



IRCA Winter Meeting 2020
Cedar Rapids, Iowa -- January 27-28, 2022

Technical issue update

presented by

Mark S. Graham

Vice President, Technical Services
National Roofing Contractors Association

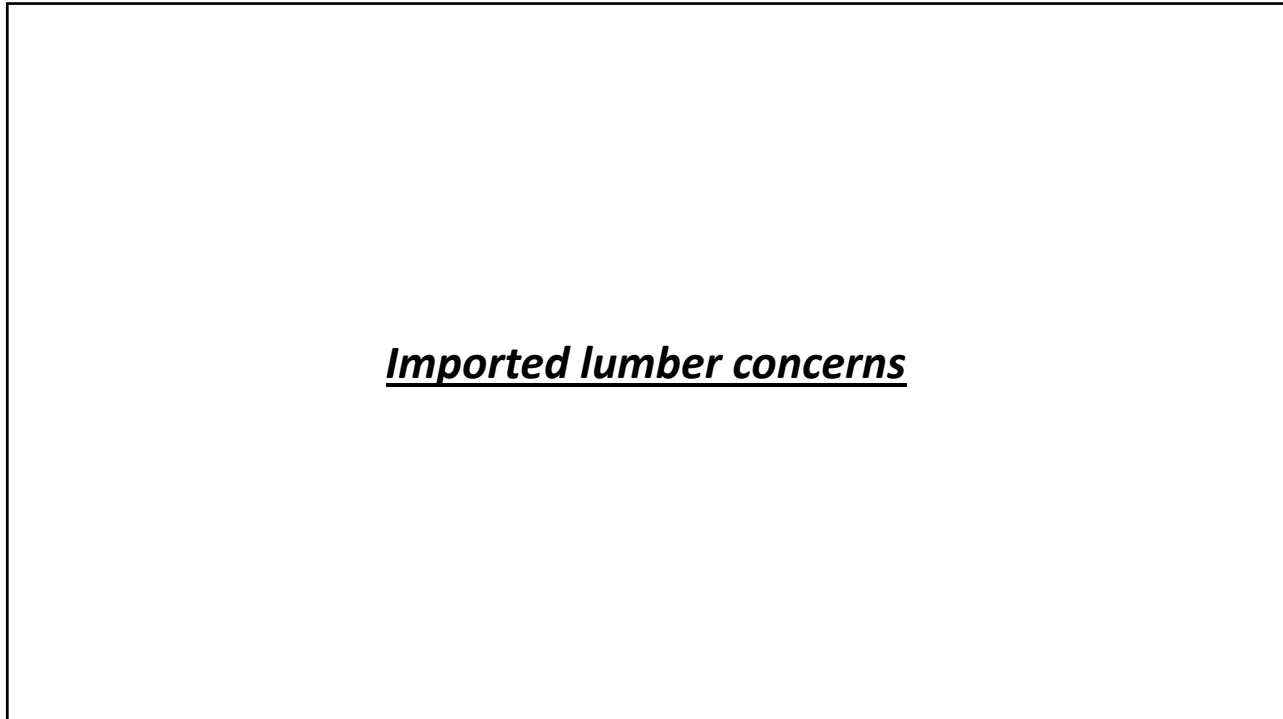


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Topics

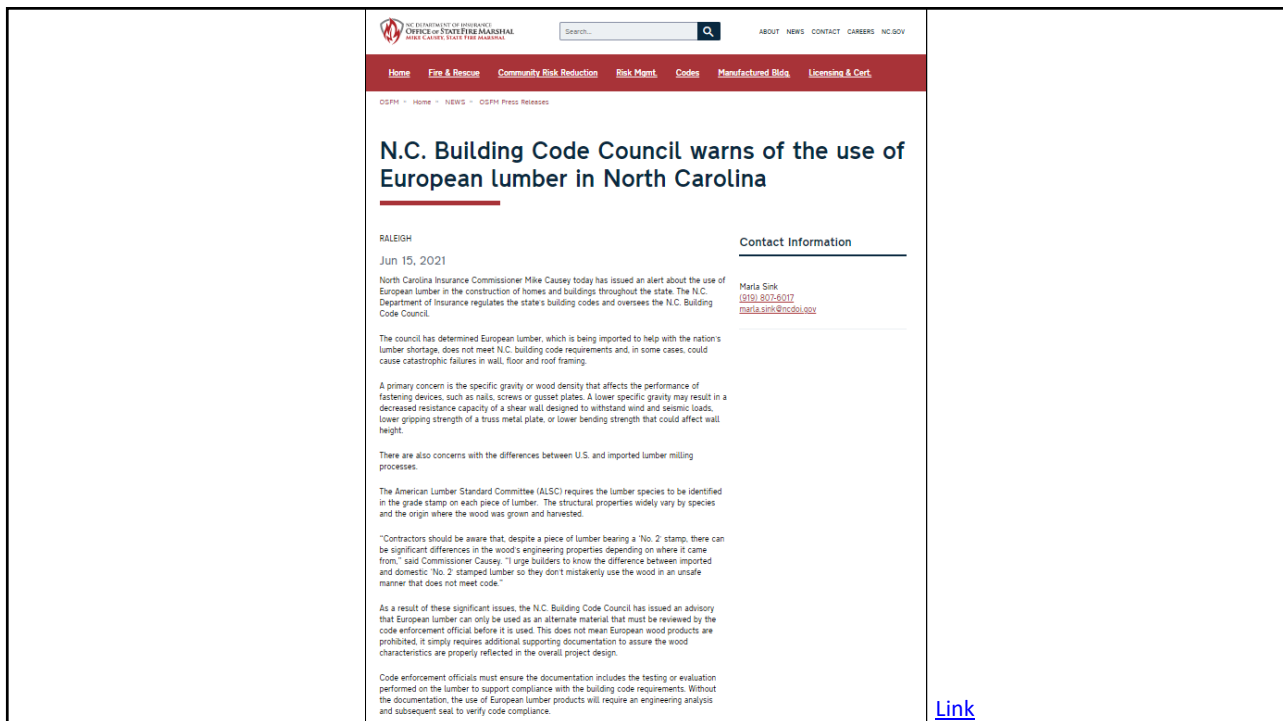
- Imported lumber concerns
- Plywood and OSB roof deck concerns
- Synthetic underlayment
- FM Global-insured roofing projects
- Construction-generated moisture
- Material availability
- Questions... and other topics

