

UL Evaluation Report

UL ER7280-01

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DIVISION: 07 00 00 THERMAL AND MOISTURE PROTECTION
Sub-level 2: 07 50 00 Membrane Roofing
Sub-level 3: 07 57 00 Coated Foamed Roofing
Sub-level 4: 07 57 13 Sprayed Polyurethane Foam Roofing

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1. SUBJECT:

ENDURATECH PREMIER SPRAY-APPLIED FOAM ROOFING SYSTEM

2. SCOPE OF EVALUATION

- 2015 and 2012 *International Building Code*® (IBC)
- 2015 and 2012 *International Residential Code*® (IRC)
- ICC-ES Acceptance Criteria for Spray-Applied Foam Plastic Insulation (AC377), May 2015
- ICC-ES Acceptance Criteria for Quality Documentation (AC 10), June 2014



The products were evaluated for the following properties:

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- Roofing Systems for Exterior Fire Exposure (ANSI/UL 790, ASTM E108)
- Roofing Systems, Wind Uplift Resistance (ANSI/UL 1897)
- Roof Deck Construction Material With Resistance to Internal Fire Exposure (ANSI/UL1256)
- Physical Properties (AC 377, Table 1)
- Physical Properties (ASTM D6083, ASTM D6694)
- Impact Resistance (FM 4470)

3. REFERENCED DOCUMENTS

- **ICC-ES:**
 - ICC-ES Acceptance Criteria for Spray-Applied Foam Plastic Insulation (AC377), dated May 2015
 - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- **ANSI/UL:**
 - ANSI/UL723 Tenth Edition, (ASTM E84), Standard Test Method for Surface Burning Characteristics of Building Materials
 - ANSI/UL790 Eighth Edition, (ASTM E108), Standard Test Methods for Fire Tests of Roof Coverings
 - ANSI/UL1256, Fourth Edition, Standard for Fire Test of Roof Deck Constructions
 - ANSI/UL 1897, Seventh Edition, Tests for Uplift Resistance of Roof Assemblies
- **ASTM:**
 - ASTM C1029-13, *Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation*
 - ASTM D6083-05, *Standard Specification for Liquid Applied Acrylic Coating Used in Roofing*
 - ASTM D6694-15, *Standard Specification for Liquid-Applied Silicone Coating Used in Spray Polyurethane Foam Roofing Systems*
- **Factory Mutual:**
 - FM 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction

4. USES

The EnduraTech Premier Spray-Applied Foam Roofing System is used in Class A and Class B roof covering systems, in accordance with ANSI/UL 790 (ASTM E108, as required by [Section 1505.1](#) of the 2015 and 2012 IBC and [Section R902.1](#) of the 2015 and 2012 IRC. Roof coverings with an A or B classification are permitted systems on buildings of any type construction. These spray foams are used as nonstructural insulation foam in above roof deck assemblies which have slopes of 4:12 or less. Installation shall be in accordance with Section 6 of this report.

5. PRODUCT DESCRIPTION

The EnduraTech Premier Roofing System is comprised of two-component, spray-applied polyurethane foam plastic insulations with or without liquid-applied coatings as described in this report. The foam plastic consists of product names, NCFI 10-011 or NCFI 10-013, and is applied at a minimum density of 2.5 pcf (40 kg/m³).

The roofing assemblies incorporating the spray foams and coatings comply with the following performance criteria when installed as described in this report.

5.1 Roofing Assemblies

Exterior Fire Exposure

Roofing assemblies evaluated under this report have been tested for fire classification Class A or B in accordance with UL 790 (ASTM E108), as required by [Section 1505.1](#) of the 2015 and 2012 IBC and [Section R902.1](#) of the 2015 and 2012 IRC.

Wind Uplift Resistance

Roofing assemblies evaluated in this report have been tested for wind uplift resistance in accordance with ANSI/UL 1897, and therefore qualify for use under [Section 1504.3](#) of the 2015 and 2012 IBC. The roofing assemblies shall be designed to resist the design wind load pressures for components and cladding in accordance with [Section 1609](#) of the 2015 and 2012 IBC.

Impact Test

Roofing assemblies in this report have been evaluated for impact resistance in accordance with "Resistance to Foot Traffic Test" in Section 4.6 of FM 4470 and therefore qualify for use under [Section 1504.7](#) of the 2015 and 2012 IBC.

