2022 RCAT/MRCA Roofing Conference & Expo
September 27-29, 2022
Fort Worth, TX

Steep slope: Update on roofing industry technical issues

presented by

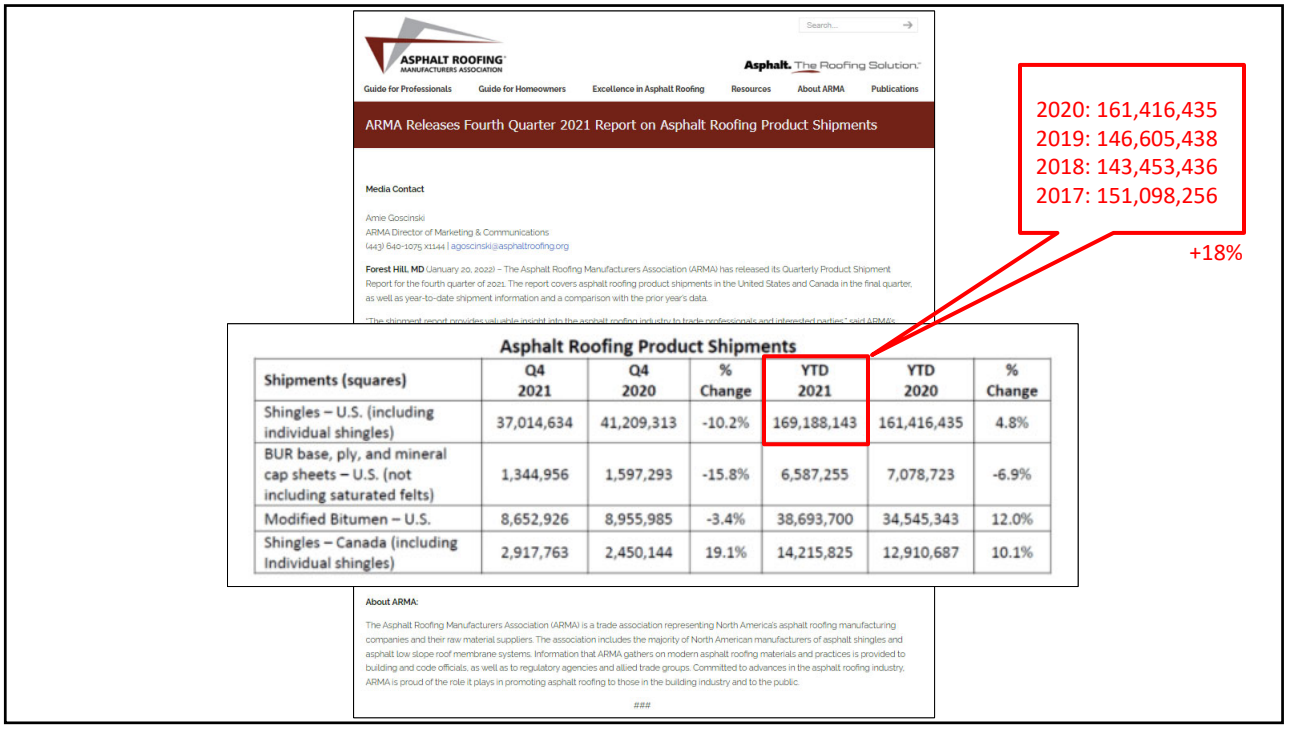
Mark S. Graham
Vice President, Technical Services
National Roofing Contractors Association (NRCA)

1

Topics

- Roofing industry market conditions
- Imported lumber and sheathing concerns
- Synthetic underlayment
- Questions

