

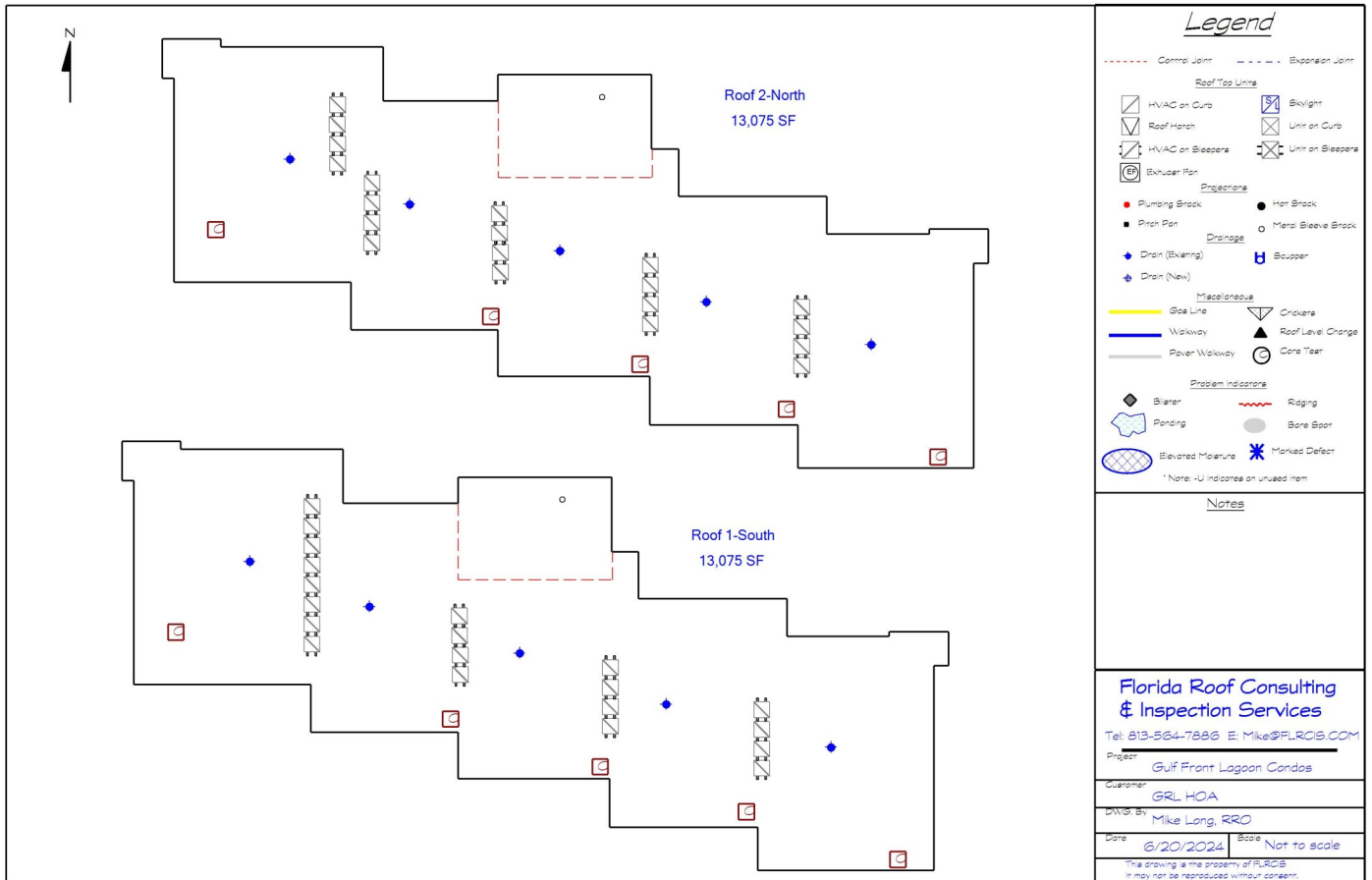
Bid Document 24 GFL: -Condominium Roof Replacement Project:
504 Florida Ave. Tarpon Springs, FL



Florida Roof Consulting
& Inspection Services
www.FLRCIS.com

Prepared by
FLRCIS

Gulf Front Lagoon Condos HOA
504 Florida Ave.
Tarpon Springs, FL
26,000 sqft. approx.



Initial _____

Existing Roof Systems:

- Structural Concrete decking / Tapered Cellular Lightweight concrete / Modbit Roofing/ Coating

Base Bid option: (approx. 13,000sqft x 2ea) 26,600sqft total

- Remove all Roofing and flashings down to the Lightweight concrete deck and to a clean substrate, clean the roof deck/LWC free from loose debris. This shall be performed on all roof levels (pull test may be needed by GAF)
- Due to the removal of the mechanically attached roof system the remaining divots and damaged Lightweight concrete shall be repaired prior to fully adhering the new sheet.
- Demo ALL existing pitch pans, line chases, vacant curbs, pipe boots and One way vents etc. Existing line chase hoods to be disposed of and new ones to be fabricated out of .050 TPO Clad metal (aluminum)
- Pitch pans located at or near roof drains will need to be built up using wood blocking to a minimum height of 8” then flashed as a curb and new Pre-finished hoods installed and foamed closed.
- Contractor must supply and install all GAF manufactured or approved materials in order to complete the listed scope.
- Wood nailers to be installed as need, all shall be re-attached to meet current code.
- Apply Olybond 500 adhesive in a splatter pattern at a rate of 2.83lbs of adhesive per 100sqft.
- Install GAF .60mil TPO Fleece backed roof membrane to be rolled into place, all wrinkles and bubbles/blisters to be broomed or rolled out using weighted rollers.
- Using Seam cleaner, wipe all laps and seams clean using clean rags and allow the cleaner to gas off prior to welding.
- Using a robotic heat welding machine, weld all seams using the pre determined heat and speed recommended by the manufacture. All seam longer than 12” on the flat roof surface should be welded using a robotic welder. Hand welders should only be used for detail work or areas a robot can not access. (units, stands, curbs etc.)
- Base flashings shall be free of asphalt or skinned using Securock or sheathing prior to fully adhering the new base flashings. Flashing membrane adhesives are to be installed at a rate of 1gal per 50-70sqft.
- New base flashing to be properly terminated using Termination bar set in water block. Then counter flash the Term bar with standard counter flashing with caulk tray secured to the wall.
- Perimeter sloped walls shall be flashed up and over the outside face and fully adhered then terminated.
- Drip Edge metals to be TPO Clad at the perimeters of the eaves on the pop up roofs. Perimeters to be fully welded using TPO membrane.
- Complete all detail work and proper tie ins daily as the roofing is being installed to ensure no water intrusion occurs.
- Supply and install walkway pads on both sides of each bank of units.
- All Details used should be approved by GAF as a standard detail and should meet or exceed the 20yr No Dollar Limit warranty Specification & requirements.

Roof top Doors:

- Awarded contractor to replace the roof top glass sliding doors to be replaced with new Metal double doors that are code approved that shall be a similar size as the current opening. Wood blocking will need to be added to the base of the door to give proper flashing heights.

Initial _____

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Metal work:

- All metals that will come into contact with the TPO membrane shall be Aluminum TPO/ clad coated metal. (pitch pans, End wall terminations, door way transitions, scuppers etc.)
- Flashings metals shall be .050 Pre-finished aluminum.
- All existing coping cap is to be removed and disposed of and be replaced using a fully cleated on the outside face system and rear fastened fabricated out .050 Pre-finished aluminum.
- Counter flashings are to be fabricated out of .050 Pre-finished aluminum. (color TBD)
- Upper roof levels are to have gutter installed on 3sides. (over the door)

Deck Replacement or repairs:

- Contractor to document in writing and with photos showing all deck repairs or patching performed.
- Flat stock steel can be used to cover small holes in the deck if found.

