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Roofing Week in Chicago
January 19-21, 2022

Roofing technical issues update

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association

Mark Graham

Topics

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

Lumber concerns

N.C. Building Code Council warns of the use of European lumber in North Carolina

RALEIGH

Jun 15, 2021

North Carolina Insurance Commissioner Mike Causey today has issued an alert about the use of European lumber in the construction of homes and buildings throughout the state. The N.C. Department of Insurance regulates the state's building codes and oversees the N.C. Building Code Council.

The council has determined European lumber, which is being imported to help with the nation's lumber shortage, does not meet N.C. building code requirements and, in some cases, could cause catastrophic failures in wall, floor and roof framing.

A primary concern is the specific gravity or wood density that affects the performance of fastening devices, such as nails, screws or gusset plates. A lower specific gravity may result in a decreased resistance capacity of a shear wall designed to withstand wind and seismic loads, lower gripping strength of a truss metal plate, or lower bending strength that could affect wall height.

There are also concerns with the differences between U.S. and imported lumber milling processes.

The American Lumber Standard Committee (ALSC) requires the lumber species to be identified in the grade stamp on each piece of lumber. The structural properties widely vary by species and the origin where the wood was grown and harvested.

"Contractors should be aware that, despite a piece of lumber bearing a 'No. 2' stamp, there can be significant differences in the wood's engineering properties depending on where it came from," said Commissioner Causey. "I urge builders to know the difference between imported and domestic 'No. 2' stamped lumber so they don't mistakenly use the wood in an unsafe manner that does not meet code."

As a result of these significant issues, the N.C. Building Code Council has issued an advisory that European lumber can only be used as an alternate material that must be reviewed by the code enforcement official before it is used. This does not mean European wood products are prohibited, it simply requires additional supporting documentation to assure the wood characteristics are properly reflected in the overall project design.

Code enforcement officials must ensure the documentation includes the testing or evaluation performed on the lumber to support compliance with the building code requirements. Without the documentation, the use of European lumber products will require an engineering analysis and subsequent seal to verify code compliance.

Contact Information

Marla Sink
(919) 807-6017
marla.sink@ncdoi.gov

Link

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 prepared a detailed response to the NCDOI 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).

###

Categories

- Air Burden
- AWC Operations
- Biobased
- Boiler MACT
- Carbon Neutrality/Biomass
- Chemicals
- Codes & Standards
- Education
- Energy Efficiency
- Fire Technology
- Fly-In
- Green Building
- Health & Safety
- Jobs
- Marketplace
- NAAQS
- NHSM
- Resiliency
- Sustainability
- Tall Wood
- Wind/Seismic

Years

- 2021
- 2020
- 2019
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012

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

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

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.

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".

Link

Example:

