



Roofing Week in Chicago
January 19-21, 2022

Roofing technical issues update

Mark S. Graham

Vice President, Technical Services
National Roofing Contractors Association

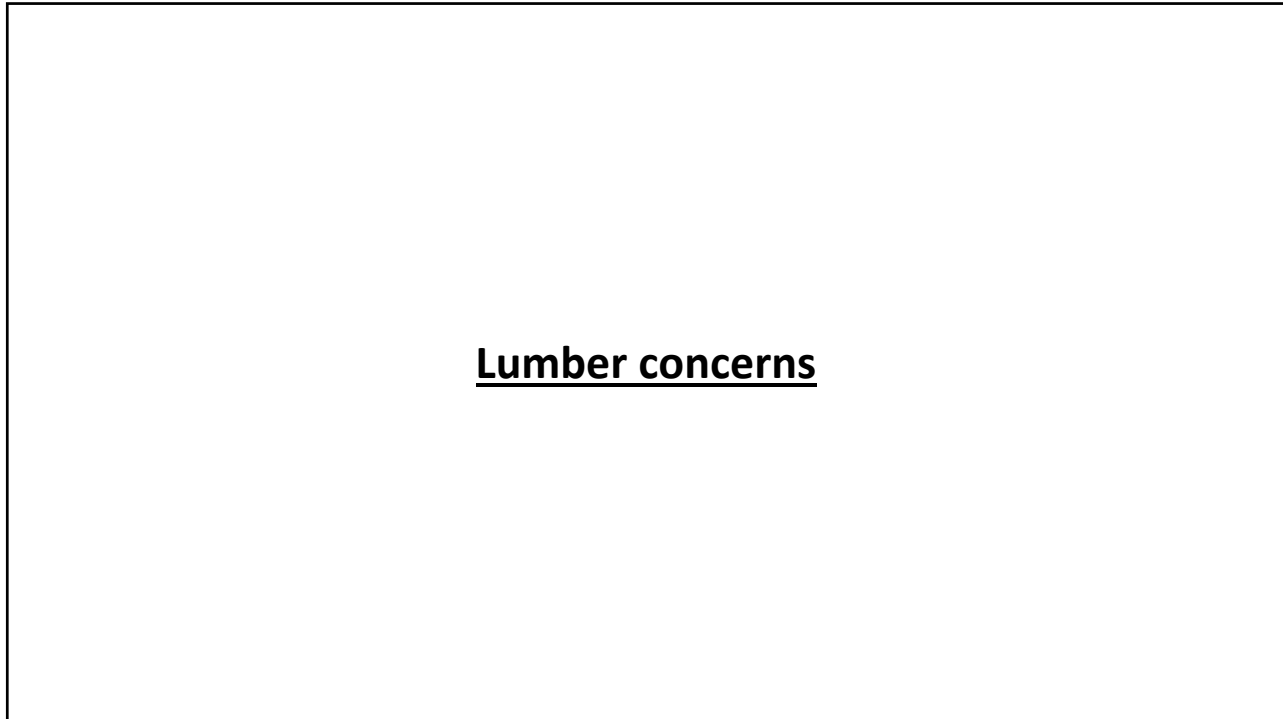


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Topics

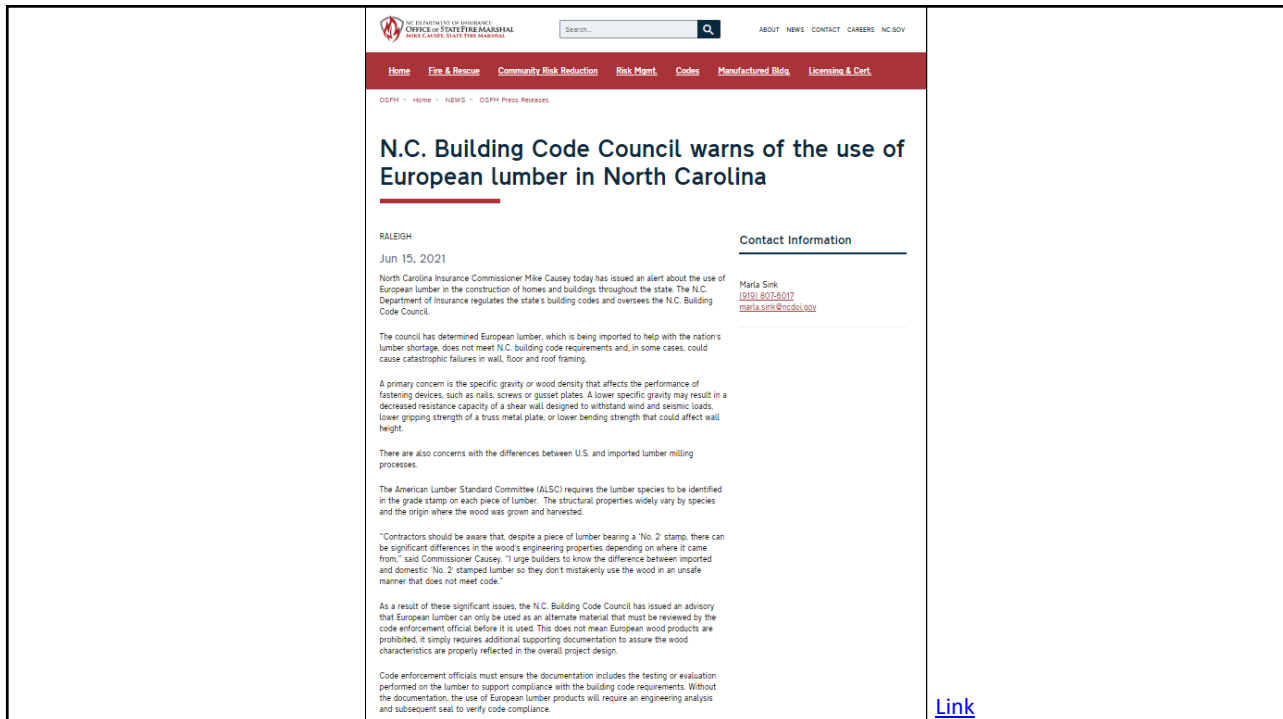
- Lumber concerns
- Wood roof deck concerns
- Synthetic underlayment
- FM Global-insured roofing projects
- Construction-generated moisture
- Material availability
- Questions... and other topics

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Lumber concerns

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AWC Response to NCDOT Press Release

Jun 18, 2021

LEESBURG, VA – On June 11, the North Carolina Department of Insurance (NCDI) 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 prepared a detailed response to the NCDI new release and can be located at the following link: [PLIB's Response to North Carolina DOI warning notice](#) | Pacific Lumber Inspection Bureau.

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.

In areas where the basic wind speeds are 130 mph or less (in some locations less than 140 mph), prescriptive provisions in the building codes that address wall studs and connection requirements have been considered to be independent of the lumber species. However, in areas where the basic wind speeds are greater than 130 mph, including coastal areas of North Carolina, the prescriptive provisions of the building codes don't typically apply and the user is directed to use the pre-engineered wood-frame construction provisions in *AWC's Wood Frame Construction Manual for One- and Two-Family Dwellings (WFCM)* or ICC's Standard for Residential Construction in High-Wind Regions (ICC 600) or to design the structure in accordance with the loads in ASCE's Minimum Design Loads for Buildings and Other Structures (ASCE 7). When designing to the wind loads in ASCE 7, *AWC's National Design Specification® for Wood Construction (NDS®)* is used, which includes design values for all North American and non-North American species approved by the American Lumber Standards Committee. Including European lumber species. Adequate resources exist for use by plans examiners, builders, and designers to accommodate the use of European lumber with these standards.

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 \(plib.org\)](#).

