INNOVI™ TPO

Single-Ply Roofing System Solutions

# Installation Manual

CANADA



Featuring MATRIX™
Performance Weathering Technology

IKO

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# SECTION 1

## 1-1 GENERAL INFORMATION

A. This IKO Installation Manual provides the minimum project installation requirements for IKO InnoviTPO roofing systems. Refer also to InnoviTPO product data sheets (PDS), detail drawings and other published information to ensure that the roof system is installed in compliance with all IKO technical and warranty requirements. In the case that the Technical Specifications Manual or various Mod Bit/Asphaltic detail drawings need to be referenced for installation, they can be found on the IKO commercial website at http://www.IKO.com/comm.

B. IKO InnoviTPO roofing systems, when installed according to the requirements of this manual, roof system project specifications and good roofing practices, are intended to function as roof coverings on low-sloped roofs, typically defined as less than a 2:12-inch pitch. Contact your IKO Commercial representative to discuss specifications for projects with slopes of a 2:12-inch pitch or greater.

C. Warranties for 20-, 25- and 30-year terms, wind limited warranties in excess of 55 mph (88 km/h), and other special warranties, may carry specific installation requirements, including, but not limited to, specific fasteners, adhesion, insulation, membrane thickness, flashing requirements and attachment rates and requirements. Refer to the relevant IKO detail drawings and technical information at http://www.Iko.com/comm or contact your IKO Commercial representative for further requirements and information.

D. Whenever a proposed application falls outside of the requirements as provided in this manual, contact your IKO Commercial representative immediately for additional information.

E. Always carefully review all project design documents and bring any concerns to the project design professional. IKO does not engage in the practice of architecture or engineering.

## 1-2 JOB SITE CONSIDERATIONS

### 1-2.1 SAFETY

A. Always comply with published safety procedures for all products used. Consult IKO product labels, safety data sheets (SDS) and product data sheets (PDS) for specific safety instructions. Always comply with all applicable health and safety requirements and regulations, including the use of all appropriate personal protective equipment (PPE).

B. All adhesives, sealants, primers and cleaning solutions or other similar materials must be kept away from any and all potential ignition sources, including flames, fire, sparks, etc. There should be absolutely no smoking while handling, installing or using these materials. Never use heat guns or open flames to dry adhesives, sealants, primers or cleaning solutions. Before installing fasteners, inspect the underside of the structural deck, if possible. Avoid possible conduits and other piping in or under the deck and/or roofing substrate.

C. Exercise caution when walking on wet roof surfaces, including those that are covered in dew, rain, frost, snow or ice. Membranes can become extremely slippery when wet.

D. Installing roofing systems on occupied buildings requires special considerations. Refer to the IKO article, "Ways to Make Your Next Commercial Roof Replacement Less Distracting for Building Tenants," at http://www.iko.com/comm, and to the current edition of The NRCA Roofing Manual: Membrane Roof Systems, for guidelines regarding installing roofing systems on occupied buildings.

### 1-2.2 CAUTIONS

A. Roofing materials, including membranes, insulations, and accessories, should be stored in their original wrap in a manner that protects them from becoming damaged.

B. Storage requirements for all insulation products include complete protection from ignition sources, moisture and incidental damage at all times. Always fully tarp any stored insulation prior to any inclement weather, and at the conclusion of each workday.

C. Roofing materials not in their original, unopened wrap or container should be stored in a dry, protected area. Any tarps used to protect materials must be secured in a manner that protects the roofing materials from moisture, wind and other potential damage. Consult product labels, Safety Data Sheets and Product Data Sheets for specific safety, use and storage instructions for all products used on the roofing project.

D. Oil-based or bituminous cements or adhesives should **never** be used; use only IKO adhesive products to install IKO InnoviTPO membrane and insulations.

### 1-2.3 COLD WEATHER

A. As a general rule of thumb, solvent-based adhesives, sealants and primers should not be applied when ambient temperatures are -4°C (25°F) or colder, or when the adhesive temperature is at or below 0°C (32°F). For potential temperature restrictions, always review the product data sheets for each product used in the roofing project.

B. Adhesives that are marked "Water-Based" will typically have special instructions regarding ambient temperature requirements and flash-off time.

C. Discontinue the application of adhesives, sealants and primers as soon as any condensation is discovered. Application may continue when condensation is no longer present.

D. Store adhesives, sealants and primers between 15°C to 27°C (60°F to 80°F), including immediately prior to use, to help avoid thickening due to cold temperatures. Refer to product data sheets for specific storage instructions. Use of a "hot box" on the roof may be helpful in keeping these materials at appropriate temperatures:

- To determine if ambient conditions are inhibiting the performance of these products, test adhesives, sealants and primers first by applying them in small areas.
- Should the product thickness make application difficult or uneven, cease application and re-warm the product to a minimum of 15°C (60°F).

E. Always ensure that the membrane surface and substrate are dry and clean prior to application. The presence of even a small amount of moisture can inhibit adhesive performance and could result in trapped moisture within the roofing system.

F. Allow membranes to relax for a longer period of time.

G. Use proper night tie-offs to reduce the impact of inclement or cold weather on the roofing project.

## 1-3 ROOF SUBSTRATE PREPARATION

A. Prior to beginning any work, the roofing contractor, deck contractor, general contractor and owner's representative should inspect the roofing substrate carefully to ensure that it is ready to receive a roofing installation. All defects discovered during inspection should be brought to the attention of the general contractor or owner in writing and corrected before roofing is begun.

B. Roof substrates must be uninterrupted, rigid, smooth, dry, clean, free of large cracks or holes, free of conduit intended to remain open to weather on the deck surface and free of sharp fins or other irregularities that could impede the installation of the roofing system. Surface irregularities must be fully corrected prior to beginning roofing work.

C. Neither IKO nor the roofing contractor has any responsibility for the structural adequacy or performance of the deck, the design of the deck to carry maximum anticipated live and dead loads, and the design of the deck to achieve positive drainage.

D. Reroofing or partial tear-off and re-cover considerations:

- Core test cuts, infrared tests or other test means can be used to determine the condition of the existing roof substrate prior to commencing tear-off of the existing roof system.
- Prior to beginning any reroofing application, all wet or damaged substrate materials discovered by these tests, or discovered during tear-off of the existing roof system, must be completely repaired and/or removed and replaced.
- In all reroof applications, the process of demolition and removal of the existing roof system components should be specified by the project designer.

E. Membrane re-cover considerations:

- Core test cuts, infrared tests or other test means can be used to determine the condition of the existing roof substrate prior to commencing re-cover of the existing roof system.
- Prior to beginning any reroofing application, all wet or damaged substrate materials or roofing materials to be left in place that are discovered by these tests, or discovered during installation of the new roof materials, must be completely repaired and/or removed and replaced.

F. All moisture, including rain, condensation, water from condensate pipes, frost, snow and ice, must be completely removed from the work surfaces prior to installing the roofing system. Never allow insulation products to come into contact with wet surfaces.

G. Any foreign materials, oil, grease and other materials that may damage the roof system must be removed completely. Rough or uneven surfaces that could cause damage to either the roofing membranes or flashings may be overlaid with insulation or cover boards as determined by the design professional.

H. All surface voids of the immediate membrane substrate greater than ¼-inch (6.3-mm) wide must be filled with insulation or addressed as directed by the project designer.

# SECTION 2

## 2-1 WOOD NAILER INSTALLATION

A. On new construction or complete tear-off projects, wood nailers must be kiln-dried structural grade number two (#2) or better.

