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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07320—Roof Tiles

REPORT HOLDER:

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EVALUATION SUBJECT:

**EXTRUDED INTERLOCKING CONCRETE ROOF TILES:
STANDARD WEIGHT TILES - ATLANTIS, BARCELONA 900,
CAPRI, CLASSIC 100, ESPANA, HARTFORD SLATE,
HOMESTEAD, MADERA, MISSION S, OLD ENGLISH
THATCH 900, PLAZA, ROMA, SAXONY, SAXONY GALAXY,
SAXONY ROBUST, SAXONY 900, TEJAS ESPANA,
VANGUARD ROLL, VILLA, AND VILLA 900; MID-WEIGHT
TILES - MADERA 700 AND SAXONY 700; LIGHTWEIGHT
TILES - CEDARLITE, ESPANA DURALITE, SAXONY 600,
SAXONY DURALITE AND VILLA DURALITE**

EXTRUDED CONCRETE ROOF TILES: SPANISH “S”

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 1999 *Standard Building Code*® (SBC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Fire classification
- Weather resistance
- Wind-uplift resistance

2.0 USES

The MonierLifetile extruded concrete roof tiles are used as Class A roof coverings in accordance with the exception to Section 1505.2 of the IBC, Section R902.1 of the IRC, and Section 1505.2 of the SBC. The roof tiles are noncombustible roof coverings in accordance with Section 1504.2 of the UBC.

3.0 DESCRIPTION

3.1 Extruded Interlocking Concrete Roof Tiles: These roof tiles are interlocking extruded concrete roof tiles that comply with ASTM C 1492 and having interlocking ribs on the

longitudinal edges of the tiles to restrict lateral movement and provide a water stop. All roof tiles are designed with anchor lugs except for the Cedarlite and Madera profiles. Mineral coloring oxides are either applied to the exposed surface in a cementitious material or mixed integrally with the tile mix to produce a through-colored product.

All roof tiles are cured to reach required strength before shipment. Product designations, dimensions and installed dry weights are indicated in Table 1 of this report. Roof tile profiles are illustrated in Figure 1.

3.2 Extruded Concrete Roof Tiles:

Spanish “S” roof tiles are extruded concrete roof tiles that comply with ASTM C 1492. The roof tile is manufactured in the same manner as the roof tiles described in Section 3.1, except the tile is noninterlocking. The roof tile is designed without anchor lugs. The product designation, dimensions and installed dry weight are indicated in Table 1. See Figure 1 for an illustration of the tile.

4.0 INSTALLATION

4.1 General:

Installation of the MonierLifetile roof tiles must be in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions, dated July 2006, published by the Tile Roofing Institute and Western States Roofing Contractors Association (hereinafter referred to as the TRI/WSRCA installation manual), and recognized in ICC-ES [ESR-2015P](#), except as otherwise noted in this report. In case of a conflict between the installation manual and this report, this report governs. This report and the TRI/WSRCA installation manual must be available at the jobsite at all times during installation. The roof tiles must be installed on a minimum roof slope of 2¹/₂:12 (20.83%). Care must be taken during field installation to ensure that horizontal joints are kept parallel to the eave and vertical joints are at right angles to the eave in order to ensure uniform contact between the tiles and proper fit and appearance. All cracked and broken roof tiles must be replaced.

4.2 Adhesive Set Systems:

The MonierLifetile roof tiles may be installed with roof tile adhesives that are recognized in a current ICC-ES evaluation report for use in concrete roofing tile applications. Installation of tiles using these adhesive set systems must be in accordance with the adhesive manufacturer's ICC-ES evaluation report.

4.3 Mortar Set Systems:

Except for the Duralite (lightweight), Saxony 600, Cedarlite and Madera tiles, the MonierLifetile roof tiles may be installed with mortars that are recognized in a current ICC-ES evaluation report for use in concrete roofing tile applications. Installation of tiles using these mortar set systems must be in

accordance with the mortar manufacturer's ICC-ES evaluation report.

4.4 Wind Resistance:

4.4.1 General: At a roof slope greater than 21:12 (175% slope) from the horizontal, a roof clip must be used.

4.4.2 Espana Duralite, Barcelona 900, Hartford Slate, Homestead, Old English Thatch 900, Plaza, Roma, Saxony (Denver, Kansas City, Phoenix, Rialto and Tacoma), Saxony Galaxy, Saxony Robust, Saxony 600, Saxony 700, Saxony 900, Saxony Duralite, Tejas Espana, Villa (Denver, Rialto and Tacoma), Villa 900 and Villa Duralite: Installation of these tiles is limited to the prescriptive parameters of Table 1507.3.7 of the IBC, Section R905.3.7 of the IRC and Table 1507.4.7 of the SBC, as applicable, for basic wind speeds (3-second gust) of 100 mph (161 km/h) or less (85 mph (137 km/h) fastest mile for SBC) and mean roof heights of 60 feet (18 288 mm) or less. For applications under the UBC, these tiles must be installed in accordance with Table 15-D-2 of the UBC.

4.4.3 Atlantis, Capri, Classic 100, Espana, Mission S, Saxony (Katy, Lake Wales, Lathrop and Stockton), Spanish "S", Vanguard Roll and Villa (Stockton and Phoenix):

4.4.3.1 IBC, IRC and SBC: For basic wind speeds (3-second gust) of 100 mph (161 km/h) or less (85 mph (137 km/h) fastest mile for SBC) and mean roof heights of 60 feet (18 288 mm) or less, tiles must be installed in accordance with the prescriptive parameters of Table 1507.3.7 of the IBC, Section R905.3.7 of the IRC and Table 1507.4.7 of the SBC, as applicable. For applications beyond these prescriptive parameters, the tiles and the fastening systems must be designed to withstand the aerodynamic wind uplift moment. The *required* aerodynamic uplift moment must be determined in accordance with Section 1609.5.3 of the IBC or Section 1606.3.3 of the SBC, as applicable, or may be determined from Tables 2 and 4 of this report.

The maximum *allowable* aerodynamic uplift moment must be determined in accordance with Table 5. The roof tiles must be mechanically fastened such that the *allowable* aerodynamic uplift moment for the roof tile/fastener/deck combination, noted in Table 5, exceeds the *required* aerodynamic uplift moment required by Section 1609.5.3 of the IBC or Section 1606.3.3 of the SBC, as applicable, or Tables 2 and 4 of this report. The fastening requirement determined from the use of Table 5 applies over the entire roof.

