CRCA Roofing Industry Breakfast
2015 CRCA Trade Show & Seminars
January 22, 2015

Be prepared – Change continues

presented by

Mark S. Graham
Associate Executive Director, Technical Services
National Roofing Contractors Association

2015 CRCA Trade Show & Seminars

January 22-23, 2015

Ventilation, Low & Steep Roofs and DOE's Current Programs

Friday, January 23, 2015 – 7:45 to 8:45 a.m.

2015 CRCA Trade Show & Seminars

January 22-23, 2015

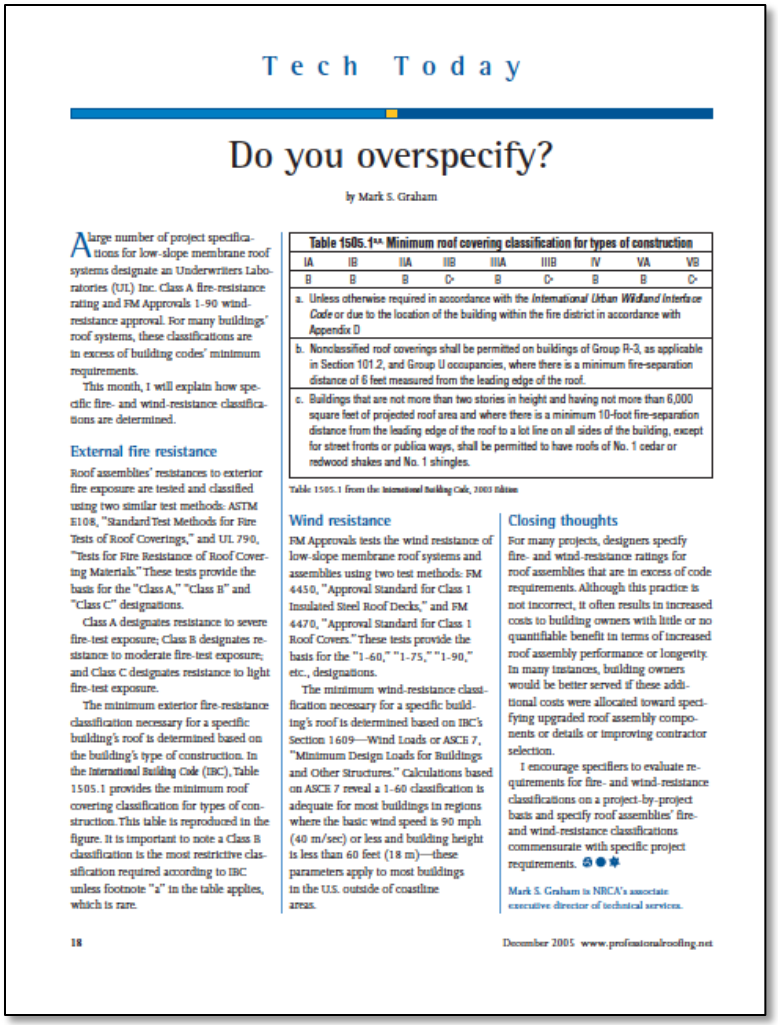
Issues that can cost you money

Friday, January 23, 2015 – 11:15 to 12:15 a.m.

“…risk avoidance decreases perceived value. Architects shedding risk reduce value to Owners…”

Keynote presentation
CSI Master Specifiers Retreat
January 15-17, 2015

Professional Roofing, December 2005



Tech Today

Do you overspecify?

by Mark S. Graham

A large number of project specifications for low-slope membrane roof systems designate an Underwriters Laboratories (UL) Inc. Class A fire-resistance rating and FM Approvals 1-90 wind-resistance approval. For many buildings' roof systems, these classifications are in excess of building codes' minimum requirements.

This month, I will explain how specific fire- and wind-resistance classifications are determined.

External fire resistance

Roof assemblies' resistances to exterior fire exposure are tested and classified using two similar test methods: ASTM E108, "Standard Test Methods for Fire Tests of Roof Coverings," and UL 790, "Tests for Fire Resistance of Roof Covering Materials." These tests provide the basis for the "Class A," "Class B" and "Class C" designations.

Class A designates resistance to severe fire-test exposure; Class B designates resistance to moderate fire-test exposure; and Class C designates resistance to light fire-test exposure.

