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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 41 00—ROOF PANELS

REPORT HOLDER:

ONDULINE NORTH AMERICA, INC.

**4900 ONDURA DRIVE
FREDERICKSBURG, VIRGINIA 22407**

EVALUATION SUBJECT:

ONDURA® CORRUGATED ASPHALT ROOFING SHEET AND ONDURA® CORRUGATED ASPHALT ROOFING TILE; ONDUVILLA® AND ONDUVILLA® FR CORRUGATED ASPHALT ROOFING TILES



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**DIVISION: 07 00 00—THERMAL AND MOISTURE
PROTECTION**
Section: 07 41 00—Roof Panels
REPORT HOLDER:

ONDULINE NORTH AMERICA, INC.
 4900 ONDURA DRIVE
 FREDERICKSBURG, VIRGINIA 22407
 (800) 777-7663
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EVALUATION SUBJECT:
**ONDURA® CORRUGATED ASPHALT ROOFING SHEET
AND ONDURA® CORRUGATED ASPHALT ROOFING
TILE; ONDUVILLA® AND ONDUVILLA® FR
CORRUGATED ASPHALT ROOFING TILES**
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Weather protection
- Wind resistance
- Durability
- Fire classification

2.0 USES

Ondura® Corrugated Asphalt Roofing Sheet, Ondura® Corrugated Asphalt Roofing Tile and Onduvilla Corrugated Asphalt Roofing Tile are used as roof covering materials and are recognized as Class C roof coverings when installed in accordance with Section 4.2 of this report. Onduvilla FR Corrugated Asphalt Roofing Tile is used as a roof covering material and is recognized as a Class A roof covering when installed in accordance with Section 4.2.2 of this report.

3.0 DESCRIPTION
3.1 Ondura® Corrugated Asphalt Roofing Sheet:

A corrugated asphalt roofing sheet consisting of corrugated sheeting made from processed mineral and organic fibers

and impregnated with bitumen (asphalt). The sheets are nominally 48 inches wide by 78³/₄ inches long by 0.123 inch thick (1219 by 2000 by 3.1 mm) and have a nominal finished weight of 0.68 pound per square foot (3.32 kg/m²). The sheets have 1³/₈-inch-deep (35 mm) corrugations spaced at 4 inches (102 mm) on center, continuous along the length. The exposed surface is factory-finished with a paint surface coating in one of eight colors - white, tan, blue, black, brown, gray, red or green.

3.2 Ondura® Corrugated Asphalt Roofing Tile:

A corrugated asphalt roofing tile that is identical to the sheet described in Section 3.1, with the exception that the tiles are 19³/₄ inches long (502 mm).

3.3 Onduvilla® Corrugated Asphalt Roofing Tile:

A corrugated asphalt roofing tile consisting of corrugated tile made from processed mineral and organic fibers and impregnated with bitumen (asphalt). The tiles are nominally 42 inches wide by 15³/₄ inches long by 0.113 inch thick (1067 by 400 by 2.9 mm) and have a nominal finished weight of 0.60 pound per square ft (2.93 kg/m²). The tiles have 1¹/₂-inch-deep (38 mm) corrugations spaced at 7¹/₂ inches on center. The exposed surface is factory-finished with a paint surface coating in one of four colors - black, brown, red or green.

3.4 Onduvilla® FR Corrugated Asphalt Roofing Tile:

A corrugated asphalt roofing tile that is identical in formulation, dimensions and weight to the Onduvilla® Corrugated Asphalt Roofing Tile with the exception of a secondary fire-retardant coating applied to the top surface of the tile.

