GAF

We protect what matters most™

Version 2.0.1

EverGuard® TPO/PVC

SELF-ADHERED

Roofing System Overview & General Requirements Manual

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WELCOME

Founded in 1886, GAF has grown to become North America's largest manufacturer of commercial and residential roofing. Professional roofing contractors have long preferred the rugged, dependable performance that a GAF roof can offer. We are the leading roofing manufacturer in North America, with plants strategically located across the U.S. A member of the Standard Industries family of companies, GAF is part of the largest roofing and waterproofing business in the world.

WHAT'S IN THIS MANUAL?

This manual is a compilation of various resources prepared by GAF to provide the most complete and comprehensive information regarding commercial roofing systems. Within it you will find the following sections:

- Guarantee Guidelines
- Application Tables
- Product Listing
- Field Guidelines
- Field Practices
- Installation Guidelines
- Appendix

DISCLAIMERS

This manual contains the latest information relating to the application of GAF's Self-Adhered Attachment Systems and is based on our years of experience in the commercial roofing field. It has been prepared as a general guide to assist design professionals, roofing contractors and building owners in the use of our roofing systems.

GAF manufactures and sells roofing materials and does not practice architecture or engineering. GAF is not responsible for the performance of its products when damage to its products is caused by such things as improper building design, or construction flaws.

The design responsibility remains with the design professionals, roofing contractor, and building owner. These guidelines should not be construed as being all-inclusive, nor should they be considered as a substitute for good application practices.

Under no circumstances does GAF have any liability for expenses arising out of or associated with the pre-existing presence of asbestos-containing materials or any other allegedly hazardous substances or materials in or on the roof to which the new GAF roofing materials are being applied.

Information contained in this Manual is presented in good faith and, to the best of GAF's knowledge, does not infringe upon any patents, foreign or domestic.

As a part of its continuing efforts to improve the performance of its products, GAF periodically makes changes to its products and application specifications. The Company reserves the right to change or modify, at its discretion, any of the information, requirements, specifications, or policies contained herein. This Manual supersedes all catalogs and previous manuals.

NOTE: PRINTED COPIES OF THIS DOCUMENT ARE RENDERED UNCONTROLLED REFER TO ELECTRONIC VERSION TO ENSURE CURRENT REVISION.

WHAT'S NEW

In order to provide the most current and up to date information to our customers, GAF routinely reviews and updates our documentation. Below is a list of changes that are in this document from the preceding version starting with version 2.0

VERSION 2.0.1 - 7/22/25

- Application Tables
  - Adjusted the Number of Fasteners per Board to 8/12/16 for EnergyGuard™ HD Polyiso & HD Barrier Polyiso
- Installation Guidelines
  - Added the weight (100 lb.) of the roller needed to secure the SA membrane to the roof substrate.

VERSION 2.0 - 12/31/24

- New format and content organization

A. GENERAL

1. GAF offers roof guarantees for a fee for all roofing system specifications published in this Manual when installed by contractors certified with GAF at the appropriate certification level in accordance with the terms and conditions set forth in this Manual, and provided that the procedures for obtaining a guarantee are followed.
2. All roofing systems for which a guarantee is requested must be Installed according to published GAF flashing requirements and details. All GAF insulation, fasteners, pre-flashed details, expansion joint covers, cements, coatings, and accessory products as job appropriate are required for guarantees unless otherwise approved in writing by Design Services or Guarantee Services before installation.
3. GAF will determine, in its sole discretion, whether a roofing guarantee will be issued to cover any proposed or completed roof. Additionally, the issuance of a guarantee and/or its effectiveness is contingent upon payment of GAF's guarantee fee and payment in full to roofing contractors and materials suppliers.
4. In the event that a roof system does not conform to GAF's standards and a guarantee is not issued, no portion of the guarantee fee is refundable.
5. GAF will not accept Notices of Award of Contract that indicate that the owner or architect has the option to accept or reject the guarantee upon completion of the roof.
6. Contact GAF Guarantee Services for further information on guarantee procedures and GAF Design Services for approval of modifications to published specifications.
7. GAF is not responsible for consequential damages under any circumstances. Building owners may make reasonable and customary temporary repairs at their own expense to minimize damage to the building or its contents in an emergency.
8. A GAF guarantee may be canceled subsequently by GAF for violation of its terms and conditions.
9. Certain GAF guarantees may be eligible for GAF WellRoof® guarantee extension. Contact GAF Guarantee Services for eligibility requirements.

B. GAF CERTIFIED CONTRACTOR PROGRAM

1. GAF does not install roofing systems. GAF does not own roof contracting companies, or have any interest in companies installing roofing systems. Accordingly, GAF is not responsible for any roofing contractor's workmanship except as specifically provided under the terms and conditions of any GAF roofing guarantee that may be issued for a particular project.
2. References to GAF certified contractors only identify a contractor eligible to apply for a GAF roofing guarantee and is not intended to convey any other meaning. Contractors enrolled in GAF certification programs are not employees or agents of GAF, and GAF does not control or otherwise supervise these independent businesses. Contractors may receive benefits, such as loyalty rewards points and discounts on marketing tools from GAF for participating in the program and offering GAF enhanced warranties or guarantees, which require the use of GAF products. Your dealings with a Contractor, and any services they provide to you, are subject to the Contractor Terms of Use, available at gaf.com
3. GAF will issue a roofing system guarantee only for roofs applied by a contractor certified with GAF at the appropriate certification level that meets GAF's requirements for guarantee issuance. The responsibility for ensuring proper application of the roof lies with the roofing contractor. It is the responsibility of the building owner and his designated representatives (and not GAF) to enforce the compliance with contractual requirements, specifications and good workmanship practices.

C. INSPECTIONS

1. GAF will inspect only those roofs where a guarantee is to be issued or where special inspection services have been purchased, and the current charge for the guarantee or inspection services has been paid. If an inspection is requested and the job is not ready or the owner's representative is not available when GAF arrives onsite, GAF reserves the right to charge for such a visit.

2. GAF reserves the right to waive inspection of roofs that are covered under a guarantee or for which guarantee coverage is sought when, in its opinion, inspection is not necessary. In such cases, the owner or designer may request a special inspection for which an additional charge may be made.
3. Any inspections made by GAF are for its sole use only and do not constitute a waiver, modification, or expansion of coverage or any of the terms and conditions of the guarantee.
4. Should a GAF Field Services Representative observe conditions on the job site that do not conform to our requirements or standard good roofing practices, such conditions will be brought to the attention of the roofing contractor. GAF, at its sole discretion, has the right to require corrective action as it deems necessary to conform to standard requirements for the issuance of the GAF roofing system guarantee.

D. GAF ROOF GUARANTEE PROGRAM

1. GAF offers an extensive selection of roof guarantees to meet the needs of most building owners. The following guarantees are available for use with selected EverGuard® adhered roofing systems when installed by an eligible GAF certified contractor. Please contact GAF Guarantee Services for additional information and specific guarantee requirements.

EverGuard® Roofing System Guarantees	Length of Coverage
Diamond Pledge™ NDL Roof Guarantee[1]	10 years
	15 years
	20 years
	25 years
System Pledge™ Roof Guarantee[1]	10 years
	15 years
	20 years
Weather Stopper® Integrated System Limited Warranty[1]	Up to 20 years
WellRoof® Guarantee Extension[2] **Coverage: Up to 25% longer term**	Up to 30 years

1. See applicable guarantee or warranty, available at gaf.com, for complete coverage and restrictions.
2. When certain additional annual maintenance requirements are met on eligible projects, GAF will extend the term of its Diamond Pledge™ NDL Roof Guarantee by up to 25% for a maximum of 30 years. Please call 877-423-7663 Options 3-3 for qualifying specifications and detailed information concerning additional requirements. All maintenance work must be completed by a GAF Chairman's Circle or PlatinumElite Commercial Contractor. See WellRoof® Guarantee Extension for complete coverage and restrictions.

Note: Refer to the TPO/PVC Guarantee Requirements for maximum guarantee lengths and additional requirements.

E. QUICK REFERENCE GUARANTEE COVERAGE FOR SELF-ADHERED SYSTEMS[1]

mil	EverGuard® SA TPO	
	60	80
Total System Guarantee Duration[2]		
10 Year		
15 Year		
20 Year		
25 Year		A
Wind Speed Coverage Limit[3]		
55 mph		
60 mph		
72 mph		
80 mph		
90 mph		
100 mph		
110 mph		
120 mph		
Accidental Puncture Coverage[4]		
16 Labor Hrs		
32 Labor Hrs	C	C
Hail Coverage[5]		
1" Hail	D	D
2" Hail	E	E
3" Hail		
Reflectivity Coverage[6]		

Key: Indicates this option is available,

A **Minimum of 2 layers of approved insulation.**

B **Minimum of 2 layers of approved insulation; top layer must be an approved cover board.**

C **Top layer of insulation must be adhered**

D **The minimum 1/2" cover board can be mechanically attached (e.g., Gypsum or HD polyiso)**

E **The top layer must be an adhered minimum 1/2" cover board (e.g., Gypsum or HD polyiso)**

1. Systems must be installed by GAF GoldElite™ Commercial Contractors and GAF PlatinumElite™ Commercial Contractors in order to be eligible for GAF guarantees. Additional requirements apply. See specimen copies of Diamond Pledge™ NDL Roof Guarantees and System Pledge™ Roof Guarantees, available at www.gaf.com, for complete coverage and restrictions.
2. Only new and complete tear-off systems are eligible for coverage longer than 20 years. Recovered roofs are only eligible for coverage up to 20 years. Coverage periods of 30 year duration are only available for GAF PlatinumElite™ Commercial Contractors, and require the use of an approved GAF Perimeter Edge Metal. System Pledge™ Roof Guarantees are eligible for up to 20 years.
3. GAF's guarantees provide coverage for leaks resulting from wind speeds up to 55 mph. Coverage in excess of the 55 mph limit is available for purchase for select systems only and requires advance written approval from GAF. Coverage of 100 mph or greater requires the use of an approved GAF Perimeter Edge Metal. Contact GAF for additional information and requirements. See specimen copies of Diamond Pledge™ NDL Roof Guarantees, System Pledge Roof Guarantees, and EverGuard® Diamond Pledge™ NDL Roof Guarantee Enhanced Wind Coverage available at www.gaf.com, for complete coverage and restrictions.
4. GAF's guarantees do not provide coverage for punctures. Coverage for accidental punctures is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. See specimen copy of the EverGuard® Diamond Pledge™ NDL Roof Guarantee and the EverGuard® Puncture Resistance Limited Warranty, available at www.gaf.com, for complete coverage and restrictions.
5. GAF's guarantees do not provide coverage for hail. Coverage for hail is available for purchase for select systems only and requires advance written approval from GAF. Contact GAF for additional information and requirements. See specimen copy of EverGuard® Diamond Pledge™ NDL Roof Guarantee (Hail Coverage), available at www.gaf.com, for complete coverage and restrictions.
6. EverGuard® TPO Reflectivity Limited Warranty is available only upon request. Limitations apply. See specimen copy of EverGuard® TPO Reflectivity Limited Warranty, available at www.gaf.com, for complete coverage and restrictions.

F. GUARANTEE REQUIREMENTS

SELF-ADHERED 10, 15, AND 20 YEAR DIAMOND PLEDGE® NDL ROOF GUARANTEE REQUIREMENTS

The following is a summary of the requirements for the installation of an EverGuard® SA TPO self-adhered roofing system in order to be eligible to receive an NDL roof guarantee. The selection of membrane type, thickness, and attachment is the responsibility of the design professionals, roofing contractor and building owner**.** GAF EverGuard® roof membranes must be used in roofing systems to be guaranteed by GAF.

TPO Guarantee Chart			
Attachment Method	**Maximum Guarantee Length**	**EverGuard® SA TPO Minimum mil Thickness**	**Insulation Requirements**
Adhered	10 years	60 mils	Refer to Insulation Attachment Table(s)
	15 years		
	20 years		
	25 years	80 mils	

1. Approved cover boards:
   a. EnergyGuard™ HD Polyiso Insulation
   b. EnergyGuard™ HD Plus Polyiso Insulation
   c. EnergyGuard™ NH HD Polyiso Insulation
   d. EnergyGuard™ NH HD Plus Polyiso Insulation
   e. Ultra HD Composite Insulation
   f. Blue Ridge STRUCTODEK® High Density Fiberboard
   g. Georgia Pacific DensDeck® Roof Board
   h. Georgia Pacific DensDeck® Prime Roof Board
   i. Georgia Pacific DensDeck® Storm X™ Prime Roof Board
   j. USG Securock® Roof Board
   k. USG Securock® UltraLight Glass-Mat Roof Board
   l. USG Securock® Ultralight Coated Glass-Mat Roof Board
   m. National Gypsum DEXcell® Glass Mat Roof Board
   n. National Gypsum DEXcell® FA™ Glass Mat Roof Board
   o. National Gypsum DEXcell® FA VSH™ Glass Mat Roof Board

SECUROCK® is a registered trademark of United States Gypsum Company.
DensDeck® is a registered trademark of Georgia-Pacific Gypsum LLC.
DEXcell® is a registered trademark of Gold Bond Building Products, LLC.
Structodek® is a registered trademark of Blue Ridge Fiberboard, Inc.

Additional Requirements for Extended-Length (25- Year) EverGuard® Diamond Pledge™ NDL Roof Guarantees	
Building Height Limitations	Buildings greater than 100 ft. (30.5 m) in height must have a minimum 3 ft. (1 m) parapet wall to be eligible for extended-length guarantees.
Roof Flashings	For extended-length guarantees, separate counter flashing or cap flashing is required; exposed termination bars are not acceptable.
Flashing Accessories	For extended-length guarantees, regardless of the membrane type, EverGuard Extreme® pre-formed flashing accessories are required. When EverGuard Extreme® pre-formed flashing accessories are not available, unreinforced EverGuard Extreme® membrane must be used.
Roof Edges	EverGuard Extreme® Cover Tape HW, EverGuard Extreme® TPO Coated Metal in conjunction with EverGuard Extreme® Flashing Strip or any other EverGuard® pre-fabricated extruded aluminum fascia systems are required. GAF Perimeter Edge Metal is required for extended length guarantees (25 years) and projects requiring enhanced wind coverage of 100 mph or greater.

A. TPO DESIGN TABLE - SELF-ADHERED - NEW CONSTRUCTION OR TEAR-OFF

Deck	Insulation/ Substrate Attachment			Insulation/Slip Sheet			
	Mech Fast.	Adhesive[1]	Hot Asphalt[3]	Polyiso	Gypsum Board	EPS[6]/XPS[6]	None
Steel	✓			✓	✓	✓	
Wood	✓	✓	✓[4]	✓	✓	✓	✓
Structural Concrete & Gypsum	✓	✓	✓[5]	✓	✓	✓	
Lightweight Insulating Concrete	✓	✓[2]	✓[4]	✓	✓	✓	
Cementitious Wood Fiber	✓	✓	✓[4]	✓	✓	✓	

1. Refer to product listing for list of acceptable adhesives.
2. Moisture content must be less than 15%. Otherwise a base sheet is required prior to attachment to the deck.
3. No hot attachment of XPS or EPS.
4. Insulation can be installed in hot asphalt only when mopping to mechanically attached base sheet in lieu of direct mopping to the deck.
5. Prime with MATRIX™ 307 Premium Asphalt Primer.
6. Cover board required. Cover board cannot be attached with hot asphalt. If the membrane is attached using hot asphalt or solvent based adhesive, the cover board must either have all joints taped prior to installation of the roofing membrane, or a layer of red rosin sheathing paper must be installed between the layers of insulation.

B. TPO DESIGN TABLE - SELF-ADHERED - RE-COVER

Existing Roofing System Type	Insulation/ Substrate Attachment			Insulation/Slip Sheet		
	Mech Fast.	Adhesive[1]	Hot Asphalt[2]	Polyiso	Gypsum Board	EPS[4]/XPS[4]
Smooth BUR/MB	✓	✓	✓[3]	✓	✓	✓
Single-Ply Membrane	✓			✓	✓	✓
Granule Surfaced BUR/MB	✓	✓	✓[3]	✓	✓	✓
Gravel Surfaced BUR/MB	✓	✓	✓[3]	✓	✓	✓[5]
Standing Seam Metal[4]	✓			✓	✓	

1. Refer to product listing for list of acceptable adhesives.
2. No hot attachment of XPS or EPS.
3. Prime with MATRIX™ 307 Premium Asphalt Primer.
4. Cover board required. Cover board cannot be attached with hot asphalt. If the membrane is attached using hot asphalt or solvent based adhesive, the cover board must either have all joints taped prior to installation of the roofing membrane, or a layer of red rosin sheathing paper must be installed between the layers of insulation.
5. Fanfold is not acceptable.