Plumbing:

- Plumbing stacks: that do not meet the required height requirements are to be raised or extended using Tubos or other approved methods.
- New retro fit roof drains are to be installed at the roof drain locations, these are to be TPO coated.
- Through wall scuppers will need to be sleeved using TPO clad metal. This detail will be discussed with the Manufacture during the pre-bid meeting.

Mechanical:

- All hvac condensing units will need to be lifted and placed on to Hurricane stands that shall be supplied and installed by the Roofing contractor or a sub to the contractor. (permits will be required)
- The awarded contractor is to hire, manage, perform and/or supervise any and all needed mechanical work needed to install the specified roof system according to all local building codes.
- All curbs that will be below the required flashing heights will need to be built up or replaced with new curbs at proper heights.
- All new Condensation lines are to be supplied and installed and placed and secured to Miro stands that shall be secured to the roof in an approved manner.
- All cost should be included in the base bid price provided by the contractor.

Electrical:

- The awarded contractor is to hire, manage, perform and/or supervise any and all needed electrical work to install the specified roof system according to all local building codes.
- All electrical cost should be included in the base bid price provided by the contractor.
- Non-visible items found during the project (tear off) may result in a change order. (buried lines etc.)

Lightning Protection:

- The property currently does not have lightning protection installed. The awarded contractor can provide pricing to add or install a new system once awarded should the client request it.

Warranties:

- Awarded contractor to provide a 5yr No Dollar limit installers warranty to cover all installed roof systems and accessories.
- Awarded contractor to provide a manufactures Full system warranty with a No Dollar Limit warranty period of 20yrs from date of completion.

Initial _____

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Note: Contractors Responsibilities:

- All required permitting & city/county/state inspections to satisfy the permitting prior to starting the project and closing of the permit prior to final payment.
- Contractor to provide all required or suggested engineering to complete the roof installation.
- Protection of the property, interior access path to/from the building and to the roof area during installation and all other aspects of the building related to the work being performed.
- Any damages to the exterior property or the interior of the building caused by the contractor or in direct result of the lack of work by the contractor will be the responsibility of the roofing contractor to make all needed repairs to the clients approval.
- Proper and safe loading and storage of all materials needed for the project.
- The Roof surface, work area and staging areas to be cleaned daily. Trash must be properly stored and secured and not stock piled.
- Safety: It is the contractors responsibility to run and maintain a safe job site throughout the project. Guidelines should meet or exceed all OSHA requirements.
- It is solely the contractors responsibility to gather measurements, test cuts and ensure the work being performed meets or exceeds Florida product approvals and meets the Manufactures specifications.
- If torching: All employees operating torches MUST be CERTA trained and all certs must be current.
- Labor: All parties directly involved with the installation of the roof system or will be performing any aspect of the roof installation shall be W2 employees (Laborers, Helpers, foreman and Project managers) no 1099 or subcontracted work shall be performed on this project. unless it pertains to separate trades (mechanical , electrical, plumbing etc.)
- Contractor to issue required certificate of Insurance along with all subs used to issues the HOA a Certificate of insurance naming the HOA as additional insured prior to any work being performed.

Project Contacts: Please submit bids to all parties listed below.

Mike Long- Florida Roof Consulting and Inspection Services: 813-564-7886 / Mike@FLRCIS.com

Review the attached documents to assist in preparing your bids and system requirements.

Notes discussed at Pre-bid Meeting:

- 1.
- 2.
- 3.
- 4.
- 5.

Initial _____

BID FORM

Bids are due 0/00/2024 by 2pm est.

Base bid:

Price should include all aspects to complete the specified scope of work. Total cost: \$ _____

Base bid:

Total Cost in writing: _____

Cost carried in the base bid to perform the Mechanical work: \$ _____

Cost carried in the base bid to perform the Electrical work: \$ _____

Unit Cost items:

- Labor & Material to repair Decking. \$ _____ Per Sqft
- Labor & Material to replace Decking \$ _____ Per Sqft
- Labor & Material to replace Wood nailers \$ _____ Per BF

Possible Change order Labor and Material Pricing: Roofing

- Per Man Hour Labor rate: \$ _____ Material Marked up _____ %

Possible Change order Labor and Material Pricing: Electrical

- Per Man Hour Labor rate: \$ _____ Material Marked up _____ %

Possible Change order Labor and Material Pricing: Mechanical

- Per Man Hour Labor rate: \$ _____ Material Marked up _____ %

Proposed Start Date: _____

Calendar Days to Complete: _____

Legal Company Name: _____

Authorized Bidders Printed Name: _____

Authorized Bidders Signature: _____ **Date:** _____

Initial _____

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FLORIDA ROOF CONSULTING & INSPECTION SERVICES

7/19/2024 | 45 Photos



Florida Roof Consulting
& Inspection Services
www.FLRCIS.com
813-564-7886

GFL Site Walk Photos

502 S Florida Ave Tarpon Springs, FL



Project Images



Club house Not Included.

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door to be replaced.

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Roof #1

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New line chase detail

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all units to be lifted and placed on code approved stands.

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roof hatches will stay and be flashed in.

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new coping cap all the way around

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new gutters around the penthouse roofs.

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Roof #2

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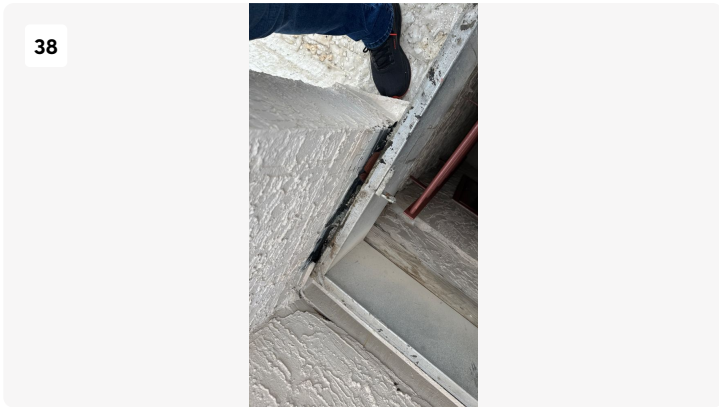
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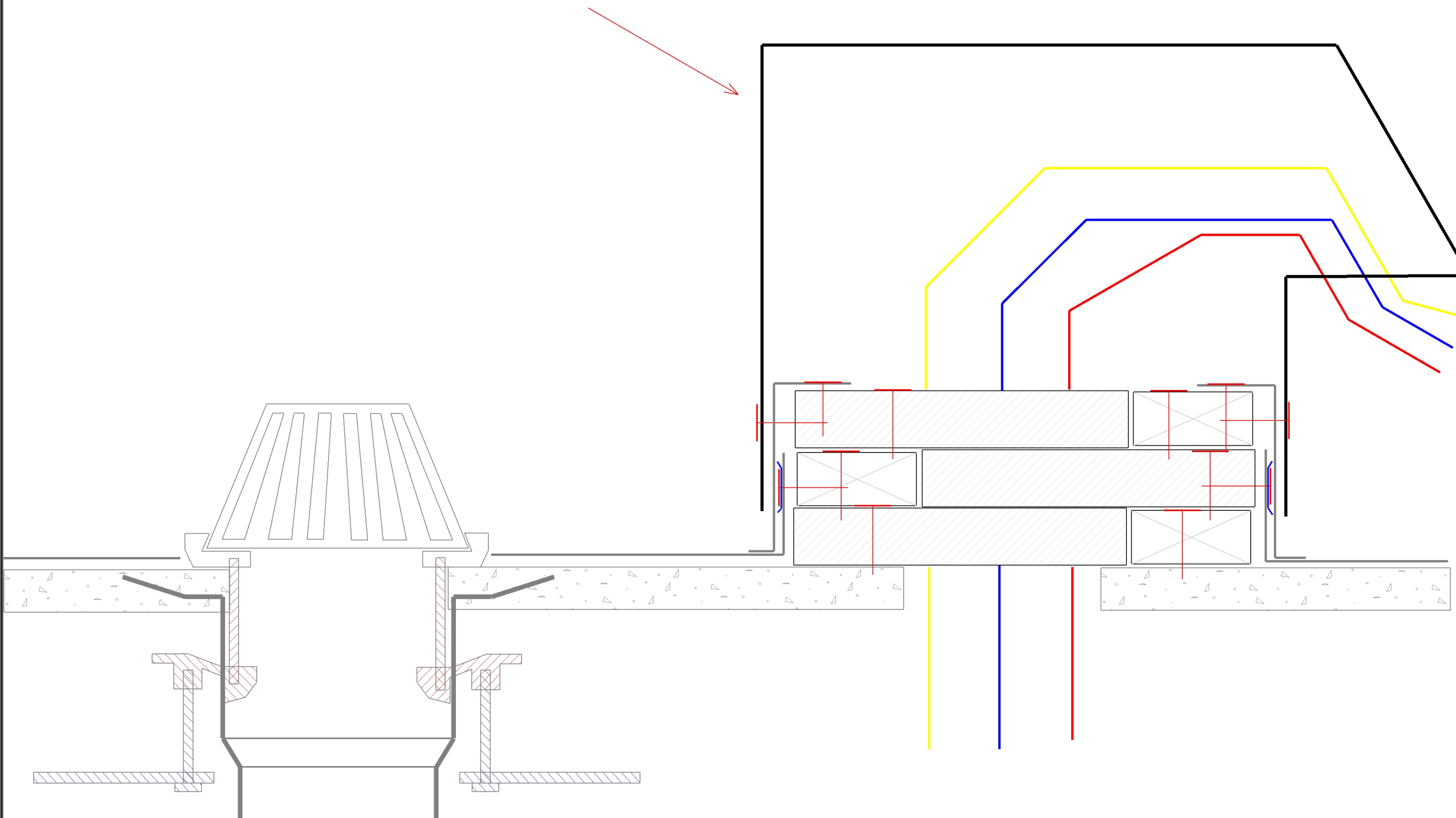
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Example for Curbed line chase.