AWC in the News

- New Report Aids in Compliance With Sound Transmission Code Provisions**
Feb 19, 2019 | *Construction Executive*
- Milwaukee Developer Wants To Build One Of World's Tallest Wooden Structures**
Jan 29, 2019 | *Wisconsin Public Radio*
- CLT and Engineered Wood Products Poised for Growth in 2019**
Jan 16, 2019 | *Forest2Market*
- Code Corner: New Year, New Code Developments**
Jan 16, 2019 | *Simpson Strong-Tie SE Blog*
- Construction's 2019 Political Forecast**
Jan 14, 2019 | *Building Forward*
- Reliant Funding's 2019 Top Apps for Construction Businesses**
Jan 11, 2019 | *Reliant Funding*

See More... [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

Element of a Grade Stamp

Mill number

Grading Agency Symbol

Indicates the species or combination of species of lumber.

Photo #2 Lumber Grade Stamp

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

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.

WC LB

Mill 54321

NO. 2

N. SPR-SC P(I) GER ROM KD-HT

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[Link](#)

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Example:

DESIGNED BY

TP NO.2

AT00 AS-SCP(1)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:

Species and Grades	Resilience Class $R = 1$									
	Dead Load = 10 psf					Dead Load = 20 psf				
	2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
Timber Species Douglas Fir Pine & Spruce	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Fir, Spruce, & Larch	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Pine	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Spruce, Fir, Pine, & Larch	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Fir	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Douglas Fir & Spruce	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16
Timber Species Douglas Fir & Spruce & Larch	16d	16	16	16	16	16	16	16	16	16
	18d	16	16	16	16	16	16	16	16	16
	20d	16	16	16	16	16	16	16	16	16

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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 strength

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RESEARCH+TECH



Considering substitutions
Be aware of potential consequences with product substitution
by Mark S. Graham

With ongoing shortages of building materials and products, substitutions have become more commonplace—but they can have unintended consequences. One issue that has arisen involves substituting European lumber for North American lumber, a decision that could result in unintended consequences.

The situation

At the start of the COVID-19 pandemic, wood product producers were operating under the same uncertainty as the rest of the world. Many mills curtailed production in anticipation of worker shortages and reduced demand. At the same time, many wholesale and retail lumber customers significantly reduced inventory levels. Also, because of the Covid-19 pandemic, several mills had closed permanently. The American Wood Council reports between 2007 and 2017, mill closures in the South resulted in a lumber capacity loss between 1.7 to 2 billion board feet. Mill closures in the Pacific Northwest represented 10% of the area's mills.

Although the demand for wood products had dipped, it quickly rebounded during the pandemic because of increased remodeling projects and new housing starts spurred, in part, by low interest

20 professionalroofing.net SEPTEMBER 2021

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September 2021

[Link](#)

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Plywood and OBS 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”

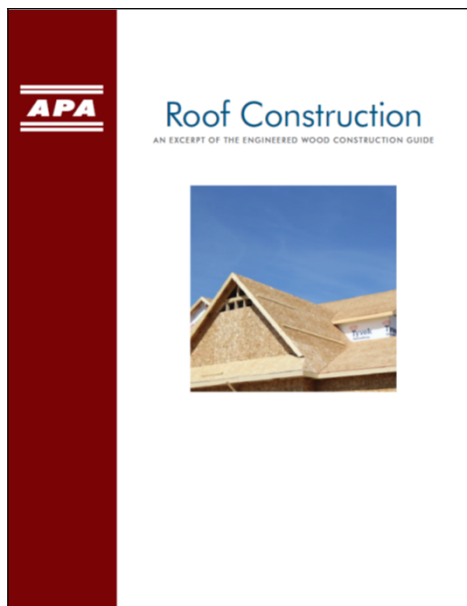
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Roof sheathing attachment

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

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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 AIA's "The Engagement Wood Association and NRCA guidelines applicable to them."

