

FIRESTONE BUILDING PRODUCTS

METAL ROOF SYSTEM

CODE APPROVAL GUIDE

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1.01 EXTERNAL FIRE RATINGS

1. All regional building codes and most local building code officials require that roofing systems meet minimum performance requirements when exposed to external fire sources. The accepted method for measuring external fire resistance is ASTM Standard E-108. This test standard, and closely related standards such as Underwriters Laboratories UL-790 and Uniform Building Code 15-2, is used to determine the ability of a roof system to hinder the horizontal spread or vertical penetration of an external fire source.

A. Noncombustible Roof Decks (Steel, Concrete, Poured Gypsum) require testing for horizontal spread of flame.

B. Combustible Roof Decks (Wood, Plywood, Tectum) require testing for both horizontal spread and vertical penetration of flame.

2. ASTM E-108, UL-790 and UBC 15-2. All classified roof covering assemblies fall into one of the three following categories:

CLASS A: "... includes roof coverings which are effective against severe fire exposures..." *

CLASS B: "... includes roof coverings which are effective against moderate fire exposures..." *

CLASS C: "... includes roof coverings which are effective against light fire exposures..." *

3. For insulated assemblies over non-combustible roof decks, any classified roofing assembly may be installed over a new roof deck, an existing roof deck or over an existing roofing assembly. Underwriters Laboratories states that "any classified roofing system may be applied over a pre-existing roof system (Class A, B, C, verifiable or not) **of the same deck type** and establishes for that roof the classification of the new system". Also, an assembly classified over a combustible deck may be installed over an existing non-combustible deck and establish for the assembly the rating of the new system. A non-combustible deck rated assembly **must** be tested and classified over a combustible deck in order to obtain the desired classification of the new assembly. Total insulation thickness of combined existing and new roofing systems may not exceed the total maximum allowable for the new roofing system, and non-insulated systems are not intended for use over insulated systems.
4. The class of roof covering required by each regional building code depends upon many factors, including the use and location of the building and the type of construction. The local building authority should always be consulted as to what the roofing assembly classification will need to be for each roofing project.

5. It should be noted that these classifications apply to roofing assemblies, and **NOT the metal roofing panel.** A metal roofing panel that is classified as part of a Class A assembly when installed over a particular insulated or non-insulated construction may not qualify as part of a Class A assembly if you make changes within the insulated or non-insulated construction.

NOTE: The column titled "UL Item Number" in the following listings has been added as a service to those who have the UL Building Materials Directory. It identifies the UL listing from which our Code Approval Guide listing derives (e.g. "A,FA,23" means Class A, Fully Adhered, item number 23; "**B,OS,01**" means **Class B, Other System, item number 01**, etc.).

- From Underwriters Laboratories Roofing Materials and Systems Directory, January, 2007, page 1.

TABLE 1.01A: UL EXTERNAL FIRE RATED ASSEMBLIES

SYSTEM: METAL ROOFING ASSEMBLIES: UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14, UC-600, UC-601, UC-750, UC-500, UC-501, UR, HR CONSTRUCTION: NEW, RETROFIT					
Max. Slope:	Class:	Deck:	Insulation Assembly:	Remarks:	UL Item No.
NL	A	C	Insulation (Optional): Any thickness Firestone ISO 95+ GL Barrier Board: 1) Dens-Deck, min ¼ inch thick 2) UL Classified gypsum board, min. ½ inch thick 3) Min. one layer of Elk "Versashield" Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory Surfacing: One of the assemblies shown above in steel, copper, aluminum		A, OS, 01
NL	A	C	Barrier Board: 1) Dens-Deck, min ¼ inch thick 2) UL Classified gypsum board, min. ½ inch thick 3) Min. one layer of Elk "Versashield" Insulation (Optional): Any thickness Firestone ISO 95+ GL or HailGard Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory Surfacing: One of the assemblies shown above in steel, copper, aluminum		A, OS, 01A

TABLE 1.01A: UL EXTERNAL FIRE RATED ASSEMBLIES (CON'T.)

SYSTEM: METAL ROOFING ASSEMBLIES: UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14, UC-600, UC-601, UC-750, UC-500, UC-501, UR, HR CONSTRUCTION: NEW, RETROFIT					
Max. Slope:	Class:	Deck:	Insulation Assembly:	Remarks:	UL Item No.
NL	A	C or Spaced Sheathing	<p>Underlayment: One layer of Elk "Versashield", MA</p> <p>Ply Sheet: One layer Type 30 base sheet or Elk "Versashield", MA</p> <p>Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard</p> <p>Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory</p> <p>Surfacing: One of the assemblies shown above in steel or copper</p>		A, OS, 02
NL	A	C	<p>Underlayment: Two layers of Elk "Versashield"</p> <p>Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard</p> <p>Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory</p> <p>Surfacing: One of the assemblies shown above in aluminum</p>		A, OS, 03
NL	A	C or Spaced Sheathing	<p>Underlayment: One or more layers of Elk "Versashield", MA</p> <p>Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard</p> <p>Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory</p> <p>Surfacing: One of the assemblies shown above in steel or copper</p>		A, OS, 04
NL	A	C or Spaced Sheathing	<p>Underlayment: One or more layers of Elk "Versashield", MA</p> <p>Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard</p> <p>Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory</p> <p>Surfacing: One of the assemblies shown above in steel, fastened to 2 x 2 wood battens</p>		A, OS, 05

TABLE 1.01A: UL EXTERNAL FIRE RATED ASSEMBLIES (CON'T.)					
SYSTEM: METAL ROOFING					
ASSEMBLIES: UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14, UC-600, UC-601, UC-750, UC-500, UC-501, UR, HR					
CONSTRUCTION: NEW, RETROFIT					
Max. Slope:	Class:	Deck:	Insulation Assembly:	Remarks:	UL Item No.
NL	A	C	Insulation (Optional): Any thickness Firestone ISO 95+ GL Insulation: Min. 1/2 in. ISOGARD HD Ply Sheet (Optional): One or more layers of Polystick MTS or Nova Seal Generation II Premium Roofing underlayment Surfacing: One of the assemblies shown above in steel or copper		A, OS, 07
NL	A	C	Insulation (Optional): Firestone ISO 95+ GL Barrier Board: 1) Dens-Deck, min ¼ inch thick 2) UL Classified gypsum board, min. ½ inch thick 4) Min. one layer of Elk "Versashield" Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory Surfacing: One of the assemblies shown above in steel, copper, aluminum		A, OS, 08
NL	A	C or Spaced Sheathing	Insulation (Optional): Firestone ISO 95+ GL, ISOGARD HD, or HailGard Underlayment: One layer ELK VersaShield Underlayment, MA Ply Sheet (Optional): One layers type 30 base sheet or VersaShield, MA Surfacing: One of the assemblies shown above in steel or copper		A, OS, 09
NL	A	C	Insulation (Optional): Firestone ISO 95+ GL, ISOGARD HD, or HailGard Underlayment: One or more layers ELK VersaShield Underlayment, MA Surfacing: One of the assemblies shown above in aluminum		A, OS, 10
NL	A	C or Spaced Sheathing	Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard Underlayment: One or more layers ELK VersaShield Underlayment, MA Surfacing: One of the assemblies shown above in steel or copper		A, OS, 11
NL	A	C or Spaced Sheathing	Insulation (Optional): Firestone ISO 95+ GL, ISOGARD HD, or HailGard Underlayment: One or more layers ELK VersaShield Underlayment, MA Surfacing: One of the assemblies shown above in steel, fastened to 2 x 2 wood battens		A, OS, 12

TABLE 1.01A: UL EXTERNAL FIRE RATED ASSEMBLIES (CON'T)					
SYSTEM: METAL ROOFING					
ASSEMBLIES: UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14, UC-600, UC-601, UC-750, UC-500, UC-501, UR, HR					
CONSTRUCTION: NEW, RETROFIT					
Max. Slope:	Class:	Deck:	Insulation Assembly:	Remarks:	UL Item No.
NL	A	C	Insulation (Optional): Any thickness Firestone ISO 95+ GL Insulation: Firestone ½" ISOGARD HD Ply Sheet: One or more layers Polystick MTS or Nova Seal Generation II Premium Roofing underlayment Surfacing: One of the assemblies shown above in steel or copper		A, OS, 14
NL	B	C	Deck: Underlayment: One layer of Elk "Versashield", MA Surfacing: One of the assemblies shown above in steel, copper, or aluminum		B, OS, 01
NL	B	Spaced Sheathing	Deck: Underlayment: One layer of Elk "Versashield", MA Surfacing: One of the assemblies shown above in steel or copper		B, OS, 02

TABLE 1.01B
UL EXTERNAL FIRE RATED ASSEMBLIES

SYSTEM: METAL ROOFING					
ASSEMBLIES: 5-V-Crimp					
CONSTRUCTION: NEW, RETROFIT					
Max. Slope:	Class:	Deck:	Insulation Assembly:	Remarks:	UL Item No.
NL	A	C-5/8 or Spaced Sheathing	Underlayment: One layer of Elk "Versashield", MA Insulation (Optional): Any thickness Firestone ISO 95+ GL, ISOGARD HD, or HailGard Ply Sheet (Optional): One or more layers of Polystick MTS, Nova Seal Generation II Premium Roofing underlayment, WR Grace Ice and Water Shield, any UL Classified Type G1, G2, or G3 base/ply sheet, Type 15, 20, or 30 felt, or UL Classified prepared roofing accessory Ply Sheet: One layer Type 30 base sheet or Elk "Versashield", MA Surfacing: 5-V-Crimp	Elk UL item #	A, OS, 06
NL	A	C-5/8 or Spaced Sheathing	Insulation (Optional): Firestone ISO 95+ GL, ISOGARD HD, or HailGard Underlayment (Optional): One layer Elk VersaShield Underlayment, MA Ply Sheet: One layer Type 30 base sheet or Elk "Versashield", MA Surfacing: 5-V-Crimp		A, OS, 13

1.02 Impact Resistance

1. Testing to UL 2218, "Impact Resistance of Prepared Roof Covering Materials", results in Classifications for impact resistance that are expressed as Class 1, 2, 3 or 4 which relate to a roof covering's ability to withstand impacts from 1-1/4, 1-1/2, 1-3/4 and 2 inch diameter steel balls, respectively. The acceptance criteria to metal roof panels is as follows: withstand the assigned class designation impact without visible evidence of tearing, fracturing, cracking, splitting, rupture, crazing or other opening of the roof covering layer. Classification is for metal panels placed over solid wood decking (3/8" or greater in thickness).

