

## SECTION 07 54 23

### THERMOPLASTIC OLEFIN MEMBRANE ROOFING SYSTEM (TPO)

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Furnish and install fully adhered elastomeric sheet roofing system over metal deck, including:
  - 1. Roofing manufacturer's requirements for the specified warranty.
  - 2. Preparation of existing roofing substrates.
  - 3. Insulation.
  - 4. Thermoplastic Olefin membrane roofing.
  - 5. Metal roof edging and copings.
  - 6. Flashings.
  - 7. Roof drains
  - 8. Other roofing-related items specified or indicated on the drawings or otherwise necessary to provide a complete weatherproof roofing system.
- B. Removal and disposal of existing roofing and insulation.
- C. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.
- D. Comply with the published recommendations and instructions of the roofing membrane manufacturer.
- E. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

##### 1.2 REFERENCES

- A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.
- B. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2004.
- C. ASTM C 1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2004.
- D. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 2003.
- E. ASTM D 1004 - Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting; 2003.
- F. ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials; 2005a.

- G. ASTM D 6878 - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2003.
- H. CAN-ULC-S770 - Standard Test Method Determination of L-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; 2003.
- I. FM 1-28 - Design Wind Loads; Factory Mutual System; 2002.
- J. FM 1-29 - Roof Deck Securement and Above Deck Roof Components; Factory Mutual System; 2005.
- K. PS 1 - Construction and Industrial Plywood; 1995.
- L. PS 20 - American Softwood Lumber Standard; 2005.
- M. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2003. (ANSI/SPRI ES-1).

### 1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definition of terms related to roofing work not otherwise defined in the section.
- B. LTTR: Long Term Thermal Resistance, as defined by CAN-ULC S770.

### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
  - 2. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.
  - 3. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
  - 1. Flashings and membrane terminations.
  - 2. Insulation fastening patterns.
  - 3. Sheet layout with perimeter and corner defined.
- C. Samples for Verification: For the following products:
  - 1. Thermoplastic (TPO) Membrane
  - 2. Insulation Board
- D. Samples: Submit samples of each product to be used.

- E. Specimen Warranty: Submit prior to starting work.
- F. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications.
- G. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.
- H. Executed Warranty.
- I. Membrane must be Energy Star rated.\

## 1.6 QUALITY ASSURANCE

- A. No private label products or products manufactured by second party are allowed.
  - 1. All roofing membrane products must be manufactured by Roofing Manufacturer.
- B. Applicator Qualifications: Roofing installer shall have the following:
  - 1. Current GAF Master or Master Select Contractor status.
  - 2. At least five years experience in installing specified roofing system.
  - 3. Capability to provide payment and performance bond to building owner.
- C. Contractor providing work under this section will install work specified in this section with their company's own installers, employed by the company. Subcontracting of installation will not be allowed.
- D. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.
  - 1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
  - 2. Notify Architect well in advance of meeting.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.
- B. Store materials clear of ground and moisture with weather protective covering.
- C. Keep combustible materials away from ignition sources.

## 1.8 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Do not apply roofing membrane during inclement weather or when air temperature may fall below 40 degrees F.
  - 2. Do not apply roofing membrane to damp or frozen deck surface.
  - 3. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weather proofed during same day.

## 1.9 ROOFING CONTRACTOR'S QUALIFICATIONS

- A. Contractor shall submit written statement authorized by the roofing system manufacturer to be certified to install the specified manufacturer's materials and has been certified for two consecutive years.
- B. The contractor shall use adequate amounts of such qualified workmen who are thoroughly trained in the crafts and techniques required to properly install the type of roofing system proposed for use and other work required to complete the work specified and within the specified time.
- C. The contractor shall have a superintendent having five (5) years experience installing the roof system specified, who is familiar with the requirements of this project, on the job at all times when roofing system work is in progress.

## 1.10 ROOFING MANUFACTURER INSPECTION

- A. Final inspection by roofing manufacturer's representative is mandatory prior to substantial completion. **Architect to be notified a minimum of 24 hours prior to manufacturer's inspection and be performed in his presence.**
- B. Written proof of final inspection by roofing manufacturer's representative is to be included in closeout documents.
- C. **It will be mandatory** that the final roof inspection report containing items to be corrected be sent to Architect for his records.
- D. Upon date of Substantial Completion, a **No Dollar Limit Warranty** will be issued and begin for a Twenty (20) year period for the total system warranty. **No exceptions.** .

