



Fall Education Seminar

October 7, 2021

Technical issue update

presented by

Mark S. Graham

Vice President, Technical Services
National Roofing Contractors Association (NRCA)



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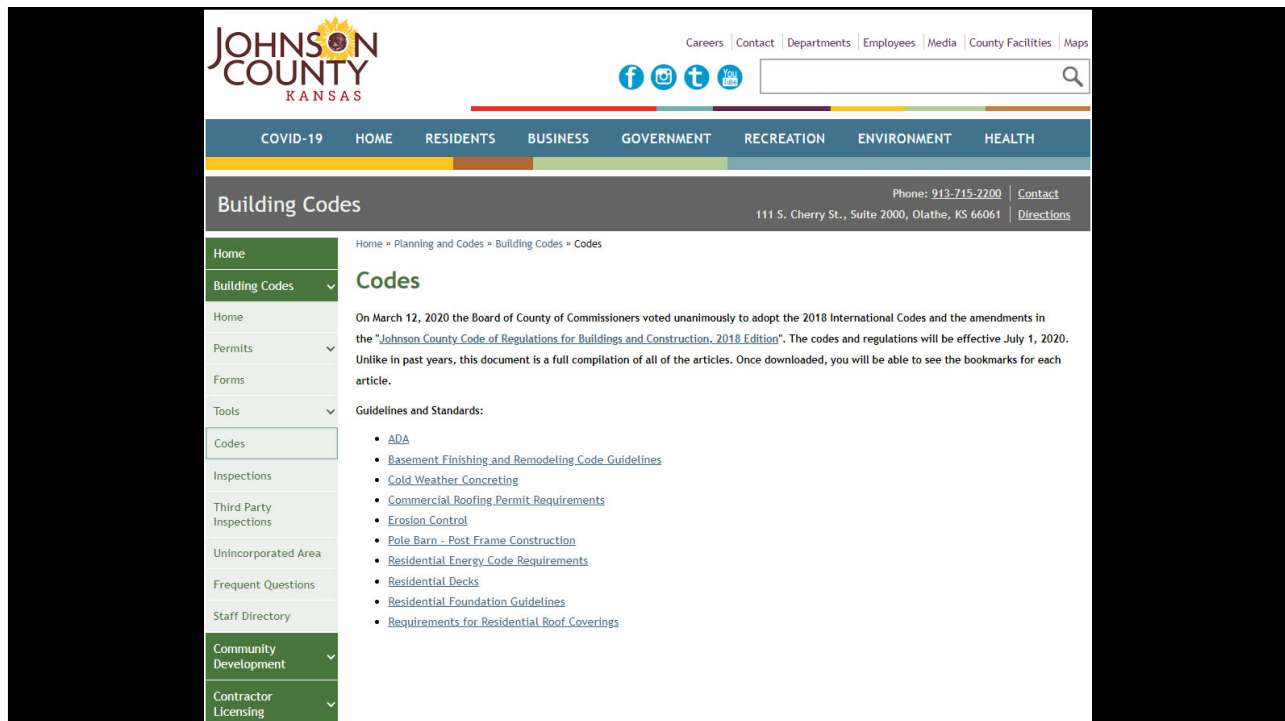
Topics

- Johnson County adoption of 2018 I-codes
- Roofing-related changes in 2021 I-codes
- Steep-slope roofing issues
- FM Global-insured roofing projects
- Questions... and other topics

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Online Permitting

Johnson County Planning & Building Codes is excited to announce the launch of MyGovernmentOnline Permitting and Inspections software. The new software will enhance the application submittal, plan review and inspection experience for contractors and residents through convenient online services. **As of January 1, 2020, all building permit applications must be submitted through the customer portal.**

In all, contractors, design professionals, and residents will have the ability to:

- Apply Online for Building Permits and Trade Permits
- Pay Permit Fees Online with Visa and Mastercard
- Submit Plans and Documents “Paperless” in PDF Format
- Track Application Progress up to Permit Issuance or Notice of Approval
- View and Print Copies of Review Comment Letters
- View and Print Copies of “Approved” Building Plans
- Request Inspections Online
- View and Print Completed Inspection Reports
- Receive Real-Time E-mail or Telephone Call Notifications When an Inspection is Completed

Please take the time to review and download a copy of the [MyGovernmentOnline customer portal instruction document](#). You may also create your free customer portal account at your earliest convenience if you do not already have an established account with the MyGovernmentOnline customer portal.

