Reviewed after the October TACs meeting

**Supplement to the 7th Edition (2020) Florida Building Code - Test Protocols for High-Velocity Hurricane Zones**

**ROOFING APPLICATION STANDARD (RAS) No. 111-20 STANDARD REQUIREMENTS FOR ATTACHMENT OF PERIMETER WOODBLOCKING AND METAL FLASHING**

5.2 Installation requirements:

5.2.1 Vertical flange dimensions shall be not less than 11/2 in. and the horizontal dimension shall not be less than 2 in. wide and shall extend back on the roof a minimum of 2 inches (51mm). The vertical flange shall be of sufficient length to extend below the sheathing or other member immediately contiguous thereto by not less than 1/2 in. Table 2 herein lists maximum vertical flange dimensions for various drip edge/gravel stop materials.

**(R10068 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 115 STANDARD PROCEDURES FOR ASPHALT SHINGLE INSTALLATION**

4.Underlayment

4.1 Underlayment shall be in accordance with Chapter 15 (High-Velocity Hurricane Zones) of the *Florida Building Code, Building*.

~~4.1 Minimum prescriptive underlayments shall be one of the following, unless otherwise specifically noted in roofing assembly Product Approval:~~

* + ~~•A double layer of an ASTM D226, Type I, with a 19-inch headlap; or~~
  + ~~•A single layer of an ASTM D226, Type II with a 4-inch headlap; or~~
  + ~~•A single layer of an ASTM D2626 coated base sheet with a 4-inch headlap.~~
  + ~~•All endlaps shall be a minimum of 6 inches.~~
  + ~~•All valleys shall be woven.~~

4.2 All ~~u~~ Underlayments shall be fastened with approved minimum 12 gage by 11/4in. corrosion-resistant annular ring shank roofing nails fastened through minimum 32 gage by 15/8in. diameter approved diameter tin caps. Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305mm) between overlaps, with 6-inch (152 mm) spacing at overlaps at the overlaps. Nails shall be of sufficient length to penetrate through the sheathing or wood plank a minimum of 3/16in. or penetrate 1 inch (25 mm) or greater thickness of lumber a minimum of 1 in., except where architectural appearance is to be preserved, in which case a minimum of 3/4in. nail may be used.

~~4.3 If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor/base sheet attached in compliance with this section above.~~

**(R10180 AS)/(R9909 AS)**

3.3       Asphalt shingles shall be installed in compliance with the Product Approval installation specifications, but in no case with less than six approved roofing nails (12 ga. by 1¼ in.  corrosion-resistant annular ring shank roofing nails) or approved fastening devices which penetrate through the sheathing or wood plank a minimum of ~~3/16~~ 1/8 in. or penetrate a 1 in. or greater thickness of lumber a minimum of 1 in. except where architectural appearance is to be preserved, in which case a minimum of ¾ in. nail may be used.

**(R9909 AS)**

6.2       Starter strip shall be a row of either self-sealing non-laminated shingles or approved starter shingles.~~The starter strip may be either a row of nonlaminated shingles trimmed to the shingle manufacturer’s recommendations or a strip of mineral-surfaced roll roofing not less than 7 in. wide.~~

6.3       If self-sealing non-laminated shingles are used for the starter strip, remove the tab portion of each shingle and position the remaining strip along the eaves.~~with~~ Install such that the factory-applied adhesive is face up and closest to ~~along~~the eaves edge. Trim material from the end of the first shingle in the starter strip according to manufacturer’s specifications to ensure that the cutouts of the first course of shingles are not placed over the starter strip joints. Fasten starter strips parallel to the eaves along a line above the eave line according to manufacturer’s installation instructions~~specifications~~. Position fasteners to insure they will not be exposed under the cutouts in the first course.

6.4       ~~For shingles without a self-sealing strip the tabs shall be removed and approved flashing cement shall be applied in spots approximately the size of a quarter at the corner of each tab of the first course.~~Starter shingles shall be nailed along a line not greater than 4 in. above the eave line nailing not greater than 6 in. o.c. ~~Ensure that the cutouts of the first course are not placed over the starter strip joints.~~

6.5       ~~If roll roofing is used for the starter strip, nail along a line not greater than 4 inches above the eave line nailing not greater than 12 inches o.c. Approved flashing cement shall be applied as noted above for nonsealing shingle starter. If more than one piece of roll roofing must be used, the end joint shall be butted. J~~Starter joints shall be staggered with succeeding shingle joints, and the number of starter joints shall be kept to a minimum.

**(R9913 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 118-20 INSTALLATION OF MECHANICALLY FASTENED ROOF TILE SYSTEMS Direct Deck & Counter Battens Only**

 NOTE #1:   ~~The following~~ ~~t~~Table 1 provides the contractor with the choices available for underlayment systems. These systems can only be used on pitches designated in the table~~below:~~.

**TABLE 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Roof Pitch** | **Counter Battens or Direct Deck** | **Choice of Underlayment** | **Plastic or Compatible Roof Cement at Nails Penetrating Underlayment** | **Reference** |
| 4:12 or Greater | Either | 1.   ASTM D226 Type II (#30) or ASTM D2626 (#43) organic base sheet nailed to deck, min. (#90) ASTM D6380, Class M or WS, Type II organic cap sheet set in Type IV hot asphalt. | Required | 3.01A |
| Either | 2.      Any Product Approval Approved underlayment system with a mechanically fastened base sheet, and cap sheet set in hot, cold, or self-adhered | Per Product Approval | 3.01B, C, or D |
| Either | 3.      Product Approval Listed Approved nail-on single-ply underlayment | Per Product Approval | 3.01E |

**(R9915 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 119-20 INSTALLATION OF MECHANICALLY FASTENED ROOF TILE SYSTEMS Direct Deck & Horizontal Battens Only (Preformed Metals With Edge Returns)**

NOTE #1:   ~~The following~~ ~~t~~Table 1 provides the contractor with the choices available for underlayment systems. These systems can only be used on pitches designated in the table~~below:~~.

**TABLE 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Roof Pitch** | **Counter Battens or Direct Deck** | **Choice of Underlayment** | **Plastic or Compatible Roof Cement at Nails Penetrating Underlayment** | **Reference** |
| 4:12 or Greater | Either | ASTM D226 Type II (#30) or ASTM D2626 (#43) organic base sheet nailed to deck, min. (#90) ASTM D6380, Class M or WS, Type II organic cap sheet set in Type IV hot asphalt. | Required | 3.01A |
| Either | 2.      Any Product Approval Approved underlayment system with a mechanically fastened base sheet, and cap sheet set in hot, cold, or self-adhered | Per Product Approval | 3.01B, C, or D |
| Either | 3.      Product Approval Listed Approved nail-on single-ply underlayment | Per Product Approval | 3.01E |

**(R9916 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 120-20 MORTAR AND ADHESIVE SET TILE APPLICATION**

**Revise RAS 120 as shown:**

NOTE #1:   ~~The following~~ ~~t~~Table 1 provides the contractor with the choices available for underlayment systems. These systems can only be used on pitches designated in the table~~below:~~.

**TABLE 1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Roof Pitch** | **Choice of Underlayment** | **Plastic or Compatible Roof Cement at Nails Penetrating Underlayment** | **Reference** |
| 2:12 or Greater | ASTM D226 Type II (#30) or ASTM D2626 (#43) ~~in~~organic base nailed to deck, min ASTM D6380, Class M or WS, Type II (#90) organic cap sheet set in Type IV hot asphalt. | Required | 3.01 A |
| 2.      Any product approved underlayment system with a mechanically fastened base sheet, and cap sheet set hot, cold, or self-adhered. | per Product Approval | 3.01 B, C, D or E |

**(R9917 AS)**

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| --- |
| Text of Modification |
| **DRAWING 10**  **EAVE TILE DETAIL**  **EPDM EAVE CLOSURE**        **DRAWING 12**  **EAVE TILE DETAIL**  **ANTIPONDING METAL** |

**(R10101 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 127-20**

**PROCEDURE FOR DETERMINING THE MOMENT OF RESISTANCE AND MINIMUM**

**CHARACTERISTIC RESISTANCE LOAD TO INSTALL A TILE SYSTEM ON A**

# 1.Scope

This standard covers the procedure for determining the Moment of Resistance (Mr) and Minimum Characteristic Resistance Load (*F'*) to install a tile system on buildings of a specified roof slope and height. Compliance with the requirements and procedures herein specified, where the design wind uplift pressures (Pasd) have been determined based on Tables 1-3 or Tables 4-6, Tables 7-9 or Tables 10-12 of this standard, as applicable, do not require additional signed and sealed engineering design calculation. All other calculations must be prepared, signed and sealed by a professional engineer or registered architect. Tables 1-3 are applicable to a wind speed of 175 mph, risk category II buildings with gable roofs with overhangs, and Exposure Category C. Tables 4-6 are applicable to a wind speed of 175 mph, risk category II buildings with gable roofs with overhangs, and Exposure Category D. Tables 7-9 are applicable to a wind speed of 175 mph, for Risk Category II buildings with hip roofs and overhangs, and Exposure Category C. Tables 10-12 are applicable to a wind speed of 175 mph, for Risk Category II buildings with hip roofs and overhangs, and Exposure Category D.

For steep slope roof systems other than tile, Tables 1-3, Tables 4-6, Tables 7-9 or Tables 10-12 of this standard, as applicable, do not require additional signed and sealed engineering design calculation when determining the use of a specific Product Approval. All other calculations must be prepared, signed and sealed by a Professional Engineer or Registered Architect.

All calculations must be submitted to the building official at time of permitting.

# How to determine the Moment Resistance (Mr) (Moment Based Systems)

1.2.1Determine the minimum design wind pressures for each roof pressure zone using the values given in Tables 1-3, or Tables 4-6, Tables 7-9 or Tables 10-12, as applicable, or those obtained by engineering analysis prepared, signed and sealed by a professional engineer or registered architect based on ASCE 7.

