



SECTION 07540

THERMOPLASTIC SINGLE-PLY ROOFING

EverGuard® RhinoBond® Attachment System

PREPARED BY:

GAF® Architectural Information Services

PROJECT NO:

*Note: GAF® does not practice architecture or engineering. This Design Line is provided as a guide specification and is based on criteria provided to GAF®. GAF® has not observed the jobsite conditions, contract specifications, or other documents and shall not be construed in any manner to be the designer of record.*

1. **GENERAL**
	1. SUMMARY
		1. Section Includes
			1. Thermoplastic Single-Ply Roofing
			2. Insulation
		2. Related Sections
			1. Section 06100: Rough Carpentry
			2. Section 07620: Sheet Metal Flashing and Trim
			3. Section 15430: Plumbing Specialties
	2. REFERENCES
		1. Factory Mutual (FM Global) - *Approval Guide*
		2. Underwriters Laboratories (UL) - *Roofing Systems and Materials Guide* (TGFU R1306)
		3. American Society for Testing and Materials (ASTM) - *Annual Book of ASTM Standards*
		4. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - *Architectural Sheet*

*Metal Manual*

* + 1. National Roofing Contractors Association (NRCA)
		2. American Society of Civil Engineers (ASCE)

**\*\*\*LEED ONLY\*\*\***

* + 1. U.S. Green Building Council (USGBC)
		2. Leadership in Energy and Environmental Design (LEED)
	1. DEFINITIONS
		1. 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.
	2. PERFORMANCE REQUIREMENTS
		1. 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.
		2. GAF® shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.
	3. SUBMITTALS
		1. Product Data: Provide product data sheets for each type of product indicated in this section.
		2. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.
		3. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.
		4. 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.

**\*\*\*LEED ONLY\*\*\***

* + 1. LEED Submittal: Coordinate with Section 01115 – Green Building Requirements, for LEED certification submittal forms and certification templates.
	1. LEED CERTIFICATION **\*\*\*LEED ONLY\*\*\***
		1. Provide a roofing system that will achieve or aid in the qualification of points satisfying:
			1. Sustainable Site Credit 7.2 – Heat Island Effect – Roof
			2. Materials & Resource Credit 5 – Local and Regional Materials
	2. QUALITY ASSURANCE
		1. Manufacturer’s Qualifications: GAF® shall provide a roofing system that meets or exceeds all criteria listed in this section.
		2. Installer’s Qualifications:
			1. Installer shall be classified as a ***Master or Master Select™*** contractor as defined and certified by GAF®.
			2. Installer shall be classified as a ***Master Select™*** contractor as defined and certified by GAF®.
			3. Installer shall be classified as a ***Master*** contractor as defined and certified by GAF®.
			4. Installer shall be classified as an ***Authorized*** contractor as defined and certified by GAF®.

**\*\*\*WellRoof only\*\*\***

* + 1. Installer’s Qualifications:
			1. Installer shall be classified as a ***Master or Master Select™*** contractor as defined and certified by GAF.
			2. Installer must be a GAF® Certified Maintenance Professional (CMP) to offer WellRoof™ Guarantee Extension Program.
		2. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.
		3. Final Inspection **\*\*\*ONLY DIAMOND PLEDGE\*\*\***

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. PRE-INSTALLATION CONFERENCE
		1. 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.
	2. REGULATORY REQUIREMENTS
		1. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.
		2. Exterior Fire Test Exposure: Provide a roofing system achieving a UL Class A B C \*\*\*CHOOSE ONE\*\*\* rating for roof slopes indicated.
		3. Windstorm Classification: Provide a roofing system which will achieve a Factory Mutual 1-60 1-75 1-90 1-120 1-135 1-150 1-180 \*\*\*CHOOSE ONE\*\*\* wind uplift rating, as listed in the current FM Approval Guide.
	3. DELIVERY, STORAGE AND HANDLING
		1. Deliver all roofing materials to the site in original containers, with factory seals intact. All products are to carry either a GAF® or BMCA® label.
		2. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.
		3. 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.
		4. 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.
		5. Materials shall be stored above 55°F (12.6°C) a minimum of 24 hours prior to application.
	4. PROJECT CONDITIONS
		1. Environmental Requirements & Restrictions
			1. Proceed with roofing only when existing and forecasted weather conditions permit.
			2. Make sure the RhinoBond® tool is set up properly for the ambient temperatures present.

