SECTION 07 54 23
THERMOPLASTIC TPO MEMBRANE ROOFING
IB ROOF SYSTEMS INDUCTION WELD ATTACHED TPO SINGLE PLY MEMBRANES

Part 1 GENERAL

1.0 SECTION INCLUDES

A. IB Thermoplastic Polyolefin (TPO) Induction Weld Attached, Polyester Reinforced Roofing Membrane
B. Thermal Roof Insulation
C. Cover Board
D. Vapor Retarder
E. Thermal Barrier
F. Membrane Flashings
G. Membrane Accessories
H. Metal Flashings

1.1 RELATED SECTIONS

A. Section 03 30 00 Cast-In-Place Concrete
B. Section 03 40 00 Precast Concrete
C. Section 03 51 13 Cementitious Wood Fiber
D. Section 03 51 16 Gypsum Concrete
E. Section 03 52 00 Lightweight Insulating Concrete Roof Insulation
F. Section 05 30 00 Metal Decking
G. Section 06 10 00 Rough Carpentry
H. Section 07 25 00 Weather Barriers
I. Section 07 60 00 Flashing and Sheet Metal
J. Section 07 70 00 Roof and Wall Specialties and Accessories
K. Section 08 60 00 Roof Windows and Skylights
L. Section 22 14 00 Facility Storm Drainage

1.2 REFERENCES

A. American Society of Civil Engineers (ASCE):
   1. ASCE 7; Minimum Design Loads for Buildings and Other Structures. Revision as adopted by local code and Authority Having Jurisdiction.
B. ASTM International (ASTM):
   1. ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
   2. ASTM D1079: Standard Terminology Relating to Roofing and Waterproofing
   3. ASTM C1177: Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
   4. ASTM C1278: Standard Specification for Fiber-Reinforced Gypsum Panel
   5. ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
   6. ASTM C1325: Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
   7. ASTM D4263: Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
   8. ASTM D6878: Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing
   9. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
   10. ASTM E108: Standard Test Methods for Fire Tests of Roof Coverings.
C. FM Approvals / Roof Nav.):
   1. FM Standard 4450: Approval Standard for Class 1 Insulated Steel Decks
   2. FM Standard 4474: Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies
   3. Factory Mutual Standard 4476: Approval Standard for Flexible Photovoltaic Modules
   4. Factory Mutual Standard 4481 – Approval Standard for Anchors for Roof Mounted Equipment
   5. FM Global Property Loss Prevention Data Sheets 1-15, 1-28, 1-29, 1-49, and 1-52
D. Underwriters Laboratories (UL):

1. UL 790: Standard Test Method for Fire Tests of Roof Coverings

E. International Code Council (ICC):
   1. International Building Code (IBC)
   2. International Residential Code (IRC)
F. International Institute of Building Enclosure Consultants (IIBEC): Glossary of Roofing Terms
G. National Roofing Contractors Association (NRCA): Low Slope Roofing and Waterproofing Manual, 2019 Edition.
H. Single Ply Roofing Institute (SPRI):
   1. ANSI / SPRI / ED-1: Design Standard for Edge Systems Used with Low Slope Roofing Systems, 2019 Edition.
   2. ANSI / SPRI / FM4435 / ES-1: Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems, Revision as adopted by local code and AHJ, 2017 Edition.
   6. ANSI / SPRI / GD-1: Structural Design Standard for Gutter Systems Used with Low-Slope Roofs, 2010 Edition.
   7. ANSI / SPRI / GT-1: Test Standard for External Gutter Systems, 2022 Edition.
   8. ANSI / SPRI / WD-1: Wind Design Standard Practice for Roofing Assemblies.
I. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA): Architectural Sheet Metal Manual, 2012 Edition.

1.3 DESIGN CRITERIA

A. Provide installed roofing system that remains watertight, resists specified uplift pressures and exposure to normal weathering conditions without failure.
B. Roofing materials and accessories shall be tested and compatible for use within the assembly, installed in accordance with manufacturer requirements.
C. Building Code Compliance: The roofing assembly shall comply with the requirements of the local building code and authorities having jurisdiction.
D. Fire Resistance Performance: Class **[A] [B] [C]** external fire classification as tested in accordance with ASTM E108 or UL 790.
E. Wind Uplift Performance: Roof system shall be designed and installed to withstand wind uplift pressures as calculated using ASCE 7, revision as adopted by the authorities having jurisdiction.
   1. Roofing system shall be tested by a qualified testing agency to resist the following design pressures:
      a. Zone 1'- Interior Field of Roof: _____ psf
      b. Zone 1 – Exterior Field of Roof: _____ psf
      c. Zone 2 – Perimeter Zone: _____ psf
      d. Zone 3 – Corner Zone: _____ psf
   2. Field, Perimeter and Corner areas shall be fastened or secured in accordance with IB specifications and details, project design, and local code requirements. Perimeter and Corner Zones shall receive supplemental fastening or securement where required, to meet calculated pressures in these areas in accordance with IB requirements and the local authority having jurisdiction.
   3. Factory Mutual Approval (FM Projects Only): Roof system shall be installed in accordance with Class 1 or noncombustible construction in compliance with requirements of Factory Mutual Global FM 4450 and FM 4470.
      a. Fire Hazard Classification: Class [**1A] [1B]**
      b. Wind Uplift Classification: FM Class ____
      c. Hail Resistance: **[Moderate Hail (MH)] [Severe Hail (SH)] [Very Severe Hail (VSH)]**
F. Roof System Reflectivity and Thermal Performance: Provide installed roofing system that complies with the following thermal performance and reflectivity requirements:
   1. Provide roof assembly to achieve a minimum total R-value of _____.
   2. Roof membrane shall be tested in accordance with ANSI / CRRC-1 Standard and comply with the following minimum reflectivity and emissivity requirements:
      a. Minimum Initial Reflectance: _____
      b. Minimum 3-year Aged Reflectance: _____ _____
      c. Initial SRI (Solar Reflectance Index): _____
      d. Energy Star: Initial solar reflectance of 0.65 with 3-year aged reflectance of .50 or greater.
      e. The roof system shall comply with the requirements of California Title 24.

1.4 SUBMITTALS

A. Submit product data, samples, shop drawings and installer certification under provisions of Division 1 General Requirements: Section 01 30 00.
B. Product Data: Submit product data sheets indicating membrane materials, base flashing, insulation, separator / thermal insulation, accessories and manufacturer's installation instructions and details including:
   1. Product Data Sheets
   2. Material Safety Data Sheets
   3. Roof assembly installation instructions and recommendations
   4. Required storage and handling recommendations.
   5. Sample of Manufacturer's Warranty
   6. Manufacturer recommended Maintenance Program Data
   7. Submit certification from manufacturer of membrane roofing system certifying the installer is authorized by the manufacturer for installation of the specified roofing system and eligible to obtain the required Manufacturer's Warranty.
C. Detail Drawings:
   1. Provide roof system elevation, section, plan, attachment, and construction detail drawings showing methods, components, flashing conditions, and location of work on the project.
   2. Submit shop drawings of tapered insulation system for approval; show direction and amount of slope, cricket locations, lengths, and details.
D. Verification Samples: Submit a quantity of **[_____]** samples for each product specified. Submit 4" x 6" (10.2 cm x 15.2 cm) TPO membrane samples in the specified color for approval.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section.
B. Installer Qualifications:
   1. Company specializing in the installation of thermoplastic roofing and all products included in this section with minimum five years documented experience.
   2. The installer must be authorized by the manufacturer and eligible to provide the required Manufacturer's Warranty.
   3. Installer must provide an adequate number of experienced workers, trained in jobsite safety practices and skilled in the use of hot-air welding equipment and the installation of materials and flashings used in the construction of the roofing assembly.
   4. Installer shall always provide a project supervisor on the job while work is in progress.
C. Application of Roofing: Work of this section shall conform to contract documents and manufacturer specifications. No deviations shall be made from this specification without the approval of the designer of record. Deviations from published manufacturer requirements require review and approval of the designer of record and written approval from the manufacturer on manufacturer's letterhead, signed by an authorized technical manager of the company. Where discrepancies exist, the Installer shall promptly notify the design professional, project engineer or owner for resolution prior to commencing work.
D. Materials: Provide only top-quality materials from a manufacturer complying with specification requirements. All materials shall be provided by the primary roofing system manufacturer or approved for use in conjunction with installation of the roofing assembly.
E. Manufacturers Final Inspection: Manufacturer's technical representative shall conduct a final inspection upon completion of projects requiring a Manufacturer's Total System Warranty covering workmanship and material to determine if the assembly is following manufacturer requirements for issuance of the warranty. A punch list of defective work and conditions requiring repair shall be provided to the installer for correction.

1.6 PRECONSTRUCTION CONFERENCE

A. Preconstruction Conference: A pre-roofing conference will be held in accordance with the contract documents at least one week prior to initiation of roofing work. Manufacturer representative, supervisor for roofing contractor, estimator for roofing contractor, architect, owner representative, sheet metal contractor, general contractor and other required parties should be present to discuss the execution of the work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact. Store products in weather-protected environment, clear of ground and moisture, secured against wind, moisture, and

damage. Prevent condensation beneath product packaging, coverings and temporary plastic shipping wrappers or shrouds by removing, opening and / or covering materials with breathable tarpaulins.

B. Materials and equipment stored on the roof must be properly staged and supported to avoid damage and / or permanent deflection of the deck. Spread loads of roofing materials on roof structures to avoid damage to existing structure. Use protective plywood as required. No material storage or construction traffic shall be allowed over the new roofing unless properly protected to prevent damage and contamination on the finished roofing.
C. Follow manufacturer's recommendations for environmental conditions and product storage. Bonding adhesives shall be stored at temperatures above 40ºF (4.4ºC). Materials shall be stored and maintained within the manufacturer's published temperature ranges.
D. Storage and disposal of hazardous materials shall comply with the requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Precautions: Install roofing only when adequate application temperatures exist to maintain a satisfactory roofing system application. Apply no insulation or membrane adhesives to the substrate or roofing membranes when deck surface temperatures are less than the recommended application temperature range stated on the products labels, or printed literature. Install no roofing material when water in any form is present on roof deck or substrate surface, or when materials are damp or wet. Proceed with roofing work only when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.
B. Temporary Roofing: Install watertight seals to protect work when adverse job conditions or weather conditions prevent permanent roofing and associated work from being installed in accordance with project requirements. Consult the designer of record and the primary roofing manufacturer regarding installation and removal of temporary roofing.
C. Install new roofing to be complete and watertight by the close of each day's work.
D. Avoid exposure of combustible materials to ignition sources and follow all safety and handling cautions, warnings, and recommendations for safe handling of materials. Material Safety Data Sheets shall be maintained at the jobsite, during transport and storage at all times.
E. Moisture: Do not proceed with installation where potential exists for condensation or uncontrolled moisture migration into the roof system from construction-related moisture or installation over moisture bearing substrates or interiors without adequate ventilation and moisture control.
F. All work shall be performed in accordance with applicable federal, state, and local requirements, codes, and safe work practices. Use of roof assembly adhesives, sealants, caulks, and related accessory materials shall conform to the requirements and VOC limits of the authority having jurisdiction.

