Low Slope Roofing Systems
The University of Wisconsin Madison
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Codes and standards

presented by

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Definitions

Standard: something established for use as a rule or basis of comparison in measuring or judging capacity, quantity, content, extent, value or quality.

Code: 1) a body of laws, as a nation, city, etc., arranged systematically for easy reference; 2) any set of principles or rules of conduct (e.g., the moral code).

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Roofing-related standards

- Promulgators: AAMA, ASCE, ASTM, CSA, CSSB, FM, SPRI, UL and WDMA
- Types of standards:
  - Test method (e.g., ASTM E108)
  - Specification/product standard (ASTM D6878)
  - Practice (ASTM D7186)
  - Guide (ASTM D6630) – Not enforceable

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TECH TODAY

An ASTM primer

Establishing and maintaining standards for the roofing industry

by Mark S. Graham

ASTM International publishes more than 12,000 standards annually

A majority of the standards that apply within the roofing industry are developed by ASTM International. Although you most likely are aware of the "ASTM" designation, you may not be aware of how the organization operates and the different types of standards it develops and maintains.

Overview

ASTM International is a globally recognized leader in the development and delivery of voluntary consensus standards. ASTM International publishes more than 12,000 standards annually used around the world to establish product quality levels, enhance health and safety, facilitate market access and trade, and establish consumer confidence.

ASTM International has no technical research or testing facilities of its own. Instead, the organization relies on its members—more than 30,000 of the world's top technical experts and business professionals from more than 140 countries—and facilitates the process and provides venues for carrying out its mission.

ASTM International's standards development and maintenance activities are carried out by more than 140 ASTM technical committees. For example, its Committee D08 on Roofing and Waterproofing is responsible for a majority of ASTM's roofing-related standards. Committee C16 on Thermal Insulation, Committee E05 on Fire Standards and Committee E06 on Performance of Buildings address roofing-related thermal insulation, fire testing and performance issues, respectively.

Standards

ASTM International committees can develop four types of standards.

Test method standards define a specific method or series of methods for testing a material or product attribute. For example, ASTM D228, "Standard Test Methods for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and Shingles Used in Roofing and Waterproofing," defines test methods for asphalt shingles, roll roofing and cap sheets.

Specification standards describe specific materials, products, systems or services and routinely include requirements for testing using ASTM international standard test methods. For example, ASTM D3462, "Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules," is the U.S. product standard defining fiberglass-reinforced asphalt shingles.

A standard practice is an accepted procedure for the performance of one or more operations or functions. In some cases, practices may include one or more test methods necessary for full use of the practice. For example, ASTM D7186, "Standard Practice for Quality Assurance Observation of Roof Construction and Repair," is the recognized consensus method for performing and reporting rooftop quality assurance observation during roof system application.

A standard guide is a compendium of information or series of options that does not recommend a specific course of action. Guides are intended to increase the awareness of information and approaches in a given subject area. Guides may propose a series of options or instructions that offer direction without recommending a definite course of action. A guide standard offers guidance based on a consensus of viewpoints but not to establish a standard practice to follow in all cases. For example, ASTM D7877, "Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes," provides commentary regarding electrical conductance testing of waterproofing membranes but does not provide specific practice or test method information.

ASTM International test methods, specifications and practice standards are appropriate to be referenced in project specifications, contracts and building codes. Because of their "information only" nature, ASTM International guide specifications are not.

Participation

A large number of NRCA member companies and, in some cases, individual company personnel are members of ASTM International, and many of them participate in various ASTM committees.

NRCA's Technical Services Section's staff members also are members of various ASTM technical committees. For example, I am a member of Committee C15 on Manufactured Masonry Units. C16, D08, E05 and E06. I also serve on the Executive Committee for Committee D08.

Additional information regarding ASTM International is available at www.astm.org. If you are not already an ASTM member, I encourage you to consider joining and participating in one or more of ASTM's technical committees.

MARK S. GRAHAM is NRCA's vice president of technical services.

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Benefits

- Direct Committee Participation
- Free Volume
- Publication Discounts
- Standardization News

Participating Members are individuals who choose to join ASTM International technical committees.

Join Now

Link

Most roofing-related standards are developed/maintained by Committee D08. Most roofing-related standards are contained in Vol. 4.04

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The purpose of the code

International Building Code, 2024 Edition

[A] 101.3 Purpose. The purpose of this code is to establish the minimum requirements to provide a reasonable level of safety, health and general welfare through structural strength, *means of egress*, stability, sanitation, light and *ventilation*, energy conservation, and for providing a reasonable level of life safety and property protection from the hazards of fire, *explosion* or *dangerous* conditions, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

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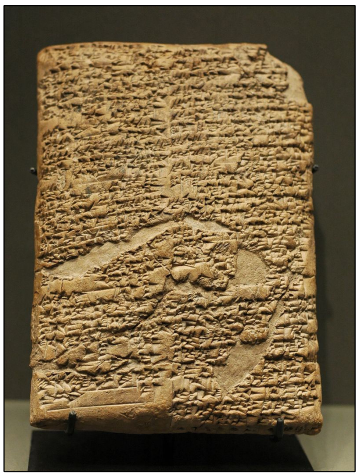
Code of Hammurabi

- Babylonian empire (1754 BC)
- 282 laws, scaled punishment
- Specific provisions to construction and contracts
- "…an eye for an eye, a tooth for a tooth…"



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Some background

Building code and standards in roofing

- The I-codes are "model codes" developed by the International Code Council (ICC)
- Model codes serve as the technical basis for state or local code adoption
- The code provides the minimum legal requirements for building construction…and operation
- The code is enforced by the "authority having jurisdiction" (AHJ)
- Code enforcement occurs at the time of installation and occupancy/use
- The code can also provide a basis for construction claims-related litigation

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Code enforcement

- Code official
- Construction litigation

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Legal considerations

"In most states, a building code violation is considered to be evidence of negligence. In some situations, a building code violation may be considered *negligence per se…*"

--Stephen M. Phillips
Hendrick, Phillips, Salzman & Siegel, PC

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Who is responsible?

- The building owner
- And, everyone else involved

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AIA General Conditions

AIA A201 – General Conditions of The Contract for Construction

Article 3 Contractor

3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statues, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by and made known to the Contractor as a request for information in such a form as the Architect may require.

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AIA General Conditions

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3.2.4 …If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay the costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages …for nonconformities of the Contract Documents to… codes…

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So, it pays to know...

or it can cost you if you don't know.

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Legacy codes

Early 1900s up to 1999

- Building Officials and Code Administrators International (BOCA)
  - *The BOCA National Building Code*
- Southern Building Code Congress International (SBCCI)
  - *The Standard Building Code*
- International Conference of Building Officials
  - *Uniform Building Code*

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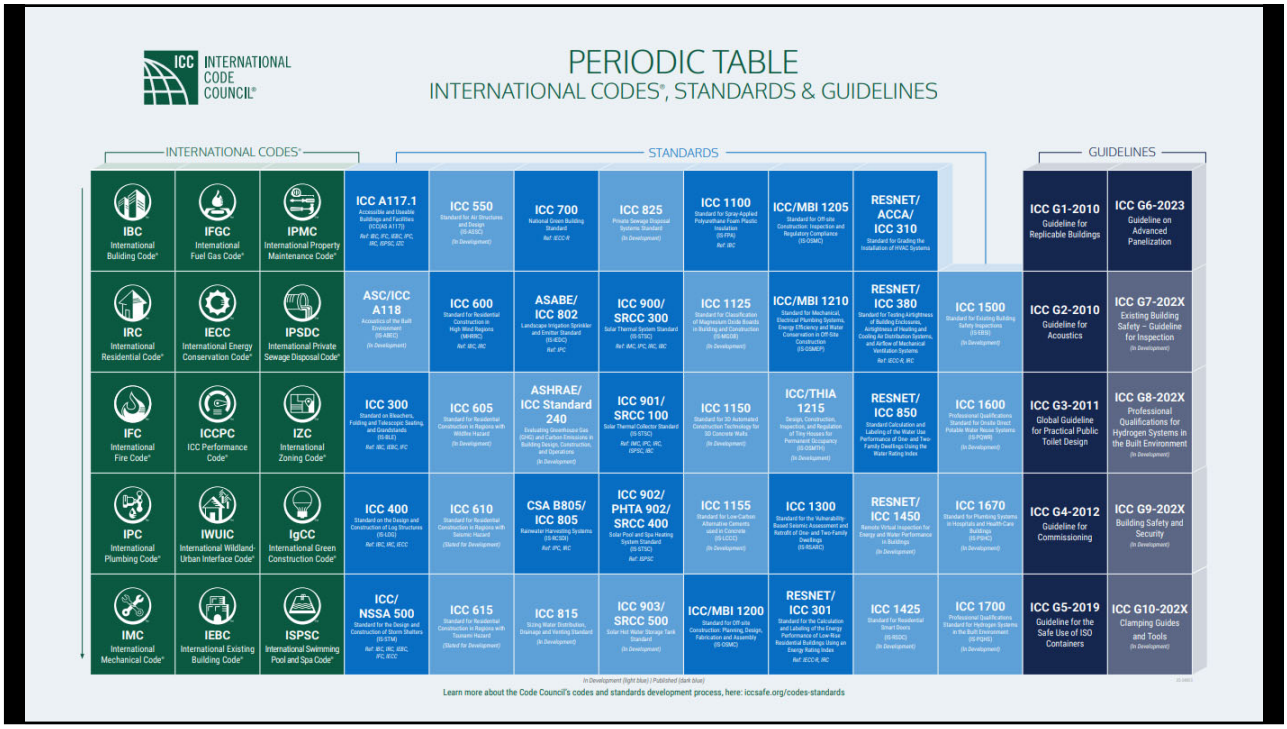