* 1. WARRANTY **\*\*\*CHOOSE ONE WARRANTY\*\*\***
		1. Provide Manufacturers standard WeatherStopper® 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: Five(5), Ten (10), Fifteen (15), Twenty (20) **\*\*\*CHOOSE ONE\*\*\*** years from the date of completion.
		2. Provide Manufacturers standard WeatherStopper® Diamond Pledge™ Guarantee with single source Edge to Edge 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: Five(5), Ten (10), Fifteen (15), Twenty (20) **\*\*\*CHOOSE ONE\*\*\*** years from the date of completion.
		3. Provide Manufacturers standard WeatherStopper® Diamond Pledge™ Guarantee with the ***WELL ROOF™ Advantage***. Provides 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: Five(5), Ten (10),Twelve (12),Fifteen (15), Twenty (20) Twenty-Five (25) **\*\*\*CHOOSE ONE\*\*\*** years from the date of completion.
			2. Extension: GAF® also guarantees to the original or first subsequent owner that coverage shall be extended by 25% of the original guarantee length, provided that the roof in inspected and maintained in accordance with the MAINTAINENCE section of this specification.
		4. Provide Manufacturers standard WeatherStopper® System Pledge™ Guarantee with single source coverage and a monetary limitation of one (1) dollar per square foot where the manufacturer agrees to repair or replace components in the roof system, which cause a leak due to failure in materials or workmanship.
			1. Duration: Five (5), Ten (10), Fifteen (15), Twenty (20) **\*\*\*CHOOSE ONE\*\*\*** 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.

* + 1. Provide Manufacturers standard WeatherStopper® Integrated Roofing System Guarantee where the manufacturer agrees to repair or replace the portion of the roofing materials, which have resulted in a leak due to a manufacturing defect or defects caused by ordinary wear and tear.
			1. Duration: Five(5), Ten (10), Fifteen (15), Twenty (20) **\*\*\*CHOOSE ONE\*\*\*** years from the date of completion.
		2. Provide Manufacturers standard prorated material warranty where the manufacturer agrees to repair or replace the portion of the roofing materials that have resulted in a leak due to a manufacturing defect or defects caused by ordinary wear and tear.
			1. Duration:
		3. **\*\*\*60 and 80 mil only\*\*\***EverGuard® TPO Puncture Resistance Limited Warranty: GAF® warrants to the original building owner, that the EverGuard® TPO roof membrane will provide puncture and tear resistance when installed and maintained in accordance with GAF®’s requirements.
		4. EverGuard® TPO Reflectivity Limited Warranty: GAF® warrants to the original building owner, that the EverGuard® TPO white roof membrane will meet or exceed the initial and “aged” ENERGY STAR® reflectivity requirements for low slope roofing membranes (65% initial, 50% aged) when installed and maintained in accordance with GAF®’s requirements. The aged reflectivity shall meet or exceed these requirements when measured after cleaning the membrane in accordance with GAF® recommendations.
1. **PRODUCTS**
	1. ACCEPTABLE MANUFACTURER
		1. GAF® - 1361 Alps Road, Wayne, NJ 07470

* 1. PERMATE VAPOR RETARDER SYSTEM
		1. Permate Vapor Retarder is an asphalt impregnated kraft paper with fiberglass strand reinforced edges. Available in 32” X 405’ (10 square) rolls and 96” X 405’ (30 square) rolls.
		2. Permate Adhesive is a black, rubber-base solvent type adhesive used to secure Permate Vapor Retarder. Available in 5 gallon pails and 50 gallon drums.
	2. LEXSUCO VAPOR RETARDER SYSTEM
		1. Lexsuco Vapor Retarder is a specially compounded, flexible, black 4 mil vinyl sheet available in 32” X 405’ (10 square) rolls.
		2. Lexsuco R907-T Adhesive is used to secure the vapor retarder to the roof deck. It is a cold applied, black rubber based adhesive with a chlorinated solvent for fire retardency. Available in 5 gallon pails and 50 gallon drums.
	3. SEPARATION SHEET
		1. Fire resistant slip sheet reinforced with a heavy weight dimensionally stable fiberglass mat with a proprietary fire resistant coating. Designed to be installed within a roofing system to provide protection from exterior fire exposure. Each roll contains 10 squares (1000 sq ft) of material, approximately 6’ x 166.7’ (1.83 m x 50.8 m); 110.2 lbs (50 Kg), **VersaShield® Solo™** by GAF®.
	4. INSULATION **\*\*\*CHOOSE APPROPRIATE PRODUCTS\*\*\***
		1. Rigid polyisocyanurate board, with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972. **EnergyGuard™ Polyiso**, with the following characteristics:
			1. Board Thickness:
			2. Thermal Resistance (LTTR value) of:
		2. Rigid, high-density polyisocyanurate board, with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972. **EnergyGuard™ HD Polyiso**, with the following characteristics:
			1. Board Thickness: ½”
			2. Thermal Resistance (R value) of: 2.5
			3. Compressive Strength: 80 psi
		3. Rigid polyisocyanurate board, with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972. **EnergyGuard™ Tapered Polyiso**, with the following characteristics:
			1. Board Thickness: tapered
			2. Thermal Resistance (LTTR value) of: varies
		4. Rigid polyisocyanurate board, with an UltraShield coated glass-fiber facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972. **EnergyGuard™ Ultra Polyiso**, with the following characteristics:
			1. Board Thickness:
			2. Thermal Resistance (LTTR value) of:
		5. ASTM C-578 Type II, expanded polystyrene recover board (EPS), with the following characteristics:
			1. Compressive Strength: 15 psi minimum
			2. Board Density: 1.35 lbs. per cubic foot. minimum
			3. Board Thickness:
			4. Thermal Resistance:

**\* A cover board must be installed over this insulation prior to installing an EverGuard® TPO RhinoBond® roof system.**

* + 1. ASTM C-578 Type IX, High density expanded polystyrene board (EPS), with the following characteristics:
			1. Compressive Strength: 25 psi nominal
			2. Board Density: 1.8 lbs. per cubic foot. minimum
			3. Board Thickness:
			4. Thermal Resistance (R value) of:

**\* A cover board must be installed over this insulation prior to installing an EverGuard® TPO RhinoBond® roof system.**

* + 1. ASTM C-578 Type X, extruded polystyrene board (XPS), with the following characteristics:
			1. Compressive Strength: 15 psi minimum
			2. Board Density: 1.3 lbs. per cubic foot. minimum
			3. Board Thickness:
			4. Thermal Resistance (R value) of:

**\* A cover board must be installed over this insulation prior to installing an EverGuard® TPO RhinoBond® roof system.**

* + 1. ASTM C-578 Type X, 3/8” Extruded polystyrene fan-fold board (XPS), with the following characteristics:
			1. Compressive Strength: 15 psi minimum
			2. Board Density: 1.3 lbs. per cubic foot. minimum
			3. Board Thickness: 3/8” (5mm)
			4. Thermal Resistance (R value) of: 1.5

**\* A cover board must be installed over this insulation prior to installing an EverGuard® TPO RhinoBond® roof system.**