2


ASPHALT ROOFING MANUFACTURERS ASSOCIATION
Asphalt. The Roofing Solution.
Guide for Professionals
Guide for Homeowners
Excellence in Asphalt Roofing
Resources
About ARMA
Publications
ARMA Releases Fourth Quarter 2021 Report on Asphalt Roofing Product Shipments
Media Contact
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.
2020: 161,416,435
2019: 146,605,438
2018: 143,453,436
2017: 151,098,256
+18%
Asphalt Roofing Product Shipments
Shipments (squares) | Q4 2021 | Q4 2020 | % Change | YTD 2021 | YTD 2020 | % Change
Shingles – U.S. (including individual shingles) | 37,014,634 | 41,209,313 | -10.2% | 169,188,143 | 161,416,435 | 4.8%
BUR base, ply, and mineral cap sheets – U.S. (not including saturated felts) | 1,344,956 | 1,597,293 | -15.8% | 6,587,255 | 7,078,723 | -6.9%
Modified Bitumen – U.S. | 8,652,926 | 8,955,985 | -3.4% | 38,693,700 | 34,545,343 | 12.0%
Shingles – Canada (including Individual shingles) | 2,917,763 | 2,450,144 | 19.1% | 14,215,825 | 12,910,687 | 10.1%
About ARMA:
The Asphalt Roofing Manufacturers Association (ARMA) is a trade association representing North America's asphalt roofing manufacturing companies and their raw material suppliers. The association includes the majority of North American manufacturers of asphalt shingles and asphalt low slope roof membrane systems. Information that ARMA gathers on modern asphalt roofing materials and practices is provided to building and code officials, as well as to regulatory agencies and allied trade groups. Committed to advances in the asphalt roofing industry, ARMA is proud of the role it plays in promoting asphalt roofing to those in the building industry and to the public.
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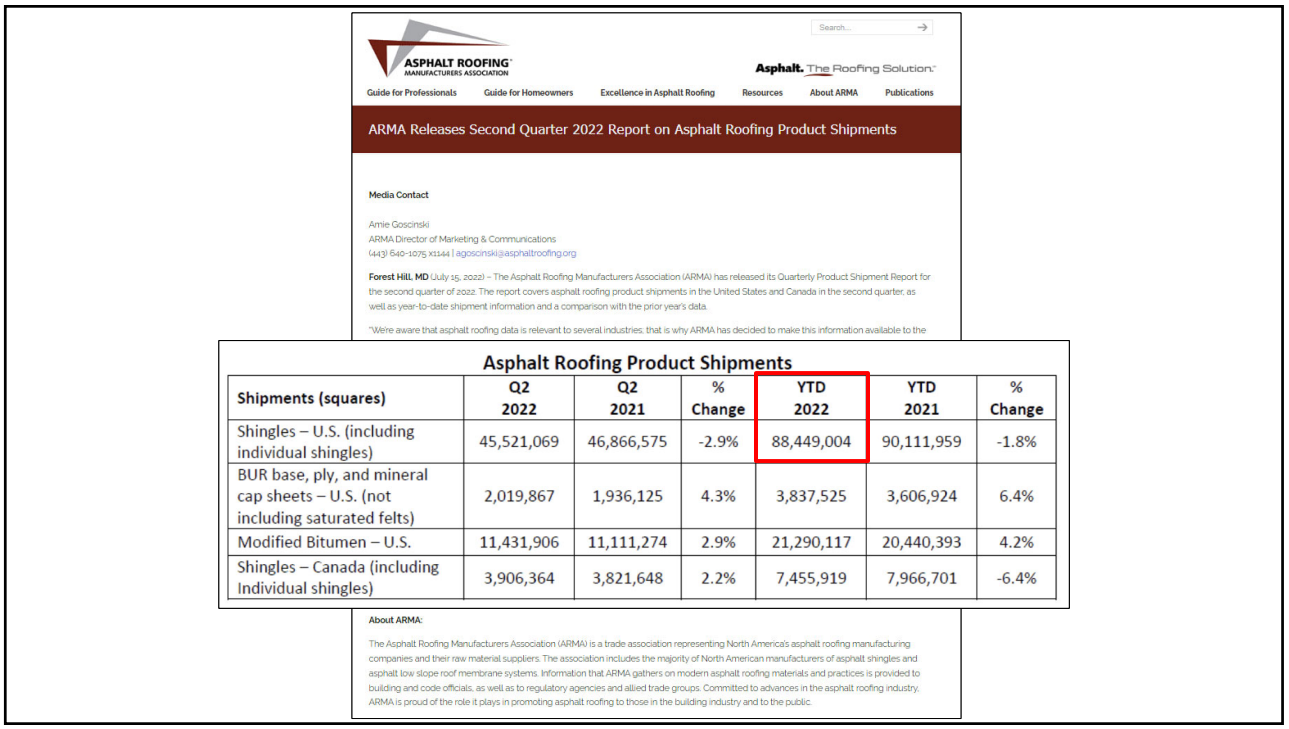
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Forest Hill, MD (July 15, 2022) – The Asphalt Roofing Manufacturers Association (ARMA) has released its Quarterly Product Shipment Report for the second quarter of 2022. The report covers asphalt roofing product shipments in the United States and Canada in the second quarter, as well as year-to-date shipment information and a comparison with the prior year's data.
Asphalt Roofing Product Shipments
Shipments (squares) | Q2 2022 | Q2 2021 | % Change | YTD 2022 | YTD 2021 | % Change
Shingles – U.S. (including individual shingles) | 45,521,069 | 46,866,575 | -2.9% | 88,449,004 | 90,111,959 | -1.8%
BUR base, ply, and mineral cap sheets – U.S. (not including saturated felts) | 2,019,867 | 1,936,125 | 4.3% | 3,837,525 | 3,606,924 | 6.4%
Modified Bitumen – U.S. | 11,431,906 | 11,111,274 | 2.9% | 21,290,117 | 20,440,393 | 4.2%
Shingles – Canada (including Individual shingles) | 3,906,364 | 3,821,648 | 2.2% | 7,455,919 | 7,966,701 | -6.4%
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.

4

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.

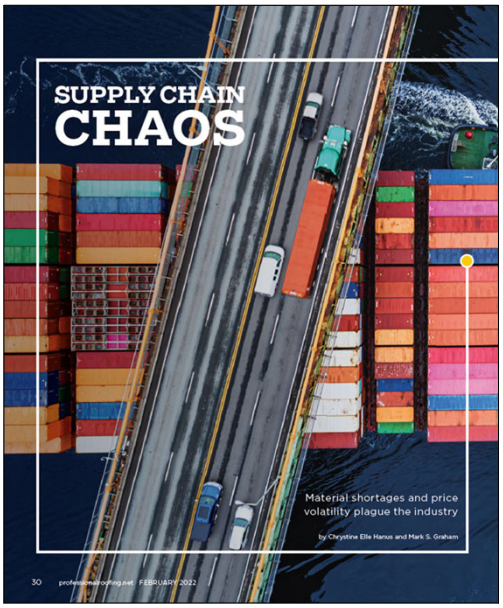
By many measures, 2020 was a productive year for the U.S. roofing industry. For example, 2020 was a near historic record level year for asphalt shingle installations. Homeowners invested in reroofing and maintaining their homes during the pandemic, spurred in part by low interest rates and the availability 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 in 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