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I-code publication cycle

- 2000 edition
- 2003 edition
- 2006 edition
- 2009 edition
- 2012 edition
- 2015 edition
- 2018 edition
- 2021 edition
- 2024 edition
- 2027 edition (currently under development)

Three-year code development and publication cycle

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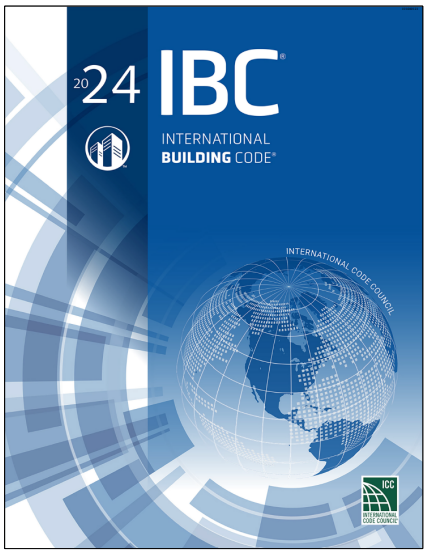
International Building Code, 2024 Edition



- Applicable to all buildings and structures, excepts those applicable to IRC 2024
- Roofing-related requirements:
  - Ch. 10-Means of egress
  - Ch. 12-Interior environment
  - Ch. 13-Energy efficiency
  - Ch. 15-Roof assemblies and rooftop structures
  - Ch. 16-Structural design
  - Ch. 20-Aluminum
  - Ch. 22-Steel
  - Ch. 24-Glass and glazing
  - Ch. 26-Plastic

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Significant roof requirements

International Building Code, 2024 Edition

- Wind resistance
- Fire classification
- Installation requirements
- Prescriptive requirements
- Reroofing

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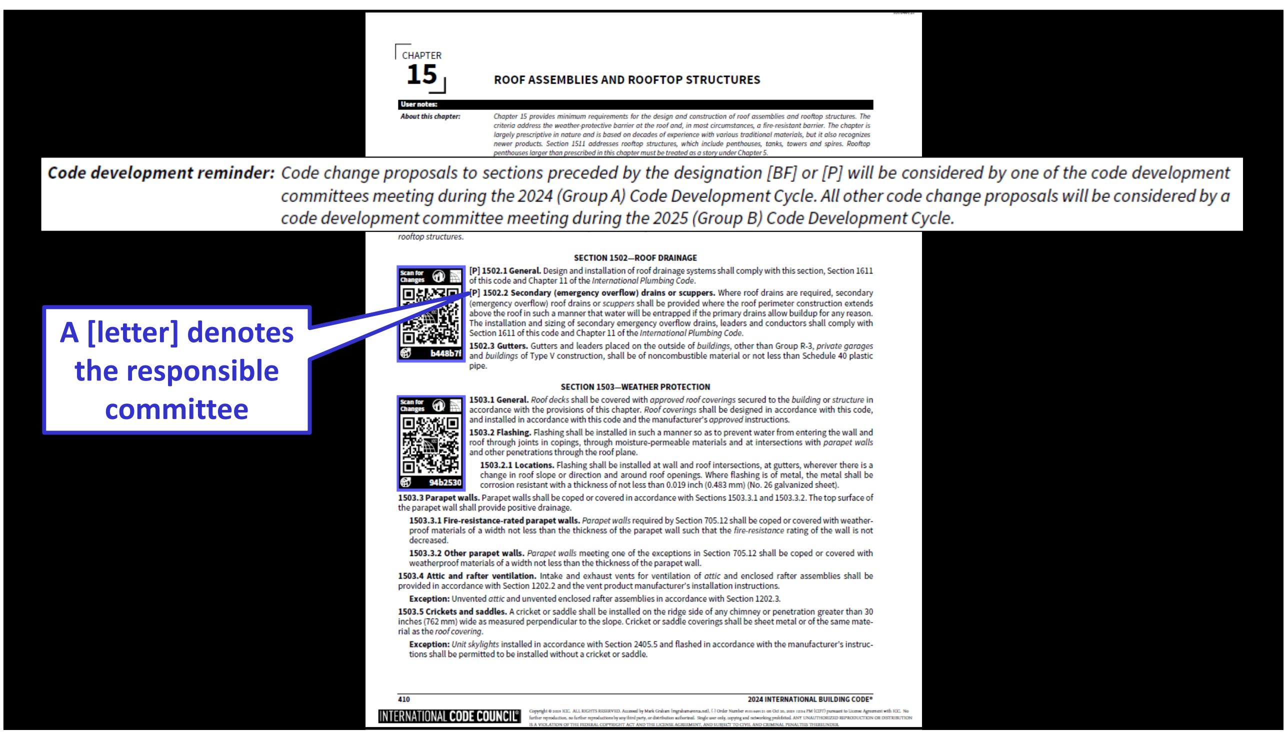

CHAPTER 15

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

User notes:

About this chapter: *Chapter 15 provides minimum requirements for the design and construction of roof assemblies and rooftop structures. The criteria address the weather-protective barrier at the roof and, in most circumstances, a fire-resistant barrier. The chapter is largely prescriptive in nature and is based on decades of experience with various traditional materials, but it also recognizes newer products. Section 1511 addresses rooftop structures, which include penthouses, tanks, towers and spires. Rooftop penthouses larger than prescribed in this chapter must be treated as a story under Chapter 5.*

Code development reminder: *Code change proposals to sections preceded by the designation [BF] or [P] will be considered by one of the code development committees meeting during the 2024 (Group A) Code Development Cycle. All other code change proposals will be considered by a code development committee meeting during the 2025 (Group B) Code Development Cycle.*

rooftop structures.

SECTION 1502—ROOF DRAINAGE

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[P] 1502.1 General. Design and installation of roof drainage systems shall comply with this section, Section 1611 of this code and Chapter 11 of the *International Plumbing Code*.

[P] 1502.2 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or *scuppers* shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. The installation and sizing of secondary emergency overflow drains, leaders and conductors shall comply with Section 1611 of this code and Chapter 11 of the *International Plumbing Code*.

1502.3 Gutters. Gutters and leaders placed on the outside of *buildings*, other than Group R-3, *private garages* and *buildings* of Type V construction, shall be of noncombustible material or not less than Schedule 40 plastic pipe.

SECTION 1503—WEATHER PROTECTION

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1503.1 General. *Roof decks* shall be covered with *approved roof coverings* secured to the *building* or *structure* in accordance with the provisions of this chapter. *Roof coverings* shall be designed in accordance with this code, and installed in accordance with this code and the manufacturer's *approved* instructions.

1503.2 Flashing. Flashing shall be installed in such a manner so as to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1503.2.1 Locations. Flashing shall be installed at wall and roof intersections, at gutters, wherever there is a change in roof slope or direction and around roof openings. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.483 mm) (No. 26 galvanized sheet).

1503.3 Parapet walls. Parapet walls shall be coped or covered in accordance with Sections 1503.3.1 and 1503.3.2. The top surface of the parapet wall shall provide positive drainage.

1503.3.1 Fire-resistance-rated parapet walls. *Parapet walls* required by Section 705.12 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall such that the *fire-resistance* rating of the wall is not decreased.

1503.3.2 Other parapet walls. *Parapet walls* meeting one of the exceptions in Section 705.12 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

1503.4 Attic and rafter ventilation. Intake and exhaust vents for ventilation of *attic* and enclosed rafter assemblies shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented *attic* and unvented enclosed rafter assemblies in accordance with Section 1202.3.

1503.5 Crickets and saddles. A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the *roof covering*.

Exception: *Unit skylights* installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

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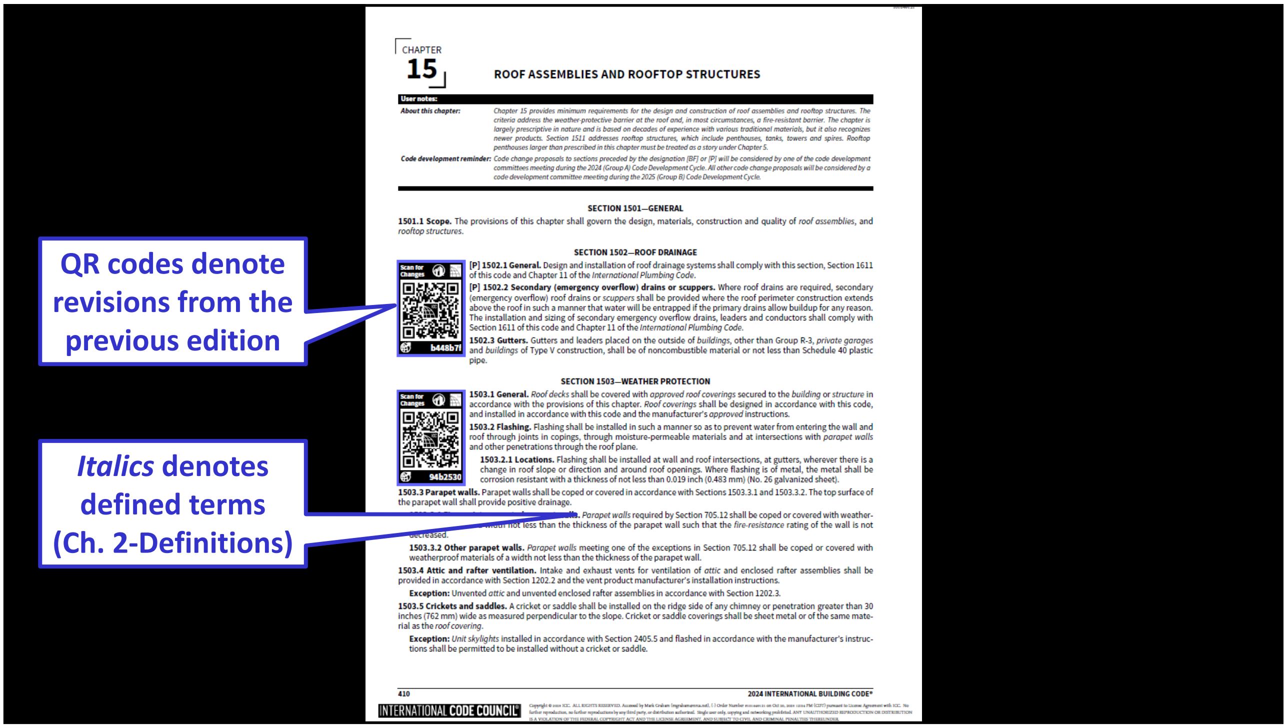