3.5 Ondura® Nails and Onduvilla® Screws (Supplied by Onduline North America Inc.):

The Ondura® nails used for installation of the Ondura® sheets and tiles are hot-dip galvanized, ring-shank nails, fabricated from ASTM A510, Grade 1008 - 1040 steel wire. The 3-inch-long (76.2 mm) nails have a nominal 0.148-inch (3.8 mm) shank diameter and a ⁷/₁₆-inch (11.1 mm) head diameter. The nails have a 0.119-inch-thick-by-0.6-inch-diameter (3.0 by 15.2 mm) EPDM rubber washer attached below the nail head allowing for a minimum ³/₄-inch penetration into or through the sheathing, whichever is less.

The Onduvilla screws used for the installation of the Onduvilla® and Onduvilla FR tiles are zinc electroplated screws fabricated from ASTM A510, Grade C1016 – C1022 steel wire, measuring approximately 2³/₄ inch (70 mm) long by nominal 0.157-inch (4 mm) diameter with a 0.39-inch (10 mm) diameter Philips oval head and a

0.63-inch-diameter (16 mm) EPDM washer allowing for a minimum $\frac{3}{4}$ -inch penetration into or through the sheathing, whichever is less.

3.6 Ridge Caps:

A wide ridge cap and a narrow ridge cap are manufactured from the same material as the sheet and tile, without the corrugations. Both ridge caps are $78\frac{3}{4}$ inches long (2000 mm), with the wide ridge cap having a width of 19 inches (483 mm) and the narrow ridge cap having a width of $12\frac{1}{2}$ inches (318 mm).

A Slim Ridge Cap is manufactured from the same material as the sheet and tile, without corrugations. The Slim Ridge Cap is $41\frac{1}{2}$ inches long (1054 mm) and $12\frac{1}{2}$ inches wide (318 mm).

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the corrugated asphalt roofing sheets and tiles must comply with this report, the manufacturer's published installation instructions and the applicable code. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

The sheets and tiles must be installed over solid or closely fitted, minimum $\frac{15}{32}$ -inch-thick (11.9 mm) exterior grade plywood complying with U.S. DOC PS-1 or PS-2, or $\frac{7}{16}$ -inch-thick (11.1 mm) OSB sheathing complying with U.S. DOC PS-2. Unless noted otherwise, sheathing must be covered with a minimum of one layer of asphalt-saturated felt underlayment complying with ASTM D226, Type II (No. 30).

In areas where there has been a history of ice forming along the eaves, causing a backup of water, an ice barrier must be provided in accordance with IBC Section 1507.5.4 or IRC Section R905.4.3.1. The ice barrier must extend from the eave to a distance of at least 24 inches (610 mm) inside the exterior wall line of the building.

Ridge caps, hip covers and valley flashing must be installed in accordance with the manufacturer's published installation instructions. Other flashing must be installed in accordance with IBC Section 1503.2 and IRC Section R903.2.

4.1.1 Ondura® Corrugated Asphalt Roofing Sheet: The roofing sheets must be installed on roofs with a minimum slope of 3:12 (25 percent), with a minimum side lap of one corrugation and a minimum end (head) lap of 7 inches (178 mm). Starting at the eave, the sheets are fastened at the corrugation crowns through the underlayment to the roof sheathing with the Ondura® nails described in Section 3.5. The fasteners must be of sufficient length to penetrate a minimum of $\frac{3}{4}$ inch (19 mm) into the sheathing or through the sheathing, whichever is less. See Figure 1 for nailing pattern and Table 1 for wind uplift resistance and nailing pattern.

4.1.2 Ondura® Corrugated Asphalt Roofing Tile: The roofing tiles must be installed on roofs with a minimum slope of 3:12 (25 percent), with a minimum side lap of one corrugation and a minimum end (head) lap of $5\frac{3}{4}$ inches (146 mm). Starting at the eave, the tiles are fastened through the underlayment to the roof sheathing with fasteners of sufficient length to penetrate a minimum of $\frac{3}{4}$ inch (19 mm) into the sheathing or through the sheathing, whichever is less. See Figures 2 and 3 for nailing pattern and Table 2 for wind uplift resistance and nailing pattern. Nails placed at tile crowns must be the Ondura® nails described in Section 3.5. Nails placed in the tile valleys at the underlaps, when required, must be

corrosion-resistant, ring-shank nails with a 0.125-inch (3.2 mm) shank diameter and a 0.410-inch (10.4 mm) head diameter.

