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EVALUATION REPORT

Boral Roofing

7575 Irvine Center Drive

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Irvine, CA. 92618

Evaluation Report M35710.12.10-R8

FL14317-R7

Date of Issuance: 12/21/2010

Revision 8: 07/01/2015

SCOPE:

This Evaluation Report is issued under Rule 61G20-3 and the applicable rules and regulations governing the use of construction materials in the State of Florida. The documentation submitted has been reviewed by Robert Nieminen, P.E. for use of the product under the Florida Building Code and Florida Building Code, Residential Volume. The products described herein have been evaluated for compliance with the 5th Edition (2014) Florida Building Code sections noted herein.

DESCRIPTION: Boral Roof Underlayments

LABELING: Labeling shall be in accordance with the requirements the Accredited Quality Assurance Agency noted herein.

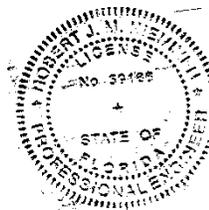
CONTINUED COMPLIANCE: This Evaluation Report is valid until such time as the named product(s) changes, the referenced Quality Assurance documentation changes, or provisions of the Code that relate to the product change. Acceptance of this Evaluation Report by the named client constitutes agreement to notify Robert Nieminen, P.E. if the product changes or the referenced Quality Assurance documentation changes. Trinity|ERD requires a complete review of this Evaluation Report relative to updated Code requirements with each Code Cycle.

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INSPECTION: Upon request, a copy of this entire Evaluation Report shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This Evaluation Report consists of pages 1 through 6.

Prepared by:



Robert J.M. Nieminen, P.E.

Florida Registration No. 59166, Florida DCA ANE1983

The facsimile seal appearing was authorized by Robert Nieminen, P.E. on 07/01/2015. This does not serve as an electronically signed document. Signed, sealed hardcopies have been transmitted to the Product Approval Administrator and to the named client

CERTIFICATION OF INDEPENDENCE:

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2. Trinity|ERD is not owned, operated or controlled by any company manufacturing or distributing products it evaluates.
3. Robert Nieminen, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the evaluation reports are being issued.
4. Robert Nieminen, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.
5. This is a building code evaluation. Neither Trinity|ERD nor Robert Nieminen, P.E. are, in any way, the Designer of Record for any project on which this Evaluation Report, or previous versions thereof, is/was used for permitting or design guidance unless retained specifically for that purpose.

ROOFING COMPONENT EVALUATION:

1. SCOPE:

Product Category: Roofing
Sub-Category: Underlayment

Compliance Statement: Boral Roof Underlayments, as marketed by Boral Roofing, have demonstrated compliance with the following sections of the Florida Building Code through testing in accordance with the following Standards. Compliance is subject to the Installation Requirements and Limitations / Conditions of Use set forth herein.

2. STANDARDS:

<u>Section</u>	<u>Property</u>	<u>Standard</u>	<u>Year</u>
1504.3.1	Wind Uplift	UL 1897	2004
1507.2.4, 1507.2.8, 1507.2.9.2, 1507.4.5.1, 1507.4.5.2, 1507.5.3, 1507.5.3.2, 1507.6.3, 1507.6.3.2, 1507.7.3, 1507.7.3.2	Physical Properties	ASTM D1970	2009
1507.3.3	Installation Practice	FRSA/TRI April 2012 (04-12)	2012
1523.6.5.2.1	Physical Properties	TAS 103	1995

