International Roofing Expo
February 7, 2024 – Las Vegas, NV

NRCA update on roofing technical issues

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association

ARMA Releases Fourth Quarter 2023 Report on Asphalt Roofing Product Shipments

Media Contact

Amie Goscinski
ARMA Director of Marketing & Communications
(443) 640-1075 x1144 | agoscinski@asphaltroofing.org

Asphalt Roofing Product Shipments

Shipments (squares)	Q4 2023	Q4 2022	% Change	YTD 2023	YTD 2022	% Change
Shingles – U.S. (including individual shingles)	37,481,462	29,865,538	25.5%	168,740,563	157,749,481	7.0%
BUR base, ply, and mineral cap sheets – U.S. (not including saturated felts)	1,367,470	1,398,161	-2.2%	6,041,145	7,055,363	-14.4%
Modified Bitumen – U.S.	8,879,214	8,040,453	10.4%	41,973,122	38,996,142	7.6%
Shingles – Canada (including Individual shingles)	1,357,093	1,569,610	-13.5%	9,051,077	12,109,765	-25.3%

About ARMA:

The Asphalt Roofing Manufacturers Association (ARMA) is a trade association representing North America's asphalt roofing manufacturing companies and their raw material suppliers. The association includes the majority of North American manufacturers of asphalt shingles and asphalt low slope roof membrane systems. Information that ARMA gathers on modern asphalt roofing materials and practices is provided to building and code officials, as well as to regulatory agencies and allied trade groups. Committed to advances in the asphalt roofing industry, ARMA is proud of the role it plays in promoting asphalt roofing to those in the building industry and to the public.

###

NEWS RELEASE
BUREAU OF LABOR STATISTICS
U.S. DEPARTMENT OF LABOR

Table A. Percent changes in CPI for All Urban Consumers (CPI-U): U.S. city average

	Seasonally adjusted changes from preceding month							Un-adjusted 12-mos. ended Dec. 2023
	Jun. 2023	Jul. 2023	Aug. 2023	Sep. 2023	Oct. 2023	Nov. 2023	Dec. 2023	
All items	0.2	0.2	0.6	0.4	0.0	0.1	0.3	3.4
Food	0.1	0.2	0.2	0.2	0.3	0.2	0.2	2.7
Food at home	0.0	0.3	0.2	0.1	0.3	0.1	0.1	1.3
Food away from home[1]	0.4	0.2	0.3	0.4	0.4	0.4	0.3	5.2
Energy	0.6	0.1	5.6	1.5	-2.5	-2.3	0.4	-2.0
Energy commodities	0.8	0.3	10.5	2.3	-4.9	-5.8	-0.1	-2.9
Gasoline (all types)	1.0	0.2	10.6	2.1	-5.0	-6.0	0.2	-1.9
Fuel oil[1]	-0.4	3.0	9.1	8.5	-0.8	-2.7	-5.5	-14.7
Energy services	0.4	-0.1	0.2	0.6	0.5	1.7	0.9	-1.1
Electricity	0.9	-0.7	0.2	1.3	0.3	1.4	1.3	3.3
Utility (piped) gas service	-1.7	2.0	0.1	-1.9	1.2	2.8	-0.4	-13.8
All items less food and energy	0.2	0.2	0.3	0.3	0.2	0.3	0.3	3.9
Commodities less food and energy commodities	-0.1	-0.3	-0.1	-0.4	-0.1	-0.3	0.0	0.2
New vehicles	0.0	-0.1	0.3	0.3	-0.1	-0.1	0.3	1.0
Used cars and trucks	-0.5	-1.3	-1.2	-2.5	-0.8	1.6	0.5	-1.3
Apparel	0.3	0.0	0.2	-0.8	0.1	-1.3	0.1	1.0
Medical care commodities[1]	0.2	0.5	0.6	-0.3	0.4	0.5	-0.1	4.7
Services less energy services	0.3	0.4	0.4	0.6	0.3	0.5	0.4	5.3
Shelter	0.4	0.4	0.3	0.6	0.3	0.4	0.5	6.2
Transportation services	0.1	0.3	2.0	0.7	0.8	1.1	0.1	9.7
Medical care services	0.0	-0.4	0.1	0.3	0.3	0.6	0.7	-0.5

Link

Producer Price Index, December 2023

	1-Month % Change	12-Month % Change	Change Since Feb 2020
Inputs To Industries			
Inputs to construction	-0.6%	1.2%	37.5%
Inputs to multifamily construction	-0.5%	2.0%	36.9%
Inputs to nonresidential construction	-0.4%	1.6%	38.6%
Inputs to commercial construction	-0.2%	1.4%	39.2%
Inputs to healthcare construction	-0.3%	1.5%	38.7%
Inputs to industrial construction	-0.5%	2.5%	34.6%
Inputs to other nonresidential construction	-0.6%	1.5%	38.4%
Inputs to maintenance and repair construction	-0.9%	0.4%	35.2%
Commodities			
Adhesives and sealants	0.0%	1.6%	33.7%
Brick and structural clay tile	0.0%	5.5%	25.2%
Concrete products	0.1%	7.3%	35.7%
Construction machinery and equipment	0.2%	7.6%	28.9%
Construction sand, gravel, and crushed stone	0.6%	8.5%	30.6%
Copper wire and cable	1.5%	0.7%	30.5%
Crude petroleum	-13.2%	-10.8%	37.7%
Fabricated structural metal products	1.6%	2.5%	55.8%
Gypsum products	0.5%	-1.7%	44.0%
Hot rolled steel bars, plates, and structural shapes	2.9%	-4.7%	56.4%
Insulation materials	0.1%	0.9%	36.6%
Iron and steel	4.3%	1.9%	57.3%
Lumber and wood products	0.1%	-4.4%	23.8%
Natural gas	1.5%	-60.5%	54.8%
Plumbing fixtures and fittings	0.2%	1.5%	18.7%
Prepared asphalt, tar roofing and siding products	0.3%	2.8%	41.6%
Softwood lumber	0.2%	-14.6%	5.0%
Steel mill products	3.3%	-2.0%	65.0%
Switchgear, switchboard, industrial controls equipment	0.2%	5.2%	40.1%
Unprocessed energy materials	-9.1%	-28.7%	55.6%

Source: U.S. Bureau of Labor Statistics

Link

ABC's Construction Backlog Indicator Inches Higher in December, Contractor Confidence Improves

January 16, 2024 | Construction Backlog Indicator, Construction Confidence Index, Construction Economics, News Releases 2024

WASHINGTON, Jan. 16—Associated Builders and Contractors reported today that its Construction Backlog Indicator increased to 8.6 months in December from 8.5 months in November, according to an ABC member survey conducted Dec. 20 to Jan. 4. The reading is down 0.6 months from December 2022.

View the full Construction Backlog Indicator and Construction Confidence Index data series.

The South, which remains the region with the lengthiest backlog, posted the largest monthly increase in December. Only the West, which historically reports the lowest backlog of any region, experienced a monthly decline.

Construction Backlog Indicator

	December 2023	November 2023	December 2022	1-Month Net Change	12-Month Net Change
Total	**8.6**	**8.5**	**9.2**	**0.1**	**-0.6**
Industry					
Commercial and institutional	9.1	8.6	9.4	0.5	-0.3
Heavy industrial	8.4	8.8	8.2	-0.4	0.2
Infrastructure	7.9	7.9	10.0	0.0	-2.1
Region					
Middle States	8.5	8.0	8.1	0.5	0.4
Northeast	8.0	8.0	8.9	0.0	-0.9
South	10.7	9.8	11.5	0.9	-0.8
West	6.6	7.4	7.2	-0.8	-0.6
Company Size					
<$30 Million	7.4	7.7	7.9	-0.3	-0.5
$30-$50 Million	11.1	9.4	13.1	1.7	-2.0
$50-$100 Million	12.3	12.0	11.1	0.3	1.2
>$100 Million	10.7	9.0	14.2	1.7	-3.5

Link

ABC's Construction Confidence Index readings for sales, profit margins and staffing levels increased in December. All three readings remain above the threshold of 50, indicating expectations for growth over the next six months.

Construction Confidence Index

Response	December 2023	November 2023	December 2022
CCI Reading			
Sales	58.9	57.0	59.0
Profit margins	54.2	51.0	52.3
Staffing	61.6	59.9	60.9
Sales Expectations			
Up big	6.7%	5.1%	9.1%
Up small	47.4%	44.7%	44.6%
No change	23.9%	26.1%	24.6%
Down small	18.7%	21.4%	16.6%
Down big	3.4%	2.7%	5.1%
Profit Margin Expectations			
Up big	4.5%	2.3%	2.9%
Up small	32.8%	28.4%	36.0%
No change	40.3%	43.6%	35.4%
Down small	19.8%	22.2%	18.9%
Down big	2.6%	3.5%	6.9%
Staffing Level Expectations			
Up big	7.8%	2.3%	4.6%
Up small	43.7%	46.7%	50.9%
No change	37.3%	40.5%	31.4%
Down small	9.3%	9.3%	9.7%
Down big	1.9%	1.2%	3.4%

Roofing professionals are invited to join industry trade associations representing contractors, consultants and manufacturers in the U.S. and Canada in taking part in a Quarterly Market Index Survey for Reroofing.

The purpose of the survey is to take the pulse of the reroofing industry on a quarterly basis and become a regular barometer of the industry's business conditions. Industry professionals have an opportunity to share their thoughts and experiences regarding reroofing as a sector of their businesses.

The survey is an industrywide effort to collect information about the reroofing market spearheaded by a coalition of trade associations, including the Asphalt Roofing Manufacturers Association, Canadian Roofing Contractors Association, Chemical Fabrics & Film Association Inc., EPDM Roofing Association, International Institute of Building Enclosure Consultants, Metal Construction Association, Metal Roofing Alliance, NRCA, National Women in Roofing, Polyisocyanurate Insulation Manufacturers Association, Roof Coatings Manufacturers Association and Single Ply Roofing Industry.

Take the Quarterly Market Index Survey for Reroofing now. Survey responses may be submitted through Jan. 22.