AUDITED BY TP® NO.2 KDHT AT00 AS-SCP(I)AUS

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:*

Joist Spacing (inches)	Species and Grade		Residential living areas= 40 psf, L/Δ = 360									
			Dead Load = 10 psf					Dead Load = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum Floor Joist Spans (ft - in)									
16	Austrian Spruce - Austria & The Czech Republic	SS	8 - 4	9 - 11	13 - 1	16 - 9	20 - 4	6 - 4	9 - 11	13 - 1	16 - 9	20 - 4
		No. 1	6 - 2	9 - 5	12 - 10	16 - 5	19 - 1	6 - 2	9 - 5	12 - 4	15 - 0	17 - 5
		No. 2	6 - 1	9 - 6	12 - 7	15 - 10	18 - 4	6 - 1	9 - 4	11 - 10	14 - 5	16 - 9
		No. 3	5 - 3	7 - 8	9 - 9	12 - 11	15 - 10	4 - 10	7 - 0	8 - 11	10 - 11	12 - 7
	Douglas Fir - France & Germany	SS	6 - 7	10 - 4	13 - 7	17 - 4	21 - 1	6 - 7	10 - 4	13 - 7	17 - 4	21 - 1
		No. 1	6 - 4	9 - 11	13 - 1	16 - 3	18 - 10	6 - 4	9 - 7	12 - 2	14 - 10	17 - 2
		No. 2	6 - 1	9 - 6	12 - 3	14 - 11	17 - 4	6 - 0	8 - 10	11 - 2	13 - 8	15 - 10
		No. 3	5 - 0	7 - 4	9 - 3	11 - 4	13 - 2	4 - 7	6 - 8	8 - 6	10 - 4	12 - 0
	Norway Spruce - Estonia, Latvia, & Lithuania	SS	6 - 2	8 - 9	12 - 10	16 - 5	19 - 11	6 - 2	8 - 9	12 - 10	16 - 5	19 - 1
		No. 1	5 - 11	9 - 4	12 - 3	15 - 2	17 - 7	5 - 11	8 - 11	11 - 4	13 - 10	16 - 1
		No. 2	5 - 9	9 - 1	12 - 0	14 - 9	17 - 1	5 - 9	8 - 8	11 - 0	13 - 5	15 - 7
		No. 3	4 - 11	7 - 2	9 - 0	11 - 0	12 - 10	4 - 5	6 - 5	8 - 3	10 - 1	11 - 8
	Norway Spruce - Finland	SS	6 - 1	9 - 6	12 - 7	16 - 0	19 - 6	6 - 1	9 - 6	12 - 7	16 - 0	19 - 6
		No. 1	5 - 11	9 - 4	12 - 3	14 - 11	17 - 4	5 - 11	8 - 10	11 - 2	13 - 8	15 - 10
		No. 2	5 - 8	8 - 5	10 - 8	13 - 0	15 - 1	5 - 3	7 - 8	9 - 9	11 - 10	13 - 9
		No. 3	4 - 5	6 - 6	8 - 3	10 - 1	11 - 8	4 - 1	5 - 11	7 - 6	9 - 2	10 - 8
	Norway Spruce - Germany, NE France, & Switzerland	SS	6 - 2	9 - 9	12 - 10	16 - 5	19 - 11	6 - 2	9 - 9	12 - 10	16 - 5	19 - 1
		No. 1	5 - 11	9 - 4	12 - 3	14 - 11	17 - 4	5 - 11	8 - 10	11 - 2	13 - 8	15 - 10
		No. 2	5 - 8	8 - 10	11 - 6	14 - 0	16 - 3	5 - 6	8 - 3	10 - 6	12 - 9	14 - 10
		No. 3	4 - 9	6 - 11	8 - 9	10 - 9	12 - 5	4 - 4	6 - 4	8 - 0	9 - 9	11 - 4
	Norway Spruce - Norway	SS	6 - 5	10 - 2	13 - 4	17 - 0	20 - 9	6 - 5	10 - 2	13 - 4	17 - 0	20 - 9
		No. 1	6 - 1	9 - 6	12 - 7	16 - 0	19 - 1	6 - 1	9 - 6	12 - 4	15 - 0	17 - 5
		No. 2	5 - 9	9 - 1	12 - 0	14 - 9	17 - 1	5 - 9	8 - 8	11 - 0	13 - 5	15 - 7
		No. 3	5 - 0	7 - 4	9 - 3	11 - 4	13 - 2	4 - 7	6 - 8	8 - 6	10 - 4	12 - 0
	Norway Spruce - Romania & Ukraine	SS	6 - 1	9 - 6	12 - 7	16 - 0	19 - 6	6 - 1	9 - 6	12 - 7	16 - 0	19 - 6
		No. 1	5 - 11	9 - 4	12 - 3	15 - 2	17 - 7	5 - 11	8 - 11	11 - 4	13 - 10	16 - 1
		No. 2	5 - 8	8 - 10	11 - 6	14 - 0	16 - 3	5 - 6	8 - 3	10 - 6	12 - 9	14 - 10
		No. 3	4 - 9	6 - 11	8 - 9	10 - 9	12 - 5	4 - 4	6 - 4	8 - 0	9 - 9	11 - 4
	Norway Spruce - Sweden	SS	6 - 2	9 - 9	12 - 10	16 - 5	19 - 11	6 - 2	9 - 9	12 - 10	16 - 5	19 - 6
		No. 1	5 - 11	9 - 4	12 - 3	14 - 11	17 - 4	5 - 11	8 - 10	11 - 2	13 - 8	15 - 10
		No. 2	5 - 8	8 - 9	11 - 1	13 - 6	15 - 8	5 - 5	8 - 0	10 - 1	12 - 4	14 - 4
		No. 3	4 - 7	6 - 9	8 - 6	10 - 5	12 - 1	4 - 2	6 - 2	7 - 9	9 - 6	11 - 0
	Scots Pine - Austria & The Czech Republic, Romania, & Ukraine	SS	6 - 4	9 - 11	13 - 1	16 - 9	20 - 4	6 - 4	9 - 11	13 - 1	16 - 9	19 - 10
		No. 1	6 - 2	9 - 9	12 - 9	15 - 7	18 - 1	6 - 2	9 - 3	11 - 8	14 - 3	16 - 6
		No. 2	5 - 11	9 - 4	11 - 10	14 - 6	16 - 10	5 - 10	8 - 7	10 - 10	13 - 3	15 - 4
		No. 3	4 - 11	7 - 2	9 - 0	11 - 0	12 - 10	4 - 5	6 - 6	8 - 3	10 - 1	11 - 8

