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The Roofing Specific Codes—A Look Ahead

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***International Building Code,
2012 Edition (IBC 2012)***



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ICC's code development process

For publication of the 2015 I-codes

- 2012 – Group A
 - IBC, IFGC, IMC, IPC and IPSDC
- 2013 – Group B
 - IRC, IECC, IFC, ICCPC, IEBC, IPMC, ISPSC, IWUIC, IZC and Admin
- 2014 – Group C
 - IgCC



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Significant roofing-related code changes

International Building Code, 2015 Edition

Ch. 12-Interior Environment:

- Attic ventilation requirements clarified
- Unvented attic provisions added



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Significant roofing-related code changes

International Building Code, 2015 Edition

Ch. 15-Roof Assemblies and Rooftop Structures:

- Asphalt shingle wind resistance moved to Sec. 1504
- Asphalt shingle classification tables combined
- Drip edge requirements revised



Significant roofing-related code changes

International Building Code, 2015 Edition

**TABLE 1504.1.1
CLASSIFICATION FOR ASPHALT SHINGLES**

Maximum Basic Wind Speed, V_{ult} from Figure 1609 A, B or C or ASCE 7	Maximum Basic Wind Speed, V_{asd} from Table 1609.3.1	ASTM D7158 ^a Shingle Classification	ASTM D3161 Shingle Classification
110	85	D, G or H	A, D or F
116	90	D, G or H	A, D or F
129	100	G or H	A, D or F
142	110	G or H	F
155	120	G or H	F
168	130	H	F
181	140	H	F
194	150	H	F

^a The standard calculations contained in ASTM D7158 assume exposure category B or C and a building height of 60 feet or less. Additional calculations are required for conditions outside of the assumptions.

Significant roofing-related code changes

International Building Code, 2015 Edition

1507.2.9.3 Drip edge. A drip edge shall be provided at eaves and rake edges of shingle roofs. Adjacent segments of drip edge shall be lapped a minimum of 2 inches (51 mm). The vertical leg of drip edges shall be a minimum of 1-1/2 inches (38 mm) in width and extend a minimum of 1/4 inch (6.4 mm) below sheathing. The drip edge shall extend back on the roof a minimum of 2 inches (51 mm). Underlayment shall be installed over drip edges along eaves. Drip edges shall be installed over underlayment along rake edges. Drip edges shall be mechanically fastened a maximum of 12 inches (305 mm) o.c.



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Significant roofing-related code changes

International Building Code, 2015 Edition

Ch. 15-Roof Assemblies and Rooftop Structures:

- Wind requirements for metal panel roofs clarified
- Aluminum roof panels can be designed using ADM1
- Slate roofs exempted from fire testing
- BIPV and Rack-mounted PV requirements clarified
- Compatibility of materials requirement omitted
- Requirements for radiant barriers added
- IPC-upgrade exemption added for reroofing



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Significant roofing-related code changes

International Building Code, 2015 Edition

Ch. 34-Existing Structures:

- Move to IEBC



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2013 – Group B

Proposed revisions for 2015 Editions

International Residential Code:

- Coordinate language in IRC Ch. 9 with IBC Ch. 15
- Coordinate rooftop PV requirements with Ch. M23
- Clarify fire classification requirements

International Energy Conservation Code:

- Clarify R-values for tapered insulation systems
- Clarify double-layer insulation requirement
- Exclude air barrier requirement in reroofing




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2014 – Group C
Proposed revisions for 2015 Editions

International Green Construction Code




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Summary

- IBC 2015 relatively minor changes
- IRC 2015 expect relatively minor changes
- IECC 2015 expect additional R-value increases
- IgCC 2015 -?-



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Questions?



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FM Approvals' revision of FM 4470

- FM 4470 provides the basis for FM's classification of roof assemblies (e.g., 1-60, 1-90)
- Previous edition dated 1992 (April 1986)
- New edition published in June 2012 with an effective date of January 1, 2013



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Code requirements

IBC 2006 and previous editions

1504.3.1 Other roof systems. Roof systems with built-up, modified bitumen, fully adhered or mechanically attached single ply, through fastened metal panels and other types of membrane roof coverings shall also be tested in accordance with FM 4450, FM 4470, UL 580 or UL 1897



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Code requirements

IBC 2009 and IBC 2012

1504.3.1 Other roof systems. Roof systems with built-up, modified bitumen, fully adhered or mechanically attached single ply, through fastened metal panels and other types of membrane roof coverings shall also be tested in accordance with FM 4474, UL 580 or UL 1897



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Revisions to FM 4470

June 2012

- Adds NFPA 276
- Changes conditions of acceptance for wind uplift and hail damage resistance testing
- Adds alternative test methods for fastener corrosion resistance
- Changes to methods on how steel roof decks are evaluated
- Adds optional tests for dynamic puncture resistance, noncombustible core insulation and solar reflectance



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Revisions to FM 4470

Evaluation of steel roof decks

- Allowable stresses per AISI S100
- Deflection based upon 200 lb. point load
- Deck design based upon 0.7-mm-thick (< 22 ga.)
- Fasteners tested for “pull over” of the deck material
- Stress calcs. on decks and fastener heads; lower value controls



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Effective date

FM 4470, Section 1.6

- Effective date is December 31, 2012
- “...Products FM Approved under a previous edition shall comply with the new version by the effective date or else forfeit Approval...”



