



Section 2 - General Requirements

Table of Contents

<u>Section Titles</u>	<u>Page Number</u>
2.00 General.....	2-3
2.01 Design Responsibility.....	2-3
2.02 Applicability.....	2-3
2.03 Re-cover & Reroof Requirements & Considerations.....	2-4
2.04 Manufacturer’s Qualifications & Quality Assurance.....	2-4
2.05 Contractor Qualifications.....	2-5
2.06 Pre-Installation Meeting.....	2-5
2.07 Job Site Considerations.....	2-5
2.08 Delivery, Handling, & Storage.....	2-5
2.09 Roof Drainage.....	2-6
2.09.1 Drain Sizing & Construction.....	2-6
2.09.2 Drain Inserts.....	2-7
2.10 System Method of Attachment To Structural Deck.....	2-7
2.10.1 Mechanically Attached/Fully Adhered Systems.....	2-7
2.10.2 Bonded Systems.....	2-7
2.10.3 Mechanically Attached Systems.....	2-7
2.10.4 Partially Adhered Systems.....	2-8
2.10.5 Protected Membrane Roof (PMR) Assemblies.....	2-8
2.11 Roof Decks - General Requirements.....	2-8
2.12 Roof Decks - New Construction & Complete Tear-Off.....	2-9
2.12.1 Steel Decks.....	2-9
2.12.2 Poured-In-Place Structural Concrete Decks.....	2-10
2.12.3 Precast Concrete Decks.....	2-11
2.12.4 Prestressed Concrete Decks.....	2-12
2.12.5 Plank & Heavy Timber Wood Decks.....	2-13
2.12.6 Plywood Decks.....	2-14
2.12.7 Structural Wood Fiber Decks.....	2-14
2.12.8 Poured-In-Place Gypsum & Gypsum Plank Decks.....	2-15
2.12.9 Poured-In-Place Lightweight Insulating Concrete Decks (LWIC).....	2-15
2.12.10 Poured-In-Place Lightweight Insulating Cellular Concrete Decks (LWICC).....	2-17
2.13 Roof Decks - Re-Cover.....	2-18
2.13.1 Gravel Surfaced Asphalt And/Or Coat Tar Pitch BUR Or Modified Bitumen Roofs.....	2-18
2.13.2 Mineral Surfaced BUR Or Modified Bitumen Roof.....	2-19
2.13.3 Non-Resaturated Or Coated Smooth Surface BUR Or Modified Bitumen Roof.....	2-19
2.13.4 Resaturated Or Coated Smooth Surface BUR Or Modified Bitumen Roof.....	2-20
2.13.5 Sprayed-In-Place Urethane Roofs.....	2-20
2.14 Roof Deck Fastener Withdrawal & Bonded Pull Resistance Testing.....	2-20
2.15 Expansion Joints.....	2-20
2.15.1 Expansion Joint Design Recommendations.....	2-20
2.15.2 Expansion Joint Flashing Recommendations.....	2-21
2.16 Area Dividers & Control Joints.....	2-21
2.17 Vapor Retarders.....	2-21
2.17.1 Vapor Retarder Recommendations.....	2-21
2.18 Roofing Asphalt.....	2-21



Section 2 - General Requirements

Table of Contents

<u>Section Titles</u>	<u>Page Number</u>
2.18.1 Asphalt Grades For Insulation, Coverboard, Base, Ply, & Cap Membranes.....	2-21
2.18.2 Asphalt Identification.....	2-21
2.18.3 Asphalt Heating & Application.....	2-22
2.19 Wood Nailers.....	2-22
2.20 Roof Insulation/Coverboard.....	2-23
2.20.1 Roof Insulation/Coverboard - Minimum Criteria & Restrictions.....	2-24
2.20.2 Roof Insulation Attachment.....	2-25
2.20.3 Mechanical Attachment Of Insulation.....	2-25
2.20.4 Hot Asphalt Attachment Of Insulation.....	2-26
2.20.5 Cold Adhesive Attachment Of Insulation.....	2-26
2.20.6 Presecurement Of Insulation.....	2-27
2.20.7 Thermal Barriers.....	2-27
2.21 Anchor Sheet Attachment Over Insulation Or LWIC.....	2-27
2.21.1 Anchor Sheet Attachment.....	2-27
2.22 Base Sheet Used As Temporary or Dry-In Roofing.....	2-28
2.23 Single Ply Membrane Attachment.....	2-28
2.23.1 In-Seam Mechanical Attachment Of Single Ply Membranes With Screw Fasteners & Disks.....	2-29
2.23.2 Fully Adhered Attachment Of Single Ply Membranes.....	2-30
2.23.2.1 Fully Adhered Attachment Of Soprema Flagon TPO - Non-Fleeceback.....	2-30
2.23.2.2 Fully Adhered Attachment Of Soprema Flagon TPO - Fleeceback.....	2-30
2.23.2.3 Fully Adhered Attachment Of Soprema Flagon PVC - Non-Fleeceback.....	2-30
2.23.2.4 Fully Adhered Attachment Of Soprema Flagon PVC - Fleeceback.....	2-30
2.24 Steep Slope Fastening Requirements.....	2-30
2.24.1 Flagon Mechanically Fastened or Fully Adhered Single Ply Membranes.....	2-30
2.25 Protected Membrane Roof (PMR) Assemblies.....	2-30
2.26 Flashing.....	2-31
2.27 Roof Walkways.....	2-33
2.28 Metal Work.....	2-34
2.29 Test Cuts.....	2-34
2.30 Extreme Weather Application.....	2-34
2.30.1 Cold Weather Application.....	2-34
2.30.2 High Humidity Application.....	2-34
2.31 Practical Design Considerations.....	2-35
2.31.1 Climate & Design.....	2-35
2.31.2 Wind Uplift Forces.....	2-35
2.31.3 Damaging Hail.....	2-35
2.31.4 Snow & Ice Loads.....	2-35
2.31.5 Extreme Temperature Fluctuations.....	2-35
2.31.6 Ponding Water.....	2-36
2.32 Project Performance Requirements.....	2-36
2.33 Warranties.....	2-36
2.33.1 Warranty Procedure.....	2-37
2.33.2 Warranty Terms.....	2-37



Section 2 - General Requirements

2.00 - General

- A. This section of the Soprema, Inc., hereafter referred to as Soprema, Technical Specification Manual shall be used in conjunction with Section 3 - Single Ply Application, Section 4 - Single Ply System Selection, and Single Ply Flashing Details as they are applicable to project design and installation. This specification supersedes all previously published specifications and Technical Bulletins.

2.01 - Design Responsibility

- A. The acceptance of the structural roof deck condition by Soprema refers solely to condition of the roof deck surface. The responsibility for the structural integrity of the roof deck system, for the proper design relationship among other building components, combined with the existing or potential interior and exterior environmental considerations, and the structural roof deck system rests solely with the design professional. This responsibility lies with the architect, roof consultant, engineer, building owner, or authorized building owner representative. Soprema reserves the right to accept or reject the existing deck conditions based on their suitability for specific Soprema assemblies and their corresponding methods of application.
2. Compliance with agency or building code approvals is determined on a project-by-project basis. Upon review by the Soprema Technical Department, Soprema will confirm approvals of various systems that will conform to specific agency or building code requirements. The term "agency" used in this context refers to Underwriters Laboratories, Inc. (UL) or FM Global (FM). The term "building code" used in this context refers to the International Building Code (IBC), or the applicable building code of the Authority Having Jurisdiction (AHJ).

2.02 - Applicability

- A. Soprema Single Ply Roofing Systems specifications are published for the purpose of defining the minimum requirements necessary for a roofing system to be eligible for a Soprema Warranty. Soprema strongly recommends that a roof design professional be consulted to address conditions beyond the scope of this specification to insure proper design and application procedures are followed as well as any Leadership in Energy and Environmental Design (LEED), Cool Roof Rating Council (CRRCC), or Energy Star considerations.
- B. Soprema Single Ply Roofing Assemblies are applicable for many low-slope commercial and industrial roofing applications. Soprema Single Ply Roofing Assemblies are not applicable where any one or more of the following conditions exists:
1. Roofs where the structural supports of the roof deck, or the structural conditions of the deck, are insufficient to support the load of the completed roof plus other potential loads as recognized by the architect, engineer, roof consultant, or building owner.
- C. Without additional design considerations from the Soprema Technical Department, the following conditions are not applicable for Soprema Single Ply Roofing Assemblies:
1. Buildings with large wall openings that could be left open, or damaged enough to permit air infiltration, during a wind event. Large wall openings are defined as openings that equal surface area greater than ten percent (10%) of the total surface area of the wall.
 2. Roofs subject to discharge that is known to be detrimental to the roof membrane or other components of the roofing system.
 3. Roofs that may be exposed to positive air pressure from below the roof deck. These include, but are not limited to: buildings with a large number of bay doors; buildings with positive air pressure; aircraft hangars; roof decks that permit air infiltration; canopies; and overhangs.

Section 2 - General Requirements

4. Roofs subject to regular traffic, either foot or mechanical.
 5. Cold storage facilities where the freezer or refrigeration insulation is used as a base to receive the new roof system.
- D. Contact local building code officials with regard to roofs that are subject to additional building code requirements, including seismic considerations. Contact the Soprema Technical Department if there are questions about which Soprema system meets the applicable building code requirements.

2.03 - Re-cover & Reroof Requirements & Considerations

- A. Existing roof systems with wet or damp components may have a significant effect on the new roofing system. A moisture survey should be conducted on an existing roof to determine the moisture content of the system. All components of the existing roof which are wet must be removed prior to installation of the new system. Depending on the warranty requirements of the project, a moisture survey may be required. Contact the Soprema Technical Department for specific warranty requirements.
- B. Existing roof systems where the existing roof shall be removed down to the existing structural concrete, gypsum, lightweight insulating concrete, or cementitious wood fiber deck, and an adhesive will be used in the new roof assembly, will typically require bonded pull tests to confirm applicability of the new roof system. When this test is appropriate, the tests will be conducted in accordance with the current edition of the FM Global Loss Prevention Data Sheet 1-52. The tests may be performed by the adhesive manufacturer or by a certified independent test laboratory. Note: The test may be performed with fifteen (15 lb) pound (6.8 kg) increments instead of the published increment.
- C. A design professional should be consulted to confirm the structural integrity of the existing roof deck. Repair or replacement of roof deck components with questionable structural integrity should be repaired or replaced as necessary.
- D. Some existing building features do not permit minimum flashing heights to be achieved. Contact the Soprema Technical Department for review of the proposed detail when existing building features do not permit termination of the new roofing system at the minimum flashing height.
- E. Re-covering over an existing single ply roofing system (i.e. EPDM, PVC, TPO, etc.) requires special consideration. Cut the existing single ply into five (5') foot (1.5 m) grid with a minimum one (1") inch (25 mm) wide strips removed at the grids. A separation barrier may be required. Contact the Soprema Technical Department for more information.
- F. Reuse of existing wood nailers is permitted as long as the condition of the nailers, as well as their attachment, are confirmed and judged to be suitable for the attachment of the new roofing system.

2.04 - Manufacturer's Qualifications & Quality Assurance

- A. Upon request, Soprema will supply proof of ISO 9001:2000 Certification.
- B. Soprema Single Ply roofing systems are installed by roofing contractors that are authorized by Soprema.
- C. Soprema reserves the right to conduct an inspection to insure compliance with Soprema specifications for any type of Warranty.
- D. The Soprema Technical Department is available for consultation concerning required deviations from current specifications due to existing building features or limitations.
- E. Departures from current Soprema specifications, without first obtaining written permission from the Soprema Technical Department, may void any eligibility for the project to receive the applicable Soprema Warranty.



Section 2 - General Requirements

- F. Upon successful completion and inspection of the roofing system, and compliance with all Warranty requirements, Soprema will issue the appropriate Warranty.

2.05 - Contractor Qualifications

- A. The roofing contractor shall be a Soprema authorized roofing applicator. The contractor shall maintain this status from before the bid process begins until after the project is inspected.
- B. Upon request by the building owner, or his representative, the roofing contractor shall present a letter confirming his authorization.
- C. The roofing contractor shall provide a full time supervisor or foreman, experienced with the specified roof system, on site during the majority of working hours.
- D. The roofing contractor shall maintain a work force skilled in the application method of the specified Single Ply Roofing System. The crew shall be properly instructed in all applicable safety procedures.
- E. The roofing contractor shall maintain all equipment and tools required to complete the work.

2.06 - Pre-Installation Meeting

- A. A pre-installation meeting should be convened within five working days prior to beginning of work on the project. All parties responsible for Division 7 work should be required to attend.
- B. All access, delivery, storage, and installation procedures should be reviewed. Coordination with related work from other trades should be determined. All unsettled issues should be noted in writing, the responsible parties assigned, and a timetable for resolution prepared.
- C. Roofing work should not begin until a "Notice To Proceed" is issued after the pre-installation meeting by the authority having jurisdiction. The Notice To Proceed should include information on: acceptable staging areas; suitable parking and access points; location of refuse containers; working hour restrictions; sanitary requirements; noise restrictions; and complaint resolution protocol between the roofing contractor, other trades, and the building owner.

2.07 - Job Site Cautions & Considerations

- A. All components of the new roofing system shall be protected from harmful contaminants and from discharge such as animal fat, petroleum base products, vegetable oil, and other related by-products which may come in to direct contact with the components during storage, installation, or end use.
- B. Soprema neither performs nor reviews dew point analyses on projects where the Soprema Single Ply Roofing System will be installed. Therefore, Soprema is not responsible for damage due to condensation from dew.
- C. Except for initial installation, all Soprema roofing system components shall be protected from direct contact with sources of heat while in service.

2.08 - Delivery, Handling, & Storage

- A. All materials shall be delivered and stored in their original unopened containers or packaging bearing the manufacturer's name, industry related test standards, and approvals.
- B. Insulation stored outside at a job site shall be stacked on pallets a minimum of four (4") inches (102 mm) above ground level and covered with a waterproof tarp. The insulation manufacturer's packaging is not considered to be a waterproof tarp and shall be slit on the narrow ends to avoid condensation inside the packaging.



Section 2 - General Requirements

- C. Store all roofing materials in a dry area with adequate ventilation. Remove materials from dry, vented storage only as needed for daily production.
- D. Consider the effect of loads on the structure and decking when stocking the roof. An attempt should be made to stock materials over deck support structures. Obtain permission from the building owner prior to stockpiling materials on the roof.
- E. Replace all materials damaged during storage or transport.