5



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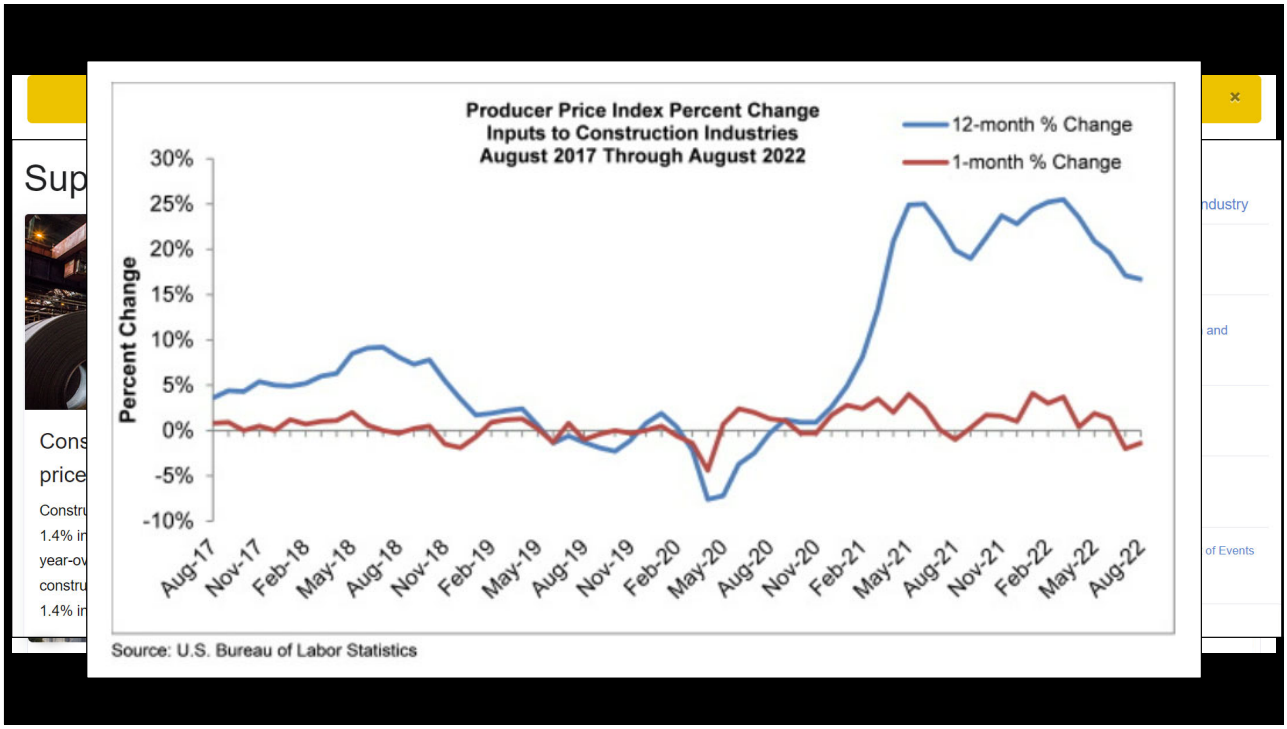

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Imported lumber concerns

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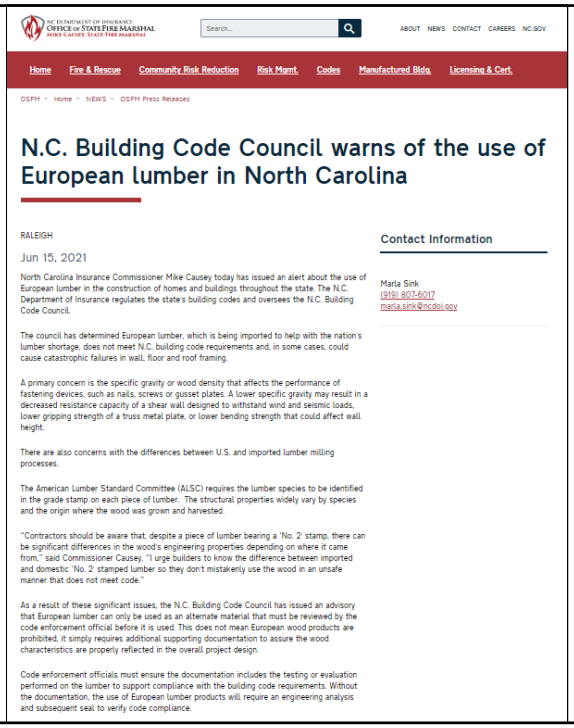

NC Department of Insurance
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OSFM > Home > NEWS > OSFM Press Releases

