

9 • Given saturated air at a temperature of 75 F and a barometric pressure of 29.92 in. Hg; determine the heat content of the mixture per pound of dry air, including the heat content of the liquid above 32 F.

From Equation 12,

$$h = 0.24 (t - 0) + W (1059.2 + 0.45t)$$

where

$$h_a = 1059.2 + 0.45t \text{ (Empirical equation derived from Keenan's Steam Tables.)}$$

$$t = 75 \text{ F.}$$

$$W = 0.01877 \text{ lb of water vapor (Table 5).}$$

$$h = 0.24 (75 - 0) + 0.01877 (1059.2 + 0.45 \times 75).$$

$$h = 38.51 \text{ Btu per pound of dry air.}$$

Chapter 2

VENTILATION AND AIR CONDITIONING STANDARDS

Vitiation of Air, Heat Regulation in Man, Effects of Heat, Effects of Cold, Temperature Changes, Acclimatization, Warmth and Comfort, Effective Temperature, Comfort Chart, Comfort Line, Comfort Zone, Application of Comfort Chart, A.S.H.V.E. Ventilation Standards, Natural and Mechanical Ventilation, Recirculation, Ultra-Violet Radiation and Ionization, Heat and Moisture Losses

VENTILATION is defined in part as "the process of supplying or removing air by natural or mechanical means to or from any space." (See Chapter 41.) The word in itself implies quantity but not necessarily quality. From the standpoint of comfort and health, however, the problem is now considered to be one of securing air of the proper quality rather than of supplying a given quantity.

The term *air conditioning* in its broadest sense implies control of any or all of the physical or chemical qualities of the air. More particularly, it includes the simultaneous control of temperature, humidity, movement, and purity of the air. The term is broad enough to embrace whatever other additional factors may be found desirable for maintaining the atmosphere of occupied spaces at a condition best suited to the physiological requirements of the human body.

VITIATION OF AIR

Under the artificial conditions of indoor life, the air undergoes certain physical and chemical changes which are brought about by the occupants themselves. The oxygen content is somewhat reduced, and the carbon dioxide slightly increased by the respiratory processes. Organic matter, which is usually perceived as odors, comes from the nose, mouth, skin and clothing. The temperature of the air is increased by the metabolic processes, and the humidity raised by the moisture emitted from the skin and lungs. Moreover, according to latest researches¹, there is a marked decrease in both positive and negative ions in the air of occupied rooms.

Contrary to old theories, the usual changes in oxygen and carbon dioxide are of no physiological concern because they are much too small even under the worst conditions. The amount of carbon dioxide in air is often used in ventilation work as an index of odors of human origin, but

¹See A.S.H.V.E. research paper entitled Changes in Ionic Content in Occupied Rooms Ventilated by Natural and Mechanical Methods, by C. P. Yaglou, L. C. Benjamin and S. P. Choate (A.S.H.V.E. TRANSACTIONS, Vol. 37, 1931).