



MIAMI-DADE COUNTY
 BUILDING AND NEIGHBORHOOD COMPLIANCE
 DEPARTMENT (BNC)
 BOARD AND CODE ADMINISTRATION DIVISION

MIAMI-DADE COUNTY
PRODUCT CONTROL SECTION

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 Miami, Florida 33175-2474
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NOTICE OF ACCEPTANCE (NOA)

Firestone Building Product Company
 250 West 96th Street
 Indianapolis, IN 46260

SCOPE:

This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County BNC - Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. BNC reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein, and has been designed to comply with the Florida Building Code and the High Velocity Hurricane Zone of the Florida Building Code.

DESCRIPTION: Firestone UltraPly TPO and TPO XR Single Ply Roof Systems over Concrete Decks

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA 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 NOA renews and revises NOA No. 08-1118.03 and consists of pages 1 through 41.
 The submitted documentation was reviewed by Jorge L. Acebo.



NOA No.: 09-0902.10
Expiration Date: 05/18/16
Approval Date: 04/14/11
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ROOFING SYSTEM APPROVAL

Category:	Roofing
Sub-Category:	Single Ply Roofing
Material:	TPO
Deck Type:	Concrete
Maximum Design Pressure	- 500 psf

TRADE NAMES OF PRODUCTS MANUFACTURED OR LABELED BY APPLICANT:

TABLE 1

<u>Product</u>	<u>Dimensions</u>	<u>Test Specifications</u>	<u>Product Description</u>
UltraPly TPO	Various	TAS 131-95	Reinforced TPO 0.045" to 0.080" thick membrane
UltraPly TPO XR 100	Various	TAS 131-95	Reinforced TPO
UltraPly TPO XR 115	Various	TAS 131-95	Reinforced TPO
TPO QuickSeam Flashing	5-3/4" x 100'	TAS 131-95	Flashing material with pre-applied adhesive
UltraPly QuickSeam R.M.A. Strip	10" x 100'		Strip of UltraPly TPO with QuickSeam Tape for anchoring membrane to substrate
Single-Ply QuickPrime	1 gallon & # gallon	Proprietary	Primer for TPO QuickSeam Flashing
EdgeGard System	Various	Various	Flashing materials and assemblies
MB Base M	39.4" x 98.7' (1 m x 30.1 m)	ASTM D 4601	Fiberglass reinforced base sheet, asphalt coated on both sides.
MB Base SA	39.4" x 99.7'	ASTM D 5147	Fiberglass reinforced base sheet, asphalt coated on both sides with a plastic release film on the underside.
Firestone SA Primer	5 gal.	Proprietary	Polymer based primer.
Firestone SBS PolyTorch	39.4" x 33'6"	ASTM D 6222	Polyester reinforced modified bitumen membrane. Torch applied.
SBS Glass Torch Base	39.4" x 33'10"	ASTM D 6163	Modified bitumen base sheet with a burn-off film and reinforced with non-woven fiberglass mat.
XR Bonding Adhesive	5 gal. pail	Proprietary	Solvent based adhesive
UltraPly Bonding Adhesive	5 gal. pail	Proprietary	Solvent based adhesive
Firestone I.S.O Stick Adhesive	5 gal	Proprietary	A dual component polyurethane adhesive.
Firestone I.S.O Twin Pack	5 gal	Proprietary	A dual component polyurethane adhesive.
Firestone I.S.O FIX II Adhesive	5 gal	Proprietary	A single component polyurethane adhesive.



APPROVED INSULATIONS:

TABLE 2

Product Name	Product Description	Manufacturer (With Current NOA)
ISO 95+ GL, ISO 95+ GL Tapered	Polyisocyanurate foam insulation	Firestone Bldg. Pro. Co.
Firestone Dens-Deck, Primed	Fire resistant rated gypsum	Firestone Bldg. Pro. Co.
FiberTop E	Woodfiber insulation board	Firestone Bldg. Pro. Co.
ISOGARD HD	Polyisocyanurate with a coated fiberglass facer	Firestone Bldg. Pro. Co.
ISOGARD HD Composite	Polyisocyanurate with a coated fiberglass facer composite insulation.	Firestone Bldg. Pro. Co.
Foamular 250	Extruded polystyrene insulation	Owens Corning
DensDeck, DensDeck Prime	Silicon treated gypsum	G-P Products

APPROVED FASTENERS:

TABLE 3

Fastener Number	Product Name	Product Description	Dimensions	Manufacturer (With Current NOA)
1.	Firestone HD Fastener	#15 Fastener for steel, Wood, concrete decks	N/A	Firestone Bldg. Pro. Co.
2.	Firestone AP Fastener	#14 Fastener for steel, Wood, concrete decks	N/A	Firestone Bldg. Pro. Co.
3.	UltraPly TPO 2-3/8" Barbed Seam Plate	Membrane seam attachment plate	2-3/8" diameter	Firestone Bldg. Pro. Co.
4.	Pre-Assembled AP fastener & plate	#14 w/insulation plate for steel, Wood, concrete decks	N/A	Firestone Bldg. Pro. Co.
5.	Pre-Assembled HD fastener & plate	#15 w/insulation plate for steel, Wood, concrete decks	N/A	Firestone Bldg. Pro. Co.
6.	Firestone HD HailGard Fastener	Insulation and membrane fastener	Various	Firestone Bldg. Pro. Co.
7.	Firestone Insulation Fastening Plate	Galvalume insulation plate	3" diameter	Firestone Bldg. Pro. Co.
8.	Firestone Concrete Drive Fastener	Structural concrete fastener	Various	Firestone Bldg. Pro. Co.
9.	Firestone HD Plus Fastener	Insulation and membrane fastener	Various	Firestone Bldg. Pro. Co.
10.	HD Seam Plates	AZ55 or AZ50 galvalume insulation plate.	2-3/8" diameter	Firestone Bldg. Pro. Co.
11.	Firestone HD Plus Seam Plate	Galvalume insulation plate	2 3/4" diameter	Firestone Bldg. Pro. Co.
12.	Firestone Metal Batten Bar	Galvalume AZ55 batten strip	10' long, 1" wide	Firestone Bldg. Pro. Co.
13.	Firestone Coiled Metal Batten Bar	Galvalume AZ55 batten strip	220' long, 1" wide	Firestone Bldg. Pro. Co.



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APPROVED FASTENERS:

TABLE 3

Fastener Number	Product Name	Product Description	Dimensions	Manufacturer (With Current NOA)
14.	Firestone Polymer Batten Strips	Polymer, corrosion --free, batten strip.	250' long, 3/4" or 1" wide	Firestone Bldg. Pro. Co.

EVIDENCE SUBMITTED:

<u>Test Agency</u>	<u>Test Identifier</u>	<u>Description</u>	<u>Date</u>
Underwriters Laboratories Inc.	01NK17982	UL 790	06/05/01
	00NK43467	UL 790	01/22/01
	99NK5401	UL 790	08/17/99
	99NK3276	UL 790	03/30/99
	98NK39140	UL 790	05/13/99
	98NK25593	UL 790	09/01/98
	03NK34486	UL 790	03/22/05
Factory Mutual Research Corporation	3006983	4470	02/08/00
	3004249	4470	11/03/99
	3003830	4470	05/26/99
	3001925	4470	05/24/99
	3014031	4470	07/22/02
	3014918	4470	12/17/03
	3012931	4470	04/04/04
	3016670	4470	04/29/04
	3017120	4470	04/30/04
	3020394	4470	09/03/04
	3022988	4470	01/28/05
	3019991	4470	09/20/05
	3029384	4470	02/28/08
	3027508	4470	02/07/07
	3026519	4470	12/14/06
	3030650	4470	05/16/08
	3033218	4470	08/12/08
3014692	4470	08/05/03	
3036642	4470	10/09/09	
3032272	4470	05/22/09	
3033921	4470	01/12/09	
3035560	4470	01/11/10	
Trinity ERD	F8300.07.08	TAS 131/ ASTM D6878	07/30/08
	F8300.11.08-R3	TAS 131/ ASTM D6878	02/25/11
	F8960.04.08	TAS 114-F/ TAS 114-D	04/15/08
	F10980.09.08	TAS 114	09/17/08



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APPROVED ASSEMBLIES:

- Membrane Type:** Single Ply, TPO, Reinforced
- Deck Type 3I:** Concrete, Insulated
- Deck Description:** 2500 psi or greater structural concrete or concrete plank
- System Type A(1):** One or more layers of insulation adhered with approved asphalt; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A
Tapered ISO 95+ GL Minimum ½" thick start with a ¼ : 12 taper	N/A	N/A
Top Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Minimum ¼" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-40 lbs/100 ft². All subsequent layers of insulation shall be adhered to the previous layer of insulation in full mopping of approved asphalt within the EVT range and at a rate of 20-40 lbs/100 ft². Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulation listed as base layer only shall be used only as base layers with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation panels used as a top layer shall be placed with the polyisocyanurate side facing down.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal.