B. Some treated wood nailers are inherently corrosive and are not recommended for use with IKO InnoviTPO Roofing Systems. If a project's specifications require the use of treated wood nailers, the following IKO requirements apply:

- Nails penetrating treated wood nailers must be hot-dipped galvanized, meeting ASTM A653, Class G185, or as currently recommended by industry associations.
- Never allow aluminum fasteners, flashings and accessory products, uncoated metal and painted metal flashing and accessories to come into direct contact with treated wood nailers.
- IKO InnoviFast Stainless Steel Fasteners may make contact with treated wood nailers.
- Separate metal components from treated wood nailers by using IKO InnoviTPO membrane as a separation layer between the components.

C. Wood nailers must be installed at the roof perimeter, atop parapet walls and where required per the project specification. Install wood nailers as follows:

- Nailers must be a minimum of 2 inches x 4 inches (50.8 mm x 101.6 mm) [nominal 1½ inches x 3½ inches (38.1 mm x 89 mm)] and must exceed the width of any metal flange attached to it by a minimum of a ½ inch (12.7 mm).
- Total wood nailer height must not be higher than the total thickness of insulation used.
- Install with a max. ⅛-inch (3.2-mm) gap between each length and each change of direction to allow for differential movement.
- If wood nailers are stacked, all end joints must be staggered a minimum of 12 inches (304.8 mm) from the prior layer in straight runs.

D. For re-cover projects and new construction projects where a poured-in-place deck is specified, wood nailers must be pressure treated for rot resistance and number two (#2) or better lumber. Asphaltic, creosote, or field treatment for rot resistance lumber is not acceptable.

E. Wood nailer securement:

- Wood nailers must be properly and firmly anchored to the building in order to provide secure attachment through the roofing warranty term.
- Mechanically fasten wood nailers to resist a minimum force of 200 lbf. (890 N) in any direction.
- Countersink all fasteners. Attach a minimum of three fasteners per nailer, not greater than 24 inches (609.6 mm) apart.
- Refer to attachment requirements of the roofing system as specified by the project designer if greater than 200 lbf. (890 N) is specified.
- Refer to FM Data Sheet 1-49 for wood nailer securement design considerations.

F. Wood nailers at poured-in-place decks:

- For new construction over poured-in-place decks or fill, and all recover projects, a waterproof separator membrane should be placed between nailers and the deck.

G. Installation of wood nailers by others:

- Wood nailers must be installed according to the above-stated requirements in order for the roofing warranty to be issued. IKO reserves the right to refuse to include termination attachments into wood nailers in the roofing warranty should the installation of the nailers by others not meet the requirements stated in this section.

## 2-2 VAPOUR BARRIER INSTALLATION

A. Install IKO vapour barriers only.

B. Unroll and align the vapour barrier before installation. Do not remove the release film at this stage. Begin installation at the low point of the roof. Use chalk lines where necessary to ensure proper alignment. Note: If a drain is the lowest point, start here with the edge of the sheet bisecting the centerline of the drain.

C. All surfaces that come into contact with the IKO MVP or MVP Sand Vapour Barrier must first be primed with IKO S.A.M. Adhesive or IKO S.A.M. Adhesive LVC in accordance with IKO's recommendations and must be permitted to dry before applying the vapour retarder. Note that priming steel and plywood decks is only required when the primary board layer above is not mechanically attached to the decking.

D. Align vapour retarder sheets over male flutes on steel decks. While aligned, remove the release film from the backside of the vapour retarder and press the vapour retarder into full contact with male flutes. Press areas in contact with the decking to ensure a full bond. The membrane shall be rolled after installation with a 75-100 lbs. roller to ensure adhesion.

E. Align successive sheets of vapour retarder with the first. All IKO MVP laps shall be primed with IKO S.A.M. Adhesive or IKO S.A.M. Adhesive LVC **(Not applicable for MVP Sand)**. Always join laps over a male flute. Overlap sides by a minimum of 3 inches (76.2 mm). Ensure end laps are a minimum of 6 inches (152.4 mm) and stagger end laps from each other by a minimum of 24 inches (609.6 mm). End laps spanning the female flutes may require support. Cut the appropriate pieces of insulation and place them within the flute so that a level, continuous surface supports the end lap.

F. For self-adhered vapour retarders on all other suitable substrates, use a similar installation method as detailed above.

G. Prior to installing air or vapour barriers by others, contact your IKO Commercial representative for further information regarding acceptability of non-IKO materials.

### 2-2.1 BITUMINOUS BASE SHEET AS A VAPOUR BARRIER INSTALLATION

A. A bituminous base sheet should **never** touch the TPO roofing membrane at any point of the roofing installation.

B. Unroll the base sheet starting at the low point of the roof. With the base sheet properly aligned, unroll the sheet and allow it to relax prior to attaching.

C. Follow these steps to install the base sheet:

1. All the base sheet side laps shall be a minimum of 3 1/2 inches (90 mm).
2. All the base sheet end laps shall be a minimum of 6 inches (152.4 mm).
3. The side and end laps of the base sheet shall be staggered a minimum of 12 inches (300 mm and 24 inches (609.6 mm), respectively, from each other and from any subsequent ply sheet or cap sheet side and end laps.
4. “Soldiering” of the end laps within the base sheet layer is an acceptable practice that may be required for specific systems, such as Fast-N-Weld, ShieldBase, and Protectobase systems.
5. All end laps shall have a forty-five degree (45°) section removed to form a positive water stop. See Part 11 of the Technical Specification Manual, drawing MB-1 for details.
6. All the metal and concrete surfaces that come into contact with a heat-fused or hot asphalt applied base sheet must first be primed with an IKO Mod-Bit Primer or IKO Standard Asphalt Primer in accordance with Part 5 of the Technical Specification Manual. Metal and concrete surfaces meant to receive a self-adhered base sheet shall be primed with the IKO S.A.M. Adhesive or IKO S.A.M. Adhesive LVC in accordance with Part 5 of the Technical Specification Manual.
7. Remove all the wrapping tape and labels before beginning the base sheet installation. The base sheets must be unrolled, allowed to relax, and then re-rolled before installation.
8. Begin the installation at the low point of the roof. Unroll and align the base sheet before attachment. Use chalk lines where necessary to ensure proper alignment. Ensure that the side laps are oriented so as not to buck the flow of water to drains. Note: If a drain is the lowest point, start here with the edge of the base sheet bisecting the centerline of the drain.

D. Cut out any fishmouths/side laps that are not completely sealed and repair accordingly.

E. Replace any fully adhered base sheets that are not fully and continuously bonded.

F. Hot asphalt attachment:

- The substrate must be suitable for asphalt attachment.
- The asphalt shall be at the manufacturer’s stated Equiviscuous Temperatures (EVT) at point of installation.
- Stagger all laps, including side and end laps, in any subsequent layers of base sheet applied over the bottom layer. Begin by installing a half-sheet to ensure correct stagger.
- The typical lap width requirement is 3 ½ inches (90 mm) at all side and end laps for hot asphalt- or roofing torch-attached base sheets.

G. Mechanical attachment:

- Base sheets may be attached using IKO InnoviFast fasteners and plates through insulation into the deck.
- The typical lap width requirements are 3.5 in (76.2 mm) at all side laps and 6 inches (152.4 mm) at all end laps for mechanically attached base sheets.

H. Only IKO-manufactured base sheets are accepted for vapour retarder applications in InnoviTPO systems.

## 2-3 INSULATION INSTALLATION

A. Polyisocyanurate insulation should not be exposed to the elements. Store insulation in a dry location, elevated above a finished surface (not dirt or grass). Do not unwrap insulation until immediately prior to installation. Tarp all insulation stored outside whenever inclement weather is expected. Install only as much insulation as can be completely covered with roofing membrane before the end of the day's work or before the onset of inclement weather.