2.09 - Roof Drainage

- A. The building owner is responsible for designing proper and adequate drainage of the roof surface. Soprema recommends a minimum slope of one-quarter ($\frac{1}{4}$ " inch per horizontal foot (1') or two (2%) percent, combined with a maximum structural roof deflection of 1/240 per deck span, or as required by the local building code. However, positively sloped roofs with less than two (2%) percent slope can be considered when: local building codes permit; Alsan Flashing surface protection system is used; and/or the owner agrees to a Soprema Ponding Water Warranty Rider.
- B. Improper drainage is defined as any area of the roof where water ponds for more than forty-eight (48) hours after a rainfall when conditions are conducive to drying. "Bird Baths" are expected and usually predictable. Ponding can also result from other sources of water including improperly plumbed HVAC discharge or condensation from steam lines. Roofs with ponding conditions that exceed the forty-eight (48) hour limit for ponding may still be warrantable with acceptance by the Soprema Technical Department and additional design considerations.
- C. The Soprema Warranty does not apply to areas of a roof that have improper drainage or ponding water as described above. The building owner should consider provisions for additional work to insure proper drainage.
- D. Each acceptable design must factor in the specific structural engineering requirements. Primary slope-to-drain requirements within the structure of each roof deck system, along with secondary slope-to-drain requirements which includes all conventional design options (i.e. crickets, saddles, tapered edge, and tapered insulation systems) to flow water to each drain point on the roof within the roofing system plane.
- E. Special provisions apply when drain lines must be run at columns, walls, or other building design characteristics which create barriers for water to flow to drain points with enough flow. Tapered crickets and saddles, or a complete tapered insulation system, are recommended under these conditions to overcome normal span deflection or to expedite the flow of water to exterior or hard to reach drains.

2.09.1 - Drain Sizing & Construction

- A. The sizing, which should be based on the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) rainfall chart, and construction parameters (i.e. gauge and dimension requirements) for all perimeter drainage conveyance should follow the guidelines set forth in the most recent SMACNA manual for gutters, downspouts, scuppers and overflow scuppers. For all interior drain systems, the sizing and flow rates must be calculated using the Standard Plumbing Code. Note: These calculations may be superseded by local code which must be verified. If the calculations are being made from known and accepted publications such as SMACNA, Standard Plumbing Code, ASCE 7-02, or current ASCE Document, and local building codes, then the most stringent interpretation will apply.
- B. For existing construction, the existing building's drainage system should be evaluated by the design professional for acceptability.* The correct operation of the existing drainage system, along with new drainage calculations if necessary, should be made to verify that the new Soprema roofing system will have



Section 2 - General Requirements

adequate drainage in accordance with applicable building codes, SMACNA, and the Standard Plumbing Code. Note: These calculations should be made whether or not the secondary slope-to-drain requirements have been altered in the new design.

*If flow is not adequate in any area and remedial treatment for that area is deemed to impractical, then a decision is typically made to eliminate that water conveyance (i.e. drain scupper, downspouts, etc.). This will only be acceptable when a calculation certifies that the remaining drainage system has the layout and capacity to compensate for the elimination of the conveyance in question.

2.09.2 - Drain Inserts

- A. The Designer Of Record must authorize the use of drain inserts. The material longevity of the insert and the watertight integrity of the connection at the insert flange is an owner maintenance item. The Designer Of Record must provide proof that the new drainage capacity calculation provides for water flow through the smaller diameter drain per the Standard Plumbing Code or applicable local building code.

2.10 - System Method of Attachment (MOA) To Structural Deck

- A. General instructions for the membrane MOA are listed in this section. Guidelines when installing a Soprema system whether its critical attachment method relies on the system being fully adhered, mechanically attached, mechanically attached/fully adhered, or loose laid. Specific guidelines for each MOA are stated below.

2.10.1 - Mechanically Attached/Fully Adhered Systems

- A. When the initial layer of the assembly is mechanically attached (i.e. thermal insulation or a thermal barrier) and successive layers are fully adhered (i.e. a layer of thermal insulation or coverboard), the mechanical attachment represents the critical attachment point for the roofing assembly. The point of critical attachment requires the use of acceptable fasteners, as described in section 2.20.3, and attachment pattern as specified by the fastener manufacturer or Soprema. Note: If the system requires a Wind Rider, an insulation attachment warranty, or a Total System warranty, refer to "Design Value" under section 2.10.3 below and section 2.35 Warranties.

2.10.2 - Bonded Systems

- A. When each layer of a roofing assembly is bonded with either Type IV certified asphalt, Soprema Adhesive for the membranes and/or High Velocity Insulation Adhesive for the insulation assembly, or heat welded, or a combination of these materials and methods, the entire system is considered to be adhered. Base or ply sheets such as Sopra G, Modified Sopra-G, Sopra IV, or Sopra VI and base, ply, and cap membranes such as Soprema Flagon TPO and Soprema Flagon PVC, may be bonded directly to acceptable decks in accordance with this specification or to acceptable substrates.

2.10.3 - Mechanically Attached Systems

- A. Any warrantable Soprema system which is mechanically attached either through the mechanical attachment of a single ply layer or through layers of insulation (a multi-layer insulation assembly may be attached through the top layer with the correct size screw/plate combination), or attached directly through the single ply membrane (i.e. Flagon MA system), requires the following treatment. The attachment assembly must utilize an acceptable screw/plate fastening system and an approved attachment pattern from the insulation manufacturer or Soprema. Note: For Soprema Flagon MA mechanical attachment, only the approved Soprafix fastener/plate fastening systems and patterns supplied by Soprema are approved.
- B. **Design Value:** On the following mechanically attached systems, the design value must be found and applied to determine the appropriate fastener/plate density and pattern for the attachment of Flagon MA systems with

Section 2 - General Requirements

riders for insulation attachment, high wind applications, and systems with Total System warranties with high wind risk. The design value is the lower value of the withdrawal resistance and the existing dynamic pull-through value (value determined by testing the membrane/plate combination). This value is then used to yield the appropriate fastener and its accompanying density and pattern. Note: The design value is known for new steel, concrete, and wood decks but on all other deck conditions a withdrawal resistance value must be determined based on field testing.

2.10.4 - Partially Adhered Systems

- A. Any time the initial layer of the roofing assembly is not fully adhered, but semi-adhered, the assembly is considered to be partially adhered. Due to the inherent attachment risk with a semi-adhered roofing system, each project must be reviewed on its own merit by the Soprema Technical Department.

2.10.5 - Protected Membrane Roof (PMR) Assemblies

- A. All Bonded Systems described in section 2.10.2 above are eligible for use with PMR roof systems. When using cold adhesive systems under a PMR system, it will be necessary to delay the installation of the polystyrene, filter fabric, and ballast until the adhesive has cured.

2.11 - Roof Decks - General Requirements

- A. The structural roof deck must be designed to provide adequate support. This includes, but is not limited to, live and dead loads for the specific building structure including those encountered during construction activity. The roof deck must be sufficiently rigid to prevent damage to the roofing components from excessive deflection due to anticipated equipment movement for repair and maintenance operations or any other similar roof related work. The end use of the building and geographical location must also be considered.
- B. The Designer of Record is responsible for a properly designed and constructed roof deck, as well as the design interrelationship of all building components. The inherent elements of the deck must also be suitable to receive the new roof. Soprema claims no responsibility for any of the mentioned factors and assumes no liability under any circumstances.
- C. The requirements for roof deck constructions and deck surface preparation which follow are provided as a guide for the Designer of Record. The Soprema acceptance of a roof deck as a satisfactory surface to accept the new roof system is limited to the surface of the roof deck and does not include the design, construction, or anchoring of the deck.
- D. In order to be eligible for a Warranty, roof decks not listed in this specification must be submitted for review and accepted, in writing, by the Soprema Technical Department.
- E. Regardless of roof deck type, the surface of the deck shall be dry, clean, smooth, free of debris or contaminants, exhibit evidence of proper design and construction, and be properly designed for anticipated loads with deflection that does not exceed 1/240 of the span at the midpoint of the span.
- F. Construction of the roof deck shall be in accordance with the project specification and the roof deck manufacturer's requirements. The Designer Of Record must determine if the decking system/structural supports are designed to withstand the uplift pressures the roof system is specified to meet.
- G. Prior to installation of the new roof, all penetrations through the roof deck should be completed. Roof penetrations may not intersect with cant strips around the parapet or other locations where cant strips may be required. Roof penetrations may not be placed closer than twenty-four (24") inches (610 mm) from the base of a parapet wall, adjoining wall, or roof edge. Roof penetrations that are placed closer than the specified distance are subject to additional technical requirements.



Section 2 - General Requirements

- H. Electrical conduit, gas pipes, or other utility piping may not be installed on the surface of the roof deck prior to installation of the roofing system. If piping of this kind is installed on the surface of the roof, then the piping shall be installed on wood blocking or other acceptable support. The local building code or the authority having jurisdiction may require piping to be secured to the structure. Contact your local building code to confirm this requirement.
- I. For roof decks with slope greater than three (3") inches per horizontal foot (25%), wood nailer insulation stops and backnailing of the membrane are required. See Section 2.24 of this specification for additional information.
- J. Expansion joints shall be designed and constructed in the appropriate quantity and placed in the proper position on the roof deck. Expansion joints must extend through the structural system to achieve function of purpose. Expansion joints shall be incorporated to separate sections of a building, to separate adjoining buildings, where steel roof decks change direction and anywhere else where extraordinary movement in the structure is anticipated.
- K. If necessary to comply with local building code or insurance requirements, thermal barriers may be installed directly over the roof deck and under the roof assembly.

2.12 - Roof Decks - New Construction Or Complete Tear-Off

- A. This section is intended to be used in conjunction with Section 2.11 Roof Decks General Requirements.

2.12.1 - Steel Decks

- A. Structural steel decks must be a minimum of 22 gauge (0.8 mm) thick, be Type "A", "B", or "F" with a one (1") inch (25 mm) maximum rib width for "A"; one and three-quarter (1 ¾") inch (44 mm) maximum rib width for "F"; and two and one-half (2 ½") inch (64 mm) maximum width for "B". The steel deck may be Grade 33 or Grade 80 and shall be galvanized or factory painted. If a corrosion resistance design consideration exists, a galvanized coating equivalent to ASTM A 525, Class G-90 should be specified. The overlapping flanges shall be flat.
- B. Steel deck fastening must comply with requirements of the manufacturer, or the authority having jurisdiction, and be designed to withstand anticipated wind pressures. The side and end laps must be fastened to insure the deck system minimizes deflection. The side laps must be button punched or screwed together on three (3') foot (1 m), or less, centers. The end laps must have a minimum two (2") inch (51 mm) overlap and be secured to supports with a maximum spacing of twelve (12") inches (305 mm). The Designer Of Record must determine if the decking system/structural supports are designed to withstand the uplift pressures the roof system is specified to meet.
- C. Wood nailers of equal thickness of the roof insulation must be provided at roof edges with gravel stops, drip edges, or gutters to function as insulation stops. Wood nailers may also be specified at parapet walls or penetrations to provide a fastening base for flanges of curbs or flashings.
- D. Steel decks require the installation of thermal insulation, or gypsum board, and a base sheet prior to installation of the roofing membrane. The thermal insulation and gypsum board must be thick enough to span the flutes, as well as capable of withstanding mechanical and foot traffic, as recommended by the manufacturer. The first layer of an insulated system may be loose laid or mechanically fastened with acceptable fasteners and plates. If the first layer is mechanically fastened, then successive layers may be hot mopped or cold adhesive applied. In all cases, positive mechanical attachment in one or more layers of the insulation/roof assembly, is required over steel roof decks.
- E. When thermal insulation is installed in more than one layer, the bottom layer in the assembly must be



Section 2 - General Requirements

mechanically fastened with acceptable fasteners and plates. Successive layers may be mechanically fastened, hot asphalt, or cold adhesive attached. As an alternate, all layers of the insulation/roof assembly may be mechanically fastened with a common fastener. In all cases, the fastener must penetrate the high rib flange of the steel deck.

- F. Soprema Single Ply Roofing Assemblies may not be installed directly over a steel deck without insulation or a thermal barrier.

2.12.2 - Poured-In-Place Structural Concrete Decks

- A. Poured-in-place structural concrete decks must have a minimum compressive strength of 2,500 pounds per square inch (psi). The poured-in-place concrete must be properly cured a minimum of twenty-eight (28) days, or the period specified by the concrete manufacturer, prior to installation of the roofing system.
- B. Poured-in-place structural concrete decks must provide for drying on the bottom side of the deck. Poured-in-place structural concrete decks poured over forms that are a permanent part of the structure and are not vented will not be accepted.
- C. Poured-in-place structural concrete decks must be cured before work on the roof systems begins. Concrete decks that are wet from either a lack of cure time or recent participation must be permitted to dry. Frozen decks must be permitted to thaw and dry.
- D. All poured-in-place structural concrete decks shall be smooth and free of dirt or contaminants. Concrete curing agents must be compatible with the new roofing system.
- E. All poured-in-place structural concrete decks requiring hot asphalt attachment of insulation, membrane, or a vapor barrier directly to the deck shall be tested for dryness prior to beginning installation of the new roofing system. Soprema recommends one of the following tests to determine concrete dryness:

Method A:

1. Pour one (1) pint (.5L) of asphalt that has been heated to a minimum of four hundred (400° F) degrees Fahrenheit (204° C) on to the deck.
2. If the asphalt bubbles or foams, then the deck is not dry enough to begin work.
3. After the asphalt cools, peel it off the concrete deck. If the bitumen can be removed without demonstrating any evidence of adhesion, then it is not dry enough to proceed.

Method B:

1. Place a section of translucent material (i.e. clear Plexiglass or plastic) approximately twelve inches (12" x 12") by twelve inches (305 mm x 305 mm) on the concrete deck and seal the edges with duct tape. This method requires a sunny afternoon to be effective.
 2. Permit the translucent material to remain in place for two hours.
 3. If condensation appears on the bottom of the translucent material, then the deck is not dry enough to begin work.
- F. The poured-in-place concrete roof deck must be level prior installation of the new roofing system. Ridges or irregularities must be ground flat and depressions must be filled with cement grout or other material accepted by the roof deck manufacturer. Voids or cracks greater than one-eighth ($\frac{1}{8}$ ") inch (3.2 mm) wide must be filled with similar material.