The minimum exterior fire-resistance classification necessary for a specific building's roof is determined based on the building's type of construction. In the International Building Code (IBC), Table 1505.1 provides the minimum roof covering classification for types of construction. This table is reproduced in the figure. It is important to note a Class B classification is the most restrictive classification required according to IBC unless footnote "a" in the table applies, which is rare.

Table 1505.1[a, b, c] Minimum roof covering classification for types of construction

IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
B	B	B	C	B	C	B	B	C

a. Unless otherwise required in accordance with the *International Urban Wildland Interface Code* or due to the location of the building within the fire district in accordance with Appendix D

b. Nonclassified roof coverings shall be permitted on buildings of Group R-3, as applicable in Section 101.2, and Group U occupancies, where there is a minimum fire-separation distance of 6 feet measured from the leading edge of the roof.

c. Buildings that are not more than two stories in height and having not more than 6,000 square feet of projected roof area and where there is a minimum 10-foot fire-separation distance from the leading edge of the roof to a lot line on all sides of the building, except for street fronts or publica ways, shall be permitted to have roofs of No. 1 cedar or redwood shakes and No. 1 shingles.

Table 1505.1 from the International Building Code, 2003 Edition

Wind resistance

FM Approvals tests the wind resistance of low-slope membrane roof systems and assemblies using two test methods: FM 4450, "Approval Standard for Class 1 Insulated Steel Roof Decks," and FM 4470, "Approval Standard for Class 1 Roof Covers." These tests provide the basis for the "1-60," "1-75," "1-90," etc., designations.

The minimum wind-resistance classification necessary for a specific building's roof is determined based on IBC's Section 1609—Wind Loads or ASCE 7, "Minimum Design Loads for Buildings and Other Structures." Calculations based on ASCE 7 reveal a 1-60 classification is adequate for most buildings in regions where the basic wind speed is 90 mph (40 m/sec) or less and building height is less than 60 feet (18 m)—these parameters apply to most buildings in the U.S. outside of coastline areas.

Closing thoughts

For many projects, designers specify fire- and wind-resistance ratings for roof assemblies that are in excess of code requirements. Although this practice is not incorrect, it often results in increased costs to building owners with little or no quantifiable benefit in terms of increased roof assembly performance or longevity. In many instances, building owners would be better served if these additional costs were allocated toward specifying upgraded roof assembly components or details or improving contractor selection.

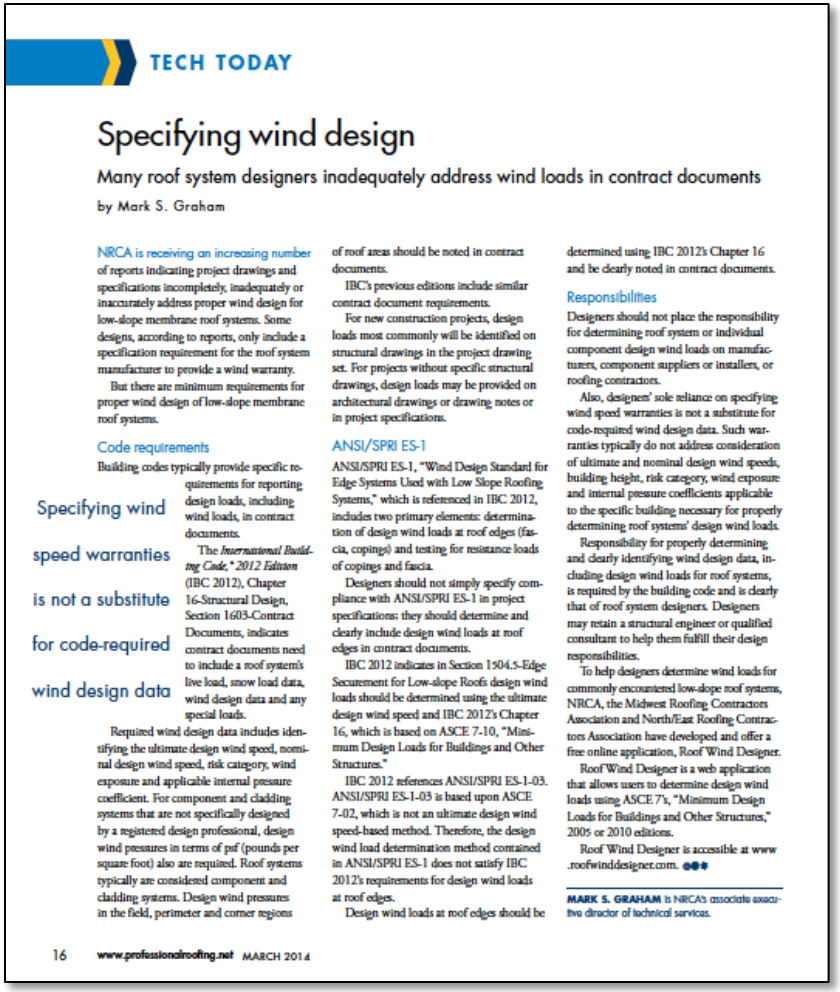
I encourage specifiers to evaluate requirements for fire- and wind-resistance classifications on a project-by-project basis and specify roof assemblies' fire- and wind-resistance classifications commensurate with specific project requirements.

