

New manual, updated guidelines

The final volume of The NRCA Roofing Manual now is available

by Mark S. Graham

This month, NRCA published *The NRCA Roofing Manual: Architectural Metal Flashing, Condensation Control and Reroofing—2010*.

The manual provides current technical information regarding architectural metal flashings, controlling condensation in roof systems and reroofing.

The manual also complements The NRCA Roofing Manual's 2007, 2008 and 2009 volumes and completes a four-year update process to replace *The NRCA Roofing and Waterproofing Manual, Fifth Edition* and its 2003 and 2006 updates.

In 2005, NRCA's Manual Update Committee—which is charged with developing and maintaining The NRCA Roofing Manual—decided to publish individual volumes of the manual annually rather than publish a complete four-volume set periodically as The NRCA Roofing and Waterproofing Manual previously had been published. The rotation allows for more efficient use of NRCA's resources and a regular publishing schedule.

The NRCA Roofing Manual: Architectural Metal Flashing, Condensation Control and Reroofing—2010 is the fourth in a four-volume set intended to update

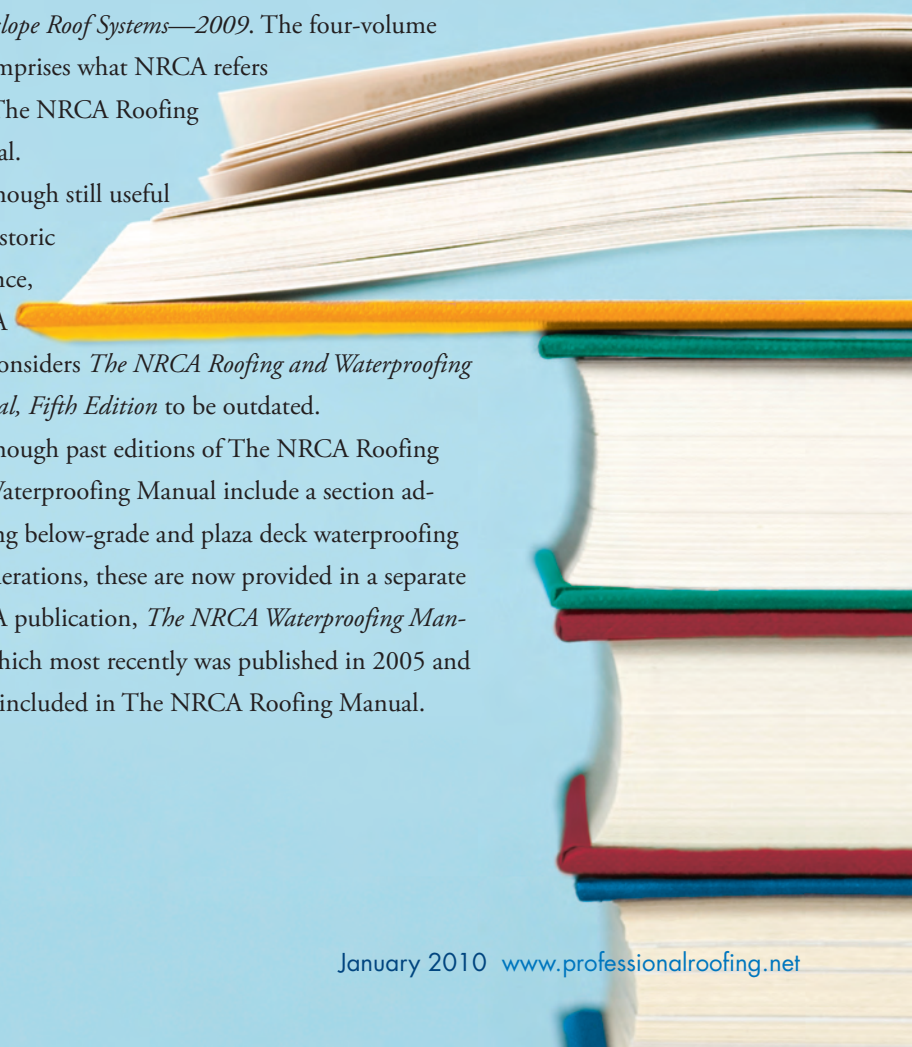
and replace *The NRCA Roofing and Waterproofing Manual, Fifth Edition*.