Legend

----- Control Joint	----- Expansion Joint
<u>Roof Top Units</u>	
HVAC on Curb	Skylight
Roof Hatch	Unit on Curb
HVAC on Sleepers	Unit on Sleepers
Exhaust Fan	
<u>Projections</u>	
Plumbing Stack	Hot Stack
Pitch Pan	Metal Sleeve Stack
Drain (Existing)	Scupper
Drain (New)	
<u>Miscellaneous</u>	
Gas Line	Crickets
Walkway	Roof Level Change
Paver Walkway	Core Test
<u>Problem Indicators</u>	
Blister	Ridging
Ponding	Bare Spot
Elevated Moisture	Marked Defect
* Note: -U indicates an unused item	

Notes

Florida Roof Consulting
& Inspection Services

Tel: 813-564-7886 E: Mike@FLRCIS.COM

Project Gulf Front lagoon

Customer GFL 2024 Roof Project

DWG. By Mike Long, RRO

Date 7/15/2024 Scale Not to scale

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SECTION 07 54 23

THERMOPLASTIC SINGLE-PLY ROOFING

Gulf Front Lagoon
Condominiums
502 S. Florida Avenue
Tarpon Springs, FL 34689

PREPARED BY:

GAF Design Services

PROJECT NO: PD-00038640

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



**Gulf Front lagoon Condominiums,
502 S Florida Avenue
Tarpon Springs, FL 34689
SPECIFICATION: TFATN60FB**

COMPONENT	TYPE	REQUIRED	ATTACHMENT	RATE OF APPLICATION
DECK	LWIC over Structural Concrete	Suitable Thickness	Per Code	N/A
SINGLE PLY MEMBRANE	EverGuard® TPO Fleece-Back Membrane 60 mil White ASTM D6878 Size: 10ft SRI: 94	1 ply	OlyBond500® Insulation Adhesive Equipment-Free Canister System	Applied in a "spatter pattern" to asphaltic base ply at a rate of 0.83 gal/square and rolled in with a 150 lb. weighted roller. Adhesion test is required.
FLASHING MEMBRANE	EverGuard® TPO 60 mil White ASTM D6878 SRI: 94	1 ply	EverGuard® #1121 Bonding Adhesive	50-70 sq ft of installed membrane per gallon. Adhesive is applied to both substrate surface and the underside of the membrane. Maximum flashing height is 66". A separate counterflashing is required for guarantees over 20 years.
GUARANTEE	EverGuard® Diamond Pledge™ NDL Roof Guarantee	20 year		Guarantee fee applicable

Applicable Codes and Testing Information

Agency	VALUE	REPORT #	PAGE #	SYSTEM #
FBC	-102.5psf (205psf)	PEER-GAF-009.A.R61 for FL5293-R60 (NON-HVHZ)	136 of 180	LWC-64

Requirements above are subject to change. Always review the appropriate Application & Specification Manual to confirm that the requirements provided above are current, and to obtain additional information that is important for a successful installation. This Cut Spec specification shall not waive, supersede or alter the requirements and recommendations found in the most current Application & Specification Manual(s), printed technical bulletins or specific correspondence drafted for this project by Field Services, Design Services, or Technical Services Manager. Application & Specification Manuals and specimen copies of guarantee/warranty documents are available at www.gaf.com.
Note: Your Field Services or Technical Services Managers are the only employees who can approve any deviation from GAF's published specification manual(s).

Each roof has unique requirements. This specification is a representation of products and their installation. To properly assess specific roofing needs, code compliance, system configurations, and warranty eligibility, contact Design Services. The above listed roofing system is based on GAF guarantee requirements and is not intended to modify, negate or alter any requirements specified by the design professional or others. Fastener pullout testing should be performed to ensure acceptable attachment into substrate. Adhesion testing is required prior to guarantee registration to ensure foam adhesive will bond to a given substrate. Any wet or damaged existing decking must be removed and replaced prior to re-roofing.

This system shall be installed by a GAF PlatinumElite™ Commercial Contractor.

All GAF and EverGuard® accessories shall be used where applicable. GAF Perimeter Edge Metal shall be used where conditions exist.

Moisture content of the lightweight concrete must be less than 15%. Any issues caused by a moisture content in excess of 15% are excluded from the guarantee.

TABLE 4F: LIGHTWEIGHT CONCRETE OVER STRUCTURAL CONCRETE DECKS - NEW CONSTRUCTION OR REROOF (TEAR-OFF)
SYSTEM TYPE F: LWC TO DECK, BONDED ROOF COVER

