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# ICC-ES Evaluation Report

# ESR-2831

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Reissued 08/2018  
This report is subject to renewal 08/2019.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**  
**SECTION: 07 54 00—THERMOPLASTIC MEMBRANE ROOFING**  
**DIVISION: 07 54 23—THERMOPLASTIC-POLYOLEFIN ROOFING**

**REPORT HOLDER:**

**FIRESTONE BUILDING PRODUCTS COMPANY, LLC**

**EVALUATION SUBJECT:**

**FIRESTONE ULTRAPLY™ TPO AND TPO XR SINGLE-PLY ROOFING MEMBRANES**



*“2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence”*



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Reissued August 2018

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**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**Section: 07 54 00—Thermoplastic Membrane Roofing**  
**Section: 07 54 23—Thermoplastic-Polyolefin Roofing**

**REPORT HOLDER:**

**FIRESTONE BUILDING PRODUCTS COMPANY, LLC**

**ADDITIONAL LISTEE:**

**GENFLEX ROOFING SYSTEMS, A DIVISION OF FIRESTONE BUILDING PRODUCTS COMPANY, LLC**

**EVALUATION SUBJECT:**

**FIRESTONE ULTRAPLY™ TPO AND TPO XR SINGLE-PLY ROOFING MEMBRANES**

**ADDITIONAL LISTEE PRODUCT NAMES: GENFLEX EZ TPO AND EZ FLEECE BACKED TPO SINGLE-PLY ROOFING MEMBRANES**

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

2015, 2012, 2009 and 2006 *International Building Code*® (IBC)

**Properties evaluated:**

- Roof covering classification
- Weather resistance
- Wind resistance
- Impact resistance

## 2.0 USES

Firestone UltraPly TPO (thermoplastic polyolefin) and UltraPly TPO XR single-ply roofing membranes are used as roof coverings in adhered and mechanically fastened membrane roofing systems.

## 3.0 DESCRIPTION

### 3.1 General:

The UltraPly TPO and UltraPly TPO XR Membrane Roofing Systems described in this report consist of single-ply roofing membranes, insulation where used, barrier board or slip sheet where used, flashing, mechanical fasteners and adhesives that are installed on a combustible or noncombustible deck. The corresponding names for GenFlex Roofing Systems products are specified in Table 1 of this report.

### 3.2 Membranes:

**3.2.1 UltraPly TPO:** A flexible thermoplastic polyolefin roofing membrane that is produced with a polyester weft inserted reinforcement. The membrane is available in white (tan or gray on special orders) and in 45-mil (1.1 mm), 60-mil (1.5 mm) and 80-mil (2 mm) thicknesses.

**3.2.2 UltraPly TPO XR:** A flexible thermoplastic polyolefin roofing membrane that is produced with a polyester weft inserted reinforcement and an 8-ounce, polyester backing. The membrane is available in white and in 45-mil (1.1 mm) and 60-mil (1.5 mm) thicknesses.

### 3.3 Insulation:

Foam plastic insulation, where used, must have a flame-spread index of not more than 75 when tested in accordance with ASTM E84 or UL 723 at the maximum thickness intended for use. Polyisocyanurate and polystyrene rigid-cellular foam plastic thermal insulation specified in Tables 2 through 5 must comply, respectively, with ASTM C1289 or ASTM C578. Wood fiberboard insulation must comply with ASTM C208. See Tables 2 through 6 for insulations used with specific roof covering systems.

### 3.4 Barrier or Cover Board:

Barrier or cover board, where used, may be minimum 1/4-inch-thick (6.4 mm) G-P Gypsum Corporation "DensDeck® Roofboard" or "DensDeck Prime® Roofboard," minimum 1/2-inch-thick (12.7 mm) gypsum board, minimum 1/2-inch-thick (12.7 mm) Firestone ISO GARD HD, minimum 1/2-inch-thick (12.7 mm) Firestone FiberTop, or Firestone V-Force Vapor Barrier.

### 3.5 Slip Sheet:

Slip Sheet, where used, may be any of the following:

- a. One or two layers of Atlas Roofing FR10 or FR50.

### 3.6 Fasteners, Plates, Bars:

Fasteners and stress plates used to attach barrier or cover board layer materials, insulation boards and the roof covering membrane must be corrosion-resistant. Fasteners may be any of the insulation and membrane fasteners and plates summarized in this section (Section 3.6) or shown in Tables 4 through 6.

**3.6.1 Firestone All-Purpose Fastener:** An epoxy-coated steel screw used in combination with the Firestone Insulation Fastening Plate to attach roofing insulation and base sheets to steel and wood substrates. Fastener length must be sufficient to penetrate through the steel deck a minimum of 3/4 inch (19 mm), and into the wood deck a minimum of 1 inch (25.4 mm).

**3.6.2 Firestone Heavy-Duty:** An epoxy-coated steel screw used in combination with the Firestone Insulation Fastening Plate to attach roofing insulation and base sheets to steel, wood and concrete decks. Fastener length must be sufficient to penetrate through the steel deck a minimum of  $\frac{3}{4}$  inch (19 mm), and into the wood or concrete deck a minimum of 1 inch (25.4 mm).

**3.6.3 Firestone Heavy Duty Plus:** An epoxy-coated steel screw used in combination with the Firestone HD Plus Seam Plate to attach roofing insulation and base sheets to steel decks. Fastener length must be sufficient to penetrate through the steel deck a minimum of 1 inch (25.4 mm).