B. Ensure that insulation is laid over a minimum 1-inch (26-mm) bearing surface.

C. Stagger all joints: Multiple layers of insulation should be installed in overlapping layers with all joints staggered a minimum of 6 inches (152.4 mm); never install successive layers directly on top of lower insulation boards.

D. Insulation should be loosely, but neatly, fitted to all penetrations, projections and nailers, with no gaps greater than a ¼ inch (6.3 mm).

E. Install IKO tapered insulation around roof drains to ensure proper slope for drainage. Refer to IKO InnoviTPO detail drawings for complete information for drain area installation.

F. IKO InnoviWeld induction-welded roofing systems require a minimum of 1 ½ inches (38.1 mm) of insulation. Warranted systems typically require a minimum 1 inch (26 mm) of insulation. In certain recover applications, a minimum of a ½ inch (12.7 mm) of IKOTherm CoverShield may qualify for warranty.

G. Ballasted systems are not permitted when the membrane is installed directly over either mechanically attached insulation or over a hard surface, such as IKOTherm CoverShield HD, DensDeck, OSB or concrete. Ballasted systems are allowed when the membrane is installed over either loose-laid or adhesively attached IKOTherm or IKOTherm III insulation.

### 2-3.1 MECHANICAL ATTACHMENT OF INSULATION

A. Insulation must be attached using IKO InnoviFast fasteners and plates appropriate for the substrate, roofing system and warranty requirements. Refer to the appropriate attachment patterns and fastening rates of the specific insulation being installed; see the IKO Innovi Attachment Guide at: http://Iko.com/comm.

B. Avoid penetration of conduits and other piping below or encased in the deck.

C. Multiple layers of insulation may be installed using a common fastener. Use the type and thickness of the top layer of insulation to determine the fastening pattern when multiple layers of insulation are being installed.

D. Fasteners should be fully seated, but never overdriven (overdriving will result in plates “cupping” rather than lying flat). Use a properly adjusted clutch or depth-sensing type of drill, instead of a standard single-speed drill. If a fastener must be removed after installation, do not reinstall fastener into same hole.

E. Please note that mechanically attached membrane systems with a fully adhered perimeter require the perimeter insulation to use the appropriate fastening pattern used in a fully adhered system as determined by the top layer of insulation.

F. The following minimum penetration requirements shall apply to the mechanical fasteners used to fasten into each deck type. The penetration is measured from the top surface of the deck and includes the tapping point of the fastener.

- Steel: 3/4 inch (19 mm).
- Concrete: 1 inch (26 mm).
- Plywood or Wood Plank: 1 inch (26 mm).

### 2-3.2 ASPHALT ATTACHMENT OF INSULATION

A. Asphalt must be heated to the manufacturer's recommended EVT less ~14°C (25°F) at the point of installation. Install enough asphalt to achieve complete adhesion, approximately 25-30 lbs. per 100 sq. ft. (1.2-1.4 k/m²), depending on substrate.

B. When hot asphalt must be applied to the IKOTherm III insulation (be it attachment to an approved substrate, to itself, or to other board products or to other such products necessary to complete a fully adhered roof assembly), the asphalt application temperature shall not exceed 199°C (390°F) at the point of contact.

C. Insulation boards must be a maximum of 4 feet by 4 feet (1.2 m x 1.2 m) for asphalt attachment.

D. Ensure complete adhesion of the insulation sheets by “walking them in” once they have been applied using asphalt.

### 2-3.3 ADHESIVE ATTACHMENT OF INSULATION

A. Only a maximum of 4-foot by 4-foot (1.2 m x 1.2 m) insulation boards may be used for adhesive attachment.

B. Apply adhesive according to the pattern prescribed by the product or project specification, or according to the appropriate IKO detail drawing showing adhesive attachment patterns.

C. To promote adhesion, weigh down each board using full pails of adhesive or other available sources of weight that will not damage the insulation board, at each corner of the board.

# SECTION 3

## 3-1 TPO MEMBRANE INSTALLATION

### 3-1.1 FULLY ADHERED SYSTEMS

A. **General Instructions.** Refer to IKO Product Data Sheets for specific membrane adhesive installation instructions. For solvent-based adhesives, sealants and primers please refer to the Product Data Sheet regarding application limitations. Spray-applied adhesive canisters must be at least 21°C (70°F) prior to use for the product to spray properly. Store adhesives in a "hot box" at 15°C-27°C (60°F-80°F) until immediately prior to use. Never apply membrane adhesive in the membrane seam area or to any area that is to be later hot air-welded to another sheet or flashing. Any membrane adhesive that intrudes within the seam area must be completely removed prior to seaming.

B. **Position Membrane.** Starting at the low point of the roof, unroll the IKO InnoviTPO Membrane sheets over the acceptable substrate. Unroll membrane completely and allow the sheet to relax for 15 to 30 minutes before attaching (minimum 15 minutes when the ambient temperature is above 15°C [60°F]). Inspect the membrane for any damage and remove any damaged or creased sections. Please note:

- The TPO membrane should be positioned so that the seams do not buck water; seams should either be positioned so that they shed (shiplapped/lower membrane rolls overlapped by upper membrane rolls) or run parallel to the flow of water wherever possible.
- Side laps of adjoining sheets should overlap a minimum of 3 inches (76.2 mm). See specific instructions regarding standard lap splice details for robotic and hand welding.
- Whenever possible, install any cut edge of a sheet as the underside (lower membrane) of the seam, under the overlap. Any exposed cut edges must be sealed completely using InnoviSeal TPO Cut Edge Sealant. (No other sealant may be used for cut edges.)

C. **Fold Back the Membrane.** Position the sheet for the proper lap width per IKO details and specifications, then fold it back evenly onto itself ("barn-door") without wrinkles to expose the underside bonding surface of the sheet and substrate.

D. **Remove Debris or Dirt.** Using a stiff broom, remove any debris or dirt that may have accumulated from the surfaces of both the membrane and the substrate. If required, clean membrane surfaces with InnoviPrime TPO Pre-Wash and allow them to dry fully.

E. **Apply Membrane Adhesive.** Apply membrane adhesive using either a 9-inch (228.6-mm)-wide solvent-resistant paint roller or a commercial-grade adhesive sprayer, depending on the type of InnoviBond Membrane Adhesive used. Apply adhesive in a uniform thickness at the specified coverage rate to both surfaces at the same time.

F. **Test Adhesive Readiness Using Finger-Push Method.** IKO InnoviBond membrane adhesives are two-sided applications. Once applied, membrane adhesive should be tested for readiness using the **finger-push method**. Allow the membrane adhesive sufficient time to flash off. For potential temperature restrictions, review the product data sheets for each product used in the roofing project. With a clean, dry finger, **touch** the adhesive surface and pull it away to be certain that the adhesive does not stick or string. **Push** forward on the adhesive at an angle throughout the

thickness of the adhesive. If wet or stringy adhesive is noted when the finger is lifted, the adhesive is not ready, and more flash-off time is required. Flash-off time will vary depending on ambient temperature, wind and humidity.

G. **Adhere the Membrane to the Substrate.** Starting at the fold, roll the portion of the membrane coated with adhesive into the adhesive-coated substrate. Roll slowly and evenly to prevent wrinkles. Follow all instructions and steps above.

H. **Broom the Membrane.** To ensure proper adhesion, use a stiff push broom to apply pressure to the surface of the bonded half of the membrane.

I. **Repeat This Procedure to Complete Installation.** Continue following the steps above across the roof until the membrane is fully adhered to the substrate.

J. **Weld the Lap.** If the membrane lap has been open for more than 12 hours or becomes contaminated with dirt, debris or moisture, wash the surfaces to be adhered using InnoviPrime TPO Pre-Wash and allow both surfaces to dry fully. Complete the laps with hot air welds as specified and refer to IKO details.