2.2.2Locate the aerodynamic multiplier (?) in tile Product Approval. 3.2.3Determine the restoring moment due to gravity (Mg) per Product Approval. 4.2.4Determine the attachment resistance (Mf) per Product Approval.

5.2.5Determine the Moment of Resistance (Mr) per following formula:

6.2.6Compare the values for Mr, with the values for Mf, noted in the Product Approval. If the Mf values are greater than or equal to the Mr values, for each area of the roof then the tile attachment method is acceptable.

# How to determine the Minimum Characteristic Resistance Load (*F'*) (Uplift Based System)

1.3.1Determine the minimum design pressures for each roof pressure zone using the values given in Table 1-3, Tables 4-6, Tables 7-9 or Tables 10-12 as applicable, or those obtained by engineering analysis prepared, signed and sealed by a professional engineer or registered architect based on the criteria set forth in ASCE 7.

2.3.2Determine the angle (*?*) of roof slope, from Tables 1-3, Tables 4-6, Tables 7-9 or Tables 10-12, as applicable.

3.3.3Determine the length (l), width (w) and average tile weight (W) of tile, per Product Approval. 4.3.4Determine the required uplift resistance (Fr) per following formula:

5.3.5Compare the values for Fr with the values for *F*' noted in the Product Approval. If the *F*' values are greater than or equal to the Fr values, for each area of roof, then the tile attachment method is acceptable

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|  | **~~4:12~~** | **1.5:12 TO LESS THAN 4.5:12** |  |

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| --- | --- | --- | --- |
| **TABLE 1 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-= 2:12 to =~~**  **RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 1** | | |
| **1 ~~and 2e~~** | **2~~n, 2r and 3e~~** | **3~~r~~** |
| -74 | -~~108~~ -98 | -128 |
| > 15' to = 20' | -78 | -~~114~~ -104 | -136 |
| > 20' to = 25' | -82 | -~~120~~ -108 | -142 |
| > 25' to = 30' | -85 | -~~125~~ -113 | -148 |
| > 30' to = 35' | -88 | -~~129~~ -116 | -153 |
| > 35' to = 40' | -91 | -~~132~~ -120 | -157 |
| > 40' to = 45' | -93 | -~~136~~ -123 | -162 |
| > 45' to = 50' | -95 | -~~139~~ -126 | -165 |
| > 50' to = 55' | -97 | -~~142~~ -128 | -169 |
| > 55' to = 60' | -98 | -~~144~~ -130 | -171 |

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| **TABLE 2 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-> 4:12 to =~~ ~~6:12~~4.5:12 TO LESS THAN 6:12**  **RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 1** | | |
| **1 ~~and 2e~~** | **2~~n, 2r and 3e~~** | **3~~r~~** |
| -57 | -91 | -~~128~~ -108 |
| > 15' to = 20' | -60 | -96 | -~~136~~ -114 |
| > 20' to = 25' | -63 | -101 | -~~142~~ -120 |
| > 25' to = 30' | -66 | -105 | -~~148~~ -125 |
| > 30' to = 35' | -68 | -109 | -~~153~~ -128 |
| > 35' to = 40' | -70 | -111 | -~~157~~ -132 |
| > 40' to = 45' | -72 | -115 | -~~162~~ -135 |
| > 45' to = 50' | -73 | -117 | -~~165~~ -139 |
| > 50' to = 55' | -75 | -120 | -~~169~~ -141 |

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| --- | --- | --- | --- |
| > 55' to = 60' | -76 | -121 | -~~171~~ -144 |

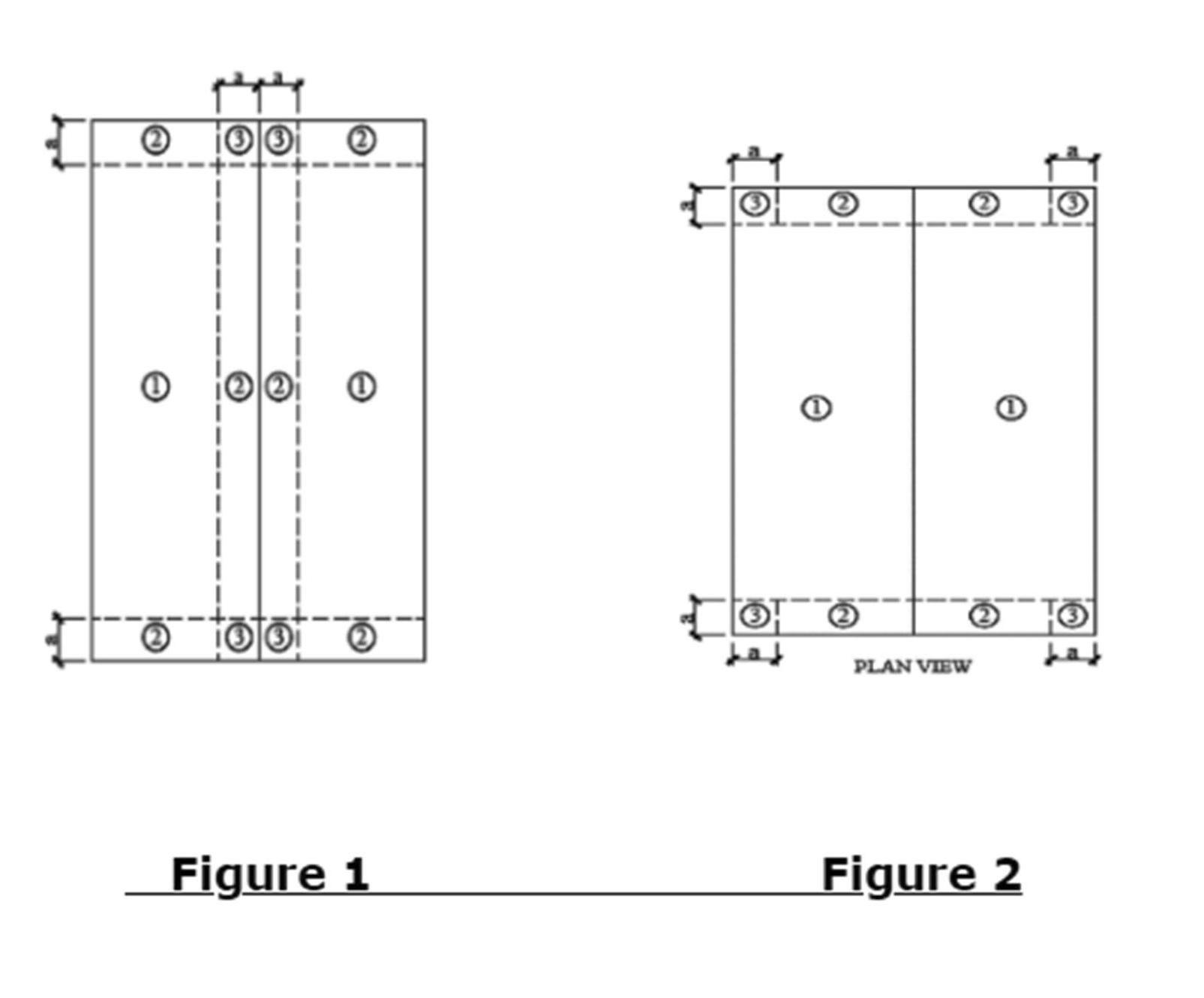
|  |  |  |  |
| --- | --- | --- | --- |
| **~~4:12~~** | **1.5:12 TO LESS THAN 4.5:12** | **RISK CATEGORY II EXPOSURE CATEGORY “D”** |  |

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| **TABLE 3 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~->~~ 6:12 to = 12:12 RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 2** | | |
| **1~~, 2e and 2r~~** | **2~~n and 3r~~** | **3~~e~~** |
| -67 | -74 | -~~115~~ -91 |
| > 15' to = 20' | -71 | -78 | -~~122~~ -99 |
| > 20' to = 25' | -74 | -82 | -~~127~~ -101 |
| > 25' to = 30' | -78 | -85 | -~~132~~ -105 |
| > 30' to = 35' | -80 | -88 | -~~137~~ -108 |
| > 35' to = 40' | -82 | -91 | -~~141~~ -111 |
| > 40' to = 45' | -85 | -93 | -~~146~~ -114 |
| > 45' to = 50' | -86 | -95 | -~~147~~ -117 |
| > 50' to = 55' | -88 | -97 | -~~151~~ -119 |
| > 55' to = 60' | -89 | -98 | -~~153~~ -121 |

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| **TABLE 4 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-= 2:12 to =~~** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 1** | | |
| **1 and 2e** | **2~~n, 2r and 3e~~** | **3~~r~~** |
| -90 | -~~131~~ -119 | -156 |
| > 15' to = 20' | -94 | -~~137~~ -124 | -163 |
| > 20' to = 25' | -98 | -~~142~~ -129 | -169 |
| > 25' to = 30' | -101 | -~~148~~ -134 | -175 |
| > 30' to = 35' | -104 | -~~152~~ -137 | -180 |
| > 35' to = 40' | -106 | -~~155~~ -140 | -184 |
| > 40' to = 45' | -109 | -~~157~~ -143 | -189 |
| > 45' to = 50' | -111 | -~~161~~ -146 | -192 |
| > 50' to = 55' | -113 | -~~164~~ -149 | -195 |
| > 55' to = 60' | -114 | -~~167~~ -151 | -198 |

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| **TABLE 5 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-> 4:12 to =~~ ~~6:12~~4.5:12 TO LESS THAN 6:12 RISK CATEGORY II EXPOSURE CATEGORY “D”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 1** | | |
| **1 and 2e** | **2~~n, 2r and 3e~~** | **3~~r~~** |
| -69 | -110 | -~~156~~ -131 |
| > 15' to = 20' | -73 | -116 | -~~163~~ -137 |
| > 20' to = 25' | -75 | -120 | -~~169~~ -142 |
| > 25' to = 30' | -78 | -124 | -~~175~~ -147 |
| > 30' to = 35' | -80 | -128 | -~~180~~ -151 |
| > 35' to = 40' | -82 | -131 | -~~184~~ -155 |
| > 40' to = 45' | -84 | -134 | -~~189~~ -158 |
| > 45' to = 50' | -85 | -136 | -~~192~~ -161 |
| > 50' to = 55' | -87 | -138 | -~~195~~ -164 |
| > 55' to = 60' | -88 | -140 | -~~198~~ -167 |

