(Item 7) of the cold air entering by infiltration, or required to replace mechanical exhaust, represents the total heat loss equivalent for any building.

DESIGN OUTDOOR WEATHER CONDITIONS

There are no hard and fast rules for selecting the design outdoor weather conditions to be used for a given locality or type of building or heating system; and the problem is to some extent a matter of judgment and experience. The outside design temperature is seldom taken as the lowest temperature, or even the lowest daily mean temperature ever recorded in a given locality. Such temperatures are rarely repeated in successive years. Likewise the wind direction and velocity prevailing at the time of design outside conditions frequently are entirely different from those prevailing during the winter season.

The A.S.H.V.E. Technical Advisory Committee on Weather Design Conditions has recommended the adoption for heating load calculations of an *outside design temperature which is equalled or exceeded during 97½ per cent of the hours in December, January, February and March.*

Complete data of this nature are not available but Column 7, Table 1, lists this recommended design temperature based on airport station readings for the period indicated, generally a five year period 1935–1939 inclusive. It is pointed out that in most cases these stations are outside of the city and that these data would apply primarily to rural areas. A comparison of the lowest recorded temperatures, with due regard to the period of record, makes it possible to determine an equivalent design temperature for city stations. In general the use of the airport data for buildings within an adjacent city will not make any appreciable difference in design load.

The calculation of these design temperatures is being carried on but due to the extensive amount of work involved will not be completed for some time. It should also be noted that the period of record for the stations listed occurred in what is known as a warm cycle and when longer periods are used it is expected that many of these design temperatures will be somewhat lower.

Because of the limited data available, design temperatures in common use are listed in Column 9. Many of these values were furnished by A.S.H.V.E. members—the balance were taken from an ACRMA Bulletin[1], manufacturers' publications and other sources[2], and a few were estimated. The map, Fig. 1, shows isotherms approximated for these design temperatures. They may be used as a guide for localities not listed in the table. Interpolation between these lines is suggested and due consideration must be given to elevations and other local conditions.

Column 8 of the table gives the maximum wind velocity which occurred with temperatures the same as, and lower than, those shown in Column 7. Winter average velocities for all temperatures are given in Column 10.

Column 6 lists the average annual minimum temperature which is the average of readings of the one lowest temperature occurring for each year the station has been in existence. It is of interest as a guide to the lowest temperature to be encountered except for an occasional extreme of short duration.

Finally, large differences in climate occur within relatively small distances of Weather Bureau stations in hilly and mountainous regions. Experience and judgment are necessary to deal properly with this factor.

TABLE 1. WINTER CLIMATIC CONDITIONS[a]