### 3-1.2 MECHANICALLY ATTACHED SYSTEMS

A. **Steel Decks.** For mechanical attachment of TPO membrane over steel decks, membrane sheets should be laid out so that the seams will run perpendicular to the direction of the flutes on the deck sheets. Projects that are insured or specified by Factory Mutual or systems tested in accordance with CSA A123.21 require the membrane attachment to run perpendicular to the deck sheets. (Please consult the FM 1-29 Loss Prevention Data Sheet for further information.)

B. **Perimeter Attachment Options.** Perimeter membrane sheets of a mechanically attached system may be either adhered or mechanically attached. The layout of membrane fasteners must meet the minimum requirements shown on the IKO TPO Attachment Guide or as required by either the project design professional or by the local building code. Fully adhered perimeter sheets should be installed in the same location as mechanically attached perimeter sheets; see item E in this section for instructions regarding installation of fully adhered perimeter sheets.

C. The following minimum penetration requirements shall apply to the mechanical fasteners used to fasten into each deck type. Penetration is measured from the top surface of the deck and includes the tapping point of the fastener.

- Steel: 3/4 inch (19 mm).
- Concrete: 1 inch (26 mm).
- Plywood or Wood Plank: 1 inch (26 mm).

D. **Mechanically Attached Perimeter Sheets:**

1. **Determine Perimeter Areas.** If the roof height is **equal to or less than 60 feet**, the perimeter is the smaller dimension of either 10% of the shortest side (plan view) or 40% of the roof height, but not less than 4% of the shortest side (plan view) or 3 feet (0.9 m). If the roof height is **greater than 60 feet**, the perimeter is 10% of the shortest side (plan view), but not less than 3 feet (0.9 m). For mechanically attached systems, spacing between fastener rows should be no greater than 60% of the width of the field sheets in the perimeters and no greater than 40% of the width in the corners.

2. **Determine Corner Areas.** Corners are the intersections of the perimeter areas. Refer to all local code requirements and project specifications (including reference to FM Global requirements) when determining corner areas and layouts for perimeter sheets. If parapets are greater than 36 inches (914.4 mm) continuous, the corners may be treated as a perimeter, unless specified differently by the project designer. Otherwise, use one of the following methods in the corners:
   - **Picture Framing.** Mechanically attach the perimeter rolls all the way into the corner. The other perimeter sheets should be mechanically attached up to the previously installed perimeter sheets, and then the fastener rows are continued to the corner through the top of the previously installed sheets. Install a cover strip of reinforced membrane extending 2 inches (50. 8 mm) on each side over the fasteners for a watertight seal. This method is commonly referred to as “picture framing.”
   - **Perimeter Fingers.** Mechanically attach perimeter rolls perpendicular to the flutes in steel deck applications. Additional fasteners and seam plates should be installed in rows not greater than 40% of the width of the field sheets. Strip in these rows over fasteners by welding 8-inch-wide strips of reinforced InnoviTPO Membrane per IKO details and apply InnoviSeal TPO Cut Edge Sealant to all cut edges. (No other sealant may be used for cut edges.)
   - Consult the IKO Innovi Attachment Guide for further information and layout details.
3. **Position Perimeter Sheets.** Install the membrane by starting at the low point of the roof, using the appropriate number of sheets that are half the width of the field membrane sheets. Unroll membrane completely and allow it to relax for a minimum of 15 to 30 minutes before beginning attachment (minimum 15 minutes when the ambient temperature is above 15°C [60°F]). Consult all relevant IKO details to ensure proper membrane overlap widths necessary for roof edge details and flashing seams. Please note:
   - Membrane should be installed so that the seams do not buck water, but either shed water or run parallel to the flow of water, wherever possible.
   - Position subsequent rolls of membrane to provide for a minimum 6-inch (152.4-mm) overlap for proper seaming as marked on the top side of the membrane, and for a minimum of 3 inches (76.2 mm) at side and end laps.
   - Whenever possible, install the cut edge of membranes as the underside of the membrane seam, not as the overlap. All cut edges that are left exposed must be sealed with InnoviSeal TPO Cut Edge Sealant. (No other sealant may be used for cut edges).
4. **Attach the Perimeter Sheet.** Attach the inside edge of the half sheet lap into the deck using the appropriate InnoviTPO Seam Plates and fasteners as required by specification. Position each fastener 2 inches (50.8 mm) inside the membrane edge and 1 inch (26 mm) from the area to be heat-welded, per lap splice details. Fastener targets are preprinted on the IKO InnoviTPO Membrane. Install each fastener so that it is properly engaged in the deck and the head is flush within the countersunk portion of the seam plate. Do not overdrive fasteners.
5. **Position the Next Perimeter Sheet.** Roll out the next perimeter sheet and position it along the lap line of the first.

6. **Fold the Membrane Back at the Lap.** After confirming the sheet is positioned allowing for the proper lap width, fold it back evenly onto itself without wrinkles or creases to expose the underside mating surface of the lap.
7. **Remove Dirt or Debris.** Sweep surfaces with a stiff broom to remove any debris or dirt that might have accumulated.
8. **Weld the Lap.** Fold the membrane back, heat-weld the side lap per **Section 3-2 Membrane Seaming** of this Installation Manual, then fasten it along the opposite edge of the sheet.
9. **Install all subsequent perimeter sheets.**

E. **Field Sheet Attachment:**

1. **Position First Field Sheet.** Roll out the first field sheet and position it along the lap line of the last perimeter sheet, allowing for a 6-inch (152.4-mm) side lap and 3-inch (76.2-mm) end laps. Unroll membrane completely and allow it to relax for a minimum of 15 to 30 minutes before beginning attachment (minimum 15 minutes when the ambient temperature is above 15°C [60°F]).
2. **Attach the Membrane.** Attach the membrane into the deck using the appropriate InnoviTPO Seam Plates and fasteners as required by specification. Position each fastener 2 inches (50.8 mm) inside the membrane edge and 1 inch (26 mm) from the area to be heat-welded, per lap splice details. Fastener guide marks ("+") are printed on the IKO InnoviTPO Membrane. Install each fastener so that it is properly engaged in the deck, and the head is flush within the countersunk portion of the seam plate. Do not overdrive fasteners. Fasteners and plates should be spaced per IKO warranty requirements, local code requirements or project specifications; whichever is more stringent (including reference to FM Global requirements).
3. **Position and Secure Subsequent Field Sheets.** Roll out, position, secure and complete adjoining field sheets allowing for 6-inch (152.4-mm) side laps and 3-inch (76.2-mm) end laps. Install each fastener so that it is properly engaged in the deck, and the head is flush within the countersunk portion of the seam plate. If the roof slope changes direction, begin working at the lower edge of the adjoining side of the roof up the slope with perimeter and field sheets until reaching previous work. A half sheet is to be installed over a ridgeline, secured and welded to the two sheets. Apply InnoviSeal TPO Cut Edge Sealant along any cut edges. (No other sealant may be used for cut edges.)
4. **QUALIFIED OPTION: Securing Membrane With Batten Bar *(Dual-Weld Systems ONLY)*.** Position perimeter and field sheets according to the design layout and as described above. Please note:
   - **Position Batten Strips.** The inside edge of the half sheet lap is fastened to the deck using appropriate InnoviFast Batten Bar and fasteners per the project design layout.
   - **Center Batten.** Center the batten 3 9/16 inches (90.5 mm) from membrane edge.
     - When batten strips must be field-cut, round the cut end. Remove all burrs created by cutting.
     - Where field drilling of metal battens is necessary, use a ¼-inch (6.3-mm) diameter drill bit. Install 2-inch (50.8-mm) field-cut membrane circle patches centered under the ends of the metal batten strips and end fasteners.