* 1. ROOF BOARD
		1. Underlayment or overlayment board with a water-resistantand silicone treated gypsum core with glass fiber facers embedded on both sides. **GP Dens-Deck® Roof Board**, distributed by BMCA®
			1. Board Thickness:
			2. Thermal Resistance (R value) of:
		2. Fiber-reinforced gypsum panel with an integral water-resistant core. Securock® Roof Board by US Gypsum.
			1. Board Thickness: ¼”
			2. Thermal Resistance (R value) of: .20
	2. MEMBRANE MATERIALS **\*\*\*CHOOSE APPROPRIATE PRODUCTS\*\*\***
		1. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.045 inch (45 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 256 lbs. **EverGuard® TPO 45 mil** thermoplastic single-ply roofing membrane by GAF®.
		2. 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF®.
		3. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.080 inch (80 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 420 lbs. **EverGuard® TPO 80 mil** thermoplastic single-ply roofing membrane by GAF®.
			1. Available Colors: White Gray Tan Regal Red Regal Blue Hartford Green Energy Gray Energy Tan
		4. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.050 inch (50 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 271 lbs. **EverGuard Extreme® TPO 50 mil** thermoplastic single-ply roofing membrane by GAF.
		5. 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. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. **EverGuard Extreme® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.
		6. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.070 inch (70 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 373 lbs. **EverGuard Extreme® TPO 70 mil** thermoplastic single-ply roofing membrane by GAF.
		7. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.080 inch (80 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 420 lbs. **EverGuard Extreme® TPO 80 mil** thermoplastic single-ply roofing membrane by GAF.
	3. FLASHING MATERIALS **\*\*\*CHOOSE APPROPRIATE PRODUCTS\*\*\***
		1. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.045 inch (45 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 256 lbs. **EverGuard® TPO 45 mil** thermoplastic single-ply roofing membrane by GAF®.
		2. 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. **EverGuard® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF®.
		3. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.080 inch (80 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 CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 420 lbs. **EverGuard® TPO 80 mil** thermoplastic single-ply roofing membrane by GAF®.
			1. Available Colors: White Gray Tan Regal Red Regal Blue Hartford Green Energy Gray Energy Tan
		4. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.050 inch (50 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 271 lbs. **EverGuard Extreme® TPO 50 mil** thermoplastic single-ply roofing membrane by GAF.
		5. 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. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. **EverGuard Extreme® TPO 60 mil** thermoplastic single-ply roofing membrane by GAF.
		6. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.070 inch (70 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 373 lbs. **EverGuard Extreme® TPO 70 mil** thermoplastic single-ply roofing membrane by GAF.
		7. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.080 inch (80 mil) thickness, for use as a single ply roofing membrane. Engineered to provide high solar reflectivity and extremely high UV and thermal resistance. These combined characteristics produce a single-ply membrane suitable for the most demanding solar installations as well as any other high heat or solar loading applications. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed and FM Approved. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 420 lbs. **EverGuard Extreme® TPO 80 mil** thermoplastic single-ply roofing membrane by GAF.
	4. ADHESIVES, SEALANTS and PRIMERS
		1. Solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard® TPO membranes, **EverGuard® TPO Bonding Adhesive**, by GAF®. **\*\*\*NOT TO BE USED IN NORTHEAST REGION\*\*\***
		2. Water-based Bonding Adhesive: Water based rubberized adhesive for use with EverGuard® TPO membranes, **EverGuard® H2O Bonding Adhesive**, by GAF®.
		3. Low VOC Solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard® TPO membranes. Contains less than 250 grams per liter of Volatile Organic Content (VOC) and has been formulated using a blend of VOC exempt and non-exempt solvents to be in compliance with air quality regulations for single ply roofing adhesives, **EverGuard® Low VOC TPO Bonding Adhesive**, by GAF®.
		4. Acrylic emulsion copolymer based adhesive for use with EverGuard® TPO membranes, **EverGuard® TPO WB181 Bonding Adhesive**, by GAF®
		5. 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®.
		6. Solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® Primer**, by GAF®. **\*\*\*NOT TO BE USED IN NORTHEAST REGION\*\*\***
		7. Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding, **EverGuard® TPO Seam Cleaner, by GAF®.**
		8. Solvent based synthetic elastomeric sealant designed for use where elastomeric caulks are required such as term bar applications, or around clamping rings at penetrations. **TOPCOAT® FlexSeal Caulk Grade**, by GAF®.
		9. 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®.
		10. 100% solids epoxy based two-part sealant suitable for filling sealant pans at irregularly-shaped penetrations. Epoxy is part A. Polyamide is part B. **EverGuard® 2-Part Pourable Sealant**, by GAF®.
	5. ACCESSORIES **\*\*\*CHOOSE APPROPRIATE PRODUCTS – EG Fasteners in BLUE\*\*\***
		1. Mechanical Fasteners
			1. **Drill•Tec™ HD Screws**: Heavy gauge alloy steel fastener with CR-10 coating with a .245” diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on wood, concrete and steel decks.
			2. **Drill•Tec™ XHD Screws**: Heavy gauge alloy steel fastener with CR-10 coating with a .275” diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on heavy steel decks.
			3. **Drill•Tec™ SXHD Screws**: Heavy gauge alloy steel fastener with CR-10 coating with a .320” diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on specific FM assemblies on heavy steel decks.
			4. **Drill-Tec™ Spikes**: Hammer-in, non-threaded fastener designed to secure insulation and membrane to structural concrete. Alloy steel fastener with a CR-10 coating and a .250 shank diameter.
			5. **Drill•Tec™ Purlin Fastener**: Alloy steel fastener with CR-10 coating with a .210” diameter thread. Factory Mutual Standard 4470 Approved, ¼” hex head. For use when mechanically fastening single-ply membranes in metal-retrofit applications.
			6. **Drill•Tec™ RhinoBond® Insulation Plates**: Galvalume, 3” (7.6 cm) diameter, specially coated for use in RhinoBond® attachment systems.
		2. 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, **EverGuard® Lip Termination Bar,** by GAF®.
		3. 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, **EverGuard® TPO UN-55 Detailing Membrane**, by GAF®.
		4. 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, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green **EverGuard® TPO 45 mil Utility Flashing Strips**, by GAF®.
		5. 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.
		6. A 6 inch (14 cm) wide, smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip with a factory laminated butyl tape. 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 Cover Tape**, by GAF.

**\*\*\*\*\*\*\*\*\*\*\*Take out for 20 yr NDL, this product is only good up to 15 yr NDL\*\*\*\*\*\*\*\*\*\*\*\*\*\***

* + 1. 24 gauge steel with 0.025” thick TPO based film. Factory supplied in sheets and required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves, available in White, Tan, Gray, Regal Red, Regal Blue, and Hartford Green . Sheet size 4’ x 10’, sheet weight 47 lbs., **EverGuard® TPO Coated Metal**,by GAF®.
		2. 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®.
		3. 0.45” thick molded TPO membrane boots are split to accommodate most common pipes and conduits and available in three standard sizes, **EverGuard® TPO Preformed Split Pipe Boots**, by GAF®.
		4. 0.060” thick molded TPO membrane designed to accommodate both inside and outside corners of base and curb flashing. Hot-air welds directly to EverGuard® TPO membrane. Size 4” x 4” with 6” flange, **EverGuard® TPO Preformed Corners** by GAF®.
		5. .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® UN-55 T-Joint Patches**, by GAF®.
		6. Universal style expansion joint covers fabricated to accommodate both wall and field applications, made of .060” thick reinforced TPO membrane, available in 5 standard sizes for most applications, **EverGuard® TPO Preformed Expansion Joint Covers,** by GAF®
		7. .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® RTS (Roof Transition Anchor) Strip,** by GAF®
		8. .045” thick reinforced TPO membrane fabricated corners. Available in four standard sizes to flash curbs that are 24”, 36”, 48”, and 60” in size. Four corners are required to flash the curb, **EverGuard® Corner Curb Wraps,** by GAF®.
		9. 1.5” wide x 1.25” high x 10’ length profile with pressure sensitive adhesive and release liner. Applied over TPO roofing systems to simulate standing seam metal roof, **EverGuard® SA TPO Standing Seam Profile**, by GAF®.
		10. 8” diameter, nominal .050” unreinforced TPO membrane for use in flashing outside corners of base and curb flashings, **EverGuard® TPO Fluted Corner**, by GAF®.
		11. 1/8” thick extruded and embossed TPO roll 30” x 50’, heat welds directly to roofing membrane. Unique herringbone traction surface. Gray in color, **EverGuard® TPO Walkway Rolls**, GAF®.
1. **EXECUTION**
	1. EXAMINATION
		1. Verify that the surfaces and site conditions are ready to receive work.
		2. Verify that the deck is supported and secured.
		3. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.
		4. Verify that the deck surfaces are dry and free of ice or snow.
		5. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.
	2. SUBSTRATE PREPARATION **\*\*\*CHOOSE APPROPRIATE DECK(S)\*\*\***

