

Code Changes Affecting the Building Enclosure in the 2024 International Building Code

By Emily Lorenz, PE, F-ACI

EVERY THREE YEARS, the model codes developed by the International Code Council (ICC) are updated through an open, transparent process. The most recent ICC codes (known as International Codes or I-codes) were published in 2024 and are available for adoption by jurisdictions. Jurisdictions adopt model codes on various schedules through unique processes; IIBEC members should consult their state or local jurisdictions to determine when the 2024 codes may be adopted.

This article will focus on significant changes to the 2024 model code, the *International Building Code* (IBC),¹ from the 2021 edition. Not all changes included in the 2024 edition of the IBC model code that may impact building enclosure projects are included in this article.

CHAPTER 2: DEFINITIONS

A new definition of *basic wind speed* and the revision of the definition of *wind speed* are due to changes in the base standard ASCE 7-22,² which was adopted as part of the 2024 IBC. The new definition states: “**BASIC WIND SPEED, V.** The wind speed used for design, as determined in **Chapter 16**,”¹ where *V* is the variable used to denote basic wind speed. A detailed discussion of the changes related to calculation of wind loads is available in Mehta and Patterson’s publication, *Wind Uplift Pressures on Low-Slope Roofs*,³ and in Scott’s “Effects of ASCE 7-22 Wind Load Provisions on Roof Covering Design.”⁴

Several definitions were added related to building-integrated photovoltaics (BIPV). A new definition of *BIPV roof covering* was added: “**BUILDING-INTEGRATED PHOTOVOLTAIC (BIPV) ROOF COVERING.** A BIPV system that also functions as a *roof covering*. Coverings include, but are not limited to, shingles, tiles and roof panels.”

The 2021 IBC term *BIPV product* was revised to be *BIPV system* as such: “A building product

system that incorporates *photovoltaic modules* and functions as a component an integral part of the building envelope, such as roof assemblies and roof coverings, exterior wall envelopes and exterior wall coverings, and fenestration.”

New definitions for ground-mounted and elevated photovoltaic support structures were added:

- “**PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND MOUNTED.** An independent *photovoltaic (PV) panel system* without usable space underneath, installed directly on the ground.”
- “**PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED.** An independent *photovoltaic (PV) panel support structure* designed with usable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.”

A new definition of *low-slope* was added to clarify that it applies to “a roof slope less than 2 units vertical in 12 units horizontal (17-percent slope).” Taken with the existing definition of *steep-slope*, this clarifies that a roof with an exact slope of 2:12 is not low slope with regard to code requirements.

Three other interrelated definitions pertaining to roofs were added or revised, including those for *landscaped roof*, *occupiable roof*, and *vegetative roof*. Numerous instances throughout the 2024 IBC have been modified related to these three types of roofs.

Two new definitions state:

- “**LANDSCAPED ROOF.** An area over a roof assembly incorporating planters, vegetation, hardscaping or other similar decorative appurtenances that are not part of the roof assembly.”
- “**OCCUPIABLE ROOF.** An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and is

equipped with a *means of egress* system meeting the requirements of this code.”

The revised vegetative roof definition now reads: “**VEGETATIVE ROOF.** An A roof assembly of interacting components designed to waterproof a building’s top surface that includes, by design, vegetation and related landscape elements a vegetative surface.”

A final new definition related to roofs was added in “**RAISED-DECK SYSTEM.** (For application to Chapter 15 only). A system consisting of decking or pavers supported by pedestals installed over a roof assembly to provide a walking surface.”

Related to walls, two definitions were revised. The term *exterior wall envelope* was changed to *exterior wall assembly* and is now defined as “a system or assembly of including the exterior wall covering, framing, and components, including exterior wall covering materials, that such as weather-resistive barriers and insulating materials. This system provides protection of the building structural members, including framing and sheathing materials, and conditioned interior space, from the detrimental effects of the exterior environment.” The definition of *exterior wall covering* was modified to include rainscreen systems.

New definitions related to walls or roofs include:

- “**INSULATED METAL PANEL (IMP).** A factory manufactured panel consisting of metal facings and an insulation core intended for

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use as a system forming an *exterior wall*, an *exterior wall covering*, a *roof covering* or a *roof assembly of a building*."

