ROOF INSPECTION AND CERTIFICATION PROCEDURES MANUAL FOR TEXAS WINDSTORM INSURANCE ASSOCIATION ELIGIBILITY BY APPOINTED ENGINEERS

Prepared by

The Texas Department of Insurance
Inspections Division
Engineering Services/Windstorm Inspections

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PREFACE

This manual was written for reference by Texas Licensed Professional Engineers (Appointed Engineers) appointed to perform roof and re-roof inspections of structures seeking eligibility for Texas Windstorm Insurance Association (TWIA) insurance in the first tier coastal counties designated as catastrophe areas in Texas.

See http://www.tdi.state.tx.us/wind/index.html to access a detailed map of each county.

The manual is based on the roofing requirements of the 2006 International Residential Code, with Texas Revisions (2006 IRC), the 2006 International Building Code, with Texas Revisions (2006 IBC), and Texas Department of Insurance (TDI) prescribed inspection procedures.

I. Appointed Engineer as a Qualified Windstorm Inspector.

A Texas Licensed Professional Engineer must be appointed as a qualified Windstorm Inspector by the Commissioner of Insurance in order to inspect and notify compliance of structures for evidence of insurability for windstorm and hail insurance coverage through the Texas Windstorm Insurance Association (TWIA). Information regarding the appointment of Texas Licensed Professional Engineers as a qualified Windstorm Inspector may be found on the TDI Windstorm Inspections Program website at http://www.tdi.state.tx.us/wind/index.html, select the "Engineering Appointment Process" link under the "Engineering Section" heading in the center of the screen, select the "Appointment of Engineer as a Qualified Inspector Process" link and refer to the "Title 28, Texas Administrative Code, Section 5.4604" link.

Only Texas Licensed Professional Engineers are eligible to apply for appointment as a Qualified Inspector.

A. Inspection of structures by an Appointed Engineer.

1. An Appointed Engineer is authorized to perform windstorm inspections of structures during the construction process, or after the completion of construction if the engineer can verify compliance with the applicable building code requirements and inspect the construction on risks that could be considered insurable property for windstorm and hail insurance coverage through the Texas Windstorm Insurance Association (TWIA).
2. An Appointed Engineer may delegate inspection duties under §5.4604(g)(5) to another person under their direct supervision.
3. Items that do not require inspection: The complete list may be found on the TDI Windstorm Inspections Program (Windstorm Inspections) website at http://www.tdi.state.tx.us/wind/index.html, select the "Windstorm Brochures" link under the "Windstorm Inspection Process" heading in the center of the screen, and select the "No Inspection Required" link.
    a. Repairs to roofs less than 100 square feet (one square) in area (aggregate or sum of all areas).
    b. Repairs or replacement of gutters.
    c. Repairs to fascia.
    d. Repair or replacement of soffits less than 24 inches wide.

B. Reference Materials for an Appointed Engineer Inspection.

1. 2006 International Residential Code (IRC), with 2006 Texas Revisions.
2. 2006 International Building Code (IBC), with 2006 Texas Revisions.
3. ASCE 7-05, *Minimum Design Loads for Buildings and Other Structures* (ASCE 7).
4. American Forest and Paper Association (AF&PA), *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM), 2001 Edition.
5. Institute for Business & Home Safety (IBHS) Guidelines for Hurricane Resistant Residential Construction, 2005 Edition, (formerly Southern Building Code Congress International, *Standard for Hurricane Resistant Residential Construction* (SSTD 10-99), 1999 Edition).

6. The List of Asphalt Shingles that comply with the 2006 IRC and IBC (asphalt shingle list).
7. The TDI product evaluation index and product evaluations for roof coverings, roof vents, and skylights (TDI product evaluations).
8. International Code Council (ICC) evaluation reports.
9. Underwriters Laboratories® (UL) or Factory Mutual Research Corporation© (FMRC) product evaluation reports.

Note: The reference materials, or sources for obtaining them, can be found on the TDI Windstorm Inspections Program website. Sources for the IRC, WFCM, IBHS documents, SSTD 10-99 and ICC evaluation reports are under the "Related Links" heading. Select the "International Code Council, American Wood Council or Institute for Business & Home Safety" links. The 2006 Texas Revisions to the IRC and IBC are under the "Building Code" heading. The asphalt shingles list and the TDI product evaluations are under the "Building Products" heading. Contact the American Society of Civil Engineers at http://www.asce.org/asce.cfm for a copy of ASCE 7.

II. Completing the Application for Certificate of Compliance, Form WPI-1.

An Appointed Engineer shall complete one (1) Form WPI-1 for each structure re-roof inspected. The Form WPI-1 shall indicate which structure is located at the address indicated. The Form WPI-1 is available for download on the TDI Windstorm Inspections website, under the TDI Forms heading on the right side of the screen.

A. Complete the physical address, city limits, structure location, COBRA, owner, and builder/contractor blanks on the Form WPI-1. Enter the Appointed Engineer's contact information and Texas Licensed Professional Engineer Registration Number in the engineer blanks.

B. Ask the consumer or contractor about the type of building(s) to be re-roofed. Are there any detached buildings, buildings attached by a breezeway, attached patio covers or carports, or any other structure roof surfaces included in the scope of re-roof inspection?

   a. When a structure with a detached garage, carport, patio cover, or other building(s) are inspected, each detached structure requires the submittal of a separate Form WPI-1.

   b. When a structure with a garage attached by a breezeway is inspected, one Form WPI-1 submittal is required.

   c. When a residential structure with an attached patio cover, carport, or other roof surface(s) are inspected, one Form WPI-1 submittal is required.