1.9 WARRANTY

A. Contractor Warranty: Contractor shall warrant roofing assembly components, accessories, and associated work of this section against leaks or defective workmanship from date of substantial completion.
   1. Term of Warranty _____years **[two] [five]**
B. Manufacturer's Limited Material Warranty: Submit executed copy of roofing manufacturer's (Commercial Limited Material, Warranty Plus Limited Labor & Material) warranty on materials from date of substantial completion.
   1. Term of Warranty _____years **[ten] [fifteen] [twenty]**
C. Manufacturer's Total System Warranty: Submit executed copy of roofing manufacturer's Total System Warranty against leaks due to defective materials or workmanship according to its standard published coverage, terms, and conditions from date of substantial completion.
   1. Term of Warranty _____years **[ten] [fifteen] [twenty] [twenty-five]**

Part 2 PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: IB Roof Systems, 506 E. Dallas Road, Suite 300, Grapevine, Texas 75061
   Toll-free: 800-426-1626
   Fax: 541-610-1726
   Email: technical@ibroof.com

Website: www.ibroof.com

B. Substitutions: Not permitted.
C. Substitution Requests: Submit in accordance with Section 01 60 00.

2.1 SCOPE / APPLICATION

A. Roof System: Provide a waterproof roof system manufactured and supplied or approved by the primary roofing materials manufacturer as specified in this section.
   1. Induction Weld Attached Membrane: IB Roof Systems Specification _____ is the basis of design for roofing assembly.
B. Base Flashing: Provide waterproof base flashing assemblies and flashings at all penetrations, vertical walls, curbs, and terminations.
C. Thermal Roof Insulation: Provide roof insulation components as specified herein, secured to the substrate in accordance with IB Specifications and the performance requirements of this section.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE

A. Roof Covering: Provide a heat-weldable, thermoplastic polyolefin TPO polymer membrane constructed with a weft-inserted polyester scrim, conforming to ASTM 6878. Flashings and accessories shall be factory-manufactured or approved by IB Roof Systems coordinated with the specified membrane and finish color.
   1. Membrane Thickness: **[60 mils] [80 mils]**, nominal
   2. Membrane Type:
      a. Smooth Back
   3. Color: **[White] [Tan] [Gray]**____
   4. Membrane Dimensions : **[5' x100'] [6' x 100'] [8' x 100'] [10' x 100'] [12' x 100']**
   5. Roof System Reflectivity and Thermal Performance: Provide installed roofing system that complies with the following thermal performance and reflectivity requirements:
      a. Reflectance (ASTM C1549): 78%
         (ASTM E903): 80%
      b. Emittance (ASTM C1371): 0.87
         (ASTM E408): 0.96
      c. Solar Reflectance Index (SRI) (ASTM E1980): 95
B. TPO Flashing Membrane: Provide a heat-weldable, thermoplastic polyolefin TPO polymer membrane constructed with a weft-inserted polyester scrim, conforming to ASTM 6878. Flashings and accessories shall be of same thickness as field membrane and shall be factory-manufactured or approved by IB Roof Systems coordinated with the specified membrane and finish color.

2.3 INSULATION

A. Polyisocyanurate: Rigid thermal roof insulation board with fiber reinforced facers on both sides meeting or exceeding the requirements of ASTM C1289.
   1. **[IB Energy Board II]** supplied by IB Roof Systems
      a. Board Size: **[4' x 4'] [4' x 8']**
      b. Minimum Thickness: _____ _____
      c. Minimum R-Value: _____
      d. Compressive Strength: **[20 psi] [25 psi]**
B. Polyisocyanurate: Rigid thermal, tapered roof insulation board with fiber reinforced facers on both sides meeting or exceeding the requirements of ASTM C1289.
   1. **[IB Energy Board II Tapered]** supplied by IB Roof Systems
      I. Board Size: 4' x 4'
      b. Minimum Slope per Foot: **[1/8"] [1/4"] [1/2"]**
      c. Minimum Starting Thickness: _____
      d. Minimum Average R-Value: _____
      e. Compressive Strength: **[20 psi] [25 psi]**
C. Polyisocyanurate: Rigid thermal roof insulation board with fiberglass facers on both sides meeting or exceeding the requirements of ASTM C1289.
   1. **[IB Energy Board III]** supplied by IB Roof Systems
      a. Board Size: **[4' x 4'] [4' x 8']** _____
      b. Minimum Thickness: _____

c. Minimum R-Value: _____
d. Compressive Strength: **[20 psi] [25 psi]**

D. Polyisocyanurate: Rigid thermal, tapered roof insulation board with fiberglass facers on both sides meeting or exceeding the requirements of ASTM C 1289.
1. **[IB Energy Board III Tapered]** supplied by IB Roof Systems
I. Board Size: 4' x 4'
b. Minimum Slope per Foot: **[1/8"] [1/4"] [1/2"]**
c. Minimum Starting Thickness: _____
d. Minimum Average R-Value: _____
e. Compressive Strength: **[20 psi] [25 psi]**

E. High Density Polyisocyanurate Cover Board: Rigid thermal, high density roof insulation board with coated fiberglass facers on both sides meeting or exceeding requirements of ASTM C1289, Type II, Class 4, Grade.
a. **[IB HD ISO]** supplied by IB Roof Systems
b. Board Size: **[4' x 4'] [4' x 8']** _____
c. Minimum Thickness: 1/2" (13 mm)
2. Minimum Average R-Value: 2.5
a. Compressive Strength: 80 – 109 psi (5.6 – 7.7 kg/cm)

F. Gypsum Fiber Roof Board: Moisture resistant, fiber reinforced gypsum roof board with integral water-resistant core conforming to the requirements of ASTM C1278.
1. **[Securock® Gypsum-Fiber Roof Board]** supplied by IB Roof Systems
a. Board Size: **[4' x 4'] [4' x 8']** _____
b. Board Thickness: **[1/4"] [3/8"] [1/2"] [5/8"]**
c. Minimum R-Value: _____

G. Gypsum Roof Board with Glass Mat Facer: Standard, pre-primed or coated, moisture-resistant gypsum board with silicone treated core and embedded fiberglass facer on both sides conforming to the requirements of ASTM C1177.
1. **[DensDeck Roof Board] [DensDeck Prime] [DensDeck ProFast] [Securock Glass-Mat Roof Board]** supplied by IB Roof Systems
a. Board Size: **[4' x 4'] [4' x 8']** _____
b. Board Thickness: **[1/4"] [3/8"] [1/2"] [5/8"]**
c. Minimum R-Value: _____

H. Expanded Polystyrene (EPS): Rigid, closed cell foam insulation conforming to the requirements of ASTM C578. Requires IB approved gypsum or high-density polyisocyanurate coverboard or additional top layer of polyisocyanurate or other approved non-EPS or XPS insulation.
1. [EPS Insulation] supplied by IB Roof Systems
a. Board Size: **[4' x 4'] [4' x 8']** _____
b. Board Thickness: _____
c. Minimum R-Value: _____
d. Board Type/Density: _____
I. Type VIII, nominal density of 1.25 pcf; Compressive Strength: 13 psi (0.9 kg/cm)
II. Type II, nominal density of 1.5 pcf; Compressive Strength: 15 psi (1.0 kg/cm)
III. Type IX, nominal density of 2.0 pcf; Compressive Strength: 25 psi (1.8 kg/cm)

I. Expanded Polystyrene (EPS) Flute Fill: Rigid, closed cell foam insulation conforming to the requirements of ASTM C 578 Type I nominal density of 1.0 pcf or greater. Available with square cut, tapered cut, or panel profile design. Intended to be loose laid or simultaneously fastened with an IB approved gypsum or high-density polyisocyanurate coverboard or additional top layer of polyisocyanurate or other approved non-EPS or XPS insulation.
2. **[EPS Flute Fill Insulation]** supplied by IB Roof Systems
a. Board Size: **[4' x 4'] [4' x 8']** _____
b. Board Thickness: _____
c. Minimum R-Value: _____
d. Board Type/Density: _____
II. Type I: Density 1.0 pcf; Compressive Strength: 10 psi (0.7 kg/cm) min.
III. Type II: Density 1.5 pcf; Compressive Strength: 15 psi (1.0 kg/cm) min.
IV. Type VIII: Density 1.25 pcf; Compressive Strength: 13 psi (0.9 kg/cm) min.
V. Type IX: Density 1.80 pcf; Compressive Strength: 25 psi (1.8 kg/cm) min.

J. Extruded Polystyrene (XPS) roof insulation; Rigid, closed cell, flat, or tapered extruded polystyrene foam insulation with integral formed skin or planed exterior faces, conforming to the requirements of ASTM C578, Type IV; nominal minimum compressive strength of 25 psi (1.8 kg/cm).
   1. **[GreenGuard XPS Insulation] [Dow XPS]** supplied by IB Roof Systems
      a. Board Size: **[4' x 4'] [4' x 8']** __
      b. Board Thickness: _____
      c. Minimum R-Value: _____
      d. Board Type/Density: _____
         I. Type IV, nominal density of 1.55 pcf; Compressive Strength: 25 psi (1.8 kg/cm)
            Note: Requires IB approved gypsum or high-density polyisocyanurate coverboard or additional top layer of polyisocyanurate or other approved non-EPS or XPS insulation.

2.4 MEMBRANE FLASHINGS AND ACCESSORIES

A. TPO Cover Strip: Reinforced 60-mil thermoplastic TPO flashing and stripping membrane made from the same material as IB TPO Single Ply Roofing Membrane with a weft-inserted polyester scrim conforming to ASTM D6878.
B. TPO HW/SA Cover Tape: Reinforced 60-mil thermoplastic TPO flashing laminated to a 3" x 30-mil self-adhesive tape. Used to strip in metal edge flanges with one half a self-adhesive TPO and the other half a heat-weldable TPO detail.
C. TPO SA Cover Tape: Reinforced 30-mil non-reinforced thermoplastic TPO membrane with a self-adhesive underside. Used for to strip in metal flanges.
D. TPO Termination Tape: 45-mil reinforced thermoplastic TPO membrane laminated on half of the width of the strip to a 3" x 30-mil self-adhesive tape. Used to terminate TPO SM membranes at any angle change greater than 2" per foot without having to terminate through the membrane with fasteners and termination bar.
E. TPO NR Detail Roll: Non-reinforced 60-mil thermoplastic TPO membrane. Used for flashing and detailing membrane.
F. TPO T-Joint Patch: Non-reinforced TPO T-Joint flashing cut into 4" (10.2 cm) diameter circular targets for reinforcing lap intersections in membrane and flashings.
G. TPO Preformed Corner: Factory-manufactured 60-mil non-reinforced corner for non-canted 90° flashings. Can be used for inside or outside corners.
H. TPO Universal Corner: Factory-manufactured, 60-mil fluted non-reinforced TPO for canted and non-canted 90° flashings.
I. TPO Pipe Flashings: TPO cone flashing with a preformed flange and tapered upper cone. Used for pipe penetrations of 1"-6" in diameter.
J. TPO Universal Pipe Flashing: TPO stepped-rib profile flashing with a preformed flange. Used for pipe penetrations of 1"-6" in diameter.
K. TPO Split Pipe Flashings: TPO no-cone split pipe flashing with a preformed flange and upper cone. Available in various diameters to accommodate pipe penetrations of 0.25"-6" in diameter.
L. TPO SA Pipe Flashing: TPO self-adhesive cone flashing with a preformed flange and factory applied pressure sensitive tape.
M. TPO Roof Vents: Prefabricated gravity vent used for non-heated exhaust ventilation.
N. TPO Dryer Exhaust Vent: TPO exhaust vent flashing used for powered exhaust ventilation.
O. TPO Wall Vent: TPO prefabricated gravity vents commonly used on 90-degree parapet walls to allow free flowing air between the vented area and exterior of the structure.
P. TPO Membrane Recover Vent: TPO two-way vent used for recover applications.
Q. TPO Penetration Curb: Two-piece, rigid molded plastic frame pans with a rounded base. Used for sealing penetrations various types of penetrations and structural supports.
R. TPO Pitch Pans: Factory-manufactured split TPO clad metal flashing with reinforced membrane base used for pitch pan penetrations.
S. TPO Clad Metal Scuppers: Factory-fabricated, custom sized through wall scupper manufactured from 24-gauge G90 galvanized, TPO clad metal with IB 0.060 non-reinforced membrane flashing.
T. Retrofit Drains: Factory-fabricated, clamping ring style roof drain made of spun-bonded aluminum with IB 60 mil reinforced membrane flashing and an EPDM seal gasket.
   1. IB TPO Retrofit Drain
      a. Size: **[2"] [3"] [4"] [5"] [6"]**
   2. IB TPO Overflow Retrofit Drain
      a. Size: **[2"] [3"] [4"] [5"] [6"]**