4.1.3 Onduvilla® and Onduvilla® FR Corrugated Asphalt Roofing Tile: The roofing tiles must be installed on roofs with a minimum slope of 3:12 (25 percent) with a minimum side lap of one corrugation and a minimum end (head) lap must of $3\frac{1}{2}$ inches (89 mm). Starting at the eave, the tiles are fastened through the underlayment to the roof sheathing with fasteners of sufficient length to penetrate a minimum of $\frac{3}{4}$ inch (19 mm) into the sheathing or through the sheathing, whichever is less. See Figure 4 for nailing pattern and Table 2 for wind uplift resistance and nailing pattern. Screws placed at tile crowns must be the Onduvilla screws described in Section 3.5.

4.2 Roof Classification:

4.2.1 Ondura® Corrugated Asphalt Roofing Sheet, Ondura® Corrugated Asphalt Roofing Tile and Onduvilla® Corrugated Asphalt Roofing Tile (Class C): When installed in accordance with this report, roof covering systems consisting of either the Ondura® Corrugated Asphalt Roofing Sheet, Ondura® Corrugated Asphalt Roofing Tile or Onduvilla® Corrugated Asphalt Roofing Tile, and one layer of asphalt-saturated felt underlayment complying with ASTM D226, Type II (No. 30) and solid or closely fitted plywood or OSB sheathing, have a Class C roof classification in accordance with IBC Sections 1505.1 and 1505.4 or IRC Section R902.1.

4.2.2 Onduvilla® FR Corrugated Asphalt Roofing Tile (Class A): When installed in accordance with this report, roof covering systems consisting of the Onduvilla® FR Corrugated Asphalt Roofing Tile, one layer of asphalt-saturated felt underlayment complying with ASTM D226, Type II (No. 30), two layers of GAF VersaShield® Solo™ Fire-Resistant Slip Sheet and solid or closely fitted plywood or OSB sheathing with 3M Fire Barrier Sealant CP 25WB+ applied at all joints in the plywood or OSB sheathing, have a Class A roof classification in accordance with IBC Sections 1505.1 and 1505.2 or IRC Section R902.1.

4.3 Wind Uplift Resistance:

See Tables 1 and 2 for allowable wind uplift resistance and corresponding nailing patterns.

4.4 Reroofing:

Reroofing must comply with the requirements in Section 4.4.1 (Replacement) or Section 4.4.2 (Recovering), as applicable.

4.4.1 Replacement: Prior to application of the sheets or tiles, the existing roof covering and underlayment must be completely removed. Any damaged sheathing must be replaced. The sheets or tiles, and underlayment, must be installed as described in Section 4.1 of this report.

4.4.2 Recovering: The sheets or tiles may be installed over existing asphalt shingle roofs, provided the requirements of 2015 IBC Section 1511, 2012 or 2009 IBC Section 1510, 2015 IRC Section R908, 2012 or 2009 IRC Section R907, as applicable, are met. When installed over an existing asphalt shingle roof with either a Class A or Class C roof classification, the composite assembly is considered a Class C roof covering.

5.0 CONDITIONS OF USE

The corrugated asphalt roofing sheets and 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 roofing sheets and tiles must be installed in accordance with the manufacturer’s published installation instructions, this report and the applicable code. In the event of a conflict between the manufacturer’s installation instructions and this report, this report governs.
- 5.2 The Ondura® Corrugated Roofing Sheets, Ondura® Corrugated Roofing Tiles, and the Onduvilla Corrugated Roofing Tiles are limited to installation where a Class C roof covering classification or nonclassified roofing is permitted, when installed in accordance with this report.
- 5.3 The Onduvilla FR Corrugated Asphalt Roofing Tiles are recognized for installation where a Class A, B or C roof covering classification is permitted, when installed in accordance with Sections 4.1 and 4.2.1, or where nonclassified roofing is permitted when installed in accordance with Section 4.1.
- 5.4 Installation is limited to roofs with ventilated attics and/or ventilated rafter spaces in accordance with the requirements of the applicable code.
- 5.5 The Ondura® Corrugated Roofing Sheets and Tiles are manufactured in Fredericksburg, Virginia, under a quality control program with inspections by ICC-ES.