CHAPTER 15

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User notes:

About this chapter: *Chapter 15 provides minimum requirements for the design and construction of roof assemblies and rooftop structures. The criteria address the weather-protective barrier at the roof and, in most circumstances, a fire-resistant barrier. The chapter is largely prescriptive in nature and is based on decades of experience with various traditional materials, but it also recognizes newer products. Section 1511 addresses rooftop structures, which include penthouses, tanks, towers and spires. Rooftop penthouses larger than prescribed in this chapter must be treated as a story under Chapter 5.*

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SECTION 1501—GENERAL

1501.1 Scope. The provisions of this chapter shall govern the design, materials, construction and quality of *roof assemblies*, and *rooftop structures*.

SECTION 1502—ROOF DRAINAGE

[P] 1502.1 General. Design and installation of roof drainage systems shall comply with this section, Section 1611 of this code and Chapter 11 of the *International Plumbing Code*.

[P] 1502.2 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or *scuppers* shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. The installation and sizing of secondary emergency overflow drains, leaders and conductors shall comply with Section 1611 of this code and Chapter 11 of the *International Plumbing Code*.

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1503.2 Flashing. Flashing shall be installed in such a manner so as to prevent water from entering the wall and roof through joints in copings, through moisture-permeable materials and at intersections with *parapet walls* and other penetrations through the roof plane.

1503.2.1 Locations. Flashing shall be installed at wall and roof intersections, at gutters, wherever there is a change in roof slope or direction and around roof openings. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.483 mm) (No. 26 galvanized sheet).

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1503.3.1 [illegible] **walls.** *Parapet walls* required by Section 705.12 shall be coped or covered with weather- [illegible] width not less than the thickness of the parapet wall such that the *fire-resistance* rating of the wall is not decreased.

1503.3.2 Other parapet walls. *Parapet walls* meeting one of the exceptions in Section 705.12 shall be coped or covered with weatherproof materials of a width not less than the thickness of the parapet wall.

1503.4 Attic and rafter ventilation. Intake and exhaust vents for ventilation of *attic* and enclosed rafter assemblies shall be provided in accordance with Section 1202.2 and the vent product manufacturer's installation instructions.

Exception: Unvented *attic* and unvented enclosed rafter assemblies in accordance with Section 1202.3.

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Exception: *Unit skylights* installed in accordance with Section 2405.5 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

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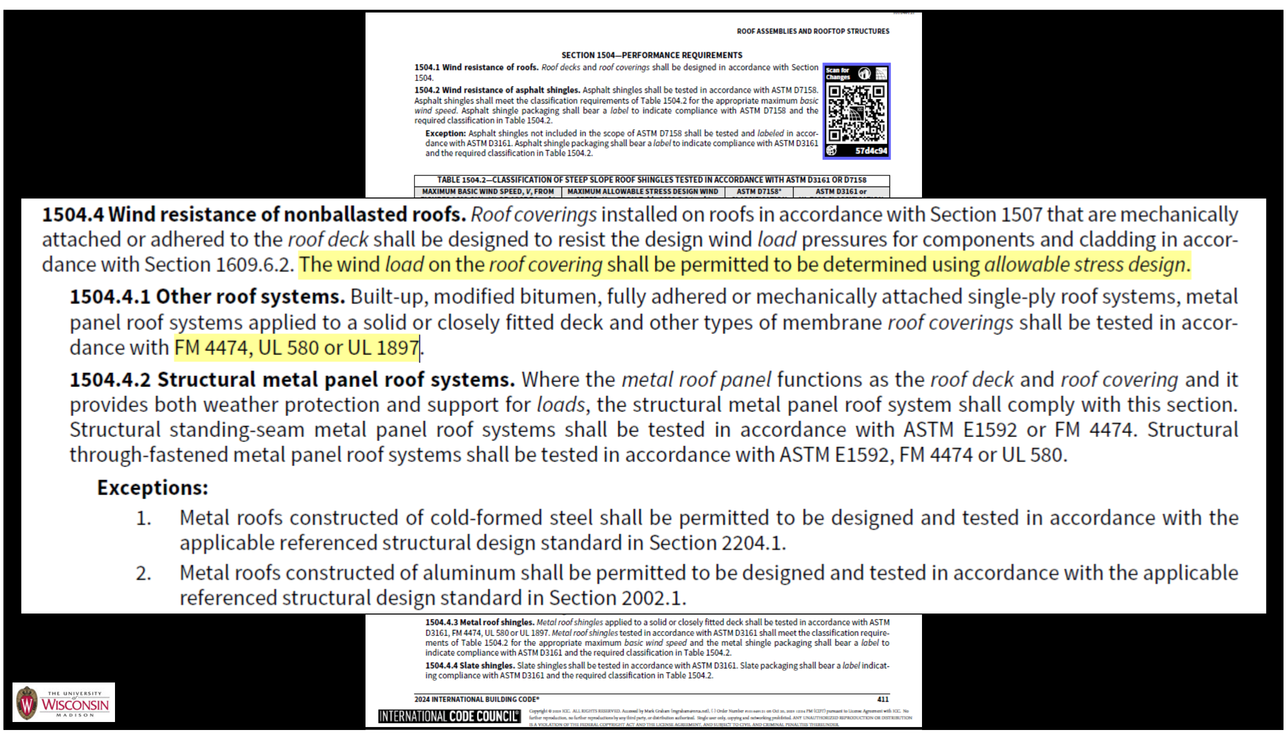

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1504—PERFORMANCE REQUIREMENTS

1504.1 Wind resistance of roofs. *Roof decks* and *roof coverings* shall be designed in accordance with Section 1504.

1504.2 Wind resistance of asphalt shingles. Asphalt shingles shall be tested in accordance with ASTM D7158. Asphalt shingles shall meet the classification requirements of Table 1504.2 for the appropriate maximum *basic wind speed*. Asphalt shingle packaging shall bear a *label* to indicate compliance with ASTM D7158 and the required classification in Table 1504.2.

Exception: Asphalt shingles not included in the scope of ASTM D7158 shall be tested and *labeled* in accordance with ASTM D3161. Asphalt shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table 1504.2.

TABLE 1504.2—CLASSIFICATION OF STEEP SLOPE ROOF SHINGLES TESTED IN ACCORDANCE WITH ASTM D3161 OR D7158

MAXIMUM BASIC WIND SPEED, *V*, FROM	MAXIMUM ALLOWABLE STRESS DESIGN WIND	ASTM D7158ᵃ	ASTM D3161 or

1504.4 Wind resistance of nonballasted roofs. *Roof coverings* installed on roofs in accordance with Section 1507 that are mechanically attached or adhered to the *roof deck* shall be designed to resist the design wind *load* pressures for components and cladding in accordance with Section 1609.6.2. The wind *load* on the *roof covering* shall be permitted to be determined using *allowable stress design*.

1504.4.1 Other roof systems. Built-up, modified bitumen, fully adhered or mechanically attached single-ply roof systems, metal panel roof systems applied to a solid or closely fitted deck and other types of membrane *roof coverings* shall be tested in accordance with FM 4474, UL 580 or UL 1897.

1504.4.2 Structural metal panel roof systems. Where the *metal roof panel* functions as the *roof deck* and *roof covering* and it provides both weather protection and support for *loads*, the structural metal panel roof system shall comply with this section. Structural standing-seam metal panel roof systems shall be tested in accordance with ASTM E1592 or FM 4474. Structural through-fastened metal panel roof systems shall be tested in accordance with ASTM E1592, FM 4474 or UL 580.

Exceptions:

1. Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2204.1.
2. Metal roofs constructed of aluminum shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2002.1.

1504.4.3 Metal roof shingles. *Metal roof shingles* applied to a solid or closely fitted deck shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. *Metal roof shingles* tested in accordance with ASTM D3161 shall meet the classification requirements of Table 1504.2 for the appropriate maximum *basic wind speed* and the metal shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table 1504.2.

1504.4.4 Slate shingles. Slate shingles shall be tested in accordance with ASTM D3161. Slate packaging shall bear a *label* indicating compliance with ASTM D3161 and the required classification in Table 1504.2.

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ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

1504.5 Ballasted low-slope single-ply roof systems. Ballasted *low-slope* single-ply roof system coverings installed in accordance with Section 1507.12 shall be designed in accordance with ANSI/SPRI RP-4.

determined from Figures 1609.3(1)through 1609.3(4), as applicable.

