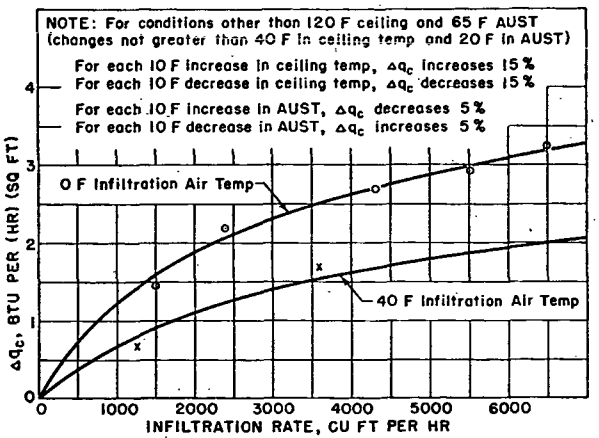


FIG. 11. ADDITIONAL HEAT FLOW FROM CEILING DUE TO INFILTRATION AIR[6]
Ceiling at 120 F, all other surfaces at 65 F (24½ x 12 x 8 ft high room)

Natural convection from heated floor

$$q_c = 0.32\ (t_p - t_a)^{1.31} \tag{8}$$

Natural convection from heated wall

$$q_c = 0.26\ (t_p - t_a)^{1.32} \tag{9}$$

Fig. 10 shows panel convection outputs calculated from these equations.

Infiltration and ventilation increase the convection from panels. Figs. 11 and 12 show the amount of increase Δq_c observed in the ASHAE Environment Laboratory.[6, 7] Equations 7 and 8 and Figs. 11 and 12 were used in the development of the design data for this chapter.

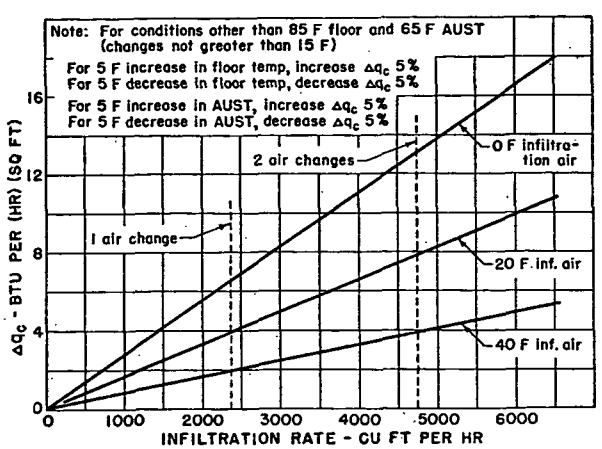


FIG. 12. ADDITIONAL HEAT OUTPUT FROM FLOOR DUE TO INFILTRATION AIR[7]
(Floor 85 F, all other surfaces 65 F; 24½ x 12 x 8 ft high room)

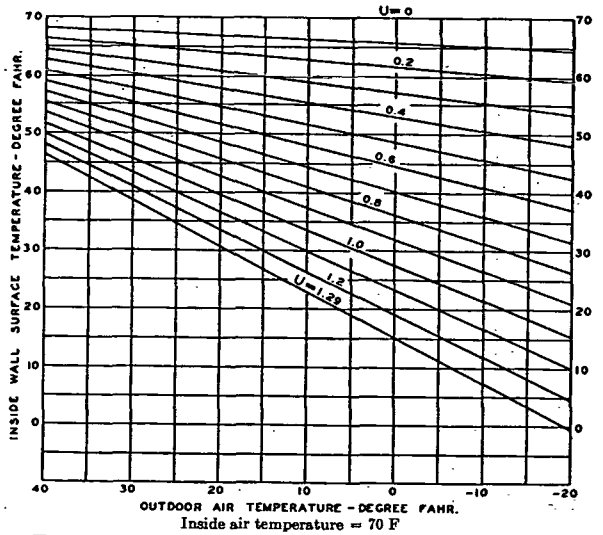


FIG. 13. RELATION OF INSIDE SURFACE TEMPERATURE TO OVERALL COEFFICIENT OF HEAT TRANSFER

Combined Heat Transfer

The heat transfer from a panel to a room can be determined by adding the radiant heat transfer from Fig. 9 to the convective heat transfer from Fig. 10.

Use of Fig. 9 requires the calculation of the AUST, the area-weighted average surface temperature of the unheated surfaces in the room. In

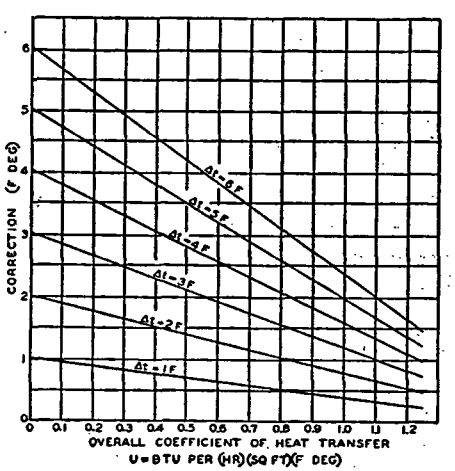


FIG. 14. INSIDE WALL SURFACE TEMPERATURE CORRECTION FOR INSIDE AIR TEMPERATURES OTHER THAN 70 F

$\Delta t = t_a - 70$
If Δt is positive: $t_w' = t_w$ + correction
If Δt is negative: $t_w' = t_w$ − correction

t_a = inside air temperature
t_w = inside wall surface temperature based on t_a = 70 F
t_w' = actual inside wall surface temperature