C. After the number of independent structures to be inspected is determined, the type of inspection shall be determined.

   a. If all roof surfaces on the building(s) applicable to a Form WPI-1 are re-roofed, then complete the Entire Re-Roof (Type) blank. Indicate if there is re-decking.

   b. If at least one roof surface on the building(s) applicable to a Form WPI-1 is not re-roofed, then complete the Partial Re-Roof (Type and Area) blank. Indicate if there is re-decking.

   c. If a skylight is installed or replaced, then check the box for "Alteration" and indicate on the blank line provided the type, number and location of the exterior opening alteration(s) as skylight(s) and windborne debris protection (if required).

D. Record the date of application when the Form WPI-1 is completed and the commencement of construction date on the form.

E. Complete the submitter information on the Form WPI-1. The information should apply to the person who provided the information recorded on the form.

F. Each completed Form WPI-1 shall be submitted by facsimile (fax) or mail to the TDI windstorm intake unit in Austin, Texas. The Form WPI-1(s) shall be sent to TDI as soon as possible after the application is taken from the consumer or contractor, and before the re-roof process begins. Please use the mail code (MC) and address, or fax telephone number on the top of the Form WPI-1. Please keep a copy of the Form WPI-1 for your records.

Note: Please complete all entries on the Form WPI-1. Omitting critical information such as mailing addresses and telephone numbers may delay the processing of the application form and require the return of the Form WPI-1 to you for correction and re-submittal. The Form WPI-1 may be completed on-line at the Windstorm Inspections website. Select the "WPI-Forms" link under the "Windstorm Inspections Process" heading, select the "Windstorm Online Application for Certificate of Compliance (WPI-1 Form)" link.

Examples for completing the Form WPI-1 are available on the Windstorm Inspections website. Select the "WPI-Forms" link under the "Windstorm Inspections Process" heading, select the "WPI-1 Guidelines" link.

III. Preparing for the Inspection of the Structure(s).

A. Documents for inspection.

1. Transfer the appropriate information from the Form WPI-1 to the appropriate Inspection Verification Form WPI-2.
2. Locate the structure on a map and record the location for your inspection records.
3. The list of Asphalt Shingles that Conform to the 2006 IRC and 2006 IBC as modified by the 2006 Texas Revisions.
4. The TDI product evaluation index and product evaluations or ICC evaluation reports for roof coverings, roof vents, and skylights.
5. A roof covering, roof vent, and skylight inspection checklist.
6. Business cards with your name, company name, address, and telephone number.
7. Your inspection report form. Please refer to the Appendix for the suggested information to include on your inspection report form.

B. Tools for the Inspection of the Structure(s).

1. A hard hat, traction-sole shoes and safety harness (if needed).
2. An extension ladder or folding ladder of sufficient length to extend safely above the roof eave height of the structure.
3. A carpenter's level and pitch meter, or a suitable alternative for determining the slope (pitch) of the roof surface. See Appendix for an example of a pitch meter.
4. A measuring tape and flashlight.

IV. Initial Inspection Documentation and On-Site Information Gathering.

A. Initial documentation.

1. Locate the owner's or contractor's representative on the jobsite. Verify the physical address of the structure, and the scope and status of the roof or re-roof inspection.

   a. If the physical address, structure location or scope of the inspection is different than recorded on the Inspection Verification form, then correct the recorded information on the Inspection Verification form. A revised Form WPI-1 must be submitted to the TDI immediately upon returning to your office to correct the information previously submitted and a revised Inspection Verification form prepared for the inspection documentation.

2. Verify that the roof covering, roof vent and skylight products can be inspected by using the asphalt shingles list, a TDI product evaluation report, an ICC Evaluation Report, an independent laboratory test report, an UL product evaluation report or a FM product evaluation report.

   a. Consider if the roof deck substrate and roof slope are appropriate for inspection using wind resistant systems in the reference materials.

   b. If the roof or re-roof cannot be inspected using the tools available, then notify the representative, using your inspection report form, that you cannot inspect the roof or re-roof and why.

   c. Note: The 2006 IBC Section 1504.8 prohibits the use of gravel or stone on the roof of a building located in a hurricane-prone region (the entire designated catastrophe area).

B. On-site information gathering.

1. Measure the structure roof slope, mean roof height (MRH), and type and thickness of the roof decking. Record the measurements on your inspection report form(s) and the inspection form.

2. Determine the Exposure Category (B or C) appropriate for the terrain surrounding the structure. Exposure Category B is typical of built-up areas where there are closely spaced structures of similar height to the structure being inspected in all directions with no open areas exceeding 600 feet in any direction for a distance of 1500 feet. Otherwise use Exposure Category C.

3. Determine the design pressure(s) applicable to the structure roof covering, roof vent(s), skylight(s), and if applicable, roof decking. Use the appropriate basic wind speed, roof slope, roof zone, effective wind area and Exposure Category to find the design pressure from the IRC Tables R301.2(2) and R301.2(3), IRC Figure R301.2(8), and the Roof Slope Conversion table in the Appendix or from ASCE 7. Use an effective wind area of 32 square feet for wood structural panels (4x8 plywood or OSB), 10 square feet for the fasteners securing the roof deck panels, 10 square feet for board decking, 10 square feet for roof vents, and 10 square feet for skylights. Note that the design pressures are higher for the perimeter roof zones (zones 2 or 3). Record the design pressures for each MRH, roof zone, and effective wind area on your inspection report form(s).

