vertical wall spaces or ventilators may be estimated by means of the following formula:

$$t_b = \frac{t\ U_{ce} + n\ t_o\ U_r}{U_{ce} + n\ U_r} \tag{11}$$

where

t = inside temperature near ceiling.
t_b = temperature in attic.
t_o = outside temperature.

If in the foregoing problem, involving the determination of the combined coefficient of transmission, the inside temperature t is 70 F and the outside temperature is $-$ 10 F, the attic temperature based on equation 11 will be:

$$t_b = \frac{70 \times 0.588 + 1.2 \times (-10) \times 0.605}{0.588 + 1.2 \times 0.605} = 26 \text{ F.}$$

As previously stated, if the attic contains windows, ventilators, etc., the attic temperature will approach or equal the outside temperature, the roof will provide little or no resistance to the passage of heat, and the heat loss through the upper part of the building may be estimated by assuming the attic temperature to be the same as the outside temperature and using the heat transmission coefficient of the ceiling.

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.

AREAS WHERE TRANSMISSION LOSSES OCCUR

Heat is lost from a building by transmission through all of those surfaces which separate heated spaces from the outside air or from unheated colder spaces within the building. In general, five kinds of surfaces are involved: (1) outside walls; (2) outside glass; (3) inside walls or partitions next to unheated spaces; (4) ceilings of upper floors, either below a cold attic space or as the underside of a roof slab, and (5) floors of heated rooms above an unheated space. In most cases, only items (1) and (2), outside wall and glass surface, are considered. Failure to take account of the other heat-losing surfaces, items (3), (4) and (5), when they exist in a building, has generally resulted in more or less dissatisfaction with the operation of the heating plant, as a result of failure to heat the rooms having such surfaces as indicated by items (3), (4) and (5).

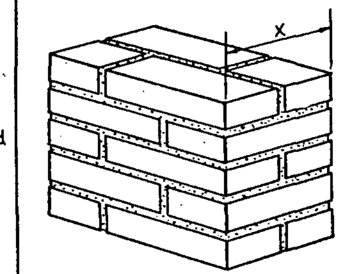
The net outside wall surface is usually determined by reference to the scale plans and elevations of the building concerned. In some cases, of course, the actual building may have to be measured. The total area of all outside openings which are occupied by windows and doors is accurately measured and listed as *glass*. The *glass* area is then deducted from the total outside wall area for each room and the difference is the net wall area. The outside wall areas for any floor should be based on the vertical floor-to-floor heights and the horizontal distance from center to center of partitions separating different rooms. If there are no partitions, measure from inside face of one wall to inside face of next wall. The areas of

TABLE 9. COEFFICIENTS OF TRANSMISSION (U) OF SOLID BRICK WALLS[b]

Note.—THESE COEFFICIENTS ARE EXPRESSED IN BTU PER HOUR PER SQUARE FOOT PER 1 DEG FAHR DIFFERENCE IN TEMPERATURE BETWEEN THE AIR ON THE TWO SIDES AND ARE BASED ON AN OUTSIDE WIND EXPOSURE OF 15 MILES PER HOUR.

The values of U in this Table are based on the following Internal Conductivities or Conductances which are expressed in B.t.u. per Hr. per Sq. Ft. per 1°F

Brick	5.00 per 1"
Cement Mortar	8.00 per 1"
Plaster board	3.73 per 3/8"
Plaster (Gypsum)	2.32 per 1"
Wood Lath & Plaster	2.00 as applied
Cork board	0.30 per 1"
Rigid Insulation (Board form)	0.33 per 1"
Cellular Gypsum (18#)	0.59 per 1"
Flaked Gypsum, Dry (24#)	0.48 per 1"
Split Furring Tile 1½" = 1.40	2" = 1.25



Y = Thickness of Insulation where specified

Number	Interior Construction	Y	Thickness of Brick – X: 8" A	12" B	16" C
1	Plain Walls – No Interior Finish		0.385	0.295	0.238
2	½" Plaster on Brick		0.356	0.277	0.227
3	¾" Plaster on Metal Lath – Furred		0.261	0.216	0.184
4	½" Plaster on Wood Lath – Furred		0.250	0.208	0.178
5	½" Plaster on ⅜" Plaster board – Furred		0.251	0.209	0.179
6	½" Plaster on Wood Lath on 2" Furring Strips – Cellular Gypsum Fill [c]	1⅝" [a]	0.171	0.151	0.135
7	½" Plaster on Wood Lath on 2" Furring Strips – Flaked Gypsum Fill	1⅝" [a]	0.154	0.137	0.124
8	½" Plaster on Rigid Insulation (Board form) Furred	½"	0.191	0.166	0.146
9		1"	0.148	0.132	0.120
10	½" Plaster on Cork board set in ½" Cement Mortar	1½"	0.127	0.115	0.104
11		2"	0.105	0.097	0.090
12	½" Plaster on 1½" Split Furring Tile set against Wall		0.284	0.231	0.195
13	½" Plaster on 2" Split Furring Tile set against Wall		0.277	0.227	0.192

[a]Based on 1⅝ in., the actual thickness of 2 in. furring strips.
[b]The coefficients on this page can also be used with sufficient accuracy for the Ideal Rolok-Bak Wall.
[c]The coefficient used for cellular gypsum, 0.59 is for 18 lb. weight—weights as low as 12 lb. may be used.