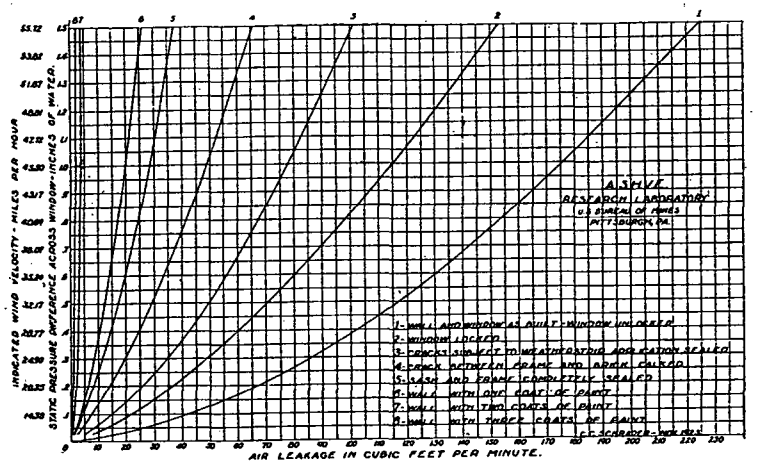


FIG. 4. RESULTS OF TESTS OF LEAKAGE THROUGH VARIOUS PARTS OF WINDOW AND FRAME

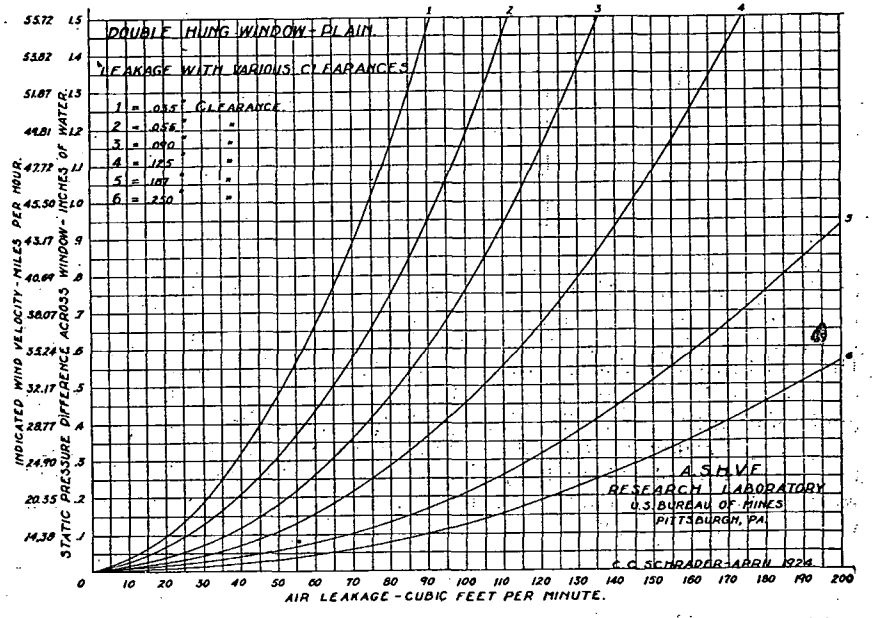


FIG. 5. LEAKAGE THROUGH PLAIN WOOD WINDOW WITH VARIOUS CLEARANCES

Note.—The curves show the leakage for the total crack. To obtain the leakage in cubic feet per hour per foot of crack, multiply by 60 and divide by 18.25.

room with one exposed wall, take all the crack; with two exposed walls, take the wall having the most crack; and with three or four exposed walls, take the wall having the most crack, but in no case take less than half the total crack. For a building having no partitions, whatever wind enters through the cracks on the windward side must leave through the cracks on the leeward side. Therefore, take one half the total crack for computing each side and end of the building.

ALLOWANCE FOR TALL BUILDINGS

In tall buildings, infiltration may be considerably influenced by temperature difference or chimney effect which will operate to produce a head that will add to the effect of the wind at lower levels and subtract from it at higher levels. On the other hand, the wind velocity at lower levels may be somewhat abated by surrounding obstructions. Furthermore, the chimney effect is reduced in multi-story buildings by the partial isolation of floors preventing free upward movement, so that wind and temperature difference may seldom cooperate to the fullest extent. Making the rough assumption that the *neutral zone*[3] is located at mid-height of a building, and that the temperature difference is 70 F, the following formulae may be used to determine an equivalent wind velocity to be used in connection with Tables 1 and 2 that will allow for both wind velocity and temperature difference:

$$M_e = \sqrt{M^2 - 1.75\,a} \qquad (1)$$

$$M_e = \sqrt{M^2 + 1.75\,b} \qquad (2)$$

where

M_e = equivalent wind velocity to be used in conjunction with Tables 1 and 2.

M = wind velocity upon which infiltration would be determined if temperature difference were neglected.

a = distance of windows under consideration from mid-height of building if *above* mid-height.

b = distance if *below* mid-height.

The coefficient 1.75 allows for about one-half the temperature difference head.

Example. If $M = 20$, the equivalent wind velocity at a height of 180 ft from the ground for a building 200 ft high would be

$$M_e = \sqrt{20^2 - 1.75 \times 80} = 16 \text{ mph}$$

For a window on the ground floor:

$$M_e = \sqrt{20^2 + 1.75 \times 100} = 24 \text{ mph}$$

For buildings of unusual height, Equation 1 would indicate negative infiltration at the highest stories which condition may, at times, actually exist, although probably greater wind velocities should be figured at such extremely high levels.

[3]See *Neutral Zone in Ventilating*, by J. E. Emswiler (A.S.H.V.E. TRANSACTIONS, Vol. 32, 1926).