TABLE 3. HEAT LOSS CALCULATION SHEET FOR UNINSULATED RESIDENCE (FIG. 1)

A	B	C	D	E	F	G
ROOM OR SPACE	PART OF STRUCTURE	NET AREA OR CRACK LENGTH	COEFFICIENT	TEMP. DIFF.[a]	HEAT LOSS (Btu per hour)	TOTALS (Btu per hour)
Bedroom A	Walls	238 sq ft	0.28	80	5330	
	Glass	40 sq ft	0.45	80	1440	
	Infiltration	36 lin ft[b]	0.35[c]	80	1010	
	Ceiling[d]	242 sq ft	0.69	39.8	6660	14,440
Bedroom B and Closet	Walls	156 sq ft	0.28	80	3490	
	Glass	40 sq ft	0.45	80	1440	
	Infiltration	36 lin ft[e]	0.35	80	1010	
	Ceiling[d]	160 sq ft	0.69	39.8	4400	10,340
Bedroom C	Walls	114 sq ft	0.28	80	2560	
	Glass	27 sq ft	0.45	80	970	
	Infiltration	18 lin ft[f]	0.35	80	500	
	Ceiling[d]	120 sq ft	0.69	39.8	3300	7,330
Bedroom D and Closet	Walls	118 sq ft	0.28	80	2650	
	Glass	20 sq ft	0.45	80	720	
	Infiltration	18 lin ft	0.35	80	500	
	Ceiling[d]	120 sq ft	0.69	39.8	3300	
	Floor over Garage	110 sq ft	0.25	35[g]	960[m]	8,130
Bathroom 1	Walls	30 sq ft	0.28	80	670	
	Glass	14 sq ft	0.45	80	500	
	Infiltration	18 lin ft	0.35	80	500	
	Ceiling[d]	55 sq ft	0.69	39.8	1510	3,180
Bathroom 2	Walls	79 sq ft	0.26	80	1770	
	Glass	9 sq ft	0.45	80	320	
	Infiltration	15 lin ft	0.35	80	420	
	Ceiling[d]	35 sq ft	0.69	39.8	960	
	Floor over Garage	35 sq ft	0.25	35	310[m]	3,780
Living Room	Walls	267 sq ft	0.28	80	5980	
	Walls (adjoining garage)	94 sq ft	0.39[h]	35	1280[m]	
	Glass	50 sq ft	0.45	80	1800	
	Infiltration	40 lin ft	0.35	80	1120	10,180
Dining Room	Walls	166 sq ft	0.28	80	3720	
	Glass (doors)	35 sq ft	1.13	80	3160	
	Glass (window)	20 sq ft	0.45	80	720	
	Infiltration[i]	31 lin ft	0.35	80	870	8,470
Kitchen and Entrance to Garage	Walls (outside)	96 sq ft	0.28	80	2150	
	Walls (adjoining garage)	51 sq ft	0.39[h]	35	700[m]	
	Infiltration	27 lin ft	0.35	80	760	
	Glass	18 sq ft	0.45	80	650	
	Door to garage	17 sq ft	0.51	35	300[m]	4,560
Lavette and Vestibule	Walls (outside)	82 sq ft	0.28	80	1840	
	Walls (adjoining garage)	85 sq ft	0.39[h]	35	1160[m]	
	Door	19 sq ft	0.51	80	780	
	Glass	9 sq ft	0.45	80	320	
	Infiltration	19 lin ft	0.35	80	530	4,630

TABLE 3. HEAT LOSS CALCULATION SHEET FOR UNINSULATED RESIDENCE (FIG. 1) (Concluded)

A	B	C	D	E	F	G
ROOM OR SPACE	PART OF STRUCTURE	NET AREA OR CRACK LENGTH	COEFFICIENT	TEMP. DIF.[a]	HEAT LOSS (Btu per hour)	TOTALS (Btu per hour)
Entrance Hall	Walls	39 sq ft	0.28	80	870	
	Door	21 sq ft	0.38	80	640	
	Infiltration	20 lin ft	0.35	80	560	
	Ceiling[d, p]	87 sq ft	0.69	39.8	2490	4,560
Garage	Walls	167 sq ft	0.28	45	2110	
	Glass	53 sq ft	1.13	45	2700	
	Doors	44 sq ft	0.51	45	1010	
	Infiltration	37 lin ft	1.62[j]	45	2700	
	Floor (heat gain)	185 sq ft	0.64[k]	−10[k]	−1180	
	Heat gain				−4710[m]	2,630
Recreation[n] Room	Floor	287 sq ft	0.64	25	4600	
	Walls	220 sq ft	0.70	25	3850	
	Glass	8 sq ft	1.13	80	720	
	Infiltration	8 lin ft	0.76	80	490	9,660
Total						91,890

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

[b]Only the south windows are used for arriving at the window crack for this room, on the assumption that whatever air enters through the south window cracks will leave through the west window cracks or elsewhere.

[c]Double-hung wood windows with storm sash are assumed to have the same leakage per foot of crack as weatherstripped windows. The air leakage per foot of crack is about 19.5 cu ft per foot of crack for a wind velocity of 12.5 mph. (See Table 2, Chapter 4.) The heat equivalent of the air leakage per hour per degree temperature difference per foot of crack is obtained by multiplying this value by 0.018, or 19.5 × 0.018 = 0.35.

[d]In this problem 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 the winter months. The attic temperature is estimated from Equation 1 to be 30.2 F when the outside temperature is −10 F and the room temperature is 70 F. The temperature difference is therefore 70 − 30.2 or 39.8 F.

[e]The window crack in the west wall having two windows is used.

[f]One-half the total crack is used in these rooms.

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

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

[i]The door crack is used for estimating the infiltration in this room and as the French doors are weatherstripped the infiltration coefficient is assumed to be the same as in Note b.

[j]The leakage for the garage doors is assumed to be twice that for poorly-fitted double-hung wood windows or about 90 cu ft per foot of crack for a wind velocity of 12.5 mph. The infiltration coefficient is therefore 0.018 × 90 or 1.62.

[k]The ground temperature is assumed to be 45 F and, as the garage temperature is 35 F, the heat transfer will be from the ground to the garage, and this heat gain should therefore be subtracted from the heat loss. The floor coefficient (U = 0.64) is based on 4 in. stone concrete and 3 in. cinder concrete. This coefficient should probably be lower as the ground itself has some heat resistance value. However, complete data are not as yet available.

[m]The heat losses from various rooms into the garage are heat gains for the garage.

[n]Heat is to be provided for the recreation room and this space is therefore figured on the basis of a 70 F temperature. Heat loss into the basement from recreation room is neglected, the calculations being based only on losses through the outside walls, glass and floor. Ground temperature assumed to be 45 F.

[p]The upstairs hall ceiling is included with the downstairs entrance hall because these are connected by means of the stairway. The heat should be provided downstairs.