4.4.3.2 UBC: All tiles must be installed in accordance with Table 15-D-1 or Table 15-D-2 of the UBC, as applicable.

4.4.4 Cedarlite and Madera 700:

4.4.4.1 IBC, IRC and SBC: For basic wind speeds (3-second gust) of 100 mph (161 km/h) or less (85 mph (137 km/h) fastest mile for SBC) and mean roof heights of 60 feet (18 288 mm) or less, tiles must be installed in accordance with the prescriptive parameters of Table 1507.3.7 of the IBC, Section R905.3.7 of the IRC and Table 1507.4.7 of the SBC, as applicable. For applications beyond these prescriptive parameters, the tiles and the fastening systems must be designed to withstand the aerodynamic wind uplift moment. The *required* aerodynamic uplift moment must be determined in accordance with Section 1609.5.3 of the IBC or Section 1606.3.3 of the SBC, as applicable, or may be determined from Table 3 of this report.

The maximum *allowable* aerodynamic uplift moment must be determined in accordance with Table 5. The roof tiles must be mechanically fastened such that the *allowable*

aerodynamic uplift moment for the roof tile/fastener/deck combination noted in Table 5, exceeds the *required* aerodynamic uplift moment required by Section 1609.5.3 of the IBC or Section 1606.3.3 of the SBC, as applicable, or Table 3 of this report. The fastening requirement determined from the use of Table 5 applies over the entire roof.

4.4.4.2 UBC: For applications under the UBC, the tile must be installed in accordance with Table 15-D-1 of the UBC. As an alternative, on minimum $\frac{7}{16}$ -inch-thick (11.1 mm) oriented strand board or minimum $\frac{15}{32}$ -inch-thick (11.9 mm) plywood, a single corrosion-resistant, buglehead wood screw, in the center fastener hole, may be used. The screw must be of sufficient length to penetrate through the deck a minimum of $\frac{3}{4}$ inch (19.1 mm). The screw head must be driven to a point that allows the face end of the tile to lift $\frac{1}{4}$ to $\frac{1}{2}$ inch (6.4 to 12.7 mm) above the tile below. The buglehead screw must have a head diameter of 0.328 inch (8.3 mm) and a shank diameter, between threads, of 0.132 inch (3.35 mm).

The tile may be installed with battens. Battens installed must be nominally 1-inch-by-3-inch (25.4 mm by 76 mm) wood. The tiles must be fastened to the battens with either corrosion-resistant 8d common nails or box nails, spaced at 10 inches (254 mm) on center. The top edge of the tile is aligned with the top of the batten.

4.4.5 Madera: For basic wind speeds (3-second gust) of 100 mph (161 km/h) or less (85 mph (137 km/h) fastest mile for SBC) and mean roof heights of 60 feet (18 288 mm) or less, the Madera tiles must be installed in accordance with the prescriptive parameters of Table 1507.3.7 of the IBC, Section R905.3.7 of the IRC or Table 1507.4.7 of the SBC. For applications under the UBC, the tile must be installed in accordance with Table 15-D-1 of the UBC. For applications beyond these prescriptive parameters, the tiles and the fastening systems must be designed to withstand the aerodynamic wind uplift moment determined in accordance with the equation set forth in Section 1609.5.3 of the IBC, or Section 1606.3.3 of the SBC.

The maximum allowable aerodynamic uplift moment is the sum of the maximum allowable moment resistance of the fastening system plus the moment resistance due to the weight of the tile. When the Madera roof tile is installed directly on solid decking [minimum of $\frac{15}{32}$ -inch-thick (11.9 mm) CDX plywood sheathing] with a 3-inch (76 mm) headlap using one 0.12-inch-shank-diameter-by-2-inch-long-by-0.32-inch-head-diameter (3 mm by 51 mm by 8 mm) corrosion-resistant wood screw through the center hole of the tile, the maximum allowable moment resistance of the fastening system is 12.3 ft-lb (192.6 N-m). The maximum allowable moment resistance due to the weight of the tile is 4.5 ft-lb (65.7 N-m) at a roof angle of zero degrees and 0.0 ft-lb (0.0 N-m) at a roof angle of 90 degrees. Linear interpolation may be used to determine the maximum allowable moment resistance due to the weight of the tile for roof angles between zero degrees and 90 degrees.

5.0 CONDITIONS OF USE

The MonierLifetile extruded concrete roof tiles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The roof tiles must be installed in accordance with this report, the applicable code and the TRI/WSRCA installation manual. In case of a conflict between the installation manual and this report, this report must govern.
- 5.2** The roof decking and roof framing system must be designed for the appropriate loads determined in accordance with the applicable code.

5.3 Mechanical fastening requirements in Table 5 of this report are applicable for areas where this report indicates that the fastening is adequate to resist wind loads as noted in Sections 4.4.3.1 and 4.4.4.1. This report evaluates the uplift resistance of the tile system only. Other items, such as batten design, batten fastening, sheathing design (other than the minimum thickness required for fastening of the roof tile), fastening of the sheathing to the structure, etc., are outside the scope of this report and must be required to resist the forces prescribed by the applicable code.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Clay and Concrete Roof Tiles \(AC180\)](#), dated August 2007.

7.0 IDENTIFICATION

The underside of each field tile, except for Cedarlite, Madera 700 and Madera tiles, is imprinted with the MonierLifetile logo (Figure 2) or the name MonierLifetile, Boral, Boral Lifetile or Vostile. Cedarlite, Madera 700 and Madera tiles have an "M" imprinted on the top side of each tile. Each shipping pallet must have a label bearing the MonierLifetile, LLC, name; the tile designation; manufacturing location and address; color; SAP number; quantity of tiles per pallet; production date; installed weight; and the evaluation report number (ESR-1647).