* + 1. Steel Deck
			1. Metal decks must be a minimum uncoated thickness of 22 gauge (0.8 mm) and shall have a G-90 galvanized finish on all panels. FM requirements may supersede those set forth in this section. Consult the current FM Guide for more information.
			2. Decks must comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.
			3. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.
		2. Structural Concrete Deck
			1. Minimum deck thickness for structural concrete is 4” (10.2 cm).
			2. Only poured in place concrete decks that provide bottom side drying are acceptable. Decks that are installed over non-vented metal decks or pans that remain in place may trap moisture in the deck beneath the roof system and are not acceptable.
			3. The roof deck shall be properly cured prior to application of the roofing system; twenty-eight (28) days is normally required for proper curing. Curing agents must be checked for compatibility with roofing materials. Prior to the installation of the roof assemblies, GAF® recommends the evaluation of the surface moisture and deck’s dryness through the use of ASTM D-4263 or hot bitumen test.
			4. The deck must be smooth, level and cannot be wet or frozen. If deck is determined to be wet, it must be allowed to dry.
			5. Treat cracks greater than 1/8” (3 mm) in width in accordance with the deck manufacturer’s recommendations.
			6. Sumps for the roof drains shall be provided in the casting of the deck.
			7. When insulation or roofing is to be adhered with hot asphalt, prime the deck with asphalt/concrete primer, ASTM D 41 at the rate of one gallon per 100 square feet (0.4 L/m2). Allow the primer to dry prior to the application of the roofing system.
			8. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer’s recommendations prior to the new roof application.
		3. Wood Deck (Plank / Heavy Timber)
			1. Wood boards must be at least 1.5” nominal thickness and have a nominal width of 4’-6”. Tongue and groove or shiplap lumber is preferred to square edge material since subsequent shrinkage or warping of square edge planks may cause ridging of the roof system above adjacent boards.
			2. All boards must have a bearing on rafters at each end and be securely nailed.
			3. Lumber shall be kiln dried.
			4. Preservatives or fire retardants used to treat decking must be compatible with roofing materials.
			5. Decking shall be kept dry and roofed promptly after installation.
			6. Knotholes or large cracks in excess of ¼” (6 mm) shall be covered with securely nailed sheet metal.
			7. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer’s recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
		4. Plywood Deck
			1. Plywood sheathing must be exterior grade, minimum 4 ply, and not less than ¾” thick .
			2. Preservatives or fire retardants used to treat the decking must be compatible with roofing materials.
			3. The deck must be installed over joists that are spaced 24” (61 cm) o.c. or less.
			4. The deck must be installed so that all four sides of each panel bear on and are secured to joist and cross blocking. “H” clips are not acceptable.
			5. Panels must be installed with a 1/8” to 1/4” (3mm – 6mm) gap between panels and must match vertically at joints to within (1/8” (3mm).
			6. Decking should be kept dry and roofed promptly after installation.
		5. Recover
			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.
	1. INSTALLATION - GENERAL
		1. Install GAF®’s EverGuard® TPO roofing system according to all current application requirements in addition to those listed in this section.
		2. GAF® EverGuard® TPO Specification #:
		3. 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.
	2. PERMATE VAPOR RETARDER SYSTEM INSTALLATION
		1. Mechanical Applicator
			1. Pour Permate adhesive in the top tray of the applicator only. Leave lower hopper empty. The applicator will apply adhesive to the back side of the Permate Vapor Retarder and apply it to the deck. Side laps are 2”; end laps 6”.
		2. Alternate Method
			1. Apply Permate adhesive at the rate of .25 to .40 gallons per square to the flutes of the steel deck using a roller or adhesive spreader.
			2. Apply the Permate Vapor Retarder on top of the Permate Adhesive.
			3. Broom the Permate Vapor Retarder on top of the adhesive to assure there are no voids or air bubbles trapped under the sheet.
			4. On wood, lightweight concrete, and precast concrete, secure the Permate Vapor Retarder to the deck with ribbons of Permate adhesive.
	3. LEXSUCO VAPOR RETARDER SYSTEM INSTALLATION
		1. Mechanical Applicator
			1. Pour R907-T adhesive in the top tray of the applicator. Leave lower hopper empty.
			2. The applicator coats the underside of the vapor retarder with adhesive at a rate of .4 gallon per square, lays, brushes, and secures the vapor barrier on the roof deck with 2” side lap. Side laps should be centered on the top of the flutes of the steel deck.
			3. End laps should be 6”.
		2. Alternate Method
			1. Spread R907-T adhesive on the top of the flutes of the steel deck using a roller or adhesive spreader.
			2. Apply the Lexsuco Vapor Retarder on top of the R907-T.
			3. Broom out the vapor retarder to insure no air bubbles are trapped under the vapor retarder.