Internal Fire Exposure

Roofing Assemblies evaluated under this report have been found to comply with internal fire exposure in accordance with UL 1256 as required by [Section 1508.1](#) of the 2015 and 2012 IBC and [Section R906.1](#) of the 2015 and 2012 IRC. A thermal barrier is not required for foam plastic that is part of a Class A, B, or C roof-covering assembly as specified under [Section 2603.4.1.5](#) of the 2015, 2012 and 2006 IBC.

5.2 Assembly Components

Spray- Applied Polyurethane Foam (SPF):

Roofing SPF evaluated in this report has been tested for physical properties in accordance with AC377, Table 1 and as referenced in [Section 1507.14.2](#) of the 2015 and 2012 IBC, and [Section R905.14.2](#) of the IRC and ASTM C1029. Surface Burning Characteristics – The spray-applied foam has a flame-spread index of 75 or less. As indicated in [Section 2603.3](#), Exception 3, of the 2015 and 2012 IBC, and [Section R316.5.2](#) of the 2015 and 2012 IRC, the smoke-developed index shall not be limited.

Coatings:

The liquid applied coatings for use with the roofing assemblies covered under this report and noted in the table below comply with [Section 1507.14.3](#) of the 2015 and 2012 IBC and [Section R905.15.2](#) of the IRC.

Coating		ASTM Designation
Acrylic	ENDURATECH Q, ENDURATECH R, ENDURATECH HT	D6083
	EVERCOAT EC, EVERCOAT HT	
Silicone	ENDURIS 3400, ENDURIS 3500	D6694

6. INSTALLATION

6.1 General

The roofing systems described shall be installed in accordance with this report, the manufacturer's published installation instructions, and [Section 1507.14](#) of the 2015 and 2012 IBC or [Section R905.14](#) of the 2015 and 2012 IRC as applicable, except as noted in this report.

The manufacturer's published installation instructions shall be available at all times on the jobsite during installation.

The slope of the roof on which the coated foam plastics are installed shall be a minimum of $1/4:12$ (2% slope) and shall not be greater than the maximum slope indicated in Table 1, Table 2, Table 3.

6.2 Substrates:

Plywood substrates must be minimum $15/32$ in. thick (11.9 mm), code compliant exterior grade or Exposure 1 plywood. All ledges must be supported by blocking or have tongue-and-groove joints as required by [Section 2603.4.1.5](#) of the 2015 and 2012 IBC.

Steel substrates are to be minimum thickness of 22 gauge. All substrates must be free and clear of any oil, grease, wax, dirt, dust, or any other contaminant that will negatively affect the bonding of the spray foam.

The deck and supporting structure to which the EnduraTech Premier Roofing System is applied must be designed to withstand the applicable wind pressures determined in accordance with [Section 1609.1](#) of the 2015 and 2012 IBC.

6.3 Reroofing:

The existing roof shall be in accordance with the provisions and limitations of [Section 1511](#) of the 2015 IBC, [Section 1510](#) of the 2012 IBC or [Section R908](#) of the 2015 IRC, and [Section R907](#) of the 2012 IRC, as applicable. The structure of the existing deck to be reroofed shall be structurally sound and adequate to support and secure the roofing covering system. Roof covering systems employing mechanical fasteners shall be qualified, to the satisfaction of the code official, as to the adequacy of fasteners penetrating through existing roof coverings into structural substrates. Since the composition and/or condition of any particular underlying existing roofing materials may vary, the reroofing material may vary, and reroofing with adhered systems is outside the scope of this report.

EnduraTech Premier Roofing System may be installed over existing Classified Class A, or B roofing systems as described in the UL Product Certification Category for Roofing Materials (TGFU), File No R7280, under the heading of Spray-Applied and Coating Systems, in addition to those outlined in Tables 1-3.

7. CONDITIONS OF USE

NCFI Polyurethanes spray-applied polyurethane roofing systems described in this Report comply with, or are suitable alternatives to what is specified in those codes listed in Section 2 of this report, subject to the following conditions:

7.1 The installation and application of the coated foam plastic roof coverings shall comply with the code, the manufacturer's published installation instructions, and this report. In the event of a conflict between the installation instructions and this report, this report governs.

