



2018 CRCA Tradeshow & Seminars
January 18-19, 2018

Roofing technical issues

presented by

Mark S. Graham

Vice President, Technical Services
National Roofing Contractors Association



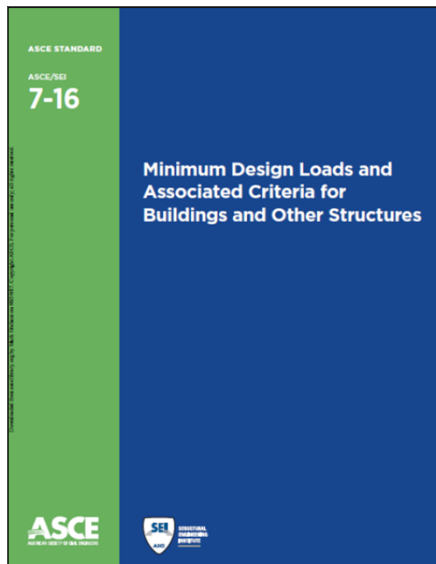
Topics

- Code update
- Roof drainage concerns
- Moisture in concrete roof decks
- Metal stud-frames parapet walls
- FM “approvals” and UL “certifications”
- Questions... other topics

International Building Code, 2018 Edition (IBC 2018)



New design load determination method

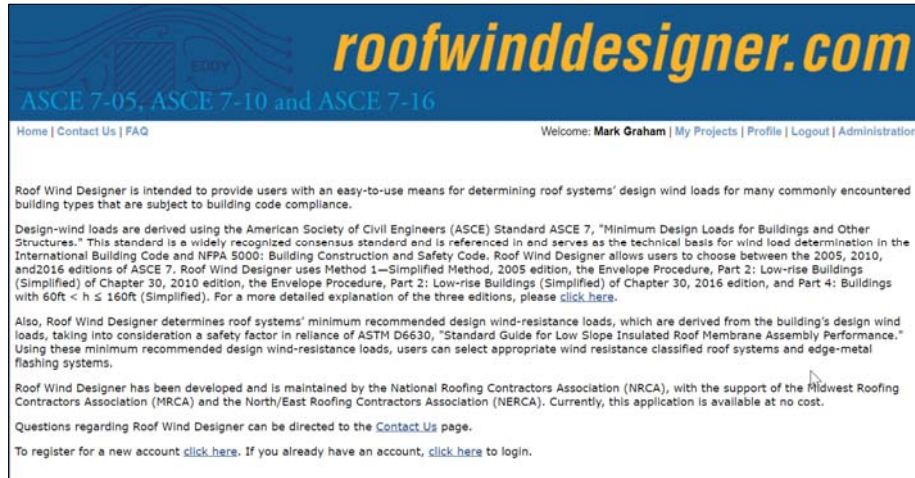


ASCE 7-16

Referenced in IBC 2018

Updating www.RoofWindDesigner.com

ASCE 7-16 capability will be available in February 2018



The screenshot shows the website's header with the logo "roofwinddesigner.com" in orange and blue. Below the logo, it lists "ASCE 7-05, ASCE 7-10 and ASCE 7-16". The navigation bar includes "Home | Contact Us | FAQ" and "Welcome: Mark Graham | My Projects | Profile | Logout | Administration". The main content area contains several paragraphs of text explaining the software's purpose, design standards (ASCE 7, NFPA 5000, etc.), and how it determines wind loads and resistance. It also mentions the support of the National Roofing Contractors Association (NRCA) and the North/East Roofing Contractors Association (NERCA).

International Existing Building Code, 2018 Edition (IEBC 2018)



TECH TODAY

New roofing rules

IEBC 2015 presents challenges when reroofing

by Mark S. Graham

For the first time, the International Existing Building Code, 2015 Edition (IEBC 2015) includes specific code requirements applicable to reroofing. IEBC 2015 also provides additional and sometimes more complex code requirements than those contained in the International Building Code (IBC) and International Residential Code (IRC).

Reroofing requirements
IEBC and IRC were developed and are maintained with the primary intent of applying to new construction. One exception is both codes also address reroofing—re-covering and replacing existing roof coverings on existing buildings.

Where adopted, IEBC 2015's structural reroofing requirements may be more stringent

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buildings into three categories: Level 1, Level 2 and Level 3.

Level 1 alterations include the removal and replacement of the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that were the same purpose. Reroofing projects are considered Level 1 alterations.

Level 2 and Level 3 alterations are larger in scope. For example, Level 3 alterations apply when the work area exceeds 50 percent of the building floor area.

IEBC 2015's Chapter 7—Alterations—Level 1 includes a new section, Section 703—Reroofing, that was not included in IEBC's previous editions. This section's requirements are identical to those of IRC 2012's Section 1518—Reroofing.

IEBC 2015's Section 707—Structural—includes newer additional requirements applicable to reroofing.

Section 707.2—Addition or Replacement of Roofing or Replacement of Equipment—indicates when roof system replacement results in additional dead load, structural components supporting the new roofing materials need to comply with IEBC. Exceptions to this requirement include when the dead load does not increase (more than 7 pounds per square foot), or when the new material has a weight less than 3 pounds per square foot.

Section 707.3—Additional Requirements for Reroof Projects—provides additional structural requirements for projects where the reroofing being undertaken (R1D) requires reroofing permits.

Section 707.3.1 requires unconditioned

measures projects for buildings where more than 25 percent of the roof area is being reroofed in Section 707.3.2 requires that R or F to have new purlins installed in order to meet IRC column lines.