TABLE 1.02
UL IMPACT RESISTANCE RATED PANELS
(ONLY STEEL, COPPER OR ALUMINUM, ANY THICKNESS)

Class 4 ratings were achieved for the following panels designations:		
UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14	UC-500, UC-501, UC-600, UC-601	5-V Crimp, UR, HR

1.03 Wind Uplift Ratings - UL

1. Roof Deck Constructions Classified for Uplift Resistance have been tested to UL 580, "Tests for Uplift Resistance of Roof Assemblies". The UL 580 test method subjects a 10 ft. by 10 ft. test sample to various static and oscillating air pressures to index performance under uplift loads imposed on roof decks.
2. The nominal static uplift pressure, the oscillating uplift pressure and the maximum static uplift pressure for each Class are:

TABLE 1.03A
UL 580 TEST PRESSURES BY CLASS

Class	Nominal Static Uplift Pressure (psf)	Range of Oscillating Pressure (psf)	Maximum Static Uplift Pressure (psf)
15	15	11 to 21	23
30	30	22 to 42	45
60	60	44 to 83	75
90	90	66 to 90	105

3. The static pressures are maintained for a 5 minute period and the oscillating pressures are applied at a 10 ± 2 second frequency and are maintained for a 60 minute period for each Class. An assembly rated Class 60 has successfully withstood pressures imposed during Class 30 and Class 60 tests. An assembly rated Class 90 has successfully withstood pressures imposed during Class 30, Class 60 and Class 90 tests.

TABLE 1.03B
UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-1 with UC-1 Batten Cover						
<p>Wood: Min. 5/8 in. nom (19/32 in. actual) thick plywood; Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*</p>	N/A	N/A	<p>Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows.</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.</p>	<p>Width: Min. 12" Max. 17"</p> <p>Metal: Min. 24 ga Steel Min. .040" Alum</p> <p>Battens: Same type and thickness of the panels</p>	<p>Clips: UC-1 24ga Galvanized Clip;</p> <p>Clip Spacing: 12"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD WOW T17 (No. 10-12x1" long No. 2 Phillip drive, wafer-head plated steel screws. Two fasteners used per clip inserted into clip guide holes.)</p>	510A
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *</p>	N/A	<p>1"-4" Firestone Iso95+ GL. Joints staggered between layers.</p> <p>Optional Coverboard: As an alternate to the bearing plates, 1/2 in. thick (15/32 in. actual) thickness plywood, APA rated sheathing, square edged may be used.</p>	<p>Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows.</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.</p>	<p>Width: Min. 12" Max. 17"</p> <p>Metal: Min. 24 ga Steel Min. .040" Alum</p> <p>Battens: Same type and thickness of the panels</p>	<p>Clips: UC-1 24ga Galvanized Clip;</p> <p>Clip Spacing: 12"o.c. max.</p> <p>Bearing Plates: Firestone Galvanized UC Bearing Plate</p> <p>Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12-15, No. 3 Phillips drive, truss-head, coated steel screws with an "S" point. Length to be 3/4" longer than overall thickness of roof deck. Two screws used per clip)</p>	510

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-2 with UC-2 Batten Cover						
<p>Wood: Min. 5/8 in. nom (19/32 in. actual) thick plywood; Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*</p>	N/A	N/A	<p>Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows.</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.</p>	<p>Width: Min. 12" Max. 17"</p> <p>Metal: Min. 24 ga Steel Min. .040" Alum</p> <p>Battens: Same type and thickness of the panels</p>	<p>Clips: UC-2 22ga Galvanized Clip;</p> <p>Clip Spacing: 12"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long No. 2 Phillips drive, wafer-head plated steel screws used with a 5/8 in" OD nylon or other plastic washer 0.030" thick. Two screws used per clip inserted into clip guide holes.)</p>	511A
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *</p>	N/A	<p>1"-4" Firestone Iso95+ GL. Joints staggered between layers.</p> <p>Optional Coverboard: As an alternate to the bearing plates, 1/2 in. thick (15/32 in. actual) thickness plywood, APA rated sheathing, square edged may be used.</p>	<p>Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows.</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.</p>	<p>Width: Min. 12" Max. 17"</p> <p>Metal: Min. 24 ga Steel Min. .040" Alum</p> <p>Battens: Same type and thickness of the panels</p>	<p>Clips: UC-2 22ga Galvanized Clip;</p> <p>Clip Spacing: 12"o.c. max.</p> <p>Bearing Plates: Firestone Galvanized UC Bearing Plate</p> <p>Fasteners: Firestone 12 x X" PH PD NW TK1 (No. 12-13, No. 3 Phillips drive, truss-head, coated steel screws with an "S" point. Length to be 3/4" longer than overall thickness of roof deck. A 5/8", OD nylon or other plastic washer 0.030" thick to be used with each screw. Two screws used per clip.)</p>	511

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-3						
Wood: Min. 5/8 in. nom (19/32 in. actual) thick plywood; Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*	N/A	N/A	Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 20" Metal: Min. 24 ga Steel Min. .032" Alum Seams: 1-1/2" High Double-Locked	Clips: UC-3 Stainless Steel Expansion Clip Clip Spacing: 12"o.c. max. Fasteners: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long, No. 2 Phillips drive, wafer-head, plated steel screws used with a 5/8" OD nylon or other plastic washer 0.030" thick. Two screws used per clip.)	512A
Wood: Deck to be min 5/8 in. nom (19/32 in. actual) thickness CDX plywood.*	One layer Elk "VersaShield" with 2 in. side lap, loose laid.	N/A	Underlayment: One layer Type 30 organic felt with 2 in. side lap. Mechanically fastened to the plywood deck per manufacturer's recommendations. Ventilation Mat: One layer Colbond "Enkamat 7010", loose laid.	Width: Max. 16" Metal: Min. 0.7mm zinc Seams: 1-1/2" High Double-Locked	Clips: UC-3 Stainless Steel Super Clip Clip Spacing: 12"o.c. max. Fasteners: (No. 10x1-1/2" long pancake head stainless steel screws. Two screws used per clip.)	623
Wood: Min. nom 5/8 in. (19/32 in. actual) thick plywood; Grade B-C, APA rated. Fastened to supports (2 x 10 wood joists No. 2 or better, spaced 24 in OC max) using 8d by 2-1/2 in. long ring shank nails spaced 6 in. OC max at the butt ends and 6 in. OC max in the field.	Gypsum board: (optional), max 5/8 in. fastened to plywood with common fastener used for panel clip	1"-6" Firestone Iso 95+ GL. Joints staggered between layers. Mechanically fastened.	(Optional) On top of insulation place a self-adhered modified bitumen installed per manufacturer's instructions	Width: Max. 20 in. Metal: Min. 24 ga steel Seams: 1-1/2 in. High Double-Locked	Clips: UC-3 Stainless Steel Expansion Clip Clip Spacing: 24"o.c. max. Bearing Plates: Firestone Stainless or galvanized UC Bearing Plate Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12 pancake wafer head steel screws. Min. 3/4" deck penetration. Two screws used per clip.)	656
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	Min ¼ in Dens Deck directly over liner panel. (Optional)	1"-4" Firestone Iso95+ GL. Joints staggered between layers. Optional Coverboard: As an alternate to the bearing plates, min 1/2 in. thick (15/32 in. actual) plywood, DOC PS-1 rated (square edged may be used) or min 7/16 in thick OSB, DOC PS-2 rated. Fasteners used to attach plywood or OSB cover board to deck when attaching clips to plywood or OSB to be Firestone HD HailGard Fastener in a pattern of 24 screws per 4-ft by 8-ft cover board.	Self-adhering modified bitumen water proofing membrane. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 20" Metal: Min. 24 ga Steel Min. .032" Alum Seams: 1-1/2" High Double-Locked	Clips: UC-3 Stainless Steel Expansion Clip Clip Spacing: 12"o.c. max. Bearing Plates: Firestone Galvanized UC Bearing Plate Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12-13, No. 3 Phillips drive, truss-head, coated steel screws with an "S" point or Firestone All-Purpose Stainless Steel Fasteners. Min. 3/4" penetration into roof deck. Two screws used per clip.) As an alternate panel clips may be attached to plywood or OSB cover board with Firestone 10x1" PC T WOW T17 SS (No. 10-10x1 - AS 1" steel screws).	512
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	One layer Elk "VersaShield" with 2 in. side lap, loose laid.	1"-4" Firestone Iso95+ GL. Joints staggered between layers. Mechanically fastened. Optional Coverboard: As an alternate to the bearing plates, 1/2 in. thick (15/32 in. actual) thickness plywood, APA rated sheathing, square edged may be used.	One layer Type 30 organic felt with 2 in. side lap. Mechanically fastened to the deck per manufacturer's recommendations.	Width: Max. 16" Metal: Min. 24 ga Steel Seams: 1-1/2" High Double-Locked	Clips: UC-3 Galvanized Steel Super Clip Clip Spacing: 12"o.c. max. Bearing Plates: Firestone Stainless UC Bearing Plate Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12 pancake wafer head steel screws. Min. 3/4" deck penetration. Two screws used per clip.)	622

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-3						
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	One layer Elk "VersaShield" with 2 in. side lap, loose laid.	1"-4" Firestone Iso95+ GL. Joints staggered between layers. Mechanically fastened. Optional Coverboard: As an alternate to the bearing plates, 1/2 in. thick (15/32 in. actual) thickness plywood, APA rated sheathing, square edged may be used.	Underlayment: One layer Type 30 organic felt with 2 in. side lap. Mechanically fastened to the plywood deck per manufacturer's recommendations. Ventilation Mat: One layer Colbond "Enkamat 7010", loose laid.	Width: Max. 16" Metal: Min. 0.7mm zinc Seams: 1-1/2" High Double-Locked	Clips: UC-3 Stainless Steel Super Clip Clip Spacing: 12" o.c. max. Bearing Plates: Firestone Stainless UC Bearing Plate Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12 pancake wafer head steel screws. Length to penetrate steel deck a minimum of 3/4 in. Two screws used per clip.)	624
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. Fastened to max 6 ft. OC steel purlins 6 in OC *	Gypsum board: (optional), max 5/8 in. fastened to steel decking with common fastener used for panel clip	1"-6" Firestone Iso 95+ GL. Joints staggered between layers. Mechanically fastened.	(Optional) On top of insulation place a self-adhered modified bitumen installed per manufacturer's instructions	Width: Max. 20 in. Metal: Min. 24 ga steel Seams: 1-1/2 in. High Double-Locked	Clips: UC-3 Stainless Steel Expansion Clip Clip Spacing: 24" o.c. max. Bearing Plates: Firestone Stainless or galvanized UC Bearing Plate Fasteners: Firestone 12 x X" PH PD WOW TK1 (No. 12 pancake wafer head steel screws. Min. 1/2" deck penetration. Two screws used per clip.)	658
Plywood: min. 5/8" nominal (19/32 in.) actual. Exposure 1, Grade B-C, APA rated sheathing conforming to requirements of DOC PS-1, with butt joints to be located over the wood supports (2 x 10 [1-1/2 x 9-1/8 actual] 42/20 square edged No. 2 grade or better S-P-F, Hemlock Fir, Douglas Fir or Southern Yellow Pine or equivalent. Spaced 24" o.c.). Plywood attached to joists with 8d x 2-1/2" long ring shank nails spaced 6" oc at edges and interior.			Type 15 or 30 organic felt, side laps min. 2", end laps per manufacturer's recommendation	Width: Max. 16 in. Metal: Min. 24 ga steel Seams: 1-1/2 in. High Single-Locked	Clips: UC-3 Stainless Steel Expansion Clip Clip Spacing: 18" o.c. max. Fasteners: Firestone 10 x 1" (No. 10 pancake Type A steel screws. Min. 1/2" deck penetration. Two screws used per clip.)	663
UC-4						
Wood: Min. 5/8 in. nom (19/32 in. actual) thick plywood: Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*	N/A	N/A	Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 18" Metal: Min. 24 ga Steel	Fastener Type: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long No. 2 Phillips Drive, wafer-head, coated steel screws. A 5/8" OD nylon or other plastic type washer, 0.030" thick to be used with each panel fastener.) Fasteners Spacing: 18" OC with two fasteners used at each location driven through adjacent guide holes in mounting flange.	376
Wood: Min. 3/4 in. nom (23/32 in. actual) thickness plywood: Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*	N/A	N/A	Rosin paper 9 mil thick. Side lap min 3 in. stapled to insulation with random spacing. Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. Stapled to insulation with min 5/16 in. long staples 6 in. OC at side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 14" Metal: Min. 16oz Copper	Fastener Type: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long, No. 2 Phillips Drive, wafer-head, coated steel screws. A 9/16" OD by 0.059" thick plated steel washer to be used with each panel fastener.) Fasteners Spacing: 9" OC with fasteners inserted in guide holes in mounting flange.	399