- **Fasten Batten Strips.** Place the fasteners starting 1 inch (26 mm) in from the end of the InnoviFast Batten Bar, then every 12 inches (304.8 mm) o.c. (unless a more frequent fastener spacing is required per wind/application design guide) using the prepunched holes in the battens.
    - Fasten batten bar working from one end only. Install each fastener so that it is properly engaged in the deck, and the head is flush with the batten strip surface. Use caution not to overdrive the fastener as this will cause the batten strip to buckle between the fasteners and interfere with the wide weld nozzle.
    - Lap field runs of batten bar. Use a common fastener to anchor overlapping batten bars using a common hole.
- **Complete the Lap.** Fold the membrane back into position, heat-weld the side lap using the wide weld nozzle, per **Section 3-2 Membrane Seaming** in this Installation Manual, then fasten along the opposite edge of the sheet.

F. **Fully Adhered Perimeter Sheets (Optional With Mechanically Attached Systems):**

1. **Position Perimeter Sheet.** Position the membrane sheet, starting at the lowest side of the roof, and unroll the TPO membrane over the substrate. The sheet should be allowed to relax for 15 to 30 minutes (minimum 15 minutes when the ambient temperature is above 15°C [60°F] prior to attempting attachment). Please note:
    - Always install membrane sheets so that the seams shed water or run parallel to the flow of water, wherever possible.
    - Overlap the sides of adjoining membrane sheets by 3 ½ inches (90 mm) and overlap the ends of adjoining sheets a minimum of 3 inches (76.2 mm). All overlaps must allow sufficient room for proper welding by either robotic or hand-welding methods.
    - Always install cut membranes so that the cut edge is installed as the underside of the seam.
2. **Fold the Membrane Back To Enable Seaming.** Position the sheet for proper lap width, per IKO details and specifications, and fold it back without wrinkles to expose the underside of the sheet and substrate.
3. **Remove All Dirt and Debris.** Carefully sweep the mating surfaces with a stiff broom to remove all dirt and debris from the seam area. If exceptionally dirty, this area may be cleaned with InnoviPrime TPO Pre-Wash.
4. **Apply InnoviBond Membrane Adhesive. Refer to Section 3-1.1 of this Installation Manual for adhesive application instructions.** Consult the appropriate IKO Product Data Sheets for specific sprayable membrane adhesive coverage rates and application instructions. IMPORTANT: Any membrane sheets that have been cut along one side should have the cut edge installed as the bottom sheet of the seam. If cut edges are exposed on the weather side, they must be sealed to specification with IKO InnoviTPO Cut Edge Sealant. (No other sealant may be used for cut edges.)

G. **Membrane Termination at the Perimeter:**

1. **Follow IKO Detail Drawings.** After the perimeter sheets are adhered to the substrate, they must be terminated along the outside edge using appropriate IKO roof edge or base tie-in detail.
2. **Install Perimeter Isolation.** Install IKO fasteners and seam plates continuously along the inside edge of the adhered perimeter area, per IKO details.

### 3-1.3 INDUCTION-WELD SYSTEMS

A. **Safety.** Induction welding requires special attention to safety before, during and after installation. **Contractors should refer to the manufacturer's user manual for proper use of the equipment and for all safety information**. Accidents can result in loss of life, injury and loss of property; use extra care and extreme caution when working with induction welders to prevent accidents.

B. **Determine Perimeter Areas.** If the roof height is **equal to or less than 60 feet (18.2 m)**, the perimeter is the smaller dimension of either 10% of the shortest side (plan view) or 40% of the roof height, but not less than 4% of the shortest side (plan view) or 3 feet (0.9 m). If the roof height is **greater than 60 feet (18.2 m)**, the perimeter is 10% of the shortest side (plan view), but not less than 3 feet (0.9 m). The fastener rate (contributory area) shall be no greater than 60% of the field fastener rate.

C. **Determine Corner Areas.** Corners are the intersections of the perimeter areas. Refer to all local code requirements and project specifications (including reference to FM Global requirements) when determining corner areas and layouts for perimeter sheets. If parapets are greater than 36 inches (914.4 mm) continuous, the corners may be treated as a perimeter, unless specified differently by the project designer. Otherwise, the fastener rate (contributory area) shall be no greater than 40% of the field fastener rate.

D. **Insulation Attachment.** Mechanically attach insulation to the roof deck per the fastening patterns provided in the IKO Innovi Attachment Guide. Use only InnoviWeld Induction Plates for all induction-welded IKO InnoviTPO roof systems. TPO and PVC induction weld plates are NOT interchangeable. Do not overdrive the fasteners, as this could distort the induction plate and result in a poor membrane weld. The membrane, insulation board and induction weld plate must all be completely dry before attempting to weld.

E. **Induction Weld Attachment.** Roll out one roll of membrane over the substrate. Unroll membrane completely and allow it to relax for a minimum of 15 to 30 minutes before beginning attachment (minimum 15 minutes when the ambient temperature is above 15°C [60°F]). Perform calibration of the induction welder and set up as detailed by the induction welder's owner's manual. Refer to the induction welder's owner's manual for setup, calibration and welding.
Please note:

- Center the induction welder over the first plate in the pattern and activate the weld. WARNING: The induction welder **must be centered** over the plate to create a full bond. If an error occurs during activation, refer to the induction welder owner's manual for corrective action.
- Immediately place a cooling magnet over the welded plate. Keep the magnet in place for a minimum of 45 seconds, while the weld cools and sets.
- Repeat the process for each induction weld plate. Working across the sheet in the direction of the aligned rows, move magnets from one row to the next.

### 3-1.4 BALLASTED SYSTEMS

A. **Be Careful with Substrates.** Do not install a ballasted system directly over or onto a hard surface, such as IKOTherm CoverShield, DensDeck, OSB or concrete, or other hard substrates. Do not install a ballasted system directly to a layer of mechanically attached insulation. Adhered IKOTherm and/or IKOTherm III polyisocyanurate insulation is an acceptable substrate for ballasted systems.

B. **Position the Membrane.** Position the membrane over the acceptable substrate so that the seams shed water and allow it to relax for 15 to 30 minutes (minimum 15 minutes when the ambient temperature is above 15°C [60°F] or until any roll tension is released). Laps should allow for a minimum of a 4-inch (101.6-mm) overlap onto adjacent sheets. Leave enough membrane for proper flashing and termination.

C. **Weld the Seam.** Heat-weld the side lap per **Section 3-2 TPO Membrane Seaming** of this Installation Manual, then fasten along the opposite edge of the sheet.

D. **Install the Ballast.** Spread ASTM #4 stone ballast over the TPO membrane at the rate specified by the project designer, but no less than 10 lbs./sq. ft. (48.8 kg/m$^2$). Ballast must be spread over the membrane using soft rubber-tired ballast buggies. Spread ballast around penetrations by hand.

E. **Protect the Membrane.** Special care must be taken to avoid any damage to the TPO membrane when distributing ballast. Protect the membrane and insulation at staging areas where ballast is loaded by layering additional insulation and/or plywood over a sacrificial layer of TPO membrane. Any roofing materials damaged during ballast installation must be removed and replaced with new materials.

F. **Walkway Pads.** Ballast should be distributed around walkway pads at the specified average ballast rate. Keep walkway pads back a minimum of 10 feet (3.04 m) from the roof edge. Suitable ballast pavers may be used around mechanical equipment.