4. Record the applicable roof covering type, manufacturer, product and system; the roof vent type, manufacturer, and model; and the skylight manufacturer, model and size on your inspection report form(s).

5. Draw a top view of the structure roof(s) in the sketch box provided on your inspection report form(s). Record the location of ridges and valleys, roof slopes and mean roof height(s), and the location of any roof decking repairs, roof vents, and skylights on the sketch.
6. Record the date of inspection on your inspection report form(s) each time an inspection or re-inspection is made.

V. Re-Roofing.

A. Roofing materials and application methods for replacing or recovering an existing roof covering shall comply with the requirements of the IRC Chapter 9, Section R907.1 or the IBC Chapter 15, Sections 1504, 1507 and 1510.

B. The roof structure shall be capable of supporting the additional weight of the roof overlay recovering system or the existing roof covering must be replaced.

C. The existing roof covering shall be removed before installing a new roof covering where any of the following conditions occur per the IRC Section R907.3 or the IBC Section 1510.3:

1. The existing roof covering is water-soaked or deteriorated so that the existing roof or roof covering is not adequate for an overlay.
2. The existing roof covering is wood shake, slate, or tile.
3. The existing roof has two or more applications of a roof covering in place.

VI. Inspection of an Asphalt Shingle Re-Roof Installation.

A. Inspecting the roof decking.

1. Asphalt shingles shall be fastened to solidly sheathed decks per the IRC Section R905.2.1 or the IBC Section 1507.2.1. Solidly sheathed decks for asphalt shingle installation include wood structural panels conforming to DOC PS 1, DOC PS 2 or CSA 0437, and shiplap or tongue-in-groove minimum ⅝” board lumber roof decks.
2. The existing roof decking shall be replaced when it is rotted, deteriorated, or damaged with new wood structural panels or board decking in accordance with the IRC or the IBC, and the manufacturer's installation instructions. New roof decking and the fastening of the decking to the rafters or trusses must meet the design wind pressures acting on the roof surface.
3. Using the design wind pressures determined in Section V above, determine the minimum roof deck thickness and fastening requirements from the reference materials such as the ASCE 7, WFCM or SSTD 10-99.
4. **Caution: Common Inspection Issues.**

a. The galvanized framing nails securing the roof decking to the roof framing shall be driven flush with the surface of the wood structural panel or board lumber, and not overdriven, underdriven or crooked.

b. See the 2006 Texas Revisions to the IRC, Section R324 or the 2006 Texas Revisions to the IBC, Section 1716.1 for corrosion resistance requirements for fasteners.

c. Verify that the roof deck is of acceptable thickness and properly attached to the roof framing.

B. Inspecting the underlayment (felt).

1. Asphalt shingles shall only be used on roof slopes of 2:12 or greater per the IRC Section R905.2.2 or the IBC Section 1507.2.2. Double underlayment application, with a minimum 19" side overlap, is required in accordance with Section R905.2.7 or the IBC Section 1507.2.8 for roof slopes of 2:12 up to 4:12.

2. Underlayment products shall conform with ASTM D 226, Type I, ASTM D 4869, Type I, or ASTM D 6757 per the IRC Section R905.2.3 or the IBC Section 1507.2.3. The IRC Section R905.2.7.2 or the IBC Section 1507.2.6 specifies that underlayment in high wind areas shall be applied with corrosion resistant fasteners in accordance with the shingle manufacturer's installation instructions along the overlap at a maximum spacing of 36 inches on center.

3. Alternatives to asphalt impregnated underlayment products specified in item 2 may be recognized by compliance with the appropriate ICC Evaluation Service, Inc. (ICC-ES) Acceptance Criteria. www.icc-es-org/, select "Evaluation Reports" link, select "CSI List" link, select "Division 07 - Thermal and Moisture Protection" link, select "07305 – Roofing Felt and Underlayment" link for a list of links to the ICC-ESR evaluation reports for alternative underlayment products.

4. A self-adhering polymer modified bitumen sheet complying with ASTM D 1970 may be installed as an underlayment for asphalt shingles per IRC Section R905.2.3 or the IBC Section 1507.2.4. It is recommended that the self-adhering underlayment not be installed over the entire roof deck if the attic is not properly ventilated, except on a detached structure that contains no conditioned floor area.

5. Underlayment for ice barriers shall be installed per IRC Section R905.2.7.1 or the IBC Section 1507.2.8.2. Valley linings shall be installed per IRC Section R905.2.8.2 or the IBC Section 1507.2.9.2.

6. **Caution: Common Inspection Issues.**

   a. Improper installation of the felt side overlap for slopes of 2:12 to 4:12 where a double underlayment application is required is common.

   b. If it is necessary to overlap the felt ends, a 6 inch end overlap is typically required.

   c. Underlayment shall be laid parallel to the eave of the roof and overlapped shingle fashion to promote the drainage of water.

C. Inspecting the asphalt shingles.

1. Asphalt shingles shall be self-sealing or interlocking and comply with ASTM D 225 or ASTM D3462, per the IRC Section R905.2.4 or the IBC Section 1507.2.5.