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
			UC-4			
Wood: Min. 5/8 in. nom (19/32 in. actual) thick plywood; Exposure 1, APA rated sheathing (42/20) square edged. Butt joints to be located over purlins, side joints not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used.*	N/A	N/A	Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. Stapled to insulation with min 5/16 in. long staples 6 in. OC at side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 17.75" Metal: Min. 24 ga Steel Min. .040" Alum	Fastener Type: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long, No. 2 Phillips Drive, wafer-head, plated steel screws used with a 5/8" OD nylon or other plastic washer.030" thick.) Fasteners Spacing: 18" OC with two fasteners at each location.	513A
Wood: Min. nom 5/8 in. (19/32 in. actual) thick plywood; Grade B-C, APA rated. Fastened to supports (2 x 10 wood joists No. 2 or better, spaced 24 in OC max) using 8d by 2-1/2 in. long ring shank nails spaced 6 in. OC max at the butt ends and 6 in. OC max in the field. As an alternate 7/16 in. thick PS-2 rated oriented strand board (OSB). Fastened to joists using No. 8 by 2-1/2 long coarse thread steel screws. Spaced 12 in OC max at the butt ends and 12 in OC in the field	N/A	N/A	(Optional) On top of insulation place a self-adhered modified bitumen installed per manufacture's instructions	Width: Min. 9-3/4" Metal: Min. 26 ga Steel Min 0.032 Alum	Fastener Type: Firestone 10x1" PC PD NW T17 (No. 10-x1" steel screws) Fasteners Spacing: 12" OC with two fasteners used at each location driven through adjacent guide holes in mounting flange.	657
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	N/A	1"-4" Firestone Iso95+ GL. Joints staggered between layers. Optional Coverboard: As an alternate to the bearing plates, 19/32 in. thick plywood may be used.	Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 18" Metal: Min. 24 ga Steel	Fastener Type: Firestone 12 x X" PH PD NW TK1 (No. 12-15 No. 3 Phillips Drive Truss head steel screws with a "S" point. Length to be 3/4". longer than overall thickness of roof deck length. A 5/8" OD nylon or other plastic type washer, 0.030" thick to be used with each panel fastener.) Fasteners Spacing: 18" OC with two fasteners used at each location. Bearing Plates: Firestone Galvanized UC Bearing Plate	377
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	N/A	1"-4" Firestone Iso95+ GL. Joints staggered between layers. Mechanically fastened. Optional Coverboard: As an alternate to the bearing plates, 1/2 in. thick (15/32 in. actual) thickness plywood, APA rated sheathing, square edged may be used.	Type 15 or 30 organic felt, side laps min 2 in., end laps per manufacturer's recommendations. When optional plywood is used, stapled with 5/16 in. long staples 6 in. OC side laps and 12 in. OC in two interior rows. As an alternate, a self-adhering modified bitumen water proofing membrane may be used. Installed per manufacturer's recommendations.	Width: Min. 12" Max. 17.75" Metal: Min. 24 ga Steel Min. .040" Alum	Fastener Type: Firestone 12 x X" PH PD NW TK1 (No. 12-15, No. 3 Phillips drive, truss-head, coated steel screws with an "S" point. Length to be 3/4" longer than overall thickness of roof deck. A 5/8" OD nylon or other plastic washer 0.030" thick to be used with each screw.) Fastener Spacing: 12" OC with two fasteners used at each location. Bearing Plates: Firestone Galvanized UC Bearing Plate	513
Open Framing: 16 MSG min thickness coated steel Hat Channels 1 in. deep and 3-1/4 in. total width. Flanges, 3/4 in. web, 1-3/4 in. (min yield strength 33,000 psi). Spaced 18 in. OC hat channels fastened to purlins with 2 No. 12-14 by 3/4 in. self-drilling, self-tapping, hex-head plated steel screws.*	N/A	N/A	Vapor Retarder: Min. 3 mil vinyl sheeting	Width: Min. 12" Max. 18" Metal: Min. 24 ga Steel	Fastener Type: (No. 10-16x1" long self-drilling, self-tapping, hex-head plated steel screws. A 5/8" OD nylon or other plastic type washer, 0.030" thick to be used with each fastener.) Fasteners Spacing: 18" OC with two fasteners used at each location driven through adjacent guide holes in mounting flange.	378

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-6						
Wood: Min. nom 5/8 in. (19/32 in. actual) thick plywood, Grade B-C, APA rated. Fastened to supports (2 x 10 wood joists No. 2 or better, spaced 24 in OC max) using 8d by 2-1/2 in. long ring shank nails spaced 6 in. OC max at the butt ends and 6 in. OC max in the field.	N/A	N/A	N/A	Width: Max. 18" Metal: Min 0.032" Alum Min 24 ga steel Seams: 2" High Double-Locked	Clips: UC-6 Galvanized Steel Low-Float Clip or UC-6 Super Clip Clip Spacing: 30"o.c. max. for Aluminum 36" OC for steel Fasteners: Firestone No. 12 x 2". Two fasteners used per clip.)	655
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	Min ¼ in Dens Deck directly over deck. (Optional)	Min 1.0" Firestone Iso95+ GL. Joints staggered between layers.	Self-adhering modified bitumen water proofing membrane	Width: Max. 18" Metal: Min. 24 ga Steel Seams: 2" High Double-Locked	Clips: UC-6 Galvanized Steel Low-Float Clip or UC-6 Super Clip Clip Spacing: 30"o.c. max. Bearing Plates: Firestone Galvanized UC Bearing Plate Fasteners: Firestone All-Purpose (AP) Fastener (No. 14 self-drilling, self-tapping, hex-washer, pancake head plated steel screws. Two fasteners used per clip.)	652
Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *	Min ¼ in Dens Deck directly over deck. (Optional)	Min 1.0" Firestone Iso95+ GL. Joints staggered between layers. Coverboard: Min 1/2 in. thick (15/32 in. actual) plywood, DOC PS-1 rated (square edged may be used) or min 7/16 in thick OSB, DOC PS-2 rated. Fasteners used to attach plywood or OSB cover board to deck to be Firestone HD HailGard Fastener in a pattern of 24 screws per 4-ft by 8-ft cover board.	Self-adhering modified bitumen water proofing membrane	Width: Max. 18" Metal: Min. 24 ga Steel Min. .032" Alum Seams: 2" High Double-Locked	Clips: UC-6 Galvanized Steel Low-Float Clip or UC-6 Super Clip Clip Spacing: 24"o.c. max. Fasteners: Firestone 10x1" PC T WOW T17 SS (No. 10-10x1 -AS 1" steel screws. Two fasteners used per clip.)	653
Open Framing: No. 16 MSG min gauge steel (50,000 psi min yield strength). Spacing to be maximum 4 ft, 0 in. OC. *	N/A	N/A	N/A	Width: Max. 16" Metal: Min. 22ga Steel Seams: 2" High Double-Locked	Clips: UC-6 Galvanized Steel Low-Float Clip or UC-6 Super Clip Clip Spacing: 48"o.c. max. Fasteners: Firestone 14x0.875" HEX SW TK1 (No. 1/4-14x7/8" long, self-drilling, self-tapping, hex-washer head plated steel screws. Two fasteners used per clip.)	571
Open Framing: No. 16 MSG min gauge steel (50,000 psi min yield strength). Spacing to be maximum 3 ft, 0 in. OC. *	N/A	N/A	N/A	Width: Max. 16" Metal: Min. .040" Alum Seams: 2" High Double-Locked	Clips: UC-6 Galvanized Steel Low-Float Clip or UC-6 Super Clip Clip Spacing: 36"o.c. max. Fasteners: Firestone 14x0.875" HEX SW TK1 (No. 1/4-14x7/8" long, self-drilling, self-tapping, hex-washer head plated steel screws. Two fasteners used per clip.)	571A

UC-7						
Wood: Nominal 5/8 in. (19/32 in. actual) plywood, Grade B-C, APA rated. Fastened to supports (joists) using no. 8 by 2-1/2 in. long coarse thread screws. Spaced 6 in. OC max. at butt ends and 6 in. OC max. in the field.	N/A	N/A	N/A	Width: Max. 12" Metal: Min. 24 ga Steel	Clips: UC-7 Galvanized Steel Clip (One piece assembly, 3" long fabricated from No. 24 MSG coated steel.) Clip Spacing: 12"o.c. max. Fasteners: Firestone 12x1" PC PD WOW T17 (1" long No. 12 steel screws. Two screws per clip)	660

