2025 CRCA Trade Show & Seminars

Oakbrook Terrace, Illinois

January 22-24, 2025

Low-slope roofing update on technical issues

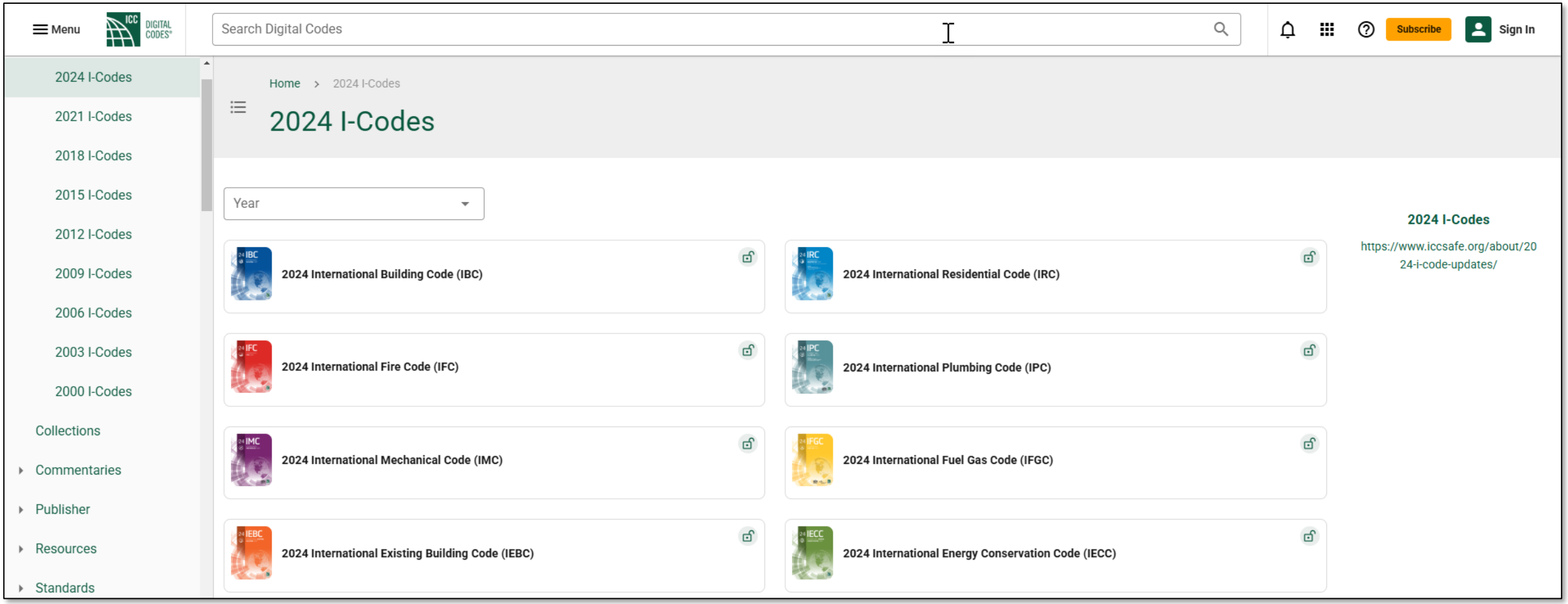
Mark S. Graham

Vice President, Technical Services

National Roofing Contractors Association

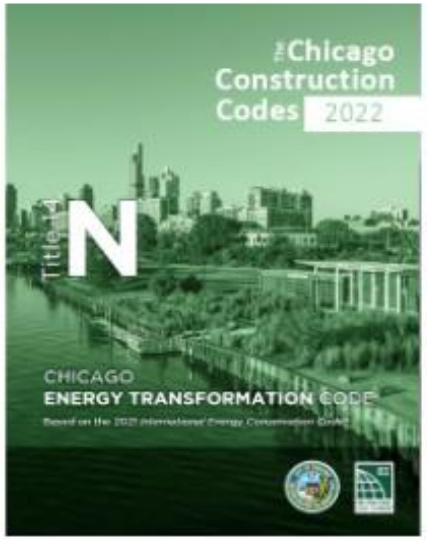
2024 I-codes

codes.iccsafe.org



City of Chicago

www.Chicago.gov



INTERIM Chicago Fire Prevention Code (14F)