The three other volumes in the set are *The NRCA Roofing Manual: Membrane Roof Systems—2007*, *The NRCA Roofing Manual: Metal Panel and SPF Roof Systems—2008* and *The NRCA Roofing Manual: Steep-slope Roof Systems—2009*. The four-volume set comprises what NRCA refers to as The NRCA Roofing Manual.

Although still useful as a historic reference, NRCA

now considers *The NRCA Roofing and Waterproofing Manual, Fifth Edition* to be outdated.

Although past editions of The NRCA Roofing and Waterproofing Manual include a section addressing below-grade and plaza deck waterproofing considerations, these are now provided in a separate NRCA publication, *The NRCA Waterproofing Manual*, which most recently was published in 2005 and is not included in The NRCA Roofing Manual.



Best-practices approach

Similar to how it approached past editions of The NRCA Roofing and Waterproofing Manual, NRCA took a best-practices approach to developing and publishing The NRCA Roofing Manual.

The manual presents time-tested, best-practice guidelines for roofing buildings and other enclosed structures. NRCA collected the manual's information from knowledgeable, practicing roofing contractors throughout the U.S. The manual reflects the consensus of the roofing contractors consulted; it does not purport to include all possible practices, designs or applications.

NRCA does not approve or endorse any specific products, methods, practices or information sources in the manual. Exclusion from the manual of certain products, methods or practices does not mean they are unsatisfactory or inappropriate. Some geographic locations may employ area practices not included in the manual.

NRCA recognizes its approach may differ from industry or standard practice. Also, NRCA's guidelines may be more or less stringent than designers' specific project designs and manufacturers' recommendations or minimum requirements for warranties. For this reason, the manual should be viewed as a guide, not a design and installation standard or code.

2010 manual

The NRCA Roofing Manual: Architectural Metal Flashing, Condensation Control and Reroofing—2010 has three primary sections and an Appendixes section.

The manual's primary sections address architectural metal flashings, condensation control and reroofing. Each primary section is further divided into chapters.

Architectural metal flashing

The Architectural Metal Flashing Section provides information regarding the design,

materials, fabrication and installation of architectural metal flashings used in low- and steep-slope roof systems.

Chapter 1—Guidelines Applicable to Metal provides information about metal types; metals' characteristics, gauges and thicknesses; protective coatings used with certain metals; standards applicable to metals; galvanic reaction of dissimilar metals; oil canning; and metals' attachment methods and joinery.

The manual indicates oil canning is an inherent phenomenon prevalent with light-gauge, cold-formed metal products. Oil canning is aesthetic in nature and does not adversely affect metal's structural integrity or waterproofing capability. The manual goes on to provide measures that should assist in reducing oil canning and its visual effects.

Chapter 2—Guidelines Applicable to Low-slope Roof Systems provides information about architectural metal flashings, copings, perimeter edge metal, counterflashings, control and expansion joints, gutters, scuppers and downspouts.

For example, in this section, NRCA suggests roof system designers consider using counterflashings that consist of separate reglet and counterflashing pieces, allowing for the installation of the sheet-metal counterflashing after membrane flashing installation is complete. This flashing configuration also facilitates reroofing. Where single-piece counterflashing has been installed, it may become deformed or require replacement of the metal during future reroofing or when membrane flashing maintenance is necessary.

Also, 32 figures in this chapter depict specific conditions and guidelines.


Chapter 3—Guidelines Applicable to Steep-slope Roof Systems discusses drip edge metal; chimneys, skylights and penetration flashings; gutters and downspouts; valleys; and headwall and sidewall flashings.

