



SECTION 07540

THERMOPLASTIC SINGLE-PLY ROOFING

*City of Tarrant
Parks and Recreation*

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Thermoplastic Polyolefin Single-Ply Roofing Membrane
 - 2. Thermoplastic Polyolefin Flashings
 - 3. Thermoplastic Polyolefin Accessories
 - 4. Insulation
- B. Related Sections
 - 1. Section 06100: Rough Carpentry
 - 2. Section 07620: Sheet Metal Flashing and Trim
 - 3. Section 15430: Plumbing Specialties

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM) - *Annual Book of ASTM Standards*
 - 1. ASTM D-751 – Standard Test Methods for Coated Fabrics
 - 2. ASTM D-2137 - Standard Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics
 - 3. ASTM E-96 - Standard Test Methods for Water Vapor Transmission of Materials
 - 4. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
 - 5. ASTM D-471 - Standard Test Method for Rubber Property—Effect of Liquids
 - 6. ASTM D-1149 - Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
 - 7. ASTM C-1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
 - 8. ASTM C-1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
 - 9. ASTM E 903 – Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres
 - 10. ASTM G155 - Standard Practice For Operating Xenon Arc Light Apparatus For Exposure Of Non-Metallic Materials
 - 11. ASTM D573 - Standard Test Method For Rubber - Deterioration In An Air Oven
- B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - *Architectural Sheet Metal Manual*
- C. National Roofing Contractors Association (NRCA)
- D. American Society of Civil Engineers (ASCE)
- E. U.S. Green Building Council (USGBC)
 - 1. Leadership in Energy and Environmental Design (LEED)
- F. Factory Mutual (FM Global) - *Approval Guide*
- G. Underwriters Laboratories (UL) - *Roofing Systems and Materials Guide (TGFU R1306)*

H. California Title 24 Energy Efficient Standards

I. ENERGY STAR

J. Cool Roofing Rating Council (CRRC)

K. Miami-Dade County

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) *Roofing and Waterproofing Manual* for definitions of roofing terms related to this section.

1.04 SUBMITTALS

A. Product Data: Provide product data sheets for each type of product indicated in this section.

B. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.

C. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.

D. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in this section.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: GAF shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installer's Qualifications:

1. Installer shall be classified as a *Master or Master Select™* contractor as defined and certified by GAF.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

D. Final Inspection

Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

1.06 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, GAF representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions and agreements reached (or disagreements), and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.

1.07 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

- B. GAF shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.08 REGULATORY REQUIREMENTS

- A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver all roofing materials to the site in original containers, with factory seals intact. All products are to carry a GAF® label.
- B. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.
- C. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.
- D. Remove manufacturer supplied plastic covers from materials provided with such. Use “breathable” type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.
- E. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.

1.10 PROJECT CONDITIONS

- A. Weather
 1. Proceed with roofing only when existing and forecasted weather conditions permit.
 2. Ambient temperatures must be above 45°F (7.2°C) when applying hot asphalt or water based adhesives.

1.11 WARRANTY

- A. Provide Manufacturers standard EverGuard® Diamond Pledge™ Guarantee with single source coverage and no monetary limitation where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
 1. Duration: Up to Twenty (20) years from the date of completion.

*Materials and workmanship of listed products within this section when installed in accordance with current GAF application and specification requirements. Contact GAF Contractor Services for the full terms and conditions of the guarantee.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. GAF® - 1 Campus Drive, Parsippany, NJ 07054

2.02 INSULATION

- A. Rigid polyisocyanurate cover board, with coated polymer-bonded glass fiber mat facers on both major surfaces of the core foam conforming to or exceeding the requirements of ASTM C 1289, Type 2, Class 4, Grade 1. **EnergyGuard™ HD Polyiso Insulation**, with the following characteristics:
 1. Board Thickness: ½” or 12.7mm

2. Minimum Compressive Strength: 80psi (551kPa)
3. Thermal Resistance (LTTR value) of: >2.5

2.03 MEMBRANE MATERIALS

- A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.
 1. 10' X 100', each roll contains 1000 sq. ft. of roofing material weighing 322 lbs. Each half sheet roll contains approximately 500 sq. ft. of roofing material, 5' X 100', weighing 162 lbs.