1504.6.1 Gutter securement for low-slope roofs. Gutters that are used to secure the perimeter edge of the roof membrane on *low-slope* built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

1504.7 Impact resistance. *Roof coverings* installed on *low-slope* roofs in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in FM 4470.

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.

TABLE 1504.8—MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d, e]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC WIND SPEED, *V* (MPH)																	
		Exposure B									Exposure C[f]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

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 outbound of any cant strip.

b. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.

c. Basic 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_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} 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 1505—FIRE CLASSIFICATION

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[BF] 1505.1 General. Fire classification of roof assemblies shall be in accordance with Section 1505. The minimum fire classification of roof assemblies installed on buildings shall comply with Table 1505.1 based on type of construction of the building. Class A, B and C *roof assemblies* and *roof coverings* required to be *listed* by this section shall be tested in accordance with ASTM E108 or UL 790. In addition, *fire-retardant-treated woodroof coverings* shall be tested in accordance with ASTM D2898.

Exception: *Skylights and sloped glazing* that comply with Chapter 24 or Section 2610.

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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.

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AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC WIND SPEED, *V* (MPH)																	
		Exposure B									Exposure C[f]								
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53
	150	17	19	22	25	27	30	36	41	46	23	26	29	32	35	38	44	50	56
ASTM D1863 (No. 6)	15	2	2	2	2	12	12	12	15	18	2	2	2	13	15	17	22	26	30
	20	2	2	2	2	12	12	13	17	21	2	2	12	15	17	19	23	28	32
	30	2	2	2	2	12	12	16	20	24	2	12	14	17	19	21	26	31	35
	50	12	12	12	12	14	16	20	24	28	12	15	17	19	22	24	29	34	39
	100	12	12	14	16	19	21	26	30	35	16	18	21	24	26	29	34	39	45
	150	12	14	17	19	22	24	29	34	39	18	21	23	26	29	32	37	43	48

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

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 outbound of any cant strip.

b. Interpolation shall be permitted for wind speed, mean roof height and parapet height. Extrapolation is not permitted.

c. Basic 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_{zt}) determined in accordance with Chapter 26 of ASCE 7 is 1.0 or where K_{zt} 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).

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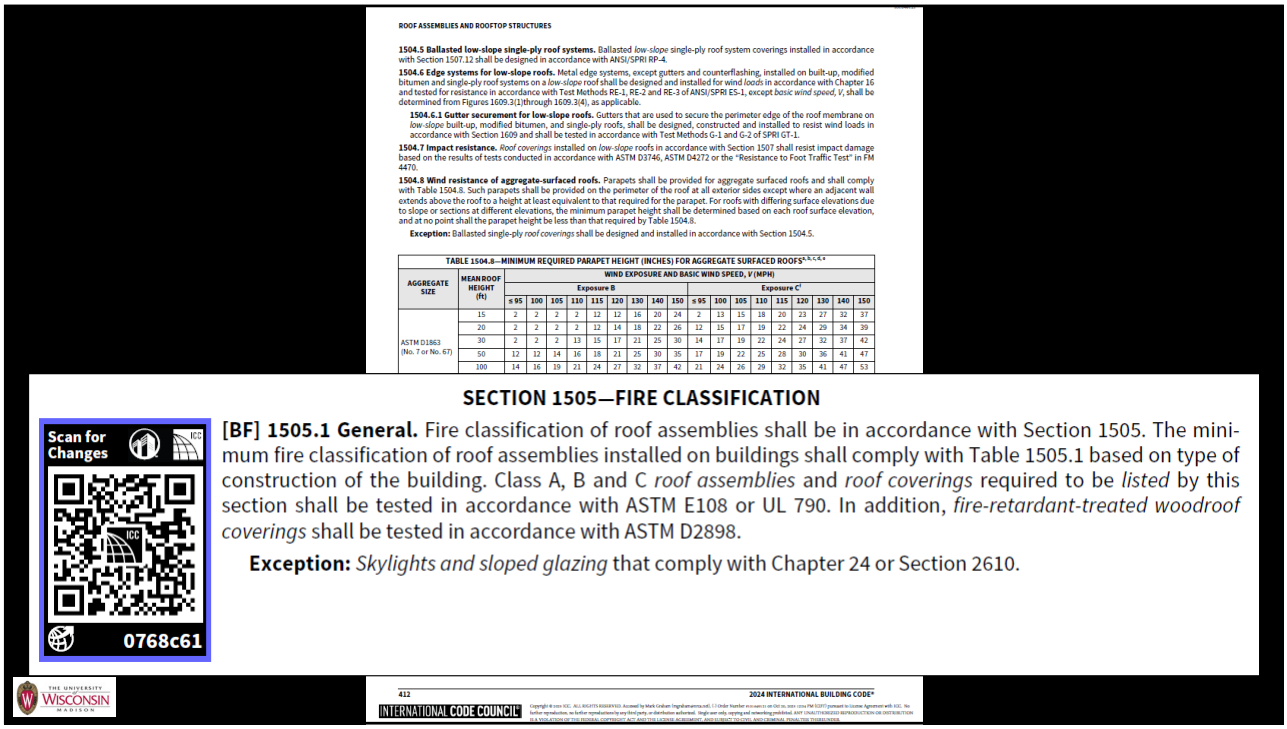

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

1504.5 Ballasted low-slope single-ply roof systems. Ballasted *low-slope* single-ply roof system coverings installed in accordance with Section 1507.12 shall be designed in accordance with ANSI/SPRI RP-4.

1504.6 Edge systems for low-slope roofs. Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roof systems on a *low-slope* roof shall be designed and installed for wind *loads* in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except *basic wind speed*, *V*, shall be determined from Figures 1609.3(1) through 1609.3(4), as applicable.

1504.6.1 Gutter securement for low-slope roofs. Gutters that are used to secure the perimeter edge of the roof membrane on *low-slope* built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1.

1504.7 Impact resistance. *Roof coverings* installed on *low-slope* roofs in accordance with Section 1507 shall resist impact damage based on the results of tests conducted in accordance with ASTM D3746, ASTM D4272 or the "Resistance to Foot Traffic Test" in FM 4470.

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.

TABLE 1504.8—MINIMUM REQUIRED PARAPET HEIGHT (INCHES) FOR AGGREGATE SURFACED ROOFS[a, b, c, d, e]

AGGREGATE SIZE	MEAN ROOF HEIGHT (ft)	WIND EXPOSURE AND BASIC WIND SPEED, *V* (MPH)																	
		Exposure B								Exposure C[f]									
		≤ 95	100	105	110	115	120	130	140	150	≤ 95	100	105	110	115	120	130	140	150
ASTM D1863 (No. 7 or No. 67)	15	2	2	2	2	12	12	16	20	24	2	13	15	18	20	23	27	32	37
	20	2	2	2	2	12	14	18	22	26	12	15	17	19	22	24	29	34	39
	30	2	2	2	13	15	17	21	25	30	14	17	19	22	24	27	32	37	42
	50	12	12	14	16	18	21	25	30	35	17	19	22	25	28	30	36	41	47
	100	14	16	19	21	24	27	32	37	42	21	24	26	29	32	35	41	47	53

SECTION 1505—FIRE CLASSIFICATION

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[BF] 1505.1 General. Fire classification of roof assemblies shall be in accordance with Section 1505. The minimum fire classification of roof assemblies installed on buildings shall comply with Table 1505.1 based on type of construction of the building. Class A, B and C *roof assemblies* and *roof coverings* required to be *listed* by this section shall be tested in accordance with ASTM E108 or UL 790. In addition, *fire-retardant-treated woodroof coverings* shall be tested in accordance with ASTM D2898.

Exception: *Skylights and sloped glazing* that comply with Chapter 24 or Section 2610.

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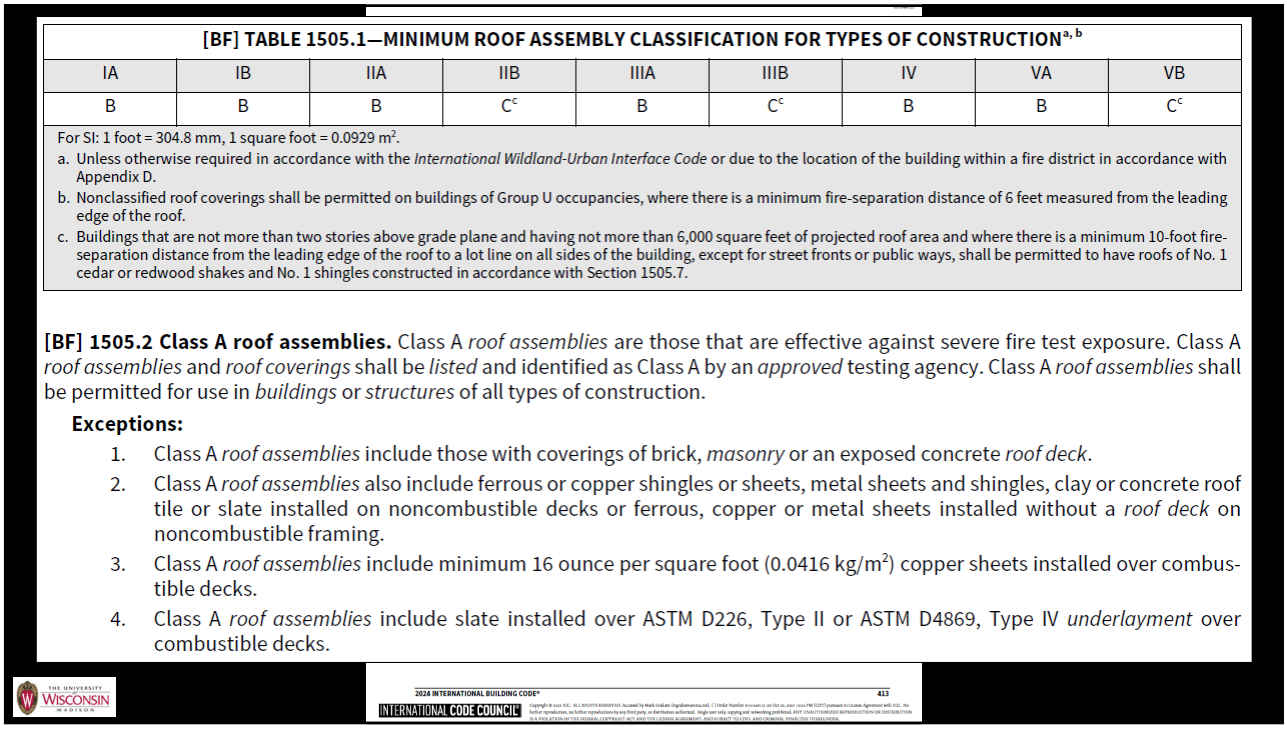