Link

“Frankenstein roofs”

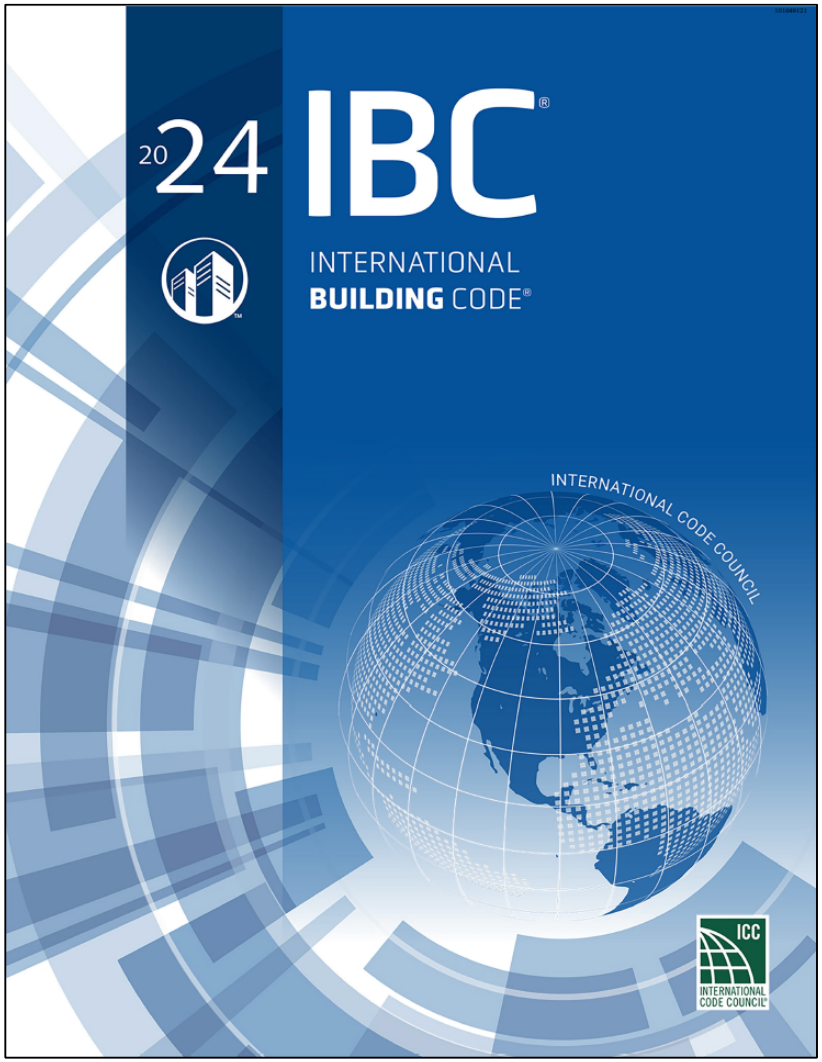
Systems approach…

FM Approvals' RoofNav

www.RoofNav.com

There are 1,118,797 approved roof assembly configurations in FM Approvals' RoofNav

--As of February 1, 2024



New to the 2024 I-codes

- Single column text format
- Updated font styles
- QR codes identifying changes
- Streamlined lists
- Consistent grouping of related text (e.g., tables follow parent sections)
- Shaded table headers and notes

iccsafe.org/design-updates

Thursday, 9:30 – 11 a.m., Rm. N234

International Roofing Expo
February 8, 2024 – Las Vegas, NV

The New 2024 I-codes: Roofing-Related Changes

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association

[BG] 1511.8 Structural fire resistance. The structural frame and roof construction supporting *loads* imposed upon the roof by any *rooftop structure* shall comply with the requirements of Table 601. The fire-resistance reduction permitted by Table 601, Note a, shall not apply to roofs containing *rooftop structures*.

[BG] 1511.9 Raised-deck systems installed over a roof assembly. *Raised-deck systems* installed above a *roof assembly* shall comply with Sections 1511.9.1 through 1511.9.5.

[BG] 1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The wall or enclosure shall extend at least from the *roof assembly* to the top surface of the *raised-deck system*. The enclosure shall not impede roof drainage in accordance with Section 1511.9.5.
2. A *raised-deck system* shall be installed above a listed *roof assembly*.

   Exception: Where the *roof assembly* is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not impede the operation of plumbing or mechanical vents, exhaust, air inlets or roof drains. Where required, access for inspection, cleaning or maintenance shall be provided.

[BG] 1511.9.2 Fire classification. The *raised-deck system* shall be listed and identified with a fire classification in accordance with Section 1505 and shall be tested in accordance with either Section 1511.9.2.1 or 1511.9.2.2.

[BG] 1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly. The *raised-deck system* shall be tested separately from the *roof assembly* over which it is installed. The fire classification of the *raised-deck system* shall

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

Exceptions:

1. *Roof replacement* or *roof recover* of existing *low-slope roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage* and meet the requirements of Sections 1608.3 and 1611.2.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *positive roof drainage* and meet the requirements of Sections 1608.3 and 1611.2. For the purposes of this exception, existing secondary drainage or *scupper* systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or *scuppers* designed and installed in accordance with Section 1502.2.

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water-soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the *roof covering* manufacturer and new ice barrier *underlayment* manufacturer.

Concerns with IBC 2024's new ponding instability requirement

- References to Sec. 1608.3 and 1611.2 direct users to ASCE 7-22, not the design method used at the time of construction
- Structural re-analysis will likely be required:
  - Are as-built drawings available?
  - Will a detailed site analysis of the building structure be necessary?
- In IBC 2024, rain loads in Ch. 16/ASCE 7-22 are not consistent with the rainfall design method in IPC 2024:
  - Which method applies?
  - Who resolves the conflict?

The newly-added code text further complicates (and adds cost) to reroofing projects with inadequate roof slope.

Use tapered insulation

[BG] 1511.8 Structural fire resistance. The structural frame and roof construction supporting *loads* imposed upon the roof by any *rooftop structure* shall comply with the requirements of Table 601. The fire-resistance reduction permitted by Table 601, Note a, shall not apply to roofs containing *rooftop structures*.

[BG] 1511.9 Raised-deck systems installed over a roof assembly. *Raised-deck systems* installed above a *roof assembly* shall comply with Sections 1511.9.1 through 1511.9.5.

[BG] 1511.9.1 Installation. The installation of a *raised-deck system* shall comply with all of the following:

1. The perimeter of the *raised-deck system* shall be surrounded on all sides by walls or by a noncombustible enclosure approved to prevent fire intrusion below the *raised-deck system*. The wall or enclosure shall extend at least from the *roof assembly* to the top surface of the *raised-deck system*. The enclosure shall not impede roof drainage in accordance with Section 1511.9.5.
2. A *raised-deck system* shall be installed above a listed *roof assembly*.

   Exception: Where the *roof assembly* is not required to have a fire classification in accordance with Section 1505.2.
3. A *raised-deck system* shall be installed in accordance with the manufacturer's installation instructions.
4. A *raised-deck system* shall not impede the operation of plumbing or mechanical vents, exhaust, air inlets or roof drains. Where required, access for inspection, cleaning or maintenance shall be provided.

[BG] 1511.9.2 Fire classification. The *raised-deck system* shall be listed and identified with a fire classification in accordance with Section 1505 and shall be tested in accordance with either Section 1511.9.2.1 or 1511.9.2.2.

[BG] 1511.9.2.1 Fire testing of the raised deck system installed over a classified roof assembly. The *raised-deck system* shall be tested separately from the *roof assembly* over which it is installed. The fire classification of the *raised-deck system* shall be not less than the fire classification for the *roof assembly* over which it is installed.

Exception: Where the decking or pavers of the *raised-deck system* consists of brick, masonry, concrete or other noncombustible materials, fire testing of the *raised-deck system* is not required.

[BG] 1511.9.2.2 Fire testing of the raised deck system together with the roof assembly. The *roof assembly* and the *raised-deck system* shall be tested together.

[BG] 1511.9.3 Pedestals or supports. The pedestals or supports for the *raised-deck system* shall be installed in accordance with manufacturer's installation instructions.

[BG] 1511.9.4 Structural requirements. The *raised-deck system* shall be designed for all applicable loads in accordance with Chapter 16 and performance requirements in Section 1504.5.

[BG] 1511.9.5 Roof drainage. The *raised-deck system*, including the wall or enclosure between the *roof assembly* and the raised deck, shall be designed and installed to allow for the operation of the roof drainage system as required by Section 1502 and the *International Plumbing Code*. The roof structure shall be designed to support any standing water resulting from the installation of the *raised-deck system*.

[BG] 1511.9.6 Accessibility and egress. The *raised-deck system* shall be accessible in accordance with Chapter 11 and means of egress shall be provided in accordance with Chapter 10.

SECTION 1512—REROOFING

1512.1 General. Materials and methods of application used for recovering or replacing an existing *roof covering* shall comply with the requirements of Chapter 15.

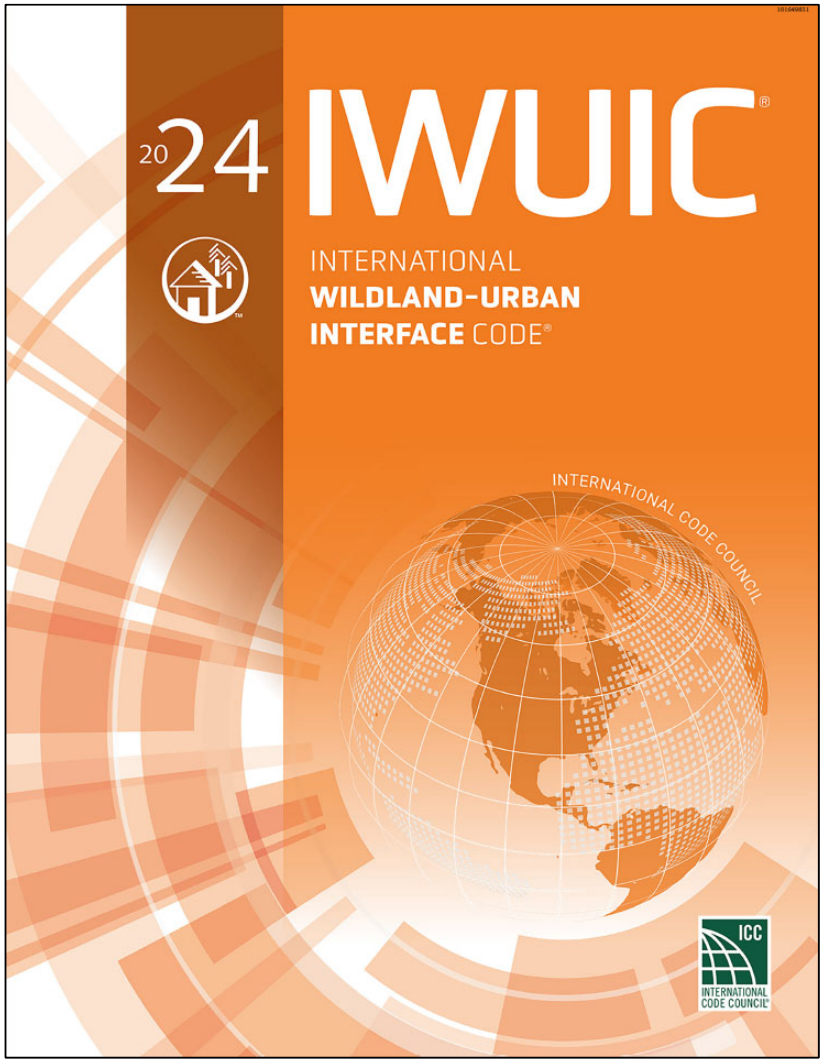
Exceptions:

1. *Roof replacement* or *roof recover* of existing *low-slope roof coverings* shall not be required to meet the minimum design slope requirement of $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide *positive roof drainage* and meet the requirements of Sections 1608.3 and 1611.2.
2. Recovering or replacing an existing *roof covering* shall not be required to meet the requirement for secondary (emergency overflow) drains or *scuppers* in Section 1502.2 for roofs that provide for *posi-*

1512.2 Roof replacement. *Roof replacement* shall include the removal of all existing layers of *roof assembly* materials down to the *roof deck*.

