

December 21, 2010

M E M O R A N D U M

TO: All Who May Be Concerned

FROM: Jonathon D. Hamrick, Construction Planning and Design Manager

SUBJECT: Roof Decks on Public Hurricane Shelters - Updated

On March 1, 2002, the Florida Building Code (FBC) became effective, eliminating all other building codes in Florida.

FBC Section 423.25.4.1 contains missile impact requirements for roof decks. Please note that all roof deck systems which satisfy the missile impact and rain resistance criteria must function as an assembly. We recognize that it is not the deck alone that fulfills the above requirements, but rather the entire assembly including the roof membrane. Hence we require that the entire assembly be tested successfully in a laboratory for compliance with SSTD 12-99.

A number of other requirements for roof deck assemblies are listed in FBC Section 423.25.4.2. Standard SSTD 12-99 addresses only the resistance of the building envelope to impact by large missiles. SSTD 12-99 does not address bearing, wind uplift anchorage, diaphragm action, all of which are part of the design by the structural engineer of record; nor does SSTD 12-99 address water intrusion. Yet a hurricane shelter must be watertight to protect the occupants. Therefore FBC Section 423.25.4.2 properly requires that the system used as a deck assembly be waterproof (resistant to rain), besides fulfilling the structural and missile impact requirements. The Office thus requires that all roof deck systems used on public hurricane shelters, except as described under items 1 and 2 below, be tested as an assembly.

Please feel free to contact Mr. Ed Hubert, P.E., of my staff at (850) 245-9226 if you have any further questions.

JDH/eha

The following roof deck assemblies listed in FBC Section 423.25.4.2 are approved for use on public hurricane shelters:

- CIP-1 Cast-in-place concrete deck, minimum 4 inch thick. Deck must be waterproof, or have insulation and watertight roofing membrane above.
- PPC-1 Precast, prestressed concrete deck, minimum 4 inch thick. Deck must be waterproof, or have insulation and watertight roofing membrane above.

Other roof deck assemblies, as follows, have been successfully tested and are also approved. For allowable enhancements to approved roof desk assemblies, see section "Enhancements" at the end of this memo.

Decks with single-ply membranes:

- BAY-1 Membrane: One layer of Bayseal Series Spray Polyurethane Foam 1.5 inches thick (with a nominal density of 2.5 to 3.0 pcf, as stated by manufacturer).
Number 11 Granules (or equal) at 40 pounds per 100 sq. ft. (nominal). Top Layer Adhered with Silicone Top Coating and Silicone Base Coating Used as Selective Surface 20 mil overall (as stated by manufacturer).
Deck: Structural concrete, 3 inches thick.
Testing by: Certified Testing Laboratories
7252 Narcoossee Road
Orlando FL 32822
PH (407) 384-7744

- CAR-1 Membrane: Minimum 45 mil Carlisle non-reinforced, reinforced, or fleeceback EPDM, adhered or mechanically fastened.
Insulation: Polyisocyanurate or any other substrate combination, with each layer having a minimum compressive strength of 16 psi, minimum total thickness 1 inch.
Fastening: Plates and fasteners as required for insulation securement, based upon system type.
Deck: Minimum 24 gauge steel or concrete.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700

CAR-2 Membrane: Minimum 45 mil Carlisle reinforced or fleeceback TPO, adhered or mechanically fastened.

Insulation: Polyisocyanurate or any other substrate combination, with each layer having a minimum compressive strength of 16 psi, minimum total thickness 1 inch.

Fastening: Plates and fasteners as required for insulation securement, based upon system type.

Deck: Minimum 24 gauge steel or concrete.

Testing by: Architectural Testing, Inc.

130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700

CAR-3 Membrane: Minimum 50 mil reinforced or fleeceback PVC, adhered or mechanically fastened.

Insulation: Polyisocyanurate or any other substrate layer combination with each layer having a minimum compressive strength of 16 psi, minimum 1 inch total thickness

Deck: 24 gauge steel or concrete.

Testing by: Architectural Testing, Inc.

130 Derry Court
York, PA 17402
Phone: (717) 764-7700

DUR-1 Membrane: Duro-Last 40 mil, 50 mil, or 60 mil polyester scrim-reinforced, single-ply roof membrane coated with a PVC compound

Slip Sheet: Nova Rollout, loose laid

Insulation: Minimum 1.5" thick ASTM C-1289, type II polyisocyanurate insulation, loose laid or mechanically attached.

Deck: 22 gauge, Type B, Grade 33 steel deck, with minimum 19/32" plywood thick structural concrete deck.

Testing by: Exterior Research and Design

600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

- DUR-2 Membrane: Duro-Last roof membrane, a polyester scrim reinforced thermoplastic (PVC) roof membrane
Slip Sheet: Duro-Last ballast mat
Insulation: 1.5" thick ASTM C-1289, type II polyisocyanurate.
Deck: Steel or concrete deck
Testing by: Trinity | ERD
10 Mauney Court
Columbia, SC 29201
Phone: (803) 988-8133
- FIB-1 Membrane: FiberTite, mechanically attached, using 3.5 inch screws
Coverboard: None
Insulation: Two layers, minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate.
Deck: 22 gauge, Type B, Grade 33 galv. steel deck, over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- FIB-2 Membrane: FiberTite XT, mechanically attached using 3.5 inch screws
Coverboard: None
Insulation: Two layers, minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate.
Deck: 22 gauge, Type B, Grade 33 galv. steel deck, over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- FIB-3 Membrane: FiberTite Xtreme, mechanically attached using 3.5 inch screws
Coverboard: None
Insulation: Two layers, minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate.
Deck: 22 gauge, Type B, Grade 33 galv. steel deck, over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

- FIB-4 Membrane: FiberTite Xtreme, mechanically attached using 3.5 inch screws
Coverboard: 0.25 inch thick Dens-Deck
Insulation: Two layers, minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate.
Deck: 22 gauge, Type B, Grade 33 galv. steel deck, over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- FIB-5 Membrane: Fiber Tite FB 45 mil, fully adhered, using an FTR adhesive
Insulation: 2 inch Elastizell lightweight insulating concrete (200 psi min.), over 3.5 inch Apache Holey Board
Deck: 1.5 inch deep, 22 gauge Type B metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- FIB-6 Membrane: FiberTite
Insulation: Minimum 2 inch thick, minimum 200 psi, cellular lightweight concrete cast over minimum 1 inch thick EPS board.
Deck: 22 gauge minimum, Type B, minimum Grade 33 steel or concrete deck
Testing by: Trinity / ERD
10 Mauney Street
Columbia SC 29201
Phone: (803) 988-8133
- FIB-7 Membrane: FiberTite-FB
Insulation: Minimum 2 inch thick, minimum 200 psi cellular lightweight concrete cast over minimum 1 inch thick EPS board.
Deck: 22 gauge minimum, Type B, minimum Grade 33 steel or concrete deck
Testing by: Trinity / ERD
10 Mauney Street
Columbia SC 29201
Phone: (803) 988-8133

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 6 of 57

- FIR-1 Membrane: Firestone 0.045 inch Ultraply TPO membrane, fastened with Firestone HD fasteners and Firestone [Seam](#) plates.
Insulation: Minimum 1.5 inch Firestone ISO-95 + GL, mechanically attached with Firestone HD fasteners and Firestone 3 inch insulation plates.
Deck: 1.5 inch deep, 22 gauge steel deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- FIR-2 Membrane: Firestone SBS FR Cap, hot mopped to Firestone SBS base sheet
Insulation: Minimum 0.5 inch Firestone Fibertop wood fiberboard, hot mopped to minimum 1.5 inch Firestone ISO 95 + GL, which is mechanically attached to steel deck. All fasteners are Firestone AP fasteners with 3 inch Firestone insulation plates.
Deck: 1.5 inch deep, 22 gauge Type B metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- FIR-3 Membrane: Firestone SBS FR Torch Cap over Firestone Poly Torch Base
Insulation: 0.25 inch Dens-Deck and the min. 1.5 inch Firestone ISO 95+ GL are mechanically fastened to the steel deck with a common fastener. All fasteners are Firestone AP fasteners and Firestone 3 inch insulation plates.
Deck: 1.5 inch deep, 22 gauge Type B metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- FIR-4 Membrane: Firestone Ultra Ply TPO, a polyester reinforced, 45 to 80 mil thermoplastic polyolefin [roofing](#) membrane.
Insulation: Minimum 200 psi, minimum 2 inch thick cellular lightweight insulating concrete
Deck: 1.5 inch deep, 22 gauge steel deck, galvanized
Testing by: Trinity | ERD
10 Mauney Court
Columbia, SC 29201
Phone: (803) 988-8133

- FIR-5 Membrane: Firestone Ultra Ply TPO XR, a polyester reinforced, 45 to 60 mil thermoplastic polyolefin roofing membrane with an 8 oz. polyester backing.
Insulation: Minimum 200 psi, minimum 2 inch thick cellular lightweight insulating concrete
Deck: 1.5 inch deep, 22 gauge steel deck, galvanized
Testing by: Trinity | ERD
 10 Mauney Court
 Columbia, SC 29201
 Phone: (803) 988-8133
- GEN-1 Membrane:
Minimum 60 mil GenFlex TPO or GenFlex TPO Plus, mechanically attached or fully adhered, or,
Minimum 60 mil GenFlex TPO Peel & Stick, fully adhered.
Insulation: Minimum two layers of 1.5 inch thick Firestone ISO 95 + GL.
Thermal barrier: (Optional) Type X Gypsum, Dens-Deck, or Securock, any thickness.
Deck: 22 gauge, Type B, Grade 33 steel deck or structural concrete deck.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620
- JMA-1. Membrane:
JM PVC or JM PVC Fleece Backed
Coverboard:(Optional) Minimum 0.25 inch DensDeck or Minimum 0.25 inch Invinsa Roof Board
Insulation: 1.5 inch thick ENRGY-3
Deck: Minimum 22 gauge Type B Steel or Structural Concrete.
Testing by: Trinity/ERD
 10 Mauney Court
 Columbia SC 29201
 PH (803) 988-8133
- SAR-1 Membrane: Sarnafil10-S327, 80 mil thick
Coverboard: 0.625 inch thick Dens-Deck
Insulation: One layer, 1.5 inch thick polyisocyanurate, AC Foam 2
Deck: 22 gauge Type B, Grade 33 profiled steel over supports spaced 5 ft. oc.
Testing by:Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

