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Book Descriptions:

concrete and clay roof tile installation manual for moderate climate regions

TRI Alliance and WSRCA submitted this manual for formal review and issuance of an IAPMO Uniform ES Evaluation Report ER2015 to help provide a stronger foundation to formal practices and recommendations included. See current schedule. See current schedule. Designed to provide answers to installation questions from roofers, contractors, architects, and building officials, the document addresses the installation needs of coldweather climates and is a companion to manufacturer installation guides. TRI offers classroom certification training and free hands-on demonstrations. The changes made to the manual became effective in the field Jan. 1. The new manual can replace the numerous individual installation guides currently in circulation, which are provided by individual tile manufacturers as part of their code approval. There currently are more than 50 manuals by various tile manufacturers in North America. Almost all tile manufacturers in North America now have formally replaced their manuals with RTIs and WSRCA's manual. The recommendations are meant for areas with moderate climates that may experience occasional winter storms and heavy rain. In locations where the January mean temperature is 30 F 1 C or less or where ice damming occurs, RTI and WSRCA suggest roofing professionals refer to the organizations Concrete and Clay Tile Roof Design Criteria Manual for Cold and Snow Regions. Copies may be ordered on RTI's Web site, www.rooftile.org. Local building officials should be consulted for engineering criteria or other special requirements. The effectiveness of a tile roof system as a weather-resistant assembly, however, depends on the proper installation of the tile roof components. The minimum recommendations for moderate regions in the manual are effective for a range of conditions, including occasional heavy rain or snow. <http://akersbergaibf.se/userfiles/944-conversion-manual.xml>

- **concrete and clay roof tile installation manual for moderate climate regions, concrete and clay roof tile installation manual for moderate climate regions.**

Although it is not practical to prescribe precise solutions for all conditions, the manual has been designed to offer suggestions for various treatments in moderate climate applications. Local building officials always should be consulted about special requirements that may exist. The manual has been submitted to ICBO's evaluation service ICBOES to obtain a report number. RTI and WSRCA stress roof system designers should be familiar with local climatic conditions and review the proper design manual. In the manual, RTI and WSRCA attempt to provide basic, general information about tile that includes information about material checklists, tile specifications and recommendations, materials and manufacturing; definitions of terms relating to tile; highwind considerations; and general topics about tile issues. These areas include the following With the new International Code Council ICC codes about to take effect, RTI and WSRCA have updated flashing requirements to include the use of No. 26 gauge metal. This recommendation is not a new concept and has been in practice for the past few years. For new construction, this will mean One layer of ASTM D226 Type II No. 30 felt, in a recognized code evaluation report, completely will cover the deck and be lapped over the hips and ridges and through valleys. Underlayment will be lapped 6 inches 1.5 mm vertically end or side lap and 2 inches 0.5 mm horizontally head lap. Tile roofs with slopes less than 3in12 14 degrees still are considered decorative. For roofs with slopes between 3in12 14 degrees and 4in12 18 degrees, underlayment may be installed as described previously or a single layer of Type 90 granular-surfaced asphalt roll roofing; two layers of ASTM D226 Type II No. 30 felt installed in shingle fashion; singleply system installed per code; or other approved underlayments may be

installed. <http://mail.kidsattractions.com/upload/943nwx-manual.xml>

After Hurricane Andrew struck south Florida, RTI spent several years attempting to identify a specific ASTM standard that could be referenced for use within the manual. Previously, there had not been a proper way to identify a specific coating level. The ASTM A641 Class 1 specification provides a minimum weight of zinc per unit area of uncoated wire surface. Because the nail industry never has been able to equate surface coating to expected life of a fastener, RTI has determined that by specifying the minimum adherence to ASTM A641 Class 1, RTI and WSRCA will at least form a threshold for tile fasteners to meet. The balance of the fastener requirements will come from the Uniform Building Code UBC. Although performed in most U.S. regions, there are specific areas in the Southwest where this practice has not been used. RTI was concerned enough about this issue to provide a subsequent Technical Bulletin about weatherblocking issues; it can be downloaded at www.rooftile.org. The bulletin provides the numerous options that are available for roofing professionals to consider. The issue of ICBOES approved weatherblocking materials still is being developed. There currently is not an approved acceptance criteria against which weatherblocking materials are tested. Discussions with ICBOES and several weatherblocking manufacturers are occurring to commence drafting acceptance criteria. Once completed, the products then can be tested against those criteria for an official ICBOES approval as a weatherblocking material. The figure was based on engineering calculations and is provided as a guideline for design professionals. Each installation method may have limiting factors depending on wind speed. As a result, RTI and the University of Southern Californias Structural Engineering Department conducted a series of tests on seismic performance of concrete and clay tile.