- **"INSULATED VINYL SIDING.** A *continuous insulation* cladding product, with manufacturer-installed foam plastic insulating material as an integral part of the cladding product, having a thermal resistance not less than *R-2*."
- **"METAL BUILDING SYSTEM.** An integrated set of fabricated components and assemblies that form a complete or partial *building shell* that is designed by the manufacturer. This system typically includes but is not limited to primary framing composed of built-up structural steel members, secondary members that are cold-formed steel or open-web *steel joists*, a metal panel roof system and *exterior wall cladding*. The system is manufactured in a manner that permits plant or field inspection prior to assembly or erection."
- **"RAINSCREEN SYSTEM.** An assembly applied to the exterior side of an *exterior wall* and consisting of, at minimum, an outer layer, an inner layer and a cavity between them sufficient for the passive removal of liquid water and water vapor."
- **"RESPONSIVE VAPOR RETARDER.** A vapor retarder material complying with a vapor retarder class of Class I or II, but that also has a vapor permeance of 1 perm or greater in accordance with ASTM E96, water method (Procedure B)."

CHAPTER 7: FIRE AND SMOKE PROTECTION FEATURES

New requirements in Chapter 7 have been added to reduce the likelihood of fire spreading. The new Section 705.6 states:

"705.6 Continuity. The *fire-resistance rating* of *exterior walls* shall extend from the top of the foundation or floor/ceiling assembly below to one of the following:

1. The underside of the floor sheathing, roof sheathing, deck or slab above.
2. The underside of a floor/ceiling or roof/ceiling assembly having a *fire-resistance rating* equal to or greater than the *exterior wall* and the *fire separation distance* is greater than 10 feet.

Parapets shall be provided as required by **Section 705.12.**"

A new Section 705.7.1 has been added under Section 705.7, Structural Stability, that reads:

"705.7.1 Floor assemblies in Type III construction. In Type III construction where a floor assembly supports gravity loads from an *exterior wall*, the *fire-resistance rating* of the portion of the floor assembly that supports

Three other interrelated definitions pertaining to roofs were added or revised, including those for *landscaped roof*, *occupiable roof*, and *vegetative roof*.

the *exterior wall* shall be not less than the *fire-resistance rating* required for the exterior wall in **Table 601**. The *fire-resistance rating* provided by the portion of the floor assembly supporting and within the plane of the *exterior wall* shall be permitted to include the contribution of the ceiling membrane when considering exposure to fire from the inside. Where a floor assembly supports gravity loads from an *exterior wall*, the *building elements* of the floor construction within the plane of the *exterior wall*, including but not limited to rim joists, rim boards and blocking, shall be in accordance with the requirements for interior *building elements* of Type III construction."

In Section 715, Joints and Voids, three exceptions have been added to both Section 715.4, Exterior Curtain Wall/Fire-Resistance-Rated Floor Intersections, and Section 715.5, Exterior Curtain Wall/Nonfire-Resistance-Rated Floor Assembly Intersections. In Section 715.4 it states:

"Exceptions: An *approved* perimeter fire containment system shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or structures constructed in accordance with **Sections 406.5** and **406.6**.
3. *Mezzanine* floors."

Exceptions for Section 715.5 reads:

"Exceptions: An *approved* material or system to retard the interior spread of fire and hot gases shall not be required for voids in the following locations:

1. Floors within a single *dwelling unit*.
2. Floors and ramps within parking garages or structures constructed in accordance with **Sections 406.5** and **406.6**.
3. *Mezzanine* floors."

Additionally, a new section was added for roof assembly intersections in Section 715.6, which states:

"715.6 Fire barrier/nonfire-resistance-rated roof assembly intersections. Voids created at the intersection of a fire barrier and the

underside of a nonfire-resistance-rated roof sheathing, slab or deck above shall be filled by an *approved* material or system to retard the passage of fire and hot gases, or shall be protected by an *approved continuity head-of-wall system* tested in accordance with **ASTM E2837** to provide an *F rating/T rating* for a time period not less than the required *fire-resistance rating* of the *fire barrier* in which it is installed."

CHAPTER 14: EXTERIOR WALLS

With the change in the definition section of *exterior wall envelope* to *exterior wall assembly*, many changes in Chapter 14 relate to terminology changes. However, several significant changes have been made related to fire and flame propagation.

New Sections 1402.5, 1402.7, and 1402.8 related to vertical and lateral flame propagation have been added. Section 1402.5 states:

"1402.5 Vertical and lateral flame propagation. *Exterior walls* on *buildings* of Type I, II, III and IV construction that contain a combustible *exterior wall covering*, combustible insulation or a combustible *water-resistive barrier* shall comply with **Sections 1402.5.1** through **1402.5.5**, as applicable. Where compliance with **NFPA 285** and associated acceptance criteria is required in **Sections 1402.5.1** through **1402.5.5**, the *exterior wall assembly* shall be tested in accordance with and comply with the acceptance criteria of **NFPA 285**."

This new section, and Subsections 1402.5.1 through 1402.5.5, consolidate the requirements for exterior wall assemblies that contain combustible components. Combustible exterior wall assemblies must be evaluated for vertical and lateral flame propagation according to **NFPA 285** for Type I, II, III, and IV construction.