When requesting inspections online, the policy will remain that all inspection request must be received half a day before the scheduled inspection time. Except concrete inspections, are required to be received 2 hours before scheduled time and on the day of concrete pour. Only concrete and homeowner occupied projects will receive set times.

Johnson County Licensed Contractors please be sure to enter your company name exactly as it reads on your license, issued by Johnson County Contractor Licensing.

If further assistance is needed pertaining to the use of the MyGovernmentOnline software, please call the technical support line at 1-866-957-3764, option 1 for assistance.

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Johnson County Commercial Roofing/Re-roofing submittal requirements

- All submittals for commercial roofing or re-roofing shall meet following items. These requirements are in accordance with 2018 IBC, and 2018 IECC. See following items for submittals and inspection for roofing and re-roofing permit for commercial projects. We also perform site inspection during different stage of the project until approval by final inspection.
- All Submittals shall be reviewed, sealed, and signed by a design professional registered in state of Kansas. (Drawings, cut sheet, manufacture specifications, product listing, etc.)
- Description of the work and method of application for new roofing or, re-roofing shall be written clearly in detail for installation and inspection by the jurisdiction.
- Type of the construction and type of the occupancy and minimum roof covering fire classification in accordance with 2018 IBC chapter 15 shall be clarified and verified on the submittals.
- Foam plastic insulation used in roofing assembly shall meet 2018 IBC chapter 26. Also, Insulation R values shall meet 2018 IECC requirements.
- Fire resistance roof construction shall meet 2018 IBC Table 601. (Note: Roof assembly consists of roof deck and roof covering, as defined in 2018 IBC, Definition chapter2)
- Combustible materials shall be permitted in buildings of type I, and II construction per 2018 IBC section 603.
- Proposed roof covering assembly shall be listed and listing design # by UL, FM, or any other approved agency shall be part of the submittals.
- All individual membrane in the roof covering assembly shall be listed and approved individually, by any approved agency (UL, FM, etc.)
- Contractors may not create their own custom roof assembly using various individual component materials of their own choosing. Contractors may only submit full assemblies approved by UL, FM, or similar authorities for review and approval by a design professional registered in the State of KS. Final, sealed, submissions are then transmitted to the Johnson County Planning and Codes Office for final review and approval before roof construction begins.

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Last year's presentation



Fall Education Seminar
October 8, 2020

Code and technical issues update

presented by

Mark S. Graham
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[Link](#)

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Roofing-related changes in the 2021 I-codes

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Edge metal testing

Changes in IBC 2021, Section 1504-Performance Requirements

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 having a slope less than 2 units vertical in 12 units horizontal (2:12) 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 design *wind speed*, *V*, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.

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Gutter testing

Changes in IBC 2021, Section 1504-Performance Requirements

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 having a slope less than 2 units vertical in 12 units horizontal (2:12) 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 design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(12) 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 (less than 2:12 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.

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ANSI/SPRI GT-1

ANSI/SPRI GT-1
Test Standard for Gutter Systems
Approved May 28, 2016

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SPRI Test Method 2

SPRI Test Method 2

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Figure 2. Test Set-up for SPRI Test G-1

Figure 3. Test Set-up for SPRI Test G-2

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Suite 201
Hulltown, IA 52032
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Disclaimer:
This standard is for use by architects, engineers, roofing contractors and building owners when designing, installing or evaluating a building's gutter system. SPRI, its members and employees do not warrant that this standard is proper and/or applicable under all conditions.

