

suction ducts or high velocity outlets arranged to move the cold heavy stratum of air which is likely otherwise to lie close to floors.

The service of industrial unit heaters is essentially that of heating, and recirculation is usual, with dependence on windows and doors for ventilation. Since the fans can be operated without heating the radiators there is some advantage from them in warm weather.

Due to the very high heat transmission rates from radiators over which air is driven at high speed by fans, industrial unit heaters usually effect material space economies.

Industrial units are now being employed for washing, humidifying, dehumidifying and otherwise conditioning air for manufacturing processes.

See Chapter X for further data on Unit Systems for Heating and Air Conditioning.

CHAPTER XXV

AIR CONDITIONING AND COOLING

Air Supply, Relative Humidity, Air Cooling, Refrigeration, Humidifying, Dehumidifying, Automatic Controlling Devices, Cleaning Units.

TEMPERATURE and humidity of surrounding air is an important factor influencing comfort and efficiency. While temperature and humidity affects human comfort, it also has an important bearing in the industrial fields where hundreds of manufacturing processes are dependent for their success upon some definite atmospheric conditions to be maintained.

Climatic conditions, of course, vary with geographical locations. A study of temperature and humidity variations in different localities tends to show that such places having an average wet bulb temperature in the neighborhood of 56 deg. fahr. with corresponding dry bulb temperatures to give an effective comfort temperature of from 62 to 69 deg. are favored with best health conditions. (See Chapter XXIII, page 366).

This chart indicates that maximum comfort is produced when temperature and humidity conditions are approximately such as to give a 64 deg. effective temperature. One condition in combination is 70 deg. dry bulb, 57 deg. wet bulb and 45 per cent relative humidity, which corresponds to a dew-point of 48 deg. and 3.59 grains of moisture per cu. ft.

See Chapter XXIII Figs. 2, 3, 4 and 5 for definite conclusions regarding the relation between temperature, humidity and air motion to produce physical comfort.

Air conditioning is the science of mechanically controlling: (1) temperature, (2) humidity, (3) purity and (4) the movement of air within buildings and other enclosures, thereby controlling the effects of such air upon the people and materials exposed to it.

Conditioning for industrial processes has become an exact science with results measurable in dollars and cents, in a more perfect product, in increased production, in elimination of waste or in some equally important factor. Varying degrees of moisture are required in manufacturing processes and the nature of the product will indicate whether a high or low relative humidity is to be maintained. Heating as well as cooling must be considered in air conditioning work such as that of textile mills, printing plants, bakeries, candy kitchens, laundries, etc., all presenting definite problems. For example, in spinning rooms 75 deg. fahr. and 65 per cent humidity have been found best for the operations; in match factories 68 deg. dry bulb and 55 deg. wet bulb permit continuous operation and reduce fire hazards; in candy dipping rooms 66 deg. dry bulb

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