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Imported lumber concerns

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Categories

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- Boiler MACT
- Carbon

AWC Response to NCDOI Press Release

Jun 18, 2021

LEESBURG, VA. – On June 11, the North Carolina Department of Insurance (NCDOI) issued a news release warning of the use of European lumber in North Carolina. The news release identified several potential use issues given the building community’s lack of familiarity with European lumber and served to alert suppliers, designers, builders, and regulators that lumber should be used in accordance with applicable codes and standards; however, there were several statements that need to be clarified or corrected. The Pacific Lumber Inspection Bureau has

AWC in the News

- [New Report Aids in Compliance With Sound Transmission Code Provisions](#)
Feb 19, 2019 | *Construction Executive*

Prescriptive provisions in the building codes that cover wood-frame construction are primarily based on the four major commercial species combinations: Douglas Fir-Larch, Hem-Fir, Southern pine, and Spruce-Pine-Fir (SPF) from Canada. These prescriptive provisions provide species- and grade-specific span tables for common loading conditions for the four major species combinations or the requirements are based on the minimum properties for certain grades of the four major species combinations. However, the building code allows the use AWC’s [Span Tables for Joists and Rafters \(STJR\)](#) for other grades and species of lumber and for other loading conditions. The span tables in STJR are species independent and only require the user to know the adjusted design values for the grade and species of lumber. Where European lumber has the same or higher design values than North American lumber, the material can be directly substituted.

High-Wind Regions (ICC 601) or to design the structure in accordance with the loads in ASCE’s Minimum Design

Due to the rapid increase in use of and lack of familiarity with lumber species other than the four major species, prescriptive design provisions for these other species are lagging, but are being developed. The Pacific Lumber Inspection Bureau is working to develop species-specific span tables for use with the prescriptive provisions in the building codes based on the NDS and has already developed exterior wall stud tables in accordance with provisions of the WFCM for use in high wind areas and can be located at the following link: [TR-5-Max-Stud-Length-Tables-for-European-Species-1.pdf \(plib.org\)](#).

[Link](#)

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NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
1202 Mail Service Center, Raleigh, NC 27699-1202
919-647-0000

The Use of Lumber Species not Recognized by the Residential Code

Code: 2018 NC Residential Building Code Date: June 28, 2021
Section: R502.1.1, R502.3, R502.5, R602.2, R802.4, R802.5 Rev. Date: August 9, 2021

Note: This interpretation is currently fluid until more complete information is available.

Question #1:
Can lumber of wood species that are not recognized by the code be used?

Table #1 Species with Specific Gravity less than 0.42

SPECIES	GRADE STAMP NOMENCLATURE	Specific Gravity
ALASKA SPRUCE	AK SPR	0.41
ASPEN	ASPEN	0.39
COTTONWOOD	COT	0.41
EASTERN HEMLOCK-BALSAM FIR	E HEM B FIR	0.36
EASTERN HEMLOCK-TAMARACK	E HEM-TAM	0.41
EASTERN SOFTWOODS	EASTERN SOFTWOODS	0.36
EASTERN WHITE PINE	EW PINE (N)	0.36
NORTHERN SPECIES	N. SPECIES	0.35
NORTHERN WHITE CEDAR	NW CEDAR	0.31
NORWAY SPRUCE ROMANIA & UKRAINE	N SPR (I) ROML UKR	0.38
NORWAY SPRUCE (NORTH)	N SPR	0.4
REDWOOD	REDWOOD	0.37
SPRUCE-PINE-FIR (SOUTH)	SPF(S)	0.36
WESTERN CEDAR	WC	0.36
WESTERN WOODS	WW	0.36

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Element of a Grade Stamp

Mill number

Grading Agency Symbol

Indicates the species or combination of species of lumber.

Photo #2 Lumber Grade Stamp

Lumber is graded based on the quality and appearance of the wood. No. 2 lumber is the most common grade for framing. However, lumber with the same No. 2 grade could have different wood properties.

For species imported from outside North America, the grade stamp will include the designation "(I)", indicating imported".

NORWAY SPRUCE ROMANIA & UKRAINE N SPR (I) ROM; UKR 0.38

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Example:

TP® NO.2
AT00 AS-SCP(I)AUS
KDHT

What is the code allowable span for this European 2x10 floor joist spaced 16 inches on center?

Design Criteria:
10 psf Dead Load
40 psf Live Load (Table R301.5)
Live Load Deflection limit = L/360 (Table R301.7)

From PLIB Simplified Span Tables for Light Frame Construction Imported Species:

Grade	Species and Grade	Member End Use - 10 psf LL, L/360									
		2x4	2x6	2x8	2x10	2x12	3x4	3x6	3x8	3x10	3x12
No. 2	European Spruce, Fir & Pine	10.0	12.0	14.0	16.0	18.0	10.0	12.0	14.0	16.0	18.0
	European Spruce, Fir & Pine - KDHT	10.0	12.0	14.0	16.0	18.0	10.0	12.0	14.0	16.0	18.0
	European Spruce, Fir & Pine - AS-SCP(I)AUS	10.0	12.0	14.0	16.0	18.0	10.0	12.0	14.0	16.0	18.0
	European Spruce, Fir & Pine - TP®	10.0	12.0	14.0	16.0	18.0	10.0	12.0	14.0	16.0	18.0
No. 1	European Spruce, Fir & Pine	12.0	14.0	16.0	18.0	20.0	12.0	14.0	16.0	18.0	20.0
	European Spruce, Fir & Pine - KDHT	12.0	14.0	16.0	18.0	20.0	12.0	14.0	16.0	18.0	20.0
	European Spruce, Fir & Pine - AS-SCP(I)AUS	12.0	14.0	16.0	18.0	20.0	12.0	14.0	16.0	18.0	20.0
	European Spruce, Fir & Pine - TP®	12.0	14.0	16.0	18.0	20.0	12.0	14.0	16.0	18.0	20.0