U. Walkway Pad: Calendared and embossed 120 mil slip resistant, heat weldable TPO walk tread for use with IB Roof Systems in 3’ x 50’ (0.91m x 15.24m) rolls.
   1. IB TPO Walk Tread
      a. Color: **[Gray] [Safety Yellow]**
V. TPO SA Yellow Safety Tape: 30-mil, non-reinforced, TPO laminated to a 25-mil self-adhesive tape. Used as a visual safety warning designation on roof areas including areas of caution and potential life safety hazards.
W. TPO U-Anchor Attachment: Lightweight rooftop attachment anchor consisting of IB TPO target membrane and U-Anchor plate.
   1. **[IB U-Anchor 2000 TPO by IB Roof Systems]**
   2. **[IB U-Anchor 2400 TPO by IB Roof Systems]**
   3. **[IB U-Anchor 3400 TPO by IB Roof Systems]**

2.5 CLEANERS, PRIMERS, ADHESIVES AND SEALANTS

A. Solvent-Based TPO Bonding Adhesive: Solvent-based membrane adhesive designed for two-sided, fully adhered contact adhesion of IB Roof Systems TPO SM Single Ply membranes to approved vertical substrates. Note: Not for use with IB TPO FB membranes.
   1. **[IB TPO Bonding Adhesive]**
   2. **[IB TPO LVOC Adhesive]**
   3. **[IB TPO CA LVOC Adhesive]**
B. Solvent-Based TPO Spray Contact Adhesive: Solvent-based sprayable membrane adhesive designed for two-sided, fully adhered contact adhesion of IB Roof Systems TPO Single Ply membranes to approved horizontal and vertical substrates.
   1. **[IB TPO Spray Contact Adhesive]**
   2. Approved TPO spray contact adhesive supplied by IB Roof Systems
C. Water Cut-Off Mastic: Butyl-based one-component mastic used as a compression sealant between IB membrane and flashings to applicable substrates.
   1. **[IB Water Stop]**
D. Polyurethane Caulk Sealant: One part polyether sealant suitable for sealing upper lip of exposed termination bars and around upper edge of penetration clamping rings, meets or exceeds ASTM C920, Type S, Grade NS, Class 35, Uses NT, T2, M, G, A & O.
   1. **[IB Seal-NT by IB Roof Systems]**
   2. **[other IB approved sealant].**
E. High Performance Sealant: High performance, plasticizer free, single component, 100% solids, moisture-curing sealant for sealing terminations, metal flashings and filling pitch pans.
   1. **[IB Sealer by IB Roof Systems]**
F. One Part Pourable Penetration Sealant: 1-Part is a moisture curing, pourable sealant designed for use in pitch pans and is suitable for application in damp, dry, or cold climates. 1-Part is solvent free, contains no isocyanates and will not shrink upon curing. 1-Part has resilient “elastomeric” properties and excellent adhesion to most construction materials.
   1. **[1-Part Pourable Penetration Sealant / by Chem Link]**
   2. **[IB Sealer by IB Roof Systems]**
   3. **[other IB approved pourable sealer]**

2.6 SEPARATION SHEETS, FIRE SHEETS AND VAPOR RETARDERS

A. Polyester Separation / Protection Sheet: Non-woven polyester UV-stabilized mat, used as a separation sheet beneath membranes, or as a protection layer over membranes in ballast-applied and overburden assemblies.
   1. **[IB Poly Separator Sheet]** (7.5’ x 360’); (2.3m x 109.7m)
   2. **[IB HD Poly Separator Sheet]** (7.5’ x 150’); (2.3m x 45.7m)
B. Separation Sheet: High-strength, polypropylene scrim reinforced fabric with polypropylene coating both sides used as separation sheet beneath membranes to resist contaminant, residue transfer and moisture from existing substrates.
   1. **[IB Separator Sheet]** (5.83’ x 515’); (1.8m x 156.9m)
C. Fire Sheet: Fire resistant glass fiber mat used as a separation sheet over polystyrene foam insulation or beneath insulation over wood substrates.
   1. **[FR-10 Fire Retardant Slipsheet / by Atlas Roofing Corporation]** (4’ x 250’); (1.2m x 76.2m)
D. Self-Adhered Vapor Retarder Primer: Solvent-based primer with enhanced resins and polymers for use over prepared substrates to improve self-adhered membrane adhesion to a variety of substrates.

1. **[I*B*arrier Primer by IB Roof Systems]**
2. **[*IB*arrier Primer LV by IB Roof Systems]**

E. Vapor Retarder: Self-adhered SBS-modified bitumen vapor retarder for steel, concrete, plywood and approved insulated substrates with tri-laminated woven polyethylene top surface and integral release film on bottom.
1. **[*IB*arrier SA Membrane]** by IB Roof Systems (3’ 7” x 133’); (1.09m x 40.5m)
2. **[*IB*arrier FG SAR]** by IB Roof Systems (3’ 3” x 105’); (1m x 32m)
3. **[IBarrier SA 106]** by IB Roof Systems (3.75’ x 49.2’); (1m x 15m)

F. Vapor Retarder: Self-adhered synthetic non-asphaltic, high temperature, air/vapor barrier membrane with a polypropylene film and an aggressive pressure-sensitive adhesive bottom.
1. **[*IB*arrier XP SA Membrane]** by IB Roof Systems (60” x 100’); (1.52m x 30.48m)

G. SBS Torch Grade Vapor Retarder: SBS-modified bitumen vapor retarder design for torch grade application for concrete and approved gypsum thermal barriers rated for to receive adhered membranes.
1. **[*IB*arrier 90G TG SBS]** (3’ 3” x 49’ 2”); (1.0m x 15.0m)
2. **[*IB*arrier 120G TG SBS]** (3’ 3” x 32’ 9”); (1.0m x 10.0m)
3. ***[IB*arrier 120P TG SBS]** (3’ 3” x 32’ 9”); (1.0m x 10.0m)

H. Asphalt Primer: **[ASTM D41 Asphalt Primer]** (for use with SBS torch grade vapor retarders)

2.8 FASTENERS

A. Standard Fasteners: Standard gauge alloy steel fastener with corrosion resistant e-coating and .228-inch diameter thread: Factory Mutual Standard 4470 approved #3 Phillips truss head for use on approved decks.
1. **[IB SD #12 Insulation Fastener] by IB Roof Systems**
2. [**IB SD Insulation Fastener] by IB Roof Systems**

B. HD Fasteners: Heavy duty gauge alloy steel fastener with corrosion resistant e-coating and .242-inch diameter thread: Factory Mutual Standard 4470 approved #3 Phillips truss head for use on approved decks.
1. **[IB HD #14 Roofing Fastener] by IB Roof Systems**
2. **[IB HD Roofing Fastener] by IB Roof Systems**

C. XHD Fasteners: Heavy duty gauge alloy steel fastener with corrosion resistant e-coating and .260-inch diameter thread: Factory Mutual Standard 4470 approved #3 Phillips truss head for use on approved decks.
1. **[IB XHD #15 Roofing Fastener]** by IB Roof Systems
2. **[IB XHD Roofing Fastener]** by IB Roof Systems

D. Purlin Fasteners: Standard gauge alloy steel fastener with corrosion resistant e-coating and .209-inch diameter thread: Factory Mutual Standard 4470 approved #3 square drive head for drilling through steel purlin thicknesses of 18 ga (.045” nominal) through 1/4” (.250”).
1. **[IB #12 Purlin Fastener]** by IB Roof Systems
2. **[IB Purlin Fastener]** by IB Roof Systems

E. Stainless Fasteners: 410 stainless steel fastener with corrosion resistant e-coating and .235-inch diameter thread: Factory Mutual Standard 4470 approved #3 Phillips truss head for use on approved decks.
1. **[#14 Stainless Roofing Fastener]** supplied by IB Roof Systems
2. **[Stainless Steel Roofing Fastener**] supplied by IB Roof Systems

F. Concrete Anchor: Hammer-in, non-threaded fastener designed to secure insulation and membrane to structural concrete. Alloy steel fastener with corrosion resistant e-coating and .239-inch shank diameter: Factory Mutual Standard 4470 approved 1/2” (13 mm) mushroom drive head.
1. **[Dekspike Concrete Anchor]** supplied by IB Roof Systems

G. Concrete Fastener: Hammer-in, non-threaded fastener designed to secure insulation and membrane to structural concrete. Alloy steel fastener with a corrosion resistant e-coating and split bulb shank of .270 - .277-inch diameter: Factory Mutual Standard 4470 approved flat top pan head.
1. CD-10 Concrete Fastener supplied by IB Roof Systems

H. Barbed Seam Plate: Galvalume, barbed fastening plate used with IB HD #14 Roofing Fastener, IB XHD #15 Roofing Fastener, IB #12 Purlin Fastener, CD-10 Concrete Anchor, and DekSpike Roofing Fasteners for securement and termination of IB membranes at penetrations and perimeter walls or edges.
1. **[IB 2” Barbed Seam Plate]** by IB Roof Systems
2. **[IB 2” Seam Plate]** by IB Roof Systems
3. **[IB 2-3/8” Barbed Seam Plate]** by IB Roof Systems
4. **[IB 2-3/8” Seam Plate]** by IB Roof Systems

I. Insulation Plate: Galvalume-coated steel insulation plates used with IB SD #12 Insulation Fastener, HD #14 Roofing Fastener, XHD #15 Roofing Fastener, CD-10 Concrete Anchor, and DekSpike Roofing Fasteners to

attach approved separator sheets, rigid insulation, and cover boards to approved substrates below IB membranes.

