Quick Reference Guide

March 03, 2021

MWA
Commercial Roofing Solutions
ON TOP OF YOUR BUILDING ENVELOPE NEEDS

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MWA Product Portfolio

Roofing

EPDM, PVC, TPO, Asphalt + Metal

Plaza Decks

Vegetated Roofs

Skylights

Cover Boards

Firestone

Firestone Building Products

Georgia-Pacific DensDeck® Roof Board

Edge Systems

Fascias, Copings + Gutters

ES-1 + FM Tested

HICKMAN EDGE SYSTEMS

Fall Protection

Design, Supply + Installation

Suspended Access and Fall Restraint

Hatch Rails

SafePro Rooftop Protection

Skyline Fall Protection

Roof Moisture Inspections

Electronic Leak Detection

Leak Monitoring Systems

SMT Structure Monitoring Technology

Concrete Moisture Mitigation

AC•TECH Concrete Primers

Coatings

Silicone, Acrylic + Urethane

Parking Decks + Waterproofing

KEMPER SYSTEM

Gaco

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Disclaimer:

The MWA Quick Reference Guide is intended to be a tool to assist industry professionals with roof design. The information in this document is deemed accurate; however, it is the responsibility of the user to verify and validate the content .

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Red Shield Insulation Attachment Matrix

Fully Adhered Systems over a 22 gauge, 33 ksi Steel Deck

FIRESTONE STANDARD 55 MPH WARRANTY *No Increase for Perimeter and Corners*									Uplift: 90 (-45) psf (not FM)					
		5-25 Year RS		30 Year RS	5-15 Year RS Bead Spacing	20-30 Year RS Bead Spacing			Fastener Spacing			Foam Bead Spacing		
		Number of fasteners per Board Size												
Product Name	Board Thickness	4' X 4'	4' X 8'	4' X 8'	All Zones	Field	Perimeter	Corner	Field	Perimeter	Corner	Field	Perimeter	Corner
PolyISO 95+ Resista	1.0"-1.4"	8	16	16	12"	12"	6"	4"	16	24	32	12"	6"	4"
	1.5"-1.9"	6	12	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
	2.0" - 4.0"	4	8	16	12"	12"	6"	4"	8	16	32	12"	6"	4"
ISOGARD HD	0.5"	6	12	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
HD Composite	1.5"	6	12	16	12"	12"	6"	4"	10	16	32	12"	6"	4"
	2.0"-4.0"	4	8	16	12"	12"	6"	4"	10	16	32	12"	6"	4"
Hailgard*	1.5"	6	12	16	12"	12"	6"	4"	8	16	32	12"	6"	4"
	2.0"-4.0"	4	8	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
Densdeck	0.25"	8	16	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
	0.5"	6	12	16	12"	12"	6"	4"	10	16	32	12"	6"	4"
	0.625"	4	8	16	12"	12"	6"	4"	8	16	32	12"	6"	4"
DensDeck Prime	0.25"	6	12	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
	0.5"	5	10	16	12"	12"	6"	4"	10	16	32	12"	6"	4"
	0.625"	4	8	16	12"	12"	6"	4"	8	16	32	12"	6"	4"
DensDeck StormX**	0.625"	4	8	n/a	12"	12"	6"	4"	16	24	32	12"	6"	4"
Securerock Gypsum-Fiber	0.25"	5	10	16	12"	12"	6"	4"	16	24	32	12"	6"	4"
	0.5"	4	8	16	12"	12"	6"	4"	12	18	32	12"	6"	4"
	0.625"	4	8	16	12"	12"	6"	4"	8	16	32	12"	6"	4"
Structodeck HD***	0.5" - 1.0"	8	16	n/a	12"	12"	6"	4"	16	24	32	12"	6"	4"

*HD Fasteners and 3" Plates, NO Hailgard Fasteners

**DensDeck StormX is only approved for UltraPly TPO membrane systems.

***Structodek HD max. 15 year warranty.

For Standard Firestone Warranties:

Mechanical fastening for insulation requirements apply to all buildings up to 250'
Foam adhesion spacing requirements apply to all buildings up to 100'
Contact MWA for requirements exceeding these building heights
Contact MWA if you are working with design or uplift pressures

AP Fasteners are acceptable for new construction and complete reroof on warranties up to 15 years
HD Fasteners are required for all recovers and all new roofs for 20 year and longer warranties
Structodeck HD is not permitted on 25 and 30 year roof systems
Full Spray coverage is acceptable in lieu of 4" bead spacing
4' x 4' boards are required when using insulation adhesive for attachment

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Invisiweld Attachment

UltraPly TPO and Firestone PVC

RED SHIELD™ WARRANTY	FIRESTONE FASTENER	Membrane / Insulation Attachment per 4' x 8' (1.2 m x 2.4 m) board			Additional Insulation Attachment When Vapor Barrier is Used		
		F	P	C	F	P	C
5-20 Year, New Construction	All-Purpose (AP)	6	10	12	CONTACT MWA		
15+ Years, Re-cover	Heavy Duty (HD)	6	10	12			
20+ Years, (See NOTE #2)	Heavy Duty (HD)	6	10	12			
72 mph Wind Speed Coverage	Heavy Duty (HD)	6	10	15			
80 mph Wind Speed Coverage	Heavy Duty (HD)	8	12	16			
90-100 mph Wind Speed Coverage	Heavy Duty (HD)	8	14	20			
110-120 mph Wind Speed Coverage	Heavy Duty (HD)	12	20	30			
For all Wind Speed Warranties above 80 mph, contact your Firestone Technical Services Advisor at 1-800-428-4511							
FM Global		F	P	C	F	P	C
FM 1-90	Heavy Duty (HD)	6	10	15	Contact your Firestone Building Systems Advisor		
FM 1-120	Heavy Duty (HD)	8	14	20			
FM 1-150	Heavy Duty (HD)	12	20	30			
Metal Building Re-cover		F	P	C	F	P	C
10, 15, or 20 Years	Membrane - Purlin Fastener	12.0" o.c.	6.0" o.c.	6.0" o.c.	N/A		
	Insulation - Heavy Duty (HD)	N/A			5	5	5
NOTE: Membrane must be attached to InvisiWeld plates that are installed directly into purlins with Firestone purlin fasteners, at a maximum of 10' o.c. in the field and 5' o.c. for perimeter and corners purlin spacing.							

Notes:

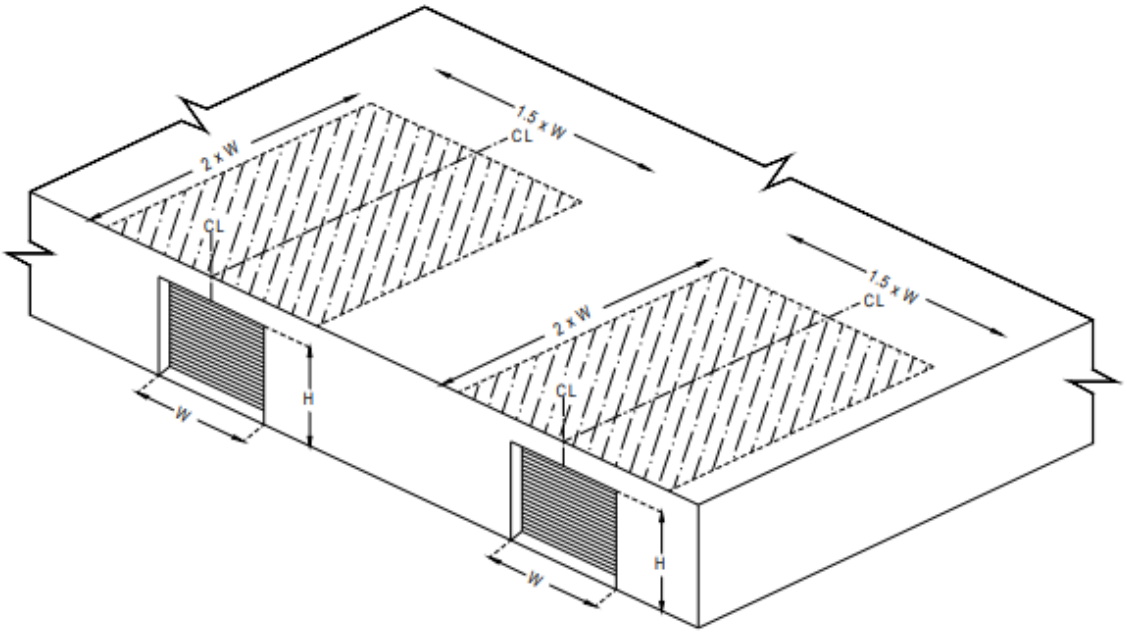
1. Rates above are based on contributory area rates.
2. 045" thick TPO and 050" thick PVC approved for 15-year warranties.
3. 060" thick or greater required for 20-year warranties.
4. 060" thick or greater required for any increased wind speed warranties.
5. 080" thick UltraPly TPO required for 25 and 30-year warranties.
6. 060" and 0.080" Firestone PVC approved for 20-year warranties.