Section 2 - General Requirements

- G. For asphalt attachment of a vapor retarder, base ply, or insulation, poured-in-place concrete roof decks must be primed with an application of American Society for Testing and Materials (ASTM) D 41 asphalt primer such as Soprema Elastocol 400 or 500. The asphalt primer is applied at the rate of one (1) gallon per one hundred (100 - 150 ft²/gal) to one hundred and fifty square feet (.41 to .61 L/m²). Asphalt primer is not required if the first layer of the system is mechanically fastened or non-asphalt based adhesives are used.
- H. If the concrete is existing, then care must be taken to remove the residue from the old roofing to the greatest possible extent. Surface damage caused by the removal of the old roof must be repaired. Proper curing or hydration of the deck must be confirmed, in writing, to the roofing contractor before the roofing application begins. On existing roof decks, or any structural concrete deck where pours have occurred for replacement and/or repair, the hydration rate must be consistent with the specified mix and for the geographic location where the mix is poured. Under tear-off conditions an acceptable dryness must be performed as described above.
- I. The Designer of Record is responsible for determining the suitability of the deck for systems applied directly to the deck. Poured-in-place concrete decks with a textured finish are not acceptable where the roof membrane will be applied directly to the deck.
- J. In most installations, a thermal insulation and a coverboard are required. A vapor barrier may also be included in the new roof assembly. Direct attachment to new, dry structural concrete or clean existing concrete may be acceptable. Contact the Soprema Technical Department. On re-cover projects, an acceptable recovery board is required.

2.12.3 - Precast Concrete Decks

- A. Manufactured concrete roof panels must have a minimum compressive strength of 2,500 psi and a minimum nominal density of 150 pounds per square (psf) foot (150 lbs/ft²) (223 kg/m²). The cross sectional shapes include plain slab, channel slab, tongue and groove plank, and single and double "T"s". They may be supported by structural steel, precast concrete beams, or load bearing walls.
- B. All precast panels must be fully cured, clean, and not exhibit excessive camber. The beam or panel attachment to the structural element should be used to eliminate excess lateral movement and to provide adequate resistance to wind uplift forces. The precast manufacturers securement guidelines should be followed for the appropriate securement protocols. Special Precaution: All single and double "T" joints must be inspected for alignment. All joints should be grouted, with a grout approved by the manufacturer, and allowed to cure completely before the application of the roofing assembly.
- C. Special Design Consideration: It is not uncommon for precast concrete deck systems to display out-of-plane unevenness due to excessive camber, misalignment, or irregularities caused by extra lateral and uplift bracing. If such a condition exists, it is possible that the slope to drain pattern has numerous negative sloped areas or the water does not flow as designed. If this has occurred, then a poured-in-place lightweight insulating concrete should be added to the prestressed concrete deck. A minimum pour of two (2") inches (51 mm) is required, and the roofing system placed on top should conform to the criteria spelled out in the lightweight insulating concrete requirements.
- D. Precast concrete decks must be dry before work on the roof system begins. Concrete decks that are wet from either a lack of cure time or recent participation must be permitted to dry. Frozen decks must be permitted to thaw and dry.
- E. Concrete curing agents must be compatible with the new roofing system.
- F. All precast concrete decks requiring hot asphalt attachment of insulation, membrane, or a vapor barrier



Section 2 - General Requirements

directly to the deck shall be tested for dryness prior to beginning installation of the new roofing system. Soprema recommends the deck dryness procedures outlined in Section 2.12.2.

- G. For asphalt attachment of a vapor retarder, base ply, or insulation, precast concrete roof decks must be primed with an application of ASTM D 41 asphalt primer such as Soprema Elastocol 400 or 500. The asphalt primer is applied at the rate of one (1) gallon per one hundred (100 - 150 ft²/gal) to one hundred and fifty square feet (.41 to .61 L/m²). Asphalt primer is not required if the first layer of the system is mechanically fastened or non-asphalt based adhesives are used.
- H. If the precast is existing, then care must be taken to remove the residue from the old roofing to the greatest possible extent. Surface damage caused by the removal of the old roof must be repaired. Proper curing or hydration of the deck must be confirmed, in writing, to the roofing contractor before the roofing application begins. On existing roof decks, or any precast deck where pours have occurred for replacement and/or repair, the hydration rate must be consistent with the specified mix and for the geographic location where the mix is poured. Under tear-off conditions an acceptable dryness must be performed as described in Section 2.12.2 above.
- I. The Designer of Record is responsible for determining the suitability of the deck for systems applied directly to the deck. Poured-in-place concrete decks with a textured finish are not acceptable where the roof membrane will be applied directly to the deck.
- J. Before installing the required rigid insulation, each joint should be covered with a partially adhered heat welded Soprema SBS Modified Bitumen base membrane. The minimum eight (8") inch (203 mm) wide heat welded joint cover shall be fully bonded on one side of the joint and left unattached on the other side.
- K. In most installations, a thermal insulation is required. A vapor barrier may also be included in the new roof assembly. Direct attachment to new, dry precast concrete or clean existing precast concrete may be acceptable. Contact the Soprema Technical Department. On re-cover projects, an acceptable recovery board is required.

2.12.4 - Prestressed Concrete Decks

- A. These decks are typically precast panels which have been manufactured with an integral steel tenon reinforcement as an additional structural element. The compressive strength should meet 2,500 psi with a density of one hundred and ten (110 to 150 psf) to one hundred and fifty pounds per square foot (164 - 223 kg/m²). They are cast in a variety of shapes including plain slab, channel slab, hollow-core, and single and double "T's."
- B. All prestressed panels must be fully cured, clean, and not exhibit excessive camber. The beam or panel attachment to the structural element should be used to eliminate excessive lateral movement and to provide adequate resistance to wind uplift forces. The precast manufacturer securement guidelines should be followed for the appropriate securement protocols.
- C. Prestressed concrete decks must be dry before work on the roof system begins. Concrete decks that are wet from either a lack of cure time or recent precipitation must be permitted to dry. Frozen decks must be permitted to thaw and dry.
- D. All prestressed concrete decks shall be smooth and free of dirt or contaminants. Concrete curing agents must be compatible with the new roofing system.
- E. All prestressed concrete decks requiring hot asphalt attachment of insulation, base ply, or a vapor barrier directly to the deck shall be tested for dryness prior to beginning installation of the new roofing system. Soprema recommends the tests outlined in Section 2.12.2.



Section 2 - General Requirements

- F. The prestressed concrete roof deck must be level prior installation of the new roofing system. Ridges or irregularities must be ground flat and depressions must be filled with cement grout or other material accepted by the roof deck manufacturer. Voids or cracks greater than one-eighth ($\frac{1}{8}$ ") inch (3.2 mm) wide must be filled with similar material.
- G. For asphalt attachment of a vapor retarder, base ply, or insulation, prestressed concrete roof decks must be primed with an application of ASTM D 41 asphalt primer such as Soprema Elastocol 400 or 500. The asphalt primer is applied at the rate of one (1) gallon per one hundred (100 - 150 ft²/gal) to one hundred and fifty square feet (.41 to .61 L/m²). Asphalt primer is not required if the first layer of the system is mechanically fastened or non-asphalt based adhesives are used.
- H. If the prestressed is existing, then care must be taken to remove the residue from the old roofing to the greatest possible extent. Surface damage caused by the removal of the old roof must be repaired. Proper curing or hydration of the deck must be confirmed, in writing, to the roofing contractor before the roofing application begins. On existing roof decks, or any prestressed deck where pours have occurred for replacement and/or repair, the hydration rate must be consistent with the specified mix and for the geographic location where the mix is poured. Under tear-off conditions an acceptable dryness must be performed as described in Section 2.12.2 above.
- I. The Designer of Record is responsible for determining the suitability of the deck for systems applied directly to the deck. Prestressed concrete decks with a textured finish are not acceptable where the roof membrane will be applied directly to the deck.
- J. Before installing the required rigid insulation, each joint should be covered with a partially adhered heat welded Soprema SBS base membrane. The minimum eight (8") inch (203 mm) wide heat welded joint cover shall be fully bonded on one side of the joint and left unattached on the other side.
- K. In most installations, a thermal insulation is required. A vapor barrier may also be included in the new roof assembly. Direct attachment to new, dry prestressed concrete or clean existing prestressed concrete may be acceptable. Contact the Soprema Technical Department. On re-cover projects, an acceptable recovery board is required.

2.12.5 - Plank & Heavy Timber Wood Decks

- A. The minimum board thickness is one (1") inch (25 mm) with ship-lap, tongue and groove, or splined side laps which interlock. Support shall be provided at the end of each board. The condition of the wood should be properly seasoned and dried with a clean surface free from sawdust, dirt, debris and any external or local environmental particulate matter. Cracks greater than one-quarter ($\frac{1}{4}$ ") inch (6.4 mm), or knotholes greater than one (1") inch (25 mm) must be covered with sheet metal one (1") inch (25 mm) larger than the anomaly in all directions and be securely fastened to the deck.
- B. The thickness of the planks is determined by the design loads anticipated for the roof and based on the distance between the supports. Boards must be free of warpage, excessive knots, dry or wet rot, or splits, which are equal to or greater than twenty-five (25%) percent of the thickness dimension. If any of these conditions exist, then remove and replace affected areas with similar materials.
- C. All wood shall be stored a minimum of four (4") inches (102 mm) off of the ground and covered with a waterproof tarp. Plank and timber decks shall be covered with a roof membrane shortly after installation.
- D. Heavy timber and plank decks must have a bearing surface on rafters at each end and be securely fastened to the support structure.
- E. A mechanically fastened base sheet, a layer of insulation, or a separation layer are required between the

Section 2 - General Requirements

wood deck and the new roofing system.

- F. In the mechanical securement of the base sheets, annular ring shank nails with one (1") inch (25 mm) round flat heads are to be used. They must penetrate a minimum of three-quarter ($\frac{3}{4}$ ") inch (19 mm). For the mechanical attachment of insulation on wood decks, only acceptable fasteners and plates may be used. For Flagon mechanically attached membrane systems, only Soprema supplied fasteners and plates are acceptable.
- G. For fully adhered insulation applications, a separator sheet, red rosin sheathing, must be used to prevent direct attachment of the insulation system to the wood plank deck.

2.12.6 - Plywood Wood Decks

- A. A multi-layer wood veneer composite, composed of an odd number of cross-laminated layers. The product must meet all prescriptive or performance parameters of the most recently published standard of the U.S. Product Standard (USPS) PS 1-83 for Construction and Industrial Plywood or meet exterior grade American Plywood Association (APA) Product Standard One (PS-1). If plywood other than APA PS-1 or USPS PS 1-83 is considered, then the Designer of Record is responsible for confirming compatibility between the roofing materials and any preservatives used to treat the plywood.
- B. The minimum thickness for plywood is fifteen-thirty seconds ($\frac{15}{32}$ ") inch (12 mm) thick with a $\frac{32}{16}$ " span rating, and an exposure grade of 1, and have a joist spacing no greater than twenty-four (24") inches (610 mm) on center.
- C. Fire retardant plywood is not an acceptable substrate for Soprema single ply roofing systems.
- D. All plywood shall be stored a minimum of four (4") inches (102 mm) off of the ground and covered with a waterproof tarp. Plywood decks shall be covered with a roof membrane shortly after installation.
- E. Wood framing, or some other means, must be used to prevent deflection in the plywood deck.
- F. Plywood decks must be secured to support members in accordance with APA recommendations.
- G. A layer of insulation, or a separation layer is required between the plywood deck and the new roofing system.
- H. In the mechanical securement of the base sheets, annular ring shank nails with one (1") inch (25 mm) round flat heads are to be used. They must penetrate a minimum of one-half ($\frac{1}{2}$ ") inch (13 mm). For the mechanical attachment of insulation on wood decks, only acceptable fasteners and plates may be used. For Flagon MA membrane systems, only Soprema supplied fasteners and plates are acceptable.
- I. For fully adhered insulation applications, a separator sheet, red rosin sheathing, must be used to prevent direct attachment of the insulation system to the plywood deck.

2.12.7 - Structural Wood Fiber Decks

- A. These decks consist of long strand wood fibers taken from selected tree species and mixed in a slurry or special binders. The final mixture is poured into a form to create a panel with a minimum thickness of at least two (2") inches (51 mm). These panels are positioned over a steel frame network of bulb "T's" or channels into which the panels are locked and create a rigid structural deck system.
- B. All structural wood fiber decks shall be stored a minimum of four (4") inches (102 mm) off of the ground and covered with a waterproof tarp. All structural wood fiber decks shall be covered with a roof membrane shortly after installation.
- C. Structural wood fiber decks must be installed with level joints and in accordance with the manufacturer's



Section 2 - General Requirements

instructions.

- D. Structural wood fiber decks must be able to support minimum design loads as recommended by the deck manufacturer.
- E. Structural wood fiber decks must provide sufficient withdrawal resistance for fasteners. Fastener withdrawal testing will be required for any existing deck.
- F. Structural wood fiber deck sections that become wet or deformed must be replaced with new decking.
- G. Structural wood fiber decks must be covered with a roof membrane shortly after installation.
- H. Structural wood fiber decks require the installation of a mechanically fastened base sheet or base membrane. Before any fastener/plate system may be used, fastener withdrawal resistance testing must be performed to determine a minimum characteristic value for design. Attachment protocol for determining the proper fastener density and layout should follow Soprema's bulletins, details, and specifications.
- I. Composite structural wood fiber decks that incorporate elements such as insulation or particleboard are not acceptable for use in Soprema roofing systems.

2.12.8 - Poured-In-Place Gypsum & Gypsum Plank Decks

- A. These systems typically consist of a poured gypsum, minimum two (2") inches (51 mm) thick excluding the form board, consisting of a slurry of aggregate or wood fibers which is mixed on-site and poured-in-place over a steel frame supporting form boards. The pour is cast into a reticulation of galvanized wire. To permit adequate drying of the mix, interior ventilation must be integral to the design. The dry density of new gypsum concrete is typically between thirty and sixty (30 - 60 lbs/ft³) pounds per cubic foot (481 to 961 kgm³). Gypsum decks are also composed of manufactured panels which are secured into an erected steel framework. Soprema roofing systems installed over structural gypsum decks are accepted on a job-to-job basis.
- B. New or existing gypsum deck roofing systems that are designed with an accepted mechanically fastened base/anchor felt or base/anchor system, normally must incorporate venting by means of a mechanically fastened base sheet.
- C. Before any fastener/plate system may be used, fastener withdrawal resistance testing must be performed to determine a minimum characteristic value for design. Attachment protocol for determining the proper fastener density and layout should follow Soprema's bulletins, details, and specifications.
- D. Existing gypsum deck roofing systems that are designed to be used with an accepted adhesive bonded insulation system are subject to bonded pull testing to determine a minimum characteristic values for design.

