

Design Conditions. This temperature is the maximum hourly outdoor temperature which has been equalled or exceeded 2½ per cent of the total hours of June, July, August and September for the period of record, in this case the 5 year period 1935-1939, and should not be confused with the period of record given in Column 4 which applies only to highest temperature ever recorded. Since all of these data are based on airport records they are not necessarily applicable to cities.

The data given in Columns 7 and 8 were obtained from local A.S.H.V.E. Chapter Secretaries and represent the design temperatures in local use. Where such information was not available it was taken from a publication of the A.C.R.M.A. ¹ and from various other sources.

The Technical Advisory Committee on Weather Design Conditions has suggested that wet-bulb design be taken as that wet-bulb temperature which has been equalled or exceeded 5 per cent of the hours during months of the period of record. While not available for the 1948 edition of THE GUIDE due to the tremendous task of compiling these data it is hoped that they will be available for some stations for future editions.

The wind velocity to be used in design should be that wind velocity which accompanies the design temperatures in each instance and since these data are not available the average summer wind velocities are reprinted from THE GUIDE 1947. It is pointed out that this is not necessarily the velocity which coincides with the design temperatures but it may be of some service to the designer.

Ventilation Rate

The introduction of outside air is necessary for proper ventilation of conditioned spaces. Chapter 12 suggests *minimum* outdoor-air requirements for representative applications; but it is to be emphasized that minimum requirements are not necessarily *adequate* requirements for all psychological attitudes and physiological responses.

Local codes and ordinances frequently specify ventilation requirements for public places and for industrial installations.

Recommended and minimum ventilation rates for the most common applications are summarized in Table 4. For further general applications, a basis of estimating the cfm per person may be taken as:

- | | | |
|----------------------------|-----------------|------------|
| 1. People not smoking..... | 7-½ Recommended | 5 Minimum |
| 2. People smoking..... | 40 Recommended | 25 Minimum |

The cooling load necessitated by the introduction of outside air for ventilation is determined once the indoor and outdoor design conditions are fixed. Calculations will be discussed subsequently.

INSTANTANEOUS HEAT LOAD

The total cooling load is frequently divided for convenience into two components; *sensible heat* and *latent heat*. While this subdivision is not imperative, past practice has found it convenient.

A gain of *sensible heat* is considered to occur when there is a direct addition of heat to the enclosure by any one or all of the mechanisms of conduction, convection, and radiation. A gain of *latent heat* is considered to occur when there is an addition of water vapor to the air of the enclosure. For example, when the humidity in an enclosure is increased by water vapor emitted by human occupants, or by water vapor resulting from a process such as cooking, the heat required to vaporize the water does *not*

TABLE 3. SUMMER CLIMATIC CONDITIONS^a
Suggested Design Wet-Bulb and Dry-Bulb Temperatures

