Table 1. Design Dry- and Wet-Bulb Temperatures, Wind Velocities, and Wind Directions for June, July, August, and September

| State | City | Design Dry-Bulb | Design Wet-Bulb | Summer Wind Velocity MPH | Prevailing Summer Wind Direction |
|---|---|---|---|---|---|
| Ala. | Birmingham | 93 | 77 | 5.2 | S |
| | Mobile | 94 | 78 | 8.6 | SW |
| Ariz. | Phoenix | 110 | 77 | 6.0 | W |
| Ark. | Little Rock | 95 | 77 | 7.0 | NE |
| Calif. | Los Angeles | 88 | 70 | 6.0 | SW |
| | San Francisco | 85 | 68 | 11.0 | SW |
| Colo. | Denver | 90 | 64 | 6.8 | S |
| Conn. | New Haven | 88 | 74 | 7.3 | S |
| D. C. | Washington | 95 | 78 | 6.2 | S |
| Fla. | Jacksonville | 94 | 78 | 8.7 | SW |
| | Tampa | 94 | 79 | 7.0 | E |
| Ga. | Atlanta | 91 | 75 | 7.3 | NW |
| | Savannah | 95 | 79 | 7.8 | SW |
| Idaho | Boise | 95 | 65 | 5.8 | NW |
| Ill. | Chicago | 95 | 75 | 10.2 | NE |
| | Peoria | 91 | 75 | 8.2 | S |
| Ind. | Indianapolis | 90 | 73 | 9.0 | SW |
| Iowa | Des Moines | 92 | 74 | 6.6 | SW |
| Ky. | Louisville | 94 | 75 | 8.0 | SW |
| La. | New Orleans | 94 | 79 | 7.0 | SW |
| Maine | Portland | 85 | 71 | 7.3 | S |
| Md. | Baltimore | 93 | 76 | 6.9 | SW |
| Mass. | Boston | 88 | 73 | 9.2 | SW |
| Mich. | Detroit | 93 | 73 | 10.3 | SW |
| Minn. | Minneapolis | 93 | 72 | 8.4 | SE |
| Miss. | Vicksburg | 95 | 78 | 6.2 | SW |
| Mo. | Kansas City | 92 | 75 | 9.5 | S |
| | St. Louis | 95 | 78 | 9.4 | SW |
| Mont. | Helena | 87 | 63 | 7.3 | SW |
| Nebr. | Lincoln | 93 | 74 | 9.3 | S |
| Nev. | Reno | 93 | 64 | 7.4 | W |
| N. J. | Trenton | 95 | 76 | 10.0 | SW |
| N. Y. | Albany | 90 | 74 | 7.1 | S |
| | Buffalo | 83 | 72 | 12.2 | SW |
| | New York | 95 | 75 | 12.9 | SW |
| N. M. | Santa Fe | 87 | 63 | 6.5 | SE |
| N. C. | Asheville | 87 | 72 | 5.6 | SE |
| | Wilmington | 93 | 79 | 7.8 | SW |
| N. Dak. | Bismarck | 88 | 69 | 8.8 | NW |
| Ohio | Cleveland | 95 | 75 | 9.9 | S |
| | Cincinnati | 95 | 78 | 6.6 | SW |
| Okla. | Oklahoma City | 96 | 76 | 10.1 | S |
| Oreg. | Portland | 83 | 65 | 6.6 | NW |
| Pa. | Philadelphia | 95 | 78 | 9.7 | SW |
| | Pittsburgh | 91 | 73 | 9.0 | NW |
| R. I. | Providence | 85 | 73 | 10.0 | NW |
| S. C. | Charleston | 94 | 80 | 9.9 | SW |
| | Greenville | 93 | 76 | 6.8 | NE |
| Tenn. | Chattanooga | 94 | 76 | 6.5 | SW |
| | Memphis | 93 | 77 | 7.5 | SW |
| Texas | Dallas | 99 | 76 | 9.4 | S |
| | Galveston | 93 | 79 | 9.7 | S |
| | San Antonio | 100 | 78 | 7.4 | SE |
| | Houston | 93 | 79 | 7.7 | S |
| | El Paso | 98 | 69 | 6.9 | E |





Table 1. Design Dry- and Wet-Bulb Temperatures, Wind Velocities, and Wind Directions for June, July, August, and September (Continued)

| State | City | Design Dry-Bulb | Design Wet-Bulb | Summer Wind Velocity MPH | Prevailing Summer Wind Direction |
|---|---|---|---|---|---|
| Utah | Salt Lake City | 95 | 67 | 8.2 | SE |
| Vt. | Burlington | 85 | 71 | 8.9 | S |
| Va. | Norfolk | 91 | 76 | 10.9 | S |
| | Richmond | 95 | 78 | 6.2 | SW |
| Wash. | Seattle | 83 | 61 | 7.9 | S |
| | Spokane | 89 | 63 | 6.5 | SW |
| W. Va. | Parkersburg | 90 | 74 | 5.3 | SE |
| Wis. | Madison | 89 | 73 | 8.1 | SW |
| | Milwaukee | 93 | 74 | 10.4 | S |
| Wyo. | Cheyenne | 85 | 62 | 9.2 | S |

## COOLING LOAD

The cooling load may be divided into the following parts:

1. Transmission of heat through walls, roof, and glass with allowances for sun-exposed surfaces and heat capacity.
2. Transmission of solar radiation through glass and absorption by interior furnishings.
3. Heat and moisture from infiltration and from outside air introduced.
4. Heat and moisture from occupants and heat from lights, machinery and other sources.

### Transmission for Surfaces Not Exposed to the Sun

The transmission load *for surfaces not exposed to the sun* is calculated in a manner similar to that described in Chapter 7, by means of the following formula:

$$H_t = A\,U\,(t_o - t) \qquad (1)$$

*where*

$H_t$ = heat transmitted through the material of the wall, glass, roof, or floor, Btu per hour.
$A$ = net inside area of wall, glass, roof, or floor, square feet.
$t$ = inside temperature, degrees Fahrenheit.
$t_o$ = outside temperature, degrees Fahrenheit.
$U$ = coefficient of transmission of wall, floor, roof or glass, Btu per hour per square foot per degree Fahrenheit difference in temperature. (Tables 3 to 13, Chapter 5.)

### Outside Temperatures

Summer dry-bulb and wet-bulb temperatures for various cities are given in Table 1. It will be noted that the temperatures are not the maximums but the design temperatures which should be used in air-conditioning calculations. The maximum outside wet-bulb temperatures as given in Weather Bureau reports usually occur only from 1 per cent to 4 per cent of the time, and they are therefore of such short duration that it is not practical to design a cooling system covering this range. The temperatures shown in Table 1 are based on a study of hourly temperatures in New York City from which factors were derived and applied to