

States. The highest temperature ever recorded is for the period of record shown. In some cases it should be noted that this period of record is comparatively short, and higher temperatures may be expected. In making comparisons for other localities than those shown in Table 3, due consideration must be given to elevation.

Column 6 of Table 3 indicates the design dry-bulb temperature suggested by the A.S.H.V.E. Technical Advisory Committee on Weather Design Conditions. This temperature is the maximum hourly outdoor temperature which has been equalled or exceeded 2½ percent 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 (Column 4) 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.<sup>1</sup> and from various other sources.

The Technical Advisory Committee on Weather Design Conditions has suggested that wet-bulb design temperature be taken as that wet-bulb temperature which has been equalled or exceeded 5 percent of the hours during months of the period of record. While not available for the 1951 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, but since these data are not available, the average summer wind velocities for the period of record were taken from U. S. Weather Bureau records revised to 1948. It is pointed out that this is not necessarily the velocity which coincides with the design temperatures, but it may serve as a guide to the designer.

Other weather data, such as *daily range of temperature*, are useful particularly when making cooling load calculations for an early morning peak on an east exposure. Daily range of temperature is the difference between the average of the daily maximum dry-bulb temperatures and the average of the daily minimum temperatures. This range is highest in semi-arid or desert regions and at high elevations, and lowest near the oceans or very large lakes. The daily range of temperature (Fahrenheit degrees) in July for the principal areas of the United States can be approximated from the following tabulation:

|                        |          |                                           |          |
|------------------------|----------|-------------------------------------------|----------|
| East Sea Shore.....    | 12 to 18 | East of Mississippi River.....            | 19 to 24 |
| Gulf Sea Shore.....    | 12 to 18 | Mississippi River to Rocky Mountains..... | 24 to 33 |
| Great Lakes Shore..... | 18 to 21 | Rocky Mountain Area.....                  | 33 to 42 |
| West Sea Shore.....    | 15 to 20 | West Coastal States.....                  | 20 to 36 |

### Ventilation Rate

The introduction of outside air is necessary for the ventilation of conditioned spaces. Chapter 6 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

TABLE 3. SUMMER CLIMATIC CONDITIONS<sup>a</sup>  
Suggested Design Wet-Bulb and Dry-Bulb Temperatures