- 7.2 The spray foam systems shall be installed by authorized applicators approved by NCFI Polyurethanes.
- 7.3 Wind uplift pressures on any roof area, including edges and corner zones shall not exceed the allowable wind pressure for the roof covering installed in that particular area.
- 7.4 The allowable wind uplift pressures listed in Tables 1-3 are for the roof systems only. The deck and framing to which the roofing system is attached shall be designed for the applicable components and cladding, wind loads in accordance with the applicable code.
- 7.5 Application over an existing roof must be in accordance with Section 6.3.
- 7.6 Where moderate or heavy foot traffic occurs for maintenance of equipment, or is otherwise necessary, the roof covering must be adequately protected to prevent rupture or wearing of the surface.
- 7.7 Flashing must be installed at wall and roof intersections, and at gutters and around roof openings, as required by [Section 1503.2](#) of the 2015 and 2012 IBC.
- 7.8 NCFI 10-011 and NCFI 10-013 roofing spray foams are manufactured in Mount Airy, NC and Clearfield, UT under the UL LLC Classification and Follow-Up Service Program, which includes audits in accordance with quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC 10.

8. SUPPORTING EVIDENCE

- 8.1 Data in accordance with ICC-ES Acceptance Criteria for Spray-Applied Foam Plastic Insulation (AC377), dated May 2015
- 8.2 UL Classification reports in accordance with ANSI/UL 1897, ANSI/UL 790, and UL1256. See UL Product Certification Categories ([TGIK](#)), ([TGFU](#)), and ([TJBX](#)), respectively.
- 8.3 Data in accordance with ASTM E84, ASTM E 108, and FM 4470 Section 5.5.
- 8.4 Documentation of quality system elements described in ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- 8.5 Data in accordance with ASTM C1029, Standard Test Method for Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
- 8.6 Data in accordance with ASTM D6083, Standard Specification for Liquid Applied Acrylic Coating Used in Roofing
- 8.7 Data in accordance with ASTM D6694, Standard Specification for Liquid-applied Silicone Coating Used in Spray Polyurethane Foam Roofing

9. IDENTIFICATION

The roofing spray foams described in this evaluation report are identified by a marking bearing the report holder's name (NCFI Polyurethanes), the product designation, the UL Classification Mark, and the evaluation report number UL ER7280-01. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark Certificate.

10. USE OF UL EVALUATION REPORT

- 10.1** The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.
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- 10.3** The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our On-Line Certifications Directory at www.ul.com/erdirectory.

TABLE 1: NONCOMBUSTIBLE DECKS – NEW OR REROOF

System No.	Top Coat/Covering		Base Foam Thickness	Fire Rating
	Product Name	Application Rate		Maximum Incline (in.)
NCFI 10-011			UL 790 Class A	
1	Gravel or Crushed Stone	Minimum 600 lbs/100 sf	Minimum 2 inches ¹	1:12
2	EnduraTech Q ² or EnduraTech R ²	Two applications at 1.75 to 1.85 gal/100 sf	Any thickness	1:12
3	ENDURIS 3400 ²	Two applications at maximum 2 gal/100 sf each	Any thickness	1:12
4	EnduraTech Q or EnduraTech R	One application at maximum 3.7 gal/100 sf surfaced with No. 11 roofing granules 45 lbs/100 sf	Any thickness	4:12
NCFI 10-013			UL 790 Class A	
5	Gravel or Crushed Stone	Minimum 600 lbs/100 sf	Minimum 2 inches ¹	1:12
6	EnduraTech Q ² or EnduraTech R ²	Four applications at maximum 1 gal/100 sf surfaced with No. 11 roofing granules 30 lbs/100 sf	Any thickness	1- ¹ / ₄ :12
7	ENDURIS 3400 ²	Two applications at 2 gal/100 sf surfaced with No. 11 roofing granules 30 lbs/100 sf	Any thickness	1- ¹ / ₄ :12
8	EnduraTech Q ² , EnduraTech R ² , or EnduraTech HT ²	Maximum of 3.4 gal/100 sf total	Any thickness	¹ / ₄ :12
9	Evercoat EC ² or Evercoat HT ²	Maximum of 3.4 gal/100 sf total	Any thickness	¹ / ₄ :12
10	ENDURIS 3400 ²	1.5 – 3.25 gal/100 sf total	Any thickness	3:12
	ENDURIS 3500 ²	1 – 2.5 gal/100 sf total		
11	EnduraTech Q ³ , EnduraTech R ³ , or EnduraTech HT ³	3 - 5.3 gal/100 sf total	Any thickness	1- ¹ / ₂ :12
12	Evercoat EC ³ or Evercoat HT ³	3 – 5.1 gal/100 sf total	Any thickness	1- ¹ / ₂ :12

¹Optional base coat of UL Classified fibered asphalt coating applied over the foam at 1 to 3 gallons per 100 square feet

²Optional No. 11 granules applied at 30 pounds per 100 square feet

³Requires surfacing of No. 11 granules applied at 3 pounds per 100 square feet.