Tile is the only roofing material that has undergone such testing and resulted in a finding that no additional fasteners are required. By raising the quality of tile installations, RTI and WSRCA believe longerlasting roof assemblies will be installed. In addition, RTI and WSRCA will provide a Spanishlanguage version of the manual by the end of 2002. The presentation will provide a pagebypage tutorial of the changes that have been included in the manual, as well as any revisions. Comments or input about the manual are encouraged and welcomed. Please log in to leave a comment. But what is "abovesheathing ventilation" Heat from solar radiation and interior heat loss from the conditioned space are easily transferred through the deck and roof system. This can increase energy costs and cause ice damming. The buildup of heat and extreme temperatures wings can also reduce the life of underlayment and other system components. This space reduces heat transfer and allows heat buildup to dissipate from the sheathing and roofing materials. This abovesheathing ventilation, or ASV, inherent to tile roof installations can be enhanced using counter battens, shims or manufactured systems to raise the horizontal battens above the roof deck. The system design will vary with the environmental challenge and goals. Specific examples are described below. This space reduces heat transfer and allows heat buildup to dissipate from the sheathing and roofing materials. This space reduces heat transfer and allows heat buildup to dissipate from the sheathing and roofing materials. With these components in place, heat transfer is minimized and heat buildup is dissipated, which reduces energy costs. Vertical counter battens or shims that raise the horizontal battens increase this space and the corresponding benefit. The addition of vented eave riser flashing and ridge ventilation completes an energysaving ASV system.

The system shown below is the Elevated Batten System made by Boral Roofing, which uses treated 1 by 2s with highgrade plastic pads, a vented eave riser flashing and vented weather blocking at the ridge. With these components in place, heat transfer is minimized and heat buildup is dissipated, which reduces energy costs. The upgraded ASV reduces temperature extremes that shorten the life of the underlayment and other roofing components. These benefits are achieved with no mechanical or moving parts. In this climate, moistureladen air can migrate under the tile and condense in the space between the tile and roof deck. The underlayment is there to protect the sheathing but if the

battens are raised above the deck, condensation will be reduced. Raised battens also allow moisture under the tile to escape to the eave. When roof tiles are fastened to a raised batten, underlayment penetrations are minimized. Snow movement on roof surfaces can cause damage to people and property. The goal in cold and snowy environments is to prevent ice dams by enhancing the ASV under the tile roof. Typically, a more substantial air space is created using larger vertical battens. A well designed "cold roof" system that includes proper snow retention is the solution. Regions "in locations where the January mean temperature is 25 deg. F or less or where ice damming often occurs". Through the voices of professionals in the field, Roofing 's editorial provides a unique perspective. Please try again. Please try again. Then you can start reading Kindle books on your smartphone, tablet, or computer no Kindle device required. In order to navigate out of this carousel please use your heading shortcut key to navigate to the next or previous heading. Register a free business account To calculate the overall star rating and percentage breakdown by star, we don't use a simple average. Instead, our system considers things like how recent a review is and if the reviewer bought the item on Amazon.

<https://www.fixemer.com/images/canon-8500-service-manual.pdf>

It also analyzes reviews to verify trustworthiness. Eagle is a family owned company that has been in the tile roofing business for over 40 years and is a joint venture of USA Owned Burlingame Industries. Eagle was founded in 1989 with the goal of manufacturing quality concrete roof tile in modern, automated and highspeed plants. As one of the nations leading manufacturers, Eagle is dedicated to servicing the new construction and remodeling industries worldwide with roof tile and accessories. Eagle also strives to innovate trend setting technologies and products that benefit the environment while helping our customers and their customers. Eagles entire team is dedicated to becoming the industrys tile company of choice providing the industry with green solutions that increase curb appeal while reducing energy costs. For more information, samples or assistance from Eagle Roofing Products, please visit our website. See our SpecWizard Click Here August 2007. Consult with Eagle for additional information or assistance. Indicate tile layout with location of cut and special shaped tiles identified. Include range samples if variation of finish is anticipated. Delete if not required. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. The following is one example of how a mockup on a large project might be specified. When deciding on the extent of the mockup, consider all the major different types of work on the project. Do not install products under environmental conditions outside manufacturers absolute limits. Fax 909 8225940. Website www.eagleroofting.com. Fax 209 2344366. Website www.eagleroofting.com. Fax 602 4428841. Website www.eagleroofting.com. Fax 877 3003248. Website www.eagleroofting.com. Please visit the Eagle website for a list of colors and reflectance, emittance and SRI values. Delete if not required. Delete weight not required.