Section 707.3.2 requires buildings located in high wind regions (V_w greater than 115 mph) or in special wind regions that are designed with roof diaphragms (roof decks) to be reinforced for structural adequacy. This requirement applies when more than 50 percent of the diaphragm is replaced during roof system replacement. The roof diaphragm, connections of the roof diaphragm to roof framing members and roof-to-wall connections are required to be evaluated using the current code's wind loads. If the diaphragm and connections are not capable of meeting 75 percent of the current code's wind loads, they must be strengthened or replaced according to IRC's requirements.

Bring in knowledgeable
When adopted, IEBC 2015's structural reroofing requirements may be more stringent than IRC and IEBC's reroofing provisions. Designers should determine whether IEBC 2015 is applicable and clearly indicate any additional work that is required for compliance in the construction documents.

The International Code Council, publisher of IEBC 2015, indicates the code currently applies in California and Colorado and in specific jurisdictions in Massachusetts, Mississippi, Oklahoma, Washington, West Virginia and Wyoming. Local AHJ's can verify whether IEBC 2015 applies. ■■■

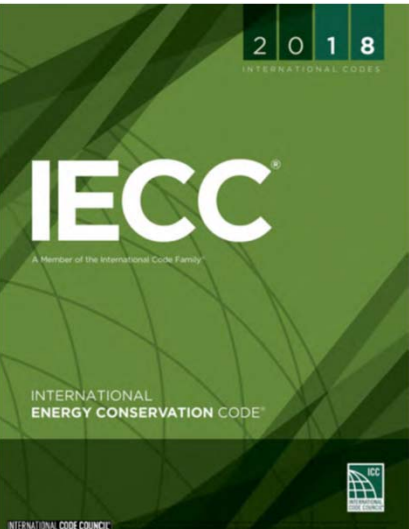
MARK S. GRAHAM is IEBC's vice president of technical services.

Professional Roofing

September 2016


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International Energy Conservation Code, 2018 Edition (IECC 2018)



2018 CRCA Tradeshow & Seminars

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Keeping an eye on
I-CODES:
Part one

Professional Roofing
December 2017

[Link to access this article](#)

Illinois' adoptions

- The City of Chicago develops their own code
- Other municipalities adopt the IBC, etc. on their own schedules
 - Expect some 2018 I-code adoptions in 2018
- State of Illinois has traditionally adopted the IECC
 - CDB already considering IECC 2018 adoption
 - August 2018 adoption (Tentative)
 - March 1, 2019 effective date (Tentative)

Roof drainage concerns

Roof drainage

SECTION 1502 ROOF DRAINAGE

[P] 1502.1 General. Design and installation of roof drainage systems shall comply with Section 1502 of this code and Sections 1106 and 1108, as applicable, of the *International Plumbing Code*.

[P] 1502.2 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. The installation and sizing of secondary emergency overflow drains, leaders and conductors shall comply with Sections 1106 and 1108, as applicable, of the *International Plumbing Code*.

1502.3 Scuppers. Where scuppers are used for secondary (emergency overflow) roof drainage, the quantity, size, location and inlet elevation of the scuppers shall be sized to prevent the depth of ponding water from exceeding that for which the roof was designed as determined by Section 1611.1. Scuppers shall not have an opening dimension of less than 4 inches (102 mm). The flow through the primary system shall not be considered when locating and sizing scuppers.

1502.4 Gutters. Gutters and leaders placed on the outside of buildings, other than Group R-3, private garages and buildings of Type V construction, shall be of noncombustible material or not less than Schedule 40 plastic pipe.

CHAPTER 11 STORM DRAINAGE

Where scuppers, scupper roofs, buildings must be removed and drained to a location that can accommodate storm water. Chapter 11 specifies the design method used for the geographic area and provides sizing methods for piping and public systems to convey the storm water away from the building. Included in this chapter are regulations for piping materials and related drainage systems.

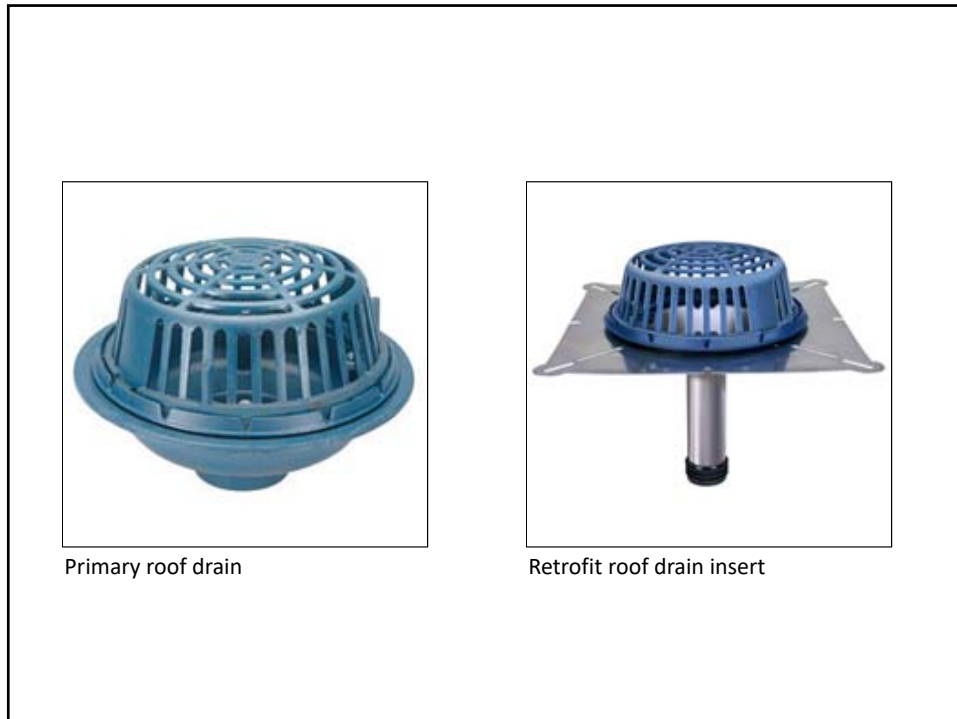
SECTION 1105 ROOF DRAINS

1105.1 General. Roof drains shall be installed in accordance with the manufacturer's instructions. The inside opening for the roof drain shall not be obstructed by the roofing membrane material.