[BF] TABLE 1505.1—MINIMUM ROOF ASSEMBLY CLASSIFICATION FOR TYPES OF CONSTRUCTION[a, b]

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C[c]	B	C[c]	B	B	C[c]

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Unless otherwise required in accordance with the *International Wildland-Urban Interface Code* or due to the location of the building within a fire district in accordance with Appendix D.

b. Nonclassified roof coverings shall be permitted on buildings of Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories above grade plane and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or public ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles constructed in accordance with Section 1505.7.

[BF] 1505.2 Class A roof assemblies. Class A *roof assemblies* are those that are effective against severe fire test exposure. Class A *roof assemblies* and *roof coverings* shall be *listed* and identified as Class A by an *approved* testing agency. Class A *roof assemblies* shall be permitted for use in *buildings* or *structures* of all types of construction.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, *masonry* or an exposed concrete *roof deck*.
2. Class A *roof assemblies* also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a *roof deck* on noncombustible framing.
3. Class A *roof assemblies* include minimum 16 ounce per square foot (0.0416 kg/m^2) copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over ASTM D226, Type II or ASTM D4869, Type IV *underlayment* over combustible decks.

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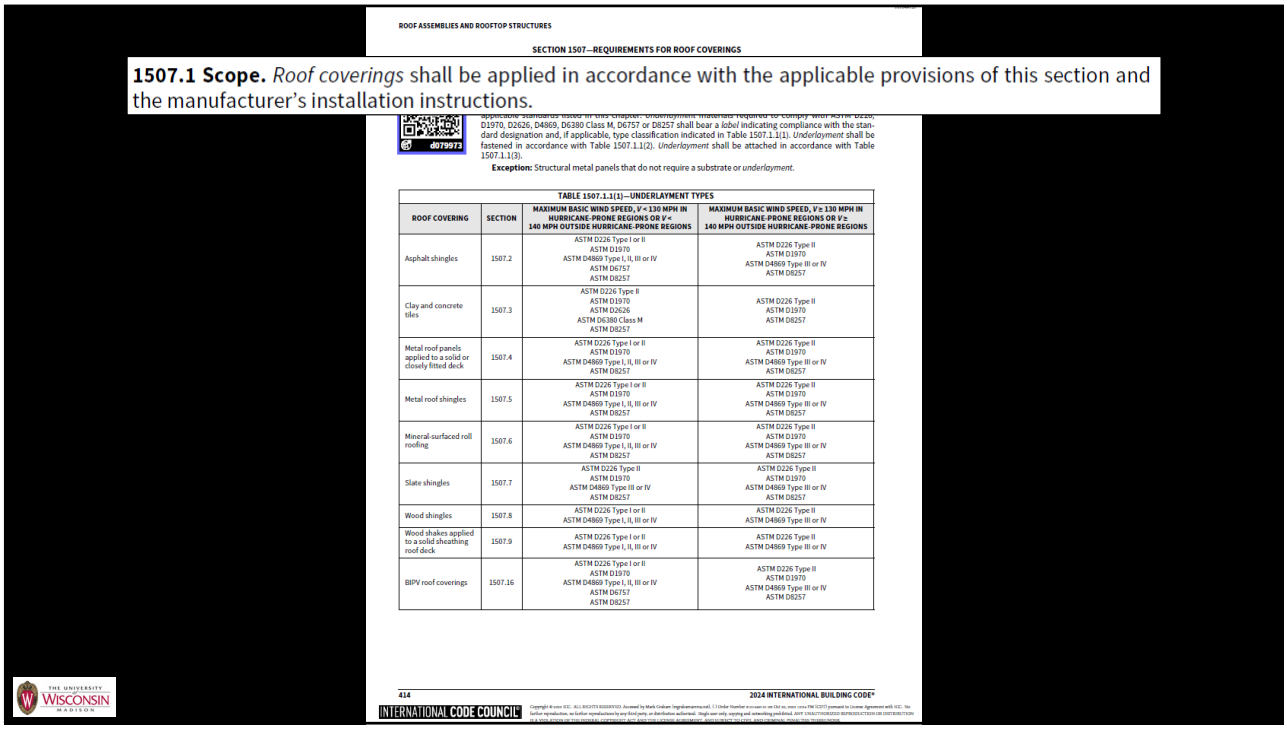

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1507—REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope. *Roof coverings* shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

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D1970, D2626, D4869, D6380 Class M, D6757 or D8257 shall bear a *label* indicating compliance with the standard designation and, if applicable, type classification indicated in Table 1507.1.1(1). *Underlayment* shall be fastened in accordance with Table 1507.1.1(2). *Underlayment* shall be attached in accordance with Table 1507.1.1(3).

Exception: Structural metal panels that do not require a substrate or *underlayment*.

TABLE 1507.1.1(1)—UNDERLAYMENT TYPES

ROOF COVERING	SECTION	MAXIMUM BASIC WIND SPEED, V < 130 MPH IN HURRICANE-PRONE REGIONS OR V < 140 MPH OUTSIDE HURRICANE-PRONE REGIONS	MAXIMUM BASIC WIND SPEED, $V \geq$ 130 MPH IN HURRICANE-PRONE REGIONS OR $V \geq$ 140 MPH OUTSIDE HURRICANE-PRONE REGIONS
Asphalt shingles	1507.2	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Clay and concrete tiles	1507.3	ASTM D226 Type II ASTM D1970 ASTM D2626 ASTM D6380 Class M ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D8257
Metal roof panels applied to a solid or closely fitted deck	1507.4	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Metal roof shingles	1507.5	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Mineral-surfaced roll roofing	1507.6	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Slate shingles	1507.7	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Wood shingles	1507.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes applied to a solid sheathing roof deck	1507.9	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
BIPV roof coverings	1507.16	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257

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Roof system types

Prescriptive requirement in Section 1507

- Asphalt shingles
- Clay and concrete tile
- Metal panels
- Metal shingles
- Mineral-surfaced roll roofing
- Slate shingles
- Wood shingles
- Wood shakes
- Built-up roofs
- Modified bitumen roofing
- Single-ply roofing
- Spray polyurethane foam
- Liquid-applied roofing
- Vegetative roofs, roof gardens and landscaped roofs
- Photovoltaic shingles
- Building-integrated photovoltaic roof panels

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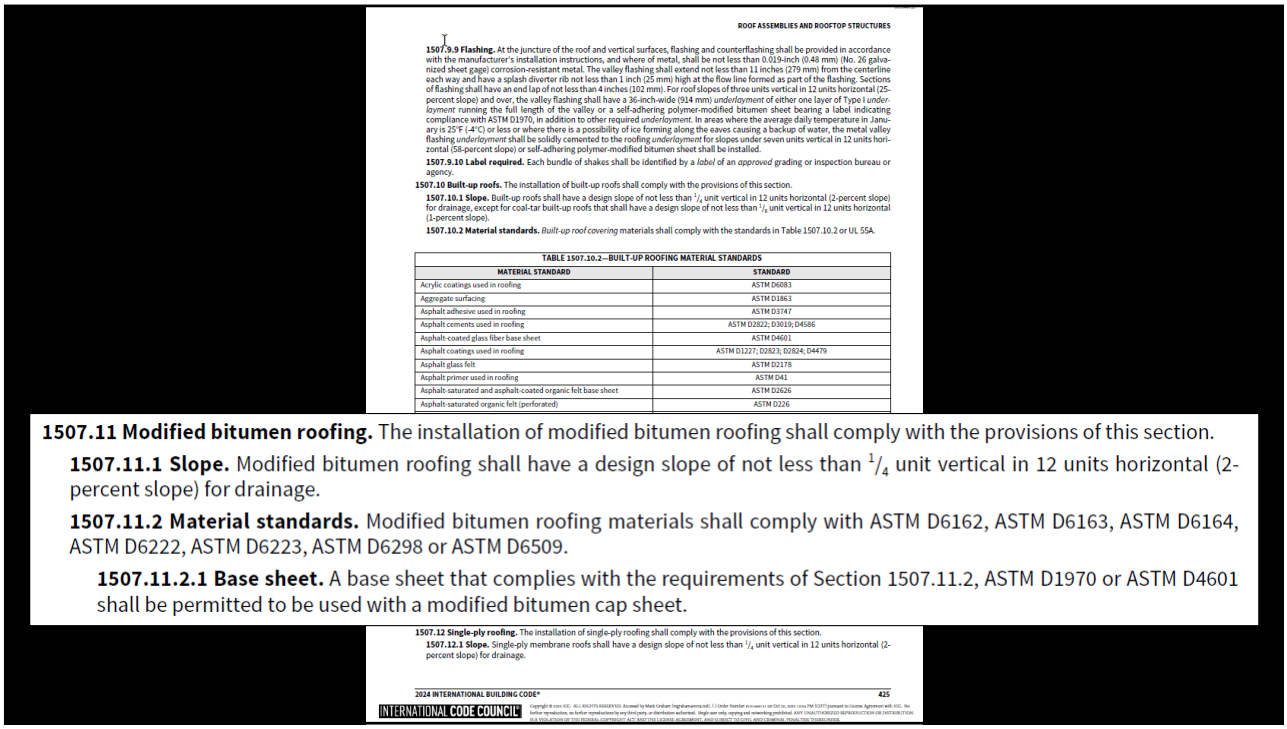