Maximum Design

Pressure: -195 psf with DensDeck cover board (See General Limitation #9)
 -180 psf without cover board (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(2): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck with Firestone I.S.O. Twin Pack Insulation Adhesive applied in ½ to ¾ in. wide ribbons or with Firestone I.S.O Stick Adhesive applied in ¾ to 1 in. wide ribbons, spaced as listed below. All subsequent layers of insulation shall be adhered to the previous layer of insulation using the same method of adhesion as the base layer. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulations listed as the base layer shall only be used as the base layer with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation boards used as a top layer shall be installed with the polyisocyanurate face down.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure:

- 150 psf, using I.S.O Stick Adhesive with ribbons spaced 12" o.c. (See General Limitations #9)
- 165 psf, using I.S.O. Twin Pack Insulation Adhesive with ribbons spaced 12" o.c. (See General Limitation #9)
- 240 psf, using I.S.O. Twin Pack Insulation Adhesive with ribbons spaced 8" o.c. (See General Limitation #9)
- 285 psf, using I.S.O. Twin Pack Insulation Adhesive with ribbons spaced 4" o.c. (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(3): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime Minimum ¼" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck with Firestone I.S.O. Twin Pack Insulation Adhesive applied in ½ to ¾ in. wide ribbons or with Firestone I.S.O Stick Adhesive applied in ¾ to 1 in. wide ribbons, spaced as listed below. All subsequent layers of insulation shall be adhered to the previous layer of insulation using the same method of adhesion as the base layer. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulations listed as the base layer shall only be used as the base layer with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation boards used as a top layer shall be installed with the polyisocyanurate face down.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure:

- 127.5 psf, using I.S.O Twin Pack Insulation Adhesive in ribbons spaced 12" o.c. (See General Limitation #9)
- 150 psf, using I.S.O Stick Adhesive in ribbons spaced 12" o.c. (See General Limitations #9)
- 187.5 psf, using I.S.O Twin Pack Insulation Adhesive in ribbons spaced 8" o.c. (See General Limitation #9)
- 247.5 psf, using I.S.O Twin Pack Insulation Adhesive in ribbons spaced 4" o.c. (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(4): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Two base insulation layers

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime Minimum ¼" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck with Firestone I.S.O. Twin Pack Insulation Adhesive applied in ½ to ¾ in. wide ribbons spaced 8" o.c. All subsequent layers of insulation shall be adhered to the previous layer of insulation using Firestone I.S.O. Twin Pack Insulation Adhesive applied in ½ to ¾ in. wide ribbons spaced 8" o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulations listed as the base layer shall only be used as the base layer with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation boards used as a top layer shall be installed with the polyisocyanurate face down.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -195 psf (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(5): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Two base insulation layers

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
Foamular 250 Minimum 1.0" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime Minimum 1/4" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck with Firestone I.S.O. Stick Adhesive applied in 3/4 to 1 in. wide ribbons spaced 12" o.c. All subsequent layers of insulation shall be adhered to the previous layer of insulation using Firestone I.S.O. Stick Adhesive applied in 3/4 to 1 in. wide ribbons spaced 12" o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment. Insulations listed as the base layer shall only be used as the base layer with a second layer of approved top layer insulation installed as the final membrane substrate. Composite insulation boards used as a top layer shall be installed with the polyisocyanurate face down.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -195 psf (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(6): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone MB Base M adhered with Firestone I.S.O. Twin Pack Insulation Adhesive applied in 1/2 - 3/4 in. wide ribbons spaced 12" o.c.

Note: Concrete deck shall be primed with ASTM D 41 asphalt primer and allowed to dry prior to application of Vapor Barrier. Base insulation shall be adhered to the Vapor Barrier using Firestone ISO Twin Pack Insulation Adhesive, applied in 1/2" to 3/4" wide ribbons spaced 12" on center. All subsequent layers of insulation shall be adhered to the previous layer of insulation using Firestone ISO Twin Pack Insulation Adhesive, applied in 1/2" to 3/4" wide ribbons spaced 12" on center. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck or DensDeck Prime Minimum: 1/4" thick	N/A	N/A

Membrane: One ply of UltraPly TPO adhered to coverboard using UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side laps are sealed with a minimum 1.5" heat weld.

Maximum Design Pressure: -232.5 psf; (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(7): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone SBS PolyTorch or SBS Glass Torch Base membrane is torch adhered to the primed concrete deck.

