Table 10. . . . Total Equivalent Temperature Differentials for Calculating Heat Gain Through Sunlit and Shaded Walls

North Latitude Wall Facing	Sun Time A.M. 8		A.M. 10		A.M. 12		P.M. 2		P.M. 4		P.M. 6		P.M. 8		P.M. 10		P.M. 12		South Latitude Wall Facing
	Exterior color of wall—D = dark, L = light																		
	D	L	D	L	D	L	D	L	D	L	D	L	D	L	D	L	D	L	
	Frame																		
NE	22	10	24	12	14	10	12	10	14	14	14	14	10	10	6	4	2	2	SE
E	30	14	36	18	32	16	12	12	14	14	14	14	10	10	6	6	2	2	E
SE	13	6	26	16	28	18	24	16	16	14	14	14	10	10	6	4	2	2	NE
S	−4	−4	4	0	22	12	30	20	26	20	16	14	10	10	6	4	2	2	N
SW	−4	−4	0	−2	6	4	26	22	40	28	42	28	24	20	6	4	2	2	NW
W	−4	−4	0	0	6	6	20	12	40	28	48	34	22	22	8	8	2	2	W
NW	−4	−4	0	−2	6	4	12	10	24	20	40	26	34	24	6	4	2	2	SW
N (Shade)	−4	−4	−2	−2	4	4	10	10	14	14	12	12	8	8	4	4	0	0	S (Shade)
	4 In. Brick or Stone Veneer + Frame																		
NE	−2	−4	24	12	20	10	10	6	12	10	14	14	12	12	10	10	6	4	SE
E	2	0	30	14	31	17	14	14	12	12	14	14	12	12	10	8	6	6	E
SE	2	−2	20	10	28	16	26	16	18	14	14	14	12	12	10	8	6	6	NE
S	−4	−4	−2	−2	12	6	24	16	26	18	20	16	12	12	8	8	4	4	N
SW	0	−2	0	−2	2	2	12	8	32	22	36	26	34	24	10	8	6	6	NW
W	0	−2	0	0	4	2	10	8	26	18	40	28	42	28	16	14	6	6	W
NW	−4	−4	−2	−2	2	2	8	6	12	12	30	22	34	24	12	10	6	6	SW
N (Shade)	−4	−4	−2	−2	0	0	6	6	10	10	12	12	12	12	8	8	4	4	S (Shade)
	8 In. Hollow Tile or 8 In. Cinder Block																		
NE	0	0	0	0	20	10	16	10	10	6	12	10	14	12	12	10	8	8	SE
E	4	2	12	4	24	12	26	14	20	12	12	10	14	12	14	10	10	8	E
SE	2	0	2	0	16	8	20	12	20	14	14	12	14	12	12	10	8	6	NE
S	0	0	0	0	2	0	12	6	24	14	26	16	20	14	12	10	8	6	N
SW	2	0	2	0	2	0	6	4	12	10	26	18	30	20	26	18	8	6	NW
W	4	2	4	2	4	2	6	4	10	8	18	14	30	22	32	22	18	14	W
NW	0	0	0	0	2	0	4	2	8	6	12	10	22	18	30	22	10	8	SW
N (Shade)	−2	−2	−2	−2	−2	−2	0	0	6	6	10	10	10	10	10	10	6	6	S (Shade)
	8 In. Brick or 12 In. Hollow Tile or 12 In. Cinder Block																		
NE	2	2	2	2	10	2	16	8	14	8	10	6	10	8	10	10	10	8	SE
E	8	6	8	6	14	8	18	10	18	10	14	8	14	10	14	10	12	10	E
SE	8	4	6	4	6	4	14	10	18	12	16	12	12	10	12	10	12	10	NE
S	4	2	4	2	4	2	4	2	10	6	16	10	16	12	12	10	10	8	N
SW	8	4	6	4	6	4	8	4	10	6	12	8	20	12	24	16	20	14	NW
W	8	4	6	4	6	6	8	6	10	6	14	8	20	16	24	16	24	16	W
NW	2	2	2	2	2	2	4	2	6	4	8	6	10	8	16	14	18	14	SW
N (Shade)	0	0	0	0	0	0	0	0	2	2	6	6	8	8	8	8	6	6	S (Shade)
	12 In. Brick																		
NE	8	6	8	6	8	4	8	4	10	4	12	6	12	6	10	6	10	6	SE
E	12	8	12	8	12	8	10	6	12	8	14	10	14	10	14	8	14	8	E
SE	10	6	10	6	10	6	10	6	10	6	12	8	14	10	14	10	12	8	NE
S	8	6	8	6	6	4	6	4	6	4	8	4	10	6	12	8	12	8	N
SW	10	6	10	6	10	6	10	6	10	6	10	8	10	8	12	8	14	10	NW
W	12	8	12	8	12	8	10	6	10	6	10	6	10	6	12	8	16	10	W
NW	8	6	8	6	8	4	8	4	8	4	8	4	8	6	10	6	10	6	SW
N (Shade)	4	4	2	2	2	2	2	2	2	2	2	2	2	2	4	4	6	6	S (Shade)

Table 10 . . . .Total Equivalent Temperature Differentials for Calculating Heat Gain Through Sunlit and Shaded Walls (Concluded)