**3.6.4 Firestone Concrete Drive Fastener:** A nonthreaded hammer-in fastener, epoxy-coated, used with Firestone Insulation Plates to attach roofing insulation, base sheets and other accessories to structural concrete substrates. Fastener length must be sufficient to penetrate into the concrete deck a minimum of  $1\frac{1}{4}$  inches (32 mm).

**3.6.5 Firestone HD HailGard Fastener:** An epoxy-coated steel screw used in roofing applications where HailGard insulation or an OSB or plywood overlay is used and fastened into steel, concrete or wood deck. Fastener length must be sufficient to penetrate through the steel deck a minimum of  $\frac{3}{4}$  inch (19 mm), and into the wood or concrete deck a minimum of 1 inch (25.4 mm).

**3.6.6 Firestone Insulation Fastening Plate:** A 3-inch-diameter (76 mm) galvalume plate used in combination with fasteners, acceptable to Firestone, to secure insulation and base sheets to the roof deck.

**3.6.7 Firestone  $2\frac{3}{8}$  Barbed Seam Plate:** A nominally  $2\frac{3}{8}$ -inch-diameter galvalume plate, with six pointed barbs projecting downward, that is used in combination with fasteners, acceptable to Firestone, to secure TPO membranes to the roof deck.

**3.6.8 Firestone HD Seam Plate:** A  $2\frac{3}{8}$ -inch-diameter (60 mm) galvalume plate used in combination with Firestone Heavy-Duty Fasteners to secure TPO membranes to the roof deck.

**3.6.9 Firestone HD Plus Seam Plate:** A  $2\frac{3}{4}$ -inch-diameter (70 mm) galvalume plate used in combination with Firestone Heavy Duty Plus Fasteners to secure TPO membranes to the roof deck.

**3.6.10 Firestone UltraPly TPO InvisiWeld Plate:** A 3-inch diameter adhesive coated galvalume plate securing underlying insulation layer(s) to the roof deck with Firestone Heavy-Duty Fasteners, which uses a RF frequency bonding tool to bond the UltraPly TPO membrane to the plate.

**3.6.11 Firestone Coiled Metal Batten Strip:** A 1-inch wide (25.4 mm) by 220-ft long (67.06 m), galvalume AZ 55, batten strip used in combination with fasteners, acceptable to Firestone, (see manufacturer's published product sheet).

### 3.7 Adhesives:

**3.7.1 Firestone UltraPly Bonding Adhesive:** A solvent-based contact adhesive designed for bonding Firestone UltraPly TPO membranes to approved insulations, wood, metal, masonry and other acceptable substrates. The adhesive is applied to both the substrate and the underside of the membrane with coverage of approximately 45 to 60 square feet (4.18 to 5.58 m<sup>2</sup>) per gallon (3.78 L), total, for both the substrate and the membrane.

**3.7.2 Firestone Single-Ply LVOC Bonding Adhesive 1168:** A bonding adhesive designed for bonding UltraPly TPO roofing membrane and flashing to insulation, wood,

metal, masonry and other substrates. The adhesive is applied to both the substrate and the underside of the membrane with coverage of approximately 45 to 60 square feet (4.18 to 5.58 m<sup>2</sup>) per gallon (3.78 L), total, for both the substrate and the membrane.

**3.7.3 Firestone Single-Ply LVOC Bonding Adhesive:** A bonding adhesive designed for bonding UltraPly TPO roofing membrane and flashing to wood, metal, masonry and other substrates. The adhesive is applied to both the substrate and the underside of the membrane with coverage of approximately 45 to 60 square feet (4.18 to 5.58 m<sup>2</sup>) per gallon (3.78 L), total, for both the substrate and the membrane.

**3.7.4 Firestone XR Bonding Adhesive:** A contact adhesive designed for bonding Firestone UltraPly TPO XR membranes to approved insulations, wood, metal, masonry and other acceptable substrates. The adhesive is applied to the substrate only, at a nominal rate of 70 to 90 square feet (6.51 to 8.37 m<sup>2</sup>) per gallon (3.78 L).

**3.7.5 Firestone I.S.O. Stick Insulation Adhesive:** A two-component, low-rise, polyurethane insulation adhesive applied in beads designed for bonding roof insulations to allowable deck types in accordance with the application rates specified in Table 4.

**3.7.6 Firestone I.S.O. Twin-Pack Insulation Adhesive:** A two-component, low-rise, polyurethane insulation adhesive designed for bonding roof insulations, in accordance with Table 4.

### 3.8 Seam Accessories and Primers:

**3.8.1 Firestone UltraPly QuickSeam R.M.A. Strips:** A 10-inch-wide (254 mm) TPO membrane with two 3-inch-wide (76.2 mm) strips of QuickSeam Tape laminated to it along its length. Used in mechanically fastened assemblies as additional reinforcement.

**3.8.2 Firestone Single-Ply QuickPrime Primer:** A solvent-based primer designed for cleaning and priming membranes prior to the application of QuickSeam accessories. The primer is applied at a rate of 200 to 250 square feet per gallon (5 to 6 square meters per liter) for a one-sided application.

**3.8.3 Firestone Single-Ply LVOC Primer:** A solvent-based primer designed for cleaning and priming membranes prior to the application of QuickSeam accessories. The primer is applied at a rate of 200 to 250 square feet per gallon (5 to 6 square meters per liter) for a one-sided application.