Amendments only (full access)

INTERIM Chicago Fuel Gas Code (14G)

Full text (full access)

INTERIM Chicago Mechanical Code (14M)

Full text (full access)

Chicago Energy Transformation Code (14N)

Full text (read only)

Purchase copy (print / digital)

Amendments only (full access)

State of Illinois

cdb.Illinois.gov

Illinois Codes

Building Codes and Regulations

Building Codes and Regulations

COUNTY & MUNICIPAL CODE REPORTING

20 ILCS 3105/10.18 requires that all municipalities or counties adopting a new building code or amending an existing building code must provide an identification of the code by title and edition including local amendments to CDB at least 30 days before the effective date of the building code.

Use the **County Municipal Code Reporting Form** to notify CDB of your new or amended code.

BUILDING CODE QUESTIONS

To assist you, CDB provides two directories; one of local building codes and the other listing state regulations and statutes for your convenience.

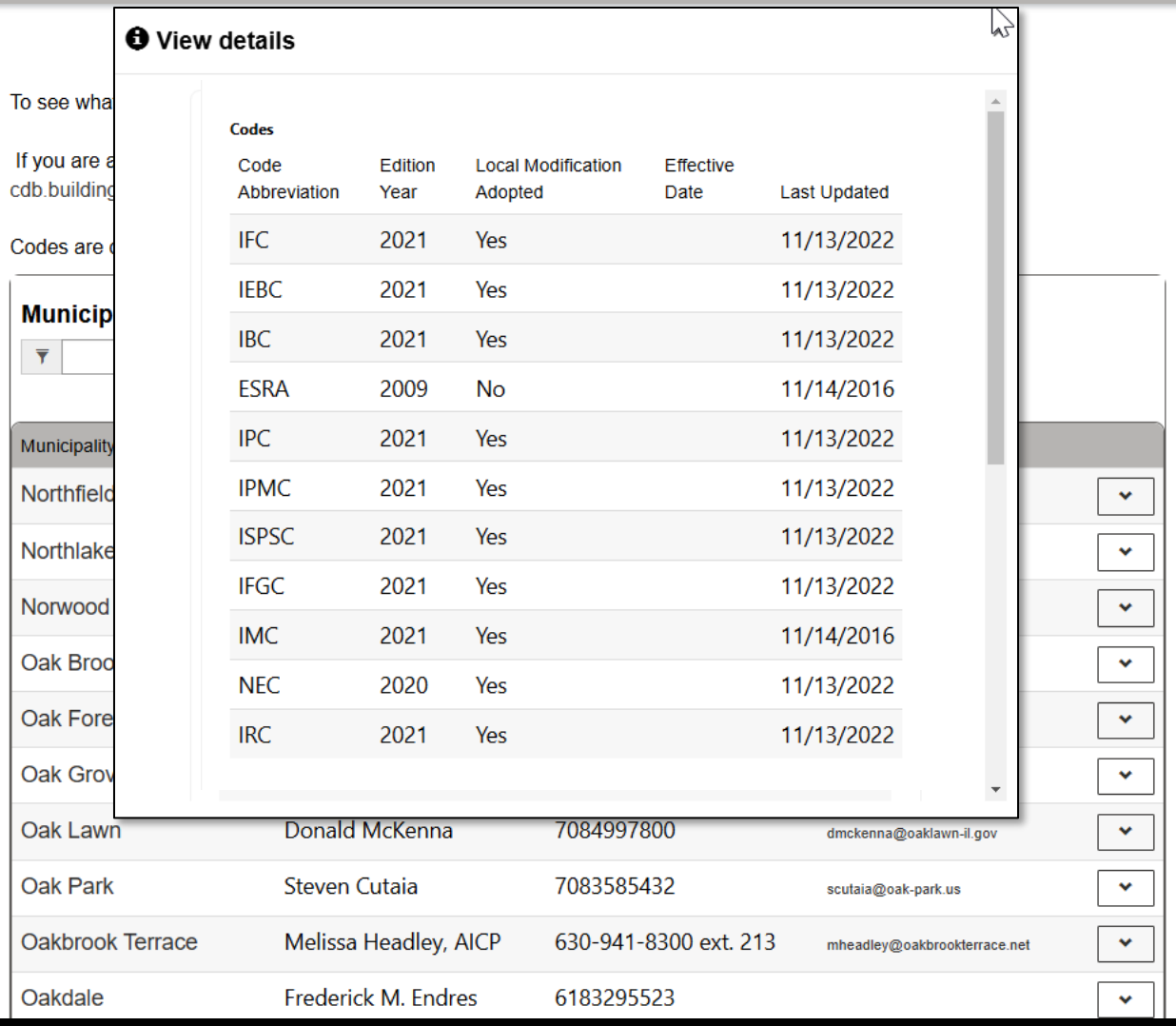
- **Illinois Municipal Code Directory**
- **Illinois Construction-Related Statutes and Rules Directory**