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

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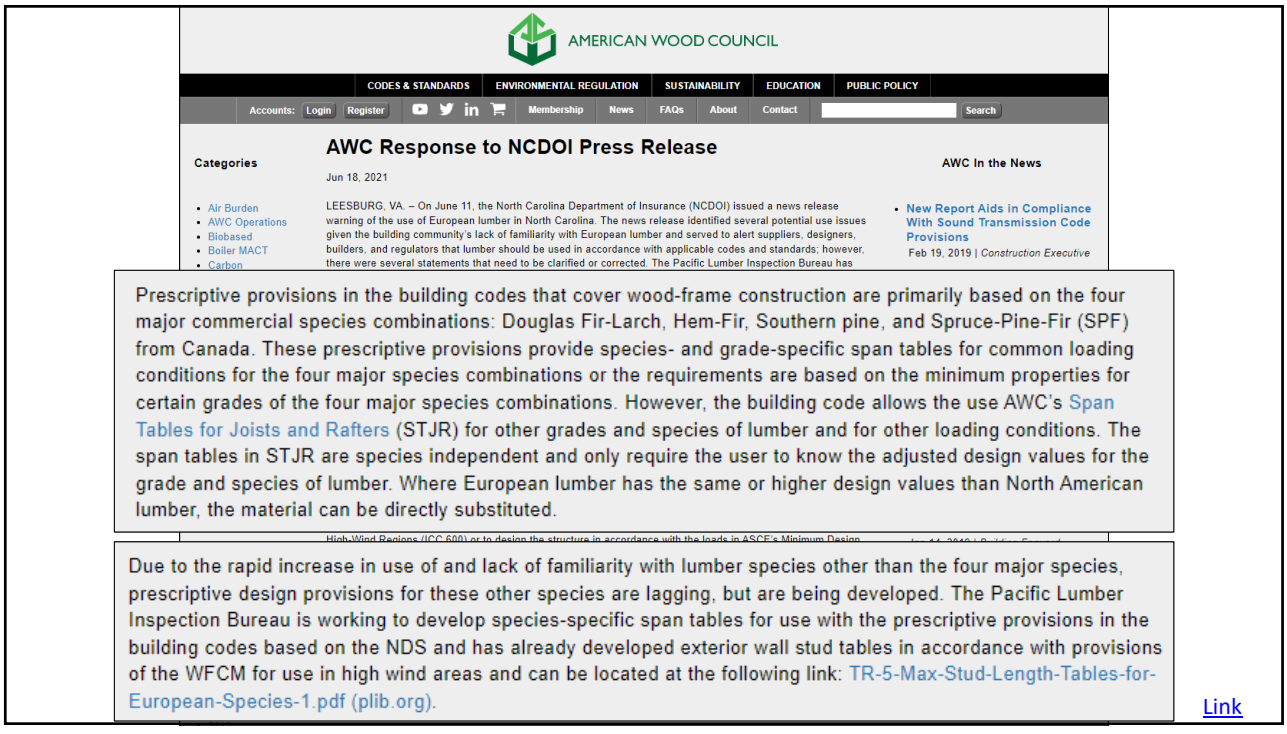
9



AMERICAN WOOD COUNCIL

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Categories

- Air Burden
- AWC Operations
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- Boiler MACT
- Carbon

AWC Response to NCDOI Press Release

Jun 18, 2021

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

AWC In the News

- **New Report Aids in Compliance With Sound Transmission Code Provisions**
  Feb 19, 2019 | *Construction Executive*

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

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

Link

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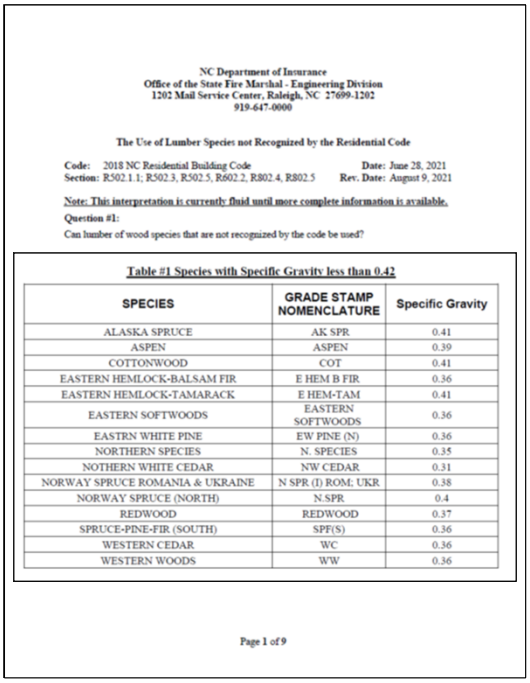


NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
1202 Mail Service Center, Raleigh, NC 27699-1202
919-647-0000

The Use of Lumber Species not Recognized by the Residential Code

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

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

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

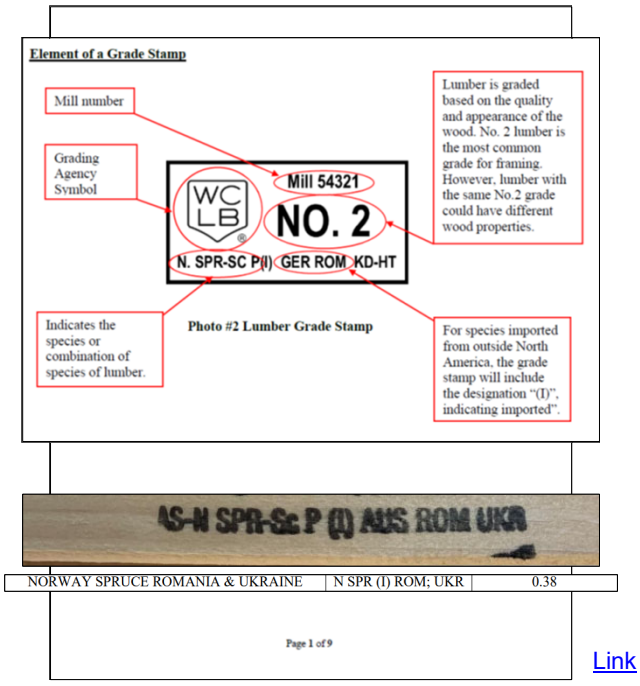
Table #1 Species with Specific Gravity less than 0.42

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

Page 1 of 9

Link

11



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.