Roof Enhancements

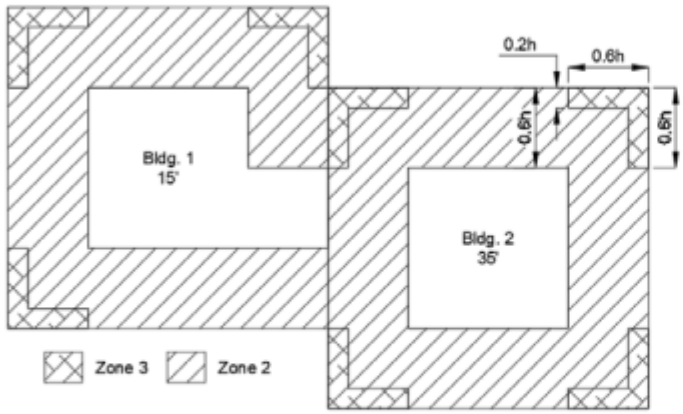
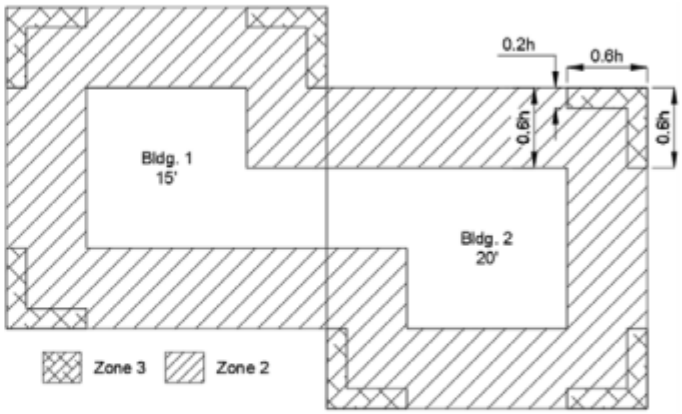
Large Wall Openings

The large wall opening enhancement is required when the sum of the various opening areas (w x h) is greater than 10% of the wall area.

Perimeter ½ sheets are required in the hatched area as shown in the diagram below. It is common installation practice to extend the perimeter along this entire building plan dimension to accommodate this rule, but it not required. For warranty purposes Firestone finds it acceptable to utilize battens, plates and fasteners or Invisiweld attachment methods for this enhancement.



Roof Elevation Changes

Elevation change of ≥ 10 ft	Elevation change of < 10 ft
	
Where the difference in roof elevations between abutting buildings or building sections is greater than or equal to 10 ft (3.0 m), treat abutting areas of the higher building as perimeter and corner areas in accordance with figure shown above.	Where the difference in roof elevations between abutting buildings is less than 10 ft (3.0 m), follow guidance in figure shown above. The perimeter and field zones continue from one roof to the other. The buildings must be abutting for this to apply.
Note: The buildings do not abut if there is any horizontal separation.	

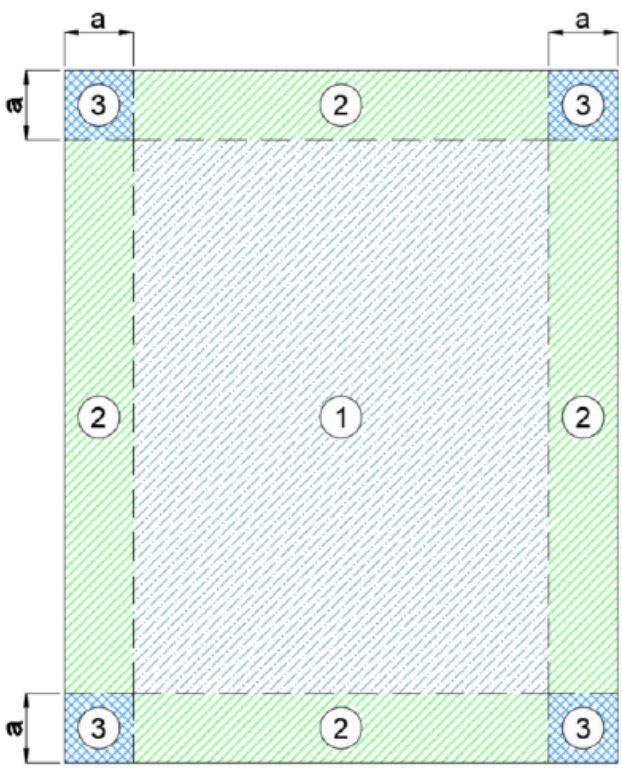
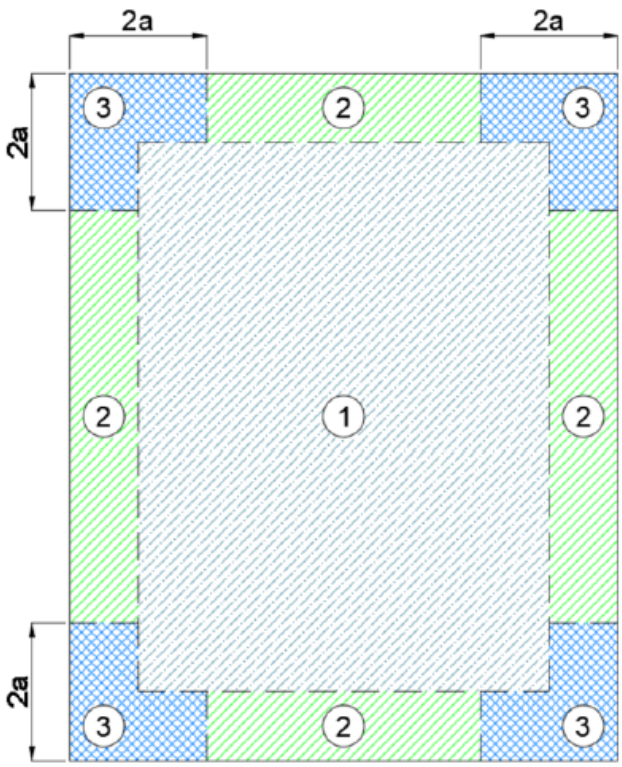
Roof Enhancements

RED SHIELD WARRANTY ENHANCEMENTS

Firestone Red Shield Warranties only require enhancements of the Perimeter and Corner attachment when one of the following conditions exist:

1. Roof Height exceeds 100’
2. Insulation adhesives is used on Warranty durations of 20 years and greater.
3. Increased Wind Speed Warranties are required (72 mph and greater).

Roof zones, as depicted below, represent the minimum roof zone construction required for warrantability and may not meet the requirements of the local Building Code, Specifications, or Building Owner requirements.

Roof Heights Where h ≤ 60 ft.	Roof Heights Where h > 60 ft.
	
Notation: a = 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft. h = Eave height shall be used for roof slopes under 2:12.	Notation: a = 10 percent of least horizontal dimension, but not less than 3 ft. h = Eave height shall be used for roof slopes under 2:12.

Warranty Pricing

RED SHIELD™ WARRANTIES (All System Types)

Warranty Type	Term	$ per Sq Ft	Min. $	$ Limit
Red Shield Platinum™*	30 Years	0.17	1275	No Dollar Limit
Red Shield**	25 Years	0.14	1050	
	20 Years	0.12	900	
	15 Years	0.08	600	
	10 Years	0.05	375	
	5 Years	0.02	150	
Hail***	Must include HD, Dens-Deck or HailGard and minimum 60 mil membrane	+0.02	N/A	
Cut & Puncture***	Minimum Membrane 60 mil Thickness Applies	+0.02	N/A	
Up Charge Rates for Warranties that include Special Conditions:	15 Year	0.02	N/A	TBD
	20 Year	0.03	N/A	
	25 Year	0.04	N/A	

* *Adding increased wind speed or hail coverage requires HailGard™ Composite Insulation. Extended Wind Speeds for other substrates will be priced in accordance with the Extended Wind Speed Coverage on pages 4 - 5.*
Hail and increased wind speed coverage not available for Metal Systems
Hail not available for Asphalt

** *2 Adhered plies of SBS or APP eligible for Max 20 Year Red Shield*
3 or 4 ply BUR eligible for Max 20 Year Red Shield

*** *Hail & Cut & Puncture only available with Single-Ply Red Shield, Platinum System Warranties, or Mechanically Attached Systems*

ADMINISTRATIVE FEES

Type	Fee
Warranty Changes:	**Free** for first change. **$75** for each subsequent change per warranty.
Change Preferred Repair Contractor:	**Free** for first change. **$100** for each subsequent change per warranty.
Post-Warranty Alterations:	**See Firestone Website**.
Warranty Inspection Charges:	**$750** each for 4th and each subsequent inspection.
Inspections to Reinstate Warranty Coverage:	**$750** per day plus travel expenses.
Miscellaneous Roof Audits:	**$750** up to 37,500 sq ft, **$0.02/sq ft** over 37,500 sq ft.
Warranty Transfers:	**$100** administrative fee.
Manually signed and/or certified Red Shield Warranty:	**$150** per original warranty. **$150** per additional copies.

Refer to current Warranty Pricing Guide for all warranty price information.

RubberGard EPDM

Warranty Matrix

TABLE 1.01-1
CHART OF ROOFING SYSTEM APPLICABILITY
RUBBERGARD™ EPDM SINGLE-PLY MEMBRANES

	System		Product	Slope	Barrel, Arch, etc.	Maximum Height	Maximum Warranty Term
RubberGard EPDM (Standard, LSFR, or FR)	Adhered		.090" PLATINUM (see PLATINUM Design Guide)	Unlimited	OK	250' (76.2 m)	30 Year
			.060" RubberGard EPDM	Unlimited	OK	250' (76.2 m)	25-Year
			.045" RubberGard EPDM	Unlimited	OK	250' (76.2 m)	15-Year
	Ballasted	Pavers	.060" RubberGard EPDM	Max. 2:12 (16.6%)	NO	250' (76.2 m)	20-Year
			.045" RubberGard EPDM	Max. 2:12 (16.6%)	NO	250' (76.2 m)	15-Year
		Stone	.060" RubberGard EPDM	Max. 2:12 (16.6%)	NO	75' (22.8 m)	20-Year
			.045" RubberGard EPDM	Max. 2:12 (16.6%)	NO	75' (22.8 m)	15-Year
	Mechanically Attached		.060" RubberGard EPDM With use of Air Barrier or where existing roof remains in place and is sealed. (Requires new or existing roof insulation be attached as in a fully adhered system)	Max. 4:12 (33.3%)	OK	Fastener Row spacing less than 7 feet 120' (36.6 m) Fastener Row spacing greater than 7 feet 80' (24.4 m)	20-Year
			.045" RubberGard EPDM	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-Year
			.060" RubberGard EPDM R.M.A.	Max. 4:12 (33.3%)	OK	120' (36.6 m)	25-Year
			.045" RubberGard EPDM R.M.A.	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-Year
EPDM RubberGard MAX (Reinforced Membrane)	Adhered		RubberGard MAX Any Thickness	Unlimited	OK	250' (76.2M)	20-Year
	Ballasted	Pavers	.075" RubberGard MAX	Max. 2:12 (16.6%)	NO	250' (76.2M)	20-Year
			.060" RubberGard MAX	Max. 2:12 (16.6%)	NO	250' (76.2M)	20-Year
			.045" RubberGard MAX	Max. 2:12 (16.6%)	NO	250' (76.2M)	15-Year
		Stone	.075" RubberGard MAX	Max. 2:12 (16.6%)	NO	75' (22.8 m)	20-Year
			.060" RubberGard MAX	Max. 2:12 (16.6%)	NO	75' (22.8 m)	20-Year
			.045" RubberGard MAX	Max. 2:12 (16.6%)	NO	75' (22.8 m)	15-Year
	Mechanically Attached		RubberGard MAX Any Thickness	Max. 4:12 (33.3%)	OK	120' (36.6 m)	20-Year
EPDM Metal Building Recover	Adhered		RubberGard EPDM Any Thickness (Standard, LSFR, or FR)	Unlimited	OK	250' (76.2 m)	20-Year
	Mechanically Attached		RubberGard R.M.A.	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-Year
GARDEN ROOFING	SEE GARDEN ROOF SECTION FOR DETAILS						