COL. 1 STATE	COL. 2 STATION ^b	COL. 3 ELEVATION ^c FT	COL. 4 PERIOD OF RECORD ^d	COL. 5 HIGHEST TEMP. EVER RECORDED ^e °F	COL. 6 DESIGN DRY-BULB TEMP. ON T.A.C. 2½% BASIS ^f °F	COL. 7 DESIGN DRY-BULB TEMP. IN COMMON USE ^g °F	COL. 8 DESIGN WET-BULB TEMP. IN COMMON USE ^h °F	COL. 9 AVERAGE SUMMER WIND VELOCITY ⁱ MPH
Ala.	Anniston	CO 733	1893-1947	105	—	95	78	5.2
	Birmingham	CO 711	1893-1945	107	—	95	78	—
	Birmingham	AP 615	1939-1947	103	94	—	—	8.6
	Mobile	CO 143	1872-1947	103	—	95	80	—
	Mobile	AP 219	1940-1947	104	92	—	—	—
Aris.	Montgomery	CO 293	1872-1947	107	—	95	78	—
	Montgomery	AP 226	1938-1944 ^d	103	—	—	—	—
	Flagstaff	CO 6957	1899-1947	93	99	90	65	—
	Kingman	AP 3473	1935-1939	107	—	105	76	6.0
	Phoenix	CO 1122	1895-1947	118	107	—	—	—
Ark.	Phoenix	AP 1112	1933-1947	117	—	105	72	—
	Tucson	AP 2561	1935-1939	112	102	100	70	—
	Tucson	CO 4853	Up to 1946	107	—	—	—	—
	Winslow	CO 4853	1937-1947	103	95	—	—	—
	Winslow	AP 4899	1876-1946	120	—	110	78	—
Calif.	Yuma	CO 146	1882-1945	113	—	95	76	12.0
	Fort Smith	AP 463	1945-1947	107	—	—	—	—
	Fort Smith	CO 451	1879-1942 ^d	110	—	95	78	6.0
	Little Rock	CO 282	1942-1947	107	97	—	—	—
	Little Rock	AP 499	1937-1946	113	104	105	70	—
Calif.	Bakersfield	AP 740	1931-1947 ^d	111	94	—	—	—
	Burbank	AP 1925	1935-1939	113	104	—	—	—
	Daggett	CO 132	1886-1947	85	—	90	65	—
	Eureka	CO 387	1887-1939	115	—	105	70	7.9
	Fresno	CO 387	1939-1947	111	103	—	—	—
Calif.	Fresno	AP 281	1877-1947	109	—	90	70	6.0
	Los Angeles	CO 534	1929-1947	102	80	85	65	—
	Los Angeles	AP 21	1877-1934	115	—	100	70	—
	Oakland	CO 305 ^a	1944-1947	112	—	—	—	—
	Red Bluff	AP 346	1935-1939	112	101	—	—	—
Calif.	Red Bluff	AP 579	1877-1947	114	—	—	—	—
	Redding	CO 116	1938-1947	108	—	85	68	—
	Sacramento	AP 22	1871-1940	110	79	—	—	—
	San Diego	CO 90	1939-1947	106	—	85	65	11.0
	San Diego	AP 34	1875-1947	101	—	91	70	—
Calif.	San Francisco	CO 62	Up to 1946	106	—	—	—	—
	San Jose	CO 100	1935-1939	116	103	95	64	6.9
	Williams	AP 124	1871-1947	105	93	—	—	—
	Denver	AP 5379	1934-1947	104	—	95	65	—
	Denver	CO 6558	Up to 1946	—	—	95	65	6.1
Calif.	Durango	CO 4587 ^a	Up to 1946	105	—	95	65	—
	Grand Junction	CO 4770	1889-1938	104	—	95	—	—
	Pueblo	AP 4810	1939-1947	104	95	93	75	—
	Pueblo	CO 229	1905-1940 ^d	101	—	—	—	—
	Hartford	AP 20	1940-1947	98	88	95	75	7.3
Conn.	Hartford	CO 180	1872-1947	101	—	—	—	—
	New Haven	AP 17	1943-1947	94	84	95	78	5.2
	New Haven	CO 128	1871-1947	106	—	—	—	—
	Washington	CO 20	1935-1939	106	92	95	80	—
	Washington	CO 23	1922-1947	102	—	95	78	8.6
Fla.	Apalachicola	CO 104	1871-1947	104	—	95	—	—
	Jacksonville	AP 29	1938-1947	105	94	98	78	—
	Jacksonville	CO 23	1871-1947	100	—	—	—	—
	Key West	AP 48	1939-1947	95	—	91	79	6.4
	Key West	CO 253	1896-1947	96	—	—	—	—
Fla.	Miami	AP 13	1940-1947	100	89	95	78	—
	Miami	CO 67	1879-1947	103	—	—	—	—
	Pensacola	AP 111	1943-1947	105	—	95	78	7.0
	Pensacola	CO 111	1890-1940	98	—	—	—	—
	Tampa	AP 12	1941-1946 ^d	98	—	—	—	—
Ga.	Tampa	CO 52	1935-1939	98	90	95	76	8.5
	Titusville	AP 1020	1935-1939	102	93	98	76	—
	Atlanta	CO 195	1871-1946	106	—	—	—	—
	Augusta	AP 424	1939-1947	105	—	95	78	—
	Augusta	CO 408	1899-1947	102	—	—	—	—
Idaho	Macon	AP 432	1939-1947	105	—	95	78	7.8
	Macon	CO 115	1871-1945 ^d	105	—	—	—	—
	Savannah	AP 36	1939-1947	105	93	95	65	5.9
	Savannah	CO 2818	1864-1939	112	—	—	—	—
	Boise	AP 2849	1939-1947	109	95	—	—	—
Idaho	Boise	CO 4150	1935-1939	104	94	—	—	—
	Burley	AP 4744	1935-1939	100	88	—	—	—
	Idaho Falls	CO 763	1900-1944 ^d	117	—	95	65	—
	Lewiston	CO 4522	1899-1947	105	—	95	65	—
	Pocatello	AP 4467	1938-1947	103	92	98	78	—
Ill.	Pocatello	CO 319	1872-1947	106	—	95	75	10.0
	Cairo	CO 601	Up to 1946	—	—	—	—	—
	Chicago	AP 615	1935-1939	107	92	—	—	—
	Chicago	CO 594	1932-1947	106	94	96	76	—
	Moline	AP 594	1932-1947	106	—	—	—	—