1. **[IB 3" Insulation Plate]** by IB Roof Systems
2. **[IB Insulation Plate]** by IB Roof Systems

J. Induction Plate: TPO coated steel insulation plates used with IB SD #12, HD #14, XHD #15, #12 Purlin, CD-10 Concrete and DekSpike Roofing Fasteners to attach approved rigid insulation, and cover boards to approved substrates by using the respective induction welding technology/tool to simultaneously weld the adhesive coated plates to the IB membrane.

1. **[IB 3" (7.6 cm) IW TPO Insulation Plate]** by IB Roof Systems
2. **[Rhinobond® TPO Plate]** supplied by IB Roof Systems

K. Multi-Purpose Termination Fastener: EPDM grommeted anchor designed to secure termination bar, counter flashing, and various metal flashings to wood, concrete, masonry, and steel. Zinc aluminum composition with corrosion resistant e-coating on thread meets FM Approval Standard 4470.

1. **[ZAC Anchors]** supplied by IB Roof Systems

L. Zinc Term Bar Anchors: Mushroom head, expanding zinc plated steel nailin anchor designed to secure termination bar, counter flashing and various metal flashings to concrete, brick, and filled masonry walls. Zamac alloy composition with corrosion resistant e-coating on thread meets FM Approval Standard 4470.

1. **[Zinc Nailin Anchor]** supplied by IB Roof Systems

M. Batten Bar: 1" (25 mm) Galvalume Steel or Polymer Batten Bar with pre-punched holes used inseam or through membrane with cover strip on IB membranes.

1. **[IB Heavy Duty Steel Batten Bar]** by IB Roof Systems
2. **[IB Polymer Batten Bar]** by IB Roof Systems

2.9 EDGINGS AND TERMINATIONS

A. TPO Coated Metal: IB non-reinforced TPO film laminated to 24-gauge ASTM A653-09, CS Type B, G90 galvanized steel.

1. **[IB TPO Clad Metal]** (4' x 10' sheets); (1.22m x 3.05m).
   a. Color: **[White] [Tan] [Gray]**

B. TPO Coated Stainless Steel Metal: IB non-reinforced TPO film laminated to 24-gauge SAE 304 stainless steel sheet metal.

1. **[IB TPO Stainless Steel-Clad Metal]** (4' x 10' sheets); (1.22m x 3.05m).
   a. Color: **[White]**

C. TPO Clad Drip Edge: IB non-reinforced TPO film laminated to 24-gauge ASTM A653-09, CS Type B, G90 galvanized steel, formed into a standard metal drip edge profile with an open-hem kick-out at the bottom to provide a corrosion resistant, heat weld-able perimeter roof edge termination supplied by IB Roof Systems. ES-1 tested and approved with use of CS Steel G90 22-gauge cleat on standard sizes.

1. **[IB TPO Clad Drip Edge]** (3" deck flange, 10' lengths); (7.6 cm x 3.05m)
   a. Face Size: **[2.5"] [4"] [Custom: ____]**
   b. Color: **[White] [Tan] [Gray]**

D. TPO Clad Gravel Stop Metal Edge: IB non-reinforced TPO film laminated to 24-gauge ASTM A653-09, CS Type B, G90 galvanized steel, formed into into a gravel stop edge profile with a ¾" (18 mm) rise and with an open-hem kick-out at the bottom to provide a corrosion resistant, heat weld-able perimeter roof edge termination supplied by IB Roof Systems. ES-1 tested and approved with use of CS Steel G90 22-gauge cleat on standard sizes.

1. **[IB TPO Clad Gravel Stop Metal Edge]** (3" deck flange, 10' lengths); (7.6 cm x 3.05m)
   a. Face Size: **[2.5"] [4"] [Custom: ____]**
   b. Color: **[White] [Tan] [Gray]**

E. TPO Clad Drip Edge Stainless Steel Metal: IB non-reinforced TPO film laminated to 24-gauge SAE 304 stainless steel, formed into a standard metal drip edge profile with an open-hem kick-out at the bottom to provide a corrosion resistant, heat weld-able perimeter roof edge termination supplied by IB Roof Systems. ES-1 tested and approved with use of 22-gauge stainless steel cleat on standard sizes.

1. **[IB TPO Clad Drip Edge Stainless Steel]** (3" deck flange, 10' lengths); (7.6 cm x 3.05m)
   a. Face Size: **[2.5"] [4"] [Custom: ____]**
   b. Color: **[White]**

F. TPO Clad Gravel Stop Stainless Steel Metal Edge: IB non-reinforced TPO film laminated to 24-gauge SAE 304 stainless steel, formed into a gravel stop edge profile with a ¾" (18 mm) rise and with an open-hem kick-out at the bottom to provide a corrosion resistant, heat weld-able perimeter roof edge termination supplied by IB Roof Systems. ES-1 tested and approved with use of 22-gauge stainless steel cleat on standard sizes.

1. **[IB TPO Clad Gravel Stop Stainless Steel Metal Edge]** (3" deck flange, 10' lengths); (7.6 cm x 3.05m)
    a. Face Size: **[2.5"] [4"] [Custom: ____]**
    b. Color: **[White] [Tan] [Gray]**

G. IB Drip Edge Profile Flashing: Incorporates a cleat and fascia cover in a two-piece low profile drip edge design. The cleat is formed from 22-gauge steel, and the fascia cover is formed from 0.040, 0.050, or 0.063 aluminum, and 24-ga, or 22-ga coated steel. A wide range of standard colors and finishes are available. ES-1 tested and approved. Approved for use in any IB Total System Warranty for up to 30 years. Products coated with a fluoropolymer, 70% PVDF finish carries a 30-year limited warranty against chalking and fading. 90-mph wind rider is available.
    1. **[IB Drip Edge Profile Flashing]** (12' lengths); (3.66m)
        a. Cover Type: Steel - **[24-gauge] [22-gauge]** Aluminum **[.040] [.050] [.063]**
        b. Face Size: **[3-1/4"] [4-3/4"] 6-1/4"] [7-3/4"] [Custom: ____]**
        c. Color: **[_____]**

H. IB Metal Coping: incorporates a cleat and coping fascia cover in a two-piece coping edge design. The cleat is formed from 22-gauge steel, and the fascia cover is formed from 0.040, 0.050, or 0.063 aluminum, and 24-ga, or 22-ga coated steel A wide range of standard colors and finishes are available. ES-1 tested and approved. Approved for use in any IB Total System Warranty for up to 30 years. Products coated with a fluoropolymer, 70% PVDF finish carries a 30-year limited warranty against chalking and fading. 90-mph wind rider is available.
    1. **[IB Metal Coping]** (12' lengths); (3.66m)
        a. Cover Type: Steel - **[24-gauge] [22-gauge]** Aluminum **[.040] [.050] [.063]**24-gauge Steel
        b. Face Size: **[4"] [5-1/2"] [Custom: ____]**
        c. Color: **[_____]**

I. IB Pro-Loc Coping: Full snap-on metal coping, incorporating an intermittent cleat and coping fascia cover in a two-piece coping tapered edge design. The cleat is formed from a 12" wide 20-gauge stainless steel, and the coping cover is formed from 0.040, 0.050, or 0.063 aluminum, and 24-ga, or 22-ga coated steel. ES-1 tested and approved. Approved for use in any IB Total System Warranty for up to 30 years. Products coated with a fluoropolymer, 70% PVDF finish carries a 30-year limited warranty against chalking and fading. 120-mph wind rider is available.
    1. **[IB Pro-Loc Coping]** (12' lengths); (3.66m)
        a. Cover Type: Steel - **[24-gauge] [22-gauge]** Aluminum **[.040] [.050] [.063]**24-gauge Steel
        b. Face Size: **[4-1/2"] [6"] [7-1/2"] [Custom: ____]**
        c. Color: **[_____]**

J. IB Hi-Wind Metal Coping: Full snap-on metal coping, in a tapered design, incorporating a continuous front canted cleat and a continuous rear spring cleat and coping fascia cover in a three-piece coping tapered edge design. The cleats are formed from 22-gauge stainless steel, and the coping cover is formed from 0.040, 0.050, or 0.063 aluminum, and 24-ga, or 22-ga coated steel. ES-1 tested and approved. FM Approved. Approved for use in any IB Total System Warranty for up to 30 years. Products coated with a fluoropolymer, 70% PVDF finish carries a 30-year limited warranty against chalking and fading. 150-mph wind rider is available.
    1. [Hi-Wind Metal Coping] (12' lengths); (3.66m)
        a. Cover Type: Steel - **[24-gauge] [22-gauge]** Aluminum **[.040] [.050] [.063]**24-gauge Steel
        b. Face Size: **[4-1/2"] [6"] [7-1/2"] [Custom: ____]**
        c. Color: **[_____]**

K. Aluminum Termination Bar: Extruded aluminum bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched holes at 6" (15.2 cm) oc.
    1. IB Aluminum Termination Bar (1" x 10' lengths); (25mm x 3.05m)

L. Foil Tape: Self-adhesive, single sided foil tape used over the joints of IB Clad Metal as a bond breaker to create an area of expansion for the TPO non-reinforced membrane patch applied to the metal joint area.

Part 3 EXECUTION

3.0 EXAMINATION

A. Prior to roof installation, inspect substrates to ensure all penetrations, drainage outlets and flashings are in place and ready to receive roofing.

B. Roof deck and flashing substrates must be clean, dry, and properly secured. Existing substrates, flashings or materials scheduled for re-use must be carefully inspected and properly prepared to ensure they are suitable for incorporation into the new roof system, free of defects, contaminants, or moisture.

C. Examine substrates for deterioration, defects and entrapped or excess moisture. Wet or deteriorated decking shall be replaced or repaired prior to start of work. Fastener and / or adhesive pull tests should be conducted to confirm adequate condition and acceptable performance of decking.
D. Review work plan to avoid excess loading of roof areas during material transport, temporary storage, or during installation. Protect building components and fixtures from damage during work.