Table 1.01-1 FSBP EPDM Single-Ply Design Guide, September 2014

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UltraPly TPO

Warranty Matrix

TABLE 1.01-1
Chart of Roofing System Applicability
Thermoplastic Single-Ply Membranes

System			Product		Slope	Barrel, Arch, etc.	Maximum Height	Maximum Warranty Term
Platinum UltraPly TPO	Adhered (single or Wide Weld)		.080" UltraPly TPO (8' or 10' sheet)		Unlimited	OK	250' (76.2 m)	30 Year
	Mechanically Attached (Wide Weld)		.080" UltraPly TPO (8' sheet only)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	30 Year
UltraPly TPO & UltraPly TPO XR	Adhered (single or Wide Weld)		.060" UltraPly TPO (8' or 10' sheet)		Unlimited	OK	250' (76.2 m)	25 Year
			.060" UltraPly TPO (8',10', or 12' sheet)		Unlimited	OK	250' (76.2 m)	20 Year
			.045" UltraPly TPO (8',10', or 12' sheet)		Unlimited	OK	250' (76.2 m)	20 Year
			UltraPly TPO XR 135 (.080")	XR Stick	Unlimited	OK	250' (76.2 m)	30 Year
				Bonding Adhesive	Unlimited	OK		
				Asphalt	Max. 4:12	OK		
			UltraPly TPO XR 115 (.060")	XR Stick	Unlimited	OK	250' (76.2 m)	20 Year
				Bonding Adhesive	Unlimited	OK		
				Asphalt	Max. 4:12 (33.3%)	OK		
			UltraPly TPO XR 100 (.045")	XR Stick	Unlimited	OK	250' (76.2 m)	15 Year
				Bonding Adhesive	Unlimited	OK		
				Asphalt	Max. 4:12 (33.3%)	OK		
	Ballasted	Pavers	.060" UltraPly TPO		Max. 2:12 (16.6%)	NO	250' (76.2m)	20 Year
			.045" UltraPly TPO		Max. 2:12 (16.6%)	NO	250' (76.2m)	15 Year
		Stone	.060" UltraPly TPO		Max. 2:12 (16.6%)	NO	75' (22.8 m)	20 Year
			.045" UltraPly TPO		Max. 2:12 (16.6%)	NO	75' (22.8 m)	15 Year
	Mechanically Attached (Single or Wide Weld)		.060" UltraPly TPO (8' or 10' sheet only)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	25 Year
			.060" UltraPly TPO (8',10', or 12' sheet)		Max. 4:12 (33.3%)	OK	120" (36.6 m)	20 Year
			.045" UltraPly TPO (8',10', or 12' sheet)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	20 Year
			UltraPly TPO XR 135 (.080")		Max 4:12	OK	120' (36.6 m)	30 Year
			UltraPly TPO XR 115 (.060")		Max. 4:12 (33.3%)	OK	120" (36.6 m)	20 Year
			UltraPly TPO XR 100 (.045")		Max. 4:12 (33.3%)	OK	120' (36.6 M)	15 Year
	InvisiWeld™ or InvisiWeld-S Plate Induction Bonded System		.045" UltraPly TPO (8',10', or 12' sheet)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	15 Year
			.060" UltraPly TPO (8' or 10' sheet only)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	20 Year
			.060" UltraPly TPO (8',10', or 12' sheet)		Max. 4:12 (33.3%)	OK	120' (36.6 m)	20 Year
			.080" UltraPly TPO (8' or 10' sheet)		Max 4:12	OK	120' (36.6 m)	30 Year
UltraPly TPO SA	Self Adhered TPO Membrane		.060" UltraPly TPO SA		Max 4:12	OK	250' (76.2 m)	20 Year

Table 1.01-1 UltraPly TPO Design Guide, February 13, 2017

Firestone PVC

Warranty Matrix

TABLE 1.01-1
Chart of Roofing System Applicability
Firestone PVC Membranes

System	Product	Slope	Barrel, Arch, etc.	Maximum Height	Maximum Warranty Term
Adhered	Firestone PVC .050" (1.3 mm)	Unlimited	OK	250' (76.2 m)	15-year
	Firestone PVC Minimum .050" (1.3 mm)	Unlimited	OK	250' (76.2 m)	15-year
	Firestone PVC .060" (1.5 mm)	Unlimited	OK	250' (76.2 m)	20-year
	Firestone PVC Minimum .060" (1.5 mm)	Unlimited	OK	250' (76.2 m)	20-year
	Firestone PVC .080" (2.0 mm)	Unlimited	OK	250' (76.2 m)	20-year
	Firestone PVC Minimum .080" (2.0 mm)	Unlimited	OK	250' (76.2 m)	20-year
	Firestone PVC XR .050" (1.3 mm)	Max. 4:12 (33.3%)	OK	250' (76.2 m)	15-year
	Firestone PVC XR .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	250' (76.2 m)	20-year
	Firestone PVC XR Minimum .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	250' (76.2 m)	20-year
	Firestone PVC XR .080" (2.0 mm)	Max. 4:12 (33.3%)	OK	250' (76.2 m)	20-year
	Firestone PVC XR Minimum .080" (2.0 mm)	Max. 4:12 (33.3%)	OK	250' (76.2 m)	20-year
Mechanically Attached	Firestone PVC or PVC XR .050" (1.3 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-year
	Firestone PVC or PVC XR .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	120" (36.6 m)	20-year
	Firestone PVC or PVC XR Minimum .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	120" (36.6 m)	20-year
	Firestone PVC or PVC XR .080" (2.0 mm)	Max 4:12	OK	120' (36.6 m)	20-year
	Firestone PVC or PVC XR Minimum .080" (2.0 mm)	Max 4:12	OK	120' (36.6 m)	20-year
InvisiWeld Plate Induction Bonded System	Firestone PVC .050" (1.3 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-year
	Firestone PVC Minimum .050" (1.3 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	15-year
	Firestone PVC .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	20-year
	Firestone PVC Minimum .060" (1.5 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	20-year
	Firestone PVC .080" (2.0 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	20-year
	Firestone PVC Minimum .080" (2.0 mm)	Max. 4:12 (33.3%)	OK	120' (36.6 m)	20-year

Membrane + Insulation Attachment

Fastener Uses

Table 1.04-1

Firestone Fastener		For the attachment of:					
		Roofing Insulation (in combination with Firestone Insulation Plate)	**Base Sheets** (In combination with Firestone Insulation Plate)	**Firestone Batten Strips**	**Firestone Seam Plates**	**Firestone Termination Bars**	**Other Firestone accessories**
TIS Sheet No.	Fastener	See the specific fastener TIS for specific application data					
1001	All-Purpose Fastener	✔	✔	✔	✔	✔	✔
1002	Heavy-Duty Fastener*	✔	✔	✔	✔	✔	✔
1005	Concrete Drive Fastener	✔	✔	✔	✔	✔	✔
		Do not use with polymer batten strips.					
1006	Polymer Fastener	✔	✔	✔	✔		
		(Special battens and plates required)					
1007	Firestone AccuTrac Kit	✔	✔				
		Insulation to steel and wood roof decks with AccuTrac installation equipment. A kit consists of both fasteners and insulation plates for the AccuTrac tool.					
1009	HD Plus Fastener			✔	✔		
		Firestone Metal Batten Strips in Batten in the Seam (B.I.T.S.), M.A.S and Reinforced MAX, mechanically attached systems.					
1011	Purlin Fastener			✔	✔		
		Membrane and QuickSeam R.M.A. Strip to 12 – 18 gauge structural steel purlins. The Firestone Purlin Fastener can be used in conjunction with Firestone 2" Metal Plates, Firestone V-Plates, or batten strips.					
1012	LWC Base Ply Fastener		✔				
		For the attachment of base sheets. Insulation may not be attached with LWC Base Ply Fastener					
1013	#12 Belted Fastener	✔	✔				
		Insulation to steel (18-24 ga.) and wood. Belted fasteners must be installed with the IF160 automatic installation tool available from SFS INTEC. When used for insulation attachment, the Firestone IFC/PH 2.75" x 2.75" (70 mm x 70 mm) plate is used.					
1014	#15 Belted Fastener	✔	✔				
		Insulation and membrane to steel (18-24 ga.) and wood. The #15 Belted fasteners must be installed with the IF160 automatic installation tool available from SFS INTEC. When used for membrane attachment, the Firestone 2 ⅜" (60.3 mm) diameter plate is used. When used for insulation, the Firestone 2.75" x 2.75" (70 mm x 70 mm) plate is used.					
1015	Metal Cap Nailing Machine		✔				
		(For the attachment of base sheets. Insulation may not be attached with nails of any kind) Cap nails are to be used to attach a base sheet to a wood deck and cannot be used to attach insulation. Cap nails cannot be used to attach a base sheet through an existing built-up roof when the roof and insulation thickness is over ½"(12.7 mm).					
1019	HailGard Fastener	✔					
		For use with Firestone HailGard Insulation and OSB to approved decks. No insulation plate required.					
✔ = Acceptable for use							