ICC 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 2018 edition, specific requirements are provided in Section R801-Roof Sheathing. IRC 2018 requires wood structural panel conditions to the Department of Commerce's PS 1, "Structural Plywood," or PS 2, "Performance Standard for Wood-based Structural (or Panels)," or CSA Group's C120, "Construction Sheathing," or C125, "Standards on OSB and Waterboards." PS 1 and C125 generally are recognized to apply to plywood, and PS 2 and C125 apply to OSB.

22 professionalroofing.net DECEMBER/JANUARY 2020-21

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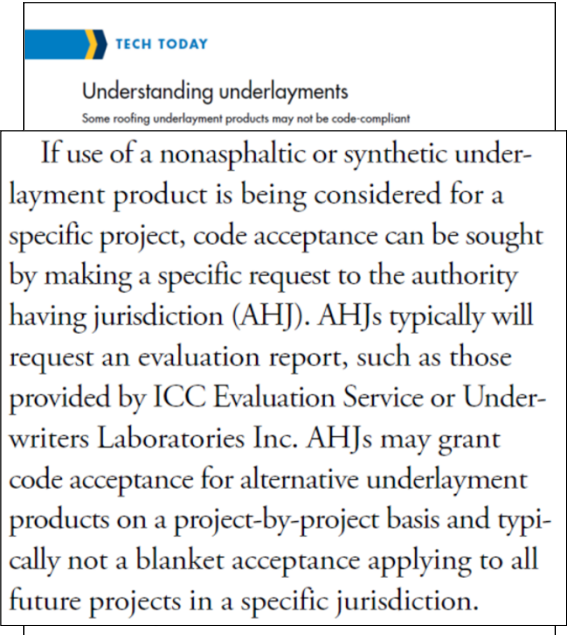
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Synthetic underlayment

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TECH TODAY

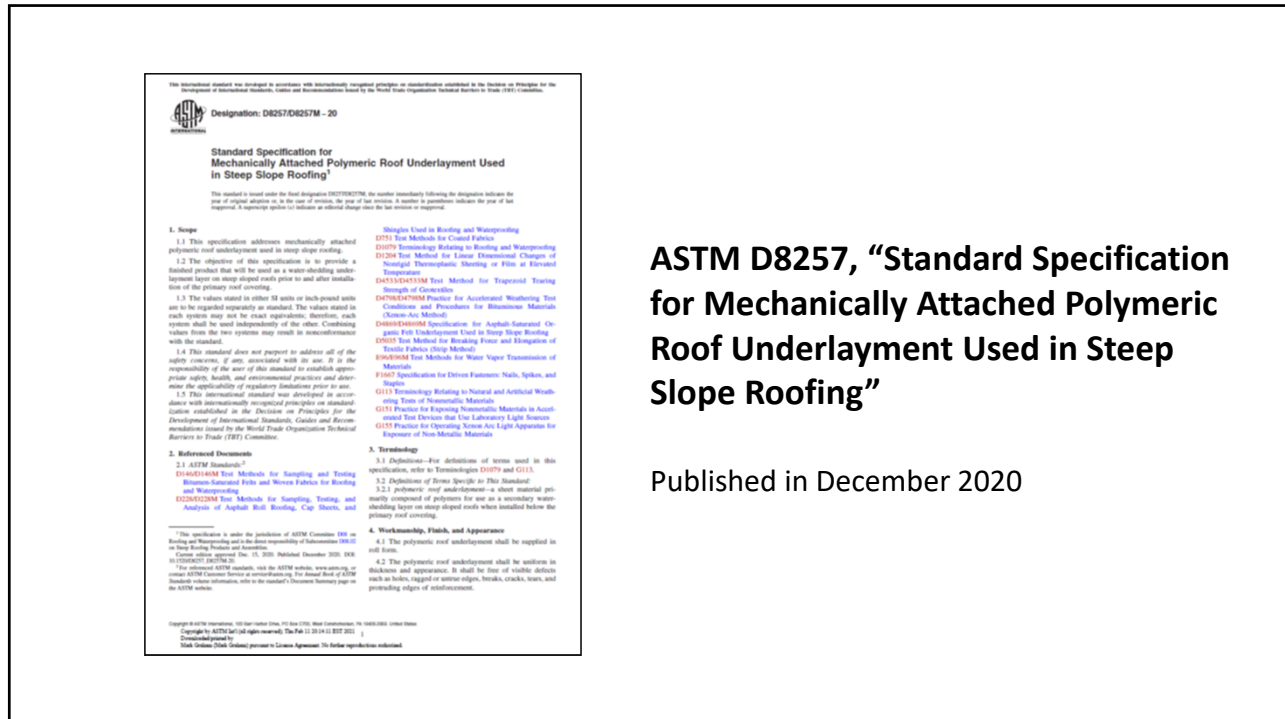
Understanding underlayments
Some roofing underlayment products may not be code-compliant