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| **TABLE 6 — GABLE ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~->~~ 6:12 to = 12:12 RISK CATEGORY II EXPOSURE CATEGORY “D”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 2** | | |
| **1~~, 2e and 2r~~** | **2~~n and 3r~~** | **3~~e~~** |
| -82 | -90 | -~~140~~ -110 |
| > 15' to = 20' | -86 | -94 | -~~146~~ -116 |
| > 20' to = 25' | -~~87~~ -89 | -98 | -~~151~~ -120 |
| > 25' to = 30' | -92 | -101 | -~~157~~ -124 |
| > 30' to = 35' | -94 | -103 | -~~161~~ -128 |
| > 35' to = 40' | -97 | -106 | -~~165~~ -131 |
| > 40' to = 45' | -99 | -109 | -~~168~~ -133 |
| > 45' to = 50' | -101 | -111 | -~~172~~ -136 |
| > 50' to = 55' | -102 | -112 | -~~174~~ -138 |
| > 55' to = 60' | -104 | -114 | -~~177~~ -140 |



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| **TABLE 7 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-= 2:12 to =~~ ~~4:12~~1.5:12 TO LESS THAN 4.5:12**  **RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 3** | | |
| **1** | **2r** | **~~2e an~~d 3** |
| -67 | -88 | -94 |
| > 15' to = 20' | -71 | -93 | -100 |
| > 20' to = 25' | -75 | -97 | -104 |
| > 25' to = 30' | -78 | -101 | -109 |
| > 30' to = 35' | -80 | -105 | -113 |
| > 35' to = 40' | -82 | -107 | -115 |
| > 40' to = 45' | -85 | -110 | -119 |
| > 45' to = 50' | -86 | -112 | -121 |
| > 50' to = 55' | -88 | -115 | -124 |

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| --- | --- | --- | --- |
| > 55' to = 60' | -89 | -117 | -125 |

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| **TABLE 8 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-> 4:12 to =~~ ~~6:12~~4.5:12 TO LESS THAN 6:12**  **RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 3** | | |
| **1** | **~~2r, 2e and 3~~** | **2 and 3** |
| -~~71~~ -54 | -~~91~~ | -~~111~~ -74 |
| > 15' to = 20' | -~~75~~ -57 | -~~97~~ | -~~118~~ -78 |
| > 20' to = 25' | -~~79~~ -59 | -~~101~~ | -~~124~~ -82 |
| > 25' to = 30' | -~~82~~ -62 | -~~105~~ | -~~129~~ -85 |
| > 30' to = 35' | -~~84~~ -64 | -~~109~~ | -~~133~~ -88 |
| > 35' to = 40' | -~~87~~ -66 | -~~112~~ | -~~137~~ -91 |
| > 40' to = 45' | -~~89~~ -67 | -~~114~~ | -~~140~~ -93 |
| > 45' to = 50' | -~~91~~ -69 | -~~117~~ | -~~143~~ -95 |
| > 50' to = 55' | -~~93~~ -70 | -~~120~~ | -~~146~~ -97 |
| > 55' to = 60' | -~~94~~ -72 | -~~122~~ | -~~149~~ -98 |

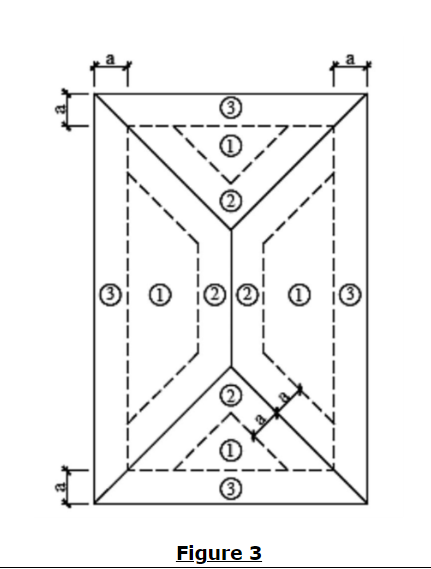
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| --- | --- | --- | --- | --- |
| **TABLE 9 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~->~~ 6:12 to = 12:12 RISK CATEGORY II EXPOSURE CATEGORY “C”** | | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 3** | | | |
| **1** | **~~2r~~** | **2e** | **3** |
| -57 | -~~98~~ | -~~101~~ -67 | -~~128~~ -88 |
| > 15' to = 20' | -60 | -~~104~~ | -~~108~~ -71 | -~~136~~ -93 |
| > 20' to = 25' | -63 | -~~109~~ | -~~113~~ -74 | -~~143~~ -97 |
| > 25' to = 30' | -66 | -~~113~~ | -~~117~~ -78 | -~~149~~ -101 |
| > 30' to = 35' | -67 | -~~117~~ | -~~121~~ -80 | -~~153~~ -104 |
| > 35' to = 40' | -70 | -~~120~~ | -~~124~~ -82 | -~~158~~ -107 |
| > 40' to = 45' | -71 | -~~123~~ | -~~128~~ -84 | -~~162~~ -110 |
| > 45' to = 50' | -73 | -~~126~~ | -~~130~~ -86 | -~~165~~ -112 |
| > 50' to = 55' | -75 | -~~129~~ | -~~133~~ -88 | -~~169~~ -115 |
| > 55' to = 60' | -76 | -~~131~~ | -~~135~~ -89 | -~~172~~ -117 |

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| --- | --- | --- | --- |
| **TABLE 10 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-= 2:12 to =~~ ~~4:12~~1.5:12 TO LESS THAN 4.5:12**  **RISK CATEGORY II EXPOSURE CATEGORY “D”** | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 3** | | |
| **1** | **2r** | **~~2e an~~d 3** |
| -82 | -106 | -114 |
| > 15' to = 20' | -86 | -111 | -120 |
| > 20' to = 25' | -89 | -116 | -124 |
| > 25' to = 30' | -91 | -120 | -129 |
| > 30' to = 35' | -94 | -123 | -132 |
| > 35' to = 40' | -97 | -126 | -136 |
| > 40' to = 45' | -99 | -128 | -138 |
| > 45' to = 50' | -101 | -131 | -141 |
| > 50' to = 55' | -102 | -133 | -143 |
| > 55' to = 60' | -104 | -135 | -146 |

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| **TABLE 11 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~-> 4:12 to =~~ ~~6:12~~4.5 TO LESS THAN 6:12**  **RISK CATEGORY II EXPOSURE CATEGORY “D”** | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones**  **See Figure 3** | |
| **1** | **2~~e, 2r~~ and 3** |
| -65 | -90 |
| > 15' to = 20' | -68 | -94 |
| > 20' to = 25' | -71 | -98 |
| > 25' to = 30' | -73 | -101 |
| > 30' to = 35' | -75 | -104 |
| > 35' to = 40' | -77 | -106 |

|  |  |  |
| --- | --- | --- |
| > 40' to = 45' | -79 | -109 |
| > 45' to = 50' | -80 | -111 |
| > 50' to = 55' | -82 | -112 |
| > 55' to = 60' | -83 | -114 |

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| **TABLE 12 — HIP ROOFS**  **MINIMUM ASD DESIGN WIND UPLIFT PRESSURES IN PSF FOR ROOF SLOPE ~~->~~ 6:12 to = 12:12 RISK CATEGORY II EXPOSURE CATEGORY “D”** | | | | |
| **Roof Mean Height**  = 15' | **Roof Pressure Zones** | | | |
| **1** | **~~2e~~** | **2r** | **3** |
| -69 | -~~119~~ | -~~123~~ -82 | -~~156~~ -106 |
| > 15' to = 20' | -73 | -~~124~~ | -~~129~~ -86 | -~~163~~ -111 |
| > 20' to = 25' | -75 | -~~129~~ | -~~133~~ -89 | -~~169~~ -116 |
| > 25' to = 30' | -78 | -~~134~~ | -~~138~~ -92 | -~~175~~ -120 |
| > 30' to = 35' | -80 | -~~137~~ | -~~142~~ -94 | -~~180~~ -123 |
| > 35' to = 40' | -82 | -~~141~~ | -~~145~~ -97 | -~~184~~ -126 |
| > 40' to = 45' | -84 | -~~143~~ | -~~148~~ -99 | -~~188~~ -128 |
| > 45' to = 50' | -85 | -~~146~~ | -~~151~~ -101 | -~~192~~ -131 |
| > 50' to = 55' | -87 | -~~149~~ | -~~154~~ -102 | -~~195~~ -133 |
| > 55' to = 60' | -88 | -~~151~~ | -~~156~~ -104 | -~~198~~ -135 |



**(S9958 AM A2)**

**(S-FBC-RAS 127-Errata #1)**

ROOFING APPLICATION STANDARD (RAS) No. 130-20

INSTALLATION CRITERIA FOR WOOD ROOF SHINGLES AND SHAKES APPLICATION

**1.         Scope**

1.1     This application standard provides the minimum installation criteria for wood shingles and shakes application.

**2.         Definitions**

2.1     For definitions of terms used in this application standard, refer to ASTM D1079 and the *Florida Building Code, Building*.

**3.         General**

3.1     Maximum exposure for wood shingles and shakes shall comply with Table 1 herein, unless specifically specified in the roof assemblies Product Approval.

3.2     Wood shingles and shakes may be applied over solid or spaced sheathing. In spaced sheathing applications, the first 36 in. above the eave line shall be solidly sheathed. All wood decks shall comply with the provisions set forth in Chapters 15 and 23 (High-Velocity Hurricane Zones) of the Florida Building Code, Building.

