

## Part IV — Energy Conservation

### CHAPTER 11

## ENERGY EFFICIENCY

### SECTION N1101 GENERAL

**N1101.1 Scope.** This chapter sets forth energy-efficiency-related requirements for the design and construction of buildings regulated by this code.

**Exception:** Provided that they are separated by building envelope assemblies from the remainder of the building, portions of the building that do not enclose conditioned space shall be exempt from the building envelope provisions, but shall comply with the provisions for building mechanical and service water heating systems.

**N1101.2 Compliance.** Compliance with this chapter shall be demonstrated by meeting the requirements of the applicable sections and tables of this chapter. Where applicable, provisions are based on the climate zone where the building is located. The climate zone where the building is located shall be based on zone assignments in Table N1101.2 for the county and state in which the building is being constructed. Alternatively, the climate zone shall be permitted to be determined by the heating degree days assigned by the building official.

**N1101.2.1 Detached one- and two-family dwellings.** Compliance shall be demonstrated by either:

1. Meeting the requirements of this chapter for buildings with a glazing area that does not exceed 15 percent of the gross area of exterior walls; or
2. Meeting the requirements of the *International Energy Conservation Code* for detached one- and two-family dwellings.

**N1101.2.2 Townhouses.** Compliance shall be demonstrated by either:

1. Meeting the requirements of this chapter for buildings with a glazing area that does not exceed 25 percent of the gross area of exterior walls; or
2. Meeting the requirements of the *International Energy Conservation Code* for residential buildings of Group R-2, R-4 or townhouses.

**N1101.3 Materials and equipment.** Materials and equipment shall be identified in a manner that will allow a determination of their compliance with the provisions of this chapter. Materials and equipment used to conform to the applicable provisions of this chapter shall be installed in accordance with the manufacturer's installation instructions.

**N1101.3.1 Insulation.** The thermal resistance (*R*-value) shall be indicated on all insulation and the insulation

installed such that the *R*-value can be verified during inspection, or a certification of the installed *R*-value shall be provided at the job site by the insulation installer. Where blown-in or sprayed insulation is applied in walls, the installer shall provide a certification of the installed density and *R*-value. Where blown-in or sprayed insulation is applied in the roof-ceiling assembly, the installer shall provide a certification of the initial installed thickness, settled thickness, coverage area, and number of bags of insulating material installed. Markers shall be provided for every 300 square feet (28 m<sup>2</sup>) of attic area, attached to the trusses, rafters, or joists, and indicate in 1-inch-high (25.4 mm) numbers the installed thickness of the insulation.

**N1101.3.2 Fenestration.** The *U*-factor of fenestration shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of fenestration shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer.

**N1101.3.2.1 Default fenestration performance.** When a manufacturer has not determined a fenestration product's *U*-factor in accordance with NFRC 100, compliance shall be determined by assigning such products a default *U*-factor from Tables 102.5.2(1) and 102.5.2(2) in the *International Energy Conservation Code*. When a manufacturer has not determined a fenestration product's SHGC in accordance with NFRC 200, compliance shall be determined by assigning such products a default SHGC from Table 102.5.2(3) of the *International Energy Conservation Code*.

**N1101.3.2.2 Air leakage.** The air leakage of prefabricated fenestration shall be determined in accordance with AAMA/WDMA 101/I.S.2, 101/I.S.2/NAFS, or NFRC 400 by an accredited, independent laboratory, and labeled and certified by the manufacturer and shall not exceed the values in Table 502.1.4.1 of the *International Energy Conservation Code*. Alternatively, the manufacturer shall certify that the fenestration is installed in accordance with Section 502.1.4 of the *International Energy Conservation Code*.

**N1101.3.3 Maintenance.** Where mechanical or plumbing system components require preventive maintenance for efficient operation, regular maintenance requirements shall be clearly stated and affixed to the component, or the source for such information shall be shown on a label attached to the component.