Col. 1 State	Col. 2 Station[b]	Col. 3 Elevation[c] ft	Col. 4 Period of Record[d]	Col. 5 Lowest Temp. on Record[d] °F	Col. 6 Average Annual Min. Temp.[e] °F	Col. 7 Design Dry-Bulb Temp. on TAC 97½% Basis[f] °F	Col. 8 Wind Vel. at Design Temp.[g] Mph	Col. 9 Design Dry-Bulb Temp. in Common Use[h] °F	Col. 10 Avg. Wind Vel.-Dec. Jan.-Feb.[i] Mph
Ala.	Anniston CO	733	1893-1947	−10				5	
	Birmingham CO	711	1893-1945	−10	12			10	8.0
	Birmingham AP	615	1939-1947	−10		21	7.4		
	Mobile CO	143	1872-1947	−1	22			15	9.9
	Mobile AP	219	1940-1947	13		30	8.5		
	Montgomery CO	293	1872-1947	−5	18			10	7.5
	Montgomery AP	226	1938-1944	9	19				
Ariz.	Flagstaff CO	6957	1899-1947	−25	−15			−10	7.7
	Kingman AP	3473	1935-1939[d]	8		22	8.6		
	Phoenix CO	1122	1895-1947	16	26			25	5.4
	Phoenix AP	1112	1937-1947	21		31	5.6		
	Tucson CO		Up to 1946	6				25	5.2
	Tucson AP	2561	1935-1939[d]	19		30	6.3		
	Winslow CO	4853	Up to 1946	−19	−1			−10	
	Winslow AP	4899	1932-1947	−18		6	7.5		
	Yuma CO	146	1876-1946[d]	22	27			30	6.7
Ark.	Fort Smith CO	545	1882-1945	−15	6			10	8.3
	Fort Smith AP	463	1945-1947	7					
	Little Rock CO	451	1879-1942	−12	10			5	8.3
	Little Rock AP	282	1942-1947	7		21	6.6		
Cal.	Bakersfield AP	499	1937-1946[d]	19	25	33	5.6	25	
	Burbank AP	740	1931-1947	21		35	4.9		
	Daggett AP	1925	1935-1939[d]			27	8.5		
	Eureka CO	115	1886-1947	20	29			30	7.3
	Fresno CO	387	1887-1939	17	26			25	5.4
	Fresno AP	281	1939-1947	23		32	4.5		
	Los Angeles CO	534	1877-1947	28	37			35	6.4
	Oakland AP	21	1929-1947	23		36	7.5	30	
	Red Bluff CO	341[e]	1877-1934	17					6.1
	Red Bluff AP	346	1944-1947	25					
	Redding AP	579	1935-1939[d]	17		32	7.1		
	Sacramento CO	116	1877-1947	17	28			30	7.2
	Sacramento AP	22	1938-1947	22					
	San Diego CO	90	1871-1940	25	37			35	6.3
	San Diego AP	34	1939-1947	34		43	5.8		
	San Francisco CO	164	1875-1947	27	37			35	7.5
	San Jose CO	100[e]	Up to 1946	22				25	
	Williams AP	124	1935-1939[d]			29	8.3		
Col.	Denver CO	5398	1871-1947	−29	−11			−10	7.5
	Denver AP	5379	1934-1947	−30		0	8.8		
	Grand Junction CO	4587[e]	1889-1945[d]	−21	−2			−15	4.4
	Pueblo CO	4770	1889-1938[d]	−27				−20	7.9
	Pueblo AP	4810	1939-1947	−26		2	6.4		
Conn.	Hartford CO	229	1905-1940	−18				0	8.7
	Hartford AP	20	1940-1947	−24		4	8.3		
	New Haven CO	180	1872-1946[d]	−15	−1			0	9.4
	New Haven AP	17	1943-1947	−4		11	8.1		
D of C.	Washington CO	128	1871-1947	−15	−1			0	7.8
	Washington AP	20	1935-1939[d]			14	7.4		
Fla.	Apalachicola CO	23	1922-1947	18				25	8.4
	Jacksonville CO	104	1871-1947	10	29			25	9.0
	Jacksonville AP	29	1938-1947	16		31	7.0		
	Key West CO	23	1871-1947	41				45	10.6
	Key West AP	48	1939-1947	42					
	Miami CO	253	1896-1947	27	38			35	10.1
	Miami AP	13	1940-1947	28	35	45	7.3		
	Pensacola CO	67	1879-1947	7	23			20	10.9
	Pensacola AP	113	1943-1947	20					
	Tampa CO	111	1890-1940[d]	19	32			30	8.6
	Tampa AP	12	1941-1946	31					
	Titusville AP	52	1935-1939[d]			38	6.5		
Ga.	Atlanta AP	1020	1878-1945[d]	−8	12	22	10.2	10	11.7
	Augusta CO	195	1871-1946[d]	3				10	6.5
	Augusta AP	424	1939-1947	10					
	Macon CO	408	1899-1947	7				15	6.7
	Macon AP	432	1939-1947	8					
	Savannah CO	115	1871-1945	8	22			20	9.5
	Savannah AP	56	1939-1947	16		29	7.7		
Idaho	Boise CO	2818	1864-1939[d]	−28				−10	9.1
	Boise AP	2849	1939-1947	−13	−1	5	4.5		
	Burley AP	4150	1935-1939[d]	−35		2	8.8		
	Idaho Falls AP	4744	1935-1939[d]	−18		−7	7.6		
	Lewiston CO	763	1900-1944	−23	1			5	4.1
	Pocatello CO	4522	1899-1947	−28	−12			−5	8.9
	Pocatello AP	4467	1938-1947	−23		6	7.2		
Ill.	Cairo CO	319	1872-1947	−16				0	9.8
	Chicago CO	601[e]	Up to 1946	−23	−8			−10	12.0
	Chicago AP	615	1935-1939[d]			−3	11.7		
	Moline AP	594	1935-1939[d]			−6	10.8	−10	
	Peoria AP	660	1935-1939[d]			6	10.7	−10	8.3

Blank spaces indicate data not yet completed.