Mark S. Graham is NRCA's associate executive director of technical services.

Common areas/topics:

- FM requirements
- External fire classifications
- Wind ratings/classifications
- Wind warrantees

Professional Roofing, March 2014



TECH TODAY

Specifying wind design

Many roof system designers inadequately address wind loads in contract documents

by Mark S. Graham

NRCA is receiving an increasing number of reports indicating project drawings and specifications incompletely, inadequately or inaccurately address proper wind design for low-slope membrane roof systems. Some designs, according to reports, only include a specification requirement for the roof system manufacturer to provide a wind warranty.

But there are minimum requirements for proper wind design of low-slope membrane roof systems.

Code requirements

Building codes typically provide specific requirements for reporting design loads, including wind loads, in contract documents.

Specifying wind speed warranties is not a substitute for code-required wind design data

The *International Building Code,® 2012 Edition* (IBC 2012), Chapter 16-Structural Design, Section 1603-Contract Documents, indicates contract documents need to include a roof system's live load, snow load data, wind design data and any special loads.

Required wind design data includes identifying the ultimate design wind speed, nominal design wind speed, risk category, wind exposure and applicable internal pressure coefficient. For component and cladding systems that are not specifically designed by a registered design professional, design wind pressures in terms of psf (pounds per square foot) also are required. Roof systems typically are considered component and cladding systems. Design wind pressures in the field, perimeter and corner regions of roof areas should be noted in contract documents.

IBC's previous editions include similar contract document requirements.

For new construction projects, design loads most commonly will be identified on structural drawings in the project drawing set. For projects without specific structural drawings, design loads may be provided on architectural drawings or drawing notes or in project specifications.

ANSI/SPRI ES-1

ANSI/SPRI ES-1, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems," which is referenced in IBC 2012, includes two primary elements: determination of design wind loads at roof edges (fascia, copings) and testing for resistance loads of copings and fascia.

Designers should not simply specify compliance with ANSI/SPRI ES-1 in project specifications; they should determine and clearly include design wind loads at roof edges in contract documents.

IBC 2012 indicates in Section 1504.5-Edge Securement for Low-slope Roofs design wind loads should be determined using the ultimate design wind speed and IBC 2012's Chapter 16, which is based on ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures."

IBC 2012 references ANSI/SPRI ES-1-03. ANSI/SPRI ES-1-03 is based upon ASCE 7-02, which is not an ultimate design wind speed-based method. Therefore, the design wind load determination method contained in ANSI/SPRI ES-1 does not satisfy IBC 2012's requirements for design wind loads at roof edges.

Design wind loads at roof edges should be determined using IBC 2012's Chapter 16 and be clearly noted in contract documents.

Responsibilities

Designers should not place the responsibility for determining roof system or individual component design wind loads on manufacturers, component suppliers or installers, or roofing contractors.

Also, designers' sole reliance on specifying wind speed warranties is not a substitute for code-required wind design data. Such warranties typically do not address consideration of ultimate and nominal design wind speeds, building height, risk category, wind exposure and internal pressure coefficients applicable to the specific building necessary for properly determining roof systems' design wind loads.

Responsibility for properly determining and clearly identifying wind design data, including design wind loads for roof systems, is required by the building code and is clearly that of roof system designers. Designers may retain a structural engineer or qualified consultant to help them fulfill their design responsibilities.

To help designers determine wind loads for commonly encountered low-slope roof systems, NRCA, the Midwest Roofing Contractors Association and North/East Roofing Contractors Association have developed and offer a free online application, Roof Wind Designer.

Roof Wind Designer is a web application that allows users to determine design wind loads using ASCE 7's, "Minimum Design Loads for Buildings and Other Structures," 2005 or 2010 editions.