3. REFERENCES:

<u>Entity</u>	<u>Examination</u>	<u>Reference</u>	<u>Date</u>
ERD (TST6049)	Wind Uplift	T6460.06.07-R1	10/09/2007
ERD (TST6049)	Physical Properties	T33190.08.10	08/06/2010
ERD (TST 6049)	Physical Properties	M33180.08.10	10/09/2010
ERD (TST6049)	Wind Uplift	T37610.07.11	07/29/2011
ERD (TST 6049)	Physical Properties	B40380.08.12	08/28/2012
ERD (TST 6049)	Physical Properties	C41420.09.12-2	09/11/2012
ERD (TST 6049)	Physical Properties	B41940.09.12	09/13/2012
ERD (TST 6049)	Physical Properties	B47390.07.14-1	07/31/2014
ERD (TST 6049)	Physical Properties	B47390.09.14	09/04/2014
PRI (TST 5878)	Physical Properties	NEI-006-02-01	04/01/2002
PRI (TST 5878)	Physical Properties	NEI-034-02-02	03/23/2006
PRI (TST 5878)	Physical Properties	NEI-045-02-01	08/08/2007
PRI (TST 5878)	Physical Properties	NEI-053-02-01	05/01/2008
PRI (TST 5878)	Physical Properties	NEI-070-02-01	08/12/2009
PRI (TST 5878)	Physical Properties	NEI-031-02-02:REV 10.27.10	10/27/2010
PRI (TST 5878)	Physical Properties	NEI-029-02-01REV: 11.03.10	12/03/2010
PRI (TST 5878)	Physical Properties	NEI-046-02-01REV	12/17/2010
PRI (TST 5878)	Physical Properties	NEI-034-02-02 / MLT-015-02-01	01/29/2013
PRI (TST 5878)	Wind Uplift	BORR-001-02-01	03/17/2015
PRI (TST 5878)	Wind Uplift	BORR-005-02-01	06/24/2015
UL, LLC. (QUA 9625)	Quality Assurance	Service Confirmation, R14610	Exp. 12/10/2017
UL, LLC. (QUA 9625)	Quality Assurance	Cross-Listing Confirmation, R16744	09/04/2013
UL, LLC. (QUA 9625)	Quality Assurance	Service Confirmation, R16744	Exp. 10/13/2017

4. PRODUCT DESCRIPTION:

4.1 **Self-Adhering Underlayments:**

- 4.1.1 **Boral TileSeal® 50^{HT}** is a nominal 50-mil thick, polyester-surfaced, self-adhering SBS modified bitumen roof underlayment.
- 4.1.2 **Boral TileSeal® HT** is a nominal 60-mil thick, polyester-surfaced, self-adhering SBS modified bitumen roof underlayment.
- 4.1.3 **GatorSeal®** is a nominal 55-mil thick, granular-surfaced, fiberglass reinforced, self-adhering SBS modified bitumen roof underlayment.
- 4.1.4 **StormSentry™** is a nominal 120-mil thick, mineral-surfaced, fiberglass reinforced, self-adhering SBS modified bitumen roof underlayment.
- 4.1.5 **Citadel® Plus** is a nominal 48-mil thick, fabric-surfaced, fiberglass reinforced, self-adhering SBS modified bitumen roofing underlayment for use as a base-layer in two-ply underlayment systems.

5. LIMITATIONS:

- 5.1 This is a building code evaluation. Neither Trinity|ERD nor Robert Nieminen, P.E. are, in any way, the Designer of Record for any project on which this Evaluation Report, or previous versions thereof, is/was used for permitting or design guidance unless retained specifically for that purpose.
- 5.2 This Evaluation Report is not for use in the HVHZ.
- 5.3 Fire Classification is not part of this Laboratory Report; refer to current Approved Roofing Materials Directory for fire ratings of this product.
- 5.4 Boral Roof Underlayments may be used with any prepared roof cover where the product is specifically referenced within FBC approval documents. If not listed, a request may be made to the AHJ for approval based on this evaluation combined with supporting data for the prepared roof covering.
- 5.5 Allowable roof covers applied atop Boral Roof Underlayments are follows. Table 1 pertains to use of each listed underlayment by-itself beneath the stated roof covers. Refer to the installation instructions and Table 2 for two-ply underlayment options.

TABLE 1: ROOF COVER OPTIONS						
Underlayment	Asphalt Shingles	Nail-On Tile	Foam-On Tile	Metal	Wood Shakes & Shingles	Slate
Boral TileSeal 50 ^{HT}	Yes	Yes (battens only)	No	Yes	Yes	Yes
Boral TileSeal ^{HT}	Yes	Yes	Yes (See 5.5.1)	Yes	Yes	Yes
GatorSeal	Yes	Yes (battens only)	No	No	Yes	Yes
StormSentry	Yes	Yes	No	No	Yes	Yes

- 5.5.1 “Foam-On Tile” is limited to use of the following unless tensile adhesion / long term aging data from an accredited testing laboratory is provided.