## 3-2 TPO MEMBRANE SEAMING

A. **Seam Requirements.** All membrane field seams must be heat-welded with a robotic welder and must create a **minimum 1 1/2-inch (38.1-mm)-wide weld**. Handheld welders are used on vertical welds or where an automatic welder is not practical or cannot be used. Hand-welded seams must create a **minimum 2-inch (50.8-mm)-wide weld** and must be compressed using a rubber/silicone roller moving back and forth, parallel to the end of the welder nozzle, ½ inch (12.7 mm) past the nozzle in both directions. All hand welds should be accomplished in two passes: The first pass creates an “air dam” that seals off the interior sheet from the outer weld area and preheats the outer weld area; the second pass completes the full 2-inch (50.8-mm) weld. TPO flashings, including membrane used for wall flashings, must be hand-welded. InnoviFlash 6-inch (152.4-mm) and 10-inch (254-mm) cover tapes, and any other pretaped accessories, should never be welded.

B. **Welder Power Supply.** A proper power source must be provided for all welding equipment. Robotic welders require a dedicated generator, as other powered tools operating from the same generator will create power surges that result in inconsistent welds. Welder cords should never be longer than 100 feet (30.4 m) from the power source. Refer to the welder manufacturer’s instructions and specifications for requirements regarding power supply to the welders.

C. **Robotic Welder Settings.** Typical settings for Leister Varimat V2 robotic welding of the IKO InnoviTPO Membrane in standard conditions of 21°C (70°F) and 50% humidity are shown below. These settings can vary depending on the brand of robotic welder used and must be adjusted throughout the workday to account for changing ambient conditions. Settings for other manufacturers' welders may differ. All robotic welds must be a minimum of 1 1/2 inches (38.1 mm) wide.

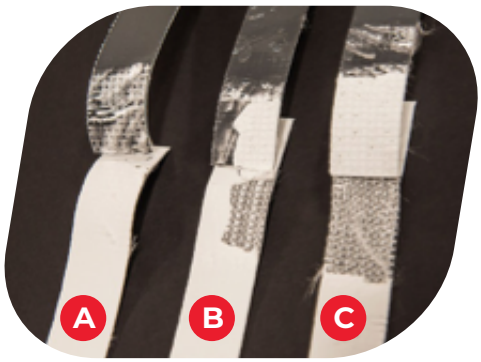
| LEISTER VARIMAT V2 (ROBOTIC WELDER) | | | | | |
|---|---|---|---|---|---|
| Membrane | Temperature Setting | | Weld Speed | | Air Flow |
| mm | F° | C° | ft/min | m/min | % |
| 45, 60, 80 | 950-1050 | 510-570 | 10-14 | 3-5 | 100 |

D. **Hand Welder Settings.** Typical settings for Leister Triac ST **hand welding** of the IKO InnoviTPO Membrane in standard conditions of 21°C (70°F) and 50% humidity are between 3 and 5. Settings can vary depending on the brand of hand welder used and must be adjusted throughout the workday to account for changing ambient conditions. Settings for other manufacturer's welders may differ. All hand welds must be a minimum of 2 inches (50.8 mm) wide.

E. **Welder Setting Adjustments.** Welders require adjustment to the air intake, temperature and speed in order to successfully make strong, watertight TPO seams. Welder settings will need to be adjusted to compensate for membrane and environmental factors, including membrane thickness, ambient temperature and humidity. Establish daily welder settings at the start of each workday, and **at any time after the hot air welder has been shut off**, by performing as many test welds as are needed to achieve a good weld. (See **F. Test Weld Procedures** below).

F. **Test Weld Procedures.** Weld-cut pieces of membrane 4- to 5-feet (1.2-1.5 m) long and at least 6 inches (152.4 mm) wide in either direction from the seam. Allow the weld to cool. Once cooled, check the peel strength, consistency of seam and weld width, and perform a visual inspection for any membrane scorching by cutting at least three, 2-inch (50.8-mm)-wide strips perpendicular to the seam, 6 inches (152.4 mm) in either direction from the seam, and peeling them apart (see photo below). If the first test welds did not result in good welds, make any adjustments needed to the welder air intake, temperature and/or speed to correct any defects in the test weld. Continue to perform further test welds at the adjusted settings until the defects are cleared.

**TEST WELD COMPARISONS:**




**A** Cold weld, **NOT acceptable**.
**B** 50% weld, **NOT acceptable**.
**C** Good weld, **ACCEPTABLE**.

G. **Membrane Preparation.** Ensure that the seam area to be welded on both membranes is completely clean and dry, that the membranes' seams are positioned properly in straight alignment along the entire length of the membrane and that the amount of overlap matches the requirements stated above. IKO InnoviTPO membrane is preprinted with seam alignment lines at 3 inches (76.2 mm) from the membrane edge for fully adhered system seams and 6 inches (152.4 mm) from the membrane edge for mechanically attached systems.

H. **Joint Covers at T-Joints.** InnoviFlash Joint Covers must be installed at all seam intersections, wherever three layers of membrane intersect and whenever seams extend through angle changes or membrane flashings. Hand-weld InnoviFlash Joint Covers by centering the cover over the intersection and following proper hand-welding procedures. When a crease appears along the seam intersection, the weld has been made. Joint covers may also be used to patch small cuts or punctures in the membrane; larger cuts or punctures will require the use of cut pieces of standard reinforced membrane, hand-welded to completely cover the cut or puncture, and with a continuous 1/8-inch (3.1-mm) bead of TPO Cut Edge Sealant applied along the entire outer edge of the patch. (No other sealant may be used for cut edges.)

I. **Probing Completed Seams.** Carefully test all completed seams, joint covers and patches before the end of each workday by probing the entirety of each weld. Using a clean, round-tipped, blunted hand tool (blunted awl, cotter key extractor, etc.), apply firm, steady horizontal pressure along the seam edge. Any penetration of the probe into the seam means that the seam contains a void and must be repaired. Mark the area of the extent of the discovered void using a water-soluble marker to indicate the area to be repaired. Do not test welds that are still warm and use care not to scratch, puncture or score the membrane during probing.

J. **Repairing Seam Voids.** Carefully lift the upper membrane of the seam and weld the void areas of both the upper and lower membranes. Using the edge of a rubber/silicone roller, apply pressure to the welded areas to completely close the void. If the repair is successful, wipe the area clean. If the repair is not successful, cut a piece of standard reinforced TPO membrane so that it is large enough to extend 2 inches (50.8 mm) past the edge of any cut area of the seam. Round the corners of the patch with scissors, center the patch over the cut area, then heat-weld the patch using a hand welder and rubber/silicone roller. Apply a continuous 1/8-inch (3.1-mm) bead of InnoviSeal TPO Cut Edge Sealant around the entire outer edge of the patch. (No other sealant may be used for cut edges.)

K. **Peel-Testing Completed Seams.** Completed seams must be peel-tested throughout the workday to ensure consistency and quality. Tests should be performed in the morning, at midday and toward the end of the workday, any time environmental conditions change during the workday and whenever the welder has been shut off. Cut samples 6 inches (152.4 mm) long in both directions across completed seams, and 2 inches (50.8 mm) wide. Peel the samples by hand to determine the quality of the completed seam; good seams will be almost impossible to peel apart, and, once peeled, should tear the TPO from scrim, leaving the scrim embedded.

L. **Repairing Peel-Tested Cut Seams.** Cut a piece of standard reinforced TPO membrane so that it is large enough to extend 2 inches (50.8 mm) past the edge of any test cut area of the seam. Round the corners of the patch with scissors, center the patch over the cut area, then heat-weld the patch using a hand welder. Apply a continuous 1/8-inch (3.1-mm) bead of InnoviSeal TPO Cut Edge Sealant around the entire outer edge of the patch. (No other sealant may be used for cut edges.)

M. **Installers must ensure that the appropriate welder nozzle for single ply systems is used**. Heat welders should be cleaned after each use as per manufacturer's instructions to ensure there is no debris that could impede the welding of the seams. It is imperative that once a welder/nozzle is used on an asphalt based membrane, it is not used again on a single ply membrane.