2.04 FLASHING MATERIALS

- A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.

2.05 ADHESIVES, SEALANTS and PRIMERS

- A. Solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard TPO membranes, **EverGuard® 1121 Bonding Adhesive**, by GAF.
- B. Solvent based liquid, required to protect field cut edges of EverGuard TPO membranes. Applied directly from a squeeze bottle, **EverGuard® TPO Cut Edge Sealant**, by GAF.
- C. Solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® TPO Primer**, by GAF.
- D. Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding, **EverGuard® TPO Seam Cleaner**, by GAF.
- E. Solvent based, trowel grade synthetic elastomeric sealant. Durable and UV resistant suitable for use where caulk is typically used. Available in 10 oz. tubes, **FlexSeal™ Caulk Grade Roof Sealant** by GAF.
- F. Commercial grade roofing sealant suitable for sealing the upper lip of exposed termination bars and penetrations and around clamping rings and comes with a 20 yr. ltd warranty against leaks caused by manufacturing defects. Meets the performance criteria of ASTM D412, ASTM D2196, ASTM D1475 and ASTM D1644, **FlexSeal™ Roof Sealant**, by GAF.

2.06 ADHESIVES, SEALANTS and PRIMERS

- A. Low VOC solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard TPO membranes, **EverGuard® Low VOC Bonding Adhesive**, by GAF. Available in 3 square or 6 square coverage rates.
- B. Low VOC solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® TPO Low VOC Primer**, by GAF.
- C. Low VOC TPO cleaner designed to clean exposed or contaminated seams prior to heat welding to remove any residual soap or revitalize aged membranes. Contains only 50 grams per liter of Volatile Organic Content and

has been formulated using a blend of primarily VOC-exempt ingredients to be in compliance with air quality regulations for single ply roofing products. **EverGuard® CleanWeld® Cleaner** by GAF®.

- D. One part butyl based high viscosity sealant suitable for sealing between flashing membrane and substrate surface behind exposed termination bars and for sealing between roofing membrane and drain flange. **EverGuard® Water Block**, by GAF.
- E. One-part, moisture-cure, self-leveling sealant designed for use in pitch pans on single ply roof systems. **EverGuard® One-Part Pourable Sealant**.

2.07 ACCESSORIES

A. Mechanical Fasteners

1. **Drill•Tec™ Standard Screws:** Standard duty alloy steel insulation fastener with CR-10 coating with a .220" diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips head for use on steel and wood decks.
2. **Drill•Tec™ HD Screws:** Heavy gauge alloy steel fastener with CR-10 coating with a .245" (6.2 mm) diameter thread. Miami Dade and Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on wood, concrete and steel decks.
3. **Drill•Tec™ Insulation Plates:** Galvalume, 3" (76 mm) diameter, suitable for use with Drill•Tec™ Standard and HD screws, and Drill•Tec™ Spikes. Special design available for use with Drill•Tec™ Polymer Screws.

B. FLASHING ACCESSORIES

1. A smooth type, unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing/reinforcing material for penetrations and corners. Required whenever preformed vent boots cannot be used, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green, 0.055 inches (55 mils) nominal thickness and sheet size: 24in x 50ft. **EverGuard® TPO Detailing Membrane**, by GAF.
2. An 8 inch (20 cm) wide smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip for use as a cover strip over coated metal and stripping-in coated metal flanges and general repairs: 0.045 inches (45 mils) nominal thickness with 100 foot length, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green **EverGuard® TPO Flashing Membrane**, by GAF.
3. Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched slotted holes at 6" on center or 8" on center. ¾" x 10' with 0.090" cross section, **Drill-Tec™ Termination Bar**, by GAF.
4. A 6 inch (14 cm) wide, smooth type, heat-weldable polyester scrim reinforced thermoplastic polyolefin membrane strip. Designed for use as a cover strip over non-coated metal edges and flanges. Each full roll contains approximately 100 Lineal Ft. of material, 6" X 100'. **EverGuard® TPO Heat-Weld Cover Tape**, by GAF.
5. .045" reinforced TPO membrane with pressure sensitive adhesive, to be installed on horizontal surfaces using plates and fasteners as a base attachment in fully adhered systems. Size 6" x 100', **EverGuard® RTA (Roof Transition Anchor) Strip™**, by GAF
6. 24 gauge steel with 0.025" thick TPO based film as required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves. Standard sheet size 4' x 10', sheet weight 47 lbs. Custom sizes available, **EverGuard® TPO Coated Metal**, by GAF.