Exceptions:

1. Where the existing *roof assembly* includes an ice barrier membrane that is adhered to the *roof deck* and the existing sheathing is not water-soaked or deteriorated to the point that it is not adequate as a base for additional roofing, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507 where permitted by the *roof covering* manufacturer and new ice barrier *underlayment* manufacturer.



IWUIC 2024

- Overlays the Building Code
- Ch. 5: Special Building Construction Regulations
- Ignition-resistant Construction Class 1, 2 or 3
- Class 1 and 2: Class A roof
  Class 3: Class B roof
- Valley, eave, gutter and downspout and roof vent requirements

Link

RESEARCH+TECH

Wildfire mitigation

The International Code Council® provides mitigation regulations in code document

by Mark S. Graham

Catastrophic wildfires, such as those that recently occurred in California, Colorado and Hawaii, have resulted in an increased demand for improved wildfire mitigation. The International Code Council Inc.'s International Wildland-Urban Interface Code® provides code-based regulations for wildfire mitigation, including roofing-specific requirements.

IWUIC

ICC developed the IWUIC in 2003. The current edition is IWUIC 2024.

IWUIC's purpose is to mitigate the risk to life and structures from wildland fire exposures and fire exposures from adjacent structures and to mitigate structure fires from spreading to wildland fuels.

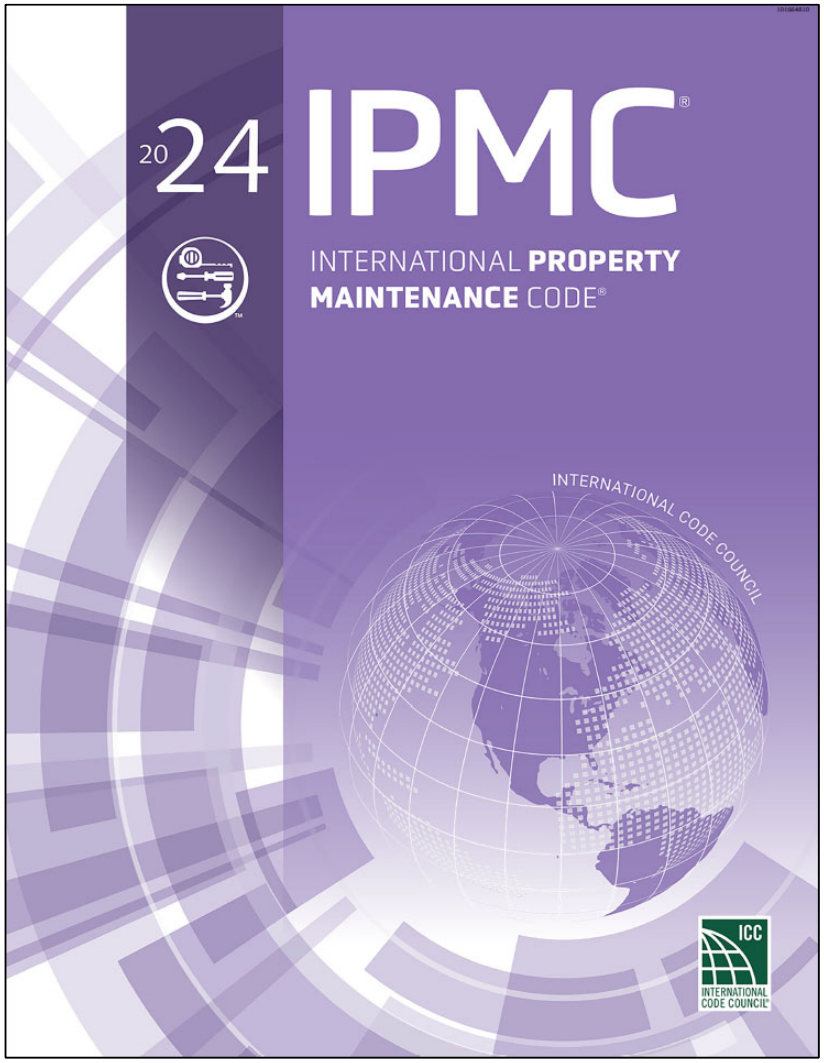
A wildland-urban interface area is a geographic area where structures and other human development meets or intermingles with wildland or vegetative fuels. The adopting agency designates the wildland-urban interface areas within its jurisdiction.

IWUIC is intended to supplement, not replace, a jurisdiction's building and fire codes (if such codes have been adopted) and provide specialized regulations. IWUIC is presented in tiered levels to

Professional Roofing

December 2023/January 2024

Link



IPMC 2024

- Sec. 304-Exterior Structure
- Sec. 507-Storm Drainage

Link

RESEARCH+TECH

Maintaining compliance

IPMC® provides code requirements for building maintenance

by Mark S. Graham

The International Code Council®'s International Property Maintenance Code® establishes minimum requirements for the maintenance of existing buildings, including their roof systems, through model code regulations. IPMC 2024 has several roofing-related requirements and can be used as a basis for roofing contractors performing periodic roof system maintenance.

IPMC 2024

The IPMC originated in 1996 when a committee consisting of representatives of the three legacy code organizations (Building Officials and Code Administrators International, International Conference of Building Officials and Southern Building Code Congress International) drafted comprehensive guidelines for existing buildings based on the legacy codes' requirements for existing buildings.

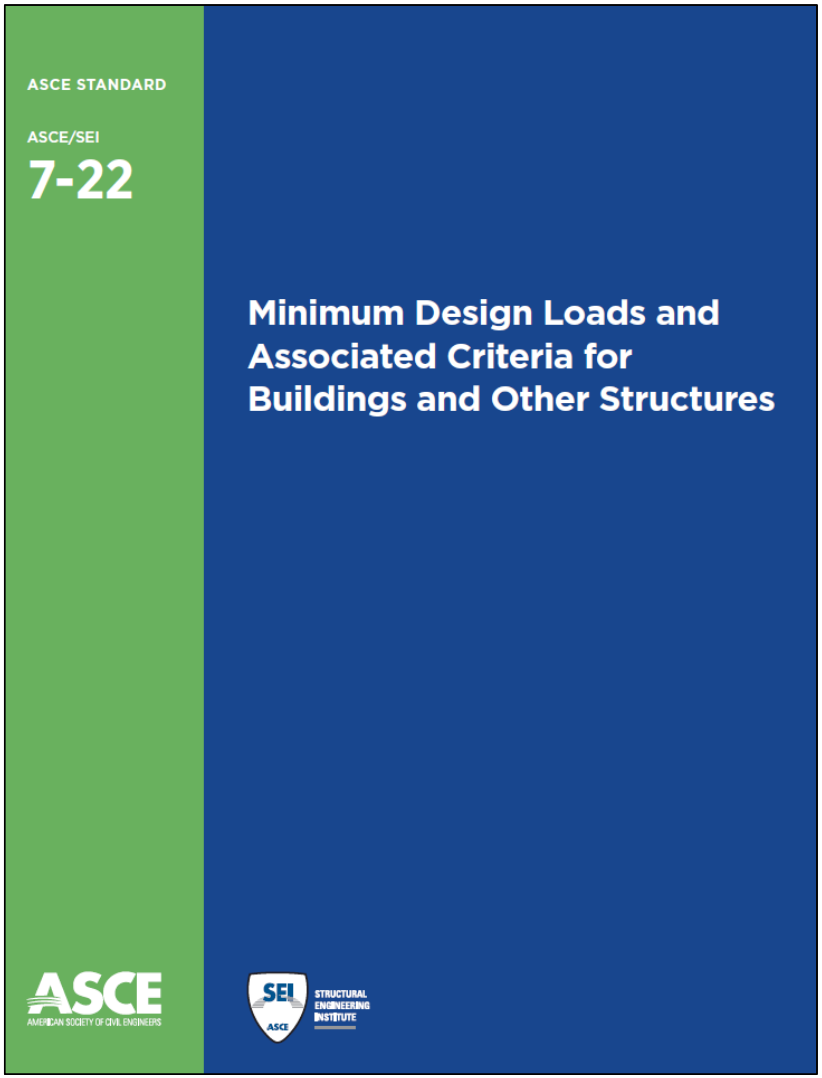
In 2000, ICC published the first edition of IPMC using ICC's code development process. New editions have been published every three years since with the most current edition being IPMC 2024.