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.

[Link](#)

Professional Roofing
December 2016

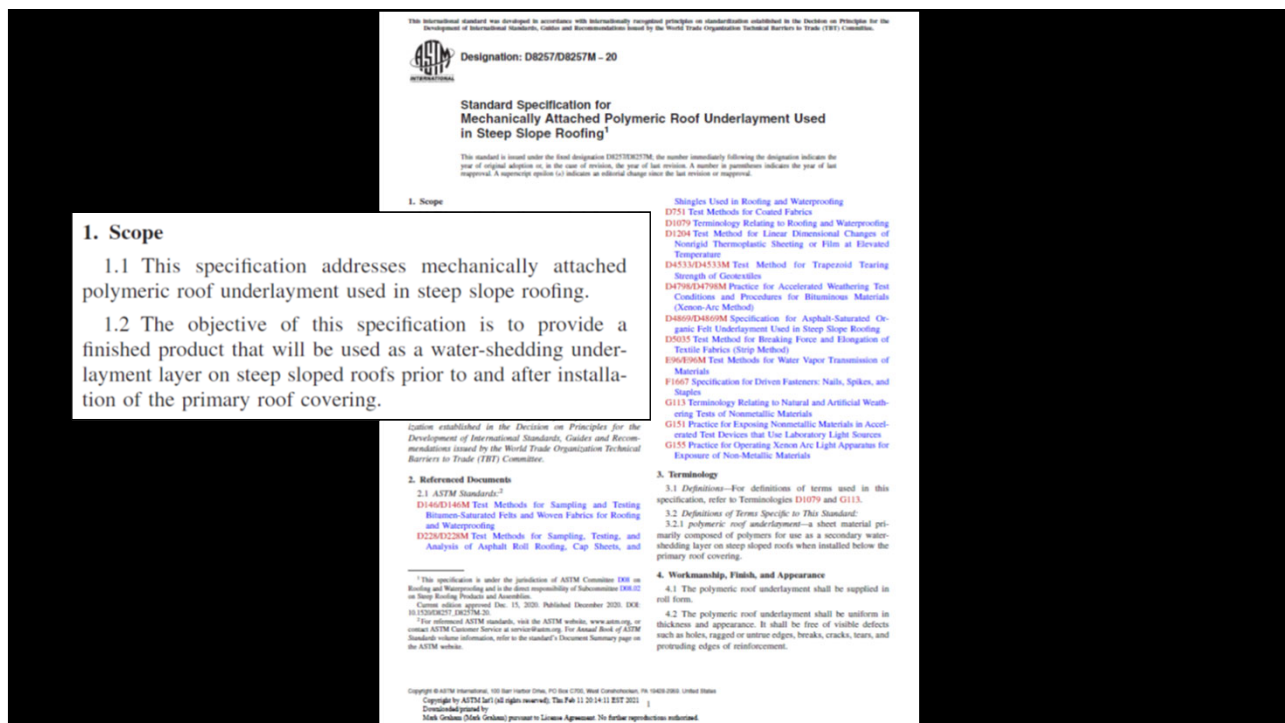
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ASTM D8257, “Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing”

Published in December 2020

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1. 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.

