

# HEATING VENTILATING AIR CONDITIONING GUIDE 1943

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    | 95              | 78              | 5.2                      | S                                |
|         | Mobile        | 95              | 80              | 8.6                      | SW                               |
| Ariz.   | Phoenix       | 105             | 76              | 6.0                      | W                                |
| Ark.    | Little Rock   | 95              | 78              | 7.0                      | NE                               |
| Calif.  | Los Angeles   | 90              | 70              | 6.0                      | SW                               |
|         | San Francisco | 90              | 65              | 11.0                     | SW                               |
| Colo.   | Denver        | 95              | 64              | 6.8                      | S                                |
| Conn.   | New Haven     | 95              | 75              | 7.3                      | S                                |
| Del.    | Wilmington    | 95              | 78              | 9.7                      | SW                               |
| D. C.   | Washington    | 95              | 78              | 6.2                      | S                                |
| Fla.    | Jacksonville  | 95              | 78              | 8.7                      | SW                               |
|         | Tampa         | 94              | 79              | 7.0                      | E                                |
| Ga.     | Atlanta       | 95              | 76              | 7.3                      | NW                               |
|         | Savannah      | 95              | 78              | 7.8                      | SW                               |
| Idaho   | Boise         | 95              | 65              | 5.8                      | NW                               |
| Ill.    | Chicago       | 95              | 75              | 10.2                     | NE                               |
|         | Peoria        | 95              | 76              | 8.2                      | S                                |
| Ind.    | Indianapolis  | 95              | 76              | 9.0                      | SW                               |
| Iowa    | Des Moines    | 95              | 77              | 6.6                      | SW                               |
| Kansas  | Wichita       | 100             | 75              | 11.0                     | S                                |
| Ky.     | Louisville    | 95              | 76              | 8.0                      | SW                               |
| La.     | New Orleans   | 95              | 79              | 7.0                      | SW                               |
|         | Shreveport    | 100             | 78              | 6.2                      | S                                |
| Maine   | Portland      | 90              | 73              | 7.3                      | S                                |
| Md.     | Baltimore     | 95              | 78              | 6.9                      | SW                               |
| Mass.   | Boston        | 92              | 75              | 9.2                      | SW                               |
| Mich.   | Detroit       | 95              | 75              | 10.3                     | SW                               |
| Minn.   | Minneapolis   | 95              | 75              | 8.4                      | SE                               |
| Miss.   | Vicksburg     | 95              | 78              | 6.2                      | SW                               |
| Mo.     | Kansas City   | 100             | 76              | 9.5                      | S                                |
|         | St. Louis     | 95              | 78              | 9.4                      | SW                               |
| Mont.   | Helena        | 95              | 67              | 7.3                      | SW                               |
| Nebr.   | Lincoln       | 95              | 75              | 9.3                      | S                                |
| Nev.    | Reno          | 95              | 65              | 7.4                      | W                                |
| N. H.   | Manchester    | 90              | 73              | 5.6                      | NW                               |
| N. J.   | Trenton       | 95              | 78              | 10.0                     | SW                               |
| N. Y.   | Albany        | 92              | 75              | 7.1                      | S                                |
|         | Buffalo       | 93              | 75              | 12.2                     | SW                               |
|         | New York      | 95              | 75              | 12.9                     | SW                               |
| N. M.   | Santa Fe      | 90              | 65              | 6.5                      | SE                               |
| N. C.   | Asheville     | 90              | 75              | 5.6                      | SE                               |
|         | Wilmington    | 95              | 79              | 7.8                      | SW                               |
| N. Dak. | Bismarck      | 95              | 73              | 8.8                      | NW                               |
| Ohio    | Cincinnati    | 95              | 78              | 6.6                      | SW                               |
|         | Cleveland     | 95              | 75              | 9.9                      | S                                |
| Okla.   | Oklahoma City | 101             | 76              | 10.1                     | S                                |
| Ore.    | Portland      | 90              | 65              | 6.6                      | NW                               |
| Pa.     | Philadelphia  | 95              | 78              | 9.7                      | SW                               |
|         | Pittsburgh    | 95              | 75              | 9.0                      | NW                               |
| R. I.   | Providence    | 93              | 75              | 10.0                     | NW                               |
| S. C.   | Charleston    | 95              | 80              | 9.9                      | SW                               |
|         | Greenville    | 95              | 76              | 6.8                      | NE                               |
| S. Dak. | Sioux Falls   | 95              | 75              | 7.6                      | S                                |
| Tenn.   | Chattanooga   | 95              | 77              | 6.5                      | SW                               |
|         | Memphis       | 95              | 78              | 7.5                      | SW                               |

# CHAPTER 7. COOLING LOAD

TABLE 1. DESIGN DRY- AND WET-BULB TEMPERATURES, WIND VELOCITIES, AND WIND DIRECTIONS FOR JUNE, JULY, AUGUST, AND SEPTEMBER (Concluded)

| STATE  | CITY           | DESIGN DRY-BULB | DESIGN WET-BULB | SUMMER WIND VELOCITY MPH | PREVAILING SUMMER WIND DIRECTION |
|--------|----------------|-----------------|-----------------|--------------------------|----------------------------------|
| Texas  | Dallas         | 100             | 78              | 9.4                      | S                                |
|        | El Paso        | 100             | 69              | 6.9                      | E                                |
|        | Galveston      | 95              | 80              | 9.7                      | S                                |
|        | Houston        | 95              | 78              | 7.7                      | S                                |
|        | San Antonio    | 100             | 78              | 7.4                      | SE                               |
| Utah   | Salt Lake City | 92              | 63              | 8.2                      | SE                               |
| Vt.    | Burlington     | 90              | 73              | 8.9                      | S                                |
| Va.    | Norfolk        | 95              | 78              | 10.9                     | S                                |
|        | Richmond       | 95              | 78              | 6.2                      | SW                               |
| Wash.  | Seattle        | 85              | 65              | 7.9                      | S                                |
|        | Spokane        | 90              | 65              | 6.5                      | SW                               |
| W. Va. | Parkersburg    | 95              | 75              | 5.3                      | SE                               |
| Wis.   | Madison        | 95              | 75              | 8.1                      | SW                               |
|        | Milwaukee      | 95              | 75              | 10.4                     | S                                |
| Wyo.   | Cheyenne       | 95              | 65              | 9.2                      | S                                |

The components of heat gain, classified by source, are further classified as sensible and latent heat gain.

The first two components fall into the classification of sensible heat gain, that is, they tend to raise the temperature of the air within the structure. The last three components not only produce sensible heat gain but they may also tend to increase the moisture content of the air within the structure.

## Normal Heat Transmission

By normal heat transmission, as distinguished from solar heat transmission, is meant the transmission of heat through windows, walls, partitions, etc. from without to interior of enclosure by virtue of difference between outside and inside air temperatures. This load is calculated in a manner similar to that described in Chapter 6 (except that flow of heat is reversed) by means of the formula:

$$H_t = AU (t_o - t_i) \quad (1)$$

where

$H_t$  = heat transmitted through the material of wall, glass, floor, etc., Btu per hour.

$A$  = net inside area of wall, glass, floor, etc., square feet.

$t_i$  = inside temperature, degrees Fahrenheit.

$t_o$  = outside temperature, degrees Fahrenheit.

$U$  = coefficient of transmission of wall, glass, floor, etc., Btu per hour per square foot per degree Fahrenheit difference in temperature (Tables 3 to 13, Chapter 4).

## Solar Heat Transmission

Calculations of the solar heat transmitted through walls and roofs are difficult to determine because of periodic character of heat flow and time lag due to heat capacity of construction.