Underlayment	Tile Adhesives
Boral TileSeal ^{HT}	3M™ 2-Component Foam Roof Tile Adhesive AH-160 (FL6332) 3M™ Roof Tile Adhesive RTA-1 (FL6276) Dow TILE BOND™ Roof Tile Adhesive (FL717) Convenience Products’ Touch ‘n Seal StormBond Roof Tile Adhesive (FL14506)

- 5.6 Allowable Substrates:
- 5.6.1 Direct-Bond to Deck:
 - Citadel Plus, Boral TileSeal 50^{HT}, Boral TileSeal^{HT}, StormSentry or GatorSeal:
 - Plywood (unprimed or primed with ASTM D41 primer).
 - Boral TileSeal^{HT}:
 - OSB primed with ASTM D41 primer.
- 5.6.2 Wind Resistance of Underlayment Systems in Foam-On Tile Applications: FRSA/TRI April 2012 (04-12) does not address wind uplift resistance of all underlayment systems beneath foam-on tile systems, where the underlayment forms part of the load-path. The following wind uplift limitations apply to underlayment systems that are not prescriptively addressed in FRSA/TRI April 2012 (04-12) and are used in foam-on tile applications. Maximum Design Pressure is the result of testing for wind load resistance based on allowable wind loads, and reflects the ultimate passing pressure divided by 2 (the 2 to 1 margin of safety per FBC 1504.9 has already been applied). Refer to FRSA/TRI April 2012 (04-12), Appendix A, Table 1A or FBC 1609 for determination of design wind loads.
- 5.6.2.1 Maximum Design Pressure = -105 psf.
 - Deck: Min. 15/32-inch plywood to meet project requirements to satisfaction of Authority Having Jurisdiction.
 - Base Ply: (Optional) Citadel Plus, self-adhered
 - Underlayment: Boral TileSeal^{HT}, self-adhered and back-nailed within the selvedge-edge side laps using 12 ga. x 1¼” ring shank nails through 32 ga., 1-5/8” diameter tin caps spaced 12-inch o.c.

5.6.2.2 Maximum Design Pressure = -202.5 psf.

- Deck: Min. 15/32-inch plywood to meet project requirements to satisfaction of Authority Having Jurisdiction.
 Primer: ASTM D41 to the plywood deck
 Base Ply: (Optional) Citadel Plus, self-adhered
 Underlayment: Boral TileSeal^{HT}, self-adhered, and back-nailed within the selvedge-edge side laps using 12 ga. x 1¼" ring shank nails through 32 ga., 1-5/8" diameter tin caps spaced 12-inch o.c.

5.6.3 Bond to Base Layer Underlayment:

- Citadel Plus, Boral TileSeal 50^{HT}, Boral TileSeal^{HT} or GatorSeal:
 ➤ ASTM D226, Type II felt; Citadel Plus.
 StormSentry:
 ➤ ASTM D226, Type II felt; Citadel Plus.

For installations under mechanically attached prepared roof coverings, base layer shall be attached per minimum codified requirements. For installations under foam-on tile systems, base layer shall be attached per minimum requirements of FRSA/TRI April 2012 (04-12), Appendix A, Table 1 or as tested in accordance with FBC Section 1504.3.1.

5.6.4 Bond to Other Substrate Types:

- Citadel Plus, Boral TileSeal 50^{HT}, Boral TileSeal^{HT}, StormSentry or GatorSeal:
 ➤ ASTM D41 primed metal (e.g., flashing metal, valley metal, etc).
 Boral TileSeal^{HT}:
 ➤ Huber Zip Deck (unprimed or primed with ASTM D41 primer); Dens Deck Prime.

Note: For installation under mechanically attached prepared roof coverings, insulation shall be attached per minimum requirements of the prepared roof covering manufacturer's Product Approval.

5.7 Exposure Limitations:

- 5.7.1 GatorSeal shall not be left exposed for longer than 30-days after installation, prior to placement of final roof cover.
 5.7.2 StormSentry shall not be left exposed for longer than 90-days after installation, prior to placement of final roof cover.
 5.7.3 Alcazar, Boral TileSeal 50^{HT} and Boral TileSeal^{HT} shall not be left exposed for longer than 180-days after installation, prior to placement of final roof cover.
 5.7.4 Citadel Plus, for use as a base-layer in a two-ply underlayment system, shall not be left exposed for longer than 180-days after installation, prior to placement of subsequent underlayment layer.

6. INSTALLATION:

- 6.1 Boral Roof Underlayments shall be installed in accordance with Boral Roofing published installation instructions subject to the Limitations set forth in Section 5 herein and the specifics noted below.
 6.2 Re-fasten any loose decking panels, and check for protruding nail heads. Sweep the substrate thoroughly to remove any dust and debris prior to application, and prime the substrate (if applicable).
 6.3 Install self-adhering underlayment when ambient and surface temperatures are minimum 40°F and rising.