2. Referenced Documents

- 2.1 ASTM Standards¹
 - D14621/A6M 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

¹This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.02 on Steep Slope Roofing Products and Assemblies. Current edition approved Dec. 15, 2020. Published December 2020. DOI: 10.1520/D8257-20E027

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D8257/D8257M - 20

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 lb/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 ^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.

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

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Where would a “breathable” underlayment be preferred over an “non-breathable” underlayment?

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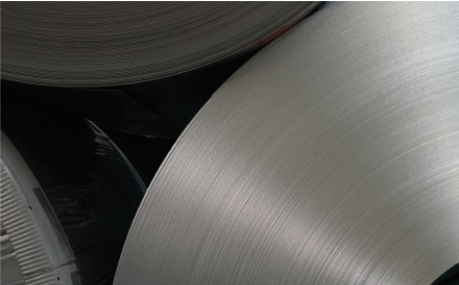
Conclusions and recommendations

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 final 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 D8227
ASTM D8227, "Standard Specification for Mechanically Attached Polymeric Roof Underlayments 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 that is used as a secondary water-shedding layer on steep-slope roofs when installed below a primary roof covering.

The standard's objective is to promote 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.

26 professionalroofing.net JULY/AUGUST 2021

Professional Roofing
July/August 2021

[Link](#)

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FM Global-insured roofing project process

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CHECKLIST FOR ROOFING SYSTEM

FM Global Clients: submit completed form and completed RoofNav CD

CONTACT INFORMATION: **FM CD**
 Roofing Contractor (Name, Address, Project No.) E
 Client Site (Name & Address) T
 Additional Detail: E

OVERVIEW OF WORK: (Submit 1 form per roof area)
 Subdiv. Name & Number (provide building diagram as appropriate)
 Type of Work: New Construction Recover (New roof or Re-roof / New cover/renovate existing roofing system)
 Roof Slope: in. per ft. / degrees ft. / Width
 Building Dimensions: Length: _____ ft. Width: _____ ft.
 Parapet Height: max. in. / mm. _____
 Roof Zone Width Dimension: Zone 1: _____ Zone 2: _____
 FM Approved RoofNav Assembly Numbers (provide Assembly Num.)*
 *Refer to FM Global Property Loss Prevention Data Sheet 1-28, Wind dimension.

ROOF SURFACING:
 None
 Gravel (Trade Name/Application Rate)
 Granules (Application Rate)
 Gravel/Stone (Application Rate)
 Ballast: Stone Size Pavers (Bene)
 Ballast Weight (pcf): Zone 1: _____ Zone 2: _____
 Additional Detail: _____

ROOF COVER / MEMBRANE:
 (Provide ALL applicable details including trade name, type, number)
 Roof Cover: Trade Name: _____
 Hail Rating Provided: _____
 Single-Ply Adhered M
 Multi-Ply Built Up Roofing (BUR) M
 Number of Plys: _____
 Lap Width: in/mm _____ Lap Adhesion Type: _____
 Panel: Through Fastened Metal Standing Seam metal Fiber Reinforced Plastic (FRP) Other: _____
 Spray Applied
 Additional Detail: _____

XC688 ENGINEERING (Rev. FEB 2020)

CHECKLIST FOR ROOFING SYSTEM

ROOF COVER / MEMBRANE SECUREMENT:
 Roof Cover Fasteners: Trade Name: _____ Size: _____
 Stress Plate/Batten: Trade Name: _____ Size: _____
 Row Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Fastener Spacing: Zone 1: _____ Zone 2: _____
 Bonding Adhesive: Trade Name: _____
 Adhesive Ribbon Width (in.): _____
 Adhesive Application Rate (gal./sq. ft.): _____
 Additional Detail: _____