IPMC 2024 has eight chapters and two appendixes (see figure). The appendixes are not mandatory unless specifically referenced in

Professional Roofing

February 2024

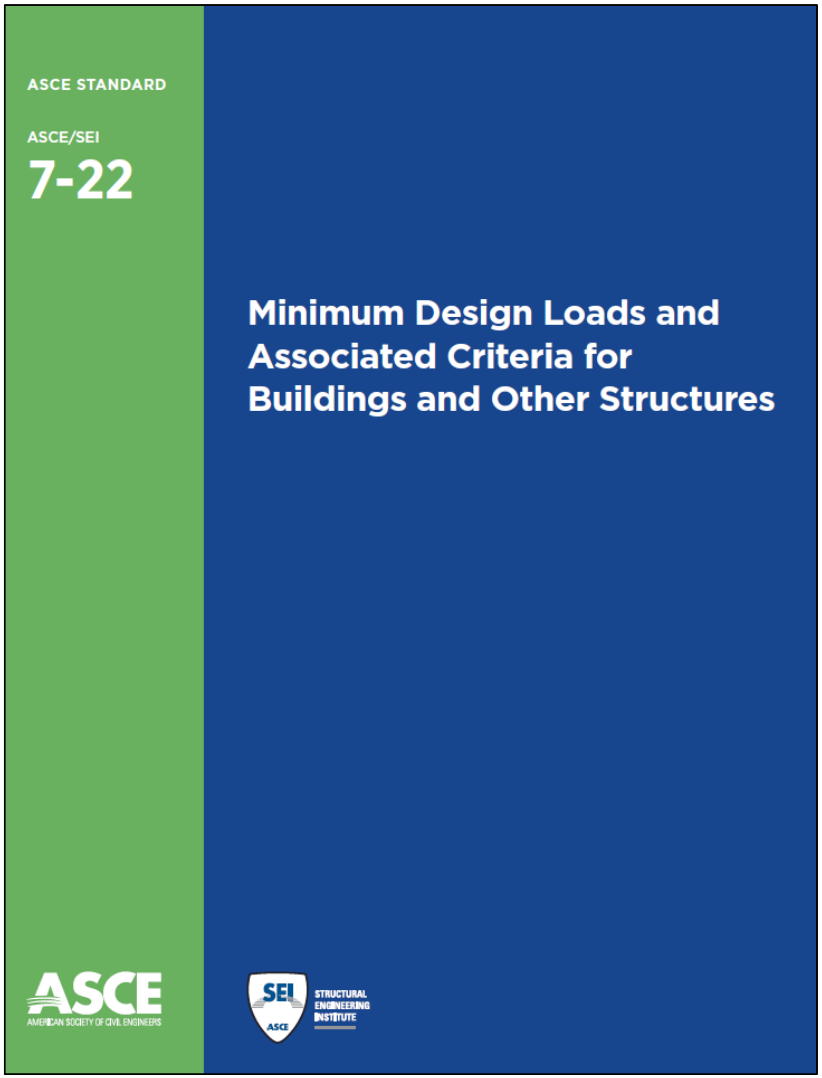
Link



ASCE 7-22

- All loads on buildings and structures
- 482 pages + commentary (1046 pages total)
- 32 chapters
- 7 appendixes
- Referenced in IBC 2024 Ch. 16- Wind Design as the basis for wind design

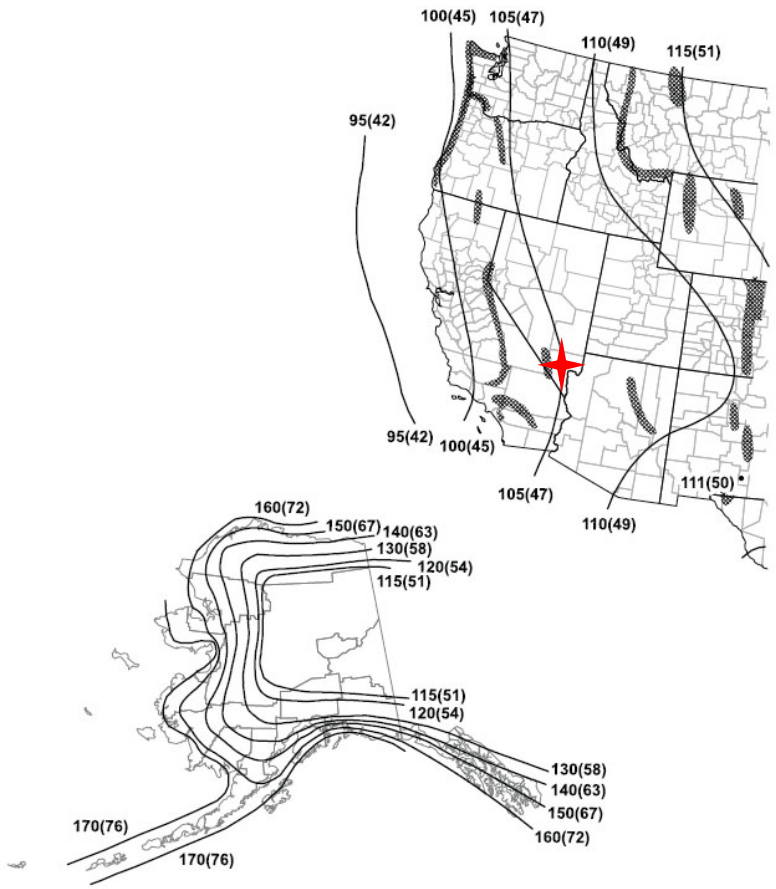
Link



ASCE 7-22 on wind design

- Ch. 26: Wind loads: General requirements
- Ch. 30: Wind loads: Components and cladding
- Ch. 31: Wind tunnel procedure
- Ch. 32: Tornado loads

99 pages



Notes:

1. Values are 3 s gust wind speeds in mi/h (m/s) at 33 ft (10 m) above ground for Exposure Category C.
2. Linear interpolation is permitted between contours. Point values are provided to aid with interpolation.
3. Islands, coastal areas, and land boundaries outside the last contour shall use the last wind speed contour.
4. Location-specific basic wind speeds shall be permitted to be determined using the ASCE Wind Design Geodatabase.

Figure 26.5-1C. Basic wind speeds for Risk Category III buildings and other structures.

CHAPTER 26
WIND LOADS: GENERAL REQUIREMENTS

26.1 PROCEDURES

26.1.1 Scope Buildings and other structures, including the main wind force resisting system (MWFRS) and all components and cladding (C&C) thereof, shall be designed and constructed to resist the wind loads determined in accordance with Chapters 26 through 31.

Risk Category III and IV buildings and other structures, including the MWFRS and all C&C thereof, shall also be designed and constructed to resist tornado loads determined in accordance with Chapter 32, as applicable.

The provisions of this chapter define basic wind parameters for use with other provisions contained in this standard.

User Note: A building or other structure designed for wind loads determined exclusively in accordance with Chapter 26 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the *ICC/NSSA Standard for the Design and Construction of Storm Shelters*. See Commentary Section C26.1.1 for an in-depth discussion on Storm Shelters.

structures (such as solid freestanding walls and solid freestanding signs, chimneys, tanks, open signs, single-plane open frames, and trussed towers) as specified in Chapter 29; or

4. Wind Tunnel Procedure for all buildings and all other structures as specified in Chapter 31.

26.1.2.2 Components and Cladding Wind loads on C&C on all buildings and other structures shall be designed using one of the following procedures:

1. Analytical Procedures provided in Parts 1 through 5, as appropriate, of Chapter 30; or
2. Wind Tunnel Procedure as specified in Chapter 31.

26.1.3 Performance-Based Procedures Wind design of buildings and other structures using performance-based procedures shall be permitted subject to the approval of the Authority Having Jurisdiction. The performance-based wind design procedures used shall, at a minimum, conform to Section 1.3.1.3.

26.2 DEFINITIONS

The following definitions apply to the provisions of Chapters 26 through 31.

APPROVED: Acceptable to the Authority Having Jurisdiction.

ASCE WIND DESIGN GEODATABASE: The ASCE database (version 2022-1.0) of geocoded wind speed design data.

User Note: The ASCE Wind Design Geodatabase of geocoded wind speed design data is available at https://asce7hazardtool.online/.

BUILDING, ELEVATED: A building supported on structural elements where wind can pass beneath the building.

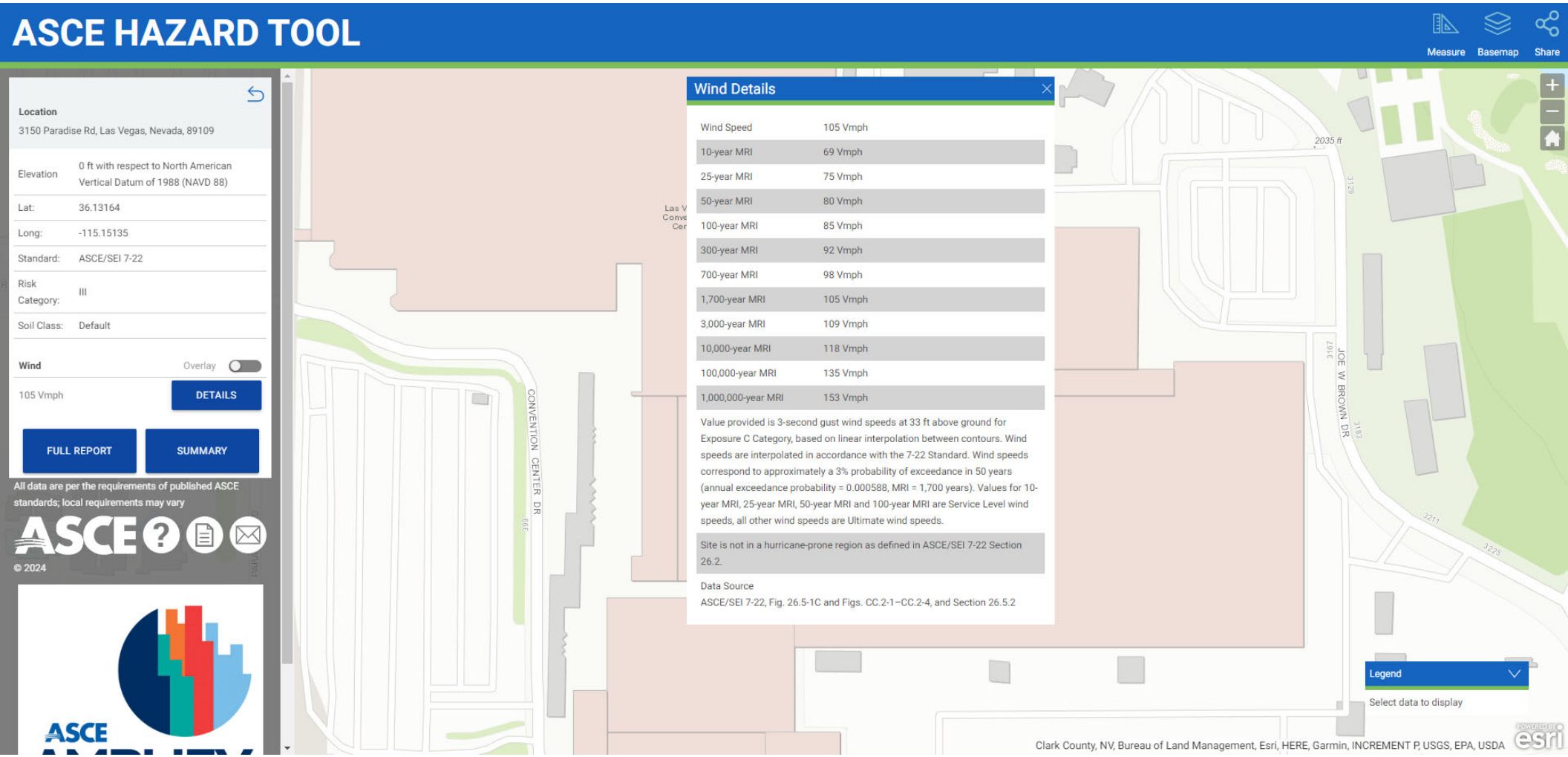
BUILDING, ENCLOSED: A building that has the total area of openings in each wall that receives positive external pressure less than or equal to 4 ft^2 (0.37 m^2) or 1% of the area of that wall, whichever is smaller. This condition is expressed for each wall by the following equation:

$$A_o < 0.01A_g \text{ or } 4 \text{ ft}^2 (0.37 \text{ m}^2), \text{ whichever is smaller,}$$

where A_o and A_g are as defined for Open Buildings.

