

With very few exceptions, ventilation standards for dusts are lacking and the only way to judge the safe concentration is by means of periodic medical examinations of the workers and by routine measurements of dust concentration.

SYNTHETIC AIR CHART

The Synthetic Air Chart designed by E. Vernon Hill³², was adopted by the Society as a standard for measuring the relative perfection of air conditions maintained in a given space. The results of tests are plotted on a chart, and the perfection of the air conditions as a whole determined on a percentage basis by deducting from 100 per cent perfection the lack of perfection in each of the following six factors:

1. The effective temperature difference, or the amount of variation from the ideal effective temperature.
2. Dust particles per cubic foot.
3. Bacteria.
4. Percentage of freedom from objectionable odors.
5. Carbon dioxide, parts per 10,000.
6. Distribution.

³²For complete description of the operation of the Synthetic Air Chart, see *Modus Operandi of The Synthetic Air Chart*, by John R. Allen (A.S.H.V.E. TRANSACTIONS, Vol. 26, 1920), and A.S.H.V.E. GUIDE, 1931, p. 411.

Chapter 29

AIR CONDITIONING FOR INDUSTRIAL PROCESSES

Moisture Content and Regain; Conditioning and Drying; Desirable Atmospheric Conditions; General Requirements; Drying and Moisture Control; Comfort Versus Production.

IN the manufacture or processing of hygroscopic materials such as textiles, paper, wood, leather, tobacco, foodstuffs, etc., the temperature and relative humidity of the air have a marked influence upon the rate of production and upon the weight, strength, appearance and general quality of the product. This influence is due to the fact that most materials of vegetable or animal origin, and to a lesser extent minerals in certain forms, take moisture from or give it up to the surrounding air.

In industries where the physical properties of the product affect value, the question of moisture is of special importance. With increase in moisture content, hygroscopic materials ordinarily become softer and more pliable. Economy of manufacturing therefore requires that the moisture content be maintained at a percentage most favorable to rapid and satisfactory manipulation and to a minimum loss of material through breakage. A constant condition is desirable in order that high speed machinery may be adjusted permanently for the desired production with a minimum loss from delays, wastage of raw material and defective product.

In the processing of hygroscopic materials, it is usually necessary to secure a final moisture content suitable for the goods as shipped. Where the goods are sold by weight it is proper that they contain a normal or standard moisture content. Air conditioning is important in certain branches of the chemical industry in controlling the temperature of reaction and facilitating or retarding evaporation. The control of moisture content of air supplied to blast furnaces in the manufacture of pig iron also has proved advantageous.

A few of the industries in which air conditioning plays an important part and the major uses in these industries are as follows:

Automobile. Drying of siccative coatings, manufacture of steel, manufacture of artificial leather, drying of rubber, manufacture of tire fabrics, cementing of inner tubes, conditioning of wooden spokes and other wooden parts, conditioning and manufacturing of all electrical windings in connection with the electrical apparatus and the manufacture of storage battery plates and the rubber containers.

Bakery. Flour storage, yeast and ingredient storage, mixers, fermentation room, make-up room, proof boxes, loaf cooling, wrapping (including paraffin paper), cake mixing and cake icing.