## 1.11 PRE-ROOFING MEETING AGENDA

- A. Verifying roof type and insulation thickness with roofing sub.
- B. Warranty: 2 year-installer/15 year OR 20 year NDL-manufacturer
- C. Manufacturer's scheduled inspection for warranty-Notification of Architect
  - 1. Warranty period does not start until date of Substantial Completion
  - 2. Distribution of inspection review to Architect
- D. Areas of concern:
  - 1. Covering over top of parapet walls with roofing membrane
  - 2. Temporary sealing of roofing membrane against walls until parapet wall membrane flashing or reglets are installed
  - 3. Installation of welded sub-flashing pieces at parapet corners
  - 4. Installation of crickets at equipment curbs
  - 5. Turning up roofing membrane to top of equipment curbs.

6. Sealing of roof penetrations at membrane
7. Keeping roof clean after roofing is installed (trash, screws, nails, etc.)
8. Positive slope all areas

E. Schedule of installation for each area of building.

## 1.12 WARRANTY

- A. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.
- B. Warranty: GAF Diamond Pledge 20 -Year NDL Warranty covering membrane, roof insulation, and membrane materials and accessories.
  1. Limit of Liability: No dollar limitation.
  2. Scope of Coverage: Repair leaks in the roofing system caused by:
    - a. Ordinary wear and tear of the elements.
    - b. Manufacturing defect in GAF brand materials.
    - c. Defective workmanship used to install these materials.
    - d. Damage due to winds up to 55 mph (88 km/h).
- C. Roof flashings, metal work and expansion joint covers shall be covered under installer's two (2) year warranty.
- D. In addition to Mfg's Warranty, a Company 2-year Guarantee from the installer (included in this specification) shall be delivered to the Owner as a condition of Acceptance.
- E. Roofer will provide a letter stating the roof system meets or exceeds 1-90 uplift design requirements.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Roofing System: GAF, Incl, Parsippany, NJ. [www.GAF.com](http://www.GAF.com). (973-628-3884)
  1. Roofing systems manufactured by others are acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:
    - a. Specializing in manufacturing the roofing system to be provided.
    - b. Minimum ten years of experience manufacturing the roofing system to be provided.
    - c. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.
    - d. ISO 9002 certified.
    - e. Able to provide isocyanate insulation that is produced in own facilities.
    - f. Roofing systems manufactured by the companies listed below are acceptable provided they are completely equivalent in materials and warranty conditions:
    - g. Able to provide membrane that is produced in own facilities.
- B. Manufacturer of Insulation and Cover Boards: Same manufacturer as roof membrane.

- C. Manufacturer of Metal Roof Edging:
  - 1. Metal roof edging products by manufacturers other than roofing manufacturer are acceptable but must be approved by roofing manufacturer.
  - 2. Field- or shop-fabricated metal roof edgings are acceptable but must be covered under the scope of the roofing membrane system no dollar limit warranty.
- D. Acceptable alternate manufacturers (Must meet guideline requirements as specified this section)
  - 1. Johns Manville JM TPO, 717 17<sup>th</sup> Street, Denver, CO 80202 (800) 922-5922
  - 2. Carlisle Syntec Sure-Weld TPO, PO Box 7000, Carlisle, PA 17013, 800-479-6832
  - 3. Elevate .060 mil TPO, 26 Century Blvd., Nashville, TN 37214, 800-428-4442.
- E. Substitution Procedures: See Instructions to Bidders.
  - 1. Submit evidence that the proposed substitution complies with the specified requirements. Comply with Section 01 60 00.

## 2.2 ROOFING SYSTEM DESCRIPTION

- A. Roofing System:
  - 1. Membrane: Thermoplastic olefin (TPO).
  - 2. Thickness: .060 mil
  - 3. Membrane Attachment: Fully Adhered.
  - 4. Slope: 1/4 inch per foot minimum by means of sloped roof deck and tapered insulation, refer to drawings.
  - 5. Comply with applicable local building code requirements.
  - 6. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification.
  - 7. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and 1-29, and meeting minimum requirements of FM 1-90 wind uplift rating.
- B. Insulation:
  - 1. Total R Value: 20 minimum.
  - 2. Tapered: Slope as indicated; provide minimum R-value at thinnest point; place tapered layer on top.
  - 3. Base Layers: Polyisocyanurate foam board, non-composite.
    - a. Attachment: Mechanically fastened.
  - 4. Top Layer: Where shown and required: 1/4"/foot tapered Polyisocyanurate foam board, non-composite.
    - a. Attachment: Mechanically fastened.

