

EXHAUST SYSTEMS, GENERAL & COMFORT VENTILATION

than the 5,440 cfm required before, even though the hood is 50 per cent larger in area. The distance of the hood from the range (X) is now the same as the hood width (W), that is, it is $1.0W$, instead of being $1.25W$ as before, and results in more effective utilization of air.

The amount a canopy hood should extend beyond the cooking equipment is regulated in many cities by ordinance, and of course in such cases the ordinance should be complied with. Where there is no code, it is customary to increase the dimension of a canopy hood 4 to 5 inches for every foot of distance between the hood face and operating surface (range, fryer, etc.). Some designers use a minimum overhang of 12 in.

A rectangular exhaust hood placed along the wall at the back of deep fat fryers and grills can be installed closer to the source of smoke and odor. In effect it becomes a lateral exhaust for an "open-surface tank," and may be designed as already outlined in the section under that heading. The smoke and oil vapor are trapped before they rise from the cooking unit, and they have less chance to spread through the room. As always, end baffles further improve the operation.

Grease filters are desirable in all kitchen hoods, including the lateral exhaust type, for two reasons: they prevent grease from entering the duct, where it condenses, causing a fire hazard, and when placed in the hood itself, they serve as excellent diffusers to assure a uniform distribution of air over the hood opening, which is generally large in area. Grease filters, however, add resistance to the system, sometimes as much as 0.5 in. water gauge. The exhaust fan should be able to handle the necessary volume of air over the range of filter resistance pressures. Grease filters should be cleaned regularly.

An approved fire damper with a fusible link should be installed in the main exhaust duct or branch adjacent to the range hood. This is required by code in many states.

Recirculation of "cleaned" air

When the rate of air exhausted by a contaminant control system is high, either in absolute number of cfm or in comparison to the cubical contents of the room, the suggestion may be made to recirculate the

cleaned air. One of two reasons may be put forward. It is often argued that the dollars-and-cents savings in heat will be so worthwhile that recirculation is attractive, or the existing heating system may have so little reserve capacity that recirculation will be the only way to maintain a comfortable working temperature. There are some basic principles to follow in deciding whether to recirculate or to provide tempered make-up air.

First, savings in fuel or in heating plant capacity are never a valid reason for recirculating air if the original air contaminant is a potential health hazard. For example, if the exhaust system is installed to control free silica dust, lead dust, other toxic dusts, harmful gases, or solvent vapors, the effluent should be exhausted outdoors. Even if the dust filter or other arrester is operating at high efficiency, so the concentration of contaminant downstream is normally within safe limits, a breakdown can always occur which would cause dangerous amounts of material to be blown back into the workroom.

Second, if the contaminant is harmless and, if after passing through a dust, mist, fume, or vapor separator, the effluent is no more contaminated than the outdoor air, recirculation would be safe.

Third, there should be no recirculation during warm weather, even if the contaminant is of the most harmless sort. The local exhaust system, discharging outdoors, will add to the general room ventilation, and so make the area more comfortable. This is particularly true if any of the processes discharge heat or steam.

Fourth, in every recirculation system, therefore, a Y-connection should be included in the discharge of the arrester. One leg should go to the outdoors, and the other should lead to the recirculation ductwork. Adjustable dampers should be arranged so that when the control is in one position, 100 per cent of the air will be discharged outdoors, and when in the opposite position, 100 per cent will be sent back to the room. Various in between adjustments can be made depending on the outdoor air temperature.

A further advantage of this Y is that should the arrester break down, the uncollected contaminant can immediately be blown outdoors, instead of the workroom.