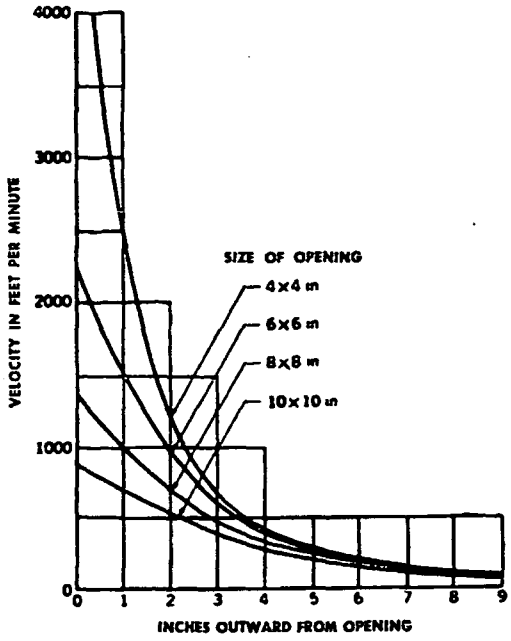


FIG 29-4 —Actual velocities for square openings of different sizes Air flow through each opening is 500 cfm

From Exhaust Hoods *J M DallaValle (The Industrial Press 1952)*

a plant engineer will attempt to improve the exhaust hood by decreasing its size in order to raise the velocity through it This does no good whatsoever, except in very close proximity to the hood face—and often does harm because the total air flow, Q, is then reduced on account of the increased hood resistance "Reaching out" can be achieved only from greater mass air movement

Confusion on this point may arise because common experience shows that air can be *blown* from a pipe or hose for considerable distances Air escaping from a compressed air line, for example, will be felt many feet away Air from a simple desk fan can be felt across the room, a person can blow cigarette smoke for many feet But these processes are not reversible

Figs 29-2 and 29-3 show that air under pressure has a "throw" about thirty times farther than the "pull" on the suction side of the fan or blower Air from the pressure side is discharged in a specific restricted direction Air on the suction side flows into the low pressure area from all directions

To illustrate a propeller fan does not create a breeze at any distance from its inlet side, a person cannot draw into his lungs particles floating in air several feet away from his face, although he can easily make them "churn" by blowing A roof exhaust fan has no magic power to reach down and exhaust air from an area several feet below it

The failure of hood-face velocity to control the velocity induced some distance away from the hood face is shown by measurements made by J M DallaValle (*Exhaust Hoods*, see "References") and illustrated in Fig 29-4 He took four different-size square hoods, 4 × 4, 6 × 6, 8 × 8, and 10 × 10 in , and drew the same quantity of air through each (500 cfm) The face velocities then were high for the small hood and low for the large hood—the calculated velocities varying from 4500 to 720 fpm It is to be noted that only 6 in out from the hood face "capture" velocities had fallen to practically the same value (200 to 250 fpm) for all four hoods

The purpose of most exhaust hoods is to set up air movement at the point or area where the contaminant is released so a sufficiently large percentage of it will be drawn to the hood and captured In selecting this control velocity, Table 29-B may serve as a guide

Baffles and enclosures. Most control velocities are relatively low, and can be nullified by drafts from cross breezes or nearby moving equipment For example, a person

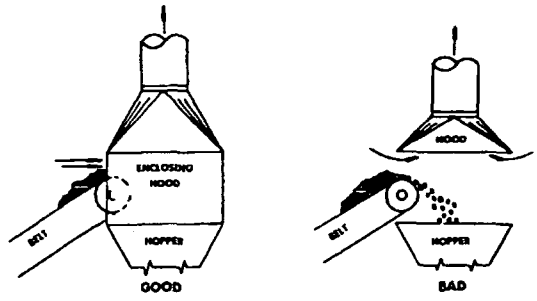


FIG 29-5 —Enclosure The more completely the hood encloses the source, the less air is required for control

Courtesy American Conference of Governmental Industrial Hygienists