<http://ablerepairandrestoration.com/images/canon-8150-manual.pdf>

Boosted Cap is an available application and should be specified in addition to Malibu field tile. Delete weight not required. Delete weight not required. Boosted Cap is an available application and should be specified in addition to Capistrano field tile. Delete weight not required. Delete weight not required. Delete weight not required. Delete weight not required. Delete weight not required. Double Eagle Bel Air not available in Lightweight. Lightweight concrete roof tiles are not available in all areas. Delete weight not required. White is special order. Delete color snot required. Delete colors not required. White is special order. Delete color not required. Helps to improve ventilation under the tile. 1 inch by 2 inch battens must be specified separately. Delete if not required. Not available in Florida. Provide 2 inches by 2 inches 51 mm by 51 mm ridge board. Delete if not required. Product for elevating battens off of the roof deck. White is special order. Delete colors not required. Delete colors not required. White is special order. Delete colors not required. Delete rake style and colors not required. Delete rake style and colors not required. Delete if not required.

Delete colors not required. Delete if not required. Delete colors not required. Fold down onto fascia or barge board, minimum of 1 inch 25 mm. Secure with nails and tin tags, round cap nails or other fasteners 6 inches 152 mm on center. Fold down and seal onto fascia or barge board. Comply with Tile Roofing Institute Moderate Climate Installation Guide Table 1A and 1B. ASTM A641 Class 1 is a nail specification that can be converted to screw fasteners through performance testing ASTM B 117. Each fastener manufacturer is responsible for supplying this support this data. Do not commence tile installation until unsatisfactory conditions are corrected. Quick Reference charts on pages 2, 23, 45, 67 and manufacturers instructions. See drawings 11,12,12,14 and 11b, 12b, and 14b.

For self curbing or prefabricated skylights, refer to skylight manufacturers installation instructions. Florida install according to manufacturers instructions and local code requirements. Clay tile roof inspection, failures, repair, product defects. Roof inspection, leak detection, roof diagnosis, roof repair. We have no relationship with advertisers, products, or services discussed at this website. Our page top photo shows clay roofing tiles installed on a low slope roof in San Miguel de Allende, Mexico. Below we comment on the special steps needed to keep a low slope clay tile roof from leaking. For example at How clay roofing tiles are secured we include a photograph of a clay tile roof in a mountainous area of Mexico where very little is done to fasten the tiles to the roof structure. Notice the drainage gaps in the batten strips. In coastal areas where high winds and hurricanes are a threat to all roofs, extra steps are taken to fasten tiles to the roof surface. Raising the high end of this shed roof a few inches will improve the roof drainage and stop the leak problem. This system works acceptably in areas such as central Guanajuato, Mexico where the structure is not subjected to high winds nor freezing weather. Mr. Cramer serves on the ASHI Home Inspection Standards. Many of the technical books about roof tiling and slating are rather vague and conveniently ignore some of the trickier problems and how they can be resolved. In Roof Tiling and Slating, the author rejects this cautious approach. Kevin Taylor uses both his extensive knowledge of the trade and his ability to explain the subject in easily understandable terms, to demonstrate how to carry out the work safely to a high standard, using tried and tested methods. This clay roof tile guide considers the various types of tiles, slates, and roofing materials on the market as well as their uses, how to estimate the required quantities, and where to buy them.

ISBN10 0471648361, ISBN13 9780471648369, Hardcover 320 pages, available from Amazon.com and also Wiley.com. See our book review of this publication. The text covers moisture needs, heat tolerance, hardiness, bloom color, foliage characteristics, and height of 350 species and cultivars. Congress Catalog Card Nr. 8150643. Alan Carson is a past president of ASHI, the American Society of Home Inspectors. Carson Dunlop Associates provides extensive home inspection education and report writing material. The text is intended as a reference guide to help building owners operate and maintain their home effectively. Field inspection worksheets are included at the back of the volume. Special Offer For a 10% discount on any number of copies of the Home Reference Book purchased as a single order. InspectAPedia.com editor Daniel Friedman is a contributing author. Or choose the The HOME REFERENCE eBook for PCs, Macs, Kindle, iPad, iPhone, or Android Smart Phones. Special Offer For a 5% discount on any number of copies of the Home Reference eBook purchased as a single order. InspectAPedia.com editor Daniel Friedman is a contributing author. Click Here One of the most common problems the teams found was failure of the roofing system. Although the investigators saw failures with all roofing types, the tile industry was the first to respond with new design criteria and installation details. These details have since been added to the Florida Building Code, and more code requirements are under discussion. The last one was in 1997, five years after the devastation left by Hurricane Andrew. Before then, most tiles installed on lowpitch roofs in Florida had been set in a bed of mortar. Because so many of these roofs failed in 1992, the tile industry developed alternative installation techniques that could better resist high winds, including methods for adhesive and mechanical attachment, which were then included as

options in the Florida code.