- SAR-2 Membrane: Sarnafil10-S327, 80 mil thick
Coverboard: 0.5 inch thick High-Density Wood Fiberboard
Insulation: One layer, 1.5 inch thick polyisocyanurate, AC Foam 2
Deck: 22 gauge Type B, Grade 33 profiled steel over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- SAR-3 Membrane: Sarnafil 6-S327 feltbacked, 60 mil thick
Coverboard: 0.625 inch thick Dens-Deck
Insulation: One layer, 1.5 inch thick polyisocyanurate, AC Foam 2
Deck: 22 gauge Type B, Grade 33 profiled steel over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- SAR-4 Membrane: Sarnafil 6-S327 feltbacked, 60 mil thick
Coverboard: 0.5 inch thick High-Density Wood Fiberboard
Insulation: One layer, 1.5 inch thick polyisocyanurate, AC Foam 2
Deck: 22 gauge Type B, Grade 33 profiled steel over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- SAR-5 Membrane: Sarnafil10-S327, 60 mil thick, attached through lightweight insulating concrete (LWIC) to the structural deck.
Coverboard: None
Insulation: 200 psi cellular LWIC with 0.25 inch slurry coat over steel deck, followed by (Optional) 1 inch thick Apache Holey Board, followed by a minimum 2 inch thick top coat.
Deck: 22 gauge Type B, Grade 33 profiled vented steel over supports spaced 4 ft. oc. minimum or structural concrete deck.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

SAR-6 Membrane: Sarnafil 6-S327 feltbacked, fully adhered to cellular lightweight insulating concrete (LWIC) surface.
Coverboard: None
Insulation: 200 psi cellular LWIC with 0.25 inch slurry coat over steel deck, followed by (Optional) 1 inch thick Apache Holey Board, followed by a minimum 2 inch thick top coat.
Deck: 22 gauge Type B, Grade 33 profiled vented steel over supports spaced 4 ft. oc. minimum or structural concrete deck.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

STV-1 Membrane: Stevens EP minimum 45 mil mechanically attached or fully adhered.
Coverboard: Optional
Insulation: Two layers of 1.5 inch ASTM C-1289 type 2 polyisocyanurate or any other substrate combination, minimum compressive strength of 18 psi.
Fastening: Membrane attachment, four Stevens #15 x 4 inch fasteners and Stevens 2.375 inch barbed metal seam plate. Insulation attachment, Stevens #12 x 4 inch insulation fasteners and Stevens 3 inch insulation plate at each corner.
Deck: Galvanized 22 gauge Type B steel or concrete.
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

STV-2 Membrane: Stevens EV minimum 45 mil mechanically attached or fully adhered.
Coverboard: Optional
Insulation: Two layers of 1.5 inch ASTM C-1289 type 2 polyisocyanurate or any other substrate combination, minimum compressive strength of 18 psi.
Fastening: Membrane attachment, four Stevens #15 x 4 inch fasteners and Stevens 2.375 inch barbed metal seam plate. Insulation attachment, Stevens #12 x 4 inch insulation fasteners and Stevens 3 inch insulation plate at each corner.
Deck: Galvanized 22 gauge Type B steel or concrete.
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 10 of 57

- TRI-1 Membrane: Tripolymer FB fully adhered in Flex rubber emulsion adhesive at 60 sf/gal.
Insulation: One or more layers, minimum 1.5 inch thick polyisocyanurate, ASTM C1289, Type II, mechanically attached.
Deck: 1.5 inch deep, 22 gauge, Type B, profiled steel deck over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- TRI-2 Membrane: Tripolymer FB fully adhered in Flex rubber emulsion adhesive at 60 sf/gal.
Insulation: 200 psi cellular lightweight concrete cast with 0.25 inch slurry coat over steel deck followed by (optional) 1 inch Apache Holey Board and a 2 inch minimum top coat.
Deck: 1.5 inch deep, 22 gauge, Type B, profiled steel deck over supports spaced 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

Decks with Built-up Membranes:

CEL-1 Membrane: (1) layer #75 nailed base sheet, nailed 7 inches oc in a 3 inch lap and (2) rows spaced evenly in the field of sheet spaced 7 inches oc, followed by (1) layer of smooth, non-woven polyester reinforced SBS modified bitumen set in hot asphalt, followed by (1) layer of granulated non-woven polyester reinforced SBS modified bitumen also set in hot asphalt (minimum modified bitumen thickness 0.160 inch).
Insulation: 2 inch Celcore cellular concrete over minimum 1 inch thick Celcore EPS holey Board.
Deck: 1.5 inch deep, 22 gauge corrugated metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

CTD-1 Membrane:
Cap: Flintlastic Premium FR-P, Flintlastic GMS, or Flintlastic Premium GMS, adhered in hot asphalt
Ply: (Optional) One or more layers, any CertainTeed base or ply sheet, adhered in hot asphalt
Base Sheet: Flintlastic Ultra Poly SMS, adhered in hot asphalt
Coverboard: Minimum 0.5 inch high density wood fiberboard, mechanically attached or adhered
Insulation: Minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate, loose laid, mechanically attached or adhered
Deck: Type B, minimum Grade 33 steel or structural concrete
Testing by: Trinity | ERD
10 Mauney Court
Columbia SC 29201
Phone: (803) 988-8133

CTD-2 Membrane:
Cap: Flintlastic Premium FR-P, Flintlastic GMS, or Flintlastic Premium GMS, adhered in hot asphalt
Ply: (Optional) One or more layers, any CertainTeed base or ply sheet, adhered in hot asphalt
Base Sheet: Flintlastic Ultra Poly SMS, mechanically attached
Insulation: Minimum 200 psi, minimum 2 inch thick cellular lightweight concrete with optional minimum 1 inch thick, minimum 1 pcf expanded polystyrene.
Deck: Type B, minimum Grade 33 steel or structural concrete
Testing by: Trinity | ERD
10 Mauney Court
Columbia SC 29201
Phone: (803) 988-8133

CTD-3 Membrane:
Cap: Flintlastic Premium FR-P, Flintlastic GMS, or Flintlastic Premium GMS, adhered in hot asphalt
Ply: (Optional) One or more layers, any CertainTeed base or ply sheet, adhered in hot asphalt
Base Sheet: Flintlastic Ultra Poly SMS, adhered in hot asphalt
Coverboard: Minimum 0.5 inch high density wood fiberboard, adhered
Insulation 2: Minimum 1.5 inch thick ASTM C1289 Type 2 polyisocyanurate, adhered
Anchor Sheet: Any CertainTeed base sheet, mechanically attached.
Insulation 1: Minimum 200 psi, minimum 2 inch thick cellular lightweight concrete with optional minimum 1 inch thick, min. 1 pcf expanded polystyrene
Deck: Type B, minimum Grade 33 steel or structural concrete
Testing by: Trinity | ERD
10 Mauney Court
Columbia SC 29201
Phone: (803) 988-8133

FRS-1 Membrane:
Cap sheet: Firestone SBS FR Cap (May substitute Firestone SBS Glass FR, SBS Torch, SBS Cap, SBS Premium, SBS FR Torch, SBS Premium FR, or SBS Premium FR Torch)
Base sheet: Firestone MB Base M (may substitute Firestone SBS Polybase, SBS Base, SBS Premium Base, SBS Polytorch Base, or SBS Glass Torch Base)
Field, 12 inches oc staggered in 2 rows evenly spaced between the laps
Insulation: Two inch minimum thick Celcore MF topping, on one inch minimum thick EPS Holey Board
Deck: Minimum 1½" deep by 22 gauge "B, BV" Galvanized Steel Deck
Testing by: Certified Testing Laboratories
7252 Narcoossee St.
Orlando FL 32822
Phone: (407) 384-7744

GAF-1 Membrane: GAF membrane, composed as follows:
60 # (per square) flood coat of asphalt and 500 # (per square) of gravel, over 3 GAFGlas Ply4 felt plies set in hot asphalt, over GAF Stratavent base sheet, fastened to lightweight concrete as follows:
CTD base ply fasteners.
Spacing: 1 row at 7 inches oc in lap, 2 equally spaced rows in field of sheet
Insulation: 2 inch Elastizell lightweight insulating concrete (200 psi min.), over 3.5 inch Apache Holey Board
Deck: 1.5 inch deep, 22 gauge Type B metal deck
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

GAF-2 Membrane:
Top Sheet: Ruberoid SBS Heat-Weld Granule, torch applied
Base Sheet: #75 Base Sheet, mechanically attached with #12 screws and 3 inch steel plates 12 inches on center in three rows 18 inches apart.
Insulation: 2 inch Energyguard Polyiso insulation.
Deck: 1.5 inch deep, 22 ga. type B metal deck
Testing by: Certified Testing Laboratories
7252 Narcoossee Rd.
Orlando Fl. 32822
Phone: (407) 384-7744

- GAF-3 Membrane: Everguard .040 mil PVC, mechanically attached with 2.875 inch #12 screws and 2 inch steel plates.
Insulation: 2 inch Energyguard Polyiso insulation, mechanically attached with 2.875 inch #12 screws and 3 inch steel plates. One every 6.4 sq. ft.
Deck: 1.5 inch deep, 22 ga. type B metal deck.
Testing by: Certified Testing Laboratories
7252 Narcoossee Rd.
Orlando Fl. 32822
Phone: (407) 384-7744
- GAF-4 Membrane: Everguard 0.045 mil TPO, mechanically attached with 2.875 inch #12 screws and 2 inch steel plates.
Insulation: 2 inch Energyguard Polyiso insulation, mechanically attached with 2.875 inch #12 screws and 3 inch steel plates. One every 6.4 sq. ft.
Deck: 1.5 inch deep, 22 ga. type B metal deck.
Testing by: Certified Testing Laboratories
7252 Narcoossee Rd.
Orlando Fl. 32822
Phone: (407) 384-7744
- GPA-1 Top Sheet: GAF Heat-Weld Plus FR smooth modified bitumen, torch applied.
Base Sheet: GAF Heat-Weld smooth modified bitumen, torch applied.
Coverboard: 0.5 inch DensDeck Prime, mechanically attached.
Insulation: Slurry Coat of Celcore Lightweight Concrete over steel deck, followed by (optional) 1 inch perforated polystyrene and minimum 2 inch layer of Celcore Lightweight Concrete
Deck: 1.5 inch deep, minimum 22 gauge type B steel deck.
Fastening: 3 inch standard round metal Olympic steel plate with # HD, pan head,
6 inch x 0.250 inch screws, located 6 inches each way in from corners and center.
Testing by: G-P Gypsum / Georgia Pacific
2861 Miller Road
Decatur GA 30035
Phone: (770) 987-5190