TABLE 1—TILE DIMENSIONS, WEIGHTS AND MANUFACTURING FACILITIES

TILE DESIGNATION	INSTALLED DRY WEIGHT ¹ (psf)	DIMENSIONS ² (in.)		MANUFACTURING FACILITY
		LENGTH	WIDTH	
Atlantis - Shake and Slate	10.4	16 ¹ / ₈	10 ¹ / ₈	Boca Raton
Barcelona 900	9.5	17	13	Lake Wales 2
Barcelona 900	9.3	17	13	Lathrop
Capri	10.1	17	12 ³ / ₈	Lake Wales
Cedarlite	5.9	13 ¹ / ₂	13	Gilroy
Classic 100	9.5	16 ¹ / ₂	13	Tacoma
Espana - Barcelona	9.0	17	12 ³ / ₈	Henderson
Espana - Barcelona	9.0	17	12 ³ / ₈	Lake Wales
Espana - Barcelona	9.0	17	12 ³ / ₈	Lathrop
Espana - Barcelona	9.0	17	12 ³ / ₈	Rialto
Espana Duralite - Barcelona	5.9	17	12 ³ / ₈	Rialto
Hartford Slate	9.1	17	13	Stockton
Homestead - Shake	9.8	16 ¹ / ₂	13	Tacoma
Madera	9.5	13 ¹ / ₂	13	Gilroy
Madera 700	7.2	13 ¹ / ₂	13	Gilroy
Mission S - Barcelona	10.3	16 ¹ / ₂	13	Phoenix
Old English Thatch 900	9.8	17	13	Stockton
Plaza	10.8	16 ¹ / ₂	13	Kansas City
Roma	9.3	16 ¹ / ₂	13	Tacoma
Saxony - Country Shake	10.3	16 ¹ / ₂	13	Katy
Saxony - Country Shake	10.3	17	12 ³ / ₈	Rialto
Saxony - Country Slate	10.3	16 ¹ / ₂	13	Katy
Saxony - Country Slate	10.3	17	12 ³ / ₈	Rialto
Saxony - Country Split Shake	10.3	16 ¹ / ₂	13	Katy
Saxony - English Thatch	10.3	16 ¹ / ₂	13	Katy
Saxony - English Thatch	10.3	17	12 ³ / ₈	Rialto
Saxony - English Thatch	10.4	17	12 ³ / ₈	Lake Wales
Saxony - Galaxy	9.6	16 ¹ / ₂	13	Henderson
Saxony - Robust	9.7	16 ¹ / ₂	13	Henderson
Saxony - Shake	11.2	16 ¹ / ₂	13	Kansas City
Saxony - Shake	10.3	16 ¹ / ₂	13	Katy
Saxony - Shake	9.5	16 ¹ / ₂	13	Phoenix
Saxony - Shake	10.5	16 ¹ / ₂	13	Tacoma
Saxony - Shake	10.3	17	12 ³ / ₈	Rialto
Saxony - Shake	10.4	17	12 ³ / ₈	Lake Wales
Saxony - Shake	9.6	17	13	Denver
Saxony - 900	9.1	17	13	Lathrop
Saxony - 900	9.1	17	13	Stockton

(Continued)

TABLE 1—TILE DIMENSIONS, WEIGHTS, AND MANUFACTURING FACILITIES (Continued)

TILE DESIGNATION	INSTALLED DRY WEIGHT ¹ (psf)	DIMENSIONS ² (in.)		MANUFACTURING FACILITY
		LENGTH	WIDTH	
Saxony - Slate	11.2	16 ¹ / ₂	13	Kansas City
Saxony - Slate	9.5	16 ¹ / ₂	13	Phoenix
Saxony - Slate	10.3	16 ¹ / ₂	13	Katy
Saxony - Slate	10.5	16 ¹ / ₂	13	Tacoma
Saxony - Slate	10.3	17	12 ³ / ₈	Rialto
Saxony - Slate	10.4	17	12 ³ / ₈	Lake Wales
Saxony - 900	9.1	17	13	Lathrop
Saxony - 900	9.1	17	13	Stockton
Saxony - Slate	9.6	17	13	Denver
Saxony - Slate Vermont	11.2	16 ¹ / ₂	13	Kansas City
Saxony - Split Old English Thatch	11.2	16 ¹ / ₂	13	Kansas City
Saxony - Split Shake	10.5	16 ¹ / ₂	13	Tacoma
Saxony - Split Shake	10.3	17	12 ³ / ₈	Rialto
Saxony - Split Shake	10.4	17	12 ³ / ₈	Lake Wales
Saxony - Split Slate	10.5	16 ¹ / ₂	13	Tacoma
Saxony - Split Slate	10.3	17	12 ³ / ₈	Rialto
Saxony - Split Slate	10.4	17	12 ³ / ₈	Lake Wales
Saxony - Split Williamsburg	11.2	16 ¹ / ₂	13	Kansas City
Saxony Duralite (Slate, Shake, Split Shake)	5.9	16 ¹ / ₂	13	Stockton
Saxony 600	5.7	17	13	Stockton
Saxony 700	7.2	17	13	Stockton
Saxony 900	9.1	17	13	Henderson
Saxony 900	9.5	17	13	Lake Wales 2
Spanish "S"	9.5	18	10 ³ / ₈	Boca Raton
Tejas Espana - Barcelona	9.0	16 ¹ / ₂	13	Katy
Vanguard Roll	8.4	16 ¹ / ₂	13	Pompano
Villa	9.3	16 ¹ / ₂	13	Stockton
Villa	9.6	16 ¹ / ₂	13	Phoenix
Villa	9.0	17	13	Rialto
Villa	9.0	16 ¹ / ₂	13	Tacoma
Villa	9.0	17	13	Denver
Villa Duralite	5.8	17	13	Rialto
Villa Duralite	6.0	17	13	Stockton
Villa 900	9.3	16 ¹ / ₂	13	Stockton
Villa 900	9.0	16 ¹ / ₂	13	Katy
Villa 900	9.0	16 ¹ / ₂	13	Kansas City
Villa 900	9.2	17	13	Lake Wales

For SI: 1 inch = 25.4 mm, 1 psf = 4.88 kg/m².

¹Installed dry weight is based on a 3-inch headlap.

²All dimensions are nominal.