| COL. 1<br>STATE | COL. 2<br>STATION <sup>b</sup> | COL. 3<br>ELEVATION <sup>c</sup><br>Ft | COL. 4<br>PERIOD<br>OF<br>RECORD <sup>d</sup> | COL. 5<br>HIGHEST<br>TEMP.<br>EVER<br>RECORDED <sup>e</sup><br>°F | COL. 6<br>DESIGN<br>DRY-BULB<br>TEMP. ON<br>T.A.C. 24%<br>BASIS <sup>f</sup><br>°F | COL. 7<br>DESIGN<br>DRY-BULB<br>TEMP. IN<br>COMMON<br>USE <sup>g</sup><br>°F | COL. 8<br>DESIGN<br>WET-BULB<br>TEMP. IN<br>COMMON<br>USE <sup>h</sup><br>°F | COL. 9<br>AVERAGE<br>SUMMER<br>WIND<br>VELOCITY <sup>i</sup><br>MPH |
|-----------------|--------------------------------|----------------------------------------|-----------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Ala.            | Anniston.....CO                | 733                                    | 1893-1947                                     | 105                                                               |                                                                                    | 95                                                                           | 78                                                                           |                                                                     |
|                 | Birmingham.....CO              | 711                                    | 1893-1945                                     | 107                                                               |                                                                                    | 95                                                                           | 78                                                                           | 5.4                                                                 |
|                 | Mobile.....CO                  | 615                                    | 1939-1947                                     | 103                                                               | 94                                                                                 | 95                                                                           | 80                                                                           | 8.0                                                                 |
|                 | Montgomery.....CO              | 293                                    | 1872-1947                                     | 107                                                               |                                                                                    | 95                                                                           | 78                                                                           |                                                                     |
| Ariz.           | Flagstaff.....CO               | 6957                                   | 1899-1947                                     | 93                                                                |                                                                                    | 90                                                                           | 65                                                                           |                                                                     |
|                 | Kingman.....AP                 | 3473                                   | 1935-1939                                     | 107                                                               | 99                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Phoenix.....CO                 | 1122                                   | 1895-1947                                     | 118                                                               |                                                                                    | 105                                                                          | 76                                                                           | 6.0                                                                 |
|                 | Tucson.....AP                  | 2561                                   | 1935-1939                                     | 112                                                               | 107                                                                                |                                                                              |                                                                              |                                                                     |
|                 | Winslow.....CO                 | 4553                                   | Up to 1946                                    | 107                                                               | 102                                                                                | 105                                                                          | 72                                                                           |                                                                     |
|                 | Yuma.....CO                    | 4899                                   | 1937-1947                                     | 103                                                               | 95                                                                                 | 100                                                                          | 70                                                                           |                                                                     |
| Ark.            | Fort Smith.....CO              | 545                                    | 1882-1945                                     | 113                                                               |                                                                                    | 110                                                                          | 78                                                                           |                                                                     |
|                 | Little Rock.....CO             | 463                                    | 1945-1947                                     | 107                                                               |                                                                                    | 95                                                                           | 76                                                                           | 6.1                                                                 |
|                 | Little Rock.....AP             | 451                                    | 1879-1942 <sup>d</sup>                        | 110                                                               |                                                                                    | 95                                                                           | 78                                                                           | 6.2                                                                 |
| Calif.          | Bakersfield.....AP             | 282                                    | 1942-1947                                     | 107                                                               | 97                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Burbank.....AP                 | 499                                    | 1937-1946                                     | 113                                                               | 104                                                                                | 105                                                                          | 70                                                                           |                                                                     |
|                 | Daguerre.....AP                | 740                                    | 1931-1947 <sup>d</sup>                        | 111                                                               | 94                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Fresno.....CO                  | 1925                                   | 1935-1939                                     | 113                                                               | 104                                                                                |                                                                              |                                                                              |                                                                     |
|                 | Fresno.....CO                  | 132                                    | 1886-1947                                     | 85                                                                |                                                                                    | 90                                                                           | 65                                                                           |                                                                     |
|                 | Fresno.....CO                  | 387                                    | 1887-1939                                     | 115                                                               |                                                                                    | 105                                                                          | 74                                                                           | 7.9                                                                 |
|                 | Fresno.....AP                  | 281                                    | 1939-1947                                     | 111                                                               | 103                                                                                |                                                                              |                                                                              |                                                                     |
|                 | Los Angeles.....CO             | 534                                    | 1877-1947                                     | 109                                                               |                                                                                    | 90                                                                           | 70                                                                           | 5.8                                                                 |
|                 | Oakland.....AP                 | 21                                     | 1929-1947                                     | 102                                                               | 80                                                                                 | 85                                                                           | 65                                                                           |                                                                     |
|                 | Red Bluff.....CO               | 305 <sup>e</sup>                       | 1877-1934                                     | 115                                                               |                                                                                    | 100                                                                          | 70                                                                           |                                                                     |
|                 | Red Bluff.....AP               | 346                                    | 1944-1947                                     | 112                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Redding.....AP                 | 579                                    | 1935-1939                                     | 112                                                               | 101                                                                                |                                                                              |                                                                              |                                                                     |
|                 | Sacramento.....CO              | 116                                    | 1877-1947                                     | 114                                                               |                                                                                    | 100                                                                          | 72                                                                           | 7.9                                                                 |
|                 | Sacramento.....AP              | 22                                     | 1938-1947                                     | 108                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | San Diego.....CO               | 90                                     | 1871-1940                                     | 110                                                               |                                                                                    | 85                                                                           | 68                                                                           |                                                                     |
|                 | San Diego.....AP               | 34                                     | 1939-1947                                     | 106                                                               | 79                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | San Francisco.....CO           | 164                                    | 1875-1947                                     | 101                                                               |                                                                                    | 85                                                                           | 65                                                                           | 10.7                                                                |
|                 | San Jose.....CO                | 100                                    | Up to 1946                                    | 106                                                               |                                                                                    | 91                                                                           | 70                                                                           |                                                                     |
|                 | Williams.....AP                | 124                                    | 1935-1939                                     | 116                                                               | 103                                                                                |                                                                              |                                                                              |                                                                     |
| Colo.           | Denver.....CO                  | 5398                                   | 1871-1947                                     | 105                                                               |                                                                                    | 95                                                                           | 64                                                                           | 6.9                                                                 |
|                 | Denver.....AP                  | 5379                                   | 1934-1947                                     | 104                                                               | 93                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Durango.....CO                 | 6558                                   | Up to 1946                                    | 99                                                                |                                                                                    | 95                                                                           | 65                                                                           |                                                                     |