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 15 of 57

JMA-1 Membrane:

Johns Manville Dynalastic 180 set in hot asphalt, over
Johns Manville Dyna base sheet set in hot asphalt, over
Johns Manville LWC CR base sheet, fastened as follows:
Fastening: 1 row at 9 inches oc and 2 equally spaced rows in center of sheet
Johns Manville Permaply 28 felt .
Insulation: 2 inch Elastizell lightweight insulating concrete (200 psi min.), over
3.5 inch Apache Holey Board.
Deck: 1.5 inch deep, 22 gauge Type B metal deck.
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

JMA-2. Membrane:

Johns Manville Dynalastic 180, 180 FR, or 250 FR set in hot asphalt, over
Johns Manville DynaLastic 180 S set in hot asphalt.
Optional, one ply of ASTM D4601 base sheet set in hot asphalt.
Insulation: 0.75 inch Fesco Board or DuraBoard adhered in hot asphalt.
Insulation: Minimum 1.5 inch ENRGY 3 mechanically attached.
Deck: 22 gauge Type B, Grade 33 profiled steel over supports at 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

JMA-3 Membrane:

Johns Manville JMCleanBond Cap self-adhered, over
Johns Manville JMCleanBond Base, self-adhered.
Insulation: Minimum 1.5 inch Nailboard, mechanically attached.
Deck: 22 gauge Type B, Grade 33 profiled steel over supports at 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

JMA-4 Membrane:

Johns Manville DynaLastic 180, 180 FR, or 250 FR set in hot asphalt, over Johns Manville DynaLastic 180 S set in hot asphalt.

Optional, one ply of ASTM D4601 base sheet, mechanically attached.

Insulation: Minimum 1.5 inch Nailboard, mechanically attached.

Deck: 22 gauge Type B, Grade 33 profiled steel over supports at 5 ft. oc.

Testing by: Exterior Research and Design

600 West Nickerson Street

Seattle, WA 98119

Phone: (206) 298-3620

JMA-5 Membrane:

One ply of Johns Manville Dynalastic180, Dynalastic 180 QuickLap, Dynalastic 180 FR, or Dynalastic 250 FR set in hot asphalt or cold adhesive, over

One or more plies of Johns Manville Dynalastic 180 S applied in hot asphalt or cold adhesive.

Optional, ASTM D4601, type 2, mechanically attached base sheet, applied in hot asphalt or cold adhesive.

Cover Board: Minimum 0.5 inch thick Retrofit Board loose laid, mechanically attached or adhered.

Insulation: Minimum 1.5 inch thick ENRGY 3 mechanically attached or adhered.

Deck: 22 gauge Type B, Grade 33 steel deck or structural concrete deck

Testing by: Exterior Research and Design

600 West Nickerson Street

Seattle, WA 98119

Phone: (206) 298-3620

JMA- 6 Membrane: UltraGard SR50 or SR80, mechanically attached or fully adhered

Coverboard: (Optional) Minimum 0.25 inch thick DensDeck or DensDeck Prime

Insulation: One or more layers, minimum 1.5 inch thick ENRGY- 3.

Deck: 22 gauge, Type B, Grade 33 steel deck or structural concrete deck.

Testing by: Exterior Research and Design

600 West Nickerson Street

Seattle, WA 98119

Phone: (206) 298-3620

LOD-2 Membrane: 2 layers of 250 gram polyester reinforced modified bitumen
Board: 3 layers of 0.5 inch Loadmaster Duraflex mineral board
Fastening: Three 0.25 inch screw fasteners
Insulation: 1 inch expanded polystyrene
Deck: 15/16 inch deep, 24 gauge corrugated metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

LOD-3 Membrane: 2 layers of 250 gram polyester reinforced modified bitumen
Board: 3 layers of 0.5 inch Loadmaster Duraflex mineral board
Fastening: Three 0.25 inch screw fasteners
Insulation: 1 inch isocyanurate
Deck: 15/16 inch deep, 24 gauge corrugated metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

LOD-4 Membrane: 1 layer 250 gram, 1 layer 180 gram polyester reinf. modified bitumen
Board: 3 layers of 0.5 inch Loadmaster Duraflex mineral board
Fastening: Three 0.25 inch screw fasteners
Insulation: 1 inch expanded polystyrene
Deck: 15/16 inch deep, 24 gauge corrugated metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

LOD-5 Membrane: 1 layer 250 gram, 1 layer 180 gram polyester reinf. modified bitumen
Board: 3 layers of 0.5 inch Loadmaster Duraflex mineral board
Fastening: Three 0.25 inch screw fasteners
Insulation: 1 inch isocyanurate
Deck: 15/16 inch deep, 24 gauge corrugated metal deck, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

- PER-1: Membrane:
Top Ply: (1) ply of Derbigum GP set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Ply sheet: (1) ply Derbibase base sheet set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Base ply: (1) ply of Derbibase base sheet nailed 7 inches oc in 4 inches lap and (2) rows spaced evenly in the field of sheet spaced 7 inches oc.
Insulation: 2 inch Concrecel lightweight concrete over 2 inch EPS Holey Board.
Deck: 1.5 inch deep, 22 gauge Type B vented steel deck
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- PER-2 Membrane:
Top Ply: (1) ply of Derbigum GP set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Ply sheet: (1) ply of Derbibase base sheet set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Insulation: (1) layer minimum 1.5 inch Derbiboard roof insulation set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Base ply: (1) ply of Derbibase sheet nailed 7 inches oc in 4 inches lap and (2) rows spaced evenly in the field of sheet spaced 7 inches oc
Insulation: 2 inch Concrecel lightweight concrete over 2 inch EPS Holey Board.
Deck: 1.5 inch deep, 22 gauge Type B vented steel deck
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- PER-3 Membrane:
Top Ply: (1) ply of Derbigum GP set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Base ply: (1) ply of Derbibase base sheet set in Permastic adhesive at an application rate of 1.5 to 2 gal. per sq.
Insulation: (1) layer minimum 1.5 inch Derbiboard roof insulation mechanically fastened.
Deck: 1.5 inch deep, 22 gauge Type B steel deck
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744

- SIP-1 Membrane: Siplast: Parabase, P30HT FR Granulated cap sheet
Fastening: Siplast Zonotite Fastener (FM 1-150)
Insulation: 2 inch ZIC concrete over 3.5 inch Insulperm board
Deck: 1.5 inch x 22 ga. corrugated metal, galvanized
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- SIP-2 Membrane:
Cap sheet: Paradiene 30MW TG (torch applied) or,
Paradiene 30MW (applied in approved Type IV asphalt or PA-311 adhesive)
over
Base sheet: Paradiene 20 TG (torch applied) or,
Paradiene 20 (applied in approved Type IV asphalt or PA-311 adhesive) with
minimum 35 lb. tensile strength over
Coverboard: One-quarter inch Securock (mechanically attached), over
Insulation: Two inch polyisocyanurate (mechanically attached), over
Deck: One and one-half inch deep, 22 gauge type B metal deck on steel joists
at 6 ft. oc
Fasteners: Number 14 Parafast screws with Parafast 3 inch Tri-Ribbed plates.
Fasteners at 12 inches oc longitudinally, ten inches oc laterally, begin 6 inches
from end of test panel.
Testing by: Certified Testing Laboratories
7252 Narcoossee Road
Orlando FL 32822
Phone: (407) 384-7744
- SOP-1 Membrane:
Base sheet: Soprafix (X), mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: Minimum 1.5 inch thick ASTM C1289, type 2 polyisocyanurate.
Deck: 1.5 inch deep, 22 gauge Type B, Grade C profiled steel deck over
supports 5 ft. oc.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-2 Membrane:
Base sheet: ASTM D4601, type 2, mechanically attached
Ply sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered Soprema base membrane.
Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered Soprema cap membrane.
Insulation: Minimum 200 psi cellular lightweight concrete with 0.25 inch slurry coat over steel followed by 1 inch thick Apache Holey Board and a 2 inch top coat of lightweight concrete.
Deck: 1.5 inch deep, 22 gauge Type B Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-3 Membrane:
Base sheet: ASTM D4601, type 2, mechanically attached
Ply sheet: Two or more plies of ASTM D2178, Type 4 or Type 6 ply sheet applied in hot asphalt or cold adhesive.
Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered Soprema cap membrane.
Insulation: Minimum 200 psi lightweight concrete with 0.25 inch slurry coat over steel followed by 1 inch thick Apache Holey Board and a 2 inch top coat of lightweight concrete.
Deck: 1.5 inch deep, 22 gauge Type B Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-4 Membrane:
Base sheet: Soprafix (S), Soprafix (F), Soprafix (H), or Soprafix (X), mechanically applied.
Ply sheet: None.
Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered Soprema cap membrane.
Insulation: Minimum 200 psi cellular lightweight concrete with 0.25 inch slurry coat over steel followed by 1 inch thick Apache Holey Board and a 2 inch top coat of lightweight concrete.
Deck: 1.5 inch deep, 22 gauge Type B Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-5 Membrane:
Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: (Optional) minimum 0.75 inch thick perlite or minimum 0.5 thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-6 Membrane:
Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 250 or 350 GR or FR GR, heat-welded.
Unless otherwise noted, when using a top sheet having a reinforcement weight less than 350 g/m², the Soprafix (S) and Soprafix (F) membranes shall be those produced using a 180 g/m² all-polyester mat.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: (Optional) minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-7 Membrane:
Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), with either 190 or 180 g/m² mat, mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 250 or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: (Optional) minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 steel at min. 5 ft. spans, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-8 Membrane:
Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), with either 190 or 180 g/m² mat, mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: (Optional) minimum 0.75 thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 steel at min. 6 ft. spans, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-9 Membrane:
Base sheet: Soprafix (X), mechanically attached.
Ply sheet: None.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: (Optional) minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-10 Membrane:
Base sheet: Soprafix (S) or Soprafix (F), with either 190 or 180 g/m² mat, mechanically attached.
Ply sheet: (Optional) Sopralene Flam 180, 250, or 350, heat-welded.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-11 Membrane:
Base sheet: (Optional) ASTM D4601, type II, mechanically attached, hot asphalt or cold adhesive applied.
Ply sheet: Elastophene 180 Sanded; Sopralene 180, 250, or 350, hot asphalt or cold adhesive applied.
Top sheet: Sopralene 180, 250, or 350 GR or FR GR, hot asphalt or cold adhesive applied.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-12 Membrane:
Base sheet: (Optional) ASTM D4601, type II, mechanically attached, hot asphalt or cold adhesive applied.
Ply sheet: Sopralene Flam 180, 250, or 350, heat-welded.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-13 Membrane:
Base sheet: Soprafix (S) or Soprafix (F), mechanically attached.
Ply sheet: Sopralene Flam 180, 250, or 350, heat-welded.
Top sheet: Sopralene Flam 180, 250, or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.25 inch thick Dens-Deck or 0.125 inch Sopraboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-14 Membrane:
Base sheet: (Optional) ASTM D4601, type II, mechanically attached, hot asphalt or cold adhesive applied.
Ply sheet: Sopralene 250 or 350, hot asphalt applied.
Top sheet: Sopralene 250 or 350 GR or FR GR, hot asphalt applied.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.25 inch thick Dens-Deck.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-15 Membrane:
Base sheet: (Optional) ASTM D4601, type II, mechanically attached, hot asphalt or cold adhesive applied.
Ply sheet: Sopralene Flam 250 or 350, heat welded.
Top sheet: Sopralene Flam 250 or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.25 inch thick Dens-Deck.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-16 Membrane:
Base sheet: Sopralene 180, 250, or 350, hot asphalt or cold adhesive applied.
Ply sheet: Elastophene 180 Sanded; Sopralene 180, 250 or 350, hot asphalt or cold adhesive applied.
Top sheet: Sopralene 180, 250 or 350 GR or FR GR, hot asphalt or cold adhesive applied.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.25 inch thick Dens-Deck or 0.125 inch Sopraboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
 600 West Nickerson Street
 Seattle, WA 98119
 Phone: (206) 298-3620