2.12.9 - Poured-In-Place Lightweight Insulating Concrete Decks (LWIC)

- A. All LWIC systems must conform to the LWIC manufacturer's, and building code, requirements for suitability of the deck, the deck and the existing BUR roofing system, and for the climatic zone location of the installation. Further, the acceptance of the deck as it relates to suitability of the cure, compressive strength, oven dry density, and properly screeded surface is the sole responsibility of the deck manufacturer's installer. The suitability of the deck must be confirmed to Soprema, by a letter from the LWIC installer stating that the LWIC has been installed in accordance with the manufacturer's instructions and the project specifications, before the deck is acceptable for a Soprema roofing system.
- B. The mechanical attachment of single ply sheets, base sheets, anchor sheets, and membrane with their corresponding Soprema accepted fastener plate system over any trade name LWIC deck is governed by its independent testing approvals and qualification through on-site withdrawal resistance testing per Soprema's

Section 2 - General Requirements

fastener testing standard. Less than one hundred (100) squares (929 m²), a minimum of ten (10) tests, with four (4) being in the perimeter. Three (3) additional tests are required for every fifty (50) squares (465 m²) of roof surface.

- C. A design that specifies rigid insulation board over the LWIC deck is restricted to existing LWIC decks. The attachment of the rigid insulation board must be to an acceptable anchor sheet. Acceptable anchor sheets would include a mechanically fastened ASTM D 4897 venting base sheet or other acceptable base sheet or base membrane. The rigid insulation board is fully adhered with hot asphalt to the vapor retarder. Note: any special attachment of the insulation with High Velocity Insulation Adhesive, or other acceptable low rise urethane adhesive, requires special mechanical attachment pattern and density protocols for the approved vapor retarder. Contact the Soprema Technical Department for additional information.
- D. New LWIC systems should be designed with expanded polystyrene board encapsulated by the LWIC system per the LWIC deck manufacturers specifications. Rigid board insulation may not be placed over new LWIC systems.
- E. Any recover application over an existing steel deck requires a report from a certified Structural Engineer stipulating the acceptability of the specific application. Specifically, the volume of LWIC in question against the design loads.
- F. It is the responsibility of the Designer Of Record to determine if an assembly using an anchor sheet into existing LWIC, followed by a dry-in sheet that is mopped, heat welded, or cold adhesive applied, followed by a new LWIC meets the State or Local Building Pressure requirements for that specific project.
- G. The LWIC system consists of a mixture of potable water that is clean and free of deleterious amounts of acid, alkali, and organic materials with either vermiculite or perlite aggregate and Portland cement conforming to Type I, II, or III as defined by ASTM C 150 or other standard as required by the manufacturer. The vermiculite loose fill used as aggregate in the LWIC shall comply with ASTM C 516. The perlite loose fill used as aggregate in the LWIC shall comply with ASTM C 549. The system is placed over a non-monolithic steel deck or monolithic concrete deck or existing BUR deck. The specified Soprema roof membrane assemblies are approved through independent laboratory wind uplift testing. The LWIC manufacturer and installer are responsible for all asbestos fibers, if any, used in this type of roof deck construction.
- H. The system is mixed and poured to protocols that meet the specific climatic conditions and drainage requirements of the project site to produce a smooth, consistent deck that will screed to a smooth surface.
- I. When poured over an acceptable slotted steel deck, minimum twenty-six (26 ga) gauge G-90 galvanized, or structural concrete deck, the pour must be a minimum of two (2") inches (51 mm) in depth. Over an existing BUR, check with the design professional and manufacturer as each case is different. The pour should also attain a minimum compressive strength of one hundred and twenty-five (125) psi (986 Pa) and an oven dry density of twenty-two (22 lb/ft³) pounds per cubic foot (352 kg/m³).
- J. Expanded polystyrene (EPS) insulation board having a nominal density of one (1 pcf) pound per cubic foot (16 kg/m³) defined as Type I by ASTM C 578 and containing approximately three (3%) percent open area may be used in conjunction with the LWIC system.
- K. When designed over a steel deck, the venting of the system must take place from above or below the deck. When these systems are installed over concrete decks, or over existing BUR roofing systems, they must be vented. Venting must be achieved through the field by means of a continuous venting through the base flashing and out through the counter-flashing, or through the flat edge details, incorporating perimeter blocking with curf cuts or perimeter metal, with built-in venting capabilities.
- L. LWIC shall meet the following criteria: Range II - Cast density of 34-42 pcf, minimum compressive strength of



Section 2 - General Requirements

160 psi; Range III - Cast density of 42-50 pcf, minimum compressive strength of 250 psi. If fastener withdrawal testing values are significantly less than the published minimum anticipated values then cylinder sampling with subsequent laboratory testing may be required. Testing to be conducted in accordance with ASTM C495-91a. The data must be selected from laboratories designated by the manufacturer of the LWIC system and include the compressive strength and dry density.

- M. If the LWIC is part of the Soprema Warranty, then cylinder sampling with subsequent laboratory testing may be required if fastener withdrawal testing values are significantly less than the published minimum anticipated values. Testing to be conducted in accordance with ASTM C495-91a and is to be incorporated in the warranty document. The data must be selected from laboratories designated by the manufacturer of the LWIC system and include the compressive strength and dry density.
- N. If the LWIC is to be included in the Soprema Warranty, then either the LWIC must be warranted to Soprema by the LWIC manufacturer or a letter from the LWIC installer stating that the LWIC was installed in accordance with manufacturer's requirements and the project specifications must be submitted by the roofing contractor.

2.12.10 - Poured-In-Place Lightweight Insulating Cellular Concrete Decks (LWICC)

- A. All LWICC systems must conform to the LWICC manufacturer's, and building code, requirements for suitability of the deck, the deck and the existing BUR roofing system, and for the climatic zone location of the installation. Further, the acceptance of the deck as it relates to suitability of the cure, compressive strength, oven dry density, and properly screeded surface is the sole responsibility of the deck manufacturer's installer.
- B. The mechanical attachment of base sheets, anchor sheets, and membrane with their corresponding Soprema accepted fastener plate system over any trade name LWICC deck is governed by its independent testing approvals and qualification through on-site withdrawal resistance testing per Soprema's fastener testing standard. Less than one hundred (100) squares (929 m²), a minimum of ten (10) tests, with four (4) being in the perimeter. Three (3) additional tests are required for every fifty (50) squares (465 m²) of roof surface.
- C. A design that specifies rigid insulation board over the LWICC deck is restricted to existing LWICC decks. The attachment of the rigid insulation board must be to an acceptable anchor sheet. Acceptable anchor sheets would include a mechanically fastened ASTM D 4897 venting base sheet or other acceptable base sheet or base membrane. The rigid insulation board is fully adhered with hot asphalt to the vapor retarder. Note: any special attachment of the insulation with High Velocity Insulation Adhesive, or other acceptable low rise urethane adhesive, requires special mechanical attachment pattern and density protocols for the approved vapor retarder. Contact the Soprema Technical Department for additional information.
- D. New LWICC systems should be designed with expanded polystyrene board encapsulated by the LWICC system per the LWICC deck manufacturers specifications. Rigid board insulation may not be placed over new LWICC systems.
- E. Any recover application over an existing steel deck requires a report from a certified Structural Engineer stipulating the acceptability of the specific application. Specifically, the volume of LWICC in question against the design loads.
- F. It is the responsibility of the Designer Of Record to determine if an assembly using an anchor sheet into existing LWICC, followed by a dry-in sheet that is mopped, heat welded, or cold adhesive applied, followed by a new LWICC meets the State or Local Building Pressure requirements for that specific project.
- G. The LWICC system consists of a mixture of potable water that is clean and free of deleterious amounts of acid, alkali, and organic materials with air entraining agent with foam concentrate which shall conform to ASTM C 869 and Portland cement conforming to Type I, II, or III as defined by ASTM C 150 or other standard as required by the manufacturer. The system is placed over a non-monolithic steel deck or monolithic

Section 2 - General Requirements

concrete deck or existing BUR deck. The specified Soprema roof membrane assemblies are approved through independent laboratory wind uplift testing. The LWICC manufacturer and installer are responsible for all asbestos fibers used, if any, in this type of roof deck construction.

- H. The system is mixed and poured to protocols that meet the specific climatic conditions and drainage requirements of the project site to produce a smooth, consistent deck that will screed to a smooth surface. The LWIC concentrate shall comply with ASTM C 869 when tested in accordance with ASTM C 796.
- I. When poured over an acceptable slotted steel deck, minimum twenty-six (26 ga) gauge G-90 galvanized, or structural concrete, the pour must be a minimum of two (2") inches (51 mm) in depth. Over an existing BUR, check with the design professional and manufacturer as each case is different. The pour should also attain a minimum compressive strength of two hundred (200) psi (1,378 Pa).
- J. Expanded polystyrene (EPS) insulation board having a nominal density of one (1 pcf) pound per cubic foot (16 kg/m³) defined as Type I by ASTM C 578 and containing approximately three (3%) percent open area may be used in conjunction with the LWICC system.
- K. When designed over a steel deck, the venting of the system must take place from above or below the deck. When these systems are installed over concrete decks, or over existing BUR roofing systems, they must be vented. Venting must be achieved through the field by means of a continuous venting through the base flashing and out through the counter-flashing, or through the flat edge details, incorporating perimeter blocking with curf cuts or perimeter metal, with built-in venting capabilities.
- L. LWICC shall meet the following criteria: Range II - Cast density of 34-42 pcf, minimum compressive strength of 160 psi; Range III - Cast density of 42-50 pcf, minimum compressive strength of 250 psi. If fastener withdrawal testing values are significantly less than the published minimum anticipated values then cylinder sampling with subsequent laboratory testing may be required. Testing to be conducted in accordance with ASTM C495-91a. The data must be selected from laboratories designated by the manufacturer of the LWICC system and include the compressive strength and dry density.
- M. If the LWICC is part of the Soprema Warranty, then cylinder sampling with subsequent laboratory testing may be required if fastener withdrawal testing values are significantly less than the published minimum anticipated values. Testing to be conducted in accordance with ASTM C495-91a and is to be incorporated in the warranty document. The data must be selected from laboratories designated by the manufacturer of the LWICC system and include the compressive strength and dry density.
- N. If the LWICC is to be included in the Soprema Warranty, then either the LWICC must be warranted to Soprema by the LWICC manufacturer or a letter from the LWICC installer stating that the LWICC was installed in accordance with manufacturer's requirements and the project specifications must be submitted by the roofing contractor.

2.13 - Roof Decks - Re-Cover

- A. Complete removal of the existing roofing system and insulation shall be treated as new construction. Refer to the appropriate part of section 2.12 for information.
- B. Depending on the condition of the existing roof assembly and the warranty required for the project, a moisture survey may be required.

2.13.1 - Gravel Surfaced Asphalt And/Or Coat Tar Pitch BUR Or Modified Bitumen Roofs

- A. Gravel surfaced asphalt and/or coal tar pitch (CTP) BUR's must be power broomed to remove any loose gravel. The high spots must be leveled and the depressions must be filled.



Section 2 - General Requirements

- B. Any existing insulation determined to be wet shall be removed. Blisters shall be repaired. When wet insulation is removed and replaced, it must be covered with a layer of modified bitumen of equal thickness to the layer of gravel surfaced existing roof that was removed.
- C. If there is moisture present within, or below, the layer of existing gravel, then a method of drying must be accomplished before proceeding with the installation of the new roof. As an alternate, the gravel may be spudded off and completely removed.
- D. Gravel surfaced asphalt and/or CTP built-up roofs require the installation of an acceptable re-cover board or a single layer of Soprema Sopraboard. The re-cover board shall be mechanically fastened with a fastener and plate. Over existing CTP, the Sopraboard must be one-quarter ($\frac{1}{4}$ " inch (6.4 mm) thick. Direct application of Soprema roofing systems to CTP is not permitted. **Caution: Fasteners that penetrate the existing roof and roof deck could cause CTP to flow into the building.**

2.13.2 - Mineral Surfaced BUR Or Modified Bitumen Roof

- A. Mineral surfaced modified bitumen or BUR's that have not been coated or resaturated may have a Soprema Single Ply Roofing System (mechanically fastened only) installed directly over the mineral surface provide the following conditions are satisfied:
 - Any existing insulation determined to be wet shall be removed. Blisters shall be repaired. When wet insulation is removed and replaced, it must be covered with a layer of modified bitumen of equal thickness to the layer of gravel surfaced existing roof that was removed;
 - The surface of the existing roof does not have areas of loose alligating;
 - All existing roof cement and/or patching material has been removed from the existing roof;
 - The existing roof does not have large splits or cracks in the surface;
 - The surface of the existing roof is primed with Soprema Elastocol 400 or 500 primer (only if new insulation will be hot asphalt attached).
- B. Prior to the installation of the roofing system, the asphalt primer is permitted to dry.
- C. If additional insulation is required by the project specification, then the existing mineral surface does not have to be primed unless the additional insulation will be hot asphalt attached. If the existing mineral surface is not primed, then the additional insulation must be mechanically fastened.

2.13.3 - Non-Resaturated Or Coated Smooth Surface BUR Or Modified Bitumen Roof

- A. Smooth surface BUR or modified bitumen roofs that have not been resaturated or coated may have a Soprema Single Ply Roofing System over the existing surface providing the following conditions are satisfied:
 - Any existing insulation determined to be wet shall be removed. Blisters shall be repaired. When wet insulation is removed and replaced, it must be covered with a layer of modified bitumen of equal thickness to the layer of gravel surfaced existing roof that was removed.
 - The surface of the existing roof does not have areas of loose alligating.
 - All existing roof cement and/or patching material has been removed from the existing roof.
 - The existing roof does not have large splits or cracks in the surface.
 - The surface of the existing roof is primed with Soprema Elastocol 400 or 500 primer (only if new insulation will be hot asphalt attached).



Section 2 - General Requirements

- B. Prior to the installation of the roofing system, the asphalt primer is permitted to dry.
- C. If additional insulation is required by the project specification, then the existing smooth surface does not have to be primed unless the additional insulation will be hot asphalt attached. If the existing smooth surface is not primed, or is not suitable for an adhered application, then the additional insulation must be mechanically fastened.

2.13.4 - Resaturated Or Coated Smooth Surface BUR Or Modified Bitumen Roof

- A. Smooth surface BUR or modified bitumen roofs that have been resaturated or coated require a layer of Sopraboard or re-cover board.

2.13.5 - Sprayed-In-Place Urethane Roofs

- A. Sprayed-in-place urethane roofs are not an acceptable substrates to receive a new Soprema roof and must be completely removed to the deck prior to installation of the new roofing system.