3.1 PREPARATION

A. All surfaces shall be cleaned and primed where required prior to installation.
B. Avoid construction traffic or work by other trades over completed roof sections. Where unavoidable, install adequate and properly secured temporary protection with tarps, plywood and / or layers of protective sheathing or insulation to avoid contamination and physical damage.
C. Proper deck and substrate preparation are the responsibility of the contractor or building owner. Review manufacturer recommended preparation requirements and methods for specific project conditions and materials.
D. Equipment, penetration, and support scheduled for demolition or renovation should be completed prior to the start of work.
E. Confirm flashing details, terminations and penetrations have adequate height or clearance to receive roofing materials and comply with manufacturer requirements.
F. Review decking and substrates for the presence of above or below deck conduit, equipment, fixtures, or structural elements that may interfere with roof installation.
G. Recover and re-roofing installations require careful preparation and examination of existing decking, substrates, terminations, flashings, rooftop equipment and supports. Qualified review by a design professional is recommended where air or vapor retarders are present or required, where high interior humidity or cold storage conditions are present, or where potential exists for condensation to occur below or within the roof assembly.
    1. Inspect and clean all substrate surfaces to remove contaminants, bituminous materials, mastics, sealants, coatings, previous roofing, and incompatible materials. Make ready to receive new roofing materials.
    2. Prepared roof deck surfaces retaining excess contaminant or incompatible materials require review and approval of IB Technical Services and shall receive a separation layer of approved IB thermal insulation or cover board.
    3. Remove and replace areas of deteriorated decking. Steel decking exhibiting rust shall be inspected for condition and suitability to receive new materials. Repair areas of minor rusting with a rust inhibitor coating
    4. Existing vertical surfaces at walls and curbs retaining excess contaminant or incompatible materials require separation from new materials with a layer of plywood / OSB sheathing or approved cover board. IB separation sheets may be used for separation of existing substrates at mechanically attached base and wall flashings.
    5. Replace all deteriorated or damaged decking, supports, drains, sheet metal and wood blocking or nailers. Inspect drainage outlets for proper operation; replace broken or stripped drain bolts.
    6. Existing flashings, membranes, integrated sheet metal, drain leads, and related accessories must be removed from perimeter edges, terminations, and penetrations. Confirm flashing substrates and conditions conform to IB Construction Details and requirements.
H. Re-roofing Installation: Remove all existing roof system components including ballast, surfacing/overburden materials, membranes, insulations, fasteners / anchors, flashings, sheet metal, copings, counter flashings, and penetration flashings.
    1. Visual observation and fastener pull tests should be performed to confirm the performance of the deck to meet IB Roof Systems and project requirements and may be required for issuance of IB Total System Warranties.
    2. Direct adhesion of thermal insulation to existing substrates with bituminous or other material residue requires field uplift testing to confirm adequate adhesive and insulation securement.
I. Recover Installation: Do not install roofing over existing roof assemblies or substrates containing moisture. Moisture surveys are recommended prior to installation of recover materials to avoid infiltration of moisture into or beneath the new roof assembly.
    1. Review existing roof system type and materials for compatibility and manufacturer's required separation or preparation prior to installation of new materials.
    2. Existing adhered and mechanically attached single ply membranes left in place must be cut on 20' (6.1m) centers in both directions. IB Induction Welded Roof Systems may be installed directly over approved and prepared existing roof systems with use of approved IB Separation or Fire Sheets in accordance with IB Specifications and Construction Details.

3. Visual observation, uplift testing and fastener pull tests should be performed to confirm adequacy of attachment of existing roof assembly and performance of the deck to meet project requirements and may be required for issuance of IB Total System Warranties.
4. Install IB TPO Membrane Recover Vents at the rate of 1 per 1000 square feet over existing insulated roof systems or over new or existing lightweight insulating concrete roof assemblies.

3.2 SUBSTRATE PREPARATION

A. Structural Concrete Deck:
   1. Deck shall be finished to a smooth uniform surface free of sharp edges, ridges, and irregular surfaces with minimum thickness of 4 inches (10.2 cm).
   2. The roof deck shall be dry, free of frost or surface moisture and permitted to cure 28 days before the start of roof system application. The underside shall be open and designed to allow adequate ventilation for drying with form materials removed. If there is any doubt about the dryness of the deck, evaluate surface moisture and deck dryness using ASTM D4263 test method.
   3. Composite form concrete decks, decks with painted, insulated, or other condition restricting underside drying require review by IB Technical Services.

B. Steel Deck:
   1. Minimum 22-gauge cold-formed steel decking with G-90 galvanized or minimum finish coat of primer paint on both sides. Galvanized steel decking when appropriate to project design criteria is recommended.
   2. Inspect and repair areas of surface corrosion in accordance with deck manufacturer's recommendations. Replace damaged or deflected panels and deteriorated areas, securing loose or inadequately attached decking.
   3. Install adequate support and framing at new and existing openings in deck.
   4. Comply with applicable building code, deck manufacturer and/or project required Factory Mutual gauge and span requirements in the current FM Approval Guide and Loss Prevention Data Sheets 1-28 and 1-29.

C. Standing Seam and Light Gauge Steel Deck:
   1. The roof deck shall be dry, free of frost or surface moisture.
   2. Inspect and repair areas of surface corrosion in accordance with deck manufacturer's recommendations. Replace damaged or deflected panels and deteriorated areas, securing loose or inadequately attached decking.
   3. Fastener pull test is necessary to confirm the fastener resistance meets the required pull-out resistance values for the project requirements.
   4. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.

D. Wood Plank Deck:
   1. Wood boards shall be kiln-dried with tongue and groove or shiplap long dimension edges, minimum 1" nominal thickness with nominal 4" to 6" (10.2 cm to 15.2 cm) minimum width.
   2. Lumber shall be dry, safely stored against the weather and covered with the roofing assembly in a timely manner after installation.
   3. Boards shall be securely fastened with ends bearing on rafters or joists.
   4. Cover knotholes, and cracks greater than 1/4" (6.3 mm) with sheet metal securely fastened into position.
   5. Fastener pull test is necessary to confirm the fastener resistance meets the required pull-out resistance values for the project requirements.
   6. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.

E. Plywood Deck:
   1. Plywood sheathing shall be not less than 15/32" (12 mm) thick, minimum 4-ply construction conforming with C-D, Exposure 1 grade.
   2. Install deck over joists spaced 24" (61 cm) oc. or less. Install deck with all sides bearing on and secured to joist and cross blocking.
   3. Fastener pull test is necessary to confirm the fastener resistance meets the required pull-out resistance values for the project requirements.
   4. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.

F. Oriented Strand Board (OSB):
   1. OSB Sheathing shall be not less than 7/16" (11 mm) thick, conforming with PS 2-10, Exposure 1, Structural 1 grade material.
   2. Install deck over joists spaced 24" (61 cm) oc. or less. Install deck with all sides bearing on and secured to joist and cross blocking.

3. Fastener pull test is necessary to confirm the fastener resistance meets the required pull-out resistance values for the project requirements.
4. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.

G. Lightweight Insulating Concrete Deck (LWIC):
1. Lightweight Insulating Cellular Concrete decks shall be minimum 2” (5.1 cm) thick over approved steel or concrete form deck with minimum compressive strength of 125 psi and density of 22 pcf (208 g/m^3) or greater.
2. Lightweight fill shall be tested and confirmed dry, certified by the deck manufacturer and installer, and ready to receive roofing material.
3. Fastener pull test is necessary to confirm the fastener resistance meets the required pull-out resistance values for the project requirements.
4. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.
5. Retrofit applications and roof applications over existing LWIC decks require the written prior approval of IB Technical Services.
6. Frozen decks are not acceptable and must be replaced. Remove and replace any wet areas of existing or new decks that exhibit entrapped or excess moisture and allow them to dry prior to start of roofing.

3.3 WOOD NAILERS

A. Wood Nailers: Install #2 or better solid wood nailers where required by project and manufacturer details. Minimum 1/2” (13 mm) plywood may be used in conjunction with solid wood nailers to fully shim or match insulation height.
B. Nailers along perimeter edges, corner regions and top of parapet walls should be designed and installed to resist calculated wind loads in accordance with ANSI / SPRI ES-1 and local building code requirements. Corner area securement should be increased by a factor of two or more as required to enhance wind resistance in these areas of heightened uplift pressures. For FM insured projects, refer to FM Loss Prevention Data Sheet 1-49 for wood nailer securement design.
C. Nailers should be nominal 4” to 6” (10.2 cm to 15.2 cm) in width extending approximately 1/2” (13 mm) beyond perimeter metal edge flanges; mechanically secured with corrosion resistant anchor bolts or fasteners with integral heads or through washers sufficient to resist pull through or back-out; approved for the specific substrate to which they are attached. Space fasteners a maximum of 24” (61 cm) oc. with at least three (3) fasteners per nailer, depending on nailer length. Each fastener must resist a minimum pull-out force of 200 lbs. ft (298 kg/m) in any direction or the design load, whichever is greater. Reduce spacing by half or 6” (15.2 cm) oc. or less at corner regions. Fastener heads must be countersunk below nailer top surface.
D. Where two or more nailers are required, attach the second nailer to first sufficient to resist design loads with corrosion resistant fasteners installed a minimum of 12” (30.5 cm) oc. staggered and 6” (30.5 cm) oc. staggered within corner areas.
E. Retrofit Metal Decks: Nailers shall be installed in two or more layers to match the total height of flute filler and recover insulation. The base nailer shall be set between and match height of existing standing seams / ribs, fastened a maximum of 12” (30.5 cm) oc. with a minimum of two fasteners between each rib. Fasteners should be installed through the metal deck and into structural steel or wood framing beneath. The top nailer must be set above the height of metal ribs and provide a continuous, smooth nailing surface.

3.4 VAPOR RETARDER

A. Where required by project details and conditions, install an IB approved vapor retarder assembly over the prepared substrate, thermal barrier, or minimal thickness of approved insulation board. Installation shall conform to the vapor retarder manufacturer, IB Roof Systems and applicable assembly approval and regulatory requirements. Surfaces to receive a vapor retarder shall be smooth, clean, and dry; primed where required with a primer approved by the vapor retarder manufacturer and IB Roof Systems. Allow primer to dry prior to membrane application.
B. Polyethylene Vapor Retarder:
1. Install polyethylene sheet type vapor retarder, loose laid, over area to receive vapor retarder lapping side laps a minimum of 2” (5.1 cm) and end laps a minimum of 6” (15.4 cm).
2. Seal side and end laps to prevent moisture intrusion.

C. Self-Adhered Vapor Retarder : **[IBarrier SA Membrane] [IBarrier FG SAR] [IBarrier SA 106] [IBarrier XP Membrane SA]**
1. Prime deck (as required and when applicable) using compatible primer.
2. Unroll vapor retarder sheet and allow it to relax for time required based on conditions.

3. Unroll **[IBarrier SA Membrane] [IBarrier SA 106] [IBarrier XP Membrane SA]** and align roll, then set into position with 3" side and 6” end laps.
4. Hold sheet tight on one end, while removing release film from underside by pulling diagonally in opposite direction.
5. Continuing installing subsequent rolls in same manner.
6. After multiple runs of the product are installed, roll the entire section of installed membrane with a weighted roller, starting from the middle working outward, min. 70 lbs.
7. Note: Over steel decks, at the end of each roll, install a 6” x 42” sheet metal plate to support the end lap between deck ribs. Ensure 6-inch end laps are maintained during installation.