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS

UC-14						
Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
<p>Wood: Plywood decking to be graded per PS83 specifications, 19/32 in. thick, exposure 1, APA Rated Sheathing (42/20) square edged. Butt ends not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant applied with a caulking gun and feathered outward from the joint when alternate underlayment is not used.*</p>	N/A	N/A	<p>Type 15 or 30 organic felt</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used.</p>	<p>Width: 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip (<i>One piece assembly, 3-1/2" wide, 1-7/8" high. Min thickness 18 MSG.</i>)</p> <p>Clip Spacing: 36"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (<i>No. 10-12x1" long pancake head, No. 2 Phillips drive, A-point, coated steel screw. Min two fasteners per clip.</i>)</p>	414
<p>Wood: Plywood decking or oriented strand board (OSB) to be a nom 5/8 in. thick, exposure sheathing span C-D, 40/20 plywood. All butt and side joints to be sealed with a one part urethane caulk sealant-feathered outward from joint when alternate underlayment is not used. In lieu of plywood, 1 in. tongue and groove decking may be used.*</p>	Min 1/4 in Dens Deck directly over deck. (Optional)	N/A	<p>Any suitable membrane to protect deck. (Optional)</p>	<p>Width: 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 48"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (<i>No. 10 x min. 1" long Pancake head wood screws with a No. 2 Phillips head or 10x1", 1/4" Hex Head Woodrip. Two screws per clip.</i>)</p>	436
<p>Wood: Min. 19/32 in. thick plywood; Rated per PS-1 specification. Butt ends not blocked.*</p>	Min 1/4 in Dens Deck directly over liner panel. (Optional)	N/A	<p>Type 30 organic felt. Sides overlapped min 2 in., end laps per manufacturer's instructions. Felt nailed to plywood deck with 1 in. long galvanized steel roofing nails, located per manufacturer's instructions. Nail spacing to be max 12 in. OC at the side lap and max 24 in. OC in interior rows.</p>	<p>Width: 16"</p> <p>Metal: Min. .032" Alum</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 18"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (<i>No. 10-12x1" long, No. 1 Phillips drive, bugle head coated steel wood screws. Two screws used per clip.</i>)</p>	508
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *</p>	5/8 in gypsum, directly over deck. (Optional)	<p>1.0"-4.5" Firestone Iso95+ GL. Joints staggered between layers.</p> <p>Optional Coverboard: As an alternate to the bearing plates, 7/16 in. thick Oriented Strand Board (OSB) may be used.</p>	<p>Type 30 organic felt.</p> <p>As an alternate, a self-adhering modified bitumen water proofing membrane may be used.</p>	<p>Width: Min. 10" Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 48"o.c. max.</p> <p>Bearing Plates: Firestone Galvanized UC Bearing Plate</p> <p>Fasteners: Firestone All-Purpose (AP) Fastener (<i>No. 14 truss head type with No. 3 Phillips drive, self-drilling steel screws. Fasteners to penetrate deck 3/4 in. min. Two screws per clip.</i>)</p>	303
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *</p>	Min 5/8 in gypsum, 4'x8' sheets, directly over liner panel. (Optional)	<p>Max. 4.0" Firestone Iso95+ GL</p> <p>Optional Coverboard: As an alternate to the bearing plates Min. APA rated plywood, exposure sheathing span C-D 40/20, nom 1/2 in. thick, or Oriented Strand Board (OSB), nom 7/16 in. thick. 4x8 ft. may be used.</p>	<p>Self-adhering modified bitumen water proofing membrane</p>	<p>Width: Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: Steel - 48"o.c. max.</p> <p>Bearing Plates: Min. 16ga Galvanized Bearing Plate</p> <p>Fasteners: Firestone All-Purpose (AP) Fastener (<i>No. 14 Truss head with No. 3 Phillips drive. Min. 3/4" penetration into steel deck. Two screws per clip.</i>)</p>	448

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-14						
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. *</p>	<p>Min 5/8 in gypsum, 4'x8' sheets, directly over liner panel. (Optional)</p>	<p>1.0"-3.5" Firestone HailGard. Insulation Attachment: Firestone All-Purpose (AP) Fastener (No. 11-13, No. 3 Phillips drive, truss head, painted steel screws. Length to depend on overall thickness of deck and to penetrate steel deck 3/4" min.) <i>(A 2" dia. formed pressure plate fabricated from No. 22 MSG coated steel to be used with each screw. Fasteners located in three rows along the 8' length of the nailable insulation beginning 6" from the 8' edges with a row down the center and spaced 21" OC beginning 6" from the 4' edges. A total of 15 fasteners used for each 4'x8' board.)</i></p>	<p>Type 30 organic felt. Sides overlapped min 2 in. End laps per manufacturer's instructions. Felt nailed to nailable insulation with 1 in. long galvanized steel roofing nails, located in side laps and between side laps per manufacturer's instructions. Nail spacing to be max 12 in. OC at the side lap and max 24 in. OC in interior rows.</p>	<p>Width: Steel - 18", 16", 12", 10" Alum - 16", 12", 10"</p> <p>Metal: Min. 24 ga Steel Min. .032" Alum</p>	<p>Clips: UC-14 Galvanized Steel Clip <i>(One piece assembly, 3-1/2 in. wide, 1-7/8 in. high. No. 18 MSG min thick coated steel.)</i></p> <p>Clip Spacing: Steel - 36" o.c. max. Alum - 18" o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (No. 10-12x1" long pancake head, No. 2 Phillips drive, A-point, coated steel screws. Min two fasteners per clip.)</p>	508A
<p>Loadmaster System*</p>	<p>Insulation: Min 1.0" Firestone Iso95+ GL, 4 by 8 ft sheets, All end joints to be staggered with respect to adjacent rows. All joints to be offset from joints in mineral board.</p> <p>1/2" Min. Duraflex Mineral Board. Joints taped with 2-1/2 in. wide taped supplied by manufacture. (See UL Roof Deck Construction for special attachment)</p>	<p>Vapor Barrier — Single ply used between Fire Barrier and the metal roof deck panels.</p>	<p>Width: Min. 10" Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 48" o.c. max.</p> <p>Fasteners: <i>(0.140 in. dia. threaded shank Phillips, bugle or trumpet head, self-drilling, self-tapping corrosion resistant coated steel screws supplied by roof deck manufacturer. Screws shall penetrate steel deck min 1/2")</i></p>	342	
<p>Loadmaster System*</p>	<p>Insulation: Min 1.0" Firestone Iso95+ GL, 4 by 8 ft sheets, All end joints to be staggered with respect to adjacent rows. All joints to be offset from joints in mineral board.</p> <p>Thermal Board: Dens Deck, Dens Deck Prime, or Duraflex Mineral Board, 1/2" Min. thickness. Joints taped with 2-1/2 in. wide taped supplied by manufacture. (See UL Roof Deck Construction for special attachment)</p>	<p>Vapor Barrier — Single ply used between Fire Barrier and the metal roof deck panels.</p>	<p>Width: Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip <i>(One piece assembly, 3-1/2" wide, 1-7/8" high, thickness 0.048")</i></p> <p>Clip Spacing: Steel - 48" o.c. max.</p> <p>Fasteners: Firestone All-Purpose (AP) Fastener (No. 14 Truss head with No. 3 Phillips drive. Min 1/2" penetration into metal deck. Two screws per clip.)</p>	486	
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi).</p> <p>A) 60 inch purlin spacing for 22ga steel panels.</p> <p>B) 48 inch purlin spacing for 24ga steel panels.</p>	N/A	<p>Maximum 4 in. Compliant with ASTM C1289 or ASTM C578 Standards, Types IV, X or XII. Located over purlins. Density to be minimum 1.8 pcf. (Optional)</p>	N/A	<p>Width: 12"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: One clip at each purlin</p> <p>Fasteners: <i>(No. 10-16 by 1 in. long, self-drilling, self-tapping, pancake head, No. 3 point, plated steel screws.)</i></p> <p><i>(No. 14-13 DP1 carbon, pancake head combination Square/Phillips Drive screws to be used when rigid insulation is used. Length to penetrate steel minimum of 3/4". Two screws per clip to be used.)</i></p> <p>Bearing Plate: Min. 16ga steel, 4 in. x 5 in. (when rigid insulation is used)</p>	254

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	UL Const. Number
UC-14						
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi).</p> <p>A) 48 inch purlin spacing for Class 90 rating..</p> <p>B) 60 inch purlin spacing for Class 60 rating.</p>	N/A	<p>Maximum 4 in. Compliant with ASTM C1289 or ASTM C578 Standards, Types IV, X or XII. Located over purlins. Density to be minimum 1.8 pcf. (Optional)</p>	N/A	<p>Width: Min. 10" Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: One clip at each purlin</p> <p>Fasteners: (No. 10-16 by 1 in. long, self-drilling, self-tapping, pancake head, No. 3 point, plated steel screws.)</p> <p>(No. 14-13 DP1 carbon, pancake head combination Square/Phillips Drive screws to be used when rigid insulation is used. Length to penetrate steel minimum of 3/4". Two screws per clip to be used.)</p> <p>Bearing Plate: Min. 16ga steel, 4 in. x 5 in. (when rigid insulation is used)</p>	255
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi).</p> <p>A) 36 inch purlin spacing for Class 90 rating for aluminum panels.</p> <p>B) 48 inch purlin spacing for Class 60 rating for aluminum panels.</p> <p>C) 60 inch purlin spacing for class 90 rating for No. 22ga steel panels.</p> <p>D) 48 inch purlin spacing for Class 60 rating for No. 24ga steel panels.</p>	N/A	<p>Maximum 4 in. Compliant with ASTM C1289 or ASTM C578 Standards, Types IV, X or XII. Located over purlins. Density to be minimum 1.8 pcf. (Optional)</p>	N/A	<p>Width: 10.5"</p> <p>Metal: 24 ga Steel .032" Alum</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: One clip at each purlin</p> <p>Fasteners: (No. 10-16 by 1 in. long, self-drilling, self-tapping, pancake head, No. 3 point, plated steel screws.)</p> <p>(No. 14-13 DP1 carbon, pancake head combination Square/Phillips Drive screws to be used when rigid insulation is used. Length to penetrate steel minimum of 3/4". Two screws per clip to be used.)</p> <p>Bearing Plate: Min. 16ga steel (when rigid insulation is used)</p>	261
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi).</p> <p>A) 60 inch purlin spacing for No. 22 MSG panels.</p> <p>B) 48 inch purlin spacing for No. 24 MSG panels.</p>	N/A	<p>Vinyl faced blanket insulation, 3 inches thick when located between panels and purlins. (Optional)</p>	N/A	<p>Width: 12"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 48"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (No. 10x1" long No. 3 self-drilling point. No. 2 Phillips Pancake head. Two screws per clip.)</p>	445
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi) spaced 48 in. OC.</p>	N/A	<p>Vinyl faced blanket insulation, 3 inches thick or 1/4 in. thick closed/microcellular polyethylene insulation with foil facing designated "Low-E Insulation™", located between panels and purlins. (Optional)</p>	N/A	<p>Width: 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: 48"o.c. max.</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (No. 10x1" long No. 3 self-drilling point. No. 2 Phillips Pancake head. Two screws per clip.)</p>	446
<p>Open Framing: No. 16 MSG min thickness steel (min yield 50 ksi).</p> <p>A) 36 inch purlin spacing for 0.032" aluminum panels.</p> <p>B) 60 inch purlin spacing for No. 22 MSG panels.</p> <p>C) 48 inch purlin spacing for No. 24 MSG panels.</p>	N/A	<p>Vinyl faced blanket insulation, 3 inches thick when located between panels and purlins. (Optional)</p>	N/A	<p>Width: 10"</p> <p>Metal: 24 ga Steel .032" Alum</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: One clip at each purlin</p> <p>Fasteners: Firestone 10x1" PC PD NW T17 (No. 10x1" long No. 3 self-drilling point. No. 2 Phillips Pancake head. Two screws per clip.)</p>	447

UL 580, CLASS 90 RATED ROOF DECK CONSTRUCTIONS (CONT.)

