

November 1, 2007

**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:**

- 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  
PH (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  
PH (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  
PH (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  
Insulation: Minimum 1.5 inch 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 inch plywood or structural concrete deck.  
Testing by: Exterior Research and Design  
600 West Nickerson Street  
Seattle, WA 98119  
PH (206) 298-3620
- 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  
PH (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  
PH (206) 298-3620

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- 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  
PH (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  
PH (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  
PH: (407) 384-7744
- 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  
PH: (407) 384-7744

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- 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  
PH (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  
PH (407) 384-7744
- 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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
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- 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  
PH (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  
PH (407) 384-7744
- 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  
PH (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  
PH (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  
PH: (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 GAF Glas 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  
PH: (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

PH: 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

PH: 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

PH: 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  
PH: (770) 987-5190

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  
PH: (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  
PH (206) 298-3620

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### 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

PH (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

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### 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

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- 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  
PH (206) 298-3620
- LOD-1 Membrane: 2 layers of 250 gram polyester reinforced modified bitumen  
Board: 3 layers of 0.5 inch Loadmaster Duraflex mineral board  
Fastening: Two 0.125 inch screw fasteners  
Deck: 15/16 inch deep, 24 gauge corrugated metal deck, galvanized  
Testing by: Certified Testing Laboratories, Architectural Division  
7252 Narcoossee Road  
Orlando, FL 32822  
PH (407) 384-7744
- LOD-2 Membrane: 2 layers of 250 gram polyester reinforced modified bitumen

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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  
PH (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  
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PH (407) 384-7744

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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

PH (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

PH (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

PH: (407) 384-7744

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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  
PH: (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  
PH: (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  
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### 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

PH (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

PH (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

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### 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

PH (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

PH (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  $350 \text{ g/m}^2$ , the Soprafix (S) and Soprafix (F) membranes shall be those produced using a  $180 \text{ g/m}^2$  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

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SOP-7 Membrane:

Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), with either 190 or 180  $\text{g/m}^2$  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

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Seattle, WA 98119

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### SOP-8 Membrane:

Base sheet: Soprafix (S), Soprafix (F), or Soprafix (X), with either 190 or 180 g/m<sup>2</sup> 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

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Seattle, WA 98119

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### 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.

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SOP-10 Membrane:

Base sheet: Soprafix (S) or Soprafix (F), with either 190 or 180 g/m<sup>2</sup> 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.

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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.

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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.  
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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.  
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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.  
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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.

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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.

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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

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Seattle, WA 98119

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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/m<sup>2</sup> 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/m<sup>2</sup> 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.

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- 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  
PH (206) 298-3620
- 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,

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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

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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

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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.

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Seattle WA 98119  
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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.

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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.

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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.

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### 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.

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Seattle WA 98119  
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### 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.

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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  
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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  
PH (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  
PH (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  
PH (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  
PH (561) 881-0020
- 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.

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- 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  
PH (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  
PH (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  
PH (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.
- 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  
PH (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  
PH (717) 764-7700

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- 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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (305) 597-5590

- 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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (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 64<sup>th</sup> Street  
Miami, FL 33166  
PH (305) 597-5590

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- 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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
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  
PH (717) 764-7700

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- 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  
PH (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  
PH (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  
PH (717) 764-7700
- 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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (412) 824-3316
- STE-1 Metal Paneling: Steelox 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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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  
PH (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. .

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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  
PH (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.