C. INSULATION FASTENER AND PLATE

Deck Type	Drill-Tec™ Fastener Type	Drill-Tec™ Plate Type	Penetration (min.)
Steel (Min. 22 gauge)	#12 Fastener	3 in. (76 mm) Steel	3/4 in. (19 mm) through the deck
	HD #14 Fastener		
Wood (Plywood, OSB, and Plank)	#12 Fastener	3 in. (76 mm) Steel	3/4 in. (19 mm) through the deck (plywood or OSB) and 1 in. (25 mm) thread into the deck (plank)
	HD #14 Fastener		
	XHD Fastener (#15)		
Structural Concrete (Min. 2,500 psi)	CD-10 Fastener	3 in. (76 mm) Steel	1 in. (25 mm) thread into the deck
	HD #14 Fastener		1 in. (25 mm) shank into the deck
Gypsum Concrete and Cementitious Wood Fiber (Tectum)	Polymer GypTec® Fastener	3 in. (76 mm) GypTec® Plate	1 1/2 in. (38 mm) thread into the deck

D. SELF-ADHERED SINGLE-PLY MEMBRANE INSULATION ATTACHMENT — STANDARD ATTACHMENT FOR WOOD, GYPSUM, LIGHTWEIGHT CONCRETE, CEMENTITIOUS WOOD FIBER

Insulation Type	Board Size	Thickness	Number of Fasteners per Board		
			Field	Perimeter	Corner
EnergyGuard™ Polyiso[1]	4 ft. x 4 ft. (1.2 m x 1.2 m)	.5 in. - 1.4 in. (13 - 35 mm)	8	12	16
	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. - 1.4 in. (13 - 35 mm)	16	24	32
	4 ft. x 4 ft. (1.2 m x 1.2 m)	1.5 in. - 1.9 in. (38 - 48 mm)	5	8	10
	4 ft. x 8 ft. (1.2 m x 2.4 m)	1.5 in. - 1.9 in. (38 - 48 mm)	10	15	20
	4 ft. x 4 ft. (1.2 m x 1.2 m)	2 in. (51 mm) minimum	4	6	8
	4 ft. x 8 ft. (1.2 m x 2.4 m)	2 in. (51 mm) minimum	8	12	16
EnergyGuard™ HD Polyiso Cover Board[2]	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	8	12	16
EnergyGuard™ Barrier Polyiso, EnergyGuard™NH Barrier Polyiso	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	8	12	16
Ultra HD Composite Insulation[2]	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	8	12	16
Gypsum Coverboard[3]	4 ft. x 8 ft. (1.2 m x 2.4 m)	.25 in. (6 mm) minimum	8	12	16
Blue Ridge STRUCTODEK® HD Fiberboard	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	16	24	32

Maximum Guarantee Wind Speed - 55 mph. If higher wind speed coverage is required, please contact GAF Design Services at designservices@gaf.com or 877-423-7663.

1. Also includes; EnergyGuard™ Ultra Polyiso Insulation | EnergyGuard™ Tapered Polyiso Insulation | EnergyGuard™ Ultra Tapered Polyiso Insulation | EnergyGuard™ NH Polyiso Insulation EnergyGuard™ NH Tapered Polyiso Insulation | EnergyGuard™ NH Ultra Polyiso Insulation | EnergyGuard™ NH Ultra Tapered Polyiso Insulation
2. Also includes; EnergyGuard™ HD Plus Polyiso Cover Board | EnergyGuard™ HD Barrier Polyiso Cover Board | EnergyGuard™ NH HD Barrier Polyiso Cover Board EnergyGuard™ NH HD Polyiso Cover Board | EnergyGuard™ NH HD Plus Polyiso Cover Board | Ultra HD Composite Polyiso Insulation
3. Also includes; USG Securock® Brand Gypsum-Fiber Roof Board | USG Securock® Brand Ultralight Coated Glass-mat Roof Board | Georgia Pacific DensDeck® Prime Roof Board | Georgia Pacific DensDeck® StormX™ Prime Roof Board | National Gypsum DEXcell FA™ Glass Mat Roof Board | National Gypsum DEXcell FA VSH™ Glass Mat Roof Board
   Note: Some gypsum coverboards come in 4 ft. x 4 ft. board sizes. Attachment rate can be reduced by 50% from the 4 ft. x 8 ft. board listed in the table above, but must have at least 4 fasteners.

E. SELF-ADHERED SINGLE-PLY MEMBRANE INSULATION ATTACHMENT — STANDARD ATTACHMENT FOR APPROVED STEEL AND STRUCTURAL CONCRETE

Insulation Type	Board Size	Thickness	Number of Fasteners per Board					
			Building Hts up to 60 ft.			Building Hts 61-100 ft.		
			Field	Perimeter	Corner	Field	Perimeter	Corner
EnergyGuard™ Polyiso[1]	4 ft. x 4 ft. (1.2 m x 1.2 m)	.5 in. - 1.4 in. (13 - 35 mm)	8	8	8	8	12	12
	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. - 1.4 in. (13 - 35 mm)	16	16	16	16	24	24
	4 ft. x 4 ft. (1.2 m x 1.2 m)	1.5 in. - 1.9 in. (38 - 48 mm)	5	5	5	5	8	8
	4 ft. x 8 ft. (1.2 m x 2.4 m)	1.5 in. - 1.9 in. (38 - 48 mm)	10	10	10	10	15	15
	4 ft. x 4 ft. (1.2 m x 1.2 m)	2 in. (51 mm) minimum	4	4	4	4	6	6
	4 ft. x 8 ft. (1.2 m x 2.4 m)	2 in. (51 mm) minimum	8	8	8	8	12	12
EnergyGuard™ HD Polyiso Cover Board[2]	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	6	6	8	6	9	12
EnergyGuard™ Barrier Polyiso, EnergyGuard™NH Barrier Polyiso	4 ft. x 4 ft. (1.2 m x 1.2 m)	2 in. (51 mm) minimum	4	4	4	4	6	6
	4 ft. x 8 ft. (1.2 m x 2.4 m)	2 in. (51 mm) minimum	8	8	8	8	12	12
Ultra HD Composite Insulation[2]	4 ft. x 8 ft. (1.2 m x 2.4 m)	2 in. (51 mm) minimum	8	8	8	8	12	12
Gypsum Coverboard[3]	4 ft. x 8 ft. (1.2 m x 2.4 m)	.25 in. (6 mm) minimum	8	8	8	8	12	12
Blue Ridge STRUCTODEK® HD Fiberboard	4 ft. x 8 ft. (1.2 m x 2.4 m)	.5 in. (13 mm) minimum	16	24	32	16	32	32

Limited to Building heights up to 100 feet. Attachment rates listed above are not applicable for regions prone to "high-winds", such as Florida's HVHZ counties, or Special Wind Regions as designated in ASCE's Basic Wind Speed Maps. Perimeter and corner zone fastening densities need to be enhanced 50% from the field on buildings between 61-100 feet. Maximum Guarantee Wind Speed - 55 mph. If higher wind speed coverage is required, or a building's parameters fall outside of what is listed above, please contact GAF Design Services at designservices@gaf.com or 877-423-7663.

1. Also includes; EnergyGuard™ Ultra Polyiso Insulation | EnergyGuard™ Tapered Polyiso Insulation | EnergyGuard™ Ultra Tapered Polyiso Insulation | EnergyGuard™ NH Polyiso Insulation EnergyGuard™ NH Tapered Polyiso Insulation | EnergyGuard™ NH Ultra Polyiso Insulation | EnergyGuard™ NH Ultra Tapered Polyiso Insulation
2. Also includes; EnergyGuard™ HD Plus Polyiso Cover Board | EnergyGuard™ HD Barrier Polyiso Cover Board | EnergyGuard™ NH HD Barrier Polyiso Cover Board EnergyGuard™ NH HD Polyiso Cover Board | EnergyGuard™ NH HD Plus Polyiso Cover Board | Ultra HD Composite Polyiso Insulation
3. Also includes; USG Securock® Brand Gypsum-Fiber Roof Board | USG Securock® Brand Ultralight Coated Glass-mat Roof Board | Georgia Pacific DensDeck® Prime Roof Board | Georgia Pacific DensDeck® StormX™ Prime Roof Board | National Gypsum DEXcell FA™ Glass Mat Roof Board | National Gypsum DEXcell FA VSH™ Glass Mat Roof Board
   Note: Some gypsum coverboards come in 4 ft. x 4 ft. board sizes. Attachment rate can be reduced by 50% from the 4 ft. x 8 ft. board listed in the table above, but must have at least 4 fasteners.

F. LOW-RISE FOAM (LRF) ADHESIVE SECUREMENT TABLE

	YES/ NO	NOTES
APPROVED INSULATIONS (MAY BE ADHERED TO SUBSEQUENT LAYERS OR DECKS LISTED ABOVE)		
Polyisocyanurate (flat /tapered)	Yes [1]	Max. 4′ x 4′ (1.2 m x 1.2 m) boards [2]
High-Density Polyiso Cover Board	Yes [1]	Max. 4′ x 4′ (1.2 m x 1.2 m) boards [2]
High-Density Wood Fiber	Yes [1]	
DensDeck® Prime	Yes [1]	
DEXcell FA Glass Mat Roof Board	Yes [1]	
DEXcell FA VSH Glass Mat Roof Board	Yes [1]	
SECUROCK® Gypsum-Fiber Roof Board	Yes [1]	
Extruded Polystyrene (XPS)	Yes [1]	Cover board required
Expanded Polystyrene (EPS)	Yes [1]	Cover board required

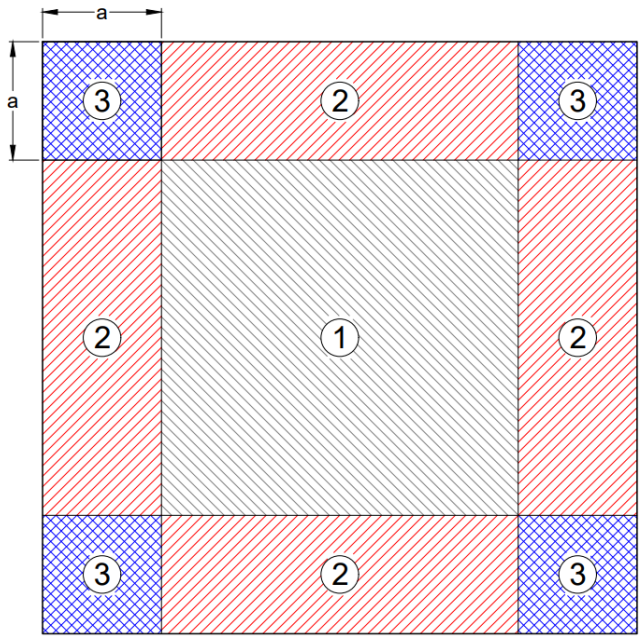
1. An adhesion test is required to ensure substrate and adhesion quality. Refer to Appendix A in the back of this manual for adhesion testing guidelines.
2. Refer to Section 3.03 N for further requirements.
3. The use of low-rise foam adhesives directly over an existing single-ply membrane is not acceptable by GAF. The use of LRF Adhesive M, OlyBond500® Canister and TPO LRF Adhesive M Low Temp can be utilized to attach new insulation/cover board to existing adhered polyiso insulation that has had its facer removed during the removal of an adhered single-ply roof system.
4. 4′ x 8′ (1.2 m x 2.4 m) polyiso boards may be installed using LRF if the following requirements are followed:
    - 6″ o.c. bead spacing only
    - Insulation boards must be flat, dry, and clean. Installation of any boards that are cupped or warped is not acceptable.
    - Lay insulation boards in place and walk-in to ensure complete adhesion. Once the board is set in place, apply adequate weight to the boards until the adhesive is cured to ensure proper securement between the insulation and substrate.
    - Does not qualify for enhanced wind coverage; GAF standard NDL Guarantee coverage only.
    - Not approved for use with any roofing system that requires the support of 3rd party testing (e.g. FM.). If 3rd party testing is utilized to support the wind uplift resistance of a roofing system, maximum 4′x4′ boards are required.

Note: Refer to the Low-Rise Foam Insulation Adhesive Coverage Rates Table within this Manual for further information.

G. PERIMETER AREA WIDTH CALCULATION - STANDARD

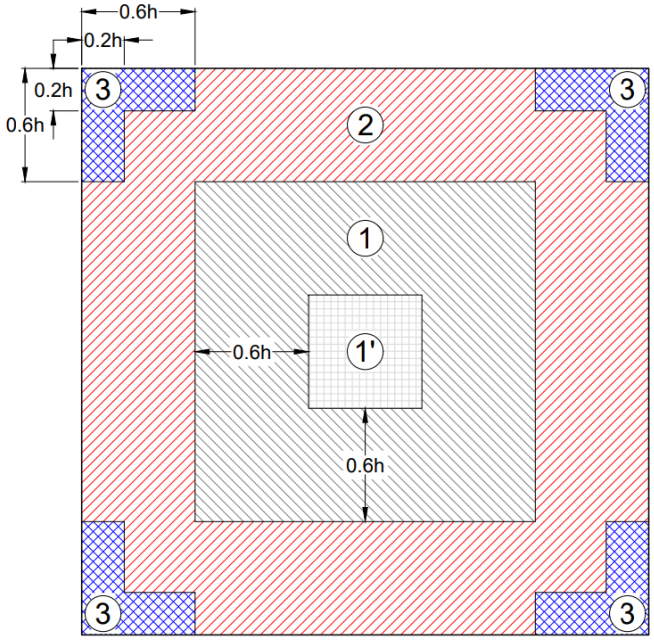
<table>
<tr><th></th><th>Building Height</th><th>Building Width</th><th>Minimum Area Width</th><th>Minimum Bead Spacing</th></tr>
<tr><td rowspan="4">STANDARD COVERAGE (UP TO 55 MPH)</td><td>0 - 34 ft. (0 - 10 m)</td><td rowspan="2"><200 ft. (61 m)</td><td>4 ft. (1.2 m)</td><td>6 in. (152 mm)</td></tr>
<tr><td>35 ft. - 100 ft. (10 - 30 m)</td><td>8 ft. (2.4 m)</td><td>6 in. (152 mm)</td></tr>
<tr><td>>100 ft. (30 m)</td><td><200 ft. (61 m)</td><td colspan="2" rowspan="2">Perimeter Area Width is throughout the perimeter and corner region. The width of this region is defined as the least of the following two measurements:
• 0.1 x building width or
• 0.4 x building height.
Note: The minimum perimeter width is 4 ft. (1.2 m). The width is defined as the narrowest dimension.</td></tr>
<tr><td>Any Height</td><td>≥200 ft. (61 m)</td></tr>
</table>

H. PERIMETER AREA WIDTH CALCULATION - ASCE 7-10

<table>
<tr><td rowspan="2">ASCE 7-10 FORMULA CALCULATIONS FOR HEIGHTS < 60 FT.</td><td> 
</td></tr>
<tr><td>Based on ASCE 7-05 (2009 IBC) and ASCE 7-10 (2012 & 2015 IBC), the perimeter (2) and corner (3) dimensions(a) would be equal to the smaller of the following:
• 0.1 times the building width, or
• 0.4 times the building eave height</td></tr>
</table>

I. PERIMETER AREA WIDTH CALCULATION - ASCE 7-16

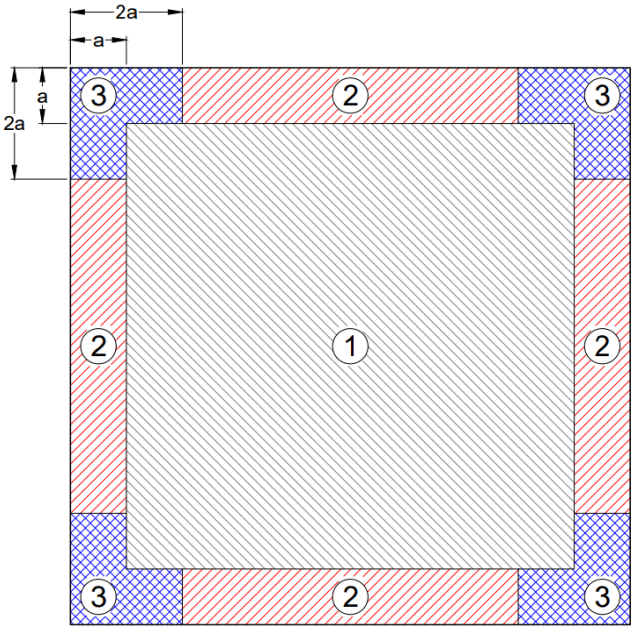
ASCE 7-16 FORMULA CALCULATIONS FOR HEIGHTS <60 FT.



