

Table 22.... Instantaneous Rates of Heat Gain Due to Transmitted Direct and Diffuse Solar Radiation by Unshaded Skylights of Hollow Glass Block of Types VI and VII Patterns
For Clear Atmospheres and 18 Deg Declination, North (August 1)

Note: For total instantaneous heat gain add these values to Table 23 values

Instantaneous Heat Gain in Btu per (hr) (sq ft)*									
Sun Time		Type VI			Type VII			Sun Time	
		North Latitude			North Latitude				
		30	40	50	30	40	50		
5 a.m.	7 p.m.	0	0	1	0	0	1	5 a.m.	7 p.m.
6	6	3	4	4	3	4	5	6	6
7	5	7	8	7	10	11	11	7	5
8	4	11	13	14	19	19	18	8	4
9	3	19	19	20	31	29	26	9	3
10	2	29	23	22	41	38	33	10	2
11	1	38	26	23	49	44	38	11	1
12		37	27	22	52	46	39	12	

* Values for Type VI are for panel as assembled. Values for Type VII are for glass block only. See text.

Table 23.... Instantaneous Rates of Heat Gain by Convection and Radiation from Unshaded Skylights of Hollow Glass Block of Types VI and VII Patterns
For Clear Atmosphere and 18 Deg Declination, North (August 1) For 80 F Indoor Temperature

Note: For total instantaneous heat gain, add these values to Table 22 values

Instantaneous Heat Gain in Btu per (hr) (sq ft)*									
Sun Time	Type VI				Type VII				Sun Time
	North Latitude			North Latitude					
	30	40	50	30	40	50			
5 a.m.	-9	-9	-9	-9	-9	-9	5 a.m.		
6	-9	-9	-9	-9	-9	-9	6		
7	-9	-9	-8	-9	-9	-9	7		
8	-7	-5	-4	-7	-7	-5	8		
9	4	5	5	2	4	4	9		
10	14	14	13	11	11	11	10		
11	21	21	19	16	16	15	11		
12	29	27	25	20	20	17	12		
1 p.m.	34	32	29	25	23	22	1 p.m.		
2	37	34	31	27	26	24	2		
3	37	35	32	28	26	25	3		
4	34	32	29	26	25	22	4		
5	29	28	26	24	23	22	5		
6	22	22	22	20	20	19	6		
7	14	14	14	13	13	13	7		

* Values for Type VI are for panel as assembled. Values for Type VII are for glass block only. See text.

Table 24.... Approximate Corrections to Tables 13 and 21 for Deviations from Indoor and Outdoor Design Temperatures

For each degree the design room temperature exceeds 80 F, subtract correction. For each degree the design outdoor dry-bulb temperature exceeds 95 F, add correction. Apply these corrections to each value in Table 13 or Table 21.

Glass Type	Correction Btu per (hr) (sq ft)
Single flat or rolled figured glass	1.0
Double flat glass and glass block	0.5

* If temperature is less than 80 F, add correction.

* If temperature is less than 95 F, subtract correction.

Where air-conditioning supply and return ducts pass through unconditioned spaces, there will be a transfer of heat from these spaces to the air in the ducts, even though these ducts are well insulated. An allowance should be made for this heat gain and included in the heat estimate so that air can be supplied at a temperature low enough to offset the rise caused by this heat gain (see Chapter 21). There will also be some heat gain to the air in ducts passing through conditioned spaces, but since a cooling effect is produced in the space through which the duct passes, this is not a loss and usually can be compensated for by adjustment of air quantities between the various spaces.

No comprehensive data are presently available for use in design load estimates to evaluate the interior load-lag

Cooling Load

Table 25.... Shade Factors for Various Types of Shading

Type of Shading	Finish on Side Exposed to Sun	Shade Factor
Canvas awning sides open	Dark or medium	0.25
Canvas awning top and sides tight against building	Dark or medium	0.35
Inside roller shade, fully drawn*	White, cream	0.41†
Inside roller shade, fully drawn*	Medium	0.62
Inside roller shade, fully drawn*	Dark	0.81
Inside roller shade, half drawn*	White, cream	0.71
Inside roller shade, half drawn*	Medium	0.81
Inside roller shade, half drawn*	Dark	0.91
Inside venetian blind, slats set at 45 deg*	White, cream	0.56†
Inside venetian blind, slats set at 45 deg*	Diffuse reflecting aluminum metal	0.45†
Inside venetian blind, slats set at 45 deg*	Medium	0.65†
Inside venetian blind, slats set at 45 deg*	Dark	0.75†
Outside venetian blind, slats set at 45 deg*	White, cream	0.15†
Outside venetian blind, slats set at 45 deg* extended as awning fully covering window	White, cream	0.15†
Outside venetian blind, slats set at 45 deg, extended as awning covering 3/4 of window*	White, cream	0.43
		Dark*, † Green tin*, †
		0.52 0.46
		0.40 0.35
		0.25 0.24
		0.15 0.22