The Onduvilla Corrugated Asphalt Roofing Tiles are manufactured in Gallarta-Vizcaya, Spain under a quality control program with inspections by ICC-ES.

The Onduvilla FR Corrugated Asphalt Roofing Tiles are manufactured in Sapanca-Sakarya, Turkey, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Corrugated Asphalt Roofing Sheets and Tiles (AC330), dated April 2006 (editorially revised August 2015, previously editorially revised March 2014).
- 6.2 Reports of fire classification testing in accordance with ASTM E108.

7.0 IDENTIFICATION

The Ondura® Corrugated Asphalt Roofing Sheets and Ondura® Corrugated Asphalt Roofing Tiles described in this report are identified by a label on each sheet or tile bearing the report holder’s name (Onduline North America Inc.) and address and the Class C roof classification. The sheets and tiles are also packaged and identified with the report holder’s name (Onduline North America Inc.) and address, the product name, the manufacturing location (Fredericksburg, Virginia) and the evaluation report number (ESR-1957). Each pallet of sheets and tiles is identified with a metal tag including the date of production.

The Onduvilla® Corrugated Asphalt Roofing Tiles described in this report are packaged and identified with a barcode label on each tile bearing the report holder’s name (Onduline North America Inc.), the product name, the manufacturing location (Gallarta Vizcaya, Spain), the Class C roof classification and the evaluation report number (ESR-1957).

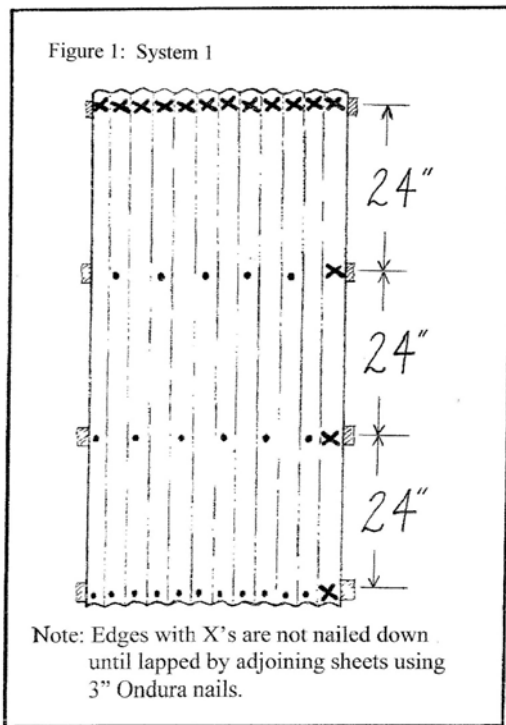
The Onduvilla® FR Corrugated Asphalt Roofing Tiles described in this report are packaged and identified with a barcode label on each tile bearing the report holder’s name (Onduline North America Inc.) and address, the product name, the manufacturing location (Sapanca-Sakarya, Turkey), the Class A roof classification and the evaluation report number (ESR-1957).