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Roof zones

Changes in IBC 2021, Section 1603-Construction Documents

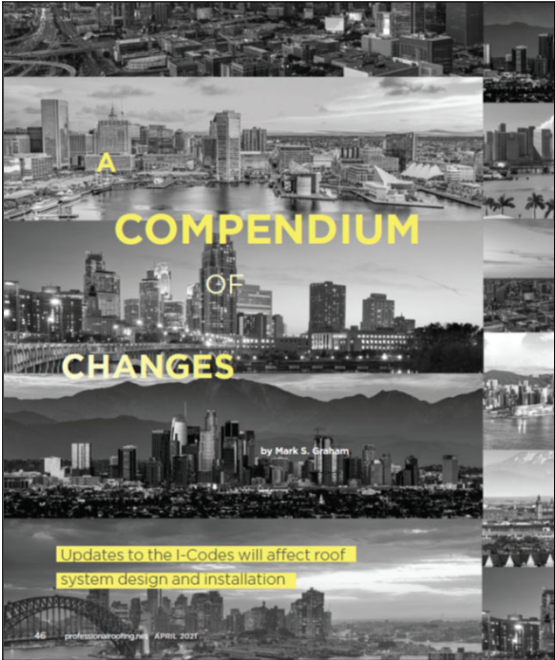
CHAPTER 16
STRUCTURAL DESIGN

1603.1.4 Wind design data. The following information related to wind *loads* shall be shown, regardless of whether wind *loads* govern the design of the lateral force-resisting system of the structure:

1. Basic design *wind speed*, V , miles per hour and *allowable stress design wind speed*, V_{asd} , as determined in accordance with Section 1609.3.1.
2. *Risk category*.
3. Wind exposure. Applicable wind direction if more than one wind exposure is utilized.
4. Applicable internal pressure coefficient.
5. Design wind pressures and their applicable zones with dimensions to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, pounds per square foot (kN/m²).

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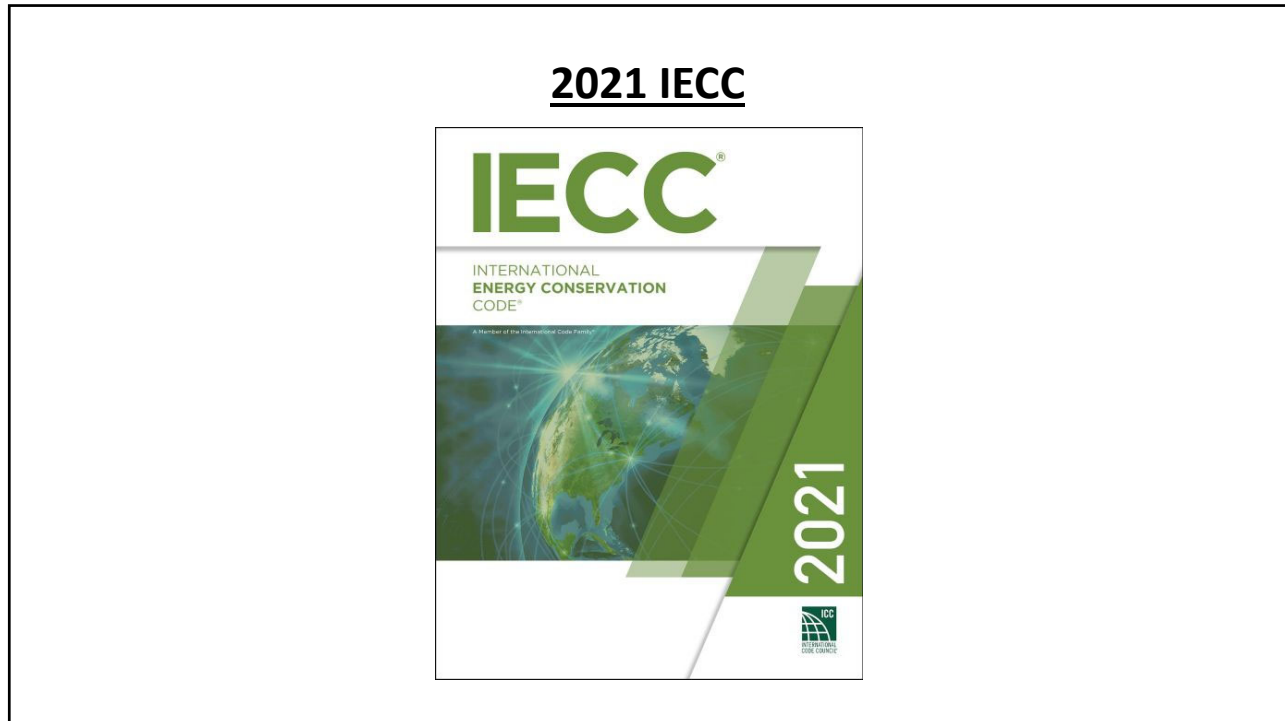
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April 2021