For more information see our **Building Codes & Regulations FAQs** or contact us at:

401 South Spring Street
3rd Floor, Stratton Building
Springfield, IL 62706
CDB.BuildingCodes@illinois.gov
Voice: 217-720-3021
TDD: 217-524-4449

- New or substantially improved buildings: IEBC® and IBC® (1/1/25 Incl. App G., Excl. Ch 11, 13, 29). Current edition or most recent preceeding edition.[1]

Illinois Municipal Code Directory



Codes

Code Abbreviation	Edition Year	Local Modification Adopted	Effective Date	Last Updated
IFC	2021	Yes		11/13/2022
IEBC	2021	Yes		11/13/2022
IBC	2021	Yes		11/13/2022
ESRA	2009	No		11/14/2016
IPC	2021	Yes		11/13/2022
IPMC	2021	Yes		11/13/2022
ISPSC	2021	Yes		11/13/2022
IFGC	2021	Yes		11/13/2022
IMC	2021	Yes		11/14/2016
NEC	2020	Yes		11/13/2022
IRC	2021	Yes		11/13/2022

Illinois Energy Codes

Illinois Energy Conservation Code

Illinois Stretch Energy Code

Advisory Council Meetings

Illinois Energy Codes

Illinois Energy Conservation Code (20 ILCS 3125/15)

The Illinois Energy Conservation Code requires design and construction professionals to follow the latest published edition of the International Energy Conservation Code (IECC) including amendments adopted by CDB for all commercial and residential buildings in the State. The 2021 Illinois Energy Conservation Code print and electronic editions are available from the International Code Council (**https://codes.iccsafe.org/**)

Illinois Stretch Energy Code (20 ILCS 3125/55)

The Illinois Stretch Energy Code allows municipalities and projects authorized or funded by the Board to achieve more energy efficiency in buildings than the Illinois Energy Conservation Code through a consistent pathway across the State.

The 2023 Illinois Stretch Energy Code print and electronic editions are available from the International Code Council (**https://codes.iccsafe.org/**).