Note: Concrete deck shall be primed with ASTM D 41 asphalt primer and allowed to dry prior to application of Vapor Barrier. Base insulation shall be adhered to the Vapor Barrier using Firestone ISO Twin Pack Insulation Adhesive, applied in 1/2" to 3/4" wide ribbons spaced 12" on center. All subsequent layers of insulation shall be adhered to the previous layer of insulation using Firestone ISO Twin Pack Insulation Adhesive, applied in 1/2" to 3/4" wide ribbons spaced 12" on center. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
DensDeck or DensDeck Prime Minimum: 1/4" thick	N/A	N/A

Membrane: UltraPly TPO adhered to coverboard using UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -232.5 psf; (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(8): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone MB Base SA, self-adhered to primed concrete deck

Note: Concrete deck shall be primed with Firestone SA Primer, roller applied at a rate of 200 ft²/gallon and allowed to dry prior to application of Vapor Barrier. Insulation shall be adhered using Firestone I.S.O. Twin Pack Insulation Adhesive, applied in ½” to ¾” wide ribbons spaced 8” o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5” thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5” thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISOGARD HD Minimum: ½” thick	N/A	N/A
DensDeck or DensDeck Prime Minimum: ¼” thick	N/A	N/A

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld

Maximum Design Pressure: -112.5 psf; (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(9): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
DensDeck or DensDeck Prime Minimum ¼" thick	N/A	N/A

Note: Base insulation shall be adhered to the deck with Firestone I.S.O. Stick Adhesive applied in ¾ to 1 in. wide ribbons spaced 12" o.c. All subsequent layers of insulation shall be adhered to the previous layer of insulation using Firestone I.S.O. Stick Adhesive applied in ¾ to 1 in. wide ribbons spaced 12" o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -150 psf (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(10): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A
Top Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime Minimum ¼" thick	N/A	N/A

Note: Insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with hot asphalt applied at a rate of 20-25 lb/sq. The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure:
 -487.5 psf without coverboard (See General Limitation #9)
 -457.5 psf with coverboard (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(11): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: Concrete deck shall be primed with ASTM D 41 asphalt primer at a rate of 3/4 - 1 gal/sq. and allowed to dry prior to application of insulation. Insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with hot asphalt applied at a rate of 20-25 lb/sq or with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -382.5 psf; Hot Asphalt Applied (See General Limitation #9)
-75.0 psf; XR Bonding Adhesive Applied (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(12): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL		
Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime		
Minimum: ¼" thick	N/A	N/A

Note: Concrete deck shall be primed with ASTM D 41 asphalt primer at a rate of ¾ - 1 gal/sq. and allowed to dry prior to application of insulation. Insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with hot asphalt applied at a rate of 20-25 lb/sq. or with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -457.5 psf; Hot Asphalt Applied (See General Limitation #9)
-300 psf; XR Bonding Adhesive Applied (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(13): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: Insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 adhered with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -112.5 psf (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(14): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
DensDeck Prime Minimum ¼" thick	N/A	N/A

Note: Insulation shall be adhered to the deck in full mopping of approved asphalt within the EVT range and at a rate of 20-25 lbs/sq. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 adhered with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -232.5 psf (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(15): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL		
Minimum: 1.5" thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL		
Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
Plywood		
Minimum: 19/32" thick	N/A	N/A
FiberTop E		
Minimum: ½" thick	N/A	N/A

Note: Insulation shall be adhered to the deck with Firestone I.S.O. Stick Adhesive applied in ¾ to 1 in. wide ribbons spaced 12" o.c. and walked in. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO membrane fully adhered with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -247.5 psf; with Plywood (See General Limitation #9)
-60 psf; with FiberTop E (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(16): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A

Note: Insulation shall be adhered to the deck with Firestone I.S.O. Stick Adhesive applied in ¾ to 1 in. wide ribbons spaced 12" o.c. and walked in. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Primer: (Optional) Concrete deck shall be primed with ASTM D 41 asphalt primer at a rate of ¾ - 1 gal/sq. and allowed to dry prior to application of insulation.

Membrane: One ply of UltraPly TPO XR 100 or UltraPly TPO XR 115 adhered to coverboard using Firestone XR Bonding Adhesive at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5" heat weld.

