NOTES FOR TABLE 8.

[a] The inside-outside temperature difference is 70− (−10) or 80 F except where otherwise noted.

[b] Volume of infiltration, cfh = (no. air changes) x (floor or ceiling area) x (ceiling height).

[c] From Equation 5a.

[d] The ceiling heat losses are calculated by estimating the attic temperature and then calculating the loss through the ceiling using the proper temperature difference. This unheated attic is not ventilated during winter months. The attic temperature is estimated from Equation 1 to be 30.2 F when the outside temperature is −10 F and room temperature is 70 F. The temperature difference is then 70−30.2 or 39.8 deg. For the insulated residence, attic temperature becomes 4.6 F and temperature difference 70−4.6 = 65.4 deg.

[e] Temperature in garage assumed to be 35 F.

[f] Coefficient for wall adjoining garage calculated on basis of metal lath and plaster on both sides of studs (U = 0.39).

[g] One half of value from Table 4, Chapter 11, for storm windows or weatherstripping.

[h] Exposed on two sides, weatherstripped windows offset by fire-place. Use 1½.

[i] Window on one side weatherstripped but double-doors are hard to close tightly. Hence, conservative value of 1½.

[j] Assuming kitchen vent, door to vestibule usually open, allow full table value of 1½.

[k] One-half value in Table 4, Chapter 11, increased to 1½ by nearby outside door in vestibule.

[l] Full value in Table 4, Chapter 11, to allow for frequent opening of outside door.

[m] Two sides exposed, large doors but large volume. Use value 1½ as given in Table 4, Chapter 11.

[n] Two small unweatherstripped windows in protected location, but fireplace, indicate 1 change.

[p] Heat losses from these rooms into garage are heat gains for garage.

[q] Neglect heat loss to basement, as losses from boiler, piping, etc., will probably keep basement near, if not above, 70 F.

[r] Upstairs hall ceiling figures with downstairs. Heat should be provided downstairs for both.

[s] Linear feet of exposed edge.

TABLE 9. SUMMARY OF HEAT LOSSES OF UNINSULATED RESIDENCE (*Btu Per Hour*)

Room or Space	Walls	Ceiling and Roof	Floor	Glass and Door	Infil-tration	Totals
Bedroom A	5330	6910	...	1440	2180	15,860
Bedroom B	3490	4660	...	1440	1470	11,060
Bedroom C	2560	3540	...	970	1260	8,330
Bedroom D	2650	3020	960	720	950	8,300
Bathroom 1	670	1510	...	500	630	3,310
Bathroom 2	1640	960	310	320	400	3,630
Lving Room	7260	...	...	1800	5400	14,460
Dining Room	3720	...	...	3100	3080	9,900
Kitchen	2850	...	...	950	2300	6,100
Lavette	3000	...	...	1100	550	4,650
Entrance Hall	870	2390	...	640	1600	5,500
Garage	−1030[a]	−1270[b]	1060	3710	1910	4,380
Recreation	840	...	570	720	2890	5,020
Design Totals	33,850	21,720	2,900	17,410	24,620	100,500
Operating Totals[c]	33,850	21,720	2,900	17,410	12,310	88,190
Percentages[d]	38.4	24.6	3.3	19.7	14.0	100.0

[a] Wall heat loss of 2110 Btuh minus wall heat gains of 1280, 700 and 1160 Btuh. [b] Heat gains of 960 and 310 Btuh. [c] Based on ½ computed infiltration. [d] Based on operating totals.

TABLE 10. SUMMARY OF HEAT LOSSES OF INSULATED RESIDENCE (*Btu Per Hour*)

Room or Space	Walls	Ceiling and Roof	Floor	Glass and Door	Infil-tration	Totals
Bedroom A	2480	2460	...	1440	2180	8,560
Bedroom B	1620	1660	...	1440	1470	6,190
Bedroom C	1190	1260	...	970	1260	4,680
Bedroom D	1230	1080	690	720	950	4,670
Bathroom 1	310	540	...	500	630	1,980
Bathroom 2	760	250	220	320	400	1,950
Living Room	3370	...	...	1800	5400	10,570
Dining Room	1730	...	...	3100	3080	7,910
Kitchen	1320	...	...	950	2300	4,570
Lavette	1390	...	...	1100	550	3,040
Entrance Hall	410	850	...	640	1600	3,500
Garage	−470[a]	−910[b]	1060	3710	1910	5,300
Recreation	840	...	570	720	2890	5,020
Design Totals	16,180	7,190	2,540	17,410	24,620	67,940
Operating Totals[c]	16,180	7,190	2,540	17,410	12,310	55,630
Percentages[d]	29.1	12.9	4.6	31.3	22.1	100.0

[a] Wall heat loss of 980 Btuh minus wall heat gains of 590, 320 and 540 Btuh. [b] Heat gains 690 and 220 Btuh. [c] Based on ½ computed infiltration. [d] Based on operating totals.

are to have storm sash. The building is constructed as follows (heat transmission coefficients U are parentheses):

Walls: Brick veneer, building paper, wood sheathing, studding, metal lath and plaster (0.28). Walls of dormer over garage, same except wood siding in place of brick veneer (0.26).

Attic Walls: Brick veneer, building paper, wood sheathing on studding (0.42).

Basement Walls: 10 in. concrete (0.10).

Roof: Asphalt shingles on wood sheathing on rafters (0.53).

Ceiling (Second floor): Metal lath and plaster (0.69).

Windows: Double-hung wood windows averaging 70 percent glass (0.45; from Chapter 9, Table 19, Section D, the U value for wood windows with storm sash is 0.53 x application factor; by interpolation this factor is 0.85). Steel casement sash in garage and basement (1.13; from Chapter 9, Table 19, U is 1.13 for all glass and the application factor is 1.00). French doors in dining room 50 percent glass, no storm doors (0.85; from Chapter 9, Table 19, U is 1.13 for all glass; by interpolation the application factor is 0.75).

Floor (Bedroom D): Maple finish flooring on yellow pine sub-flooring; metal lath and plaster ceiling below (0.25).

Floor (Basement and Garage): 4 in. stone concrete on 3 in. cinder concrete (0.10).

Solution: The calculations for this problem are given in Table 8, and a summary of the results in Table 9. The values in column F of Table 8 were obtained by multiplying together the figures in columns C, D, and E. The heat losses are calculated to the nearest 10 Btu. See reference notes for Table 7 for further explanation of data.

Attention is called to the summary of heat losses (Table 9) for the uninsulated residence. As storm windows are used in this instance the *glass* and *door* transmission heat losses of 19.8 percent are *relatively* small. The infiltration losses of 14.0 percent are also comparatively small because the storm windows are equivalent to weatherstripping. In this problem, the wall, ceiling and floor transmission losses comprise 66.2 percent of the total.

Example 7: Calculate the heat loss of residence shown in Fig. 2 based on the same conditions as in *Example 6* but having construction improved or insulated to obtain coefficients as follows:

Walls, 0.13; *Walls of Dormer over Garage*, 0.12; *Attic Walls*, 0.28; *Walls Adjoining Garage*, 0.18; *Basement Walls (Recreation Room)*, 0.10.

Roof, 0.53.

Ceiling (Second Floor), 0.15.

Windows (Same as in *Example 6*).

Floor (Bedroom D), 0.18.

Solution: The procedure for calculating the heat losses is similar to that for *Example 6*. A summary of the results is given in Table 10.

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