SOP-17 Membrane:
Base sheet: Sopralene Flam 180, 250, or 350, heat-welded.
Ply sheet: Sopralene Flam 180, 250 or 350, heat-welded.
Top sheet: Sopralene Flam 180, 250 or 350 GR or FR GR, heat-welded.
Insulation: One or more layers ASTM C1289, type II polyiso., min. total thickness 1.5 in.
Coverboard: Minimum 0.25 inch thick Dens-Deck or 0.125 inch Sopraboard.
Deck: Minimum 1.5 inch deep, 22 ga., type B, Grade 33 profiled steel over supports spaced minimum 4 ft. oc, or concrete.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

SOP-18 Construction #1:
Membrane:
Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered fiberglass, polyester or glass/polyester composite reinforced Soprema cap membrane.
Ply sheet: One or more plies of Sopralene Flam 180 or 250, heat welded or Sopralene 180 or 250 Sanded, Elastophene 180 Sanded or Elastophene 180 PS applied in hot asphalt or cold adhesive.
Base sheet: (Optional) ASTM D 4601, type 2 mechanically attached, applied in hot asphalt or applied in cold adhesive.
Recover Board: Minimum 0.25 inch thick Dens-Deck, mechanically attached or loose laid.
Insulation: Minimum 200 psi lightweight concrete with 0.25 inch slurry coat over steel followed by optional 1 inch thick EPS board and a 2 inch thick top coat of lightweight concrete.
Deck: 22 gauge, Type B, Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.

SOP-19 Construction #2:

Membrane:

Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered fiberglass, polyester or glass/polyester composite reinforced Soprema cap membrane.

Ply sheet: (Optional) One or more plies of heat welded, asphalt applied, cold adhesive applied, or self-adhered fiberglass, polyester or glass/polyester composite reinforced Soprema base membrane.

Base sheet: Soprafix or Soprafix[X], mechanically attached.

Recover Board: Min. 0.25 inch thick Dens-Deck, loose laid

Insulation: Minimum 200 psi lightweight concrete with 0.25 inch slurry coat over steel followed by optional 1 inch thick EPS board and a 2 inch thick top coat of lightweight concrete.

Deck: 22 gauge, Type B, Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.

SOP-20 Construction #3:

Membrane:

Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered 180 gram/m² polyester or glass/polyester composite reinforced Soprema cap membrane.

Ply sheet: One or more plies of ASTM D 2178, type 4 or 6 applied in hot asphalt or cold adhesive.

Base sheet: (Optional) ASTM D 4601, type 2 mechanically attached, applied in hot asphalt or applied in cold adhesive.

Recover Board: Minimum 0.25 inch thick Dens-Deck, mechanically attached or loose laid.

Insulation: Minimum 200 psi lightweight concrete with 0.25 inch slurry coat over steel followed by optional 1 inch thick EPS board and a 2 inch thick top coat of lightweight concrete.

Deck: 22 gauge, Type B, Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.

SOP-21 Construction #4:

Membrane:

Top sheet: Heat welded, asphalt applied, cold adhesive applied, or self-adhered 180 gram/m² polyester reinforced Soprema cap membrane.

Ply sheet: (Optional) One or more plies of heat welded, asphalt applied, cold adhesive applied, or self-adhered fiberglass, polyester or glass/polyester composite reinforced Soprema base membrane.

Base sheet: Colvent SA, self-adhered or Colvent TG, heat welded.

Recover Board: (Optional) Minimum 0.25 inch thick Dens-Deck, mechanically attached or loose laid.

Insulation: Minimum 200 psi lightweight concrete with 0.25 inch slurry coat over steel followed by optional 1 inch thick EPS board and a 2 inch thick top coat of lightweight concrete.

Deck: 22 gauge, Type B, Grade 33 profiled vented steel deck over supports spaced min. 4 ft., or structural concrete deck.

SOP-22

Membrane:

Base sheet: ASTM D4601, Type I or II or ASTM D2178 Type IV or VI, mechanically attached, or fully adhered.

Base membrane: Sopralene 180 Sanded, Sopralene 180 Sanded 3.5 mm, Sopralene 180 PS, Sopralene 250 Sanded, Sopralene 250 Sanded 3.5 mm, Sopralene 250 PS,

Sopralene 250 PS 2.7 mm, Sopralene 350 sanded, Sopralene 350 PS, mechanically attached, hot asphalt, cold adhesive or ribbon stripped.

Cap membrane: Sopralene 180 SP 3.5 mm, Sopralene Flam 180 GR, Sopralene Flam 180 FR GR, Sopralene Flam 180 FR + GR, Sopralene 250 SP, Sopralene Flam 250 GR, Sopralene Flam 250 FR GR, Sopralene Flam 250 FR + GR, Sopralene 350 SP, Sopralene Flam 350 GR, Sopralene Flam 350 FR GR, heat welded,

Or,

Sopralene 180 Sanded, Sopralene 180 GR, Sopralene 180 FR GR, Sopralene 250 Sanded, Sopralene 250 GR, Sopralene 250 FR GR, Sopralene 350 Sanded, Sopralene 350 GR, Sopralene 350 FR GR, in hot asphalt, cold adhesive or ribbon stripped.

Coverboard: (Optional) Minimum 0.75 inch thick perlite or minimum 0.5 inch thick high density wood fiberboard.

Insulation: Minimum two layers of 1.5 inch thick ASTM C578, minimum 1.25 lb. density expanded or extruded polystyrene.

Thermal barrier: (Optional) Type X Gypsum, or Dens Deck, any thickness.

Deck: 22 gauge, Type B, Grade 33 steel deck or structural concrete deck.

Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620

- SOP-23 Base membrane: One or more layers of the following:
Sopralene Flam 180, Sopralene Flam 180 2.7 mm, Sopralene 180 SP,
Sopralene 180 SP 3.5 mm, Soprafix, Soprafix-e, Soprafix[X], Sopralene Flam
250, Sopralene 250 SP, Sopralene Flam 350, Sopralene 350 SP, Sopralene
180 Sanded, Sopralene 180 Sanded 3.5 mm, Sopralene 180 PS, Sopralene
250 Sanded, Sopralene 250 Sanded 3.5 mm, Sopralene 250 PS, Sopralene
250 PS 2.7 mm, Sopralene 350 Sanded, or Sopralene 350 PS.
Ply Membrane:(Optional) Any Soprema membrane, heat welded, adhered in
hot asphalt or cold adhesive or ribbon stripped. Cap membrane: Sopralene
250 SP, Sopralene Flam 250 GR, Sopralene Flam 250 FR GR, Sopralene
Flam 250 FR UW GR, Sopralene Flam 250 FR + GR,
Sopralene Flam 250 FR + UW GR, Sopralene 350 SP, Sopralene Flam 350
GR, Sopralene Flam 350 FR GR, Sopralene 250 Sanded, Sopralene 250
GR, Sopralene 250 FR GR, Sopralene 250 FR UW GR, Sopralene 350
Sanded, Sopralene 350 GR, Sopralene 350 FR GR.
Coverboard: Minimum 0.25 inch thick SECUROCK®.
Insulation: One or more layers of minimum 1.5 inch thick ASTM C1289
polyisocyanurate insulation or minimum 1.5 inch thick, minimum 1.35 pcf
ASTM C578 expanded or extruded polystyrene (EPS or XEPS).
Dry-in Roof: (Optional) One or more layers of ASTM D4601 base sheet,
ASTM D2178 ply sheet or modified bitumen membrane in any combination.
Thermal barrier: (Optional) Any rigid-board thermal barrier (e.g., gypsum-
based board or perlite board).
Deck: 22 gauge, Type B, Grade 33 steel deck or structural concrete deck.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
Phone: (206) 298-3620
- SOP-24 Cap membrane: Soprapstar Flam torch-applied or Soprapstar Sanded applied
in hot asphalt or cold adhesive.
Base: Sopralene applied in hot asphalt or cold adhesive.
Coverboard: Minimum 0.75 inch perlite mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate
loose laid, mechanically attached or adhered.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA
documentations for attachment requirements and maximum design
pressures.