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2021 IECC Commercial – Tapered insulation

C402.2 Thermal resistance of cold-formed steel walls. C-factor of each cold-formed steel stud shall be permitted to be determined in accordance with Equation 4.1:

$$U = 1/R + (ZF) \quad \text{Equation 4.1}$$

where:

- R = The cumulative R-value of the wall components along the path of heat transfer, excluding the cavity insulation and steel stud.
- ZF = The effective R-value of the cavity insulation with steel studs as specified in Table C402.1.4.2.

NOMINAL STUD SPACING (inches)	SPACING OF STUDS (inches)	GAFFY AVERAGE (inches)	CORRECTION FACTOR (F)	EFFECTIVE R-VALUE (R-value)
F ₁	16	13	0.48	3.98
	24	13	0.42	4.40
F ₂	16	13	0.32	3.60
	24	13	0.27	3.93
6	16	13	0.35	3.25
	24	13	0.45	3.55
x	16	13	0.40	3.50
	24	13	0.35	3.75

COMMERCIAL ENERGY EFFICIENCY

C402.2 Specific building thermal envelope insulation requirements. Insulation in *building thermal envelope* opaque assemblies shall comply with Sections C402.2.1 through C402.2.7 and Table C402.1.3.

C402.2.1 Roof assembly. The minimum thermal resistance (R-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly.

C402.2.2 Thermal resistance of cold-formed steel walls. C-factor of each cold-formed steel stud shall be permitted to be determined in accordance with Equation 4.1:

$$U = 1/R + (ZF) \quad \text{Equation 4.1}$$

where:

- R = The cumulative R-value of the wall components along the path of heat transfer, excluding the cavity insulation and steel stud.
- ZF = The effective R-value of the cavity insulation with steel studs as specified in Table C402.1.4.2.

TABLE C402.1.4.2 EFFECTIVE R-VALUES FOR STEEL STUD WALL ASSEMBLIES

NOMINAL STUD SPACING (inches)	SPACING OF STUDS (inches)	GAFFY AVERAGE (inches)	CORRECTION FACTOR (F)	EFFECTIVE R-VALUE (R-value)
F ₁	16	13	0.48	3.98
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	24	13	0.27	3.93
6	16	13	0.35	3.25
	24	13	0.45	3.55
x	16	13	0.40	3.50
	24	13	0.35	3.75

COMMERCIAL ENERGY EFFICIENCY

FI Def = FI Proposed - FI Table
 FI Proposed = Proposed F-factor × Finesture length
 FI Table = (F-factor specified in Table C402.1.4) × Finesture length
 C = Sum of the (CA, Df) values for each distinct below-grade wall assembly type of the building thermal envelope.
 CA Def = CA Proposed - CA Table
 CA Proposed = Proposed C-value × Area
 CA Table = Observed allowable C-factor specified in Table C402.1.4 × Area

When the proposed vertical glazing area is less than or equal to the maximum vertical glazing area allowed by Section C402.1.1, the value of D (Excess Vertical Glazing Value) shall be zero. Otherwise:

$$D = (GA + UV) - (DA + U \text{ Wall}), \text{ but not less than zero.}$$

DA = (Proposed Vertical Glazing Area) × (Observed Glazing Area allowed by Section C402.1.1)

U Wall = Sum of the (UA Proposed) values for each opaque assembly of the exterior wall.