3.3     Wood shingles and shakes shall not be installed on roof mean heights greater than 33 feet, unless specifically specified in the roof assemblies Product Approval.

4.         Wood Shingles

4.1     Underlayment

Solid Sheathing:       Two plies of ASTM D226, Type 1 felt or an Approved ASTM D8257 synthetic underlayment overlapped half the width of a full sheet plus 2 in. ~~19 in~~., or a single layer of ASTM D226 Type II felt or an Approved ASTM D8257 synthetic underlayment overlapped a minimum of 4 in. on side laps, and 6 in. on the end laps. Fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c., and one row at the laps fastened 6 in. o.c.

Spaced Sheathing:    ~~Underlayment shall be installed at~~ A~~a~~ minimum ~~of~~ 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be ~~F~~fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.

                                    Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

4.2     Edge metal shall comply with Section 1517.6 of the Florida Building Code, Building, and RAS 111.

4.3     Valleys may be installed open or closed. A 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D1970 self-adhering polymer-modified underlayment shall be installed centered in the valley.~~,~~ ASTM D226 Type II felt or Approved ASTM D8257 synthetic underlayment shall be fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved flashing cement.

4.4     Valley metals shall comply with the Section 1517.6 of the Florida Building Code, Building. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 11/4 in. annular ring shank roofing nails at every clip (see Detail A).

4.5     Metal laps shall be a minimum of 12 in., and shall be sealed with approved flashing cement. For open valley installations, the wood shingles are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shingles are to be miter cut along the center water diverter. Wood shingle fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shingles and the positioning of the fasteners higher at the valley may be required.

4.6     The maximum exposure to the weather for wood shingle applications shall comply with Table 1 herein.

4.7     Reserved.

4.8     The beginning or starter course of wood shingles at the eave line shall be doubled as a minimum. The wood shingles shall be project a minimum 3/4 in. to a maximum of 2 in. beyond the drip edge at both eaves and rakes. Spacing between shingles (joints or key ways) shall be a minimum of 1/4 in. and a maximum of 3/8 in. Shingles shall be positioned so that they cover the joints in the preceding course and adjacent courses shall be offset a minimum of 11/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail B).

4.9     Each shingle shall be fastened with a minimum of two (2) 5d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shingle, and 1/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.10   Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer’s shingles. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II ~~organic~~ felt or Approved ASTM D8257 synthetic underlayment, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shingles. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

4.11   Metal flashing materials shall comply with Section 1517.6 of the Florida Building Code, Building. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shingles. The step-flashing unit shall be installed just up slope from the exposed area of the wood shingle, in such a manner as to be covered by the next wood shingle, while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shingle. Nail each step-flashing unit near the upper corner. Location of the shingle fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shingles shall be installed up to the vertical head wall and out over the top course of wood shingles a minimum of 5 in. Wall treatment or flashing or headwall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shingles. Metal counter flashing shall be installed in compliance with Roofing Application Standard RAS 111.

4.12   Roof penetration that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer’s recommendations, unless otherwise indicated in roof assembly’s Product Approval.

5.        Wood Shakes

5.1        Underlayments:

Solid Sheathing:     ~~Underlayment shall be installed at~~ A~~a~~ minimum ~~of~~ 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be ~~F~~fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.

Spaced Sheathing:   ~~Underlayment shall be installed at~~ A~~a~~ minimum ~~of~~ 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be ~~F~~fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.

                                  Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.

5.2        Interlayment shall be a minimum of ASTM D226 Type I felt or Approved ASTM D8257 synthetic underlayment with a minimum width of 18 in. and shall be applied between each succeeding course of shakes. Interlayment shall be fastened on the upper edge of the sheet. The bottom edge of the interlayment shall be positioned above the butt edge of each course of shakes, a distance equal to twice the weather exposure of the wood shakes. Extend interlayment up vertical surfaces a minimum of 4 in. No ~~felt~~underlayment shall be exposed.

5.3        Edge metal shall comply with Section 1517.6 of the Florida Building Code, Building and RAS 111.

5.4        Valleys may be installed open or closed. A minimum 36 in. wide sheet of minimum ASTM D226 Type II ~~organic~~ felt  or Approved ASTM D8257 synthetic underlayment shall be installed over the underlayment and centered in the valley, fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with ~~a~~Approved ~~flashing~~ roof cement.

5.5        Valley metals shall comply with the Section 1517.6 of the Florida Building Code, Building. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 11/4 in. annular ring shank roofing nails at every clip (see Detail A).

5.6        Metal laps shall be a minimum of 12 in., and shall be sealed with approved flashing cement. For open valley installations, the wood shakes are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shakes are to be miter cut along the center water diverter. Wood shake fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shakes and the positioning of the fasteners higher at the valley may be required.

5.7        The maximum exposure to the weather for wood shakes shall comply with Table 1 herein. An interlayment sheet shall be installed between each shake. The beginning or starter course of wood shakes at the eave line shall be doubled as a minimum. The wood shakes shall project a minimum 3/4 in. to a maximum 2 in. beyond the drip edge at both eaves and rakes.

5.8        Spacing between shakes (joints or key ways) shall be a minimum 3/8 in. and a maximum of 5/8 in. Shakes shall be positioned so that they cover the joints in the preceding course. Adjacent courses shall be offset a minimum of 11/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail D).

5.9        Each shake shall be fastened with a minimum of two (2) 6d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shake, and 11/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).

5.10      Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer’s shakes. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II ~~organic~~ felt or Approved ASTM D8257 synthetic underlayment, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roofwith two fasteners of the same type as that used for the field shakes. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven. (see Detail C).

5.11      Metal flashing materials shall comply with Section 1517.6 of the Florida Building Code, Building. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shakes. The step-flashing unit shall be installed just up slope from the exposed area of the wood shake, in such a manner as to be covered by the next wood shake while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shake. Nail each step-flashing unit near the upper corner. Location of the shake fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shake shall be installed up to the vertical head wall. The head wall flashing shall then be installed to extend up the vertical surface 5 in., and out over the top course of wood shake a minimum of 5 in. Wall treatment or metal counterflashing shall be brought down over all vertical flanges of the step flashing or head wall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shake. Metal counterflashing shall be installed in compliance with RAS 111.

5.12      Roof penetrations that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer’s recommendations, unless otherwise indicated in roof assembly’s Product Approval.