Mill 54321
WC LB
NO. 2
N. SPR-SC P(I) GER ROM KD-HT

Indicates the species or combination of species of lumber.

Photo #2 Lumber Grade Stamp

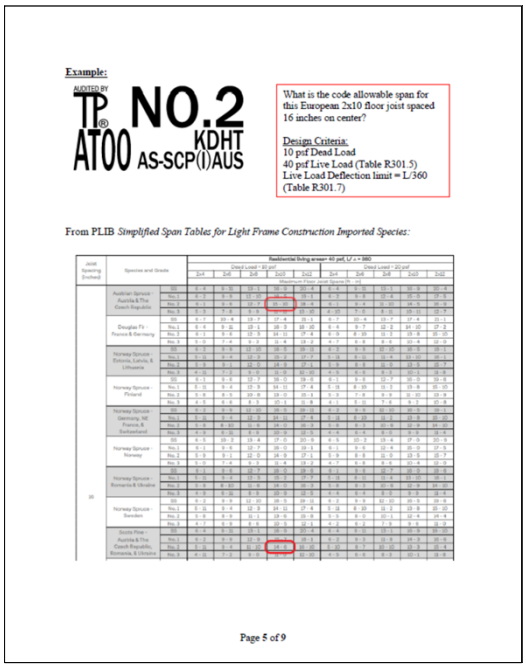
For species imported from outside North America, the grade stamp will include the designation "(I)", indicating imported".

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

Page 1 of 9

Link

12



Example:

AUDITED BY TP ATOO NO.2 KDHT 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:*

Page 5 of 9

13

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

20 professionalroofing.net SEPTEMBER 2021

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September 2021

Link

14

Imported plywood and OBS concerns

15

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”

16

Concerns with Brazilian plywood

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Lawsuit highlights inferior Brazilian plywood and false certification

A recent lawsuit has shined a light on the use of inferior Brazilian plywood and its false certification by long-time certifier PFS-TECO, according to NRCA General Counsel Trent Cotney.

What the lawsuit claimed

The suit was filed by U.S. Structural Plywood Integrity Coalition, which includes nine family-owned plywood manufacturers. The group alleged that PFS-TECO designated PS 1 certification for the plywood despite failing to meet U.S. standards. The lawsuit claimed negligence, false advertising and loss of revenue.

PS 1 certification indicates structural integrity for plywood panels used in floors, roofs and walls of commercial and residential buildings. After its production, PFS-TECO inspected the plywood and stamped it PS 1 before it was made available in the U.S.; however, the plywood had substantial failure rates during American Plywood Association testing and evaluation from other laboratories. Unfortunately, the plywood in question has been used throughout the U.S. for new construction projects, as well as for reconstruction in Florida, Puerto Rico and other areas affected by hurricanes.

The suit alleges that dating to Jan. 1, 2016, the inspection services "made false statements of fact through certifications that authorized 35 Brazilian plywood producers to export plywood into Florida" they either knew or

JUL./AUG. 2022
VOL. 52 ISSUE 6

Link

17

PFS·TECO

PFS Corporation d/b/a PFS TECO
An Employee-Owned Company

NEWS RELEASE

For Immediate Release
For more information, contact:

Scott Drake
Office: (608) 839-1013
scott.drake@pfsteco.com

Court-Issued Permanent Injunction related to Brazilian Plywood

Cottage Grove, WI (May 31, 2022) — In September 2019, a group of US plywood manufacturers filed a complaint in the Southern District of Florida concerning PFS TECO's work as an accredited third-party agency in Southern Brazil. The complaint alleged that the PFS TECO certification mark should be considered false advertising because their group believes it is not possible for plywood made from pine grown in Southern Brazil to meet the requirements of US DOC Product Standard 1 (PS 1).

PFS TECO has tested and certified plywood in Brazil for over 20 years. PFS TECO has been accredited and reaccredited by International Accreditation Services, Inc. as an inspection and testing agency and Standards Council of Canada as a certification agency. The third-party certification system for building products involves the manufacturer taking responsibility for their product while the third-party agency's role is to be the impartial link between the manufacturer and the local building official's review of the application of the product. The certification mark is intended to inform the building official that the manufacturer has demonstrated they have the capability to comply with the product standard and they had third-party oversight at the time the product was manufactured. The referenced product type and grade in the mark are then used during the building official's inspection.

On May 23, 2022, PFS TECO and the U.S. Structural Plywood Integrity Coalition agreed on the terms of a permanent injunction to settle the ongoing dispute between them. On the following day, according to the terms agreed by the parties, the Judge issued a permanent injunction under which PFS TECO exits the certification market for PS 1 rated plywood in Southern Brazil. The case was settled before the jury trial took place and/or the Court has made any determination on the case's merits. Therefore, the federal district court has not made any determination concerning the accuracy of the plaintiffs' allegations concerning the "strength" of the Brazilian plywood bearing the PFS TECO stamps or what "wholesalers and retailers" must or should do regarding existing stocks of the labeled product.