U Wall = Area-weighted average U-value of all above-grade wall assemblies.

UAV = Sum of the (UA Proposed) values for each vertical glazing assembly.

UV = UAV/total vertical glazing area.

When the proposed skylight area is less than or equal to the skylight area allowed by Section C402.1.1, the value of E (Excess Skylight Value) shall be zero. Otherwise:

$$E = (EA + US) - (SA + U \text{ Roof}), \text{ but not less than zero.}$$

EA = (Proposed Skylight Area) × (Allowable Skylight Area as specified in Section C402.1.1)

U Roof = Area-weighted average U-value of all roof assemblies.

UAS = Sum of the (UA Proposed) values for each skylight assembly.

US = (EA + US) - (SA + U Roof), but not less than zero.

C402.2 Specific building thermal envelope insulation requirements. Insulation in *building thermal envelope* opaque assemblies shall comply with Sections C402.2.1 through C402.2.7 and Table C402.1.3.

C402.2.1 Roof assembly. The minimum thermal resistance (R-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly.

Prescriptive approach

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**TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD***

CLIMATE ZONE	0 AND 1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs																
Insulation entirely above roof deck	R-20ci	R-25ci	R-25ci	R-25ci	R-25ci	R-25ci	R-30ci	R-30ci	R-30ci	R-30ci	R-30ci	R-30ci	R-35ci	R-35ci	R-35ci	R-35ci
Metal buildings ^b	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-25 + R-11 LS	R-30 + R-11 LS	R-30 + R-11 LS	R-25 + R-11 + R-11 LS	R-25 + R-11 + R-11 LS
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	R-49	R-49	R-49	R-49	R-49	R-49	R-60	R-60	R-60	R-60
Walls, below grade																
Floors																
Slab-on-grade floors																

(Note: The table content is truncated for brevity in this summary.)

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2021 IECC Commercial – Tapered insulation

C402.2.1.1 Tapered, above-deck insulation based on thickness. Where used as a component of a roof/ceiling assembly R-value calculation, the sloped roof insulation R-value contribution to that calculation shall use the average thickness in inches (mm) along with the material R-value-per-inch (per-mm) solely for R-value compliance as prescribed in Section 402.1.3.

C402.2.1.2 Minimum thickness, lowest point. The minimum thickness of above-deck roof insulation at its lowest point, gutter edge, roof drain or scupper, shall be not less than 1 inch (25 mm).

C402.2.1.3 Suspended ceilings. Insulation installed on suspended ceilings having removable ceiling tiles shall not be considered part of the minimum thermal resistance (R-value) of roof insulation in roof/ceiling construction.

C402.2.1.4 Joints staggered. Continuous insulation board shall be installed in not less than two layers and the edge joints between each layer of insulation shall be staggered, except where insulation tapers to the roof deck at a gutter edge, roof drain or scupper.

C402.2.3 Floors, R-value, or assembly: over or below slabs.

“...average thickness...”

“...not less than 1 inch...”

C44
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Be aware whether and, if so, when your state and local jurisdictions will be adopting the 2021 I-codes

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Steep-slope roofing issues

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RESEARCH+TECH



Know your steep-slope roof decks

Following plywood and OSB installation guidelines can help ensure a successful roof system performance

by Mark S. Graham

22 professionalroofing.net DECEMBER/JANUARY 2020-21

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December/January 2020-21

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Standards for wood structural panels

International Residential Code, 2018 Edition

Plywood:

- U.S. Department of Commerce PS-1, “Structural Plywood”
- CSA Group O325, “Construction Sheathing”

Oriented-strand board (OSB):

- U.S. Department of Commerce PS-2, “Performance Standard for Wood-based Structural-use Panels”
- CSA Group O437, “Standards for OSB and Waferboard”

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Common, but not referenced in the Code

Plywood and OSB:

- APA-The Engineered Wood Association Standard PRP-108, “Performance Standards and Policies for Structural-Use Panels”

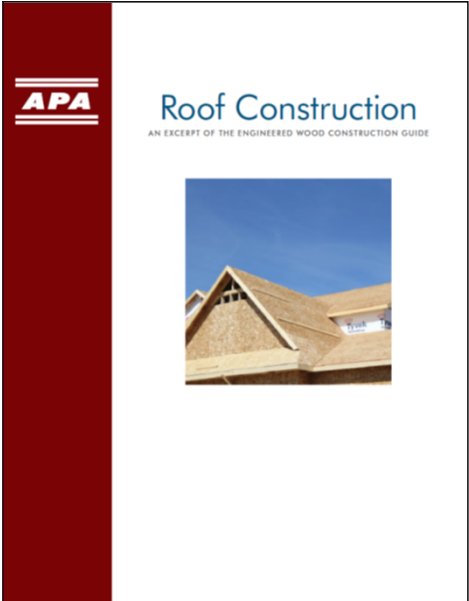
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Roof sheathing attachment

IRC 2018 Table 602.3(1), Rows 30-32 (minimum attachment):

- Panel edges:
 - 2½-inch-long 8d common nails at 6 inches o.c. at supported panel edges
- Intermediate supports:
 - 2½-inch-long 8d common nails at 12 inches o.c. at intermediate supports

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APA Form E30, "Roof Construction"
--Roofing-specific excerpts from APA's *Engineered Wood Construction Guide* (102 pages)

[Link](#)

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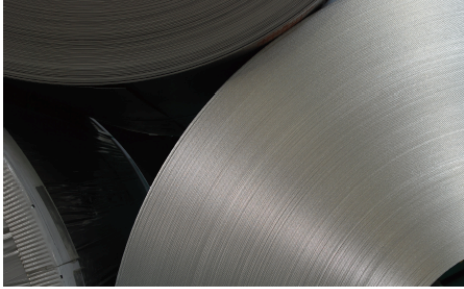
Recommendations
Roof sheathing attachment

- **New construction:**
 - Be careful with deck "acceptance".
 - Deck acceptance should be limited to the visual surface and no visual presence of moisture on the surface

- **Reroofing:**
 - Since deck condition and attachment typically cannot be determined until roof covering tear-off, consider unit price or T & M pricing for deck replacement and/or deck re-fastening

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RESEARCH+TECH



A new standard
Guidelines for synthetic underlayments
by Mark S. Graham

26 professionalroofing.net JULY/AUGUST 2021

Professional Roofing

July/August 2021

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This International Standard has developed in accordance with internationally recognized principles of harmonization established in the Technical Principles for the Development of International Standards, Codes and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D8257/D8257M - 20

Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing¹

This standard is listed under the final designation D8257/D8257M. The number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last approval. A separate number indicates an editorial change since the last revision.

1. Scope

1.1 This specification addresses mechanically attached polymeric roof underlayment used in steep slope roofing.

1.2 The objective of this specification is to provide a finished product that will be used as a water-shedding underlayment layer on steep sloped roofs prior to and after installation of the primary roof covering.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system should be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.4 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.5 This international standard was developed in accordance with internationally recognized principles of standardization established in the Decision on Principles for the Development of International Standards, Codes and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

1.1.1 This specification addresses mechanically attached polymeric roof underlayment used in steep slope roofing.

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2. Referenced Documents

2.1 ASTM Standards²

D1051/D1051M Test Methods for Sampling and Testing Bitumen-Coated Felt and Glass Felt for Roofing and Waterproofing

D2255/D2255M Test Methods for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and

3. Terminology

3.1 Definitions—For definitions of terms used in this specification, refer to Terminology D1077 and G113.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 polymeric roof underlayment—a sheet material primarily composed of polymeric film or a secondary water-shedding layer on steep sloped roofs when installed below the primary roof covering.