2. Fasteners for asphalt shingles shall be roofing nails with a minimum 12 gage (0.105 inch) shank, minimum $\frac{3}{8}$ inch diameter head, and long enough to penetrate through the roofing materials and at least $\frac{3}{4}$ inch into the roof sheathing, or through roof sheathing less than $\frac{3}{4}$ inch thick per the IRC Section R905.2.5 or the IBC Section 1507.2.6. The shingle fasteners shall be galvanized steel, stainless steel, aluminum, or copper roofing nails. See the 2006 Texas Revisions to the IRC, Section R324 or the 2006 Texas Revisions to the IBC, Section 1716.1 for corrosion resistance requirements for fasteners.

3. Special fastening methods tested in accordance with ASTM D 3161, Class F, are required for asphalt shingle roofs located where the wind speed is 110 mph or

greater per the IRC Section R905.2.6 or the IBC Section 1507.2.7. Refer to the List of Asphalt Shingles that Conform to 2006 IRC and 2006 IBC on the TDI Windstorm Inspections website to determine if the asphalt shingles being installed shall be labeled to comply with this requirement.

Asphalt shingle manufacturers have tested their asphalt shingle roof covering products to these standards and the asphalt shingle wrappers shall bear a label indicating compliance with ASTM D 3161, Class F or using one of the alternative methods listed. Asphalt shingles tested to ASTM D 3161, Class F, are appropriate for installation on sloped roofs. (Reference: IRC Sect. R905.2.6 and IBC Sect. 1504.1.1) As an alternative, asphalt shingles may be tested to determine the resistance of the sealant to uplift force using ASTM D 6381 and for the installation to be designed using UL 2390 to determine appropriate uplift and force coefficients applied to the shingle. (Reference: IBC Sect. 1609.5.2) The alternative method is not referenced in the IRC, but may be applied to residential structures. Asphalt shingles tested to ASTM D 6381 are appropriate for installation on sloped roofs. ASTM D 7158 combines ASTM D 6381 and UL 2390 into one standard. ASTM D 7158 is not referenced in the 2006 IRC or IBC. ASTM D 7158 is referenced in the 2007 Supplement to the 2006 IRC and IBC, and most manufacturers have embraced ASTM D 7158 testing and labeling of their products. Asphalt shingles tested to ASTM D 7158 are appropriate for installation on sloped roofs.

4. Shingles with factory seal strip must be adhered (sealed) prior to approval in order to provide the maximum wind resistance.

Wind Resistance of Asphalt Shingles Summary:

ASTM D 3161, Class F – Asphalt shingles tested and labeled on the wrapper as conforming to ASTM D 3161, Class F are acceptable for installation where the basic wind speed is less than or equal to 130 mph.

Alternative Test Methods:

ASTM D 6381/UL 2390 –Asphalt shingles tested and labeled on the wrapper as conforming to ASTM D 6381 and UL 2390, Class G are acceptable for installation where the basic wind speed is less than or equal to 120 mph. Asphalt shingles tested and labeled on the wrapper as conforming to ASTM D 6381 and UL 2390, Class H are acceptable for installation where the basic wind speed is less than or equal to 130 mph.

ASTM D 7158 – Asphalt shingles tested and labeled on the wrapper as conforming to ASTM D 7158, Class G are acceptable for installation where the basic wind speed is less than or equal to 120 mph. Asphalt shingles tested and labeled on the wrapper as conforming to ASTM D 7158, Class H are acceptable for installation where the basic wind speed is less than or equal to 130 mph.

APPLICABILITY OF ASPHALT SHINGLE TESTS TO CATASTROPHE ZONES			
ZONE	**BASIC WIND SPEED**	**ASTM D 3161**	**ASTM D 6381/UL 2390 OR ASTM D 7158**
INLAND II	110	Class F	Class G or Class H
INLAND I	120	Class F	Class G or Class H
SEAWARD	130	Class F	Class H

Notes: Asphalt shingles must conform to the appropriate classification for either ASTM D 3161, ASTM D 6381/UL 2390, or ASTM D 7158. Conformance with more than one standard is not required.

4. The shingles on the TDI Asphalt Shingles List shall be installed in strict conformance with the manufacturer's installation instructions on the shingle wrapper. Typically, the shingles are installed with the normal number of nails shown in the installation instructions. If the installation instructions include additional high wind fastening or sealing requirements, not only for a high wind warranty, then these additional requirements shall be followed. If the contractor is installing the shingles with six or more nails, then the fasteners shall be located as shown in the installation instructions for six or more nails.

5. **Caution: Common Inspection Issues.**

   a. Asphalt shingles shall not be installed on roofs with less than 2:12 slope.

   b. Asphalt shingles shall be fastened with appropriately galvanized roofing nails, not with staples.

   c. The nails securing the asphalt shingles shall be corrosion resistant as specified in the 2006 Texas Revisions to the IRC and IBC, and the manufacturer's installation instructions.

   d. The nails securing the asphalt shingles to the roof deck shall be driven flush with the surface of the shingle, not overdriven, underdriven or crooked, and the required nails shall not be omitted.

   e. Improperly driven (overdriven, underdriven or crooked) nails that damage the performance of the shingles or do not allow the shingles to seal properly.

   f. The nails shall be driven in the shingle at the locations shown in the installation instructions; not above or below the nail line or nailing area, so the nails pass through the over-lying and under-lying shingles, or shingle lamination.

   g. The starter course shingles shall be fastened to the roof deck within the distance from the rake or eave edge of the roof specified in the installation instructions.

   h. The starter course shingles shall not be omitted, installed upside down, or extend too far beyond the edge of the roof.

   i. The nails securing the shingles along the rake edges shall be located within the distance to the rake edge specified by the manufacturer.

   j. The shingle exposure and alignment shall comply with the installation instructions.

   k. Where the roof slope exceeds 20 units vertical in 12 units horizontal (167%), special methods of fastenings are required per IRC Section R905.2.6.

   l. The shingle adhesive may not activate because the temperature is too low, or the adhesive has become contaminated due to blowing dirt or water that reduces the adhesion between the layers of shingles.

   m. Re-roofs with new or existing shingles that are damaged or have damage to the shingle bonds due to wind, hail, tree limbs, wind driven debris, roof traffic, or other reasons shall not be approved as insurable property.

n. Replacement shingles shall be properly sealed to the existing shingles at the interface or tie-ins.