TABLE 1: NONCOMBUSTIBLE DECKS – NEW OR REROOF (continued)

System No.	Top Coat/Covering		Base Foam Thickness	Fire Rating
	Product Name	Application Rate		Maximum Incline (in.)
NCFI 10-013				UL 790 Class B
13	EnduraTech Q ¹ , EnduraTech R ¹ , or EnduraTech HT ¹	Maximum of 3.4 gal/100 sf total	Any thickness	1/2:12
14	Evercoat EC ¹ or Evercoat HT ¹	Maximum of 3.4 gal/100 sf total	Any thickness	1/2:12

¹Optional No. 11 granules applied at 30 pounds per 100 square feet

TABLE 2: COMBUSTIBLE DECKS¹ – NEW OR REROOF

System No.	Top Coat/Covering		Base Foam Thickness	Fire Rating
	Product Name	Application Rate		Maximum Incline (in.)
NCFI 10-011 or 10-013				UL 790 Class B
15	Gravel or Crushed Stone	Minimum 600 lbs/100 sf	Minimum 2 inches ²	1:12
16	EnduraTech Q ³ , EnduraTech R ³ , or EnduraTech HT ³	Maximum of 3.4 gal/100 sf total	Minimum 1-1/2 inches	1-1/2:12
17	Evercoat EC ³ or Evercoat HT ³	Maximum of 3.4 gal/100 sf total	Minimum 1-1/2 inches	1-1/2:12
18	ENDURIS 3400 ⁴	1.5 – 3.25 gal/100 sf total	Minimum 1-1/2 inches	1:12
	ENDURIS 3500 ⁴	1 – 2.5 gal/100 sf total		
19	EnduraTech Q ³ or EnduraTech R ³	One application at maximum 3.7 gal/100 sf	Minimum 1-1/2 inches	1/2:12

¹Minimum 15/32 inch thick plywood deck

²Base coat of Dead Level Fibrated Asphalt Roof Coating applied over the foam at 1 to 3 gallons per 100 square feet

³Requires surfacing of No. 11 granules applied at 45 pounds per 100 square feet.

⁴Requires surfacing of No. 11 granules applied at 30 pounds per 100 square feet.

TABLE 3: COMBUSTIBLE DECKS¹ –RECOVER

System No.	Existing Roof System	Top Coat/Covering		Base Foam Thickness	Fire Rating
		Product Name	Application Rate		Maximum Incline (in.)
NCFI 10-011 or 10-013					UL 790 Class B
20	Class A or Class B gravel or smooth surfaced BUR	EnduraTech Q ² or EnduraTech R ²	One application at maximum 3.7 gal/100	Minimum 1- ¹ / ₂ inches	¹ / ₂ :12
21		EnduraTech Q ² , EnduraTech R ² or EnduraTech HT ²	3 – 5.3 gal/100 sf total 3 – 5.1 gal/100 sf total	Minimum 1 inch	1:12
22		Evercoat EC ² or Evercoat HT ²	2 – 5.1 gal/100 sf total	Minimum 1 inch	1:12
23	Class A or Class B gravel or smooth surfaced BUR	ENDURIS 3400 ³	1.5 – 3.25 gal/100 sf total	Minimum 1 inch	1:12
		ENDURIS 3500 ³	1.5 – 2.5 gal/100 sf total		
24	Class A or Class B gravel or smooth surfaced BUR	Gravel or Crushed Stone	Minimum 600 lbs/100 sf	Minimum 2 inches ⁴	1:12

¹ Minimum ¹⁵/₃₂ inch thick plywood deck

² Requires surfacing of No. 11 granules applied at 45 pounds per 100 square feet.

³ Requires surfacing of No. 11 granules applied at 30 pounds per 100 square feet.

⁴ Optional base coat of UL Classified fibered asphalt coating applied over the foam at 1 to 3 gallons per 100 square feet

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