Table 1.04-1 FSBP Attachment Guide, June 16, 2016

***HD Fasteners required for recovers and 20+ year warranties.**

Membrane + Insulation Attachment

Fastener Substrates

TABLE 1.05-1
ALLOWABLE FASTENER AND SUBSTRATE CONFIGURATIONS

Firestone Fastener		ADHERED MEMBRANE SYSTEMS	Mechanically Attached Membrane Systems		Acceptable for 20-year warranty	Steel Decks	Structural Concrete Decks	Plywood or OSB Decks	Cementitious Wood Fiber Decks	Gypsum Decks	Lightweight Insulating Concrete Decks (See Section 1.06 F for additional requirements)	
TIS Sheet No.	Fastener	Insulation Attachment	Insulation Attachment	Membrane Batten Strips or Seam Plates							Steel Pan	Concrete
1001	All-Purpose Fastener	✔	✔	✔		✔		✔				
1002	Heavy-Duty Fastener	✔	✔	✔	✔	✔	✔	✔			✔	✔
1005	Concrete Drive Fastener	✔	✔	✔	✔		✔					✔
1006	Polymer Fastener	✔	✔	✔	✔				✔	✔		
1007	Firestone AccuTrac Kit	✔	✔			✔		✔				
1009	HD Plus Fastener	✔	✔	✔	✔	✔						
1011	Purlin Fastener			✔								
1012	LWC Base Ply Fastener				✔					✔	✔	✔
		For the attachment of base sheets. Insulation may not be attached with LWC Base Ply Fastener										
1013	#12 Belted Fastener	✔	✔			✔		✔				
1014	#15 Belted Fastener	✔	✔		✔	✔		✔				
1015	Nail Driver							✔				
		For the attachment of base sheets. Insulation may not be attached with nails of any kind										
1019	HailGard Fastener	✔	✔		✔	✔	✔	✔			✔	✔

✔ = Acceptable for use

Table 1.05-1 FSBP EPDM Single-Ply Design Guide, September 2014

TABLE 1.08-3
CHART OF INSULATION ATTACHMENT OPTIONS
(MECHANICAL ATTACHMENT)

Structural Deck To Which Insulation/ Cover Board Will Be Mechanically Attached	Attachment Method						
	Firestone All Purpose (AP) and Plates	Firestone Heavy Duty (HD) and Plates	Firestone Polymer Fasteners and Plates	Firestone Concrete Drives and Plates	Firestone Belted Fastener and Plates	Firestone HailGard	Minimum penetration of fastener into/ through deck
Steel	✔	✔	N/A	N/A	✔	✔	¾" (19mm) through deck
Structural Concrete	N/A	✔	N/A	✔	N/A	✔	Heavy Duty(HD) or HailGard: 1" (25.4mm) into deck Concrete Drives: 1¼" (31.7mm) into deck
Plywood or OSB	✔	✔	N/A	N/A	✔	✔	1" (25.4mm) into or through deck
Wood Plank	✔	✔	N/A	N/A	✔	✔	1" (25.4mm) into or through deck
Gypsum	N/A	N/A	✔	N/A	N/A	N/A	1½" (38.1mm) into deck.
Cementitious Wood Fiber	N/A	N/A	✔	N/A	N/A	N/A	1½" (38.1mm) into deck.
Lightweight insulating concrete over steel deck (See Section 1.06 H for additional requirements)	N/A	✔	N/A	N/A	N/A	✔	Heavy Duty (HD) or HailGard ¾" (19mm) through steel pan
Lightweight insulating concrete over concrete deck (See Section 1.06 H for additional requirements)	N/A	✔	N/A	✔	N/A	✔	Heavy Duty (HD) or HailGard 1" (25.4mm) into the structural concrete deck. Concrete Drives 1¼" (31.7mm) into the structural concrete deck.

✔ = Acceptable for use
N/A = Not Applicable

Table 1.08-3 FSBP EPDM Single-Ply Design Guide, September 2014

Membrane + Insulation Attachment

Insulation Adhesives | Pull Tests

ACCEPTABLE INSULATION ADHESIVE SUBSTRATES

	Substrate	ISO Stick			ISO Twin Pack			ISO Spray			ISO Fix		
		Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable	Acceptable	Pull Test Required	Not Acceptable
Structural Deck	Steel*	X			X			X			X		
	New Structural Concrete**	X			X			X			X		
	Existing Structural Concrete		X			X		X				X	
	Plywood, OSB, Wood Planking	X			X			X			X		
	Cementitious Wood Fiber		X		X			X			X		
	Poured Gypsum		X			X		X				X	
	Lightweight Insulating Concrete Decks***	X					X	X					X
Membranes	V-Force	X			X			X					X
	Existing Asphalt		X			X		X				X	
	Existing Granule Surfaced Mod Bit		X			X		X				X	
	Existing Smooth Surfaced Mod Bit		X			X		X				X	
	Coal Tar Pitch		X			X				X			X
	Existing Single Ply Membranes			X			X			X			X
Insulation Cover/Barrier Boards	ISO 95+ GL, Resista, ISOGARD HD	X			X			X			X		
	FiberTop, StructoDeck	X			X			X			X		
	DensDeck, DensDeck Prime	X			X			X			X		
	Expanded / Extruded Polystyrene		X			X			X			X	
	Woodfiber (non-Firestone)		X			X			X			X	
	Fiberglass Insulation			X			X			X			X
	Perlite Insulation			X			X			X			X

* New steel decks may require cleaning to remove process oils.
** New poured decks must have a minimum 28 day cure time.
*** Acceptable Lightweight concrete includes cellular or air-entrained concrete. Lightweight concrete with aggregate (such as perlite or vermiculite) is not acceptable

TABLE 1.04-1
THE MINIMUM FASTENER PULLOUT RESISTANCES FOR SPECIFIC SYSTEMS

System	Minimum Fastener Pullout
Fully Adhered systems with Insulation Mechanically Attached to Deck	300 lb (136.1 KG)
Single-Ply mechanically attached.	400 lb (181.4 Kg)
Base Sheet Mechanically Attached to Deck	300 lb (136.1 Kg)
Base Sheet Nailed to Deck (Cap nail or LWC Fastener)	40 lb (18.1 Kg)
Contact the Quality Building Services Technical Department at Firestone Building Products when the structural deck does not meet the minimum fastener pullout requirements.	

Table 1.04-1 FSBP EPDM Single-Ply Design Guide, September 2014

TABLE 1.04 –2
RECOMMENDED NUMBER OF PULL OUT TESTS

ROOF SIZE		Number of Pull-Out Tests
Less Than 10,000 sf	Less Than 1,000 m^2	6
10,000 sf - 50,000 sf	1,000 m^2 – 5,000 m^2	10
50,000 sf - 100,000 sf	5,000 m^2 – 10,000 m^2	20
Over 100,000 sf	10,000 m^2	1 per 5,000 sf./ 500 m^2

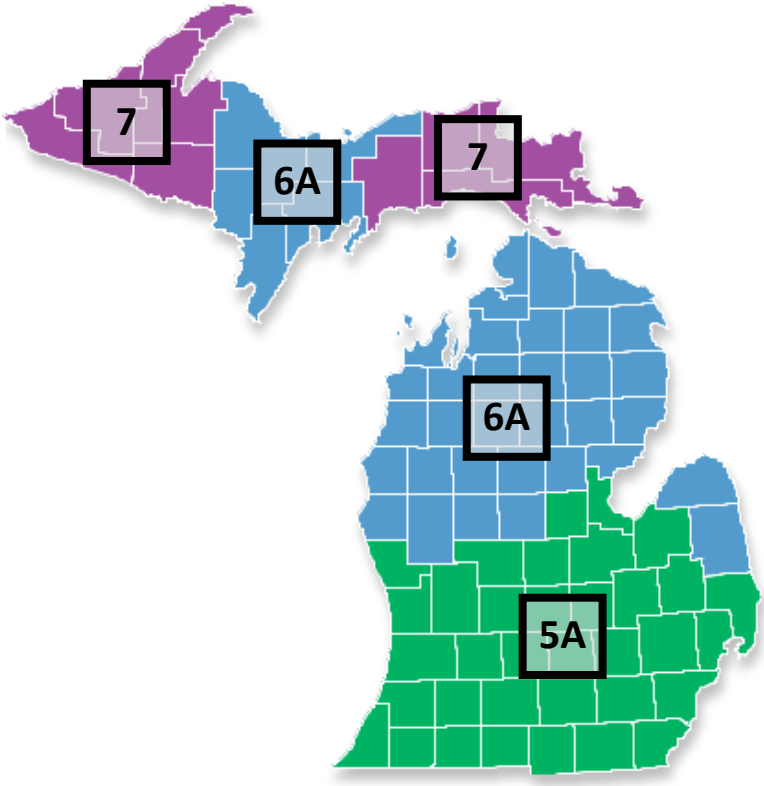
Table 1.04-2 FSBP EPDM Single-Ply Design Guide, September 2014

Section 2

2015 Michigan Energy Code	**15**
Wind Uplift Design	**16**
Factory Mutual (FM)—EPDM Assemblies	
Adhered Cover Board	**17**
Mechanically Attached Cover Board	**18**
Factory Mutual Perimeter Enhancements	**19**

2015 Michigan Energy Code—Part 10a

Effective September 20, 2017



Minimum R Value

(per Table 5.5 of ASHRAE 90.1—2013)

Zone 5A	R-30
Zone 6A	R-30
Zone 7	R-35

For roofs of a NONresidential building with insulation entirely above deck.