Maximum Design Pressure: -270.0 psf (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(17): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISOGARD HD Minimum ½" thick	N/A	N/A

Note: Insulation shall be adhered to the deck with Firestone I.S.O. FIX II Adhesive applied in ¾" – 1" wide ribbons spaced 4" o.c. or with Firestone I.S.O. Stick Adhesive Fastener applied in continuous ¾" – 1" wide ribbons spaced 12" o.c Adhesive. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -247.5 psf (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: 2500 psi or greater structural concrete or concrete plank
System Type A(18): One or more layers of insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISOGARD HD Minimum ½" thick	N/A	N/A

Note: Insulation shall be adhered to the deck with Firestone I.S.O. FIX II Adhesive applied in ¾" – 1" wide ribbons spaced 4" o.c. or with Firestone I.S.O. Stick Adhesive Fastener applied in continuous ¾" – 1" wide ribbons spaced 12" o.c Adhesive . Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 membrane fully adhered to the top insulation layer with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5" heat weld.

Maximum Design Pressure: -360 psf; (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(19): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone MB Base SA, self-adhered to primed concrete deck

Note: Concrete deck shall be primed with Firestone SA Primer, roller applied at a rate of 200 ft²/gallon and allowed to dry prior to application of Vapor Barrier. Insulation shall be adhered using Firestone I.S.O. Twin Pack Insulation Adhesive, applied in ½” to ¾” wide ribbons spaced 8” o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5” thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5” thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISOGARD HD Minimum: ½” thick	N/A	N/A
DensDeck or DensDeck Prime Minimum: ¼” thick	N/A	N/A

Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon or with hot asphalt applied at a rate of 20-25 lb/sq (only when using DensDeck or DensDeck Prime). The roof cover laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -112.5 psf; (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(20): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone MB Base SA, self-adhered to primed concrete deck

Note: Concrete deck shall be primed with Firestone SA Primer, roller applied at a rate of 200 ft²/gallon and allowed to dry prior to application of Vapor Barrier. Insulation shall be adhered using Firestone I.S.O. Stick Adhesive Fastener, applied in ¾" – 1" wide ribbons spaced 12" o.c. or Firestone I.S.O. Twin Pack Insulation Adhesive applied in ½" – ¾" wide ribbons spaced 12" o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISOGARD HD Minimum: ½" thick	N/A	N/A
ISOGARD HD Composite Minimum: 2" thick	N/A	N/A

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld
 Or
 Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -90.0 psf; (See General Limitation #9)



Membrane Type: Single Ply, Thermoplastic, TPO
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank.
System Type A(21): Vapor Barrier and insulation adhered with approved adhesive; membrane fully adhered.

All General and System Limitations apply.

Vapor Barrier Firestone MB Base SA, self-adhered to primed concrete deck

Note: Concrete deck shall be primed with Firestone SA Primer, roller applied at a rate of 200 ft²/gallon and allowed to dry prior to application of Vapor Barrier. Insulation shall be adhered using Firestone I.S.O. Stick Adhesive Fastener, applied in ¾" – 1" wide ribbons spaced 12" o.c. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Mid Insulation Layer (Optional)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum: 1.5" thick	N/A	N/A
Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
DensDeck or DensDeck Prime Minimum: ¼" thick	N/A	N/A

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld

Or

Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 fully adhered with hot asphalt applied at a rate of 20-25 lb/sq or with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld

Maximum Design Pressure: -90.0 psf; (See General Limitation #9)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type B(1): Base layer of insulation mechanically fastened, optional top layer adhered with approved asphalt.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISOGARD HD Composite Minimum 1" thick	1 or 8 with 7	1: 1.33 ft²

Note: Base layer shall be mechanically attached with fasteners and density described above. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density. See Roofing Application Standard RAS 117 for fastening details.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -60.0 psf; (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type B(2): Base layer of insulation mechanically fastened, optional top layer adhered with approved asphalt.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISOGARD HD Composite Minimum 1.5" thick	1 or 8 with 7	1: 1.33 ft²

Note: Base layer shall be mechanically attached with fasteners and density described above. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density. See Roofing Application Standard RAS 117 for fastening details.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -112.5 psf; (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type B(3): Base layer of insulation mechanically fastened, optional top layer adhered with approved asphalt.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISOGARD HD Composite Minimum 2" thick	1 or 8 with 7	1: 1.33 ft²

Note: Base layer shall be mechanically attached with fasteners and density described above. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density. See Roofing Application Standard RAS 117 for fastening details.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -120.0 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type B(4): Base layer of insulation mechanically fastened, optional top layer adhered with approved asphalt.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum 2" thick	1 or 8 with 7	1:1 ft ²
Top Insulation Layer (cover board)	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISOGARD HD Minimum ½" thick	N/A	N/A

Note: Base layer shall be mechanically attached with fasteners and density described. Top layer of insulation shall be adhered to base insulations with Firestone I.S.O. Twin Pack Insulation Adhesive in continuous ½" – ¾" wide beads spaced 12" o.c. or Firestone I.S.O. FIX II Adhesive or I.S.O. Stick Adhesive Fastener applied in continuous ¾" – 1" wide ribbons spaced 12" o.c. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density (See Roofing Application Standard RAS 117 for fastening details).