TABLE N1101.2  
CLIMATE ZONES BY STATES AND COUNTIES

| County                  | Zone | County                  | Zone | County                    | Zone | County          | Zone | County                 | Zone |
|-------------------------|------|-------------------------|------|---------------------------|------|-----------------|------|------------------------|------|
| <b>ALABAMA</b>          |      |                         |      |                           |      |                 |      |                        |      |
| Autauga <sup>a</sup>    | 6    | Aleutian Region         | 17   | Desha <sup>a</sup>        | 6    | Lake            | 8    | Jefferson              | 13   |
| Baldwin <sup>a</sup>    | 4    | Aleutians East          | 17   | Drew <sup>a</sup>         | 6    | Lassen          | 13   | Kiowa                  | 13   |
| Barbour <sup>a</sup>    | 5    | Anchorage               | 17   | Faulkner <sup>a</sup>     | 7    | Los Angeles     | 4    | Kit Carson             | 13   |
| Bibb <sup>a</sup>       | 6    | Annette Island          | 15   | Franklin                  | 8    | Madera          | 6    | La Plata               | 15   |
| Blount                  | 7    | Bering Straits          | 19   | Fulton                    | 8    | Marin           | 6    | Lake                   | 17   |
| Bullock <sup>a</sup>    | 5    | Bristol Bay             | 17   | Garland <sup>a</sup>      | 7    | Mariposa        | 8    | Larimer                | 13   |
| Butler <sup>a</sup>     | 5    | Chatham                 | 16   | Grant <sup>a</sup>        | 6    | Mendocino       | 8    | Las Animas             | 11   |
| Calhoun <sup>a</sup>    | 6    | Chugach                 | 17   | Greene                    | 8    | Merced          | 6    | Lincoln                | 13   |
| Chambers <sup>a</sup>   | 6    | Copper River            | 18   | Hempstead <sup>a</sup>    | 7    | Modoc           | 5    | Logan                  | 13   |
| Chilton <sup>a</sup>    | 6    | Delta/Greely            | 18   | Hot Spring <sup>a</sup>   | 7    | Mono            | 5    | Mesa                   | 13   |
| Choctaw <sup>a</sup>    | 5    | Denali                  | 18   | Howard <sup>a</sup>       | 7    | Monterey        | 6    | Mineral                | 17   |
| Clarke <sup>a</sup>     | 5    | Fairbanks N. Star       | 18   | Independence              | 8    | Napa            | 6    | Moffat                 | 15   |
| Clay                    | 7    | Haines                  | 16   | Izard                     | 8    | Nevada          | 11   | Montezuma              | 15   |
| Cleburne                | 7    | Iditarod Area           | 19   | Jackson                   | 8    | Orange          | 4    | Montrose               | 13   |
| Coffee <sup>a</sup>     | 4    | Juneau                  | 16   | Jefferson <sup>a</sup>    | 6    | Placer          | 4    | Montezuma              | 13   |
| Colbert                 | 8    | Kashunamiut             | 18   | Johnson                   | 8    | Plumas          | 3    | Otero                  | 11   |
| Conecuh <sup>a</sup>    | 5    | Kenai Peninsula         | 17   | Lafayette <sup>a</sup>    | 6    | Riverside       | 4    | Ouray                  | 15   |
| Coosa <sup>a</sup>      | 6    | Ketchikan Gateway       | 15   | Lawrence                  | 8    | Sacramento      | 6    | Park                   | 17   |
| Covington <sup>a</sup>  | 4    | Kodiak Island           | 16   | Lee <sup>a</sup>          | 7    | San Benito      | 6    | Phillips               | 13   |
| Crenshaw <sup>a</sup>   | 5    | Kuspuk                  | 18   | Lincoln <sup>a</sup>      | 6    | San Bernardino  | 7    | Pitkin                 | 17   |
| Cullman                 | 7    | Lake & Peninsula        | 17   | Little River <sup>a</sup> | 6    | San Diego       | 9    | Prowers                | 11   |
| Dale <sup>a</sup>       | 4    | Lower Kuskokwim         | 18   | Logan <sup>a</sup>        | 7    | San Francisco   | 6    | Pueblo                 | 11   |
| Dallas <sup>a</sup>     | 5    | Lower Yukon             | 18   | Lonoke <sup>a</sup>       | 7    | San Joaquin     | 6    | Rio Blanco             | 15   |
| De Kalb                 | 8    | Matanuska-Susitna       | 17   | Madison                   | 9    | San Luis Obispo | 6    | Rio Grande             | 17   |
| Elmore <sup>a</sup>     | 6    | North Slope             | 19   | Marion                    | 9    | San Mateo       | 6    | Routt                  | 17   |
| Escambia <sup>a</sup>   | 4    | Northwest Arctic        | 19   | Miller <sup>a</sup>       | 6    | Santa Barbara   | 5    | Saguache               | 16   |
| Etowah                  | 7    | Pribilof Islands        | 17   | Mississippi               | 8    | Santa Clara     | 6    | San Juan               | 17   |
| Fayette                 | 7    | Sitka                   | 15   | Monroe <sup>a</sup>       | 8    | Santa Cruz      | 6    | San Miguel             | 15   |
| Franklin                | 8    | Southeast Island        | 15   | Montgomery                | 8    | Shasta          | 6    | Sedgwick               | 13   |
| Geneva <sup>a</sup>     | 4    | Southwest Region        | 17   | Nevada <sup>a</sup>       | 6    | Sierra          | 11   | Summit                 | 17   |
| Greene <sup>a</sup>     | 5    | Yakutat                 | 17   | Newton                    | 9    | Siskiyou        | 11   | Teller                 | 13   |
| Hale <sup>a</sup>       | 5    | Yukon Flats             | 19   | Ouachita <sup>a</sup>     | 6    | Solano          | 6    | Washington             | 13   |
| Henry <sup>a</sup>      | 4    | Yukon-Koyukuk           | 19   | Perry <sup>a</sup>        | 7    | Sonoma          | 6    | Weld                   | 13   |
| Houston <sup>a</sup>    | 4    | Yupit                   | 18   | Phillips <sup>a</sup>     | 7    | Stanislaus      | 6    | Yuma                   | 13   |
| Jackson                 | 8    |                         |      | Polk                      | 8    | Sutter          | 6    |                        |      |
| Jefferson <sup>a</sup>  | 6    | <b>ARIZONA</b>          |      | Reinsett                  | 7    | Tehama          | 6    | <b>CONNECTICUT</b>     |      |
| Lamar                   | 7    | Apache                  | 13   | Searcy                    | 9    | Trinity         | 9    | Fairfield              | 12   |
| Lauderdale              | 8    | Cochise                 | 6    | Sebastian                 | 8    | Tulare          | 6    | Hartford               | 13   |
| Lawrence                | 8    | Coconino                | 14   | Sevier <sup>a</sup>       | 7    | Tuolumne        | 8    | Litchfield             | 14   |
| Lee <sup>a</sup>        | 6    | Gila                    | 7    | Sharp                     | 8    | Ventura         | 4    | Middlesex              | 12   |
| Limestone               | 8    | Granma                  | 6    | St Francis <sup>a</sup>   | 7    | Yolo            | 6    | New Haven              | 12   |
| Lowndes <sup>a</sup>    | 5    | Greenlee                | 6    | Stone                     | 9    | Yuba            | 6    | New London             | 12   |
| Macon <sup>a</sup>      | 6    | La Paz                  | 3    | Union <sup>a</sup>        | 6    |                 |      | Tolland                | 14   |
| Madison                 | 8    | Maricopa                | 3    | Van Buren                 | 8    | <b>COLORADO</b> |      | Windham                | 14   |
| Marengo <sup>a</sup>    | 4    | Mohave                  | 1    | Washington                | 9    | Adams           | 13   | <b>DELAWARE</b>        |      |
| Marion                  | 7    | Navajo                  | 10   | White <sup>a</sup>        | 7    | Alamosa         | 16   | Kent                   | 9    |
| Marshall                | 8    | Pinal                   | 4    | Woodruff <sup>a</sup>     | 7    | Arapahoe        | 13   | New Castle             | 10   |
| Mobile <sup>a</sup>     | 4    | Santa Cruz              | 6    | Yell <sup>a</sup>         | 7    | Archuleta       | 16   | Sussex                 | 9    |
| Monroe <sup>a</sup>     | 5    | Yavapai                 | 16   |                           |      | Baca            | 11   | <b>DC</b>              |      |
| Montgomery              | 8    | Yuma                    | 16   |                           |      | Bent            | 11   | Washington             | 10   |
| Morgan                  | 5    |                         |      |                           |      | Boulder         | 13   | <b>FLORIDA</b>         |      |
| Perry <sup>a</sup>      | 5    | <b>ARKANSAS</b>         |      |                           |      | Chaffee         | 16   | Alachua <sup>a</sup>   | 3    |
| Pickens <sup>a</sup>    | 6    | Arkansas <sup>a</sup>   | 6    |                           |      | Cheyenne        | 13   | Baker <sup>a</sup>     | 3    |
| Pike <sup>a</sup>       | 5    | Ashley <sup>a</sup>     | 6    |                           |      | Clear Creek     | 17   | Bay <sup>a</sup>       | 4    |
| Randolph                | 8    | Baxter <sup>a</sup>     | 9    |                           |      | Conejos         | 16   | Bradford <sup>a</sup>  | 3    |
| Russell <sup>a</sup>    | 5    | Benton                  | 9    | <b>CALIFORNIA</b>         |      | Costilla        | 16   | Brevard <sup>a</sup>   | 2    |
| Shelby <sup>a</sup>     | 6    | Boone                   | 9    | Alameda                   | 6    | Crowley         | 11   | Broward <sup>a</sup>   | 1    |
| St. Clair <sup>a</sup>  | 6    | Bradley <sup>a</sup>    | 6    | Alpine                    | 15   | Custer          | 16   | Calhoun <sup>a</sup>   | 4    |
| Sumter <sup>a</sup>     | 5    | Calhoun <sup>a</sup>    | 6    | Amador                    | 8    | Delta           | 13   | Charlotte <sup>a</sup> | 2    |
| Talladega <sup>a</sup>  | 6    | Carroll                 | 9    | Butte                     | 6    | Denver          | 13   | Citrus <sup>a</sup>    | 2    |
| Tallapoosa <sup>a</sup> | 6    | Chicot <sup>a</sup>     | 6    | Calaveras                 | 8    | Dolores         | 15   | Clay <sup>a</sup>      | 3    |
| Tuscaloosa <sup>a</sup> | 6    | Clark <sup>a</sup>      | 6    | Colusa                    | 6    | Douglas         | 13   | Collier <sup>a</sup>   | 1    |
| Walker <sup>a</sup>     | 6    | Clay                    | 8    | Contra Costa              | 6    | Eagle           | 15   | Columbia <sup>a</sup>  | 3    |
| Washington <sup>a</sup> | 5    | Cleburne                | 8    | Del Norte                 | 9    | El Paso         | 13   | Dade <sup>a</sup>      | 1    |
| Wilcox <sup>a</sup>     | 5    | Cleveland <sup>a</sup>  | 6    | El Dorado                 | 8    | Elbert          | 13   | De Soto <sup>a</sup>   | 2    |
| Winston                 | 7    | Columbia <sup>a</sup>   | 6    | Fresno                    | 6    | Fremont         | 11   | Dixie <sup>a</sup>     | 3    |
|                         |      | Conway <sup>a</sup>     | 7    | Glenn                     | 6    | Garfield        | 15   | Duval <sup>a</sup>     | 3    |
|                         |      | Craighead               | 8    | Humboldt                  | 9    | Gilpin          | 13   | Escambia <sup>a</sup>  | 4    |
|                         |      | Crawford                | 8    | Imperial                  | 3    | Grand           | 17   | Flagler <sup>a</sup>   | 3    |
|                         |      | Crittenden <sup>a</sup> | 7    | Inyo                      | 9    | Gunnison        | 17   | Franklin <sup>a</sup>  | 4    |
| <b>ALASKA BOROUGHS</b>  |      | Cross <sup>a</sup>      | 7    | Kern                      | 5    | Hinsdale        | 17   | Gadsden <sup>a</sup>   | 4    |
| <b>AND REAA's</b>       |      | Dallas <sup>a</sup>     | 6    | Kings                     | 6    | Huerfano        | 11   |                        |      |
| Adak Region             | 16   |                         |      |                           |      | Jackson         | 17   |                        |      |
| Alaska Gateway          | 19   |                         |      |                           |      |                 |      |                        |      |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County                    | Zone | County                     | Zone | County                  | Zone | County          | Zone | County       | Zone |
|---------------------------|------|----------------------------|------|-------------------------|------|-----------------|------|--------------|------|
| Gilchrist <sup>a</sup>    | 3    | Chatham <sup>a</sup>       | 4    | Mcintosh <sup>a</sup>   | 4    | Bannock         | 15   | Gallatin     | 10   |
| Glades <sup>a</sup>       | 1    | Chattahoochee <sup>a</sup> | 5    | Meriwether <sup>a</sup> | 6    | Bear Lake       | 15   | Greene       | 11   |
| Gulfa <sup>a</sup>        | 4    | Chattooga                  | 8    | Miller <sup>a</sup>     | 4    | Benewah         | 14   | Grundy       | 13   |
| Hamilton <sup>a</sup>     | 3    | Cherokee                   | 8    | Mitchell <sup>a</sup>   | 4    | Bingham         | 15   | Hamilton     | 10   |
| Hardee <sup>a</sup>       | 2    | Clarke                     | 7    | Monroe <sup>a</sup>     | 6    | Blaine          | 15   | Hancock      | 13   |
| Hendry <sup>a</sup>       | 1    | Clay <sup>a</sup>          | 5    | Montgomery <sup>a</sup> | 5    | Boise           | 15   | Hardin       | 10   |
| Hernando <sup>a</sup>     | 2    | Clayton                    | 7    | Morgan <sup>a</sup>     | 6    | Bonner          | 15   | Henderson    | 13   |
| Highlands <sup>a</sup>    | 2    | Clinch <sup>a</sup>        | 4    | Murray                  | 8    | Bonneville      | 15   | Henry        | 13   |
| Hillsborough <sup>a</sup> | 2    | Cobb                       | 7    | Muscogee <sup>a</sup>   | 5    | Boundary        | 15   | Iroquois     | 13   |
| Holmes <sup>a</sup>       | 4    | Coffee <sup>a</sup>        | 5    | Newton                  | 7    | Butte           | 16   | Jackson      | 10   |
| Indian River <sup>a</sup> | 2    | Colquitt <sup>a</sup>      | 4    | Oconee                  | 7    | Camas           | 15   | Jasper       | 11   |
| Jackson <sup>a</sup>      | 4    | Columbia <sup>a</sup>      | 6    | Oglethorpe              | 7    | Canyon          | 12   | Jefferson    | 11   |
| Jefferson <sup>a</sup>    | 4    | Cook <sup>a</sup>          | 4    | Paulding                | 7    | Caribou         | 15   | Jersey       | 10   |
| Lafayette <sup>a</sup>    | 3    | Coweta                     | 7    | Peach <sup>a</sup>      | 5    | Cass            | 14   | John Daviess | 14   |
| Lake <sup>a</sup>         | 2    | Crawford <sup>a</sup>      | 5    | Pickens                 | 8    | Clark           | 15   | Johnson      | 10   |
| Lee <sup>a</sup>          | 1    | Crisp <sup>a</sup>         | 5    | Pierce <sup>a</sup>     | 4    | Clearwater      | 12   | Kane         | 14   |
| Leon <sup>a</sup>         | 4    | Dade                       | 8    | Pike <sup>a</sup>       | 6    | Cluster         | 16   | Kankakee     | 13   |
| Levy <sup>a</sup>         | 2    | Dawson                     | 8    | Polk                    | 7    | Elmore          | 15   | Kendall      | 13   |
| Liberty <sup>a</sup>      | 4    | De Kalb                    | 7    | Pulaski <sup>a</sup>    | 5    | Franklin        | 15   | Knox         | 13   |
| Madison <sup>a</sup>      | 3    | Decatur <sup>a</sup>       | 4    | Putnam <sup>a</sup>     | 6    | Fremont         | 16   | La Salle     | 13   |
| Manatee <sup>a</sup>      | 2    | Dodge <sup>a</sup>         | 5    | Quitman <sup>a</sup>    | 5    | Gem             | 13   | Lake         | 14   |
| Marion <sup>a</sup>       | 2    | Dooley <sup>a</sup>        | 5    | Rabun                   | 8    | Gooding         | 13   | Lawrence     | 11   |
| Martin <sup>a</sup>       | 1    | Dougherty <sup>a</sup>     | 5    | Randolph <sup>a</sup>   | 5    | Idaho           | 15   | Lee          | 14   |
| Monroe <sup>a</sup>       | 1    | Douglas                    | 7    | Richmond <sup>a</sup>   | 6    | Jefferson       | 16   | Livingston   | 13   |
| Nassau <sup>a</sup>       | 3    | Early <sup>a</sup>         | 5    | Rockdale                | 5    | Jerome          | 14   | Logan        | 12   |
| Okaloosa <sup>a</sup>     | 4    | Echols <sup>a</sup>        | 4    | Schley <sup>a</sup>     | 5    | Kootenai        | 14   | Macon        | 12   |
| Okeechobee <sup>a</sup>   | 2    | Effingham <sup>a</sup>     | 4    | Screven <sup>a</sup>    | 5    | Latah           | 14   | Macoupin     | 11   |
| Orange <sup>a</sup>       | 2    | Elbert                     | 7    | Seminole <sup>a</sup>   | 4    | Lemhi           | 15   | Madison      | 10   |
| Osceola <sup>a</sup>      | 2    | Emanuel <sup>a</sup>       | 5    | Spalding                | 7    | Lewis           | 15   | Marion       | 11   |
| Palm Beach <sup>a</sup>   | 1    | Evans <sup>a</sup>         | 4    | Stephens <sup>a</sup>   | 7    | Lincoln         | 15   | Marshall     | 13   |
| Pasco <sup>a</sup>        | 2    | Fannin                     | 8    | Stewart <sup>a</sup>    | 5    | Madison         | 16   | Mason        | 12   |
| Pinellas <sup>a</sup>     | 2    | Fayette                    | 7    | Sumter <sup>a</sup>     | 5    | Minidoka        | 15   | Massac       | 10   |
| Polk <sup>a</sup>         | 2    | Floyd                      | 7    | Tallapoosa <sup>a</sup> | 5    | Nez Perce       | 12   | Mcdonough    | 13   |
| Putnam <sup>a</sup>       | 3    | Forsyth                    | 8    | Terrell <sup>a</sup>    | 6    | Oneida          | 15   | Mchenry      | 14   |
| Santa Rosa <sup>a</sup>   | 4    | Franklin                   | 7    | Tattnalla <sup>a</sup>  | 4    | Owyhee          | 12   | McLean       | 12   |
| Sarasota <sup>a</sup>     | 2    | Fulton                     | 7    | Taylor <sup>a</sup>     | 5    | Payette         | 12   | Menard       | 12   |
| Seminole <sup>a</sup>     | 2    | Gilmer                     | 8    | Telfair <sup>a</sup>    | 5    | Power           | 15   | Mercer       | 13   |
| St Johns <sup>a</sup>     | 3    | Glascow <sup>a</sup>       | 7    | Terrill <sup>a</sup>    | 5    | Shoshone        | 14   | Monroe       | 10   |
| St Lucie <sup>a</sup>     | 2    | Glynn <sup>a</sup>         | 4    | Thomas <sup>a</sup>     | 4    | Teton           | 16   | Montgomery   | 11   |
| Sumter <sup>a</sup>       | 2    | Gordon                     | 8    | Tift <sup>a</sup>       | 5    | Twin Falls      | 14   | Morgan       | 12   |
| Suwannee <sup>a</sup>     | 3    | Gady <sup>a</sup>          | 4    | Toombs <sup>a</sup>     | 4    | Valley          | 16   | Moultrie     | 12   |
| Taylor <sup>a</sup>       | 3    | Greene <sup>a</sup>        | 5    | Towns                   | 8    | Washington      | 13   | Ogle         | 14   |
| Union <sup>a</sup>        | 3    | Gwinnett                   | 7    | Treutlen <sup>a</sup>   | 5    |                 |      | Peoria       | 13   |
| Volusia <sup>a</sup>      | 2    | Hall <sup>a</sup>          | 8    | Troup <sup>a</sup>      | 6    |                 |      | Perry        | 10   |
| Wakulla <sup>a</sup>      | 4    | Hallam <sup>a</sup>        | 8    | Turner <sup>a</sup>     | 5    | <b>ILLINOIS</b> |      | Piatt        | 12   |
| Walton <sup>a</sup>       | 4    | Hancock <sup>a</sup>       | 6    | Twigg <sup>a</sup>      | 5    | Adams           | 12   | Pike         | 12   |
| Washington <sup>a</sup>   | 4    | Haralson                   | 7    | Union                   | 8    | Alexander       | 10   | Pope         | 10   |
|                           |      | Harris                     | 8    | Upson <sup>a</sup>      | 5    | Bond            | 11   | Pulaski      | 10   |
| <b>GEORGIA</b>            |      | Hart                       | 7    | Walker                  | 8    | Boone           | 14   | Putnam       | 13   |
| Appling <sup>a</sup>      | 4    | Heard <sup>a</sup>         | 6    | Walton                  | 7    | Brown           | 12   | Randolph     | 10   |
| Atkinson <sup>a</sup>     | 4    | Henry                      | 7    | Ware <sup>a</sup>       | 4    | Bureau          | 13   | Richland     | 11   |
| Baker <sup>a</sup>        | 4    | Houston <sup>a</sup>       | 5    | Warren <sup>a</sup>     | 6    | Calhoun         | 11   | Rock Island  | 13   |
| Baldwin <sup>a</sup>      | 4    | Irwin <sup>a</sup>         | 5    | Washington <sup>a</sup> | 6    | Carroll         | 14   | Rock Island  | 13   |
| Banks                     | 6    | Jackson                    | 7    | Wayne <sup>a</sup>      | 4    | Cass            | 12   | Saline       | 10   |
| Barrow                    | 7    | Jasper                     | 6    | Webster <sup>a</sup>    | 5    | Champaign       | 12   | Sangamon     | 12   |
| Bartow                    | 7    | Jeff Davis <sup>a</sup>    | 4    | Wheeler <sup>a</sup>    | 5    | Christian       | 11   | Schuyler     | 12   |
| Ben Hill <sup>a</sup>     | 5    | Jefferson <sup>a</sup>     | 6    | White                   | 8    | Clark           | 12   | Scott        | 12   |
| Berrien <sup>a</sup>      | 4    | Jenkins <sup>a</sup>       | 5    | Whitfield               | 8    | Clay            | 11   | Shelby       | 11   |
| Bibb <sup>a</sup>         | 5    | Johnson <sup>a</sup>       | 5    | Wilcox <sup>a</sup>     | 5    | Clinton         | 10   | St Clair     | 10   |
| Bleckley <sup>a</sup>     | 5    | Jones <sup>a</sup>         | 6    | Wilkes                  | 7    | Coles           | 12   | Stark        | 13   |
| Brantley <sup>a</sup>     | 4    | Lamar <sup>a</sup>         | 6    | Wilkinson <sup>a</sup>  | 5    | Cook            | 14   | Stephenson   | 14   |
| Brooks <sup>a</sup>       | 4    | Lanier <sup>a</sup>        | 4    | Worth <sup>a</sup>      | 5    | Crawford        | 11   | Tazewell     | 12   |
| Bryan <sup>a</sup>        | 4    | Laurens <sup>a</sup>       | 5    |                         |      | Cumberland      | 12   | Union        | 10   |
| Bulloch <sup>a</sup>      | 5    | Lee <sup>a</sup>           | 5    | <b>HAWAII</b>           |      | De Kalb         | 14   | Vermilion    | 12   |
| Burke <sup>a</sup>        | 6    | Liberty <sup>a</sup>       | 4    | Hawaii                  | 1    | De Witt         | 12   | Wabash       | 11   |
| Butts                     | 7    | Lincoln <sup>a</sup>       | 6    | Honolulu                | 1    | Douglas         | 12   | Warren       | 13   |
| Calhoun <sup>a</sup>      | 5    | Long <sup>a</sup>          | 4    | Kalawao                 | 1    | Du Page         | 14   | Washington   | 10   |
| Camden <sup>a</sup>       | 4    | Lowndes <sup>a</sup>       | 4    | Kauai                   | 1    | Edgar           | 12   | Wayne        | 11   |
| Candler <sup>a</sup>      | 5    | Lumpkin                    | 8    | Maui                    | 1    | Edwards         | 11   | White        | 10   |
| Carroll                   | 7    | Macon <sup>a</sup>         | 5    |                         |      | Effingham       | 11   | Whiteside    | 14   |
| Catoosa                   | 8    | Madison                    | 7    | <b>IDAHO</b>            |      | Fayette         | 11   | Will         | 13   |
| Charlton <sup>a</sup>     | 4    | Marion <sup>a</sup>        | 5    | Ada                     | 12   | Ford            | 13   | Williamson   | 10   |
|                           |      | Mcduffie <sup>a</sup>      | 6    | Adams                   | 15   | Franklin        | 10   | Winnebago    | 14   |
|                           |      |                            |      |                         |      | Fulton          | 13   | Woodford     | 13   |

(continued)