BUILDING, LOW-RISE: An enclosed, partially enclosed, or partially open building that complies with the following conditions:

ascehazardtool.org



CHAPTER 30
WIND LOADS: COMPONENTS AND CLADDING

30.1.1 Building Types This chapter applies to the determination of wind pressures on components and cladding (C&C) on buildings.

1. Part 1 is applicable to an enclosed, partially enclosed, or partially open
   - Low-rise building (see definition in Section 26.2); or
   - Building with $h \leq 60$ ft (18.3 m).

   The building has a flat roof, gable roof, multispan gable roof, hip roof, monoslope roof, stepped roof, or sawtooth roof, and the wind pressures are calculated from a wind pressure equation.
2. Part 2 is applicable to an enclosed, partially enclosed, or partially open
   - Building with $h > 60$ ft (18.3 m).

   The building has a flat roof, pitched roof, gable roof, hip roof, mansard roof, arched roof, or domed roof, and the wind pressures are calculated from a wind pressure equation.

Section 26.2; and
2. The building does not have response characteristics that make it subject to across-wind loading, vortex shedding, or instability caused by galloping or flutter; nor does it have a site location for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.

30.1.3 Limitations The provisions of this chapter take into consideration the load magnification effect caused by gusts in resonance with along-wind vibrations of flexible buildings. The loads on buildings that do not meet the requirements of Section 30.1.2 or that have unusual shapes or response characteristics shall be determined using recognized literature documenting such wind load effects or shall use the wind tunnel

30.2.1 Wind Load Parameters Specified in Chapter 26 The following wind load parameters are specified in Chapter 26:

- Basic wind speed, V (Section 26.5),
- Wind directionality factor, K_d (Section 26.6),
- Exposure category (Section 26.7),
- Topographic factor, K_{zt} (Section 26.8),
- Ground elevation factor, K_e (Section 26.9),
- Velocity pressure exposure coefficient, K_z or K_h (Section 26.10.1); Velocity pressure, q_z (Section 26.10.2),
- Gust-effect factor (Section 26.11),
- Enclosure classification (Section 26.12), and
- Internal pressure coefficient, (GC_{pi}) (Section 26.13).

30.2.2 Minimum Design Wind Pressures The design wind pressure for C&C of buildings shall not be less than a net pressure of 16 lb/ft^2 (0.77 kN/m^2) acting in either direction normal to the surface.

30.2.4 External Pressure Coefficients Combined gust-effect factor and external pressure coefficients for C&C, (GC_p), are given in the figures associated with this chapter. The pressure coefficient values and gust-effect factor shall not be separated.

30.3.2 Design Wind Pressures Design wind pressures on C&C elements of low-rise buildings and buildings with $h \le 60$ ft (18.3 m) shall be determined from the following equation:

$$p = q_h K_d [(GC_p) - (GC_{pi})] (\text{lb/ft}^2) \qquad (30.3\text{-}1)$$

$$p = q_h K_d [(GC_p) - (GC_{pi})] (\text{N/m}^2) \qquad (30.3\text{-}1.\text{SI})$$

where

q_h = Velocity pressure evaluated at mean roof height h as defined in Section 26.10;
K_d = Wind directionality factor, see Section 26.6; and
(GC_p) = External pressure coefficients given in

- Figure 30.3-1 (walls),
- Figures 30.3-2A–G (flat roofs, gable roofs, and hip roofs) and 30.5.2 (pitched free roofs),
- Figure 30.3-3 (stepped roofs),
- Figure 30.3-4 (multispan gable roofs),
- Figsure 30.3-5A–B (monoslope roofs),
- Figure 30.3-6 (sawtooth roofs),
- Figure 30.3-7 (domed roofs),
- Figure 30.3-8 (arched roofs),
- Figure 30.3-2A (bottom surfaces of elevated buildings).

(GC_{pi}) = Internal pressure coefficient given in Table 26.13-1.

bottom flat horizontal surface of elevated buildings shall be determined using the roof pressure coefficients from Figure 30.3-2A with the following modifications:

1. h_B shall be the height above grade of the bottom surface of the elevated building, as depicted in Figure 30.3-1A. The value of h shall equal h_B for determining zone dimensions from Figure 30.3-2A. For elevated buildings with a flat bottom horizontal building surface and situated on a slope, h_B shall be taken as the maximum height between the slope and the bottom of the elevated building.
2. Areas of the horizontal surface above partially enclosed spaces and areas extending a_B perpendicular to walls beneath the elevated building with plan dimension greater than 4 ft (1.2 m), as shown in the shaded regions in Figure 30.3-1A, shall be designed to resist positive pressures equal to the Zone 4 wall pressures obtained using Figure 30.3-1. The value of a_B shall equal 0.4 h_B or the width of the wall, whichever is smaller for determining zone dimensions from Figure 30.3-1A.

The loading convention shall denote downward loading on the bottom surface with negative pressure coefficients and upward loading on the bottom surface with positive pressure coefficients.

EXCEPTION: The provisions of Section 30.3.2.1 do not apply to buildings with $h_B < 2$ ft (0.61 m).

Table 30.3-1. Steps to Determine C&C Wind Loads for Enclosed, Partially Enclosed, and Partially Open Low-Rise Buildings.

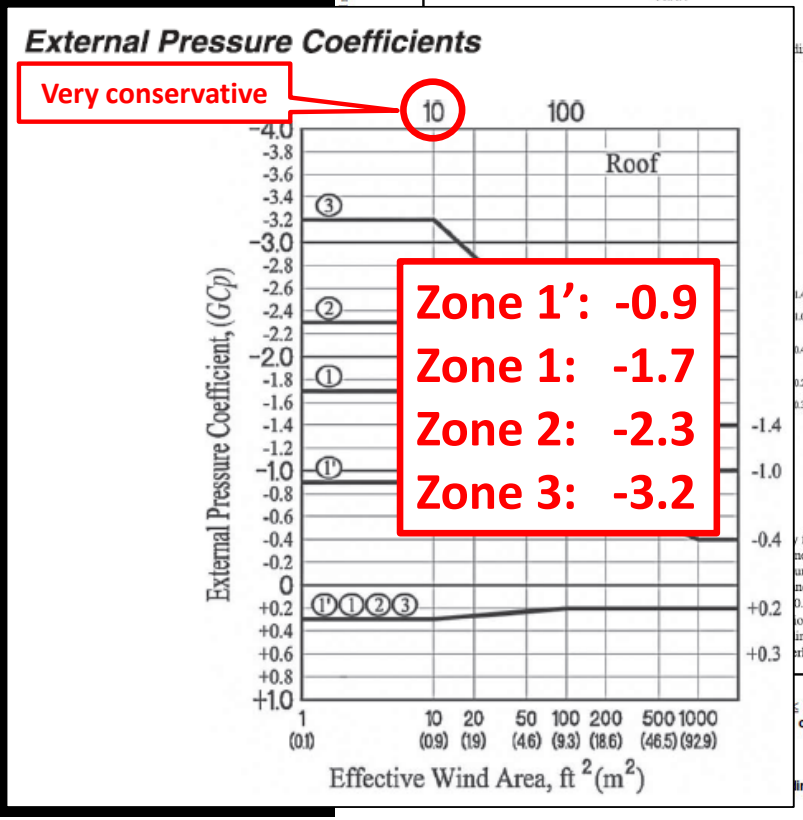
Step 1: Determine risk category; see Table 1.5-1.
Step 2: Determine the basic wind speed, V, for applicable risk category; see Figure. 26.5-1.
Step 3: Determine the wind load parameters:
- Wind directionality factor, K_d; see Section 26.6 and Table 26.6-1.
- Exposure Category B, C, or D; see Section 26.7.
- Topographic factor, K_{zt}; see Section 26.8 and Figure 26.8-1.
- Ground elevation factor, K_e; Section 26.9 and Table 26.9-1.
- Enclosure classification; see Section 26.12.
- Internal pressure coefficient, (GC_{pi}); see Section 26.13 and Table 26.13-1.

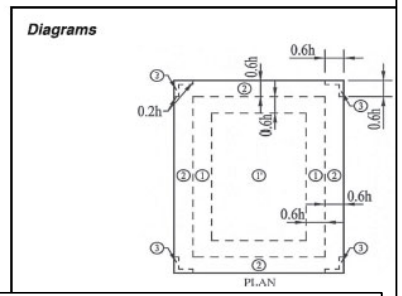
Step 4: Determine velocity pressure exposure coefficient, K_h; see Table 26.10-1.
Step 5: Determine velocity pressure, q_h, Equation (26.10-1).
Step 6: Determine external pressure coefficient, (GC_p):
- Walls; see Figure 30.3-1.
- Flat roofs, gable roofs, hip roofs; see Figure 30.3-2.
- Stepped roofs; see Figure 30.3-3.
- Multispan gable roofs; see Figure 30.3-4.
- Monoslope roofs; see Figure 30.3-5.
- Sawtooth roofs; see Figure 30.3-6.
- Domed roofs; see Figure 30.3-7.
- Arched roofs; see Figure 30.3-8.
- Bottom horizontal surface of elevated buildings; see Section 30.3.2.1.