**3.8.4 Firestone V-Force SB Primer:** A solvent-based primer designed for cleaning and preparing substrate prior to the application of V-Force vapor barrier membrane. Application rate is dependent on substrate type (see manufacturer's published instruction guide). The primer is available in 5 gallon pails and has a shelf-life of 2 years when stored in unopened containers between 50°F - 80°F (10°C - 27°C).

### 3.9 Impact Resistance:

The Firestone UltraPly TPO and UltraPly TPO XR Membrane Roofing Systems described in this report comply with requirements for impact resistance in accordance with Section 4.6 of FM 4470.

## 4.0 INSTALLATION

### 4.1 General:

Installation of the UltraPly TPO and UltraPly TPO XR roofing membranes described in this report must comply with the applicable code, the manufacturer's published installation instructions and this report. The manufacturer's

published installation instructions must be available on the jobsite at all times during installation.

The slope of the roof on which the single-ply membranes are installed must be a minimum of  $1/4:12$  (2 percent slope) and must not be more than the maximum slope indicated for the particular assembly as listed in Tables 2 and 3.

Penetrations and terminations of the roof covering must be flashed and made weathertight in accordance with the requirements of the membrane manufacturer and IBC Section 1503.2.

#### 4.2 Fire Classification:

**4.2.1 New Construction:** Roof covering systems described in Tables 2 and 3, when installed in accordance with this report, are classified as Class A or B roof covering systems in accordance with ASTM E108 or UL 790.

**4.2.2 Reroofing:** The existing deck must be inspected to verify that the structure to be reroofed is structurally sound and adequate to support and secure the roofing membrane. Prior to installation of new roof coverings, inspection by and written approval from the code official having jurisdiction must be required.

Class A, B, or C roof covering systems may be installed over existing classified roof covering systems under the following conditions without additional roof classification tests, provided the resulting classification is the lower of the new and existing roofing classification:

- New uninsulated systems installed only over existing uninsulated assemblies
- New insulated systems installed over existing uninsulated systems only

#### 4.3 Wind Uplift Resistance:

**4.3.1 New Construction:** The allowable wind uplift pressures for the single-ply roof covering systems described in the report are noted in Tables 4 through 6. Metal edge securement systems must be listed in accordance with ANSI/SPRI ES-1 and designed and installed for wind loads in accordance with IBC Section 1504.5 and IBC Chapter 16.

**4.3.2 Reroofing:** Roof covering systems employing mechanical fasteners must 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 material may vary widely, reroofing with adhered systems is outside the scope of this report.

#### 5.0 CONDITIONS OF USE

The single-ply roofing membranes described in this report comply with, or are suitable alternatives to what is specified in, those codes indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation of the roofing systems must comply with the IBC, the manufacturer's published installation instructions and this report. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.
- 5.2 The single-ply roof covering systems must be installed only by applicators approved by Firestone Building Products Company, LLC.
- 5.3 Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4.1.5.
- 5.4 Foam plastic insulation, where used, must bear the label of an approved agency indicating that the foam

plastic has a flame-spread index of not more than 75 when tested at the maximum thickness intended for use in accordance with ASTM E84 or UL 723, subject to the approval of the code official.

- 5.5 Above-deck thermal insulation board must comply with the applicable standards listed in Table 1508.2 of the IBC.
- 5.6 Design wind uplift pressure on any roof area, including edge and corner zones, must not exceed the allowable wind pressure for the system installed in that particular area. Refer to the allowable wind uplift pressure for roof coverings as listed in Tables 4 through 6.
- 5.7 The allowable wind uplift pressures listed in Tables 4 through 6 are for the roof covering only. The deck and framing to which the roof covering is attached must be designed for the applicable components and cladding wind loads in accordance with the IBC.
- 5.8 When application is over existing roofs, documentation of the wind uplift resistance of the composite roof construction must be submitted to the code official for approval at the time of permit application.
- 5.9 Calculations demonstrating that the required wind resistance is less than the allowable wind resistance must be submitted to the code official.
- 5.10 UltraPly TPO roofing membranes are manufactured in Tusculmbia, Alabama and Wellford, South Carolina under a quality control program with inspections by ICC-ES.
- 5.11 UltraPly TPO XR roofing membranes are manufactured in Tusculmbia, Alabama, under a quality program with inspections by ICC-ES.

#### 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Membrane Roof-covering Systems (AC75), dated July 2010 (editorially revised September 2016).

#### 7.0 IDENTIFICATION

The roof covering system components (membrane, fasteners and adhesives) described in this report are identified with a label indicating the company name (Firestone Building Products Company, LLC, or GenFlex Roofing Systems, A Division of Firestone Building Products Company, LLC), the product name, and the evaluation report number (ESR-2831).