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Recommendations

Imported lumber

- Beware of imported lumber and its possibly lower properties
- You should not make representations of roof deck's or wood blocking's strengths

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The image shows a snippet from a professional roofing article. At the top left, there is a green bar with the text "RESEARCH+TECH". Below this is a photograph of a warehouse filled with stacks of lumber. To the right of the photo, the article title "Considering substitutions" is followed by a sub-headline "Be aware of potential consequences with product substitution" and the author "by Mark S. Graham". The main text begins with a large "W" and discusses the impact of the COVID-19 pandemic on wood product production and the consequences of substituting European lumber for North American lumber. A "Link" label is positioned at the bottom right of the article snippet.

Professional Roofing

September 2021

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Plywood and OSB roof deck concerns

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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”

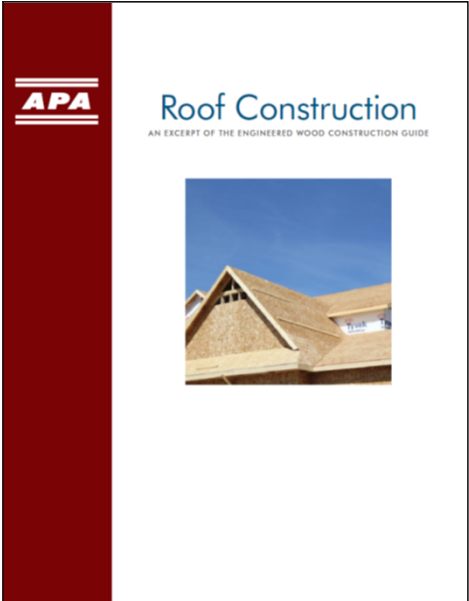
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Roof sheathing attachment

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)

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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
 - Prepare building owners for the need for deck replacement and/or deck reattachment

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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

Plywood or oriented strand board structural panel sheathing are integral components of many steep-slope roof assemblies, and proper use of these products can help ensure successfully performing assemblies. If you use or encounter plywood and/or OSB structural panel sheathing roof decks, it is important to be knowledgeable of the applicable code requirements and APA-The Engineered Wood Association and NIBCA guidelines applicable to them.

IRC 2018

The International Residential Code® provides specific requirements applicable to plywood and OSB structural panel sheathing used as roof decks for one- and two-family dwellings. In IRC's introduction, specific requirements are provided in Section B603 Roof Sheathing.

IRC 2018 requires wood structural panels conform to the Department of Commerce PS-1, "Structural Plywood," or PS-2, "Performance Standard for Wood-based Structural-Use Panels," or CSA Group™'s ODS, "Construction Sheathing," or ODS, "Standards on OSB and Waferboard." PS-1 and ODS generally are required to apply to plywood, and PS-2 and ODS apply to OSB.

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Synthetic underlayment

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Understanding underlayments
Some roofing underlayment products may not be code-compliant

If use of a nonasphaltic or synthetic underlayment product is being considered for a specific project, code acceptance can be sought by making a specific request to the authority having jurisdiction (AHJ). AHJs typically will request an evaluation report, such as those provided by ICC Evaluation Service or Underwriters Laboratories Inc. AHJs may grant code acceptance for alternative underlayment products on a project-by-project basis and typically not a blanket acceptance applying to all future projects in a specific jurisdiction.

Professional Roofing
December 2016

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This international standard has developed in accordance with internationally recognized principles as administered according to 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. Its 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 approval cycle indicates an editorial change since the last revision or approval.

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 limited 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 shall 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 on 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.

Keywords Used in Roofing and Waterproofing

D051 Test Methods for Coated Fabrics

D1075 Terminology Relating to Roofing and Waterproofing

D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

D4533/D4533M Test Method for Triaxonal Tearing Strength of Coatings

D570/D470M Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Dewax-Acc Method)

D6041/D6041M Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing

D6050 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

D6050/D6050M Test Methods for Water Vapor Transmission of Materials

F400 Specification for Drive Fasteners: Nails, Spikes, and Staples

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G157 Practice for Operating X-ray Air Light Apparatus for Exposure of Non-Metallic Materials

2. Referenced Documents

2.1 ASTM Standards²

D1402/D1402M Test Methods for Sampling and Testing Bitumen-Saturated Felt and Glass Fabrics for Roofing and Waterproofing

D2032/D2032M 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 D1075 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 as 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, breaks, cracks, tears, and protruding edges of reinforcement.

¹This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.02 on Felt, Roofing Felt, and Membranes.

Current edition approved Dec. 15, 2020. Published December 2020. DOI: 10.1520/D8257-20(2.00).

This international standard was developed in accordance with internationally recognized principles on 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.

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

Published in December 2020

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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.

Shingles Used in Roofing and Waterproofing

D751 Test Methods for Coated Fabrics

D1079 Terminology Relating to Roofing and Waterproofing

D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

D4533/D4533M Test Method for Trapezoid Tearing Strength of Geotextiles

D4798/D4798M Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method)

D4869/D4869M Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing

D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

E96/E96M Test Methods for Water Vapor Transmission of Materials

F1667 Specification for Driven Fasteners: Nails, Spikes, and Staples

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

2. Referenced Documents

2.1 ASTM Standards²

D1460/D1460M Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing

D2262/D2262M 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 Terminologies D1079 and G113.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *polymeric roof underlayment*—a sheet material primarily composed of polymers for use as a secondary water-shedding layer on steep sloped roofs when installed below the primary roof covering.