- Colorado
- Connecticut
- Delaware
- District of Columbia
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan

Illinois Building Codes

Year
Current Adoption

NEW

2023 Illinois Stretch Energy Code
2021 IECC Amended
Effective Date: Jan 01, 2025

2021 International Building Code (IBC)

2021 Illinois Energy Conservation Code
Effective Date: Jan 01, 2024

2021 International Existing Building Code (IEBC)

2021 International Energy Conservation Code (IECC)

UPDATED

2021 International Residential Code (IRC)

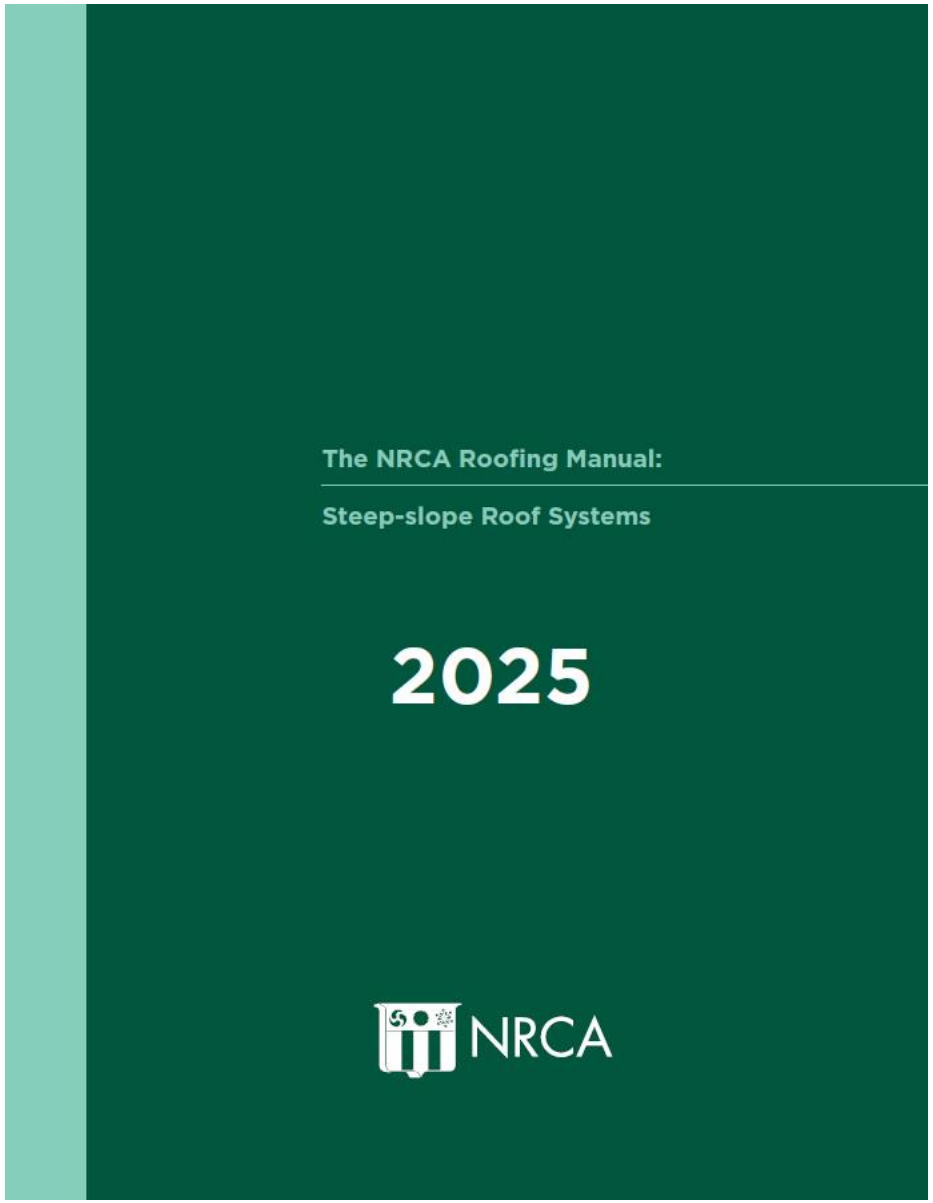
2015 International Plumbing Code (IPC)