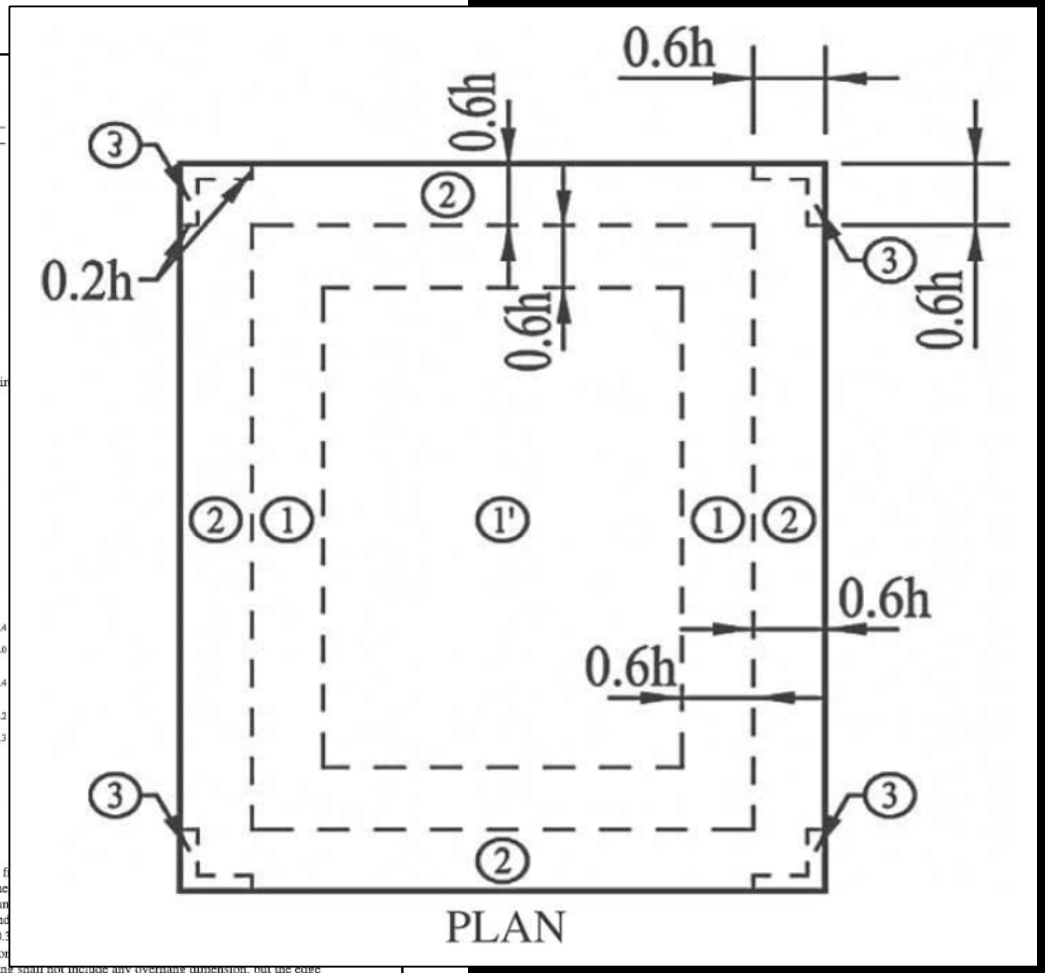
Step 7: Calculate wind pressure, p; Equation (30.3-1).

PART 2: BUILDINGS WITH $h > 60$ ft [($h > 18.3$ m)]

User Note: Use Part 2 of Chapter 30 for determining wind pressures for C&C of *enclosed, partially enclosed, or partially open buildings with* $h \le 60$ ft (18.3 m) that have roof shapes as specified in the applicable figures. These provisions are based on the Directional Procedure with *wind pressures calculated from the specified equation* applicable to each building surface.







18.3 m)]: external pressure coefficients (GC_p) for enclosed, open buildings—gable roofs, $\theta \leq 7°$.

lings and Other Structures 319

CHAPTER 32
TORNADO LOADS

32.1 PROCEDURES

32.1.1 Scope Buildings and other structures classified as Risk Category III or IV and located in the tornado-prone region as shown in Figure 32.1-1, including the main wind force resisting system (MWFRS) and all components and cladding (C&C) thereof, shall be designed and constructed to resist the greater of the tornado loads determined in accordance with the provisions of this chapter or the wind loads determined in accordance with Chapters 26 through 31, using the load combinations provided in Chapter 2.

range from approximately Enhanced Fujita Scale EF0 – EF2 intensity, depending on the risk category and effective plan area of the building or other structure (see Section C32.5.1). Options for protection of life and property from more intense tornadoes include construction of a storm shelter and/or design for longer-return-period tornado speeds as provided in Appendix G, including performance-based design. A building or other structure designed for tornado loads determined exclusively in accordance with Chapter 32 cannot be designated as a storm shelter without meeting additional critical requirements provided in the applicable building code and ICC 500, the ICC/NSSA *Standard for the Design and Construction of Storm Shelters*. See Commentary Section C32.1.1 for an in-depth discussion on storm shelters.

32.1.2 Permitted Procedures The design tornado loads for buildings and other structures, including the MWFRS and C&C elements thereof, shall be determined using one of the procedures as specified in this section and subject to the applicable limitations of Chapters 26 through 32, excluding Chapter 28.

An outline of the overall process for the determination of the tornado loads, including section references, is provided in Figure 32.1-3.

32.1.2.1 Tornado Loads on the Main Wind Force Resisting System Tornado loads for the MWFRS shall be determined using one or more of the following procedures, as modified by Chapter 32:

1. Directional Procedure for buildings of all heights as specified in Chapter 27 for buildings meeting the requirements specified therein;
2. Directional Procedure for Building Appurtenances (such as rooftop structures and rooftop equipment) and Other Structures (such as solid freestanding walls and solid freestanding signs, chimneys, tanks, open signs, single-plane open frames, and trussed towers) as specified in Chapter 29 for buildings meeting the requirements specified therein; or
3. Wind Tunnel Procedure for all buildings and all other structures as specified in Chapter 31 for buildings meeting the requirements specified therein.

32.1.2.2 Tornado Loads on Components and Cladding Tornado loads on the C&C of all buildings and other structures shall be determined using one or more of the following procedures, as modified by Chapter 32:

1. Analytical Procedures as specified in Parts 1 through 5, as appropriate, of Chapter 30, for buildings or other structures meeting the requirements specified therein; or
2. Wind Tunnel Procedure for all buildings and other structures as specified in Chapter 31, for buildings meeting the requirements specified therein.

32.1.3 Performance-Based Procedures Tornado design of buildings and other structures using performance-based procedures shall be permitted subject to the approval of the Authority Having Jurisdiction. The performance-based tornado design procedures used shall, at a minimum, conform to Section 1.3.1.3 and be documented and submitted to the Authority Having Jurisdiction in accordance with Section 1.3.1.3.

32.2 DEFINITIONS

The following definitions apply to the provisions of Chapter 32. Terms not defined in this chapter shall be defined in accordance with Chapters 26 through 31, as appropriate, excluding Chapter 28.

ASCE TORNADO DESIGN GEODATABASE: The ASCE database (version 2022-1.0) of geocoded tornado speed design data.

OTHER STRUCTURES, SEALED: A structure that is completely sealed or has controlled ventilation such that tornado-induced atmospheric pressure changes will not be transmitted to the inside of the structure, including but not limited to certain tanks and vessels.

TORNADO-PRONE REGION: The area of the conterminous United States most vulnerable to tornadoes, as shown in Figure 32.1-1.

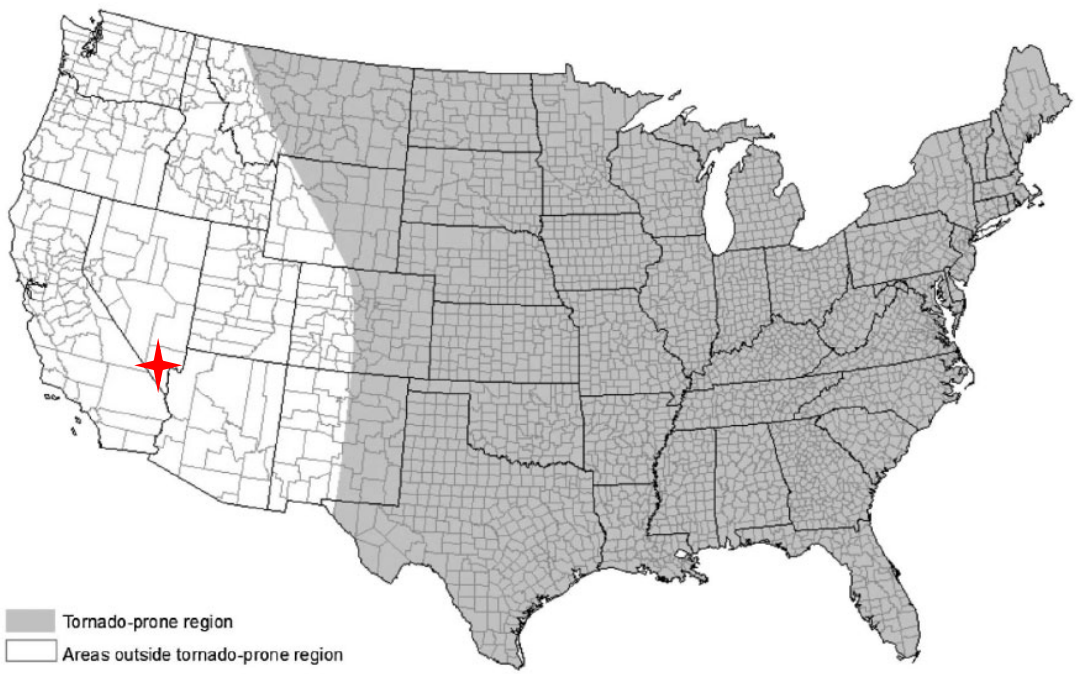


Figure 32.1-1. Tornado-prone region.

the effects of atmospheric pressure change and gust-effect factor, to be used in determination of tornado loads for buildings and some other structures, as determined in Section 32.13

K_{dT} = Tornado directionality factor as defined in Section 32.6

K_{hTor} = Tornado velocity pressure exposure coefficient evaluated at height $z = h$, as determined in Section 32.10

K_{vT} = Tornado pressure coefficient adjustment factor for vertical winds as defined in Section 32.14

K_{zTor} = Tornado velocity pressure exposure coefficient evaluated at height z, as determined in Section 32.10

p_{pT} = Combined net tornado design pressure on a parapet from Equation (32.15-3), lb/ft^2 (N/m^2)

p_T = Design tornado pressure to be used in determination of tornado loads for buildings and for certain other structures, lb/ft^2 (N/m^2)

coefficient form by (GC_{pi}), shall follow the same sign convention as provided in Section 26.4, where positive pressure acts toward the surface and negative pressure acts away from the surface.

32.4.2 Critical Load Condition Values of external pressures shall be combined algebraically with the combined effects of internal pressures and atmospheric pressure change to determine the most critical load.