INSULATION / COVER BOARD:

Layer	Insulation / Cover Board Trade Name	Board Dimensions (ft. x ft.)	Thick (in.)
1. Top			X
2. Next			X
3. Next			X
4. Next			X
5. Thermal Barrier			X
6. Glass Fiber/Mineral Wool/Batt			X
7. Vapor Barrier			X
Other:			
<input type="checkbox"/> None			
Additional Detail: _____			

INSULATION / COVER BOARD SECUREMENT:
 Insulation / Cover Board Fasteners: Trade Name: _____ Size: _____ Type: _____
 Stress Plate: Trade Name: _____ Size: _____ Type: _____
 Fastener Spacing: Zone 1: _____ Zone 2: _____
 Bonding Adhesive: Trade Name: _____
 Adhesive Ribbon Width (in.): _____
 Adhesive Application Rate (gal./sq. ft.): _____
 Additional Detail: _____

BASE SHEET: (Include Trade Name, Type, and Width)
 None
 Trade Name: _____ Width: _____ 36"
 Fastened Adhered Lap Adhes
 Lap Width: in/mm _____
 Air Retarder Vapor Retard
 Additional Detail: _____

BASE SHEET SECUREMENT:
 Base Sheet Adhesive Name: _____ Adhesiv
 Base Sheet Fastener Trade Name: _____ Type: _____
 Head Diameter: _____ Length: _____
 Spacing (Attach sketches as necessary)
 Spacing Along Laps: Zone 1: _____ Zone 2: _____ Zone 3: _____
 No. Intermediate Rows: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Spacing Along Intermediate Rows: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Additional Detail: _____

XC688 ENGINEERING (Rev. FEB 2020)

CHECKLIST FOR ROOFING SYSTEM

DECK:
 Steel: Manufacturer: _____ Type (e.g. wide flk): _____ Thickness: _____ Gauge: _____ Yield Strength: _____
 LWC Form Deck: _____
 Concrete Pre-cast panels or Cast in Place
 Wood: Particle Board (Mandatory) Cementitious Wood Fiber (Pultrud Test Required)
 Fiber Reinforced Gypsum Fiber Reinforced Plastic
 Gypsum (Pultrud Test Required): Plank or Poured
 Other: _____
 Additional Detail: _____

DECK OR ROOF PANEL SECUREMENT:
 Deck Or Roof Panel Fasteners: _____ Type: _____
 Trade Name: _____ Size: _____ Washer: _____
 Length: _____
 Weld: Size: _____ Weld: _____ Washer: _____
 Fastener / Weld Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Deck Side Lap Fastener Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Additional Detail: _____

ROOF STRUCTURE (Include Brac, Gable, Etc.):
 Purlin: 2" or 2" Thickness: _____
 Purlin: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Joist: Wood or Steel: _____
 Joist Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Beams: Wood or Steel: _____
 Beam Spacing: Zone 1: _____ Zone 2: _____ Zone 3: _____
 Other: _____
 Additional Detail: _____

PERIMETER FLASHING: (Attach a detailed sketch of metal fascia, gravel stop, nailer, blocking, coping, etc.)
 FM Approved Flashing
 Other (Applicable only when FM Approved system is not available): _____
 Manufacturer/Trade Name: _____
 Flashing Max Wind Rating: _____
 Flashing / Coping Detail: Face Height: _____ Thickness: _____
 Hook Strip Detail: Height: _____ Thickness: _____ Fastener spacing: _____
 Nailer / Blocking Details Per FM Global Data Sheet 1-42? Yes No (Attach Details)
 Nailer Securement: Diameter: _____ Spacing: _____ Embedment: _____
 Additional Detail: _____