D. Torch Applied Vapor Retarder: **[IBarrier 90G TG SBS] [IBarrier 120G TG SBS] [IBarrier 120P TG SBS]**
1. Prime deck (as required and when applicable) using compatible ASTM D41 asphalt primer.
2. All laps must be parallel or perpendicular to the slope of the roof such water is never against the lap.
3. Never apply SBS torch grade membranes by any method except welding with a propane torch or other heat welding equipment specifically designed for application of SBS torch grade modified bitumen. Extreme care should be taken to avoid overheating of the sheet.
4. The coiled membrane must be unrolled and allowed to relax. Reroll to apply. Unroll approximately 10 ft. (3 meters), align the roll, then the propane torch flame is applied uniformly across the exposed back surface of the membrane and lap areas until the compound reaches the proper application temperature and exhibits a slight sheen.
5. Be sure that there are complete burn-off of release films where present on the underside of the rolls, membrane selvage edges or both surfaces as applicable.
6. Install full-width sheets, lapping 4" (10 cm) on the sides and 6" (15.2 cm) on ends. Stagger adjacent end laps a minimum of 18" (45.7 cm) apart.
7. Avoid overheating which may result in damage to or improper adhesion of the membrane. (The flame should be moved from side to side in the shape of an “L”, applying about 80% of the heat to the membrane and 20% to the substrate or underlying plies including the lap area of the previously installed courses.) The membrane is unrolled as heat is applied to ensure proper adhesion.
8. When complete, re-roll the opposite end of the membrane and install it in the same manner. A minimum 1/4" (6.5 mm) bitumen flow-out must be obtained at all seam areas. Dry laps are not acceptable.
9. To ensure the proper 1/4” (6.5 mm) flow of bitumen at the seam areas, a weighted roller may be used. Roller application should follow behind the torch no more than 4 ft. (1.2 m) or less than 3 ft. (0.91 m) to be sure that the membrane will be at the proper temperature to produce proper flow. Hand rollers or “walking-in the seam” methods are also acceptable.
10. Check all seams for full and uniform adhesion. Un-adhered seams must be lifted with a heated trowel and resealed by lightly torching the seam area.
11. All end laps must be staggered by a minimum of 18" (45.7 cm) so that no adjacent end laps coincide.
12. If end laps fall in line or are not staggered the proper distance, the full width of SBS torch grade membrane must be installed over the end laps.
13. Follow with an adjacent course in the same manner.
14. Hold sheet tight on one end, while removing release film from underside by pulling diagonally in opposite direction. Continuing installing subsequent rolls in same manner.
15. After multiple runs of the product are installed, roll the entire section of installed membrane with a weighted roller, starting from the middle working outward, min. 70 lbs.

E. Coordinate vapor retarder installation, detailing and integration into other building envelope components and / or existing vapor / air barrier assemblies. Prior to roof system installation, IB recommends the building owner, design professional and installer confirm project design, roof assembly and associated detail requirements including wind resistance, adequate thermal resistance and insulation, and the provision of adequate ventilation where project conditions require use of a vapor retarder.

3.5 SEPARATION AND FIRE SHEETS

A. Where required for project details, install one or more layers of **[Atlas Fire Sheet 10] [IB Separator Sheet] [IB Poly Separator Sheet] [IB HD Poly Separator Sheet]** over the prepared substrate. Install separation and fire sheets in conformance with project design, regulatory and IB specification requirements.

B. Lap sheets a minimum of 2” (5.1 cm) on sides and ends. Where two layers are required, install the second layer with all side and end laps offset a minimum of 12 (30.5 cm) from the first course. Fasten installed separation sheets with approved IB fasteners and 3” (7.6 cm) Galvalume Insulation plates as required to hold in position.

3.6 THERMAL BARRIERS

A. Install one layer of approved thermal barrier board over the prepared deck where required by local code, UL fire rated assembly or applicable roof system approval listing. For combustible decks, install one layer of UL classified minimum 1/2” (13 mm) gypsum board, 1/4” (6.3 mm) **[DensDeck Roof Board],** 1/4” (6.3 mm) **[DEXCell Glass Mat Roof Board],** 1/4” (6.3 mm**) [Securock Glass-Mat Roof Board], or 1**/4” (6.3 mm) **[Securock Gypsum-Fiber Roof Board**] over the substrate.
B. Thermal barrier board joints shall be staggered in one direction and offset a minimum of 6” (15.2 cm) from all joints in underlying plywood decks. Secure thermal barrier boards with approved fasteners in accordance with the requirements of the approved IB Roof Systems assembly.

3.7 FLUTE FILL INSULATION PLACEMENT

A. Do not install wet, damaged, or warped insulation boards.
B. Loose lay flute fill insulation between the metal roof standing seams.
C. Fasten insulation with IB Roof Systems approved insulation fasteners and stress plates as required for preliminary attachment specifications or project requirements.
D. Do not install any more insulation than will be completely waterproofed each day.

3.8 INSULATION PLACEMENT

A. Set insulation over the substrate with board edges fitted uniformly and closely together. Install insulation boards over steel decks with long dimension edges parallel to and bearing on ribs. Avoid joints or gaps greater than 1/4” (6.3 mm) and fill gaps greater than 1/4” (6.3 mm) with matching insulation material. Offset board joints a minimum of 12” (30.5 cm) in one direction from preceding course. For multiple layer installations, all joints must be staggered and offset both horizontally and vertically from preceding courses and layers.
B. Do not install wet, damaged, or warped insulation boards.
C. Where insulation board thickness is greater than 3” (7.6 cm) insulation should be installed in two layers.
D. Fit and miter cut board edges at crickets, valleys, hips, ridges, and other changes in plane to provide a smooth transition and surface without voids. Install boards flush to the substrate, edges fully supported or bearing on deck ribs to avoid puncture or breakage.
E. Install sumps with minimum 1/2” (13 mm) per foot factory tapered insulation panels at drains to provide a minimum 36” x 36” (0.91 m x 0.91 m) or larger sump area.
F. Fasten roof insulation with IB Roof Systems approved insulation fasteners and stress plates in accordance with IB specifications and project requirements. Install roof assembly to comply with design uplift pressures calculated under ASCE 7 and as required by local building codes or the Authority Having Jurisdiction. Refer to 3.9 and Table A.5 for more information in fastener placement for induction welded systems.
G. Do not install any more insulation than will be completely waterproofed each day.

3.9 INSULATION AND MEMBRANE ATTACHMENT

A. Install TPO coated induction weld plates over installed insulation or fire sheet, to meet or exceed IB Roof Systems minimum grid fastening pattern over Concrete, Steel, or Wood Decks.
B. As an alternate, induction weld plates may be placed in rows spaced a maximum of 60” (1.52m) apart, fastened 12” (30.5 cm) oc. or less into approved Steel or Concrete decks; or through existing approved Standing Seam or Metal roofs into minimum 16-gauge purlins. For ribbed steel decks, fastener rows must be set perpendicular to direction of the ribs. For approved Wood decks, rows shall be a maximum of 48” (1.22m) apart, fastened 12” (30.5 cm) oc. through deck sheathing into the underlying wood joists or structural members.
C. Secure TPO coated induction weld plates in place with approved fasteners through all layers to the substrate in accordance with IB Construction Details and the fastening table below, or selected Induction Weld roof assembly Fast Spec.
D. Set fasteners and induction plates with screw gun installation tool, or clutch equipped, adjustable depth screw gun taking care not to overdrive or strip-out. Screws and plates shall be driven straight, perpendicular to the deck and flush to the insulation or substrate and surface penetrating into or through the roof deck in accordance with IB requirements. Avoid uneven, tilted or under/over driving installation of induction plates. Mark fastener lines as needed to maintain straight fastening lines and avoid irregular spacing or location of plates. Increase fastening rates where required to comply with design uplift pressures calculated under ASCE 7 and as required by project design, local building codes or the authority having jurisdiction.
    1. Install insulation with cross or short dimension joints staggered. Multi-layer insulation and cover board assemblies may be simultaneously mechanically attached to the deck.

2. Stagger board joints a minimum of 12” (30.5 cm) in one direction. For multiple layer installations, all joints must be staggered and offset both horizontally and vertically a minimum of 12” (30.5 cm) from proceeding courses and layers.

E. Ensure insulation and prepared substrates are smooth, clean, dry, and properly secured in accordance with project requirements and IB specifications. Remove all debris, dirt, or other contaminants from substrate surface prior to installation.

F. Position IB TPO SM membrane in place with minimum 3” (7.6 cm) side and end laps beginning from the low side of the roof and allow to relax. Install membrane courses so water runs over or with, but not against, membrane laps. Install membrane courses perpendicular to the direction of ribs on steel decks, to purlins on metal roof recovers, and wood joists or structural supports on wood decks using row fastened induction weld assemblies.

G. Extend membrane over and below lower outside edge of perimeter edge nailers a minimum of 1” (25 mm) and fasten 12” (30.5 cm) oc. At parapet walls, curbs, and other vertical terminations, install IB induction plates along base of approved vertical substrate not to exceed 18” (45.7 cm) on center. Install plates no closer than 3” (7.6 cm) from vertical transition and secure membrane in place. For induction weld attached base or wall flashings exceeding 18” (45.7 cm) in height, install first row of induction plates 4-1/2” (9.5 cm) above field of roof. Install additional fastener rows spaced no more than 24” (61 cm) apart vertically up the wall. Plates shall be spaced no more than 18” (45.7 cm) on center within fastening rows.

H. Perimeter Zone Attachment:
   1. Supplemental membrane fastening is required along Perimeter Zone areas. Zone width and dimensions will vary depending on many factors and shall be calculated in accordance with ASCE 7 and the requirements of the authority having jurisdiction (AHJ) and local building code.
      a. Install additional fasteners and plates per 4’ x 4’ or 4’ x 8’ (1.22m x 1.22m or 1.22 x 2.44m) insulation board, by decreasing spacing between fasteners within rows, or use of a higher fastening density grid pattern in accordance with IB Construction Details and minimum fastening requirements shown in Section 3.9 below. Increase fastening where required in accordance with ASCE 7 Perimeter Zone calculations to meet specific project design, local building code, and Authority Having Jurisdiction requirements.
      b. Supplemental fastening along Perimeter Zones may require installation of additional structural supports, framing members, or purlins for metal roof recover assemblies and other constructions to accommodate reduced row spacing and enhanced wind resistance.

I. Corner Zone Attachment:
   1. Supplemental membrane fastening is required within Corner Zone areas. Zone width and dimensions will vary depending on many factors and shall be calculated in accordance with ASCE 7 and the requirements of the authority having jurisdiction (AHJ) and local building code.
      a. Install additional fasteners and plates per 4’ x 4’ or 4’ x 8’ (1.22m x 1.22m or 1.22 x 2.44m) insulation board, by decreasing spacing between fasteners within rows, or use of a higher fastening density grid pattern in accordance with IB Construction Details and minimum fastening requirements shown in Section 3.10 below. Increase fastening where required in accordance with ASCE 7 Corner Zone calculations to meet specific project design, local building code, and authority having jurisdiction requirements.
      b. Supplemental fastening within Corner Zones may require installation of additional structural supports, framing members or purlins for metal roof recover assemblies and other constructions to accommodate reduced row spacing and enhanced wind resistance.

J. Avoid contamination of membrane surfaces within the seam areas (side, end, and flashing laps). Ensure all seam areas are clean and free of debris or other contamination prior to welding. Use only IB Roof Systems recommended cleaning procedures and products where necessary to clean membrane prior to seaming or after completed installation.

K. IB membrane side laps and seams shall be hot-air welded using either an automatic hot-air welding machine or hot-air hand welder in accordance with IB Roof Systems specifications, flashing details and welding procedures. Follow all IB weld speed and temperature recommendations for IB membranes and pre-flashed accessories.