Section 1402.7 states:

"1402.7 Exterior wall veneers manufactured using combustible adhesives. *Exterior wall assemblies* on *buildings* of Type I, II, III or IV construction that are greater than 40 feet (12,192 mm) in height above *grade plane* and contain an exterior wall *veneer* manufactured using a combustible adhesive to laminate a metal core with noncombustible facing materials shall be tested in accordance with, and comply with, the acceptance criteria of **NFPA 285**, with the adhesive level at the maximum application rate intended for use. Combustibility shall be determined in accordance with **Section 703.3**."

This new Section 1402.7 provides requirements for metal claddings comprised of a metal core and noncombustible facings

that are laminated to the metal core using combustible laminating adhesive. Section 1402.8, Vertical and Lateral Flame Propagation Compliance Methods, adds requirements to demonstrate compliance.

Under Section 1403, Materials, additional sections have been added for fiber-mat reinforced cementitious backer units (Section 1403.13) and insulated vinyl siding (Section 1403.14), which is also newly defined in 2024. Section 1403.2, Water-Resistive Barrier, includes two new sentences that state, "The intersection between the *water-resistive barrier* material and fenestration openings shall be flashed and assembled in accordance with the fenestration manufacturer's installation instructions, or other *approved* methods for applications not addressed by the fenestration manufacturer's instructions. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and *building* appendages in a manner to meet the requirements of the exterior wall envelope as described in **Section 1402.2**." This language was added to ensure that the water-resistive barrier (WRB) is continuous at the top of walls and terminated at penetrations.

Further changes to Section 1403.2, Water-Resistive Barrier, include an additional compliance method for WRBs and specific requirements for horizontal applications of WRBs. The additional compliance method allows the WRB to be a foam plastic insulating sheathing system complying with Section 1402.2 and the manufacturer's instructions. The new language requires that "No. 15 asphalt felt and water-resistive barriers complying with **ASTM E2556** shall be applied horizontally..." and be appropriately lapped.

With the addition of definitions (Section 202) or materials (Section 1403), new sections have been added to Section 1404, Installation of Wall Coverings, for insulated vinyl siding (in Section 1404.15) and fiber-mat reinforced cementitious backer units (Section 1404.19).

Changes to Section 1404.3, Vapor Retarders, are related to the newly added term *responsive vapor retarder*. An additional section, 1404.3.2, has also been added on vapor barrier installation, which reads:

"1404.3.2 Vapor retarder installation. Vapor retarders shall be installed in accordance with the manufacturer's instructions or an *approved* design. Where a vapor retarder also functions as a component of a continuous air barrier, the vapor retarder shall be installed as an air barrier in accordance with the **International Energy Conservation Code**."

Combustible exterior wall assemblies must be evaluated for vertical and lateral flame proposition according to NFPA 285 for Type I, II, III, and IV construction.

Additional changes to Section 1404.3 included modified or added footnotes to Table 1404.3(2), Vapor Retarder Options; Table 1404.3(4), Continuous Insulation with a Class I or II Responsive Vapor Retarder; and a new Table 1404.3(5), Continuous Insulation on Walls without a Class I, II, or III Interior Vapor Retarder.

A new Section 1404.4.1, Fenestration Flashing, was added to Chapter 14. It states:

"1404.4.1 Fenestration flashing. Flashing of the fenestration to the wall assembly shall comply with the fenestration manufacturer's instructions or, for conditions not addressed by the fenestration manufacturer's instructions, shall comply with one of the following:

1. The *water-resistive barrier* manufacturer's flashing instructions.
2. The flashing manufacturer's flashing instructions.
3. A flashing design or method of a *registered design professional*.
4. Other *approved* methods."

Cladding attachment for steel cladding and wood was moved from Chapter 26 to Chapter 14 and now appears in Section 1404.5, Fastening.

Other entirely new sections in Chapter 14 include Section 1409, Insulated Metal Panel (IMP); Section 1411, Building-Integrated Photovoltaic (BIPV) Systems for Exterior Wall Coverings and Fenestration; and Section 1412, Soffits and Fascias at Roof Overhangs.

CHAPTER 15: ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

Two sections of Chapter 15 related to roof drainage were altered significantly in the 2024 IBC. Section 1502.3, Scuppers, was deleted in its entirety. The reasoning for the deletion is that Section 1502.1 and Section 1502.2 already reference Section 1611 of the IBC and Chapter 11 of the *International Plumbing Code*;⁵ thus, Section 1502.3, Scuppers, was duplicative.

Exceptions 1 and 2 of Section 1512.1 of the IBC were revised due to IIBEC-facilitated code change proposals. Section 1512.1 now reads:

"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 **Section 1608.3** and **Section 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 have been determined to resist all design loads meet the requirements of **Section 1608.3** and **Section 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**."