TABLE 2—REQUIRED AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)¹
[Atlantis, Capri, Classic 100, Espana, Saxony (Katy and Lake Wales),
Mission S, Spanish “S”, Vanguard Roll and Villa (Stockton, Tacoma and Phoenix) Tiles]

AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Hip $\approx 12^\circ < \alpha \leq 25^\circ$ ($3:12 < \alpha \leq 5\frac{1}{2}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	13.1	14.4	17.1	18.6	20.1	23.3	25.0	26.8
40	14.2	15.6	18.6	20.2	21.8	25.3	27.2	29.1
50	15.2	16.7	19.8	21.5	23.3	27.0	29.0	31.0
60	16.0	17.6	20.9	22.7	24.5	28.4	30.5	32.6
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Gable $\approx 12^\circ < \alpha \leq 27^\circ$ ($3:12 < \alpha \leq 6:12$)								
Hip $25^\circ < \alpha \leq 27^\circ$ ($5\frac{1}{2}:12 < \alpha \leq 6:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0-30	17.5	19.2	22.9	24.8	26.8	31.1	33.4	35.7
40	19.0	20.8	24.8	26.9	29.1	33.8	36.2	38.8
50	20.2	22.2	26.4	28.7	31.0	36.0	38.6	41.3
60	21.3	23.4	27.9	30.2	32.7	37.9	40.7	43.5
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Gable $27^\circ < \alpha \leq 45^\circ$ ($6:12 < \alpha \leq 12:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0-30	10.7	11.7	14.0	15.2	16.4	19.0	20.4	21.8
40	11.6	12.7	15.2	16.5	17.8	20.6	22.1	23.7
50	12.4	13.6	16.2	17.5	19.0	22.0	23.6	25.3
60	13.0	14.3	17.0	18.5	20.0	23.2	24.9	26.6
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Monoslope $\approx 12^\circ < \alpha \leq 30^\circ$ ($3:12 < \alpha \leq 6\frac{3}{4}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0-30	19.0	20.8	24.8	26.9	29.1	33.7	36.1	38.7
40	20.6	22.6	26.9	29.2	31.5	36.6	39.2	42.0
50	21.9	24.1	28.6	31.1	33.6	39.0	41.8	44.8
60	23.1	25.4	30.2	32.7	35.4	41.1	44.1	47.2

For **SI**: 1 foot = 304.8 mm, 1ft-lb = 1.356 N.m, 1 mph = 1.61 km/h.

¹This table is based on an Importance Factor of 1.00 and a Tile Factor of 1.446 ft³. The Tile Factor has been determined from a multiplication of the exposed width of the roof tile, the length of the roof tile and the moment arm of the roof tile. In this case, the exposed width and the length of the tile are 11³/₈ inches (289 mm) and 17 inches (432 mm), respectively. The table will provide conservative required aerodynamic wind uplift moments for any roof tile that has a Tile Factor less than 1.446 ft³ (0.041 m³).

TABLE 3—REQUIRED AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)¹—CEDARLITE AND MADERA 700 TILES

AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb) EXPOSURE B Hip $\approx 12^\circ < \alpha \leq 25^\circ$ ($3:12 < \alpha \leq 5\frac{1}{2}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	8.5	9.4	11.2	12.1	13.1	15.2	16.3	17.4
40	9.3	10.2	12.1	13.2	14.2	16.5	17.7	18.9
50	9.9	10.9	12.9	14.0	15.2	17.6	18.9	20.2
60	10.4	11.4	13.6	14.8	16.0	18.5	19.9	21.3
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb) EXPOSURE B Gable $\approx 12^\circ < \alpha \leq 27^\circ$ ($3:12 < \alpha \leq 6:12$) Hip $25^\circ < \alpha \leq 27^\circ$ ($5\frac{1}{2}:12 < \alpha \leq 6:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	11.4	12.5	14.9	16.2	17.5	20.3	21.7	23.3
40	12.4	13.6	16.2	17.5	19.0	22.0	23.6	25.3
50	13.2	14.5	17.2	18.7	20.2	23.4	25.2	26.9
60	13.9	15.2	18.1	19.7	21.3	24.7	26.5	28.4
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb) EXPOSURE B Gable $27^\circ < \alpha \leq 45^\circ$ ($6:12 < \alpha \leq 12:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	7.0	7.6	9.1	9.9	10.7	12.4	13.3	14.2
40	7.6	8.3	9.9	10.7	11.6	13.4	14.4	15.4
50	8.1	8.8	10.5	11.4	12.4	14.3	15.4	16.4
60	8.5	9.3	11.1	12.0	13.0	15.1	16.2	17.3
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb) EXPOSURE B Monoslope $\approx 12^\circ < \alpha \leq 30^\circ$ ($3:12 < \alpha \leq 6\frac{3}{4}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0-30	12.3	13.6	16.1	17.5	18.9	22.0	23.5	25.2
40	13.4	14.7	17.5	19.0	20.5	23.8	25.6	27.4
50	14.3	15.7	18.7	20.2	21.9	25.4	27.2	29.2
60	15.1	16.5	19.7	21.3	23.1	26.8	28.7	30.7

For SI: 1 foot = 304.8 mm, 1ft-lb = 1.356 N.m, 1 mph = 1.61 km/h.

¹The required aerodynamic wind uplift moments in Table 3 are based on an Importance Factor of 1.00 and a Tile Factor of 0.942 ft³ (0.0267 m³). The Tile Factor has been determined from a multiplication of the exposed width of the roof tile, the length of the roof tile and the moment arm of the roof tile. In this case, the exposed width and the length of the tile are 11³/₄ inches (298.45 mm) and 13¹/₂ inches (343 mm), respectively.

TABLE 4—REQUIRED AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)¹
[Saxony (Lathrop and Stockton) and Villa (Rialto and Denver) tiles]

AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Hip $\approx 12^\circ < \alpha \leq 25^\circ$ ($3:12 < \alpha \leq 5\frac{1}{2}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	13.8	15.2	18.1	19.6	21.2	24.6	26.4	28.3
40	15.0	16.5	19.6	21.3	23.0	26.7	28.7	30.7
50	16.0	17.6	20.9	22.7	24.6	28.5	30.5	32.7
60	16.9	18.5	22.0	23.9	25.9	30.0	32.2	34.4
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Gable $\approx 12^\circ < \alpha \leq 27^\circ$ ($3:12 < \alpha \leq 6:12$)								
Hip $25^\circ < \alpha \leq 27^\circ$ ($5\frac{1}{2}:12 < \alpha \leq 6:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	18.5	20.3	24.1	26.2	28.3	32.8	35.2	37.7
40	20.0	22.0	26.2	28.4	30.7	35.6	38.2	40.9
50	21.4	23.4	27.9	30.3	32.7	38.0	40.7	43.6
60	22.5	24.7	29.4	31.9	34.5	40.0	42.9	45.9
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Gable $27^\circ < \alpha \leq 45^\circ$ ($6:12 < \alpha \leq 12:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	11.3	12.4	14.7	16.0	17.3	20.1	21.5	23.0
40	12.2	13.4	16.0	17.4	18.8	21.8	23.4	25.0
50	13.1	14.3	17.0	18.5	20.0	23.2	24.9	26.6
60	13.8	15.1	18.0	19.5	21.1	24.4	26.2	28.1
AERODYNAMIC UPLIFT MOMENT, M_a (ft-lb)								
EXPOSURE B								
Monoslope $\approx 12^\circ < \alpha \leq 30^\circ$ ($3:12 < \alpha \leq 6\frac{3}{4}:12$)								
Height (feet)	Basic Wind Speed, V (mph—3-second gust)							
	105	110	120	125	130	140	145	150
0 - 30	20.0	21.9	26.1	28.3	30.7	35.5	38.1	40.8
40	21.7	23.8	28.4	30.8	33.3	38.6	41.4	44.3
50	23.1	25.4	30.2	32.8	35.5	41.1	44.1	47.2
60	24.4	26.8	31.8	34.5	37.4	43.3	46.5	49.7