**(R10178 AS)**

**ROOFING APPLICATION STANDARD (RAS) No. 130-20**

INSTALLATION CRITERIA FOR WOOD ROOF SHINGLES AND SHAKES APPLICATION

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| *Note: Tables remain unchanged*  1.            Scope  1.1          This application standard provides the minimum installation criteria for wood shingles and shakes application.  2.            Definitions  2.1          For definitions of terms used in this application standard, refer to ASTM D1079 and the *Florida Building Code, Building*.  3.            General  3.1          Maximum exposure for wood shingles and shakes shall comply with Table 1 herein, unless specifically specified in the roof assemblies Product Approval.  3.2          Wood shingles and shakes may be applied over solid or spaced sheathing. In spaced sheathing applications, the first 36 in. above the eave line shall be solidly sheathed. All wood decks shall comply with the provisions set forth in Chapters 15 and 23 (High-Velocity Hurricane Zones) of the *Florida Building Code,* *Building*.  3.3          Wood shingles and shakes shall not be installed on roof mean heights greater than 33 feet, unless specifically specified in the roof assemblies Product Approval.  4.            Wood Shingles  4.1          Underlayment  4.1 Underlayment  Solid Sheathing: ~~Two plies of ASTM D226, Type 1 felt overlapped. 19 in., or a single layer of ASTM D226 Type II felt overlapped a minimum of 4 in. on side laps, and 6 in. on the end laps.~~ Two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, ~~or ASTM D8257~~ underlayment shall be installed as follows: Apply a strip of underlayment for the first course that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply a full sheet~~s~~ of ~~reinforced~~ underlayment, for the second course. Apply the third course of underlayment overlapping the second course ~~successive sheets~~ half the width of a full sheet plus 2 inches. Overlap all successive courses half the width of a full sheet plus  inch. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment Fasteners ~~d with~~ shall be corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c., and one row at the laps fastened 6 in. o.c.~~  Spaced Sheathing: Underlayment shall be installed at Aa minimum of 36 in. at the eave line, fastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.                  Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.  4.2          Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building*, and RAS 111.  4.3          Valleys may be installed open or closed. A 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D1970 self-adhering polymer-modified underlayment shall be installed centered in the valley., ASTM D226 Type II felt shall be fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved flashing cement.  4.4          Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 11/4 in. annular ring shank roofing nails at every clip (see Detail A).  4.5          Metal laps shall be a minimum of 12 in. and shall be sealed with approved flashing cement. For open valley installations, the wood shingles are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shingles are to be miter cut along the center water diverter. Wood shingle fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shingles and the positioning of the fasteners higher at the valley may be required.  4.6          The maximum exposure to the weather for wood shingle applications shall comply with Table 1 herein.  4.7          Reserved.  4.8          The beginning or starter course of wood shingles at the eave line shall be doubled as a minimum. The wood shingles shall be project a minimum 3/4 in. to a maximum of 2 in. beyond the drip edge at both eaves and rakes. Spacing between shingles (joints or keyways) shall be a minimum of 1/4 in. and a maximum of 3/8 in. Shingles shall be positioned so that they cover the joints in the preceding course and adjacent courses shall be offset a minimum of 11/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail B).  4.9          Each shingle shall be fastened with a minimum of two (2) 5d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shingle, and 1/2 in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).  4.10        Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer’s shingles. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shingles. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).  4.11        Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shingles. The step-flashing unit shall be installed just up slope from the exposed area of the wood shingle, in such a manner as to be covered by the next wood shingle, while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shingle. Nail each step-flashing unit near the upper corner. Location of the shingle fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shingles shall be installed up to the vertical head wall and out over the top course of wood shingles a minimum of 5 in. Wall treatment or flashing or headwall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shingles. Metal counter flashing shall be installed in compliance with Roofing Application Standard RAS 111.  4.12        Roof penetration that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer’s recommendations, unless otherwise indicated in roof assembly’s Product Approval.  5.            Wood Shakes  5.1          Underlayments:  Solid Sheathing: Underlayment shall be installed ~~at a minimum of 36 in. at the eave line~~. with two layers of ASTM D226 Type II or ASTM D4869 Type III, Type IV, or ASTM D8257 underlayment shall be installed as follows: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full sheets of reinforced underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 6 inches (152 mm) and shall be offset by 6 feet (1829 mm). Underlayment shall be fastened to a nailable deck with a maximum fastener spacing measured horizontally and vertically of 12 inches (305 mm) o.c. between side laps, and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be fastened with corrosion resistant 12 ga. roofing nails through tin caps. ~~Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c.~~  Spaced Sheathing:           Underlayment shall be installed at Aa minimum of 36 in. wide course of underlayment shall be installed at the eave line. Underlayment shall be Ffastened with corrosion resistant 12 ga. roofing nails through tin caps. Fasten with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 in. o.c. horizontally and vertically.                  Roofing nails shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in.  5.2          Interlayment shall be a minimum of ASTM D226 Type I felt or an Approved ASTM D8257 synthetic underlayment with a minimum width of 18 in. and shall be applied between each succeeding course of shakes. Interlayment shall be fastened on the upper edge of the sheet. The bottom edge of the interlayment shall be positioned above the butt edge of each course of shakes, a distance equal to twice the weather exposure of the wood shakes. Extend interlayment up vertical surfaces a minimum of 4 in. No felt underlayment shall be exposed.  5.3          Edge metal shall comply with Section 1517.6 of the *Florida Building Code, Building* and RAS 111.  5.4          Valleys may be installed open or closed. A minimum 36 in. wide sheet of minimum ASTM D226 Type II organic felt or an Approved ASTM D8257 synthetic underlayment shall be installed over the underlayment and centered in the valley, fastened 6 in. o.c. through tin-caps at each edge of the sheet. Minimum end laps shall be 12 in. and fully adhered with approved ~~flashing Approved~~ roof cement.  5.5          Valley metals shall comply with the Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be preformed with side returns and a minimum 1 in. high center water diverter. Valley metal shall have a minimum formed width of 20 in. Valley metal shall be fastened with minimum 2 in. wide metal clips spaced 12 in. o.c. Metal clips shall be fabricated of similar metal and fastened with minimum two approved 11/4 in. annular ring shank roofing nails at every clip (see Detail A).  5.6          Metal laps shall be a minimum of 12 in., and shall be sealed with approved flashing cement. For open valley installations, the wood shakes are to be cut to form a straight edge. The open area of the valley shall be no less than 4 in. and no more than 8 in. wide. For closed valley installations, the wood shakes are to be miter cut along the center water diverter. Wood shake fasteners shall be kept back at least 8 in. from the valley centerline. Wider wood shakes and the positioning of the fasteners higher at the valley may be required.  5.7          The maximum exposure to the weather for wood shakes shall comply with Table 1 herein. An interlayment sheet shall be installed between each shake. The beginning or starter course of wood shakes at the eave line shall be doubled as a minimum. The wood shakes shall project a minimum 3/4 in. to a maximum 2 in. beyond the drip edge at both eaves and rakes.  5.8          Spacing between shakes (joints or keyways) shall be a minimum 3/8 in. and a maximum of 5/8 in. Shakes shall be positioned so that they cover the joints in the preceding course. Adjacent courses shall be offset a minimum of 11/2 in. In any three courses (adjacent), no two joints should be directly aligned (see Detail D).  5.9          Each shake shall be fastened with a minimum of two (2) 6d hot-dipped, galvanized box nails. Fastened 3/4 in. to 1 in. from the edge of the shake, and 11/2in. to 2 in. above the butt line of the next course. In all cases, fasteners shall be of sufficient length to penetrate through the plywood panel or wood plank decking not less than 3/16 in., or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven (see Detail C).  5.10        Hip and ridges may be installed from pre-manufactured units or field assembled units from manufacturer’s shakes. The exposed juncture of the roof hip and ridge areas shall be covered with a minimum 6 in. wide strip of ASTM D226 Type II organic felt, prior to installing the hip and ridge units. No felt shall be left exposed. Lay alternate overlapping hip and ridge units, starting with a double starter course. The weather exposure of the hip and ridge units shall be the same exposure as the field shingles. Each side of the hip and ridge units shall be a minimum of 4 in. wide. Each hip and ridge unit shall be fastened to the roof with two fasteners of the same type as that used for the field shakes. Fasteners shall be of sufficient length to penetrate the plywood panel or wood plank decking not less than 3/16 in.; or to penetrate into a 1 in., or greater, thickness of lumber not less than 1 in. Nails shall be driven straight and flush. Nails shall not be overdriven. (see Detail C).  5.11        Metal flashing materials shall comply with Section 1517.6 of the *Florida Building Code, Building*. Metal step flashing shall be used at all vertical side walls. The length of the step flashing units shall be 3 in. longer than the exposure of the shakes. The step-flashing unit shall be installed just up slope from the exposed area of the wood shake, in such a manner as to be covered by the next wood shake while maintaining a minimum 3 in. headlap. Step flashing metal shall extend 5 in. up the vertical surface and 5 in. horizontally onto the wood shake. Nail each step-flashing unit near the upper corner. Location of the shake fasteners must be adjusted to insure that the step flashing is not penetrated. Vertical head walls shall be flashed with apron type metal flashing. Wood shake shall be installed up to the vertical head wall. The head wall flashing shall then be installed to extend up the vertical surface 5 in., and out over the top course of wood shake a minimum of 5 in. Wall treatment or metal counterflashing shall be brought down over all vertical flanges of the step flashing or head wall flashing a minimum of 3 in. and shall terminate a minimum of 1 in. above the surface of the wood shake. Metal counterflashing shall be installed in compliance with RAS 111.  5.12        Roof penetrations that protrude through a roof shall be flashed at all intersecting angles to prevent leakage. Flashing details shall be in compliance with manufacturer’s recommendations, unless otherwise indicated in roof assembly’s Product Approval. |
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**(R10238 AM original A1 plus A2)**

**ROOFING APPLICATION STANDARD (RAS) No. 133 STANDARD PROCEDURE FOR INSTALLATION OF METAL ROOF SYSTEMS**

7.1 Eaves may be terminated with a drip edge flashing (see Figure ~~4/~~2) or a gutter at the transition with a side wall. Refer to material and application methods for fabrication, attachment, and sizing set forth in RAS 111.

**(R10140 AS)**

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| 7.3.2 Rake flashings are perimeter flashings at the sloping edge of the metal Roof System Assembly, usually terminated with a drip edge ~~or gravel stop~~ flashing (see Figure 4, below). Rake flashings shall be fabricated from materials, sized and attached in compliance with RAS 111. |
|  |

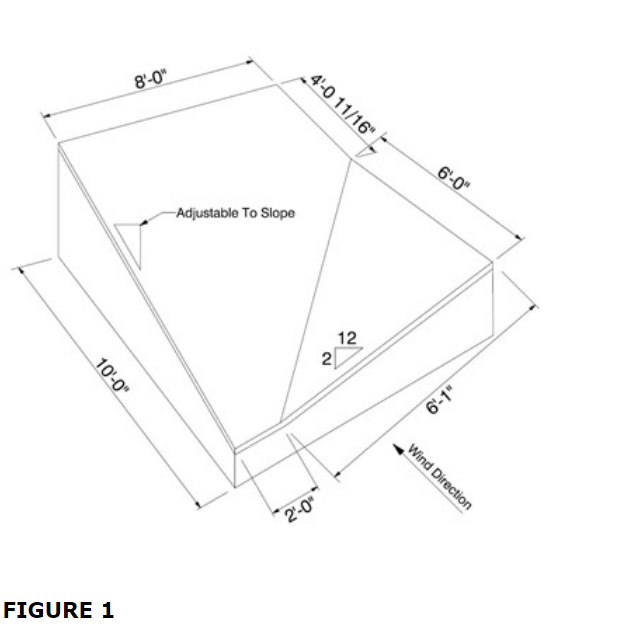
**(R10144 AS)**

**TESTING APPLICATION STANDARD (TAS) No. 100-~~95~~ 23 TEST PROCEDURE FOR WIND AND WIND DRIVEN RAIN RESISTANCE OF DISCONTINUOUS ROOF SYSTEMS**

7.2       Simulated Rainfall and Flow Meter Calibration - ~~A maximum of three months prior to conducting the test,~~ ~~t~~The flow meter(s) shall be calibrated every six months using the following method:

**(R9906 AS)/ (R9908 AS)**

Replace existing Figure 1 with this version



**WIND DRIVEN RAIN TEST FRAME**

**Revise Section 8.1.2 as shown.**

8.1.2    The wood test deck shall be positioned at the minimum slope, as applicable in the High-Velocity Hurricane Zone jurisdiction, for the type of discontinuous roof system being tested, but not less than 2 in:12 in. Adjustments to slope shall be made only to the 10-foot slope of the test deck.