Deck	Thermal Board	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	
UC-14						
<p>Open Framing: No. 16 MSG minimum thickness steel with a minimum yield strength of 50,000 psi. Purlin spacing as follows:</p> <p>A) 48 inch purlin spacing for Class 90 rating for No. 24 MSG panels in all widths.</p> <p>B) 60 inch purlin spacing for class 90 rating for No. 22 MSG 12 inch wide panels only.</p> <p>C) 60 inch purlin spacing for Class 60 rating for No. 22 MSG panels in all widths.</p>	N/A	Any compressible blanket insulation, 3 inches max. thickness when located between panels and purlins.	N/A	<p>Width: Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip (<i>One piece assembly, 3-1/2 in. wide, 1-7/8" high. No. 18 MSG min thick coated steel.</i>)</p> <p>Clip Spacing: One clip at each purlin</p> <p>Fasteners: (<i>No. 10-16x1" long plated steel pancake head No. 2 Phillips drive with a No. 3 self-drilling point. Two screws per clip.</i>)</p>	543
<p>Open Framing: No. 16 MSG minimum thickness coated steel purlins with a minimum yield strength of 50,000 psi. Or minimum "H" series open-web joists. Maximum spacing "48" O.C.*</p> <p>Optional Steel Deck: No. 29 MSG minimum steel. Minimum yield strength 80,000 psi, minimum depth 9/16 inches, maximum pitch 2.6667 inches O.C.*</p>	See UL Roof Deck Construction	<p>1"-6" Firestone Iso95+ GL. Joints staggered between layers. Mechanically fastened.</p> <p>Optional Coverboard: As an alternate to the bearing plates minimum 1/2" thick APA rated plywood or Oriented Strand Board (OSB) may be installed over Rigid Board in lieu of bearing plates.</p>	Any suitable membrane to protect Insulation and Coverboard	<p>Width: Max. 18"</p> <p>Metal: Min. 24 ga Steel</p>	<p>Clips: UC-14 Galvanized Steel Clip (<i>One piece assembly, 3-1/2 in. wide, 1-7/8" high. No. 18 MSG min thick coated steel.</i>)</p> <p>Clip Spacing: 48" o.c. max.</p> <p>Bearing Plates: Firestone Galvanized UC Bearing Plate</p> <p>Fasteners: (<i>No. 14 self-tapper. Two screws per clip to be used. Min. 1/2" penetration into steel purlins.</i>)</p>	544
<p>Steel: No. 22 MSG min thick coated steel (min yield strength 33,000 psi). Min depth 1-1/2 in. Max pitch 6 in. fabricated to various profiles. Fastened to supports 6' o.c. Purlins(joists) 6 ft. o.c.</p>		Optional Max. 4.0" Firestone Iso95+ GL		<p>Width: Max. 18"</p> <p>Metal: Min. 24 ga Steel or min. 0.032 Aluminum</p>	<p>Clips: UC-14 Galvanized Steel Clip</p> <p>Clip Spacing: Steel - 18" o.c. max.</p> <p>Bearing Plates: Min. 20ga Galvanized Steel or min. 26 gauge Stainless steel Bearing Plate</p> <p>Fasteners: Firestone No. 12 Fastener <i>Two screws per clip.</i></p>	664
5V Crimp						
<p>Wood: Min. 5/8 in., Type CDX APA Rated plywood sheathing.*</p>	One layer Elk "VersaShield" with 2 in. side lap, loose laid.	N/A	One layer of Type 30, fastened per manufacturer's installation instructions.	<p>Width: Max. 22.5"</p> <p>Metal: Min. 26 ga Steel</p>	<p>Fastener Type: Firestone 9x1.5" HEX SW PP (Color)</p> <p>Fastener Spacing: 24 in. O.C. and located on the top part of the panel v-crimp.</p>	629

4. **UL 1897 Testing:** Test is conducted in accordance with UL 1897 "Uplift Test for Roof Covering Systems". The test method subjects a minimum 10 ft by 10 ft sample to various short term (one minute increments) static air pressure to index performance under uplift loads imposed on a roofing system's securement to a specified roof deck.

**TABLE 1.03C
UL 1897 TESTED ROOF CONSTRUCTIONS**

Deck	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	Wind Uplift
UC-3					
Steel, min. 22 MSG	Foamed Plastic (rigid insulation): Min. 1 in., max thickness 4 in. Joints staggered between layers. Mechanically fastened to the steel deck per manufacturer's recommendation.	Underlayment #1: One layer Type 30 organic felt with 2 in. side laps. Mechanically fastened to the steel deck per manufacturers recommendations. Underlayment #2: One layer UL Classified ELK "VersaShield" with 2 in. side laps., loose laid.	Roof Panel: Width 16 in. max. with 1-1/2 in high legs. No. 24 MSG min thick coated steel. Panels continuous over three or more clips with no end laps. Panel ribs seamed wit and electric seaming tool with seaming operation to include upper tabs of panel clips. Identified as "UC-3".	Fasteners (screws): Fasteners used to attach panel clips to steel deck to be No. 12 pancake wafer head steel screws. Length to penetrate steel deck a minimum 3/4 in. Two screws used per clip inserted into clip guide holes. Bearing Plates: Plates used with panel screw fasteners under panel to be 4 by 4 in. min 26 gauge stainless steel. As an alternate, 1/2 in. thick (15/32 in actual) plywood, APA rated sheathing, square edged may be used. Roof Deck Fasteners (Panel Clips): Two part assembly, base 5 in. long, 1 in. wide, 0.42 in. high. Fabricated from No. 22 MSG min thick coated steel. Upper tab 3 in. long, 0.42 in. wide, 1.786 in. high. Fabricated from No. 24 MSG min thick coated steel. Spaced a maximum 12 in. OC. Identified as "UC-3 SuperClip".	-142 PSF
Steel, min 22 MSG	Foamed Plastic (rigid insulation): Min. 1 in., max thickness 4 in. Joints staggered between layers. Mechanically fastened to the steel deck per manufacturer's recommendation.	Underlayment: One layer Type 30 organic felt with 2 in. side laps. Mechanically fastened to the steel deck per manufacturers recommendations. Underlayment: One layer UL Classified ELK "VersaShield" with 2 in. side laps., loose laid. Vapor Barrier: One layer Colbond "Enkamat 7010", loose laid	Roof Panel: Width 16 in. max. with 1-1/2 in high legs. 0.027 in. thick RHEINZINK. This is a zinc material. Panels continuous over three or more clips with no end laps. Panels ribs double seamed with and electric seaming tool with seaming operation to include upper tabs of panel clips. Identified as "UC-3".	Fasteners (screws): Fasteners used to attach panel clips to steel deck to be No. 12 pancake wafer head steel screws. Length to penetrate steel deck a minimum 3/4 in. Two screws used per clip inserted into clip guide holes. Bearing Plates: Plates used with panel screw fasteners under panel to be 4 by 4 in. min 26 gauge stainless steel. As an alternate, 1/2 in. thick (15/32 in actual) plywood, APA rated sheathing, square edged may be used. Roof Deck Fasteners (Panel Clips): Two part assembly, base 5 in. long, 1 in. wide, 0.42 in. high. Fabricated from min. 0.0225 in. thick 304 stainless steel. Upper tab 3 in. long, 0.42 in. wide, 1.786 in. high. Fabricated from min. 0.0172 in. thick 304 stainless steel. Spaced a maximum 12 in. OC. Identified as "UC-3 SuperClip".	-187 PSF
Plywood, min 19/32 in. thick CDX		Underlayment: One layer Type 30 organic felt with 2 in. side lap. Fastened to the plywood deck per manufacturer's recommendations. Underlayment: One layer UL Classified Elk "VersaShield" with 2 in. side lap, loose laid. Vapor Barrier: One layer of Colbond "Enkamat 7010", loose laid	Roof Panels: Width 16 in. max. with 1-1/2 in high legs. 0.027 in. thick RHEINZINK. This is a zinc material. Panels continuous over three or more clips with no end laps. Panels ribs double seamed with and electric seaming tool with seaming operation to include upper tabs of panel clips. Identified as "UC-3".	Fasteners (Screws): Fasteners used to attach panel clips to plywood deck to be No. 10 by 1-1/2 in. long pancake head stainless steel screws. Two screws used per clip inserted in clip guide holes. Roof Deck Fasteners (Panel Clips): Two part assembly, base 5 in. long, 1 in. wide, 0.42 in. high. Fabricated from min. 0.0225 in. thick 304 stainless steel. Upper tab 3 in. long, 0.42 in. wide, 1.786 in. high. Fabricated from min. 0.0172 in. thick 304 stainless steel. Spaced a maximum 12 in. OC. Identified as "UC-3 SuperClip".	-247 PSF
Plywood, min 19/32 in. thick CDX		Underlayment: One layer Type 15 or 30 organic felt with 2 in. side lap. Fastened to the plywood deck per manufacturer's recommendations.	Roof Panels: Width 16 in. max. with 1-1/2 in high legs. 24 ga. Coated steel. Panel ribs single seamed. Identified as "UC-3".	Fasteners (Screws): Fasteners used to attach panel clips to plywood deck to be No. 10 by 1 in. long pancake head screws. Two screws used per clip inserted in clip guide holes. Roof Deck Fasteners (Panel Clips): Two part assembly, base 5 in. long, 1 in. wide, 0.42 in. high. Fabricated from min. 0.0225 in. thick 304 stainless steel. Upper tab 3 in. long, 0.42 in. wide, 1.786 in. high. Fabricated from min. 0.0172 in. thick 304 stainless steel. Spaced a maximum 18 in. OC. Identified as "UC-3 Expansion Clip".	-157 PSF
Plywood, min 19/32 in. thick CDX		Underlayment: One layer Type 15 or 30 organic felt with 2 in. side lap. Fastened to the plywood deck per manufacturer's recommendations.	Roof Panels: Width 16 in. max. with 1-1/2 in high legs. 24 ga. Coated steel. Panel ribs single seamed. Identified as "UC-3".	Fasteners (Screws): Fasteners used to attach panel clips to plywood deck to be No. 10 by 1 in. long pancake head screws. Two screws used per clip inserted in clip guide holes. Roof Deck Fasteners (Panel Clips): Two part assembly, base 5 in. long, 1 in. wide, 0.42 in. high. Fabricated from min. 0.0225 in. thick 304 stainless steel. Upper tab 3 in. long, 0.42 in. wide, 1.786 in. high. Fabricated from min. 0.0172 in. thick 304 stainless steel. Spaced a maximum 12 in. OC. Identified as "UC-3 Expansion Clip".	-202 PSF

UL 1897 TESTED ROOF CONSTRUCTIONS (CONT.)