			4. Note: The Lexsuco Vapor Retarder has a natural tendency to react to the solvent in R907-T. Some curling will be noted along the edges of the Lexsuco Vapor Retarder as it bonds with the R907-T. As the bond cures the sheet will gradually relax, and this will not affect performance.
			5. On wood, lightweight concrete, and precast concrete, secure the Lexsuco Vapor Retarder to the deck with ribbons of R907-T adhesive.
	4. SEPARATION SHEET
		1. Apply VersaShield® Solo™ without wrinkles or creases, perpendicular to the direction the roof membrane will be installed.
		2. Overlap VersaShield® Solo™ a minimum of 2” (51 mm) at the side laps and 4” (102 mm) at end laps, offset from adjacent end laps by 6’ (1.83 m)
		3. Fasten VersaShield® Solo™ with corrosion resistant nails with 1” minimum diameter metal or plastic caps. Install only enough nails to hold the sheet in place until the primary roof covering is applied, unless more fasteners are required by code. Nails should be long enough to penetrate the deck at least ¾” (19 mm). Nails must be driven flush with the surface of the VersaShield® Solo™. Overdriving will damage the sheet. Raised fasteners may damage the roof membrane or back out.
		4. Do not install more VersaShield® Solo™ than can be covered by the roof membrane the same day. VersaShield® Solo™ is not waterproof and should not be exposed to the weather before being covered with the primary roof covering.
	5. INSULATION - GENERAL
		1. 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.
		2. Do not install wet, damaged or warped insulation boards.
		3. For new construction over a metal deck or tear off down to a metal deck, install insulation boards so that all edges are supported by the high flutes of the decking with no more than ¼” gap between adjoining boards. With the EverGuard® RhinoBond® Attachment System, the first (or only layer) of insulation does not need to be staggered. Butt the insulation, overlay/recover boards tightly together with no more than a ¼” gap between boards. If installing multiple layers of insulation, the boards should be staggered a min of 6”.
		4. Overlay/recover boards may be installed using all full-size overlay boards in a non-staggered manner. These overlay/recover include gysum (Dens Deck and Securock). If plywood or OSB is specified, it must be a minimum thickness of ¾”.
		5. When installing the EverGuard® RhinoBond® Attachment System over tapered insulation, it is critical the RhinoBond® plates are flat and flush against the insulation surface to ensure proper welding of the plate to the membrane. For this reason, it is preferable to install the tapered insulation first and cover the tapered system with an overlay/recover board.
		6. Do not install any more insulation than will be completely waterproofed each day.
		7. Do not align seams with rows of plates, as the step-down that is created will cause an incomplete weld of the RhinoBond® plate.
		8. Do not straddle plates over insulation joints, as the gaps will create an incomplete weld of the RhinoBond® plate.
		9. Use the appropriate length and type of Drill-Tec™ Fastener for the structural deck. See the EverGuard® RhinoBond® Attachment Table.
		10. EverGuard® RhinoBond® plates are different in type and color. TPO plates are a yellow/green, while the PVC plates are black in color. The appropriate plate must be used with the appropriate membranes.
		11. Mechanical attachment for the three distinct areas or zones of a roof
			1. Roof areas have three distinct areas or zones. They are corners (either inside or outside), roof perimeter, and the field of the roof. Each of these areas have their own attachment rates.
			2. These zones or areas have to be determined before the insulation, cover or overlay board’s fasteners are installed. A building’s perimeter edges and corner areas or zones are determined by the height and width and other conditions referenced by ASCE 7 and FM 1-29.
		12. Securing the EverGuard® RhinoBond® Plate and Fastener
			1. Insulation, overlay/recover boards are to be mechanically attached to the structural deck in accordance with the RhinoBond® Attachment Table
			2. Install the proper number of fasteners per insulation overlay/recover board per roof zone or area.
			3. Fasten to the substrate in an appropriate grid pattern as established by the RhinoBond® Attachment Table. Using chalk lines to make the grids on the substrate is the easiest way to make sure the grid is consistent and plates are easy to find.
			4. Fasteners must be tight enough that the EverGuard® RhinoBond® Plate does not turn or rock.
			5. Over-driven fasteners that distort the face or top of the plate must be removed and discarded. A new EverGuard® RhinoBond® Plate and Fastener must be reinstalled next to the original, but not into the same space and hole.
			6. Under driven or “high fasteners” must be re-driven to proper depth.
			7. When installation of RhinoBond® Plates and Fasteners are complete, the area should be blown or broomed clean to remove any dirt or debris from the substrate surface or contaminates from the plate’s bonding surface. This is critical so as not to puncture the membrane from beneath or to impair the welding of the membrane to the EverGuard® RhinoBond® Plate.