3.2.2 *workmanship, finish, and appearance*

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4.3 The surface of the underlayment sheet shall be designed to provide traction and slip resistance to the applicator.

7. Test Methods

7.1 Conditioning—Unless otherwise stated, all specimens to be tested shall be conditioned for a minimum period of 24 h at

TABLE 1 Requirements for Polymeric Roof Underlayments

Test Requirement	Specimen Type	Test Method	Conditions of Acceptance
Unrolling	As received	7.2	No visible cracking, tearing, or delamination of underlayment
Pliability	As received	7.3	No visible cracking or delamination of underlayment
Water Vapor Transmission	As received	7.4	Results shall be reported in Perms
Liquid Water Transmission	As received	7.5	Shall meet the "PASS" requirements of ASTM D4869/D4869M
Linear Dimensional Change	As received	7.6	Max. linear change of -2.5 to +1 %
Tensile Strength (machine and cross-machine direction)	As received After Thermal Cycling After Laboratory Accelerated Weathering	7.7 7.7 and 7.11 7.7 and 7.12	Min. 3.5 kN/m [20 lbf/in.]
Tearing Strength (machine and cross-machine direction)	As received After Thermal Cycling After Laboratory Accelerated Weathering	7.8 7.8 and 7.11 7.8 and 7.12	Min. 67 N [15 lbf]
Fastener Pull-Through Resistance	As received After Thermal Cycling After Laboratory Accelerated Weathering	7.9 7.9 and 7.11 7.9 and 7.12	Min. 111 N [25 lbf]
Hydrostatic Resistance	As received After Thermal Cycling After Laboratory Accelerated Weathering	7.10 7.10 and 7.11 7.10 and 7.12	No water shall pass through any specimen
Thermal Cycling	As received	7.11	No visible damage such as peeling, chipping, crazing, spitting, cracking, flaking, or pitting
Laboratory Accelerated Weathering ⁴	As received	7.12	No visible damage such as peeling, chipping, crazing, spitting, cracking, flaking, or pitting

⁴ The effect of laboratory accelerated weathering on the tensile strength, tearing strength, fastener pull-through resistance, and hydrostatic resistance of the roof underlayment is for the purpose of simulating the effect of solar radiation, heat, and moisture on the roof underlayment during the period in which it is exposed to the environment before the roof covering is installed.

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4.3 The surface of the underlayment sheet shall be designed to provide traction and slip resistance to the applicator. **7. Test Methods**
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Liquid Water Transmission	As received	7.5	Shall meet the "PASS" requirements of ASTM D4869/D4869M
Linear Dimensional Change	As received	7.6	Max. linear change of -2.5 to +1 %
Tensile Strength (machine as received)	As received	7.9	Min. 111 N (25 lbf)
Tearing Strength (machine as received)	As received	7.9 and 7.11	
Fastener Pull-Through Resistance	As received	7.9 and 7.11	
	After Thermal Cycling	7.9 and 7.12	
	After Laboratory Accelerated Weathering	7.9 and 7.12	
Hydrostatic Resistance	As received	7.10	No water shall pass through any specimen
	After Thermal Cycling	7.10 and 7.11	
	After Laboratory Accelerated Weathering	7.10 and 7.12	
Thermal Cycling	As received	7.11	No visible damage such as peeling, chipping, crazing, spitting, cracking, flaking, or pitting
Laboratory Accelerated Weathering ^a	As received	7.12	No visible damage such as peeling, chipping, crazing, spitting, cracking, flaking, or pitting

^a The effect of laboratory accelerated weathering on the tensile strength, tearing strength, fastener pull-through resistance, and hydrostatic resistance of the roof underlayment is for the purpose of simulating the effect of solar radiation, heat, and moisture on the roof underlayment during the period in which it is exposed to the environment before the roof covering is installed.

Some synthetic underlayments are vapor retarders, while others are vapor "open"

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Where would a "breathable" underlayment be preferred over a "non-breathable" underlayment?


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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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RESEARCH+TECH

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

After more than eight years in development, in December 2020 ASTM International published the first U.S. product standard applicable to synthetic, steep-slope underlayment products. If you are involved with the design or installation of steep-slope roof systems, I encourage you to become familiar with this standard and begin to use it when specifying and procuring steep-slope underlayment products.

ASTM D8257
ASTM D8257, "Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep-Slope Roofing," addresses mechanically attached synthetic underlayment used in steep-slope roofing systems.

The standard defines polymeric underlayment as a sheet material primarily composed of polymers for use as a secondary water-shedding layer on steep-slope roofs when installed below a primary roof covering. The standard's objective is to provide a finished product that will be used as a water-shedding underlayment layer before and after the installation of a primary steep-slope roof covering.