Based on the ASCE 7-16 (2018 IBC), the perimeter and corner dimensions are as follows:

- Perimeter (2): width dimension is equal to 0.6 times the building eave height(h)
- Corners (3): length dimension is equal to 0.6 times the building eave height and the width dimension is equal to 0.2 times the building eave height(h)

ASCE 7-16 FORMULA CALCULATIONS FOR HEIGHTS >60 FT.



- Perimeter(2): 10% of the least horizontal dimension(a)
- Corners(3): Length of the corner is 2 times 10% of the least horizontal dimension(a) and the width is 10% of the least horizontal dimension

J. GAF TPO SYSTEMS SPECIFICATION PLATE – SELF-ADHERED

T SA N I 60

MEMBRANE TYPE	MEMBRANE ATTACHMENT	CONSTRUCTION TYPE	INSULATION	MEMBRANE (THICKNESS AND TYPE)
T= TPO	SA = SELF-ADHERED	N = New R = Recover T - Tear-off	I = Insulated N = Non-Insulated	60 = 60 mil Smooth 80 = 80 mil Smooth

Membranes			
Product	**Description**	**ASTM Standard**	**Available Thickness (mil)**
TPO Membrane			
EverGuard® TPO Membrane	Single-ply roofing membrane	ASTM D6878-21	45, 60, 80
EverGuard® TPO With MembraneShield Temporary Dirt-Blocking Film	Single-ply roofing membrane	ASTM D6878-21	60, 80
EverGuard® TPO Fleece-back Membrane 100, 115, 135	Single-ply roofing membrane with polyester fleece	ASTM D6878-21	45, 60, 80
EverGuard® TPO Fleece-back Membrane	Single-ply roofing membrane with polyester fleece	ASTM D6878-21	45, 60, 80
EverGuard® TPO Fleece-back With MembraneShield Temporary Dirt-Blocking Film	Single-ply roofing membrane with polyester fleece	ASTM D6878-21	60
Extreme TPO Membrane			
EverGuard® Extreme TPO	Single-ply roofing membrane with enhanced heat aging and UV protection	ASTM D6878-21	50, 60, 70, 80
EverGuard® Extreme TPO Fleece-back	Single-ply roofing membrane with enhanced heat aging and UV protection and polyester fleece	ASTM D6878-21	50, 60, 70, 80
Self-Adhered TPO Membrane			
EverGuard® SA TPO Membrane	Self-adhered single-ply roofing membrane	ASTM D6878-19	60, 80
PVC Membrane			
EverGuard® PVC Membrane	Single-ply roofing membrane	ASTM D4434-21	50, 60, 80
EverGuard® PVC Fleece-Back Membrane	Single-ply roofing membrane with polyester fleece	ASTM D4434-21	50, 60, 80
EverGuard® PVC KEE Membrane	Single-ply roofing membrane with KEE	ASTM D 4434 - 21 TYPE III	50, 60, 80
EverGuard® PVC KEE Fleece-Back Membrane	Single-ply roofing membrane with KEE and polyester fleece	ASTM D 4434 - 21 TYPE III	50, 60, 80

Insulation			
Product	**Description**	**ASTM Standard**	**Available Size(s)**
Polyiso Insulation			
EnergyGuard™ Polyiso Insulation	Flat Polyiso with GRF Facers	ASTM C1289 Type II Class 1 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ Tapered Polyiso Insulation	Tapered Polyiso with GRF Facers	ASTM C1289 Type II Class 1 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m)& 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ Ultra Polyiso Insulation	Flat Polyiso with CGF Facers	ASTM C1289 Type II Class 2 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.1 m x 2.4 m)
EnergyGuard™ Tapered Ultra Polyiso Insulation	Tapered Polyiso with CGF Facers	ASTM C1289 Type II Class 2 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m)
EnergyGuard™ Barrier Polyiso Insulation	Flat polyiso with CGF facers for combustible deck applications	ASTM C1289, Type II, Class 2, Grade 2 (20 psi), or Grade 3 (25 psi)	4 ft. x 4 ft. (1.2 m x 1.1 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ NH Polyiso Insulation	Flat Non-Halogenated Polyiso with GRF Facers	ASTM C1289 Type II Class 1 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ NH Tapered Polyiso Insulation	Tapered Non-Halogenated Polyiso with GRF Facers	ASTM C1289 Type II Class 1 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m)
EnergyGuard™ NH Ultra Polyiso Insulation	Flat Non-Halogenated Polyiso with CGF Facers	ASTM C1289 Type II Class 2 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ NH Ultra Tapered Polyiso Insulation	Tapered Non-Halogenated Polyiso with CGF Facers	ASTM C1289 Type II Class 2 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m)
EnergyGuard™ NH Barrier Polyiso Insulation	Flat Non-Halogenated Polyiso with CGF Facers for Combustible Deck Applications	ASTM C1289 Type II Class 2 Grade 2 (20 psi) or Grade 3 (25 psi).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Polyiso Cover Boards			
EnergyGuard™ HD Polyiso Cover Board	High-Density >80 psi Cover Board	ASTM C1289 Type II Class 4 Grade 1 (80 psi min)	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ HD Plus Polyiso Cover Board	High-Density >110 psi Cover Board	ASTM C1289 Type II Class 4 Grade 2 (110 psi min).	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ HD Barrier Polyiso Cover Board	High-Density >80 psi Cover Board for Combustible Deck Applications	ASTM C1289 Type II Class 4 Grade 1 (80 psi min)	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ NH HD Polyiso Cover Board	High-Density Non-Halogenated >80 psi Cover Board	ASTM C1289 Type II Class 4 Grade 1 (80 psi min)	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
EnergyGuard™ NH HD Plus Polyiso Cover Board	High-Density Non-Halogenated >110 psi Cover Board	ASTM C1289 Type II Class 4 Grade 2 (110 psi min)	4 ft. x 4 ft. (1.21 m x 1.21 m) & 4 ft. x 8 ft. (1.21 m x 2.44 m)
EnergyGuard™ HD-MA Polyiso Cover Board[2]	High Density ≥ 80 psi	ASTM C1289 Type II Class 5 Grade 1 (80 psi min)	4 ft. x 8 ft. (1.2 m x 2.4 m)

[2] For use in mechanically attached and induction-welded applications only.

Insulation (cont'd)			
Product	**Description**	**ASTM Designation**	**Available Size(s)**
Polyiso Composite Insulation			
Ultra HD Composite Insulation	High Density Composite Insulation with CGF Facers	Top Layer: Meets the requirements of ASTM C1289 Type II Class 4 Grade 1 (80 psi min); Bottom Layer: Meets the requirements of ASTM C1289 Type II Class 2 Grade 2 (20 psi)	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Gypsum Boards			
USG Securock® Brand Gypsum-Fiber Roof Board	Fiber-reinforced gypsum panel	ASTM C1278	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
USG Securock® Brand Ultralight Glass-mat Roof Board	Fiber-reinforced gypsum panel with an ultra light I core	ASTM C1177	4 ft. x 8 ft. (1.2 m x 2.4 m)
USG Securock® Brand Ultralight Coated Glassmat Roof Board	Coated fiber-reinforced gypsum panel with an ultra light core	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Georgia Pacific DensDeck® Roof Board	Reinforced gypsum panel with coated glass mat facers	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Georgia Pacific DensDeck® Prime Roof Board	Reinforced gypsum panel with coated glass mat facers and pre-primed on one side	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Georgia Pacific DensDeck® StormX™ Prime Roof Board	Reinforced gypsum panel with coated glass mat facers which can be used in systems seeking a FM Very Severe Hail (VSH) classification[1]	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
National Gypsum DEXcell® Glass Mat Roof Board	Coated fiberglass facers with a gypsum core	ASTM C1177	4 ft. x 8 ft. (1.2 m x 2.4 m)
National Gypsum DEXcell FA™ Glass Mat Roof Board	Heavy duty coated fiberglass facers with a gypsum core	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
National Gypsum DEXcell FA VSH™ Glass Mat Roof Board	Heavy duty coated fiberglass facers with a gypsum core which can be used in systems seeking a FM Very Severe Hail (VSH) classification[1]	ASTM C1177	4 ft. x 4 ft. (1.2 m x 1.2 m) & 4 ft. x 8 ft. (1.2 m x 2.4 m)
Wood Fiber Boards			
Blue Ridge STRUCTODEK®HD Fiberboard Roof Insulation Cover Board	High-density fiberboard roof insulation with unique, patent-pending, non-asphaltic primed red coating that allows for a solid membrane bond	ASTM C208, Type II, Grade 1 and Grade 2	4 ft. x 4 ft. (1.21 m x 1.21 m) & 4 ft. x 8 ft. (1.21 m x 2.44 m)

Footnotes

1. Systems approved under FM 4470 - Very Severe Hail (Class 1-VSH). See FM Global Data Sheet 1-34 for more information. Visit RoofNav.com for approved assemblies.
2. EnergyGuard™ HD-MA Polyiso Cover Board for use in mechanically attached & induction welded systems only

General comments

SECUROCK® is a registered trademark of the United States Gypsum Company.
DensDeck® is a registered trademark of Georgia-Pacific Gypsum LLC.
DEXcell® is a registered trademark of Gold Bond Building Products, LLC.
Structodek® is a registered trademark of Blue Ridge Fiberboard, Inc.

Vapor Retarder, Anchor Sheet & Slip Sheet		
Product	**Description**	**Roll Size[1]**
Vapor Retarder		
GAF SA Vapor Retarder XL	31 mil self-adhered vapor-inhibiting membrane	6 squares per roll
GAF SA Vapor Retarder XL40	41 mil self-adhered vapor-inhibiting membrane	6 squares per roll
Slip Sheets		
Versashield® SOLO™ Fire Resistant Slip Sheet	Proprietary coating applied to a heavy weight, fiberglass mat to enhance fire resistance	10 squares per roll
EverGuard® Polymat Cushioning Layer	6 oz/yd non-woven polyester mat	32 squares per roll
EverGuard Polymat Separation Layer	3 oz/yd non-woven polyester mat	49 squares per roll

Footnote

1. Installed coverage will be lower and dependent on quantity and width of side and end laps

Primers, Sealants, & Cleaners		
Product	**Description**	**Packaged Size(s)**
Primers		
EverGuard® TPO Primer	Solvent-based primer for ensuring good adhesion between metal edges, cover tape, adhesives, sealants, and TPO membrane	15 oz aerosol, 1 gal (3.79 L)
EverGuard® Low VOC TPO Primer	Low-VOC solvent-based primer for ensuring good adhesion between metal edges, cover tape, adhesives, sealants, and TPO membrane	1 gal (3.79 L)
Sealants		
FlexSeal™ Caulk Grade Sealant	Caulk grade solvent-based contact synthetic elastomeric sealant	10 oz. (296 ml)
FlexSeal™ Sealant	Self-leveling solvent-based contact synthetic elastomeric sealant	10 oz. (296 ml), 1 gal (3.79 L)
EverGuard® Water-Block Sealant	Butyl-based high-viscosity sealant	10.5 oz. (310 ml)
EverGuard® TPO Cut Edge Sealant	Seal cut membrane edges	1 pint (473 ml) bottle
EverGuard® One-Part Pourable Sealant	One-part, moisture-cure, self-leveling sealant for pitch pans	0.53 gal (2 L) pouch
Cleaners		
EverGuard® TPO Seam Cleaner	TPO membrane cleaner for exposed or contaminated seams	15 oz aerosol, 5 gal (18.9 L)
EverGuard® TPO Low-VOC Seam Cleaner	Low-VOC TPO membrane cleaner for exposed or contaminated seams	1 gal (3.79 L)
EverGuard® PVC Membrane Conditioner	PVC membrane cleaner for exposed or contaminated seams	1 gal (3.79 L)

Bonding Adhesives						
Product	**Packaged Size(s)**	**Minimum Application Temperature**	**Compatible Materials**	**Application**	**Installed Coverage per Container[1]**	**Installed Rate per Gallon**
EverGuard® TPO Quick Spray Adhesive	Aerosol can, Canister (sizes vary)	20°F (-6.7°C)	Smooth TPO membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	20-25 sq. ft. for aerosol. Up to 3 squares or 10 squares depending upon canister size	See gaf.com for detailed application instructions or video
EverGuard® TPO Quick Spray Adhesive LV50	Aerosol can, Canister (sizes vary)	40°F (4.4°C)	Smooth TPO membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	20-25 sq. ft. for aerosol. Up to 3 squares or 10 squares depending upon canister size	See gaf.com for detailed application instructions or video
EverGuard® #1121 TPO Bonding Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth TPO membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	Approximately 300 sq. ft. (3 sq.)	50-70 sq. ft. per gallon (1.23 - 1.75 sqm. per liter)
EverGuard® TPO Low VOC Bonding Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth TPO membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	600 sq. ft. (6 sq.)	100-120 sq. ft. per gallon (2.45 - 2.94 sqm. per liter)
EverGuard® TPO 3 Square Low VOC Bonding Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth TPO membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	300 sq. ft. (3 sq.)	50-70 sq. ft. per gallon (1.23 - 1.75 sqm. per liter)
EverGuard® WB 181 Bonding Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth TPO membrane	Apply adhesive **equally to both** the substrate and underside of membrane	600 sq. ft. (6 sq.)	100-120 sq. ft. per ½ gallon (2.45 - 2.94 sqm. per liter)
			Fleece-back TPO membrane, Fleece-Back PVC membrane	Apply to the roof **substrate surface ONLY**		100-120 sq. ft. per gallon (2.45 - 2.94 sqm. per liter)
EverGuard® PVC Quick Spray Adhesive	Canister (sizes vary)	20°F (-6.7°C)	Smooth PVC membrane only	Apply adhesive **equally to both** the substrate and underside of membrane	up to 6 squares	See gaf.com for detailed application instructions or video
		40°F (4.4°C)	Smooth PVC KEE membrane only			

Footnote

1. Coverage rates are approximate and may vary depending on the substrate

Bonding Adhesives (cont'd)						
Product	**Packaged Size(s)**	**Minimum Application Temperature**	**Compatible Materials**	**Application**	**Installed Coverage per Container[1]**	**Installed Rate per Gallon**
EverGuard® PVC #2331 Bonding Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth PVC membrane only	Apply adhesive divided **equally to both** the substrate and underside of membrane	300 sq. ft. (3 sq.)	50-70 sq. ft. per gallon (1.23 - 1.75 sqm. per liter)
EverGuard® PVC Quick-Lay Adhesive	5 gal (18.93 L) pails	40°F (4.4°C)	Smooth PVC membrane only	Apply to the **substrate ONLY**	600 sq. ft. (6 sq.)	100-120 sq. ft. per gallon (2.45 - 2.94 sqm. per liter)

Adhesive Accessories
Product
EverGuard® TPO Quick Spray Adhesive Hose & Gun Kit
EverGuard® TPO Quick Spray Adhesive LV 50 Hose & Gun Kit
EverGuard® TPO Quick Spray Adhesive Hose & Gun Cleaner

Low-Rise Foam Adhesives					
Product	**Packaged Size(s)**	**Minimum Application Temperature**	**Compatible Materials**	**Application**	**Installed Coverage per Container[1]**
LRF Adhesive O	Bag in box, Cartridge, Drum	40°F (4.4°C)	TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in. (25.4 mm) wide beads or spatter pattern applied to the **substrate only**	Cartridge - up to 6 squares per case of 4 Bag in Box - up to 20 squares per box set 15 gal. drums - up to 90 squares per set
LRF Adhesive M	Bag in box, Cartridge, Drum	40°F (4.4°C)	Insulation, TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads applied to the **substrate only**	Cartridge - up to 6 squares per case of 4 Bag in Box - up to 30 squares per box set 15 gal. drum - up to 90 squares per set 50 gal. drum - up to 300 squares per set
TPO LRF Adhesive M Low Temp	Cartridge	25°F (-3.9°C)	Insulation, TPO fleece-back membrane only;	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads applied to the **substrate only**	Cartridge -up to 6 squares per case of 4
LRF Adhesive M LTA	Cartridge	25°F (-3.9°C)	Insulation, TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads applied to the **substrate only**	Cartridge -up to 6 squares per case of 4
LRF Adhesive M Canister	Two-part canister system	40°F (4.4°C)	Insulation, TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads or spatter pattern applied to the **substrate only**	up to 35 sq. for insulation, up to 24 sq. for TPO/PVC fleece-back membranes per set
LRF Adhesive XF Canister	Two-part canister system	32° F (1.7 °C)	Insulation, TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads or spatter pattern applied to the **substrate only**	up to 35 sq. for insulation, up to 24 sq. for TPO/PVC fleece-back membranes per set
OlyBond500™ Adhesive Fastener	1500 ml cartridges, Bag in box, Drum	40°F (4.4°C)	Insulation	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads applied to the roof **substrate surface only**	Cartridge - up to 6 squares per case of 4 Bag in Box - up to 30 squares per box set 15 gal Drums - up to 90 squares per set 50 gal Drum - up to 300 squares per set
OlyBond500™ Canisters	Two-part canister system	40°F (4.4°C)	Insulation, TPO fleece-back membrane, PVC fleece-back membrane	3/4 in. (19.1 mm) to 1 in.(25.4 mm) wide beads or spatter pattern applied to the roof **substrate surface only**	up to 35 sq. for insulation, up to 24 sq. for Fleece-Back TPO/PVC membranes per set

Footnote

1. Coverage rates are approximate and may vary depending on the substrate

Accessories

These are GAF's accessory product offerings. Refer to the **Installation Guidelines Section** for usage & application.