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

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 Great Recession, 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

Professional Roofing

September 2021

Link

Plywood and OBS roof deck concerns

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”

Common, but not referenced in the Code

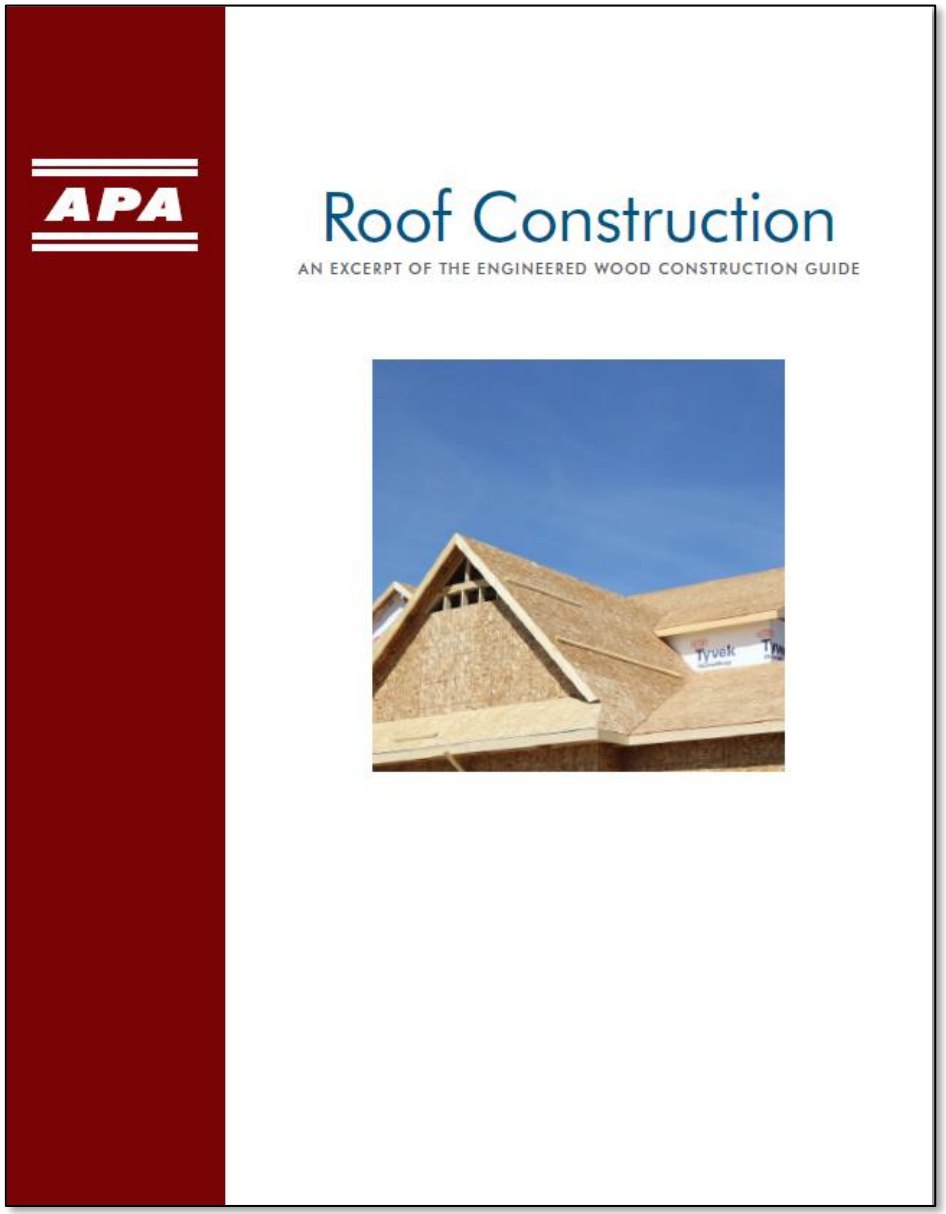
Plywood and OSB:

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

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



<u>APA Form E30, “Roof Construction”</u>

--Roofing-specific excerpts from APA’s *Engineered Wood Construction Guide* (102 pages)

Link

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

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 NRCA 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 2018 edition, specific requirements are provided in Section R803-Roof Sheathing.