1105.2 Roof drain flow rate. The published roof drain flow rate, based on the head of water above the roof drain, shall be used to size the storm drainage system in accordance with Section 1106. The flow rate used for sizing the storm drainage piping shall be based on the maximum anticipated ponding at the roof drain.

SECTION 1106 SIZE OF CONDUCTORS, LEADERS AND STORM DRAINS

1106.1 General. The size of the vertical conductors and leaders, building *storm drains*, building *storm sewers* and any horizontal branches of such drains or *sewers* shall be based on the 100-year hourly rainfall rate indicated in Figure 1106.1 or on other rainfall rates determined from *approved* local weather data.



Primary roof drain

Retrofit roof drain insert

NRCA's interim recommendations

Roof drainage concerns

- Be cautious of roof drain issues, particularly in reroofing situations
 - IBC 2009 adds secondary drainage
 - IBC 2015 provides exception
 - IPC 2015 and IPC 2018 changes
- Assure membrane opening is larger than drain outlet/piping opening
- Be cautious of retrofit drain inserts
- Consider proposal/contract language

Moisture in concrete roof decks

NRCA Industry Issue Update, August 2013



NRCA Member Benefits

Moisture in Lightweight Structural Concrete Roof Decks

Concrete Moisture Presents Challenges for Roofing Contractors

NRCAs Technical Services Section is receiving an increasing number of inquiries relating to the application of roof systems over concrete roof decks. These inquiries can be separated into two general questions: When is a concrete roof deck dry enough to apply a roof covering? And why is a roof system applied over a concrete roof deck showing signs of moisture infiltration when the roof covering isn't leaking?

CONCRETE BASICS

There are three general types of concrete: normal-weight structural concrete, lightweight structural concrete and lightweight insulating concrete.

Normal-weight structural concrete is what most people think of as concrete. It has a density of about 150 pounds per cubic foot (pcf). Lightweight structural concrete has structural load-carrying capabilities similar to normal-weight structural concrete. It has a density in the range of 85 to 130 pcf. Lightweight insulating concrete, which many roofing professionals are familiar with as an insulating, slope-in-place deck topping, typically has a density in the range from 30 to 60 pcf.

Structural concrete—normal-weight structural concrete and lightweight structural concrete—is produced by mixing large and small aggregates, Portland cement, water and, in some instances, admixtures such as fly ash or various chemical additives. Admixtures can add entrained air to the concrete, accelerate concrete's curing, retain concrete's excess moisture and/or lengthen concrete's finishing time. Use of admixtures typically is not visually identifiable in the field; microscopic analysis usually is needed for post-application identification of admixtures.

The primary difference in the composition of normal-weight structural concrete and lightweight structural concrete is the large aggregate type. Normal-weight structural concrete contains normal-weight aggregates such as stone or crushed gravel, which are dense and typically will absorb no more moisture than about 2 percent by weight. Lightweight structural concrete uses lightweight,

porous aggregates such as expanded shale, which will absorb about 5 to 25 percent moisture by weight. Lightweight aggregates need to be saturated with moisture...it's often stored in ponds...before mixing. As a result, lightweight structural concrete inherently contains much more water than normal-weight structural concrete.

Lightweight structural concrete is used in roofing-related applications for cast-in-place concrete roof decks using removable forms; composite roof decks where a normal form deck remains in place and as a deck topping material, such as a concrete topping surface over precast concrete planks or slabs.

Once poured, lightweight structural concrete typically cannot be easily distinguished from normal-weight structural concrete.

Visual identification is possible using impregnation, typically a microscope used by a trained technician.

REPORTED PROBLEMS

The problems reported to NRCA associated with lightweight structural concrete roof decks include the following:

- **Adhesive accumulation.** Excessive moisture from a concrete deck can be present differential drains into and condensed within a roof system.
- **Adhesive del.** The presence of moisture can result in deterioration of moisture-sensitive roofing materials and adhesive bond loss between adhered material layers.
- **Adhesive cure with water bleed and late-onset adhesive cure/powder.** Excessive moisture can affect adhesive curing and drying rates. Also, moisture can result in adhesive "rewetting," resulting in bond strength loss.
- **Metal and faster corrosion.** Excessive moisture can contribute to and accelerate metal components' corrosion, including fastener corrosion.
- **Insulation R-value loss.** The accumulation and presence of moisture in most insulation products will result in reduced thermal performance (lower effective R-value).
- **Microbial growth.** The presence of prolonged high-moisture

Moisture on concrete roof decks

RESEARCH • TECH



Moisture in concrete roof decks
Normal-weight and lightweight structural concrete cause some concern
by Mark S. Graham

NISCA continues to receive a significant number of reports of moisture-related problems associated with concrete roof decks. Following a recent background investigation and NISCA-based recommendations for addressing the issue:

What's happened
The issue of moisture in concrete roof decks in the past. Since 2005, NISCA has received numerous reports of moisture-related problems with roof systems installed on concrete roof decks. Both lightweight structural and normal-weight structural concrete, significant problems include: roof system delamination, substrate loss, substrate failure with water bleed and low modulus/cracking/substrate, metal and balloon corrosion, insulation R-value loss and microbial growth.