- 7.1 The report holder's contact information is the following:

**FIRESTONE BUILDING PRODUCTS COMPANY, LLC**  
**250 WEST 96<sup>th</sup> STREET**  
**INDIANAPOLIS, INDIANA 46260**  
**(800) 428-4442**  
[www.firestonebpc.com](http://www.firestonebpc.com)

- 7.2 The Additional Listee's contact information is the following:

**GENFLEX ROOFING SYSTEMS, A DIVISION OF FIRESTONE BUILDING PRODUCTS COMPANY, LLC**  
**250 WEST 96<sup>th</sup> STREET**  
**INDIANAPOLIS, INDIANA 46260**  
**(800) 428-4442**  
[www.genflex.com](http://www.genflex.com)

TABLE 1—PRODUCT TRADE NAMES

FIRESTONE BUILDING PRODUCTS COMPANY, LLC	GENFLEX ROOFING SYSTEMS A DIV. OF FIRESTONE BUILDING PRODUCTS COMPANY, LLC
<b>MEMBRANES</b>	
UltraPly TPO	EZ TPO
UltraPly TPO XR	EZ Fleece Backed TPO
<b>INSULATION BOARDS</b>	
ISO 95+ GL	GenFlex ISO Insulation
ISO 95+ GL Tapered	GenFlex ISO Insulation Tapered
ISOGARD HD	GenFlex HD ISO
ISOGARD HD Composite	GenFlex HD Composite ISO
RESISTA	Coated Glass Facer (flat)
RESISTA Tapered	Coated Glass Facer (tapered)
<b>FASTENING COMPONENTS</b>	
UltraPly Bonding Adhesive	EZ TPO Bonding Adhesive
Single-Ply LVOC Bonding Adhesive 1168	EZ TPO Bonding Adhesive LVOC 1168
Single-Ply LVOC Bonding Adhesive	EZ TPO Bonding Adhesive LVOC
Firestone XR Bonding Adhesive	GenFlex Fleece Backed Bonding Adhesive
Firestone I.S.O. Twin-Pack Insulation Adhesive	GenFlex One Step Insulation Adhesive
Firestone All-Purpose Fastener	GenFast AP Fastener
Firestone Heavy-Duty	GenFlex Heavy Duty
Firestone Heavy-Duty Plus	GenFlex Heavy Duty Plus
Firestone Concrete Drive Fastener	GenFast Concrete Drive
Firestone HD HailGard Fastener	GenFast HailGard Fastener
Firestone Insulation Fastening Plate	GenFast 3" Round Insulation Plate
Firestone 2 <sup>3</sup> / <sub>8</sub> Barbed Seam Plate	GenFlex 2 <sup>3</sup> / <sub>8</sub> Barbed Seam Plate
Firestone HD Seam Plate	GenFlex HD Seam Plate
Firestone HD Plus Seam Plate	GenFlex HD Plus Seam Plate
<b>OTHER</b>	
Firestone QuickSeam R.M.A. Strips	GenFlex TPO Peel & Stick RMA
Firestone Single-Ply QuickPrime Primer	GenFlex Clear Primer
Firestone Single-Ply LVOC Primer	GenFlex All-Purpose LVOC Primer

TABLE 2—FIRE CLASSIFICATION ASSEMBLIES—ADHERED ROOF COVERING SYSTEMS

SYSTEM NO.	ROOF CLASS	DECK <sup>2</sup>	MAX. ROOF SLOPE	INSULATION <sup>1</sup>	BARRIER OR COVER BD./ BASE/PLY SHEET	MEMBRANE
1	A	Noncombustible	1/4:12	(Optional) UL-classified polyisocyanurate, any thickness	1/2-inch thick "ISOGARD HD"	UltraPly TPO
2	A	Noncombustible	1/4:12	(Optional) Min. 1-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	---	UltraPly TPO
3	A	Combustible	2 1/2:12	1 1/2-inch-thick Firestone "ISO 95 + GL"	1/2-inch thick "DensDeck"	UltraPly TPO
4	A	Combustible	1/4:12	(Optional) Min. 1-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Min. 1-inch thick "ISOGARD HD"	UltraPly TPO
5	A	Combustible	1:12	(Optional) UL-classified foam plastic insulation, any thickness	Min. 1/4-inch thick "DensDeck", "DensDeck Prime" or "DensDeck DuraGuard"	UltraPly TPO XR
6	B	Combustible	1/4:12	(Optional) Min. 1-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	1/2-inch thick "ISOGARD HD"	UltraPly TPO
7	B	Noncombustible	1:12	UL-classified foam plastic insulation, any thickness	Min. 7/16-inch thick APA-rated OSB	UltraPly TPO XR
8	B	Noncombustible	1:12	4-inch-thick Firestone "ISO 95 + GL"	Two plies, Type G2 "MB Base Sheet"	UltraPly TPO XR
9	B	Noncombustible	1:12	4-inch-thick Firestone "ISO 95 + GL"	Two plies, Type G2 "MB Base Sheet", 1 ply "APP 170", 1 ply "APP 180FR"	UltraPly TPO XR
10	Existing Class A, B or C system to retain existing classification.	Combustible	1/2:12	Existing Class A, B or C uninsulated BUR system (mineral surfaced cap sheet)	---	UltraPly TPO XR

For **SI**: 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa.

<sup>1</sup>All foam plastic insulation must be UL classified and limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

<sup>2</sup>Wood deck must be minimum 15/32-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength ( $f_c$ ) of 2500 psi.