FIGURE C301.1a
CLIMATE ZONES

R 408.31098 (C506.1) Envelope alterations.

EXCEPTIONS:

5. Roof Recovering.

7. Removal and replacement of a roof membrane where the insulation is installed entirely above the roof deck, a minimum of R-20 insulation shall be permitted where the placement of additional insulation greater than R-20 insulation would require either of the following:

a. Raising the height of parapets, weep systems, or through wall flashings where roof abuts adjoining walls or parapets.

b. Raising the height of mechanical or electrical equipment, mechanical curbs, roof hatches, skylight curbs, service equipment, piping, conduit, duct work, roof platforms, ladders, stairs, guard rails, expansion joints, roof davits, or door thresholds.

This is not a replacement for the code itself, refer to the 2015 Michigan Energy Code and ASHRAE 90.1-2013 for complete code information.

MWA Commercial Roofing Solutions
ON TOP OF YOUR BUILDING ENVELOPE NEEDS

Wind Speed Design

Uplift Pressures Calculated in RoofWindDesigner.com

Height	Zone 1 (PSF)	Zone 2 (PSF)	Zone 3 (PSF)
15'	28.6	47.9	72.1
20'	28.6	47.9	72.1
25'	28.6	47.9	72.1
30'	28.6	47.9	72.1
35'	30	50.3	75.7
40'	31.1	52.2	78.6
45'	32	53.6	80.8
50'	33.1	55.5	83.7
55'	34	57	85.8
60'	34.8	58.4	88

Calculation Criteria

ASCE 7-10 (2015 Michigan Building Code)
115 MPH Wind Design Speed
Enclosed Building
Risk Category II (most common)
Exposure B (urban / suburban areas)
Steel Deck, Flat (1.5:12 or less)
EPDM Roof System
Design Uplift-Resistance Capacity
No parapet included

DISCLAIMER

1. The Registered Design Professional is responsible for determining the Design Uplift-Resistance Capacity (MBC 2015: 1603.1.4):

> **1603.1.4 Wind design data.** The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:
>
> 5. Design wind pressures to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, psf (kN/m^2).

2. Loads shown are for information purposes only and are not be used as certified design loads.
3. Design Uplift-Resistance Capacity Loads include a reasonable safety factor of 2.0x
4. Confirm tested assembly complies with requirements of the Red Shield Warranty, if applicable.

WIND UPLIFT COMPLIANCE

When reviewing Wind Uplift Design pressures, refer to Firestone tested assemblies in the following reports:

1. Firestone Code Approval Guide (lists common FM tested assemblies)
2. FM RoofNav, Design Pressure shown with safety factor included
3. UL Evaluation Reports, Maximum Design Pressure shown
4. State of Florida Product Approvals, Maximum Design Pressure shown
5. ICC ESR-3026, Allowable Wind Uplift Pressure shown

Note: Tested assemblies depicting Allowable Wind Uplift Pressures or Maximum Design Pressures already include a reduction (half) in the tested uplift pressure as a safety factor; therefore, you must double the tested uplift pressure in order to compare it to the Design Uplift-Resistance Capacity.

FM 1-90 | Fully Adhered 060 EPDM with Adhered Cover Board

Fully Adhered EPDM Systems over a 22 gauge 33 ksi steel deck

MECHANICALLY ATTACHED BASE LAYER OF INSULATION WITH ADHERED COVER BOARD

Cover Board	Mech. Attach. Base Layer Min. Thickness	Cover Board Bead Spacing			2nd Layer min. 0.5" ISO in Adh.			MA Base ISO Attachment			Membrane							Bonding				Insulation Adhesive				Resista	Vapor Barrier OPTIONAL			Roof Nav #	Notes/ Comments:
		Field	Perimeter	Corner	Field	Perimeter	Corner	Field	Perimeter	Corner	LS-FR	LS-FR PT	Platinum	Platinum PT	FullForce	MAX	max. slope (x:12)	BA-2004	Single Ply LVOC	Water Based	Solvent Free BA	ISO Stick	Twin Pack	ISO Spray	ISO Fix	Resista in lieu of ISO 95+ Optional (o)	4 mil Polyethylene	6 mil Polyethylene	V-Force on DensDeck. Min. DD Size		
ISO 95+ GL		12	6	4																											
	2.25" ISO							8	16	32	x	x	x	x			0.50	x	x	x		x	x		x	O	x	x	0.25	259515-0-0	
0.5" ISOGard HD		12	6	4																											
	1.5" ISO							16	24	32	x	x	x	x		x	0.25	x	x	x	x	x	x	x	x	O	x	x	0.25	307691-0-0	
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			REQ. .25" min.	384816-0-0	AP Fasteners
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			n/a	384817-0-0	Optional thermal barrier
1.5" ISOGard HD Comp		12	6	4																											
	1.5" ISO							12	18	32	x	x	x	x			0.50	x	x		x	x	x	x	x	O	x	x	0.25	341899-0-0	
	1.5" ISO							16	24	32	x	x	x	x			0.50	x	x	x	x	x	x	x	x	O	x	x	0.25	341216-0-0	
	2.0" ISO							8	16	32	x	x	x	x			0.50	x	x		x	x	x	x	x	O	x	x	0.25	341907-0-0	
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			REQ. .25" min.	384816-0-0	AP Fasteners, Interim iso layer in adhesive.
0.25" DensDeck		12	6	4																											
	1.5" ISO							16	24	32	x	x					1.00	x					x	x		O			REQ. .25" min.	424403-0-0	AP Fasteners
0.25" DensDeck Prime		12	6	4																											
	1.5" ISO							16	24	32	x	x					1.00	x					x	x		O			REQ. .25" min.	424403-0-0	AP Fasteners
	1.5" ISO							16	24	32	x	x					1.00		x				x	x		O	x	x	0.25	305743-0-0	AP Fasteners
	2.2" ISO							8	16	32	x	x				x	0.25	x	x	x	x		x	x		O			n/a	395716-0-0	AP Fasteners, Optional thermal barrier
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O				384817-0-0	Optional thermal barrier
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			REQ. .25" min.	384816-0-0	AP Fasteners
0.50" DensDeck Prime		12	6	4																											
	2.0" ISO							12	18	32	x	x				x	0.50			x			x			O			n/a	388115-0-0	
0.25" Securock GF		12	6	4																											
	1.5" ISO							16	24	32	x	x					1.00	x					x	x		O			REQ. .25" min.	424403-0-0	AP Fasteners
	1.5" ISO							16	24	32	x	x					1.00		x				x	x		O	x	x	0.25	305743-0-0	AP Fasteners
	2.2" ISO							8	16	32	x	x				x	0.25	x	x	x	x		x	x		O			n/a	395716-0-0	AP Fasteners, Optional thermal barrier
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			REQ. .25" min.	384816-0-0	AP Fasteners
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			n/a	384817-0-0	Optional thermal barrier
0.50" Wood Fiber		12	6	4																											
	2.2" ISO				12	6	4	8	16	32	x	x	x	x	x		0.50	x	x	x	x	x	x	x	x	O			n/a	384817-0-0	Optional thermal barrier
	2.2" ISO							8	16	32	x	x				x	0.25	x	x	x	x		x	x		O			n/a	395716-0-0	AP Fasteners, Optional thermal barrier

MECHANICALLY ATTACHED SUBSTRATE BOARD WITH INSULATION AND COVER BOARD IN ADHESIVE

Cover Board	Cover Board Min. Thickness	Cover Board Bead Spacing			2nd Layer min. 1.5" ISO in Adh.			Base Layer min. 1.5" ISO in Adh.			Membrane							Bonding				Insulation Adhesive				Resista	Vapor Barrier V-Force in Primer REQUIRED			Roof Nav #	Notes/ Comments:
		Field	Perimeter	Corner	Field	Perimeter	Corner	Field	Perimeter	Corner	LS-FR	LS-FR PT	Platinum	Platinum PT	FullForce	MAX	max. slope (x:12)	BA-2004	Single Ply LVOC	Water Based	Solvent Free BA	ISO Stick	Twin Pack	ISO Spray	ISO Fix	Resista in lieu of ISO 95+ Optional (o)	DensDeck	Securock GF	Substrate Board Attachment (4'x8' Board)		
ISO 95+ GL	1.5"	12	6	4				12	6	4	x	x	x	x			0.5	x	x	x		x	x	x		O	0.25"	0.50"	8 /board	293919-0-0	
DD, DDP, Securock GF	0.25"	12	6	4				12	6	4	x	x	x	x		x	0.5	x	x			x				O	0.25"	0.50"	8 /board	294276-0-0	
DD, DDP, Securock GF	0.25"	12	6	4	12	6	4	12	6	4	x	x					1	x	x			x	x	x		O	0.25"	0.50"	8 /board	408523-0-0	
DDP, Securock GF	0.50"	12	6	4				12	6	4	x	x			x		1	x			x			x		O	0.50"	n/a	12 /board	372357-0-0	DensDeck Prime Substrate Board ONLY
DDP, Securock GF	0.25"	12	6	4				12	6	4	x	x					1				x	x	x	x		O	0.25"	0.50"	8 /board	377589-0-0	
DDP, Securock GF	0.25"	12	6	4				12	6	4	x	x	x	x		x	0.5				x	x	x	x		O	0.25"	0.50"	8 /board	377588-0-0	

Refer to RoofNav assembly for complete information/requirements

It is the responsibility of the designer/user to validate assemblies in the chart for accuracy and warrantability.

DD = DensDeck, DDP = DensDeck Prime, Securock GF = Securock Gypsum Fiber

Must use primer when adhering V-Force to substrate board.