Deck	Insulation	Underlayment	Panel Type and Width	Clips and/or Fasteners	Wind Uplift
UC-4					
Plywood, min 19/32 in. thick APA rated sheathing Grade B-C fastened to supports with 8d x 2-1/2 in. long ring shank nails spaced 6" o.c.			Roof Panels: Width 9-3/4 in. max. with 1-1/2 in high legs. 26 ga. Coated steel or 0.032 Aluminum. Panel ribs single seamed. A bead of sealant may be used at panel ribs. Identified as "UC-4".	Fasteners (Screws): Fasteners used to attach panel to plywood deck to be No. 10 by 1 in. long pancake head screws. Two screws spaced 12 in. o.c	-247 PSF
Plywood, min 19/32 in. thick APA rated sheathing Grade B-C fastened to supports with 8d x 2-1/2 in. long ring shank nails spaced 12" o.c. in the field and 6" o.c. along the perimeter			Roof Panels: Width 9-3/4 in. max. with 1-1/2 in high legs. 26 ga. Coated steel or 0.032 Aluminum. Panel ribs single seamed. A bead of sealant may be used at panel ribs. Identified as "UC-4".	Fasteners (Screws): Fasteners used to attach panel to plywood deck to be No. 10 by 1 in. long pancake head screws. Two screws spaced 12 in. o.c	-217 PSF
UC-6					
Supports (Purlins): No. 16 MSG steel (50ksi yield strength) spaced max 3 ft 0 in. OC			Metal Roof Deck Panels: "UC-6" panel. 0.040 in. min thickness aluminum. Panel width 16 in., height of female rib 2 in., male rib 1-3/4 in. Panels continuous over two or more spans. Panels seamed 180° at ribs with an electric seamer.	Fasteners (Screws): Used to attach panel clips to purlins, No. ¼-14 by 7/8 in. long, self-drilling, self-taping, hex-head steel. Two screws used per clip. Roof Deck Fasteners (Panel Clips): "UC-6 Clip". Two part assembly. Located over panel sides, fastened to supports using two fasteners per clip.	-165 PSF
UC-7					
Plywood: Min. 5/8 in. APA rated sheathing Grade B-C fastened to supports with No. 8d by 2-1/2 in. long steel ring shank nails spaced 6 in. OC in the field and 6 in OC along the perimeter			Metal Roof Deck Panels: "UC-7" panel. Min. 24 MSG thickness steel. Panel width 12 in., max 1 in. high at the ribs. A bead of sealant may be used at panel ribs.	Fasteners (Screws): Used to attach panel clips to deck, No. 12 by 1 in. long steel screws. Two screws used per clip. Roof Deck Fasteners (Panel Clips): "UC-7 Clip". One piece assembly spaced 12 in. OC and fastened to deck using two fasteners per clip.	-120 PSF
UC-14					
Steel, min 22 MSG	Foamed Plastic rigid insulation (optional): max thickness 4 in. Joints staggered between layers. Mechanically fastened to the steel deck per manufacturer's recommendation.		Roof Panel: Width 18 in. max. with 1-3/4 in high legs. 24 ga, coated steel or 0.032 Aluminum. A bead of sealant may be used at panel side joints.	Fasteners (screws): Fasteners used to attach panel clips to steel deck to be No. 12 pancake wafer head steel screws. Length to penetrate steel deck a minimum 1/2 in. Two screws used per clip inserted into UC-14 clip guide holes. Bearing Plates: Plates used with panel screw fasteners under panel to be 4 by 4 in. min 26 gauge stainless steel. Bearing plate optional if insulation is not used.	-105 PSF
5V Crimp					
Plywood, min 5/8 in. thick CDX		Underlayment: One layer Type 30 organic felt with 2 in. side lap. Fastened to the plywood deck per manufacturer's recommendations. Underlayment: One layer UL Classified Elk "VersaShield" with 2 in. side lap, loose laid.	Roof Panels: "5-V-Crimp" panel. 0.172 in. min thickness steel. Panel width 22-1/2 in.	Fasteners (Screws): No. 9 by 1-1/2 in. long hex head steel screws with a bonded washer. Fasteners spaced 24 in. OC and located on the top part of the panel v-crimp.	-155 PSF

1.04 Internal Fire (“P” Assemblies)

1. The following panel designations can be used in Design Nos.: **P225, P227, P230, P237, P259, P508, P510, P512, P514, P518, P701, P711, P717, P720, P722, P723, P726, P731, P734, P736, P801, P815, P819:**
 - A. **Mechanically Attached Metal Roof Panels** – Type UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-500, UC-501, UC-600, UC-601, UR, HR, and VR roof panels (26 MSG min gauge coated steel, min 0.020 in. thick copper or 0.032 min. gauge coated aluminum) placed over specified insulation and/or roof covering for the respective designs. Panel secured to top layer of 7/16 in. APA-rated oriented strand board (OSB) laminated to rigid insulation or 5/8 in. plywood over rigid insulation. Refer to individual Roof-Ceiling design under the appropriate Building Unit item for name of Classified Companies. Panels secured to oriented strand board or plywood at side ribs with panel clips designed specifically for these panels. Panel clips spaced 18 in. oc using No. 12-15 No. 3 Phillips self-drilling, self-tapping truss head steel or stainless steel screw. Zinc plated carbon steel screws. The oriented strand board laminated insulation or plywood covered rigid insulation are mechanically fastened to steel roof deck and covered with a 30 lb. felt.
 - B. **Mechanically Attached Metal Roof Panels** – Type UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-500, UC-501, UC-600, UC-601, UR, HR, and VR roof panels (26 MSG min gauge coated steel, min 0.020 in. thick copper or 0.032 min. gauge coated aluminum) placed over specified insulation and/or roof covering for the respective designs.
2. Type UC-1, UC-2, UC-3, UC-4, UC-6, and UC-7 are secured by their panel clips with the upper portion of the clip engaging the panel rib, a 3 in. by 4 in. bearing plate fabricated of nominal 0.018 in. thick coated steel is used under each panel clip. The bearing plate shall be placed over the specified roof insulation. The fastener shall penetrate the roof deck a min of ½ in. and shall be spaced 18 in. OC.
3. Type UC-500, UC501, UC-600, UC-601, UR, HR, and VR are screwed into the top of the panel rib through the metal panels into the specified insulation. Panel clips are attached using No. 12-15 Phillips drive truss head steel or stainless steel screw with a “S” point or tek point. Two fasteners per clip are used. The fasteners shall penetrate the roof deck a min. of ½ in. and shall be spaced 18 in. OC.

1.05 STATE OF FLORIDA and MIAMI-DADE APPROVALS

TABLE 1.05A
STATE OF FLORIDA PRODUCT APPROVAL

Specific State of Florida Product Approvals can be viewed by going to www.floridabuildingcode.org/ .		
FL Product Approval Number	Firestone Metal Products Profile	Type of Metal
FL 13629	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-14, 5-V-Crimp	See specific product approval
FL 11299-R0	UC-500	See specific product approval
FL 2833-R2	UC-6	See specific product approval

NOTE: Florida Product Approval Numbers FL 175-02, FL 2833-R1, FL 3570-R1, FL 4193-R1, FL 5292-R1, and FL 10601-R2 are consolidated under FL 13629.

**TABLE 1.05B
MIAMI-DADE NOTICE OF ACCEPTANCE**

Specific Miami-Dade Notice of Acceptance (NOA) can be viewed by going to www.maimidade.gov/buildingcode/ .			
Miami-Dade NOA#	Firestone Metal Products Profile:		Roof System:
06-0821.10	UC-3	(expires 08/11/10)	24 ga. Steel, 22 ga steel deck, insulated
06-0821.11	UC-3	(expires 08/04/10)	24 ga Rheinzink, WD, NI
06-0821.12	UC-3	(expires 08/18/10)	24 ga Rheinzink, 22 ga steel deck, insulated
06-0821.13	5-V-Crimp	(expires 12/08/10)	Min. 26ga Steel, WD, NI
06-0821.16	UC-4	(expires 3/22/11)	Min. 24ga Steel, WD, NI
06-1208.01	UC-3	(expires 02/16/11)	Min. 0.032" Aluminum, WD, NI
08-1210.08	UC-3	(expires 08/11/10)	24 ga. Steel, .040 Alum., 22 ga steel deck, insulated
07-0822.02	UC-6	(expires 02/06/13)	Steel, large & small Impact rated
07-0822.04	UC-9, UC-11	(expires 11/25/12)	Min. 24ga Steel, WD, NI
07-0822.05	UC-3	(expires 4/14/13)	Min. 16oz Copper, WD, NI
08-0325.01	UC-3	(expires 4/14/13)	Min. 24ga Steel, WD, NI
08-0611.01	UC-4	(expires 3/22/11)	Min. 24ga Steel, WD, NI
08-0915.02	UC-14	(expires 12/31/13)	Min. 24ga Steel, WD, NI
09-0219.02	UC-4	(expires 07/29/14)	Min. 0.032 Aluminum

Notes:

See specific Miami-Dade NOA for the maximum pressure allowed for all areas of the roof
WD = wood deck, 19/32" or greater
NI = non-insulated

**TABLE 1.05C
FLORIDA BUILDING CODE (HVHZ)
TAS 100-95 (WIND DRIVEN RAIN TEST)**

Model	Underlayment	Fire Barrier	Water Entry	Panel Uplift	Wind Speed	Pass/Fail
UC-3, 24 ga., w/ 12" oc, 1-1/2" ribs	ASTM D226, Type II (30# felt)	Elk VersaShield	No Entry	No Uplift	110 mph	Pass
UC-4, 24 ga., w/ 11-3/4" oc, 1-1/2" ribs	ASTM D226, Type II (30# felt)	Elk VersaShield	No Entry	No Uplift	110 mph	Pass
UC-6, 24 ga., w/ 12" oc, 2" ribs	ASTM D226, Type II (30# felt)	Elk VersaShield	No Entry	No Uplift	110 mph	Pass
UC-14, 24 ga., w/ 12" oc, 1- 3/4" ribs	ASTM D226, Type II (30# felt)	Elk VersaShield	No Entry	No Uplift	110 mph	Pass

**TABLE 1.05D
FLORIDA BUILDING CODE (HVHZ)
TAS 125**

Model	Underlayment	Fire Barrier	Uplift
UC-3 – 24ga steel, 16" wide panels, continuous clip of 22ga steel attached 6"oc with #12 x 1-1/4" pancake screws into 5/8" plywood	30# asphalt saturated felt, ASTM D226, Type II, 6"oc 0.120" x 1-1/4" galvanized annular ring shank nails with 32 ga tin caps in the perimeter, 12"oc in the field	VersaShield, loose laid	-408.5 psf test pressure

1.06 Energy Star Approvals - As Currently Listed at www.energystar.gov

TABLE 1.06
ENERGY STAR APPROVALS

Color	Models	Initial Solar Reflectance	Solar Reflectance after 3 years
Almond SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.57	0.56
Bone White SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.72	0.7
Brandywine SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.25	0.23
Champagne Metallic SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.37	0.36
Charcoal Gray SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.29	0.28
CityScape SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.35	0.34
Classic Copper SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.42	0.40
Colonial Red SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.31	0.31
Dark Bronze SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.26	0.25
Dark Ivy SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.25	0.25
Hemlock Green SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.32	0.29
Mansard Brown SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.30	0.29
Matte Black SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.25	0.27
Medium Bronze SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.30	0.28
Patina Green SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.26	0.28
Regal Red SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.42	0.41
Sandstone SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.51	0.50

ENERGY STAR APPROVALS (CONT.)