2.14 - Roof Deck Fastener Withdrawal & Bonded Pull Resistance Testing

- A. Soprema requires fastener pullout testing on many deck types. The requirement to do the testing and the number of tests to be conducted will depend on the age of the roof deck, type of roof deck, and the system warranty requirements of the project. Fastener withdrawal testing is always required on reroof projects where threaded or manually driven fasteners are used. The authority having jurisdiction may have additional fastening requirements in addition to the Soprema Limited Warranty requirements. Fastener withdrawal resistance testing shall be conducted in accordance with the current edition of the ANSI/SPRI *Standard Field Test Procedure For Determining The Withdrawal Resistance Of Roofing Fasteners* or in accordance with the requirements of the authority having jurisdiction.
- B. Soprema requires bonded pull testing on many existing monolithic deck types where the existing roof is removed down to the existing deck. The requirement to do the testing and the number of tests to be conducted will depend on the age of the roof deck, type of roof deck, and the system warranty requirements of the project. Bonded pull testing is always required on reroof projects where adhesives are used to anchor the membrane or insulation directly to the roof deck. The authority having jurisdiction may have additional bonding requirements in addition to the Soprema Limited Warranty requirements. Bonded resistance testing shall be conducted in accordance with the current edition of the FMG *Loss Prevention Data Sheet 1-52 "Field Uplift Tests"* or in accordance with the requirements of the authority having jurisdiction.

2.15 - Expansion Joints

- A. The design and location of expansion joints are the responsibility of the Designer of Record. Unless approved prior to bid.

2.15.1 - Expansion Joint Design Recommendations

- A. Although the design and location of expansion joints are the responsibility of the Designer of Record, Soprema recommends that expansion joints are included in the design whenever:
 - One dimension of the building exceeds two hundred (200') feet (61 m);
 - Steel framing or structural steel changes direction or elevation;
 - Roof decking changes direction such as in "T", "U", or "L" shapes and the decking going each direction is not fastened to the same structural member;
 - The roof deck material changes from one decking material to another;



Section 2 - General Requirements

- New additions are connected to an existing buildings;
- Junctions such as canopies, overhangs, or loading docks into a main structure or where expansion joints are part of the new or existing structural system.

2.15.2 - Expansion Joint Flashing Recommendations

- Expansion joints shall be continuous and shall not be ended before the break in the structure.
- All metal/elastomeric composite expansion joint covers shall be elevated on curbs a minimum of eight (8") inches (203 mm) above the surface of the roof.

2.16 - Area Dividers & Control Joints

- Any design, whether utilizing a vertical or horizontal blocking configuration, which covers areas of the roofing system that do not involve structural building components, differential movement, but is designed solely to interrupt the build-up and/or transfer of membrane system stresses, caused by thermal factors, torsional movement, geometric imbalance (L or H shaped roof layouts) or by gross dimensional restrictions (a total distance not to exceed two hundred (200') feet (61 m) in any one direction), requires the use of a control joint. Note: These designs must not interfere or restrict the logical slope-to-drain pattern of the roofing system. If so, alternate slope-to-drain design provisions must be made. Refer to Approved Details for more information.
- The design and location of area dividers and control joints are the responsibility of the Designer of Record.
- Area dividers and control joints are acceptable alternatives to expansion joints if they are installed where they were not included in the original design. Area dividers and control joints should be designed and installed using the same criteria as expansion joints.

2.17 - Vapor Retarders

- The Designer of Record is responsible for the need, design, and placement of a vapor retarder.

2.17.1 - Vapor Retarder Recommendations

- The need, design, and placement of a vapor barrier should be investigated if any of the following conditions exists:
 - A project where the outside average January temperature is below forty (40° F) degrees Fahrenheit (5° C) and where interior relative humidity of forty-five (45%) percent or greater is possible;
 - A project where construction components or construction processes may create moisture after the roof is installed and temporarily create the conditions described above.

2.18 - Roofing Asphalt

- Asphalt for the application of components in Soprema systems must meet ASTM D 312 Type IV criteria.

2.18.1 - Asphalt Grades For Insulation & Coverboard

- ASTM D 312, Type IV or ASTM D 6152 SEBS Type IV asphalt can be used for insulation, coverboard, base sheet, base membrane, ply sheet, ply membrane, and cap membrane mopping on slopes four inches (4:12) in twelve inches (33%) or less.

2.18.2 - Asphalt Identification

- Soprema recommends an identification system for mopping grade asphalt and the practical use of the information. The following information should be printed on the asphalt packages or bills of lading covering

Section 2 - General Requirements

bulk asphalt and should include:

- Type IV per ASTM D 312 or ASTM D 6152;
- Flash Point (FP) per ASTM D 92;
- Equiviscous Temperature Range (EVT).

2.18.3 - Asphalt Heating & Application

- A. Soprema requires that all mopping grade asphalt to be applied at the EVT range specific to the application method, i.e. mopping or mechanical spreader, as printed on the asphalt cartons or bills of lading.
- B. The asphalt at the point of application shall be the EVT plus or minus twenty-five (25° F) degrees Fahrenheit (13° C). For manual mopping, a viscosity of one hundred and twenty-five (125) centipoise should be achieved. For mechanical spreaders, a viscosity of seventy-five (75) centipoise should be achieved. Under no circumstances shall the asphalt temperature be less than four hundred and twenty-five (425° F) degrees Fahrenheit (219° C) at the point of application.
- C. Asphalt for thermal insulation applications over concrete shall be applied at the rate of thirty (30 lbs.) pounds per one hundred (100) square feet (1.44 kg/m²) plus or minus twenty (20%) percent. Asphalt attachment of thermal insulation shall be limited to four feet (4'x4') by four feet (1.2 m x 1.2 m) boards.
- D. Asphalt for thermal insulation over gypsum, coverboard over thermal insulation, base sheet, ply sheet, or cap sheet shall be applied at the rate of twenty-five (25 lbs.) pounds per one hundred (100) square feet (1.2 kg/m²) plus or minus twenty (20%) percent.
- E. Thermometers on kettles and tankers shall be in good working order and checked periodically to insure accuracy.

2.19 - Wood Nailers

- A. On new construction or complete tear-off projects, wood nailers must be kiln-dried structural grade number two projects where the existing roof will be left in place and a re-cover board will be added, wood nailers must be pressure treated for rot resistance and be number two (#2) or better lumber. Asphaltic, creosote, or field treatment for rot resistance are not acceptable.
- B. Wood nailers are required at the following locations:
 - Where parapet walls or adjoining walls are not present to serve as insulation stops;
 - Where sheet metal is used and not fastened directly to the metal roof deck;
 - Where sheet metal is used and the fastener spacing is greater than six (6") inches (152 mm) o.c. over the insulation (The minimum fastening rate for pitch pans is two (2) fasteners per flange);
 - Where specified in Section 2.24 Steep Slope Fastening Requirements of this specification and as specified in C, D, E, and F below.
 - At all locations as required by Soprema details or the Designer of Record.
- C. For roof slopes greater than two (2:12) inches per horizontal foot (17%) and less than three (3") inches per horizontal foot (25%), the wood nailers are spaced twenty-four (24') feet (7.3 m) on center.
- D. For roof slopes greater than three (2:12) inch per horizontal foot (25%) and less than six (6") inches per horizontal foot (50%), the wood nailers are spaced sixteen (16') feet (4.9 m) on center.
- E. For roof slopes greater than six (6:12) inch per horizontal foot (50%) and less than twelve (12") inches per



Section 2 - General Requirements

horizontal foot (100%), the wood nailers are spaced twelve (12') feet (3.7 m) on center.

- F. For roof slopes greater than twelve (12:12) inch per horizontal foot (100%) the wood nailers are spaced four (4') feet (1.2 m) on center.
- G. The Designer of Record shall specify that the attachment of wood nailers must resist a minimum of two hundred (200 lbs.) pounds (91 kg) of withdrawal per lineal foot in all directions. Fasteners that are used to attach wood nailers to the substrate must meet the corrosion resistance criteria of FM 4470.

2.20 - Roof Insulation/Coverboard

- A. The selection of insulation and/or coverboard as the substrate to receive the new Soprema roofing system are the responsibility of the Designer of Record. The Designer of Record is also responsible for selecting insulation and/or coverboard type and thickness but may not select types or thicknesses that are not acceptable to Soprema.
- B. Soprema reserves the right to accept or reject any roof insulation and/or coverboard as a suitable substrate for attachment of a Soprema roofing system. Sprayed-in-place polyurethane foam and Phenolic Foam are not acceptable substrates to receive a Soprema roofing system.
- C. The roof insulation and/or coverboard must be manufactured for use as a roof insulation and must be able to withstand foot traffic without crushing.
- D. Roof insulation must have the integral strength necessary to span the flutes on metal deck. Contact the insulation manufacturer for flute spanability guidelines.
- E. All thermal roof insulations manufactured in four feet (4'x8') by eight feet (1.2 m x 2.4 m) size must be mechanically fastened in accordance with Soprema requirements.
- F. Mechanical fastening of insulation, whether it be the thermal insulation or the coverboard, shall be increased by fifty (50%) percent on the perimeter and seventy-five (75%) percent in the corners. The perimeter and corner dimensions shall be the lesser of forty (40%) percent of the building height or ten (10%) percent of the building's lesser plan dimension. The minimum dimension for the perimeter and corners is six (6') feet (1.8 m). Successive layers of insulation may be hot asphalt or cold adhesive attached to a mechanically fastened base layer. Additional fastening may be required in the corners to accommodate building code or insurance requirements.
- G. All thermal roof insulations that are hot asphalt attached, either full mopping or strip mopping, or cold adhesive attached, either fully bonded or ribbon stripped, shall be no larger than four feet (4'x4') by four feet (1.2 m x 1.2 m) unless approved in writing by the Soprema Technical Department prior to the job start. Hot asphalt strip mopping is not acceptable on the perimeter or in the corners of the building. Hot asphalt or cold adhesive attachment of insulation is not permitted directly to vapor barriers with a burn-off film on the top surface.
- H. Cold adhesive attachment of insulation, whether it be the thermal insulation or a coverboard, shall be increased by fifty (50%) percent on the perimeter and seventy-five (75%) percent in the corners. The perimeter and corner dimensions shall be the lesser of forty (40%) percent of the building height or ten (10%) percent of the building's lesser plan dimension. The minimum dimension for the perimeter and corners is six (6') feet (1.8 m). Cold adhesive attachment of insulation directly to metal decks is not permitted unless approved in writing by the Soprema Technical Department prior to the job start.
- I. Contact the authority having jurisdiction regarding R-value requirements to comply with building and/or energy codes.

Section 2 - General Requirements

2.20.1 - Roof Insulation/Coverboard - Minimum Criteria & Restrictions

- A. The listed insulation thicknesses are minimums in a fully supported application. Refer to the insulation manufacturer's literature for maximum flute spanability over metal deck.
- B. All insulations must be UL Classified and FM Approved.
- C. The following insulation/coverboard requirements only represent what is necessary for the assembly to qualify for a Soprema Limited Warranty. Additional requirements may be necessary in order for a qualified assembly to meet building code criteria. Contact the Soprema Technical Department to confirm agency compliance of an entire assembly before bidding or installation of the system begins.
- Polyisocyanurate must meet the ASTM C 1289 standard, Type II, Class 1. The minimum thickness is one and one-half (1½") inch (38 mm) for flat stock and one-half (½") inch (13 mm) for tapered systems on all fully adhered systems. The minimum thickness is one and one-quarter (1¼") inch (32 mm) for flat stock and one-half (½") inch (13 mm) for tapered systems on Flagon systems. Soprema does not require a coverboard for mechanically attached single ply systems, however, a coverboard may be required to meet building code criteria.
 - Perlite/Polyisocyanurate Composite must meet the ASTM C 1289 standard for the polyisocyanurate and the ASTM C 728 standard for the perlite. The minimum thickness is one and one-half (1 ½") inch (38 mm) for flat stock and one (1") inch (25 mm) for tapered systems. The insulation must be installed with the perlite side up. If the composite is installed with the perlite side down, then the coverboard requirements described above in "Polyisocyanurate" would apply.
 - Expanded Polystyrene (EPS) must meet the ASTM C 578 standard. The minimum thickness is one (1") inch (25 mm) for flat stock and one-half (½") inch (13 mm) for tapered systems. The minimum density is one (1 lb.) pound (0.45 kg). For mechanically fastened or fully adhered systems, an acceptable coverboard is required. Acceptable coverboards for mechanically fastened systems would be wood fiber, perlite or acceptable gypsum. Acceptable coverboards for adhered systems would be wood fiber or acceptable gypsum.
 - Perlite/Expanded Polystyrene Composite must meet the ASTM C 578 standard for the EPS and the ASTM C 728 standard for the perlite. The minimum thickness is one and one-half (1 ½") inch (38 mm) for flat stock and one (1") inch (25 mm) for tapered systems. The minimum density for the EPS is one (1 lb.) pound (0.45 kg). The composite may be installed with the perlite side up or down. If the composite will be installed with the perlite side down, then the coverboard requirements described above in "Expanded Polystyrene" would apply. If the composite will be installed with the perlite side up, then a coverboard is not required for mechanically fastened systems. See Expanded Polystyrene (EPS) paragraph above if Soprema High Velocity Insulation Adhesives will be used to adhere the EPS or adhere a coverboard to the EPS.
 - Wood Fiber/Expanded Polystyrene Composite must meet the ASTM C 578 standard for the EPS and the ASTM C 208 standard for the wood fiber. The minimum thickness is one and one-half (1 ½") inch (38 mm) for flat stock and one (1") inch (25 mm) for tapered systems. The minimum density for the EPS is one (1 lb.) pound (0.45 kg). The composite must be installed with the wood fiber side up. See Expanded Polystyrene (EPS) paragraph above if Soprema High Velocity Insulation Adhesives will be used to adhere the EPS.
 - High density wood fiberboard insulation must meet ASTM C 208 standards. Minimum thickness is seven-sixteenth (7/16") inch (11 mm).
 - Perlite must meet the ASTM C 728 standard. The minimum thickness is three-quarter (¾") inch (19 mm). Perlite may only be adhered with hot asphalt and may not be adhered with any urethane based adhesive. Perlite may only be used as a coverboard with mechanically fastened systems.



