Balancing the System

CORRECT air distribution contributes as much or more to the success of a forced air heating, ventilating, cooling or air conditioning system as does any other single factor. An air conditioning system may deliver the required quantity of conditioned air and still fail to give satisfactory room conditions because of poor air distribution. The scope of the chapter is limited to the air distribution within the conditioned space. Reference is made to the distributing duct system only insofar as it affects the performance of the air distribution outlet. See Chapter 41 for information on air duct design.

STANDARDS FOR SATISFACTORY CONDITIONS

Air distribution within a space to be conditioned consists in producing within the space the proper effective temperature whether for cooling, heating or ventilating. This means that a reasonable uniformity of temperature, humidity and velocity must be obtained within the zone of occupancy. This zone is usually the room space between the floor and a plane 6 ft above the floor. Air must have a proper combination of quantity, temperature, humidity and velocity to satisfy the over-all demands, whether for cooling, heating or ventilating. Any or all of these factors may need to be controlled to produce proper comfort conditions. Also the quantities delivered to various locations must be proportioned, so that the sections of the area having the highest or lowest load requirements are satisfied. Otherwise some areas will be too hot, cold, stuffy or drafty, since the effective temperature will be too high or low in these areas.

Other important considerations are dirt and noise. The use of air cleaning devices is recommended to prevent or reduce streaking and smudging of walls and ceilings. Outlets should not increase the noise above the acceptable level.

Reference should be made to Chapter 12, Physiological Principles, for the accepted standards on room temperature, humidity, air motion and direction. Material in Chapter 42, Sound Control, covers acceptable room noise levels and noise generated by air outlets.

DEFINITIONS

The following definitions referring to air distribution equipment have gained general acceptance.

1. *Supply Opening or Outlet*: Any opening through which air is delivered into a space which is being heated, or cooled, or humidified, or dehumidified, or ventilated.
2. *Exhaust Opening or Return Intake*: Any opening through which air is removed from a space which is being heated, or cooled, or humidified, or dehumidified, or ventilated.
3. *Outside Air Opening*: Any opening used as an entry for air from outdoors.
4. *Grille*: A covering for any opening and through which air passes.
5. *Damper*: A device used to vary the volume of air passing through a confined cross-section by varying the cross-sectional area.
6. *Multiple Louver Damper*: A damper having a number of adjustable blades.