32.5 TORNADO HAZARD MAPS

32.5.1 Tornado Speed The tornado speed, V_T, used in the determination of tornado loads on buildings and other structures shall be determined from Figures 32.5-1 and 32.5-2 as follows:

1. For Risk Category III buildings and structures, use Figures 32.5-1A through 32.5-1H.

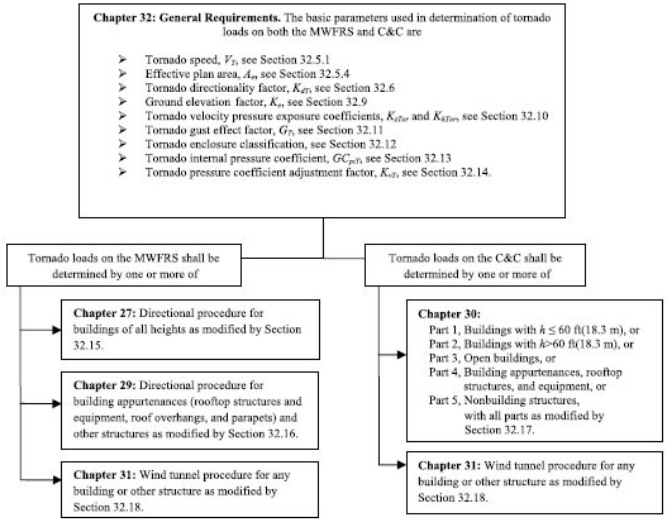


Figure 32.1-3. Outline of process for determining tornado loads.

2. For Risk Category IV buildings and structures, use Figures 32.5-2A through 32.5-2H.

To select the appropriate tornado hazard map to use for the assigned risk category, the effective plan area, A_e, of the building, other structure, or facility, shall be determined in accordance with Section 32.5.4 and shall be rounded up to next available mapped A_e, including 1; 2,000; 10,000; 40,000; 100,000; 250,000; 1,000,000; and 4,000,000 ft^2 (0.1; 186; 929; 3,716; 9,290; 23,226; 92,903; and 371,612 m^2). Alternatively, linear interpolation of tornado speed between maps using the logarithm of the effective plan area size is permitted.

Alternatively, it shall be permitted to use the tornado speeds from the ASCE Tornado Design Geodatabase. The ASCE Tornado Design Geodatabase is available at the ASCE 7 Hazard Tool (https://asce7hazardtool.online) or approved equivalent.

32.5.2 Design for Tornado Loads Not Required For Risk Category III and IV buildings and other structures determined to have tornado speeds $V_T < 60$ mi/h (26.8 m/s), design for tornado loads shall not be required. Where $V_T \ge 60$ mi/h (26.8 m/s) but is less than the following threshold speeds then design for tornado loads shall not be required:

1. For Exposure B: $V_T < 0.5V$, or
2. For Exposure C: $V_T < 0.6V$, or
3. For Exposure D: $V_T < 0.67V$,

where V is the basic wind speed determined in accordance with Section 26.5 and the exposure category is determined in accordance with Section 26.7.3, based on the exposure resulting in the greatest wind loads for any wind direction at the site.

32.5.3 Direction of Tornadic Wind The tornadic wind shall be assumed to come from any horizontal direction.

32.5.4 Effective Plan Area The effective plan area, A_e, of the building or other structure shall be determined in accordance with this section.

32.5.4.1 Essential Facilities For Essential Facilities and buildings and other structures required to maintain the functionality of Essential Facilities, the effective plan area shall be equal to the area of the smallest convex polygon enclosing both the Essential Facility and all of the buildings and other structures that maintain the functionality of the Essential Facility.

32.5.4.2 Other than Essential Facilities For buildings and structures that are not designated as Essential Facilities and are not required to maintain the functionality of Essential Facilities, the effective plan area shall be equal to the area of the smallest convex polygon enclosing the plan of the building, other structure, or facility. It is permitted to reduce the effective plan area to that of the effective plan area of the largest structurally independent building or other structure, which does not share structural components with adjacent buildings or other structures.

32.5.4.3 Ground-Mounted Photovoltaic Panel Systems The effective plan area, A_e, of ground-mounted photovoltaic

RoofWindDesigner.com

NRCA | ROOF WIND DESIGNER

WELCOME MARK GRAHAM | MY PROJECTS | PROFILE | ADMIN | LOGOUT

HOME | CONTACT | FAQ

ROOF WIND DESIGNER

ASCE 7-05, ASCE 7-10, ASCE 7-16 AND ASCE 7-22

Roof Wind Designer is intended to provide users with an easy-to-use means for determining roof systems' design wind loads for many commonly encountered building types that are subject to building code compliance.

Design-wind loads are derived using the American Society of Civil Engineers (ASCE) Standard ASCE 7, "Minimum Design Loads for Buildings and Other Structures." This standard is a widely recognized consensus standard and is referenced in and serves as the technical basis for wind load determination in the International Building Code and NFPA 5000: Building Construction and Safety Code. Roof Wind Designer allows users to choose between ASCE 7's 2005, 2010, 2016, and 2022 editions. Roof Wind Designer uses ASCE 7-05's Method 1—Simplified Method, ASCE 7-10's Envelope Procedure, Part 2: Low-rise Buildings (Simplified) of Chapter 30, ASCE 7-16's Envelope Procedure, Part 2: Low-rise Buildings (Simplified) of Chapter 30, and Part 4: Buildings with 60ft < h ≤ 160ft (Simplified), and ASCE 7-22's Part 1: Low-rise Buildings, Part 2: Buildings with h > 60 ft [(h > 18.3 m)], and Part 4: Building appurtenances, rooftop structures and equipment. A more detailed explanation of ASCE 7's four editions.

Comparing ASCE 7's versions and FM's rating calculator

Based on a hypothetical building

Version	Method	Wind speed	Zone 1' (Center)	Zone 1 (Field)	Zone 2 (Perimeter)	Zone 3 (Corner)
ASCE 7-05	ASD	V_{ASD} = 90 mph	--	-27.2 psf	-45.5 psf	-68.6 psf
ASCE 7-10	ULT	V_{ULT} = 120 mph	--	-42 psf	-70.5 psf	-105.9 psf
	ASD		--	-25.2 psf	-42.3 psf	-63.6 psf
ASCE 7-16	ULT	V_{ULT} = 105 mph	-29.5 psf	-51.2 psf	-67.6 psf	-92 psf
	ASD		-17.7 psf	-30.7 psf	-40.5 psf	-55.2 psf
ASCE 7-22	ULT	V_{ULT} = 105 mph	-29.3 psf	-51.0 psf	-67.2 psf	-91.6 psf
	ASD		-17.6 psf	-30.6 psf	-40.3 psf	-55 psf
FM calculator	FM (ASD/ULT)	V_{ASD} = 90 mph	-24 psf	-43 psf	-57 psf	-77 psf

Comparing ASCE 7's versions and FM's rating calculator

Based on a hypothetical building

Version	Method	Wind speed	Zone 1' (Center)	Zone 1 (Field)	Zone 2 (Perimeter)	Zone 3 (Corner)
ASCE 7-05	ASD	V_{ASD} = 90 mph	--	-27.2 psf	-45.5 psf	-68.6 psf
ASCE 7-10	ULT	V_{ULT} = 120 mph	--	-42 psf	-70.5 psf	-105.9 psf
	ASD		--	-25.2 psf	-42.3 psf	-63.6 psf
ASCE 7-16	ULT	V_{ULT} = 105 mph	-29.5 psf	-51.2 psf	-67.6 psf	-92 psf
	ASD		-17.7 psf	-30.7 psf	-40.5 psf	-55.2 psf
ASCE 7-22	ULT	V_{ULT} = 105 mph	-29.3 psf	-51.0 psf	-67.2 psf	-91.6 psf
	ASD		-17.6 psf	-30.6 psf	-40.3 psf	-55 psf
FM calculator	FM (ASD/ULT)	V_{ASD} = 90 mph	-24 psf	-43 psf	-57 psf	-77 psf

CHAPTER

16 STRUCTURAL DESIGN

User notes:

About this chapter: *Chapter 16 establishes minimum design requirements so that the structural components of buildings are proportioned to resist the loads that are likely to be encountered. In addition, this chapter assigns buildings and structures to risk categories that are indicative of their intended use. The loads specified herein along with the required load combinations have been established through research and service performance of buildings and structures. The application of these loads and adherence to the serviceability criteria enhance the protection of life and property.*

Code development reminder: *Code change proposals to this chapter will be considered by the IBC—Structural Code Development Committee during the 2025 (Group B) Code Development Cycle.*

SECTION 1601—GENERAL

1601.1 Scope. The provisions of this chapter shall govern the structural design of *buildings*, *structures* and portions thereof.

Scan for Changes

SECTION 1602—NOTATIONS

1603.1.4 Wind and tornado design data. The following information related to wind *loads* and, where required by Section 1609.5, tornado loads shall be shown, regardless of whether wind or tornado *loads* govern the design of the lateral force-resisting system of the *structure*:

1. Basic *wind speed*, V, mph (m/s), tornado speed, V_T, mph (m/s), and *allowable stress design wind speed*, V_{asd}, mph (m/s), as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Effective plan area, A_e, for tornado design in accordance with Chapter 32 of ASCE 7.
4. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
5. Applicable internal pressure coefficients, and applicable tornado internal pressure coefficients.
6. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the *structure*, pounds per square foot (kN/m^2). Where design for tornado loads is required, the design pressures shown shall be the maximum of wind or tornado pressures.

information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the *construction documents*.

Exception: *Construction documents* for *buildings* constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:

1. Floor and roof dead and *live loads*.
2. Ground snow load, p_g, and *allowable stress design* ground snow load, $p_{g(asd)}$.
3. Basic *wind speed*, V, mph (m/s), and *allowable stress design* wind speed, V_{asd}, as determined in accordance with Section 1609.3.1 and wind exposure.
4. *Seismic design category* and *site class*.
5. Flood design data, if located in *flood hazard areas* established in Section 1612.3.

Considerations

Wind design (ASCE 7)

- Designers: Include code-required wind design information in your Construction Documents
- Contractors: Look for the wind design information.
  - Drawing Sheet S-1 is a common location
- If wind design information is not provided, consider submitting an RFI

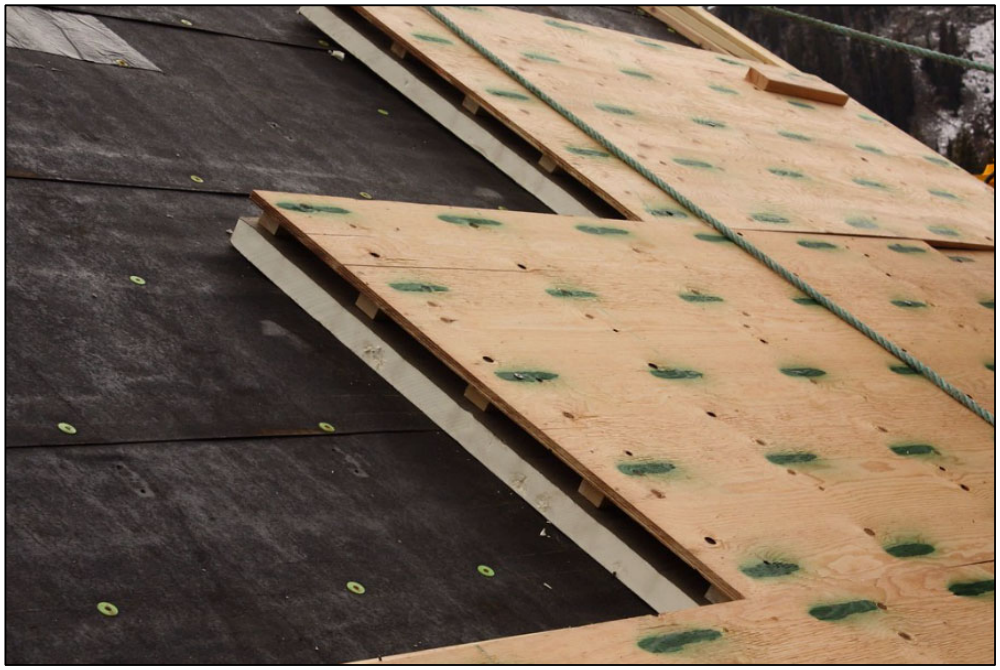
“Moisture” meter concerns

These meters do not read moisture…
…they are reading relative conductivity, which can be correlated to specific materials in specific conditions when properly calibrated.