System No.	Deck (Note 1)	Lightweight Concrete (Note 14)			Roof Cover (Note 15)	MDP (psf)
		Type	Min. Compressive Strength (psi)	Min. Thick. (in)		
CELCORE (FL2037):						
LWC-54.	Structural concrete	Celcore Cellular Concrete	200	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.), TPOFB-OB1 or TPOFB-OB2	-300.0
CONCRECEL (FL5584 AND FL10500):						
LWC-55.	Structural concrete	Concrecel	200	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.), TPOFB-OB1, TPOFB-OB2 or TPOFB-WB	-225.0
ELASTIZELL (FL4994):						
LWC-56.	Structural concrete	Elastizell	220	2	TPOFB-WB	-200.0
LWC-57.	Structural concrete	Elastizell	220	2	TPOFB-OB1 or TPOFB-OB2	-200.0
LWC-58.	Structural concrete	Elastizell	200	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.)	-210.0
SIPLAST INSULCEL (NOA 22-1020.11):						
LWC-59.	Structural concrete	Insulcel	200	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.), TPOFB-OB1 or TPOFB-OB2	-270.0
MEARLCRETE (FL13492):						
LWC-60.	Structural concrete	Mearlcrete	730	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (6-inch o.c.)	-45.0
LWC-61.	Structural concrete	Mearlcrete	290	2	TPOFB-OB1, TPOFB-OB2 or TPOFB-WB	-205.0
LWC-62.	Structural concrete	Mearlcrete	200	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.)	-270.0
PRE-EXISTENT CELLULAR LWC:						
LWC-63.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 97 lbf per Note 11.	180	2	TPOFB-LM1, TPOFB-LM2, TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.)	-92.5
LWC-64.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 97 lbf per Note 11.	180	2	TPOFB-OB1, TPOFB-OB2 or TPOFB-WB	-102.5
LWC-65.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 97 lbf per Note 11.	180	2	TPOFB-LO1 or TPOFB-LO2 (4-inch o.c.)	-112.5
LWC-66.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 117 lbf per Note 11.	400	2	TPO-1121	-127.5
LWC-67.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 117 lbf per Note 11.	400	2	TPOFB-XF1 or TPOFB-XF2	-130.0
LWC-68.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 117 lbf per Note 11.	400	2	TPO-QSA	-150.0
LWC-69.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 117 lbf per Note 11.	400	2	TPO-QSALV50	-154.0
LWC-70.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: MCRF, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 98 lbf per Note 11.	410	2	TPO-QSALV50; total wet rate 2.7 lbs/square; contact application with ½ to substrate and ½ to membrane backside	-297.5
	Note:	The reported MDP is the allowable maximum design pressure of the new roof cover adhered to the pre-existent LWC, and is irrespective of the performance of the pre-existent LWC (See Note 12). The deck and pre-existent LWC shall be capable of resisting the project design pressure requirements, not to exceed the noted MDP, to the satisfaction of the Authority Having Jurisdiction.				
LWC-71.	Structural concrete	Pre-existent cellular lightweight insulating concrete; Note: Fastener withdrawal, Drill-Tec™ Base Sheet Fastener (1.7 in.), min. 178 lbf per Note 11.	540	2	TPO-1121	-487.5

GAF GUIDE SPECIFICATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Thermoplastic Polyolefin Single-Ply Roofing Membrane
2. Thermoplastic Polyolefin Flashings
3. Thermoplastic Polyolefin Accessories
4. Insulation

B. Related Sections

1. Section 06100: Rough Carpentry
2. Section 07620: Sheet Metal Flashing and Trim
3. Section 15430: Plumbing Specialties

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards

1. ASTM D-751 – Standard Test Methods for Coated Fabrics
2. ASTM D-2137 - Standard Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics
3. ASTM E-96 - Standard Test Methods for Water Vapor Transmission of Materials
4. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheet or Film at Elevated Temperature
5. ASTM D-471 - Standard Test Method for Rubber Property—Effect of Liquids
6. ASTM D-1149 - Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment
7. ASTM C-1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
8. ASTM C-1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
9. ASTM E 903 – Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres
10. ASTM G155 - Standard Practice For Operating Xenon Arc Light Apparatus For Exposure Of Non-Metallic Materials
11. ASTM D573 - Standard Test Method For Rubber - Deterioration In An Air Oven

B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - *Architectural Sheet Metal Manual*

C. National Roofing Contractors Association (NRCA)

D. U.S. Green Building Council (USGBC)

1. Leadership in Energy and Environmental Design (LEED)

E. Florida Building Code

1.3 DEFINITIONS

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

GAF GUIDE SPECIFICATION

1.4 SUBMITTALS

- A. Product Data: Provide product data sheets for each type of product indicated in this section.
- B. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.
- C. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.
- D. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in this section.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: GAF shall provide a roofing system that meets or exceeds all criteria listed in this section.
- B. Installer's Qualifications:
 - 1. Installer shall be classified as a **GAF PlatinumElite™ Commercial Contractor or Gold Elite Commercial Contractor** as defined and certified by GAF.
- C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.
- D. Final Inspection
Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

1.6 PRE-INSTALLATION CONFERENCE

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

1.7 PERFORMANCE REQUIREMENTS

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

1.8 REGULATORY REQUIREMENTS

- A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.
- B. Florida Building Code: Provide a roofing system which will achieve a -102.5 psf (205 psf) wind uplift rating, as listed in the most current Florida Building Code Evaluation Report.
 - 1. FL5293-R60 NON-HVHZ (LWC-64)

GAF GUIDE SPECIFICATION

1.9 DELIVERY, STORAGE AND HANDLING

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

1.10 PROJECT CONDITIONS

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

1.11 WARRANTY

- A. Provide Manufacturers standard EverGuard® Diamond Pledge™ Guarantee with single source edge-to-edge coverage and no monetary limitation where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
 - 1. Duration: Twenty (20) years from the date of completion.
 - a) Covered components include GAF roofing membrane, liquid-applied membrane or coating, base flashing, high wall waterproofing flashing, insulation, expansion joint covers, preflashed accessories, and metal flashings used by the contractor of record that meet SMACNA standards (the “GAF Roofing Materials”).
 - b) Materials and workmanship of listed products within this section are included when installed in accordance with current GAF application and specification requirements. Contact GAF Design Services for the full terms and conditions of the guarantee.
 - c) Leaks caused by any non-GAF materials, such as the roof deck, existing materials, or non-GAF insulation are not covered.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Acceptable Manufacturer: GAF, Commercial Roofing Products Division, which is located at: 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 877-423-7663 (option 4, then option 3); Email: designservices@gaf.com; Web: www.gaf.com

2.2 MEMBRANE MATERIALS

GAF GUIDE SPECIFICATION

- A. A fleece-backed, polyester scrim reinforced thermoplastic polyolefin membrane for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant.

1. EverGuard® Fleece-Back TPO 60 Mil Membrane by GAF.

- a) 10' X 100', each roll contains 1000 sq. ft. of material weighing 344 lbs.
- b) Color: White

2.3 CURB/WALL FLASHING MEMBRANE

A. GENERAL

1. EverGuard® membrane flashing should be of the same type and thickness as the roof membrane.
2. EverGuard® TPO Fleece-Back membranes are optional flashing membranes for all EverGuard® TPO systems. These membranes may be a solution when a contaminated substrate is encountered.

B. FLASHING MEMBRANE

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

2.4 ADHESIVES, SEALANTS AND PRIMERS

- A.** Solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard TPO membranes, **EverGuard® 1121 Bonding Adhesive**, by GAF.
- B.** Two component fast-acting, low-rise polyurethane foam adhesive. The “A” and “B” components are dispensed from two pre-pressurized disposable cylinders. **OlyBond500® Equipment Free Canister System** distributed by GAF.
- C.** Solvent based primer for preparing surfaces to receive butyl based adhesive tapes, **EverGuard® TPO Primer**, by GAF.
- D.** Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding, **EverGuard® TPO Seam Cleaner**, by GAF.
- E.** Solvent based, trowel grade synthetic elastomeric sealant. Durable and UV resistant suitable for use where caulk is typically used. Available in 10 oz. tubes, **FlexSeal™ Caulk Grade Roof Sealant** by GAF.
- F.** Commercial grade roofing sealant suitable for sealing the upper lip of exposed termination bars and penetrations and around clamping rings. Meets the performance criteria of ASTM D412, ASTM D2196, ASTM D1475 and ASTM D1644, **FlexSeal™ Roof Sealant**, by GAF.
- G.** One part butyl based high viscosity sealant suitable for sealing between flashing membrane and substrate surface behind exposed termination bars and for sealing between roofing membrane and drain flange. **EverGuard® Water Block**, by GAF.
- H.** One-part, moisture-cure, self-leveling sealant designed for use in pitch pans on single ply roof systems. **EverGuard® One-Part Pourable Sealant**.