North Latitude Wall Facing	Sun Time A.M. 8		A.M. 10		A.M. 12		P.M. 2		P.M. 4		P.M. 6		P.M. 8		P.M. 10		P.M. 12		South Latitude Wall Facing
	Exterior color of wall—D = dark, L = light																		
	D	L	D	L	D	L	D	L	D	L	D	L	D	L	D	L	D	L	
	8 In. Concrete or Stone or 6 In. or 8 In. Concrete Block																		
NE	4	2	4	0	16	8	14	8	10	6	12	8	12	10	10	8	8	6	SE
E	6	4	14	8	24	12	24	12	18	10	14	10	14	10	12	10	10	8	E
SE	6	2	6	4	16	10	18	12	18	12	14	12	12	10	12	10	10	8	N
S	2	1	2	1	4	1	12	6	16	12	18	12	14	12	10	8	8	6	NE
SW	6	2	4	2	6	2	8	4	14	10	22	16	24	16	22	16	10	8	NW
W	6	4	6	4	6	4	8	6	12	8	20	14	28	18	26	18	14	10	W
NW	4	2	4	0	4	2	4	4	6	6	12	10	20	14	22	16	8	6	SW
N (Shade)	0	0	0	0	0	0	2	2	4	4	6	6	8	8	6	6	4	4	S (Shade)
	12 In. Concrete or Stone																		
NE	6	4	6	2	6	2	14	8	14	8	10	8	10	8	12	10	10	8	SE
E	10	6	8	6	10	6	18	10	18	12	16	10	12	10	14	10	14	10	E
SE	8	4	8	4	6	4	14	8	16	10	16	10	14	10	12	10	12	10	NE
S	6	4	4	2	4	2	4	2	10	6	14	10	16	12	14	10	10	8	N
SW	8	4	8	4	6	4	6	4	8	6	10	8	18	14	20	14	18	12	NW
W	10	6	8	6	8	6	10	6	10	6	12	8	16	10	24	14	22	14	W
NW	6	4	6	2	6	2	6	4	6	4	8	6	10	8	18	12	20	14	SW
N (Shade)	0	0	0	0	0	0	0	0	2	2	4	4	6	6	8	8	6	6	S (Shade)

Notes for Table 10

Explanation: {Total heat transmission from solar radiation and temperature *difference* between outside and room air, Btu per (hr) (sq ft wall area)} = {Equivalent temperature differential from above table} × {Heat transmission coefficient for wall, Btu per (hr) (sq ft) (F deg)}

1. *Source.* Same as Table 9. A north wall has been assumed to be a wall in the shade; this is practically true. Dark colors on exterior surface of walls have been assumed to absorb 90 percent of solar radiation and reflect 10 percent; white colors absorb 50 percent and reflect 50 percent. This includes some allowance for dust and dirt since clean, fresh white paint normally absorbs only 40 percent of solar radiation.

2. *Application.* These values may be used for all normal air conditioning estimates, usually without corrections, when the load is calculated for the hottest weather. Correction for latitude (Note 3) is necessary only where extreme accuracy is required. There may be jobs where the indoor room temperature is considerably above or below 80 F, or where the outdoor design temperature is considerably above 95 F, in which case it may be desirable to make correction to the temperature differentials shown. The solar intensity on all walls other than east and west varies considerably with time of year.

3. *Corrections. Outdoor* minus room temperature. If the outdoor maximum design temperature minus room temperature is different from the base of 15 deg, correct as follows: When the difference is greater (or less) than 15 deg, add the excess to (or subtract the deficiency from) the above differentials.

Outdoor daily range temperature. If the daily range of temperature is less than 20 deg, add 1 deg to every 2 deg lower daily range; if the daily range is greater than 20 deg, subtract 1 deg for every 2 deg higher daily range. For example, the daily range in Miami, Florida is 12 deg, or 8 deg less than 20 deg; therefore, the correction is +4 deg.

Color of exterior surface of wall. Use temperature differentials for light walls only where the permanence of the light wall is established by experience. For cream colors use the values for light walls. For medium colors interpolate half way between the dark and light values. Medium colors are medium blue, medium green, bright red, light brown, unpainted wood, natural color concrete, etc. Dark blue, red, brown, green, etc., are considered dark colors.

For latitudes other than 40 deg north; and in other months. These table values will be approximately correct for the east or west wall in any latitude (0 deg to 50 deg North or South) during the hottest weather. In the lower latitudes when the maximum solar altitude is approximately 90 deg to 90 deg (the maximum occurs at noon) the temperature differential for either a south or north wall will be approximately the same as a north, or shade wall. The temperature differential (t_e) for any wall facing, and for any latitude for any month may be approximated as follows:

$$t_e = t_p + \frac{I_2}{I_1} \times (t_m - t_p)$$

where

t_p = temperature differential for the same wall in shade for desired time of day; obtained from Table 10.

I_1 = maximum solar radiation intensity transmitted through glass, Btu per (hr) (sq ft) for particular wall facing, in July, 40 deg north latitude (*note:* this is maximum value irrespective of time).

I_2 = same as I_1 except use the maximum value for wall facing, for month, and latitude desired for t_e.

t_m = temperature differential for particular wall facing, for the desired time of day from above table.

(*Note that this makes adjustment only for solar radiation, and that there may be additional correction for outdoor temperature.*)

4. *For insulated walls* use same temperature differentials as used for uninsulated walls.