Roof Wind Designer is accessible at www.roofwinddesigner.com.

MARK S. GRAHAM is NRCA's associate executive director of technical services.

16 www.professionalroofing.net MARCH 2014

Proper wind design:

- Wind-load prediction:
  - IBC Ch. 16
  - ASCE 7
- Wind-resistance testing:
  - FM 4474
  - UL 580/UL 1897

Specifying a wind warrantee is not a substitute for code-required wind design data (IBC Sec. 1603)

Professional Roofing, February 2014

TECH TODAY

Quality-assurance guidelines

Quality-assurance observers have specific project roles and responsibilities

by Mark S. Graham

Proper quality assurance during roof system installation can be an important element for long-term performance.

Quality assurance—unlike quality control, which is performed by roofing contractors—is the responsibility of a building owner or his or her designated representative, such as a licensed design professional, roof consultant or general contractor. The purpose of quality assurance is to verify the scope and intent of a project's contract documents are being met and roof system materials are being installed in accordance with contract documents, manufacturers' installation instructions and accepted industry practices.

The most effective means of providing quality assurance is visually observing materials and procedures

NRCA asserts the most effective means of providing quality assurance is by visually observing materials and procedures used at the time of roof system installation. The person performing visual observation often is referred to as a quality-assurance observer (QAO).

ASTM D7186

ASTM D7186, "Standard Practice for Quality Assurance Observation of Roof Construction and Repair," establishes the role and responsibilities of those performing quality-assurance observation, as well as procedures for observation and reporting.

A QAO's function is to provide on-site observation and reporting of a roof system's construction process in a clear, accurate and objective manner; a QAO should not direct or order any work. A QAO should:

- Observe and record the general condition of the job site and roof areas under construction and materials used and stored
- Note pre-existing property damage or damage that can occur and the substrate condition and repair or replacement procedures
- Observe and record the installation of roofing materials and any other components specified in the contract documents, and flashing installation and detailing
- Record weather conditions, roofing crew size, foreman's name and all job-site visitors

A QAO should prepare a daily written report with photographs; this report should be made available to all parties involved in the roofing project. A copy of the report should be provided to the roofing contractor no later than the commencement of work the following day. ASTM D7186 includes sample pre-construction damage, material delivery, daily construction and progress summary, and unit cost tracking report forms for use by QAOs when completing the documentation necessary to provide proper quality assurance.

A QAO also should keep on-site copies of contract documents, including project specifications, the roof plan, construction detail drawings and any addenda, as well as stamped material submittals and minutes from the pre-bid, pre-construction and project meeting minutes.

A QAO is responsible for providing and maintaining the tools and equipment required to perform his or her work, including any necessary safety equipment, such as personal protective equipment and fall protection. A QAO should follow all applicable safe work practices.

A QAO or the firm providing the quality-assurance observations must provide insurance and submit a certificate of insurance showing coverage for workers' compensation, comprehensive general liability, automobile insurance and, if applicable, professional liability insurance. Insurance limits shall be the statutory amounts or higher amounts if required in the contract.

NRCA guidelines

ASTM D7186 references the following NRCA documents that provide industry-accepted guidelines for evaluating roof system application:

- *Quality Control Guidelines for the Application of Built-up Roofing*
- *Quality Control Guidelines for the Application of Polymer-modified Bitumen Roofing*
- *Quality Control Guidelines for the Application of Thermoset Single-ply Roof Membranes*
- *Quality Control Guidelines for the Application of Spray Polyurethane Foam-based Roofing*
- *Quality Control Guidelines for the Application of Asphalt Shingle Roof Systems*

NRCA recommends these documents be used with ASTM D7186 to provide effective quality assurance.

When a QAO will be present on a job site, NRCA recommends his or her role be clearly defined and understood by all parties, including the building owner, licensed design professional, general contractor or construction manager, and roof consultant. NRCA encourages referencing ASTM D7186 for this purpose.

All NRCA documents referenced can be purchased by accessing the NRCA Bookstore at shop.nrca.net.

MARK S. GRAHAM is NRCA's associate executive director of technical services.

12 www.professionalroofing.net FEBRUARY 2014

QAO (RCI: "RRO"):

- ASTM D7186:
  - "…observe…"
  - Daily reports, including to contractor
  - QAO safety:
    - Insurance
    - Workers comp.
    - PPE
    - Fall protection
- NRCA QC/QC guidelines

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

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

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