INFILTRATION THROUGH WALLS

Table 1 gives data on infiltration through brick and frame walls. From the results of recent experiments[1], it appears that the data in Table 1 for brick walls are more probably representative of poor workmanship with porous brick and lime mortar. For good workmanship, the leakage through hard brick walls with cement-lime mortar does not exceed one-third the values given. These tests indicate that plastering reduces the leakage by about 96 per cent; a heavy coat of cold water paint, 50 per cent; and 3 coats of oil paint carefully applied, 28 per cent. The infiltration through walls ranges from 6 to 25 per cent of that through windows and doors in a 10-story office building, with imperfect sealing of plaster at the baseboards of the rooms. With perfect sealing the range is from

TABLE 1. INFILTRATION THROUGH WALLS

Expressed in cubic feet per square foot per hour[a]

TYPE OF WALL	WIND VELOCITY, MILES PER HOUR					
	5	10	15	20	25	30
8½ in. Brick Wall—Plain	1.75	4.20	7.85	12.2	18.6	22.9
8½ in. Brick Wall—Plastered	0.017	0.037	0.066	0.107	0.161	0.236
13 in. Brick Wall—Plain	1.44	3.92	7.48	11.6	16.3	21.2
13 in. Brick Wall—Plastered	0.005	0.013	0.025	0.043	0.067	0.097
Frame Wall, with lath and plaster[b]	0.03	0.07	0.13	0.18	0.23	0.26
Frame Wall, with lath and plaster[c]	0.02	0.05	0.10	0.15	0.20	0.25

[a]The values in this table are 20 per cent less than test values to allow for building up of pressure in rooms.
[b]Wall construction: No. 1 common butt-edged sheathing, building paper, bevel siding painted, wood lath and 3 coats gypsum plaster.
[c]Wall construction: Shiplap sheathing, building paper, cedar shingle, wood lath and 3 coats gypsum plaster.

0.5 to 2.7 per cent or a practically negligible quantity, which indicates the importance of good workmanship in proper sealing at the baseboard. It will be noted from Table 1, that the infiltration through properly plastered walls can be neglected.

The value of building paper when applied between sheathing and shingles is indicated by Fig. 1, which represents the effect on outside construction only without lath and plaster. In a complete wall, the value of the paper would of course be much less than that shown because plastering practically eliminates the leakage.

The amount of infiltration that may be expected through simple walls used in farm and other shelter buildings, is shown in Fig. 2. The infiltration there indicated is that determined in the laboratory and should be multiplied by the factor 0.80 to give proper working values.

[1]*Air Infiltration through Various Types of Brick Wall Construction*, by Larson, Nelson and Braatz [A.S.H.V.E. JOURNAL (Heating, Piping and Air Conditioning), November, 1929].

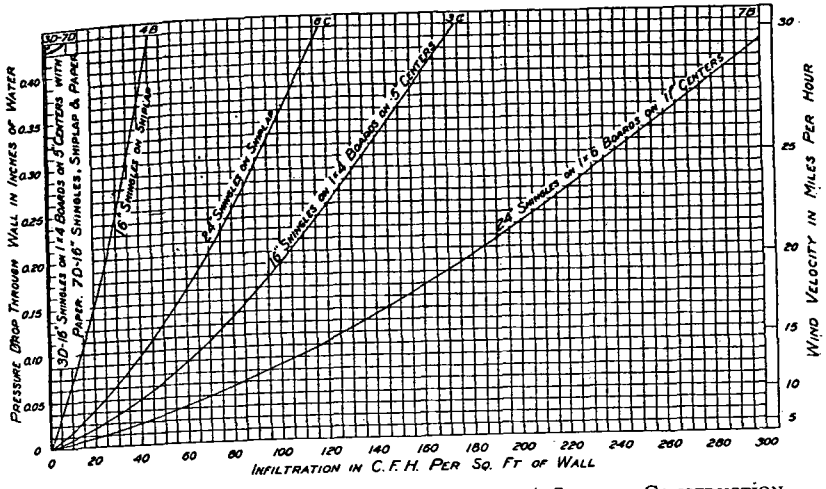

FIG. 1. INFILTRATION THROUGH VARIOUS TYPES OF SHINGLE CONSTRUCTION

INFILTRATION THROUGH WINDOWS

The amount of infiltration in cubic feet per hour per foot of crack for various types of windows is given in Table 2. The distinction between *crack* and *clearance* of a wood sash is shown by Fig. 3. *For window and sash leakage*, the length of crack in double-hung windows is equal to the perimeter of sash plus length of meeting rail. For steel sash the length of crack is the aggregate perimeter of the movable or ventilating sections

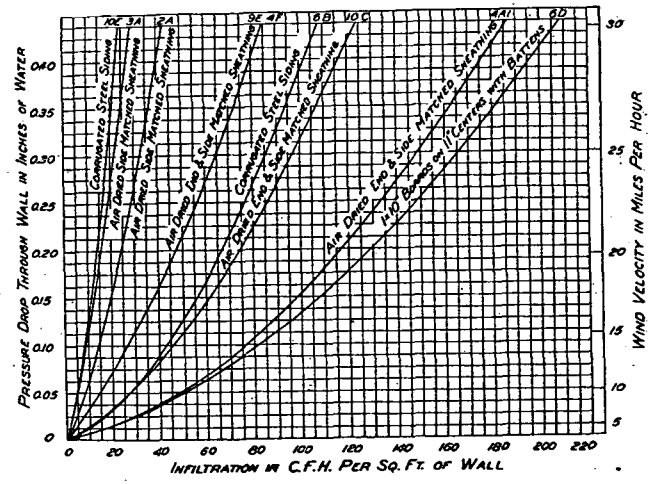

FIG. 2. INFILTRATION THROUGH SINGLE SURFACE WALLS USED IN FARM AND OTHER SHELTER BUILDINGS