TABLE 5-A. SUMMARY OF HEAT LOSS CALCULATIONS FOR RESIDENCE SHOWN IN FIG. 2

Room or Space No.	Room	Glass Transmission Losses	Other Transmission Losses	Infiltration Losses	Total
1	Living Room	7,100	9,040	8,970	25,110
2	Dining Room	2,640	4,640	742	8,022
3	Kitchen	1,060	3,300	663	5,023
4	Dining Alcove	1,370	3,718	807	5,895
5	Entry	1,888	1,312	4,320	7,520
6	Vestibule	1,854	1,436	3,900	7,190
7	Bedroom (A) and Closet	3,773	3,558	1,445	8,776
8	Bedroom (B) and Closet	3,960	4,070	1,445	9,475
9	Bedroom (C) and Closet	2,900	3,765	1,660	8,325
10	Upstairs Hall	1,450	920	1,660	4,030
11	Bath	1,450	1,940	1,660	5,050
12	Attic (heated)	3,040	28,021	1,125	32,186
GRAND TOTAL of heat required for building in Btu per hour at −8 F with a 17-mile southwest wind					126,602

TABLE 5-B. HEAT LOSS CALCULATION SHEET FOR LIVING ROOM (FIG. 2)

Part of Building	Exposure	Net Surface Area or Crack Length	Coefficient	Temp. Difference	Net Btu	Exposure Factor	Total Btu
Wall	E	75.6	0.263	78	1,550		1,550
Glass	E	15.0	1.13	78	1,320		1,320
Crack 1/16 in.[a]	E	19.0	0.5	78	(742)[d]		
Wall[b]	S	127.6	0.263	78	2,620	1.15	3,010
Doors	S	42.0	1.13[c]	78	3,710	1.15	4,260
Crack 1/16 in.	S	40.0	2.50	78	7,800	1.15	8,970[d]
Wall	W	75.6	0.263	78	1,550	1.15	1,780
Glass	W	15.0	1.13	78	1,320	1.15	1,520
Crack 1/16 in.[a]	W	19.0	0.50	78	(742)[d]		
Floor	Over Basement	241.0	0.339	33[e]	2,700		2,700
GRAND TOTAL of heat required for room in Btu per hour at −8 F with a 17-mile southwest wind							25,110

[a] Windows weatherstripped.

[b] Chimney figured as part of wall, that is, of the same construction.

[c] Transmission coefficient taken same as glass for entire door.

[d] Three sides of this room are exposed and therefore only the wall having the greatest infiltration loss is used in estimating the total leakage for the room. If the infiltration loss for the south side of the room containing the two outside doors had been less than half the total infiltration loss for the room, then half the total leakage would have been used.

[e] Air temperature at floor assumed 65 F. Air temperature in basement assumed 32 F.

Chapter 3

HEAT TRANSFER THROUGH MATERIALS AND CONSTRUCTIONS

Transmission Coefficients by Test; Transmission Coefficients by Computation; Areas where Transmission Losses Occur; Calculations for Transmission Losses; Condensation on Building Surfaces; Sun Effect on Buildings.

THIS chapter relates primarily to the loss of heat by conduction through solid materials, such as the exterior walls, roof, glass, etc. of a building, under equilibrium conditions. These *transmission losses*, as they are termed, are computed by taking into account the heat transmission coefficients of the various structural members involved. (See par. 5, p. 11). These coefficients may be determined experimentally by test, or they may be calculated with sufficient accuracy when certain physical constants are known.

TRANSMISSION COEFFICIENTS BY TEST

The standard method of testing built-up wall sections is by means of the *guarded hot-box*.[1] The *Nicholls Heat Meter*[2] may be used for testing actual walls of buildings.

If the hot-box method is used, tests are usually run under still-air conditions, which means there was no wind movement during the test over the surfaces of the wall. In practice, some wind movement over the exterior surface of the wall should always be allowed for; hence, still-air coefficients cannot be used in actual work as they do not provide for the normal wind movement over the outside of the building in the locality in question during the heating season. Moreover, still-air transmission coefficients cannot be corrected to provide for moving-air conditions by multiplying by a single constant factor.

It would be obviously impossible to determine the air-to-air heat transmission coefficients of every type of wall construction in use with the heat meter or the hot-box on account of the great amount of time involved. Hence, the method of computing the coefficients from fundamental constants must be resorted to in most cases, but heat-meter and the hot-box tests can be used to good advantage in checking the accuracy of the computed values.

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[1] See *Standard Code for Heat Transmission through Walls* (A.S.H.V.E. TRANSACTIONS, Vol. 34, 1928).

[2] See *Measuring Heat Transmission in Building Structures and a Heat Transmission Meter*, by P. Nicholls (A.S.H.V.E. TRANSACTIONS, Vol. 30, 1924).