Product	Available in			Product	Available in		
	TPO	Extreme TPO	PVC		TPO	Extreme TPO	PVC
Drains				**Flashing Accessories**			
GAF Steely Drain Retro Flat Deck Drain	N/A			EverGuard® RTA Strip	Yes	No	No
EverGuard® Hercules® Drain				EverGuard® Coated Metal		Yes	Yes
EverGuard® Coated Hercules Drain	Yes	No	Yes	EverGuard® T-Joint Patch		Yes	Yes
EverGuard® Coated SpeedTite™ Drain				EverGuard® Sacrificial Slip Sheet		No	No
Penetration, Pipe, & Vent Boots				**Self-Adhered Flashing Accessories**			
EverGuard® Vent Boot	Yes	Yes	Yes	EverGuard® SA TPO Vent Boot	Yes	Yes	No
EverGuard® Split Pipe Boot				EverGuard® SA EPDM Flashing Tape: 6 in. x 100 ft., 9 in. x 50 ft., 12 in. x 50 ft.			
EverGuard® Square Tube Wrap				EverGuard® SA EPDM T-Joint Patch			
EverGuard® Conical Pipe Boot	Yes	No	Yes	EverGuard® SA EPDM 7 in. x 9 in. Patch			
EverGuard® Pourable Sealer Pocket	No	No	Yes	EverGuard® SA EPDM T-Joint Cover Patch			
EverGuard® Split Pourable Sealer Pocket	Yes	Yes	No	**Vents**			
Corners				EverGuard® Vent	Yes	No	No
EverGuard® Universal Corner	Yes	Yes	Yes	EverGuard® T-Top Vent	Yes	No	No
EverGuard® Corner Curb Wrap				**Scuppers**			
EverGuard® Fluted Corner				EverGuard® Scupper	Yes	No	No
EverGuard® Inside Corner				**Traffic Protection**			
Flashing Rolls				EverGuard® Walkway Roll	Yes	No	Yes
EverGuard® Primerless TPO Cover Tape	Yes	No	No	**Roof Mounts**			
EverGuard® TPO Cover Tape		No	No	GAF Rooftop Equipment Mount 100	Yes	Yes	Yes
EverGuard® TPO Cover Tape HW		No	No	GAF Rooftop Equipment Mount 240	Yes	Yes	Yes
EverGuard® Detailing Membrane		Yes	Yes	**Deck-Mounted Commercial Domes**			
EverGuard® Flashing Strip		Yes	Yes	GAF VELUX® Skylights	Yes	Yes	Yes
TruGround Conductive Primer	Yes	Yes	No				

Edge Metal

Product	Cap Material	Cap Metal Gauge
Drip Edge		
EverGuard® Drip Edge (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.
EverGuard® Pro Drip Edge (Aluminum/Steel) Flat	Galvanized Steel	22 ga.
	Aluminum	.040 in.
EverGuard® Pro Drip Edge (Aluminum/Steel) Pitched	Galvanized Steel	22 ga.
	Aluminum	.040 in.
EverGuard® TPO Drip Edge (Aluminum/Steel)	Galvanized Steel	24 ga.
EverGuard® PVC Drip Edge (Aluminum/Steel)	Galvanized Steel	24 ga.
Coping		
EverGuard® Continuous Cleat Coping (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.
EverGuard® Gold Coping (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.

Product	Cap Material	Cap Metal Gauge
Coping (Cont')		
EverGuard® Coping (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.
M-Weld™ Snap-On Coping (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Stainless Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.
M-Weld™ Snap-On Plus Coping (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.
	Stainless Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.
		.063 in.
Edge Box		
EverGuard® EdgeBox RI	Galvanized Steel	20 ga.

Edge Metal (cont'd)

Product	Cap Material	Cap Metal Gauge	Product	Cap Material	Cap Metal Gauge
Fascia			**Fascia**		
EverGuard® Gravel Stop (Aluminum/Steel)	Galvanized Steel	24 ga.	EverGuard® Fascia (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.			22 ga.
	Aluminum	.040 in.		Aluminum	.040 in.
		.050 in.			.050 in.
		.063 in.			.063 in.
EverGuard® EZ Fascia (Aluminum/Steel)	Galvanized Steel	24 ga.	EverGuard® One Edge Fascia (Aluminum/Steel)	Galvanized Steel	24 ga.
		22 ga.			22 ga.
	Stainless Steel	24 ga.		Stainless Steel	24 ga.
		22 ga.			22 ga.
	Aluminum	.040 in.		Aluminum	.040 in.
		.050 in.			.050 in.
		.063 in.	**Gutters**		
EverGuard® Pro Fascia (Aluminum/Steel)	Galvanized Steel	24 ga.	EverGuard® WR Box Gutter	Galvanized Steel	24 ga.
		22 ga.			22 ga.
	Aluminum	.040 in.		Aluminum	.040 in.
EverGuard® Pro Extended Fascia (Aluminum/Steel)	Galvanized Steel	22 ga.			.050 in.
	Aluminum	.050 in.			.063 in.
EverGuard® One Edge Extended Fascia (Aluminum/Steel)	Galvanized Steel	22 ga.	EverGuard® WR Offset Gutter	Galvanized Steel	24 ga.
	Aluminum	.050 in.			22 ga.
		.063 in.		Aluminum	.040 in.
EverGuard® Pro HG Fascia (Aluminum/Steel)	Galvanized Steel	24 ga.			.050 in.
		22 ga.			.063 in.
	Aluminum	.040 in.	EverGuard® WR Chamfer Gutter	Galvanized Steel	24 ga.
		.050 in.			22 ga.
		.063 in.		Aluminum	.040 in.
					.050 in.
					.063 in.

Edge Metal (cont'd)

Gutters		
EverGuard® XL Gutter	Galvanized Steel	24 ga.
		22 ga.
	Aluminum	.040 in.
		.050 in.

Plates and Fasteners

Product	Size	Product	Size
TPO & PVC Membrane Fasteners			
Drill-Tec™ #14 Fastener	Lengths from 1 1/4 in. to 24 in.	Drill-Tec™ CD-10 Fastener	Lengths from 2 in. to 12 in.
Drill-Tec™ XHD Fastener (#15)	Lengths from 2 in. to 22 in.	Drill-Tec™ Purlin Fastener (Retro Driller)	Lengths from 4 in. to 10 in.
Drill-Tec™ SXHD Fastener (#21)	Lengths from 2 in. to 21 in.	Drill-Tec™ #12 Purlin Fastener	Lengths from 1 3/8 in. to 9 3/ in.
Drill-Tec™ Purlin Hex Head Fastener	Lengths from 3 3/4 in. to 8 in		
TPO & PVC Membrane Plates			
Drill-Tec™ 2 in. Double-Barbed XHD Plate	Galvalume® coated steel	Drill-Tec™ 2 3/4 in. Barbed SXHD Plate	Galvalume® coated steel
Drill-Tec™ Barbed XHD Plate	Galvalume® coated steel	Drill-Tec™ 2 in. Steel Wall Plate	Galvalume® coated steel
Drill-Tec™ 2 3/8 in. Eye Hook® AccuSeam® Plate	Galvalume® coated steel	Drill-Tec™ Double 2 3/8 in. Barbed XHD Plate	Galvalume® coated steel
Insulation Fasteners			
Drill-Tec™ #12 Fastener	Lengths from 1-5/8 in. to 8 in.	Drill-Tec™ XHD Fastener (#15)	Lengths from 2 in. to 22 in.
Drill-Tec™ #14 Fastener	Lengths from 1-1/4 in. to 24 in.	Drill-Tec™ CD-10 Fastener	Lengths from 2 in. to 12 in.
Insulation Plates			
Drill-Tec™ 3 in. Steel Plate	Galvalume® coated steel	Drill-Tec™ 3 in. Ribbed Galvalume Plate (Flat)	Galvalume® coated steel
Drill-Tec™ 3 in. Plastic Locking Plate	Plastic	Drill-Tec™ 3 in. Standard Steel Plate	Galvalume® coated steel
Drill-Tec™ 3 in. AccuTrac® Recessed Plate	Galvalume® coated steel	Drill-Tec™ 3 in. AccuTrac® Flat Plate	Galvalume® coated steel

Plates and Fasteners (cont'd)

Insulation Pre-Assembled Plate & Fasteners

Product	Fastener	Plate	Plate material
Drill-Tec™ ASAP® 3S	#12 Fastener Lengths from 1-5/8 in. to 8 in.	3 in. Standard Steel Plate	Galvalume® coated steel

Specialty Deck & Wall Plates & Fasteners

Product	Size	Material/Description
Drill-Tec™ Polymer GypTec® Fastener	Lengths from 2-1/2 in. to 8 in.	For gypsum and cementitious wood fiber (tectum) decks
Drill-Tec™ 2 in. GypTec® Plate	2 in.	Galvalume® coated steel for membrane
Drill-Tec™ 3 in. GypTec® Plate	3 in.	Galvalume® coated steel for insulation
Drill-Tec™ 3 in. LD Fastener (Lite Deck)	Lengths from 2-5/8 in. to 12 in.	For gypsum and cementitious wood fiber (tectum) decks
Drill-Tec™ 3 in. LD Plate	3 in.	Galvalume® coated steel for insulation
Drill-Tec™ Base Sheet Fastener E	1.2 in. or 1.7 in. length	For lightweight insulating concrete
Drill-Tec™ Locking Impact Nail	1.4 in. or 1.8 in. length	For gypsum and cementitious wood fiber (tectum) decks

Termination Bars

Drill-Tec™ FLAT Termination Bar	1 in. width x 10 ft. per bar	6063-T6 extruded aluminum
Drill-Tec™ LIP Termination Bar	3/4 in. width x 10 ft. per bar	6063-T6 extruded aluminum
Drill-Tec™ Masonry Anchors	Lengths from 7/8 in. to 2 in.	Zinc alloy / zinc plated steel pins

Plates and Fasteners (cont'd)			
Induction-Welded Plate & Fasteners			
Product	**(Plate) material**	**Size**	**Applicable fasteners[1]**
Drill-Tec™ RhinoBond® TPO SXHD® Plate	TPO Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ SXHD® (#21)
Drill-Tec™ RhinoBond® TPO XHD® Plate	TPO Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ XHD Fastener, Drill-Tec™ #15 DF Fastener, Drill-Tec™ #15 EHD Fastener, Drill-Tec #14 Fastener, Drill-Tec #14 DF Fastener, Drill-Tec #14 HD Fastener, Drill-Tec™ #12 Purlin Fastener
Drill-Tec™ TPO IW Plate	TPO Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec #14 HD Fastener, Drill-Tec™ #15 EHD Fastener, Drill-Tec #12 Purlin Fastener
Drill-Tec™ RhinoBond® TPO XHD®Tread Safe Plate	TPO Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ #14 Fastener, Drill-Tec™ XHD® Fastener (#15), Drill-Tec™ Purlin Fastener, Drill-Tec™ Hex-Head Purlin Fastener
Drill-Tec™ RhinoBond® PVC SXHD® Plate	PVC Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ SXHD® (#21)
Drill-Tec™ RhinoBond® PVC XHD® Plate	PVC Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ XHD Fastener, Drill-Tec™ #15 DF Fastener, Drill-Tec™ #15 EHD Fastener, Drill-Tec #14 Fastener, Drill-Tec #14 DF Fastener, Drill-Tec #14 HD Fastener, Drill-Tec #12 Purlin Fastener
Drill-Tec™ PVC IW Plate	PVC Coated Galvalume®steel	3 in. Standard Steel Plate	
Drill-Tec™ RhinoBond® PVC XHD®Tread Safe Plate	PVC Coated Galvalume®steel	3 in. Standard Steel Plate	Drill-Tec™ #14 Fastener, Drill-Tec™ XHD® Fastener (#15), Drill-Tec™ Purlin Fastener, Drill-Tec™ Hex-Head Purlin Fastener
Drill-Tec™ TreadSafe Tubes	Polyamide	1.5 in., 2.5 in. , 4.3 in. and 6.5 in	For use with Tread Safe Plates above

[1] Refer to code listing for approved fasteners for appropriate substrates

Field Guidelines

A. Regulatory Requirements & Pre-Job Conference

1. Conform to all applicable building and jurisdictional codes, including roof assembly wind uplift and fire resistance requirements and slope limitations. For roof slopes, GAF recommends compliance with the IBC requirement of at least ¼:12 slope.
2. Follow local, state and federal guidelines for disposing of used or expired adhesives, sealants and other products subject to disposal regulations.
3. Potential problems in roofing applications, as well as potential conditions that may be detrimental to installation and performance of the roof system, should be resolved before the start of the installation. This is best accomplished by a pre-job meeting with the architect; roofing contractor; general contractor; all other subcontractors whose work will involve the roof system/related systems; and a GAF representative.
4. The following are common items of discussion at a pre-job conference:
    a. Submittals of materials, drawings, and project documents.
    b. Roof deck conditions.
    c. Flashing and expansion joint details.
    d. Insurance underwriters or building code requirements.
    e. Unusual project conditions.
    f. Protection of the roof, building, building occupants, and contents during and after application.
    g. Application techniques.
    h. Coordination and scheduling of other trades that will be working on the project.
    i. Designation by the roofing contractor of a qualified person responsible for quality control. This person should be on the project full time during application of the roof system.
    j. Scheduling of material shipments, material storage, and rooftop loading.

B. Delivery, Storage & Protection

1. If storing away from or prior to the roof site delivery
    a. Extreme heat or cold conditions may require special storage. Refer to gaf.com for product data sheets for specific product storage requirements .
    b. Store materials in a weather-protected environment, clear of the ground and moisture, according to GAF instructions.
    c. All materials stored outside must be raised above ground or roof level on pallets and covered with a tarpaulin or other waterproof and “breathable” material. Insulation products should be properly stored and secured to avoid weather and wind damage.
    d. Factory-installed plastic shipping shrouds are not designed for rooftop storage. Use “breathable” type covers, such as waterproof tarpaulins, to protect from weather and moisture. To reduce condensate during job site storage, remove the plastic shipping shroud or cut the plastic shroud to allow for venting.
2. At the roof site:
    a. Deliver products to site in original containers with seals unbroken and labeled with manufacturers’ names, product brand names and types.
    b. Store all adhesives, coatings, and sealants/caulks to protect them from freezing. Frozen material must be discarded and replaced. Properly seal all liquid material containers after use.
    c. Cover and protect materials at the end of each day’s work.

d. Do not remove any protective tarpaulins until immediately before material will be installed. Keep materials properly protected and in like new condition until time of installation

e. Do NOT use materials that are wet or damaged to the extent that they will no longer serve their intended purpose. Remove all damaged materials from the job site.

f. When staging materials on the roof during application, ensure the deck and structure are not overloaded by the weight and loads of construction materials.

C. Environmental Requirements & Restrictions

1. Do not apply roofing materials during inclement or threatening weather.
2. Do not expose materials vulnerable to water or sun damage in quantities greater than can be covered with membrane during the same day.
3. Be aware that high or gusting winds make the installation of some materials more difficult.
4. Do not install materials when moisture, such as liquid water, dew, snow or ice, is present on the roof deck or substrate to which the materials are to be applied.

