MEASUREMENT OF AIR FLOW

The quantity, velocity, and pressure of air discharged by a fan or flowing through a pipe may be determined by various methods. An anemometer is used where accuracy is not required and where air velocities not over 600 ft. per min. are to be measured, as at registers. For the greatest measure of reliability the anemometer shall have been newly calibrated, and correction shall be made for the error as shown by the calibration.

The standard method for measuring air velocity and pressure shall be the Pitot Tube as described in the A. S. H. & V. E. Standard Code for the Testing of Centrifugal and Disc Fans (TRANS., A. S. H. & V. E., Vol. 29, 1923, p. 407.) Installation tests for determination of fan capacity and efficiency shall be under laboratory conditions, in accordance with this Code.

CHAPTER XXII

AIR CLEANERS

THE desirability of air free from objectionable dirt and dust has long been recognized. This was especially true in certain industrial processes, but it is only recently that people have come to the realization of the economic importance of dust free air for use in general ventilation.

The first attempts at cleaning air probably were by the use of dry screens.

Since ordinary Portland cement all passes through a screen having 100 meshes to the inch, it is apparent that much dust may pass the finest mesh dry screen. When a screen as fine as this is moistened, not only the dirt ceases to pass, but also the air passages clog, so that the filter becomes ineffective.

Fine cloth filters are effective, except that they clog up rapidly and soon become impervious to air.

These considerations led many years ago to the development of the water using-air washer.

TYPES OF AIR WASHERS

Air washers are arranged to pass the air over a large surface area of water: (1) by passing it through a fine spray; (2) by passing it over wet surfaces; (3) by passing it both through a spray and over wet surfaces. After the air is washed it is freed from entrained water.

When air is cleansed by washing its humidity or moisture content is usually changed. In passing through the water spray or over the wet surfaces both the dry and wet bulb temperature of the air approaches that of the water at which temperature the air tends to become saturated. The moisture content of the air may, therefore, be controlled by controlling the water temperature. By using water at a very low temperature the washer becomes a dehumidifier or by heating the water the air may be humidified. By raising the dry bulb temperature of the air after leaving the washer its relative humidity may also be controlled. The humidifying efficiency of any air washer may be given as

$$E = 1 - \frac{\text{Final wet bulb depression}}{\text{Initial wet bulb depression}}$$

for example: With an initial wet bulb depression of 20 deg. and the final wet bulb depression of 6 deg., the humidfying efficiency is

$$E = 1 - \frac{6 \text{ deg.}}{20 \text{ deg.}} = 0.70$$

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