NRCA recommends roof system designers specify crickets at the upslope side of chimneys or curbed roof penetrations



(skylights) when any of the following conditions apply:

- The chimney or curb is at least 24 inches wide.
- A large volume of water, snow, ice or debris is expected because of the climate or large surface area above the penetration.
- The roof slope is 6-in-12 (27 degrees) or greater.
- The average January temperature is 30 F or lower, and significant accumulations of snow and ice are likely on the upslope side of the chimney or curb.



NRCA recognizes most low-slope roof systems are in effect “self-drying”

Also, 20 figures in this chapter depict specific conditions and guidelines.

Chapter 4—Construction Details provides text and 48 details depicting individual architectural metal flashing conditions. Details are provided for typical copings; perimeter edge metal; counterflashings; expansion joints; gutters, scuppers and downspouts; valleys; aprons and headwalls; backers and crickets; sidewalls; and joint and seam conditions. NRCA intends for the details to be used as a guide or customized for use in developing construction details for specific project conditions.

An Appendix to the Architectural Metal Flashing Section provides information about metals’ expansion coefficients.

This volume marks the first time NRCA has devoted a manual section to detailed information regarding architectural metal flashings. In the fourth and fifth editions of *The NRCA Roofing and Waterproofing Manual*, limited information was provided regarding architectural metal flashings in the sections discussing metal roof systems. In the 2010 volume, the information regarding architectural metal flashings greatly is

expanded and more detailed than in previous editions.

NRCA intends this section to be used to complement or in lieu of the Sheet Metal and Air Conditioning Contractors’ National Association’s *Architectural Sheet Metal Manual* or *Residential Sheet Metal Guidelines*.

Condensation control

The manual’s Condensation Control Section provides information about minimizing and controlling condensation in low- and steep-slope roof assemblies.

Chapter 1—Fundamentals of Condensation Control provides information about moisture sources, principles of moisture vapor movement and climate conditions applicable to all buildings and roof assemblies. The chapter also describes how to use the psychrometric chart to determine changing temperature and humidity conditions and their effects on the volume of moisture in air.

Chapter 2—Condensation Control for Low-slope Roof Systems discusses how to prevent condensation accumulation, how to determine the need for and proper placement of a vapor retarder, and materials for vapor retarders for low-slope roof systems.

NRCA recognizes most low-slope roof systems are in effect “self-drying” roof systems designed without impermeable vapor retarder layers. Self-drying roof systems have little or no protection from moisture accumulation from buildings’ interior moisture, but they also “dry down” when the direction of vapor drive is from a building’s exterior to its interior as typically is the case during summer. Years of experience have shown self-drying roof systems perform satisfactorily, and NRCA considers the concept technically viable.

For low-slope roof systems, NRCA suggests a properly designed, positioned and installed vapor retarder be considered in the following situations:

- Buildings located in areas where the expected outside average temperature during the coldest month is lower than 40 F and the expected interior relative humidity in winter is 45 percent or greater
- Buildings located in Climate Zones 7 or 8
- Buildings that serve the function of cold storage or a freezer (In these instances, the vapor retarder layer serves the function of an air barrier.)

Chapter 3—Condensation Control and Ventilation for Steep-slope Roof Assemblies provides information about preventing moisture migration and accumulation, attic ventilation, unvented attics, ventilation of vaulted ceiling assemblies and roof vents applicable to steep-slope roof assemblies.

NRCA recognizes venting attics at a 1:150 ratio and the concept of unvented attics as being technically viable but subject to certain specific limitations as described in the manual.

The section’s appendixes include a psychrometric chart, U.S. climate zone table organized by state and county, thermal property data of common building materials, thermal resistance values for air films and spaces, and climatic design data organized by state and major city.

Currently, few publications addressing building construction include detailed information about moisture accumulation and movement and controlling condensation in buildings. Even the American Society of Heating, Refrigerating and Air Conditioning Engineers Inc. has reduced the amount of information it provides about moisture accumulation and movement, vapor retarder design and attic ventilation in its *2009 ASHRAE Handbook—Fundamentals*.