D. Working Environment

1. Work should only begin when the contractor has decided to his/her satisfaction that all specifications are workable as specified, and that the contractor can meet the project and code requirements.
2. The contractor should only begin roofing work when the substrates have been prepared as necessary and are ready to accept the roofing materials installed as specified.
3. Provide a safe working environment, including, but not limited to, adequate fall protection, restriction of 'unauthorized access to the work area, and protection of the building and its occupants.
4. Safe work practices should be followed, including, but not limited to, keeping tools in good operating order; providing adequate ventilation if adhesives are used; and daily housekeeping to remove debris and other hazards.
5. Protect the building, contents, surrounding area, building occupants and contractor personnel during work. Coordinate all work operations with the building owner and building occupants so that adequate interior protection, as necessary, is provided and disruption to normal building operations is minimized.
6. Where heavy wheeled or other traffic over the partially completed roofing is unavoidable, provide and use adequate plank or plywood, set over a minimum thickness of rigid board insulation, to protect the newly installed roof.
7. Provide temporary water cut-offs and tie-ins at the end of each work day. Remove all temporary work at the beginning of the next work day.
8. When tearing off an existing membrane, limit removal to the area that will be completely reroofed that day with the new roofing system.
9. If conditions are uncovered or created that would be detrimental to the proper execution of specified work, immediately notify the building owner and the designer of record of these conditions for consultation on acceptable remedy or resolution of the problem.

E. Safety Considerations & Warnings

1. As with any construction process, safety is a key element. All applicable safety standards and good roofing practices must be followed. Read and understand Installation Guidelines before starting application. Follow all precautions and directions.
2. Only properly trained and professionally equipped roofing contractors experienced in the installation of each TPO and PVC roofing application should install these systems. Never allow contact between the heated surface of a hot welder or other tool and the applicator's hair, skin, or clothing. Always wear protective gear, including but not limited to: hardhats, eye protection, heavy-duty gloves, and snug-fitting clothing.

3. Solvent-containing accessories may be combustible and should always be kept from heat, flame or any source of ignition. Empty containers must be disposed of in accordance with local, state, and federal regulations.
4. Thoroughly train all personnel in first aid procedures, and always comply with all OSHA safety standards and fire codes. Also, use extreme caution when working around equipment, such as gas lines or HVAC units, which have electrical or gas connections.
5. EverGuard® TPO or PVC roof membranes may be slippery when wet. Exercise caution when walking on the TPO or PVC membranes during or after a rain shower, or if moisture is present in the form of dew, frost or ice. Pay attention while walking on light-colored surfaces as ice or frost build-up may not be as visible as on a dark surface.

Field Practices

A. Roofing Area Preparation

1. General
    a. Deck preparation is the sole responsibility of the building owner and/or roofing contractor.
    b. Protect building surfaces against damage and contamination from roofing work.
    c. All defects in the roof deck or substrate must be corrected by the responsible parties before new roofing work commences.
    d. Verify that the deck surface is dry, sound, clean and smooth, and free of depressions, waves, or projections.
    e. Where work must continue over completed roof areas, protect the finished roofing system from damage.
2. New & Tear-off Applications
    a. Remove all existing roofing materials to the roof decking, including flashings, metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants.
    b. Confirm quality and condition of roof decking by visual inspection and by fastener pull-out testing. GAF recommends these test results to be kept on file as part of the acceptability of the substrate surface for a Diamond Pledge™ NDL Roof Guarantee.
    c. Secure all loose decking. Remove and replace all deteriorated decking.
    d. Remove abandoned equipment and equipment supports.
    e. Confirm that height of equipment supports will allow the installation of minimum 8in. (203 mm) flashing heights.
    f. For guarantees 20 years or greater, new roof construction or a tear-off is required.
3. Re-cover Applications
    a. Remove all surfacing and debris from the roof surface.
    b. Remove blisters and ridges from the roof membrane.
    c. When re-covering over an existing single-ply roof, that roof must be first cut into a maximum 10 ft. x 10 ft. (3 m x 3 m) grid before the application of a new slip sheet and/or membrane.
        i. PVC must be separated from existing PVC roofs and other types of single-ply membranes and asphaltic membranes that have active sealants, including asphalt cement, single-ply adhesives, or other non-compatible materials. This can be accomplished by installing a polymat slip sheet, insulation, cover board, or fleece-back PVC membrane.
        ii. Installation over an existing mechanically attached membrane is only acceptable if all existing fasteners are flush and do not cause ridging/tenting at the existing membrane.
    d. Remove all existing flashings, including metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants. If the wall/curb flashings are in good condition and tightly adhered to the substrate, new TPO or PVC flashing materials may be installed over these to a height of 30 in. (762 mm) without adhesives for sheets up to 10 ft. (3 m) wide. For sheets up to 12 ft. (3.5 m) wide, flashings may be installed up to 36 in. (914 mm). New PVC flashing materials must be installed over a layer of polymat or insulation board.
    e. The existing roof surface must be free of visible moisture, such as ponding water, ice, or snow.

f. It is recommended that the building owner have a moisture survey performed to ascertain the condition and suitability of the existing roofing materials to receive a re-cover system. A survey is required if perlite or wood fiber insulation is used in a re-cover system. GAF will not be responsible for damage to the roofing system resulting from moisture in the existing roofing system. Remove and replace all existing roofing materials that contain moisture.

g. Confirm quality and condition of roof decking by visual inspection if possible, and by fastener pull-out testing. Remove and replace all deteriorated decking.

h. Test cuts

   i. Take test cuts to verify the existing roof construction and condition. Generally three test cuts should be made for roofs under 100 squares (920 sq. m) and one test cut per 100 squares (920 sq. m) above the minimum amount.

   ii. Test cuts must be representative of the roofing system(s).

i. Remove abandoned equipment and equipment supports.

j. Raise equipment supports to allow the installation of minimum 8 in. (203 mm) flashing heights.

k. Re-cover installations over coal tar pitch roofs are not recommended. However, if the designer of record chooses to re-cover over an existing coal tar pitch roof, GAF requires the following:

   i. Existing loose gravel must be broomed or vacuumed (do not spud).

   ii. If high spots remain, a thicker insulation board must be used to provide a smooth substrate for the EverGuard® membrane.

   iii. A minimum 1 in. (25 mm) polyiso insulation is required for TPO applications.

   iv. A minimum 1.5 in. (38 mm) polyiso insulation is required for PVC applications.

   v. Do not use EPS/XPS over coal tar pitch roofs.

l. Surface preparation for TPO and PVC fleece-back membrane directly to EPDM

   i. Clean surface of EPDM

      1. The existing EPDM membrane must be power-washed and cleaned with GAF EPDM Activator. Refer to GAF EPDM Activator Product Data Sheet.

   Note: See Appendix for Adhesion Test Guidelines.

B. Membrane Preparation

1. Substrate Surface Preparation

   a. Substrates must be inspected and accepted by the contractor as suitable to receive and hold roof membrane materials.

      Note: EverGuard Extreme® has a light gray backer sheet to distinguish it from regular TPO membrane. It is the contractor's responsibility to install EverGuard Extreme® where specified on the roof; i.e., under highly reflective glass or metal, or wherever sustained exposure to high temperatures requires.

   b. Prepare substrate surfaces thoroughly before applying new roofing materials. This is particularly important for re-cover and reroofing applications.

   c. Preparation includes, but is not limited to, removal of existing flashings, replacement of wet/damaged existing roofing materials, removal of loose aggregate, removal of abandoned equipment, supports and penetrations, replacement of damaged decking, etc. Providing a smooth, even, sound, clean, and dry substrate minimizes the likelihood that underlying deficiencies will cause premature deterioration or even failure of the new roofing system.

2. Membrane Surface Preparation for Seaming

    a. Proper preparation of the area to be heat-welded is critical to forming a good, long-lasting seam. Heat-welding uses the thermoplastic nature of the material to melt two pieces of material together, fusing it into a single piece. In order to properly fuse these two discrete pieces together, the materials must be clean and dry; if not clean and dry, contaminants will interfere with the weld and, generally, the result is a poor or false weld.

    b. Satisfactory heat welding requires that the membrane be clean of dirt and contaminants, and free from dew, rain, and other sources of moisture.

    c. The factory-fresh membrane typically will not require cleaning before welding, provided that welding is performed immediately after placement of the membrane. Membrane that has been exposed for a longer period of time will require additional cleaning methods, depending on the type of contamination present.

        i. Any material rolled out and put into place needs to be welded the same day, including welding of any detail work.

        ii. Membrane that has been exposed overnight or for more than 12 hours or has otherwise become contaminated, will require cleaning.

        iii. All TPO and TPO Extreme unreinforced preformed accessories and EverGuard® Detailing Membrane to be prepped with EverGuard® TPO Seam Cleaner applied with white rag, prior to hot-air welding.

        Note: When probing the seams, should weld be inadequate, re-clean unreinforced membrane with EverGuard® TPO Seam Cleaner and an abrasive pad.

3. Seam Cleaning

    a. Refer to the Membrane/Seam Cleaning Table in the Appendix.

    b. If Low-Rise Foam Adhesive is accidentally spilled on the surface of the finished roof, use the following procedure to clean the roof:

        i. Carefully scrape off the adhesive without rupturing the underlying roof membrane.

        ii. After removal of adhesive, cover the affected area with either EverGuard® smooth or fleece-back membrane.

C. Welding

1. Heat Welding Equipment

    a. Successful hot air welding requires the use of specialized, properly maintained and adjusted equipment operated by experienced personnel familiar with hot air welding techniques. Achieving consistent welds is a function of ensuring that the roofing membrane surface is clean and prepared for heat welding.

    b. Welding equipment consists of three main components: hot air welder (either automatic or hand held), extension cords, and power supply.

        i. Current generation automatic hot-air welder (recommended)

            1. Minimum Power Supply: 220 volts, 30 amps, 10,000 watt continuous

        ii. Current generation hand-held hot-air welder (recommended)

            1. Minimum Power Supply: 110 volts, 15 amps, 2500 watt continuous

        iii. Commercial Grade 10,000-watt voltage-controlled generator (minimum)

            1. THD (Total Harmonic Distortion) rating should be six (6) or less for quality welds

2. 240v & 120v Outlets
3. GFCI Line Cords
4. Volt Meters

iv. Extension Cords

1. Automatic Welders - #10 wire with a standard plug configuration. Maximum 100 ft. (30.5 m) in length.
2. Hand-Held Welders - #12 wire with a standard plug configuration. Maximum 100 ft. (30.5 m) in length.
3. For longer lengths, consult an electrician for line voltage drop. Heavier-gauge extension cords are likely to be required.

v. Stable power supply- Adequate wattage and consistent voltage is critical to obtaining consistent hot air welds and to prevent damage to the welder. The use of a contractor-supplied portable generator is recommended. House-supplied power is acceptable for hand welders only. Do not connect to a power source that is:

1. Used for other equipment that cycles on and off.
2. Is subject to momentary disruptions or power surges.
3. Incapable of providing sufficient power.
4. THD greater than six (6) may lead to fluctuations which may impact welding.

c. Silicone Hand Roller (used in conjunction with hand-held welders)

i. Ensure that the roller is in good condition. Rollers with rounded edges should be replaced.

Note: Outdated welding equipment and inadequate or fluctuating electrical power are the most common causes of poor seam welds.

2. Equipment Maintenance

a. Follow the manufacturer recommendations for equipment maintenance and repair

b. Owner maintenance of welding equipment includes keeping the equipment safe from physical abuse and damage from the elements, keeping the welding nozzles clean from membrane residue, keeping the air filters free from clogging, and replacing heating elements when needed.

i. Follow the equipment manufacturer's recommendations regarding other aspects of equipment maintenance and repair (i.e., motor brushes, switches, belts, etc.).

ii. Store welding equipment in weather tight tool boxes. Tool boxes for automatic welders in particular should be fitted with cushioning foam material to protect the welder during transit and hoisting operations.

iii. Clean welding nozzles on a daily basis with a wire brush. Nozzles have a tendency to retain membrane residue on their surfaces. This buildup of residue can interfere with welding if not removed.

iv. Clean air filters on a weekly basis. Clogged air filters restrict air flow. This prevents the welding tool from operating efficiently, and can cause the fan motor to overheat.

v. Heating elements are readily field-replaceable. Heating elements are vulnerable to both physical and thermal shock, particularly if the welder is shut off without first being allowed to cool down.

3. Equipment Settings

a. Setting up the hot air robotic welder properly is key to having a properly installed roof and performing test welds is one of the most important steps to ensure that you are obtaining a properly welded roof.

Making appropriate adjustments before you begin the final welding process assures that the correct combinations are achieved.

b. Test welds should be performed at the beginning of every work period.
   i. Just before welding in the morning,
   ii. Upon returning from lunch in the afternoon, and
   iii. When there's been a significant change in weather (e.g., air temperature, wind speed, cloud cover, etc.)

c. The correct speed and temperature settings for automatic welders are determined by preparing test welds at various settings. This is called a "film tearing bond." A deficient weld fails by separating between the two layers of the membrane.

d. Adjustments to Equipment Settings— factors that will affect the settings: membrane thickness, l ambient temperatures, and membrane color . For initial automatic air welder setting, use the formula below:
   i. Speed Formula: Start at (ambient temp °F/10) + 2 = FPM (Feet Per Minute)
   ii. Example: 70/10 + 2 = 9 FPM

   Note: This formula serves as an initial starting point. Adjustments may need to be made to achieve a proper film tearing bond weld.

e. Cautions & Warnings
   i. Do not touch the welding nozzle and heat shield, and avoid keeping unprotected skin in the flow of hot air. The welding nozzle, heat shield, and hot air being expelled from hot air welders is very hot and can result in severe burns.
   ii. Be aware of your surroundings when operating the welder as you will be walking backwards.
   iii. The operator must keep in mind the relationship between ambient temperature, automatic air welder speed, heat setting and how much weight is on the machine in order to achieve a film tearing bond (weld).

4. Test Welds
   a. Take 2 pieces of "bag fresh" EverGuard® membrane approximately 18 in. (457 mm) long.
   b. Set your automatic welder's speed and heat. For full size welders, such as the BAK LarOn, GAF suggests starting at the following settings:
      i. Temperature between 800°F (427°C) and 1,148°F (620°C). Speed 10-16 feet (3.05-4.88 m) per minute. New equipment may run faster and hotter.
      ii. For an initial setting, use the formula below as a general guideline:

      Speed Formula: Start at (ambient temp °F/10) + 2 = FPM (Feet Per Minute)

      Example Scenario: Start out by setting the speed at 10 FPM and the temperature at 600°F (315°C) and do a test weld. Bump temperature up 100°F (38°C) to 700°F (371°C) keeping the same 10 FPM. Perform another test weld. Continue doing this in 100°F (38°C) increments keeping speed the same until the machine is maxed out [typically 1,148°F (620°C)] and find the weld window. Set up the machine in the middle of the weld window.

      Note: Remember, settings required for a good weld will change based on equipment type, weather conditions and membrane thickness.
   c. Weld the 18in. (457 mm) pieces together and then allow the membrane to cool for at least 10 minutes. Cut 1 in. (25 mm) wide strips across the welded material. The welds are tested by application of pressure causing the seam to peel apart.

d. An acceptable weld will fail by exposing the scrim reinforcement. This is called a “film tearing bond” or “FTB”. The film tearing bond will be between 1 in. (25 mm) and 1.5 in. (38 mm) wide.

e. A partial weld will fail by partially separating between the two layers of the membrane.

f. An unacceptable weld will fail by separating between the two layers of the membrane. This is also known as a “cold weld” or “false weld”.

g. During cooler temperatures, it is even more critical to perform test welds in the morning, after any extended break such as lunch, or after significant change in weather (e.g., air temperature, wind speed, cloud cover, etc.).

h. Hand welding during colder temperatures also needs to be adjusted.

i. Perform test welds on membrane you will be using that day

ii. Do not use scrap material to create test welds

iii. Perform daily quality control including probing and checking seams at the end of the day

5. Adjustments to the Hot Air Robotic Welder Settings

a. Many factors will affect the settings, including overcast skies and lower air temperatures. This will generally require a slower speed and lower heat settings. The slower speed and heat provides the additional heat energy to compensate for heat-draining conditions.

b. The correct speed and temperature settings for automatic welders are determined by preparing test welds at various speed and heat settings.

c. Only make one change at a time and avoid changing heat and speed together.

d. If you are welding at 1,148° F (620° C) and do not get a good weld, do not automatically adjust the speed because the temperature may be too high. Lowering the temperature may be a necessary adjustment.

e. If the weld is greater than 1.5 in. (38 mm), you may have the temperature too high and this could lead to a failed weld over time.

f. Having too much weight on the automatic hot-air welder combined with too high of a speed setting can potentially cause wrinkle issues in the weld area.