6.4 Citadel Plus:

- 6.4.1 Citadel Plus is limited to use as a base or mid-layer in multi-ply underlayment systems beneath Boral TileSeal 50^{HT}, Boral TileSeal^{HT}, GatorSeal or StormSentry.
 6.4.2 Slope limitations are those associated with the top-layer underlayment.
 6.4.3 Direct to Deck:

Cut the membrane into manageable lengths, typically 10 to 12 ft. Align the membrane parallel to the roof edge, extending over by ¼-inch. Fold the membrane away from the edge onto itself. Remove the release sheet. Place the membrane with the exposed rubberized asphalt onto the deck, pressing firmly into place. Roll into place with a weighted roller.

Boral recommends fastening of the top edge of the sheet to the deck with roofing nails, nails & tin-tags or 1-inch diameter plastic or steel cap nails spaced 24-inch o.c. for slopes below 7:12 and 12-inch o.c. for slopes 7:12 and greater. Overlap successive courses minimum 2 inches (horizontal lap) and minimum 4" end (vertical) laps.

Install final underlayment layer atop Citadel Plus per 'direct-to-deck' instructions for Boral TileSeal 50^{HT}, Boral TileSeal^{HT}, GatorSeal or StormSentry.

- 6.4.4 **To Base Sheet:**
Install ASTM D226, Type II felt in accordance with Code requirements or install Citadel Plus in accordance with Boral Roofing published installation instructions and Section 6.4.3 and when used as part of a multi-ply system.
Install Citadel Plus as a mid-ply in accordance with Boral Roofing published installation instructions and Section 6.4.3.
Install final underlayment layer atop Citadel Plus per 'direct-to-deck' instructions for Boral TileSeal 50^{HT}, Boral TileSeal^{HT}, GatorSeal or StormSentry.
- 6.5 Boral TileSeal 50^{HT}:**
- 6.5.1 Install Boral TileSeal 50^{HT} in compliance with manufacturer's published installation instructions and the requirements for ASTM D1970 underlayments in FBC Sections 1507 for the type of prepared roof covering to be installed.
- 6.5.2 Do not use Boral TileSeal 50^{HT} on roof pitches less than 2:12.
- 6.5.3 **Non-Tile Applications, Direct to Deck:**
Cut the membrane into manageable lengths, typically 10 to 12 ft. Align the membrane parallel to the roof edge, extending over by ¼-inch. Fold the membrane away from the edge onto itself. Remove the release sheet. Place the membrane with the exposed rubberized asphalt onto the deck, pressing firmly into place. Roll into place with a weighted roller.
Boral recommends fastening of the black selvedge edge to the deck with roofing nails, nails & tin-tags or 1-inch diameter plastic or steel cap nails spaced 24-inch o.c. for slopes below 7:12 and 12-inch o.c. for slopes 7:12 and greater. Overlap successive courses the width of the black-selvedge area, minimum 3-inch.
Seal under end (vertical) laps using approved mastic, or use Joined and Folded Seam or Inverted Sheet Seam method detailed in Boral Roofing published installation instructions.
- 6.5.4 **Non-Tile Applications, to Base Sheet:**
Install ASTM D226, Type II felt in accordance with Code requirements.
Install Boral TileSeal 50^{HT} in accordance with Boral Roofing published installation instructions and Section 6.5.3, except end (vertical) laps, described below.
Apply SBS Mastic under all end (vertical) laps or any other laps where the self-adhering bituminous underside is in contact with the fabric top surface, rolling the interface into place with a weighted roller.
- 6.5.5 **Tile Applications:**
Reference is made to FRSA/TRI April 2012 (04-12) Installation Manual and Table 1 herein, using the instructions noted above as a guideline. Tile shall be loaded and staged in a manner that prevents tile slippage and/or damage to the underlayment.
Battens must be used for all tile installations atop Boral TileSeal 50^{HT}. Boral Roofing's Elevated Batten System™ or counter battens are required for roof pitches of 2 ½:12 to less than 4:12.
- 6.6 GatorSeal and StormSentry:**
- 6.6.1 Install GatorSeal and StormSentry in compliance with manufacturer's published installation instructions and the requirements for ASTM D1970 underlayments in FBC Sections 1507 for the type of prepared roof covering to be installed.
- 6.6.2 Do not use GatorSeal on roof pitches less than 2:12. Do not use StormSentry on roof pitches less than ½:12 while ensuring there is no possibility for ponding water on the surface of StormSentry.
- 6.6.3 **Non-Tile applications, Direct to Deck:**
Cut the membrane into manageable lengths, typically 10 to 12 ft. Align the membrane parallel to the roof edge, extending over by ¼-inch. Fold the membrane away from the edge onto itself. Remove the release sheet. Place the membrane with the exposed rubberized asphalt onto the deck, pressing firmly into place. Roll into place with a weighted roller.
Boral recommends fastening of the black selvedge edge to the deck with roofing nails, nails & tin-tags or 1-inch diameter plastic or steel cap nails spaced 24-inch o.c. for slopes below 7:12 and 12-inch o.c. for slopes 7:12 and greater. Overlap successive courses the width of the black-selvedge area, minimum 3-inch.
Seal end (vertical) laps using SBS Mastic under all side (vertical) laps or any other laps where the self-adhering bituminous underside is in contact with the granular or mineral top surface, rolling the interface into place with a weighted roller, or using the Inverted Sheet Seam detailed in Boral Roofing published installation instructions.