GAF GUIDE SPECIFICATION

2.5 FLASHING ACCESSORIES

A. GENERAL FLASHING ACCESSORIES

1. A smooth type, unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing/reinforcing material for penetrations and corners. Required whenever preformed vent boots cannot be used, 0.055 inches (55 mils) nominal thickness and sheet size: 24in x 50ft. **EverGuard® TPO UN-55 Detailing Membrane**, by GAF.
2. An 8 inch (20 cm) wide smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip for use as a cover strip over coated metal and stripping-in coated metal flanges and general repairs: 0.045 inches (45 mils) nominal thickness with 100 foot length, **EverGuard® TPO 45 Mil Utility Flashing Membrane**, by GAF.
3. 24 gauge steel with 0.025" thick TPO based film as required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves. Standard sheet size 4' x 10', sheet weight 47 lbs. Custom sizes available, **EverGuard® TPO Coated Metal**, by GAF.
4. Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched slotted holes at 6" on center or 8" on center. ¾" x 10' with 0.090" cross section, **DRILL-TEC™ Termination Bar**, by GAF.
5. .055" thick smooth type, unreinforced thermoplastic polyolefin membrane designed for use as a conforming membrane seal over T-joints in 60 and 80 mil membrane applications. **EverGuard® T-Joint Patches**, by GAF.

B. ROOF EDGE ACCESSORIES

1. A 6 inch (14 cm) wide, smooth type, heat-weldable polyester scrim reinforced thermoplastic polyolefin membrane strip. Designed for use as a cover strip over non-coated metal edges and flanges. Each full roll contains approximately 100 Lineal Ft. of material, 6" X 100'. **EverGuard® TPO Heat-Weld Cover Tape**, by GAF.

C. WALL & CURB ACCESSORIES

1. 55 mil TPO membrane and 24 gauge coated metal prefabricated into standard and custom size thru wall scuppers. Available in two sizes: 4" x 6" x 12" (l x w x d) with a 5.75" x 3.75" opening and 8" x 10" x 12" (l x w x d) with a 9.75" x 7.75" opening, **EverGuard® TPO Scupper**, by GAF
2. .045" or .060" thick reinforced TPO membrane fabricated corners. Available in four standard sizes to flash curbs that are 24", 36", 48", and 60" in size. Four corners are required to flash the curb, **EverGuard® Corner Curb Wraps**, by GAF.
3. 0.060" thick molded TPO membrane outside corners of base and curb flashing. Hot-air welds directly to EverGuard®TPO membrane. Size 4" x 4" with 6" flange, **EverGuard®TPO Universal Corners** by GAF.
4. 0.055" molded TPO membrane inside corners of base and curb flashing. Hot-air welds directly to EverGuard TPO membrane. Size 6" x 6" x 5.5" high **EverGuard® TPO Preformed Corners** by GAF.
5. 8" diameter, nominal .050" vacuum formed unreinforced TPO membrane for use in flashing outside corners of base and curb flashings, **EverGuard® TPO Fluted Corner**, by GAF.

D. PENETRATION ACCESSORIES

1. 0.075" thick molded TPO membrane sized to accommodate most common pipe and conduits, (1" to 6" diameter pipes), including square tube. Hot-air welded directly to EverGuard TPO membrane, supplied with stainless steel clamping rings, **EverGuard® TPO Preformed Vent Boots** by GAF.
2. 0.045" thick molded TPO membrane preformed boots are split to accommodate most common pipes and conduits and available in three standard sizes, **EverGuard® TPO Split Pipe Boots**, by GAF.
3. 0.045" thick molded TPO membrane preformed square boots are split to accommodate most common square penetrations and conduits and available in three standard sizes, **EverGuard® TPO Square Tube Wraps**, by GAF.

GAF GUIDE SPECIFICATION

4. .070 thick molded penetration pocket to provide structure and foundation for the application of a pourable sealant for a variety of roof penetrations, weldable and 9" x 6" x 4" (l x w x h). **EverGuard® TPO Pourable Sealer Pocket**
 5. Constructed from spun aluminum and preflashed using .055" thick smooth type, unreinforced thermoplastic polyolefin membrane. Available in a wide range of sizes to allow a proper fit into any size roofing drain. **EverGuard® TPO Drain** by GAF
 6. Aluminum drain unit coated with a weldable TPO compound. TPO membrane can be heat welded directly to the drain body, resulting in a strong, secure installation. Each drain is fitted with a BlueSeal® mechanical drain seal for a secure, tight seal into the building drain system. Available in two sizes (3" and 4"), and custom sizes are available. **EverGuard® TPO Coated Metal Drain** by GAF
- E. WALKWAYS
1. 1/8" thick extruded and embossed TPO roll 34.25" x 50', heat welds directly to roofing membrane. Unique "diamond tread" traction surface and features a 2" (51 mm) welding strip (smooth border) along each longitudinal edge that is compatible with hand or automatic welders. Available in gray or safety yellow, **EverGuard® TPO Walkway Rolls**, GAF.

PART 3 EXECUTION

3.1 SITE CONDITIONS

- A. Obtain verification that the building structure can accommodate the added weight of the new roofing system.
- B. Confirm the adequacy of the new roofing system to provide positive slope to drain. Eliminate ponding areas by the addition of drainage locations or by providing additional pitch to the roof surface.
- C. Prepare substrate surfaces thoroughly prior to application of new roofing materials. This is particularly important for re-cover and reroofing applications. 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.
- D. All defects in the roof deck or substrate must be corrected by the responsible parties before new roofing work commences. Verify that the deck surface is dry, sound, clean, and smooth, and free of depressions, waves, or projections.
- E. Protect building surfaces against damage and contamination from roofing work.
- F. Where work must continue over completed roof areas, protect the finished roofing system from damage.
- G. Deck preparation is the sole responsibility of the building owner or roofing contractor. All defects in the roof deck or substrate must be corrected before roofing work commences.
- H. Refer to GAF Roof Guarantee Program for specific requirements for extended guarantees.

3.2 SUBSTRATE PREPARATION

- A. Tear-off
 1. 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.

GAF GUIDE SPECIFICATION

2. Confirm the quality and condition of the roof decking by visual inspection. Fastener pull-out testing must be conducted by the roof fastener manufacturer.
 3. Secure all loose decking. Remove and replace all deteriorated decking.
 4. Remove abandoned equipment and equipment supports.
 5. Confirm that the height of equipment supports will allow the installation of full-height flashings.
- B. Structural Concrete Deck
1. Minimum Min. 2,500 psi compressive resistance (98,066 kilogram-force/square centimeter)
 2. The deck must be smooth, level and cannot be wet or frozen. If deck is determined to be wet, it must be allowed to dry.
 3. Only poured in place concrete decks that provide bottom side drying are acceptable. Decks that are installed over non-vented metal decks or pans that remain in place may trap moisture in the deck beneath the roof system and are not acceptable.
 4. The roof deck shall be properly cured prior to application of the roofing system; twenty-eight (28) days is normally required for proper curing. Curing agents must be checked for compatibility with roofing materials. Prior to the installation of the roof assemblies, GAF recommends the evaluation of the surface moisture and deck's dryness through the use of ASTM D-4263 or hot bitumen test.
 5. Treat cracks greater than 1/8" (3 mm) in width in accordance with the deck manufacturer's recommendations.
 6. Sumps for the roof drains shall be provided in the casting of the deck.
 7. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations prior to the new roof application.
 8. Code standards apply when their requirements exceed those listed here.
 9. For Pre-Cast Concrete Decks
 - a) Minimum 2" (51 mm) deck thickness
 - b) Joints must be filled with a masonry grout to correct imperfections between slabs and feathered to provide a slope not greater than 1/8:12 adhered insulated assemblies.
 - c) If the joints cannot be grouted and finished smooth, then a leveling course of lightweight insulating concrete (minimum 2" [51 mm] thickness) must be applied. Do not seal joints between the slabs; leave open to permit venting and drying of the roof fill from below.
 10. For Pre-Stressed Concrete Decks
 - a) GAF recommends a minimum 2" (51 mm) cellular lightweight concrete fill be installed over all pre-stressed concrete decks prior to installation of the roof system and/or insulation because variations in camber and thickness of pre-stressed concrete members may make securement of the roof system difficult.
 - b) Provisions must be made for the curing or drying of the fill installed over the top of the pre-stressed deck members. Do not seal joints between the slabs; leave open to permit venting and drying of the roof fill from below.
 11. For Poured Structural Concrete Decks
 - a) Minimum 4" (102 mm) deck thickness
 - b) Must be poured over removable forms or must provide for bottom side drying. Poured-in-place structural concrete decks that are poured over non-vented metal decks or pans that remain in place not acceptable.
 12. When insulation or roofing is to be adhered with hot asphalt, prime the deck with asphalt/concrete primer, ASTM D 41 at the rate of one gallon per 100 square feet (0.4 L/m²). Allow the primer to dry prior to the application of the roofing system.
- C. Lightweight Insulating Concrete Deck
1. Insulating concrete decks are required to have a minimum thickness of 2" (52 mm), a minimum compressive strength of 125 psi (9 kg/cm) and a minimum density of 22 pcf (208 g/m²). Individual deck manufacturer's standards apply when their specifications exceed the minimum thickness, compressive