6. Automatic Hot Air Welding of Field Seams

a. Successful automatic welding is primarily a function of proper machine adjustment and ensuring a consistent power supply.

b. Membrane must be cleaned and free from all dirt and debris prior to hot air welding of seams.

c. Verify correct power supply voltage with a voltmeter.

d. Determine proper welder speed and temperature settings by performing the test weld procedure.

e. Mark all locations where automatic welding starts and stops to identify locations of possible weld discontinuities. These areas should be carefully probed and repaired as required.

f. The weld must provide a maximum film-tearing bond of 1.5 in. (38 mm) and a minimum 1 in. (25 mm) film-tearing bond.

g. Membrane laps must be heat-welded together. All welds must be continuous, without voids or partial welds. Welds must be free of burns or scorch marks; however, seaming of PVC membrane should exhibit bleed-out when properly welded.

h. All reinforced membrane TPO and PVC field seams should be made using an automatic hot air welder.

i. Tend to all T-joints by carefully pressing each joint down by silicone roller edge or other hard-edged tool immediately after the T-joint has emerged from the automatic welder.

i. 60, 70 & 80 mil TPO membrane T-joints require the installation of a heat-welded membrane cover patch.

ii. 80 mil PVC membrane T-joints require the installation of a heat-welded membrane cover patch.

j. All cut edges of TPO reinforced membranes must be sealed with EverGuard® TPO Cut Edge Sealant. PVC reinforced membranes do not require cut edge sealant.

7. Hand-Held Welding Seams

a. Successful hand welding is a skill that involves individual technique, normally developed and refined over time. Operators should be proficient in different nozzle configurations. Correct selection of welder temperature and nozzle width can have an effect on the quality of the hand weld.

b. Membrane must be cleaned and free from all dirt and debris prior to hand-welding.

c. During basic hand welding, the hot air welder is held in one hand, and a hard silicone roller is typically held in the other hand. When hand welding with a roller, finger pressure is often used to place and tack the upper piece of membrane in position. However, a silicone roller must always be used for final welding. Tack welding and back-tacking is not permitted in the field welding of seams.

d. The membrane must be heat-welded together using the "two-pass method". Weld from the interior on the first pass and finish the weld with the second pass.

e. The welding nozzle is introduced between the two layers of membrane, and the silicone roller is rolled back and forth perpendicular to the nozzle mouth to press the membrane together and accomplish the weld. The roller should remain flat to ensure proper compression.

f. All welds must be continuous, without voids or partial welds. TPO welds must be free of burns or scorch marks; however, seaming of PVC membrane should exhibit bleed-out when properly welded. There should be no bleed out on TPO.

g. The ability to achieve satisfactory welds with the hot air welder being held in either hand facilitates welding at various angles and in various situations.

h. The weld must provide a maximum film-tearing bond of 1.5 in. (38 mm) and a minimum 1 in. (25 mm) film-tearing bond.

i. Depending on the type of welding being performed, the temperature setting will vary, as will the width of the welding nozzle.

D. Seam Probing

1. Refer to the Seam Probing Checklist located in the Appendix.

2. Seam probing is the physical inspection of a hot air weld area by running a suitable blunt probe along the length of a seam with horizontal pressure applied into the bottom edge of the weld. Seam probing checks the integrity of the weld to help ensure a water-tight roofing system and is critical to locating small skips in a welded lap. Seam probing is not a replacement for conducting test welds.

3. Contractors are responsible for initial probing of their welds. Do not wait for a GAF Field Services Representative to find issues with the welds during the roof inspection after the roof is already completed. This could lead to more difficult and costly repairs requiring re-inspection by GAF.

4. Exercise care when handling and walking with the seam probe to avoid injuries from the point end.

E. Seam Repair

1. Repair all voids, open welds or cold-welds routinely throughout the day but no later than the end of each workday using a hand-welder.

2. To make a minor repair on a seam, use a T-Joint Cover Patch, UN-55 Detailing Membrane, or the same material type being used for the field sheet.

3. If repairs are needed for an entire open seam, use reinforced membrane a minimum of 4in. (102 mm) wide. Finish the detail by heat-welding T-Joint Cover Patches at each corner. Any damage caused to the field sheet (not in the seams) must be patched with reinforced membrane.
4. All repaired seams should be probed after they have cooled completely to determine if the weld is acceptable. If the repaired seam is not acceptable, repair areas as necessary until corrected.

F. Field Quality Control

1. Field quality control should be performed in accordance with NRCA's Quality Control and Quality-assurance Guidelines for the Application of Membrane Roof Systems.
2. Inspect completed roof sections on a daily basis. It is the contractor's responsibility to probe all heat-welded seams and perform an adequate number of seam cuts to ascertain seam consistency.
3. Immediately correct all defects, irregularities, and deficiencies identified during inspections. All voids that are found must be patched over per Seam Repair section above. Do not re-weld seam voids more than 24 hours after initial welding of the seam.
4. Remedial work must be performed with like materials and in a manner consistent with the balance of the roofing installation.

G. Clean-up

1. Clean bonding adhesive, bituminous markings, and other contaminants if possible.
2. For severe contamination, cut and remove any sheet membrane contaminated with solvent-based adhesive, bituminous markings, and other contaminants from the finished surface.
3. Cleaning the adjacent area with an all-purpose cleaner, then rinse off soapy residue.
4. Apply EverGuard® TPO Seam Cleaner or EverGuard® Low VOC Seam Cleaner for TPO membrane and EverGuard® PVC Membrane Conditioner, MEK (methyl ethyl ketone) or acetone for PVC membrane. Refer to the Membrane/Seam Cleaning Table for more information.
5. Complete the repair by installing a patch of like material to specific system requirements.

H. Maintenance

1. Upon completion of the roofing system, the owner should establish an inspection and maintenance program in accordance with standard good roofing practice.

Installation Guidelines

A. Wood Nailer

1. Install perimeter blocking and flashing in accordance with current ANSI/SPRI ES-1 and FM Property Loss Prevention Data Sheet 1-49. See 200 series construction details for more detail.
2. Use untreated wood blocking and nailers in all GAF roof systems unless required otherwise by code or insurance carrier.
3. If pressure treated wood is required, use fasteners and separators as recommended by the specifier, code or insurance carrier.
4. GAF does not recommend the use of ACQ or CA treated lumber and assumes no responsibility for corrosion problems resulting from its use.
5. GAF does not warrant or guarantee the attachment of the wood nailers, nor the performance of the wood nailers or any leaks that may be caused by wood nailer installation.

B. Gypsum Fire Barrier Board

1. Install gypsum boards in minimum of 2 ft. x 2 ft. (610 mm x 610 mm) size pieces. Every piece must be properly secured to the substrate. Do not kick insulation boards into place.
2. Gypsum boards must have the joints staggered in both directions a minimum of 6 in. (152 mm) from previous layers.
3. Over steel decking, install gypsum board edges parallel to deck flute and over flute surface.
4. Do NOT use gypsum boards that are wet, warped, or buckled; they must be discarded. Boards that are broken, cracked, or crushed must not be installed unless the damaged area is first removed and discarded.
5. Remove and replace gypsum boards that become wet or damaged after installation.
6. Install no more gypsum board than can be properly covered with roofing membrane by the end of each day.
7. Refer to the following Insulation, Re-Cover & Gypsum Fire Barrier Board Installation section for gypsum

C. Class I Vapor Barrier/Retarder Installation

1. Seal gaps at perimeter and penetration areas with foam sealant.
2. Install the vapor barrier/retarder to substrate so that wrinkles and buckles are not formed.
3. Self-Adhered Products Installation
    i. Ensure substrates are dry, smooth, free of contaminants, and in sound condition to receive self-adhered membrane.
    ii. Overlap GAF SA Vapor Retarder XL membrane per applicable installation recommendations of the manufacturer.
    iii. Refer to the GAF Product Listing for applicable GAF products and commercial underlayments on gaf.com for detailed application instructions.

D. Insulation, Re-Cover & Gypsum Fire Barrier Board Installation

1. Install insulation board and re-cover board as required in accordance with the Insulation Design Tables in this Manual.
2. Do NOT install insulation boards that are wet, warped, or buckled. Broken, cracked, or crushed areas of boards should be removed before installing
3. **Note:** Boards that become wet or damaged after installing should be replaced.

4. EPS, XPS or polyiso insulation may be used to fill in flutes of steel decking when used in conjunction with a cover board.
5. Placement
    a. Install insulation boards in pieces a minimum of 2 ft. x 2 ft. (610 mm x 610 mm) in size. Butt insulation boards together with a maximum ¼ in. (6.3 mm) space between boards. Do not kick insulation boards into place.
    b. Insulation boards installed over steel decking must have boards placed parallel to deck flutes with edges over flute surface for bearing support.
    c. Fit insulation boards around penetrations and perimeter with a maximum ¼ in. (6.3 mm) space between board and penetration.
    d. Multiple layers of insulation must have the joints between boards staggered in both directions a minimum of 6 in. (152 mm) from previous layers.
    e. Install tapered insulation to provide a sump area with a minimum area of 36 in. x 36 in. (914 mm x 914 mm) where applicable.
    f. Install no more insulation than can be properly covered with roofing membrane by the end of each day.
6. Application – Mechanical Attachment
    a. Use appropriate number, type, and length of Drill-Tec™ fasteners for structural deck type. Refer to the "Insulation Fastener & Plate Table" in the GAF Application Tables for more information.
    b. Drill-Tec™ "flat" plates (without the countersunk fastener holes protruding from the bottom of the plates) are required when plates are installed over hard surfaces such as EnergyGuard™ HD Polyiso Cover Board(s), DensDeck®, SECUROCK® or other hard cover boards to allow the plates to rest flush on the surface.
    c. Pre-drilling is required for concrete decks, and may be required for gypsum concrete and cementitious wood fiber decks.
    d. Install fasteners and plates to the insulation surface without over-driving.
    e. Additional fasteners must be installed in corner/perimeter roof areas for all EverGuard® systems. Refer to the "Perimeter Securement Table" in the GAF Application Tables to determine the width of the perimeter area.
7. Application - Hot Asphalt
    a. Use ASTM D312, Type III or Type IV asphalt.
    b. Hot asphalt application requires priming of concrete and gypsum decks and existing asphaltic roofing systems.
    c. Apply asphalt at the rate of 25 lbs. (11.3 kg) per 100 sq. ft. (9.2 sq. m) over the entire surface to which the board is to be adhered.
    d. Asphalt application rates of up to 60 lbs. (27 kg) per 100 sq.ft. (9.2 sq. m) may be required if the substrate surface is rough or porous, such as an existing flood coat and gravel surfacing. Ensure existing gravel and dirt is vacuumed, power-broomed, or power-washed away.
    e. Apply asphalt at its EVT temperature (+/- 25°F, 13.9°C) to obtain a proper bond, typically within the range of 425 °F (218°C) to 475°F (246°C).
    f. Walk in the boards after installation to ensure a proper bond.
    g. Maximum board size is 4 ft. x 8 ft. (1.2 m x 2.4 m).
8. Application – Low-Rise Foam Adhesive

a. For 4 ft. x 4 ft. (1.2 m x 1.2 m) polyisocyanurate board, ribbon-adhere with GAF low-rise foam adhesive in ribbons spaced 12 in. (305 mm) o.c. maximum for the field of the roof, and 6 in. (152 mm) o.c. maximum for perimeters and corners. Refer to the "Perimeter Securement Table" in the GAF Application Tables to determine the width of the perimeter area.

b. For 4 ft. x 8 ft. (1.2 m x 2.4 m) polyisocyanurate board, ribbon-adhere with GAF low-rise foam adhesive in ribbons spaced 6 in. (152 mm) o.c. maximum for the field of the roof, and 6 in. (152 mm) o.c. maximum for perimeters and corners. Refer to the "Perimeter Securement Table" in the GAF Application Tables to determine the width of the perimeter area.

c. **Note:** 4 ft. x 8 ft. (1.2 m x 2.4 m) insulation boards do not qualify for GAF enhanced wind coverage: (55 mph or greater).

d. **Note:** 4 ft. x 8 ft. (1.2 m x 2.4 m) insulation boards are not approved for use with any roofing system that requires the support of 3rd party testing (e.g. FM.).

e. Walk in the insulation boards after installation to ensure complete adhesion. Once the board is set in place, apply adequate weight to the boards until the adhesive is cured to ensure proper securement of the insulation to the substrate.

9. Crickets and Saddles -

a. When installing crickets, saddles, or cut tapered insulation panels, it may be advantageous to use an approved low rise foam adhesive in lieu of mechanical attachment. See Application – Low-Rise Foam Adhesive above for more information.

E. Membrane Installation

1. Refer to the Surface Preparation section before installing.
2. General
   a. EverGuard® SA TPO Self Adhered Membrane can be installed down to an ambient air temperature of 20 °F (-6.66 °C) and rising.
   b. In cold weather conditions, refer to Cold Weather Application details in the Appendix (AP-4)
3. Membrane Layout & Securement
   a. Roll out the membrane and remove any wrinkles or buckles from the sheet.
   b. Install full-width rolls throughout the field and perimeter of the roof. Half sheets are not necessary. Refer to the "Perimeter Half Sheet Table" in the GAF Application Table Section to determine the width of the perimeter area.
   c. Parallel to Primary Slope Method
      i. Use the red line on the membrane to maintain a 3 in. (76 mm) side lap.
   d. Perpendicular to Primary Slope Method
      i. Run the membrane from high to low elevation.
   e. Fold the membrane in half longitudinally, exposing the split in the release liner.
   f. Peel the upper half of the release liner from the adhesive film back of the EverGuard® SA TPO Self Adhered Membrane and lay to the side of the panel. Do not cut the release liner.
   g. Roll the EverGuard® SA TPO Self Adhered Membrane with the exposed adhesive onto the substrate in line with the original layout position. Maintain a rounded radius at the longitudinal fold when rolling out to avoid creating wrinkles. Broom in the sheet
   h. Apply pressure to the EverGuard® SA TPO Self Adhered Membrane using a 100 lb. weighted roller. Roll the remaining installed membrane sheet to promote maximum adhesion to the substrate. This installed area will be the anchor point and alignment guide for the installation of the remainder of the roll. Rolling in the width-direction of the membrane will help avoid creating wrinkles in the sheet.

i. Install the other side of the sheet by folding the EverGuard® SA TPO Self Adhered Membrane back to the point that the release liner becomes accessible. Be careful to avoid creasing the membrane at the fold. Peel the remaining release liner from the adhesive on the rest of the roll. Roll the membrane into place while maintaining a rounded radius at the fold.

j. Apply pressure to the membrane using a weighted roller as specified above. Roll the remaining installed EverGuard® SA TPO Self Adhered Membrane sheet to promote maximum adhesion to the substrate. Again, rolling in the width-direction of the membrane will help avoid creating wrinkles in the sheet.

k. Position the next sheet to overlap the installed first course EverGuard® SA TPO Self Adhered Membrane a minimum of 3 in. (76 mm) while ensuring the laps are installed shingle-fashion to prevent backwater laps.

4. Membrane Surface Preparation for Seaming

   a. In order to properly weld the membrane pieces together, the materials must be clean, dry and free of contaminants. If not clean and dry, contaminants will interfere with the weld and, generally, the result is a poor or false weld.

   b. Factory-fresh membranes typically will not require cleaning before welding, provided that welding is performed immediately after placement of the membrane.

   c. Membrane will require cleaning if it has been exposed for a longer period of time (e.g., for more than 12 hours or overnight) or has become dirty due to foot traffic or other contamination. Cleaning methods will depend on the type of contamination present. Refer to the "Seam Cleaning" section of the GAF Field Practices manual for more information.