FM 1-90 | Fully Adhered 060 EPDM with Mech. Attached Cover Board

Fully Adhered EPDM Systems over a 22 gauge 33 ksi steel deck

Product Name	Board Thickness	Fastener Spacing			Membrane							Bonding				Resista	Vapor Barrier			Roof Nav #	Notes/ Comments:
																	OPTIONAL				
		Field	Perimeter	Corner	LS-FR	LS-FR PT	Platinum	Platinum PT	FullForce	MAX	max. slope (x:12)	BA-2004	Single Ply LVOC	Water Based	Solvent Free BA	Resista in lieu of ISO 95+ Optional (o)	4 mil Polyethylene	6 mil Polyethylene	V-Force on DensDeck. Min. DD Size		
ISO 95+ GL	1.25"-1.9"	12	18	32	x	x	x	x			0.50	x	x	x		O	x	x	0.25	320370-0-0	Solvent Free: 377886-0-0 (F:12 1.5" ISO)
	2" greater	8	16	32	x	x	x	x			0.50	x	x	x		O	x	x	0.25	32581-0-0	Solvent Free: 425421-0-0 (F:8)
ISOGard HD	.5"	12	18	32	x	x	x	x			0.50	x	x		x	O	x	x	0.25	285091-0-0	
ISOGard HD Comp	1.5"	8	16	32	x	x	x	x			0.50	x	x	x	x	O	x	x	0.25	291405-0-0	
Hailgard	2.0"	16	24	32	x	x			x		1.00	x	x			NO	x	x	0.25	286011-0-0	Plates and Fasteners, no HailGard Fasteners
DensDeck	.5"	16	24	32	x	x					1.00	x	x	x		O			0.25	34485-0-0	
DensDeck Prime	.25"	12	18	32	x	x				x	0.25	x	x	x	x	O			0.25	265577-0-0	
	.5"	8	16	32	x	x				x	0.50			x		O			n/a	388109-0-0	
Securerock	0.25	10	16	32	x	x				x	0.25	x	x	x	x	O	x	x	0.25	400691-0-0	
	0.5	8	16	32	x	x				x	0.25	x	x	x	x	O			0.25	400694-0-0	

Refer to RoofNav assembly for complete information/requirements.

It is the responsibility of the designer/user to validate assemblies in the chart for accuracy and warrantability.

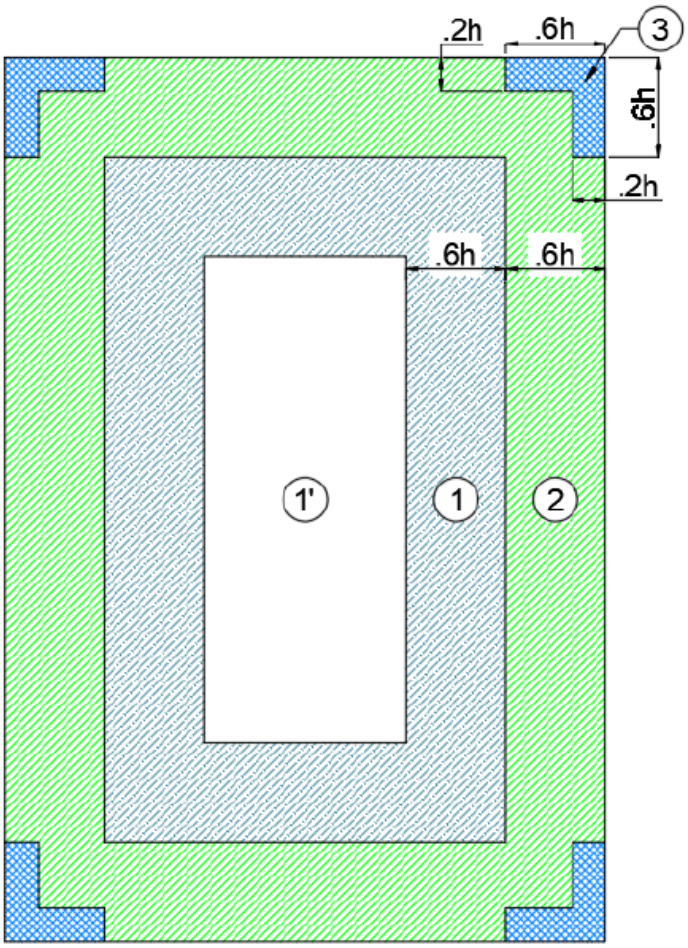
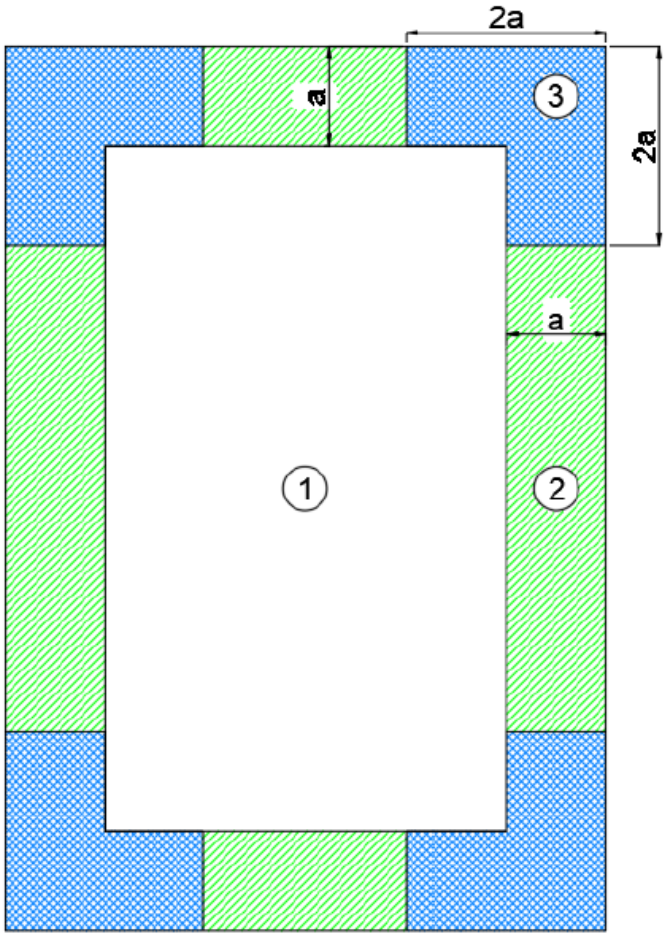
Must use primer when adhering V-Force to substrate board.

DD=DensDeck

Roof Enhancements

Factory Mutual

In 2020, Factory Mutual adopted the ASCE 7-16 definitions for roof zones. This includes the addition of a fourth roof area found on some configurations. Not all buildings will contain all four roof zones, in fact, some may only contain two roof zones. FM no longer accepts the old roof zone definitions.

Roof Heights Where h ≤ 60 ft.	Roof Heights Where h > 60 ft.
	
Roof Zone Layout Example for Building Height ≤ 60' (Roof Slope ≤ 1.5" (7°)) *h* = Roof Height	Roof Zone Layout Example for Building Heights > 60' (Roof Slope ≤ 1.5" (7°)) *a* = 10% of least horizontal dimention, but not less than 3 ft (0.9 m).
Example: Building Height = 30 ft .6h = 18 ft .2h = 6 ft Zone 3: 18′ x 18′ x 6′; Zone 2: 18′; Zone 1: 18′; Zone 1': Remainder	Example: Buidling Dimensions: 80′ x 200′ Least Horizontal Dimention: 80′ *a* = 8' 2*a* = 16' Zone 3: 16′ x 16′ x 8′; Zone 2: 8′; Zone 1: Remainder

Contact MWA for more information or refer to the current Firestone Attachment Guide.

Section 3

S4200 Coverage Rates **21**

Gaco

Gaco

Coverage Rates

S4200

Products	Roof Types				
	Single-Ply	Metal**	Smooth Mod Bit or Smooth Built-Up	Granulated Cap Sheet	Concrete
GacoWash *Concentrated Cleaner*	9:1 ratio: 1 gallon concentrated equals 4000 sq. ft.	9:1 ratio: 1 gallon concentrated equals 4000 sq. ft.	N/A	N/A	9:1 ratio: 1 gallon concentrated equals 4000 sq. ft.
GacoFlex A4271 BleedTrap *Sealer for Asphalt Roofing*	N/A	N/A	1 coat at 100 sq. ft./gal 6-8 dry mils	1 coat at 100 sq. ft./gal 6-8 dry mils	N/A
GacoFlex E5320 *2-Part Epoxy Primer/Filler*	N/A	Rusty metal: 2 coats at 250 sq. ft./gal per coat	N/A	N/A	1 coat at 250 sq. ft./gal
GacoFlex SF4200 SeamSeal *Solvent-Free Silicone Sealant*	75-100 linear feet at 4" wide 32 mils thickness	450 fasteners or 75-100 linear feet at 4" wide 32 mils thickness	75-100 linear feet at 4" wide 32 mils thickness	75-100 linear feet at 4" wide 32 mils thickness	75-100 linear feet at 4" wide 32 mils thickness
GacoFlex S4200 Series *Solvent-Free 100% Silicone Roof Coating*	1 coat 10 year = 1.25 gal/sq. 15 year = 1.75 gal/sq. 20 year = 2.25 gal/sq.	1 coat 10 year = 1.25 gal/sq. 15 year = 1.75 gal/sq. 20 year = 2.25 gal/sq.	1 coat 10 year = 1.25 gal/sq. 15 year = 1.75 gal/sq. 20 year = 2.25 gal/sq.	1 coat 10 year = 1.75 gal/sq. 15 year = 2.25 gal/sq. 20 year = 2.75 gal/sq.	1 coat 10 year = 1.25 gal/sq. 15 year = 1.75 gal/sq. 20 year = 2.25 gal/sq.
GacoFlex S4200 Series *DFT Warranty*	10 year = 20 WFT/ 18 DFT 15 year = 28 WFT/ 26 DFT 20 year = 36 WFT/ 34 DFT	10 year = 20 WFT/ 18 DFT 15 year = 28 WFT/ 26 DFT 20 year = 36 WFT/ 34 DFT	10 year = 20 WFT/ 18 DFT 15 year = 28 WFT/ 26 DFT 20 year = 36 WFT/ 34 DFT	10 year = 28 WFT/ 26 DFT 15 year = 36 WFT/ 34 DFT 20 year = 44 WFT/ 42 DFT	10 year = 20 WFT/ 18 DFT 15 year = 28 WFT/ 26 DFT 20 year = 36 WFT/ 34 DFT
GacoFlex SF2036 WalkPad *Solvent-Free Silicone Walkway System*	4 gallons per square to achieve a 2' x 50' walkway Granules: 0.5 lb. per square	4 gallons per square to achieve a 2' x 50' walkway Granules: 0.5 lb. per square	4 gallons per square to achieve a 2' x 50' walkway Granules: 0.5 lb. per square	4 gallons per square to achieve a 2' x 50' walkway Granules: 0.5 lb. per square	4 gallons per square to achieve a 2' x 50' walkway Granules: 0.5 lb. per square

NOTE: Application rate is job specific. Additional material may be required due to overspray, wind, waste and residual coating left in the container.