- SOP-25 Cap membrane: Soprastar Stick self-adhered, Soprastar Flam torch-applied or Soprastar Sanded applied in hot asphalt or cold adhesive.
Ply: Sopralene torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: Elastophene 180 or Sopralene applied in hot asphalt or cold adhesive.
Coverboard: Minimum 0.75 inch perlite mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate loose laid, mechanically attached or adhered.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentations for attachment requirements and maximum design pressures.
- SOP-26 Cap membrane: Soprastar Stick self-adhered, Soprastar Flam torch-applied or Soprastar Sanded applied in hot asphalt or cold adhesive.
Ply: (Optional) Elastophene 180 applied in hot asphalt or cold adhesive or Sopralene torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: Elastophene 180 or Sopralene applied in hot asphalt or cold adhesive.
Coverboard: 0.5 inch high density wood fiberboard mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate loose laid, mechanically attached or adhered.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentations for attachment requirements and maximum design pressures.
- SOP-27 Cap membrane: Soprastar Stick self-adhered, Soprastar Flam torch-applied or Soprastar Sanded applied in hot asphalt or cold adhesive.
Ply: Sopralene 250 torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: Sopralene 250 torch-applied, applied in hot asphalt or applied in cold adhesive.
Coverboard: Minimum 0.25 inch DensDeck mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate loose laid, mechanically attached or adhered.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentations for attachment requirements and maximum design pressures.

- SOP-28 Cap membrane: Soprastar Stick self-adhered, Soprastar Flam torch-applied or Soprastar Sanded applied in hot asphalt or cold adhesive.
Ply: Sopralene torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: Sopralene torch-applied, applied in hot asphalt or applied in cold adhesive.
Coverboard: Minimum 0.25 inch SECUROCK Gypsum Fiber Roof Board mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate loose laid, mechanically attached or adhered.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentation for attachment requirements and maximum design pressures.
- SOP-29 Cap membrane: Sopralene 250 torch-applied, applied in hot asphalt or applied in cold adhesive.
Ply: Sopralene 250 torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: (Optional) ASTM D4601, Type II mechanically attached, applied in hot asphalt or applied in cold adhesive.
Coverboard: Minimum 0.25 inch SECUROCK Gypsum Fiber Roof Board mechanically attached or adhered.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate loose laid, mechanically attached or adhered
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentation for attachment requirements and maximum design pressures.
- SOP-30 Cap membrane: Soprastar Stick self-adhered, Soprastar Flam torch-applied or Soprastar Sanded applied in hot asphalt or cold adhesive.
Ply: Sopralene torch-applied, applied in hot asphalt or applied in cold adhesive.
Base: Soprafix or Soprafix (X), mechanically attached.
Insulation: Minimum 1.5 inch thick ASTM C-1289 Type II polyisocyanurate, preliminarily attached.
Deck: Steel or structural concrete.
Note: Refer to Florida Product Approval and/or Miami-Dade NOA documentation for attachment requirements and maximum design pressures.

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 34 of 57

- WPH-1 Membrane: One ply of Sika Ply MS-3G, Premium Cap Sheet, Pika Ply MS-3G (HP), Performance Ply MS FR, Performance Ply MS, Pika Ply MS-4, Pika Ply 350 GR, Pika Ply 250 GR or Pika Ply 350 GR FR, applied in hot asphalt or cold adhesive.
- Or,**
- One ply of Pika Ply MS-4G (TG), Pika Ply MS-4 (TG), Pika Py 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR FR (TG), Pika Ply Copper, Pika Ply Stainless or Pika Ply Aluminum, torch applied.
- Ply sheet: One or more plies of Pika Ply SS-3G, Pika Ply SS-3G (HP), Pika Ply 2.2 (FS), Pika Ply SS-3P, Performance Ply SS, Pika Ply SS-4, Pika Ply 350 S or Pika Ply 180 (FS), applied in hot asphalt or cold adhesive.

Or,

One or more plies of Pika Ply SS-3G (TG), Pika Ply SS-3P (TG), or Pika Ply 250 S (TG), torch applied.

Base Sheet: One ply of any approved minimum ASTM D4601, Type II, base sheet, mechanically attached.

Insulation:

Lightweight Concrete: Minimum 200 psi cellular lightweight insulating concrete.

Deck: 22 gauge steel or structural concrete.

Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

WPH-2

Membrane: One ply of Sika Ply MS-3G, Premium Cap Sheet, Pika Ply MS-3G (HP), Performance Ply MS FR, Performance Ply MS, Pika Ply MS-4, Pika Ply 350 GR, Pika Ply 250 GR or Pika Ply 350 GR FR, applied in hot asphalt or cold adhesive.

Or,

One ply of Pika Ply MS-4G (TG), Pika Ply MS-4 (TG), Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR FR (TG), Pika Ply Copper, Pika Ply Stainless or Pika Ply Aluminum, torch applied.

Ply sheet: Two or more plies of any approved minimum ASTM D2178, Type IV or VI ply sheet applied in hot asphalt or cold adhesive.

Base Sheet: One ply of any approved minimum ASTM D4601, Type II, base sheet, mechanically attached.

Insulation: Lightweight Concrete: Minimum 200 psi cellular lightweight insulating concrete.

Deck: 22 gauge steel or structural concrete.

Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 36 of 57

- WPH-3 Membrane:
Cap Sheet: Pika Ply MS-4, Performance Ply MS FR, Pika Ply 250 GR, Pika Ply 250 GR FR, Pika Ply 350 GR or Pika Ply 350 GR FR, applied in hot asphalt or cold adhesive.
Ply Sheet: One or more plies of Pika Ply SS-3P, Performance Ply SS, Pika Ply SS-4, or Pika Ply 350 S, applied in hot asphalt or cold adhesive.
Base Sheet: (Optional) Any approved minimum ASTM D4601, Type II, base sheet, mechanically attached or applied in hot asphalt or cold adhesive.
Coverboard: Minimum 0.75 inch thick perlite or minimum 0.5 inch high-density wood fiberboard.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620
- WPH-4 Membrane:
Cap Sheet: Pika Ply MS-4 (TG), Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR (TG) or Pika Ply 350 GR FR (TG), torch applied.
Ply Sheet: One or more plies of Pika Ply SS-3P (TG) or Pika Ply 250 S (TG), torch applied.
Base Sheet: (Optional) Any approved minimum ASTM D4601, Type II, base sheet, mechanically attached or applied in hot asphalt or cold adhesive.
Coverboard: Minimum 0.75 inch thick perlite or minimum 0.5 inch high-density wood fiberboard.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

WPH-5 Membrane:
Cap Sheet: Pika Ply 250 GR, Pika Ply 250 GR FR, Pika Ply 350 GR, or Pika Ply 350 GR FR, applied in hot asphalt.
Ply Sheet: One or more plies of Pika Ply SS-4 or Pika Ply 350 S, applied in hot asphalt.
Base Sheet: (Optional) Any approved minimum ASTM D4601, Type II, base sheet, mechanically attached or applied in hot asphalt or cold adhesive.
Coverboard: 0.25 inch thick Densdeck.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

WPH-6 Membrane:
Cap Sheet: Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR (TG), or Pika Ply 350 GR FR (TG), torch applied.
Ply Sheet: One or more plies of Pika 250 S (TG), torch applied.
Base Sheet: (Optional) Any approved minimum ASTM D4601, Type II, base sheet, mechanically attached or applied in hot asphalt or cold adhesive.
Coverboard: 0.25 inch thick Densdeck.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

WPH-7 Membrane:
Cap Sheet: Pika Ply MS-4 (TG), Performance Ply MS FR, Pika Ply 250 GR, Pika Ply 250 GR FR, Pika Ply 350 GR, or Pika Ply GR FR, applied in hot adhesive or cold adhesive.
Ply Sheet: One or more plies of Pika Ply SS-3P, Performance Ply SS, Pika Ply SS-4, Pika Ply 350 S, applied in hot asphalt or cold adhesive.
Base Sheet: Pika Ply SS-3P, Performance Ply SS, Pika Ply SS-4, or Pika Ply 350 S, applied in hot asphalt or cold adhesive.
Coverboard: 0.25 inch thick Densdeck.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

WPH-8 Membrane:
Cap Sheet: Pika Ply MS-4 (TG), Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR (TG), or Pika Ply GR FR (TG), torch applied.
Ply Sheet: One or more plies of Pika Ply SS-3P (TG) or Pika Ply 250 S (TG), torch applied.
Base Sheet: Pika Ply SS-3P (TG) or Pika Ply 250 S (TG), torch applied.
Coverboard: 0.25 inch thick Densdeck.
Insulation: One or more layers of any approved ASTM C1289, Type II polyisocyanurate, total minimum thickness of 1.5 inches.
Deck: Minimum 22 gauge, Type B, Grade 33 steel over supports spaced 4 ft. o.c. or Structural Concrete.
Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 39 of 57

WPH-9 Membrane: One ply of Sika Ply MS-3G, Premium Cap Sheet, Pika Ply MS-3G (HP), Performance Ply MS FR, Performance Ply MS, Pika Ply MS-4, Pika Ply 350 GR, Pika Ply 250 GR or Pika Ply 350 GR FR, applied in hot asphalt or cold adhesive.

Or,

One ply of Pika Ply MS-4G (TG), Pika Ply MS-4 (TG), Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR FR (TG), Pika Ply Copper, Pika Ply Stainless or Pika Ply Aluminum, torch applied.

Ply sheet: One or more plies of Pika Ply SS-3G, Pika Ply SS-3G (HP), Pika Ply 2.2 (FS), Pika Ply SS-3P, Performance Ply SS, Pika Ply SS-4, Pika Ply 350 S or Pika Ply 180 (FS), applied in hot asphalt or cold adhesive.

Or,

One or more plies of Pika Ply SS-3G (TG), Pika Ply SS-3P (TG), or Pika Ply 250 S (TG), torch applied.

Base Sheet: One ply of any approved minimum ASTM D4601, Type II, base sheet, mechanically attached.

Insulation:

Lightweight Concrete: Minimum 300 psi cellular lightweight insulating concrete.

Deck: 22 gauge steel or structural concrete.

Testing by: Trinity/ERD Research and Design
600 West Nickerson Street
Seattle WA 98119
Phone: (206) 298-3620

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 40 of 57

WPH-10 Membrane: One ply of Sika Ply MS-3G, Premium Cap Sheet, Pika Ply MS-3G (HP), Performance Ply MS FR, Performance Ply MS, Pika Ply MS-4, Pika Ply 350 GR, Pika Ply 250 GR or Pika Ply 350 GR FR, applied in hot asphalt or cold adhesive.