C. WALL & CURB ACCESSORIES

1. 55 mil TPO membrane and 24 gauge coated metal prefabricated into standard and custom size thru wall scuppers. Available in two sizes: 4" x 6" x 12" (l x w x d) with a 5.75" x 3.75" opening and 8" x 10" x 12" (l x w x d) with a 9.75" x 7.75" opening, **EverGuard® TPO Scupper**, by GAF
2. .045" thick reinforced TPO membrane fabricated corners. Available in four standard sizes to flash curbs. Four corners are required to flash the curb, **EverGuard® Corner Curb Wraps**, by GAF.
3. 0.045" thick molded TPO membrane outside corners of base and curb flashing. Hot-air welds directly to EverGuard TPO membrane. Size 4" x 4" with 6" flange, **EverGuard® TPO Universal Corners** by GAF.
4. 0.055" molded TPO membrane inside corners of base and curb flashing. Hot-air welds directly to EverGuard TPO membrane. Size 6" x 6" x 5.5" high **EverGuard® TPO Preformed Corners** by GAF.
5. 8" diameter, nominal .050" vacuum formed unreinforced TPO membrane for use in flashing outside corners of base and curb flashings, **EverGuard® TPO Fluted Corner**, by GAF.

D. PENETRATION ACCESSORIES

1. 0.075" thick molded TPO membrane sized to accommodate most common pipe and conduits, (1" to 6" diameter pipes), including square tube. Hot-air welded directly to EverGuard TPO membrane, supplied with stainless steel clamping rings, **EverGuard® TPO Preformed Vent Boots** by GAF.
2. 0.045" thick molded TPO membrane preformed boots are split to accommodate most common pipes and conduits and available in three standard sizes, **EverGuard® TPO Split Pipe Boots**, by GAF.
3. 0.045" thick molded TPO membrane preformed square boots are split to accommodate most common square penetrations and conduits and available in three standard sizes, **EverGuard® TPO Square Tube Wraps**, by GAF.
4. .070 thick molded penetration pocket to provide structure and foundation for the application of a pourable sealant for a variety of roof penetrations, weldable and 9" x 6" x 4" (l x w x h). **EverGuard® TPO Pourable Sealer Pocket**
5. Constructed from spun aluminum and preflashed using .055" thick smooth type, unreinforced thermoplastic polyolefin membrane. Available in a wide range of sizes to allow a proper fit into any size roofing drain. **EverGuard® TPO Drain** by GAF
6. Aluminum drain unit coated with a weldable TPO compound. TPO membrane can be heat welded directly to the drain body, resulting in a strong, secure installation. Each drain is fitted with a BlueSeal® mechanical drain seal for a secure, tight seal into the building drain system. Available in two sizes (3" and 4"), and custom sizes are available. **EverGuard® TPO Coated Metal Drain** by GAF®

E. ROOF EDGE ACCESSORIES

- 1- New 24 gage gravel guard to match existing fabricated using GAF TPO coated metal
- 2- New G-90 24 ga metal counter flashing at all walls and curbs (no exposed term bar)
- 3- Replace 50ft of gutter to the south eave matching existing

F. FIELD OF ROOF ACCESSORIES

1. Pre-manufactured expansion joint covers used to bridge expansion joint openings in a roof structure. Fabricated to accommodate all roof to wall and roof to roof applications, made of .060" reinforced TPO membrane, available in 5 standard sizes for expansion joint openings up to 8" wide. **EverGuard® TPO Expansion Joint Covers**, by GAF

2. .055" thick smooth type, unreinforced thermoplastic polyolefin membrane designed for use as a conforming membrane seal over T-joints in 60 and 80 mil membrane applications. **EverGuard® T-Joint Patches**, by GAF.
3. 1/8" thick extruded and embossed TPO roll 34" x 50', heat welds directly to roofing membrane. Unique herringbone traction surface. Available in gray or yellow, **EverGuard® TPO Walkway Rolls**, GAF.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that the surfaces and site conditions are ready to receive work.
- B. Verify that the deck is supported and secured.
- C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.
- D. Verify that the deck surfaces are dry and free of ice or snow.
- E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.02 SUBSTRATE PREPARATION