Section 2 - General Requirements

- Cellular glass insulation must meet ASTM C 552 standards. Minimum thickness is one (1") inch (25 mm). For mechanically fastened or fully adhered applied single ply systems, an acceptable coverboard is required. Acceptable coverboards for fully adhered applied systems would be wood fiber or glass-faced gypsum. For mechanically fastened single ply systems, acceptable coverboards would be wood fiber or an acceptable gypsum.
- Glass-faced gypsum coverboard must meet ASTM C 1177 standards. Minimum thickness is one-quarter ($\frac{1}{4}$ " inch (6.4 mm). As a coverboard over thermal insulation, glass-faced gypsum may be pre-secured, mechanically anchored, adhered with acceptable asphalt, or adhered with acceptable cold adhesive. As a thermal barrier installed below the thermal insulation and/or roof membrane, the minimum thickness is one-half ($\frac{1}{2}$ " inch (13 mm).
- Unfaced gypsum coverboard must meet ASTM C 1278 standards. Minimum thickness is one-quarter ($\frac{1}{4}$ " inch (6.4 mm). As a coverboard over thermal insulation, unfaced gypsum may be pre-secured, mechanically anchored, adhered with acceptable asphalt, or adhered with acceptable cold adhesive. As a thermal barrier installed below the thermal insulation and/or roof membrane, the minimum thickness is one-half ($\frac{1}{2}$ " inch (13 mm).
- Extruded Polystyrene must meet ASTM C 578, Type VI minimum standards. If the extruded polystyrene insulation is used below the roof membrane, then the same coverboard requirements listed for EPS apply. All extruded polystyrene insulation used on top of the roofing membrane must be covered with an acceptable filter fabric and a minimum of ten (10 lbs.) pounds per square foot (48.8 kg/m²) of acceptable ballast with additional ballast in the perimeter and corners per the insulation manufacturer's specifications. To assist in draining the roof, channel cut insulation may be installed in lieu of standard Type VI described herein.
- Extruded Polystyrene/Mortar faced laminate, minimum thickness is two (2") inches (51 mm). The extruded polystyrene must meet ASTM C 578 standards and have a minimum density of two-point-two (2.2 lbs.) pounds per cubic foot (35.3 kg/m³). The mortar facing must be a latex modified mortar between three-eighths ($\frac{3}{8}$ " inch (9.5 mm) and fifteen-sixteenths ($\frac{15}{16}$ " inch (24 mm) thick. The extruded polystyrene/mortar faced laminate may only be used in a Protected Membrane Roof (PMR) design and may not be used under the modified bitumen roofing system.

2.20.2 - Roof Insulation Attachment

- A. Roof insulation must be positively attached over an acceptable substrate. The insulation shall be attached in accordance with the requirements of the Designer of Record. Local building codes, insurance underwriters, and other authorities having jurisdiction may have additional fastening requirements to satisfy separate criteria.
- B. Refer to Approved Details of this specification for insulation fastening patterns and densities.

2.20.3 - Mechanical Attachment Of Insulation

- A. All mechanical fasteners and plates used to attach insulation/coverboard must meet the corrosion resistance requirements of the authority having jurisdiction and Soprema.
- B. Mechanical fasteners used to anchor insulation to a roof deck are subject to the following minimum penetration requirements. Fastener penetration is measured from the top surface of the deck and includes the tapping point of the fastener.
 - Steel Deck - three-quarter ($\frac{3}{4}$ " inch (19 mm)
 - Concrete Deck - one (1") inch (25 mm)
 - Wood Plank Deck - three-quarter ($\frac{3}{4}$ " inch (19 mm)

Section 2 - General Requirements

- Plywood Deck - three-quarter ($\frac{3}{4}$ ") inch (19 mm)
 - Structural Wood Fiber Decks - one (1") inch (25 mm)
 - Poured-In-Place Gypsum & Gypsum Plank Decks - one (1") inch (25 mm)
 - Poured-In-Place Lightweight Insulating Concrete Decks (LWIC) - one (1") inch (25 mm)
 - Poured-In-Place Lightweight Insulating Cellular Concrete Decks (LWICC) - one (1") inch (25 mm)
- C. Presecurement of insulation is required on Flagon systems. Refer to Section 2.20.6 and the Approved Details of this specification for insulation fastening patterns and densities.
- D. Nail attachment of roofing insulation to a nailable deck is not acceptable.

2.20.4 - Hot Asphalt Attachment Of Insulation

- A. Hot asphalt may be used to attach insulation to: concrete roof decks; vapor barriers on concrete roof decks; mechanically fastened thermal barriers on metal roof decks; vapor barriers on mechanically fastened thermal barriers; and mechanically fastened base sheets over an acceptable roof deck. Hot asphalt may also be used to attach acceptable coverboards to thermal insulation.
- B. The following is required for hot asphalt attachment of insulation:
- The specified insulation must be approved for asphalt attachment by the insulation manufacturer.
 - The Designer of Record must specify asphalt attachment.
 - The insulation must be attached with ASTM D 312 Type IV asphalt or ASTM D 6152 SEBS Type IV SEBS asphalt.
 - The specified insulation must be compatible with the roof deck, specified asphalt, and Soprema requirements.
- C. When insulation and coverboards are thicker than three-quarter ($\frac{3}{4}$ ") inch (19 mm), the maximum acceptable board dimensions are four feet (4'x4') by four feet (1.2 m x 1.2 m). Coverboards one-half ($\frac{1}{2}$ ") inch (13 mm) or less can be installed in four foot (4' x 8') by eight foot (1.2 m x 2.4 m) dimensions.
- D. Hot asphalt attachment of extruded or expanded polystyrene insulation is not permitted unless the asphalt is permitted to cool to between two hundred and twenty-five and two hundred and fifty (225° to 250° F) degrees Fahrenheit (107° to 121° C) before placement of maximum four (4") inch (102 mm) thick by four (4') feet (1.2 m) square board size. When a coverboard is backmopped to the polystyrene, the asphalt must be permitted to cool to the same temperature range as above.

2.20.5 - Cold Adhesive Attachment Of Insulation

- A. Low rise urethane foam adhesives, such as Soprema High Velocity Insulation Adhesive II (HVIA II) and High Velocity Insulation Adhesive III (HVIA III) may be used to attach insulation to concrete, gypsum, cementitious wood fiber and wood decks. HVIA II and HVIA III may also be used to attach thermal insulation to vapor retarders and coverboards to thermal insulation. HVIA II and HVIA III may not be used to attach insulation to steel decks without prior written approval from the Soprema Technical Department.
- B. Acceptable insulation, coverboards, as well as their minimum thicknesses, and acceptable vapor retarders, are as follows:
- Sopraboard - one-eighth ($\frac{1}{8}$ ") inch (3.2 mm)
 - High Density Wood Fiberboard - one-half ($\frac{1}{2}$ ") inch (13 mm)
 - Acceptable Gypsum - one-quarter ($\frac{1}{4}$ ") inch (6.4 mm)
 - Polyisocyanurate - one and one-half (1 $\frac{1}{2}$ ") inch (38 mm)
 - Polystyrene - one (1") inch (25 mm)
 - Vapor Retarders - all Soprema sand or granule surfaced modified bitumen sheets, Sopra-G, Modified



Section 2 - General Requirements

Sopra-G, Sopra IV, Sopra VI, Soprabase, Sopraglass, and acceptable ASTM D 4897 base sheets.

- C. The minimum HVIA II and HVIA III ribbon size is one-half ($\frac{1}{2}$ " inch (13 mm) to three-quarter ($\frac{3}{4}$ " inch (19 mm). A larger ribbon size may be required to provide positive contact between the substrate and the acceptable thermal insulation or coverboard.
- D. The standard HVIA II and HVIA III ribbon pattern is twelve (12") inches (305 mm) on center. More frequent ribbon spacing may be required on the perimeter and in the corners of the roof as determined by the most current American Society of Civil Engineers (ASCE) Design Calculation Document or the authority having jurisdiction. Contact Soprema for acceptable insulations and patterns for Wind Rider Warranty projects.
- E. When insulation and coverboards are thicker than three-quarter ($\frac{3}{4}$ " inch (19 mm), the maximum acceptable board dimensions are four feet (4'x4') by four feet (1.2 m x 1.2 m). Coverboards one-half ($\frac{1}{2}$ " inch (13 mm) or less can be installed in four foot (4'x8') by eight foot (1.2 m x 2.4 m) dimensions.

2.20.6 - Presecurement Of Insulation

- A. For Soprema roofing systems where the single ply membrane is mechanically fastened, presecurement of the thermal insulation and/or coverboard is required. If both thermal insulation and a coverboard are specified, then only the top layer needs to be presecured.
- B. The thermal insulation/coverboard is presecured at the rate of two (2) fasteners and plates for boards measuring two foot (2'x4') by four foot (610 mm x 1220 mm), four (4) fasteners and plates for boards measuring four foot (4'x4') by four foot (1.2 m x 1.2 m), and six (6) fasteners and plates for boards measuring four foot (4'x8') by eight foot (1.2 m x 2.4 m) or greater.

2.20.7 - Thermal Barriers

- A. A thermal barrier between the insulation and the roof deck may be required by the local building code. Contact the authority having jurisdiction to determine thermal barrier requirements.
- B. Thermal barriers are subject to the same mechanical fastening requirements as thermal insulation if insulation and roofing membrane will be adhered to the thermal barrier. Thermal barriers may be fastened independently or fastened with a common fastener for the entire insulation/thermal barrier assembly.

2.21 - Anchor Sheet Attachment Over Insulation or LWIC

- A. Anchor sheet(s) which are attached to the structural deck and are used to attach insulation systems, whether they are fiberglass or SBS sheet(s), mechanically attached or adhered. Applications must be accepted in advance by the Soprema Technical Department. Approved fiberglass anchor sheets are Sopra G or Modified Sopra G or any alternative product included in Soprema's current agency or building code approvals. Approved SBS anchor membranes are Elastophene 180 Sanded, Sopralene 180 Sanded, or Sopralene 180 SP.
- B. Whether mechanically attached, heat welded, cold adhered, or hot attached (see individual application procedure in the Soprema Technical Specification Manual for Modified Bitumen Systems), the base sheet or membrane must have a minimum three (3") inch (76 mm) side lap and a six (6") inch (152 mm) end lap. After installation of the base sheet or base membrane, and before the application of the insulation system, all fishmouths, ridges, and voids must be repaired and/or replaced.

2.21.1 - Anchor Sheet Application

- A. This applies to base sheets, either fiberglass or SBS, that are mechanically attached or adhered directly to the structural deck and are used to directly attach membrane systems to the structural deck system. Approved fiberglass anchor sheet(s) are: Sopra-G, Modified Sopra-G Soprabase, Sopra 4897, or any

Section 2 - General Requirements

alternative product included in Soprema's current agency or building code approvals. Approved SBS base membranes are: Elastophene 180 Sanded, Elastophene 180 PS, Sopralene 180 Sanded, Sopralene 180 SP 3.5 mm, or Sopralene 180 SP. Applications must be accepted by the Soprema Technical Department in advance. If mechanically fastened, care must be taken not to over tighten or overdrive the fastener through the fiberglass base sheet.

2.22 - Base Sheet Used As Temporary Or Dry-In Roofing

- A. It is not advisable to use only one (1) ply of fiberglass base sheet as a temporary roof. The minimum anchor sheet or base sheet configuration to qualify for use as a temporary or dry-in roof are two (2) plies of Sopra IV, Sopra VI, or Sopra-G applied in hot asphalt or one (1) ply of SBS base membrane applied by heat welding, hot asphalt or cold adhesive. The following guidelines apply: a) the application must be accepted prior to the installation and b) the time limit for two (2) fiberglass plies is one week and the time limit for one (1) ply of SBS membrane is one (1) month.* A glaze coat is required when the temporary roof is made with fiberglass base or ply sheets.

*The film surfacing on some SBS base membranes may be subject to releasing from the membrane if exposed to ultraviolet light for as little as two weeks. Left unattended, this may result in the temporary clogging of internal roof drains under certain conditions. If exposure of the temporary roof is anticipated to be longer than two weeks, then a high brush sanded base membrane should be used.

- B. When a base sheet or base ply membrane is used as a dry-in sheet prior to the application of a new LWIC or LWICC pour, and Soprema does not know the pressure design of the existing structural decking; the pressure design of the existing LWICC; or the fastener securement ability into the existing LWICC. Consequently, Soprema's Wind Rider only applies to the new roof assembly, i.e. the new mechanically fastened base sheet into the new LWICC, new mopped insulation (if applicable), and the SBS membrane plies. Any deviation from this must be accepted, in writing by the Soprema Technical Department, prior to bid.

2.23 - Single Ply Membrane Attachment

- A. Soprema single ply membranes shall be installed over either an acceptable insulation or coverboard. Acceptable insulations and coverboards are listed in section 2.20 of this specification.
- B. Mechanically fastened single ply membrane side laps shall be six (6") inches (152 mm) and end laps shall be no less than two (2") inches (51 mm).
- C. Fully adhered single ply side laps and end laps shall be no less than two (2") inches (51 mm).

2.23.1 - In-Seam Mechanical Attachment Of Single Ply Membranes With Screw Fasteners & Disks (Flagon MA)

- A. Fastener frequency for in-seam mechanical attachment of single ply membranes with screws and plates will vary depending on the system design, the wind resistance requirements of the project, and the roof deck. Additional rows of fasteners and plates in the field, perimeter, and corners in the width of the sheets will be dependant on the same factors as above. Refer to the Approved Details section of this specification for in-seam base membrane fastening patterns and densities.
- B. Refer to Section 2.20.6 - "Presecurement of Insulation" for insulation presecurement requirements.
- C. Fasteners and plates for in-seam fastening must be provided by Soprema.
- D. As an alternate, in-seam mechanical attachment may be accomplished with Soprema metal or polymer batten bars. Refer to the Approved Details section of this specification for in-seam single ply membrane fastening patterns and densities.



Section 2 - General Requirements

2.23.2 - Fully Adhered Attachment of Single Ply Membranes

- A. Fully adhered single ply membranes shall be installed with the appropriate adhesive to an acceptable substrate. The insulation Fastener frequency for attachment of insulation and/or coverboard with screws and plates will vary depending on the system design, the wind resistance requirements of the project, and the roof deck. Additional fastening with screws and plates in the field, perimeter, and corners in the width of the sheets will be dependant on the same factors as above. Refer to the Approved Details section of this specification for in-seam single ply membrane fastening patterns and densities.
- B. Both standard and fleeceback single ply membranes may be used in a fully adhered designs.

2.23.2.1 - Fully Adhered Attachment of Soprema Flagon TPO - Non-Fleeceback

- A. Apply Soprema TPO Bonding Adhesive at the rate specified in the applicable Product Data Sheet to an acceptable substrate and the back side of the TPO. Allow the adhesive to flash off until it is tacky to the touch of a clean, dry knuckle. Mate the adhesive surfaces avoiding wrinkles or fishmouths in the membrane. Broom the surface to insure intimate contact between the adhesive surfaces.

2.23.2.2 - Fully Adhered Attachment of Soprema Flagon TPO - Fleeceback

- A. Apply Soprema TPO Bonding Adhesive at the rate specified in the applicable Product Data Sheet to an acceptable substrate. Roll in the Flagon TPO while the adhesive is still wet. Broom the surface to insure intimate contact between the adhesive surface and the membrane.

2.23.2.3 - Fully Adhered Attachment of Soprema Flagon PVC - Non-Fleeceback

- A. Apply Soprema PVC Bonding Adhesive at the rate specified in the applicable Product Data Sheet to an acceptable substrate and the back side of the PVC. Roll in the Flagon PVC while the adhesive is still wet. Broom the surface to insure intimate contact between the adhesive surface and the membrane.