5. Base Attachment (at Perimeter, Internal Walls, Curbs, and Penetrations)

   a. Option 1: Roof membrane to be mechanically secured at the perimeter, at the base of internal walls and curbs, and at all penetrations with Drill-Tec™ Membrane Fasteners and Plates at a 12 in. (305 mm) o.c. maximum spacing. Membrane may be heat welded to coated metal flanges. A minimum of 4 fasteners per penetration is required.

   b. Option 2: Membrane to be extended vertically 3 in. (76 mm) up walls and curbs and secured to the wall/curb substrate within 2 in. (51 mm) of the plane of the roof with Drill-Tec™ Membrane Fasteners and inverted Termination Bar at a 12 in. (305 mm) o.c. maximum spacing. This detail is required to be used for all pressurized buildings.

   c. Option 3: Utilization of Roof Transition Anchor (R.T.A.) Strip may be installed as the method of securement for a non-penetrating base attachment on adhered TPO systems.

   d. Fasteners must be installed to achieve the proper embedment depth. Install fasteners vertical to the deck, or horizontal to the wall/curb without lean or tilt.

   e. Install fasteners so that the plate is drawn down tightly to the membrane surface. Properly installed fasteners will not allow the plate/termination bar to move (under-driving), and will not cause wrinkling of the membrane (over-driving).

6. Heat-weld all EverGuard® reinforced membrane seams in accordance with heat-welding guidelines.

   a. For selvage edge laps of EverGuard® SA TPO Self Adhered Membrane, overlap the roof membrane a minimum of 3 in. (76 mm) and heat weld the laps.

   b. Non-selvage edge laps or end laps of EverGuard® SA TPO Self Adhered Membrane are made by butting adjacent sheets, and welding an 8 in. (203 mm) wide flashing strip cut out of smooth TPO membrane of the same thickness as the field sheet.

F. Flashing Installation

1. Refer to construction details at gaf.com for visual depiction of flashing requirements.

2. Refer to the Field Practices & Field Guidelines section manual prior to installing flashings for application temps, hot air-welding guidelines and other quality control guidelines.
3. All perimeter, curb, and penetration conditions must be flashed with membrane flashing, and flashing accessories as appropriate to the site condition.
4. All non-self-adhered membrane flashing, and flashing accessories must be hot-air welded. Refer to the GAF Field Practices manual for more detailed information.
5. All membrane flashings must be of the same type, thickness, and color as the roofing membrane
    a. Recommended flashing height up any vertical surface is 8 in. (203 mm).
6. When flashing with membrane flashing or EverGuard® Coated Metal, all corners must be reinforced with pre-formed corners or non-reinforced membrane.
7. When using EverGuard® TPO adhesives, use any one of the following substrates: polyisocyanurate insulation and high density (without foil facer); high density fiberboard roof insulation; gypsum roof board; cured structural concrete (without curing and sealing compound present); untreated OSB; untreated CDX plywood; Type X gypsum board; and dry, sound masonry (without curing and sealing compounds present).
8. When using EverGuard® SA TPO Self Adhered Membrane, all vertical substrates must first be primed with EverGuard® TPO Primer or EverGuard® Quick Spray.
9. Fire-treated plywood/wood for parapet walls must be covered with an approved gypsum board for adhered EverGuard® systems only.

G. Curbs, Parapet, and Building Walls (Flashing)

10. General
    a. Refer to the GAF Product Listing for adhesive application rates. Note: Porous substrates may require double application of adhesive.
    b. After application of adhesive, carefully position the membrane flashing avoiding wrinkles and buckles.
    c. If selvage edge, overlap onto the roof membrane a minimum of 6 in. (152 mm) to heat-weld.
    d. If non-selvage edge, strip in using an EverGuard® Flashing Strip product or 8 in. wide field fabricated strip of reinforced membrane over the joints.
    e. Heat-weld all laps in EverGuard® smooth reinforced flashing membrane in accordance with heat-welding guidelines in the GAF Field Practices manual.
    f. For TPO Fleece-Back Membrane
        i. Non-selvage butt ends of adjacent sheets should be stripped in using EverGuard® Flashing Strip product or 8 in. wide field fabricated strip of reinforced membrane over the joint.
        ii. When installing fleece-back membranes to a vertical surface in adhesive, the material should be rolled in with hand rollers and must have top edge fastening and termination installed immediately to avoid slippage. For best results, flashings may need to be rolled in several times with a hand-held, silicone roller.
11. EverGuard® SA TPO Self-Adhered Membrane
    a. EverGuard® SA TPO Self-Adhered Membrane can be installed down to an ambient air temperature of 20 degrees and rising.
    b. The thickness of the flashing membrane must be the same as the thickness of the EverGuard® SA TPO Self Adhered Membrane.
    c. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.
    d. Porous substrates may require application of EverGuard® TPO Primer, EverGuard® Quick Spray Adhesive or a separation board.
    e. All vertical butt-ends of EverGuard® SA TPO flashings must be stripped in.

f. All EverGuard® SA TPO flashings MUST be rolled-in to complete the flashing detail.

12. Vertical Sheet Method (Smooth and Fleece-back TPO Membranes)
    a. 6 ft. max width
        i. Non-adhered - 12 ft. max height with vertical in seam attachment 12 in. (305 mm) o.c.
        ii. Adhered - Unlimited height with vertical in seam attachment 12 in. (305 mm) o.c.
        iii. Supplemental Horizontal Fastening
            a. At inside and outside corners (three sheets wide) and at the end of the wall (three sheets wide).
            b. Install termination bar or plates fastened 12 in. (305 mm) o.c. beginning at 6 ft. high and incrementally every 12 ft. until the height of the wall.
    b. 8 ft. to 12 ft. wide
        i. Adhered - 12 ft. max with vertical in seam attachment 12 in. (305 mm) o.c. (For bucket adhesives only)
        ii. Adhered - Unlimited height with vertical in seam attachment 12 in. (305 mm) o.c. (For spray canister)
13. Horizontal Sheet Method (Unlimited Height)(Smooth and Fleece-back TPO Membranes)
    a. Non-adhered - 30 in. (762 mm) sheets incrementally fastened with a termination bar or plates fastened 12 in. (305 mm) o.c. until the height of the wall.
    b. Adhered - 60 in. (1.7 m) sheets incrementally fastened with a termination bar or plates fastened 12 in. (305 mm) o.c. until the height of the wall. (For bucket adhesives only)
    c. Adhered - 12 ft. (max sheet width) incrementally fastened with termination bar or plates fastened 12 in. (305 mm) o.c. until the height of the wall. (For spray canister only)
14. EverGuard® Coated Metal Flashing
    a. EverGuard® Coated Metal must be formed in accordance with GAF's construction details and designed to meet/exceed ANSI/SPRI/FM4435/ES-1 design criteria.
    b. EverGuard® Coated Metal sections used for base flashing, and coping must be butted together with a 1/4 in. (6 mm) gap to allow for expansion and contraction. Heat weld a 6 in. (152 mm) wide non-reinforced membrane strip to both sides of the joint. A 2 in. (51 mm) wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.
    c. EverGuard® Coated Metal used for sealant pans and scupper inserts, and corners of roof edging, base flashing, and coping, must be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. EverGuard® PVC and TPO Coated Metal flashings must be stripped in using 6 in. (152 mm) membranes.
    d. All exposed metal edges must have a 1/2 in. (13 mm) hem to provide corrosion protection and edge reinforcement for improved durability.
    e. When installing over an existing wall or curb flashing, and the flashing is in good condition and adhered tightly, removal is not required prior to a full covering of EverGuard® Coated Metal flashing.
15. EverGuard® Preformed Accessories for Curbs
    a. Refer to the GAF Product Listing for EverGuard® pre-formed accessory products.
    b. For reinforced membranes, follow the installation method for Adhered Reinforced Membrane Flashing or Loose Reinforced Membrane Flashing in prior sections. Corners of curbs must be reinforced with a field-fabricated Everguard® unreinforced patch or EverGuard® preformed accessory.
    c. For EverGuard® Corner Curb Wraps, apply loose or adhered and heat-weld flange to roof membrane.

H. Curbs, Parapet, and Building Walls (Termination)

1. When using EverGuard® SA TPO membrane for wall flashing, a separate counterflashing is required; exposed termination bars are not acceptable.
2. There are 2 options for terminating flashing on curb, parapet and building walls: 1. Termination bar with counterflashing, 2 Continuous clip and coping metal.
3. Termination Bar with counterflashing - Minimum. 8 in. (203 mm) in height (Option 1)
   a. Apply EverGuard® Water-Block Sealant or FlexSeal™ Caulk Grade Sealant between the substrate and membrane flashing. Secure membrane flashing at the top horizontal edge with a termination bar mechanically fastened 6 in. (152 mm) o.c; termination bars that are counter flashed must be fastened 12 in. (305 mm) o.c. for extended-length guarantee(s).
4. Continuous Clip and Coping Metal (Option 3)
   a. Wrap the membrane up and over and extend down the exterior face of the parapet wall 1 ½ in. (38.1 mm). Install the continuous clip along the outside face 12 in. (305 mm) o.c. Coping metal engaged in the continuous clip and mechanically fastened 12 in. (305 mm) o.c. with neoprene washered fasteners along the inside face. Coping Metal to be designed in accordance with the applicable building code and tested for resistance in accordance with the applicable ANSI/SPRI/FM 4435/ES-1, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

I. T-joint Patches

1. T-joint patches may be prefabricated or field-fabricated from un-reinforced TPO or PVC membrane 4 in. (102 mm) in diameter. They must be completely hot-air welded over the T-joint at the intersection of the three pieces of reinforced membrane. During installation, care must be taken to “crease-in” the unreinforced membrane at the three step-off locations.
2. TPO T-joint patches must be cleaned with EverGuard® TPO Seam Cleaner or EverGuard® TPO Low VOC Seam Cleaner.
3. T-joint patches are required on 60 and 80 mil TPO and EverGuard® SA TPO Membranes.

J. Roof Perimeter Systems and Securement

1. Metal roof edging must be designed according to the applicable building code and tested for resistance in accordance with the applicable ANSI/SPRI/FM 4435/ES-1, “Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.”
2. For extended-length guarantees (greater than 20 years), use any engineered EverGuard® Perimeter Edge Metal.
3. GAF Perimeter Edge Metal
   a. Install EverGuard® Perimeter Edge Metal according to application instructions included or on gaf.com.
   b. GAF Perimeter Edge Metal is required for
      i. Extended-length guarantees (25, 30 & 35 years)
      ii. Projects requiring enhanced wind coverage of 100 mph or greater.
      iii. EverGuard® TPO Cover Tape (15 year maximum guarantee duration)

   Note: EverGuard TPO Cover Tape cannot be used on 1:12 slope or greater.

   c. Clean the entire surface to be covered, metal and roof membrane, with soap and water, and dry the entire area. Wipe area to be primed with a damp wipe of an EverGuard® TPO Seam Cleaner.
   d. Prime surfaces mating with the butyl tape with EverGuard® TPO Primer, keeping primer only on the surface receiving the tape. After the primer has flashed off, pull release paper on the back of the tape, exposing the butyl adhesive, and mate the two surfaces. Roll the tape portion of the cover strip at a 45-degree angle to ensure a good bond.

4. EverGuard® TPO Cover Tape HW (Heat-weld)
    a. This is a hybrid cover tape consisting of 6 in. (152 mm) of .045 reinforced TPO membrane with 3 in. (76 mm) butyl tape on half of the back surface. Refer to Step 6 (above) and follow procedures for the butyl tape preparation and installation. Then heat weld the EverGuard® TPO Cover Tape HW to the field membrane with a 2 in. (51 mm) hand welder or automatic heat welder, to all membrane-to-membrane surfaces. For extended-length guarantees, use EverGuard Extreme® TPO Cover Tape Heat Weld.

    Note: Any overlap ends must be stripped in with detail membrane and welded completely to finish the detail.

K. Round and Square Tube Penetrations

1. Flash penetrations with preformed accessory or field fabricate with unreinforced membrane and target. See product listing for EverGuard® penetration accessory products.
2. Roof membrane must be mechanically attached at the base of each penetration with Drill-Tec™ screws and plates a maximum of 12 in. (305 mm) o.c., with a minimum of four fasteners per penetration.
3. All flashings require the installation of a stainless steel draw band around the top of the flashing. Install EverGuard® Water-Block Sealant on the inside top of the flashing and add the draw band and apply FlexSeal™ Caulk Grade Sealant around the top of the flashing.

L. Irregularly Shaped and Clustered Penetrations

1. Flash irregular penetrations with an appropriate pre-formed accessory, or field-fabricated EverGuard® Coated Metal sealant box.
2. Allow 1 in. (25.4 mm) clearance around the projection. If multiple projections, allow 1 in. (25.4 mm) between projection and box.
3. Preformed TPO Accessories
    a. Installation of EverGuard® TPO Pourable Sealer Pocket requires field membrane securement around the penetration. A minimum of four (4) system-appropriate fasteners and plates are required around the penetration.
    b. Prime all inside surfaces and outside lip of EverGuard® TPO Split Pourable Sealer Pocket with EverGuard® TPO Primer. Allow primer to dry prior to applying EverGuard® One-Part Pourable Sealant. Fill the EverGuard® Pourable Sealer Pocket with EverGuard® One-Part Pourable Sealant to the top of the pocket, ensuring that all voids are filled.
4. EverGuard® Coated Metal Sealant Box/Pitch Pan
    a. Fabricate 4 in. (102 mm) flanged sealant pans formed of EverGuard® Coated Metal, secured to the deck through the roof membrane with Drill-Tec Fasteners 12 in. (305 mm) o.c., or a minimum of 4 per box.
    b. Strip in metal flanges with 8 in. (203 mm) wide membrane flashing strips and vertical pop riveted seams with 4 in. (102 mm) unreinforced membrane.
    c. Inside surface of EverGuard® Coated Metal sealant box (bare metal side) and roof projection must be clean and dry before filling with sealant
    d. Fill the lower half of the pan with quick-set non-shrink grout. Once set, fill the EverGuard® Pourable Sealer Pocket with EverGuard® One-Part Pourable Sealant to the top of the pocket, ensuring that all voids are filled.
    e. Finish with 4 corners heat-welded to box, flange and roof.

M. Non-reinforced Membrane Flashing

1. Non-reinforced membrane can be used as a field-fabricated penetration/reinforcement flashing only where preformed corners and pipe boots cannot be properly installed.
2. Fabricate target to snuggly fit over penetration onto roof membrane and min 2 in. (52 mm) past Drill-Tec™ plates.

3. Adhere non-reinforced membrane 8 in. (203 mm) vertically up penetration leaving 1 in. (25.4 mm) to weld on target.
4. For application of adhesive, refer to the GAF Product Listing for appropriate product, application and temperatures.
5. Top of the flashing requires EverGuard® FlexSeal™ Caulk Grade Sealant or EverGuard® Water-Block Sealant between the penetration and the membrane. Add and tighten stainless steel band and seal top of membrane with EverGuard® FlexSeal™ Caulk Grade Sealant.

N. Expansion Joints

1. Common applications for flashing expansion openings are: Roof to roof, curb to curb, roof to wall and curb to wall.
2. Field Fabrication - TPO or PVC Systems
   a. Field fabricate flashings for expansion openings using reinforced membrane. Flashings should be 1-½ times the width of the opening.
   b. Roof membrane must be mechanically attached along the base of expansion opening with screws and plates a minimum of 12 in. (305 mm) o.c.
   c. Place a backer rod that is 1-1/2 times the width of the expansion joint opening in the gap, cover with reinforced membrane and heat-weld to the roof membrane.
3. Refer to GAF construction details for installation method.

O. Roof Drains

1. All roof drains must be fitted with compression clamping rings and strainer baskets.
2. Roof drains must be provided with a min. 36 in. x 36 in. (914 mm x 914 mm) sumped area if possible. Slope of tapered insulation within the sumped area must not exceed 4:12.
3. For EverGuard® SA TPO roof membrane applications, the self-adhered membrane is cut just short of the drain flange. A separate smooth reinforced membrane drain flashing sheet is heat welded to the roofing membrane and set into the drain. EverGuard® TPO Cut Edge Sealant must be used on TPO drain targets. 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 in. (13 mm) membrane flap extending past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations.
   a. For cast iron and aluminum drains, the roofing membrane must be set in a full bed of FlexSeal™ Caulk Grade Sealant or EverGuard® Water-Block Sealant on the drain flange prior to securing with the compression clamping ring.
4. When a seam runs within 9 in. of the drain flange or in the sump area, a target needs to be installed. Cut the membrane back past the bowl and remove. Add reinforced membrane target large enough to extend out of the sump area onto the flat area to make a 1 in. weld.
5. Alternatively, if the seam does not run under the clamping ring, the exposed seam can be covered with a 6 in. (152 mm) wide reinforced membrane drain target strip heat welded to the membrane. Then follow step 6.
6. Tighten the drain compression clamping ring in place.