For SI: 1 foot = 304.8 mm, 1ft-lb = 1.356 N.m, 1 mph = 1.61 km/h.

¹The required aerodynamic wind uplift moments in Table 4 are based on an Importance Factor of 1.00 and a Tile Factor of 1.525 ft³ (0.0267 m³). The Tile Factor has been determined from a multiplication of the exposed width of the roof tile, the length of the roof tile and the moment arm of the roof tile. In this case, the exposed width and the length of the tile are 12 inches (305 mm) and 17 inches (432 mm), respectively.

TABLE 5—ALLOWABLE AERODYNAMIC UPLIFT MOMENT (ft-lb)

Tile designation: Capri, Vanguard Roll and Villa (Medium Profiles)			
Fasteners	¹⁵ / ₃₂ " Plywood Sheathing	⁵ / ₈ " Plywood Sheathing	Batten Installation ¹
2-10d ring shank nails	36.1	45.5	36.4
1-#8 screw	33.3	33.3	30.1
2-#8 screws	55.5	55.5	41.9
1-10d smooth or screw shank nails	12.9	15.2	8.7
2-10d smooth or screw shank nails	19.1	23.5	11.9
1-10 smooth or screw shank nails—field clip	30.5	30.5	29.6
1-10d smooth or screw shank nails—eave clip	25.2	25.2	27.5
2-10d smooth or screw shank nails—field clip	41.7	41.7	40.2
2-10d smooth or screw shank nails—eave clip	38.1	38.1	37.6
Tile designation: Espana, Mission S, and Spanish "S" (High Profiles)			
2-10d ring shank nails	28.6	41.2	26.8
1-#8 screw	28.7	28.7	25.5
2-#8 screws	51.3	51.3	37.1
1-10d smooth or screw shank nails	11.3	13.0	8.2
2-10d smooth or screw shank nails	13.1	15.4	12.7
1-10 smooth or screw shank nails—field clip	29.3	29.3	24.4
1-10d smooth or screw shank nails—eave clip	35.5	35.5	29.4
2-10d smooth or screw shank nails—field clip	33.8	33.8	44.0
2-10d smooth or screw shank nail—eave clip	44.3	44.3	47.2
Tile designation: Atlantis, Classic 100, and Saxony (Katy, Texas, and Lake Wales, Florida) (Low Profiles)			
2-10d ring shank nails	39.1	46.4	24.6
1-#8 screw	39.1	39.1	25.6
2-#8 screws	50.1	50.2	36.1
1-10d smooth or screw shank nails	13.5	16.0	10.1
2-10d smooth or screw shank nails	20.2	25.0	12.8
1-10 smooth or screw shank nails—field clip	30.5	30.5	29.6
1-10d smooth or screw shank nails—eave clip	25.2	25.2	27.5
2-10d smooth or screw shank nails—field clip	41.7	41.7	40.2
2-10d smooth or screw shank nails—eave clip	38.1	38.1	37.6
Tile designation: Cedarlite (Low Profile)			
1-#8 screw	19.8	N/A	N/A
2-#8 screws	30.8	N/A	N/A
Tile designation: Saxony (Lathrop and Stockton, California) (Low Profile)			
2 roofing nails	21.8	N/A	N/A

For SI: 1 inch = 25.4 mm, 1ft-lb = 1.356 N.m.

¹The allowable values noted in this column are applicable to Atlantis, Capri, Classic 100, Mission S, Saxony, Vanguard Roll and Villa tiles installed with battens. The values in the column are not applicable to Espana and Spanish "S" tiles.

General notes for Table 5:

- Except for the Cedarlite, Madera and Madera 700 tiles, the hole marked "B" in Figure 1 must be used when a single nail or screw is required. For the Cedarlite, Madera and Madera 700 tiles, the hole marked "C" in Figure 1 must be used when a single nail or screw is required. For all roof tiles, the holes marked "A" and "B" in Figure 1 must be used when two nails or screws are required.
- Ring shank must be 10d ring shank polymer coated galvanized steel nails [nominally 3 inches (76 mm) long, nominally ⁵/₁₆-inch-diameter (7.9 mm) flat heads, nominally 0.121-inch (3.07 mm) shank diameters, and nominally 0.131-inch (3.33 mm) ring diameters] located in holes at the head of tile as shown in Figure 1.
- No. 8 screws must be coarse-threaded and 2¹/₂-inch-long (63.5 mm) [2 inches (51 mm) long for use with Cedarlite tiles], plastic-coated, galvanized steel wood screws [square drive, flat countersunk head having a nominal diameter of 0.335 inch (8.51 mm), shank diameter of 0.131 inch (3.33 mm) and a screw thread diameter of 0.175 inch (4.45 mm)] located in holes at the head of tiles as shown in Figure 1.
- Smooth or screw shank nails must be 10d galvanized (mechanically plated complying with ASTM A 641, Class I) steel [nominally 3-inch-long (76 mm), nominally ⁵/₁₆-inch-diameter-flat-head (7.9 mm), nominally 0.128-inch (3.25 mm) screws or screws with 0.131-inch (3.33 mm) smooth shank diameter] located in holes at the head of tiles as shown in Figure 1.
- When using eave and field clips, attachment of the tiles must be accomplished by a combination of nails and clips. Tiles must be nailed to the sheathing or battens with one or two 10d galvanized nails (conforming to the requirements noted in Note 4 above) as indicated in the table. Additionally, each tile must be secured with a 0.060-inch-thick (1.52 mm) and 0.5-inch-wide (12.7 mm) clip which is secured to plywood sheathing or eave fascia, as appropriate, with a single nail per clip. For clips having more than one nail hole, place nail in the innermost nail hole (the one closest to the upright of the clip). The following clip/nail combinations must be permitted:
 - Aluminum alloy clip with 1.25-inch (31.75 mm) HD galvanized roofing nail [0.128-inch (3.25 mm) shank diameter].
 - Galvanized steel deck clip with 1.25-inch HD galvanized roofing nail [0.128-inch (3.25 mm) shank diameter].
 - Stainless steel clip with 1.25-inch HD galvanized roofing nail [0.128-inch (3.25 mm) shank diameter].
- On field clips, the clip position is appropriate for a tile head lap of 3 inches.
- For eave clips, the clip position is appropriate for a ³/₄- (19.05 mm) to 2-inch (51 mm) overhang at the eaves.
- Corrosion-resistant roofing nails must have 0.124-inch (3.15 mm) shank diameters, 2¹/₂-inch (63.5 mm) length, and 0.395-inch (10.03 mm) head diameters.
- N/A - Not applicable.