TABLE N1101.2—continued  
CLIMATE ZONES BY STATES AND COUNTIES

| County         | Zone | County      | Zone | County        | Zone | County       | Zone | County          | Zone |
|----------------|------|-------------|------|---------------|------|--------------|------|-----------------|------|
| <b>INDIANA</b> |      |             |      |               |      |              |      |                 |      |
| Adams          | 13   | Spencer     | 10   | Johnson       | 13   | Edwards      | 11   | Thomas          | 13   |
| Allen          | 13   | St Joseph   | 13   | Jones         | 14   | Elk          | 9    | Trego           | 12   |
| Bartholomew    | 11   | Starke      | 13   | Keokuk        | 13   | Ellis        | 12   | Wabunsee        | 11   |
| Benton         | 13   | Steuben     | 14   | Kossuth       | 15   | Ellsworth    | 11   | Wallace         | 12   |
| Blackford      | 13   | Sullivan    | 11   | Lee           | 13   | Finney       | 11   | Washington      | 12   |
| Boone          | 12   | Switzerland | 10   | Linn          | 14   | Ford         | 11   | Wichita         | 12   |
| Brown          | 11   | Tippecanoe  | 13   | Louisa        | 13   | Franklin     | 10   | Wilson          | 9    |
| Carroll        | 13   | Tipton      | 13   | Lucas         | 13   | Geary        | 11   | Woodson         | 10   |
| Cass           | 13   | Union       | 12   | Lyon          | 15   | Gove         | 12   | Wyandotte       | 11   |
| Clark          | 10   | Vanderburgh | 10   | Madison       | 14   | Graham       | 12   |                 |      |
| Clay           | 12   | Vermillion  | 12   | Mahaska       | 13   | Grant        | 11   | <b>KENTUCKY</b> |      |
| Clinton        | 13   | Vigo        | 12   | Marion        | 13   | Gray         | 11   | Adair           | 9    |
| Crawford       | 11   | Wabash      | 14   | Marshall      | 14   | Greeley      | 12   | Allen           | 9    |
| Daviess        | 11   | Warren      | 12   | Mills         | 13   | Greenwood    | 11   | Anderson        | 10   |
| De Kalb        | 13   | Warrick     | 10   | Mitchell      | 15   | Hamilton     | 11   | Bell            | 10   |
| Dearborn       | 11   | Washington  | 11   | Monona        | 14   | Harper       | 9    | Boone           | 11   |
| Decatur        | 12   | Wayne       | 12   | Monroe        | 13   | Harper       | 11   | Bourbon         | 10   |
| Delaware       | 13   | Wells       | 13   | Montgomery    | 13   | Haskell      | 11   | Boyd            | 11   |
| Dubois         | 11   | White       | 13   | Muscatine     | 13   | Hodgema      | 11   | Boyle           | 10   |
| Elkhart        | 13   | Whitley     | 14   | Obrien        | 15   | Jackson      | 11   | Bracken         | 11   |
| Fayette        | 12   |             |      | Osceola       | 15   | Jefferson    | 12   | Breathitt       | 10   |
| Floyd          | 10   | <b>IOWA</b> |      | Page          | 13   | Jewell       | 12   | Breckenridge    | 9    |
| Fountain       | 12   | Adair       | 14   | Palo Alto     | 13   | Johnson      | 11   | Bullitt         | 10   |
| Franklin       | 12   | Adams       | 13   | Plymouth      | 15   | Kearny       | 11   | Butler          | 9    |
| Fulton         | 14   | Allamakee   | 15   | Pocahontas    | 15   | Kingman      | 10   | Caldwell        | 9    |
| Gibson         | 10   | Appanoose   | 13   | Polk          | 14   | Kiowa        | 10   | Calloway        | 9    |
| Grant          | 13   | Audubon     | 14   | Pottawattomie | 14   | Leflore      | 9    | Campbell        | 11   |
| Greene         | 11   | Benton      | 14   | Poweshiek     | 14   | Linn         | 12   | Carlisle        | 9    |
| Hamilton       | 12   | Black Hawk  | 15   | Ringgold      | 13   | Leavenworth  | 11   | Carroll         | 10   |
| Hancock        | 12   | Boone       | 14   | Scott         | 13   | Lincoln      | 11   | Carter          | 11   |
| Harrison       | 10   | Bremer      | 15   | Shelby        | 14   | Logan        | 12   | Casey           | 10   |
| Hendricks      | 12   | Buchanan    | 15   | Sioux         | 13   | Lyon         | 11   | Christian       | 9    |
| Henry          | 12   | Buena Vista | 15   | Story         | 14   | Marion       | 11   | Clark           | 10   |
| Howard         | 13   | Butler      | 15   | Tama          | 14   | Marshall     | 12   | Clay            | 10   |
| Huntington     | 14   | Calhoun     | 14   | Taylor        | 13   | Mcpherson    | 11   | Clinton         | 10   |
| Jackson        | 11   | Carroll     | 14   | Union         | 13   | Meade        | 10   | Crittenden      | 9    |
| Jasper         | 13   | Cass        | 14   | Van Buren     | 13   | Miami        | 10   | Cumberland      | 9    |
| Jay            | 13   | Cedar       | 14   | Wapello       | 13   | Mitchell     | 12   | Davies          | 9    |
| Jefferson      | 10   | Cerro Gordo | 16   | Washington    | 14   | Montgomery   | 9    | Edmonson        | 9    |
| Jennings       | 11   | Cherokee    | 15   | Wayne         | 13   | Morris       | 11   | Elliot          | 11   |
| Johnson        | 12   | Chickasaw   | 15   | Webster       | 15   | Morton       | 10   | Estill          | 10   |
| Knox           | 11   | Clarke      | 13   | Winnebago     | 15   | Nemaha       | 11   | Fayette         | 10   |
| Kosciusko      | 14   | Clay        | 15   | Winneshiek    | 15   | Neosho       | 9    | Fleming         | 11   |
| La Porte       | 13   | Clayton     | 15   | Woodbury      | 15   | Ness         | 12   | Floyd           | 10   |
| Lagrange       | 14   | Clinton     | 15   | Worth         | 15   | Norton       | 13   | Franklin        | 10   |
| Lake           | 14   | Crawford    | 14   | Wright        | 15   | Osage        | 10   | Fulton          | 9    |
| Lawrence       | 11   | Cedar       | 14   |               |      | Osborne      | 12   | Gallatin        | 11   |
| Madison        | 13   | Davis       | 13   | <b>KANSAS</b> |      | Ottawa       | 11   | Garrard         | 10   |
| Marion         | 12   | Decatur     | 13   | Allen         | 10   | Pawnee       | 11   | Grant           | 11   |
| Marshall       | 13   | Delaware    | 15   | Anderson      | 10   | Phillips     | 12   | Graves          | 9    |
| Martin         | 11   | Des Moines  | 13   | Atchison      | 11   | Pottawatomie | 11   | Grayson         | 9    |
| Miami          | 14   | Dickinson   | 15   | Barber        | 9    | Pratt        | 10   | Green           | 9    |
| Monroe         | 11   | Dubuque     | 14   | Barton        | 11   | Rawlins      | 13   | Greenup         | 11   |
| Montgomery     | 12   | Emmet       | 15   | Bourbon       | 10   | Reno         | 11   | Hancock         | 9    |
| Morgan         | 12   | Fayette     | 15   | Brown         | 11   | Republic     | 12   | Hardin          | 9    |
| Newton         | 13   | Floyd       | 15   | Butler        | 10   | Rice         | 11   | Harlan          | 10   |
| Noble          | 14   | Franklin    | 15   | Chase         | 10   | Riley        | 11   | Harrison        | 11   |
| Ohio           | 11   | Greene      | 14   | Chautauqua    | 9    | Rooks        | 12   | Hart            | 9    |
| Orange         | 11   | Grundy      | 15   | Cherokee      | 9    | Rush         | 11   | Henderson       | 9    |
| Owen           | 12   | Guthrie     | 14   | Cheyenne      | 13   | Russell      | 11   | Henry           | 10   |
| Parke          | 12   | Hamilton    | 15   | Clark         | 10   | Saline       | 11   | Hickman         | 9    |
| Perry          | 10   | Hancock     | 15   | Clay          | 11   | Scott        | 12   | Hopkins         | 9    |
| Pike           | 11   | Hardin      | 15   | Cloud         | 12   | Sedgwick     | 10   | Jackson         | 10   |
| Porter         | 13   | Harrison    | 14   | Coffey        | 10   | Seward       | 10   | Jefferson       | 10   |
| Posey          | 10   | Henry       | 13   | Comanche      | 9    | Shawnee      | 11   | Jessamine       | 10   |
| Pulaski        | 13   | Howard      | 15   | Cowley        | 9    | Sheridan     | 12   | Johnson         | 11   |
| Putnam         | 12   | Humboldt    | 15   | Crawford      | 9    | Smith        | 12   | Kenton          | 11   |
| Randolph       | 13   | Ida         | 15   | Decatur       | 13   | Stafford     | 11   | Knott           | 10   |
| Ripley         | 11   | Iowa        | 14   | Dickinson     | 11   | Stanton      | 11   | Knox            | 10   |
| Rush           | 12   | Jackson     | 14   | Doniphan      | 11   | Stevens      | 10   | Larue           | 9    |
| Scott          | 11   | Jasper      | 14   | Douglas       | 10   | Sumner       | 9    |                 |      |
| Shelby         | 12   | Jefferson   | 13   |               |      |              |      |                 |      |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County                  | Zone | County                        | Zone | County               | Zone | County           | Zone | County              | Zone |
|-------------------------|------|-------------------------------|------|----------------------|------|------------------|------|---------------------|------|
| Laurel                  | 10   | Claiborne <sup>a</sup>        | 6    | Baltimore            | 10   | Ionia            | 14   | Faribault           | 15   |
| Lawrence                | 11   | Concordia <sup>a</sup>        | 5    | Baltimore City       | 9    | Iosco            | 15   | Fillmore            | 15   |
| Lee                     | 10   | De Soto <sup>a</sup>          | 5    | Calvert              | 9    | Iron             | 17   | Freeborn            | 15   |
| Leslie                  | 10   | East Baton Rouge <sup>a</sup> | 4    | Caroline             | 9    | Isabella         | 15   | Goodhue             | 15   |
| Letcher                 | 10   | East Carroll <sup>a</sup>     | 6    | Carroll              | 11   | Jackson          | 14   | Grant               | 16   |
| Lewis                   | 11   | East Feliciana <sup>a</sup>   | 4    | Cecil                | 10   | Kalamazoo        | 14   | Hennepin            | 15   |
| Lincoln                 | 10   | Evangeline <sup>a</sup>       | 4    | Charles              | 9    | Kalkaska         | 15   | Houston             | 15   |
| Livingston              | 9    | Franklin <sup>a</sup>         | 6    | Dorchester           | 9    | Kent             | 14   | Hubbard             | 17   |
| Logan                   | 9    | Grant <sup>a</sup>            | 5    | Frederick            | 11   | Keweenaw         | 17   | Isanti              | 16   |
| Lyon                    | 9    | Iberia <sup>a</sup>           | 4    | Garrett              | 13   | Lake             | 15   | Itasca              | 17   |
| Madison                 | 10   | Iberville <sup>a</sup>        | 4    | Harford              | 10   | Lapeer           | 14   | Jackson             | 15   |
| Magoffin                | 10   | Jackson <sup>a</sup>          | 6    | Howard               | 10   | Leelanau         | 15   | Kanabec             | 16   |
| Marion                  | 10   | Jefferson <sup>a</sup>        | 3    | Kent                 | 10   | Lenawee          | 14   | Kanawha             | 16   |
| Marshall                | 9    | Jefferson Davis <sup>a</sup>  | 4    | Montgomery           | 10   | Licking          | 14   | Gittson             | 17   |
| Martin                  | 11   | La Salle <sup>a</sup>         | 5    | Prince Georges       | 10   | Luce             | 16   | Gochiching          | 17   |
| Mason                   | 11   | Lafayette <sup>a</sup>        | 4    | Queen Annes          | 9    | MacKinnac        | 16   | Lac Qui Parle       | 15   |
| McCracken               | 9    | LaFourche <sup>a</sup>        | 3    | Somerset             | 9    | Macomb           | 14   | Lake                | 17   |
| McCreary                | 10   | Lincoln <sup>a</sup>          | 6    | St Marys             | 9    | Manistee         | 15   | Lake Of The Woods   | 17   |
| McLean                  | 9    | Livingston <sup>a</sup>       | 4    | Talbot               | 9    | Marquette        | 15   | Le Sueur            | 15   |
| Meade                   | 9    | Madison <sup>a</sup>          | 6    | Washington           | 14   | Mason            | 15   | Lincoln             | 15   |
| Menifee                 | 10   | Morehouse <sup>a</sup>        | 6    | Wicomico             | 9    | Mecklenburg      | 15   | Lyon                | 15   |
| Mercer                  | 10   | Natchitoches <sup>a</sup>     | 5    | Worcester            | 9    | Menominee        | 16   | Mahnomen            | 17   |
| Metcalfe                | 9    | Orleans <sup>a</sup>          | 3    |                      |      | Midland          | 15   | Marshall            | 17   |
| Monroe                  | 9    | Ouachita <sup>a</sup>         | 6    | <b>MASSACHUSETTS</b> |      | Missaukee        | 15   | Martin              | 15   |
| Montgomery              | 10   | Plaquemines <sup>a</sup>      | 3    | Barnstable           | 14   | Monroe           | 13   | McLeod              | 15   |
| Morgan                  | 10   | Pointe Coupee <sup>a</sup>    | 4    | Berkshire            | 14   | Montcalm         | 14   | Meeker              | 16   |
| Muhlenberg              | 9    | Rapides <sup>a</sup>          | 5    | Bristol              | 12   | Montmorency      | 15   | Mille Lacs          | 16   |
| Nelson                  | 10   | Red River <sup>a</sup>        | 5    | Dukes                | 12   | Muskegon         | 14   | Morrison            | 16   |
| Nicholas                | 11   | Richland <sup>a</sup>         | 6    | Essex                | 14   | Newaygo          | 15   | Mower               | 15   |
| Ohio                    | 9    | Sabine <sup>a</sup>           | 5    | Franklin             | 14   | Oakland          | 14   | Murray              | 15   |
| Oldham                  | 10   | St Bernard <sup>a</sup>       | 3    | Hamden               | 14   | Oceana           | 15   | Nicollet            | 15   |
| Owen                    | 10   | St Charles <sup>a</sup>       | 3    | Imperial             | 14   | Ogemaw           | 15   | Nobles              | 15   |
| Owsley                  | 10   | St Helena <sup>a</sup>        | 4    | Madison              | 13   | Ontonagon        | 17   | Norman              | 17   |
| Pendleton               | 11   | St James <sup>a</sup>         | 5    | Nantucket            | 12   | Osceola          | 15   | Olmsted             | 15   |
| Perry                   | 10   | St John The Baptist           | 3    | Norfolk              | 13   | Oscoda           | 15   | Otter Tail          | 17   |
| Pike                    | 10   | St Landry <sup>a</sup>        | 4    | Plum                 | 12   | Otsego           | 15   | Pennington          | 17   |
| Powell                  | 10   | St Martin <sup>a</sup>        | 4    | St Louis             | 13   | Ottawa           | 14   | Pine                | 16   |
| Pulaski                 | 10   | St Mary <sup>a</sup>          | 3    | Worcester            | 14   | Presque Isle     | 15   | Pipestone           | 15   |
| Robertson               | 11   | St Thomas <sup>a</sup>        | 4    |                      |      | Roscommon        | 15   | Polk                | 17   |
| Rockcastle              | 10   | Tangipahoa <sup>a</sup>       | 4    | <b>MICHIGAN</b>      |      | Saginaw          | 14   | Pope                | 16   |
| Rowan                   | 11   | Texas <sup>a</sup>            | 5    | Alcona               | 15   | Sanilac          | 14   | Ramsey              | 15   |
| Russell                 | 10   | Terrebonne <sup>a</sup>       | 3    | Alger                | 16   | Schoolcraft      | 16   | Red Lake            | 17   |
| Scott                   | 11   | Union <sup>a</sup>            | 3    | Allegan              | 14   | Shiawassee       | 14   | Redwood             | 15   |
| Shelby                  | 10   | Vermilion <sup>a</sup>        | 4    | Alpena               | 15   | St Clair         | 14   | Renville            | 15   |
| Simpson                 | 9    | Winn <sup>a</sup>             | 5    | Antrim               | 15   | St Joseph        | 14   | Rice                | 15   |
| Spencer                 | 9    | Washington <sup>a</sup>       | 4    | Arenac               | 15   | Tuscola          | 14   | Rock                | 15   |
| Taylor                  | 9    | Webster <sup>a</sup>          | 6    | Baraga               | 17   | Van Buren        | 14   | Roseau              | 17   |
| Todd                    | 9    | West Baton Rouge <sup>a</sup> | 4    | Barry                | 14   | Washtenaw        | 13   | Scott               | 15   |
| Trigg                   | 9    | West Carroll <sup>a</sup>     | 6    | Bay                  | 15   | Wayne            | 13   | Sherburne           | 16   |
| Trimble                 | 10   | West Feliciana <sup>a</sup>   | 4    | Benzie               | 15   | Wexford          | 15   | Sibley              | 15   |
| Union                   | 9    | Winn <sup>a</sup>             | 5    | Berrien              | 14   |                  |      | St Louis            | 17   |
| Warren                  | 9    |                               |      | Branch               | 14   | <b>MINNESOTA</b> |      | Stearns             | 16   |
| Washington              | 10   | <b>MAINE</b>                  |      | Calhoun              | 14   | Aitkin           | 17   | Steele              | 15   |
| Wayne                   | 10   | Androscoggin                  | 15   | Cass                 | 14   | Anoka            | 16   | Stevens             | 16   |
| Webster                 | 9    | Arundel                       | 17   | Charlevoix           | 15   | Becker           | 17   | Swift               | 16   |
| Whitley                 | 10   | Cumberland                    | 15   | Cheboygan            | 15   | Beltrami         | 17   | Todd                | 16   |
| Wolfe                   | 10   | Franklin                      | 16   | Chippewa             | 16   | Benton           | 16   | Traverse            | 16   |
| Woodford                | 10   | Hancock                       | 15   | Clare                | 15   | Big Stone        | 16   | Wabasha             | 15   |
|                         |      | Kennebec                      | 15   | Clinton              | 14   | Blue Earth       | 15   | Wadena              | 17   |
| <b>LOUISIANA</b>        |      | Knox                          | 15   | Crawford             | 15   | Brown            | 15   | Waseca              | 15   |
| Acadia <sup>a</sup>     | 4    | Lincoln                       | 15   | Delta                | 16   | Carlton          | 17   | Washington          | 15   |
| Allen <sup>a</sup>      | 4    | Oxford                        | 16   | Dickinson            | 16   | Carver           | 15   | Watsonwan           | 15   |
| Ascension <sup>a</sup>  | 4    | Penobscot                     | 15   | Eaton                | 14   | Cass             | 17   | Wilkin              | 17   |
| Assumption <sup>a</sup> | 3    | Piscataquis                   | 17   | Emmet                | 15   | Chippewa         | 16   | Winona              | 15   |
| Avoyelles <sup>a</sup>  | 5    | Sagadahoc                     | 15   | Genesee              | 14   | Chisago          | 16   | Wright              | 16   |
| Beauregard <sup>a</sup> | 4    | Somerset                      | 17   | Gladwin              | 15   | Clay             | 17   | Yellow Medicine     | 15   |
| Bienville <sup>a</sup>  | 6    | Waldo                         | 15   | Gogebic              | 17   | Clearwater       | 17   |                     |      |
| Bossier <sup>a</sup>    | 6    | Washington                    | 15   | Grand Traverse       | 15   | Cook             | 17   | <b>MISSISSIPPI</b>  |      |
| Caddo <sup>a</sup>      | 6    | York                          | 15   | Gratiot              | 14   | Cottonwood       | 15   | Adams <sup>a</sup>  | 5    |
| Calcasieu <sup>a</sup>  | 4    |                               |      | Hillsdale            | 14   | Crow Wing        | 17   | Alcorn              | 7    |
| Caldwell <sup>a</sup>   | 6    | <b>MARYLAND</b>               |      | Houghton             | 17   | Dakota           | 15   | Amite <sup>a</sup>  | 4    |
| Cameron <sup>a</sup>    | 4    | Allegany                      | 12   | Huron                | 14   | Dodge            | 15   | Attala <sup>a</sup> | 6    |
| Catahoula <sup>a</sup>  | 5    | Anne Arundel                  | 9    | Ingham               | 14   | Douglas          | 16   | Benton              | 7    |