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -90.0 psf; Firestone UltraPly Bonding Adhesive (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(1): All layers of insulation simultaneously attached; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
Plywood Minimum 19/32" thick	1	1:1 ft ²

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -150 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(2): All layers of insulation simultaneously attached; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL		
Minimum 1.2" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
Plywood		
Minimum 19/32" thick	6	1:1.6 ft ²

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -52.5 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced

Deck Type 3I: Concrete, Insulated

Deck Description: Min. 2500 psi structural concrete or concrete plank

System Type C(3): All layers of insulation simultaneously attached; membrane fully adhered.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL		
Minimum 1.5" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Top Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
DensDeck Prime		
Minimum ½" thick	1	See Below

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design

Pressure: -75 psf at a fastener density of 1:1.33 ft² (See General Limitation #7)
-105 psf at a fastener density of 1:1 ft² (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(4): Membrane fully adhered over mechanically fastened insulation.

All General and System Limitations apply.

Base Insulation Layer	Fastener Type (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	4	1:1.33

Note: Base layer shall be mechanically attached with fasteners and density described above. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density. See Roofing Application Standard RAS 117 for fastening details.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -90 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(5): Membrane fully adhered over mechanically fastened insulation.

All General and System Limitations apply.

Base Insulation Layer	Fastener Type (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum 2" thick	4	1:1.6

Note: Base layer shall be mechanically attached with fasteners and density described above. Insulation panels listed are minimum sizes and dimensions; if larger panels are used the number of fasteners per board shall be increased maintaining the same fastener density. See Roofing Application Standard RAS 117 for fastening details.

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -75 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(6): Membrane fully adhered over mechanically fastened insulation.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Top Insulation Layer (cover board)	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISOGARD HD Minimum ½" thick	1 or 8 with 7	1: 1.33 ft ²

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft²/gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -60.0 psf; (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type C(7): Membrane fully adhered over mechanically fastened insulation.

All General and System Limitations apply.

Base Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: All layers shall be simultaneously fastened; see top layer below for fasteners and density. Insulation panels listed are minimum sizes and dimensions; if larger panels are used, the number of fasteners shall be increased maintaining the same fastener density. Please refer to Roofing Application Standard RAS 117 for insulation attachment.

Top Insulation Layer (cover board)	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO GARD HD Minimum 1" thick	1 or 8 with 7	1: 1.8 ft²

Membrane: Firestone UltraPly TPO membrane fully adhered to the top insulation layer with Firestone UltraPly Bonding Adhesive applied to both the substrate and the underside of the roof cover for a combined rate of 120 ft² /gal. The roof cover side and end laps are sealed with a minimum 1.5 in. heat weld.

Maximum Design Pressure: -45.0 psf; (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type D(1): Membrane mechanically attached over preliminary fastened insulation.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: All layers of insulation and membrane shall be simultaneously attached. See membrane below for fasteners and density. Refer to Roofing Application Standard RAS 117 for insulation attachment requirements. Insulation shall have preliminary attachment, prior to the installation of the roofing membrane.

Membrane: Mechanically attach Firestone UltraPly QuickSeam R.M.A. Strips with Firestone Heavy Duty Fasteners 6" o.c. in Firestone Coiled Metal Batten Strip centered within the 4" wide center section of the UltraPly QuickSeam R.M.A Strips in rows 10 ft. o.c. Firestone UltraPly TPO roof cover is adhered to the UltraPly QuickSeam R.M.A. Strips by first priming the underside of the roof cover, at the strip locations, with Firestone Single-Ply QuickPrime and placing the primed portion of the roof cover onto the strips. Minimum 2" wide side laps are sealed with a minimum 1.5" wide heat weld.

Maximum Design Pressure: -45 psf (See General Limitation #7)



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3I: Concrete, Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type D(2): Membrane mechanically attached over preliminary fastened insulation.

All General and System Limitations apply.