VII. Inspection of Other Re-Roof Installations.

A. Other re-roof installations, such as modified bitumen, single ply, built-up, metal roof panel, metal roof shingle, wood shingle, wood shake, roofing tile and sprayed polyurethane foam roofing shall be inspected to meet the Component and Cladding (C&C) wind pressure acting on the roof surface in strict conformance with the TDI product evaluation report, the ICC evaluation report, UL or FM listing or the independent laboratory test report, and the manufacturer's installation instructions.

B. The TDI product evaluation reports specify the manufacturer (and private label brands in some cases), roofing product(s), assembly design pressure(s), roof deck requirements, system component specifications, fastening requirements, and roof slope limitations applicable to the product installation and inspection.

C. An ICC evaluation report and the manufacturer's installation instructions may be used to inspect the installation of a roof covering product, provided that the ICC report specifies the manufacturer, roofing product, assembly design pressure, roof deck requirements, component specifications, fastening requirements, and roof slope limitations.

D. **Caution: Common Inspection Issues**

1. The product evaluations are only applicable to the manufacturer and product specified in the report. The product evaluations shall not be applied generically to similar products manufactured by another company or other products manufactured by the same company, unless specified in the product evaluation report.

2. Some products are not appropriate for all roof deck thicknesses or design pressures; require special preparation of the roof deck or the use of specific fastener, plate, base sheet, or underlayment products; or may not be installed over an existing roof covering.

3. Fasteners shall be driven flush with the surface, not overdriven, underdriven, or crooked.

4. Each product assembly application is limited by the allowable design pressure rating. An evaluation report by TDI or ICC does not mean that the product is appropriate for all applications.

VII. Inspection of Roof Vent Installations.

A. Roof vents shall be inspected for anchorage to the structure to meet the C&C design pressure from the IRC Tables R301.2(2) and R301.2(3), and IRC Figure R301.2(8); the IBC Section 1609 or ASCE 7. Roof vents shall be inspected in strict conformance with the TDI product evaluation report, the ICC evaluation report or the independent laboratory test report, and the manufacturer's installation instructions.

B. The TDI product evaluation reports specify the manufacturer (and private label brands in some cases), roof vent product(s), assembly design pressure(s), roof deck requirements, fastening requirements, and roof slope limitations applicable to the product installation and inspection.

C. An ICC evaluation report and the manufacturer's installation instructions may be used to inspect the installation of a roof vent product provided that the ICC report specifies the manufacturer, roof vent product, assembly design pressure, roof deck requirements, fastening requirements, and roof slope limitations.

D. **Caution: Common Inspection Issues**

1. The product evaluations are only applicable to the manufacturer and product specified in the report. The product evaluations shall not be applied generically to similar products manufactured by another company or other products manufactured by the same company, unless specified in the product evaluation report.
2. Some products are not appropriate for all roof deck thicknesses or design pressures, require special high wind strapping, or require the use of specific fasteners.
3. Each product assembly application is limited by the allowable design pressure rating. An evaluation by TDI or ICC does not mean that the product is appropriate for all applications.

IX. Inspection of Skylights.

A. Skylights shall comply with the IRC Section R308.6 or the IBC Section 2405.5. Unit skylights shall be tested and bear a label from an approved inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 per the IRC Section R308.6.10 of the Texas Revisions (AAMA/WDMA 101/I.S.2/NAFS is also acceptable).

B. Skylights shall comply with the 2006 Texas Revisions to the IRC Sections R301.2.1.1 and R301.2.1.2, and the 2006 Texas Revisions to the IBC Sections 2405.6 and 2405.7. Skylights on structures located in the Inland I and Seaward catastrophe zones shall be protected from windborne debris. The skylight shall be windborne debris resistant or protected by a removable windborne debris resistance system (shutter). The skylight and shutter shall be inspected in strict conformance with the TDI product evaluation report, the ICC evaluation report or the independent laboratory test report, and the manufacturer's installation instructions. Exterior opening protection for windborne debris shall meet the large missile test of ASTM E 1996 and ASTM E 1886, or AAMA 506.

C. The TDI product evaluation reports specify the manufacturer (and private label brands in some cases), skylight product(s), performance grade rating [design pressure(s)], windborne debris resistance, maximum size tested, roof deck requirements, curb installation requirements (where applicable), fastening requirements, and roof slope limitations applicable to the product installation and inspection.

D. An ICC evaluation report and the manufacturer's installation instructions may be used to inspect the installation of a skylight product provided that the product labeling complies with the Texas Revisions to the IRC, Section R308.6.10 or the IBC, Section 2405.7.1 and the ICC report specifies the manufacturer, skylight product(s), performance grade rating [design pressure(s)], windborne debris resistance, maximum size tested, roof deck requirements, curb installation requirements (where applicable), fastening requirements, and roof slope limitations.