IRC 2018 requires wood structural panels conform to the Department of Commerce's PS 1, "Structural Plywood," or PS 2, "Performance Standard for Wood-based Structural-Use Panels," or CSA Group™'s O325, "Construction Sheathing," or O437, "Standards on OSB and Waferboard." PS 1 and O325 generally are recognized to apply to plywood, and PS 2 and O437 apply to OSB.

Professional Roofing

December/January 2020-21

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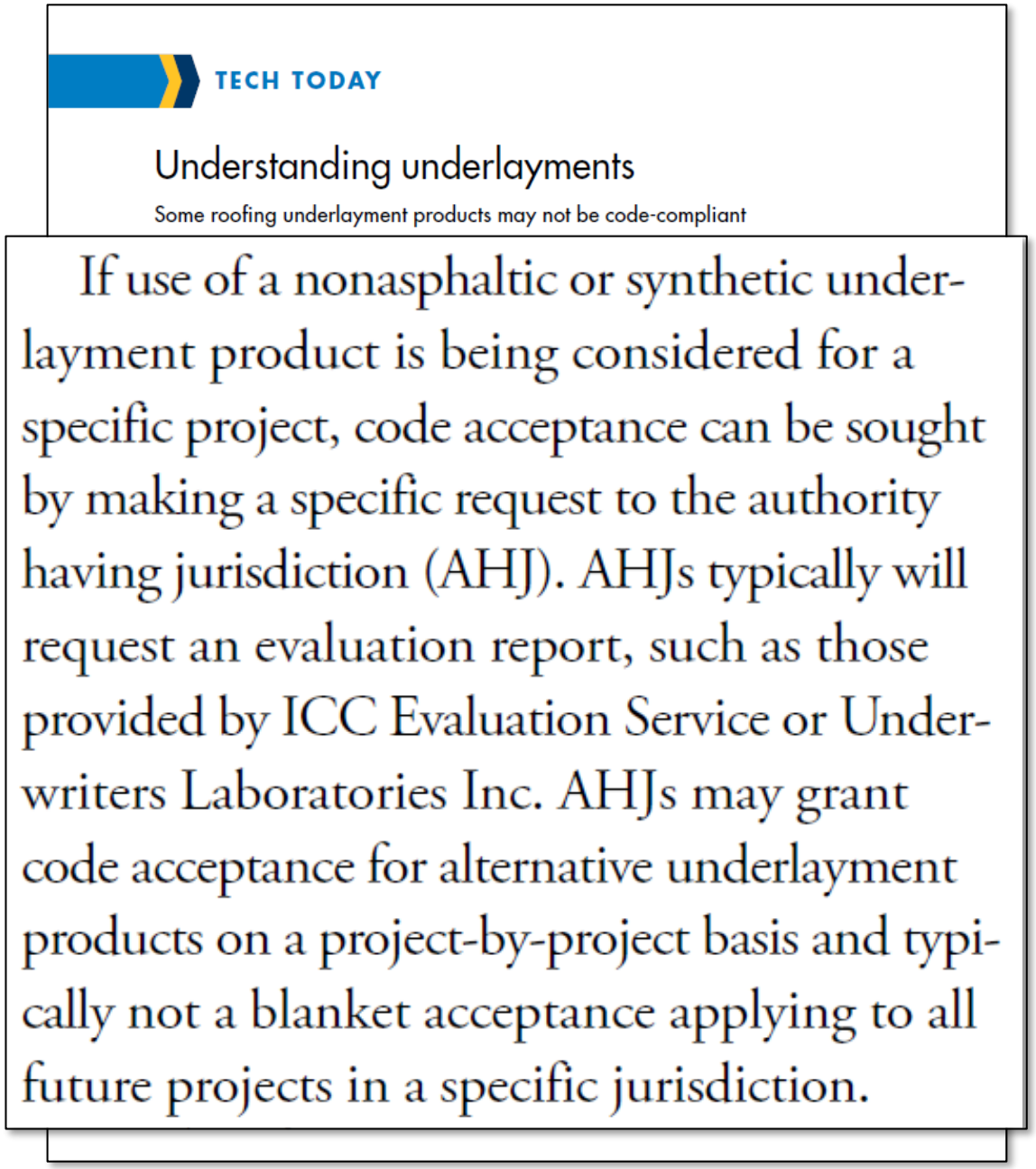
Synthetic underlayment