## 2.3 TPO MEMBRANE MATERIALS

- A. Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D 6878, with polyester weft inserted reinforcement and the following additional characteristics:
  - 1. Thickness: 0.060 inch (1.52 mm) plus/minus 10 percent, with coating thickness over reinforcement of 0.024 inch (0.61 mm) plus/minus 10 percent.

2. Sheet Width: Provide sheets of width necessary to accommodate batten spacing required by manufacturer for project conditions.
  3. Puncture Resistance: 380 lbf (1174 N), minimum, when tested in accordance FTM 101C Method 2031.
  4. Solar Reflectance: 0.81, minimum, when tested in accordance with ASTM C 1549.
  5. Color: White.
  6. Acceptable Product: Energy Guard TPO by GAF.
- B. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.
1. Thickness: 0.060 inch (1.52 mm) plus/minus 10 percent.
  2. Tensile Strength: 1550 psi (10.7 MPa), minimum, when tested in accordance with ASTM D 638 after heat aging.
  3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D 638 after heat aging.
  4. Tearing Strength: 12 lbf (53 N), minimum, when tested in accordance with ASTM D 1004 after heat aging.
  5. Color: White.
  6. Acceptable Product: EverGuard Detailing Membrane by GAF.
- C. Tape Flashing 6 inch (140 mm) nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.045 inch (1.6 mm) nominal; EverGuard Cover Tape by GAF.
- D. Pourable Sealer: One Part Pourable Sealer by GAF.
- E. Bonding Adhesive: Neoprene and SBR rubber blend, formulated for compatibility with the membrane other substrate materials, including masonry, wood, and insulation facings; TPO Solvent Based Bonding Adhesive 1121 by GAF.
- F. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.
- G. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches (33 mm) wide by 0.10 inch (2.5 mm) thick; Termination Bar by GAF.
- H. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; Everguard TPO Cut Edge Sealant by GAF.
- I. Seal Caulk Grade by GAF.
- J. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; Vent Boot Pipe Flashing by GAF.

## 2.4 ROOF INSULATION AND COVER BOARDS

- A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C 1289 Type II Class 1, with the following additional characteristics:
1. Thickness: 3.5 " = 1.5" + 2.0" + 1/4" per foot tapered ISO where shown on drawings.
    - a. Insulation Joints must be staggered.

2. Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
    - a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
  3. R-Value (LTTR):
    - a. 3.5 inch Thickness: (R20 minimum)
  4. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
  5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
  6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
  7. Acceptable Product: EnergyGuard Polyisocyanurate Insulation by GAF.
- B. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

## 2.5 METAL ACCESSORIES

- A. Parapet Copings: Formed metal coping with galvanized steel anchor/support cleats for capping any parapet wall; watertight, maintenance free, without exposed fasteners; butt type joints with concealed splice plates; mechanically fastened as indicated; 24 gauge steel with Kynar finish. Designer to select color.

## 2.6 ACCESSORY MATERIALS

- A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.
1. Width: 3-1/2 inches (90 mm), nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.
  2. Thickness: Same as thickness of roof insulation.

## 2.7 MISCELLANEOUS ACCESSORIES

- A. Roofing Fasteners: Galvanized or non-ferrous type, size, and style as required to suit application.
- B. Mechanical Fasteners for Insulation: Appropriate to purpose intended and approved by Factory Mutual; length required for thickness of material; with metal washers. Type as required to fastening into metal deck.

# PART 3 EXECUTION

## 3.1 GENERAL

- A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

- B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.
- C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.
- D. Perform work using competent and properly equipped personnel.
- E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.
- F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).
- G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
  - 1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
  - 2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
  - 3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.
- H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.
- I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

### 3.2 EXAMINATION

- A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck. Observe and verify deck is not damaged prior to insulation installation.
- B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.
- C. Examine roof substrate to verify that it is properly sloped to drains.
- D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

### 3.3 PREPARATION

- A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

- B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.
- C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch (6 mm) wide with fill material acceptable insulation to membrane manufacturer.
- D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.
- E. The total extent of preparation shall include the above and comply with the membrane manufacturer's recommendations.

### 3.4 INSULATION AND COVER BOARD INSTALLATION

- A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.
- B. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.
- C. Lay roof insulation in courses parallel to roof edges.
- D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch (6 mm). Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).
- E. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by Factory Mutual for FM Class specified in PART 2 and membrane manufacturer, whichever is more stringent.