E. The Appointed Engineer shall record the type, impact or non impact resistant skylight, and record the type of protection provided if the skylight is not windborne debris resistant, on your inspection report form.

F. **Caution: Common Inspection Issues**

1. Approved inspection agencies for AAMA/WDMA/CSA 101/I.S.2/A440 (or AAMA/WDMA 101/I.S.2/NAFS) compliance include the American Architectural Manufacturers Association (AAMA), Keystone Certifications, Inc., National Accreditation and Management Institute (NAMI), and the Window and Door Manufacturers Association (WDMA).

2. An Appointed Engineer is not authorized to inspect the installation of a unit skylight that does not bear a label from an approved inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 (or AAMA/WDMA 101/I.S.2/NAFS).
3. An Appointed Engineer is not authorized to inspect the installation of an impact resistant unit skylight that does not bear a label from an approved inspection agency to indicate compliance with the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 (or AAMA/WDMA 101/I.S.2/NAFS), and ASTM E 1996 and ASTM E 1886, or AAMA 506.
4. An Appointed Engineer is not authorized to inspect the installation of an impact resistant skylight shutter that does not bear a label to indicate compliance with the requirements of ASTM E 1996 and ASTM E 1886, or AAMA 506.
5. The product evaluations are only applicable to the manufacturer and product specified in the report. The product evaluations shall not be applied generically to similar products manufactured by another company or other products manufactured by the same company, unless specified in the product evaluation report.
6. Some products are not appropriate for all roof deck thicknesses or design pressures, require special high wind strapping, require a curb for mounting, or require the use of specific fasteners.

X. Complete the Inspection and Submit the Inspection Verification Form.

A. The Appointed Engineer shall verify that the roofing or re-roofing project is complete and passes inspection, with the roof covering, roof vent(s), skylight(s), and windborne debris protection (if required) installed properly in accordance with the 2006 IRC or 2006 IBC with Texas Revisions, product evaluation reports, and manufacturer's installation instructions. It is recommended that the inspections shall be conducted as the products are installed.

B. The Appointed Engineer shall transfer the inspection information from their inspection report form to the Inspection Verification Form WPI-2.

C. The Appointed Engineer shall review the Inspection Verification Form WPI-2 to confirm that all dates of inspection are recorded, the information recorded is complete and accurate, and the information at the bottom is completed and the form is sealed, signed and dated.

D. The Appointed Engineer shall submit the Inspection Verification Form WPI-2 by facsimile (fax) or mail to the TDI windstorm intake unit in Austin, Texas for processing.

E. **Caution: Common Inspection Issues**

1. The Appointed Engineer must complete all inspections and verify that all repairs are completed before submitting the Inspection Verification Form WPI-2 to the TDI.
2. Any outstanding documented concerns on file with the Department concerning the roof or re-roof project inspected by the Appointed Engineer must be resolved before a Certificate of Compliance, Form WPI-8 will be issued by TDI.
3. Upon receipt of the properly completed Inspection Verification form for the property under consideration, the Department will issue a WPI-8 on the condition that the application is accurate and complete, and no outstanding documented concerns remain unresolved.

4. The TDI retains the right to revoke a WPI-8 when sufficient evidence indicates that the subject roof does not meet the adopted windstorm building codes and eligibility requirements for windstorm and hail insurance coverage through the TWIA.

Note: Examples for completing the Form WPI-2 are available on the Windstorm Inspections website. Select the "WPI-Forms" link under the "Windstorm Inspections Process" heading, select the "WPI-2 Guidelines" link.

Appendix

Table 1
Roof Slope Conversion Table

Roof Slope = Slope in Degrees (°)