2015 International Swimming Pool and Spa Code (ISPSC)

Info | Useful Links

Illinois

Currently there is no statewide Illinois building code. Units of local government can adopt codes of their choice. Effective 1/1/2025, a statewide building code will go into effect as required by the Capital Development Board Act (20 ILCS 3105). More information can be found at https://cdb.illinois.gov/business/codes/buildingcodesregulations.html The IL Energy Conservation Code is documented at https://cdb.illinois.gov/business/codes/illinois-energy-codes.html. It requires the State to adopt the current version of the IECC for all commercial and residential occupancies. The **Illinois Plumbing Code**, as maintained by the Illinois Department of Public



2025 NRCA Manual

Steep-slope Roof Systems

The Manual represents
“best practice” guidelines

Link

Significant revisions

The NRCA Roofing Manual: Steep-slope Roof Systems-2005

- OSB roof decks are no longer recommended
- Nailbase and vented nailbase insulation should be installed in two layers with staggered and offset joints
- Joints in vented nailbase insulation should be taped
- Updated code references to 2024 I-codes
- New appendix addressing IBHS' Fortified program

TO VIEW, CLICK ON BOOK COVER

The NRCA Roofing Manual—2025 Set

NRCA

Roof Wind Designer

www.roofwinddesigner.com

RESEARCH+TECH

Plywood or OSB?

Moisture-related concerns exist with wood structural panels

by Mark S. Graham

NRCA's technical services staff continues to hear from roofing contractors experiencing moisture-related dimensional stability problems with plywood and oriented strand board structural panel sheathing used with steep-slope roof systems. Following is a brief discussion of moisture mechanics, linear expansion and thickness swell testing, and NRCA's recommendations for plywood and OSB structural panel sheathing roof decks.

Moisture mechanics

Plywood and OSB sheathing, similar to all wood products, are hygroscopic, meaning they tend to absorb and release moisture from their surroundings.

When not exposed to direct wetting, structural panel sheathing's moisture content is a function of its environment's relative humidity and temperature. During construction and its service life, panels may be exposed to direct moisture. When exposed to direct wetting, structural panel sheathing's moisture content is influenced by wetting time and panel variables that affect capillarity, such as veneer species of plywood and wax additives in OSB.

Professional Roofing

April 2021

Link

Standards for wood structural panels

International Residential Code, 2021 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