2.23.2.4 - Fully Adhered Attachment of Soprema Flagon PVC - Fleeceback

- A. Apply Soprema PVC Bonding Adhesive at the rate specified in the applicable Product Data Sheet to an acceptable substrate. Allow the adhesive to flash off until it is tacky to the touch of a clean, dry knuckle. Mate the adhesive surfaces avoiding wrinkles or fishmouths in the membrane. Broom the surface to insure intimate contact between the adhesive surfaces.

2.24 - Steep Slope Fastening Requirements

- A. Additional membrane fastening is not required for roofs with slopes of three (3:12) inch per horizontal foot (25%) or less.
- B. For roof slopes greater than two (2:12) inches per horizontal foot (17%) the single ply membranes should be applied with the length of the base sheet parallel to the slope of the roof.
- C. All fastening into wood blocking shall be accomplished with annular ring or spiral shank nails with one (1") inch (25 mm) diameter heads and a minimum of one (1") inch (25 mm) in length. As an alternate, (1") inch (25 mm) diameter heads and a minimum of one (1") inch (25 mm) in length. As an alternate, fastening may be accomplished with Soprema Soprafix plates and fasteners.
- D. On steep sloped roofs where additional fastening is required, wood nailers with minimum nominal dimensions of two inches (2" x 4") by four inches (51 mm x 102 mm) shall be installed perpendicular to the roof slope. The wood nailers shall match the thickness of the insulation and be installed in accordance with section 2.19 of this specification. As an alternate, shop fabricated metal channels may be used in lieu of wood nailers to achieve blocking requirements.

Section 2 - General Requirements

2.24.1 - Flagon Mechanically Fastened or Fully Adhered Single Ply Membranes

- A. For roof slopes greater than two (2:12) inches per horizontal foot (17%) and less than three (3:12) inches per horizontal foot (25%), no additional fastening is required.
- B. For roof slopes greater than three (3:12) inches per horizontal foot (25%) and less than six (6:12) inches per horizontal foot (50%), single ply membranes shall be fastened with four (4) equally spaced fasteners at a wood nailer spacing of sixteen (16') feet (4.9 m) on center.
- C. For roof slopes greater than six (6:12) inches per horizontal foot (50%) and less than twelve (12") inches per horizontal foot (100%), single ply membranes shall be fastened with four (4) equally spaced fasteners at a wood nailer spacing of twelve (12') feet (3.7 m) on center.
- D. For roof slopes greater than twelve (12:12) inch per horizontal foot (100%) single ply membranes shall be fastened with four (4) equally spaced fasteners at a wood nailer spacing of four (4') feet (1.2 m) on center.

2.25 - Protected Membrane Roof (PMR) Assemblies

- A. All information within this section shall be considered as part of the PMR specification.
- B. All flashing must conform to the requirements stated within this section. The flashing material must extend a minimum of eight (8") inches (203 mm) above the extruded polystyrene insulation.
- C. Extruded polystyrene insulation boards shall be installed with drainage channels down. If the styrene has a ribbed surface, then the board shall be installed with the ribbed surface up.
- D. A filter fabric is required between the extruded polystyrene and the ballast. Acceptable filter fabrics would include, but not be limited to, Soprema Sopra Filter Fabric TXC-75.
- E. In order to provide proper protection against wind uplift of the insulation, all ballast shall be of appropriate size and weight. The Designer Of Record is responsible for the ballast design and selection on a specific installation. The weight of the ballast must be considered when determining the structure's capability to support the load of the completed roof installation, as well as other expected loads. Soprema assumes no responsibility for conducting structural analysis and strongly recommends that a design professional make this determination prior to starting the project.
- F. The stone ballast shall be free of dirt, sand, and other foreign matter and be water worn with smooth rounded edges. The stone ballast shall conform to ASTM D 448, size #4 using ASTM C 136 method of testing. The stone ballast shall be nominal three-quarter ($\frac{3}{4}$ ") inch to one and one-half ($1 \frac{1}{2}$ ") inch (19 to 38 mm) diameter stone. The ballast is applied at a minimum rate of approximately ten (10) to twelve (12) pounds (48.8 to 58.6 kg/m²) per square foot in the field of the roof and over the polystyrene insulation and a layer of filter fabric. The ballast is applied at a minimum rate of approximately twenty (20 lbs/ft²) pounds per square foot (97.6 kg/m²) over a four (4') foot (1.22 m) wide area at the roof perimeter and around all penetrations.
- G. Pavers with a smooth metal trowel finish may be used in lieu of ballast and shall be applied at a minimum rate of not less than fifteen (15 lbs/ft²) per square foot (6.8 kg/m²). Pavers or concrete blocks shall be of the type that will be resistant to long term weathering. The pavers shall be spaced a maximum of one-half ($\frac{1}{2}$ ") inch (13 mm) apart. Pavers must be positioned on supports or pedestals. The supports or pedestals may be six (6") inch (152 mm) squares of Soprema Soprawalk or other commercially available products designed for this purpose. These supports shall be located at the intersections of the corners of the pavers, i.e. where the four corners meet, where all four pavers rest on the same square of support or pedestal. A filter fabric, such as those described above, is required between the polystyrene insulation and the paver supports. As an alternate to pedestals, extruded polystyrene with ribs on the top surface and channels on the bottom surface,



Section 2 - General Requirements

may be used.

- H. Interlocking pavers weighing a minimum of ten (10 lbs/ft²) pounds per square foot (48.8 kg/m²), which have documented proof of performance for wind and weather resistance, may be used. This factory engineered paver system shall have a minimum performance warranty from the system manufacturer equal to the Soprema warranty. A filter fabric, such as those described above, is required between the polystyrene insulation and the paver supports.
- I. Crushed stone ballast is permitted when it is free of excessive fractures, dirt, and other foreign matter. Crushed stone shall be durable and meet the following physical testing requirements:
 Specific Gravity: Minimum 2.4 mg/m² using ASTM C 127 test method.
 Impact Resistance: Maximum 40% weight loss using ASTM C 535 and C 131 test methods.
 Soundness: Maximum 12% weight loss with sodium sulfate and ASTM C 88 test method. Maximum 18% weight loss with magnesium sulfate and ASTM C 88 test method.
- J. Ten pounds (10 lbs/ft²) per square foot (48.8 kg/m²) will not provide adequate ultraviolet protection for the filter fabric if stone larger than ASTM D 488, size #4 is used. The following chart provides information regarding minimum coverages for several common ballast sizes:

<u>ASTM Size Number</u>	<u>Nominal Size</u>	<u>Minimum Acceptable Coverage</u>
4	¾" to 1 ½" (19 to 38 mm)	10 lbs/ft ² (48.8 kg/m ²)
357	¾" to 2" (19 to 51 mm)	10 lbs/ft ² (48.8 kg/m ²)
3	1" to 2" (25 to 51 mm)	10 lbs/ft ² (48.8 kg/m ²)
24	¾" to 2 ½" (19 to 64 mm)	11 lbs/ft ² (53.7 kg/m ²)
2	1 ½" to 2 ½" (38 to 64 mm)	13 lbs/ft ² (63.4 kg/m ²)
1	1 ½" to 3 ½" (38 to 89 mm)	16 lbs/ft ² (78 kg/m ²)

- K. Precast and prestressed concrete decks, including single and double "T's" require a minimum of one layer of acceptable insulation as a leveling course prior to the installation of the roof system.
- L. When installing a PMR system over a steel or wood deck, the Designer Of Record is responsible for determining whether or not a thermal barrier is required by local building codes.

2.26 - Flashing

- A. To properly seal the edges of a roofing system, a flashing system is required at all roof penetrations and perimeters.
- B. The designed flashing height on new construction shall be a minimum of eight (8") inches (203 mm) above the surface of the roof. In all cases, the designed flashing height shall be higher than the potential water level that may be encountered as a result of a torrential rain. Exception: The required minimum height for penetration pockets is four (4") inches (102 mm) above the surface of the roof.
- C. Flashing height can not exceed twenty-four (24") inches (610 mm) without additional design considerations. Additional design considerations would include supplemental fastening of the flashing material. Caution: The roofing applicator must be certain that the new flashing material is not being installed over weep holes, existing through wall flashings, or overflow scuppers.
- D. Through-wall flashings are recommended on all masonry walls. When through-wall flashings are not incorporated in to the design of the masonry wall, the top of the masonry wall must be protected with water resistant metal or stone coping.

Section 2 - General Requirements

- E. Termination bars are an acceptable method for flashing terminations. Termination bars shall be fastened twelve (12") inches (305 mm) on center as a maximum but must be fastened at whatever spacing is necessary to provide continuous compression to the top of the flashing material.
- F. Reglet mounted counter flashings are recommended at adjoining walls. Reglets may also be used on parapet walls where through-wall flashings have not been incorporated in to the design of the roof.
- G. As an alternate, surface mounted counter flashing may be used in lieu of reglet mounted counter flashing. The contact point of the surface mounted counter flashing shall provide a constant seal and the surface above the counter flashing must be a watertight closure.
- H. A metal or stone coping is required when flashing extends to the wood nailer at the top of a parapet wall or over the top of a parapet. When the flashing does not extend over the top of a parapet wall, and the specified metal termination or counter flashing cannot be installed the same day, the top edge of the base flashing must receive a temporary night seal. All temporary night seal materials must be removed prior to heat welding the flashing cap sheet.
- I. External insulated finishing systems, stucco, cobblestone, textured masonry, corrugated metal panels, certain types of gypsum boards and other uneven or decorative surfaces are not suitable substrates to receive flashing. Uneven surfaces shall be covered with an overlay of one-half (½") inch (13 mm) thick exterior grade plywood and a mechanically fastened base sheet. Base sheet fastening shall be done in accordance with "Approved Details" of this specification. Textured surfaces shall be covered with acceptable Gypsum board. All overlays shall be firmly fastened to underlying structural members and covered with the specified base sheet.
- J. The top of all flashing located under counter-flashing shall be fastened six to eight (6"-8") inches (152-203 mm) on center with fasteners specified in the Approved Details section of this specification.
- K. All existing flashing shall be removed prior to the installation of new flashing material.
- L. Penetration pockets are not recommended by Soprema. Penetration pockets are considered a maintenance item and are not covered under the terms and conditions of the Soprema Warranty. If penetration pockets must be used, then there must be a minimum of one (1") inch (25 mm) of clearance between penetrations and between penetrations and the sides of the pocket.
- M. For alternate flashing methods, refer to the Approved Details section of this specification.
- N. The Federal Emergency Management Agency (FEMA) has published a document titled "Rooftop Attachment of Lightning Protection Systems in High-Wind Regions." The FEMA recommendations, as well as the Soprema guidelines for anchoring the recommended cover strips are as follows:

The FEMA guidelines recommend that lightning protection system cables be covered with a nine (9") inch wide strip of membrane. Further, FEMA recommends that the strips be installed in approximately three (3') foot (1 m) sections with a gap of three (3") inches (76 mm) between each section

- Soprema will permit lightning protection systems (LPS) to be installed according to these guidelines with the following conditions and limitations:
- The three (3') foot (1 m) long and nine (9") inch (229 mm) wide strips must be heat welded directly to the single ply roof membrane.
- The cover strips may not be installed directly over the length of membrane side laps or end laps. If the lightning protection system cable intersects membrane side laps or end laps, then there must be a minimum of three (3") inches (76 mm) of clearance on each side of the exposed lap.



Section 2 - General Requirements

Following the FEMA guidelines will not have an impact on the UL Certification of the lightning protection system. The anchoring of the LPS in this manner, as well as the standard methods, will not be covered by the Soprema Warranty.

2.27 - Roof Walkways

- A. Soprema recommends the installation of an additional layer of membrane or SopraTrak or SopraTrak II (TPO or PVC respectively) walkways on roofs that will be subjected to regular foot traffic. The extra layer of protection is recommended at all access points and to and from rooftop equipment that is serviced more frequently than monthly.
- B. SopraTrak, or an additional layer of membrane, shall be spot heat welded directly to the single ply membrane. Soprema recommends eight (8) spot welds per five (5') foot (1.5 m) length. The heat welds shall be two (2") inches (51 mm) square with half of the welds at the four corners and half of the welds between the four corners. Walkways should be no longer than five (5') feet (1.5 m) in length and shall have a four (4") inch (102 mm) gap between sections to permit drainage.
- C. Walkways are considered a maintenance item and walkway attachment is not covered by the Soprema Warranty. The building owner is responsible for walkway maintenance.
- D. Walkways with sleepers shall have a sacrificial piece of membrane under each sleeper. The sacrificial piece of membrane shall measure a minimum of two (2") inches (51 mm) wider than the sleeper in all directions.

2.28 - Metal Work

- A. All metal flashing shall be supported by wood nailers.
- B. Horizontal metal flanges for drip edges or gravel stops shall be a minimum of three and one-half (3 ½") inches (89 mm) wide and fastened four (4") inches (102 mm) on center. Overlaps in metal shall be a minimum of three (3") inches (76 mm) wide. All gravel stops or eve strips should be manufactured from an accepted (see "H" below) minimum gauge metal.
- C. All factory fabricated metal shall be installed in accordance with the manufacturer's instructions.
- D. All shop fabricated metal shall be installed in accordance with the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) or SPRI ES-1. Refer to these documents for specifics not addressed in this section or in the Approved Details section of this specification.
- E. Metal flashing material, and the fasteners used to fasten the metal, shall be made out of the same metal.
- F. The vertical face of metal counter-flashing shall be a minimum of four (4") inches (102 mm) with a minimum one-half (½") inch (13 mm) thirty (30°) degree bend drip edge. The bottom edge of the metal counter-flashing shall cover the top of the membrane flashing a minimum of three (3") inches (76 mm). Metal counter-flashing shall be fastened twelve (12") inches (305 mm) on center, or as frequently as necessary to provide continuous compression, and fasteners shall be watertight. Metal counter flashing assemblies should be a two-piece design with the bottom edge of the metal extending a minimum of three (3") inches (76 mm) beyond the base flashing fasteners.
- G. All roof top utilities piping must be set on wood blocking or other acceptable support. The wood blocking or acceptable support must be set on a loose layer of single ply membrane or SopraTrak. The sacrificial cushion layer shall be a minimum of two (2") inches (51 mm) larger than the wood blocking, or acceptable support, in all directions.
- H. When specification shop formed metal is proposed to be warranted by Soprema, the roofing contractor is

Section 2 - General Requirements

responsible to submit either specification metal details or roofing contractor proposed shop drawings to Soprema's Technical Department for review and possible approval prior to bidding and installation. All other related roofing components must meet, or exceed, Soprema's standards, SMACNA's Architectural Sheet Metal Manual Fifth Edition, American National Standard Institute (ANSI) Single Ply Roofing Institute (SPRI) ES 1-98 "Wind Design Standard for Edge Systems Used With Low-slope Roofing Systems", National Roofing Contractor's Association Roofing and Waterproofing Manual Fifth Edition requirements or the Florida Building Code - Test Protocol HVHZ Roofing Application Standard (RAS) No. 111, "Standard Requirements for Attachment of Perimeter Wood Blocking and Metal Flashing" requirements or recommendations with the most stringent requirements or recommendations prevailing. In addition, proof of purchase of an acceptable factory applied coating of the flat stock must be submitted upon request. If stainless steel is specified by the Designer of Record, proof of purchase of the flat stock must be submitted upon request.