## 3-3 TPO BASE TIE-INS

A. **Requirements.** TPO membrane must be secured at all locations where the membrane goes through an angle change greater than 1 inch (26 mm).

B. **InnoviFast Fasteners and Plates.** Securement may be made using InnoviFast TPO Seam Plates and appropriate InnoviFast fasteners, typically spaced at 12 inches (304.8 mm) o.c., either horizontally into the deck or vertically into the wall, per IKO detail drawings. See the IKO Innovi Attachment Guide for information matching fasteners with substrate types.

C. **InnoviEdge TPO Coated Metal.** Securement may be made using InnoviEdge TPO Coated Metal, fastened into wood nailers per appropriate IKO detail drawings. TPO membrane may then be heat-welded to the TPO Coated Metal, following the welding practices and standards given in **Section 3-2** above.

D. **InnoviFlash Reinforced Perimeter Strip (RPS) (Acceptable for up to 20-year Limited Warranties Only).** Securement may be made using the InnoviFlash RPS, fastened into the parapet wall or the deck using appropriate InnoviFast fasteners and plates, spaced at a maximum of 12 inches (304.8 mm) o.c. Apply InnoviPrime TPO Primer or TPO Primer LVOC on the portion of the membrane that will be adhered to the RPS, using a scrub pad and circular motion. Once the primer is dry, remove the release liner, set the InnoviTPO membrane onto the RPS and press in the membrane by hand. Reinforce the adhesion of the RPS by applying pressure using a rubber/silicone roller to press the field membrane to the RPS. Use an appropriate InnoviBond membrane adhesive to adhere the field membrane to the parapet wall, following instructions given in **Section 3-1** above and on the selected product's Product Data Sheet.

E. **Membrane Wall Flashing.** Follow the appropriate IKO detail drawing for installing membrane wall flashings. Mechanical attachment of wall flashings is allowed for some warranty terms; however, adhesive attachment of wall flashings is preferred whenever possible. Never apply adhesive in areas that are to be welded.

F. **Flashing Height.** All flashings must extend a minimum of 8 inches (203.2 mm) above the roof level.

# SECTION 4

## 4-1 FLASHING PENETRATIONS

A. **General Information.** All penetrations through the roof system must be flashed. Flashings must seal directly to the penetration and to the membrane. In recover or partial tear-off applications, completely cut and remove all loose existing materials to ensure a proper fit of the new TPO flashings. **Follow the instructions given in the relevant IKO Details and Product Data Sheets for installing IKO Innovi flashings.**

B. **Flashing Pipes, Tubes and Structural Supports.** Use InnoviBoot molded "Universal" or preformed "Split" (either round or square) flashings wherever possible. See the relevant IKO Innovi Product Data Sheets for sizes and compatibility. For larger diameter penetrations, or wherever preformed or molded flashings cannot be used, use InnoviFlash TPO Unsupported Flashing.

C. **Roof Drains.** (For reroof or re-cover applications: Remove existing or broken clamping hardware and replace with new hardware. Remove all existing flashing [including lead flashing], roofing materials and cement from the existing drain in preparation for membrane and InnoviSeal Water Stop Mastic). **FOR ALL ROOF DRAIN FLASHINGS: Follow all relevant IKO detail drawings.** Ensure that mating surfaces between the clamping ring and the drain bowl are even and clean. Create a sump to promote drainage by installing tapered insulation around the drain that creates a smooth transition from the roof surface to the drain. Slope into drain should not exceed 1:12 inches (2.5:30.5 mm). Install the TPO membrane and cut a hole for the roof drain that enables a ½ inch (12.7 mm) to a ¾ inch (19 mm) of membrane to extend inside the drain clamping ring and ensure that the membrane extends past the bolt holes. In the membrane, cut round holes that align with the clamping bolts (a paper punch may be used). Apply a minimum of one-half of a full tube of InnoviSeal Water Block Mastic in a continuous bead on the clamping ring seat flange below the membrane. Install the roof drain clamping ring, and install and tighten all clamping bolts. Tighten the clamping bolts to achieve constant compression.

D. **Insert Drains.** Insert drains may be used in reroofing applications when existing drains are deteriorated and not suitable for reuse. Follow manufacturer's installation instructions for installing and securing the insert drain. Install the TPO membrane and cut a hole for the insert drain that enables a ½ inch (12.7 mm) to a ¾ inch (19 mm) of membrane to extend inside the drain clamping ring and ensure that the membrane extends past the bolt holes. In the membrane, cut round holes that align with the clamping bolts (a paper punch may be used). Apply a minimum of one-half of a full tube of InnoviSeal Water Block Mastic in a continuous bead on the clamping ring seat flange below the membrane. Install the roof drain clamping ring, and install and tighten all clamping bolts. Tighten the clamping bolts to achieve constant compression.

E. **Penetration Clusters/Atypical Penetrations.** Ensure that the membrane surface to be flashed is clean and dry. Prime the membrane surface and inside of the InnoviFlash Sealant Pocket, using InnoviPrime TPO Primer or TPO Primer LVOC. Fit both pieces of the InnoviFlash Sealant Pocket together around the penetration. If smaller size is required, remove excess material by cutting along the vertical guidelines. Heat-weld the vertical and horizontal overlaps entirely. Heat-weld the Sealant Pocket flange to the TPO field membrane. Fill the pocket with InnoviSeal Universal Sealant.

F. **Hot Pipes.** Any penetrations with an in-service temperature more than 71°C (159.8°F) must be flashed in a manner that fully protects the TPO membrane from the heat source. In all such cases, an intermediate "cool sleeve" must be installed around the hot pipe, and the flashing must seal only to the cool sleeve. Follow all relevant IKO details.

G. **Flexible Penetrations.** Wiring not housed in conduit or other flexible penetrations must be contained in a weathertight gooseneck (by others) that is set in InnoviSeal Water Block Mastic and secured firmly to the deck. Follow all relevant IKO details for flashing the gooseneck.

H. **Scuppers.** IKO InnoviFlash TPO Scuppers are preformed scupper insert flashings, sized to fit most common scupper openings. Insert appropriately sized InnoviFlash TPO Scupper into the hole in the perimeter wall. Lift the membrane flange and fasten it to the deck and the wall through the coated metal flange. Heat-weld the membrane flange to the field and wall membranes. Apply InnoviSeal TPO Cut Edge Sealant around the edge of the flange. (No other sealant may be used for cut edges.)

I. **Expansion Joints.** Install where specified by the project designer in accordance with IKO details. Expansion joint assemblies shall be sized as needed to provide for all anticipated movement and make logical transition to other materials at perimeters.

## 4-2 FLASHING VERTICAL SURFACES AND CURBS

A. **General Information.** Cut large pieces of IKO InnoviTPO Membrane to flash all walls, parapets, curbs and other vertical surfaces. Flashings must be terminated at a minimum height of 8 inches (203.2 mm).

B. **Vertical Substrates.** Substrates to be flashed must be flat, smooth, clean, dry, uninterrupted and free of sharp fins or edges. Substrates with irregular surfaces or substrates not conducive to exterior use will require an overlay of 5/8-inch (15.8-mm) exterior-grade plywood, mechanically fastened per the project designer's specifications. Typical substrates requiring overlay are those made from interior-grade gypsum board, asphaltic substrates, stucco, stone, textured masonry and corrugated metal.

C. **Reroof Applications.** In reroof applications, all existing flashing material must be completely removed, including residual adhesives. Substrates with adhesives that cannot be removed might need to be overlaid with exterior-grade plywood. Typical substrates requiring overlay are those made from interior-grade gypsum board, asphaltic substrates, stucco, stone, textured masonry and corrugated metal.