(continued)

TABLE N1101.2—continued  
CLIMATE ZONES BY STATES AND COUNTIES

| County                       | Zone | County                 | Zone | County         | Zone | County          | Zone | County        | Zone |
|------------------------------|------|------------------------|------|----------------|------|-----------------|------|---------------|------|
| Bolivar <sup>a</sup>         | 6    | Wilkinson <sup>a</sup> | 4    | Moniteau       | 11   | Lake            | 15   | Gosper        | 13   |
| Calhoun <sup>a</sup>         | 6    | Winston <sup>a</sup>   | 6    | Monroe         | 12   | Lewis And Clark | 15   | Grant         | 14   |
| Carroll <sup>a</sup>         | 6    | Yalobusha              | 7    | Montgomery     | 11   | Liberty         | 16   | Greeley       | 14   |
| Chickasaw <sup>a</sup>       | 6    | Yazoo <sup>a</sup>     | 6    | Morgan         | 11   | Lincoln         | 15   | Hall          | 13   |
| Choctaw <sup>a</sup>         | 6    |                        |      | New Madrid     | 9    | Madison         | 15   | Hamilton      | 13   |
| Claiborne <sup>a</sup>       | 5    | <b>MISSOURI</b>        |      | Newton         | 9    | McCone          | 15   | Harlan        | 13   |
| Clarke <sup>a</sup>          | 5    | Adair                  | 12   | Nodaway        | 13   | Meagher         | 15   | Hayes         | 13   |
| Clay <sup>a</sup>            | 6    | Andrew                 | 12   | Oregon         | 9    | Mineral         | 15   | Hitchcock     | 13   |
| Coahoma                      | 7    | Atchison               | 13   | Osage          | 11   | Missoula        | 15   | Holt          | 14   |
| Copiah <sup>a</sup>          | 5    | Audrain                | 12   | Ozark          | 9    | Musselshell     | 15   | Hooker        | 14   |
| Covington <sup>a</sup>       | 5    | Barry                  | 9    | Pemiscot       | 9    | Park            | 15   | Howard        | 14   |
| De Soto                      | 7    | Barton                 | 10   | Perry          | 10   | Petroleum       | 15   | Jefferson     | 13   |
| Forrest <sup>a</sup>         | 5    | Bates                  | 11   | Pettis         | 11   | Phillips        | 16   | Johnson       | 13   |
| Franklin <sup>a</sup>        | 5    | Benton                 | 11   | Phelps         | 10   | Pondera         | 16   | Kearney       | 13   |
| George <sup>a</sup>          | 4    | Bollinger              | 10   | Pike           | 12   | Powder River    | 15   | Keshena       | 14   |
| Greene <sup>a</sup>          | 5    | Boone                  | 11   | Platte         | 11   | Powell          | 16   | Kearney Paha  | 14   |
| Grenada <sup>a</sup>         | 6    | Buchanan               | 12   | Polk           | 10   | Prarie          | 15   | Rimball       | 14   |
| Hancock <sup>a</sup>         | 4    | Butler                 | 9    | Pulaski        | 10   | Ravalli         | 15   | Knox          | 14   |
| Harrison <sup>a</sup>        | 4    | Caldwell               | 12   | Putnam         | 13   | Richland        | 15   | Lancaster     | 13   |
| Hinds <sup>a</sup>           | 6    | Callaway               | 11   | Ralls          | 12   | Roosevelt       | 16   | Lincoln       | 14   |
| Holmes <sup>a</sup>          | 6    | Camden                 | 11   | Randolph       | 12   | Rosebud         | 15   | Logan         | 14   |
| Humphreys <sup>a</sup>       | 6    | Cape Girardeau         | 9    | Ray            | 11   | Sanders         | 15   | Loup          | 14   |
| Issaquena <sup>a</sup>       | 6    | Carroll                | 12   | Reynolds       | 9    | Sheridan        | 16   | Madison       | 14   |
| Itawamba                     | 7    | Carter                 | 10   | Ripley         | 9    | Silver Bow      | 16   | Mcpherson     | 14   |
| Jackson <sup>a</sup>         | 4    | Cass                   | 11   | Saline         | 11   | Stillwater      | 15   | Merrick       | 13   |
| Jasper <sup>a</sup>          | 5    | Cedar                  | 11   | Schuyler       | 13   | Sweet Grass     | 15   | Morrill       | 14   |
| Jefferson <sup>a</sup>       | 5    | Chariton               | 12   | Scotland       | 12   | Teton           | 15   | Nance         | 13   |
| Jefferson Davis <sup>a</sup> | 5    | Christian              | 10   | Scott          | 10   | Boone           | 16   | Nemaha        | 13   |
| Jones <sup>a</sup>           | 5    | Clark                  | 13   | Shannon        | 10   | Treasure        | 15   | Nuckolls      | 13   |
| Kemper <sup>a</sup>          | 6    | Clay                   | 11   | Shelby         | 12   | Valley          | 16   | Otoe          | 13   |
| Lafayette                    | 7    | Clinton                | 12   | St. Charles    | 10   | Wheatland       | 15   | Pawnee        | 13   |
| Lamar <sup>a</sup>           | 4    | Cole                   | 11   | St. Clair      | 11   | Wibaux          | 15   | Perkins       | 13   |
| Lauderdale <sup>a</sup>      | 6    | Cooper                 | 11   | St. Francois   | 10   | Yellowstone     | 15   | Phelps        | 13   |
| Lawrence <sup>a</sup>        | 5    | Crawford               | 10   | St. Louis      | 10   | Yellowstone     | 15   | Pierce        | 14   |
| Leake <sup>a</sup>           | 6    | Dade                   | 10   | St. Louis City | 10   | National Park   | 15   | Platte        | 13   |
| Lee                          | 7    | Dallas                 | 10   | St. Genevieve  | 10   |                 |      | Polk          | 13   |
| Leflore <sup>a</sup>         | 6    | Daviess                | 12   | Stoddard       | 9    | <b>NEBRASKA</b> |      | Red Willow    | 13   |
| Lincoln <sup>a</sup>         | 5    | De Kalb                | 12   | Stone          | 9    | Adams           | 13   | Richardson    | 13   |
| Lowndes <sup>a</sup>         | 6    | Dent                   | 10   | Sullivan       | 12   | Antelope        | 14   | Rock          | 14   |
| Madison <sup>a</sup>         | 6    | Douglas                | 10   | Texas          | 9    | Arthur          | 14   | Saline        | 13   |
| Marion <sup>a</sup>          | 4    | Dunklin                | 9    | Texas          | 10   | Banner          | 14   | Sarpy         | 13   |
| Marshall                     | 7    | Franklin               | 10   | Vernon         | 11   | Blaine          | 14   | Saunders      | 13   |
| Monroe <sup>a</sup>          | 6    | Gasconade              | 11   | Warren         | 11   | Boone           | 14   | Scotts Bluff  | 14   |
| Montgomery <sup>a</sup>      | 6    | Gentry                 | 12   | Washington     | 10   | Box Butte       | 15   | Seward        | 13   |
| Neshoba <sup>a</sup>         | 6    | Groene                 | 11   | Wayne          | 10   | Boyd            | 14   | Sheridan      | 15   |
| Newton <sup>a</sup>          | 6    | Grundy                 | 12   | Webster        | 10   | Brown           | 14   | Sherman       | 14   |
| Noxubee <sup>a</sup>         | 6    | Harrison               | 13   | Worth          | 13   | Buffalo         | 13   | Sioux         | 15   |
| Oktibbeha <sup>a</sup>       | 6    | Henry                  | 11   | Wright         | 10   | Burt            | 14   | Stanton       | 14   |
| Panola                       | 7    | Hickory                | 11   | <b>MONTANA</b> |      | Butler          | 13   | Thayer        | 13   |
| Pearl River                  | 4    | Holt                   | 12   | Beaverhead     | 15   | Cass            | 13   | Thomas        | 14   |
| Perry <sup>a</sup>           | 5    | Howard                 | 11   | Big Horn       | 15   | Cedar           | 14   | Thurston      | 14   |
| Pike <sup>a</sup>            | 6    | Iron                   | 9    | Blaine         | 16   | Chase           | 13   | Valley        | 14   |
| Pontotoc                     | 7    | Jackson                | 10   | Broadwater     | 15   | Cherry          | 14   | Washington    | 13   |
| Prentiss                     | 7    | Jasper                 | 9    | Carbon         | 15   | Cheyenne        | 14   | Wayne         | 14   |
| Quitman                      | 7    | Jefferson              | 10   | Carter         | 15   | Clay            | 13   | Webster       | 13   |
| Rankin <sup>a</sup>          | 6    | Johnson                | 11   | Cascade        | 15   | Colfax          | 13   | Wheeler       | 14   |
| Scott <sup>a</sup>           | 6    | Knox                   | 12   | Chouteau       | 15   | Cuming          | 14   | York          | 13   |
| Sharkey <sup>a</sup>         | 6    | Laclede                | 10   | Custer         | 15   | Custer          | 14   |               |      |
| Simpson <sup>a</sup>         | 5    | Lafayette              | 11   | Daniels        | 16   | Dakota          | 14   | <b>NEVADA</b> |      |
| Smith <sup>a</sup>           | 5    | Lawrence               | 10   | Dawson         | 15   | Dawes           | 15   | Carson City   | 12   |
| Stone <sup>a</sup>           | 4    | Lewis                  | 12   | Deer Lodge     | 16   | Dawson          | 13   | Churchill     | 12   |
| Sunflower <sup>a</sup>       | 6    | Lincoln                | 11   | Fallon         | 15   | Deuel           | 14   | Clark         | 5    |
| Tallahatchie                 | 7    | Linn                   | 12   | Fergus         | 15   | Dixon           | 14   | Douglas       | 13   |
| Tate                         | 7    | Livingston             | 12   | Flathead       | 16   | Dodge           | 13   | Elko          | 15   |
| Tippah                       | 7    | Macon                  | 12   | Garfield       | 15   | Douglas         | 13   | Esmeralda     | 12   |
| Tishomingo                   | 7    | Madison                | 10   | Gallatin       | 15   | Dundy           | 13   | Eureka        | 15   |
| Tunica                       | 7    | Maries                 | 11   | Glacier        | 16   | Fillmore        | 13   | Humboldt      | 13   |
| Union                        | 7    | Marion                 | 12   | Golden Valley  | 15   | Franklin        | 13   | Lander        | 13   |
| Walshall <sup>a</sup>        | 4    | Mcdonald               | 9    | Granite        | 16   | Frontier        | 13   | Lincoln       | 12   |
| Warren <sup>a</sup>          | 6    | Mercer                 | 13   | Hill           | 16   | Furnas          | 13   | Lyon          | 13   |
| Washington <sup>a</sup>      | 6    | Miller                 | 11   | Jefferson      | 15   | Gage            | 13   | Mineral       | 12   |
| Wayne <sup>a</sup>           | 5    | Mississippi            | 9    | Judith Basin   | 15   | Garden          | 14   | Nye           | 12   |
| Webster <sup>a</sup>         | 6    |                        |      |                |      | Garfield        | 14   | Pershing      | 12   |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County               | Zone | County                | Zone | County                   | Zone | County               | Zone | County      | Zone |
|----------------------|------|-----------------------|------|--------------------------|------|----------------------|------|-------------|------|
| Storey               | 12   | <b>NEW YORK</b>       |      | Bladen <sup>a</sup>      | 6    | Sampson <sup>a</sup> | 6    | Williams    | 17   |
| Washoe               | 12   | Albany                | 14   | Brunswick <sup>a</sup>   | 6    | Scotland             | 7    |             |      |
| White Pine           | 15   | Allegheny             | 15   | Buncombe                 | 9    | Stanly               | 7    | <b>OHIO</b> |      |
| <b>NEW HAMPSHIRE</b> |      | Bronx                 | 11   | Burke                    | 8    | Stokes               | 9    | Adams       | 11   |
| Belknap              | 15   | Broome                | 15   | Cabarrus                 | 7    | Surry                | 9    | Allen       | 13   |
| Carroll              | 15   | Cattaraugus           | 15   | Caldwell                 | 8    | Swain                | 9    | Ashland     | 13   |
| Cheshire             | 15   | Cayuga                | 14   | Camden                   | 7    | Transylvania         | 9    | Ashtabula   | 13   |
| Coos                 | 16   | Chautauqua            | 13   | Carteret <sup>a</sup>    | 6    | Tyrrell <sup>a</sup> | 6    | Athens      | 11   |
| Grafton              | 15   | Chemung               | 15   | Caswell                  | 8    | Union                | 7    | Auglaize    | 13   |
| Hillsborough         | 15   | Chenango              | 15   | Catawba                  | 8    | Vance                | 8    | Belmont     | 12   |
| Merrimack            | 15   | Clinton               | 15   | Chatham                  | 8    | Wake                 | 7    | Brown       | 11   |
| Rockingham           | 15   | Columbia              | 13   | Cherokee                 | 9    | Warren               | 8    | Butler      | 12   |
| Strafford            | 15   | Cortland              | 15   | Chowan                   | 7    | Washington           | 7    | Carroll     | 13   |
| Sullivan             | 15   | Delaware              | 15   | Clay                     | 9    | Wayne                | 11   | Campaign    | 13   |
|                      |      | Dutchess              | 13   | Cleveland                | 7    | Wayne                | 7    | Clark       | 13   |
| <b>NEW JERSEY</b>    |      | Erie                  | 14   | Columbus <sup>a</sup>    | 6    | Wilkes               | 9    | Clermont    | 11   |
| Atlantic             | 10   | Essex                 | 16   | Craven <sup>a</sup>      | 6    | Wilson               | 7    | Clinton     | 12   |
| Bergen               | 12   | Franklin              | 16   | Cumberland               | 7    | Yadkin               | 7    | Columbiana  | 13   |
| Burlington           | 11   | Fulton                | 15   | Currituck                | 7    | Yancey               | 7    | Coshocton   | 12   |
| Camden               | 10   | Genesee               | 14   | Dare <sup>a</sup>        | 6    |                      |      | Crawford    | 13   |
| Cape May             | 10   | Greene                | 14   | Davidson                 | 8    | <b>NORTH DAKOTA</b>  |      | Cuyahoga    | 13   |
| Cumberland           | 10   | Hamilton              | 16   | Davie                    | 8    | Adams                | 16   | Darke       | 13   |
| Essex                | 11   | Herkimer              | 15   | Duplin <sup>a</sup>      | 6    | Barnes               | 17   | Defiance    | 14   |
| Gloucester           | 10   | Jefferson             | 15   | Durham                   | 8    | Bent                 | 17   | Delaware    | 13   |
| Hudson               | 11   | Kings                 | 10   | Edgecombe                | 8    | Butts                | 16   | Erie        | 13   |
| Hunterdon            | 12   | Lewis                 | 15   | Forsyth                  | 9    | Boone                | 17   | Fairfield   | 12   |
| Mercer               | 11   | Livingston            | 14   | Franklin                 | 8    | Boone                | 16   | Fayette     | 12   |
| Middlesex            | 11   | Madison               | 14   | Gaston                   | 7    | Bowman               | 16   | Franklin    | 12   |
| Monmouth             | 11   | Monroe                | 14   | Gates                    | 7    | Burke                | 17   | Fulton      | 14   |
| Morris               | 12   | Montgomery            | 14   | Graham                   | 7    | Burleigh             | 16   | Gallia      | 11   |