In addition, the Tile Roofing Institute TRI developed guidelines for using smoothshank nails, ringshank nails, and screws. With few exceptions, most post-1997 roof tiles were fastened in place using one of these systems. The 2004 FEMA survey found that these roofs had a much higher survival rate than those installed earlier. The solution is to attach hip and ridge tiles to a ridge board, using screws through the tile that penetrate at least 1 inch into the board. Tim Reinhold with the Tampa-based Institute for Business and Home Safety reports that his organization had supported a code-mandated ban on mortar-set tiles in highwind areas, but he notes that opposition by roof installers was too strong. As a compromise, the industry came out with a code-approved prebagged mortar with just the right amount of sand and cement. Tom Smith of TLS Consulting in Rockton, Ill., who served on the FEMA survey teams, says that the size of the blowoff area of mortar-set systems typically was much greater than for tiles attached with foam or mechanical fasteners. He advises against mortar set, no matter what type of mix the roofer uses. FEMA's Home Builders Guide to Coastal Construction, published in June 2005, also recommends mechanical attachment rather than mortar set in all highwind areas. To improve attachment, both mechanical fasteners, such as screws or nose clips, and adhesive foam are recommended for coastal homes. He reports that many roofers were still setting hip and ridge tiles on a bed of mortar, even where they had nailed or screwed the field tiles. Best practice calls for a rake board and battens, as detailed in the illustration below. The Tile Roofing Institute also recommends ridge boards to secure ridge caps. Best practice calls for nose clips to secure the eaves edge, which is most vulnerable to wind uplift. The manual was released in October of 2005, and adopted by the Florida Building Code in November.

On all tile roofs, the contractor now has to include wood or metal nailers along hips and ridges, and the installer has to securely fasten tiles to this board using screws, nails, or a foam adhesive. The old version, published in 2002, had just one page dealing with highwind applications. The new version, released in July 2006, includes nine pages of tables, formulas, and specs for areas subject to sustained winds over 100 miles per hour. The FEMA teams found some roofs with mechanically attached and foam-adhered tiles that didn't perform as predicted. Olson, who also studied failed roofs after the storms, says that the culprits involved installation problems on both foam and mechanically fastened roofs. On the foam installations that fared poorly, Olson discovered that installers hadn't followed the foam manufacturers' instructions. They used too little foam or didn't put the foam at the right locations on the tile, or both. With the failed mechanically attached roofs, the problem was not enough fasteners, or fasteners of the wrong type. In some cases, they have made those installers get recertified to use the system. TRI will also offer a special highwind training program to Florida contractors in January and February 2007. Issues covered include: Because of their profiles, tiles often don't sit flat against the roof, and many are installed on battens. Often the fastening tables say to use two screws, but the installer uses only one. And after storms, we see a lot of transplanted roofers from other parts of the country who might not be familiar with how to install tile in Florida. An online copy is available free from the Tile Roofing Institute. For more information, go directly to the manufacturer Dow Chemicals Tile Bond Polyfoam Products Polyset One. Tile roofs are strong, versatile, and durable. Available in a variety of styles and finishes, tile adds curb appeal to any home, be it American Colonial, Spanish Hacienda, or French Provincial.

As with any roof type, weather proofing and installation are keys to long-term performance. This article will provide tips on how to avoid common errors in tile installation. Several industry standards have been developed and are used in order to assure quality installation of clay and concrete tiles, such as the National Roofing Contractors Association, the Roof Tile Institute, and the Western States Roofing Contractors Association. But even with these established standards, tile roofs are frequently installed incorrectly, with mistakes that are repeatedly the same. Some local building codes may require two layers of underlayment be provided due to cold climate conditions or

the low slope of a roof; therefore, it is important to verify underlayment requirements before installation begins. Underlayment is a crucial component to the roof because it acts as a drainage plane for a watershedding tile roof. Tile roofs are unique in this aspect, as the primary drainage plane is the underlayment and not the topmost layer like other roofing materials, such as asphalt or wood shingles. This is why any puncture or tear in the underlayment should be sealed so no water intrusion below the underlayment can occur. Water intrusion could eventually result in leaks into the residence, which could cause a substantial amount of damage. However, leaks don't always show up right away, even though deterioration could be occurring to the roof decking and other wood components. The underlayment should lap over the top of roof penetration flashings and under the bottom, creating a shinglelike order to ensure the water shedding capabilities of the underlayment. This technique is important at small penetrations, such as plumbing and roof vents, as well as at large penetrations such as skylights and chimneys. The flashing surrounding these large penetrations is made up of several pieces, so the same shinglelike lapping is essential at these locations.