Since the 2005 publication of the NISCA *Roofing and Waterproofing Manual*, 2010 edition, NISCA has long promoted the practice and use method as a viable assessment to determine a concrete roof deck's dryness before membrane application. Also, since 2010, the correlation between concrete 3R dryness method and its true "dryness"

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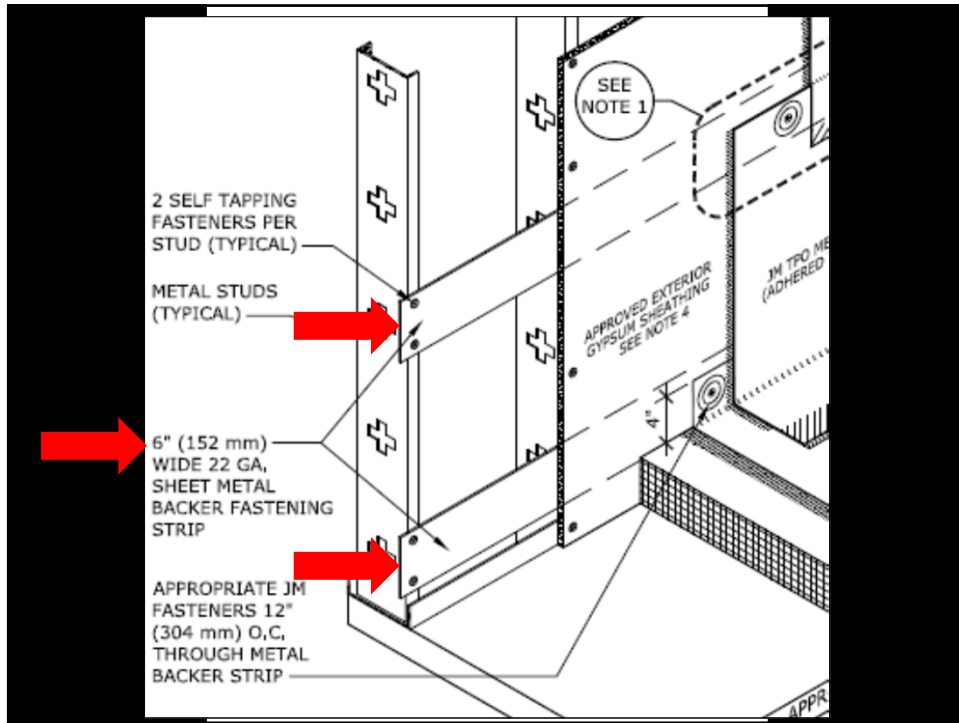
Professional Roofing,
Sept. 2017

[Link to access this article](#)

*There is a need for the roofing industry
to re-think on roof deck "acceptance"*

Metal stud-framed parapet walls



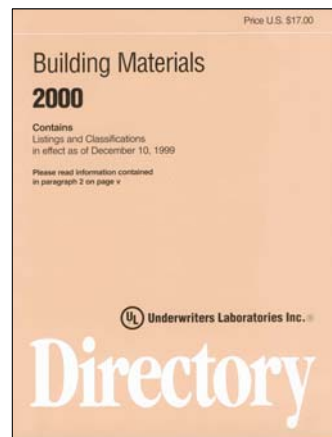
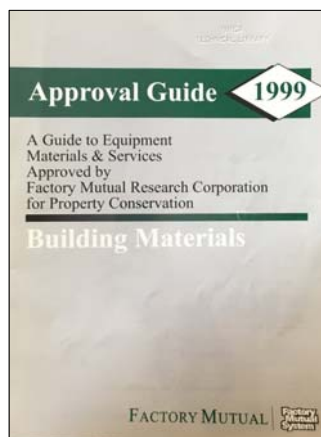


*Applicators need more guidance
on base termination/attachment details*

FM “approvals” and UL “certifications”

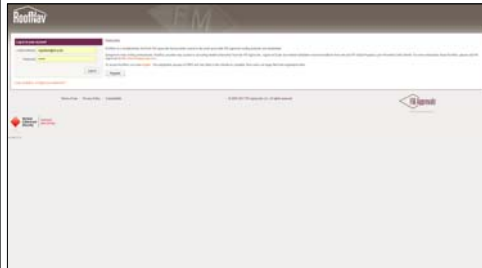
Documentation sources

Previously



Documentation sources

Current generation



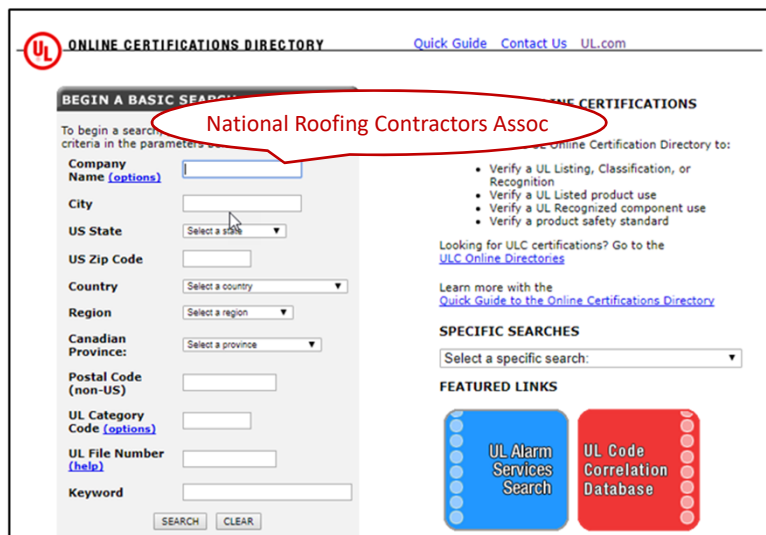
www.roofnav.com




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| Company Name | Category Name | Link to File |
|--|--|-----------------------------|
| Construction No. 575 | Roof Deck Constructions | TGKX.575 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Metal Roof Deck Panels | TJPV.R20610 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Roof Deck Fasteners | TISX.R20686 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R27046 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Roofing Systems | TGFU.R20610 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Roofing Systems, Uplift Resistance | TGIK.R20610 |

Model number information is not published for all product categories. If you require information about a specific model number, please contact [Customer Service](#) for further assistance.