| Ocean                | 11   | Nassau                | 11   | Granville                | 8    | Cass                 | 17   | Geauga      | 13   |
| Passaic              | 12   | New York              | 10   | Greene                   | 7    | Dickey               | 16   | Greene      | 12   |
| Salem                | 10   | Niagara               | 14   | Hamford                  | 8    | Divide               | 17   | Guernsey    | 12   |
| Somerset             | 12   | Oneida                | 15   | Halifax                  | 7    | Dunn                 | 16   | Hamilton    | 11   |
| Sussex               | 13   | Onondaga              | 14   | Harnett                  | 7    | Eddy                 | 17   | Hancock     | 13   |
| Union                | 11   | Ontario               | 14   | Haywood                  | 9    | Emmons               | 16   | Hardin      | 13   |
| Warren               | 12   | Orange                | 12   | Henderson                | 9    | Foster               | 17   | Harrison    | 13   |
|                      |      | Orleans               | 14   | Hertford                 | 7    | Golden Valley        | 16   | Henry       | 14   |
| <b>NEW MEXICO</b>    |      | Oswego                | 14   | Hoke                     | 7    | Grand Forks          | 17   | Highland    | 11   |
| Bernalillo           | 9    | Otsego                | 15   | Hyde <sup>a</sup>        | 6    | Grant                | 16   | Hocking     | 12   |
| Catron               | 11   | Pulnam                | 12   | Iredell                  | 8    | Griggs               | 17   | Holmes      | 13   |
| Chaves               | 7    | Queens                | 10   | Jackson                  | 9    | Hettinger            | 16   | Huron       | 13   |
| Cibola               | 12   | Rensselaer            | 9    | Johnston                 | 7    | Kidder               | 17   | Jackson     | 11   |
| Colfax               | 7    | Richmond              | 14   | Jones <sup>a</sup>       | 6    | La Moure             | 16   | Jefferson   | 13   |
| Curry                | 9    | Rockland              | 12   | Lee                      | 7    | Logan                | 16   | Knox        | 13   |
| De Baca              | 9    | Saratoga              | 14   | Lenoir                   | 7    | Mchenry              | 17   | Lake        | 13   |
| Dona Ana             | 7    | Schenectady           | 14   | Lincoln                  | 7    | Mcintosh             | 16   | Lawrence    | 11   |
| Eddy                 | 7    | Schoharie             | 9    | Macon                    | 9    | Mckenzie             | 16   | Licking     | 12   |
| Grant                | 7    | Schuyler              | 15   | Madison                  | 9    | McLean               | 17   | Logan       | 13   |
| Grady                | 7    | Seneca                | 14   | Martin                   | 7    | Mercer               | 16   | Lorain      | 13   |
| Guadalupe            | 6    | St. Lawrence          | 15   | Mcdowell                 | 8    | Morton               | 16   | Lucas       | 14   |
| Harding              | 11   | Steuben               | 15   | Mecklenburg              | 7    | Mountrail            | 17   | Madison     | 12   |
| Hidalgo              | 7    | Suffolk               | 11   | Mitchell                 | 11   | Nelson               | 17   | Mahoning    | 13   |
| Lea                  | 7    | Sullivan              | 15   | Montgomery               | 7    | Oliver               | 16   | Marion      | 13   |
| Lincoln              | 6    | Tioga                 | 15   | Moore                    | 7    | Pembina              | 17   | Medina      | 13   |
| Los Alamos           | 12   | Ulster                | 15   | Nash                     | 7    | Pierce               | 17   | Meigs       | 11   |
| Luna                 | 7    | Warren                | 15   | New Hanover <sup>a</sup> | 6    | Ramsey               | 17   | Mercer      | 13   |
| Mckinley             | 13   | Washington            | 15   | Northampton              | 7    | Ransom               | 16   | Miami       | 13   |
| Mora                 | 15   | Wayne                 | 14   | Onslow <sup>a</sup>      | 6    | Renville             | 17   | Monroe      | 12   |
| Otero                | 7    | Westchester           | 12   | Orange                   | 8    | Richland             | 16   | Montgomery  | 12   |
| Quay                 | 8    | Wyoming               | 14   | Pamlico <sup>a</sup>     | 6    | Rolette              | 17   | Morgan      | 12   |
| Rio Arriba           | 12   | Yates                 | 14   | Pasquotank               | 7    | Sargent              | 16   | Morrow      | 13   |
| Roosevelt            | 8    |                       |      | Pender <sup>a</sup>      | 6    | Sheridan             | 17   | Muskingum   | 12   |
| San Juan             | 12   | <b>NORTH CAROLINA</b> |      | Perquimans               | 7    | Sioux                | 16   | Noble       | 12   |
| San Miguel           | 12   | Alamance              | 8    | Perrin                   | 8    | Slope                | 16   | Ottawa      | 13   |
| Sandoval             | 13   | Alexander             | 8    | Pitt                     | 7    | Stark                | 16   | Paulding    | 14   |
| Santa Fe             | 13   | Allegheny             | 11   | Polk                     | 7    | Steele               | 17   | Perry       | 12   |
| Sierra               | 8    | Anson                 | 7    | Randolph                 | 8    | Stutsman             | 17   | Pickaway    | 12   |
| Socorro              | 9    | Ashe                  | 11   | Richmond                 | 7    | Towner               | 17   | Pike        | 11   |
| Taos                 | 15   | Avery                 | 11   | Robeson                  | 7    | Traill               | 17   | Portage     | 13   |
| Torrance             | 11   | Beaufort <sup>a</sup> | 6    | Rockingham               | 8    | Walsh                | 17   | Preble      | 12   |
| Union                | 11   | Bertie                | 7    | Rowan                    | 7    | Ward                 | 17   | Putnam      | 13   |
| Valencia             | 10   |                       |      | Rutherford               | 7    | Wells                | 17   | Richland    | 13   |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County                 | Zone | County                  | Zone | County                 | Zone | County                    | Zone | County               | Zone |
|------------------------|------|-------------------------|------|------------------------|------|---------------------------|------|----------------------|------|
| Ross                   | 12   | Okfuskee                | 7    | Butler                 | 14   | Berkeley <sup>a</sup>     | 5    | Hutchinson           | 14   |
| Sandusky               | 13   | Oklahoma                | 8    | Cambria                | 13   | Calhoun <sup>a</sup>      | 6    | Hyde                 | 15   |
| Scioto                 | 11   | Okmulgee                | 8    | Cameron                | 15   | Charleston <sup>a</sup>   | 5    | Jackson              | 14   |
| Seneca                 | 13   | Osage                   | 8    | Carbon                 | 13   | Cherokee                  | 7    | Jerauld              | 15   |
| Shelby                 | 13   | Ottawa                  | 9    | Centre                 | 13   | Chester                   | 7    | Jones                | 15   |
| Stark                  | 13   | Pawnee                  | 8    | Chester                | 11   | Chesterfield              | 7    | Kingsbury            | 15   |
| Summit                 | 13   | Payne                   | 8    | Clarion                | 14   | Clarendon <sup>a</sup>    | 6    | Lake                 | 15   |
| Trumbull               | 13   | Pittsburg               | 7    | Clearfield             | 15   | Colleton <sup>a</sup>     | 5    | Lawrence             | 15   |
| Tuscarawas             | 13   | Pontotoc                | 7    | Clinton                | 13   | Darlington <sup>a</sup>   | 6    | Lincoln              | 15   |
| Union                  | 13   | Pottawatomie            | 7    | Columbia               | 13   | Dillon <sup>a</sup>       | 6    | Lyman                | 15   |
| Van Wert               | 13   | Pushmataha <sup>a</sup> | 6    | Crawford               | 14   | Dorchester <sup>a</sup>   | 6    | Marshall             | 16   |
| Vinton                 | 11   | Roger Mills             | 9    | Cumberland             | 12   | Edgefield <sup>a</sup>    | 6    | Mccook               | 15   |
| Warren                 | 12   | Rogers                  | 9    | Dauphin                | 12   | Fairfield                 | 7    | Mcpherson            | 16   |
| Washington             | 11   | Seminole                | 7    | Delaware               | 10   | Florence <sup>c</sup>     | 7    | Meade                | 15   |
| Wayne                  | 13   | Sequoyah                | 7    | Elk                    | 15   | Georgetown <sup>a</sup>   | 5    | McAlester            | 14   |
| Williams               | 14   | Stephens                | 7    | Erie                   | 14   | Greenville                | 7    | Meyer                | 15   |
| Wood                   | 14   | Texas                   | 10   | Fayette                | 12   | Greenwood                 | 7    | Minnehaha            | 15   |
| Wyandot                | 13   | Tillman                 | 7    | Forest                 | 15   | Hampton <sup>a</sup>      | 5    | Moody                | 15   |
|                        |      | Tulsa                   | 8    | Franklin               | 11   | Horry <sup>a</sup>        | 5    | Pennington           | 15   |
|                        |      | Wagoner                 | 8    | Fulton                 | 12   | Jasper <sup>a</sup>       | 5    | Perkins              | 15   |
| <b>OKLAHOMA</b>        |      | Washington              | 9    | Greene                 | 12   | Kershaw <sup>a</sup>      | 5    | Potter               | 15   |
| Adair                  | 8    | Washita                 | 8    | Huntingdon             | 12   | Lancaster                 | 7    | Roberts              | 16   |
| Alfalfa                | 9    | Woods                   | 9    | Indiana                | 12   | Laurens                   | 7    | Sanborn              | 15   |
| Atoka                  | 7    | Woodward                | 9    | Jefferson              | 15   | Lee <sup>a</sup>          | 6    | Shannon              | 15   |
| Beaver                 | 10   |                         |      | Juniata                | 12   | Lexington                 | 6    | Spink                | 15   |
| Beckham                | 8    | <b>OREGON</b>           |      | Lackawanna             | 14   | Marietta <sup>a</sup>     | 6    | Stanley              | 15   |
| Blaine                 | 8    | Baker                   | 15   | Lancaster              | 11   | Merced <sup>a</sup>       | 6    | Sully                | 15   |
| Bryan                  | 7    | Benton                  | 10   | Lawrence               | 11   | McCormick <sup>a</sup>    | 6    | Todd                 | 14   |
| Caddo                  | 8    | Clackamas               | 10   | Lehigh                 | 12   | Jewberry <sup>a</sup>     | 6    | Tripp                | 14   |
| Canadian               | 8    | Clatsop                 | 11   | Lehigh                 | 12   | Oconee                    | 7    | Turner               | 15   |
| Carter <sup>a</sup>    | 6    | Columbia                | 11   | Luzerne                | 13   | Orangeburg <sup>a</sup>   | 6    | Union                | 14   |
| Cherokee               | 8    | Coos                    | 9    | Lycoming               | 13   | Pickens                   | 7    | Walworth             | 15   |
| Choctaw <sup>a</sup>   | 6    | Crook                   | 14   | Mckean                 | 13   | Richland <sup>a</sup>     | 6    | Yankton              | 14   |
| Cimarron               | 10   | Curry                   | 9    | Mitchell               | 14   | Saluda <sup>a</sup>       | 6    | Ziebach              | 15   |
| Cleveland              | 7    | Deschutes               | 9    | Monroe                 | 12   | Spartanburg               | 7    |                      |      |
| Coal                   | 7    | Douglas                 | 9    | Montgomery             | 13   | Sumter <sup>a</sup>       | 6    | <b>TENNESSEE</b>     |      |
| Comanche               | 7    | Gilliam                 | 12   | Montour                | 11   | Union                     | 7    | Anderson             | 9    |
| Cotton                 | 7    | Grant                   | 15   | Montour                | 13   | Williamsburg <sup>a</sup> | 6    | Bedford              | 8    |
| Craig                  | 9    | Harney                  | 15   | Northampton            | 12   | York                      | 7    | Benton               | 9    |
| Creek                  | 8    | Hood River              | 12   | Northumberland         | 13   |                           |      | Bledsoe              | 8    |
| Custer                 | 8    | Jackson                 | 11   | Perry                  | 12   | <b>SOUTH DAKOTA</b>       |      | Blount               | 8    |
| Delaware               | 8    | Jefferson               | 13   | Philadelphia           | 10   | Aurora                    | 15   | Bradley              | 8    |
| Dewey                  | 9    | Josephine               | 9    | Pike                   | 13   | Beadle                    | 15   | Campbell             | 10   |
| Ellis                  | 9    | Klamath                 | 14   | Potter                 | 15   | Bennett                   | 14   | Cannon               | 9    |
| Garfield               | 8    | Lake                    | 14   | Schuykill              | 13   | Bon Homme                 | 14   | Carroll              | 9    |
| Garvin                 | 7    | Lane                    | 10   | Snyder                 | 13   | Brookings                 | 16   | Carter               | 10   |
| Grady                  | 7    | Linn                    | 11   | Somerset               | 13   | Brown                     | 16   | Cheatham             | 9    |
| Grant                  | 7    | Linn                    | 10   | Sullivan               | 14   | Brule                     | 15   | Chester              | 8    |
| Greer                  | 7    | Malheur                 | 12   | Susquehanna            | 15   | Buffalo                   | 15   | Claiborne            | 10   |
| Harmon                 | 7    | Marion                  | 16   | Tioga                  | 15   | Butte                     | 15   | Clay                 | 9    |
| Harper                 | 9    | Morrow                  | 12   | Union                  | 13   | Campbell                  | 15   | Cocke                | 9    |
| Haskell                | 7    | Nebraska                | 10   | Venango                | 14   | Charles Mix               | 14   | Coffee               | 8    |
| Hughes                 | 7    | Polk                    | 10   | Warren                 | 14   | Clark                     | 16   | Crockett             | 8    |
| Jackson                | 7    | Sherman                 | 13   | Washington             | 12   | Clay                      | 14   | Cumberland           | 9    |
