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

Given: VU and CFM; Find: ppm

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

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

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

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 XXV

METHODS OF DRYING

DRYING is an extraordinarily interesting problem in engineering, and thousands of the products that we use every day go through some sort of drying process during their manufacture. Wood when dried becomes a workable and dependable material, the leather used in our shoes must submit to the drying operation, and the manner of its drying determines its value in the finished product. Clay when dried becomes ceramic ware, flour mixed with water when dried becomes macaroni, wood pulp dried becomes paper and gelatine dried and sensatized becomes photographic film. All textiles require the drying process at some time during their manufacture.

The term drying is often used to cover dehydration, distillation, oxidation, evaporation or any chemical action due to each of these conditions. Drying in its broader sense is not confined to the removal of moisture alone, but may refer to the evaporation or removal of substances other than water and to such operations as paint and varnish drying, linoleum manufacture and many other materials which require special treatment with respect to temperature, relative humidity and rates of moisture removal.

METHODS OF DRYING

In general, drying processes may be divided into three classes: vacuum drying, drying with radiant heat, and drying with air currents.

The vacuum method is particularly adapted to material which must be dried quickly at low temperatures and is generally used in the drying of milk, sugar, vegetables and similar products.

In drying with radiant heat the temperature of the material being dried is above that of the air surrounding it. The uniform distribution of radiant heat is important in the proper drying of materials, and the radiator used should have relatively large radiating surface and be well distributed in the drying area. About one-third to one-half of the heat given off by the radiating surface passes through the air to the object which is to be dried without materially raising the air temperature, the remaining portion of the heat emitted by the radiator warms the air by convection and produces air currents which assist in the removal of the moisture from the material being dried.

Drying with currents of air or air processing as this method is usually termed, depends for its success upon the proper circulation in the drying chamber so that it will come into direct contact with the substance to be dried. In ordinary work air temperatures carried are from 70–200 deg. fahr. with a relative humidity of 90–50 per cent. When temperatures exceed 200 deg. the process is referred to as high temperature