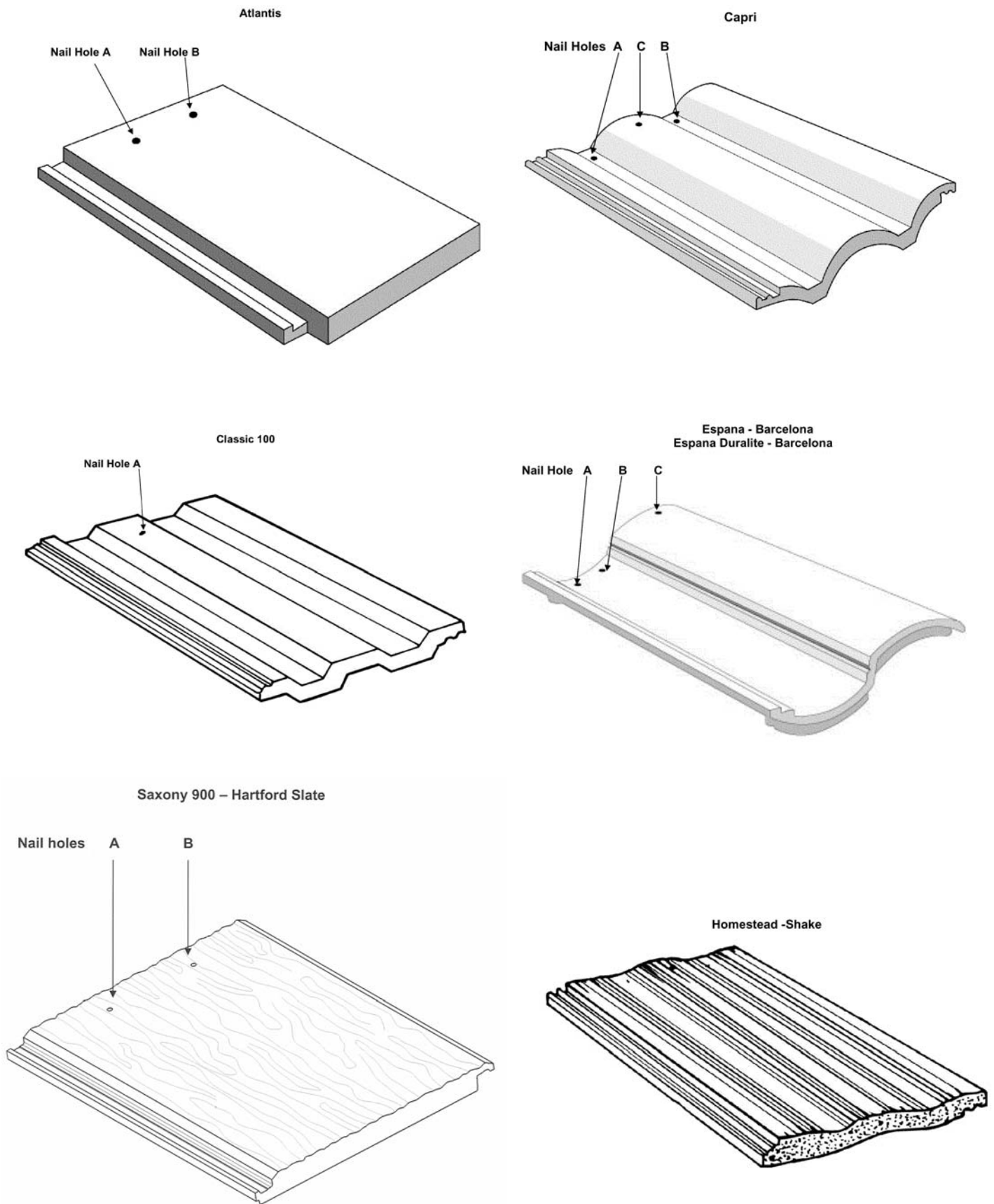


FIGURE 1—TILE ILLUSTRATIONS

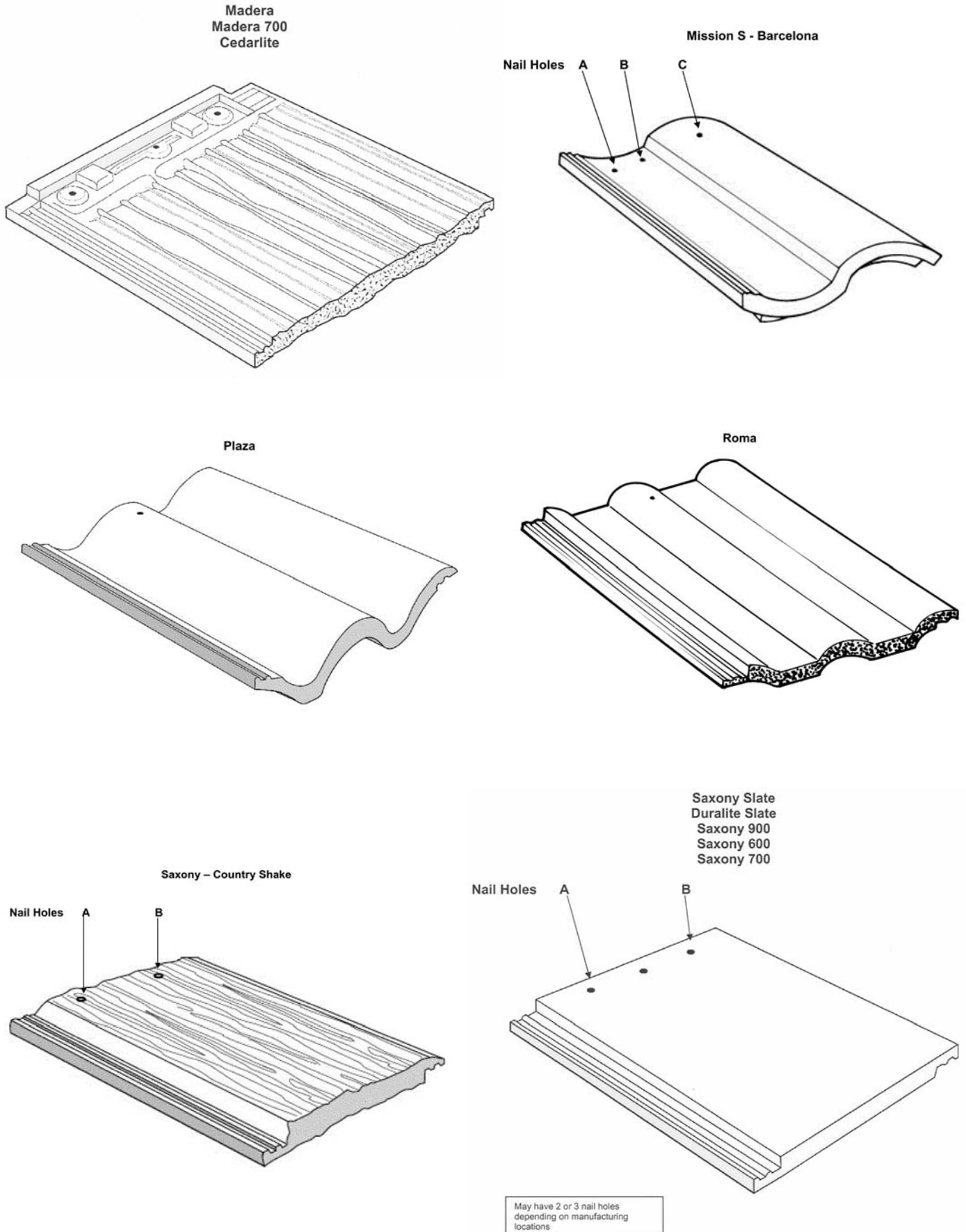
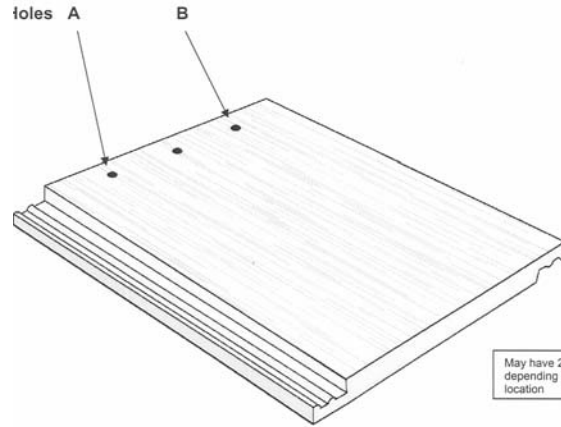