FOR METAL RETROFIT ONLY

* + 1. Securing the EverGuard® RhinoBond® Plate and Fastener
			1. Insulation, overlay/recover boards are to be mechanically attached to the existing metal panel in accordance with GAF application recommendations.
			2. Install the proper number of fasteners per insulation overlay/recover board per roof zone or area.
			3. Fasten thru the metal panels and into the existing purlins using Drill-Tec™ purlin fasteners and RhinoBond TPO XHD plates, in accordance with GAF application recommendations.
			4. Fasteners must be tight enough that the EverGuard® RhinoBond® Plate does not turn or rock.
			5. Over-driven fasteners that distort the face or top of the plate must be removed and discarded.  A new EverGuard® RhinoBond® Plate and Fastener must be reinstalled next to the original, but not into the same space and hole.
			6. Under driven or “high fasteners” must be re-driven to proper depth.
			7. When installation of RhinoBond® Plates and Fasteners are complete, the area should be blown or broomed clean to remove any dirt or debris from the substrate surface or contaminates from the plate’s bonding surface.  This is critical so as not to puncture the membrane from beneath or to impair the welding of the membrane to the EverGuard® RhinoBond® Plate.
			8. Bond the plates to the roof cover using the RhinoBond® bonding tool in accordance with GAF requirements.
	1. INDUCTION WELDING OF THE EVERGUARD® MEMBRANE (RhinoBond)
		1. Equipment
			1. RhinoBond® Portable Bonding Machine (a minimum of two machines is recommended per project).
			2. Minimum 5000-watt, continuous generator per two RhinoBond® Portable Bonding Machines.
			3. 100’ max length, #12 minimum gauge electrical cords.
			4. 6 cooling clamps (stand-up magnets that put pressure on the newly welded plate)
			5. Pliers
			6. Heavy duty plunger
			7. Lumber Crayon
		2. Equipment Settings
			1. IMPORTANT: As with any electrical tool, it is imperative that the tool receive the recommended amount of current for its proper operation. Damage could result from overload (surge) as well as a low voltage situation. No other electrical devices shall be run at the same time as the RhinoBond® Portable Bonding Machines.
			2. The RhinoBond® tool must be adjusted to achieve the maximum bond strength with most roofing membranes between 0° and 120° F.
		3. Calibration of the machine
			1. The user must adjust the RhinoBond® tool to achive maximum bond strength with EverGuard® roofing membranes from 0° to 120° F ambient temperatures. The tool leaves the factory set to deliver an optimal weld with most membranes at 70°F when set to an energy level of “0”. The energy level must be adjusted up (+1, +2, etc.) when temperatures are below 70°F, and down (-1, -2 etc) when temperatures are above 70°F. These adjustments can be made by using the up/down arrow keys next to the display window on the machine.
			2. In an area adjacent to the day’s work, lay out 5 EverGuard® RhinoBond® Plates 10” apart and cover them with a fresh piece of field membrane approximately 18” x 5’.
			3. Locate the plates under the membrane by dragging your foot across the surface of the membrane. After locating the RhinoBond® Plate, center the machine’s red location circle directly over the plate.
			4. Determine an initial setting based on the ambient temperature. Remember that 70°F is a “0” energy setting on the display. On a 110° F day in Phoenix, AZ your initial energy setting may be “2” or “3”.
			5. Weld the first plate at your initial energy setting and immediately place the cooling clamp onto the plate and mark the setting with the lumber crayon. Increase the energy setting using the “up” arrow on the machine by a unit of 1. Weld the second plate to the right of the first plate; mark the setting in crayon and put the second cooling clamp on the plate. Increase by another unit of 1 and weld the third plate. Repeat this process for the next two plates – installing them to the left of your first weld – except *reduce* the energy setting by a unit of 1 from your original setting each time. From left to right, your set of plates will be marked as follows (on a 70 degree F day): -2, -1, 0, 1, 2.
			6. Let the membrane over the plates cool to ambient temperature and fold the membrane over exposing the RhinoBond® Plates. Standing on the membrane, use your pliers to grip the plate and pull the plate from the test material, delaminating the plate from the membrane in the process.
			7. Three distinct types of bonds are probable, and are as follows: Full bond, an even and consistent weld of the membrane to the plate. The plate will also leave an impression in the membrane. This is a spec installation. Uneven/incomplete weld of the plate to the membrane. Cause of failure may be energy source set too low, machine not centered over the plate completely, or the plate may be over-driven. This would be a complete or partial hit of the plate. Remember, a full concentration of heat applied to the plate is needed to achieve a spec weld.
		4. Place roof membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent securement.
		5. Full-width rolls shall be installed in the field and perimeter regions of the roof.
		6. Overlap full roof membrane sheets a minimum of 3” for side and end laps.
		7. Install membrane so that the lap runs across the roof slope and lapped toward the drainage points if possible.
		8. All exposed sheet corners shall be rounded a minimum of 1”.
		9. All cut edges of reinforced TPO membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
		10. Weld TPO to RhinoBond® Plates with RhinoBond® Portable Bonding Tool. Weighted cooling magnets are placed over the bonded membrane/plates for a minimum of 45 seconds.
	2. FLASHINGS **\*\*\*OPTION 1 ~ GENERAL - Architect\*\*\***
		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 is required.
		5. Non-coated metal edge details must be installed in accordance with current EverGuard® construction details and requirements.
		6. All twenty (20) year EverGuard® systems require the use of coated metal edges where applicable. Bonding adhesive and/or cover tape is not acceptable.
		7. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.
		8. Consult the EverGuard® *Application and Specifications Manual* or GAF® Contractor Services for more information on specific construction details.
	3. FLASHINGS **\*\*\*OPTION 2 ~ DETAILED – Contractor\*\*\***
		1. 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 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.
		2. 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 ¼” 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.
		3. 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.
		4. 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.
		5. 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.
		6. Parapet and Building Walls:
			1. Flash walls with EverGuard® TPO membrane adhered to the 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 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:

|  |  |
| --- | --- |
| RhinoBond® Systems | 12” on center |

* + - 1. All coated metal wall flashings and loose applied membrane flashings must be provided with separate metal counterflashings, or metal copings.
			2. Metal counterflashings may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with EverGuard® caulking.
			3. Flash wall scuppers with a coated metal insert that is mechanically attached to the wall and integrated as part of the wall flashing.
		1. 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:

|  |  |
| --- | --- |
| RhinoBond® Systems | 12” on center |

* + - 1. All coated metal curb flashings and loose applied membrane flashings must be provided with separate metal counterflashings, or metal copings.
			2. Metal counterflashings may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with EverGuard® caulking.
		1. 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 ½” 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.
	1. TRAFFIC PROTECTION
		1. Install walkway pads/rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.
		2. Walkway pads must be spaced 2" apart to allow for drainage between the pads.
		3. Fully adhere walkway pads/rolls to the roof membrane with solvent-based bonding adhesive, applied at the rate of 1 gal. per 100 sq. ft. to both the walkway and roof membrane surfaces. Press walkway in position once adhesive is tacky to the touch.
		4. Alternatively, walkway pads/rolls may be hot-air-welded to the roof membrane surface continuously around the perimeter of the pad/roll.
	2. ROOF PROTECTION
		1. Protect all partially and fully completed roofing work from other trades until completion.
		2. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.
		3. 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.
		4. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.
	3. FIELD QUALITY CONTROL
		1. Check the quality of plate welds with a heavy-duty plunger. Set the plunger beside the plate and pull up to see if the weld holds the plate. Cut a small slit in the plunger head to remove the vacuum pressure.
	4. CLEAN-UP
		1. All work areas are to be kept clean, clear and free of debris at all times.
		2. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.
		3. 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.
		4. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.
		5. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.
		6. Clean and restore all damaged surfaces to their original condition.
	5. MAINTENANCE **\*\*\*WELL ROOF ADVANTAGE ONLY\*\*\***
		1. Inspections to the roof shall be performed annually by a GAF® **Master** or **Master Select™** contractor, and also must be a GAF® **Certified Maintenance Professional (CMP).**
		2. An annual roofing system maintenance program shall be performed by a GAF® **Master** or **Master Select™ Certified Maintenance Professional (CMP)** in accordance with GAF’s 10 Point Maintenance Program provided with your Diamond Pledge™ guarantee.
		3. Submit copies of the roof inspection form, accompanying photographs (a minimum of 6 photos showing the condition of the roof and critical details), and a record of all roofing system maintenance to the GAF Contractor Services Department within sixty (60) days of the anniversary date of the completion of the roofing system. Annual roof inspections must be started within the first two (2) years of the guarantee term.

END OF SECTION