It should also be mentioned that at penetrations with a width larger than 30 inches, installment of a cricket flashing is recommended to prevent snow and debris buildup. At rakes, the underlayment should be lapped under the rake flashing to prevent water intrusion from winddriven rain and snow below the underlayment. At eaves, the underlayment should be lapped over the eave flashing in order to provide a continuous avenue for water to drain off of the roof. In all of these cases, reverselapped underlayment and flashing interfaces can result in damaged components and can eventually lead to leaks. Note the roof underlayment is run under the uphill side of the penetration flashing. Water will run under the flashing and into the deck penetration at this location. Source Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions Design Criteria, by Roof Tile Institute and Western States Roofing Contractors Association Two events are necessary to create an ice dam a warm interior and a cold exterior. When snow accumulates on a roof with a warm attic, it begins to melt. When the melting snow reaches the end of the roof at the eaves, which stay cold as they are not adjacent to attic space, the melted snow refreezes. This situation can cause major damage to homes if the moisture management materials are not correctly lapped. If not properly protected, water can travel under the underlayment and enter the home's walls, ceiling, and building components. This is just one more reason why paying particular attention to the lapping conditions of moisture management materials is so important. Other precautions can be addressed to ensure that ice damming occurrences are significantly reduced. One option, and probably the most effective, is to eliminate the warm attic environment. To do this, insulation should be placed above the ceiling in the attic to keep the warm air in the living space of the home and not in the attic space.

Additionally, sufficient ventilation should be established to provide a constant flow of air through the attic space from the ridge to the eaves. If this cold attic system is correctly installed, the probability of ice damming should be completely eliminated. Valleys are located at the intersection of two sloping roof planes which creates an area of concentrated water flow, so additional protection is necessary to prevent water intrusion. Whether using additional underlayment or sheet metal flashing at valleys, installation should consider the flow of water. This will ensure all valley components are lapped in a shinglelike manner, in the direction of water flow. Note battens and bird stop extended into valley flashing resulting in debris accumulation. Construction debris, such as tile fragments and underlayment scraps also block the flow of water. Note placement of battens around valley flashing. Source Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions Design Criteria, by Roof Tile Institute and Western States Roofing Contractors Association. Battens are usually 1inch x 2inch wood supports nailed or stapled horizontally to the roof decking. Tiles with projecting anchor lugs are hung on the battens and fastened to them. The purpose of battens is to provide space for water and debris to drain below the tiles, as well as to allow the

system to ventilate. It is also pertinent that battens be withheld from the valleys so a clear drainage path is present for water and debris to exit the system. Another method for providing a drainage plane below the tiles is to install counter battens. Counter battens are nailed or stapled vertically to the roof decking and are used to support the horizontal battens. Battens should be spaced at a maximum of 24 inches apart on the counter battens, and are recommended to be spaced 16 inches apart at locations with high snow loads to avoid deflection of the battens, which could result in cracked or damaged tiles.

Source Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions Design Criteria, by Roof Tile Institute and Western States Roofing Contractors Association. First, when installed directly on the deck, without battens, one fastener must be provided at every tile. If battens are being utilized, additional factors determine the fastening schedule. The pitch of the roof must be known when determining requirements. Because tiles with projecting anchor lugs hang on the battens, a low slope roof has less stringent fastener requirements than a steeply sloped roof. If the slope of the roof is under a 5/12 pitch, fasteners are not required. On roofs with a slope between 5/12 and less than 12/12, one fastener is required per tile on every other row. For slopes 12/12 and greater, one fastener per tile is mandatory. High wind and snow areas have special fastener requirements depending on the governing code. If the wind speed exceeds 80 miles per hour, or the height of the structure exceeds 40 feet, all tiles are required to have one fastener, rake tiles are required to have two fasteners, wind clips are to be utilized at all eave tiles, and mastic is to be applied to the noses of all ridge, rake, and hip tiles. In snow areas, two fasteners per tile are necessary for all tiles.