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

1507.9.9 Flashing. At the juncture of the roof and vertical surfaces, flashing and counterflashing shall be provided in accordance with the manufacturer's installation instructions, and where of metal, shall be not less than 0.019-inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal. The valley flashing shall extend not less than 11 inches (279 mm) from the centerline each way and have a splash diverter rib not less than 1 inch (25 mm) high at the flow line formed as part of the flashing. Sections of flashing shall have an end lap of not less than 4 inches (102 mm). For roof slopes of three units vertical in 12 units horizontal (25-percent slope) and over, the valley flashing shall have a 36-inch-wide (914 mm) *underlayment* of either one layer of Type I *underlayment* running the full length of the valley or a self-adhering polymer-modified bitumen sheet bearing a label indicating compliance with ASTM D1970, in addition to other required *underlayment*. In areas where the average daily temperature in January is 25°F (-4°C) or less or where there is a possibility of ice forming along the eaves causing a backup of water, the metal valley flashing *underlayment* shall be solidly cemented to the roofing *underlayment* for slopes under seven units vertical in 12 units horizontal (58-percent slope) or self-adhering polymer-modified bitumen sheet shall be installed.

1507.9.10 Label required. Each bundle of shakes shall be identified by a *label* of an *approved* grading or inspection bureau or agency.

1507.10 Built-up roofs. The installation of built-up roofs shall comply with the provisions of this section.

1507.10.1 Slope. Built-up roofs shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage, except for coal-tar built-up roofs that shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (1-percent slope).

1507.10.2 Material standards. *Built-up roof covering* materials shall comply with the standards in Table 1507.10.2 or UL 55A.

TABLE 1507.10.2—BUILT-UP ROOFING MATERIAL STANDARDS

MATERIAL STANDARD	STANDARD
Acrylic coatings used in roofing	ASTM D6083
Aggregate surfacing	ASTM D1863
Asphalt adhesive used in roofing	ASTM D3747
Asphalt cements used in roofing	ASTM D2822; D3019; D4586
Asphalt-coated glass fiber base sheet	ASTM D4601
Asphalt coatings used in roofing	ASTM D1227; D2823; D2824; D4479
Asphalt glass felt	ASTM D2178
Asphalt primer used in roofing	ASTM D41
Asphalt-saturated and asphalt-coated organic felt base sheet	ASTM D2626
Asphalt-saturated organic felt (perforated)	ASTM D226

1507.11 Modified bitumen roofing. The installation of modified bitumen roofing shall comply with the provisions of this section.

1507.11.1 Slope. Modified bitumen roofing shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage.

1507.11.2 Material standards. Modified bitumen roofing materials shall comply with ASTM D6162, ASTM D6163, ASTM D6164, ASTM D6222, ASTM D6223, ASTM D6298 or ASTM D6509.

1507.11.2.1 Base sheet. A base sheet that complies with the requirements of Section 1507.11.2, ASTM D1970 or ASTM D4601 shall be permitted to be used with a modified bitumen cap sheet.

1507.12 Single-ply roofing. The installation of single-ply roofing shall comply with the provisions of this section.

1507.12.1 Slope. Single-ply membrane roofs shall have a design slope of not less than $^1/_4$ unit vertical in 12 units horizontal (2-percent slope) for drainage.

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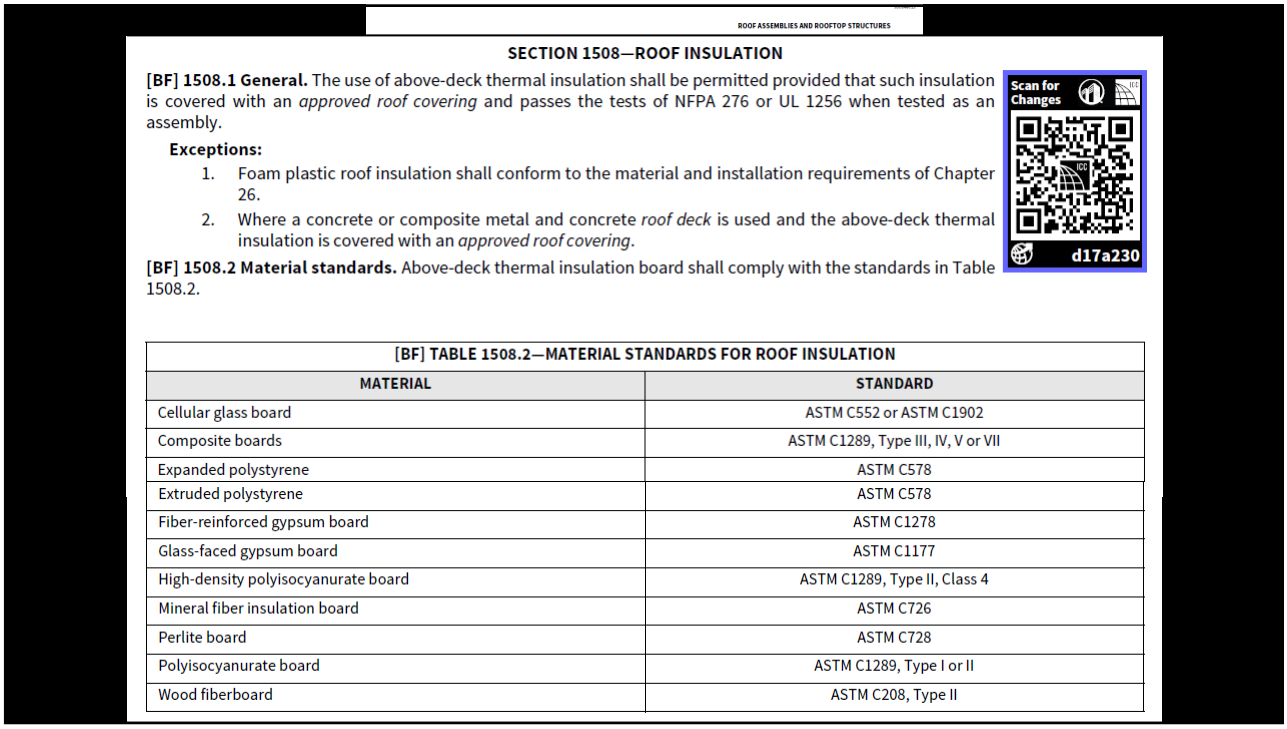

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1508—ROOF INSULATION

[BF] 1508.1 General. The use of above-deck thermal insulation shall be permitted provided that such insulation is covered with an *approved roof covering* and passes the tests of NFPA 276 or UL 1256 when tested as an assembly.

Exceptions:

1. Foam plastic roof insulation shall conform to the material and installation requirements of Chapter 26.
2. Where a concrete or composite metal and concrete *roof deck* is used and the above-deck thermal insulation is covered with an *approved roof covering*.

[BF] 1508.2 Material standards. Above-deck thermal insulation board shall comply with the standards in Table 1508.2.

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[BF] TABLE 1508.2—MATERIAL STANDARDS FOR ROOF INSULATION

MATERIAL	STANDARD
Cellular glass board	ASTM C552 or ASTM C1902
Composite boards	ASTM C1289, Type III, IV, V or VII
Expanded polystyrene	ASTM C578
Extruded polystyrene	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4
Mineral fiber insulation board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208, Type II