D. **Base Tie-Ins, Intermediate Attachment and Termination.** Base tie-ins must be installed at all angle changes, per IKO details. Intermediate attachment of adhered vertical flashings is required at 5-foot (1.52-m) intervals. Intermediate attachment of mechanically attached vertical flashings is required at 18-inch (457.2-mm) intervals using appropriate InnoviFast fasteners and plates spaced at a minimum of 12 inch (304.8 mm) o.c. All vertical flashings must be terminated per the relevant IKO details.

## 4-3 SHEET METAL WORK

A. **General.** Sheet metal work includes the installation of coping caps, gravel stops, roof edging and metal flashing and counterflashing elements. The TPO membrane roofing system must be completely installed and watertight before beginning sheet metal application work. All sheet metal work should be fabricated and installed according to the guidelines set forth by the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and the National Roofing Contractors Association (NRCA).

B. **Codes and Standards.** The designer and roofing contractor should be aware that many municipalities and other jurisdictions are beginning to enforce metal codes that, until recently, were merely used as guidelines. These metal codes relate to minimum standards on material, fabrication and testing of roof-related sheet metal work. It is the contractor's responsibility to review and know the building codes relating to their roofing projects to avoid costly remedial work and to bring a project into compliance.

C. **IKO TPO Coated Metal.** IKO offers TPO Coated Metal sheets, which may be formed into metal edge systems, as well as preformed TPO coated metal gravel stop and drip edge products. Whenever possible, use IKO brand TPO Coated Edge Metal products and install per IKO published details and specifications.

D. **Metal Edge Products by Others.** Metal edge products by others may be accepted for inclusion in the IKO warranty coverage via a deviation request. To be considered for warranty inclusion, the edge metal must be either shop- or factory-formed or extruded, and configured and installed in accordance with SMACNA guidelines and NRCA installation instructions. The metal used must be either 24-ga (0.61 mm) G-90 Kynar prefinished steel or 0.040-inch (1.01-mm) aluminum (mill finished, prefinished or anodized). IKO must be notified in writing at the time of the contractor's warranty application that the contractor intends to install edge metal by others, and a shop drawing of the intended edge system showing the installed location, linear profile, fastener spacing and fastener type must be submitted to IKO with the warranty application. As with all IKO warranties, the installing contractor carries complete warranty liability for the edge metal for the first two years of the warranty term.

E. **Finishing and Flashing Metal Edge Products.** All metal edge systems must be flashed according to current IKO details. Contractor-formed metal edge systems must be stripped in to the highest point in the metal dam, per current IKO details. The appropriate IKO InnoviSeal sealant product must be used as shown in current IKO details.

F. **Warranty Inclusion.** Warranty coverage for edge metal systems shall not exceed the terms, conditions and limits of the IKO Diamond Shield Limited Warranty, including the maximum wind speed covered. Aesthetic appearance of metal edge systems is excluded from coverage in the IKO Diamond Shield Limited Warranty.

### 4-4 ROOF WALKWAYS

A. To protect the roofing membrane, InnoviStep TPO Walkway Pads must be placed on the membrane at all roof access points and wherever routine traffic on the membrane is anticipated at least once each month - such as around rooftop units and other rooftop items that may require maintenance or service - as well as at all locations specified by the project designer. Install walkway pads according to IKO details and application instructions; walkway pads installed on adhered systems should be adhered, walkway pads installed on mechanically attached systems should be heat-welded. Never install walkway pads over membrane seams.

B. If areas of consistent or extreme traffic are expected, contact IKO to discuss enhanced solutions to help prevent or mitigate damage to the roofing membrane components. Use of pavers as walkways requires that a loose-laid, sacrificial layer of IKO InnoviTPO Membrane is installed under the pavers.

C. Damage to the roofing system from foot traffic is not covered by any IKO warranty. Walkway maintenance is the responsibility of the building owner and not part of the warranted roofing system.

## SECTION 5

### 5-1 DAILY SEAL

A. **Daily Seal (also "Night Seal" or "Night Tie-Off").** A watertight seal must be applied to the edge of the roofing layers at the end of each day's work and prior to any inclement weather. Locate daily seals on the downslope so that water flows away from the sealed membrane edge. Seal locations should be planned carefully in advance, so that drainage is not restricted during construction by partially installed roof sections.

B. **Daily Seal Installation.** Ensure that enough membrane is extended out to create a tight seal. Recover applications over gravel-surfaced membranes require that all existing gravel surfacing is removed from the area to be sealed. Install a temporary seal or flashing strip to ensure that moisture does not flow beneath or damage any completed section of the new roofing system.

C. **Daily Seal Removal and Cleanup.** Membrane contaminated with the sealant or flashing used as a night seal must be cut away and discarded prior to resumption of work. All residual adhesive or sealant must be completely removed from the substrate before roofing can continue.

### 5-2 FINISHED ROOF PROTECTION

A. **Protection From Other Trades.** Once the roof system installation is substantially completed, the roofing membrane and flashing must be protected from physical damage by continuing construction work by other trades. Work with the general contractor or building owner to determine what trades might work on or over the completed roof and where their work is expected to take place. Overlay the completed roof system at all of these work areas with slip sheets of scrap membrane and lay OSB or plywood over the slip sheets.

B. **When Damage by Others Occurs.** Regularly inspect the completed roof system during work by other trades. If damage occurs to the roof system, bring it to the general contractor or building owner's attention immediately. Repairs should be made at the earliest opportunity in order to preserve the waterproof integrity of the installed roof system and to ensure that issuance of the roof system warranty is not impeded.

## 5-3 MEMBRANE REPAIR

A. **Clean the Roofing Membrane.** Prior to starting repairs to installed IKO InnoviTPO Membrane, completely clean the area to be repaired, using a scrub brush and warm soapy water. Rinse the area with clear water and fully dry the area with clean cloths. Apply InnoviPrime TPO Pre-Wash or TPO Pre-Wash LVOC to the area to be repaired.

B. **Repair Using a Patch of Reinforced TPO Membrane.** Cut a piece of IKO InnoviTPO Membrane large enough so that it extends a minimum of 2 inches (50.8 mm) past the affected area in every direction. Round the corners of the repair patch and heat-weld the patch to the roofing membrane. Apply a continuous 1/8-inch (3.1-mm) bead of InnoviSeal TPO Cut Edge Sealant around the entire outer edge of the patch. (No other sealant may be used for cut edges.)

C. **Making Multiple Repairs.** Whenever more than six repairs are required in an area less than one square (100 sq. ft. [9.3 $m^2$]), the contractor may install a cut piece of IKO InnoviTPO Membrane extending a minimum of 6 inches (152.4 mm) past the damaged area, over the existing membrane. The membrane should be applied in the same manner as the existing membrane. Apply a continuous 1/8-inch (3.1-mm) bead of InnoviSeal TPO Cut Edge Sealant around the entire outer edge of the membrane patch. (No other sealant may be used for cut edges.)

D. **Extensive Areas of Damage.** Contact your IKO Commercial representative regarding areas of extensive damage. Your IKO Commercial representative will work with you to provide a repair scenario that will enable the existing IKO warranty to continue.

## 5-4 CLEANUP

A. **General Cleaning Instructions.** IKO InnoviTPO Membrane cleans easily by gently scrubbing with nonabrasive soapy water (such as a gentle dishwashing detergent, in small amounts) and rinsing the area with clean water from a hose or other generic water source.

B. **Using InnoviPrime TPO Pre-Wash.** Small areas that are stubborn to soapy water may be cleaned with a scrub brush and InnoviPrime TPO Pre-Wash. Rinse the cleansed area with clean water from a hose or other generic water source.

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