Color	Models	Initial Solar Reflectance	Solar Reflectance after 3 years
Sherwood Green SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.27	0.26
Sierra Tan SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.35	0.34
Silver Metallic SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.59	0.60
Sky Blue SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.29	0.28
Slate Gray SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.36	0.33
Stone White SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.57	0.56
Terra Cotta SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.34	0.33
Tropical Patina SR	UC-1, UC-2, UC-3, UC-4, UC-6, UC-7, UC-600, UC-601, 5VC, VR Classic Omega, UR Pro Omega	0.28	0.28

1.07 CRRC Rated Panels

TABLE 1.07
CRRC RATED PANELS

Color	Brand	Initial Solar Reflectance	3-year Solar Reflectance	Initial thermal Emittance	3-year Thermal Emittance	CRRC Product ID
Stone White SR	Any panel	0.55	0.55	0.83	0.82	0806-0010
Fluropon Cityscape	Any panel	0.35	0.34	0.84	0.83	0806-0004
Fluropon Classic II Silver Metallic	Any panel	0.56	0.55	0.76	0.76	0806-0005
Fluropon Bone White	Any panel	0.70	0.69	0.84	0.84	0806-0006
Fluropon Sandstone	Any panel	0.51	0.49	0.84	0.83	0806-0007
Classic Copper SR	Any panel	0.35	0.35	0.75	0.75	0806-0022
Charcoal Gray SR	Any panel	0.25	0.25	0.83	0.82	0806-0021
Mansard Brown SR	Any panel	0.25	0.25	0.83	0.83	0806-0019
Hemlock Green SR	Any panel	0.25	0.25	0.83	0.83	8060-0015

CRRC RATED PANELS (CONT.)

Color	Model	Initial Solar Reflectance	3-year Solar Reflectance	Initial thermal Emittance	3-year Thermal Emittance	CRRC Product ID
Patina Green SR	Any panel	0.32	0.32	0.83	0.82	0806-0014
Almond SR	Any panel	0.55	0.55	0.83	0.82	08060013
Medium Bronze SR	Any panel	0.25	0.25	0.83	0.83	0806-0011
Slate Gray SR	Any panel	0.35	0.35	0.83	0.81	8060-0009
Terra Cotta SR	Any panel	0.35	0.35	0.83	0.82	0806-0012
Sky Blue SR	Any panel	0.25	0.25	0.83	0.83	0806-0023
Colonial Red SR	Any panel	0.25	0.25	0.83	0.82	0806-0016

1.08 Air Infiltration & Water Penetration

**TABLE 1.08A
ASTM E283 AND E1680 AIR INFILTRATION TESTS**

Panel System:	ASTM E283		ASTM E1680		
	Static Pressure Differential (PSF)	Air Infiltration Rate (CFM/SF)	Preload Pressure (PSF)	Static Pressure Differential (PSF)	Air Infiltration Rate (CFM/SF)
UC-1					
24ga Steel & 0.038" Aluminum 17.0" Wide w/ Batten	1.56	0.03			
	6.24	0.06			
UC-3					
24ga Steel & 0.040" Aluminum 17.75" Wide w/o sealant	1.56	0.03			
	6.24	0.05			
24ga Steel 20" Wide w/o Sealant	12.0	0.044	15±	-1.57	0.011
				1.57	0.008
				-6.24	0.0138
				6.24	0.0333
24ga Steel 18" Wide w/ Sealant			15+/30-	±1.57	0.0015
				±6.24	0.0022

ASTM E283 and E1680 Air Infiltration Tests (cont.)

Panel System:	ASTM E283		ASTM E1680		
	Static Pressure Differential (PSF)	Air Infiltration Rate (CFM/SF)	Preload Pressure (PSF)	Static Pressure Differential (PSF)	Air Infiltration Rate (CFM/SF)
UC-4					
24ga Steel & 0.040" Aluminum 17.75" Wide	1.56 (w/o sealant)	0.22			
	6.24 (w/o sealant)	0.52			
	1.56 (w/ sealant)	0.04			
	6.24 (w/ sealant)	0.17			
24ga Steel 18" Wide w/ Sealant			15±	-1.57	0.010
				1.57	0.028
				-6.24	0.010
				6.24	0.099
UC-6					
24ga Steel 18" Wide w/ Sealant			15+ /30-	±1.57	0.0031
				±6.24	0.0091
UC-14					
24ga Steel 18" Wide w/ Sealant			15+ /30-	±1.57	0.0017
				±6.24	0.0039
UC 500					
24 gauge steel and 0.038 Aluminum, 12" wide	1.56 (w/o sealant)	0.07			
	6.24 (w/o sealant)	0.17			
	1.56 (w/ sealant)	0.03			
	6.24 (w/ sealant)	0.11			

**TABLE 1.08B
ASTM E331 AND E1646 WATER PENETRATION TESTS**

Panel System:	ASTM E331		ASTM E1646		
	Static Pressure Differential (PSF)	Water Infiltration	Preload Pressure (PSF)	Static Pressure Differential (PSF)	Water Infiltration
UC-1					
24ga Steel & 0.038" Aluminum 17.0" Wide w/ Batten	10.5	None			
24ga Steel 18.0" Wide w/ Batten	6.24	None	15±	2.86	None

ASTM E331 and E1646 Water Penetration Tests (cont.)

Panel System:	ASTM E331	ASTM E1646	Panel System:	ASTM E331	ASTM E1646
	Static Pressure Differential (PSF)	Water Infiltration		Static Pressure Differential (PSF)	Water Infiltration
UC-2					
24ga Steel 16" Wide w/ Batten	6.24	None	15±	2.86	None
UC-3					
24ga Steel & 0.040" Aluminum 17.75" Wide w/o Sealant	10.5	None			
24ga Steel 20" Wide w/o Sealant			15±	2.86	None
24ga Steel 18" Wide w/ Sealant			15+/30-	15.0	None
UC-4					
24ga Steel & 0.038" Aluminum 17.75" Wide w/o Sealant	10.5	None			
24ga Steel 18" Wide w/ Sealant			15±	2.86	None
UC-6					
24ga Steel 16" Wide w/ Sealant			15+/30-	12.0	None
UC-14					
24ga Steel 18" Wide w/ Sealant			15+/30-	12.0	None
UC 500					
24 gauge steel and 0.038 Aluminum, 12" wide	10.5 sealed	No Entry			
	10.5 unsealed	No Entry			

1.09 Structural Performance

**TABLE 1.09A
ASTM E330 Structural Performance Tests**

Product Name	Panel width	Material type	Material thickness	Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift pressure (psf)
UC-1	17.0"	Steel	24 ga	2.0'	- 60	
		Aluminum	0.038	2.0'	- 75	
UC-2	21.0"	Aluminum	0.032	1.0'-2.0'		- 22.97
				2.25'		- 20.65
				2.5'		- 18.33
				2.75'		- 16.01
				3.0'		- 13.69

ASTM E330 Structural Performance Tests (cont.)

Product Name	Panel width	Material type	Material thickness	Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift pressure (psf)
UC-2	17.0"	Aluminum	0.032	1.0'		- 31.8
				1.25'		- 29.4
				1.5'		- 27.1
				1.75'		- 54.8
				2.0'		- 22.5
				2.25'		- 20.9
				2.5'		- 19.4
				2.75'		- 17.9
			3.0'		- 16.4	
UC-2	13.0"	Aluminum	0.032	1.0'		- 35.5
				1.25'		- 33.2
				1.5'		- 30.9
				1.75'		- 28.6
				2.0'		- 26.3
				2.25'		- 23.6
				2.5'		- 21.0
				2.75'		- 18.3
			3.0'		- 15.7	
UC-2	17.0"	Aluminum	0.040	1.0'		- 47.13
				1.25'		- 45.84
				1.5'		- 44.56
				1.75'		- 43.28
				2.0'		- 42.00
				2.25'		- 37.68
				2.5'		- 33.37
				2.75'		- 29.06
			3.0'		- 24.74	
UC-2	13.0"	Aluminum	0.040	1.0'		- 45.4
				1.25'		- 42.8
				1.5'		- 40.2
				1.75'		- 37.6
				2.0'		- 35.1
				2.25'		- 32.0
				2.5'		- 29.0
				2.75'		- 26.0
			3.0'		- 23.0	
UC-2	13.0"	Steel	24 ga.	1.0'		- 33.9
				1.25'		- 31.9
				1.5'		- 30.0
				1.75'		- 28.0
				2.0'		- 26.1
				2.25'		- 24.2
				2.5'		- 22.3
				2.75'		- 20.4
			3.0'		- 18.5	

ASTM E330 Structural Performance Tests (cont.)

Product Name	Panel width	Material type	Material thickness	Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift pressure (psf)
UC-2	17.0"	Steel	0.024	1.0'		- 22.12
				1.25'		- 20.76
				1.5'		- 19.40
				1.75'		- 18.04
				2.0'		- 16.68
				2.25'		- 16.46
				2.5'		- 16.25
				2.75'		- 16.04
UC-2	17.0"	Steel	0.030	3.0'		- 15.83
				1.0'		- 37.43
				1.25'		- 35.57
				1.5'		- 33.71
				1.75'		- 31.85
				2.0'		- 30.00
				2.25'		- 29.59
				2.5'		- 29.19
UC-2	21.0"	Steel	0.024	2.75'		- 28.79
				3.0'		- 28.39
				1.0'		- 18.07
				1.25'		- 16.78
				1.5'		- 15.50
				1.75'		- 14.22
				2.0'		- 12.94
				2.25'		- 12.35
UC-2	21.0"	Steel	0.030	2.5'		- 11.77
				2.75'		- 11.19
				3.0'		- 10.61
				1.0'		- 28.87
				1.25'		- 27.03
				1.5'		- 25.19
				1.75'		- 23.35
				2.0'		- 21.51
UC-3	17.75"	Steel	24 ga.	2.25'		- 21.45
				2.5'		- 21.39
UC-3	17.75"	Aluminum	0.038	2.0'	-45	
UC-4	17.75"	Aluminum	0.038	2.0'	-75	
UC-4	17.75"	Steel	24 ga.	2.0'	-105	
UC-7	12.0"	Aluminum	0.032	2.75'		- 21.33
				3.0'		- 21.28
				1.0'	- 104.3	- 41.7
				1.25'		- 39.1
				1.5'		- 36.5
				1.75'		- 33.9
				2.0'	- 78.3	- 31.3
				2.25'		- 28.8
2.5'		- 26.4				
2.75'		- 23.9				
3.0'	- 53.95	- 21.5				

ASTM E330 Structural Performance Tests (cont.)

