VP is 1 in of water Hence the suction as measured with a U-tube or water manometer at the hood must be 2 in water gauge (w g) This negative pressure of 2 in w g at each hood is a common requirement in specifications for design of dust exhaust systems

Hood design for specific operations The hood should also be shaped and positioned to take advantage of any natural movement of the contaminant that may exist, rather than to buck it If heat is released, the flow of convection currents should be toward the hood If heavy particles are thrown off, as in rough grinding, their trajectory should be toward the hood intake But a caution should be noted the air-borne dust which is of health significance is made up of particles that are extremely small, 0 1 to perhaps 5 microns° in diameter (A micron is 1/25,000 in) It has been shown by T F Hatch (see "References") and others that such particles, even if impelled at extremely high initial velocities, travel a very short distance in air—a matter of a few inches at the most

Unlike chips or large particles, they cannot be thrown into a hood any considerable distance away The hood acts by confining a mass air movement into it which carries the dust along

For even distribution of the air flow through a large hood, flow may be controlled by passing the air through a narrow slot into a plenum chamber The flow distribution along a hood is fixed by the ratio of the velocity through the slot to the velocity in the chamber For most purposes, the distribution will be good enough if the velocity through the slot is about twice the average velocity through the plenum Usually a slot velocity of 2000 fpm is suggested

Recommended designs for hoods for many special operations or applications are given in section 5 of the ACGIH *Industrial Ventilation—A Manual of Recommended Practice*, 9th ed (*see* "References") Designs show the size or proportions of hoods and are complete with recommended air quantities, duct sizes, air velocities and hood entrance losses This manual should be used for any hood design problem

Canopy hoods seldom provide the control expected There are several reasons for this velocity distribution is poor between canopy and the source of evolution, greater volume of air flow is required for contaminant control, control may be lost because of room air cross currents, and, frequently, this type of hood forces the employee to work under it, that is between the point of contaminant evolution and the exhaust source

Canopy hoods are best used where thermal currents (caused by rising hot air) funnel the contaminant into the exhaust system Where these are not vigorous, a fairly even distribution of air flow (within limits) can sometimes be obtained by putting baffles in the center to create a plenum chamber in the upper part of the hood

The amount of air required for a canopy hood can be approximated by the equation

$$Q = 1.4 \times 2(L + W)HV, \qquad (13)$$

where Q = rate of air flow (cfm),
L = tank length (ft),
W = tank width (ft),
H = height of canopy above tank (ft),
V = desired control velocity (fpm)

V ranges from 100 fpm to 500 fpm, depending on cross drafts

Canopy hoods can be improved by a vertical baffle or curtain wall (located between the hood and the contaminant source) on one or more sides

If the tank can be enclosed so that only one long side is left open and the hood can be kept at the same height from the tank surface, the air requirement for the same control velocity would be reduced by two-thirds

This reduction in air requirement well illustrates the reason for securing hoods which partially or completely enclose the process, even if hoods must be constructed with channels to accommodate monorails or must be made so they will rise or swing to one side for access to the tank or other equipment

The overhead hood takes advantage of the thermal movement of air and mist from warm

°As part of its concept of Standard International units, the International Standards Organization, through its Technical Committee ISO TC-20, has suggested use of the term "micro-meter" in place of "micron"