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FM Global-insured roofing project process

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<p>CHECKLIST FOR ROOFING SYSTEM</p> <p>FM Global Client: submit completed form and completed Roof/av Co</p> <p>CONTACT INFORMATION: FM GL</p> <p>ROOFING CONTRACTOR (NAME, ADDRESS, PROJECT NO.) TE</p> <p>CLIENT SITE (NAME & ADDRESS) TE</p> <hr/> <p>OVERVIEW OF WORK: (Submit 1 form per roof area)</p> <p>Building Name & Number (provide building diagram as appropriate)</p> <p>Type of Work: <input type="checkbox"/> New Construction <input type="checkbox"/> Recover (New roof over existing)</p> <p><input type="checkbox"/> Reroof (New over/replace existing roofing system)</p> <p>Building Dimensions: Length: _____ ft. Width: _____ ft.</p> <p>Roof Slope: _____ in. per ft. / degrees</p> <p>Parapet Height: max. in./ft. _____</p> <p>Roof Zone Width (Dimension): Zone 1: _____ Zone 2: _____</p> <p>FM Approved Roof/Nav Assembly Numbers (provide Assembly Num)</p> <p>Refer to FM Global Property Loss Prevention Data Sheet 1-28, W1 dimensions.</p> <p>ROOF SURFACING:</p> <p><input type="checkbox"/> Type: _____ (Trade Name/Application Rate)</p> <p><input type="checkbox"/> Coating: _____ (Trade Name/Application Rate)</p> <p><input type="checkbox"/> Granules: _____ (Application Rate)</p> <p><input type="checkbox"/> Cracking: _____ (Application Rate)</p> <p><input type="checkbox"/> Ballast: _____ Stone Size: _____ Pavers: _____ (Bare)</p> <p>Ballast Weight (psf): Zone 1: _____ Zone 2: _____</p> <p>Additional Detail: _____</p> <p>ROOF COVER / MEMBRANE:</p> <p>(Provide all applicable details including trade name, type, number)</p> <p>Roof Cover: Trade Name _____</p> <p>Roof Rating Provided: <input type="checkbox"/> Single Ply <input type="checkbox"/> Adhered <input type="checkbox"/> M</p> <p><input type="checkbox"/> Multi-Ply Built Up Roofing (BUR) <input type="checkbox"/> M</p> <p><input type="checkbox"/> Lap Width: _____ in/mm <input type="checkbox"/> Lap Adhesion Type: _____</p> <p><input type="checkbox"/> Panel: <input type="checkbox"/> Through Fastened Metal <input type="checkbox"/> Standing Seam Metal <input type="checkbox"/> Fiber Reinforced Plastic (FRP)</p> <p><input type="checkbox"/> Other: _____</p> <p><input type="checkbox"/> Spray Applied</p> <p>Additional Detail: _____</p> <p style="font-size: small;">X2688 ENGINEERING (Rev. FEB 2020)</p>	<p>CHECKLIST FOR ROOFING SYSTEM</p> <p>ROOF COVER / MEMBRANE SECUREMENT:</p> <p>Roof Cover Fasteners: Trade Name _____ Size: _____</p> <p>Stress Plate/Batten: Trade Name _____ Size: _____</p> <p>Flow Spacing: Zone 1: _____ Zone 2: _____</p> <p>Fastener Spacing: Zone 1: _____ Zone 2: _____</p> <p>Bonding Adhesive: Trade Name _____</p> <p>Adhesive Ribbon Width (in.) _____</p> <p>Adhesive Ribbon Spacing (in.): Zone 1: _____ Zone 2: _____</p> <p>Adhesive Application Rate (gal./sq.) _____</p> <p>Additional Detail: _____</p> <p>INSULATION / COVER BOARD:</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>Layer</th> <th>Insulation / Cover Board Trade Name</th> <th>Board Dimensions (ft. x ft.)</th> <th>Thic (in.)</th> </tr> </thead> <tbody> <tr> <td>1. Top</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>2. Next</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>3. Next</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>4. Next</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>5. Thermal Barrier</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table> <p><input type="checkbox"/> Glass Fiber/Mineral Wool/Batt <input type="checkbox"/> Face/Face Vapor Barrier</p> <p>Other: _____</p> <p>Additional Detail: _____</p> <p>INSULATION / COVER BOARD SECUREMENT:</p> <p>Insulation / Cover Board Fasteners: Trade Name _____ Type _____</p> <p>Stress Plate Trade Name _____ Size _____</p> <p>Fastener Spacing: Zone 1: _____ Zone 2: _____</p> <p>Bonding Adhesive: Trade Name _____</p> <p>Adhesive Ribbon Width (in.) _____</p> <p>Adhesive Ribbon Spacing (in.): Zone 1: _____ Zone 2: _____</p> <p>Adhesive Application Rate (gal./sq.) _____</p> <p>Additional Detail: _____</p> <p>BASE SHEET: (Include Trade Name, Type, and Width)</p> <p><input type="checkbox"/> None</p> <p>Trade Name: _____ Width: _____ 30</p> <p><input type="checkbox"/> Fastened: _____ Adhered: _____</p> <p><input type="checkbox"/> Lap Width: _____ in/mm <input type="checkbox"/> Lap Adhes: _____</p> <p><input type="checkbox"/> Air Retarder: _____ Vapor Ret: _____</p> <p>Additional Detail: _____</p> <p>BASE SHEET SECUREMENT:</p> <p>Base Sheet Adhesive Name _____ Adhes: _____</p> <p>Base Sheet Fastener Trade Name _____ Type _____</p> <p>Head Diameter: _____ Length: _____</p> <p>Spacing: (Attached sketches as necessary)</p> <p>Spacing Along Laps: Zone 1: _____ Zone 2: _____</p> <p>No. Intermediate Rows: Zone 1: _____ Zone 2: _____</p> <p>Spacing Along Intermediate Rows: Zone 1: _____ Zone 2: _____</p> <p>Additional Detail: _____</p> <p style="font-size: small;">X2688 ENGINEERING (Rev. FEB 2020)</p>	Layer	Insulation / Cover Board Trade Name	Board Dimensions (ft. x ft.)	Thic (in.)	1. Top			X	2. Next			X	3. Next			X	4. Next			X	5. Thermal Barrier			X	<p>CHECKLIST FOR ROOFING SYSTEM</p> <p>DECK:</p> <p><input type="checkbox"/> LWC (Form Deck) <input type="checkbox"/> Concrete <input type="checkbox"/> Precast panels or Cast in Place</p> <p><input type="checkbox"/> Wood (Pulver Test Required): <input type="checkbox"/> Fiber Reinforced Cement <input type="checkbox"/> Fiber Reinforced Plastic</p> <p><input type="checkbox"/> Gypsum (Pulver Test Required): <input type="checkbox"/> Plank or <input type="checkbox"/> Poured</p> <p>Other: _____</p> <p>Additional Detail: _____</p> <p>DECK OR ROOF PANEL SECUREMENT:</p> <p>Deck Or Roof Panel Fasteners: _____ Type _____</p> <p>Trade Name: _____</p> <p>Length: _____</p> <p>Washer: _____ Size: _____</p> <p>Fastener / Washer Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p>Deck Side Lap Fastener Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p>Additional Detail: _____</p> <p>ROOF STRUCTURE (Include Size, Gage, Etc.):</p> <p><input type="checkbox"/> Purlin: _____ or _____ 2" Thickness: _____</p> <p>Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p><input type="checkbox"/> Joist: _____ Wood or _____ Steel</p> <p>Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p><input type="checkbox"/> Truss: _____ Wood or _____ Steel</p> <p>Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p>Beam Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____</p> <p>Other: _____</p> <p>Additional Detail: _____</p> <p>PERIMETER FLASHING: (Attach a detailed sketch of metal, fascia, gravel stop, nailer, blocking, coping, etc.)</p> <p><input type="checkbox"/> FM Approved Flashing</p> <p><input type="checkbox"/> Other (Applicable only when FM Approved system is not available):</p> <p>Manufacturer/Trade Name: _____</p> <p>Flashing Max Wind Rating: _____ Thickness: _____</p> <p>Fascia / Coping Detail: Face Height: _____ Fastener spacing: _____</p> <p>Hook Size Detail: Height: _____ Thickness: _____</p> <p>Nailer / Blocking Details Per FM Global Data Sheet 1-427: <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach Details)</p> <p>Nailer/Securement Diameter: _____ Spacing: _____ Embedment: _____</p> <p>Additional Detail: _____</p> <p>DRAINAGE:</p> <p>For new construction: Has roof drainage been designed by a Qualified Engineer per FM Global Loss Prevention Data Sheet 1-54 and the local building code? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)</p> <p>For re-roofing and recovery: Will the roof drainage be changed from the original design (i.e. drains inserted/covered/removed, new expansion joints, blocked or reduced scupper size)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, were the changes reviewed by a Qualified Engineer? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)</p> <p>Is secondary (interceptory) roof drainage accepted per FM Global Data Sheet 1-54? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)</p> <p>Additional Detail: _____</p> <p>ROOF MOUNTED EQUIPMENT: (Attach drawings, calculations and any supporting detail.)</p> <p>Roof mounted equipment secured per FM Global Loss Prevention Data Sheet 1-28 and the local building code? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Additional Detail: _____</p> <p style="font-size: small;">X2688 ENGINEERING (Rev. FEB 2020)</p>
Layer	Insulation / Cover Board Trade Name	Board Dimensions (ft. x ft.)	Thic (in.)																							
1. Top			X																							
2. Next			X																							
3. Next			X																							
4. Next			X																							
5. Thermal Barrier			X																							