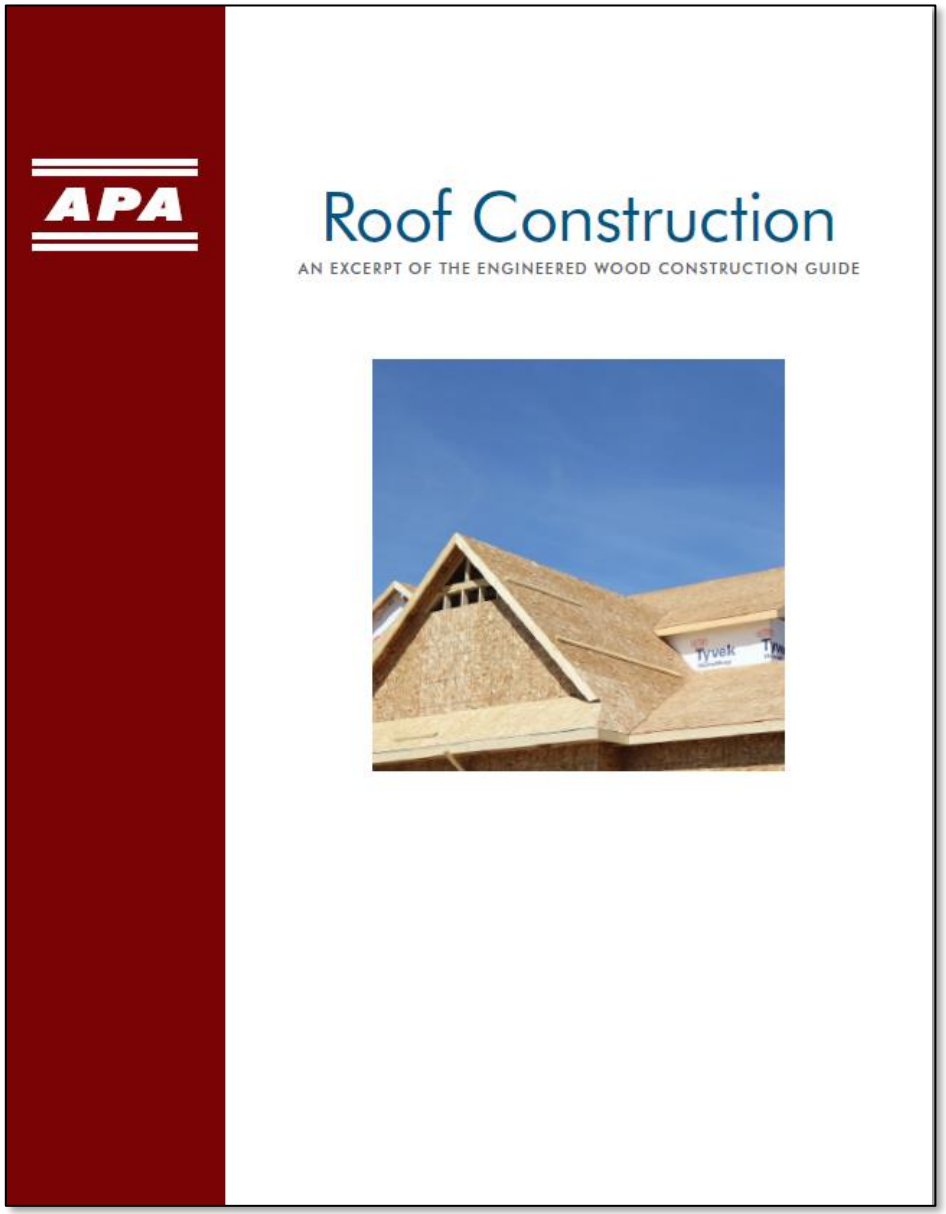
Plywood and OSB:

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

Attachment of Wood Panels: The *International Residential Code, 2024 Edition's* Table R602.3(1)-Fastening Schedule provides minimum fastener and fastener spacing requirements for wood structural panels into roof framing shown in Figure 6.1.

Item	Description of building elements	Number and type of fasteners	Spacing of fasteners	
			Edges (inches)	Intermediate supports (inches)
Wood structural panels, roof sheathing to framing and particle board wall sheathing to framing				
31	3/8- to ½-inch-thick	6d common or deformed nail (2" x 0.113" x 0.281" head)	6	6
		8d common nail (2½" x 0.131" x 0.281" head), or RSRS-01 nail (2⅜" x 0.113" x 0.281" head)	6	6
32	19/32- to ¾-inch thick	8d common nail (2½" x 0.131" x 0.281" head), or RSRS-01 nail (2⅜" x 0.113" x 0.281" head)	6	6
33	7/8- to 1¼-inch thick	10d common nail (3" x 0.148" x 0.281" head), or 2½" x 0.131" x 0.281" head deformed nail	6	12

Figure 6-1. Roof sheathing-specific excerpt from International Residential Code, 2024 Edition's Table R602.3(1)-Fastening Schedule



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

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

Link

Considerations

Lumber, plywood and OSB

- Be extra cautious of plywood and OSB roof decks
- Limit your deck acceptance responsibilities
- Consider more proactive plywood and OSB deck replacement
- Consider pull tests for plywood and OSB roof decks when using mechanically-attached membrane systems

RESEARCH + TECH

Photo courtesy of Atlas Roofing, Atlanta

Know the options

Proper specification is essential for nail-base insulation

by Mark S. Graham

In roof assembly configurations with nailable roof coverings, such as asphalt shingles and metal panels, factory-fabricated, nail-base insulation is becoming more common as a component of insulation entirely above the roof deck. Because nail-base insulation serves multiple functions, including being a roof covering substrate and thermal insulation layer, proper design and specification are essential for roof assembly performance.