TECH TODAY

Understanding underlayments

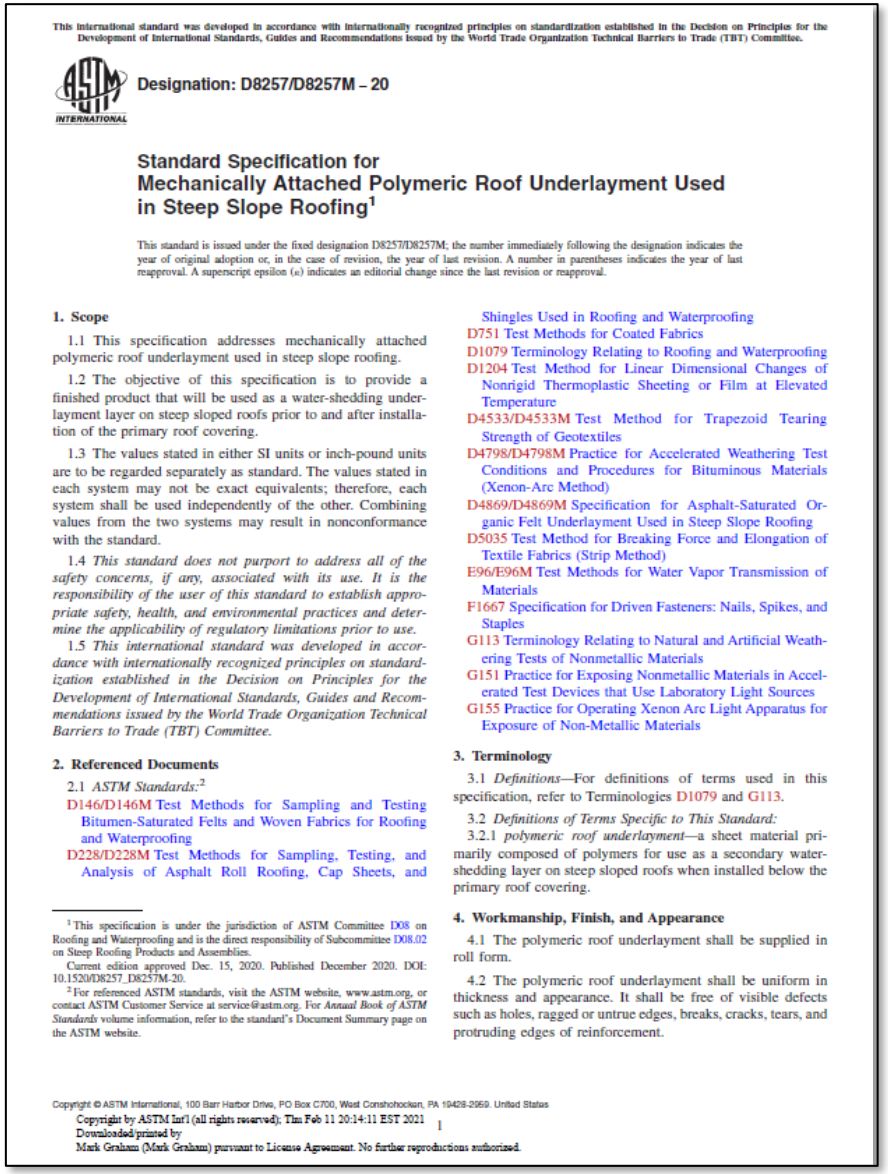
Some roofing underlayment products may not be code-compliant

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



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, Guides 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 Roofing[1]

This standard is issued under the fixed designation D8257/D8257M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

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

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

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system 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, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D146/D146M Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing

D228/D228M Test Methods for Sampling, Testing, and Analysis of Asphalt Roll Roofing, Cap Sheets, and 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

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.