- 6.6.4 Non-Tile Applications, to Base Sheet:
Install ASTM D226, Type II felt in accordance with Code requirements or install Citadel Plus in accordance with Boral Roofing published installation instructions and Section 6.4.
Install GatorSeal or StormSentry over ASTM D226, Type II felt or Citadel Plus in accordance with Boral Roofing published installation instructions and Section 6.6.3 except end (vertical) laps, described below.
Apply SBS Mastic under all side (vertical) laps or any other laps where the self-adhering bituminous underside is in contact with the granular top surface, rolling the interface into place with a weighted roller.
- 6.6.5 Tile Applications:
Reference is made to FRSA/TRI April 2012 (04-12) Installation Manual and Table 1 herein, using the instructions noted above as a guideline. Tile shall be loaded and staged in a manner that prevents tile slippage and/or damage to the underlayment.
Battens must be used for all tile installations atop GatorSeal.
- 6.7 Boral TileSeal^{HT}:**
- 6.7.1 Install Boral TileSeal^{HT} in compliance with manufacturer's published installation instructions and the requirements for ASTM D1970 underlayments in FBC Sections 1507 for the type of prepared roof covering to be installed.
- 6.7.2 Do not use Boral TileSeal^{HT} on roof pitches less than 2:12.
- 6.7.3 Non-Tile Applications, Direct to Deck:
For OSB substrate, prime with ASTM D41 primer and allow to dry prior to installation. Cut the membrane into manageable lengths, typically 10 to 12 ft. Align the membrane parallel to the roof edge, extending over by ¼-inch. Fold the membrane away from the edge onto itself. Remove the release sheet. Place the membrane with the exposed rubberized asphalt onto the deck, pressing firmly into place. Roll into place with a weighted roller.
Boral recommends fastening of the black selvedge edge to the deck with roofing nails, nails & tin-tags or 1-inch diameter plastic or steel cap nails spaced 24-inch o.c. for slopes below 7:12 and 12-inch o.c. for slopes 7:12 and greater. Overlap successive courses the width of the black-selvedge area, minimum 3-inch.
Seal under end (vertical) laps using approved mastic, or use Joined and Folded Seam or Inverted Sheet Seam method detailed in Boral Roofing published installation instructions.
- 6.7.4 Non-Tile Applications, to Base Sheet:
Install ASTM D226, Type II felt in accordance with Code requirements or install Citadel Plus in accordance with Boral Roofing published installation instructions and Section 6.4.
Install Boral TileSeal^{HT} in accordance with Boral Roofing published installation instructions and Section 6.7.3, except end (vertical) laps, described below.
Apply SBS Mastic under all end (vertical) laps or any other laps where the self-adhering bituminous underside is in contact with the fabric top surface, rolling the interface into place with a weighted roller.
- 6.7.5 Tile Applications:
Reference is made to FRSA/TRI April 2012 (04-12) Installation Manual and Table 1 herein, using the instructions noted above as a guideline. Tile shall be loaded and staged in a manner that prevents tile slippage and/or damage to the underlayment.
Battens must be used for all tile installations atop Boral TileSeal^{HT} with roof pitches of 2½ to less than 3:12. Boral Roofing's Elevated Batten System or counter battens are required.
Approved foam adhesive may be used for roof slopes 2:12 and greater.

7. BUILDING PERMIT REQUIREMENTS:

As required by the Building Official or Authority Having Jurisdiction in order to properly evaluate the installation of this product.

8. MANUFACTURING PLANTS:

Contact the manufacturer or the named QA entity for information on plants covered under Rule 61G20-3 QA requirements.

9. QUALITY ASSURANCE ENTITY:

UL, LLC. – QUA9625; (414) 248-6409; Karen.buchmann@us.ul.com

- END OF EVALUATION REPORT -