| Jefferson <sup>a</sup> | 6    | Tillamook               | 11   | Wayne                  | 15   | Codington                 | 16   | Davidson             | 8    |
| Johnston <sup>a</sup>  | 6    | Umatilla                | 12   | Westmoreland           | 13   | Corson                    | 15   | De Kalb              | 9    |
| Kay                    | 9    | Union                   | 13   | Wyoming                | 14   | Custer                    | 15   | Decatur              | 8    |
| Kingfisher             | 8    | Washita                 | 15   | York                   | 11   | Davison                   | 15   | Dickson              | 9    |
| Kiowa                  | 7    | Wasco                   | 13   | <b>RHODE ISLAND</b>    |      | Day                       | 16   | Dyer                 | 8    |
| Latimer                | 7    | Washington              | 10   | Bristol                | 12   | Deuel                     | 16   | Fayette <sup>a</sup> | 7    |
| Le Flore               | 7    | Wheeler                 | 13   | Kent                   | 12   | Dewey                     | 15   | Fentress             | 10   |
| Lincoln                | 7    | Yamhill                 | 10   | Newport                | 12   | Douglas                   | 14   | Franklin             | 8    |
| Logan                  | 8    |                         |      | Providence             | 14   | Edmunds                   | 15   | Gibson               | 9    |
| Love <sup>a</sup>      | 6    | <b>PENNSYLVANIA</b>     |      | Washington             | 12   | Fall River                | 15   | Giles                | 8    |
| Major                  | 9    | Adams                   | 11   | <b>SOUTH CAROLINA</b>  |      | Faulk                     | 15   | Grainger             | 9    |
| Marshall <sup>a</sup>  | 6    | Allegheny               | 12   | Abbeville              | 7    | Grant                     | 16   | Greene               | 9    |
| Mayes                  | 8    | Armstrong               | 13   | Aiken <sup>a</sup>     | 6    | Gregory                   | 14   | Grundy               | 9    |
| Mcclain                | 7    | Beaver                  | 12   | Allendale <sup>a</sup> | 5    | Haakon                    | 15   | Hamblen              | 9    |
| Mccurtain              | 7    | Bedford                 | 13   | Anderson               | 7    | Hamlin                    | 16   | Hamilton             | 8    |
| Mcintosh               | 7    | Berks                   | 12   | Bamberg <sup>a</sup>   | 5    | Hand                      | 15   | Hancock              | 10   |
| Murray                 | 7    | Blair                   | 13   | Barnwell <sup>a</sup>  | 5    | Hanson                    | 15   | Hardeman             | 8    |
| Muskogee               | 7    | Bradford                | 15   | Beaufort <sup>a</sup>  | 5    | Harding                   | 15   | Hardin               | 8    |
| Noble                  | 8    | Bucks                   | 11   |                        |      | Hughes                    | 15   | Hawkins              | 9    |
| Nowata                 | 9    |                         |      |                        |      |                           |      |                      |      |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County              | Zone | County                 | Zone | County                 | Zone | County                     | Zone | County                  | Zone |
|---------------------|------|------------------------|------|------------------------|------|----------------------------|------|-------------------------|------|
| Haywood             | 8    | Bell <sup>a</sup>      | 5    | Glasscock              | 6    | Mcculloch <sup>a</sup>     | 5    | Val Verde <sup>a</sup>  | 4    |
| Henderson           | 8    | Bexar <sup>a</sup>     | 4    | Goliad <sup>a</sup>    | 3    | McLennan <sup>a</sup>      | 5    | Van Zandt               | 5    |
| Henry               | 9    | Blanco <sup>a</sup>    | 5    | Gonzales <sup>a</sup>  | 4    | McMullen <sup>a</sup>      | 3    | Victoria <sup>a</sup>   | 3    |
| Hickman             | 9    | Borden                 | 7    | Gray                   | 9    | Medina <sup>a</sup>        | 4    | Walker <sup>a</sup>     | 4    |
| Houston             | 9    | Bosque <sup>a</sup>    | 5    | Grayson                | 6    | Menard <sup>a</sup>        | 5    | Waller <sup>a</sup>     | 4    |
| Humphreys           | 9    | Bowie                  | 6    | Gregg                  | 6    | Midland                    | 6    | Ward                    | 6    |
| Jackson             | 9    | Brazoria <sup>a</sup>  | 3    | Grimes <sup>a</sup>    | 4    | Milam <sup>a</sup>         | 4    | Washington <sup>a</sup> | 4    |
| Jefferson           | 9    | Brazos <sup>a</sup>    | 4    | Guadalupe <sup>a</sup> | 4    | Mills <sup>a</sup>         | 5    | Webb <sup>a</sup>       | 3    |
| Johnson             | 10   | Brewster <sup>a</sup>  | 5    | Hale                   | 8    | Mitchell                   | 6    | Wharton <sup>a</sup>    | 3    |
| Knox                | 8    | Briscoe                | 8    | Hall                   | 8    | Montague                   | 6    | Wheeler                 | 8    |
| Lake                | 9    | Brooks <sup>a</sup>    | 3    | Hamilton <sup>a</sup>  | 5    | Montgomery                 | 4    | Wichita                 | 7    |
| Lauderdale          | 8    | Brown <sup>a</sup>     | 5    | Hansford               | 9    | Moore                      | 9    | Wilbarger               | 7    |
| Lawrence            | 8    | Burleson <sup>a</sup>  | 4    | Hardeman               | 7    | Morris                     | 6    | Wilcox <sup>a</sup>     | 2    |
| Lewis               | 8    | Burnet <sup>a</sup>    | 5    | Hardin <sup>a</sup>    | 4    | Murray                     | 7    | Williamson <sup>a</sup> | 4    |
| Lincoln             | 8    | Caldwell <sup>a</sup>  | 4    | Harris <sup>a</sup>    | 4    | Nacogdoches <sup>a</sup>   | 5    | Wilson <sup>a</sup>     | 4    |
| Loudon              | 8    | Calhoun <sup>a</sup>   | 3    | Harrison               | 6    | Navarro <sup>a</sup>       | 5    | Winkler                 | 6    |
| Macon               | 9    | Callahan               | 6    | Hartley                | 9    | Newton <sup>a</sup>        | 4    | Wise                    | 5    |
| Madison             | 8    | Cameron <sup>a</sup>   | 2    | Haskell                | 6    | Nolan                      | 6    | Wood                    | 6    |
| Marion              | 8    | Camp                   | 6    | Hays <sup>a</sup>      | 4    | Nueces                     | 6    | Yoakum                  | 8    |
| Marshall            | 8    | Carson                 | 9    | Hemphill               | 8    | Ochiltree                  | 9    | Young                   | 6    |
| Maury               | 9    | Cass                   | 6    | Henderson <sup>a</sup> | 5    | Odham                      | 9    | Zapata <sup>a</sup>     | 2    |
| Mcminn              | 8    | Castro                 | 9    | Hidalgo <sup>a</sup>   | 2    | Orange <sup>a</sup>        | 4    | Zavala <sup>a</sup>     | 3    |
| McNairy             | 8    | Chambers <sup>a</sup>  | 4    | Hill <sup>a</sup>      | 5    | Palo Pinto                 | 6    |                         |      |
| Meigs               | 8    | Cherokee <sup>a</sup>  | 5    | Hockley                | 8    | Panola <sup>a</sup>        | 5    |                         |      |
| Monroe              | 8    | Childress              | 7    | Hood <sup>a</sup>      | 8    | Parker                     | 5    |                         |      |
| Montgomery          | 9    | Clay                   | 6    | Hopkins                | 6    | Parker                     | 9    |                         |      |
| Moore               | 8    | Cochran                | 8    | Howard                 | 5    | Pecos <sup>a</sup>         | 5    |                         |      |
| Morgan              | 10   | Coke                   | 6    | Howard                 | 6    | Polk <sup>a</sup>          | 4    |                         |      |
| Obion               | 9    | Coleman <sup>a</sup>   | 5    | Hudspeth               | 6    | Potter                     | 9    |                         |      |
| Overton             | 9    | Collin                 | 5    | Hunt                   | 6    | Presidio <sup>a</sup>      | 5    |                         |      |
| Perry               | 8    | Collingsworth          | 7    | Hutchinson             | 9    | Rains                      | 6    |                         |      |
| Pickett             | 10   | Colorado <sup>a</sup>  | 4    | Imperial               | 5    | Randall                    | 9    |                         |      |
| Polk                | 8    | Comal <sup>a</sup>     | 4    | Irwin                  | 6    | Reagan <sup>a</sup>        | 5    |                         |      |
| Putnam              | 9    | Comanche <sup>a</sup>  | 5    | Jackson <sup>a</sup>   | 3    | Real <sup>a</sup>          | 4    |                         |      |
| Rhea                | 8    | Concho <sup>a</sup>    | 5    | Jasper <sup>a</sup>    | 4    | Red River                  | 6    |                         |      |
| Roane               | 9    | Cooke                  | 6    | Jeff Davis             | 6    | Reeves                     | 6    |                         |      |
| Robertson           | 9    | Coryell <sup>a</sup>   | 5    | Jefferson <sup>a</sup> | 4    | Refugio <sup>a</sup>       | 3    |                         |      |
| Rutherford          | 8    | Cottle                 | 5    | Jim Hogg <sup>a</sup>  | 3    | Roberts                    | 9    |                         |      |
| Scott               | 10   | Crawford               | 5    | Jim Wells <sup>a</sup> | 3    | Robertson <sup>a</sup>     | 4    |                         |      |
| Sequatchie          | 8    | Crockett <sup>a</sup>  | 5    | Johnson <sup>a</sup>   | 5    | Rockwall                   | 5    |                         |      |
| Sevier              | 9    | Gosby                  | 7    | Jones                  | 6    | Runnels <sup>a</sup>       | 5    |                         |      |
| Shelby <sup>a</sup> | 7    | Culberson              | 5    | Karnes <sup>a</sup>    | 3    | Rusk <sup>a</sup>          | 5    |                         |      |
| Smith               | 9    | Dallas                 | 5    | Kaufman                | 5    | Sabine <sup>a</sup>        | 5    |                         |      |
| Stewart             | 9    | Dallam                 | 8    | Kendall <sup>a</sup>   | 5    | San Augustine <sup>a</sup> | 5    |                         |      |
| Sullivan            | 9    | Dawson                 | 7    | Kenedy <sup>a</sup>    | 2    | San Jacinto <sup>a</sup>   | 4    |                         |      |
| Sumner              | 8    | De Witt <sup>a</sup>   | 3    | Kent                   | 7    | San Patricio <sup>a</sup>  | 3    |                         |      |
| Tipton              | 8    | Deaf Smith             | 9    | Kerr <sup>a</sup>      | 5    | San Saba <sup>a</sup>      | 5    |                         |      |
| Trousdale           | 9    | Delta                  | 8    | Kimble <sup>a</sup>    | 5    | Schleicher <sup>a</sup>    | 5    |                         |      |
| Unicoi              | 10   | Denton                 | 5    | King                   | 7    | Scurry                     | 7    |                         |      |
| Union               | 9    | Dickens                | 7    | Kinney <sup>a</sup>    | 4    | Shackelford                | 6    |                         |      |
| Van Buren           | 8    | Dimmit <sup>a</sup>    | 3    | Kleberg <sup>a</sup>   | 2    | Shelby <sup>a</sup>        | 5    |                         |      |
| Warren              | 9    | Donley                 | 8    | Knox                   | 7    | Sherman                    | 9    |                         |      |
| Washington          | 9    | Duval <sup>a</sup>     | 3    | La Salle <sup>a</sup>  | 3    | Smith <sup>a</sup>         | 5    |                         |      |
| Wayne               | 8    | Eastland               | 6    | Lamar                  | 6    | Somervell <sup>a</sup>     | 5    |                         |      |
| Weakley             | 9    | Ellis <sup>a</sup>     | 6    | Lamb                   | 8    | Starr <sup>a</sup>         | 2    |                         |      |
| White               | 9    | Ellis <sup>a</sup>     | 4    | Lampasas <sup>a</sup>  | 5    | Stephens                   | 6    |                         |      |
| Williamson          | 8    | El Paso                | 6    | Lavaca <sup>a</sup>    | 4    | Sterling                   | 6    |                         |      |
| Wilson              | 9    | Ellis <sup>a</sup>     | 5    | Lee <sup>a</sup>       | 4    | Stonewall                  | 7    |                         |      |
|                     |      | Erath                  | 5    | Leon <sup>a</sup>      | 5    | Sutton <sup>a</sup>        | 5    |                         |      |
|                     |      | Falls <sup>a</sup>     | 5    | Liberty <sup>a</sup>   | 4    | Swisher                    | 9    |                         |      |
|                     |      | Fannin                 | 6    | Limestone <sup>a</sup> | 5    | Tarrant <sup>a</sup>       | 5    |                         |      |
|                     |      | Fayette <sup>a</sup>   | 4    | Lipscomb               | 9    | Taylor                     | 6    |                         |      |
|                     |      | Fisher                 | 6    | Live Oak <sup>a</sup>  | 3    | Terrell <sup>a</sup>       | 5    |                         |      |
|                     |      | Floyd                  | 8    | Llano <sup>a</sup>     | 5    | Terry                      | 7    |                         |      |
|                     |      | Foard                  | 7    | Loving                 | 6    | Throckmorton               | 6    |                         |      |
|                     |      | Fort Bend <sup>a</sup> | 4    | Lubbock                | 7    | Titus                      | 6    |                         |      |
|                     |      | Franklin               | 6    | Lynn                   | 7    | Tom Green <sup>a</sup>     | 5    |                         |      |
|                     |      | Freestone <sup>a</sup> | 5    | Madison <sup>a</sup>   | 4    | Travis <sup>a</sup>        | 4    |                         |      |
|                     |      | Frio <sup>a</sup>      | 3    | Marion                 | 6    | Trinity <sup>a</sup>       | 4    |                         |      |
|                     |      | Gaines                 | 7    | Martin                 | 6    | Tyler <sup>a</sup>         | 4    |                         |      |
|                     |      | Galveston <sup>a</sup> | 3    | Mason <sup>a</sup>     | 5    | Upshur                     | 6    |                         |      |
|                     |      | Garza                  | 7    | Matagorda <sup>a</sup> | 3    | Upton <sup>a</sup>         | 5    |                         |      |
|                     |      | Gillespie <sup>a</sup> | 5    | Maverick <sup>a</sup>  | 3    | Uvalde <sup>a</sup>        | 4    |                         |      |