Indeed, the injunction does not prohibit, limit, or restrain the sale and/or use of the products labeled with PFS TECO mark on or before May 31, 2022. The injunction entered by the Court addresses only the future actions of PFS TECO. The injunction was made without any findings of fact about the products that have been labeled. The injunction specifically does not order the removal or obliteration of any label applied to the product on or before May 31, 2022. The relevant injunction language states:

> "IT IS ORDERED AND ADJUDGED that, within seven (7) days of the entry of this Judgment, PFS TECO is ordered to revoke all of the PS 1 certificates and grade stamps that PFS TECO has issued to plywood mills located in southern Brazil by emailing a notice of PS 1 certificate revocation to each Brazilian licensee and to remove all revoked PS 1 certificates from the PFS TECO website."

608.839.1013 · 1507 Matt Pass · Cottage Grove, WI 53527
WWW.PFSTECO.COM

PFS TECO TESTED MARKS YOU CAN BUILD ON

Link

PFS-TECO New Release

May 31, 2022

18

Conclusions and recommendations

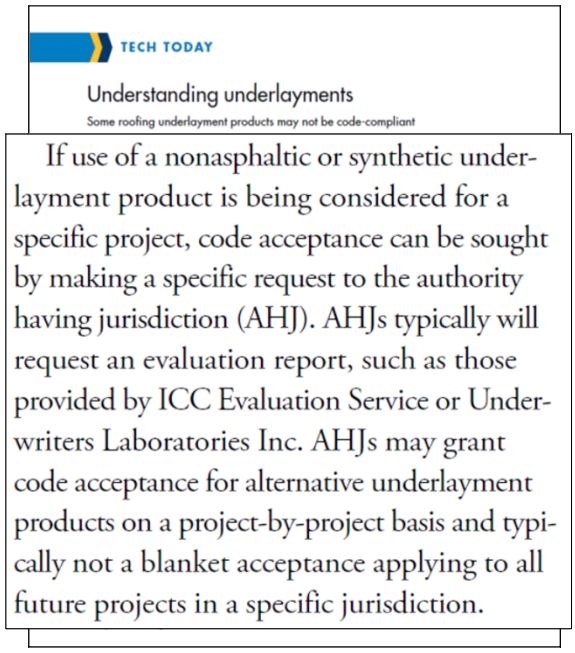
Concerns with imported lumber and plywood and OSB sheathing

- Be cautious of newly-installed lumber and plywood and OSB
- You may want to check grade stamps
- Roof deck acceptance should be limited
- Prepare yourself for more roof deck replacement

19

Synthetic underlayment

20



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

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December 2016

21

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

ASTM D8257

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

26 professionalroofing.net JULY/AUGUST 2021

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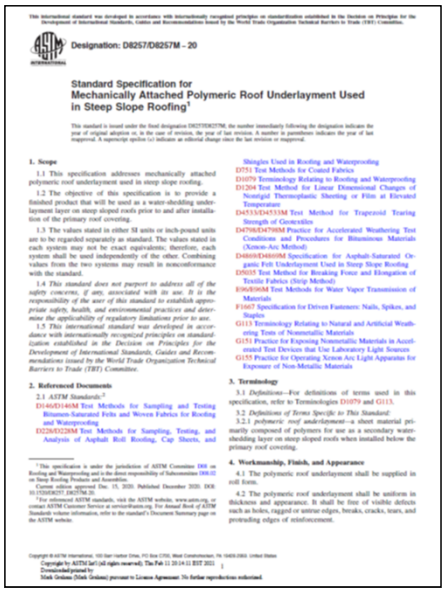
22