TABLE 3—FIRE CLASSIFICATION ASSEMBLIES—MECHANICALLY FASTENED ROOF COVERING SYSTEMS

SYSTEM NO.	ROOF CLASS	DECK <sup>2</sup>	MAX. ROOF SLOPE	SLIP SHEET	INSULATION <sup>1</sup>	BARRIER OR COVER BD./ BASE/PLY SHEET	MEMBRANE
1	A	Combustible	5:12	---	1.5-inch-thick Firestone "ISO 95 + GL"	Min. 1/4-inch thick "DensDeck"	UltraPly TPO
2	A	Noncombustible	1:12	---	1.5-inch-thick ISO 95+GL	(Optional) 1/2-inch-thick ISOGARD HD	UltraPly TPO
3	A	Noncombustible	3/4:12	---	(Optional) UL-classified foam plastic insulation, any thickness.	1/2-inch thick "ISOGARD HD"	UltraPly TPO
4	A	Combustible	1:12	Two layers of GAF "VersaShield® Fire-Resistant Roof Deck Protection" or GAF "VersaShield® Solo™ Fire-Resistant Slip Sheet	---	---	UltraPly TPO
5	B	Combustible	1/2:12	---	(Optional) Min. 1-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	1/2-inch thick "ISOGARD HD"	UltraPly TPO
6	B	Combustible	1:12	One layer of GAF "VersaShield® Fire-Resistant Roof Deck Protection" or GAF "VersaShield® Solo™ Fire-Resistant Slip Sheet	---	---	UltraPly TPO
7	B	Noncombustible	1:12	---	4-inch-thick Firestone "ISO 95 + GL"	One ply of MB Base Sheet, 1 ply of Type G3	UltraPly TPO XR

For SI: 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa.

<sup>1</sup>All foam plastic insulation must be UL classified and limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

<sup>2</sup>Wood deck must be minimum 15/32-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (*f<sub>c</sub>*) of 2500 psi.

TABLE 4—WIND RESISTANCE—ADHERED ROOF COVERING SYSTEMS

SYSTEM NO.	DECK <sup>3</sup>	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
		TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
W-1	Wood	(a) Min. 1.2-inch to max. 4-inch-thick Firestone "ISO 95 + GL" or (b) min. 2-inch to max. 4-inch-thick Firestone HailGard	(a) Loose-laid or (b) HD HailGard fastener @ 1.6 ft <sup>2</sup> per fastener	<sup>7</sup> / <sub>16</sub> -inch-thick OSB (Omit for HailGard insulation)	HD HailGard fastener to deck @ 2.6 ft <sup>2</sup> per fastener	UltraPly TPO	UltraPly Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane @ 120 ft <sup>2</sup> per gallon	45
W-2	Wood	---	---	1-inch-thick "ISOGARD HD"	All-Purpose Fastener & Insulation Fastening Plate @ 1 per 2 ft <sup>2</sup>	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane @ 60 ft <sup>2</sup> per gallon	45
W-3	Wood	---	---	1-inch-thick "ISOGARD HD"	All-Purpose Fastener & Insulation Fastening Plate @ 1 per 1.33 ft <sup>2</sup>	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane @ 60 ft <sup>2</sup> per gallon	75
W-4	Wood	---	---	Min. ¼-inch thick DensDeck	Heavy-duty Fastener & Insulation Fastening Plate @ 1 per 1.33 ft <sup>2</sup>	UltraPly TPO	UltraPly Bonding Adhesive to substrate and underside of membrane @ 60 ft <sup>2</sup> per gallon	60
S-1	Steel	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	All-Purpose Fastener & Insulation Fastening Plate @ 1.33 ft <sup>2</sup> per fastener	---	---	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane @ 120 ft <sup>2</sup> per gallon	90
S-2	Steel	Min. 2-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	All-Purpose Fastener & Insulation Fastening Plate @ 1.6 ft <sup>2</sup> per fastener	---	---	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane @ 120 ft <sup>2</sup> per gallon	75
S-3	Steel	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	All-Purpose Fastener & Insulation Fastening Plate @ 2 ft <sup>2</sup> per fastener	Min. ¼-inch thick DensDeck or DensDeck Prime	I.S.O. Twin Pack Insulation Adhesive ½- to ¾-inch beads @ 12 inches o.c.	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 (not with DensDeck) or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane @ 120 ft <sup>2</sup> per gallon	45



TABLE 4—WIND RESISTANCE—ADHERED ROOF COVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	VAPOR BARRIER	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
C-1	Concrete	Firestone MB Base M secure to deck with I.S.O. Twin Pack Insulation Adhesive ½- to ¾-inch ribbons at 12 inches o.c.	One or 2 layers of 1.5-inch-thick Firestone "ISO 95 + GL"	I.S.O. Twin Pack Insulation Adhesive ½- to ¾-inch ribbons at 12 inches o.c.	Min. ¼-inch-thick DensDeck or DensDeck Prime	I.S.O. Twin Pack Insulation Adhesive ½ to ¾-inch ribbons at 12 inches o.c.	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 (not with DensDeck) or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane at 120 ft <sup>2</sup> per gallon	232
C-2	Concrete	Firestone SBS PolyTorch or Glass Torch Base, torch adhered.	One or 2 layers of 1.5-inch-thick Firestone "ISO 95 + GL"	I.S.O. Twin Pack Insulation Adhesive ½- to ¾-inch ribbons at 12 inches o.c.	Min. ¼-inch-thick DensDeck or DensDeck Prime	I.S.O. Twin Pack Insulation Adhesive ½ to ¾-inch ribbons at 12 inches o.c.	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 (not with DensDeck) or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane at 120 ft <sup>2</sup> per gallon	232
C-3	Concrete	---	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	I.S.O. Twin Pack Insulation Adhesive ½- to ¾-inch ribbons at 12 inches o.c.	---	---	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane at 120 ft <sup>2</sup> per gallon	165
C-4	Concrete	---	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Hot asphalt, full mopping	½-inch thick Fiber Top fiberboard insulation	Hot asphalt, full mopping	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to Fiber Top at 60 ft <sup>2</sup> per gallon	135
C-5	Concrete	---	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Hot asphalt, full mopping	Min. ¼-inch-thick DensDeck	Hot asphalt, full mopping	UltraPly TPO	UltraPly Bonding Adhesive to DensDeck at 60 ft <sup>2</sup> per gallon	195
C-6	Concrete	---	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Hot asphalt, full mopping	---	---	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive 1168 or Single-Ply LVOC Bonding Adhesive to substrate at 60 ft <sup>2</sup> per gallon	180