4. Workmanship, Finish, and Appearance

4.1 The polymeric roof underlayment shall be supplied in roll form.

4.2 The polymeric roof underlayment shall be uniform in thickness and appearance. It shall be free of visible defects such as holes, rips, or surface edges, marks, cracks, tears, and protruding edges of reinforcement.

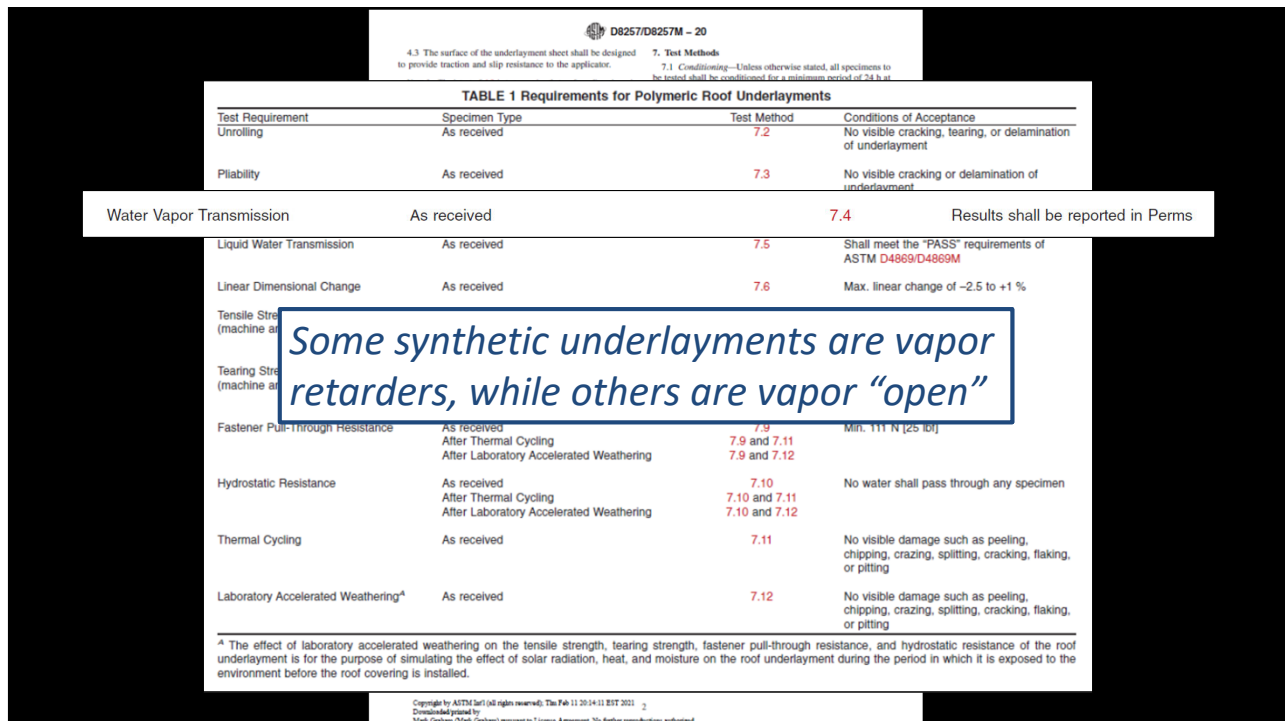
ASTM D8257, “Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing”

Published in December 2020

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Conclusions and recommendations

Synthetic underlayments

- Specify, select and purchase synthetic underlayments based upon ASTM D8257
- Beware of specific products' vapor retarder or vapor "open" characteristics
- ASTM D8257 will first be introduced into IBC 2024 and IRC 2024
 - Until then, code official "acceptance" is still needed