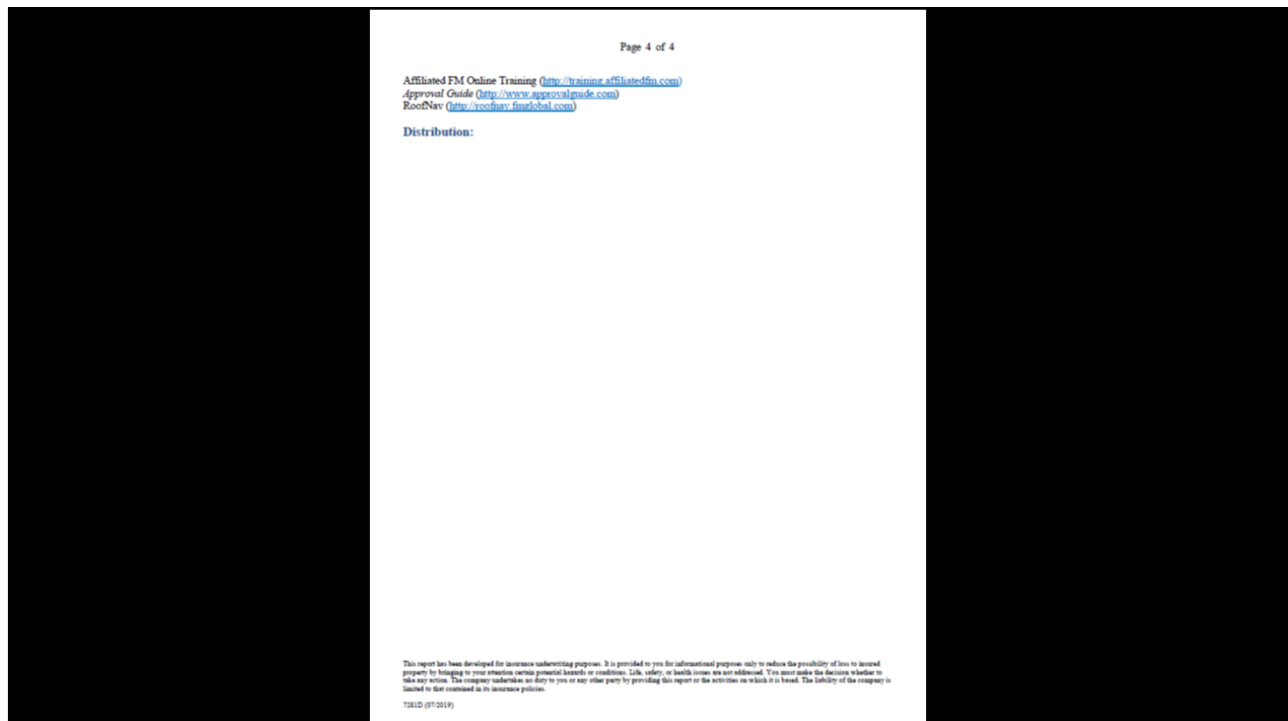
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The problem...