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, ragged or untrue edges, breaks, cracks, tears, and protruding edges of reinforcement.

[1] This specification is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.02 on Steep Roofing Products and Assemblies.

Current edition approved Dec. 15, 2020. Published December 2020. DOI: 10.1520/D8257_D8257M-20.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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

Published in December 2020

Designation: D8257/D8257M – 20

Standard Specification for Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing[1]

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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, splitting, cracking, flaking, or pitting
Laboratory Accelerated Weathering[A]	As received	7.12	No visible damage such as peeling, chipping, crazing, splitting, 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.

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 Stre (machine a			
Tearing Stre (machine a			
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, splitting, cracking, flaking, or pitting
Laboratory Accelerated Weathering[A]	As received	7.12	No visible damage such as peeling, chipping, crazing, splitting, 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"

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

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

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, sloped-slope underlayment products. If you are involved with the design or installation of sloped-slope roof systems, I encourage you to become familiar with this standard and begin to use it when specifying and procuring sloped-slope underlayment products.

ASTM D8257

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

The standard defines polymeric underlayment as a sheet material primarily composed of polymers for use as a secondary water-shedding layer on sloped-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 sloped-slope roof covering.

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July/August 2021

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FM Global-insured roofing project process

CHECKLIST FOR ROOFING SYSTEM

FM Global Clients: submit completed form and completed RoofNav Co

CONTACT INFORMATION: FM GL

ROOFING CONTRACTOR (NAME, ADDRESS, PROJECT NO.)	TE
	E-
CLIENT SITE (NAME & ADDRESS)	TE
	E-

OVERVIEW OF WORK: *(Submit 1 form per roof area)*

Building Name & Number (provide building diagram as appropriate):	
Type of Work: ☐ New Construction ☐ Recover (New roof ov ☐ Reroof (New cover/remove existing roofing syste	
Building Dimensions: Length: *ft/m;*	Width:
Roof Slope: in. per ft. / degrees	
Parapet Height ,max *(in./m)*:	Parapet Height
Roof Zone Width/Dimension*: Zone 1': Zone 1: Zone 2:	
FM Approved RoofNav Assembly Numbers *(provide Assembly Num*	

***Refer to FM Global Property Loss Prevention Data Sheet 1-28, Wir dimensions.**

ROOF SURFACING:

☐ None	
☐ Coating	*(Trade Name/Application Rate)*
☐ Granules	*(Application Rate)*
☐ Gravel/Slag	*(Application Rate)*
☐ Ballast: ☐ Stone Size ☐ Pavers	*(Beve*
Ballast Weight (psf): Zone 1': Zone 1:	
Additional Detail:	

ROOF COVER / MEMBRANE:
(*Provide ALL applicable details including trade name, type, numbe*)

Roof Cover: Trade Name:	
Hail Rating Provided:	
☐ Single Ply:	☐ Adhered
☐ Multi-Ply Built Up Roofing (BUR) Number of Plies:	☐ M
☐ Lap Width in/mm	☐ Lap Adhesion Type
☐ Panel: ☐ Through Fastened Metal ☐ Standing Seam metal ☐ Fiber Reinforced Plastic (FRP) ☐ Other:	
☐ Spray Applied	
Additional Detail:	

CHECKLIST FOR ROOFING SYSTEM

ROOF COVER / MEMBRANE SECUREMENT:

Roof Cover Fasteners: Trade Name:			L
Stress Plate/Batten: Trade Name:		Size:	
Row Spacing: Zone 1':	Zone 1:	Zone 2:	Zon
Fastener Spacing: Zone 1':	Zone 1:	Zone 2:	
Bonding Adhesive: Trade Name:			
Adhesive Ribbon Width (in.):			
Adhesive Ribbon Spacing (in.): Zone 1':	Zone 1:	Zone 2:	
Adhesive Application Rate (gal./sq.):			
Additional Detail:			

INSULATION / COVER BOARD:

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	

☐ Glass Fiber/Mineral Wool/Batt ☐ Facer Type/Vapor Barrier
☐ Other:
☐ None
Additional Detail:

INSULATION / COVER BOARD SECUREMENT:

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

BASE SHEET: *(Include Trade Name, Type, and Width)*

☐ None	
Trade Name:	Width: ☐ 36 i
☐ Fastened	☐ Adhered
☐ Lap Width in/mm	☐ Lap Adhesi
☐ Air Retarder	☐ Vapor Reta
Additional Detail:	

