

FIG. 4. OUTSIDE DESIGN TEMPERATURE BASIS FOR FIGS. 2 AND 3

and 3 give the heat flow through the inside surface of roofs⁵ with details of the construction of the roofs tested. The conditions for which these results are given are: solar radiation for 40 deg north latitude on August 1 as given in Fig. 1, outdoor design temperature reaching a maximum of 95 F as shown in Fig. 4, and an indoor temperature of 75 F. Due to deviations in the tests from design temperature, solar conditions, and typical construction it is believed that the values from Figs. 2 and 3, as well as from Figs. 5, 6, 7, and 8 for walls, may be as much as 20 to 30 per cent below normal design expectations.

Curves in Figs. 5, 6, 7 and 8 were prepared by the A.S.H.V.E. Laboratory from tests made there and show the heat flow through the inside surface of three types of walls for various orientations⁵. The results are given for the following conditions: 90 per cent of the solar radiation given in Fig. 1 for 40 deg north latitude on August 1; outdoor design temperature reaching a maximum of 95 F, as shown in Fig. 4, and an indoor temperature of 78 F and 50 per cent relative humidity.

The heat flow shown in Figs. 2, 3, 5, 6, 7 and 8 is a combination of normal transmission and solar radiation transmission and is the total heat flow through the wall or roof. Due to the heat capacity of walls and roofs there is a time lag² in the transmission of heat through them as shown by the curves. For the types of construction covered in these figures and for the conditions indicated, the heat flow through the inside surface at any given time can be read directly. For other types of construction, the curves may be used as a guide in estimating the heat flow.

TABLE 3. TIME LAG IN TRANSMISSION OF SOLAR RADIATION THROUGH WALLS AND ROOFS

TYPE AND THICKNESS OF WALL OR ROOF	TIME LAG, HOURS
1-in. yellow pine horizontal roof, water proofing, smooth black finish.....	1
2-in. yellow pine horizontal roof, water proofing, smooth black finish.....	1 3/4
4-in. reinforced clay tile horizontal roof, water proofing, slag finish.....	2 1/4
2-in. gypsum horizontal roof, water proofing, slag finish.....	2 1/4
Slate and slaters felt on 2 1/4 in. tongue and grooved yellow pine, sloped roof.....	2 1/2
4-in. gypsum horizontal roof, water proofing, slag finish.....	4 1/2
6-in. concrete horizontal roof, water proofing, slag finish.....	5
1-in. concrete, 4-in. cinders, 1 1/2-in. concrete, water proofing, smooth black finish.....	8
Wood siding, 1-in. sheathing, 2 x 4 studs, lath and plaster.....	2
Wood siding, 1-in. sheathing, 2 x 4 studs (studding space filled with insulation) lath and plaster.....	5
4-in. brick, 1-in. sheathing, 2 x 4 studs, lath and plaster.....	7
4-in. brick, 8-in. tile and plaster.....	10 1/2
13-in. brick, plastered.....	12
9-in. brick, 3 3/4-in. tile, 5 1/4-in. air space, 3 3/4-in. tile and 1 1/4-in. plaster.....	16

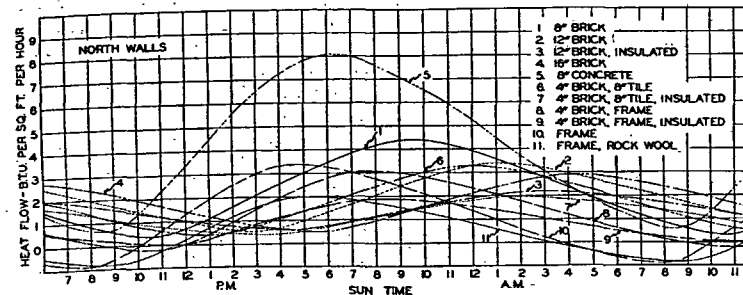


FIG. 5. HEAT FLOW-TIME RELATIONSHIP FOR NORTHERN EXPOSED WALLS

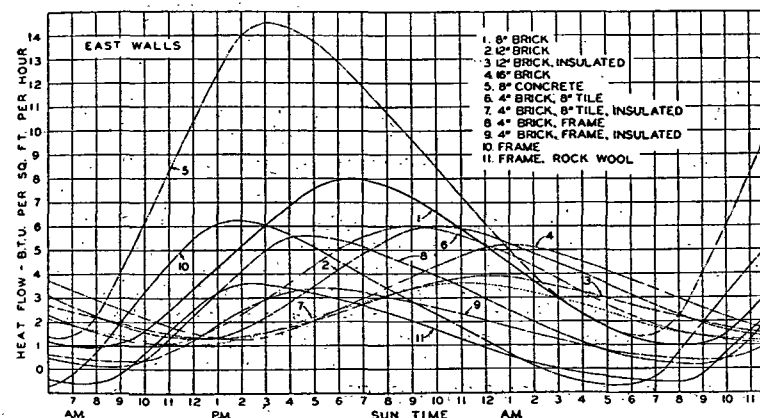


FIG. 6. HEAT FLOW-TIME RELATIONSHIP FOR EASTERN EXPOSED WALLS

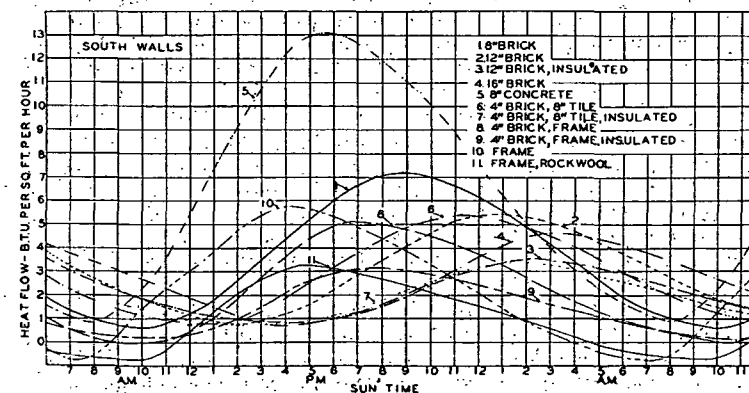


FIG. 7. HEAT FLOW-TIME RELATIONSHIP FOR SOUTHERN EXPOSED WALLS