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TGJZ.R27046
Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems

[Page Bottom](#)

Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems

[See General Information for Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems](#)

NATIONAL ROOFING CONTRACTORS ASSOCIATION R27046
 SUITE 600
 10255 W HIGGINS RD
 ROSEMONT, IL 60018 USA

The NRCA ROOFING MANUAL includes Construction (Installation) Details for each of the Edge Flashing (or Fascia) or Coping

Product Classifications described below.

SPRI Test Method RE-2 - See manufacturer's installation instructions.

1. - **Raised Perimeter Edge (Fascia Cap) Flashing**, 8-in wide, 24 ga.G-90 galvanized steel or 24 ga. Type 302 or Type 304 stainless steel fascia cover, 22 ga. G-90 galvanized steel or 22 ga. Type 302 or Type 304 stainless steel continuous front face cleat.
Rated 170 psf
2. - **Raised Perimeter Edge (Fascia Cap) Flashing**, 8-in wide, 0.040-in 3105 or 3003 aluminum fascia cover, 0.040-in 3105 or 3003 aluminum continuous front face cleat.
Rated 140 psf
3. - **Raised Perimeter Edge (Fascia Cap) Flashing**, 8-in wide, 0.040-in 3105 or 3003 aluminum fascia cover, 0.050-in 3105 or 3003 aluminum continuous front face cleat.
Rated 230 psf
4. - **Raised Perimeter Edge (Fascia Cap) Flashing With Flat Drip**, 8-in wide, 24 ga.G-90 galvanized steel or 24 ga. Type 302 or Type 304 stainless steel fascia cover, 22 ga. G-90 galvanized steel or 22 ga. Type 302 or Type 304 stainless steel continuous front face cleat.
Rated 250 psf

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TGJZ.GuideInfo
Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems

[View Listings](#) [Page Bottom](#)

Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems

[Guide Information for Roofing Materials and Systems](#)

GENERAL

This category covers metal roof-edge systems, which may include edge flashings and copings or other horizontal roof-edge terminations as shown in the individual certifications.

These products are investigated for wind resistance associated with high-velocity winds. The investigation includes 1) an evaluation of the structural integrity of the substrate that secures the edge, such as nailers, 2) the wind resistance of the edge detail, and 3) the material being used.

These products are intended to be used where the design load rating of the edge system complies with the required design wind load for the building as derived from either building codes and/or design standards, such as ASCE 7, "Minimum Design Loads for Buildings and Other Structures." The magnitude of the wind velocity across a roof deck and the resulting uplift pressures on a roof deck are dependent upon many factors, such as wind gusts, the shape of the roof deck, edge configuration, and the landscape surrounding the roof-deck installation. A method to calculate the uplift pressures on roof decks is contained in ASCE 7 (2002).

These products are intended to be installed in accordance with the manufacturer's installation instructions. Authorities Having Jurisdiction should be consulted before installation.

RELATED PRODUCTS

For uplift resistance of metal roof-deck constructions that also includes attachment to supports, see [Roof-deck Constructions \(TRKX\)](#). Unless otherwise noted, plywood deck assemblies are intended to consist of minimum D-C-rated sheathing.

For uplift resistance of metal roof-deck panels used in roof-deck constructions, see [Metal Roof-deck Panels \(TRPV\)](#).

See also [Roof-covering Materials \(TRVT\)](#).

ADDITIONAL INFORMATION

For additional information, see [Roofing Materials and Systems \(SABM\)](#).

REQUIREMENTS

The basic standard used to investigate products in this category is ANSI/SPRI E5-1, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems."

Within ANSI/SPRI E5-1, roof-edge products are investigated to the following specific test methods:

1. SPRI Test Method RE-1 - Test for Roof Edge Termination of Ballasted or Mechanically Attached Systems,
2. SPRI Test Method RE-2 - Pull-Off Test for Edge Flashings, or
3. SPRI Test Method RE-3 - Pull-Off Test for Copings

UL MARK

The Certification Mark of UL on the product or on the smallest unit container in which the product is packaged is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service. The [Certification Mark](#) for these products includes the UL symbol, the words "CERTIFIED" and "SAFETY," the geographic identifier(s), and a file number.

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Keyword

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| CARLISLE SYNTEC INC | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R26275 |
| CERTAINTED CORP | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R26871 |
| FABRAL INC | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R26274 |
| GAF | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R27207 |
| NATIONAL ROOFING CONTRACTORS ASSOCIATION | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R27046 |
| OMG INC, DBA OMG EDGESYSTEMS | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R25074 |
| SIKA SARNAFIL INC | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R26450 |
| SIPLAST INC | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R25592 |
| TREMCO INC | Roof-edge Systems, Metal, for Use with Low-slope Roofing Systems | TGJZ.R26229 |