- I. Metal coping must have a minimum face dimension of three (3") inches (76 mm) with a drip edge or hemmed edge on either side. The attachment of the coping system should be to both the inside and outside faces of the wall. Coping end laps shall be made watertight by using a double bead of urethane sealant under a minimum four (4") inch (102 mm) overlap of the coping or a minimum eight (8") inch (203 mm) wide cover plate.

2.29 - Test Cuts

- A. Soprema does not recommend destructive test cut on newly installed roofing systems. Should test cuts be required by the Designer of Record or some other purpose, Soprema recommend ASTM procedures D 2829 and D 3617 for collection of samples.

2.30 - Extreme Weather Application

2.30.1 - Cold Weather Application

- A. Soprema does not place any restrictions on the application of its fully adhered single ply systems at temperatures above forty (40°F) degrees Fahrenheit (4.4°C). Roof applications below this temperature require special measures to insure proper application of the roofing system. Below this temperature, the Soprema Bonding Adhesives used to fully adhere these systems will have extended drying times and potentially cause condensation of water on the adhesive film producing lower bond strength.
- B. Soprema does not place any restrictions on the application of its mechanically fastened single ply systems.
- C. For hot asphalt applied product applications below fifty (50° F) degrees Fahrenheit (10° C), all hot asphalt carriers must be insulated and monitored for the EVT tolerance and all rolls must be hand mopped with the mop not more than three (3') feet (1 m) from the leading edge of the membrane. The appropriate asphalt temperature shall be maintained during the installation of Soprema hot asphalt applied temporary roofs or dry-in roofing systems. Unless asphalt temperatures at the point of application can be maintained at four hundred and twenty-five (425°F) degrees Fahrenheit (219°C), or the asphalt EVT, asphalt and roof membrane application shall be discontinued during cold weather. During some cold weather installations, it may be desirable to cut the modified bitumen membrane into lengths between twelve (12') feet and eighteen (18') feet (3.7 m to 5.5 m).
- D. Application procedures may not begin, or continue, when water is present in any form on the roof deck. Any moisture or condensation that could cause poor adhesion, voids, or entrapment within the system must be removed from the roof deck before work begins or continues.

2.30.2 - High Humidity Application

- A. During periods of high humidity, combined with late hour or night roofing, the relative humidity will approach dew point during the application. Under these circumstances, all work must cease when the ambient



Section 2 - General Requirements

temperature is within five (5° F) degrees Fahrenheit (2.7° C) range of the dew point based on the relative humidity. If these conditions exist, high humidity with night or late hour roofing, the weather conditions should be monitored on a National Weather Service radio station or with weather instruments on the job.

2.31 - Practical Design Considerations

2.31.1 - Climate & Design

- A. It is generally held that designers, contractors, and Soprema may be exonerated from these extreme weather problems and consequences due to “acts of God.” However, it is recommended that known local weather extremes be brought to the attention of the owner by incorporating these conditions into the roofing assembly design by the design professional. It is for this reason Soprema has developed a series of climate map guides covering the following areas of hazard: wind, hail, snow, and ice load, heat and cyclic shock. These maps are available upon written request to the Soprema Corporate Technical Department.

2.31.2 - Wind Uplift Forces

- A. The standard for evaluation of any warranted project requiring FMG Class 1-60, 1-90, enhanced FMG uplift rating, or ASCE calculation, is for Soprema to receive the completed design review from the design professional. The information is to be extracted from FMG publications 1-28, 1-28R/1-29R, 1-29, 1-49, or ASCE 7-02 or the currently used ASCE Document. A large segment of the U.S. population is located in areas which exhibit localized extreme high wind isotachs (refer to the ASCE 50 year Wind Map) and attention must be paid to the exact location of each project when conducting wind force evaluations.

2.31.3 - Damaging Hail

- A. FMG, through its Class 1 approval program, has a procedure for testing the effects of dynamic puncture and incorporates this into the assembly approval. While this represents good qualification, it does not take into consideration a vast geographic portion of the U.S. landmass when viewed against the frequency and hail size maps presently available. The exact geographical location should be considered against the FMG hail storm map, Soprema Hail Map or equivalent map. When the site indicates a risk beyond FMG criteria, the design professional should provide the owner with a more hail resistant roofing assembly option. While expressly limited in all warranties, some Soprema systems provide superior long-term protection against hail than do other systems. Contact the Soprema Technical Department for more information.

2.31.4 - Snow & Ice Loads

- A. For single ply system construction, the design professional is responsible for evaluating the relative severity of the local snow and ice load. The Soprema criteria uses the ASCE 7-02 or the currently ASCE document ground snow load map. Based on this map, projects may be limited to single ply membrane systems, which feature superior resistance to the forces created by prolonged, excessive snow and ice loads.

2.31.5 - Extreme Temperature Fluctuations

- A. It is common knowledge that large scale thermally induced loads which occur at a higher than average frequency will affect the longevity of the roof system. Soprema has mapped the U.S. landmass for this dynamic stress loading produced by weather extremes. Although quantitative data has been used to create this mapping, a direct relationship to specific roofing systems is still not precise. The map is to be used as a general guideline in ascertaining which systems may perform better over the span of time as opposed to others. During the project registration process, some systems may be accepted or rejected at the sole discretion of Soprema due to these factors. Soprema does not recommend the coverboard or top layer of insulation to be mechanically fastened in cold weather climates because of thermal bridging.



Section 2 - General Requirements

2.31.6 - Ponding Water

- A. Ponding water is defined as roof areas holding water forty-eight (48) hours after rain when conditions are conducive to drying. As a general guideline, areas larger than three foot (3' x 3') by three foot (1 m x 1 m) and a minimum of one-quarter ($\frac{1}{4}$ ") inch (6.3 mm) deep, would be in need of remedial work to qualify for the Soprema Warranty. Standing water is defined as water that remains after this forty-eight (48) hour period. "bird baths" are expected and usually predictable.
- B. Under the Terms and Conditions of the Soprema Warranty, a Building Owner or the Designer Of Record must recognize that Soprema must either exclude ponding and standing water for a particular project or those areas must be treated under the Soprema ponding and standing water warranty provisions. Further they must recognize that any damage to the roof assembly and membranes due to improper maintenance according to the Soprema Repair and Maintenance Guide, i.e. clogged drains, installation of new curbs or other equipment that is placed directly in an existing waterway and/or severely blocks or stops the original roof drainage design at the time of the Soprema roof installation are excluded from Warranty coverage. Since dirt, algae, mold and other foreign materials can collect in ponded and standing water areas, the cosmetic appearance and apparent health risks associated with such areas of the roof are not the responsibility of Soprema, but rather the Building Owner or his Representative.
- C. The Building Owner or Representative, roofing contractor and a Soprema Field Technical Representative will meet on the roof immediately after, within forty-eight (48) hours, a rainstorm. The standing or ponding water areas will be spray-marked along with photo documentation. See currently Soprema Approved Details that depict how the ponding and standing water roof areas must be treated using Soprema liquid membrane.
- D. Note: Soprema requires the Owner to sign Addendum "A" - Ponding Water Agreement form when serious standing or ponding water exists on a soon-to-be warranted project.

2.32 - Project Performance Requirements

- A. It is the roofing contractor's responsibility to confirm that the roof assembly submitted on the Project Registration Form (PRF) complies with the performance requirements of the project specification, i.e. UL Class A, FM Class 1-90, or other building code or agency compliance prior to submission of the PRF to Soprema even if the assembly recommendation is made by Soprema. The Soprema Technical Department is available for consultation to confirm that the system that is specified meets the performance requirements that have been documented in the project specification.

2.33 - Warranties

- A. Limited Material Product Replacement Warranty - Soprema offers a limited material only warranty to protect the building owner against leaks that result from product manufacturing defects. The term of the warranty is ten (10) years.
- B. Standard No Dollar Limit (NDL) Roof Warranty - Soprema offers a variety of roof warranties covering roof assemblies. The terms of these warranties vary. Some of these warranties cover leaks resulting from defective material or defective installation. The fee associated with these types of warranties is based on the duration of the coverage and the specific components of the assembly included in the warranty coverage. Contact a Soprema sales representative in the region where your project is located for pricing on a project-by-project basis.
- C. Exceptions - Tie-ins to other roof assemblies and repairs made to existing roof assemblies will not be warranted by Soprema.
- D. Only specific Soprema personnel expressly authorized by Soprema management to modify warranties may



Section 2 - General Requirements

make modifications or additions to the standard Soprema warranty documents. Once issued, the warranty document, together with any rider(s) expressly made a part of the warranty document will set forth the entire agreement between the building owner and Soprema with respect to the warranted roof.

2.33.1 Warranty Procedure

- A. If the owner of a project is expecting a roof warranty upon completion of roof installation, there are several steps that must first be completed by the roofing contractor and/or the Owner's design professionals before roof installation begins. The first step is to review the Soprema General Requirements and Approved Details and then apply those guidelines to the deck and insulation, base/anchor sheet, slope-to-drain, and other relevant design considerations present on the project. The next step is to select an appropriate assembly based on the Soprema Method Of Application Selector. Once an appropriate assembly has been identified, a technical review may be requested from the Soprema Technical Department. The qualification for various lengths of warranty coverage available is governed by: the geographical territory (climate factors such as snow/ice loads, thermal fluctuations, hail, latitude, etc); design factors (potential for substrate movement, insulation, attachment, and deck assembly); slope-to-drain; slope to deck; building use (i.e. retail, offices, freezer, pool); method of application (reroofing); and inherent liability (material only warranty versus a type of roof assembly warranty or special riders (wind, accessories, etc.).
- B. Once the design is reviewed, the information must be submitted to Soprema by an authorized Soprema roofing contractor using the Soprema Project Registration Form (PRF). The Soprema Technical Department may review the project information submittal (for warranty eligibility purposes only) and advise of alternate design suggestions (for warranty eligibility purposes only). The materials are then shipped and the local Field Technical Representative is notified, who contacts the Soprema contractor to coordinate the required Technical Services for the specific project.
- C. Once the project is substantially completed, a final inspection by a Field Technical Representative or other qualified Soprema employee will need to be performed. A Checklist and Punchlist are issued and items are corrected and confirmed back to Soprema by the roofing contractor. Once written confirmation is received from the roofing contractor that all Punchlist items have been corrected, the Checklist has been signed by the roofing contractor, and all the roofing contractor's invoices related to the project have been paid, the project is considered successfully completed and Soprema can issue the agreed upon warranty document(s). Whether or not to issue a warranty and the express terms of any warranty issued, however, shall always be subject to the discretion of Soprema.

2.33.2 Warranty Terms

- A. Soprema offers a standard material only warranty program for all approved roof assemblies for a term of ten (10) years at no charge. Soprema also offers a variety of roof membrane and/or roof assembly warranties of varying periods of time. Contact your local Soprema sales representative for the current warranty offering and for the schedule of current warranty charges.
- B. Soprema also offers a variety of Standard NDL Roof Warranties with the following qualifications. All components under the warranty umbrella must be purchased directly from Soprema or have an accepted purchase deviation notice approved by the Soprema Technical Department. All phases of the application must be available for on-site inspection and an installation review by Soprema Field Technical Service Representatives. All final inspections should take place in the presence of the design professional, the roofing contractor, and the Owner or Owner Representative. Note: Any deviations in the specification design, details or final installation instructions must be acknowledged and witnessed by those in attendance at the final inspection.
- C. Soprema reserves the right to agree to any modification of the standard warranty with a warranty rider.



Section 2 - General Requirements

Warranty riders are only granted with written permission from the Soprema Technical Department. Riders, generally speaking, must conform to the most recent "rider specimen's" published by Soprema. These specimens must be executed before the project is bid or approved for shipment and must be referenced on the Project Registration Form (PRF). Therefore, if the original warranty approval does not include the terms and provisions requested by the Owner or through the specification process, Soprema has no obligation to include these provisions as riders to its warranty.

- D. For Wind Riders, a Project Information Form (PIF) must be submitted along with the PRF (when applicable) to the Technical Department for review and approval of fastening patterns. Any fastening pattern approval by Soprema is for warranty purposes only. It is the roofing contractor's and Owner's responsibility to make sure that the fastening pattern satisfies building code requirements.
- F. Only specific Soprema personnel expressly authorized by Soprema management to modify warranties may alter, amend or add to the Soprema Warranty Specimen that is distributed prior to bid. Any different promises in this regard, whether oral or written, do not bind Soprema.
- G. Special warranties can only be authorized by the Soprema Technical Department. Any different promises in this regard, whether oral or written, do not bind Soprema. A specimen of the desired special warranty must be requested by the roofing contractor or Owner/Owner Representative prior to bidding or, if a job is not bid, commencement of work. If the request can be accommodated, the Technical Department will provide the roofing contractor or Owner/Owner Representative with a specimen warranty. As specimen warranty that is not expressly rejected by the roofing contractor or Owner/Owner Representative, in writing, within seventy-two (72) hours after delivery will be deemed accepted by them and will be incorporated into Soprema's warranty document for that project only.
- H. Prior to bidding and the project start-up, it is the Soprema Authorized Roofing Contractor's responsibility to obtain and forward to the Soprema Technical Department a written acknowledgment and acceptance of the approved "Warranty Specimen" document from the Owner/Owner Representative(s). Without prior Acknowledgment and Approval, Soprema is neither obligated nor responsible to include any non-approved specification mandated by the Owner/Owner Representative into the standard Soprema Warranty Document(s) after the seventy-two (72) hour process as outlined above occurs or after the project is completed.
- I. As between the Soprema and the Owner, Soprema's Warranty Document will supersede and be in lieu of, all other warranties, whether written or oral, expressed or implied, including, without limitation, any merchantability or fitness for a particular purpose.
- J. Since Soprema does not practice the professions of architecture or engineering, any review, inspection or approval, expressed or implied, by Soprema or its agents or representatives of the construction or condition of any existing roof, roof deck or building, or the drawings, plans or specifications for a new or replacement roof, is solely for the purpose of determining if Soprema is willing to issue a warranty and does not in any way create a warranty by Soprema of those items and is not a substitute for the professional judgment of an architect, engineer, or a roofing consultant.

End of Section