- A. Recover – Over Existing Substrate
 1. Suitable roofs for recover shall be free of dust, dirt, debris, and any contaminants that may adversely affect the performance of the new roof. Areas of substantial deck deflection or membrane imperfections shall be corrected prior to installing any new roofing.
 2. For recover installations over single-ply, fluid applied, coal tar and metal roofs, contact GAF Contractor Services for prior approval and technical requirements.
 3. Taking test cuts to verify the existing roof construction and condition. Three test cuts should be made for roofs under 100 squares and one test cut per 100 squares above the minimum amount. It is highly recommended and in certain circumstances, required, that a moisture survey be made to determine the extent of wet insulation and moisture entrapment. Contact GAF Contractor Services for more information on moisture surveys.
 4. Existing substrates and insulation (if applicable) must be dry over the majority of the roof area. Wet or deteriorated areas of insulation and substrate must be removed and replaced with new materials. When adhering insulation or new roofing directly to the existing roof surface, the existing roof system components must be well attached to each other and their substrate.
 5. All applicable code requirements must be met for recover over an existing roofing system.
 6. GAF does not recommend partial recover or re-roofing of a single roof area due to the potential for defects in the portion of the roof system not replaced or negatively affecting the performance of the new membrane. When required by project conditions or budget considerations, GAF requires full separation of the old and new roof areas by means of a full curb mounted expansion joint or area divider installed to provide a complete watertight seal or break between areas. Tie-in constructions, in which the old and new membranes are adhered directly to each other and stripped in are not acceptable for coverage under certain guarantees.

3.03 INSTALLATION - GENERAL

- A. Install GAF's EverGuard® TPO roofing system according to all current application requirements in addition to those listed in this section.

- B. GAF EverGuard® TPO Specification #: TFARI60
- C. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.04 INSULATION - GENERAL

- A. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder must be repaired.
- B. Do not install wet, damaged or warped insulation boards.
- C. Install insulation boards with staggered board joints in one direction (unless taping joint).
- D. Install insulation boards snug. Gaps between board joints must not exceed ¼” (6 mm). All gaps in excess of ¼” (6 mm) must be filled with like insulation material.
- E. Wood nailers must be 3-1/2” (8.9 cm) minimum width or 1” (25 mm) wider than metal flange. They shall be of equal thickness as the insulation, and be treated for rot resistance. All nailers must be securely fastened to the deck.
- F. Do not kick insulation boards into place.
- G. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
- H. Insulation should not be installed over new lightweight insulating concrete.
- I. Do not install any more insulation than will be completely waterproofed each day.

3.05 INSULATION

- A. The insulation must be securely attached to the roof deck. A minimum FMRC 1-60 attachment is recommended. Refer to FMRC Approval Guide for FM fastening patterns. Factory Mutual requires fastener density increased in corner areas for FM 1-60 as well as perimeter and corner area fastener density increases for FM 1-90 or greater. Refer to FM Loss Prevention Data Sheets 1-7, 1-28, and 1-49.
- B. Use only fasteners with a minimum 3 inch (7.6 cm) stress plate when mechanically attaching insulation. Do not attach insulation with nails.

3.06 MEMBRANE APPLICATION

- A. Adhered:
 - 1. Place membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent attachment. Roof membrane shall be fully adhered immediately after it is rolled out, followed by welding to adjacent sheets.
 - 2. Overlap roof membrane a minimum of 3” (15 cm) for side laps and 3” (15 cm) for end laps.
 - 3. Install membrane so that the side laps run across the roof slope lapped towards drainage points.
 - 4. All exposed sheet corners shall be rounded a minimum of 1”.
 - 5. Use full width rolls in the field and perimeter region of roof.
 - 6. Use appropriate bonding adhesive for substrate surface, applied with a solvent-resistant roller, brush or squeegee.