(continued)

**TABLE N1101.2—continued**  
**CLIMATE ZONES BY STATES AND COUNTIES**

| County               | Zone | County                    | Zone | County               | Zone | County           | Zone | County         | Zone |
|----------------------|------|---------------------------|------|----------------------|------|------------------|------|----------------|------|
| Amelia               | 9    | Patrick                   | 10   | Suffolk              | 8    | Lewis            | 12   | Kewaunee       | 15   |
| Amherst              | 9    | Pittsylvania              | 9    | Virginia Beach       | 8    | Lincoln          | 10   | La Crosse      | 15   |
| Appomattox           | 9    | Powhatan                  | 9    | Waynesboro           | 11   | Logan            | 10   | Lafayette      | 15   |
| Arlington            | 10   | Prince Edward             | 9    | Williamsburg         | 8    | Marion           | 12   | Langlade       | 17   |
| Augusta              | 11   | Prince George             | 8    | Winchester           | 11   | Marshall         | 12   | Lincoln        | 17   |
| Bath                 | 11   | Prince William            | 10   |                      |      | Mason            | 11   | Manitowoc      | 15   |
| Bedford              | 9    | Pulaski                   | 11   | <b>WASHINGTON</b>    |      | Mcdowell         | 11   | Marathon       | 15   |
| Bland                | 11   | Rappahannock              | 11   | Adams                | 12   | Mercer           | 11   | Marinette      | 15   |
| Botetourt            | 9    | Richmond                  | 8    | Asotin               | 12   | Mineral          | 12   | Marquette      | 15   |
| Brunswick            | 8    | Roanoke                   | 9    | Benton               | 11   | Mingo            | 10   | Menominee      | 15   |
| Buchanan             | 10   | Rockbridge                | 9    | Chelan               | 12   | Monongalia       | 11   | Milwaukee      | 15   |
| Buckingham           | 9    | Rockingham                | 11   | Clallam              | 12   | Monroe           | 11   | Monroe         | 15   |
| Campbell             | 9    | Russell                   | 10   | Clark                | 11   | Morgan           | 11   | Oconto         | 15   |
| Caroline             | 9    | Scott                     | 10   | Columbia             | 12   | Nicholas         | 11   | Oneida         | 17   |
| Carroll              | 11   | Shenandoah                | 11   | Cowlitz              | 11   | Ohio             | 11   | Ontonagon      | 15   |
| Charles City         | 8    | Smyth                     | 11   | Douglas              | 14   | Pendleton        | 13   | Ozaukee        | 15   |
| Charlotte            | 9    | Southampton               | 8    | Ferry                | 15   | Pleasant         | 11   | Pepin          | 15   |
| Chesterfield         | 9    | Spotsylvania              | 10   | Franklin             | 11   | Pocahontas       | 13   | Pierce         | 15   |
| Clarke               | 11   | Stafford                  | 10   | Garfield             | 12   | Preston          | 13   | Polk           | 16   |
| Craig                | 10   | Surry                     | 8    | Grant                | 12   | Putnam           | 10   | Portage        | 15   |
| Culpeper             | 10   | Sussex                    | 8    | Grays Harbor         | 11   | Raleigh          | 11   | Price          | 17   |
| Cumberland           | 9    | Tazewell                  | 11   | Island               | 12   | Randolph         | 13   | Racine         | 15   |
| Dickenson            | 10   | Virginia Beach            | 8    | Jefferson            | 11   | Richie           | 11   | Richland       | 15   |
| Dinwiddie            | 8    | Warren                    | 11   | King                 | 10   | Roane            | 11   | Rock           | 15   |
| Essex                | 9    | Washington                | 11   | Kitsap               | 11   | Sumner           | 12   | Rusk           | 16   |
| Fairfax              | 10   | Westmoreland              | 8    | Kittitas             | 14   | Taylor           | 12   | Sauk           | 15   |
| Fauquier             | 10   | Wise                      | 10   | Klickitat            | 12   | Tucker           | 13   | Sawyer         | 17   |
| Floyd                | 11   | Wythe                     | 11   | Lewis                | 11   | Wyle             | 11   | Shawano        | 15   |
| Fluvanna             | 9    | York                      | 8    | Lincoln              | 10   | Upshur           | 12   | Sheboygan      | 15   |
| Franklin             | 10   |                           |      | Mason                | 11   | Wayne            | 10   | St Croix       | 15   |
| Frederick            | 11   | <b>VIRGINIA</b>           |      | Okanogan             | 15   | Webster          | 12   | Taylor         | 17   |
| Fredericksburg Giles | 10   | <b>INDEPENDENT CITIES</b> |      | Pacific              | 11   | Wetzel           | 12   | Trempealeau    | 15   |
| Gloucester           | 8    | Alexandria                | 10   | Pend Oreille         | 11   | Wirt             | 11   | Vernon         | 15   |
| Goochland            | 9    | Bedford                   | 9    | Pierce               | 11   | Wood             | 11   | Vilas          | 17   |
| Grayson              | 11   | Bristol                   | 9    | Snohomish            | 12   | Wyoming          | 11   | Walworth       | 15   |
| Greene               | 10   | Buena Vista               | 8    | Skagit               | 11   |                  |      | Washburn       | 17   |
| Greensville          | 8    | Charlottesville           | 9    | Skamania             | 11   | <b>WISCONSIN</b> |      | Washington     | 15   |
| Halifax              | 9    | Chesapeake                | 8    | Snohomish            | 11   | Adams            | 15   | Waukesha       | 15   |
| Hampton              | 8    | Clifton Forge             | 10   | Spokane              | 14   | Ashland          | 17   | Waupaca        | 15   |
| Hanover              | 9    | Colonial Hts              | 10   | Stevens              | 15   | Barron           | 16   | Waushara       | 15   |
| Henrico              | 8    | Covington                 | 11   | Thurston             | 11   | Bayfield         | 17   | Winnebago      | 15   |
| Henry                | 10   | Danville                  | 9    | Wahkiakum            | 11   | Brown            | 15   | Wood           | 15   |
| Highland             | 11   | Emporia                   | 8    | Walla Walla          | 11   | Buffalo          | 15   |                |      |
| Isle Of Wight        | 8    | Fairfax                   | 10   | Whatcom              | 12   | Burnett          | 17   | <b>WYOMING</b> |      |
| James City           | 8    | Falls Church              | 10   | Whitman              | 14   | Calumet          | 15   | Albany         | 16   |
| King And Queen       | 9    | Fredericksburg            | 10   | Yakima               | 12   | Chippewa         | 15   | Big Horn       | 15   |
| King George          | 9    | Galax                     | 11   | <b>WEST VIRGINIA</b> |      | Clark            | 15   | Campbell       | 15   |
| King William         | 9    | Hampton                   | 8    | Barbour              | 13   | Columbia         | 15   | Carbon         | 16   |
| Lancaster            | 8    | Harrisonburg              | 11   | Berkeley             | 11   | Crawford         | 15   | Converse       | 15   |
| Lee                  | 10   | Hopewell                  | 11   | Boone                | 10   | Dane             | 15   | Crook          | 15   |
| Loudoun              | 10   | Leesington                | 9    | Braxton              | 11   | Dodge            | 15   | Fremont        | 15   |
| Louisa               | 8    | Lynchburg                 | 9    | Brooke               | 12   | Door             | 15   | Goshen         | 14   |
| Lunenburg            | 11   | Manassas                  | 10   | Cabell               | 10   | Douglas          | 17   | Hot Springs    | 15   |
| Madison              | 8    | Manassas Park             | 10   | Calhoun              | 11   | Dunn             | 15   | Johnson        | 15   |
| Mathews              | 8    | Martha's Vine             | 10   | Clay                 | 11   | Eau Claire       | 15   | Laramie        | 15   |
| Mecklenburg          | 8    | Newport News              | 8    | Doddridge            | 12   | Florence         | 17   | Lincoln        | 17   |
| Middlesex            | 8    | Norfolk                   | 8    | Fayette              | 12   | Fond Du Lac      | 15   | Natrona        | 15   |
| Montgomery           | 11   | Norton                    | 10   | Gilmer               | 11   | Forest           | 17   | Niobrara       | 15   |
| Nansemond            | 8    | Petersburg                | 8    | Grant                | 13   | Grant            | 15   | Park           | 15   |
| Nelson               | 9    | Poquoson                  | 8    | Greenbrier           | 12   | Green            | 15   | Platte         | 14   |
| New Kent             | 8    | Portsmouth                | 8    | Hampshire            | 11   | Green Lake       | 15   | Sheridan       | 15   |
| Newport News         | 8    | Radford                   | 11   | Hancock              | 12   | Iowa             | 15   | Sublette       | 17   |
| Norfolk              | 8    | Richmond                  | 8    | Hardy                | 12   | Iron             | 17   | Sweetwater     | 16   |
| Northampton          | 8    | Roanoke                   | 9    | Harrison             | 12   | Jackson          | 15   | Teton          | 17   |
| Northumberland       | 8    | Salem                     | 9    | Jackson              | 11   | Jefferson        | 15   | Uinta          | 16   |
| Nottoway             | 9    | South Boston              | 9    | Jefferson            | 11   | Juneau           | 15   | Washakie       | 15   |
| Orange               | 10   | Staunton                  | 11   | Kanawha              | 10   | Kenosha          | 15   | Weston         | 15   |
| Page                 | 11   |                           |      |                      |      |                  |      |                |      |

a. A moisture vapor retarder is not required in these counties. See Section R318.1.

## SECTION N1102 BUILDING ENVELOPE

**N1102.1 Thermal performance criteria.** The minimum required insulation *R*-value or the area-weighted average maximum required fenestration *U*-factor (other than opaque doors which are governed by Section N1102.1.3) for each element in the building thermal envelope (fenestration, roof/ceiling, opaque wall, floor, slab edge, crawl space wall and basement wall) shall be in accordance with the criteria in Table N1102.1.

Detached one-and-two family dwellings with greater than 15-percent glazing area; townhouses with greater than 25-percent glazing area; and any residential building in climates with heating degree days equal to or greater than 13,000; shall determine compliance using the building envelope requirements of Chapter 4 or 5 of the *International Energy Conservation Code*.

**N1102.1.1 Exterior walls.** The minimum required *R*-value in Table N1102.1 shall be met by the sum of the *R*-values of the insulation materials installed in framing cavities and/or insulating sheathing applied, and not by framing, drywall, structural sheathing, or exterior siding materials. Insulation separated from the conditioned space by a vented space shall not be counted towards the required *R*-value.

**N1102.1.1.1 Mass walls.** Mass walls shall be permitted to meet the mass wall criteria in Table N1102.1.1(1),

based on the insulation position and the climate zone where the building is located. Other mass walls shall meet the frame wall criteria for the building type and the climate zone where the building is located, based on the sum of interior and exterior insulation. Walls with exterior insulation position have the entire effective mass layer interior to an insulation layer. Walls with integral insulation position have either insulation and mass materials well mixed as in wood (logs); or substantially equal amounts of mass material on the interior and exterior of insulation as in concrete masonry units with insulated cores or masonry cavity walls. Walls with interior insulation position have the mass material located exterior to the insulating material. Walls not meeting either of the above descriptions for exterior or integral positions shall meet the requirements for "Other mass walls" in Table N1102.1.1.1(1). The *R*-value of the mass assembly for typical masonry constructions shall be taken from Table N1102.1.1.1(2). The *R*-value for a solid concrete wall with a thickness of 4 inches (102 mm) or greater is R-1.1. *R*-values for other assemblies are permitted to be based on hot box tests referenced in ASTM C 236 or ASTM C 976, two dimensional calculations or isothermal planes calculations.

**N1102.1.1.2 Steel-frame walls.** The minimum required *R*-values for steel-frame walls shall be in accordance with Table N1102.1.1.2.

TABLE N1102.1  
SIMPLIFIED PRESCRIPTIVE BUILDING ENVELOPE THERMAL COMPONENT CRITERIA  
MINIMUM REQUIRED THERMAL PERFORMANCE (*U*-FACTOR AND *R*-VALUE)

| BUILDING LOCATION |              | MAXIMUM GLAZING<br><i>U</i> -FACTOR<br>(Btu / (hr · ft <sup>2</sup> · °F)) | MINIMUM INSULATION <i>R</i> -VALUE [(hr · ft <sup>2</sup> · °F) / Btu] |       |        |                |                                                |                   |
|-------------------|--------------|----------------------------------------------------------------------------|------------------------------------------------------------------------|-------|--------|----------------|------------------------------------------------|-------------------|
| Climate Zone      | HDD          |                                                                            | Ceilings                                                               | Walls | Floors | Basement walls | Slab perimeter<br><i>R</i> -value and<br>depth | Crawl space walls |
| 1                 | 0-499        | Any                                                                        | R-13                                                                   | R-11  | R-11   | R-0            | R-0                                            | R-0               |
| 2                 | 500-999      | 0.90                                                                       | R-19                                                                   | R-11  | R-11   | R-0            | R-0                                            | R-4               |
| 3                 | 1,000-1,499  | 0.75                                                                       | R-19                                                                   | R-11  | R-11   | R-0            | R-0                                            | R-5               |
| 4                 | 1,500-1,999  | 0.75                                                                       | R-26                                                                   | R-13  | R-11   | R-5            | R-0                                            | R-5               |
| 5                 | 2,000-2,499  | 0.65                                                                       | R-30                                                                   | R-13  | R-11   | R-5            | R-0                                            | R-6               |
| 6                 | 2,500-2,999  | 0.60                                                                       | R-30                                                                   | R-13  | R-19   | R-6            | R-4, 2 ft.                                     | R-7               |
| 7                 | 3,000-3,499  | 0.55                                                                       | R-30                                                                   | R-13  | R-19   | R-7            | R-4, 2 ft.                                     | R-8               |
| 8                 | 3,500-3,999  | 0.50                                                                       | R-30                                                                   | R-13  | R-19   | R-8            | R-5, 2 ft.                                     | R-10              |
| 9                 | 4,000-4,499  | 0.45                                                                       | R-38                                                                   | R-13  | R-19   | R-8            | R-5, 2 ft.                                     | R-11              |
| 10                | 4,500-4,999  | 0.45                                                                       | R-38                                                                   | R-16  | R-19   | R-9            | R-6, 2 ft.                                     | R-17              |
| 11                | 5,000-5,499  | 0.45                                                                       | R-38                                                                   | R-18  | R-19   | R-9            | R-6, 2 ft.                                     | R-17              |
| 12                | 5,500-5,999  | 0.40                                                                       | R-38                                                                   | R-18  | R-21   | R-10           | R-9, 4 ft.                                     | R-19              |
| 13                | 6,000-6,499  | 0.35                                                                       | R-38                                                                   | R-18  | R-21   | R-10           | R-9, 4 ft.                                     | R-20              |
| 14                | 6,500-6,999  | 0.35                                                                       | R-49                                                                   | R-21  | R-21   | R-11           | R-11, 4 ft.                                    | R-20              |
| 15                | 7,000-8,499  | 0.35                                                                       | R-49                                                                   | R-21  | R-21   | R-11           | R-13, 4 ft.                                    | R-20              |
| 16                | 8,500-8,999  | 0.35                                                                       | R-49                                                                   | R-21  | R-21   | R-18           | R-14, 4 ft.                                    | R-20              |
| 17                | 9,000-12,999 | 0.35                                                                       | R-49                                                                   | R-21  | R-21   | R-19           | R-18, 4 ft.                                    | R-20              |

For SI: 1 Btu/(hr · ft<sup>2</sup> · °F) = 5.68W/m<sup>2</sup> · K, 1 (hr · ft<sup>2</sup> · °F)/Btu = 0.176m<sup>2</sup> · K/W.

**TABLE N1102.1.1.1(1)**  
**MASS WALL PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS**

| BUILDING LOCATION |              | MASS WALL ASSEMBLY R-VALUE <sup>a</sup> (hr · ft <sup>2</sup> · °F) / Btu |                  |
|-------------------|--------------|---------------------------------------------------------------------------|------------------|
| Climate Zone      | HDD          | Exterior or integral insulation                                           | Other mass walls |
| 1                 | 0-499        | R-3.8                                                                     | R-9.7            |
| 2                 | 500-999      | R-4.8                                                                     | R-9.7            |
| 3                 | 1,000-1,499  | R-4.8                                                                     | R-9.7            |
| 4                 | 1,500-1,999  | R-8.1                                                                     | R-10.8           |
| 5                 | 2,000-2,499  | R-8.9                                                                     | R-10.8           |
| 6                 | 2,500-2,999  | R-8.9                                                                     | R-10.8           |
| 7                 | 3,000-3,499  | R-8.9                                                                     | R-10.8           |
| 8                 | 3,500-3,999  | R-8.9                                                                     | R-10.8           |
| 9                 | 4,000-4,499  | R-8.9                                                                     | R-10.9           |
| 10                | 4,500-4,999  | R-10.4                                                                    | R-12.3           |
| 11                | 5,000-5,499  | R-11.9                                                                    | R-15.2           |
| 12                | 5,500-5,999  | R-11.9                                                                    | R-15.2           |
| 13                | 6,000-6,499  | R-11.9                                                                    | R-15.2           |
| 14                | 6,500-6,999  | R-15.5                                                                    | R-18.4           |
| 15                | 7,000-8,499  | R-15.5                                                                    | R-18.4           |
| 16                | 8,500-8,999  | R-18.4                                                                    | R-18.4           |
| 17                | 9,000-12,499 | R-18.4                                                                    | R-18.4           |

For SI: 1 (hr · ft<sup>2</sup> · °F)/Btu = 0.176 m<sup>2</sup> · K/W.

a. The sum of the value in Table N1102.1.1.1(2) and additional insulation layers.