GAF GUIDE SPECIFICATION

strength, or density requirements.

2. Cellular lightweight insulating concrete decks can be installed over non-slotted, galvanized metal decking designed for cellular lightweight insulating concrete or structural concrete.
3. Aggregate lightweight insulating concrete decks must be installed over permanent venting steel forms.
4. The insulating deck/fill must be installed by an applicator approved by the deck manufacturer.
5. The roof system shall be installed immediately following deck curing to prevent damage from exposure to precipitation. The deck manufacturer determines the minimum curing time and maximum exposure limitations.
6. LWIC should not be poured during rainy periods. Deck areas that have frozen before they have cured must be removed and replaced. Decks which receive precipitation prior to installation of the roof membrane must be checked for moisture content and dryness.
7. Where the mean January temperature (Reference current ASHRAE Fundamentals Handbook) is below 40 °F (4.4°C), lightweight insulating concrete decks must be poured and roofed between April 1st and October 31st. This type of deck is unacceptable in Alaska.
8. Code standards apply when their requirements exceed those listed here.

3.3 NAILER INSTALLATION

A. Acceptable Wood

1. Solid Blocking: Non-pressure treated wood as required, #2 Grade or better, nominal 1 1/4" (30 mm) x 4" (102 mm) with a minimum thickness of 3 1/2" (88 mm).
2. Shim Material: Plywood, 1/2" (13 mm) x width to match solid blocking.
3. Verify the condition of existing roof nailers and anchor to resist 250 lb. per ft. (550 kg) load applied in any direction. New nailers should meet same load requirements.
4. DRILL-TEC™ HD screws 18" (457 mm) o.c. attachment to structural wood, steel decks with a 1" (25 mm) thread embedment.
5. DRILL-TEC™ spikes or HD screws 18" (457 mm) o.c. attachment to concrete decks. Min. 1" (25 mm) shank or thread penetration.
6. Wood nailers attached to gypsum, concrete, cellular concrete and cementitious wood fiber must be fastened 12" (305 mm) o.c., through the nailer into the substrate with substrate approved DRILL-TEC™ fasteners.
7. Three anchors per length of wood nailer minimum.

B. Metal Blocking

1. 20 Ga. galvanized steel box with pre-punched holes and supplied with corrosion-resistant fasteners.
2. Closure and finish strip required for metal decking.
3. Secure in place using provided #14 x 1½-in. universal fasteners through pre-punched holes to roof edge.
4. Install end cap and top of box section with #14 x 1½-in. universal fasteners.

3.4 INSTALLATION – GENERAL

- A. Install GAF's EverGuard® TPO roofing system according to all current application requirements in addition to those listed in this section.
- B. GAF EverGuard® TPO Specification #: TFATN60FB
- C. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.5 SINGLE PLY MEMBRANE APPLICATION

GAF GUIDE SPECIFICATION

A. GENERAL

1. Substrates must be inspected and accepted by the contractor as suitable to receive and hold roof membrane materials.
2. Place roof membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent securement.
3. Membrane that has been exposed for more than 12 hours or has become contaminated will require additional cleaning methods.
 - a) Light Contamination - Membrane that has been exposed overnight up to a few days to debris, foot traffic, or dew or light precipitation can usually be cleaned with a white cloth moistened with EverGuard® TPO Cleaner (or EverGuard® CleanWeld™ Conditioner, a low-VOC cleaner) for TPO membranes.
 - b) Dirt-Based Contamination - Membrane that is dirt encrusted will require the use of a low-residue cleaner, such as Formula 409® and a mildly abrasive scrubbing pad to remove the dirt. This must be followed by cleaning with a white cloth moistened with EverGuard® TPO Cleaner (or EverGuard® CleanWeld™ Conditioner) for TPO membranes.
 - c) Exposure-Based Contamination - Membrane that is weathered or oxidized will require the use of EverGuard® TPO Cleaner, EverGuard® CleanWeld™ Conditioner and a mildly abrasive scrubbing pad to remove the weathered/oxidized top surface layer. This must be followed by cleaning with a white cloth moistened with EverGuard® TPO Cleaner (or EverGuard® CleanWeld™ Conditioner) for TPO membranes. Unexposed membrane left in inventory for a year or more may need to be cleaned as instructed above. Be sure to wait for solvent to flash off prior to welding.
 - d) Chemical-Based Contamination - Membrane that is contaminated with bonding adhesive, asphalt, flashing cement, grease and oil, and most other contaminants usually cannot be cleaned sufficiently to allow an adequate heat weld to the membrane surface. These membranes should be removed and replaced.

B. Adhered

1. All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane, and other contaminants that may result in a surface that is not sound or is uneven.
2. Full-width rolls can be installed throughout the field and perimeter of the roof. Half sheets are not necessary.
3. Overlap roof membrane a minimum of 3" (76 mm) for end laps. For fleece-back membrane, butt ends together and cover joint with 8" (203 mm) wide EverGuard® Flashing Strip heat-welded. Membranes are provided with lap lines along the side laps.
4. Best practice is to install membrane so that the side laps run across the roof slope lapped toward drainage points.
5. All exposed sheet corners must be rounded a minimum of 1" (25 mm).
6. Use full-width rolls throughout the field and perimeter of the roof. Half sheets are not necessary.
7. Membrane laps shall be heat-welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns and scorch marks.
8. Weld shall be a minimum of 1" (25.4 mm) in width for automatic machine welding and a minimum 2" in width for hand welding. Code requirements may supersede these instructions.
9. Roof membrane must be mechanically attached along the base of walls with screws and plates 6" (152 mm) on center.
10. Adhesive should be applied to the membrane at the following rate:
 - a) Low rise foam in canisters should be applied in "spatter method" for fleece-back membrane applications ONLY by dispensing the adhesive in a spray pattern similar to the action required when hand watering a flower bed, with a 50% substrate coverage.
11. Use appropriate bonding adhesive for substrate surface, applied with a solvent-resistant roller, brush or squeegee.

GAF GUIDE SPECIFICATION

12. Adhere approximately one half of the membrane sheet at a time. One half of the sheet's length shall be folded back in turn to allow for adhesive application. Lay membrane into adhesive once the bonding adhesive is tacky to the touch.
13. Roll membrane with a weighted roller to ensure complete bonding between adhesive and membrane.
14. Prevent seam contamination by keeping the adhesive application a few inches back from the seam area.
15. Reference the Adhesive securement tables in the EverGuard® Application and Specifications Manuals for substrate adhesion and compatibility.
16. Roll in membrane using a 150 lb. membrane roller or equivalent.
17. To reduce thermal bridging, a full spray of approved Low Rise Foam Adhesive may be used to attach individual insulation layers or adhere the top layer to a mechanically fastened bottom layer.