TABLE 4—WIND RESISTANCE—ADHERED ROOF COVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	VAPOR BARRIER	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
C-7	Primed concrete	Firestone V-Force, self-adhered over deck primed with V-Force SB Primer	Min. 1 1/2-inch-thick ISO 95+GL	Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c.	Min. 1/2-inch-thick FiberTop	Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c.	UltraPly TPO XR	XR Bonding Adhesive at 70-90 ft <sup>2</sup> per gal	45
C-8							UltraPly TPO	UltraPly Bonding Adhesive or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane at 120 ft <sup>2</sup> per gal	60
C-9							UltraPly TPO	Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 120 ft <sup>2</sup> per gal	263
C-10	Primed concrete	Firestone V-Force, self-adhered over deck primed with V-Force SB Primer	Min. 1 1/2-inch-thick ISO 95+GL	Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c. or Firestone I.S.O. TwinPack Adhesive in continuous 1/2-3/4-inch-wide ribbons at 12 inches o.c.	(Optional) Min. 1-or 1 1/2-inch-thick ISO 95+GL	(For optional cover board) Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c.	UltraPly TPO XR	XR Bonding Adhesive at 70-90 ft <sup>2</sup> per gal	113
C-11							UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 120 ft <sup>2</sup> per gal	278
C-12	Primed concrete	Firestone V-Force, self-adhered over deck primed with V-Force SB Primer	Min. 1 1/2-inch-thick ISO 95+GL	Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c.	Min. 1/2-inch-thick ISOGARD HD	Firestone I.S.O. Stick in continuous 3/4-inch-wide ribbons at 12 inches o.c.	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 120 ft <sup>2</sup> per gal	263
C-13							UltraPly TPO XR	XR Bonding Adhesive at 70-90 ft <sup>2</sup> per gal or hot asphalt at 20-25 lbs/sq	263

TABLE 4—WIND RESISTANCE—ADHERED ROOF COVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	VAPOR BARRIER	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
C-14	Primed concrete	Firestone V-Force, self-adhered over deck primed with V-Force SB Primer	Min. 1 <sup>1</sup> / <sub>2</sub> -inch-thick ISO 95+GL	Firestone I.S.O. Stick in continuous <sup>3</sup> / <sub>4</sub> -1-inch-wide ribbons at 12 inches o.c	Min. <sup>1</sup> / <sub>4</sub> -inch-thick DensDeck Prime	Firestone I.S.O. Stick in continuous <sup>3</sup> / <sub>4</sub> -1-inch-wide ribbons at 12 inches o.c.	UltraPly TPO	UltraPly Bonding Adhesive or Single-Ply LVOC Bonding Adhesive to substrate and underside of membrane at	248
C-15							UltraPly TPO	Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 120 ft <sup>2</sup> per gal	263
C-16							UltraPly TPO XR	XR Bonding Adhesive at 70-90 ft <sup>2</sup> per gal or hot asphalt at 20-25 lbs/sq	263
C-17	Concrete	---	---	---	Min. <sup>1</sup> / <sub>2</sub> -inch wood fiberboard or min. <sup>1</sup> / <sub>4</sub> -inch-thick DensDeck	Concrete Drive or High Density Fasteners with Hex Plates at 2.7 ft <sup>2</sup> (fiberboard) or 1.8 ft <sup>2</sup> (DensDeck) per fastener	Ultra-Ply TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 (only with wood fiberboard) to substrate and underside of membrane at 90 ft <sup>2</sup> per gallon	38
C-18	Concrete	---	---	---	---	---	UltraPly TPO XR	Hot asphalt at 20 to 40 lbs per sq.	500