Insulation Layer	Insulation Fasteners (Table 3)	Fastener Density/ft ²
ISO 95+ GL Minimum 1.5" thick	N/A	N/A

Note: All layers of insulation and membrane shall be simultaneously attached. See membrane below for fasteners and density. Refer to Roofing Application Standard RAS 117 for insulation attachment requirements. Insulation shall have preliminary attachment, prior to the installation of the roofing membrane.

- Membrane:** Firestone UltraPly TPO mechanically fastened to the deck through the insulation as described below:
- Fastening #1:** Membrane is mechanically attached using Firestone HD Plus Fasteners and HD Plus Seam Plates spaced 6" o.c. within minimum 6" wide laps. Laps are spaced at maximum 142" o.c. and sealed with a minimum 1.5" heat weld.
Maximum Design Pressure: -60 psf (See General Limitation #7)
- Fastening #2:** Membrane is mechanically attached using Firestone HD Plus Fasteners and 1" wide Firestone Coiled Metal Batten Strip with fasteners spaced 6" o.c. along the batten bar within minimum 6" wide laps. Laps are spaced at maximum 142" o.c. and sealed with a minimum 5" wide heat weld that encapsulates the fasteners and batten strip.
Maximum Design Pressure: -60 psf (See General Limitation #7)
- Fastening #3:** Membrane is mechanically attached using Firestone HD Plus Fasteners and HD Plus Seam Plates spaced 6" o.c. within minimum 6" wide laps. Laps are spaced at maximum 114" o.c. and sealed with a minimum 1.5" heat weld.
Maximum Design Pressure: -67.5 psf (See General Limitation #7)
- Fastening #4:** Membrane is mechanically attached using Firestone HD Plus Fasteners and 1" wide Firestone Coiled Metal Batten Strip with fasteners spaced 6" o.c. along the batten bar within minimum 6" wide laps. Laps are spaced at maximum 114" o.c. and sealed with a minimum 5" wide heat weld that encapsulates the fasteners and batten strip.
Maximum Design Pressure: -67.5 psf (See General Limitation #7)
- Fastening #5:** Membrane is mechanically attached using Firestone HD Fasteners and HD Seam Plates spaced 12" o.c. within minimum 6" wide laps. Laps are spaced at maximum 142" o.c. and sealed with a minimum 1.5" heat weld.
Maximum Design Pressure: -52.5 psf (See General Limitation #7)



Fastening #6: Membrane is mechanically attached using Firestone HD Fasteners and 1" wide Firestone Coiled Metal Batten Strip with fasteners spaced 6" o.c. along the batten bar within minimum 6" wide laps. Laps are spaced at maximum 142" o.c. and sealed with a minimum 5" wide heat weld that encapsulates the fasteners and batten strip.

Maximum Design Pressure: -52.5 psf (See General Limitation #7)

Fastening #7: Membrane is mechanically attached using Firestone HD Plus Fasteners and Firestone 3/4" or 1" Polymer Batten Strips with fasteners spaced 6" o.c. along the batten bar in rows spaced 142" o.c. and along one intermediate field row centered in the field of the sheet. Side laps are sealed with a minimum 5" heat weld and the intermediate field row is covered with a minimum 5" wide strip of UltraPly TPO and sealed with a minimum 1.5" heat weld on either side of the batten.

Maximum Design Pressure: -135 psf (See General Limitation #7)

Fastening #8: Membrane is mechanically attached using Firestone HD Fasteners and Firestone 3/4" or 1" Polymer Batten Strips with fasteners spaced 6" o.c. along the batten bar within minimum 6" wide laps. Laps are spaced at maximum 68" o.c. and sealed with a minimum 5" wide heat weld that encapsulates the fasteners and batten strip.

Maximum Design Pressure: -82.5 psf (See General Limitation #7)

Maximum Design Pressure:

See Fastening Options Above



Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3: Concrete, Non-Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type F(1): Membrane adhered to substrate

All General and System Limitations Apply.

Barrier: None.
Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 Reinforced Membrane fully adhered with Hot Asphalt with the EVT range at a rate of 20-40 lbs per 100 sq. ft.
Maximum Design Pressure: -500 psf (See General Limitation #9)

Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3: Concrete, Non-Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type F(2): Membrane adhered to substrate

All General and System Limitations Apply.

Barrier: None.
Membrane: Firestone UltraPly TPO XR 100 or UltraPly TPO XR 115 Reinforced Membrane fully adhered with Firestone XR Bonding Adhesive
Maximum Design Pressure: -470 psf (See General Limitation #9)

Membrane Type: Single Ply, TPO, Reinforced
Deck Type 3: Concrete, Non-Insulated
Deck Description: Min. 2500 psi structural concrete or concrete plank
System Type F(3): Membrane adhered to primed substrate

All General and System Limitations Apply.

