TYPES OF FANS

Manufacturers generally provide special fans for the collection of various industrial wastes. These are available for the collection of coal dust, wood shavings, wool, cotton and many other substances. When substances having an abrasive character are conveyed, the fan blades and housing should be protected from wear. This may be accomplished by placing a collector on the negative side of the fan or by lining the housing and blades with rubber.

PROTECTION AGAINST CORROSION

The removal of gases and fumes in many chemical plants requires that metals used in the construction of the exhaust system be resistant to chemical corrosion. A list of the materials which may be used to resist the action of certain fumes is given in Table 8. Hoods and ducts, when short, may frequently be constructed of wood and be quite effective. Rubberized paints are available and may be applied as protective coatings in handling such gases and fumes as chlorine and hydrochloric acid.

Chapter 41

DRYING SYSTEMS

Drying Methods, Radiant-Heat Drying, Conduction or Direct Contact Drying, Convection or Air Drying, Mechanism of Drying, Omissions in the Cycle, General Rules for Drying, Humidity Chart, Dryer Calculations, Design, Estimating Methods

DRYING, in its broader sense, refers to the removal of water, or other volatile liquid from either a gaseous, liquid, or solid material. In practice, the process of direct drying gaseous material is referred to generally as dehumidifying, or condensing, and in some cases chemicals are used in the adsorption or absorption of moisture. The subjects of dehumidification and dehydration are treated in Chapter 24. Drying a liquid is called evaporation or distillation. The common usage of the word *drying* refers to the removal of water or other liquid, such as a solvent, by evaporation from a solid material.

When the solid to be dried contains large amounts of free water, the actual drying process is frequently preceded by the removal of part of the water by some mechanical means, such as filtration, settling, pressing or centrifuging. Removal of as much water as possible by such methods is usually advisable, as the cost of these operations, per pound of water removed, is generally much less than by evaporation. In some drying processes the evaporation of the liquid is accompanied by a chemical change, as in the drying of paint and varnish.

DRYING METHODS

Heat must be supplied in order to dry a solid by evaporation. Since this latent heat is large compared with the specific heat of the materials, drying becomes largely a problem in heat transfer. Hence drying methods are often classified according to the method of heat transfer used, as follows:

1. Radiant-heat drying.
2. Drying by direct contact, and conduction.
3. Convection or air drying.

Radiant-Heat Drying

Drying by sun heat is still practiced where danger of rain is slight, atmospheric pollution is negligible and sufficient time can be allowed.

Radiating surfaces, (heated by steam, electricity or other means), afford a good method of heat distribution and control. Radiant heating sets up