

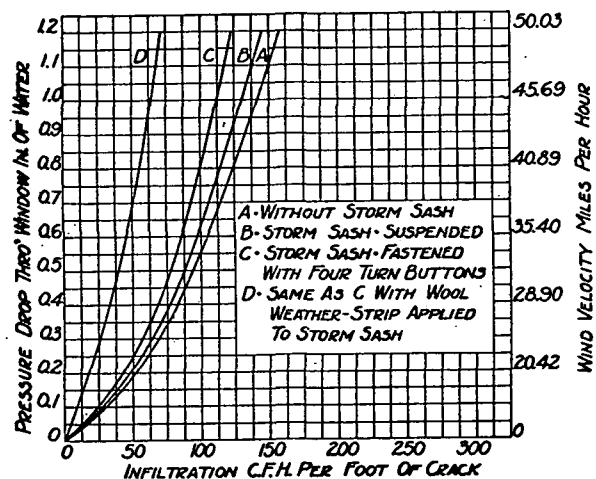


FIG. 6. INFILTRATION THROUGH SASH PERIMETER OF WINDOW, WITH AND WITHOUT STORM SASH— $\frac{5}{64}$ IN. CRACK AND $\frac{1}{32}$ IN. CLEARANCE

AIR CHANGE METHOD OF ESTIMATING INFILTRATION

The amount of air leakage is sometimes roughly estimated by assuming a certain number of air changes per hour for each room, the number of changes assumed being dependent upon the type, use and location of the room, as indicated in Table 3.

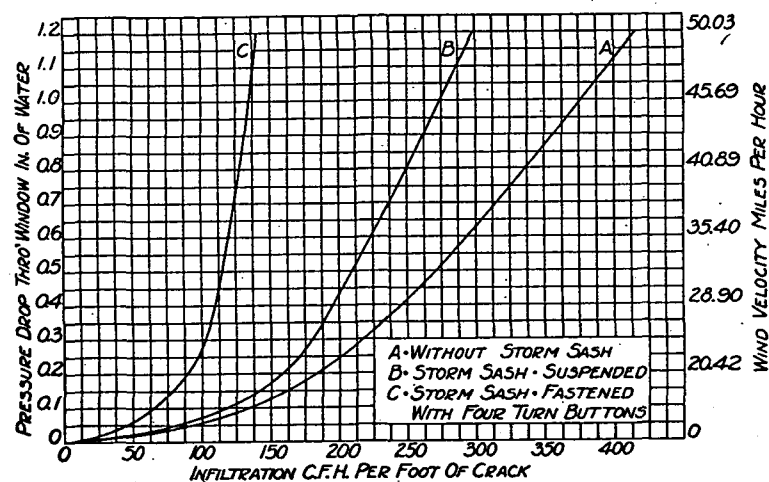


FIG. 7. INFILTRATION THROUGH SASH PERIMETER OF WINDOW WITH AND WITHOUT STORM SASH— $\frac{1}{8}$ IN. CRACK AND $\frac{1}{8}$ IN. CLEARANCE

HEAT REQUIRED TO WARM AIR ENTERING BY INFILTRATION

Because of the influx of cold air by infiltration, provision must be made for the heat required to warm this air to room temperature. The heat required is given by the following equation:

$$H_i = 0.24 Q d (t - t_o) \quad (3)$$

where

H_i = Btu per hour required for heating air leaking into building from outside temperature t_o to inside temperature, t .

Q = cubic feet of air entering per hour at inside temperature, t .

d = density (pounds per cubic foot) of air at inside temperature, t .

t = inside temperature at the proper level.

t_o = outside air temperature for which heating system is designed.

0.24 = specific heat of air.

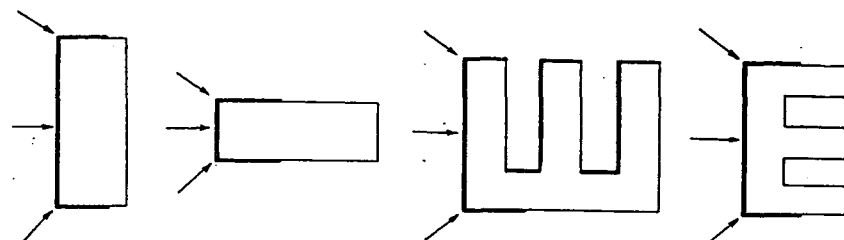


FIG. 8. DIAGRAM SHOWING PART OF PERIMETER OF BUILDING (IN HEAVY OUTLINE) FOR WHICH ALLOWANCE SHOULD BE MADE ON ACCOUNT OF EXPOSURE TO PREVAILING WINDS

It is sufficiently accurate to take $d = 0.075$ lb in which case the equation reduces to

$$H_i = 0.018 Q (t - t_o) \quad (4)$$

While a heating reserve must be provided to warm inleaking air on the windward side of a building, this does not necessarily mean that the heating plant must be provided with a reserve capacity, since the inleaking air, warmed at once by adequate heating surface in exposed rooms, will move transversely and upwardly through the building, thus relieving other radiators of a part of their load. The actual loss of heat of a building caused by infiltration is not to be confused with the necessity for providing additional heating capacity for a given space. Infiltration is a disturbing factor in the heating of a building, and its maximum effect (maximum in the sense of an average of wind velocity peaks during the heating season, above some reasonably chosen minimum) must be met by a properly distributed reserve of heating capacity, which reserve, however, is not in use at all places at the same time, nor in any one place at all times.

Example. Consider a room with four 7 ft x 4 ft. double-hung weatherstripped wood windows with $\frac{1}{8}$ in. crack, and calked frame. Assume a wind velocity of 20 mph and a temperature difference of 70 F. Neglecting chimney effect, what is the maximum heat loss of this room due to infiltration?