TABLE 1—MAXIMUM ALLOWABLE WIND DESIGN PRESSURE FOR ONDURA® SHEETS

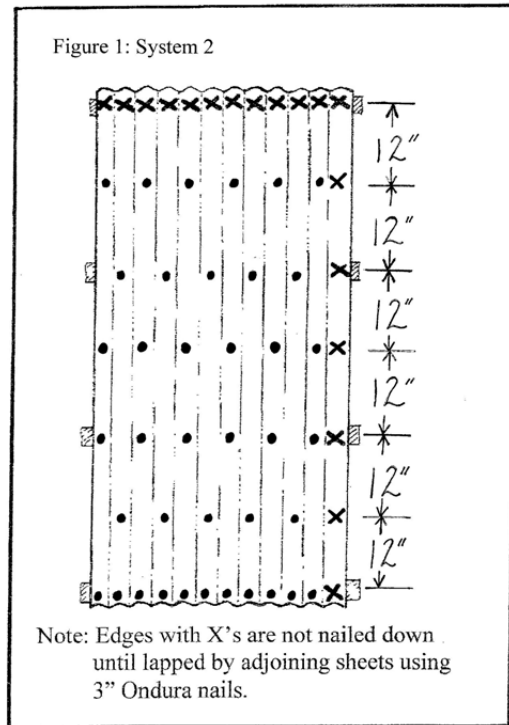
SYSTEM NUMBER	SUBSTRATE	NAILING PATTERN ¹		DESIGN WIND UPLIFT PRESSURE (psf)
		Starter Row, End (Head) Laps and End Row	Field of Sheet	
1	Min. 15/32-inch-thick exterior grade plywood or 7/16-inch-thick OSB	One at each corrugation crown	One at each crown, in rows 24 inches o.c.	30
2	Min. 15/32-inch-thick exterior grade plywood or 7/16-inch-thick OSB	One at each corrugation crown	One at each crown, in rows 12 inches o.c.	60

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

¹See Figure 1 for illustration.



SYSTEM 1



SYSTEM 2

For SI: 1 inch = 25.4 mm.

FIGURE 1—TYPICAL NAILING PATTERN FOR ONDURA® SHEETS (SEE TABLE 1)

TABLE 2—MAXIMUM ALLOWABLE WIND DESIGN PRESSURE FOR ONDURA®, ONDUVILLA® AND ONDUVILLA® FR TILES

SYSTEM NUMBER	PRODUCT	SUBSTRATE	NAILING PATTERN ¹		DESIGN WIND UPLIFT PRESSURE (psf)
			Starter Row and End Row	End (Head) Laps	
3	Ondura®	Min. ¹⁵ / ₃₂ -inch-thick exterior grade plywood or ⁷ / ₁₆ -inch OSB	One at each corrugation crown	One at each valley under lap, 4 ¹ / ₂ inches from end of tile; one at corrugation crowns marked X as shown in Figure 2	47
4	Ondura®	Min. ¹⁵ / ₃₂ -inch-thick exterior grade plywood or ⁷ / ₁₆ -inch OSB	One at each corrugation crown	One at each corrugation crown marked X as shown in Figure 3	54
5	Onduvilla®/Onduvilla® FR	Min. ¹⁵ / ₃₂ -inch-thick exterior grade plywood or ⁷ / ₁₆ -inch OSB	One at each corrugation crown	One at each corrugation crown marked X as shown in Figure 4	41

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

¹See Figure 2 for System No. 3, Figure 3 for System No. 4, and Figure 4 for System No. 5.