Or,

One ply of Pika Ply MS-4G (TG), Pika Ply MS-4 (TG), Pika Ply 250 GR (TG), Pika Ply 250 GR FR (TG), Pika Ply 350 GR FR (TG), Pika Ply Copper, Pika Ply Stainless or Pika Ply Aluminum, torch applied.

Ply sheet: Two or more plies of any approved minimum ASTM D2178, Type IV or VI ply sheet applied in hot asphalt or cold adhesive.

Base Sheet: One ply of any approved minimum ASTM D4601, Type II, base sheet, mechanically attached.

Insulation:

Lightweight Concrete: Minimum 300 psi cellular lightweight insulating concrete.

Deck: 22 gauge steel or structural concrete.

Testing by: Trinity/ERD Research and Design

600 West Nickerson Street

Seattle WA 98119

Phone: (206) 298-3620

Decks with Standing Seam Metal:

- BEM-1 Metal paneling: BEMO, USA 400 16 in. x 0.032 in. aluminum roofing panel system.
Underboard: 40 mil W.R.Grace ice and water shield (modified bitumen peel and stick membrane), on 0.25 inch primed Dens Board, 2.6 inch Iso faced two sides with insulation.
Fasteners: #14 x 6. 25 inch galvanized fasteners, 2 per clip, clips at 15.75 inches and 48 inch.
Support: 22 ga. x 50 ksi Type B profile steel deck.
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- BEM-2 Metal paneling: BEMO, USA 400 16 inch x 0.024 inch galvanized panel system.
Fasteners: #14 x 1.5 inch galvanized fasteners, 2 per clip, clips at 15.75 inches and 48 inches.
Support: 14 ga. Z purlins at 4 ft. o.c. over steel joist (open framing).
Testing by: Certified Testing Laboratories, Architectural Division
7252 Narcoossee Road
Orlando, FL 32822
Phone: (407) 384-7744
- BER-1 Metal paneling: Berridge Double-Locked Zee-Lock, 24 ga.
Fasteners: Connect through to metal deck with one #12 fastener at 18 inches oc
Underlayment: One layer of W.R. Grace Ice and Water Shield.
Insulation: Two layers of 2 inch thick Atlas AC Foam II rigid insulation
Fire barrier: One layer of 0.5 inch Dens-Glass gypsum board
Deck: Berridge S metal deck, 0.875 inch deep x 24 ga.
Fasteners to purlin: One- #12-14 #2 drill point self-drilling fastener at 5.5 in.
Fasteners to side laps: One- #8 x 0.625 inch self-drilling fastener at 18 inches
Purlins: 8 inch x 2.5 inch, 16 ga. channel at 4 ft. oc
Testing by: Hurricane Test Laboratory, Inc.
6655 Garden Beach Road
Riviera Beach, FL 33404
Phone: (561) 881-0020

- BER-2 Metal paneling: Berridge Double-Locked Zee-Lock metal roof panels, 24 ga.
Panel Clip: Berridge Continuous Zee-Rib Clip, 24 ga.
Fasteners: Two-#14 x 1 inch self-drilling screws with neoprene washers, 24 inches o.c., through panel clips and purlins
Purlins: 4 inch x 2.5 inch Cee-Purlins at top, bottom and 48 inches o.c.
Testing by: Testing by: Architectural Testing, Inc..
2865 Market Loop, Suite B
Southlake, TX 76092
Phone: (817) 424-8463
- BER-3 Metal paneling: Berridge Cee-Lock, 24 gauge, 16 ½ inch overage, 57.0 ksi yield steel
Panel Clip: Berridge Continuous Cee-Rib Clip, 24 gauge
Fasteners: Two-#10-16 x 1 inch pancake head, self-drilling screws per support, 48 inches o.c., through panel clips and purlins
Purlins: 4 inch x 2.5 inch, 16 ga. CEE-purlins at top, bottom, and at 48 inches o.c.
Testing by: Force Engineering and Testing, Inc.
19530 Ramblewood Drive
Humble TX 77338
PH (281) 540-9966
- BUT-1 Metal paneling: Butler MR-24 standing seam metal roof paneling, 22 gauge steel, bare Galvalume or painted galvanized.
Purlins: Cold-formed purlins (or truss purlins) 0.60 inch minimum of ASTM A-1011, Grade 55 steel.
Fasteners: MR-24 clips, spaced 2 ft. oc, each secured to purlins with one-0.375 inch self-tapping Scrubolt.
- CEC-1 Metal paneling: Ceco Building Systems 26 gauge (0.0181 inch thick) MAP panels, strength 50 ksi minimum
Insulation: Glass fiber blanket placed between supports and panel
Supports: Cold-formed Zees, 8.5 inch depth, 16 gauge minimum at 6 ft. maximum spacing
Fasteners: Panel to supports: #12-14 self-drilling screws at 6 inches oc top and bottom, 12 inches oc intermediate
Testing by: University of Florida
Civil Engineering Dept. (Dr. Duane Ellifritt).
Gainesville, Florida
Phone: (352) 392-0933

- CEC-2 Metal paneling: Ceco Building Systems 24 gauge (0.0228 inch thick) CXP standing seam panels, strength 50 ksi minimum
Insulation: Glass fiber blanket placed between supports and panel
Supports: Cold-formed Zees, 8.5 inch depth, 16 gauge min. or steel joists at 6 ft. max. spacing
Fasteners: Two (2) 1/4-14 self-drilling screws per CL75 or CL76 CXP hold-down clip
Testing by: University of Florida CEC-2
Civil Engineering Dept. (Dr. Duane Ellifritt).
Gainesville, Florida
Phone: (352) 392-0933
- ENG-1 Metal paneling: Englert series 2500, 24 ga. standing seam roof panel.
Fastening: Anchor clips, 24 ga. stainless steel tops and 18 inch galv. bottoms, secured to OSB under using 2--#14 x 6 inch self-drilling screws. Anchor clips located 18 inches from each end, then 48 inches oc.
Board: 7/16 inch Oriented Strand Board, with ice and water barrier over,
Insulation: 3 inch isocyanurate
Fastening: #14 x 6 inch long self-drilling screws at each corner of the OSB sheet, midspan of each edge, and in the center of sheet.
Deck: 36 inch wide by 0.031 inch galvanized steel B-decking, overlapped one valley width and laid parallel to the supports.
Fastening to purlins:#14 x 1.25 inch long self-drilling screws in every valley at each end of decking and 12 inches oc on each edge and seam..
Supports: 2 inch x 4 inch purlins at 5 ft. oc.
Testing by: Architectural Testing, Inc.
130 Derry Court
York PA 17402-9405
Phone: (717) 764-7700
- ENG-2 Metal paneling: Englert KR-24 metal roof and wall paneling, 18 inch wide, 2 inch high female rib, interlocks with a 180 degree seam. Panels have two clip offsets and two stiffening ribs. Panels fabricated from galvalume coil stock having a thickness of 0.024 inch and yield stress of 50,000 psi minimum.
Insulation: Rigid insulation is a closed-cell, polyisocyanurate foam core integrally laminated to heavy black (non-asphaltic), fiber-reinforced facers.
Deck: 1 ½ inch Type B metal deck supported at 4 ft. oc.
Fasteners: Insulation to metal deck: 5--#12 x 4 inch self-drilling screws and 3 inch stress plates.
Panels to metal deck: Panels in 48 inch lengths, using 24 gauge clip with 2--#12 x 4 inch self-drilling screws at 4 ft. oc.

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 44 of 57

- FAB-1 Metal Paneling: Stand N Seam panels, 24 ga. steel (0.024 inch) with 2.5 inch seams at 16 inch oc.
Board: 0.625 inch Dens-glass gypsum board, over
Insulation: 1 inch rigid insulation board, over
Deck: 22 ga. steel, 1.5 inch deep B-decking.
Fasteners, metal panels to deck: #10 x 4.5 inch Dekfast screws, 2 per Stand N Seam clip.
Fasteners, steel deck to purlins: 5-#10 x 1 inch hex head self-tapping screws, 1 each end and at 10 inches oc.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700
- FAB-2 Metal Paneling: Stand N Seam panels, 0.032 inch aluminum, with 2.5 inch seams at 16 inch oc.
Ice and Water Shield
Board: 0.625 inch Dens-glass gypsum board, over
Insulation: 1 inch rigid insulation board, over
Deck: 22 ga. steel, 1.5 inch deep B-decking.
Fasteners, metal panels to deck: #10 x 4.5 inch Dekfast screws, 2 per Stand N Seam clip.
Fasteners, steel deck to purlins: 5-#10 x 1 inch hex head self-tapping screws, 1 each end and at 10 inches oc.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700
- GAR-1 Metal Paneling: Garland R-MER Span, 0.032 inch (3105-H14) Alum., 16 inches wide
Insulation: 2.75 inch rigid insulation.
Board: 0.5 inch Densdeck.
Underlayment: 40 mil. Ice & water shield by Grace Vycor®
Deck: 1.5 inch x 22 ga. corrugated metal.
Stress Plates: 26 ga. x 0.180 inch deep, galvanized steel.
Fasteners: Garland 1-pc, 16 ga. galv. Steel clips in each line at 60 inches oc., lines of clips 16 inches oc., using #14 x 5 inch Buildex Roof Grips.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590

- GAR-2 Metal Paneling: Garland R-MER Span, 24 ga. Steel (0.024 inch), 16 inches wide
Insulation: 2.75 inch rigid insulation.
Board: 0.5 inch Densdeck.
Underlayment: 40 mil. Ice & water shield by Grace Vycor®
Deck: 1.5 inch x 22 ga. corrugated metal.
Stress Plates: 26 ga. x 0.180 inch deep, galvanized steel.
Fasteners: Garland 1-pc, 16 ga. galv. Steel clips in each line at 60 inches oc, lines of clips at 16 inches oc, using #14 x 5 inch Buildex Roof Grips.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590
- GAR-3 Metal Paneling: Garland R-MER Span, 0.032 inch (3105-H14) Alum., 16 inches wide
Supports: 0.059 inch thick, galvanized steel Z-section installed at 60 inches o.c.
Fasteners: Garland 1-pc, 16 ga. galv. steel clips attached by (2) 0.25 inch x 1 inch self drilling screws.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590
- GAR-4 Membrane:
Stress-Ply EUV applied in hot asphalt.
Base/Plies: Two plies of ASTM D2178, Type IV or Type IV felt, and/or ASTM D4601, Type II base sheet, applied in hot asphalt.
Coverboard: One-half inch thick High Density Fiberboard, hot asphalt applied.
Insulation: One or more layers of minimum 16 psi ASTM C1289 Type-II polyisocyanurate.
Deck: 22 gauge steel deck or structural concrete deck.
Testing by: Exterior Research and Design
600 West Nickerson Street
Seattle, WA 98119
PH (206) 298-3620