Considerations

"Moisture" meters

- Read/understand the instruction manual
- Understand device sensitivity
- Understand proper operating conditions
- Proper calibration/recalibration is critical
- Don't overstate the meter's capability
- Verify job-specific results with gravimetric analysis



Nailbase insulation considerations

Nailbase insulation considerations

- Double layer design and application
- Taped joints can control vapor leaks/underlayment wrinkling at board joints
- Pressure-tested and FRT nailbase are not good ideas for nailbase

Insurance industry issues

- The insurance industry is dealing with significant claims
  - Premium increase are commonplace
- Coverage changes
  - Let's take a look at an example… my policy coverage

Insurance industry issues

Preliminary conclusions

- Expect premium costs to (continue to) increase
- Homeowners will likely have less coverage… maybe unknowingly
- Beware of ACV proration and replacement cost limits
- 15-year-old roofs…
- Contractors performing insurance work should prepare for changes

Radio frequency radiation

Rooftop cell phone transmitters

CRCA Canadian Roofing Contractors Association

Advisory Bulletin

JUNE 2023

Radiofrequency Radiation and Electromagnetic Fields

The increased number of cellular antennas and other communication equipment that generates radiofrequency radiation (RF) and electromagnetic fields (EMF) may be exposing roofers and other contractors to harmful levels of radiations when working on rooftops, sides of buildings and other locations where RF generating antennas are located. This bulletin will focus on radiation types, safety limits and mitigating exposure.

With the ever-increasing use and development of communication technology, there is an increased risk for those working in and around communication devices and equipment that emit radiofrequency electromagnetic fields (EMF) such as smart meters, cell phone towers and equipment using 5G technology. Roof areas are often prime locations for this type of equipment and anyone accessing these roof areas for any reason should be aware of the Occupational Health and Safety requirements and the Safety Code 6. Consult with provincial and/or federal authorities having jurisdiction for further information/guidance for most stringent requirements.

What is Radiofrequency (RF) Radiation?

There are two types of radiation – ionizing radiation and non-ionizing radiation. Both are forms of electromagnetic energy, but ionizing radiation has more energy than non-ionizing radiation. Ionizing radiation, like x-rays or gamma rays, has enough energy to cause chemical changes by breaking chemical bonds. Sources of this type of radiation can be found in hospitals, nuclear energy plants, and nuclear weapons facilities. Non-ionizing radiation causes molecules to vibrate, which generates heat. RF radiation is a type of non-ionizing radiation and is the energy used to transmit wireless information. RF radiation is invisible and power levels of equipment and amount of RF radiation can fluctuate without warning.

About Safety Code 6

Health Canada publishes Safety Code 6[1] which sets out recommended safety limits for human exposure to radiofrequency electromagnetic fields (EMF) in the frequency range from 3 kHz to 300 GHz. This range covers the frequencies used by communications devices and equipment that emit radiofrequency EMF such as: Wi-Fi, cell phones, smart meters, cell phone towers, those using 5G technology.

Safety Code 6 is reviewed on a regular basis to confirm that it continues to provide protection against all known potentially adverse health effects. If new scientific evidence were to show that exposure to radiofrequency EMF below the levels found in Safety Code 6 poses a risk, the Government of Canada would take steps to protect the health of Canadians.

[1] https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/occupational-exposure-regulations/safety-code-6-radiofrequency-exposure-guidelines.html

2430 Don Reid Drive, Suite 100, Ottawa, ON K1H 1E1
1-800-461-2722 | Tel: (613) 232-6724 | Fax: (613) 232-2893
Email: crca@roofingcanada.com | www.roofingcanada.com

CRCA Advisory Bulletin

June 2023

Link

How protect yourself from RF radiation
The risks associated with RF radiation increases with the number of devices present, the closer a worker is to the equipment/device(s), and the more time that is spent in the area. Workers can protect themselves by the following:

How protect yourself from RF radiation

The risks associated with RF radiation increases with the number of devices present, the closer a worker is to the equipment/device(s), and the more time that is spent in the area. Workers can protect themselves by the following:

- Complete a visual assessment of the area to determine if cellular antennas or other RF radiation generating antennas are present. If you are not sure, ask your supervisor, the building owner, or the property manager if RF-generating antennas are present where you need to work. The building owner or property manager should have the information, or know whom to contact for information about antennas, their locations, and the RF radiation levels.
- Look for warning signs posted near RF antennas; the signs should identify the hazard and tell you where to get more information.
- Contact the building owner/manager and the antenna licensee to have the equipment temporarily powered down or moved.

Recognize the signage

Photos courtesy of Peter Shackford—Hettrick, Cyr & Associates, Inc.

Some useful references

- CRCA Advisory Bulletin (Link)
- Health Canada's Safety Code 6 (Link)
- Federal Communications Commission (Link)
- Center for Construction Research and Training (Link)

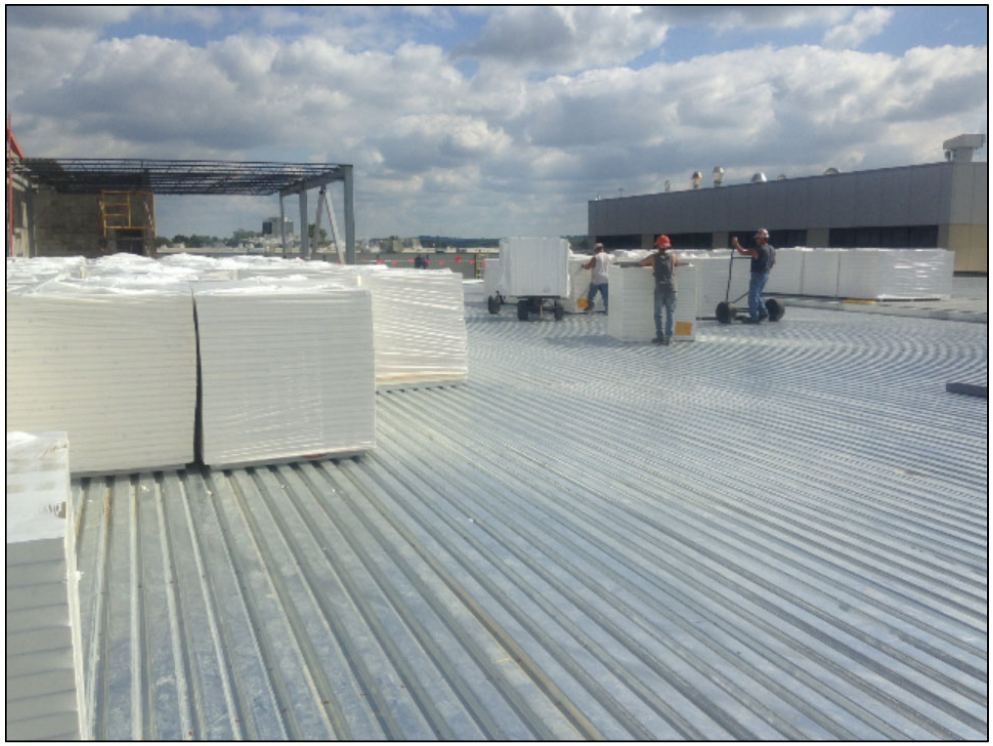

NRCA
TOOLBOXTALKS
National Roofing Contractors Association

Link

Radio frequency (RF) hazards

According to the Federal Communications Commission (FCC), radio waves and microwaves emitted by transmitting antennae are one form of electromagnetic energy that harm people. Harm from RF exposure will vary according to power levels, length of exposure time and distance from the antennae. Sources of RF energy on a rooftop often are not obvious and usually are not properly marked or defined as danger zones by warning signs. In many cases, antennae are hidden by building elements so workers may not be aware of their presence. Here are some important facts about RF energy and things that you can do to avoid it:

- High levels of RF may heat body tissue and increase body temperature, causing tissue damage because the body cannot cool quickly enough to prevent damage. This is called RF's thermal effects, and your eyes are the most vulnerable part of your body. Actual contact may cause a shock or burn.
- At lower, nonthermal levels of RF exposure, nervous system and immune system problems, kidney damage, neurological disorders and even some cancers may occur.
- Become familiar with what RF transmitters or antennae look like and the dangers of working near them. Be aware that warning signs for RF transmitters may not always be present on a roof.
- Your employer must inquire as to the presence of RF equipment and whether it may be shut down or shielded or other barrier device installed for the duration of the work period roofing workers will be in proximity to the transmitter.
- Symptoms of RF exposure often seem the same as physical exertion and can become heat exhaustion or heat stroke. Removing a worker from the area and cooling the body is important. Trained, professional medical care of the symptoms is critical.



Roof deck loading considerations

Some examples of roof loading

- Pallet of asphalt shingles (42 bundles): 2,500 to 4,200 lbs.
- Pallet of TPO membrane rolls: 1,400 to 3,450 lbs.
- Pallet of MB cap sheet (20 rolls): About 2,500 lbs.
- Pallet of glass-faced gypsum board (4 x 4): 1,600 to 2,400 lbs.
- Pallet of bonding adhesive (45 pails): 1,800 lbs.
- Bundle of polyiso. (4 x 8): 250 to 500 lbs.

Some initial considerations

Roof deck loading concerns

- Roofing operations may exceed live load capacity
- Note joist/framing orientation
- Consider avoiding adjacent load placement
- Position loads across joists/framing
- Consider added dunnage across framing
- Also consider rooftop equipment weight

Other topics…

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association
10255 West Higgins Road, 600
Rosemont, Illinois 60018-5607

(847) 299-9070
mgraham@nrca.net
www.nrca.net

Personal website: www.MarkGrahamNRCA.com