Designation: D8257/D8257M – 20

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

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

Published in December 2020

23

Designation: D8257/D8257M – 20

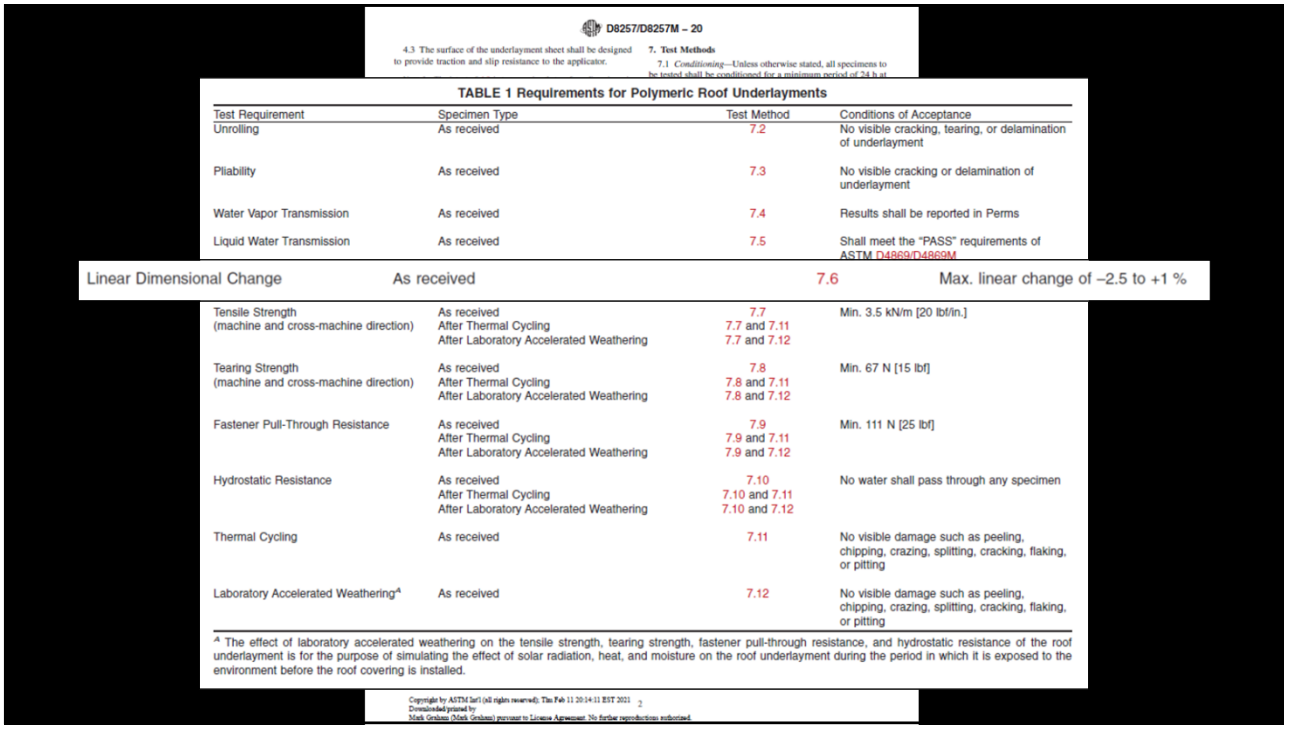
Standard Specification for
Mechanically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing[1]

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.

24



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

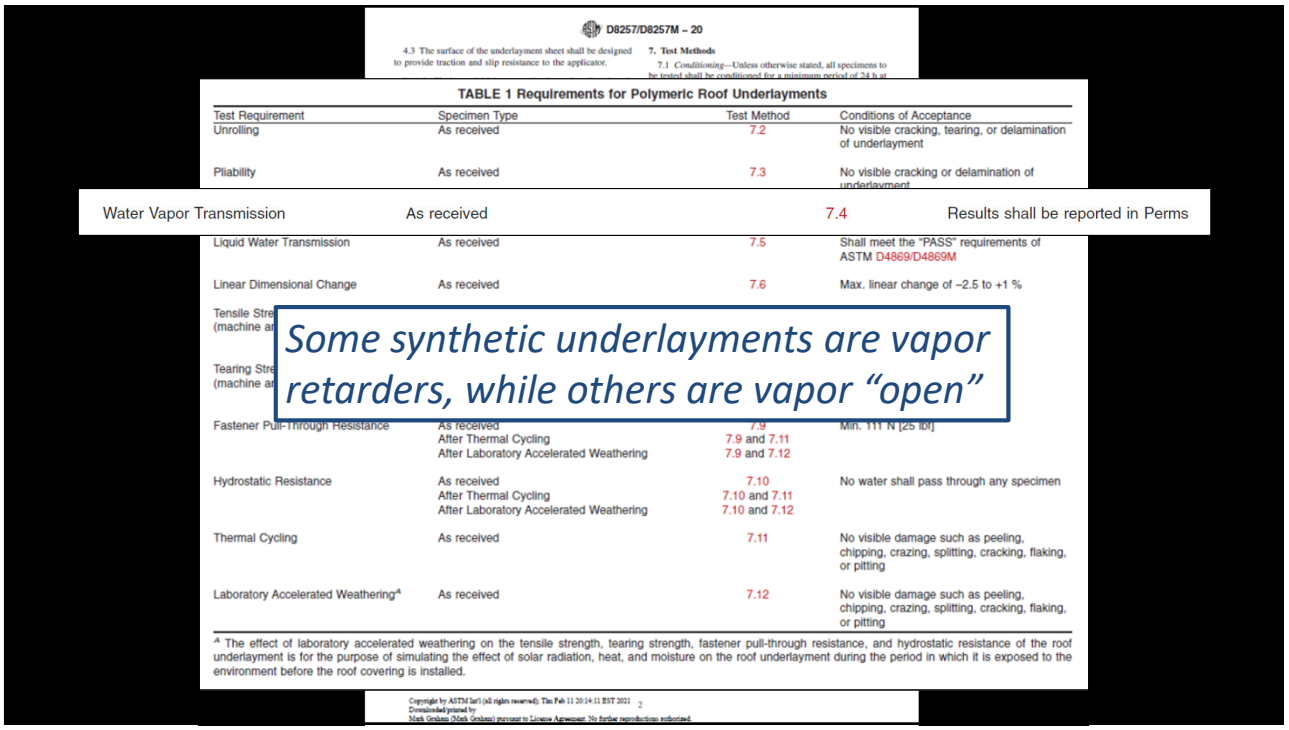
7.1 *Conditioning*—Unless otherwise stated, all specimens to be tested shall be conditioned for a minimum period of 24 h at

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 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.