Although condensation control in buildings is not the responsibility of roofing contractors, NRCA has included this section in *The NRCA Roofing Manual* to provide background information regarding moisture issues in buildings.

Reroofing

The Reroofing Section is divided into six chapters.

Chapter 1—Introduction to Reroofing provides general information, including definitions, regarding reroofing. Reroofing is defined as the process of re-covering or tearing off and replacing an existing roof system.

Chapter 2—Evaluation of Existing Roof Systems provides information regarding the process of evaluating existing roof systems to determine whether re-covering or tear-off and replacement is most appropriate.

The manual suggests that whenever possible, an inspection of a building's interior in the areas underneath the roof area be considered for reroofing to determine specific conditions and reveal any deficiencies. Also, the manual recommends inspecting a roof's perimeter and existing roof system. Specific steps and items to evaluate during these inspections are described in the manual as are additional evaluation criteria specific to low- and steep-slope roof systems.

Chapter 3—Building Code Requirements provides specific requirements applicable to reroofing and limitations to re-covering roof systems. The requirements provided are based on the *International Building Code, 2009 Edition* and *International Residential Code® for One- and Two-Family Dwellings, 2009 Edition*. For example, both codes generally require completely tearing off existing roof covering layers when more than one roof covering layer exists.

Chapter 4—Roof Decks for Reroofing provides guidelines for evaluating existing roof decks before reroofing. NRCA's guidelines for roof decks during reroofing differ somewhat from the recommendations for new construction projects. This is because of the large number of roof deck

types encountered on existing buildings and more stringent roof deck requirements being applied to newly constructed buildings.

Information about identifying and properly addressing existing cementitious wood fiber panels; cast-in-place, post-tensioned and precast concrete; lightweight insulating concrete; poured gypsum; precast gypsum panels; steel; thermal-setting fill; structural wood panels; and wood plank and wood board roof decks is provided.

Chapter 5—Roof Re-cover Design Guidelines provides design considerations applicable to roof re-cover situations.

Specific design guidance discusses building code compliance, fire-resistance classifications, wind-uplift resistance, added weight, and existing flashings and flashing heights for re-cover situations. Additional considerations are provided specific to low- and steep-slope roof re-cover designs.

Chapter 6—Roof Replacement Design Guidelines provides design considerations applicable to roof system replacement situations. Included is information regarding building code compliance, fire-resistance classifications, wind-uplift resistance, and existing flashings and flashing heights for roof system replacement situations. Also, additional considerations are provided specific to low- and steep-slope roof system replacement designs, including drainage and slope; perimeters, wood nailers and flashings; through-wall flashings; and ice damming prevention.

For roof system replacement projects, once considerations discussed in Chapter 6 and considerations applicable to roof decks described in Chapter 4 are addressed, the manual recommends consulting other volumes of The NRCA Roofing Manual for guidance regarding the design, materials and installation of new replacement roof system types.

Appendixes

The manual's Appendixes Section includes three appendixes.

Appendix 1—Referenced Organizations provides contact information for 25 roofing-related organizations the manual references.

Appendix 2—Unit Conversions provides information about unit abbreviations and conversions from U.S. customary units to metric units. Separate tables provide conversion factors for measurement units; metal gauges, thicknesses and weights; and roof slopes.

Appendix 3—Glossary provides definitions for 794 roofing-specific terms used in The NRCA Roofing Manual.

Getting the manual

The NRCA Roofing Manual: Architectural Metal Flashing, Condensation Control and Reroofing—2010 is available in print and electronic versions.

The print version complements and is best used in conjunction with the other print versions of The NRCA Roofing Manual. NRCA members who have paid their 2010 membership dues and new NRCA members will receive a free copy of the print version this month.

The electronic version is a CD that includes the 2007, 2008, 2009 and 2010 volumes.

Also, the NRCA Construction Details CD—2010 provides the construction details contained in all four volumes in a format that can be manipulated using computer-aided design software.

All versions are available by accessing shop.nrca.net.   

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To read a history of the manual, log on to www.professionalroofing.net.