1:12 = 4.8º

2:12 = 9.5º

3:12 = 14.0º

4:12 = 18.4º

5:12 = 22.6º

6:12 = 26.6º

7:12 = 30.3º

8:12 = 33.7º

9:12 = 36.9º

10:12 = 39.8º

11:12 = 42.5º

12:12 = 45.0º

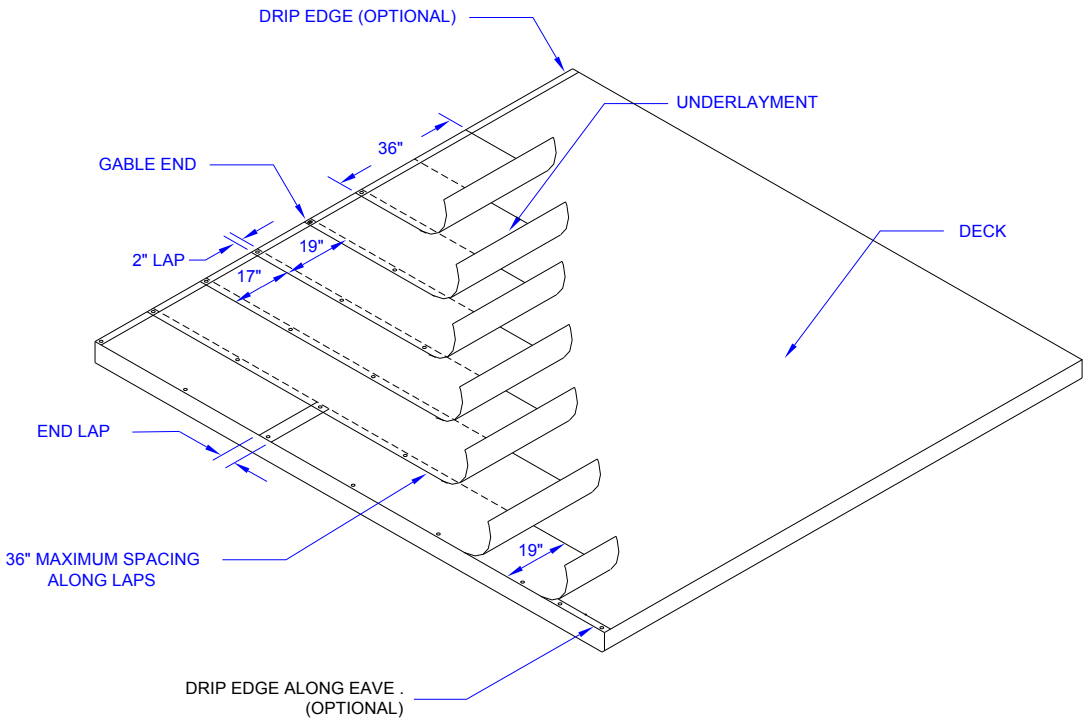

Figure 1
Double Layer Underlayment

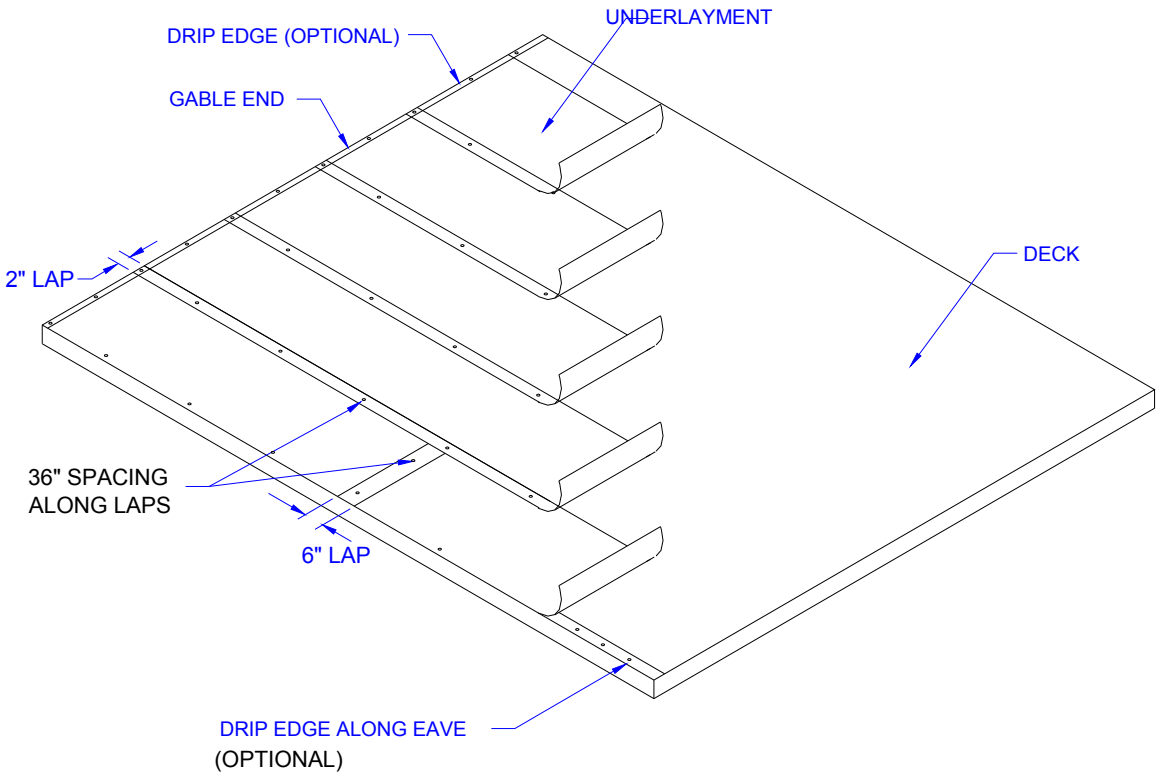

Figure 2
Single Layer Underlayment

Figure 3: Recognized logos for the approved inspection agencies referenced in the IRC Section R308.6.9 and the IRC R308.6.10 of the Texas Revisions:

American Architectural Manufacturers Association (AAMA),

Keystone Certifications, Inc.,

National Accreditation and Management Institute (NAMI),

Window and Door Manufacturers Association (WDMA).