**(R9908 AS)**

**TESTING APPLICATION STANDARD (TAS) No. 100(A)-95 TEST PROCEDURE FOR WIND AND WIND DRIVEN RAIN RESISTANCE AND/OR INCREASED WINDSPEED RESISTANCE OF SOFFIT VENTILATION STRIP AND CONTINUOUS OR INTERMITTENT VENTILATION SYSTEM INSTALLED AT THE RIDGE AREA**

**Add new section and revise existing sections of TAS 100(A) as shown:**

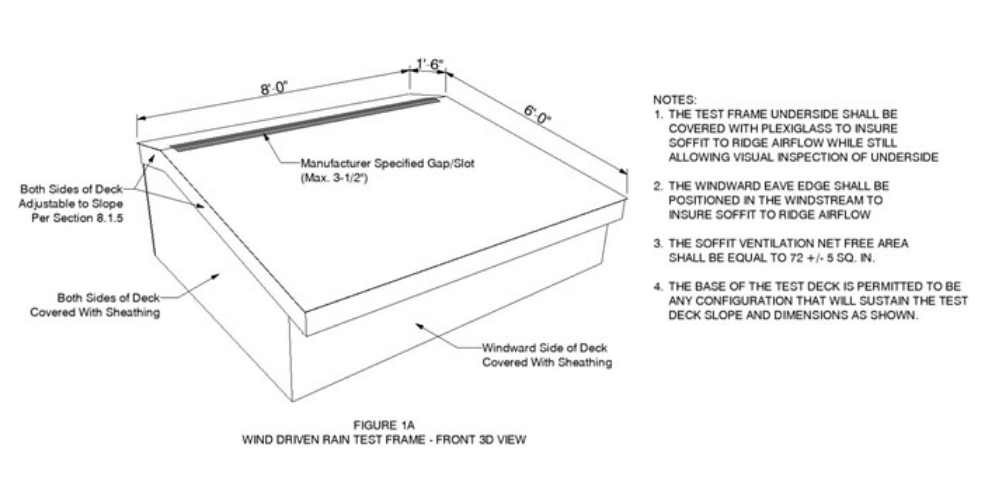
7.1.3 Calibration of the wind stream velocity shall be conducted every six months or whenever a change is made to any wind tunnel component.

7.2 Simulated Rainfall and Flow Meter Calibration - ~~A maximum of three months prior to conducting the test, t~~The flow meter(s) shall be calibrated every six months using the following method:

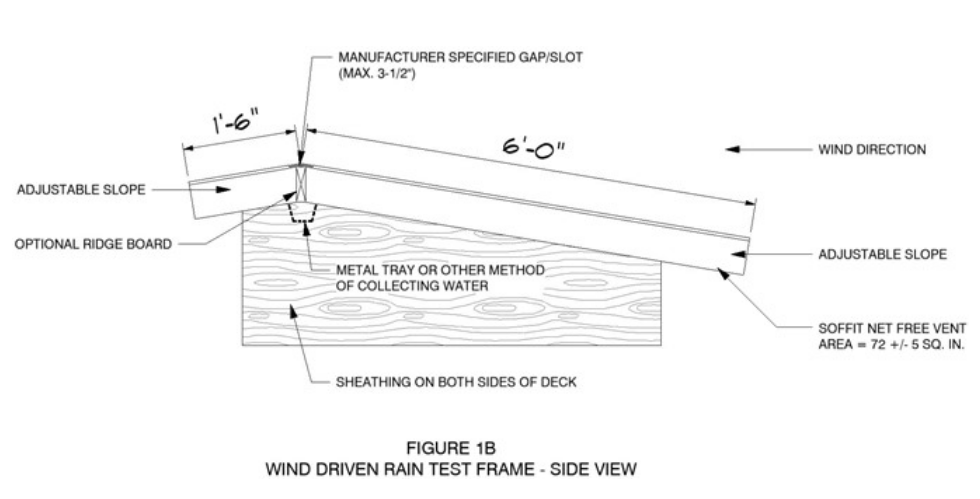
7.3 Water Distribution Check - ~~Prior to conducting the test, t~~The water distribution over the test frame shall be checked and calibrated every six months using the method outlined herein.

**(R9855 AS)**

**Replace existing Figure 1A with this version.**



**Replace existing Figure 1B with this version.**



**Revise Section 5 as shown:**

**5. Apparatus**

5.1 The Test Frame

5.1.1 The test frame shall consist of a base structure of sufficient dimensions to hold the test specimen noted in Section 8, constructed from wood or steel framing, and a wood deck, constructed from plywood sheathing. ~~Deck support joists shall be placed at 24 in. centers. (See Figure 1.)~~ ~~The deck slopes, on the windward and leeward side, shall be adjustable or multiple interchangeable decks shall be available to test assemblies at slopes of 2 in., 4 in. and 6 in. in 12 in.~~The deck support assembly shall be capable of supporting not less than 55 lbs per square foot of dead load. The windward end and each side of the test frame shall be covered with plywood to insure soffit to ridge airflow.

**Revise Section 8 as shown:**

**8. Test Specimens**

8.1 Deck

8.1.1 The wood test deck shall consist of APA 32/16 span rated plywood sheathing of 15/32 in. thickness installed over 2 in.×6 in. perimeter supports and 2 in.×6 in. intermediate supports spaced 24 in. apart. The sheathing shall be attached with 8d common nails at 6 in. o.c. at panel edges and 12 in. o.c. at intermediate supports. The “windward deck” shall be 8~~'~~ ft.  wide by 6~~'~~ ft. long and the leeward deck shall be 8~~'~~ ft. wide by 1~~'~~ ft. 6 in. long and shall overhang the leeward end of the test frame.

8.1.2 Sheathing panels, which meet at the ridge, shall be installed such that a gap exists along the ridge. The gap size shall be specified by the ridge ventilation system manufacturer, but shall not exceed 3.5 in. in width.

8.1.3 The type of soffit ventilation shall be specified by the ridge ventilation system manufacturer; but the net free area shall be equal to 72 ± 5 in2. The soffit ventilation assembly shall be installed beneath the windward eave of the test specimen. (See Figure 1B.)

8.1.3.1 The testing agency shall confirm that adequate soffit to ridge ventilation exists prior to conducting the wind driven rain test. Ventilation shall comply with the *Florida Building Code*. The net-free area of the ventilation  products shall be recorded and reported in the test report.

8.1.4 A tray or other means of collecting water shall be installed on the underside of the ridge and/or deck area to capture any water which infiltrates the ridge area ventilation system. The tray or other means shall be sized and configured to insure that all water penetrating the ridge area ventilation system or the ventilation unit, is captured.

8.1.5 The wood test deck shall be positioned at the minimum slope, as applicable in the High-Velocity Hurricane Zone~~s jurisdiction~~, for the type of ridge area ventilation system being tested, but not less than 2 in:12 in. The deck slopes, on the windward and leeward side, shall be adjustable or multiple interchangeable decks shall be available to test assemblies at slopes of 2 in., 4 in. and 6 in. in 12 in.(See Figure 1B.)

**Revise TAS 100(A) edition:**

**TESTING APPLICATION STANDARD (TAS) No. 100(A)-~~95~~23**

**TEST PROCEDURE FOR WIND AND WIND DRIVEN RAIN**

**RESISTANCE AND/OR INCREASED WINDSPEED RESISTANCE OF**

**SOFFIT VENTILATION STRIP AND CONTINUOUS OR INTERMITTENT**

**VENTILATION SYSTEM INSTALLED AT THE RIDGE AREA**

**(R9907 AS)**

**TESTING APPLICATION STANDARD (TAS) No. 103-20 TEST PROCEDURE FOR SELF-ADHERED UNDERLAYMENTS FOR USE IN TILE ROOF SYSTEMS**

10.1.2.2     UV Exposure shall consist of 460 hours of continuous ultraviolet light exposure in accordance with the apparatus and configuration in 13~~.1.2.1~~ herein. Alternatively, exposure to accelerated weathering of no less than 500 hours in accordance with ASTM D4798, Cycle A-1 is permitted.

13.1           This test covers the determination of the ultraviolet resistance performance of materials specified in Section 1. Conducting accelerated weathering in accordance with Section 24 for a minimum of 500 hours is permitted as an alternative to this Section.

24.2.2     At the conclusion of the required accelerated weathering, the weathered underlayment shall be tested per Table 24.2. Any product not achieving the values therein will be considered as having failed the test. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment.

**(R9844 AS)**

**1. Scope**

1.1 This Protocol covers procedures for testing self-adhering, ~~prefabricated~~, polymer modified bituminous, and solid thermoplastic sheet roofing materials intended for use as underlayment in Tile Roof Systems to assist in the waterproofing to function in combination with a Prepared Roof Covering. These products may employ granular or particulate surfacing materials on one side. The Granule Adhesion test shall be required for all granular surfaced materials used as a bonding surface for mortar or adhesive set tile systems.

1.2 The test procedures outlined in this Protocol cover the determination of the Wind Uplift Resistance; the Thickness; the Dimensional Stability; the Tear Resistance; the Breaking Strength; the Elongation; the Low Temperature Flexibility; the Ultraviolet Resistance; the Accelerated Aging Performance; the Cyclic Elongation Performance; the Water Vapor Transmission; the Compound Stability; the Puncture Resistance; the Tile Slip-page Resistance; the Peel Resistance; the Accelerated Weathering Performance of an underlayment material; the Tensile Adhesion properties of the exposed surface of the underlayment; and Granular Adhesion for granular surfaced underlayment.

*Note: 1.3 remains unchanged*

**2.Referenced Documents**

2.1 *ASTM Test Standards:*

|  |  |
| --- | --- |
| D1079 | Standard Definitions and Terms Relating to Roofing, Waterproofing and Bituminous Materials |
| D1623 | Standard Test Method For Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics |
| D1970 | Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection (Low Temperature Flexibility) |
| D2523 | Testing Load-Strain Properties of Roofing Membranes |
| D4073 | Standard Test Method For Tensile Tear Strength of Bituminous Roofing Membranes |
| D5147 | Sampling and Testing Modified Bituminous Sheet Materials |
| E96 | Water Vapor Transmission of Materials |
| E380 | Excerpts from the Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System) |

2.2 Reserved

2.3 Reserved

 2.4 The Florida Building Code, Building.

2.5*~~Application Standards~~*Reserved

|  |  |
| --- | --- |
| ~~TAS 124~~ | ~~Test Procedure for Field Uplift Testing of Existing Membrane Roof Systems~~ |

2.6 Reserved

*Note: 3., 4., 5., and 6. Remain unchanged.*

**7. Wind Uplift**

7. Adhered or mechanically attached tile underlayment or underlayment assemblies shall be tested in accordance with FM 4474 or UL 1897.