- IME-1 Metal Paneling: Innovative Metals Co., Series 300, 24 ga. Steel (0.024 inch), inches wide
Insulation: Two and three-quarters inch rigid insulation.
Board: One-half inch Dens deck.
Underlayment: 40 mil. ice & water shield by Grace Vycor®
Deck: One and one-half inch x 22 ga. corrugated metal.
Stress Plates: 26 ga. x 0.180 inch deep, galvanized steel.
Fasteners: Imetco 1-pc, 16 ga. galv. steel clips attached by #14 x 5 inch Buildex Roof Grips.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590
- IME-2 Metal Paneling: Innovative Metals Co., Series 300, 0.032 inch (3105-H14) Alum., 16 inches wide
Insulation: Two and three-quarters inch rigid insulation.
Board: One-half inch Dens deck.
Underlayment: 40 mil. ice & water shield by Grace Vycor®
Deck: One and one-half inch x 22 ga. corrugated metal.
Stress Plates: 26 ga. x 0.180 inch deep, galvanized steel.
Fasteners: Imetco 1-pc, 16 ga. galv. steel clips attached by #14 x 5 inch Buildex Roof Grips.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590
- IME-3 Metal Paneling: Innovative Metals Co., Series 300, 0.032 inch Alum., 16 inches wide
Supports: 0.059 inch thick, galvanized steel Z-section installed at 60 inches o.c.
Fasteners: Imetco 1-pc, 16 ga. galv. steel clips attached by (2) one-quarter inch x 1 inch self drilling screws.
Testing by: Hurricane Engineering & Testing, Inc.
8532 NW 64th Street
Miami, FL 33166
Phone: (305) 597-5590

- LOC-1 Metal Paneling: LOC-Seam 360 panels, 24 ga. steel (0.241 inch) with 2 inch high seams at 16 inches oc
Metal Paneling: SS-360 panels, 24 ga. steel with 3/32 inch high ribs at 5 1/16 inch oc.
Supports: 0.060 inch Z-shape, 8 inch deep, 2.5 inch flanges at 60 inches oc.
Fastening: S3PC-1 clips attached to purlins by (2)B#12 x 1.25 inch Ultra-Z roof fasteners
Testing by: Hurricane Test Laboratory, Inc.
6655 Garden Road
Riviera Beach, FL 33404
Phone: (561) 881-0020
- MBC-1 Metal paneling: MBCI Superlok, 24 ga. Steel (0.023 inch) with 2 inch high seam at 16 inches oc
Support: 16 ga. structural member at 5 ft. oc
Fastener: 3-14 x 1.25 inch (2) fasteners per Superlok clip
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316
- MBC-2 Metal paneling: MBCI Superlok, 24 ga. Steel (0.023 inch), 16 inches wide
Insulation: 4 inch rigid insulation
Board: 0.5 inch OSB
Underlayment: Ice and water shield
Deck: One and one-half inch x 22 ga. corrugated metal
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316
- MBC-3 MBCI R-Panel Standard Seam Roof Panel 36 inch wide, 24 ga. (0.023 inch) with 1.5 inch ribs on 12 inch oc
Support: 16 ga. structural member at 4 ft. oc
Fastener: 3-14 x 1.25 inch (1) self-drilling fastener at 12 inches horizontal and 12 inches oc vertically at sidelap
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316

- MBC-4 Metal paneling: MBCI Superlok, 24 ga. steel (0.023 inch), 16 inches wide
Insulation: Generic R-20 3.3 inch Isocyanurate
Underlayment: Generic Membrane Underlayment
Deck: 1.5 inch x 22 ga. B-Deck
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek, PA 15145
Phone: (412) 824-3316
- MBC-5 Metal Paneling: MBCI Doublelok, 24 ga. steel (0.023) with 3 inch high seam 24 inches oc
Support: 16 ga structural member at 5 ft oc.
Fastener: Two (2) 14 x 1 inch TEK-2 fasteners with 0.625 inch washer per Doublelok clip
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek, Pa. 15145
Phone: (412) 824-3316
- MBC-6 Metal Paneling: MBCI Battenlok HS Standing Seam Roof Panel, 24 ga. steel x 16 " wide
Insulation: Three and one-quarter inch rigid insulation.
Underlayment: All Climate Underlayment
Deck: One and one-half inch x 22 ga. corrugated metal, 33 to 50 ksi yield
Fasteners: #14-10 x 6" self-drill fasteners (2) per clip.
Testing by: Farabaugh Engineering & Testing, Inc.
515 Braddock Avenue
Turtle Creek, PA 15145
PH (412) 824-3316
- MEA-1 Membrane: 16 inch x 24 ga. Steel Zip-rib Standing Seam Roof panel by Merchant and Evans, Inc.
Underlayment: 40 mil Duraclad
Board: 1 layer of one-half inch Duraflex mineral board
Insulation: Two and one-half inches rigid insulating foamcore, fibrous material both sides
Fastening: Four #14 x 4 inch metal screws
Deck: 15/16 inch x 25 ga. corrugated metal
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700

- MEA-2 Membrane: 0.040 inch thick aluminum Zip-rib Standing Seam Roof panel manufactured by Merchant and Evans, Inc. composed of three individual interlocking 12 inch x 36 inch Zip-rib panels
Underlayment: 40 mil adhesive flexible Duraclad with adhesive backing.
Board: 1 layer of one-half inch Duraflex mineral board secured with #12 x 3.25 inch bugle head metal screws and a 3 inch x 3 inch washer. Screws extend into metal deck.
Insulation: Two and one-half inches rigid insulating foam core, with 0.01 inch thick fibrous material both sides.
Fastening: #12 x 3.25 inch bugle head metal screws. See Board above for details.
Deck: 1.5 inch x 22 ga. corrugated galvanized steel B-deck. Panels secured with two #2080 clips per interlocking seams.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700
- MEA-3 Membrane: 24 gauge galvanized steel constructed Zip-Rib panel manufactured by Merchant and Evans, Inc. with a 2.5 inch high rib, providing 16 inches coverage.
Fastening: #10 x 0.75 inch hex head self-drilling screws at 6 inches oc along the perimeter, ends of panel secured by 3 screws spaced 2.5 inches oc from ends and one at midspan.
Supports: 0.060 inch thick galvanized steel C-channel purlins at 4 ft.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700
- MEA-4 Metal paneling: 0.032 inch thick aluminum Zip-Rib Standing Seam Roof panel manufactured by Merchant and Evans, Inc. composed of three individual interlocking 16 inch x 36 inch Zip-Rib panels.
Underlayment: 40 mil adhesive flexible Duraclad with adhesive backing.
Board: 1 layer of one-half inch Duraflex mineral board secured with four-number 14 x 5 inch metal screws.
Insulation: Two and one-half inches rigid insulating foam core, with 0.01 inch thick fibrous material both sides.
Fastening: #14 x 5 inch metal screws. See Board above for details.
Deck: 15/16 inch x 25 ga. corrugated galvanized steel deck. Steel backing secured with four- number 14 x 5 inch metal screws.

Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9405
Phone: (717) 764-7700

MEA-5 Metal paneling: Metal Paneling, Merchant and Evans, Inc. Zip-Lok Metal Standing Seam Roof Panels, 24 gauge galvalume or galvanized steel
Fastening: Metal clips at each seam.
Fastening: #10 screws, 2" long, 2 per clip at 6" on center all around perimeter.
Support purlin spacing at 4 ft. oc.
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17406-8405
PH (717) 764-4400

MET-1 Metecno-Morin Metal Paneling: SRR Standing Seam Roof Panel 24 ga. steel, two and one-half inch high seam (minimum) by 16 inches wide
Underlayment: Ice and water shield, over one-quarter inch Densdeck, over
Insulation: One and one-half inch rigid insulation, over
Deck: One and one-half inch by 22 gauge steel B-deck, supported by 16 ga. purlins at 5 ft. oc
Fastener: #14-13 x 4.5 inch self-drill fasteners (2 per clip) at 2 ft. and 5 ft. oc
Testing by: Farabaugh Engineering and Testing, Inc.
401 Wide Drive
McKeesport, PA 15135
Phone: (412) 751-4001

MET-2 Metecno-Morin Metal Paneling: SRR Standing Seam Roof Panel 16 inches wide by 0.040 inch aluminum,
Underlayment: Ice and water shield, over one-quarter inch Densdeck, over
Insulation: One and one-half inch rigid insulation, over
Deck: One and one-half inch by 22 gauge steel B-deck, supported by 16 ga. purlins at 5 ft. oc
Fastener: #14-13 x 4.5 inch self-drill fasteners (2 per clip) at 5 ft. oc
Testing by: Farabaugh Engineering and Testing, Inc.
401 Wide Drive
McKeesport, PA 15135
Phone: (412) 751-4001

Roof Decks on Public Hurricane Shelters

December 21, 2010

Page 51 of 57

MOR-1 Metal Paneling: Morin steel roof paneling 2.5 inches deep, 0.026 inch to 0.027 inch thick

Insulation: Miradri 300 HT water and ice protection, over 1.5 inch polystyrene, over 0.5 inch Densglass sheetrock

Deck: 1 15/32 inch deep, 0.030 inch thick, Type BR-28 corrugated metal deck

Testing by: Architectural Testing, Inc.

130 Derry Court

York, PA 17402-9405

Phone: (717) 764-7700

MOR-2 Metal Paneling: Morin SSR/SRR 24 ga. steel, 2.5 inch high seam at 16 inches oc

Underlayment: Miradri 300 HT ice and water protection, over 0.5 inch Densglass, over

Insulation: 1.5 inch polystyrene

Deck: B-deck, 0.030 inch thick

Fastener: #14 x 5 inch long self-drilling screws 2 per clip at 72 inches oc over 6 inch x 6 inch steel sheet bearing plate x 0.035 inch

Testing by: Architectural Testing, Inc.

