
APPENDIX B - Simplified ASCE 7-02
Wind Loads For Typical Low-Rise Buildings
January 31, 2004

A.1 General. This appendix provides simplified wind loads that result in designs reasonably consistent with the requirements ASCE 7. It is intended for use by qualified design professionals and is subject to the limitations of Section A.2. In this method, a single wind pressure for each roof and wall vertical projected area and the roof horizontal projected area is used to determine main wind force resisting system loads. For components and cladding loads, surface pressures are determined for specific building elements such that multiple pressure zones are not required to be separately evaluated.

A.2 Limitations. These provisions are applicable to buildings meeting the following conditions:

- Light-frame, concrete, or masonry construction using shear walls and horizontal diaphragms to resist lateral loads.
- Mean roof height of 40 feet or less.
- One- and two-family dwellings, apartments, commercial buildings, and other building uses or occupancies with a wind load importance factor of 1.0.

A.3 Wind Design Criteria

A.3.1 Basic Wind Speed
The basic (design) wind speed shall be determined in accordance with Figure A1 or as required by the local governing building code.

A.3.2 Wind Exposure and Topography. The provisions of this Appendix are based on wind exposure category B (suburban, urban, or wooded terrain) as defined in ASCE 7. For buildings located in wind exposure category C (open or coastal terrain), tabulated exposure B wind loads shall be increased by a factor 1.4 (see table footnotes as applicable in Section A.4). Buildings sited within 10 building heights from the top edge of a prominent topographic feature shall be designed in accordance with ASCE 7. A prominent topographic feature has a ground slope of greater than 15 percent and a vertical rise of greater than 50 feet, and is separated from features of similar or greater height by a distance of more than approximately 100 times the height of the topographic feature.

A.3.3 Wind-borne Debris Region.
The wind-borne debris region shall be defined in accordance with the Figure A1 for Atlantic Ocean and Gulf of Mexico coastal areas as follows:

Basic Wind Speed ≥ 120 mph – all areas.

110 mph ≤ Basic Wind Speed < 120 mph – all areas within 1 mile of coastline.

A.3.4 Building Enclosure Condition
Building enclosure condition shall be classified in accordance with Table A1 for the purpose of determining wind loads in accordance with Section A.4.2 and A.4.3.

A.3.5 Counteracting Dead Load
When dead load is used to counteract
effects of wind pressure, it shall be factored as follows for Allowable Strength Design (ASD) and Load and Resistance Factor or Strength Design (LRFD) methods:

ASD: \[ W - 0.6D \]

LRFD: \[ 1.6W - 0.9D \]

where \( W \) is wind load effect due to wind loads determined in accordance with Section A4 and D is dead load effect due to estimated actual dead load. Load effects include stresses in or forces applied to structural members, connections, or systems.

Other load combinations and design load effects shall be considered in accordance with ASCE 7, Chapter 2.

A.4 Wind Loads

A.4.1 Lateral Force Resisting System Loads. Wind pressures from Table A2 shall be applied to building roof and wall vertical projected areas (VPA) corresponding to each of four elevations of the building to determine maximum lateral wind forces (shear) tributary to horizontal diaphragms, shear walls, and related connections.

A.4.2 Roof System Uplift Loads. Wind pressures from Table A3 shall be applied to the horizontal projected area (HPA) of a roof system to determine uplift loads tributary to structural elements, assemblies, and connections that experience loads from multiple roof surfaces.

A.4.3 Components and Cladding Loads. Table A4 shall be used to determine inward (positive) and outward (negative) acting wind loads tributary to wall and roof components, cladding, and related connections. Design wind pressures shall be applied perpendicular to the tributary area of the component, cladding, or connection under consideration.

Table B1

Classification of Building Enclosure Condition

<table>
<thead>
<tr>
<th>Partially-Enclosed Building</th>
<th>Enclosed Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings meeting one of the following:</td>
<td>All buildings not classified as 'partially enclosed' including:</td>
</tr>
<tr>
<td>- All buildings with intentional openings in the exterior envelope exceeding the lesser of 4 ft² or 1 percent of the total projected wall or roof area on any building side, or</td>
<td>- Buildings not within the wind-borne debris region, and</td>
</tr>
<tr>
<td>- Buildings within the wind-borne debris region with conventional exterior glazing (unprotected from debris impact) exceeding the above opening amounts</td>
<td>- Buildings within the wind-borne debris region with glazing protection or impact resistant glazing in accordance with ASCE 7 or the local governing building code.</td>
</tr>
</tbody>
</table>
Table B1 Notes:
1. Building enclosure condition affects internal pressures experienced within the building. Because internal pressure acts inward or outward on all exterior building surfaces simultaneously, the net effect on lateral building loads is zero. Therefore, building enclosure condition does not affect determination of lateral building loads in Section A4.1.
2. Open buildings are not addressed; refer to ASCE 7 for appropriate wind loads. Open buildings have openings in each wall which exceed 80 percent of the wall area.