7. Apply bonding adhesive at 3 squares of finished, mated surface area per 5 gallons. A greater quantity of bonding adhesive may be required based upon the substrate surface condition.
8. Apply bonding adhesive at 6 squares of finished, mated surface area per 5 gallons (Option 2 - Low VOC). A greater quantity of bonding adhesive may be required based upon the substrate surface condition.
9. Prevent seam contamination by keeping the adhesive application a few inches back from the seam area.
10. Adhere approximately one half of the membrane sheet at a time. One half of the sheet's length shall be folded back in turn to allow for adhesive application. Lay membrane into adhesive once the bonding adhesive is tacky to the touch.
11. Roll membrane with a weighted roller to ensure complete bonding between adhesive and membrane.
12. Membrane laps shall be heat-welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns and scorch marks.
13. Weld shall be a minimum of 1-1/2" in width for automatic machine welding and a minimum 2" in width for hand welding.
14. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
15. Supplemental membrane attachment is required at the base of all walls and curbs, and where the angle of the substrate changes by more than five (5) degrees (1" in 12"). Roofing membrane shall be secured to the structural deck with appropriate Drill-Tec™ screws and plates spaced every 12" o.c. The screws and plates must be installed no less than 1/2" from the membrane edge. Alternatively, the roofing membrane may be turned up the vertical plane a minimum of 3" and secured with screws and termination bar. Fastener spacing is the same as is used for in-lap attachment. The termination bar must be installed within 1-1/2" to 2" of the plane of the roof membrane, with a minimum of 1" of membrane extending above the termination bar.
16. Supplemental membrane attachment to the structural deck is required at all penetrations unless the insulation substrate is fully adhered to the deck. Roofing membrane shall be secured to the deck with appropriate Drill-Tec™ screws and plates.
17. Fasteners must be installed to achieve the proper embedment depth. Install fasteners without lean or tilt.
18. Install fasteners so that the plate or termination bar is drawn down tightly to the membrane surface. Properly installed fasteners will not allow the plate or termination bar to move (underdriving), but will not cause wrinkling of the membrane (overdriving).

3.07 FLASHINGS

A. General:

1. All penetrations must be at least 24" (61 cm) from curbs, walls, and edges to provide adequate space for proper flashing.
2. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.
3. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.
4. Hot-air weld all flashing membranes, accessories, and coated metal. A minimum 2" wide (hand welder) weld or minimum 1 - 1/2" automatic machine weld is required.
5. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
6. Consult the EverGuard® *Application and Specifications Manual* or GAF Contractor Services for more information on specific construction details, or those not addressed in this section.

B. Coated Metal Flashings:

1. Coated metal flashings shall be formed in accordance with current EverGuard construction details and SMACNA guidelines.
2. Coated metal sections used for roof edging, base flashing and coping shall be butted together with a 1/4" gap to allow for expansion and contraction. Hot-air weld a 6" wide reinforced membrane flashing strip to both sides of the joint, with approximately 1" on either side of the joint left un-welded to allow for expansion and contraction. 2" wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.

3. Coated metal used for sealant pans, scupper inserts, corners of roof edging, base flashing and coping shall be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. Hot-air weld a 6" wide reinforced membrane flashing strip over all seams that will not be sealed during subsequent flashing installation.
4. Provide a ½" hem for all exposed metal edges to provide corrosion protection and edge reinforcement for improved durability.
5. Provide a ½" hem for all metal flange edges whenever possible to prevent wearing of the roofing and flashing membranes at the flange edge.
6. Coated metal flashings shall be nailed to treated wood nailers or otherwise mechanically attached to the roof deck, wall or curb substrates, in accordance with construction detail requirements.

C. Reinforced Membrane Flashings:

1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.
2. Membrane flashing may either be installed loose or fully adhered to the substrate surface in accordance with "Construction Detail Requirements".
3. Where flashings are to be fully adhered, apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.
4. Apply the adhesive only when outside temperature is above 40°F. Recommended minimum application temperature is 50°F to allow for easier adhesive application.
5. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

D. Un-reinforced Membrane Flashings:

1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.
2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.
3. The un-reinforced membrane flashing shall be adhered to the penetration surface. Apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

E. Roof Edges:

1. Roof edge flashings are applicable for gravel stop and drip edge conditions as well as for exterior edges of parapet walls.
2. Flash roof edges with metal flanges nailed 4" O.C. to pressure-treated wood nailers. Where required, hot-air weld roof membrane to coated metal flanges.
3. When the fascia width exceeds 4", coated metal roof edging must be attached with a continuous cleat to secure the lower fascia edge. The cleat must be secured to the building no less than 12" O.C.
4. Alternatively, roof edges may be flashed with a 2-piece snap on fascia system, adhering the roof membrane to a metal cant and face nailing the membrane 8" on center prior to installing a snap-on fascia.
5. Flash roof edge scuppers with a coated metal insert that is mechanically attached to the roof edge and integrated as a part of the metal edging.