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So, what does all this mean?

- FM has re-evaluated pre-12/31/12 classifications:
 - Reduce deck span, increase deck thickness and/or grade (33 ksi to 80 ksi) to maintain wind rating and existing RoofNav number
 - Re-evaluate assemblies, lower wind rating and create a new RoofNav number
- FM classifications likely have changed



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Example

Sika Sarnafil Roofing Technical Bulletin #08-12, dated December 19, 2012

System description:

S327 membrane, 9' 6" row spacing, attached with XP/XPN fasteners at 6" o.c. to 22 ga. steel roof deck

Pre-12/31/12 wind rating:

120 psf

New wind ratings:

- 90 psf using 80 ksi steel deck
- 90 psf using 22 ga., 33 ksi steel deck and 6' membrane row spacing



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Suggestions

- Be careful!
- Work closely with manufacturers
- For current projects, notify and seek clarification from A/E/C, GC/CMs and/or building owners.



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Professional Roofing, January 2013

Tech Today column, page 12



Changes reduce some FM classifications

FM 4470 has been revised, resulting in different uplift resistance criteria

by Mark S. Graham

FM Approvals has revised its criteria for determining the uplift resistance of membrane and liquid applied roof assemblies. Because many roofing professionals rely on FM Approval classifications when specifying and specifying low-slope roof assemblies, they should be aware of the change and its effect on specific roof assembly classifications.

FM 4470

FM 4470, "Approved Standard for Single-Ply Polymer Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class I and Noncombustible Roof Deck Construction," is the basis for FM Approval determination of 1.6k, 1.8k, 1.2k, etc., classifications used for low-slope membrane and liquid applied roof assemblies. In June 2012, FM Approvals revised FM 4470 to the effective date of the new standard was Dec. 31, 2012. The revisions include adding 107% "Standard Method for Five-Year Determination of the Rate of Return Rate or Shading, Investment with Constant Monthly Money-Back Paying Component," as a determinant of the rate of return for wind uplift and hail damage resistance testing and adding an alternative test method for determining inherent corrosion resistance.

One of the more significant changes to FM 4470 is how roof and deck are evaluated. With the revised standard, roof and deck cannot exceed the allowable stresses provided for in ANSI 1.305, "North American Specification for the Design of Cold Formed Steel Structural Members." The maximum allowable deflection for roof decks is based on 200-pound point load, previously a 200-pound point load was used. Also, minimum designs of roof decks now are based on

a minimum 0.7 mm-thick (lightly less than 22 gauge), 15-ksi yield strength steel. Previously, minimum 0.75 mm-thick (22 gauge) steel complying with the ASTM International specification was used for evaluation.

The method of analyzing attachment of roof decks also has been revised. Deck fasteners are no longer for fastener "pull-out" pull strength of the deck material. Also, stress calculations are performed on both roof decks and fastener heads, and the lower of the two values is used as the basis for classification.

FM 4470 also now includes additional provisions allowing for optional testing for dynamic pressure resistance of roof connections and solar reflectance of roof surfaces.

All products tested after Dec. 31, 2012, are required to satisfy the new standard's requirements. Products FM Approvals already approved under previous editions of FM 4470 also need to comply with the current edition by the effective date of the classification.

What this means

If a specific classified assembly results in an increased roof and deck, FM Approvals has gone back to the manufacturer to determine if the manufacturer's permit is complete for the deck stresses or reduced the assembly's wind rating to a level where the deck no longer is overstressed. Assembly manufacturers likely changed include reducing the deck span and/or increasing the deck roof thickness and/or yield strength (less 15 ksi to 80 ksi). For assemblies where the wind rating has

been reduced, the assembled previous Roof/Nor members have been withdrawn and new Roof/Nor members need to avoid confusion.

If you use the new version of FM 4470 for an allowed roof assembly applied to a 1 1/2-inch-thick, 22-gauge steel deck at a 6-foot maximum span, FM Approvals has indicated maximum classifications are based on 1.16k when using a 15-ksi steel deck and 1.30k when using an 80-ksi steel deck. For mechanically attached single-ply membrane assemblies, classifications will vary based on assembly parameters and span. The new span rating, but generally, classifications will be noticeably lower than with FM 4470's previous version.

All products tested after Dec. 31, 2012, are required to satisfy the new standard's requirements

Proceed cautiously

Roof system designers and specifiers need to be aware of FM 4470's revision and its effect on assembly parameters, span ratings and Roof/Nor members for membrane and liquid applied roof assemblies using steel roof decks.

For roofing projects designed before the implementation date but that will be installed after the implementation date, classification needs to be sought regarding which version of FM 4470 applies. If the current version applies, changes to the roof assembly specifications may be necessary and affect a project's cost.

Encourage roof system designers and specifiers and roofing contractors to work closely with manufacturers when determining changes to specific assembly parameters, span ratings and Roof/Nor members. ■■■

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Questions?





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