130 Derry Court

York, PA 17402-9402

Phone: (717) 764-7700

MOR-3 Metal Paneling: Morin SSR/SRR 0.032 inch aluminum, 2.5 inch high seam at 16 inches oc

Underlayment: Miradri 300 HT ice and water protection, over 0.5 inch Densglass, over

Insulation: 1.5 inch polystyrene

Deck: B-deck, 0.030 inch thick

Fastener: #14 x 5 inch long self-drilling screws 2 per clip at 72 inches oc over 6 inch x 6 inch steel sheet bearing plate x 0.035 inch

Testing by: Architectural Testing, Inc.

130 Derry Court

York, PA 17402-9402

Phone: (717) 764-7700

- MOR-4 Metal Paneling: Morin SLR 24 ga. steel, two inch high seam at 16 inches oc
Underlayment: Miradri 300 HT ice and water protection, over 0.5 inch
Densglass, over
Insulation: 1.5 inch polystyrene
Deck: B-deck, 0.030 inch thick
Fastener:#14 x 5 inch long self-drilling screws 2 per clip at 72 inches oc
over 6 inch x 6 inch steel sheet bearing plate x 0.035 inch
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9402
Phone: (717) 764-7700
- MOR-5 Metal Paneling: Morin SLR 0.032 inch aluminum, two inch high seam at 16
inches oc
Underlayment: Miradri 300 HT ice and water protection, over 0.5 inch
Densglass, over
Insulation: 1.5 inch polystyrene
Deck: B-deck, 0.030 inch thick
Fastener:#14 x 5 inch long self-drilling screws 2 per clip at 72 inches oc
over 6 inch x 6 inch steel sheet bearing plate x 0.035 inch
Testing by: Architectural Testing, Inc.
130 Derry Court
York, PA 17402-9402
Phone: (717) 764-7700
- PAC-1 Metal paneling: 16 inch x 24 ga. Tite-Lok Plus by PAC-Clad, open framing supports at
5 ft. oc
Clips: Tite-Loc Plus two-piece sliding clip, spaced 5 ft. oc
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316

- PAC-2 Metal paneling: 16 inch x 24 ga. Tite-Lok Plus by PAC-Clad Ice and water shield
Board: 2 inch OSB
Insulation: 4 inch rigid insulation
Deck: 1.5 inch x 22 ga. corrugated metal
Clips: Spaced 5 ft. oc
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316
- PAC-3 Metal paneling: 16 inch x 24 ga. Tite-Lok Plus by PAC-Clad Ice and water shield
Insulation: 3.3 inch rigid insulation
Deck: 1.5 inch x 22 ga. corrugated metal
Clips: Spaced 5 ft. oc
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek PA 15145
Phone: (412) 824-3316
- PAC-4 Metal paneling: 16 inch x 0.032 inch sheet aluminum panel roofing
Self-adhering "peel and stick" 40 mil waterproof membrane
One-half inch Dens-Deck
1 inch ISO board rigid insulation
One and one-half inches deep x 22 gauge metal deck
Clips: #14-13 x 4 inch self-drill (2 per clip). Clips located at 5 ft. oc.
Testing by: Farabaugh Engineering and Testing, Inc. (FETLabs)
401 Wide Drive
McKeesport, PA 15135
PH (412) 751-4001
- STE-1 Metal Paneling: Steelex Systems, L.L.C. LRX/CF Roof Panel, 16 inch wide,
24 ga. with 2 inch high seams.
Support: 6 ga. structural members at 5 ft. oc.
Insulation: Optional blanket or rigidboard insulation.
Fastener: (1) #12-14 x 1.125 inch SDS at each CF clip.
Testing By: Architectural Testing Inc.
2865 Market Loop, Suite B
Southlake, TX 76092
Phone: (817) 410-7202

- SUM-1 Metal paneling, exterior: SUMTECH International, 22 gauge, smooth or embossed G-90 galvanized steel, factory finished with 20 or 30 year paint coating
Insulation: 6 inch polystyrene, R-24. Density 1 pcf.
Metal paneling, interior: 26 gauge, smooth or embossed G-90 galvanized steel
Slope: 3/12 minimum
Exterior metal paneling is 22 gauge, testing not required per FBC Volume 1C, sect. 7.4.1.
Manufacturer states that this system is waterproof.
Per letter of June 1, 2003, by Jaime Barreto, Executive Director, PH (813) 903-9011.
- TRI-1. Metal paneling: Trident Sur-Lok 360 Plus. Roof panels are PC-216 panel with Triple-Lok seam, 16 inch coverage width, 24 gauge aluminum/zinc coated steel with painted or unpainted finish.
Fastening: Panel clips are MC 12310. Clip tabs are 0.032 inch thick, 50 ksi G-90 steel. Clip bases are 0.060 inch thick, 50 ksi G-90 steel. Panels are attached to support beam with (2) #1/4-14 self-drilling screws per clip.
Perimeter fasteners are
12-14 x 1.5 inch long hex head self-drilling screws with sealing washer, maximum 5 ft. oc at panel ends.
Supports: Interior purlins are C 8 x 2.5 x16 ga. at 5 ft. oc. End purlins are C 8 x 2.5 x16 ga. Connections of interior to end purlins are 2 inch x 2 inch x 0.125 inch angles with 0.25 inch bolts.
Testing by: Architectural Testing.
2865 Market Loop, Suite B
Southlake TX 76092
Phone: (817) 410-7202
- UNA-1 Metal paneling: UNACLAD/Copper Sales, Inc. 22 ga. steel UC5 Batten Seam.
Fasteners: One quarter-14 HWH (2 per support) Self driller with bonded neoprene washer.
Support: 16 ga. steel purlins.
Deck: None required.
Underlayment: None required.
Insulation: None required.
Fire Barrier: None required.
Notice of Acceptance by Miami Dade Code Compliance, NOA #01-0509.13
Testing by: Force Engineering & Testing, Inc.
2405-A South Houston Avenue
Humble, TX 77396
Phone: (281) 540-6603

- UNA-2 Metal paneling: UNACLAD/Copper Sales, Inc. 22 ga. steel UC6 Standing Seam.
Fasteners: One quarter-14 HWH (2 per clip) Self driller with bonded neoprene washer.
Support: 16 ga. steel purlins.
Deck: None required.
Underlayment: None required.
Insulation: None required.
Fire Barrier: None required.
Notice of Acceptance by Miami Dade Code Compliance, NOA #01-0509.12
Testing by: Force Engineering & Testing, Inc. (continued)
2405-A South Houston Avenue
Humble, TX 77396
Phone: (281) 540-6603
- WHI-1 Metal paneling: Whirlwind Weather Lok-16, 24 ga. steel (0.023 inch) with 2 inch high seam at 16 inches oc
Support: 16 gauge structural members at 5 ft. - 2 inches oc
Fastener: (2) one quarter-14 x 1.25 inch fasteners per clip
Notice of Acceptance by Miami-Dade Compliance NOA 02-0508.01
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek, PA 15145
Phone: (412) 824-3316
- WHI-2. Metal Paneling: Super Seam-Plus, 24ga.steel (0.023 inch) with 3 inch high seam 24 inches oc
Support: 16 ga structural member at 5 ft oc.
Fastener: Two (2)14 x 1 inch Tek 2 fasteners with 0.625 inch washer per Doublelok clip
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek, Pa. 15145
Phone: (412) 824-3316

Note: This assembly appears in this memo as MBC-5 using MBCI Doublelok as the roof panel. MBCI has licensed Whirlwind Systems to use MBCI's tested assembly MBC-5, using the new name Super Seam-Plus for the standing seam metal deck. .

WHI-3 Metal paneling: Whirlwind Weather Lok-16, 24 ga. steel (0.023 inch) with 2 inch high seam at 16 inches oc
Underlayment: Ice and water shield membrane
Insulation : 3.3 inch rigid insulation with a minimum R-20 rating
Deck: 1.5 inch x 22 ga. B deck
Clip: Weather-Lok 16 clip over 4.5 inch x 5.25 inch x 16 ga. bearing plate
Fastener: (2) #14 Dekfast fasteners per clip
Notice of Acceptance by Miami-Dade Compliance NOA 02-0508.01
Testing by: Farabaugh Engineering and Testing, Inc.
515 Braddock Avenue
Turtle Creek, PA 15145
Phone: (412) 824-3316

Enhancements:

Alternative materials or enhancements to a given tested assembly are acceptable, provided they are a product by the same manufacturer of the material tested. A tested assembly may be enhanced in one or more of the following three ways:

1. Thicker material of a given component. Examples follow:

Example A. Assume that 1.5 inch x 22 gauge Type B steel deck was tested as part of an assembly. Steel deck 1.5 inch x 20 gauge Type B is acceptable.

Example B. Assume that 45 mil EPDM membrane was tested as part of an assembly. 60 mil EPDM is acceptable.

2. Higher grade material in a given component. Examples follow:

Example C. Assume that #30 ABC regular base sheet was tested as part of an assembly. ABC Bettergrade base sheet is acceptable.

Example D. Assume that 60 mil plain PVC single-ply roofing was tested as part of an assembly. 60 mil reinforced PVC is acceptable.

3. Additional materials used. Examples follow:

Example E. Assume that one ply of 60 mil PVC single-ply roofing was tested as part of an assembly. Two plies of 60 mil PVC are acceptable.

Example F. Assume that a single ply membrane and 2 inch rigid isocyanurate insulation over a metal deck were successfully tested as an assembly. 0.5 inch nailable insulation between the isocyanurate insulation and the membrane is acceptable. This is because, even though the nailable insulation was not a part of the assembly tested, yet it improves the tested assembly's missile impact-resistive capacity.

4. Wider support spacing. An example follows:

Example G. Assume that a roof deck assembly was tested with supports spaced 5 ft. oc. A spacing of 66 inches or even 72 inches is acceptable from a missile-impact perspective. This is because wider support spacings cause the assembly to become more flexible, in turn, causing the missile to bounce or rebound instead of penetrating the membrane. However, wider support spacings should be carefully investigated for gravity loads by the design engineer.