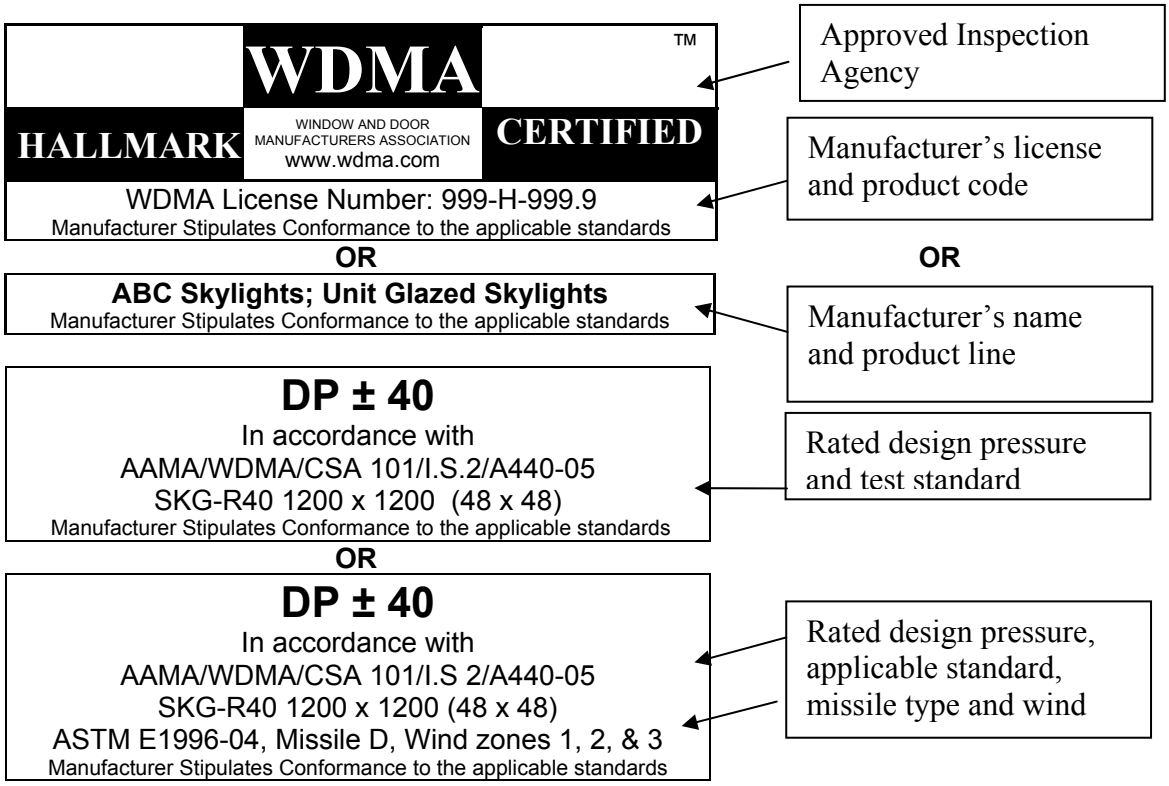

Figure 4: Example label information for an impact resistant or a non-impact resistant skylight with the WDMA inspection agency logo.

Asphalt Shingles
Fasteners

Follow the installation instructions on the shingle package.

Do not place fasteners in the sealant line.

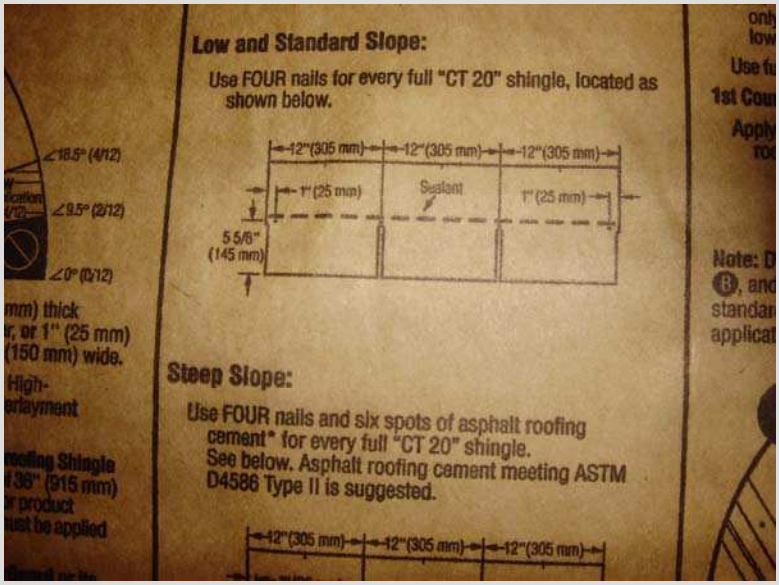

Figure 5: Typical manufacturer's installation instructions on the shingle wrapper.

Figure 6: Typical roof slope meter used for measuring roof slope.

Recommendations for development of an Inspection Report Form for documenting and communicating inspection results.

A. Appointed Engineers should produce and maintain legible, detailed written records of all roofing inspection activity. These records are most easily produced by using a printed inspection report form. The report form should, at minimum, include the following information:

1. Jobsite address and the name and telephone number of the property owner.

2. Name, business address, and telephone number of the roofing contractor.

3. Type of structure being re-roofed (house, detached garage, etc.).

4. Location of the roof being inspected (Inland II, Inland I, or Seaward).

5. Type of roof being inspected (asphalt composition shingle, metal roof panel, or flat membrane roof, etc.).

6. Roof characteristics (slope, mean roof height, design pressures).

7. Items inspected (roof decking, underlayment, roof covering, roof vents, skylights).

8. Type of inspection (initial, final, or re-inspection of items requiring repair).

9. A sketch of the roof layout indicating the roof slope(s), ridge, hip, valley and parapet locations. The areas which have been re-roofed or where decking was replaced must be clearly indicated. Each report shall indicate the scope of the inspection performed that day.

10. Itemized listing of deficient items.

11. Project status and inspection conclusions (approved, incomplete, disapproved, or cancelled).

12. Date and time of the inspection.

Note: Completed inspection reports should be provided to homeowners and roofing contractors at the time of the inspection. Carbon report forms are ideal for this purpose. The Appointed Engineer should retain copies of inspection report forms for their permanent records.