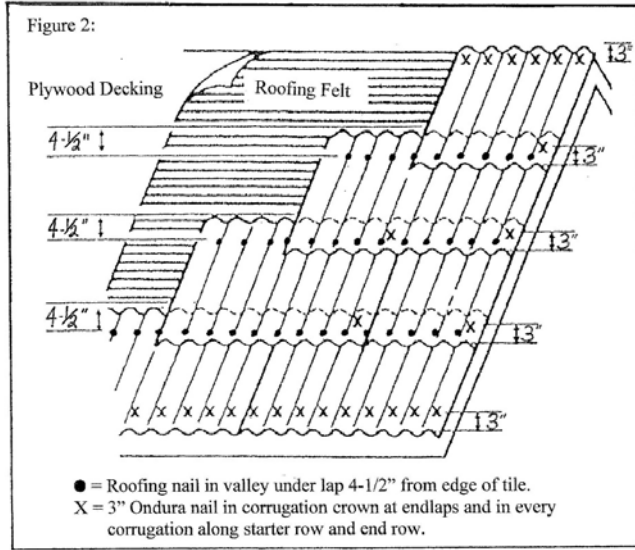


FIGURE 2—TYPICAL NAILING PATTERN FOR ONDURA® TILES (SEE SYSTEM NO. 3, TABLE 2)

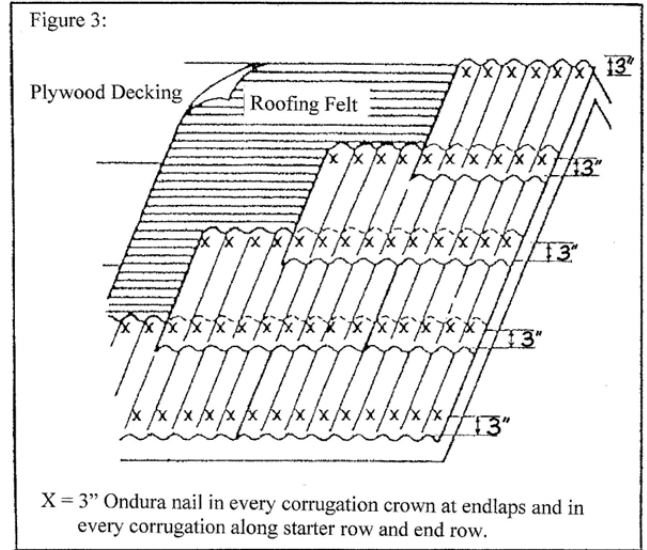


FIGURE 3—TYPICAL NAILING PATTERN FOR ONDURA® TILES (SEE SYSTEM NO. 4, TABLE 2)

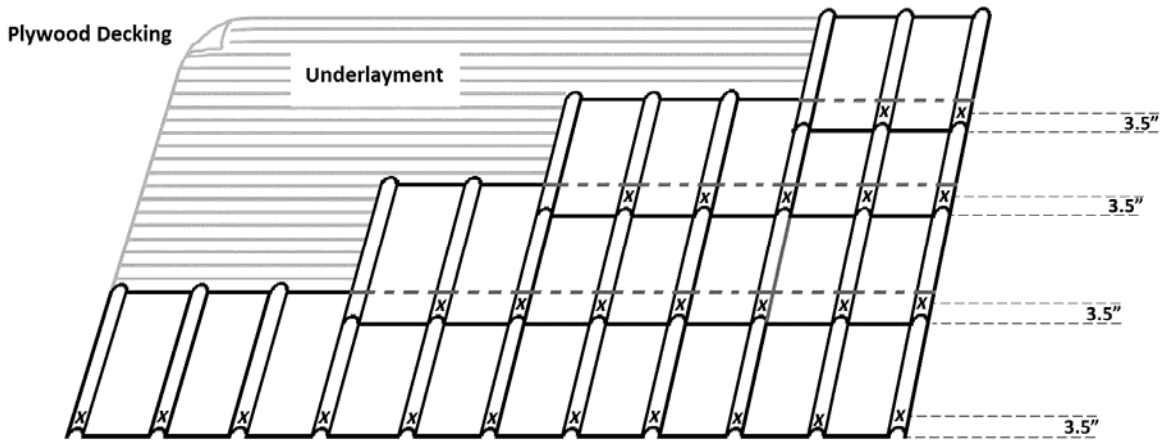


FIGURE 4—TYPICAL FASTENING PATTERN FOR ONDUVILLA® / ONDUVILLA® FR TILES (SEE SYSTEM NO.5, TABLE 2)

For SI: 1 inch = 25.4 mm.