### 3.5 THERMOPLASTIC OLEFIN MEMBRANE INSTALLATION

- A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.
- B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.
- C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.
- D. Install membrane adhered to the substrate, with edge securement as specified.
- E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
- F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6 ) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
  - 1. Exceptions: Round pipe penetrations less than 18 inches (460 mm) in diameter and square penetrations less than 4 inches (200 mm) square.

2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

### 3.6 FLASHING AND ACCESSORIES INSTALLATION

- A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.
- B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
  1. Follow roofing manufacturer's instructions.
  2. Remove protective plastic surface film immediately before installation.
  3. Install water block sealant under the membrane anchorage leg.
  4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
  5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
  6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
  7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.
- C. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.
  1. Use the longest practical flashing pieces.
  2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
  3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
  4. Provide termination directly to the vertical substrate as shown on roof drawings.
- D. Roof Drains:
  1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
  2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
  3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
  4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
  5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

- E. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.
  - 1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
  - 2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1 inch (25 mm) clearance from penetration, sloped to shed water.
  - 3. Structural Steel Tubing: If corner radii are greater than 1/4 inch (6 mm) and longest side of tube does not exceed 12 inches (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.
  - 4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer.
  - 5. High Temperature Surfaces: Where the in-service temperature is, or is expected to be, in excess of 180 degrees F (82 degrees C), protect the elastomeric components from direct contact with the hot surfaces using an intermediate insulated sleeve as flashing substrate as recommended by membrane manufacturer.
- F. After constructing pitch pans for conduit and piping penetrating roof system, fill pitch pans with pourable sealer to completely waterproof penetrations.

### 3.7 FINISHING AND WALKWAY INSTALLATION

- A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
- B. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1.0 inch (25 mm) and maximum of 3.0 inches (75 mm) from each other to allow for drainage.
  - 1. If installation of walkway pads over field fabricated splices or within 6 inches (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6 inches (150 mm) on either side.
  - 2. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

### 3.8 FIELD QUALITY CONTROL

- A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).
- B. Perform all corrections necessary for issuance of warranty.
- C. **NEW ROOFING SYSTEM SHALL NOT ALLOW PONDING WATER.**  
Architectural details are graphic in nature and do not show actual scale installation of roofing layers or flashing. Cut and/or taper wood blocking at roof edges along gutter side or at scuppers so that no ponding exists. Taper roofing insulation at perimeter of roof drains to allow proper drainage of surrounding roof, free of ponding.

### 3.9 CLEANING

- A. Clean all contaminants generated by roofing work from building, roof membrane, flashing, and surrounding areas, including bitumen, adhesives, sealants, clay, dirt and coatings.
- B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.
- C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

### 3.10 PROTECTION

- A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

### 3.11 EXISTING ROOFING SYSTEM

- A. Patch all areas of existing roof surfaces disturbed during re-flashing, mechanical work, or other areas needing repair. Match surface conditions (ie: gravel or smooth surface, asphalt shingle, etc.). Owner's representative to inspect and approve all work and entire roof surface prior to acceptance. Level areas where ponding water previously occurred.

END OF SECTION

## COMPANY LETTERHEAD

### CERTIFICATE OF GUARANTEE FROM INSTALLER

We, \_\_\_\_\_  
(Name of Company or Contractor) agree to maintain the roofing and flashing on the below mentioned building for the period indicated. This agreement is to render the roof and the flashing waterproof subject to the conditions outlined below.

OWNER OF BUILDING \_\_\_\_\_

Location of Building \_\_\_\_\_

City \_\_\_\_\_ Roof Area \_\_\_\_\_ square feet \_\_\_\_\_

This Guarantee effective this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, for the term of two (2) years from this date, provided any defects result from defective material or workmanship and are not caused by other mechanics, fire, accidents, or by nature over which we have no control.

It is understood and agreed that the Contractor will not be responsible for leaks or failure in the roofing system or flashing due to sustained winds in excess of speeds stated in manufacturer's warranty, distortion of the foundation on which the roofing rests, excessive hail storms, or any other conditions over which we have no control as stated in manufacturer's exclusions.

Signed \_\_\_\_\_  
Name of Company

By \_\_\_\_\_

Position \_\_\_\_\_

Company is a \_\_\_\_\_  
Corp./Partnership/Individual

NOTARY PUBLIC

Registered in the State of \_\_\_\_\_

SEAL

**NOTE:** Roof system manufacturer's NDL Twenty (20) year warranty from the manufacturer is to be submitted in addition to the guarantee from the installer found on this form. Manufacturer's Warranty is mandatory - **NO EXCEPTIONS.**