**TABLE N1102.1.1.1(2)**  
**MASS ASSEMBLY R-VALUES**

| ASSEMBLY TYPE                    | UNGRAOUTED CELLS<br>NOT INSULATED<br>(hr · ft <sup>2</sup> · °F) / Btu | UNGRAOUTED CELLS INSULATED (hr · ft <sup>2</sup> · °F) / Btu |                                                     |                                                    |
|----------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
|                                  |                                                                        | No grout                                                     | Vertical cells grouted<br>at 10 ft. o.c. or greater | Vertical cells grouted<br>at less than 10 ft. o.c. |
| 6" Light weight concrete block   | 2.3                                                                    | 5.0                                                          | 4.5                                                 | 3.8                                                |
| 6" Medium weight concrete block  | 2.1                                                                    | 4.2                                                          | 3.8                                                 | 3.2                                                |
| 6" Normal weight concrete block  | 1.9                                                                    | 3.3                                                          | 3.1                                                 | 2.7                                                |
| 8" Light weight concrete block   | 2.6                                                                    | 6.7                                                          | 5.9                                                 | 4.8                                                |
| 8" Medium weight concrete block  | 2.3                                                                    | 5.3                                                          | 4.8                                                 | 4.0                                                |
| 8" Normal weight concrete block  | 2.1                                                                    | 4.2                                                          | 3.8                                                 | 3.3                                                |
| 12" Light weight concrete block  | 2.9                                                                    | 9.1                                                          | 7.9                                                 | 6.3                                                |
| 12" Medium weight concrete block | 2.6                                                                    | 7.1                                                          | 6.4                                                 | 5.2                                                |
| 12" Normal weight concrete block | 2.3                                                                    | 5.6                                                          | 5.1                                                 | 4.3                                                |
| Brick cavity wall                | 3.7                                                                    | 6.7                                                          | 6.2                                                 | 5.4                                                |
| Hollow clay brick                | 2.0                                                                    | 2.7                                                          | 2.6                                                 | 2.4                                                |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 (hr · ft<sup>2</sup> · °F)/Btu = 0.176 m<sup>2</sup> · K/W.

TABLE N1102.1.1.2  
STEEL-FRAME WALL MINIMUM PERFORMANCE REQUIREMENTS (R-VALUE)

| CLIMATE ZONES | HDD          | EQUIVALENT STEEL-FRAME WALL CAVITY AND SHEATHING R-VALUE <sup>a</sup> (hr·ft <sup>2</sup> ·°F) / Btu |
|---------------|--------------|------------------------------------------------------------------------------------------------------|
| 1–4           | 0–1999       | R-11+R-5, R-15+R-4, R-21+R-3                                                                         |
| 5–8           | 2,000–3,999  | R-11+R-5, R-15+R-4, R-21+R-3                                                                         |
| 9–12          | 4,000–5,999  | R-11+R-9, R-15+R-8, R-21+R-7                                                                         |
| 13–15         | 6,000–8,499  | R-13+R-10, R-19+R-9, R-25+R-8                                                                        |
| 16 and 17     | 8,500–12,999 | R-13+R-10, R-19+R-9, R-25+R-8                                                                        |

For SI: 1 (hr·ft<sup>2</sup>·°F)/Btu = 0.176 m<sup>2</sup>·K/W.

a. The cavity insulation R-value requirement is listed first, followed by the sheathing R-value requirement.

**N1102.1.2 Ceilings.** The required “Ceiling R-value” in Table N1102.1 assumes standard truss or rafter construction and shall apply to all roof/ceiling portions of the building thermal envelope, including cathedral ceilings. Where the construction technique allows the required R-value of ceiling insulation to be obtained over the wall top plate, R-30 shall be permitted to be used where R-38 is required and R-38 shall be permitted to be used where R-49 is required.

**N1102.1.3 Opaque doors.** Opaque doors separating conditioned and unconditioned space shall have a maximum U-factor of 0.35. One opaque door shall be permitted to be exempt from this U-factor requirement.

**N1102.1.4 Floors.** The required R-value in Table N1102.1 shall apply to all floors, except any individual floor assembly with over 25 percent of its conditioned floor area exposed directly to outside air shall meet the R-value requirement in Table N1102.1 for “Ceilings.”

**N1102.1.5 Basement walls.** When the basement is a conditioned space, the basement walls shall be insulated in accordance with Table N1102.1. When the basement is not a conditioned space, either the basement walls or the ceilings separating the basement from conditioned space shall be insulated in accordance with Table N1102.1. When insulating basement walls, the required R-value shall be applied from the top of the basement wall to a depth of 40 feet (3048 mm) below grade or to the top of the basement floor, whichever is less.

**N1102.1.6 Slab-on-grade floors.** For slabs with a top edge above finished grade or 12 inches (305 mm) or less below finished grade, the required R-value in Table N1102.1 shall be applied to the outside of the foundation or the inside of the foundation wall. The insulation shall extend downward from the top of the slab, or downward to the bottom of the slab and then horizontally in either direction, until the distance listed in Table N1102.1 is reached.

When installed between the exterior wall and the edge of the interior slab, the top edge of the insulation shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the exterior wall. Insulation extending horizontally away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil.

In locations of 500 HDD or greater, R-2 shall be added to the values in Table N1102.1 where uninsulated hot water

pipes, air distribution ducts or electric heating cables are installed within or under the slab.

**Exception:** Slab perimeter insulation is not required for heated slabs in areas of very heavy termite infestation probability as shown in Figure R301.2(6). Where this exception is used, building envelope compliance shall be demonstrated by (a) using *International Energy Conservation Code* Section 502.2.2 or *International Energy Conservation Code* Chapter 4 with the actual slab insulation R-value in Table N1102.1, or (b) using *International Energy Conservation Code* Section 502.2.4.

**N1102.1.7 Crawl space walls.** Where the floor above the crawl space is uninsulated, insulation shall be installed on crawl space walls when the crawl space is not vented to outside air. The required R-value in Table N1102.1 shall be applied inside of the crawl space wall, downward from the sill plate to the exterior finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). The exposed earth in all crawl space foundations shall be covered with a continuous vapor retarder having a maximum permeance rating of 1.0 perm [(57 mg)/(s·m<sup>2</sup>·Pa)], when tested in accordance with ASTM E 96.

**N1102.1.8 Masonry veneer.** For exterior foundation insulation, that horizontal portion of the foundation that supports a masonry veneer shall not be required to be insulated.

**N1102.1.9 Protection.** Exposed insulating materials applied to the exterior of foundation walls shall be protected. The protection shall extend at least 6 inches (152 mm) below finished grade level.

**N1102.1.10 Air leakage.** All joints, seams, penetrations; site-built windows, doors, and skylights; openings between window and door assemblies and their respective jambs and framing; and other sources of air leakage (infiltration and exfiltration) through the building thermal envelope shall be caulked, gasketed, weatherstripped, wrapped, or otherwise sealed to limit uncontrolled air movement.

**N1102.1.11 Recessed lighting fixtures.** When installed in the building envelope, recessed lighting fixtures shall meet one of the following requirements:

1. Type IC rated, manufactured with no penetrations between the inside of the recessed fixture and ceiling cavity and sealed or gasketed to prevent air leakage into the unconditioned space.

2. Type IC or non-IC rated, installed inside a sealed box constructed from a minimum 0.5-inch-thick (12.7 mm) gypsum wallboard or constructed from a pre-formed polymeric vapor barrier, or other air-tight assembly manufactured for this purpose, while maintaining required clearances of not less than 0.5 inch (12.7 mm) from combustible material and not less than 3 inches (76 mm) from insulation material.
3. Type IC rated, in accordance with ASTM E 283 admitting no more than 2.0 cubic feet per minute (cfm) (0.944 L/s) of air movement from the conditioned space to the ceiling cavity. The lighting fixture shall be tested at 1.57 psi (75 Pa) pressure difference and shall be labeled.

**N1102.2 Maximum solar heat gain coefficient for fenestration products.** The area-weighted-average solar heat gain coefficient (SHGC) for glazed fenestration installed in locations with 3,500 or fewer heating degree days shall not exceed 0.40.

**N1102.3 Fenestration exemption.** Up to 1 percent of the total glazing area shall be exempt from *U*-factor requirement.

**N1102.4 Replacement fenestration.** Where some or all of an existing fenestration unit is replaced with an entirely new replacement fenestration product, including frame, sash and glazed portion, in an existing building, the replacement fenestration product shall have a *U*-factor that does not exceed the “Maximum fenestration *U*-factor” and an SHGC that does not exceed the “Maximum fenestration SHGC” in Table N1102.4 applicable to the climate zone (HDD) where the building is located. Replacement skylights and roof windows shall be permitted to have a maximum *U*-factor of 0.60 when installed in any location above 1,999 HDD. The replacement fenestration products must also satisfy the air leakage requirements of Section N1101.3.2.2.

**TABLE N1102.4  
REPLACEMENT FENESTRATION REQUIREMENTS**

| HEATING DEGREE DAYS | MAXIMUM                       |                   |
|---------------------|-------------------------------|-------------------|
|                     | Fenestration <i>U</i> -factor | Fenestration SHGC |
| 0 – 1,999           | 0.75                          | 0.40              |
| 2,000 – 3,999       | 0.50                          | 0.40 <sup>a</sup> |
| 4,000 – 5,999       | 0.40                          | Any               |
| 6,000 – 8,499       | 0.35                          | Any               |
| 8,500 – 12,999      | 0.35                          | Any               |

a. Up to but not including 3,500 HDD.

## SECTION N1103 MECHANICAL SYSTEMS

**[E] N1103.1 Heating and air conditioning appliance and equipment performance.** Performance of equipment listed in Table N1103.1 is covered by preemptive Federal law. Appliances and equipment not listed in Table N1103.1 shall meet the minimum efficiency requirements of Section 503.2 of the *International Energy Conservation Code*.

**N1103.2 Controls.** At least one thermostat shall be provided for each separate heating, cooling, or combination heating and cooling system. Heat pumps shall have controls that prevent supplementary electric resistance heater operation when the heating load can be met by the heat pump alone. Supplementary heater operation shall be permitted during outdoor coil defrost cycles, not exceeding 15 minutes.

**N1103.3 Duct insulation.** All portions of the air distribution system shall be installed in accordance with Section M1601 and be insulated to an installed R-5 when system components are located within the building but outside of conditioned space, and R-8 when located outside of the building. When located within a building envelope assembly, at least R-8 shall be applied between the duct and that portion of the assembly furthest from conditioned space.

**Exception:** Exhaust air ducts and portions of the air distribution system within appliances or equipment.

**N1103.4 Duct sealing.** All ducts shall be sealed in accordance with Section M1601.3.1.

**[E] N1103.5 Piping insulation.** All mechanical system piping shall be insulated in accordance with Table N1103.5.

**Exceptions:** Piping installed within appliances and equipment or piping serving fluids between 55°F (13°C) and 120°F (49°C).

## SECTION N1104 SERVICE WATER HEATING

**[E] N1104.1 Water heating appliance and equipment performance.** Performance of equipment listed in Table N1104.1 is covered by preemptive Federal law. Appliances and equipment not listed in Table N1104.1 shall meet the minimum efficiency requirements of Section 504.2 of the *International Energy Conservation Code*.

**TABLE N1103.1**  
**MINIMUM EQUIPMENT PERFORMANCE**

| EQUIPMENT CATEGORY                                                                      | SUBCATEGORY <sup>a</sup> | REFERENCED STANDARD                        | MINIMUM PERFORMANCE                             |
|-----------------------------------------------------------------------------------------|--------------------------|--------------------------------------------|-------------------------------------------------|
| Air-cooled heat pumps heating mode < 65,000 Btu/h cooling capacity                      | Split systems            | ARI 210/240                                | 6.8 HSPF <sup>a,b</sup>                         |
|                                                                                         | Single package           |                                            | 6.6 HSPF <sup>a,b</sup>                         |
| Gas-fired or oil-fired furnace < 225,000 Btu/h                                          | —                        | DOE 10 CFR Part 430, Subpart B, Appendix N | AFUE 78% <sup>b</sup><br>$E_t$ 80% <sup>c</sup> |
| Gas-fired or oil-fired steam and hot-water boilers < 300,000 Btu/h                      | —                        | DOE 10 CFR Part 430, Subpart B, Appendix N | AFUE 78% <sup>b,d</sup>                         |
| Air-cooled air conditioners and heat pumps cooling mode < 65,000 Btu/h cooling capacity | Split systems            | ARI 210/240                                | 10.0 SEER <sup>b</sup>                          |
|                                                                                         | Single package           |                                            | 9.7 SEER <sup>b</sup>                           |

For SI: 1 Btu/h = 0.2931 W.

- a. For multicapacity equipment, the minimum performance shall apply to each capacity step provided. Multicapacity refers to manufacturer-published ratings for more than one capacity mode allowed by the product's controls.
- b. This is used to be consistent with the National Appliance Energy Conservation Act (NAECA) of 1987 (Public Law 100-12).
- c. These requirements apply to combination units not covered by NAECA (three-phase power or cooling capacity > 65,000 Btu/h).
- d. Except for gas-fired steam boilers, for which the minimum AFUE shall be 75 percent.
- e. Seasonal rating.

**TABLE N1103.5**  
**MINIMUM HVAC PIPING INSULATION THICKNESSES<sup>a</sup>**

| PIPING SYSTEM TYPES                 | FLUID TEMP RANGE (°F) | INSULATION THICKNESS inches <sup>b</sup> |
|-------------------------------------|-----------------------|------------------------------------------|
| <b>Heating systems</b>              |                       |                                          |
| Low pressure/temperature            | 20-250                | 1.5                                      |
| Low temperature                     | 20-200                | 1.0                                      |
| Steam condensate (for feed water)   | Any                   | 1.5                                      |
| <b>Cooling systems</b>              |                       |                                          |
| Chilled water, refrigerant or brine | 40-55                 | 0.75                                     |
|                                     | Below 40              | 1.25                                     |

For SI: 1 inch = 25.4 mm, °C = [(°F - 32)/1.8].

- a. The pipe insulation thicknesses specified in this table are based on insulation R-values ranging from R-4 to R-4.6 per inch of thickness. For materials with an R-value greater than R-4.6, the insulation thickness specified in this table may be reduced as follows:

$$\text{New Minimum Thickness} = \frac{4.6 \times \text{Table Thickness}}{\text{Actual R-Value}}$$

For materials with an R-value less than R-4, the minimum insulation thickness shall be increased as follows:

$$\text{New Minimum Thickness} = \frac{4.0 \times \text{Table Thickness}}{\text{Actual R-Value}}$$

- b. For piping exposed to outdoor air, increase thickness by 0.5 inch.

**TABLE N1104.1**  
**REQUIRED PERFORMANCE OF DOMESTIC HOT WATER HEATING EQUIPMENT**  
**SUBJECT TO MINIMUM FEDERAL STANDARDS**

| CATEGORY                           | MAXIMUM INPUT RATING | MINIMUM EFFICIENCY          |
|------------------------------------|----------------------|-----------------------------|
| Electric; storage or instantaneous | 12 kW                | $0.93 - 0.00132 \times V^a$ |
| Gas; storage                       | 75,000 Btu/h         | $0.62 - 0.0019 \times V^a$  |
| Gas; instantaneous                 | 200,000 Btu/h        | $0.62 - 0.0019 \times V^a$  |
| Oil; storage                       | 105,000 Btu/h        | $0.59 - 0.0019 \times V^a$  |
| Oil; instantaneous                 | 210,000 Btu/h        | $0.59 - 0.0019 \times V^a$  |

For SI: 1 Btu/h = 0.2931 W, 1 gallon = 3.785 L.

- a. V is the rated storage volume in gallons as specified by the manufacturer.

**Chapter 11 is not adopted in the City of Seattle.  
See the Washington State Energy Code with  
Seattle Amendments for regulations pertaining to  
energy efficiency.**