

be provided at both the back of the grille and at the grille to direct the air flow. Fig. 11 shows a section through a room inlet opening at the top of a rising flue and indicates the air conditions when no vanes are used. Fig. 12 shows a section through the same room inlet opening when vanes are advantageously placed to direct the flow of air.

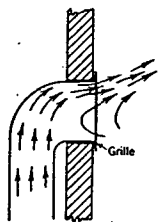


FIG. 11. AIR CONDITIONS AT INLET OPENING AT THE TOP OF A RISING FLUE WHEN NO VANES ARE USED

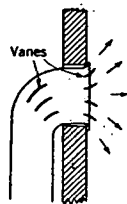


FIG. 12. AIR CONDITIONS AT INLET OPENING AT THE TOP OF A RISING FLUE WHEN DIRECTIONAL VANES ARE USED

In many theater and commercial installations the ejector-like action of high-velocity air emerging from a duct is taken advantage of, and scientifically proportioned nozzles are installed to cause definite recirculation of the room air.

Chapter 21

INDUSTRIAL EXHAUST SYSTEMS

Types, Design of Systems, Suction and Velocity Requirements, Design of Hoods, Design of Duct Systems, Collectors, Resistance of Systems, Selection of Fans and Motors

EXHAUST and collecting systems are found in almost every industry and are a vital adjunct in maintaining safe and hygienic conditions. The present chapter attempts to give general information relating to the design of factory exhaust systems in order that efficient and economical control of dusts and fumes may be achieved.

TYPES OF SYSTEMS

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.

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

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 as possible of the dust and fumes. This class includes 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 must 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.

Consideration must also be given to the natural movement of the fumes. For those that are lighter than air the hood should be over or above the machine and where a heavy vapor or dust-laden air at ordinary temperature is to be removed, horizontal or floor-connections are required. If it is attempted to remove heavy dust such as lead oxides by an overhead hood the conditions may be worse than if no exhaust were used at