~~7.1 This test covers the determination of the wind uplift resistance of materials specified in Section 1 of this Protocol in accordance with TAS 124 except as noted below.~~

~~7.1.1 Test Deck Construction~~

~~7.1.1.1 Test is being conducted on materials noted in Section 1 of this Protocol; therefore, any reference to “roof membrane” in TAS 124 shall be regarded as ‘underlayment.’~~

~~7.1.1.2 Four (4) 8' × 8' test decks shall be constructed of 40/20 19/32 in. APA Rated Plywood Sheathing attached to wood joists spaced 24 o.c. Each test deck shall consist of four (4) panels of said sheathing, the corners of which shall meet at the center of each test deck, leaving a 1/8 in. gap between panels.~~

~~7.1.1.3 Adhere one (1) layer of underlayment to each test deck.~~

~~7.1.2 Procedure~~

~~7.1.2.1 Test shall be a laboratory test not a field test; therefore, any instruction in TAS 124 which references “building or outdoor conditions” shall be regarded as “laboratory conditions.”~~

~~7.1.2.2 Regulate the negative pressure in the chamber. Begin by raising the negative pressure in the chamber to 30 lbf/ft2 and holding this pressure for one (1) minute. Thereafter, raise the negative pressure in increments of 15 lbf/ft2, holding each incremented pressure for one (1) minute, until the negative pressure has been held at 90 lbf/ft2 for one (1) minute.~~

~~7.1.3 Report~~

~~7.1.3.1 Any test specimen which exhibits any significant separation between the membrane and tested substrate shall be considered as failing the wind uplift.~~

**(R10175 AS)**

23.3.2.1     Control specimens shall be conditioned at 73.4 ± 3.6°F and 50% ± 5% relative humidity for minimum 4 hours.

23.3.2.2     All remaining specimens shall be conditioned at 180 ± 2°F and 65% ± 5% relative humidity. Six specimens each shall be conditioned for 14, 60 and 120 days.

23.3.3        Test all samples in accordance with ASTM D1623. Testing shall be performed after a stabilization at 73.4 ± 3.6°F and 50% ± 5% relative humidity.

**(R9843 AS)**

**TESTING APPLICATION STANDARD (TAS) No. 104-20 TEST PROCEDURE FOR NAIL-ON UNDERLAYMENT FOR USE IN TILE ROOF SYSTEMS**

9.1.2.2       UV Exposure shall consist of 460 hours of continuous ultraviolet light exposure in accordance with the apparatus and configuration in 12~~.1.2.2~~ herein. Alternatively, exposure to accelerated weathering of no less than 500 hours in accordance with ASTM D4798, Cycle A-1 is permitted.

12.1           This test covers the determination of the ultraviolet resistance performance of materials specified in Section 1. Conducting accelerated weathering in accordance with Section 20 for a minimum of 500 hours is permitted as an alternative to this Section.

20.2.2       At the conclusion of the required accelerated weathering, the weathered underlayment shall be tested per Table 20.2. Any product not achieving the values therein will be considered as having failed the test. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment.

**(R9853 AS)**

**TESTING APPLICATION STANDARD (TAS) No. 110-2000**

**TESTING REQUIREMENTS FOR PHYSICAL PROPERTIES OF ROOF**

**MEMBRANES, INSULATION, COATINGS AND OTHER ROOFING COMPONENTS**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 11(A)**   |  |  |  | | --- | --- | --- | | **Product** | **Test** | **Test Standard** | | Mechanically Attached Rigid, Discontinuous Roof Assembly | Wind Driven Resistance | TAS 100 | | Mechanically Attached Rigid, Discontinuous Roof Assembly | Static Uplift Resistance | TAS 102 | | Mechanically Attached Clipped, Rigid, Discontinuous Roof Assembly | Static Uplift Resistance | TAS 102(A) | | Mortar or Adhesive Set Tile Roof Assembly | Static Uplift Resistance | TAS 101 | | Rigid, Discontinuous Roof Assembly | Wind Tunnel Performance | TAS 108 | | Rigid, Discontinuous Roof Assembly | Air Permeability | TAS 116 | | Concrete Roof Tile | Physical Properties | TAS 112 | | Clay Roof Tile | Physical Properties | C1167 | | Fiberglass Reinforced Composite Tile | Physical Properties | TAS 135 | | **Underlayment** | | | | Self-Adhered Underlayments | Physical Properties | TAS 103 | | Nail-On Underlayments | Physical Properties | TAS 104 | | Asphalt Based Underlayments | Physical Properties | See Section2 of this Protocol | | **Attachment Components** | | | | Nails, Screws, Clips, etc. | Corrosion Resistance | Appendix Eof  TAS114 | | Adhesive (for use in adhesive set tile Roof System Assemblies) | Physical Properties | See Section 1523.6.5.2.17 of Florida Building Code – Building | | Mortar (for use in mortar settile Roof System Assemblies) | Physical Properties | TAS 123 | | Adhesive(for use as arepairor supplemental attachment component) | Physical Properties | TAS 123(A) |     **Table 14**   |  |  |  | | --- | --- | --- | | **Product** | **Test** | **Test Standard** | | Attic Ventilation  Products *(soffit vent*  *strips, ridge vents,*  *static vents, louvers,*  *turbines, powered*  *vents, etc.)* | Wind and Wind  Driven Rain  Resistance | TAS 100(A) | | ‘Small’ Protruding  Ridge Ventilation  Products *(static vents,*  *louvers, turbines,*  *powered vents, etc.)* | Increased Wind  Speed Resistance | TAS 100(A) | | ‘Large’ Protruding  Ridge Ventilation  Products *(turbines,*  *powered vents, etc.)* | Pressure Resistance | ~~TAS 100(B)~~  TAS 202 | | Plastic Ridge Vents | Ultraviolet  Resistance | ASTM G155 | | Plastic Ridge Vents | Burning  Resistance | ASTM D635 or D1929 | |
|  |

**(R10097 AS)**

**TABLE 2(A)**

|  |  |
| --- | --- |
| **PRODUCT                                          TESTSTANDARD** | |
| **Membrane or Roll Roofing Products** | |
| AsphaltCoatedFiberglassBaseSheet | D4601 |
| Asphalt Glass Felt for Roofing | D2178 |
| Asphalt Coated Fiber glass Vented Base | D4897 |
| Asphalt Coated Organic Base Sheet | D2626 |
| Asphalt Organic Roll Roofing | D6380 Class WS |
| Asphalt Saturated Felt | D226 |
| Synthetic Roof Underlayment | D8257 |
| Roll Roofing, Glass Mat, Granule Surface | D3909 |
| Roll Roofing, Organic, Smooth Surface | D6380ClassS |
| Roll Roofing, Organic, Granule Surface | D6380ClassM |
| SBS Polyester & Glass Fiber Reinforced | D6162 |
| SBS Glass Fiber Reinforced | D6163 |
| SBS Polyester Reinforced | D6164 |
| APP Polyester Reinforced | D6222 |
| APP Polyester & Glass Fiber Reinforced | D6223 |
| SBS with Metallic Laminate Surfacing | D6298 |
| APP Base Sheet Glass Fiber Reinforced | D6509 |
| AcceleratedWeatheringallmembranesSpecifiedforuseascapsheets1 | D5147 |
| Mechanically Attached Anchor or Base Sheets | TAS117(B) |

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|  |

**TABLE 9**

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **Test Standard** |
| Fiber Cement Roof Assembly | Wind Driven Rain Resistance | TAS100 |
| Fiber Cement Roofing Products | Physical Properties | TAS135 |
| Mechanical Attached Fiber Cement Tile or Shake Roof Assemblies (Uplift Based System) | Static Uplift Resistance | TAS102(A)(See  TAS 135 for details) |
| Mechanically Attached, Clipped Fiber Cement Tile or Shake Roof Assemblies(Uplift Based System) | Static Uplift Resistance | TAS102(A)(See  TAS 135 fordetails) |
| Fiber Cement Panel Roof Assemblies | Uplift Pressure Resistance | E 330(See TAS  135fordetails) |
| **Underlayment** | | |
| Self-Adhered Underlayments | Physical Properties | TAS103 |
| Nail-On Underlayments | Physical Properties | TAS104 |
| Synthetic Underlayments | Physical Properties | ASTM D8257 |
| Asphalt Based Underlayments | Physical Properties | SeeSection2ofthisProtocol |
| **Attachment Components** | | |
| Nails, Screws,Clips,etc. | Corrosion Resistance | AppendixEofTAS114 |

**TABLE 10**

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **TestStandard** |
| Non-Rigid, Discontinuous Roof Assembly | Wind Driven Rain Resistance | TAS100 |
| Non-Rigid, Discontinuous Roof Assembly | Wind Resistance | TAS107 |
| Non-Rigid, Discontinuous Roof Assembly | Fire Resistance min. Class ‘B’ | E108min.Class‘B’ |
| Granule Surfaced, Glass Felt Asphalt Shingles | Physical Properties | D3462 |
| Granule Surfaced, Class ‘A’ Asphalt Shingles Fiber glass Reinforced | Physical Properties | D3018TAS135 |
| Composite Shingles Fiber Cement Shingles | Physical Properties | TAS135 |
| Metal Shingles | Salt Spray and Accelerated Weathering | B117andG23 |
| **Underlayment** | | |
| Self-Adhered Underlayments | Physical Properties | TAS 103 orASTMD1970 |
| Nail-OnUnderlayments | PhysicalProperties | TAS104 |
| Synthetic Underlayments | Physical Properties | ASTM D8257 |
| Asphalt Based Underlayments | Physical Properties | See Section 2ofthisProtocol |
| **Attachment Components** | | |
| Nails, Screws, Clips, etc. | Corrosion Resistance | AppendixEofTAS114 |