3.6 FLASHINGS

A. GENERAL

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

B. Coated Metal Flashings:

1. Coated metal flashings shall be formed in accordance with current EverGuard construction details and SMACNA guidelines.
2. Coated metal sections used for roof edging, base flashing and coping shall be butted together with a 1/4" gap to allow for expansion and contraction. Hot-air weld a 6" wide reinforced membrane flashing strip to both sides of the joint, with approximately 1" on either side of the joint left un-welded to allow for expansion and contraction. 2" wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.
3. Coated metal used for sealant pans, scupper inserts, corners of roof edging, base flashing and coping shall be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. Hot-air weld a 6" wide reinforced membrane flashing strip over all seams that will not be sealed during subsequent flashing installation.
4. Provide a 1/2" hem for all exposed metal edges to provide corrosion protection and edge reinforcement for improved durability.
5. Provide a 1/2" hem for all metal flange edges whenever possible to prevent wearing of the roofing and flashing membranes at the flange edge.
6. Coated metal flashings shall be nailed to treated wood nailers or otherwise mechanically attached to the roof deck, wall or curb substrates, in accordance with construction detail requirements.

C. Reinforced Membrane Flashings:

1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.
2. Membrane flashing may either be installed loose or Adhered to the substrate surface in accordance with "Construction Detail Requirements".
3. Apply the adhesive only when outside temperature is above 40°F. Recommended minimum application temperature is 50°F to allow for easier adhesive application.
4. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

GAF GUIDE SPECIFICATION

5. Please note that solvent-based adhesives must be allowed to dry until tacky to the touch before mating flashing membrane. Water-based adhesive must be allowed to flash off completely.
 6. Heat-weld all laps in EverGuard® smooth-reinforced flashing membrane in accordance with heat-welding guidelines. All seams in fleece-back membrane and smooth field sheet must be stripped in with 8" (203 mm) flashing strip.
 7. For extended length guarantees, separate counterflashing is required; exposed termination bars are not acceptable.
- D. Un-Reinforced Membrane Flashings:
1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.
 2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.
 3. Apply the adhesive only when outside temperature is above 40°F. Recommended minimum application temperature is 50°F to allow for easier adhesive application. Water-based adhesives are approved for use with smooth TPO membranes for flashings only.
 4. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.
 5. Please note that solvent-based adhesives must be allowed to dry until tacky to the touch before mating flashing membrane. Water-based adhesive must be allowed to flash off completely.
- E. Roof Edges:
1. Roof edge flashings are applicable for gravel stop and drip edge conditions as well as for exterior edges of parapet walls.
 2. Flash roof edges with coated metal flanged edging with a minimum 3" (76 mm) wide flange nailed 4" (102 mm) on center to wood nailers, and heat weld 8" (203 mm) membrane strip to metal flanges.
 3. When the fascia width exceeds 4" (102 mm), coated metal roof edging must be attached with a continuous cleat to secure the lower fascia edge. The cleat must be secured to the building no less than 12" (305 mm) o.c.
 4. Flash roof edge scuppers with a coated metal insert that is mechanically attached to the roof edge and integrated as a part of the metal edging.
 5. Alternatively, roof edges may be flashed with a 2-piece snap on fascia system, adhering the roof membrane to a metal cant and face nailing the membrane 8" (152 mm) on center prior to installing a snap-on fascia.
 - a) Submit design drawings for review and approval to Architect or Specifier before fabrication.
 - b) Installing contractor shall check as-built conditions and verify the manufacturer's roof edging details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the roof edging manufacturer's installation guide when setting edging.
- F. Parapet and Building Walls:
1. Flash walls with EverGuard® TPO membrane adhered to the substrate with bonding adhesive, loose applied or with coated metal flashing nailed 4" (102 mm) on center to pressure-treated wood nailers.
 2. Maximum flashing height without intermediate fastening is 24" (610 mm) for loose-applied flashing and 54" (1.4 m) for adhered flashing
 3. Secure membrane flashing at the top edge with a termination bar. EverGuard® Water Block shall be applied between the wall surface and membrane flashing underneath all exposed termination bars. Exposed termination bars must be mechanically fastened 6" (152 mm) o.c. (20-year max. guarantee); termination bars that are counter flashed must be fastened 12" (305 mm) o.c.
 4. Exposed termination bars must be sealed with Flexseal™ Caulk Grade Sealant.
 5. Roof membrane must be mechanically attached along the base of walls with screws and plates 12" (305 mm) on center [6" (152 mm) on center for Ballasted Systems]

GAF GUIDE SPECIFICATION

6. Metal cap flashings must have continuous cleats or be face fastened 12" (305 mm) o.c. on both the inside and outside of the walls.
 7. Flash wall scuppers with a coated metal insert that is mechanically attached to the wall and integrated as part of the wall flashing.
 8. Roof Transition Anchor (R.T.A.) Strip may be installed as the alternate method of base securement for a RhinoBond® non-penetrating base attachment detail.
- G. Curbs and Ducts:
1. Flash curbs and ducts with EverGuard® TPO membrane adhered to the curb substrate with bonding adhesive, loose applied or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
 2. Maximum flashing height without intermediate fastening is 24" (610 mm) for loose-applied flashing and 54" (1.4 m) for adhered flashing
 3. Secure membrane flashing at the top edge with a termination bar. EverGuard® Water Block shall be applied between the wall surface and membrane flashing underneath all exposed termination bars. Exposed termination bars shall be mechanically fastened 6" (152 mm) on center for guarantees less than 20 years and 12" (305 mm) on center for guarantees greater than 20 years or that are counter-flashed.
 4. Exposed termination bars must be sealed with Flexseal™ Caulk Grade Sealant.
 5. Roof membrane must be mechanically attached along the base of walls with screws and plates 12" (305 mm) on center [6" (152 mm) on center for Ballasted Systems]
 6. Metal counterflashings may be optional with Adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with Flexseal™ Roofing Cement.
 7. All coated metal curb flashings and loose applied membrane flashings must be provided with separate metal counterflashings, or metal copings.
- H. Roof Drains:
1. Roof drains must be fitted with compression type clamping rings and strainer baskets. Original-type cast iron and aluminum drains, as well as retrofit-type cast iron, aluminum or molded plastic drains are acceptable.
 2. Roof drains must be provided with a minimum 36" x 36" sump. Slope of tapered insulation within the sump shall not exceed 4" in 12".
 3. Extend the roofing membrane over the drain opening. Locate the drain and cut a hole in the roofing membrane directly over the drain opening. Provide a ½" of membrane flap extending past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations.
 4. For cast iron and aluminum drains, the roofing membrane must be set in a full bed of water block on the drain flange prior to securement with the compression clamping ring. Typical water block application is one 10.5 ounce cartridge per drain.
 5. Lap seams shall not be located within the sump area. Where lap seams will be located within the sump area, a separate roof membrane drain flashing a minimum of 12" larger than the sump area must be installed. The roof membrane shall be mechanically attached 12" on center around the drain with screws and plates. The separate roof drain flashing shall be heat welded to the roof membrane beyond the screws and plates, extended over the drain flange, and secured as above.
 6. Tighten the drain compression ring in place.
- I. Expansion Joints:
1. Any prefabricated expansion joint metal nailing strips must be fastened to wood nailers, curbs or secured to walls with appropriate nails or DRILL-TEC™ Fasteners.
 2. Roof membrane must be mechanically attached along the base of raised curb-expansion joints with screws and plates a minimum of 12" (305 mm) o.c. The expansion joint cover bellows shall be at least 2 times the expansion joint opening.
 3. Metal nailing strip must be set in FlexSeal™ Caulk Grade Sealant and secured with fasteners and neoprene washers fastened 6" (152 mm) o.c