TABLE 4—WIND RESISTANCE—ADHERED ROOF COVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	VAPOR BARRIER	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
C-19	Concrete	---	---	---	---	---	UltraPly TPO XR	XR Bonding Adhesive at 70 to 90 ft <sup>2</sup> per gal.	470
C-20	Concrete	---	Min. 1.4-inch to max. 4-inch-thick, any FM-approved polyisocyanurate insulation	Loose laid	Min. ½-inch thick FM-approved fiberboard insulation	Heavy Duty Fasteners with Hex Plates at 2.7 ft <sup>2</sup> per fastener.	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 90 ft <sup>2</sup> per gallon	38
SC-1	Steel or concrete	---	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	All-Purpose Fasteners (steel), Heavy Duty or Concrete Drive Fasteners (concrete) with approved plates at 2.7 ft <sup>2</sup> per fastener.	---	---	UltraPly TPO	UltraPly Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 to substrate and underside of membrane at 90 ft <sup>2</sup> per gallon	38
SC-2	Steel or concrete	Min. ¼-inch thick DensDeck fastened to deck with All-Purpose or Heavy Duty Fasteners (steel) or Concrete Drive Fasteners (concrete) followed by self-adhered V-Force Vapor Barrier Membrane over DensDeck primed with V-Force SB Primer	Min. 1½-inch-thick ISO 95+GL followed by an optional layer of min. 1½-inch-thick ISO 95+GL	Firestone I.S.O. Stick in continuous ¾-1-inch-wide ribbons at 12 inches o.c.	Min. ½-inch-thick FiberTop or ISOGARD HD or min. ¼-inch-thick DensDeck or DensDeck Prime	Firestone I.S.O. Stick in continuous ¾-1-inch-wide ribbons at 12 inches o.c.	UltraPly TPO XR	XR Bonding Adhesive at 70-90 ft <sup>2</sup> per gal or hot asphalt at 20-25 lbs/sq	45
							UltraPly TPO	Ultra-Ply Bonding Adhesive, Single-Ply LVOC Bonding Adhesive or Single-Ply LVOC Bonding Adhesive 1168 (not with DensDeck) at 60 ft <sup>2</sup> per gal	

TABLE 4—WIND RESISTANCE—ADHERED ROOFCOVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	SUPPLEMENTAL LIGHTWEIGHT CONCRETE ATTACHMENT <sup>1</sup>	INSULATION		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE	ATTACHMENT	TYPE	ATTACHMENT <sup>1</sup>	
LC-1	Cellular lightweight concrete, 200 psi, on structural concrete.	---	---	---	UltraPly TPO XR	XR Bonding Adhesive to substrate at 70-90 ft <sup>2</sup> per gallon.	467
LC-2	Cellular lightweight concrete, 300 psi, on steel deck.	Heavy-Duty Fasteners with Insulation Fastening Plates at 2 ft <sup>2</sup> per fastener	---	---	UltraPly TPO XR	XR Bonding Adhesive to substrate at 70-90 ft <sup>2</sup> per gallon.	75
LC-3	Celcore lightweight concrete, 300 psi, on steel deck.	Heavy-Duty Fasteners with Insulation Fastening Plates at 2 ft <sup>2</sup> per fastener	---	---	UltraPly TPO XR	XR Bonding Adhesive to substrate at 70-90 ft <sup>2</sup> per gallon.	90
LC-4	Celcore lightweight concrete, 300 psi, on steel deck.	---	---	---	UltraPly TPO XR	XR Bonding Adhesive to substrate at 70-90 ft <sup>2</sup> per gallon.	45

For SI: 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa; 1 gal = 3.785 L.

<sup>1</sup>Insulation, adhesive and fasteners must be FM-approved.

<sup>2</sup>All foam plastic insulation must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

<sup>3</sup>Wood deck must be minimum <sup>15</sup>/<sub>32</sub>-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength ( $f_c$ ) of 2500 psi, unless otherwise noted. See Section 5.9 of this report.

TABLE 5—WIND RESISTANCE—WELDED ROOF COVERING SYSTEMS

SYSTEM NO.	DECK <sup>3</sup>	VAPOR BARRIER	INSULATION		COVER BOARD		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
			TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE <sup>1</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
WW-1	Wood	(Optional) Min. 1/4-inch-thick DensDeck or DensDeck Prime	Min. 1 1/2-inch-thick ISO 95+GL	Loose-laid	Min. 1/2-inch-thick FiberTop or ISOGARD HD or min. 1/4-inch-thick DensDeck or DensDeck Prime	InvisiWeld Plates and Heavy Duty Fasteners at 5.3 ft <sup>2</sup> per fastener	UltraPly TPO	Bonded to InvisiWeld Plates with RhinoBond Bonding Tool and RhinoBond Cooling Clamps	45
WSC-1	Steel or concrete	(Optional) Min. 1/4-inch-thick DensDeck or DensDeck Prime	(Optional) (Min. 1 1/2-inch-thick ISO 95+GL)	Loose-laid	Min. 1/2-inch-thick FiberTop or ISOGARD HD or min. 1/4-inch-thick DensDeck or DensDeck Prime	InvisiWeld Plates and Heavy Duty Fasteners (through steel) or Concrete Drive Fasteners (through concrete) at 5.3 ft <sup>2</sup> per fastener	UltraPly TPO	Bonded to InvisiWeld Plates with RhinoBond Bonding Tool and RhinoBond Cooling Clamps	45
WSC-2	Steel or concrete	---	(Optional) Min. 1.5-inch-thick ISO 95+GL	Loose-laid	Min. 1/2-inch-thick FiberTop or ISOGARD HD or min. 1/4-inch-thick DensDeck or DensDeck Prime	InvisiWeld Plates and Heavy-Duty Fasteners (through steel) or Concrete Drive Fasteners (through concrete) at 4 ft <sup>2</sup> per fastener	UltraPly TPO	Bonded to InvisiWeld Plates with RhinoBond Portable Bonding Tool and RhinoBond Cooling Clamps	60
WSC-3	Steel or concrete	---	(Optional) Min. 1.5-inch-thick ISO 95+GL	Loose-laid	Min. 1/2-inch-thick FiberTop or ISOGARD HD or min. 1/4-inch-thick DensDeck or DensDeck Prime	InvisiWeld Plates and Heavy-Duty Fasteners (through steel) or Concrete Drive Fasteners (through concrete) at 2.7 ft <sup>2</sup> per fastener	UltraPly TPO	Bonded to InvisiWeld Plates with RhinoBond Portable Bonding Tool and RhinoBond Cooling Clamps	75
WSC-4	Steel or concrete	---	(Optional) Min. 1.5-inch-thick ISO 95+GL	Loose-laid	Min. 1/2-inch-thick FiberTop or ISOGARD HD or min. 1/4-inch-thick DensDeck or DensDeck Prime	InvisiWeld Plates and Heavy-Duty Fasteners (through steel) or Concrete Drive Fasteners (through concrete) at 2 ft <sup>2</sup> per fastener	UltraPly TPO	Bonded to InvisiWeld Plates with RhinoBond Portable Bonding Tool and RhinoBond Cooling Clamps	105