Product Name	Panel width	Material type	Material thickness	Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift pressure (psf)
UC-7	12.0"	Aluminum	0.040	1.0'	- 111.1	- 44.4
				1.25'		- 41.1
				1.5'		- 37.8
				1.75'		- 34.5
				2.0'	- 78.3	- 31.3
				2.25'		- 28.8
				2.5'		- 26.4
				2.75'		- 23.9
				3.0'	- 53.9	- 21.5
UC-7	16.0"	Aluminum	0.032	1.0'	- 72.7	- 29.0
				1.25'		- 27.3
				1.5'		- 25.6
				1.75'		- 23.9
				2.0'	- 55.5	- 22.2
				2.25'		- 20.6
				2.5'		- 19.1
				2.75'		- 17.6
				3.0'	- 40.0	- 16.0
UC-7	16.0"	Aluminum	0.040	1.0'	- 89.0	- 35.6
				1.25'		- 33.2
				1.5'		- 30.9
				1.75'		- 28.6
				2.0'	- 65.8	- 26.3
				2.25'		- 24.3
				2.5'		- 22.3
				2.75'		- 20.3
				3.0'	- 45.75	- 18.3
UC-7	12.0"	Steel	24 ga.	1.0'	- 103.7	- 41.4
				1.25'		- 38.3
				1.5'		- 35.2
				1.75'		- 32.1
				2.0'	- 72.9	- 29.1
				2.25'		- 28.0
				2.5'		- 27.0
				2.75'		- 26.0
				3.0'	- 62.6	- 25.0
UC-7	12.0"	Steel	22 ga.	1.0'	- 157.9	- 63.1
				1.25'		- 59.1
				1.5'		- 55.2
				1.75'		- 51.3
				2.0'	- 118.7	- 47.4
				2.25'		- 44.1
				2.5'		- 40.8
				2.75'		- 37.5
				3.0'	- 85.6	- 34.2

ASTM E330 Structural Performance Tests (cont.)

Product Name	Panel width	Material type	Material thickness	Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift pressure (psf)
UC-7	16.0"	Steel	24 ga.	1.0'	- 66.0	- 26.4
				1.25'		- 25.1
				1.5'		- 23.9
				1.75'		- 22.7
				2.0'	- 53.8	- 21.5
				2.25'		- 20.8
				2.5'		- 20.1
				2.75'		- 19.4
UC-7	16.0"	Steel	22 ga.	3.0'	- 47.17	- 18.8
				1.0'	- 101.0	- 40.4
				1.25'		- 38.3
				1.5'		- 36.3
				1.75'		- 34.3
				2.0'	- 80.75	- 32.3
				2.25'		- 30.8
				2.5'		- 29.3
UC-500	12.0"	Alum	0.038"	2.0'	-105	
				UC-500	12.0"	Steel
UC-500	12.0"	Steel	24 ga.	5.0'	-20	
				2.0'	-60	
UC-500	12.0"	Steel	26 ga.	4.0'	-27	
				4.0'	-20	

**TABLE 1.09B
ASTM E1592 Structural Performance Tests**

Product Name	Panel Width	Material Type	Clip	Clip/Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift Pressure (psf)
UC-3	14.0"	16 oz. Copper	UC-3 Stainless Steel Expansion Clip	1.0'	- 100.8	- 61.0
				2.5'		- 51.8
				3.0'		-42.7
				3.5'		- 33.6
				4.0'	- 40.4	- 24.4
UC-3	16.0"	24 ga. Steel	UC-3 Stainless Steel Expansion Clip	1.0'	-77.6	
				5.0'	-41.2	

ASTM E1592 Structural Performance Tests (cont.)

Product Name	Panel Width	Material Type	Clip	Clip/Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift Pressure (psf)
UC-3	20"	24 ga. Steel	UC-3 Stainless Steel Expansion Clip	1.0'	-190.0	-95.0
				1.25'		-89.58
				1.5'		-84.17
				1.75'		-78.75
				2.0'		-73.33
				2.25'		-67.92
				2.5'		-62.50
				2.75'		-57.08
				3.0'		-51.67
				3.25'		-46.25
				3.5'		-40.83
		3.75'		-35.42		
		4.0'	-60.0	-30.0		
UC-3	20"	0.032" Aluminum	UC-3 Stainless Steel Expansion Clip	1.0'	- 150.0	
				4.0'	- 45.0	
UC-4	18"	0.032" Aluminum	N/A	1.0'	-55.0	
				4.0'	-15.0	
UC-6	18"	24 ga. Steel	UC-6 Low-Float Clip, Galvanized Steel	1.0'	-220.0	-110.0
				1.25'		-104.69
				1.5'		-99.38
				1.75'		-94.06
				2.0'		-88.75
				2.25'		-83.44
				2.5'		-78.13
				2.75'		-72.81
				3.0'		-67.5
				3.25'		-62.19
				3.5'		-56.88
				3.75'		-51.56
				4.0'		-46.25
				4.25'		-40.94
4.5'		-35.63				
4.75'		-30.31				
5.0'	-50.0	-25.0				
UC-6	16"	0.032" Aluminum	UC-6 Low-Float Clip	1.0'	-114.9	
				5.0'	-49.9	

ASTM E1592 Structural Performance Tests (cont.)

Product Name UC-6	Panel Width 16"	Material Type 0.032" Aluminum	Clip UC-6 Low- Float Clip	Clip/Purlin Spacing	Max. Test Uplift Pressure (psf)	Design Uplift Pressure (psf)
UC-6	18"	0.032" Aluminum	UC-6 Low Float Clip, Stainless Steel	1.0'	-180.0	-90.0
				1.25'		-85.94
				1.5'		-81.88
				1.75'		-77.81
				2.0'		-73.75
				2.25'		-69.69
				2.5'		-65.63
				2.75'		-61.56
				3.0'		-57.50
				3.25'		-53.44
				3.5'		-49.38
				3.75'		-45.31
				4.0'		-41.25
				4.25'		-37.19
				4.5'		-33.13
4.75'		-29.06				
5.0'		-25.0				
UC-14	16"	24 ga. Steel	UC-14 Clip, Galvanized Steel	1.0'		-50.00
				1.25'		-47.92
				1.5'		-45.83
				1.75'		-43.75
				2.0'		-41.67
				2.25'		-39.58
				2.5'		-37.50
				2.75'		-35.42
				3.0'		-33.33
				3.25'		-31.25
				3.5'		-29.17
3.75'		-27.08				
4.0'		-25.00				
UC-14	18"	24 ga. steel	UC-14 Clip, Galvanized Steel	1.0'	-95.0	
				4.0'	-40.0	
UC-14	18"	.032" Aluminum	UC-14 Clip, Stainless Steel	1.0'	-55.0	
				4.0'	-30.0	

1.10 Factory Mutual Ratings

**TABLE 1.10
FACTORY MUTUAL RATINGS**

UC-3 – 24 GA (MIN.) STEEL – 20" (MAX.) PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-120	UC-3 STAINLESS EXPANSION CLIP 12" O.C. PANEL 20" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	OSB SECURED W/AP'S AND PLATES @ 16 PER 4 X 8	259059-0-0	259347-0-0
1-120	UC-3 STAINLESS EXPANSION CLIP 12" O.C. PANEL 20" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 1.5" HAILGARD SECURED W/AP'S AND PLATES @ 16 PER 4 X 8	259334-0-0	N/A

FACTORY MUTUAL RATINGS (CON'T)

UC-3 – 24 GA (MIN.) STEEL – 20" (MAX.) PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-105	UC-3 STAINLESS EXPANSION CLIP 12" O.C. PANEL 20" MAX.	UNA-CLAD #12 W/NYLON WASHER 2 PER CLIP	YES	ISO 95+ GL, ISOGARD HD, DENS- DECK OR DENS-DECK PRIME	259335-0-0	259348-0-0
1-105	UC-3 STAINLESS EXPANSION CLIP 12" O.C. PANEL 20" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	OSB SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259336-0-0	259349-0-0
1-105	UC-3 STAINLESS EXPANSION CLIP 12" O.C. PANEL 20" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 1.5" HAILGARD SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259337-0-0	N/A

UC-4 – 24 GA (MIN.) STEEL – 9.75" PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-165	NO CLIP, BUT UC BEARING PLATE (STAINLESS STEEL) 12" O.C. PANEL 9-3/4" MAX.	UNA-CLAD #12 FASTENER 2/PLATE	YES	ISO 95+ GL, ISOGAR HD, DD OR DDP	259060-0-0	259350-0-0
1-105	NO CLIP PANEL 9-3/4" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) EVER 12" OC (ADJACENT SLOTS)	NO	OSB SECURED W/AP'S AND PLATES @ 16 PER 4 X 8	259338-0-0	259351-0-0
1-105	NO CLIP PANEL 9-3/4" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) EVER 12" OC (ADJACENT SLOTS)	NO	MIN. 1.5" HAILGARD SECURED W/AP'S AND PLATES @ 16 PER 4 X 8	259340-0-0	N/A

UC-6 – 22 GA STEEL – 18" (MAX.) PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-150	UC-6 LOW FLOAT CLIP (STAINLESS STEEL OR GALVANIZED) PANEL 18" MAX.	UNA-CLAD #12 PURLIN DRILLING FASTENER 2/PLATE	NO	STRUCTURAL PANEL SYSTEM "NO INSULATION"	259061-0-0	N/A

Factory Mutual Ratings (cont.)

UC-6 – 24 GA (MIN.) STEEL – 18" PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-105	UC-6 LOW FLOAT CLIP (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	OSB SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259358-0-0	259394-0-0
1-105	UC-6 LOW FLOAT CLIP (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 1.5" HAILGARD SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259361-0-0	N/A
1-135	UC-6 SUPER CLIP (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	YES	ISO 95+ GL, ISOGARD HD, DENS-DECK OR DENS-DECK PRIME	259359-0-0	259406-0-0
1-90	UC-6 SUPER CLIP (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 7/16" OSB SECURED W/AP FASTENERS AND INSULATION PLATES@ 16 PER 4 X 8	259360-0-0	259407-0-0
1-90	UC-6 SUPER CLIP (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 1.5" HAILGARD SECURED W/AP FASTENERS AND INSULATION PLATES @ 16 PER 4 X 8	259362-0-0	N/A

UC-14 – 24 GA (MIN.) STEEL – 18" (MAX.) PANEL WIDTH						
UPLIFT RATING	PANEL CLIP	CLIP FASTENERS	BEARING PLATE	SUBSTRATE / SECUREMENT	ROOFNAV # NEW (STEEL)	ROOFNAV # RECOVER (STEEL)
1-60	UC-14 CLIPS (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	OSB SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259354-0-0	259408-0-0
1-60	UC-14 CLIPS (STAINLESS STEEL OR GALVANIZED) 12" OC PANEL 18" MAX.	UNA-CLAD #10 (STAINLESS STEEL OR ECOATED) 2/CLIP	NO	MIN. 1.5" HAILGARD SECURED W/HD HAILGARD FASTENRES@ 24 PER 4 X 8	259356-0-0	N/A

1.11 Concentrated Load Testing

Testing is per FM 4471, Section 5.4 Foot Traffic Resistance, which uses a 200# load concentrated on a 3" x 3" square area at mid span with joists on 5 foot centers.

Table 1.11 Concentrated Load Testing

Panel	Panel description	Maximum Deflection	Permanent Deflection	Damage
UC-3	Nominal 20" wide, 24 ga. Steel with 1.5" rib; 180° seam	0.1875"	None	No failure
UC-4	Nominal 17-3/4" wide, 24 ga. Steel with 1.5" Snap rib	0.125"	None	No failure
UC-14	Nominal 18" wide, 24 ga. Steel with 1.75" rib; Snap Lock	0.0625"	None	No failure
UC-6	Nominal 18" wide, 24 ga. Steel with 1.5" rib; 180° seam	0.0625"	None	No failure