25



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

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

26

NRCA permeance testing of asphalt shingle roof assemblies

27

Measurement of a vapor retarder's effectiveness

Classification	Permeance[1]
Class I vapor retarder	0.1 perm or less
Class II vapor retarder	1.0 perm or less and greater than 0.1 perm
Class III vapor retarder	10 perm or less and greater than 1.0 perm

[1] Permeance determined according to ASTM E-96 Test Method A (the desiccant method or dry cup method)

28

VAPOR PERMEABILITY PROVIDES

TEST MATERIAL	PERMEANCE RATING
Asphalt shingles – individual	0.9
#15 felt	7.0
Breathable synthetic	9.5
Nonbreathable synthetic	0.1
7/16-in. OSB decking	1.0

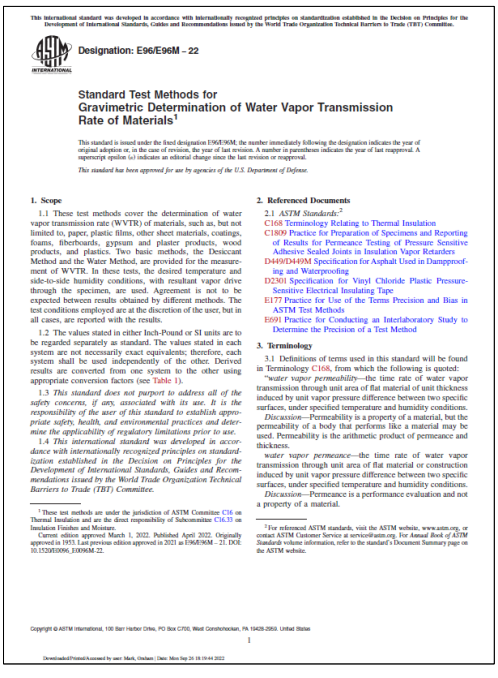
TEST MATERIAL	PERMEANCE RATING
OSB, #15 felt, Classic® shingles	0.31
OSB, Fiberglas™-reinforced felt, Classic® shingles	0.32
OSB, nonbreathable, Classic® shingles	0.27

IIBEC (formerly RCI) *Interface*

December 2011

Link

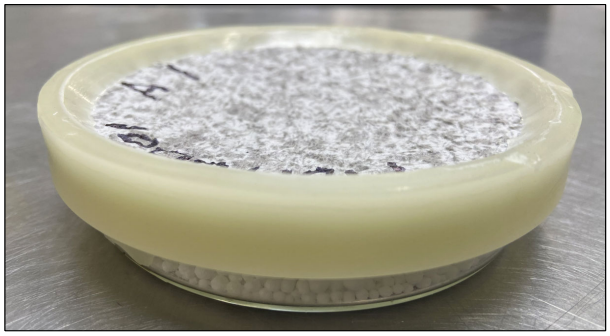
29



Designation: E96/E96M – 22

Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials[1]

ASTM E96, "Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials"



30

ASTM E96 Procedure A results

NRCA permeance testing of asphalt shingle roof assemblies

Sample	Water vapor permeance (Perms)
7/16” OSB sheathing	1.4
15/32” CDX plywood sheathing	0.9

31

ASTM E96 Procedure A results -- continued

NRCA permeance testing of asphalt shingle roof assemblies

Sample	Water vapor permeance (Perms)
Non-breathable synthetic underlayment	0.02
Breathable synthetic underlayment	0.5

32

ASTM E96 Procedure A results -- continued

NRCA permeance testing of asphalt shingle roof assemblies

Sample	Water vapor permeance (Perms)
Non-breathable synthetic underlayment over 7/16” OSB sheathing	0.03
Non-breathable synthetic underlayment over 15/32” CDX plywood sheathing	0.05
Breathable synthetic underlayment over 7/16” OSB sheathing	0.50
Breathable synthetic underlayment over 15/32” CDX plywood sheathing	0.22

33

ASTM E96 Procedure A results -- continued

NRCA permeance testing of asphalt shingle roof assemblies

Sample	Water vapor permeance (Perms)
Laminated asphalt shingle over non-breathable synthetic underlayment over 7/16” OSB sheathing	0.05
Laminated asphalt shingle over non-breathable synthetic underlayment over 15/32” CDX plywood sheathing	0.04
Laminated asphalt shingle over breathable synthetic underlayment over 7/16” OSB sheathing	0.40
Laminated asphalt shingle over breathable synthetic underlayment over 15/32” CDX plywood sheathing	0.09

34

ASTM E96 Procedure A results -- continued

NRCA permeance testing of asphalt shingle roof assemblies

Sample	Water vapor permeance (Perms)
Laminated asphalt shingle over non-breathable synthetic underlayment over 7/16" OSB sheathing	0.05 0.10 with nail
Laminated asphalt shingle over non-breathable synthetic underlayment over 15/32" CDX plywood sheathing	0.04 0.10 with nail
Laminated asphalt shingle over breathable synthetic underlayment over 7/16" OSB sheathing	0.40 0.50 with nail
Laminated asphalt shingle over breathable synthetic underlayment over 15/32" CDX plywood sheathing	0.09 0.18 with nail

35

"Preliminary" conclusions

NRCA permeance testing of asphalt shingle roof assemblies

- There is a potential for condensation development at the roof deck level when using synthetic underlayment
- Functional below-deck ventilation is (even more) important for mitigating condensation development at the roof deck level when using synthetic underlayment

36

Questions…. and other topics

37

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38