which reduces to pointing off two places in the CFM and multiplying by the ppm.

Given: VU and CFM; Find: ppm

$$\frac{0.1 \times VU}{CFM} \times 1{,}000 = ppm \quad (5)$$

which reduces to pointing off three places in the CFM, one place in the VU, and dividing the former into the latter.

Given: VU and ppm; Find: CFM

$$\frac{1{,}000}{ppm \times 10} \times VU = CFM \quad (6)$$

As the VU represents a definite weight of ozone, in a definite period of time, ozonizers so rated leave no question as to their actual capacity. The decimal character of the unit admits of much facility in calculations.

WATER PURIFICATION

Ozone finds a very important application in the purification of water. Operating costs rarely exceed an energy expenditure of 500 watt hours per thousand gallons.

Ozone successfully eliminates odors and tastes of organic origin, particularly the tastes and odors due to excessive chlorination, and the presence of chlorinated phenols and tarry substances. Organic colors are bleached, and the effluent of a properly designed ozonizer is practically sterile.

The essentials of a good water ozonizer are, an adequate and constant supply of ozone, in sufficiently high concentrations to effect high solubility at normal temperatures, adequate mixing of the ozonized air and water, under conditions which produce maximum diffusion and absorption, and over a sufficient period of time to effect sterilization. The control should provide under and over voltage release, together with a release for water pressures too low to efficiently operate the mixing device.

INDUSTRIAL USES

Ozone finds a number of applications as an oxidizing agent, in industrial operations, many of which are of little interest in ventilation. However, ozone may be used to accelerate the drying of paints and varnishes, the "oxidation" of drying oils, and many other drying operations involving oxidation. Such problems are generally specific, and it is advisable to consult the manufacturers of ozone equipment concerning them.

COLD STORAGE

Ozone is of value in cold storage for the prevention of mould development, deodorizing of storage spaces, after removal of odoriferous products, to prepare for other commodities. The preservation of flavor, particularly in eggs, and the general freshening and vitalizing of the air, the advantage of which is reflected by the superior condition of products stored in "fresh" air over those stored in "dead" air.

CHAPTER XXIV

DUST, EXHAUST AND COLLECTING SYSTEMS

PNEUMATIC exhaust and collecting systems may be classified in various ways. They may be classified by the economic purpose to be accomplished by the industries served, or by the type of system used.

Classifying exhaust systems by industries served, they fall in subdivisions such as, metal working, woodworking, leather and shoe manufacturing, rubber industry, flint grinding, pottery works, pulverizing works, celluloid manufacturing, printing establishments, felt hatting and fur manufacturing, textile mills, grain and cereal industry, etc.

TYPES OF SYSTEMS

The type of exhaust system to be used is determined by the industry served, kind of material handled, and the work to be accomplished. There are two general arrangements; the central and the group systems. In the central system a single or double fan is located near the center of the shop with a piping system radiating to the various machines to be served. In the group system, which is sometimes employed where the machines to be served are widely scattered, small individual exhaust fans are located at the center of the machine groups.

The group arrangement has the advantage of flexibility. It is, however, more difficult to balance than the central, and also the large number of small diameter trunk lines required show a much higher friction loss per foot of length than with the central system where one large main pipe serves a considerable number of machines.

Exhaust systems are also characterized by the means employed to collect the dust or other material handled. The dust or refuse may be collected and controlled by enclosing hoods, open hoods, inward air leakage or general room exhaustion.

With some classes of machinery it is not feasible to closely hood the machines and in these cases open hoods over or adjacent to the machines are provided to collect as much of dust and fumes arising as possible. In this class come such machines as rubber mills, package filling machinery, sand blast, crushers, forges, pickling tanks, melting furnaces, and the unloading points of various types of conveyors.

The open hoods should be placed as close to the source of dust or fumes as possible with due regard to the movements of the operator.

When the hood has to be placed at some distance above the machine it should be large enough to encompass an area of considerable extent as diffusion is usually quite rapid.

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