RATING OF AIR CLEANERS

Air washers and filters are rated as follows:

1. Capacity in cubic feet of air handled per minute.
2. Resistance in inches of water which the cleaner offers to the flow of air at its rated capacity.
3. Percentage of dust removal at its rated capacity.
4. Percentage of entrained moisture remaining in the air after passing through the cleaner while operated at its rated capacity.
5. If considered as a humidifying agent, the humidifying and dehumidifying efficiency.

CHAPTER XXX

OZONE IN VENTILATION

Physical, Chemical and Germicidal Properties, Deodorizing Ozone Production, Proper Concentration, Industrial Uses.

OZONE is a normal constituent of pure, natural air and its quantity varies with the topography of the country, particularly with regard to the altitude, the presence of bodies of water, and certain plant life.

Ozone is produced, photo-chemically, by ultra-violet light of short wave length (120-180 $\mu\mu$), while light of greater amplitude (300-330 $\mu\mu$) exerts a decomposing effect. At high altitudes, where short wave radiations are more intense, ozone naturally occurs in greater quantities. It is continuously under the destructive effect of longer waves, however, but a dynamic equilibrium is finally reached between the rate of formation and the rate of decay, which shifts with the altitude. Since light of longer wave length penetrates closer to the earth than does that of shorter amplitude, the equilibrium becomes favorable to ozone directly as the altitude.

In summing up the evidence at hand it may be concluded that ozone, while mostly absent from city air, is normally present in pure country air, but in amounts that are difficult to estimate accurately. In nature the air is continuously under ionizing influences, and the enclosing of air, as in buildings, excludes these influences, in addition to destroying the original ionization of the air. Ionization is involved in chemical activity.

The process of ozonizing, in addition to supplying ozone, ordinarily absent from city air, further provides considerable ionized oxygen, producing a fresh, chemically active air, comparable with fresh, pure air of nature.

Physical Properties

Density—Observed Values; 1.657 (Otto, Direct weight method).
1.717 (Soret, by diffusion).
Calculated Value; 1.66

The foregoing values refer to air as unity. Its rate of diffusion, with respect to oxygen is 0.75.

Heat of Formation—The production of ozone is an endothermic reaction, the heat of formation being 34,000 calories per gram molecule (Jahn, Zeit. Anorg. Chem. 68, 250; 1910).

Boiling Point −112 deg. cent. (International Critical Tables, 1926).

At a temperature of 270 deg. Cent. (518 deg. fahr.), Ozone is instantly decomposed.

Odor—Strong, penetrating and characteristic. Perceptible to the sense of smell in concentrations above 0.01 p.p.m. by volume (Hill & Aeberly, *Heating and Ventilating Magazine*, December, 1921).

Olfacty (minimum perceptible concentration expressed in molecules per c.c.) 2.705×10^9 at 0 deg. cent. and 760.

Solubility—Soluble in water and dilute acids, quite soluble in carbon tetrachloride and many vegetable oils.

Material for this Chapter prepared especially for THE GUIDE by Frank E. Hartman.