FM Global's X2688 form is typically completed *after* the roof system has been designed, bids are received and a Contract for the work is signed

...any resulting changes should be addressed by a Change Order

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The following design criteria were used for this review:

- 125 mph Wind Speed (for 3-second gusts)
- 1.15 Wind Importance Factor (for cladding)
- Ground Roughness "C"
- Partially Enclosed Building Classification

The following wind ratings are needed for each area:

Roof Area	Field	Perimeter	Corner
Main Roof	1-150	1-225 (8 ft.)	1-225 (8 ft. x 16 ft.)

Review Comments:

1. After completion of the roof installation, conduct uplift testing in accordance with FM Global Property Loss Prevention Data Sheet 1-52, *Field Verification of Roof Wind Uplift Resistance*. Perform 2 tests in the field, 2 tests in the perimeter, and 1 test in the corner. Final acceptance of the roofing installation will be dependent upon satisfactory performance of the roof installation during the uplift testing. The following pressures are considered passing for each roof area:
 - Field: 90 psf
 - Perimeters: 137 psf
 - Corners: 137 psf

roof system components and installation.

Design loads (ASCE 7-10) from the Construction Documents:

- Field: -68.6 psf
- Perimeter and corners: -115.4 psf

Resulting loads for FM 1-52 testing (based on the Construction Documents' design loads):

- Field: -52 psf
- Perimeter and corners: -87 psf

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- Situations like this are commonplace on FM Global-insured projects
- I'm aware of a project where a replacement FM Global field engineer was brought in during a project... and FM Global issued a new Plan Review Letter with significant revisions

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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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Construction-generated moisture

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RESEARCH+TECH



Construction-generated moisture
Unintended moisture accumulation can affect roof system performances
by Mark S. Graham

24 professionalroofing.net DECEMBER/JANUARY 2021-22

Professional Roofing

December 2021/January 2022

Link

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Some things we know...

Construction-generated moisture

- Cooler temperatures are more challenging than warmer temperatures
 - Cool air holds less moisture
- Some “modern” materials are less moisture tolerant
- Water-based products release moisture; more than solvent-based materials
- Concrete is placed using much more water than is necessary for proper hydration
- Concrete admixtures typically slow moisture release

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Some things we know (cont.)...

Construction-generated moisture

- Temporary enclosures can trap moisture/prevent moisture release
- Temporary heating can be problematic
 - Propane heaters release large amounts of moisture vapor
- Bringing warm, stored materials out into a cold environment can result in surface condensation

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Recommendations


Construction-generated moisture

- Realize practical (and physical) limitations
- Consider appropriate contract provision language so you don't take on additional liability
- When construction-generated moisture cannot be controlled, use a vapor retarder at the deck level

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Material and product shortages and price volatility

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Asphalt, The Roofing Solution™

Guide for Professionals Guide for Homeowners Excellence in Asphalt Roofing Resources About ARMA Publications

ARMA Releases Fourth Quarter 2021 Report on Asphalt Roofing Product Shipments

Media Contact

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 ARMA Director of Marketing & Communications
 643) 640-1075 x1144 | agosinski@asphaltroofing.org

Forest Hill, MD January 20, 2022 – The Asphalt Roofing Manufacturers Association (ARMA) has released its Quarterly Product Shipment Report for the fourth quarter of 2021. The report covers asphalt roofing product shipments in the United States and Canada in the final quarter, as well as year-to-date shipment information and a comparison with the prior year's data.

The shipment report provides national shipment data into the asphalt roofing industry to trade professionals and interested parties. visit ARMA.org

2020: 161,416,435
 2019: 146,605,438
 2018: 143,453,436
 2017: 151,098,256

+18%

Asphalt Roofing Product Shipments						
Shipments (squares)	Q4 2021	Q4 2020	% Change	YTD 2021	YTD 2020	% Change
Shingles – U.S. (including individual shingles)	37,014,634	41,209,313	-10.2%	169,188,143	161,416,435	4.8%
BUR base, ply, and mineral cap sheets – U.S. (not including saturated felts)	1,344,956	1,597,293	-15.8%	6,587,255	7,078,723	-6.9%
Modified Bitumen – U.S.	8,652,926	8,955,985	-3.4%	38,693,700	34,545,343	12.0%
Shingles – Canada (including individual shingles)	2,917,763	2,450,144	19.1%	14,215,825	12,910,687	10.1%

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

###

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Iowa Roofing Contractors Association

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Material and product shortages and price volatility

The screenshot shows the NRCA website's 'Supply Chain Shortage Information' section. It includes three articles with images and dates:

- Construction material prices are 22.3% higher than a year ago** (Jan 19, 2021): Construction material prices rose 0.6% in December 2021 and are up 22.3% on a year-over-year basis; nonresidential construction material prices are 23.2% higher than a year ago.
- Construction material prices are 23.5% higher than a year ago** (Dec 15, 2021): Construction material prices rose 1.4% from October to November and are up 23.5% on a year-over-year basis.
- Owens Corning will expand capacity to meet growing demand** (Dec 14, 2021): Owens Corning, Toledo, Ohio, plans to accelerate increased production capabilities to support growing demand for its roofing products.

A calendar on the right lists events: Jan 31, 2022 (NRCA Roofing Industry Fall Protection from A to Z), Jan 30 - Feb 3, 2022 (NRCA's 135th Annual Convention and International Roofing Expo 2022), Feb 3, 2022 (NRCA Foreman Leadership Training, Level 1), and March 10, 2022 (LEGALCON).

