Basements and Unheated Rooms

The heat loss through floors into basements and into unheated rooms kept closed may be computed by assuming a temperature for these rooms of 32 F.

Additional information on the inside and outside temperatures to be used in heat loss calculations is given in Chapter 7.

TABLE 18. COEFFICIENTS OF TRANSMISSION (*U*) OF DOORS, WINDOWS AND SKYLIGHTS

Coefficients are based on a wind exposure of 15 mph, and are expressed in Btu per hour, per square foot, per degree Fahrenheit difference in temperature between the air inside and outside of the door, windor or skylight.

A. Windows and Skylights

	U
Single	1.13[a-c]
Double	0.45[a]
Triple	0.281[a]

B. Solid Wood Doors[b-c]

Nominal Thickness Inches	Actual Thickness Inches	*U*
1	$\frac{25}{32}$	0.69
1¼	1$\frac{1}{16}$	0.59
1½	1$\frac{5}{16}$	0.52
1¾	1$\frac{3}{8}$	0.51
2	1$\frac{5}{8}$	0.46
2½	2$\frac{1}{8}$	0.38
3	2$\frac{5}{8}$	0.33

[a] See *Heating, Ventilating and Air Conditioning*, by Harding and Willard, revised edition, 1932.
[b] Computed using $C = 1.15$ for wood; $f_i = 1.65$ and $f_o = 6.0$.
[c] It is sufficiently accurate to use the same coefficient of transmission for doors containing thin wood panels, as that of single panes of glass, namely, 1.13 Btu per hour per square foot per degree difference between inside and outside air temperature.

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Chapter 6

AIR FILTRATION

Causes of Air Leakage, Air Leakage Through Walls, Window Leakage, Wind Velocity to be Selected, Crack used for Computations, Multi-Story Buildings, Heat Equivalent of Air Entering by Infiltration

INFILTRATION (or exfiltration) losses are those resulting from the displacement of heated air in a building by unheated outside air, the interchange taking place through various apertures in the building, such as cracks around doors and windows, fireplaces and chimneys. This leakage of air must be considered in heating and cooling calculations. (See Chapters 7 and 8).

CAUSES OF AIR LEAKAGE

A building is a shell in which the internal pressure in general is not in equilibrium with the external pressure. At some places, the latter is greater than the former, and inflow will occur in such regions through any openings in the wall whether large or small. At other places the reverse is true. The internal pressure automatically assumes a value to correspond to the requirement that outflow must equal inflow. The agencies that cause leakage are the natural forces of wind and temperature difference, and those produced by fans if any are used. A consideration of all factors involved in causing pressure difference at various places about a building would present an exceedingly complex problem.

In tall single story buildings, the *chimney effect* caused by the inside-outside temperature difference becomes a factor of importance. Even in multi-story buildings it usually is not possible to isolate the several floors completely, and chimney effect is operative to a considerable degree, tending to force air in at the lower levels and out at the upper.

Since the full force of the wind usually is not the effective pressure differential, owing to back pressure built up within the building, the actual amount of infiltration (cubic feet) is assumed to be 80 per cent of that determined in laboratory experiments.

AIR LEAKAGE THROUGH WALLS

Table 1[1] gives data on infiltration through brick and frame walls. The brick walls listed in this table are walls which show poor workmanship

[1] Air Infiltration through Various Types of Brick Wall Construction, by Larson, Nelson and Braatz (A.S.H.V.E. TRANSACTIONS, Vol. 36, 1930).