**TABLE 11(A)**

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **TestStandard** |
| Mechanically Attached Rigid, Discontinuous Roof Assembly | Wind Driven Resistance | TAS100 |
| Mechanically Attached Rigid, Discontinuous Roof Assembly | Static Uplift Resistance | TAS102 |
| Mechanically Attached Clipped, Rigid, Discontinuous Roof Assembly | Static Uplift Resistance | TAS 102(A) |
| Mortar or Adhesive Set Tile Roof Assembly | Static Uplift Resistance | TAS101 |
| Rigid, Discontinuous Roof Assembly | Wind Tunnel Performance | TAS108 |
| Rigid, Discontinuous Roof Assembly | Air Permeability | TAS116 |
| Concrete Roof Tile | Physical Properties | TAS112 |
| Clay Roof Tile | Physical Properties | C1167 |
| Fiberglass Reinforced Composite Tile | Physical Properties | TAS135 |
| **Underlayment** | | |
| Self-Adhered Underlayments | Physical Properties | TAS103 |
| Nail-On Underlayments | Physical Properties | TAS104 |
| Synthetic Underlayments | Physical Properties | ASTM D8257 |
| Asphalt Based Underlayments | Physical Properties | See Section2 of this Protocol |
| **Attachment Components** | | |
| Nails, Screws, Clips, etc. | Corrosion Resistance | AppendixEofTAS114 |
| Mortar (for use in mortar settile Roof System Assemblies) | Physical Properties | TAS123 |
| Adhesive(for use as arepairor supplemental attachment component) | Physical Properties | TAS 123(A) |

**TABLE 11(B)**

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **Test Standard** |
| Slate | Physical Properties | C406 |
| **Underlayment** | | |
| Self-Adhered Underlayments | Physical Properties | TAS 103 orASTMD1970 |
| Nail-On Underlayments | Physical Properties | TAS104 |
| Synthetic Underlayments | Physical Properties | ASTM D8257 |
| Asphalt Based Underlayments | Physical Properties | See Section 2ofthisProtocol |
| **Attachment Components** | | |
| Nails, Screws, Clips, etc. | Corrosion Resistance | Appendix E ofTAS114 |

**TABLE 17**

|  |  |  |
| --- | --- | --- |
| **Product** | **Test** | **Test Standard** |
| Non-Rigid, Discontinuous Roof Assembly | Wind Driven Rain Resistance | TAS 100 |
| Plastic Tile/Shake/Slate Systems | Uplift Performance | TAS 125 |
| Plastic Tile/Shake/Slate | Outdoor Exposure  Xenon Arc | G26 (6500 watts) Test Method 1 or G155 (4500 hours) |
| Tensile Test | D638  (+/- 10% allowable difference between exposed and non-exposed samples) |
| Flexural Test | C158  (+/- 10% allowable difference between exposed and non-exposed samples) |
| Plastic Tile/Shake/Slate | Self Ignition | D1929  (greater than 650°F) |
| Plastic Tile/Shake/Slate | Smoke Density Rating | E84 (rating less than 450) or D2843 (rating less than 75) |
| Plastic Tile/Shake/Slate | Rate of Burning | D635  (Class CC-1 or CC-2) |
| **Underlayment** | | |
| Self-Adhered Underlayments | Physical Properties | TAS 103 or ASTM D1970 |
| Nail-On Underlayments | Physical Properties | TAS 104 |
| Asphalt Based Underlayments | Physical Properties | See Section 2 of this Protocol |
| Synthetic Underlayments | Physical Properties | ASTM D8257 |
| **Attachment Components** | | |
| Nails, Screws, Clips, etc. | Corrosion Resistance | Appendix E of TAS 114 |

# 18. Referenced Standards

**ASTM**

Standard reference

ASTM International

100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959

number Title

D8257 Standard Specification for Mechnically Attached Polymeric Roof Underlayment Used in Steep Slope Roofing

**(R10146 AS)**

**Revise TAS 110 as shown:**

**Table 9 Footnote**

All underlayments~~(with the exception of TAS 103 or TAS 104 underlayments)~~ with exposure limitation in excess of 30 days shall be exposed to ~~must submit enhanced A~~accelerated ~~W~~weathering testing in conjunction with~~applicable~~ the following ~~P~~physical ~~P~~properties: breaking strength, elongation, and low temperature flexibility. ~~testing. Exposure limitations up to a maximum of 180 days will be established through~~ Underlayments shall be exposed in accordance with ASTM D4798 ~~for 1000 hours (~~cycle A-1~~);~~. Exposure limitations shall be established per TAS 103, Table 24.1. pPass/fail criteria shall be established by physical properties requirements of the standard under which the product is approved. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment. ~~testing of the weathered samples. Physical property testing where specimen size will not fit into the accelerated weathering device may be omitted.~~

**Table 10 Footnote**

All underlayments~~(with the exception of TAS 103 or TAS 104 underlayments)~~ with exposure limitation in excess of 30 days shall be exposed to ~~must submit enhanced A~~accelerated ~~W~~weathering testing in conjunction with~~applicable~~ the following ~~P~~physical ~~P~~properties: breaking strength, elongation, and low temperature flexibility. ~~testing. Exposure limitations up to a maximum of 180 days will be established through~~ Underlayments shall be exposed in accordance with ASTM D4798 ~~for 1000 hours (~~cycle A-1~~);~~. Exposure limitations shall be established per TAS 103, Table 24.1. pPass/fail criteria shall be established by physical properties requirements of the standard under which the product is approved. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment. ~~testing of the weathered samples. Physical properties testing where specimen size will not fit into the accelerated weathering device may be omitted.~~

**Table 11 (B) Footnote 3**

All underlayments~~(with the exception of TAS 103 or TAS 104 underlayments)~~ with exposure limitation in excess of 30 days shall be exposed to ~~must submit enhanced A~~accelerated ~~W~~weathering testing in conjunction with~~applicable~~ the following ~~P~~physical ~~P~~properties: breaking strength, elongation, and low temperature flexibility. ~~testing. Exposure limitations up to a maximum of 180 days will be established through~~ Underlayments shall be exposed in accordance with ASTM D4798 ~~as outlined in ASTM D5147~~ ~~for 1000 hours (~~cycle A-1~~);~~. Exposure limitations shall be established per TAS 103, Table 24.1. pPass/fail criteria shall be established by physical properties requirements of the standard under which the product is approved. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment. ~~testing of the weathered samples. Physical properties testing where specimen size will not fit into the accelerated weathering device may be omitted.~~

**Table 17 Footnote**

All underlayments~~(with the exception of TAS 103 or TAS 104 underlayments)~~ with exposure limitation in excess of 30 days shall be exposed to ~~must submit enhanced A~~accelerated ~~W~~weathering testing in conjunction with~~applicable~~ the following ~~P~~physical ~~P~~properties: breaking strength, elongation, and low temperature flexibility. ~~testing. Exposure limitations up to a maximum of 180 days will be established through~~ Underlayments shall be exposed in accordance with ASTM D4798 ~~for 1000 hours (~~cycle A-1~~);~~. Exposure limitations shall be established per TAS 103, Table 24.1. pPass/fail criteria shall be established by physical properties requirements of the standard under which the product is approved. Additionally, there shall not be cracking of the surface layer or visible delamination between layers of the underlayment. ~~testing of the weathered samples. Physical properties testing where specimen size will not fit into the accelerated weathering device are not required to be included.~~

**(R9854 AS)**

Table 15, Footnote 2 – revise as follows:

Standing seam metal roof panel systems that pass the requirements of ~~FM 4471, Appendix G or~~ ASTM E2140-01, shall be permitted to be installed to a minimum slope of 1:12.

**(R9952 AM G1)**

**TESTING APPLICATION STANDARD (TAS) 124-20 TEST PROCEDURE FOR FIELD UPLIFT RESISTANCE OF EXISTING MEMBRANE ROOF SYSTEMS AND IN SITU TESTING FOR REROOF AND NEW CONSTRUCTION APPLICATIONS**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Revise 4.3 to clarify it does not address new construction.**  4.3 When ~~new construction will require~~a tear off of the existing roof system assembly is required, areas of existing roofing shall be removed to deck level. Sample assemblies shall be applied including a lifting panel, as detailed in Section 5.2 when the bonded pull test procedure is utilized. Sample panels shall be covered and waterproofed with a membrane roof covering to return the existing assembly to a waterproof condition.    6.2.1 The Bell chamber test is appropriate when the selected roofing system has been tested in accordance with TAS 114 Appendix C or Appendix J.  The Bell Chamber test is not appropriate for systems tested in accordance with TAS 114 Appendix D.  6.2.~~1~~2  6.2.~~2~~3  6.2.~~3~~4  6.2.~~4~~5    6.3.1 Testing shall only be conducted on fully adhered roof coverings and when all other roofing system components are adhered and or partially adhered. This test is not appropriate when any of the roofing system components are mechanically attached.  10.1.2 Any roof system assembly which exhibits an upward deflection greater than ~~or equal to~~ 1 inch (25 mm) during any of the tests shall be considered as failing at the point where 1 inch (25 mm) of deflection is recorded. Refer to Table 3 for deflection limitations.    **Insert new Table 3.**  Table 3 Maximum Recommended Deflection for Adhered Covers on Steel Deck Roofs Before the Sample is Considered Suspect   |  |  | | --- | --- | | Test Pressure (PSF) | Maximum Deflection (in) | | 60 < P < 120 | ½ or 0.50 | | 120 < P < 180 | ¾ or 0.75 | | 180 < P < 225 | 15/16 or 0.94 |   Note: For roof assemblies in which thin topping boards or the roof cover are adhered to a substrate immediately below using ribbons of adhesive, use a maximum deflection of 1 in. (25 mm) to determine suspect test samples. |
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**(R9922 AM A1 only)**