**Add surface factor for metal roof profile, normally 15-40%.

†Additional coating may be required to achieve dry mil requirement due to surface profile.

GACOFLEX S4200 QUICKSPECS

Approved Substrates: EPDM, PVC, Hypalon, TPO, Metal, SBS, APP, BUR (smooth only), Spray Polyurethane Foam, Silicone Coatings, and Concrete.

Single-Ply

1. Repair Membrane
2. Clean roof with GacoWash
3. Prepare roof with SF4200 SeamSeal and GacoFlex 66S Reinforcing Polyester Mesh

BUR / Mod Bit

1. Repair Membrane
2. Apply GacoFlex A4271 BleedTrap Sealer
3. Prepare roof with SF4200 SeamSeal and GacoFlex 66S Reinforcing Polyester Mesh

*When using GacoFlex S20 or S2100 series in lieu of GacoFlex S4200, an application of GacoFlex E5320 2-part epoxy primer is required prior to S20/S2100 coating application.

Section 4

ISOGARD Insulation Selection Guide	**23**
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Firestone ISOGARD Family of Polyiso Insulation

	ASTM C1289					
	Type I	Type II			Type IV	Type V
Description	High performance aluminum foil facers on both sides	Glass reinforced mat facers on both sides	Coated, inorganic, fiberglass facers on both sides	Coated glass facers on both sides	ISOGARD HD board on one side with coated, inorganic, fiberglass facers on the other side	7/16" OSB on one side with black glass reinforced mat facer on the other side
Class / Grade	Class 1	Class 1	Class 2	Class 4		
	Grade 3 (25 PSI)	Grade 2 (20 PSI)	Grade 2 (20 PSI)	Grade 1 (80 PSI)	Grade 2 (20 PSI)	Grade 2 (20 PSI)
		Grade 3 (25 PSI)	Grade 3 (25 PSI)	Grade 2 (120 PSI)	Grade 3 (25 PSI)	Grade 3 (25 PSI)
Use / Specs	Wall Only Flat Only 1.0" - 4.0" 4' x 8'	Roof Flat / Tapered 0.5" - 4.5" 4' x 4', 4' x 8'	Roof Flat / Tapered 1.0" - 4.0" (flat) 4' x 4', 4' x 8'	Roof Flat Only 0.5" 4' x 4', 4' x 8'	Roof Flat Only 1.5" - 4.0" 4' x 4', 4' x 8'	Roof Flat Only 1.5" - 4.0" 4' x 4', 4' x 8'
New Name	**Enverge CI Foil**	**ISOGARD GL**	**ISOGARD CG**	**ISOGARD HD**	**ISOGARD HD Composite**	**ISOGARD HG**
Formerly	Enverge CI Foil	ISO 95+ GL	Resista	ISOGARD HD	ISOGARD HD Composite	HailGard

General Notes:

- 4' x 4' boards are REQUIRED when being adhered with an approved Firestone insulation adhesive
- Do not use ISOGARD HD/HD Composite/HG on ballasted roof membranes
- Do not apply hot asphalt to ISOGARD HD/HD Composite boards
- ISOGARD HD Composite: HD coverboard only available in 80 PSI
- ISOGARD CG assemblies achieve a Class A Fire Rating on a combustible deck without a barrier board
- ISOGARD CG, Grade 3 (25 PSI) Insulation is limited to a MAXIMUM 2.9" thick board size
- Chart represents only those Types/Classes/Grades available through Firestone Building Products

Long-Term Thermal Resistance
Polyiso Board Stock Insulation

SIZE	R-VALUE	PCS
0.5	2.9	96
1.0	5.7	48
1.1	6.3	42
1.2	6.8	40
1.3	7.4	36
1.4	8.0	34
1.5	8.6	32
1.6	9.1	30
1.7	9.7	28
1.8	10.3	26
1.9	10.8	25
2.0	11.4	24
2.1	12.0	22
2.2	12.6	21
2.3	13.2	20
2.4	13.8	20
2.5	14.4	19
2.6	15.0	18
2.7	15.6	17
2.8	16.2	17
2.9	16.8	16
3.0	17.4	16
3.1	18.0	15
3.2	18.6	15
3.3	19.2	14
3.4	19.9	14
3.5	20.5	13
3.6	21.1	13
3.7	21.7	12
3.8	22.3	12
3.9	23.0	12
4.0	23.6	12

BASED ON ASTM C1289-13e1

R-Value	Thickness
20.0	2 layers 1.8" (R-20.6)
25.0	2 layers 2.2" (R-25.2)
30.0	2 layers 2.6" (R-30.0)
35.0	2 layers 3.1" (R-36.0)
40.0	2 layers 3.5" (R-41.0)

Tapered Insulation Panels
4'x4'

Slope	Panel	Dimensions	BD FT per Panel	PCS
1/8	AA	.5" - 1"	12	64
	A	1" - 1.5"	20	38
	B	1.5" - 2"	28	26
	C	2" - 2.5"	36	20
	D	2.5" - 3"	44	16
	E	3" - 3.5"	52	14
	F	3.5" - 4"	60	12
	FF	4" - 4.5"	68	10
1/4	X	.5" - 1.5"	16	48
	Y	1.5" - 2.5"	32	24
	Z	2.5" 3.5"	48	16
	ZZ	3.5" - 4.5"	64	12
	G	1" - 2"	24	32
	H	2" - 3"	40	18
	I	3" - 4"	56	12
1/2	Q	.5" - 2.5"	24	32
	QQ	2.5" - 4.5"	56	12
	XX	1" - 3"	32	24
3/16	JJ	.5" - 1.25"	14	54
	KK	1.25" - 2"	26	28
	LL	2" - 2.75"	38	20
	MM	2.75" - 3.5"	50	14
	J	1" - 1.75"	22	34
	K	1.75" - 2.5"	34	22
	L	2.5" - 3.25"	46	16
	M	3.25" - 4"	58	12
3/8	SS	.5" - 2"	20	38
	TT	2" - 3.5"	44	16
	SS1	1" - 2.5"	28	26
	TT1	2.5" - 4"	52	14
1/16	1A	.5" - .75"	10	72
	1B	.75" - 1"	14	54
	1	1" - 1.25"	18	42
	2	1.25" - 1.5"	22	34
	3	1.5" - 1.75"	26	30
	4	1.75" - 2"	30	26
	5	2" - 2.25"	34	22
	6	2.25" - 2.5"	38	20

MWA Commercial Roofing Solutions
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Modified Bitumen Selection Guide