For SI: 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa; 1 gal = 3.785 L.

<sup>1</sup>Insulation, adhesive and fasteners must be FM-approved.

<sup>2</sup>All foam plastic insulation must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

<sup>3</sup>Wood deck must be minimum 15/32-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (*f<sub>c</sub>*) of 2500 psi, unless otherwise noted. See Section 5.9 of this report.

TABLE 6—WIND RESISTANCE—MECHANICALLY FASTENED ROOF COVERING SYSTEMS

SYSTEM NO.	DECK <sup>3</sup>	INSULATION		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
		TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
SC-1	Steel or concrete	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	Heavy-Duty Plus Fasteners with HD Plus Seam Plates (steel) or Concrete Drive Fasteners with HD Seam Plates (concrete), fastener rows at 142 inches o.c., 12 inches o.c. along side laps	30
SC-2	Steel or concrete	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	Heavy-Duty Plus Fasteners with HD Plus Seam Plates (steel) or Concrete Drive Fasteners with HD Seam Plates (concrete), fastener rows at 142 inches o.c., 6 inches o.c. along side laps	60
SC-3	Steel or concrete	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	Heavy-Duty Plus Fasteners with HD Plus Seam Plates (steel) or Concrete Drive Fasteners with HD Seam Plates (concrete), fastener rows at 114 inches o.c., 6 inches o.c. along side laps	68
SC-4	Steel or concrete	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Loose laid	UltraPly TPO	Heavy-Duty Fasteners with HD Seam Plates, fastener rows at 142 inches o.c., 6 inches o.c. along side laps	52
SC-5	Steel or concrete	Min. 1.4-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	Heavy-Duty Fasteners with 2 <sup>3</sup> / <sub>8</sub> Barbed Seam Plates, fastener rows at 6 ft o.c., 18 inches o.c. along side laps	30

TABLE 6—WIND RESISTANCE—MECHANICALLY FASTENED ROOF COVERING SYSTEMS (Continued)

SYSTEM NO.	DECK <sup>3</sup>	INSULATION		MEMBRANE		ALLOWABLE WIND UPLIFT PRESSURE (psf)
		TYPE <sup>1,2</sup>	ATTACHMENT <sup>1</sup>	TYPE	ATTACHMENT <sup>1</sup>	
SC-6	Steel or concrete	Min. 1.4-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	Heavy-Duty Fasteners with 2 <sup>3</sup> / <sub>8</sub> Barbed Seam Plates, fastener rows at 9 ft-6 inches o.c., 6 inches o.c. along side laps	38
SC-7	Steel or concrete	Min. 1.4-inch to max. 4-inch-thick, any FM-approved foam plastic insulation	Preliminarily attached	UltraPly TPO	Heavy-Duty Plus Fasteners with HD Plus Seam Plates (steel only) or Heavy-duty Fasteners with HD Seam Plates, fastener rows at 7 ft-6 inches o.c., 12 inches o.c. along side laps	45
MS-1	Steel	Min. 1.4-inch to max. 4-inch-thick, any FM-approved foam plastic insulation	Preliminarily attached	UltraPly TPO	Heavy-Duty Plus Fasteners with HD Plus Seam Plates, fastener rows at 9 ft-6 inches o.c., 12 inches o.c. along side laps	45
MS-2	Steel	Min. 1.5-inch to max. 4-inch-thick Firestone "ISO 95 + GL"	Preliminarily attached	UltraPly TPO	QuickSeam R.M.A. Strips @ 10 ft o.c. with Coiled Metal Batten Strips and Heavy-Duty Fasteners along strips @ 6 inches o.c.; Single-Ply Quick Prime or Single-Ply LVOC Primer to underside of membrane at strip locations	45

For SI: 1 inch = 25.4 mm; 1 ft = 0.305 m; 1 psf = 47.88 Pa.

<sup>1</sup>Insulation and fasteners must be FM-approved.

<sup>2</sup>All foam plastic insulation must be limited to the maximum thickness in accordance with Section 5.4 of this report or the maximum thickness in accordance with this table, whichever is less.

<sup>3</sup>Wood deck must be minimum 1<sup>5</sup>/<sub>32</sub>-inch-thick (11.9 mm) plywood. Steel deck must be minimum No. 22 gage galvanized steel [0.030 inch (0.76 mm)]. Concrete must have a minimum compressive strength (*f<sub>c</sub>*) of 2500 psi, unless otherwise noted. See Section 5.9 of this report.