BASE SHEET SECUREMENT:

Base Sheet Adhesive Name:	Adhesiv
Base Sheet Fastener Trade Name:	Type:
Head Diameter:	Length:
Spacing: (Attached Sketches as necessary)	
Spacing Along Laps: Zone 1': Zone 1:	Zon
No. Intermediate Rows: Zone 1': Zone 1:	Zone
Spacing Along Intermediate Rows: Zone 1': Zone 1:	Zone
Additional Detail:	

CHECKLIST FOR ROOFING SYSTEM

DECK:

☐ Steel:	Manufacturer:	Type (e.g. wide rib):	Thickness / Gauge:	Yield Strength:	
☐ LWIC (Form Deck):		☐ Cementitious Wood Fiber *(Pullout Test Required)*:			
☐ Concrete: ☐ Pre-cast panels or ☐ Cast in Place					
☐ Wood *(Pullout Test Required)*:					
☐ Fiber Reinforced Cement:		☐ Fiber Reinforced Plastic			
☐ Gypsum *(Pullout Test Required)*: ☐ Plank		or ☐ Poured			
☐ Other:					
Additional Detail:					

DECK or ROOF PANEL SECUREMENT:

Deck Or Roof Panel Fasteners: Trade Name:			Type:	
Length:			Size Washer:	
If Weld: Size:		Weld:		Washer:
Fastener / Weld Spacing:	Zone 1':	Zone 1:	Zone 2:	Zone 3:
Deck Side Lap Fastener Spacing:	Zone 1':	Zone 1:	Zone 2:	Zone 3:
Additional Detail:				

ROOF STRUCTURE (Include Size, Gage, Etc.):

☐ Purlins ☐ "C" or ☐ "Z"			Thickness:	
Purlin:	Zone 1':	Zone 1:	Zone 2:	Zone 3:
☐ Joists ☐ Wood or ☐ Steel				
Joist Spacing Zone 1':		Zone 1:	Zone 2:	Zone 3:
☐ Beams ☐ Wood or ☐ Steel				
Beam Spacing: Zone 1':		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:	
Fascia / Coping Detail: Face Height:	Thickness:
Hook Strip Detail: Height:	Thickness: Fastener spacing:
Nailer / Blocking Details Per FM Global Data Sheet 1-49? ☐ 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 and 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)
Is secondary (emergency) 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:

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

Distribution:

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

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

Construction-generated moisture

Construction-generated moisture

Unintended moisture accumulation can affect roof system performances

by Mark S. Graham

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's 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, some adhesives

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December 2021/January 2022

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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

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

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

Material and product shortages and price volatility

ASPHALT ROOFING MANUFACTURERS ASSOCIATION

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ARMA Releases Fourth Quarter 2021 Report on Asphalt Roofing Product Shipments

Media Contact

Amie Goscinski
ARMA Director of Marketing & Communications
(443) 640-1075 x1144 | agoscinski@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 valuable insight into the asphalt roofing industry to trade professionals and interested parties," said ARMA's

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.

###

Material and product shortages and price volatility

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Resources

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 ®

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

NRCA | Education | Industry

Jan. 31, 2022
NRCA Roofing Industry Fall Protection from A to Z
New Orleans, La.

Jan. 30 - Feb. 3, 2022
NRCA's 135th 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, Ill.

+Full List of Events

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 communications with its affiliates 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 level of roofing material and product in inventory shrunk considerably

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 invested in 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 is the level of roofing material and product in inventory shrunk 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 roof insulation 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 a job-specific basis with fewer roofing materials and products being stocked in inventory.

NRCA Industry Issue Update: Roofing Material Shortages and Price Volatility

Link

Substitutions…

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

tial 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 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 opinion 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 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 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 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

RESEARCH+TECH

Consider alternatives

Code interpretations, modifications and alternatives provide some code compliance flexibility

by Mark S. Graham

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

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

Alternative acceptance

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

Section 104.10-Modifications gives a code official authority to

Professional Roofing

April 2019

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Questions… and other topics

Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association
10255 West Higgins Road, 600
Rosemont, Illinois 60018-5607

(847) 299-9070
mgraham@nrca.net
www.nrca.net

Twitter: @MarkGrahamNRCA
Personal website: www.MarkGrahamNRCA.com