Outside shading screen, solar altitude 10 deg

Outside shading screen, solar altitude 20 deg

Outside shading screen, solar altitude 30 deg

Outside shading screen, solar altitude, above 40 deg

* Roller shades are assumed to be opaque. Some white shades may transmit considerable solar radiation. For white translucent shades fully drawn use 0.55 and for half drawn use 0.77.

† Venetian blinds are fully drawn and cover window. It is assumed that the occupant will adjust slats to prevent direct rays from passing between slats. If slats are fully closed (slats set at 90 deg) use same factors as used for roller shade fully drawn.

‡ Commercial shade with wide slats. The sun may shine on window through sides of shade. Estimate the exposed portion of glass as unshaded.

§ Commercial shade, bronze. Metal slats 0.85 inches wide 17 per inch and set at 17 deg angle with horizontal. At solar altitudes below 40 deg some direct solar rays are allowed to pass between slats, and this amount becomes progressively greater at low solar altitudes.

¶ Commercial aluminum shade. Slats 0.65 inches wide, 17.5 per inch, set at 17 deg angle with horizontal. At solar altitudes below 40 deg some direct solar rays are allowed to pass between slats and this amount becomes progressively greater at low solar altitudes.

‡ From first paper in Reference 25.

effect, but several investigators^{14, 15, 16, 17, 18, 19} have made a study of the problem and have presented many useful data. Tables 9, 10, 12, 13, 17, 19, 20, 21, 22, and 23 are all based on instantaneous rates of heat transfer. Hence, practical judgment and experience offer the only basis of procedure. Until the needed data become available, it is recommended that the noncontinuous load be averaged over two or three hours during the time of maximum load, when determining the total instantaneous cooling load where a large portion of the heat gain is radiant. This suggestion applies only to conditions near the time of maximum heat gain, as the heat stored within the structure would necessarily appear in the cooling load eventually; but if it appears at a time when the gain from outdoors is relatively low, the equipment will be able to maintain satisfactory conditions within the range of maximum capacity.

LOAD FROM INTERIOR PARTITIONS, CEILINGS, AND FLOORS

Whenever a conditioned space is adjacent to another space in which a different temperature prevails, the transfer of heat through the separating structural section must be considered. Calculations are made according to the relation:

$$q = U_i A_i (t_i - t_o) \text{ Btu per hour.} \quad (6)$$

where

U_i = coefficient of overall heat transfer between the adjacent and the conditioned space, Btu per (hour) (square foot) (Fahrenheit degree).

Table 26.... Length of Horizontal Projection Required for Shading Windows and Walls

For Shading 10 Ft Down From Projection For April 11 Through September 1

Latitude	Sun Time		Projection in Feet						
	A.M. →		N	NE	E	SE	S	SW	
	↓								
30 Deg north	6 a.m.	6 p.m.	17.4	*	*	*	*	*	
	7	5	5.6	*	*	*	*	0.9	
	8	4	2.0	11.2	17.4	13.8	2.5		
	9	3	0.6	6.3	10.8	8.7	3.5		
	10	2	—	3.3	6.3	7.1	3.9		
40 Deg north	5 a.m.	7 p.m.	*	*	*	*	*	*	
	6	6	12.0	*	*	*	*	*	
	7	5	3.5	*	*	*	*	1.8	
	8	4	—	9.7	18.9	16.1	4.3		
	9	3	—	4.7	11.2	11.6	5.4		
50 Deg north	5 a.m.	7 p.m.	8.4	*	*	*	*	*	
	6	6	1.6	*	*	*	*	3.7	
	7	5	—	9.4	19.7	18.9	6.5		
	8	4	—	3.1	12.8	14.3	7.9		
	9	3	—	0.6	7.6	11.6	8.4	0.6	
11	10	2	—	—	3.7	8.7	8.7	3.9	
	11	1	—	—	—	6.5	9.1	6.5	
	12		—	—	—	—	—	—	
P.M. →			N	NW	W	SW	S	SE	

* Projection greater than 30 ft required.