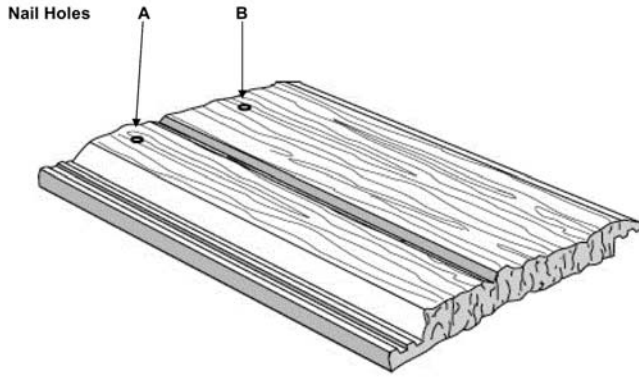


FIGURE 1—TILE ILLUSTRATIONS (Continued)

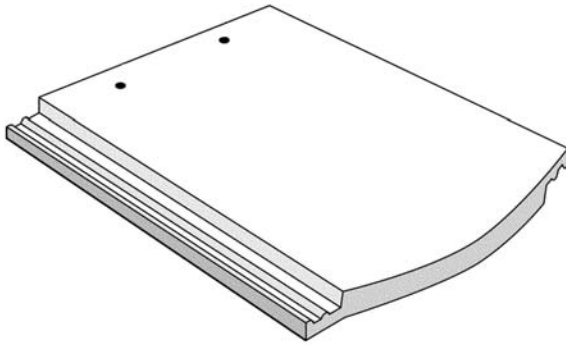
Saxony – Shake
Duralite Shake
Saxony 900
Saxony 600
Saxony 700