F. Parapet and Building Walls:

1. Flash walls with EverGuard TPO membrane adhered to the substrate with bonding adhesive, loose applied (Less than 24" in height) or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
2. Secure membrane flashing at the top edge with a termination bar. Water Block shall be applied between the wall surface and membrane flashing underneath all exposed termination bars. Exposed termination bars shall be mechanically fastened 8" on center; termination bars that are counter flashed shall be fastened 12" on center.
3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate:

Adhered Systems	12" on center
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4. All coated metal wall flashings and loose applied membrane flashings must be provided with separate metal counterflashing, or metal copings.
5. Metal counterflashing may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with FlexSeal® roofing cement or FlexSeal® caulk grade.
6. Flash wall scuppers with a coated metal insert that is mechanically attached to the wall and integrated as part of the wall flashing.

G. Curbs and Ducts:

1. Flash curbs and ducts with EverGuard TPO membrane adhered to the curb substrate with bonding adhesive, loose applied (Less than 18" in height) or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
2. Secure membrane flashing at the top edge with a termination bar. Water Block shall be applied between the curb/duct surface and membrane flashing underneath all termination bars. Exposed termination bars shall be mechanically fastened every 8" o.c.; termination bars that are counter flashed shall be fastened 12" on center.
3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate:

Adhered Systems	12" on center
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4. All coated metal curb flashings and loose applied membrane flashings must be provided with separate metal counterflashing, or metal copings.
5. Metal counterflashing may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with FlexSeal® roofing cement or FlexSeal® caulk grade.

H. Roof Drains:

1. Roof drains must be fitted with compression type clamping rings and strainer baskets. Original-type cast iron and aluminum drains, as well as retrofit-type cast iron, aluminum or molded plastic drains are acceptable.
2. Roof drains must be provided with a minimum 36" x 36" sump. Slope of tapered insulation within the sump shall not exceed 4" in 12".
3. Extend the roofing membrane over the drain opening. Locate the drain and cut a hole in the roofing membrane directly over the drain opening. Provide a 1/2" of membrane flap extending past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations.
4. For cast iron and aluminum drains, the roofing membrane must be set in a full bed of water block on the drain flange prior to securement with the compression clamping ring. Typical water block application is one 10.5 ounce cartridge per drain.
5. Lap seams shall not be located within the sump area. Where lap seams will be located within the sump area, a separate roof membrane drain flashing a minimum of 12" larger than the sump area must be installed. The roof membrane shall be mechanically attached 12" on center around the drain with screws and plates. The separate roof drain flashing shall be heat welded to the roof membrane beyond the screws and plates, extended over the drain flange, and secured as above.
6. Tighten the drain compression ring in place.

3.08 TRAFFIC PROTECTION

- A. Install walkway rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.
- B. Walkway pads must be spaced 2" apart to allow for drainage between the pads.
- C. Heat-weld walkway rolls to the roof membrane surface continuously around the perimeter of the roll.
- D. Walkway rolls may be installed with TPO primer and 3" seam tape.
 - 1. Roll or brush the TPO primer on the back of the TPO pad along the edges and down the middle length of the pad.
 - 2. Clean and prime the roof membrane where the pad will be installed.
 - 3. Install tape to the back of the cleaned area of the pad and roll in with a silicone hand roller.
 - 4. Remove release paper and install the tapes pads directly onto the roof membrane. Roll pads to secure in place

3.09 ROOF PROTECTION

- A. Protect all partially and fully completed roofing work from other trades until completion.
- B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.
- C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.
- D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.10 CLEAN-UP

- A. All work areas are to be kept clean, clear and free of debris at all times.
- B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.
- C. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.
- D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.
- E. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.
- F. Clean and restore all damaged surfaces to their original condition.

END OF SECTION