### TABLE B2
Lateral Wind Loads for Application to Vertical Projected Wall and Roof Area [Exposure B, Mean Roof Height 30 feet]

<table>
<thead>
<tr>
<th>Basic Wind Speed (mph)</th>
<th>Design Wind Pressure (psf)</th>
<th>For Roof VPA by Roof Slope</th>
<th>For Wall VPA by Roof Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤20° (4:12)</td>
<td>≥25° (5.6:12)</td>
<td>≤10° (2:12)</td>
</tr>
<tr>
<td>85</td>
<td>0</td>
<td>2.4</td>
<td>7.7</td>
</tr>
<tr>
<td>90</td>
<td>0</td>
<td>2.7</td>
<td>8.6</td>
</tr>
<tr>
<td>100</td>
<td>0</td>
<td>3.3</td>
<td>10.7</td>
</tr>
<tr>
<td>110</td>
<td>0</td>
<td>4.0</td>
<td>12.9</td>
</tr>
<tr>
<td>120</td>
<td>0</td>
<td>4.8</td>
<td>15.4</td>
</tr>
<tr>
<td>130</td>
<td>0</td>
<td>5.6</td>
<td>18.0</td>
</tr>
<tr>
<td>140</td>
<td>0</td>
<td>6.5</td>
<td>20.9</td>
</tr>
<tr>
<td>150</td>
<td>0</td>
<td>7.4</td>
<td>24.0</td>
</tr>
</tbody>
</table>

Table B2 Notes:
1. Table applies to wind exposure category B (urban, suburban, or wooded terrain). For exposure category C (open or coastal exposure), multiply table values by 1.4.
2. Table applies to a mean roof height of 30 feet. For other mean roof heights from 15 feet to 40 feet, multiply table values by the following factor: \( f_h = 0.0087 (h) + 0.74 \) where \( h \) is the mean roof height in feet.
3. Interpolation between reported wind speeds and roof slopes shall be permitted. For roof slopes greater than 45° (12:12), use wall VPA value.
4. Extrapolation to wind speeds other than shown shall be permitted by multiplying tabulated values by the ratio of squared winds speeds. For example, a wall VPA pressure of 20.9 psf at 110 mph from the table can be used to determine a pressure for a 170 mph wind speed by multiplying as follows: \( (20.9 \text{ psf}) \times (170/110)^2 = 49.9 \text{ psf} \).

Table B3 Notes:
1. Table applies to wind exposure category B (urban, suburban, or wooded terrain). For exposure category C (open or coastal exposure), multiply table values by 1.4.
2. Table applies to a mean roof height of 30 feet. For other mean roof heights from 15 feet to 40 feet, multiply table values by the following factor: \( f_h = 0.0087 (h) + 0.74 \) where \( h \) is the mean roof height in feet.
3. Table B3 applies to a mean roof height of 30 feet. For other mean roof heights from 15 feet to 40 feet, multiply table values by the following factor: \( f_h = 0.0087 (h) + 0.74 \) where \( h \) is the mean roof height in feet.
4. For hip roofs, multiply roof uplift pressure by 0.9 for roof slope less than 25° (5.6:12) and 0.8 for roof slope greater than 25° (5.6:12). This adjustment does not apply to overhangs on hip roofs.
5. Apply roof uplift pressure to horizontal projected area bounded by exterior walls. Apply overhang uplift pressure to horizontal projected area of overhangs projecting outward from exterior walls.
6. Extrapolation to wind speeds other than shown shall be done in accordance with note 4 of Table A2.
Table B4 Notes:

1. Table applies to wind exposure category B (urban, suburban, or wooded terrain).
   For exposure category C (open or coastal exposure), multiply table values by 1.4.

2. Table applies to enclosed buildings. For partially-enclosed buildings, multiply
   table values by 1.25.

3. Table applies to a mean roof height of 30 feet or less. For mean roof heights
   greater than 30 feet, multiply the table values by the following factor: 
   \( f_h = 0.0087 (h - 0.74) \) where \( h \) is the mean roof height in feet.

4. Interpolation between reported wind speeds shall be permitted. Extrapolation of
   tabulated pressures to wind speeds other than shown shall be done in accordance
   with note 4 of Table A2.

5. Non-air permeable claddings (siding and roofing) do not allow venting of air
   either through the siding, or through cavities behind the cladding that lead to vent
   openings on the same face of the building. Most claddings are air-permeable to
   some degree and provide some reduction in wind load, provided the supporting
   wall behind the cladding is relatively non-air permeable. For vinyl cladding,
   ASTM Standard D3679 permits a 50 percent reduction in wind load for this
   reason. Similarly, claddings such as brick veneer (with weeps and vent space)
   and hardboard lap siding have been reported to experience cladding wind load
   reductions of 30 percent or more. Wind loads on roofing, such as asphalt shingles,
   have been reported to experience wind load reductions of as much as 25 percent.
   Refer to the cladding manufacturer for an appropriate air-permeable cladding
   reduction factor to use. Consideration should also be given to the dynamic nature
   of wind pressures (e.g., fluttering) and its potential effect (e.g., fatigue) on some
   cladding systems and related connections.

6. Roof overhang pressure includes pressure from underside of the overhang as well
   as on the upper surface. If an “open soffit” is used, the roof overhang pressure
   should also apply to the roof sheathing (if sheathed) or the roofing (if not
   sheathed underneath).

References:
- Minimum Design Loads for Buildings and Other Structures, ASCE
  7-02, ASCE, Reston, VA. 2002.
- Structural Loads for One- and Two-Family Dwellings, U.S. Dept. of