Saxony - English Thatch

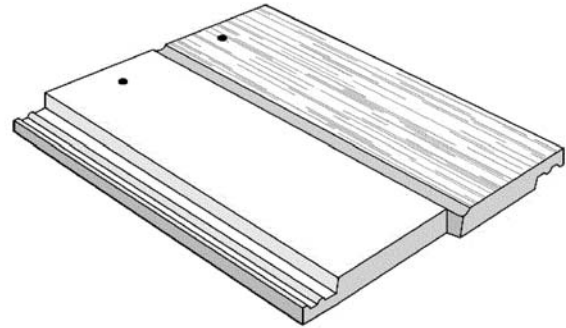


May have 2 or 3 nail holes depending on manufacturing location

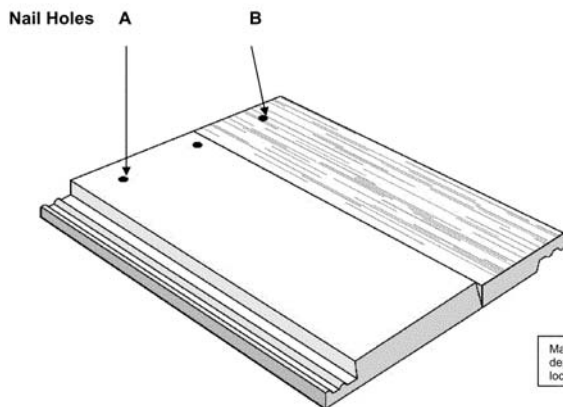
Saxony – Slate Vermont



Saxony Split Old English Thatch

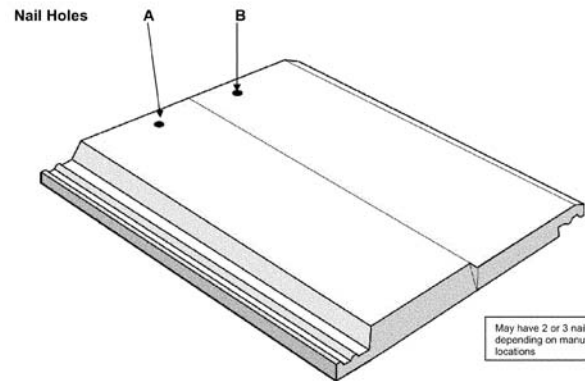


Saxony – Split Shake



May have 2 or 3 nail holes depending on manufacturing location

Saxony – Split Slate



May have 2 or 3 nail holes depending on manufacturing locations

FIGURE 1—TILE ILLUSTRATIONS (Continued)

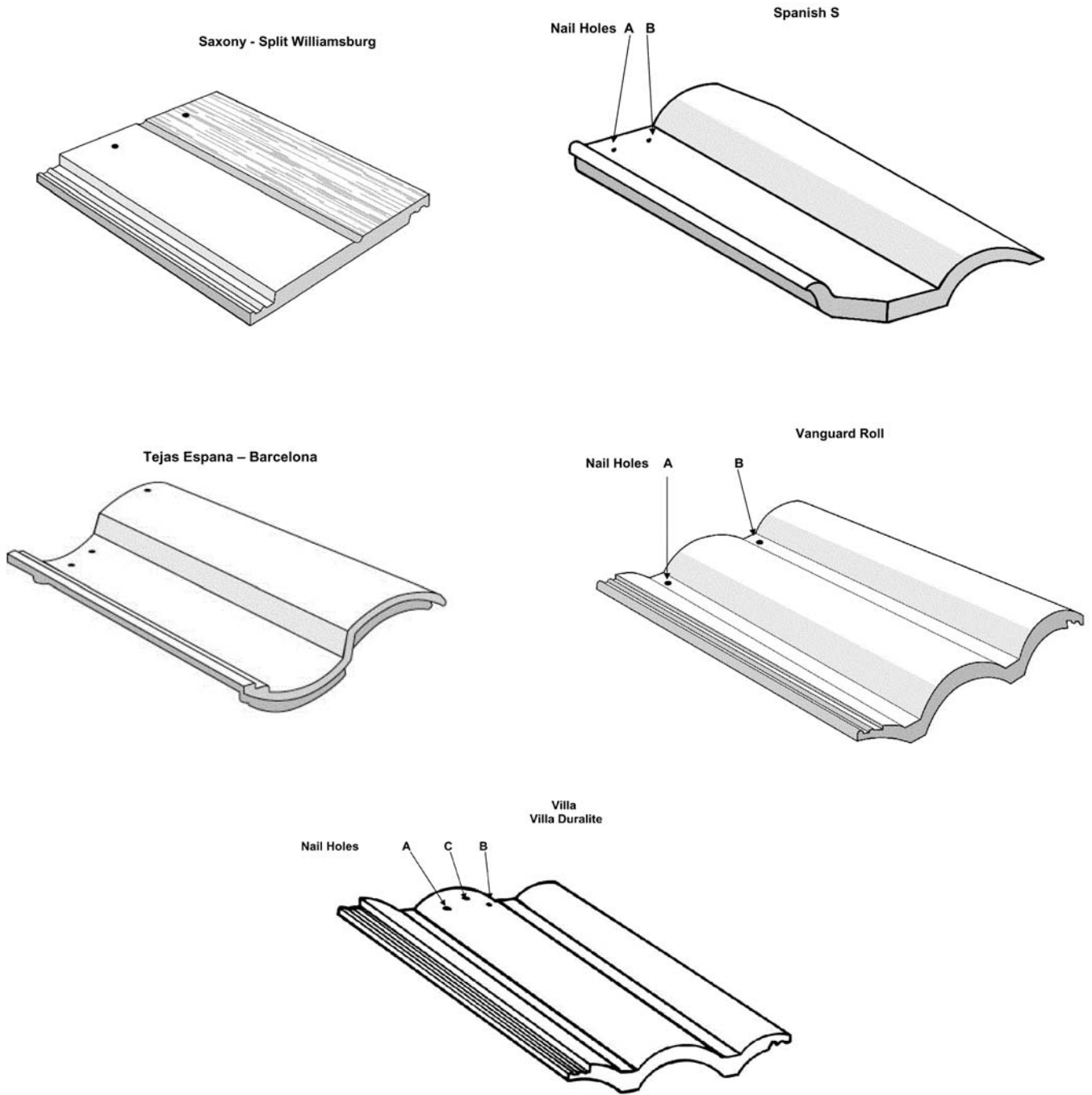


FIGURE 1—TILE ILLUSTRATIONS (Continued)



FIGURE 2—MONIERLIFETILE LOGO

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Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07320—Roof Tiles

REPORT HOLDER:

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EVALUATION SUBJECT:

EXTRUDED INTERLOCKING CONCRETE ROOF TILES: STANDARD WEIGHT TILES: ATLANTIS, BARCELONA 900, CAPRI, CLASSIC 100, ESPANA, HOMESTEAD, MADERA, MISSION S, OLD ENGLISH THATCH 900, PLAZA, ROMA, SAXONY, SAXONY GALAXY, SAXONY ROBUST, SAXONY 900, TEJAS ESPANA, VANGUARD ROLL, VILLA, AND VILLA 900

MID-WEIGHT TILES: MADERA 700 AND SAXONY 700

LIGHTWEIGHT TILES: CEDARLITE, ESPANA DURALITE, SAXONY 600, SAXONY DURALITE AND VILLA DURALITE

EXTRUDED CONCRETE ROOF TILES: SPANISH “S”

PURPOSE OF THIS SUPPLEMENT

This supplement is issued to indicate that the Extruded Interlocking Concrete Roof Tiles and Extruded Concrete Roof Tiles described in the master report ESR-1647 comply with the 2004 *Florida Building Code—Building*, when installation is in accordance with the master report.

Use of the roof tiles in High Velocity Hurricane Zones has not been evaluated, and is outside the scope of the supplement.

This supplement expires concurrently with the master report reissued on November 1, 2007.