Primer: Concrete deck shall be primed with ASTM D 41 asphalt primer at a rate of ¾ - 1 gal/sq and allowed to dry prior to the application of the specified roofing membrane.
Membrane: One ply of UltraPly TPO XR 115 adhered to primed deck with hot asphalt applied at a rate of 20-25 lb/sq or with Firestone XR Bonding Adhesive applied at a rate of 70-90 ft²/gallon. The roof cover laps are sealed with a minimum 1.5" heat weld.
Maximum Design Pressure: -495 psf; Hot Asphalt Applied (See General Limitation #9)
Pressure: -180 psf; XR Bonding Adhesive Applied (See General Limitation #9)



CONCRETE DECK SYSTEM LIMITATIONS:

1. If mechanical attachment to the structural deck through the lightweight insulating concrete is proposed, a field withdrawal resistance testing shall be performed to determine equivalent or enhanced fastener patterns and density. All testing and fastening design shall be in compliance with Testing Application Standard TAS 105 and Roofing Application Standard RAS 117 and/or RAS 137, calculations shall be signed and sealed by a Florida registered Professional Engineer, Registered Architect, or Registered Roof Consultant.

GENERAL LIMITATIONS:

1. Fire classification is not part of this acceptance; refer to a current Approved Roofing Materials Directory for fire ratings of this product.
2. Insulation may be installed in multiple layers. The first layer shall be attached in compliance with Product Control Approval guidelines. All other layers shall be adhered in a full mopping of approved asphalt applied within the EVT range and at a rate of 20-40 lbs./sq., or mechanically attached using the fastening pattern of the top layer
3. All standard panel sizes are acceptable for mechanical attachment. When applied in approved asphalt, panel size shall be 4' x 4' maximum.
4. An overlay and/or recovery board insulation panel is required on all applications over closed cell foam insulations when the base sheet is fully mopped. If no recovery board is used the base sheet shall be applied using spot mopping with approved asphalt, 12" diameter circles, 24" o.c.; or strip mopped 8" ribbons in three rows, one at each side lap and one down the center of the sheet allowing a continuous area of ventilation. Encircling of the strips is not acceptable. A 6" break shall be placed every 12' in each ribbon to allow cross ventilation. Asphalt application of either system shall be at a minimum rate of 12 lbs./sq. **Note: Spot attached systems shall be limited to a maximum design pressure of -45 psf.**
5. Fastener spacing for insulation attachment is based on a Minimum Characteristic Force (F') value of 275 lbf., as tested in compliance with Testing Application Standard TAS 105. If the fastener value, as field-tested, are below 275 lbf. Insulation attachment shall not be acceptable.
6. Fastener spacing for mechanical attachment of anchor/base sheet or membrane attachment is based on a minimum fastener resistance value in conjunction with the maximum design value listed within a specific system. Should the fastener resistance be less than that required, as determined by the Building Official, a revised fastener spacing, prepared, signed and sealed by a Florida registered Professional Engineer, Registered Architect, or Registered Roof Consultant may be submitted. Said revised fastener spacing shall utilize the withdrawal resistance value taken from Testing Application Standards TAS 105 and calculations in compliance with Roofing Application Standard RAS 117.
7. Perimeter and corner areas shall comply with the enhanced uplift pressure requirements of these areas. Fastener densities shall be increased for both insulation and base sheet as calculated in compliance with Roofing Application Standard RAS 117 and/or RAS 137. Calculations prepared, signed and sealed by a Florida registered Professional Engineer, Registered Architect, or Registered Roof Consultant (**When this limitation is specifically referred within this NOA, General Limitation #9 will not be applicable.**)
8. All attachment and sizing of perimeter nailers, metal profile, and/or flashing termination designs shall conform to Roofing Application Standard RAS 111 and applicable wind load requirements.
9. The maximum designed pressure limitation listed shall be applicable to all roof pressure zones (i.e. field, perimeters, and corners). Neither rational analysis, nor extrapolation shall be permitted for enhanced fastening at enhanced pressure zones (i.e. perimeters, extended corners and corners). (**When this limitation is specifically referred within this NOA, General Limitation #7 will not be applicable.**)
10. All products listed herein shall have a quality assurance audit in accordance with the Florida Building Code and Rule 9B-72 of the Florida Administrative Code.

END OF THIS ACCEPTANCE



NOA No.: 09-0902.10
Expiration Date: 05/18/16
Approval Date: 04/14/11
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