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UL's roofing-related category codes

| Test standards | UL Category Code | Description (applies to:) |
|--|------------------|---|
| n/a | TEVT | Roof covering materials |
| ASTM E108/UL790, ASTM D3161 & ASTM D3462 | TFWZ | Asphalt shingles (fire, wind & product standard) |
| ASTM E108/UL790 & ASTM D3161 | TFXX | Non-asphaltic shingles (fire & wind) |
| ASTM D7158 | TGAH | Asphalt shingles (wind) |
| UL 2218 | TGAM | Impact resistance (hail) |
| ASTM C1371, ASTM C1549 | TGFE | Solar reflectance |
| UL 55A, UL 2218 & UL 790 | TGFU | BUR, MB and SPF systems (product standard, impact & fire) |
| UL 1897 | TGIK | TFWZ & TGFU systems (wind) |
| Various ASTM standards | TGJR | Various components (product standard) |
| UL 580 & UL 1256 | TGKX | All listed assemblies (wind, fire) |
| ANSI/SPRI ES-1 | TGJZ | Edge metal flashings (wind) |



A UL label (i.e., certification) applies only to a specific certification (e.g., category code)

Some products/assemblies may have multiple UL certifications addressing different attributes

FM's RoofNav

www.roofnav.com



The screenshot shows the RoofNav website interface. At the top, there is a navigation bar with the RoofNav logo and the FM logo. Below the navigation bar is a login form with fields for email address (pre-filled with 'mg@roofnav.com') and password. There are 'Log In' and 'Register' buttons. Below the login form, there is a footer section with links for 'Home of Use', 'Privacy Policy', and 'Compliance'. The footer also includes the copyright notice '© 2005-2017 FM Approvals LLC. All rights reserved.' and the FM Approvals logo.

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Enter Assembly #

MY PROJECTS PRODUCT SEARCH SYSTEM SEARCH ASSEMBLY SEARCH RATINGS CALCULATOR REFERENCE MATERIALS ?

Project/Roof Area not specified

Welcome to RoofNav

FM Approvals welcomes you to RoofNav, your source for the latest information on FM Approved roofing assemblies and products.

To get the most from RoofNav, we recommend reviewing the training materials, documentation, and online help within the application. See the links at the top of each page; and on the navigation bar, look under *Reference Materials*, and click the question mark (?) for context sensitive help.

What's New

This section communicates new functionality, changes, and items of interest. In addition, Data Sheets and Approvals Standards are kept current in the Reference Materials section.

2/16/2017 Maintenance to RoofNav has completed, and includes:

- Minor enhancements to projects, roof areas, contacts, and Ratings Calculator
- Glossary updates for Maintenance Coating and Preliminary Insulation Securement
- Components in assembly layers are now shaded for improved readability and sorted by Company and Trade Name

12/21/2016 A revised Approval Standard 4476, Roof-Mounted Rigid Photovoltaic Module Systems has been published. It is available under the Reference Materials tab.

12/16/2016 A revised Approval Standard 4476, Single Ply, Polymer Modified Bitumen Sheet Built

Getting Started

Using the links below, you are just a click away from learning how to get the most out of RoofNav:

- [Downloadable RoofNav Quick Start Guide](#)
- [RoofNav Online Training](#)
- [Help Documentation](#)

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Enter Assembly #

MY PROJECTS PRODUCT SEARCH SYSTEM SEARCH ASSEMBLY SEARCH RATINGS CALCULATOR REFERENCE MATERIALS ?

Data Sheets

FM Global Property Loss Prevention Data Sheets are engineering guidelines written to help reduce the chance of property loss due to fire, weather conditions and failure of electrical and mechanical equipment. They incorporate loss experience, input from consensus standards committees, equipment manufacturers and others, and represent 170 years of FM Global research into the area of property protection. The data sheets included in RoofNav are specific to roofing installations and the roofing industry.

Note: Adobe Acrobat Reader version 6.0 or later is required to open Data Sheets.

[Get Adobe Reader](#)

Most Commonly Used Data Sheets

The following table shows the Data Sheets that provide the most useful information for the majority of roofing professionals.

| Data Sheet | Purpose | Month Issued |
|--|--|--------------|
| 1-29 - Roof Deck Securement and Above-Deck Roof Components | Provides recommendations for the required corner and perimeter enhancements for all roof systems except Standing/Lap Seam roofs. Also provides general installation guidelines and recommendations for hail resistance and internal and exterior fire ratings. | 4/2016 |
| 1-31 - Panel Roof Systems | Provides recommendations for the required corner and perimeter enhancements for standing/lap seam roofs. | 7/2016 |
| 1-33 - Safeguarding Torch-applied Roof Installations | Provides design considerations and precautions that should be taken during the installation of torch-applied roof covers. | 1/2000 |
| 1-49 - Perimeter Flashing | Provides recommendations for selecting FM Approved perimeter flashing and nailer securement, and provides general installation details. | 7/2016 |

Other Roofing-Related Data Sheets

The following table shows other Data Sheets that are useful for roofing designers, plan reviewers, and others who are interested in knowing detailed information about how roofs are designed.

| Data Sheet | Purpose | Month Issued |
|--|--|--------------|
| 1-0 - Safeguards During Construction | Examines the hazards associated with construction, alteration, and demolition operations. Provides recommended precautions to greatly reduce the danger of fire, explosions, water and wind damage, and collapse. | 4/2012 |
| 1-13 - Chimneys | Provides guidelines for elimination or reduction of damage to chimneys and related equipment caused by fire, explosion, lightning, wind, structural failure, and earthquake. | 4/2012 |
| 1-15 - Roof Mounted Solar Photovoltaic Panels | Provides property loss prevention guidance related to fire and natural hazards for the design, installation, and maintenance of all roof mounted photovoltaic (PV) solar panels used to generate electrical power. | 10/2014 |
| 1-20 - Protection Against Exterior Fire Exposure | Provides guidelines for recognizing and dealing with a potential fire exposure from one or more existing buildings or yard storage, and to enable designers and architects to avoid exposure problems when laying out new buildings. | 10/2016 |
| 1-22 - Criteria for Maximum Foreseeable Loss Fire Walls and Space Separation | Provides design criteria and guidelines for Maximum Foreseeable Loss (MFL) fire walls and space separation. | 4/2011 |
| 1-28 - Design Wind Loads | Provides additional information for determining the wind speed for your location and for understanding how the wind uplift rating is determined for different areas of the roof. | 10/2016 |
| 1-28R1-29R - Roof Systems | Provides descriptive and background information on roof systems, including various generic types of roof components, wind forces, fire resistance, hail resistance, etc. | 1/2016 |