The basics

Nail-base insulation is composed of a layer of rigid board insulation factory-adhered or laminated to a layer of structural wood panel sheathing, such as plywood or oriented strand board.

The U.S. product standard for nail-base insulation is ASTM C1289, "Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," Type V. It provides requirements for a polyisocyanurate insulation foam core

Professional Roofing

September 2024

Link

Nailbase insulation considerations

- Double layer design and application
- Taped joints can control vapor leaks/underlayment wrinkling at board joints
- Pressure-tested and FRT nailbase are not good ideas for nailbase

Polyiso. testing

R-value testing


HP31
HP32
HP33
HP34
HP21
HP22
HP23
HP24
HP12
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HP14
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EP14
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EP12
EP11

LTTR – ASTM C1303 and ASTM C518

- A 15-year time-weighted average R-value
- The predicted R-value after 5-years (under controlled laboratory conditions)

R-value – ASTM C518

- R-value at the time of the test

- LTTR and R-value is typically tested and reported at 75 F.
- NRCA tests at 75 F, but we also test at 40 F and 110 F.

Test results

Manufacturer	Apparent density (lb/ft^3)	Thickness (inches)
1c	2.726	2.578
1p	2.002	2.594
2c	3.254	2.576
2p	2.024	2.585
3p	2.218	2.500
4p	2.057	2.735

Test results

Manufacturer	R-value (75 F)
1c	14.4
1p	13.9
2c	13.6
2p	15.6
3p	13.2
4p	15.3

More test results

Manufacturer	R-value (40 F)	R-value (75 F)	R-value (110 F)
1c	10.8	14.4	12.8
1p	8.9	13.9	12.0
2c	14.5	13.6	12.1
2p	15.4	15.6	13.4
3p	12.6	13.2	11.6
4p	16.9	15.3	13.1

Preliminary conclusions

- Tested R-values vary
- Some tested R-values are already lower than LTTR
- Some samples are exhibiting different characteristics

Preliminary recommendations

- Specify, purchase and sell polyisocyanurate insulation (and all insulation products) based on their thicknesses, not its R-values

“Fully” adhered

TECH TODAY

The fully adhered misnomer

Terminology can create unrealistic expectations within the roofing industry

by Mark S. Graham

The term "fully adhered" is used by some manufacturers and specifiers to identify adhered single-ply membrane roof system configurations or refer to the adhesion of rigid board insulation to underlying substrates. But this terminology can create application and performance expectations that are unrealistic and likely cannot be achieved.

NRCA recommends the term "fully adhered" be avoided

Definitions

When considering the term "fully adhered," it is important to realize it is not specifically defined by the U.S. roofing industry.

The industry's consensus-based terminology standard, ASTM D1079, "Standard Terminology Relating to Roofing and Waterproofing," does not include terms or definitions for fully adhered, adhered or adhesion.

Similarly, the glossary contained in the appendix of *The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing—2014* does not contain a specific definition for the term fully adhered. The manual defines "adhere" as: "To cause two surfaces to be held together by the combined strength of the molecular forces and the mechanical interlocking achieved between adhesive and the bonded surface … ."

Merriam-Webster defines adhere (and its derivatives adhered and adhering) as "to hold fast or stick by or as if by gluing, suction, grasping, or fusing." Similarly, the term "fully" is defined as "in a full manner or degree; complete."

Although not specifically defined, the implication of fully adhered is 100 percent adhesion between two surfaces or materials.