3.10 INDUCTION WELD SUBSTRATE WITHDRAWAL RESISTANCE AND FASTENING TABLE

Deck / Substrate Type	Fastener Withdrawal – Average Resistance Values[1]	Insulation Fastener Recommendations		Fastener Penetration into Deck
		Fastener/Plate	IB Standard Warranty Fastening Pattern[2]	

			Field/Perimeter/Corner	
Structural Concrete	800 lbs.	IB HD #14 or Dekspike	6-9-12	1” Min.
22 ga. Steel	525 lbs.	IB XHD #15	6-9-12	3/4” through
24 ga. Steel	425 lbs.	IB XHD #15	8-12-16	3/4” through
16 ga. Purlin	600 lbs.	IB #12 Purlin	60” rows / 12”/9”/6” oc.	1” through
½” minimum Plywood	425 lbs.	IB HD #14	8-12-16	½” through
1” minimum Wood Plank	450 lbs.	IB HD #14	8-12-16	1” Min.
2” Nominal Wood Joist / Structural Support	735 lbs.	IB XHD #15	48” rows / 12”/9”/6” oc.	Min. 1-5/16” into
LWIC over Steel Form Deck	425 lbs.	IB XHD #15	8-12-16	3/4” through
7/16” minimum OSB	Contact IB Technical Services for prior approval and fastening schedule per project			
5/8” minimum OSB	Contact IB Technical Services for prior approval and fastening schedule per project			

[1]Fasteners shall be IB Roof Systems supplied and approved for the specifics substrate / roof deck type.
[2]Fastening density based on 4’ x 8’ board size and conformance with IB required withdrawal resistance values. Row fastening based on maximum row and fastener spacing. Fastening rates are the minimum required for the IB Standard Warranty. Additional fastening may be required to meet project or local code requirements.

3.11 TPO MEMBRANE INDUCTION WELDING

A. Follow Induction Weld device equipment manufacturer’s specifications, precautions and guidelines for operation and care of induction weld equipment.
B. Substrates and induction weld plates must be dry, clean, and free of dirt or debris prior to unrolling field membrane. Care must be taken on projects requiring pre-drilled fastener pilot holes or where dusty, windy, or tear-off conditions are present and could contaminate plates. Ensure installed plates are flush to substrate and tight without being overdriven.
C. Ensure electrical power supply provides continuous, consistent current as required for tool operation. A minimum 5000-watt dedicated generator with maximum 100’ (30.5m) 12-gauge power cord is recommended.
D. Perform initial tool set-up and calibration procedure, adjusting settings for TPO SM membrane at the appropriate mil thickness range. Complete calibration procedure anytime equipment is powered off after initial calibration.
E. Prior to start of induction welding, test welds are required to confirm consistent weld quality and adequate attachment to induction plates. Conduct a minimum of two test welds on small samples of membrane to be installed and perform a peel test to confirm full, uniform adhesion. Test weld must exhibit full adhesion without membrane scorching or overheating.
F. Laps and seams are recommended for completion after membrane securement to installed induction plates. Seams may as an alternate method be welded in advance of full induction welding, providing securement is completed by the close of each day. Membrane seaming prior to full induction welding requires sufficient, securement along each course to resist membrane movement, wind loads and other weather exposure until full induction welding is completed.
G. Position tool inductor directly over installed plates with induction tool search and control function. Plates can also be pre-located manually by light marking with the sole of a shoe and/or by placing a marking magnet over the plate. Remove magnet and complete the weld following tool manufacturer’s operating guidelines.
H. Place a magnet directly over the welded plate immediately upon moving the tool to the next plate location and allow it to cool. Do not roll or kick magnet into position. The magnet should remain in place for 2-3 minutes or until completion of five or more additional plate welds are completed. Magnets must be regularly inspected and kept clean of any metallic debris or shavings.
I. Periodically inspect welds after completion as work progresses by lifting membrane near the plate to check for adhesion. Partially welded or unbonded plates may be re-welded one time after fully cooled. Unsuccessful weld repair requires plate replacement and membrane repair.
J. Use the hand-held induction welder for vertical surfaces and hard to reach areas around and under roof mounted units.
K. Membrane securement to induction weld plates must avoid partially bonded or skipped plates. Install membrane to achieve full bonding to every installed plate.

3.12 SEAM WELDING

A. The minimum recommended weld width for seams completed with an automatic hot-air welder is 1-1/2” (3.8 cm). Seams, laps, and flashings completed with a hot-air hand welder shall maintain a minimum 1-1/2” (3.8 cm) weld width. Hand welded seams and laps shall be rolled with a silicone roller during welding to ensure a continuous welded seam.

B. Regular test welds shall be conducted during all hot-air welding operations to verify attainment of watertight, properly welded membrane laps and seams, and to adjust welding parameters and settings as required. IB recommends test weld samples be retained for review, dated, and labeled, as part of a thorough Quality Control program by the installer.
C. Only install as much roofing in one day as can be seamed and completed to a watertight condition. Seam areas must be kept clean and free of contaminants, adhesives, dirt, or moisture. Clean spills and accidental seam contamination immediately before drying or setting occur. Follow IB recommended cleaning procedures for welding to existing weathered membrane or cleaning areas of contamination. IB Membrane Cleaner may be used to wipe and remove moisture from within membrane laps prior to welding.
D. Install IB TPO T-Joint Patches at all T-joint locations in field laps and flashing seams membrane installations. Hot-air weld T-joint patches over the prepared seam intersections and laps in accordance with IB TPO Construction Details.
E. All seams and laps shall be visually inspected and physically probed after they have been set and cooled. Probe all seam areas to locate cold welds or presence of voids.
F. Repair all seam defects and deficiencies the same day they are discovered.
G. Apply a bead of IB TPO Cut Edge Sealant to all cut edges of roofing membrane

3.13 FLASHING

A. General: Refer to the General Requirements and IB Construction Details of this Manual, which outlines and or depicts flashing requirements for typical construction conditions. Install flashing materials as shown in the roofing details. Contact IB Technical Services for conditions not addressed in the IB Construction Details or for approval of alternative flashing options.
    1. IB Roof Systems requires installation of all roof construction details in accordance with published IB Construction Details utilizing IB manufactured and approved accessories, membranes and required components.
    2. IB Base and Wall Flashing Details are approved for use over a variety of substrates conforming with IB requirements including structural poured and precast concrete, masonry block, dimensional lumber, plywood, and oriented strand board sheathing, approved pre-manufactured metal curbs and IB supplied, approved gypsum cover boards.
    3. Wood and steel-framed walls shall be surfaced with approved plywood, OSB or IB approved gypsum cover board products designed for direct application of roofing materials. Framed walls with approved gypsum sheathing require provision of a suitable wood nailing strip or wood blocking for the termination and attachment of flashing membranes.
    4. Base flashings shall be constructed with IB reinforced membrane the same mil thickness as used in the field of roof and shall be installed as a separate component from installation of the field membrane. Field membrane courses may not be extended up vertical surfaces at base flashings and walls, except where alternate membrane terminations are incorporated at the base of the curb/wall.
    5. Minimum flashing height is 8” (20.3 cm).
    6. Base flashings and wall coverings may typically be installed either as Adhered, Induction Welded, or Mechanically Attached in place and should conform to the height recommendations and limitations below. Insufficient height or termination of base flashings and penetrations below a roof’s potential water accumulation depth or where exposed to wind-driven rain or snow loads should be avoided. Sealants and caulks may be inadequate in preventing water entry under these conditions and will require periodic regular owner maintenance.
    7. Proper securement of IB Roof Systems field and flashing membranes is required to ensure adequate resistance to wind and other loads to which the roof system will be subjected. For standard IB Roof System installations, follow the following securement requirements for mechanical fastening of IB field of roof and flashing membranes at roof system terminations, penetrations, vertical intersections, walls, and perimeter edges.
    8. The maximum distance from the wall that horizontal mechanical attachment is installed is 6” (15.2 cm). For horizontal mechanical attachment beyond 6” (15.2 cm), move the attachment to the vertical substrate.
    9. Use only IB supplied and approved fasteners, plates, anchors, and accessory products for the securement of IB membranes and flashing products.
    10. Plate bonded flashings shall be attached in accordance with IB Construction Details, published IB Specifications, Table A. 10 – Induction Welded Wall Substrate and Fastening Table and Table A.11 – Flashing Securement Table.

11. Split / rough face concrete masonry block units are not suitable for direct flashing application. Smooth-faced units should be installed at areas to receive base and wall flashings with provision for through wall or reglet style counterflashing. Surface mount flashing terminations are not permitted at concrete masonry block wall substrate.
12. Walls clad with smooth, corrugated or standing seam metal panels, lap siding, hardboard, EIFS, stucco / cement finish or similar exterior claddings require the installed IB base flashing to extend up vertical surfaces behind the cladding with a minimum 2” overlap. Bottom edge of cladding or finish materials shall include provision of a sheet metal closure and counterflashing.
13. For occupied structures and projects where odor or fume control concerns exist, care should be taken during project planning to assess potential entry points into the structure. Consideration should be given to the use of compatible air / vapor barrier seals at openings of the roof deck, terminations, walls, and penetrations; and selection of construction details and low fume, reduced VOC, content adhesives and accessory products which are approved for the specific application.
14. Flashing of curbs, parapets, expansion joints, and other penetrations of the roof must be performed using approved IB TPO SM membrane and IB TPO factory-manufactured accessories. Non-reinforced membrane may be used for flashing pipe penetrations, penetration pockets, and scuppers, as well as inside and outside corners, in accordance with IB TPO details when the use of IB factory-manufactured accessories cannot be used or with prior approval from Technical.
15. Follow IB TPO Flashing Details and procedures for all curb, wall, terminations, and penetration flashings including metal edging/coping and drainage outlets using IB manufactured and supplied accessories.
16. Tie-ins to sloped roof areas, transitions of roof plane or installation at valleys with slopes 2” in 12” or greater require termination and securement of the field membrane in accordance with IB Construction Details. Refer to IB Construction Details for additional requirements.
17. Install sheet metal in compliance with IB TPO Flashing Details and SMACNA guidelines for type, grade and forming of seams.
18. Use only IB TPO clad coated metal stock formed metal edging and flashing components for construction of flashing details where welded membrane or welded flashing terminations to coated metal flanges are required.
19. All clad coated metal flashing corners and joints must be reinforced with an additional layer of IB NR 5” x 8” (12.7 cm x 20.3 cm) Metal Joint Patch or larger piece of NR Detail Flashing if required by joint size.
20. Surfaces with existing asphalt, coal tar, mastics, sprayed polyurethane foam or similar incompatible materials shall be removed, thoroughly cleaned, or separated from contact with new IB TPO flashings by a slip sheet, approved insulation or cover boards, or approved plywood, etc.
21. DensGlass® boards are NOT to be used as a substrate for fully adhered attachment on parapet walls, according to the manufacturer.
22. Conduits and wiring shall be properly secured and supported above the IB roof system on approved piping / conduit support details.
23. Wood blocking and wood nailers shall be provided where required by project details and in accordance with IB Construction Details.

3.14 FLASHING INSTALLATION

A. General Application Guidelines
   1. Substrate surfaces shall be smooth, clean, dry, and properly secured in place, ready to receive flashing materials prior to the start of work.
   2. Hand welding of flashing membrane and accessory laps and seams by means of a hand welder shall maintain a minimum 1-1/2” (3.8 cm) weld width. Flashing seams and laps shall be probed after completion and adequate set time for watertight seam integrity and proper bond. Regular test welds prior to and during progress of work is an important part of project quality control and consistency in proper membrane seaming.
   3. When using TPO bonding adhesives, be sure to use the adhesive specific to membrane and follow ambient weather conditions restrictions for use. Avoid contamination of lap and seam areas prior to welding with membrane or insulation adhesives, caulks, or primers.
   4. All membrane flashing corners shall be reinforced with an additional layer of IB TPO Preformed Corners or IB TPO Universal Corners or IB TPO NR Detail Roll membrane.
   5. Remove and discard flashing materials or membrane used for temporary seals prior to completion of final flashing application.