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The document is an 'Industry Issue Update' from NRCA, dated September 2021. The title is 'Roofing material shortages and price volatility'. It discusses the impact of COVID-19 on the roofing industry, including supply chain issues, price increases, and the need for energy-efficient roofing systems. A 'Link' button is visible at the bottom right.

Roofing material shortages and price volatility

September 2021

The U.S. roofing industry is experiencing unprecedented shortages of roofing materials and products and significant price volatility. NRCA is providing this Industry Issue Update to help its members with building owners, facility managers, general contractors and construction managers involved in roof purchasing decisions.

Although this information is intended to apply specifically to the U.S. roofing market, based on NRCA's communications with its affiliate and partners in Canada, Mexico and elsewhere worldwide, shortages of roofing materials and products and price volatility appear to be global issues.

BACKGROUND

Compared with other industries, the U.S. roofing industry is domestic in nature. With few exceptions, a vast majority of roofing products and materials used are manufactured in the U.S. from U.S.-sourced raw materials, delivered by U.S. suppliers and distributors, and installed by U.S. roofing contractor companies. Although the global economy has some effect on many purchasing decisions, the U.S. roofing industry is largely driven by the U.S. economy, interest rates and consumer sentiment.

During the past decade, the U.S. roofing industry has experienced a period of consistent, moderate growth. The roofing materials and products supply chain has expanded its capacity and roofing contractors have added field personnel and capability to fill this growing need. In many regions of the U.S., additional roofing industry growth has been limited by a lack of adequately trained field personnel.

At the same time, energy code requirements and sustainability incentive programs have resulted in a demand for more energy-efficient roof systems. For example, when reroofing a building, it is not unusual to replace an existing, aged roof system having an R-10 insulation value with a new roof system with an energy code mandated minimum R-20, R-25, R-30 or R-35 insulation value. Such increases in insulation value necessitate using greater amounts of and thicker insulation, usually in multiple layers, longer fasteners, more layers of insulation adhesive and additional material at handling and installation labor.

THE CURRENT SITUATION

The U.S. roofing industry responded and adapted to the onset of the COVID-19 pandemic remarkably well. The U.S. roofing industry quickly was considered "essential," and at the start of the pandemic, the roofing materials and products supply chain functioned with only minimal interruptions. Roofing contractors adapted to additional safe work practices necessary to perform work on occupied buildings during the pandemic.

By many measures, 2020 was a productive year for the U.S. roofing industry. For example, 2020 was a near historic record level year for asphalt shingle installations. Homeowners limited to traveling and maintaining their homes during the pandemic, spurred in part by low interest rates and the availability of stimulus funding, and the roofing industry responded to several weather events involving high winds and hail. The institutional and industrial segments of the U.S. roofing industry also experienced similar levels of activity.

However, one noticeable change in the level of roofing material and product inventory shrank considerably. Roofing material suppliers and distributors reduced their material and product inventories. Since the start of the pandemic, far more roofing materials and products are being shipped on a job-specific basis. This especially is the case with reroofing and roof covering projects and certain specialty products, such as ballistics and adhesives. A few years ago, many roofing jobs often could be carried out with roofing materials and products held in inventory, but manufacturers now are shipping roofing materials and products on a job-specific basis with fewer roofing materials and products being stocked in inventory.

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We are now learning a new term....

“...allocation...”

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Some common substitutions...

- Fasteners
- Adhesives
- Insulation

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Recommended substitution process...

- Owner approval
 - Change order
- Manufacturer approval
 - Documented in writing
- Code approval
 - Code official acceptance (Documented in writing)

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The screenshot shows a page from the International Building Code (IBC) with the following content:

SCOPE AND ADMINISTRATION

nal damage, and where required by this code, the building official shall require the building to meet the requirements of Section 1612 or Section R322 of the International Residential Code, as applicable.

[A] 104.3 Notice and orders. The building official shall issue necessary notices or orders to ensure compliance with this code.

[A] 104.4 Inspections. The building official shall make the required inspections, or the building official shall have the authority to accept reports of inspection by approved agencies or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such approved agency or by the responsible individual. The building official is authorized to engage such expert opinions as deemed necessary to report on unusual technical issues that arise, subject to the approval of the appointing authority.

[A] 104.4 Identification. The building official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the building official has reasonable cause to believe that there exists in a structure or on a premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the building official is authorized to enter the structure or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such structure or premises be occupied that credentials be presented to the occupant and entry requested. If such structure or premises is unoccupied, the building official shall first make a reasonable effort to locate the owner or other person having charge or control of the structure or premises and request entry. If entry is refused, the building official shall have recourse to the remedies provided by law to secure entry.

[A] 104.7 Department records. The building official shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records for the period required for retention of public records.

[A] 104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be civilly or criminally rendered liable personally and be hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by legal representatives of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

[A] 104.9 Approved materials and equipment. Materials, equipment and devices approved by the building official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Used materials and equipment. Materials that are reused shall comply with the requirements of this code for new materials. Used equipment and devices shall not be reused unless approved by the building official.

[A] 104.10 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the building official shall have the authority to grant modifications for individual cases, upon application of the owner or the owner's authorized agent, provided that the building official shall first find that special individual reason makes the strict letter of this code impractical, the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, accessibility, life and fire safety or structural requirements. The details of action granting modifications shall be recorded and entered in the files of the department of building safety.

public, or conflict with existing laws or ordinances.

4. A determination that the variance is the minimum necessary to afford relief, considering the flood hazard.

5. Submission to the applicant of written notice specifying the difference between the design flood elevation and the elevation to which the building is to be built, stating that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation, and stating that construction below the design flood elevation increases risks to life and property.


[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where

2021 INTERNATIONAL BUILDING CODE®

INTERNATIONAL CODE COUNCIL

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RESEARCH+TECH



Professional Roofing
April 2019

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

22 www.professionalroofing.net APRIL 2019 [Link](#)

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Questions... and other topics

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