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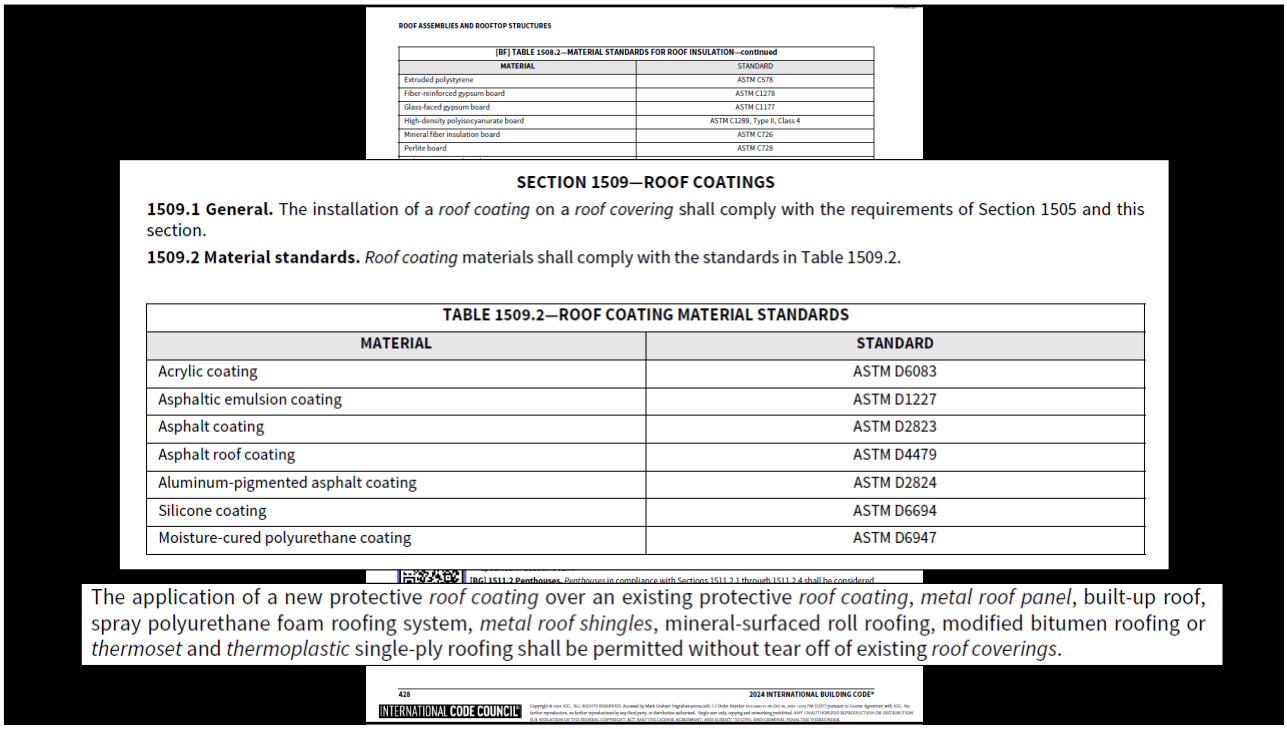

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

[BF] TABLE 1508.2—MATERIAL STANDARDS FOR ROOF INSULATION—continued

MATERIAL	STANDARD
Extruded polystyrene	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4
Mineral fiber insulation board	ASTM C726
Perlite board	ASTM C728

SECTION 1509—ROOF COATINGS

1509.1 General. The installation of a *roof coating* on a *roof covering* shall comply with the requirements of Section 1505 and this section.

1509.2 Material standards. *Roof coating* materials shall comply with the standards in Table 1509.2.

TABLE 1509.2—ROOF COATING MATERIAL STANDARDS

MATERIAL	STANDARD
Acrylic coating	ASTM D6083
Asphaltic emulsion coating	ASTM D1227
Asphalt coating	ASTM D2823
Asphalt roof coating	ASTM D4479
Aluminum-pigmented asphalt coating	ASTM D2824
Silicone coating	ASTM D6694
Moisture-cured polyurethane coating	ASTM D6947

[BG] 1511.2 Penthouses. *Penthouses* in compliance with Sections 1511.2.1 through 1511.2.4 shall be considered

The application of a new protective *roof coating* over an existing protective *roof coating*, *metal roof panel*, built-up roof, spray polyurethane foam roofing system, *metal roof shingles*, mineral-surfaced roll roofing, modified bitumen roofing or *thermoset* and *thermoplastic* single-ply roofing shall be permitted without tear off of existing *roof coverings*.

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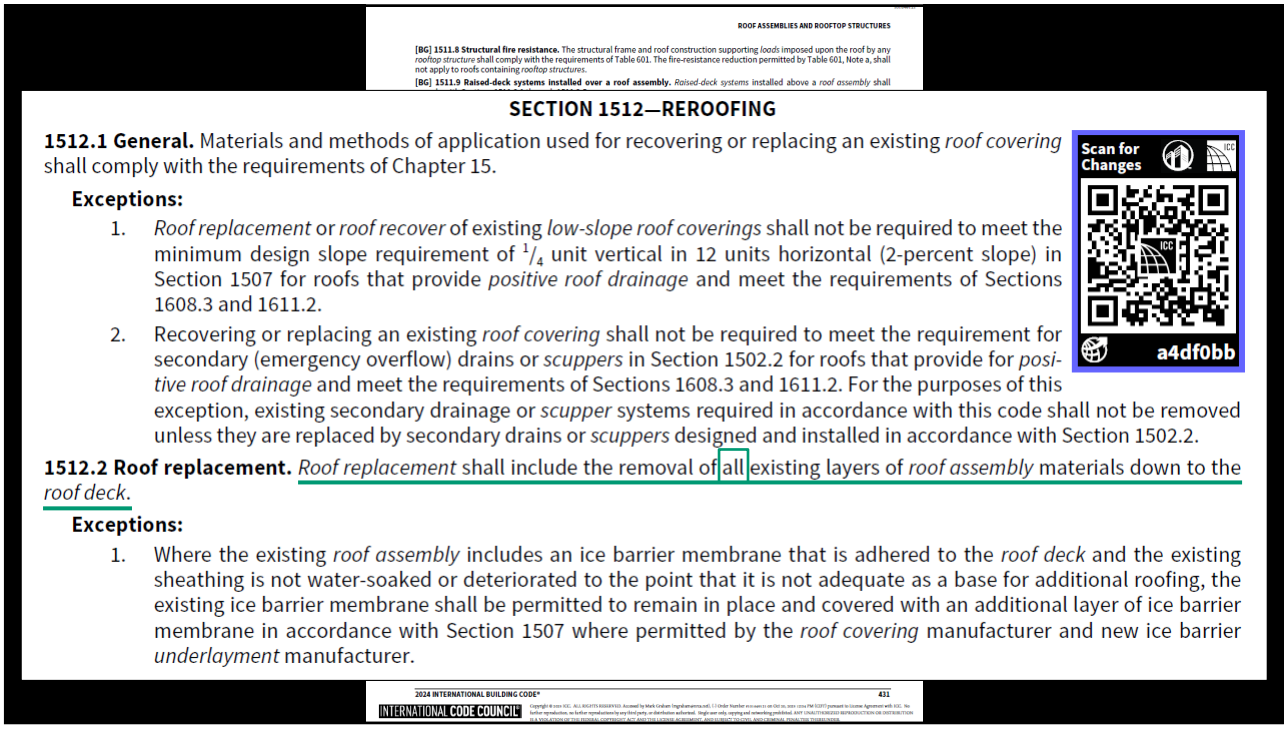

ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

[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

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 *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.

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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.

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ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

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.

1512.3 Roof recover. The installation of a new *roof covering* over an existing *roof covering* shall be permitted where any of the following conditions occur:

1. Where the new *roof covering* is installed in accordance with the *roof covering* manufacturer's approved instructions.
2. Complete and separate roofing systems, such as standing-seam *metal roof panel* systems, that are designed to transmit the roof *loads* directly to the *building*'s structural system and that do not rely on existing roofs and *roof coverings* for support, shall not require the removal of existing *roof coverings*.
3. Metal panel, metal shingle and concrete and clay tile *roof coverings* shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1512.3.1.
4. The application of a new protective *roof coating* over an existing protective *roof coating*, *metal roof panel*, built-up roof, spray polyurethane foam roofing system, *metal roof shingles*, mineral-surfaced roll roofing, modified bitumen roofing or *thermoset* and *thermoplastic* single-ply roofing shall be permitted without tear off of existing *roof coverings*.

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*.

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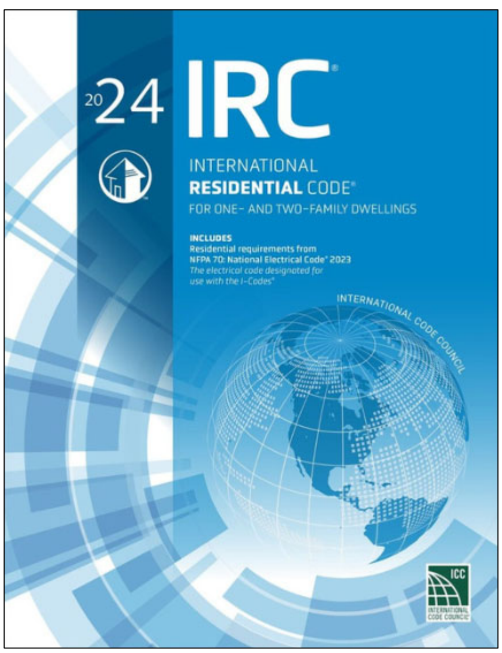

<u>IRC 2024</u>

- One- and two-family dwellings and limited short-term care facilities
- Ch. 9: Roofing
  - Requirements closely match those of IBC Ch. 15
  - IRC tends to be more prescriptive than IBC

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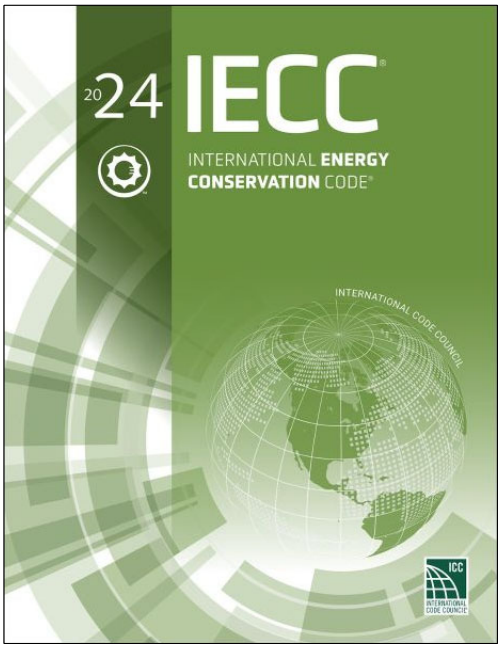