6. Where tie-ins are required for new or existing air or vapor barriers and retarders, consult IB Technical Services and the specific material manufacturer for recommendations and requirements on required detailing.

B. Parapets:
   1. Flashings can be installed either with adhesive applied to the membrane and substrate, or plate bonded in place. Maximum standard parapet wall height conditions are:
      a. Plate Bonded Parapet Walls:
         I. Wall flashings that are to be plate bonded in place, install fasteners and plates per 4’ x 4’ or 4’ x 8’ (1.22m x 1.22m or 1.22m x 2.44m) insulation board/substrate using the prescribed fastening density grid pattern in accordance with IB Construction Details and minimum fastening requirements shown in Section Table below.
      b. Adhered Parapet Walls:
         I. Wall heights 60” (1.52m) or less, refer to Standard Adhered Wall Detail.
         II. Wall heights exceeding 60” (1.52m), the adhered membrane shall be additionally fastened in the vertical lap at in-seam spacing at 12” (30.5 cm) oc. (Refer to IB Construction Detail T-WD-02 Adhered Tall Wall).
   2. Secure membrane flashing at the top edge with a termination bar, counter flashing, or metal cap flashing. Apply a bead of IB Water Stop sealant between the wall surface and membrane flashing, and underneath all termination bars and surface mounted counter flashings. Exposed termination bars must be mechanically fastened 6” (15.2 cm) oc. Termination bars that are counter flashed must be fastened 12” (30.5 cm) oc.
   3. Roof membrane must be mechanically attached, or plate bonded along the base of walls and field terminations a minimum of 12” (30.5 cm) oc. with approved fasteners and barbed seam plates or use induction method at same schedule.
   4. Metal counter flashings with fully adhered or dry-hung membrane wall flashings are required on warranty terms longer than 20 years. (They are not required for warranty term lengths of 20 years or less.) All termination bars, either exposed or covered, must be sealed with Solar Seal 900 Caulk or IB Sealer.
   5. Metal cap flashings must have continuous cleats or be face-fastened 12” (30.5 cm) oc. on both the inside and outside of the walls.

3.15 EDGE METAL INSTALLATION

A. TPO Clad Perimeter Edge Flashings:
   1. Perimeter edge details should be installed in accordance with ANSI / SPRI ES-1 and applicable local code requirements. Continuous metal cleats one gauge heavier than the edge metal or as required for pre-manufactured IB edge systems shall be installed along perimeter edges. As an alternative, IB TPO clad edge metal may be externally fastened in accordance with IB TPO Construction Details with approved fasteners.
   2. TPO Clad Metal is applicable for both drip edge and gravel stop conditions as well as the exterior edges of parapet walls. TPO Clad Metal constructed of galvanized metal may be used for warranties up to 20 years. For extended length warranties (greater than 20 years), use IB TPO Clad Drip Edge or IB TPO Clad Gravel Stop of Stainless-Steel construction or IB pre-manufactured fascia and coping systems only.
   3. Roof edge flashings constructed with IB TPO coated metal are secured through the metal flanges nailed 4” (10.2 cm) oc. staggered or using IB HD #14 Fasteners at 12” (30.5 cm) oc. into wood nailers.
   4. Form exposed edge metal flanges with a 1/2” (13 mm) hem formed where applicable for use with a continuous metal cleat. Clad metal termination bars and miscellaneous metal flashings should be formed with fully closed 1/2 (13 mm) hems with or without caulk lip kick-out as required.
   5. Flashings formed from TPO clad metal for perimeter drip edge, gravel guard edge, 90° or other transitions, clad metal termination bars and similar linear lengths of metal flashing require sealing of butt-joints in accordance with published IB TPO Butt-Joint Details. Install metal flashings with a 3/8” (9.5mm) to 1/2” (12.7 mm) gap between ends to allow for expansion. Seal joint with application of a 2” (5.1 cm) strip of foil bond-breaker tape and cover with a minimum 5” (12.7 cm) wide strip of non-reinforced IB TPO membrane centered over the joint and extending down the outside face prior to application of final reinforced flashing strip-in membrane.
   6. Perimeter Edge Metal Wall Closures, 90° flashings with inside/outside corners and similar constructions shall be formed to provide a continuous clad metal flange with all overlapping joints sealed, riveted, and covered with a strip of non-reinforced membrane prior to application of reinforced flashing membrane.
   7. Lapped TPO clad perimeter edge metal and similar metal flashing butt-joints are susceptible to fatigue and splitting of flashing and / or field membranes at these locations due to movement and expansion of metal

flashings. IB Roof Systems does not recommend use of lapped butt-joint details nor warrants against leaks or damage caused by metal movement.
8. Install a 6” (15.2 cm) IB TPO Cover Strip to TPO clad metal flanges and field membrane and heat-weld in place.
9. Apply a bead of IB TPO Clear Cut Edge Selant to flashing edges.

B. Non-Clad Perimeter Edge Flashings:
1. Perimeter edge details should be installed in accordance with ANSI / SPRI ES-1 and applicable local code requirements. Continuous metal cleats one gauge heavier than the edge metal or as required for pre-manufactured IB edge systems shall be installed along perimeter edges. As an alternative, IB TPO clad edge metal may be externally fastened in accordance with IB Construction Details with approved fasteners.
2. Roof edge flashings constructed with non TPO coated metal are secured through the metal flanges nailed 4” (10.2 cm) oc. staggered or using IB HD #14 Fasteners at 12” (30.5 cm) oc. into wood nailers.
3. Form exposed edge metal flanges with a 1/2” (13 mm) hem formed where applicable for use with a continuous metal cleat.
4. Flashings formed from non TPO clad metal for perimeter drip edge, gravel guard edge, 90° or other transitions, clad metal termination bars and similar linear lengths of metal flashing require sealing of butt-joints in accordance with published IB TPO Butt-Joint Details. Install metal flashings with a 3/8” (9.5mm) to 1/2” (12.7 mm) gap between ends to allow for expansion. Seal joint with application of a 2” (5.1 cm) strip of foil bond-breaker tape.
5. Prime metal with IB TPO Primer prior to applying SA Cover Tape.
6. Install a 6” (15.2 cm) width of IB SA Cover Tape or IB TPO HW/SA Cover Tape to the metal flange and installed TPO membrane. When using the IB TPO/SA Cover Tape, heat-weld the non-SA portion that is installed over the membrane using hot-air welding techniques.
7. Apply a bead of IB TPO Clear Cut Edge Selant to flashing edges.
8. Lapped perimeter edge metal and similar metal flashing butt-joints are susceptible to fatigue and splitting of flashing and / or field membranes at these locations due to movement and expansion of metal flashings. IB Roof Systems does not recommend use of lapped butt-joint details nor warrants against leaks or damage caused by metal movement.

C. Manufactured Edge Systems:
1. Note: For extended length warranties (greater than 20 years; use IB pre-manufactured edge system).
2. IB TPO field membrane shall be turned over the roof edge or parapet wall and down outside face of wall extending past bottom of wood nailer a minimum of ½” (13 mm).
3. The outside edge of wood nailer(s) must be aligned flush with or extend slightly past outermost edge of wall.
4. Follow any applicable pre-installation and post installation requirements of the manufacturer’s edge system design requirements.
5. Install edge system per manufacturer’s installation and securement instructions. Comply with design uplift pressures calculated under ASCE 7 and as required by local building codes or authority having jurisdiction.
6. Important: Remove protective film immediately upon installation.

3.16 WALKWAYS AND SAFETY STRIPS

A. Safety Tape Installation:
1. After the membrane has been cleaned, prepare to install IB TPO Primer to the membrane surface where the safety tape will be applied.
2. Prepare the primer for application by mixing it thoroughly, stirring every 15–20 minutes during application. Note: After mixing, the product may develop a texture like applesauce. This is normal and does not affect performance.
3. Once surfaces are dry, apply the IB TPO Primer using a brush or a scouring pad in a full and uniform application. Avoid overworking the primer. Let the primer dry completely, typically within 20 minutes, before applying the IB TPO SA Yellow Safety Tape. It should look dull or flat and feel dry to touch. Drying time may vary based on air temperature and humidity.
4. To apply the Safety Tape, remove the release liner from the safety tape and slowly apply to the applied membrane working the tape into place to avoid wrinkles. Use a hand roller to ensure strong adhesion between the safety tape and the TPO membrane. Roll until all surfaces are smooth against the receiving substrates.
5. Avoid installing IB TPO SA Yellow Safety Tape over membrane seams and membrane overlaps, if possible.

B. Walkway Installation:

1. Clean the membrane prior to walkway pad installation at locations designated to receive walkways. Provide manufacturers walkway pads at roof access points, hatches, areas of foot traffic, and around rooftop equipment requiring periodic maintenance.
2. IB TPO Walk Tread shall be continuously perimeter welded to the membrane in accordance with IB Construction Details and requirements. Do not install walk tread directly over completed seams. Hold back walk tread edges a minimum of 3” (7.6 cm) on either side of a completed membrane or flashing seams.
3. Walkway pad installation must be monitored to avoid overheating the underlying membrane or walk tread while welding in place. Probe welds to ensure adequate bond to membrane surfaces.

3.17 DAILY SEALS

A. Install night seals as temporary closure to prevent moisture infiltration at membrane terminations and flashings that cannot be finished by the close of each day. Remove temporary seals prior to the next day’s work to avoid contamination or damage to the completed membrane.
B. Remove and replace areas that are damaged, wet, or contaminated prior to continuation of work. Clean and prepare seams in accordance with IB recommendations.
C. Clean temporary sealant materials from deck and flashing substrates and prepare surfaces to receive permanent roofing and flashing materials.

3.18 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
B. Final Roof Inspection: Arrange for roofing system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
   2. Manufacturer shall provide a copy of the inspection report to contractor and owner’s representative for corrective action or compliance of specified requirements.
D. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.19 CLEAN UP AND PROTECTION

A. During installation, keep all work surfaces clean and free of dirt and debris. Remove excess materials, trash, cartons, loose fasteners, tools, and debris from the roof daily. Dispose of waste material, packaging, and debris in accordance with project requirements and applicable regulatory requirements.
B. Avoid contamination of finished membrane surfaces. Install protective materials and tarps as necessary to protect completed roof areas from damage. Remove adhesive spills, residue, and other contaminants immediately before drying or setting up.
C. IB recommends contractor pre-inspection of the completed installation in advance of a requested IB final inspection. Pre-inspection should include review of all project details, drainage outlets, inspection of laps and seams, sheet metal work, sealants, and caulks.
D. Avoid construction traffic or material staging over completed membrane areas. Install protective tarping and plywood secured against wind and the elements to prevent membrane contamination and physical damage from other trades or work.

END OF SECTION