|                 | Grand Junction.....CO          | 4587 <sup>e</sup>                      | Up to 1946                                    | 105                                                               |                                                                                    | 95                                                                           | 65                                                                           | 6.3                                                                 |
|                 | Pueblo.....CO                  | 4770                                   | 1889-1938                                     | 104                                                               |                                                                                    | 95                                                                           | 65                                                                           |                                                                     |
|                 | Pueblo.....AP                  | 4810                                   | 1939-1947                                     | 104                                                               | 95                                                                                 |                                                                              |                                                                              |                                                                     |
| Conn.           | Hartford.....CO                | 229                                    | 1905-1940 <sup>d</sup>                        | 101                                                               |                                                                                    | 93                                                                           | 75                                                                           |                                                                     |
|                 | Hartford.....AP                | 20                                     | 1940-1947                                     | 98                                                                | 88                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | New Haven.....CO               | 180                                    | 1872-1947                                     | 101                                                               |                                                                                    | 95                                                                           | 75                                                                           | 7.4                                                                 |
|                 | New Haven.....AP               | 17                                     | 1943-1947                                     | 94                                                                | 84                                                                                 |                                                                              |                                                                              |                                                                     |
| D. C.           | Washington.....CO              | 128                                    | 1871-1947                                     | 106                                                               |                                                                                    | 95                                                                           | 78                                                                           | 5.9                                                                 |
|                 | Washington.....AP              | 20                                     | 1935-1939                                     | 106                                                               | 92                                                                                 |                                                                              |                                                                              |                                                                     |
| Fla.            | Apalachicola.....CO            | 23                                     | 1922-1947                                     | 102                                                               |                                                                                    | 95                                                                           | 80                                                                           |                                                                     |
|                 | Jacksonville.....CO            | 104                                    | 1871-1947                                     | 104                                                               |                                                                                    | 95                                                                           | 78                                                                           | 8.4                                                                 |
|                 | Jacksonville.....AP            | 29                                     | 1938-1947                                     | 105                                                               | 94                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Key West.....CO                | 23                                     | 1871-1947                                     | 100                                                               |                                                                                    | 98                                                                           | 78                                                                           |                                                                     |
|                 | Key West.....AP                | 48                                     | 1939-1947                                     | 95                                                                |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Miami.....CO                   | 253                                    | 1898-1947                                     | 96                                                                |                                                                                    | 91                                                                           | 79                                                                           | 8.7                                                                 |
|                 | Miami.....AP                   | 13                                     | 1940-1947                                     | 100                                                               | 89                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Pensacola.....CO               | 67                                     | 1879-1947                                     | 103                                                               |                                                                                    | 95                                                                           | 78                                                                           |                                                                     |
|                 | Pensacola.....AP               | 112                                    | 1943-1947                                     | 105                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Tampa.....CO                   | 111                                    | 1890-1946                                     | 98                                                                |                                                                                    | 95                                                                           | 78                                                                           | 7.4                                                                 |
|                 | Tampa.....AP                   | 12                                     | 1941-1946 <sup>d</sup>                        | 98                                                                |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Titusville.....AP              | 52                                     | 1935-1939                                     | 98                                                                | 90                                                                                 |                                                                              |                                                                              |                                                                     |
| Ga.             | Atlanta.....AP                 | 1020                                   | 1935-1939                                     | 102                                                               | 93                                                                                 | 95                                                                           | 76                                                                           | 7.9                                                                 |
|                 | Augusta.....CO                 | 195                                    | 1871-1946                                     | 106                                                               |                                                                                    | 98                                                                           | 76                                                                           |                                                                     |
|                 | Augusta.....AP                 | 424                                    | 1939-1947                                     | 105                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Macon.....CO                   | 408                                    | 1899-1947                                     | 105                                                               |                                                                                    | 95                                                                           | 78                                                                           |                                                                     |
|                 | Macon.....AP                   | 432                                    | 1939-1947                                     | 102                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Savannah.....CO                | 115                                    | 1871-1945 <sup>d</sup>                        | 105                                                               |                                                                                    | 95                                                                           | 78                                                                           | 8.0                                                                 |
|                 | Savannah.....AP                | 56                                     | 1939-1947                                     | 105                                                               | 93                                                                                 |                                                                              |                                                                              |                                                                     |
| Idaho           | Boise.....CO                   | 2818                                   | 1864-1939                                     | 112                                                               |                                                                                    | 95                                                                           | 65                                                                           | 5.8                                                                 |
|                 | Boise.....AP                   | 2849                                   | 1939-1947                                     | 109                                                               | 95                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Burley.....AP                  | 4150                                   | 1935-1939                                     | 104                                                               |                                                                                    |                                                                              |                                                                              |                                                                     |
|                 | Idaho Falls.....AP             | 4744                                   | 1935-1939                                     | 100                                                               | 88                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Lewiston.....CO                | 763                                    | 1900-1944 <sup>d</sup>                        | 117                                                               |                                                                                    | 95                                                                           | 65                                                                           |                                                                     |
|                 | Pocatello.....CO               | 4522                                   | 1899-1947                                     | 105                                                               |                                                                                    | 95                                                                           | 65                                                                           |                                                                     |
|                 | Pocatello.....AP               | 4467                                   | 1938-1947                                     | 103                                                               | 92                                                                                 |                                                                              |                                                                              |                                                                     |
| Ill.            | Cairo.....CO                   | 319                                    | 1872-1947                                     | 106                                                               |                                                                                    | 98                                                                           | 78                                                                           |                                                                     |
|                 | Chicago.....CO                 | 601                                    | Up to 1946                                    | 105                                                               |                                                                                    | 95                                                                           | 75                                                                           | 9.5                                                                 |
|                 | Chicago.....AP                 | 615                                    | 1935-1939                                     | 107                                                               | 92                                                                                 |                                                                              |                                                                              |                                                                     |
|                 | Moline.....AP                  | 594                                    | 1932-1947                                     | 106                                                               | 94                                                                                 | 96                                                                           | 76                                                                           |                                                                     |