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Enter Assembly #

MY PROJECTS | PRODUCT SEARCH | SYSTEM SEARCH | ASSEMBLY SEARCH | RATINGS CALCULATOR | REFERENCE MATERIALS

Project/Roof Area not specified

Welcome to RoofNav

FM Approvals welcomes you to RoofNav, your source for the latest information on FM Approved roofing assemblies and products.

To get the most from RoofNav, we recommend reviewing the training materials, documentation, and online help within the application. See the links at the top of each page, and on the navigation bar, look under *Reference Materials*, and click the question mark (?) for context sensitive help.

What's New

This section communicates new functionality, changes, and items of interest. In addition, Data Sheets and Approvals Standards are kept current in the Reference Materials section.

- 2/16/2017** Maintenance to RoofNav has completed, and includes:
 - Minor enhancements to projects, roof areas, contacts, and Ratings Calculator
 - Glossary updates for Maintenance Coating and Preliminary Insulation Securement
 - Components in assembly layers are now shaded for improved readability and sorted by Company and Trade Name
- 12/21/2016** A revised Approval Standard 4478, Roof-Mounted Rigid Photovoltaic Module Systems has been published. It is available under the Reference Materials tab.
- 12/19/2016** A revised Approval Standard 4470, Single Ply Polymer Modified Bitumen Sheet Roll

Getting Started

Using the links below, you are just a click away from learning how to get the most out of RoofNav:

- [Downloadable RoofNav Quick Start Guide](#)
- [RoofNav Online Training](#)
- [Help Documentation](#)

Back | + Add Scenario | S Reset Scenario

Assembly Properties

Assembly #: 319122-0-0
 Roof System: Single-Ply System
 Application: New Roof
 Cover Securement: Attached
 Deck Type: Steel

Slope: 1.0000
 Wind Uplift: 105
 Internal Fix: 1
 Exterior Fix: A
 Nail: SH
 For Use With Non-Combustible Walls: No

FM 1-105A SH

* FM Approved roofs must also have corner and perimeter enhancements and FM Approved perimeter flashing. For details, see FM Global Property Loss Prevention Data Sheets 1-29 and 1-49. For StandingLap Seam roofs, see Property Loss Prevention Data Sheet 1-31. Adobe Acrobat Reader version 6.0 or later is required to open Property Loss Prevention Data Sheets. Click [here](#) to download this software for free.

Assembly Details

| | | |
|---|-----------|---|
| 1 Cover (Single-ply) | | |
| <input checked="" type="radio"/> | GAF | Everguard Extreme TPO |
| <input type="radio"/> | GAF | Everguard TPO |
| Securement (Sheet Lap) | | |
| <input checked="" type="radio"/> | Generic | weld, hot air |
| 2 Securement (Cover) from 1. Cover (Single-ply) to 7. (Deck) Steel | | |
| <input type="radio"/> | GAF | Drill-Tec Extra Heavy Duty ASAP Assembled Screw and 2-3/8 in. Steel Plate |
| <input checked="" type="radio"/> | SSSP15641 | Drill-Tec 2 3/8 in. Barbed XHD Plate |
| <input type="radio"/> | GAF | Drill-Tec XHD Fastener |
| <input type="radio"/> | SSSP16831 | |
| <input type="radio"/> | OMG | Eyehook Seam Plate |
| <input type="radio"/> | OMG | OMG XHD screw |
| <input type="radio"/> | SSSP16932 | |
| <input type="radio"/> | OMG | Eyehook Reel-Fast Plates |
| <input type="radio"/> | OMG | OMG XHD screw |
| <input type="radio"/> | SSSP16833 | |
| <input type="radio"/> | OMG | Eyehook Accuseam Plate |
| <input type="radio"/> | OMG | OMG XHD screw |
| <input type="radio"/> | SSSP19462 | |
| <input type="radio"/> | GAF | Drill-Tec Eyehook AccuSeam Plate |
| <input type="radio"/> | GAF | Drill-Tec XHD Fastener |
| <input type="radio"/> | SSSP19483 | |
| <input type="radio"/> | GAF | Drill-Tec Eyehook AccuSeam Plate |
| <input type="radio"/> | OMG | OMG XHD screw |
| <input type="radio"/> | SSSP20355 | |
| <input type="radio"/> | OMG | Eyehook Accuseam Plate |
| <input type="radio"/> | GAF | Drill-Tec XHD Fastener |
| <input type="radio"/> | SSSP20356 | |
| <input type="radio"/> | OMG | Eyehook Reel-Fast Plates |
| <input type="radio"/> | GAF | Drill-Tec XHD Fastener |
| <input type="radio"/> | SSSP20357 | |
| <input type="radio"/> | OMG | Eyehook Seam Plate |
| <input type="radio"/> | GAF | Drill-Tec XHD Fastener |