Realistic expectations

Experienced roofing industry professionals realize the expectation of complete adhesion between two surfaces such as a single-ply membrane and underlying rigid board insulation is unrealistic and likely cannot be achieved in field applications.

Taken at its most literal sense, complete adhesion between a single-ply membrane and a rigid board insulation substrate is impossible because there will not be membrane adhesion at the insulation boards' joints.

Also, thickness variability in insulation boards and its effect on adhesion needs to be considered. For example, the U.S. product standard for polyisocyanurate insulation, ASTM C1289, "Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," permits a board thickness tolerance of ±⅛-inch and crushing and depressions up to ⅛ of an inch in depth on up to 10 percent of a polyisocyanurate insulation board's surface area. Because reinforced single-ply membranes tend to lay relatively flat, having an adhered membrane application readily conform to and remain completely adhered to the recognized irregularities in insulation boards is unlikely.

Irregular, nonsmooth roof deck surfaces create similar situations. Because board-type insulation is relatively rigid, it generally will not readily conform to irregularities in roof deck substrates. Individual rigid boards tend to rest on the high points in a roof deck's finished surface and span the low points.

As a result, rigid board insulation seldom is completely adhered to roof deck substrates. It generally is adhered at the relative high points in the roof deck's surface and may be partially or marginally adhered and even unadhered at the relative low points. Specifying smaller insulation board sizes (4 by 4 feet instead of 4 by 8 feet) generally is suggested to minimize rigid insulation boards from spanning substrate low-point irregularities.

In practice

The concept of lacking 100 percent, complete adhesion between two adhered surfaces is not new to the roofing industry; it has long been recognized in the application of built-up roof membranes where voids between plies can occur. To address this, NRCA's *Quality Control Guidelines for the Application of Built-up Roofing* indicates interply moppings are intended to be continuous; however, voids of limited size are permitted provided overlapping voids do not occur between two or more plies. NRCA has maintained this position since the late 1970s, and it has become well-accepted by the roofing industry.

As it applies to adhering rigid board insulation in continuously applied adhesive applications, actual adhesion rates of about 60 to 90 percent are common (even less in some specific instances) in successfully performing adhered roof systems.

On this basis, NRCA recommends the term "fully adhered" be avoided and suggests the term "adhered" for field applications because it is more realistic.

MARK S. GRAHAM is NRCA's vice president of technical services.

Professional Roofing

January 2017

Link

“Moisture” meter concerns

These meters do not read moisture…
…they are reading relative conductivity, which can be correlated to specific materials in specific conditions when properly calibrated.

Considerations

"Moisture" meters

- Read/understand the instruction manual
- Understand device sensitivity
- Understand proper operating conditions
- Proper calibration/recalibration is critical
- Don't overstate the meter's capability
- Verify job-specific results with gravimetric analysis

IR thermometers

The same concerns apply:

- Not really measuring temperature
- Emissivity
- Reflectivity
- Devices are sensitive to temperature and humidity changes

Low Slope Roofing Systems

PRINT

Course Overview

If you design, install, commission, maintain or repair low slope roofing systems, this course will provide you with the tools and techniques to do your job correctly and avoid problems. Upon completing this course, you will be able to identify the best solutions to your roofing problems, whether you're working on new construction, performing maintenance, or re-roofing.

Upcoming dates (1)

Dec. 2-3, 2025

Madison, WI

ENROLL NOW

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College of Engineering

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Home / courses / Advanced Topics and Current Issues in Low-slope Roofing

Advanced Topics and Current Issues in Low-slope Roofing

PRINT

Course Overview

Learning objectives for this new course include expanding on your ability to troubleshoot water- and wind-related failures, gaining a greater understanding of moisture mechanics and issues related to concrete roof decks, and recognizing some legal considerations and sustainability issues in the roofing industry.

Upcoming dates (1)

Mar. 25-26, 2025

Madison, WI

ENROLL NOW

Add to Calendar

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We're moving! NRCA's new office address as of April 1, 2025…

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