	Name	ASTM			Thickness (mils)	Reinforcement	Surfacing		Length	Width	Net Coverage (SF)	Weight (LBS)	Attachment		
							Top	Bottom					Mop	Cold	Torch
SBS BASE	SBS Base	D 6163	Type I	Grade S	90	1.8 lb/100 ft² non-woven Fiberglass Mat	Sand	Sand	50'	3'3"	149	85	Asphalt	MB Cold	
	SBS Premium Base	D 6163	Type II	Grade S	90	2.0 lb/100 ft² Fiberglass-scrim reinforced fiberglass mat	Sand	Sand	50'	3'3"	149	82	Asphalt	MB Cold	
	SBS Glass Torch Base	D 6163	Type I	Grade S	120	1.8 lb/100 ft² non-woven Fiberglass Mat	Sand	Polyfilm	33'6	3'3"	98	53			Torch
	SBS Glass Torch Base 1.5	D 6163	Type I	Grade S	90	1.8 lb/100 ft² non-woven Fiberglass Mat	Sand	Polyfilm	50'	3'3"	150	93			Torch
	SBS Poly Base	D 6164	Type I	Grade S	90	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Sand	Sand	50'	3'3"	149	85	Asphalt	MB Cold	
	SBS Poly Torch Base	D 6164	Type I	Grade S	120	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Sand	Polyfilm	33'5	3'3"	98	77			Torch
	SBS Premium Poly Base	D 6164	Type II	Grade S	162	5.43 lb/100 ft² non-woven polyester mat with glass fiber yarns	Sand	Sand	33'6"	3'3"	101	106	Asphalt	MB Cold	Torch
SBS Cap	SBS Cap	D 6164	Type I	Grade G	155	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold	
	SBS FR Cap	D 6164	Type I	Grade G	155	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold	
	SBS Torch	D 6164	Type I	Grade G	150	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Polyfilm	33'6"	3'3"	98	90			Torch
	SBS FR Torch	D 6164	Type I	Grade G	160	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Polyfilm	33'6"	3'3"	98	90			Torch
	SBS Glass	D 6163	Type I	Grade G	155	1.8 lb/100 ft² Fiberglass Mat	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold	
	SBS Glass FR	D 6163	Type I	Grade G	155	1.8 lb/100 ft² Fiberglass Mat	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold	
	SBS Glass FR Torch	D 6163	Type I	Grade G	155	1.8 lb/100 ft² Fiberglass Mat	Granule	Polyfilm	33'6"	3'3"	98	95			Torch
	SBS Premium	D 6164	Type II	Grade G	160	5.43 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold/ Liquigard	
	SBS Premium FR	D 6164	Type II	Grade G	160	5.43 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Sand	33'6"	3'3"	98	95	Asphalt	MB Cold	
	SBS Premium Torch	D 6164	Type II	Grade G	160	5.43 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Polyfilm	33'6"	3'3"	98	102			Torch
	SBS Premium FR Torch	D 6164	Type II	Grade G	160	5.43 lb/100 ft² non-woven polyester mat with glass fiber yarns	Granule	Polyfilm	33'6"	3'3"	98	102			Torch
	SBS Smooth	D 6164	Type I	Grade S	145	3.89 lb/100 ft² non-woven polyester mat with glass fiber yarns	Sand	Sand	33'6"	3'3"	98	85	Asphalt	MB Cold	
APP BASE	APP 80 Glass Base	D6509			80	1.8 lb/100 ft² non-woven glass fiber mat	Sand	Polyfilm	65'4	3'3"	196	96			Torch
	APP Premium Base	D6509			85	1.8 lb/100 ft² non-woven glass fiber mat	Sand	Sand	65'4	3'3"	196	100		MB Cold	Torch
	APP 160	D6222	Type I	Grade S	154	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Sand	Polyfilm	32'10"	3'3"	98	102			Torch
	APP 160 Cool	D6222	Type I	Grade S	155	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Sand	Sand	32'10"	3'3"	98	104		MB Cold	
	APP 170	D6222	Type I	Grade S	175	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Sand	Polyfilm	32'10"	3'3"	98	103			Torch
	APP 170 Cool	D6222	Type I	Grade S	175	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Sand	Sand	32'10"	3'3"	98	103		MB Cold	
APP CAP	APP 180	D6222	Type I	Grade G	165	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Granule	Polyfilm	32'10"	3'3"	98	95			Torch
	APP 180 Cool	D6222	Type I	Grade G	165	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Granule	Sand	32'10"	3'3"	98	95		MB Cold	
	APP 180 FR	D6222	Type I	Grade G	165	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Granule	Polyfilm	32'10"	3'3"	98	97			Torch
	APP 180 FR Cool	D6222	Type I	Grade G	165	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Granule	Sand	32'10"	3'3"	98	105		MB Cold	
	APP Premium FR	D6223	Type II	Grade G	180	3.9 lb/100 ft² Fiber glass reinforced non-woven polyester mat	Granule	Sand	32'10"	3'3"	98	105		MB Cold	

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BONDING ADHESIVE QUICK REFERENCE GUIDE

	RubberGard EPDM				UltraPly TPO				Firestone PVC			Temperature (°F)		Coverage		
	LS-FR/FR	Platinum EPDM	MAX/FR	EcoWhite/Plat.	UltraPly TPO	Flex/Adhered	TPO Platinum	TPO XR	PVC	PVC KEE	PVC XR	Storage	Application	Double Sided (SF/gal)	Shelf Life (years)	VOC Content
BA-2004	Y	Y	Y	Y								60-80	40+	45-60	1	633 g/L
EPDM Solvent Free BA[7, 9]	Y	Y		Y								60-80	40+	120-150	1	<=16 g/L
Jet Bond[1]	Y	Y	Y	Y	Y	Y	Y	Y				60-80	25+	800-1,000[8]	1	<250 g/L
Water Based BA P[2]	Y		Y	Y	Y	Y	Y					60-80	40+[6]	100-120	1	< 250 g/L
Single-Ply LVOC BA	Y	Y	Y	Y	Y	Y	Y					60-80	20+	45-60	1	<250 g/L
Single-Ply LVOC BA-1168	Y	Y	Y	Y	Y	Y	Y					60-80	45+	45-60	1	<250 g/L
UltraPly BA					Y	Y	Y					60-80	40+	45-60	1	633 g/L
XR Bonding Adhesive[9]					Y[3]			Y[4]				60-80	40+	70-90	1	<250 g/L
XR Stick, ISO Spray R, Twin Jet								Y			Y	60-80	40+	varies	1.5	varies
PVC Bonding Adhesive									Y			60-80	40+	50-70	1	<510 g/L
PVC LVOC Bonding Adhesive									Y			60-80	40+	50-60	1	<200 g/L
PVC Water Based BA[2]									Y		Y	60-80	50+[6]	140-180[5]	1	<180 g/L

[1] Canister MUST remain at 70 degrees minimum at time of application.

[2] ONLY approved for up to 15 year warranties and MAX 55mph wind speeds.

[3] For use on vertical and curb applications only. No field application.

[4] On non-ISO products ONLY.

[5] 100-120 sf/gal for PVC XR application.

[6] Cannot freeze within 48 hours of application.

[7] Cannot freeze within 12 hours of application.

[8] Per canister.

[9] Single sided application only. Apply to substrate only.

MWA Commercial Roofing Solutions
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PRIMER QUICK REFERENCE GUIDE

	RubberGard EPDM					UltraPly TPO				Underlayments[2]				Temperature (°F)		Coverage		
	LS-FR/FR	FullForce[1]	Platinum	MAX	EcoWhite/Plat	UltraPly TPO	TPO SA[1]	Flex/Adhered	TPO XR	V-Force	Clad-Gard	Enverge	BASEGARD SA	Storage	Application	Single Sided (SF/gal)	Shelf Life	VOC Content
QuickPrime Plus	Y	Y	Y	Y										60-80	40	200-250	1 year	<=664 g/L
QuickPrime Plus LVOC	Y	Y	Y	Y	Y[5]									60-80	40	150-225	1 year	<=250 g/L
Single-Ply QuickPrime	Y	Y	Y	Y	Y	Y	Y	Y	Y					60-80	40	200-250	1 year	645 g/L
Single-Ply LVOC	Y	Y	Y	Y	Y	Y	Y	Y	Y					60-80	40	200-250	1 year	<=250 g/L
Firestone SA Solvent Based (SB)										Y	Y	Y		32-104	14+	80-133	2 years	500 g/L
Firestone SA Water Based (WB)										Y	Y	Y		41-105	41+	133-400[4]	2 years	3 g/L
SA-LVOC Primer										Y	Y	Y		32-104	14+	100-200	5 years	240 g/L
SA Primer[3]													Y	60-80	40	100-125	1 year	664 g/L

[1] A primer MUST be used for vertical applications. Primers can be brush or roll applied for VERTICAL applications only.

[2] Brush or roller application of primers for underlayments is acceptable.

[3] Roller applicatoin only.

[4] For use on Pourous substates only.

[5] Can be used, but will leave a visual residue. Recommend using a Single-Ply Primer

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MWA Commercial Roofing Solutions
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Firestone Assembly Solutions by Substrate Type

	Steel	Structural Concrete	Lt. Wt. Concrete		Cementitious Wood Fiber	Gypsum	Wood	Existing Smooth BUR, SBS/APP	Existing Smooth Coal Tar (CTP)**
			Strurctural	Insulating					
Fastened Base Sheet	N/A	N/A	LWC Base-Ply/ Two Piece Impact Nail	LWC Base-Ply/ Two Piece Impact Nail	Two Piece Impact Nail Polymer Fast.	LWC Base-Ply/ Two Piece Impact Nail Polymer Fast.	N/A	N/A	N/A
ISO/Substrate Board - Mechanically Attached	AP HD HD Plus	HD Concrete Drive	Into Steel or Structural Concrete Decks	Into Steel or Structural Concrete Decks	Polymer Fasteners	Polymer Fasteners*	AP HD	Into Steel or Structural Concrete Decks	Into Steel or Structural Concrete Decks
ISO/Substrate Board - Insulation Adhesive	YES	Postive Adhesivion Test Required, except New Concrete	Postive Adhesivion Test Required	N/A	Postive Adhesivion Test Required	Postive Adhesivion Test Required	YES	Postive Adhesivion Test Required	Postive Adhesivion Test Required
V-Force	Yes*	Primed	Primed	N/A	N/A	N/A	Primed	Primed	N/A
BASEGARD SA Base Sheet	Primed	Primed	N/A	N/A	N/A	N/A	Primed	Primed	N/A
Torched Base Sheet	N/A	ASTM D41 Primer	N/A	N/A	N/A	N/A	N/A	ASTM D41 Primer	N/A
Asphalt Mopped Base Sheet	N/A	ASTM D41 Primer	N/A	N/A	N/A	N/A	N/A	ASTM D41 Primer	N/A
MB Cold Applied Base Sheet	N/A	ASTM D41 Primer	N/A	N/A	N/A	N/A	N/A	ASTM D41 Primer	N/A

*No Factory Mutual Testing (FM) available
**CTP Recovers require min. 0.5" ISO for TPO membranes, and 1.5" ISO for Black EPDM membranes to ensure CTP doesn't flow into building.
N/A = Not Applicable
Structural Concrete min. 3,000 PSI
Min. 2" Lt. Wt. Concrete
BASEGARD SA must be applied over SA Primer or heat actived (torch or insulation adhesive)
V-Force Primers: Firestone SA Water Based Primer or Firestone SA Solvent Based Primer
Existing Aspahlt and CTP Roofs may require a Primer
Assemblies listed represent a baseline for approved installation methods, contact MWA to ensure entire roof is warrantable.
Installation methods represented may not hold FM, UL, or other required/prescribed testing
Acceptable Lightweight Concrete substrates include cellular or air- entrained concrete. Lightweight Concrete substrates with aggregate (such as perlite or vermiculite) are not acceptable.
All light weight concrete assemblies containing insulation, require a vapor retarder.
All adhered insulation/cover boards must be 4'x4'
HD fasteners may be used in light weight concrete assemblies to attach insulation/cover board into structural concrete substrate or steel pan.
Refer to TIS sheets for approved substrates for each particular product.
Platinum Systems require a complete tear off of existing roof system.

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