

2 • What is the major problem in conditioning hospitals?

For general hospital wards, the major problem seems to be one of providing adequate amounts of ventilation rather than air conditioning, with some provision for cooling over-heated wards on unusually warm summer days.

3 • What are the usual requirements for ventilation of operating rooms?

To preclude the accumulation of explosive mixtures and to reduce the concentration of anesthetics below the physiologic threshold, it is desirable that ventilation to the extent of 6 to 12 air changes be provided.

4 • What are the optimum air conditions for premature infants?

The best chances for life in premature infants are created by maintaining a relative humidity of 65 per cent and an environmental temperature sufficiently high to keep the body temperature within normal limits.

5 • How does air conditioning assist in the treatment of allergic disorders?

In cases in which the individual fails to respond to medical treatment, air conditioning may provide a valuable adjunct in relieving the symptoms. Although the chief remedial factor in the treatment by conditioned air is the filtration of pollen, it has been found that in warm weather temperatures between 75 and 82 F and relative humidities well below 50 per cent are more conducive to comfort.

Chapter 32

RAILWAY AIR CONDITIONING

Passenger Car Ventilation, Quantity of Outside Air, Method of Air Distribution, Air Cleaning, Steam or Vapor Heating Equipment, Cooling Equipment, Humidity and Temperature Control, Power Supply, Installation and Operating Costs

THE general principles of air conditioning as applied to buildings also apply to railway passenger cars, but due to space and weight limitations and the severity of the service, equipment designed for stationary work is seldom suitable for car installations. Equipment for railway use must be safe, reliable, compact, light in weight, accessible for inspection and repairs, automatic in operation and in addition, have low initial, operating, and maintenance costs. To air condition a passenger car properly, ventilating, filtering, heating, cooling, humidifying, and control equipment must be provided together with an adequate power supply. Air from the interior of the car is mixed with air from the outside and passed through the air conditioning unit where it is heated or cooled, humidified or dehumidified and delivered to the interior of the car through suitable ducts and grilles.

PASSENGER CAR VENTILATION

One of the important problems in connection with air conditioning of cars is that of ventilation. In non air-conditioned cars, ventilation is accomplished by exhaust fans, roof ventilators and open doors and windows. This practice provides an ample supply of outside air but does not prevent the entrance of smoke, cinders, and dirt.

Quantity of Outside Air

An average passenger car contains approximately 5000 cu ft of air and may seat as many as 80 passengers. The occupants are continually liberating heat, carbon dioxide, moisture, odors, and some organic matter from their breath, skin and clothing. The heat and moisture can be removed by cooling and dehumidification, but the other constituents can be successfully handled only by proper ventilation and air cleansing. In the average car from 2000 to 2500 cfm should be circulated by the air conditioning unit. Some of this air may be recirculated, but a portion of it should always be brought in from the outside. The amount of outside air required depends upon the type of car, number of passengers, air temperature, humidity, odors, and whether or not occupants are smoking, and will vary from 15 to 90 per cent of the total air circulated. The per-