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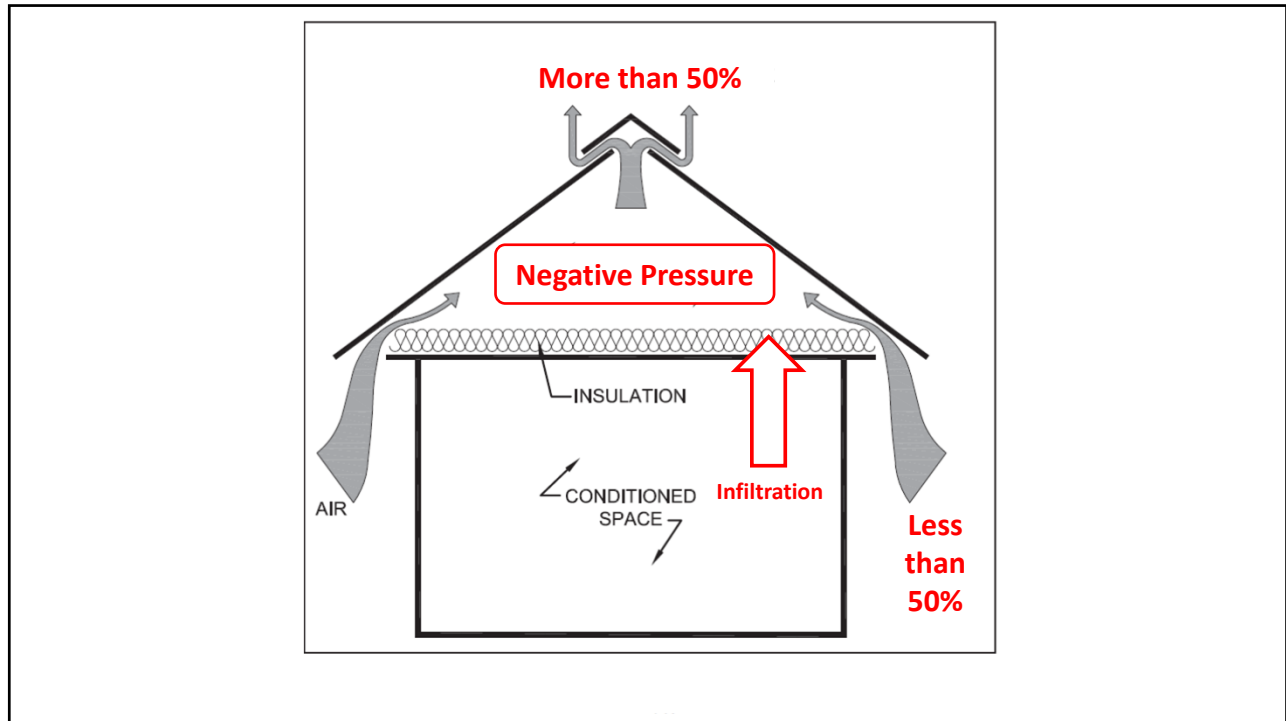


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July 2018

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Be careful not to install excess amounts of ridge vents.... It can have undesirable consequences

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FM Global-insured roofing project process

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CHECKLIST FOR ROOFING SYSTEM			
<small>FM Global OFFICE REVIEW (Please leave blank for FM Global Office Review)</small>			
FM Global OFFICE REVIEW (Please leave blank for FM Global Office Review)			
WIND:			
Design Wind Speed: <input type="text"/>	(mph)	Ground Terrain: <input type="checkbox"/> B	<input type="checkbox"/> C <input type="checkbox"/> D
Uplift Pressure in field: <input type="text"/>	(psf)	Uplift Rating Required: <input type="text"/>	
Adequate Uplift Rating Provided: <input type="text"/>		Adequate? <input type="checkbox"/> Yes	<input type="checkbox"/> No
<small>If standing seam, has collapse been reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No</small>			
COMMENTS: <input style="width: 100%;" type="text"/>			
<small>20688 ENGINEERING (Rev. Oct 2016)</small>			

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Conclusions and recommendations

FM Global-insured roofing project process

- FM Global/FM Approvals is not likely a party to the Contract for roofing work
 - FM Global makes recommendations to their insureds/building owner clients
 - FM Global should not be dictating to the Roofing Contractor
- A FM Global-insured roof assembly is a premium product
 - It is typically (well) above minimum code requirements
- Actively manage roofing projects for FM Global-insured clients

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Questions... and other topics

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