These changes ensure that roofs are properly evaluated during reroofing. Exception 1 of Section 1512.1 of the IBC now requires a check for ponding instability if an existing roof does not meet minimum slope. Similarly, Exception 2 of Section 1512.1 of the IBC requires a check for ponding instability if an existing roof does not have secondary drainage.

In Section 1504.8, Wind Resistance of Aggregate-Surfaced Roofs, additional requirements were added related to the protection of aggregate-surfaced roofs. Section 1504.8 reads:

"1504.8 Wind resistance of aggregate-surfaced roofs. Parapets shall be provided for aggregate surfaced roofs and shall comply with **Table 1504.8**. Such parapets shall be provided on the perimeter of the roof at all exterior sides except where an adjacent wall extends above the roof to a height at least equivalent to that required for the parapet. For roofs with differing surface elevations due to slope or sections at different elevations, the minimum parapet height shall be determined based on each roof surface elevation, and at no point shall the parapet height be less than that required by **Table 1504.8**.

Exception: Ballasted single-ply roof coverings shall be designed and installed in accordance with **Section 1504.5**."

Modifications to Table 1504.8 include changing *design wind speed* to *basic wind speed* and adding or modifying footnotes. Changes to the footnotes are:

- a. "Parapet height is measured vertically from the top surface of the coping down to the surface of the roof covering in the field of the roof adjacent to the parapet and outboard of any cant strip."
- b. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.
- c. Basic design wind speed, *V*, and wind exposure shall be determined in accordance with **Section 1609**.
- d. Where the minimum required parapet height is indicated to be 2 inches (51 mm), a gravel stop shall be permitted and shall extend not less than 2 inches (51 mm) from the roof surface and not less than the height of the aggregate.
- e. The tabulated values apply only to conditions where the topographic factor (K_z) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_z is incorporated in the basic wind speed in **Section 1609**.
- f. For Exposure D, add 8 inches (203 mm) to the parapet height required for Exposure C and the parapet height shall not be less than 12 inches (305 mm)."

Section 1507.1.1, Underlayment, has been simplified, while the related Table 1507.1.1(1), Underlayment Types, has been revised to incorporate changing *design wind speed* to *basic wind speed* and adding various ASTM standards for the various roof covering types. Additionally, Table 1507.1.1(2), Underlayment Application, has been revised significantly.

Deck requirements for wood shingles and wood shakes have likewise been updated in Sections 1507.8.1 and 1507.9.1, respectively.

A new Section 1511.9, Raised-Deck Systems Installed over a Roof Assembly, adds many provisions related to raised deck systems such as those related to installation, fire classification, pedestals or supports, structural requirements, roof drainage, and accessibility and egress.

Exceptions in Section 1512.2, Roof Replacement, were added or revised as such: **"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.

2. Where the existing roof includes a self-adhered *underlayment* 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 self-adhered *underlayment* shall be permitted to remain in place and covered with an *underlayment* complying with **Tables 1507.1.1(1), 1507.1.1(2) and 1507.1.1(3)**.
3. Where the existing roof includes one layer of self-adhered *underlayment* and the existing layer cannot be removed without damaging the *roof deck*, a second layer of self-adhered *underlayment* is permitted to be installed over the existing self-adhered *underlayment* provided that the following conditions are met:
 - 3.1. It is permitted by the *roof covering* manufacturer and self-adhered *underlayment* manufacturer.
 - 3.2. The existing sheathing is not water-soaked or deteriorated to the point that it is not adequate as a base for additional roofing.
 - 3.3. The second layer of self-adhered *underlayment* is installed such that buildup of material at walls, valleys, roof edges, end laps and side laps does not exceed two layers."

Finally, an exception was added to Section 1512.3, Roof Recover, that reads:

"Exception: A roof recover shall not be permitted where any of the following conditions occur:

1. The existing roof or *roof covering* is water-soaked or has deteriorated to the point that the existing roof or *roof covering* is not adequate as a base for additional roofing.
2. The existing *roof covering* is slate, clay, cement or asbestos-cement tile.
3. The existing roof has two or more applications of any type of *roof covering*."

CHAPTER 16: STRUCTURAL DESIGN

Tornado loads were added to Chapter 16, Structural Design, due to their inclusion in ASCE 7-22.² More information on how to design for wind loads is available in *Wind Uplift Pressures on Low-Slope Roofs*³ and "Effects of ASCE 7-22 Wind Load Provisions on Roof Covering Design."⁴

CHANGING THE CODE

There are several opportunities available to those who are interested in playing a greater

role in the ICC's code development process. Codes are updated on a three-year cycle, and code changes are being reviewed for the 2027 editions of the codes now. Contact Emily Lorenz, senior director of technical services at IIBEC, at elorenz@iibec.org for more information. 

REFERENCES

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