DRAINAGE:
 For new construction: Has roof drainage been designed by a Qualified Engineer per FM Global Loss Prevention Data Sheet 1-54 for the local building code? Yes No (Attach details)
 For re-roofing and recovering: will the roof drainage be changed from the original design (i.e. drains inserted/covered/removed, new expansion joints, blocked or reduced scupper size)? Yes No
 If yes, were the changes reviewed by a Qualified Engineer? Yes No (Attach details)
 Secondary (intermittent) roof drainage provided per FM Global Data Sheet 1-54? Yes No (Attach details)
 Additional Detail: _____

ROOF MOUNTED EQUIPMENT: (Attach drawings, calculations and any supporting detail.)
 Roof mounted equipment secured per FM Global Loss Prevention Data Sheet 1-28 and the local building code? Yes No
 Additional Detail: _____

XC688 ENGINEERING (Rev. FEB 2020)

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Affiliated FM Online Training (<http://training.affiliatedfm.com>)
 Approval Guide (<http://www.approvalguide.com>)
 RoofNav (<http://roofnav.fmatglobal.com>)

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T01ED (07/2019)

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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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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

The process of constructing buildings and certain building systems and finishes can result in the generation and release of relatively large amounts of moisture. Left unaccounted for and allowed to become entrapped within a building, this moisture can result in premature deterioration of some building systems and materials, including roof systems. Following is a brief discussion of some construction-generated moisture sources and examples of how their effects can be mitigated.

Moisture sources
 During construction, large amounts of water are used in the manufacture and installation of certain building materials. For example, a normal weight structural concrete mix with a water-to-cement ratio of 0.45 contains about 50 gallons of water per cubic yard of concrete. In some instances, additional water is added to ease the transport and placement of concrete. About half of this water will be consumed during the concrete hydration and curing process. The remaining water is left to dissipate by evaporation and moisture vapor transport over time. Similarly, many building construction finish materials contain large amounts of water. Plaster, drywall, drywall compounds, white adhesive

[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
- Many concrete admixtures 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 ROOFING MANUFACTURERS ASSOCIATION
 Asphalt, The Roofing Solution™
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ARMA Releases Fourth Quarter 2021 Report on Asphalt Roofing Product Shipments

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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.

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%

2020: 161,416,435
2019: 146,605,438
2018: 143,453,436
2017: 151,098,256
+18%

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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Material and product shortages and price volatility

NRCA NATIONAL ROOFING CONTRACTORS ASSOCIATION

Supply Chain Shortage Information

Construction material prices are 22.3% higher than a year ago

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.

Jan. 19, 2021

Construction material prices are 23.5% higher than a year ago

Construction material prices rose 1.4% from October to November and are up 23.5% on a year-over-year basis.

Dec. 15, 2021

Owens Corning will expand capacity to meet growing demand

Owens Corning, Toledo, Ohio, plans to accelerate increased production capabilities to support growing demand for its roofing products.

Dec. 14, 2021

Calendar

- Jan. 31, 2022: NRCA Roofing Industry Fall Protection from A to Z, New Orleans, LA
- Jan. 30 - Feb. 3, 2022: NRCA's 136th Annual Convention and International Roofing Expo 2022, New Orleans, LA
- Feb. 3, 2022: NRCA Foreman Leadership Training, Level 1, New Orleans, LA
- March 10, 2022: LEGALCON, Rosemont, IL

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INDUSTRY ISSUE UPDATE

NRCA Member Benefit

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 communication 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 in 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 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 safety 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 focused on reroofing 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 roll-insulations and roof covering products and certain specialty products, such as fasteners 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 job-specific basis with fewer roofing materials and products being stocked in inventory.

The level of roofing material and product in inventory shrank considerably

NRCA Industry Issue Update: Roofing Material Shortages and Price Volatility

[Link](#)

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Substitutions...

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

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SCOPE AND ADMINISTRATION

...
 not 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 Notices 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 agency 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] 104.5 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 employees 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 permanent law or ordinance, shall not thereby be civilly or criminally rendered liable personally and is 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 determination 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


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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 code's 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 custom 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

[Link](#)

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Questions... and other topics

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