IECC 2024

- Not yet published/pending appeal
- C- and R-provisions:
  - Commercial: Similar R-values and reflectivity, and more complex air barrier requirements
  - Residential: Some lower R-values and more complex air barrier requirements

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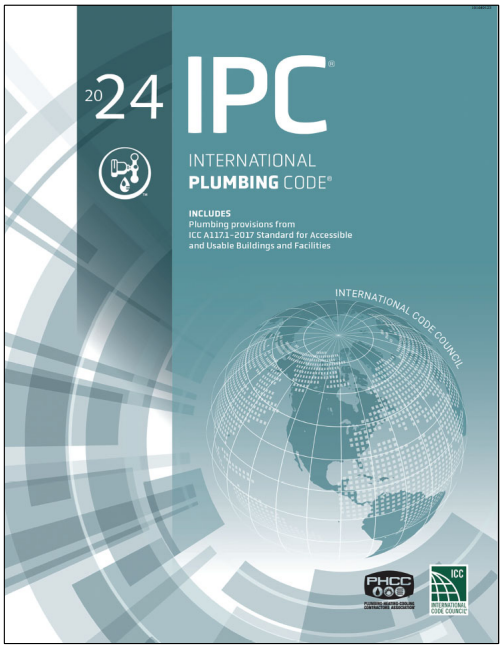

IPC 2024

- Ch. 11: Storm Drainage
  - Roof drains, scuppers and gutters
  - Maps based on a 100-yr. hourly rainfall rate
- No substantive roofing-related changes

Link

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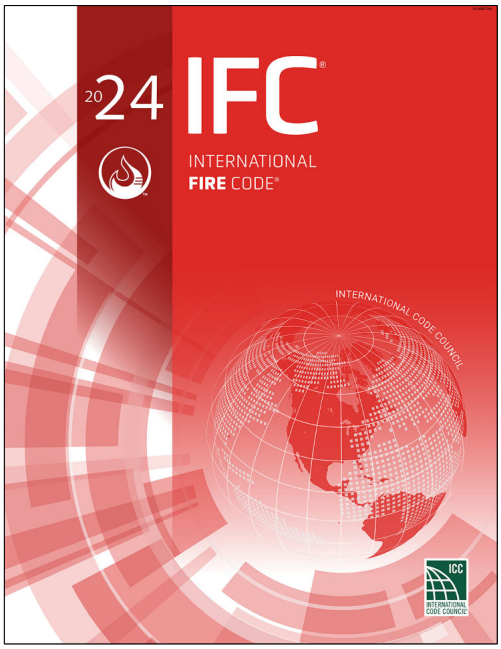

IFC 2024

- Sec. 303-Asphalt Kettles
- Sec. 317-Vegetative and Landscaped Roofs
- Sec. 701.2-Fire-resistance-rated construction
- Sec. 3305.10-Safeguarding Roofing Operations
- No substantive roofing-related changes

Link

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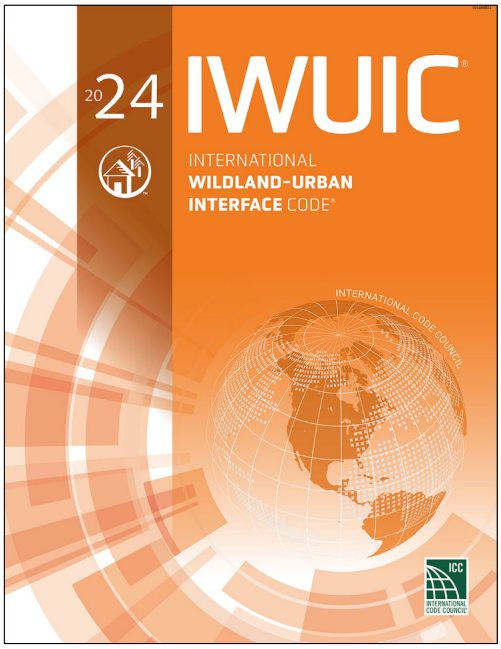

IWUIC 2024

- 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

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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

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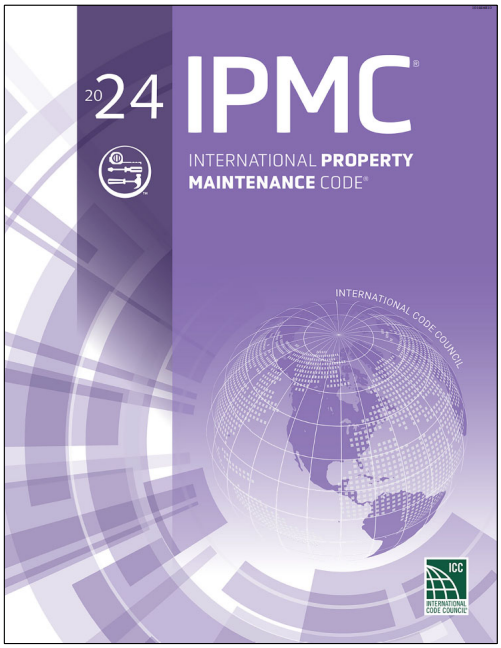

IPMC 2024

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

Link

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RESEARCH+TECH

2024 IPMC
INTERNATIONAL PROPERTY MAINTENANCE CODE

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

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How should I deal with alternatives to what is permitted by the Code?

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Alternative materials, design and methods of construction and equipment

- IBC 2024, Sec. 104.11
- IRC 2024, Sec. R104.11
- IECC 2024, Sec. C102 and Sec. R102
- IPC 2024, Sec. 105.2
- IEBC 2024, Sec. 104.11
- IFC 2024, Sec. 104.10

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RESEARCH+TECH

Consider alternatives

Code interpretations, modifications and alternatives provide some code compliance flexibility

by Mark S. Graham

Building codes by their nature tend to be relatively restrictive; they limit designs, materials and construction methods to those specifically prescribed in codes and meeting the codes' performance requirements. However, most codes also contain provisions that allow code officials to accept limited, project-specific modifications and alternatives to code requirements.

You should be aware of a code's interpretation, modification and alternative acceptance provisions because these may provide a basis for acceptance of roof system designs and roofing products that do not specifically comply with a code's requirements.

Alternative acceptance

In Chapter 1-Scope and Administration of the *International Building Code,® 2018 Edition*, Section 104-Duties and Powers of Building Official grants a code official the authority to enforce the code, render interpretations and adopt procedures to clarify the code's provisions. Such interpretations and procedures are not intended to waive code requirements.

Section 104.10-Modifications gives a code official authority to

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Code compliance is becoming increasingly challenging and presents significant liability risks

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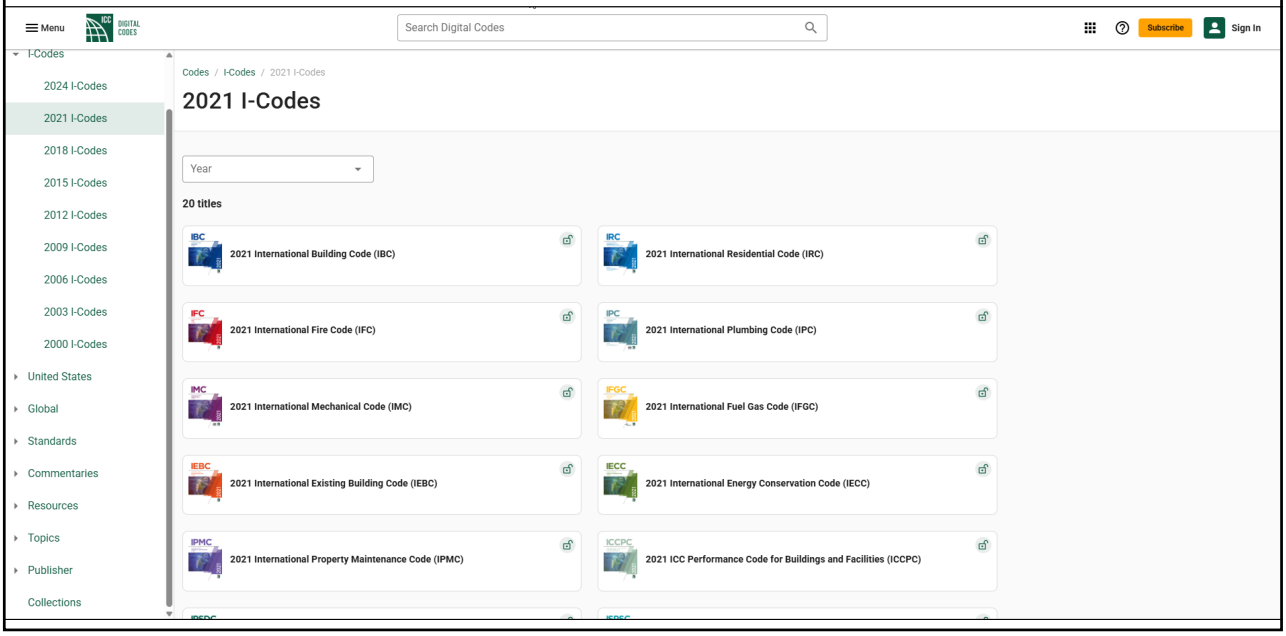
The I-codes are available online… and they're free

codes.iccsafe.org



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Closing thoughts

- Beware of the code(s) and specific editions that apply
- Beware of local amendments
- Work collaboratively with the AHJ/code official

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Questions

Codes and standards

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