3. Insulation (Board Stock)

- GAF EnergyGuard NH Polyiso Insulation [View](#)
- GAF EnergyGuard NH Ultra Polyiso Insulation [View](#)
- GAF EnergyGuard POLYISO INSULATION [View](#)
- GAF EnergyGuard TAPERED POLYISO INSULATION [View](#)
- GAF EnergyGuard Ultra Polyiso Insulation [View](#)
- GAF EnergyGuard Ultra Tapered Polyiso Insulation [View](#)
- National Gypsum Company DEXcell Cement Roof Board [View](#)
- National Gypsum [View](#)
- National Gypsum [View](#)
- Owens Corning [View](#)
- Owens Corning [View](#)
- Owens Corning [View](#)

4. Securement (B)

- SSSP15260 [View](#)
- See Separate [View](#)
- See Separate [View](#)

5. Insulation (Board)

- GAF [View](#)
- GAF [View](#)
- GAF [View](#)
- GAF [View](#)
- GAF [View](#)
- GAF [View](#)
- National Gypsum [View](#)
- National Gypsum [View](#)
- National Gypsum [View](#)
- Owens Corning [View](#)
- Owens Corning (China) Investment Co., Ltd. Thermafiber RD-180 [View](#)
- Owens Corning (China) Investment Co., Ltd. Thermafiber RD-200 [View](#)

6. Thermal Barrier optional

- GAF EnergyGuard Perlite Roof Insulation (homogeneous) [View](#)
- GAF EnergyGuard Perlite Roof Insulation (laminated) [View](#)
- Georgia-Pacific Gypsum LLC DensDeck [View](#)
- United States Gypsum Company SECUROCK Gypsum-Fiber Roof Board [View](#)
- None [View](#)

Usage Details

Insulation (Board Stock)

Company: GAF

Trade Name: EnergyGuard POLYISO INSULATION

Material: polyisocyanurate/polyurethane

Min Board Size: 48.00 x 48.00 in

Board Profile: flat

Min Thickness: 0.5000 in

Max Thickness: 4.0000 in

Min Density: 0.0000 lb/ft³

Comments: none

7. (Deck) Steel

- See Separate [View](#)
- See Separate [View](#)
- See Separate [View](#)

Securement (C)

- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- ITW Comm [View](#)
- ITW Comm [View](#)
- ITW Comm [View](#)
- ITW Comm [View](#)

8. Securement (D)

- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- Hilli Inc [View](#)
- ITW Comm [View](#)

9. Structure [View](#)

Usage Details

Deck (Steel)

Company: See Separate Steel Deck Manufacturer Listing [View](#)

Trade Name: steel deck, min 80 ksi, 20 to 18 ga., wide rib (>90 psf) [View](#)

Acoustical: No [View](#)

Design Thickness: 0.0358 in [View](#)

Rib Type: Type WR [View](#)

Max Span: 72.0000 in [View](#)

Min Depth: 1.5000 in [View](#)

Min Grade: 80.0000 ksi [View](#)

Max Depth: 1.5000 in [View](#)

Min Thickness: 0.0000 in [View](#)

Min Width: 24.0000 in [View](#)

Max Width: 36.0000 in [View](#)

Comments: none [View](#)



An FM Approvals' approval applies to all of the attributes of the specific FM standard referenced and may address multiple attributes (e.g., fire, uplift, impact, solar reflectivity).

Recommendations

Compliance with FM and UL requirements

- Obtain UL rating and/or FM approval information from manufacturers
 - FM Roofnav number
 - UL certification
- Maintain this information in your project file

Note: With FM and UL's current online systems, only current information is accessible; legacy information is not readily available.

Some "fun" ...

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Enter Assembly #

MY PROJECTS | PRODUCT SEARCH | SYSTEM SEARCH | **ASSEMBLY SEARCH** | RATINGS CALCULATOR | REFERENCE MATERIALS

Classifications | Specifications | Search Results

Assembly Characteristics

Roof System: (Select)

Application: (Select)

Cover Securement: (Select)

Deck Type: (Select)

Slope: = (Select)

Assembly Ratings

Wind Uplift: >= 60 psf **≥ 1-60**

Internal Fire: (Select)

Exterior Fire: (Select)

Hail: (Select)

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Enter Assembly #

MY PROJECTS | PRODUCT SEARCH | SYSTEM SEARCH | **ASSEMBLY SEARCH** | RATINGS CALCULATOR | REFERENCE MATERIALS

Classifications | Specifications | Search Results

Found: 948215 records **→ 948,215 assemblies (as of Jan. 18, 2018)**

| Assembly # ▲ | Cover Type | Application Type | Securement Type | Deck Type | Wind Uplift | I/Fire | E/Fire | Slope | Hail |
|--------------|-------------------------|------------------|-----------------|-----------|-------------|--------|--------|-------|------|
| 1-0-0 | Composite Panel System | New Roof | Attached | No Deck | 105 | 1 | A | 5 | SH |
| 2-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 90 | 1 | A | 5 | SH |
| 3-0-0 | Composite Panel System | New Roof | Attached | No Deck | 60 | 1 | A | 2 | SH |
| 4-0-0 | Composite Panel System | New Roof | Attached | No Deck | 90 | 1 | A | 2 | SH |
| 5-0-0 | Composite Panel System | New Roof | Attached | No Deck | 75 | 1 | A | 2 | SH |
| 6-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 90 | 1 | A | 5 | SH |
| 7-0-0 | Composite Panel System | New Roof | Attached | No Deck | 60 | 1 | A | 5 | SH |
| 9-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 120 | 1 | A | 5 | SH |
| 10-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 90 | 1 | A | 5 | SH |
| 12-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 60 | 1 | C | 5 | SH |
| 13-0-0 | StandingLap Seam System | New Roof | Attached | No Deck | 90 | 1 | A | 5 | SH |
| 14-0-0 | Composite Panel System | New Roof | Attached | No Deck | 90 | 1 | A | 5 | SH |

Questions... other topics?



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