P. Retrofit Drain Inserts

1. Drain inserts must only be used in the event the original drain is damaged and cannot be repaired without complete replacement of the drain. Drain inserts will reduce water flow. Consult the design professional to ensure adequate drainage is maintained.
2. Clean the inside of the existing drain line where the drain insert is to be installed. Failure to clear this section of drain line can prevent the sealing of the drain and degrade the performance of the drain seal and is required.

3. The drain insert is installed on top of the roofing membrane and is secured to the roof deck 6 in. (152 mm) o.c. with Drill-Tec™ screws.
4. A separate reinforced membrane target sheet is placed over the drain flange and roof membrane. The drain target sheet is heat welded to a coated metal drain flange and roof membrane.
5. Install the drain clamping ring if applicable.
6. All drains must be provided with a strainer basket.

Q. Scuppers

1. Flash wall scuppers with pre-manufactured EverGuard® TPO Scupper or field fabricate from reinforced membrane and EverGuard® Coated Metal.
2. EverGuard® TPO Scupper
   a. EverGuard® TPO has premanufactured scuppers available in standard and custom sizes. Contact GAF or your local distributor for details.
3. EverGuard® Coated Metal Scupper (Field-Fabricated)
   a. Through wall EverGuard® Coated Metal wall or overflow scuppers must be fabricated with 4 in. (102 mm) wide flanges. Additional corner pieces to be pop-riveted to the flanges to create a continuous flange. All flange corners must be rounded.
   b. At the interior side, install wall scuppers over the roof or wall flashing membrane and secure to the roof deck/wall with Drill-Tec™ fasteners 6 in. (152 mm) o.c., with a minimum of 2 fasteners per side. At the exterior side, it must be made waterproof by the installer.
   c. Strip in scupper with reinforced target membrane.
   d. All corners must be reinforced with EverGuard® PVC or EverGuard® TPO Universal Corners or field fabricated from EverGuard® unreinforced materials.
   e. Alternatively, EverGuard® Coated Metal may be replaced with reinforced flashing membrane heat welded to membrane on the wall face and roof deck. Be sure that all corners are reinforced with universal corners or reinforced EverGuard® material. Fully adhere to the opening and terminate on the exterior wall face with a termination bar and FlexSeal™ Caulk Grade Sealant or EverGuard® Water-Block Sealant.

R. Heater Stacks

1. Flash heater stacks with pre-formed EverGuard® accessories or field fabricate with EverGuard® unreinforced membrane.
2. The temperature of any heater stack that comes into contact with the EverGuard® membrane or flashing should not exceed 160° F (71° C) for EverGuard® TPO membrane, 190° F (88° C) for EverGuard Extreme® TPO or 140° F (60° C) for EverGuard® PVC membrane.
3. Heat stacks must be equipped with either cone-shaped or vertical tube-type flashing sleeves so that the membrane flashing is not directly in contact with the heater stack. Fasten heat stack/flashing sleeve flange with Drill-Tec™ screws and plates thru roof membrane into deck, minimum 4 fasteners per stack.
4. Field Fabrication
   a. Flash heater stack flashing sleeve with EverGuard® Detailing Membrane.
   b. Fabricate target to snuggly fit over heater stack flashing sleeve onto roof membrane and min 2 in. (52 mm) past Drill-Tec™ plates. Heat-weld target to roof membrane.
   c. If adhering flashing with EverGuard® adhesives, make sure to use the correct bonding adhesive with the membrane being installed.
   d. Top of the flashing requires EverGuard® FlexSeal™ Caulk Grade Sealant or EverGuard® Water-Block Sealant between the heater stack flashing sleeve and the flashing membrane. Add and tighten stainless steel band and seal top of membrane with EverGuard® FlexSeal™ Caulk Grade Sealant.

S. Skylights

1. See skylights section on gaf.com for more details.

T. Wood Support Blocking

1. Install a protective layer of EverGuard® TPO walkway rolls or pads under wood support blocking.
2. If using pre-fabricated pipe stands with rubber-like bases, no slip sheet is required on TPO membranes.

U. Non-Penetrating Ballasted Support Bases

1. Install a protective layer of EverGuard® TPO walkway roll under ballasted base.

V. Lightning Suppression

1. Secure lightning suppression cable to the roof surface by means of 2 in. (51 mm) wide EverGuard® TPO Flashing membrane strips heat-welded to the roof membrane.
2. Secure lightning rod to reinforced EverGuard® membrane patch that is heat welded in place. Securement should not penetrate the roof membrane.

W. Traffic Protection

1. Walkway rolls should be installed at all roof access locations, including ladders, hatchways, stairs, and doors. Install walkway rolls or pads including, but not limited to rooftop equipment, work locations, and areas of repeated rooftop traffic.
2. Walkway rolls or pads must be spaced 6 in. (152 mm) to allow for drainage. Edges of walkway rolls or pads must be placed 6 in. (152 mm) from any seam.
3. Heat-weld walkway rolls or pads to the roof membrane surface continuously around the walkway roll or pad perimeter. Provide 2 in. (50 mm) gap in the continuous weld at the lowest elevation to provide exit for any potential trapped moisture.

X. Temporary Night-Seal

1. The roofing installation, flashings and terminations must be made watertight at the end of each day's activity to prevent water infiltration into the completed roofing system installation.
2. Remove all temporary night-seal materials prior to continuing with the roof installation and dispose of them properly.

Membrane/Seam Cleaning Table		
Type of Contamination	**Method**	**Membrane Cleaner**
Light*	1. Rinse the area thoroughly with clean water. 2. Wipe area with clean white terry cloth moistened with membrane cleaner. 3. Allow solvents to flash off. Drying time for the cleaner increases 3-5 minutes for every 1° F drop in temperature.	TPO: EverGuard® TPO Seam Cleaner or EverGuard® TPO Low VOC Seam Cleaner PVC: EverGuard® PVC Membrane Cleaner, MEK or acetone
Dirt-Based**	1. Clean membrane with a low-residue cleaner (Formula 409®) using a mildly abrasive pad. 2. Rinse the area thoroughly with clean water. 3. Wipe area with clean white terry cloth moistened with membrane cleaner. 4. Allow solvents to flash off. Drying time for the cleaner increases 3-5 minutes for every 1° F drop in temperature.	
Exposure-Based ***	1. Use scrub brushes sparingly with low-residue cleaner (Formula 409®) using a mildly abrasive pad. 2. Rinse the area thoroughly with clean water. 3. Wipe area with clean white terry cloth moistened with membrane cleaner. 4. Allow solvents to flash off. Drying time for the cleaner increases 3-5 minutes for every 1° F drop in temperature.	

* Light Contamination — Membrane that has been exposed for a few days to air-borne debris, foot traffic, or dew or light precipitation.
** Dirt-Based Contamination — Membrane that is dirt encrusted.
*** Exposure-Based Contamination — Membrane that is weathered or oxidized.

Seam Probing Checklist	
☐	Conduct probes daily.
☐	Allow the seam to cool down at least 30 minutes or to ambient temperature before probing.
☐	Probe welded seams with a blunt or dull cotter key puller hand tool (sharp points or edges must be filed down).
☐	Conduct initial probing on hands and knees.
☐	Subsequent probing may be completed with a cotter key hand tool that can be affixed to standard extension handle, which allows the tool to be used from a standing position.
☐	Continuous use of the probe will cause it to become sharper. Ensure that the point is blunted/rounded off at all times.
☐	Run the probing tool parallel to the edge of the seam applying ample pressure at the base of the weld. Use caution to avoid damaging the membrane surface with the point of the probing tool.
☐	When probing, extra attention must be given to all membrane seam intersections, heat-welded seams above insulation joints and areas where the robotic welder stops and starts again.
☐	Mark all voids, open welds or cold-welds using a water-soluble marker or crayon so repairs can be made.

Adhesion Testing Guidelines

Purpose

Testing is required to ensure foam adhesive will bond to a given substrate. GAF requires roofing contractors (or a qualified third party) to conduct an adhesion test prior to registering a GAF Diamond Pledge™ NDL Roof Guarantee.

Guidelines

1. Do not use adhesive to install roofing materials on any roof deck or other substrate that shows signs of deterioration or loss of integrity.
2. GAF recommends that contractors keep test results on file to be submitted to GAF upon request. Submission of results to GAF is not required in the ordinary course; however, GAF may request them on a job-to-job basis. Failure to perform the required testing or to be able to produce the test results may delay or prevent the issuance of a GAF Diamond Pledge™ NDL Roof Guarantee
3. GAF may, at its sole discretion, require additional testing prior to the job start or prior to issuance of a GAF Diamond Pledge™ NDL Roof Guarantee in accordance with ANSI/SPRI IA-1 2015 Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.

Frequency

1. Minimum of 4 tests for the first 50,000 square feet [500 sqs.] (4,650 square meters) of roof surface area.
2. 2 additional tests for each additional 50,000 [500 sqs.] square feet (4,650 square meters) of roof surface.
3. Tests should not be performed in close proximity to each other.

Directions

GAF Preferred Test Method: "Shovel Test" Materials:

1. Refer to "Product Listing" for GAF approved adhesives.
2. Square edge shovel or similar
3. Minimum 12 in. x 12 in. (305 mm x 305 mm) piece(s) of minimum 1 ½ in. (38 mm) EnergyGuard™ polyiso roof insulation or minimum 15/32 in. (25 mm) plywood

- ☐ Install low-rise foam adhesive on roof deck or roof substrate in accordance with GAF or other GAF - approved manufacturer's requirements. Please see the specific Technical Data Sheet of the tested low-rise foam at gaf.com
- ☐ Place a minimum 12 in. x 12 in. (305 mm x 305 mm) piece of polyiso roof insulation or plywood in the foam adhesive (ribbons or spatter pattern) over the roof deck or roof substrate that is being tested. One or more ribbons are required.
- ☐ Allow adhesive to cure for a minimum of 1 hour.
  - ☐ Low-rise foam cure rates are dependent on ambient and substrate temperatures and may not cure or set for up to 24 hours. Conduct the first shovel test after 1 hour and if results are negative allow the remaining tests to cure for 24 hours and then test. Should the 24 hour test pass then the substrate is compatible and the substrate is acceptable.
- ☐ Pull up on the adhered board by placing a shovel under the corner or end of the board. The direction of the adhesive ribbon(s) should not affect adhesion results. Make sure that the shovel* is placed squarely under the board.
  *If the existing substrate is insulation, GAF requires that a piece of plywood be placed under the bottom of the shovel in order to not crush the underlying insulation. Failure to do so can lead to inaccurate test results.
- ☐ Examine the board and substrate to determine the location of the bond failure.

☐ Failure should be within the adhesive or board. If the foam adhesive has separated from the substrate, this is unacceptable and foam adhesive should not be used to bond the new roof to this substrate.
☐ When testing adhesion to a deck, if the failure occurs in the deck, the deck is not suitable for using foam adhesive to bond the roof to the deck.
☐ **Record mode of failure and place in project file.** 1. Photographs 2. Date, time & air temperature

Cool Weather Applications	
EverGuard® TPO/PVC Adhered Roofing Systems	
Cool Weather Application	The application of single-ply roofing systems during cool weather presents considerations that need to be accommodated during installation. By following proper procedures and exercising recommended precautions, cool weather applications can progress more efficiently and effectively, resulting in higher quality roof installations. Follow the cool weather application instructions that are specific to the product or system you are installing when the temperature is below 40°F (4.4°C). Acceptable weather conditions are based not only on the actual ambient temperature, but also the total combination of nature's elements (e.g. wind, humidity, snow, sleet, etc.). These cool weather installation recommendations will help reduce the potential for: • Membrane wrinkling • Failures and blow-offs due to improper adhesion • Poor/false welds • Membrane blisters on adhered systems
Plan Carefully	Careful planning of work during cool weather can greatly improve the quality of the installation and can minimize problems associated with cool temperatures: • There must be no ice, water on the roof substrate. • Do not apply roofing materials during inclement or threatening weather. • The roof substrate must be clean and dry. • Protect all water-based products from freezing temperatures. Any water-based materials that have been frozen must be discarded. • Protect all solvent-based products from freezing temperatures. Any solvent-based materials can be used once brought up to the correct dispensing temperature. • Lay out the roof area and place materials where they will be needed when starting your application. Complete each roof section daily. Application should be scheduled so that there are no partially completed portions of the roof left exposed.
Installation Practices	Membranes… remove rolls from storage only as they are being installed. Install membrane rolls immediately after removal from storage. Many factors will affect the welder settings, including overcast skies and lower air temperatures. These conditions will generally require a slower speed. The slower speed provides the additional heat energy to compensate for heat-draining conditions. Hand welding during colder temperatures also requires adjustment. The correct speed and temperature settings for automatic welders are determined by preparing test welds at various settings. • Do not use scrap material to create test welds. For additional information on test welds, please see Test Welding Thermoplastic Membranes (TAB-C-39). • Perform daily quality control checks including probing and checking seams at the end of the day. Field Seaming during cooler temperatures reinforces the always important need to perform field test welds: • In the morning • After any extended break such as lunch • After any significant change in weather (e.g., air temperature, wind speed, cloud cover, etc.)

	Adhesives, Sealants and Primers... will take longer to flash-off and dry during lower temperatures. • In order to minimize exposure to cooler temperatures, adhesives, sealants, and primers need to be stored at certain temperatures until they are ready to be used. Please refer to the appropriate product technical data sheet for specific information. • All adhesive, sealant and primer products must be brought up to the appropriate temperature for dispensing (i.e., 70 - 90°F (21- 32°C)). Please review the installation instructions or technical data sheet for the specific product for proper temperature. Use a heat blanket or hot box to warm the product to the recommended temperature. • Only apply the adhesive when the adhesive, substrate, membrane and outside temperatures are at the recommended temperatures for the specific product. Not waiting the appropriate time it takes for the adhesive to set up (tack) will likely result in adhesion problems. • Do not heat adhesive containers with torches or other high temperature devices. • Do not attempt to thin these products.

Drill-Tec™ Rhinobond® Attachment Systems and EverGuard® TPO/PVC Mechanically Attached Roofing Systems can be installed in temperatures below 40°F (4.4°C). In cooler weather applications, membrane wrinkling may occur and will not impact eligibility for guarantee coverage as long as the wrinkles are not more than 1 in. (25.4 mm) in height. For more information refer to Wrinkles on Mechanical or RhinoBond® Attached Roof Systems (TAB-C-45). Be sure to perform test welds at various points of the day to make sure the settings on the Rhinobond® Induction Tool are correct.

EverGuard® TPO/PVC Adhered Roofing Systems will have set-up (tack) times that vary for each specific adhesive product. For example, a water-based adhesive, such as EverGuard® WB181 Bonding Adhesive, will take longer compared to a solvent-based adhesive like EverGuard® #1121 Bonding Adhesive. Refer to specific adhesive packaging or Technical Data Sheet on gaf.com for storage temperature ranges. See below for application temperatures:

Product Name	Application Temperature
EverGuard® TPO Quick Spray Adhesive & LV 50 EverGuard® PVC Quick Spray Adhesive (PVC Smooth) EverGuard® TPO Self-Adhered Roof Membrane OlyBond500® Insulation Adhesive - SpotShot (Winter Grade)	20°F (-6.7°C) and rising
OlyBond500® Insulation Adhesive - Bag in Box/Drum (Winter Grade) TPO LRF Adhesive M Low Temp	25°F (-3.9°C) and rising
LRF Adhesive XF	32°F (0°C) and rising
EverGuard® #1121 Bonding Adhesive (TPO) EverGuard® #2331 Bonding Adhesive (PVC) EverGuard® Low VOC TPO Bonding Adhesive EverGuard® PVC Quick-Lay Bonding Adhesive EverGuard® WB181 Bonding Adhesive (TPO/PVC) LRF Adhesive M - All packaging types LRF Adhesive O - All packaging types OlyBond500® Canisters OlyBond500® Insulation Adhesive - All packaging types EverGuard® TPO 3 Square Low VOC Bonding Adhesive EverGuard® PVC Quick Spray Adhesive (XK/KEE membranes)	40°F (4.4°C) and rising

EverGuard® TPO/PVC Architectural Roofing Details Manual

Scan this QR code to access the **EverGuard® TPO/PVC Architectural Roofing Details Manual**, where you can find all the single-ply details compiled in one comprehensive book.

GAF

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