GAF GUIDE SPECIFICATION

4. Expansion joints may be field fabricated. Reference appropriate Construction Detail.

J. Scuppers:

1. Coated-metal roof-edge scuppers must be provided with a min. 4" (102 mm) wide flange nailed to wood nailers, with hemmed edges and secured with continuous clips in accordance with the gravel stop assembly.
2. Coated-metal wall scuppers must be provided with 4" (102 mm) wide flanges, with additional corner pieces pop-riveted to the flanges to create a continuous flange. All flange corners must be rounded.
3. Install wall scuppers over the roof and flashing membrane and secure to the roof deck/wall with DRILL-TEC™ Fasteners 6" (152 mm) o.c., a minimum of 2 fasteners per side.
4. All corners must be reinforced with EverGuard® PVC or EverGuard® TPO Universal Corners or field-fabricated from EverGuard® non-reinforced materials.
5. Strip-in scupper with flashing membrane target sheet.
6. Alternately, a wall scupper box may be field-flashed using non-reinforced flashing membrane heat-welded to membrane on the wall face and roof deck. Fully adhere to the scupper box and terminate on the outside wall face with a termination bar and FlexSeal™ Caulk Grade sealant.
7. EverGuard® TPO has prefabricated scuppers in standard and custom sizes available

K. Wood Support Blocking:

1. Wood support blocking, typically 4" x 4" (102 mm x 102 mm), is usually installed under light-duty or temporary roof-mounted equipment, such as electrical conduit, gas lines, condensation, and drain lines.
2. Install wood support blocking over a protective layer of EverGuard® TPO walkway rolls or PVC walkway pads. Place wood blocking on oversized slip sheet, fold two sides vertically, and fasten with roofing nails into the blocking.

3.7 TRAFFIC PROTECTION

- A. Install walkway rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.
- B. Walkway pads must be spaced 6" apart to allow for drainage between the pads.
- C. Heat-weld walkway rolls to the roof membrane surface continuously around the perimeter of the roll.

3.8 ROOF PROTECTION

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

3.9 CLEAN-UP

- A. All work areas are to be kept clean, clear and free of debris at all times.

GAF GUIDE SPECIFICATION

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

END OF SECTION



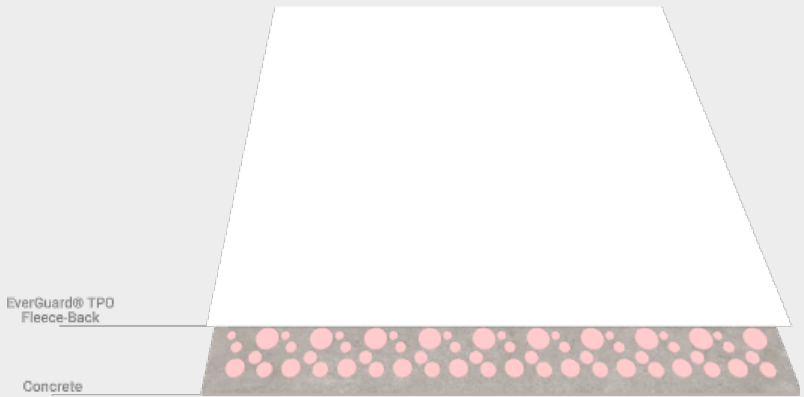
Project

Gulf Front Lagoon Bldg 1-2
504 S Florida Ave, Tarpon Springs, FL...

Prepared By

FLRCIS

Mike@FLRCIS.Com



System

LAYER	MATERIAL	ATTACHMENT
Deck	Concrete	
Membrane	EverGuard® TPO Fleece-Back - 60	OlyBond500® Adhesive Canisters

Note: The images shown are for illustration purposes only and may not be an accurate representation of the products. Images are not drawn to scale. Products depicted are based solely on user inputs and GAF has not verified the accuracy of this information and/or its applicability or suitability for a particular project. GAF expressly disclaims any and all liability arising from any reliance on this information. Always review the appropriate Application and Specification Manual to confirm current requirements, and to obtain additional information that is important for successful roof design and installation. Each roof has unique requirements. It is the sole responsibility of the end user to confirm final product selection with the roofing contractor and/or design professional. This drawing is not intended to replace or supersede contract drawings or plans, or to modify, negate, or alter any requirements specified by the design professional, the general contractor or roofing contractor, local building codes, or others.



Contents

Data Sheets

EverGuard® TPO Fleece-Back..... 3
OlyBond500® Adhesive Canisters..... 6

Environmental Sheets

EverGuard® TPO Fleece-Back..... 8

Safety Sheets

EverGuard® TPO Fleece-Back..... 31
OlyBond500® Adhesive Canisters Part 1..... 36
OlyBond500® Adhesive Canisters Part 2..... 44

EverGuard®
GAF TPO
Fleece-back Membrane

45, 60, 80



Description:

Combine performance and value with EverGuard® TPO Fleece-Back Membrane 45-mil, 60-mil, and 80-mil.

Factory-applied polyester fleece lets you offer the proven performance of EverGuard® TPO, while increasing durability and reducing labor:

- Provides enhanced puncture resistance against foot traffic, hail, and other impacts*
- Does not require a slip sheet when installed over a variety of existing roof systems
- Guarantees available according to thickness, with coverage up to 30 years for 80-mil.†

Accessories:

Fabricating details on-site can be time-consuming, costly, inconsistent, and even unreliable. EverGuard® TPO prefabricated accessories save you time and labor, deliver consistent performance, and create a uniform aesthetic.

* GAF warranties and guarantees do not provide coverage against traffic except where GAF walkways are applied, or against hail or other impact. Refer to gaf.com for more information on warranty and guarantee coverage and restrictions. Hail or puncture resistance coverage may be available for purchase for eligible systems. Contact GAF for more information.

† Additional requirements apply. Contact GAF for more information. See applicable guarantee, available at gaf.com, for complete coverage and restrictions.

Product Information:

Explore installation options — EverGuard® TPO Fleece-Back Membrane can be installed with a wide range of applications:

- **Mechanically attached** — quick, cost-effective, and available practically year-round
- **Adhered** — effective with EverGuard® WB181 Bonding Adhesive (water-based) or hot asphalt for a smooth appearance and excellent wind uplift
- **LRF Adhesive O** — low-rise foam that's low-VOC, ideal for minor surface irregularities, and available in a cartridge or 5-gallon container
- **LRF Adhesive M** — low-rise foam that's similar to LRF-O and can also be used for ISO insulation applications
- **LRF Adhesive XF** — 2-part low-rise foam that's Low-VOC, ideal for minor surface irregularities, and can adhere up to 24 squares of Fleece-Back Membrane.
- **OlyBond 500** — 2-part low-rise foam that's Low-VOC, ideal for minor surface irregularities, and can adhere up to 24 squares of Fleece-Back Membrane



MADE IN THE U.S.A.
WITH DOMESTIC AND IMPORTED MATERIALS.
AMERICAN JOBS IN AMERICAN FACTORIES.



Visit gaf.com

For additional information, contact GAF Design Services at 1-877-423-7663 or designservices@gaf.com

We protect what matters most™

GAF

Physical Properties (ASTM D6878)

Type	ASTM Test Method	ASTM D6878 Minimum	EverGuard® TPO Fleece-Back Membrane Test Values (approx.)†		
			45 mil	60 mil	80 mil
Nominal Thickness	ASTM D751	0.039" (0.99 mm)	0.045" (1.14 mm)	0.060" (1.52 mm)	0.080" (2.03 mm)
Breaking Strength	ASTM D751 Grab Method	220 lbf (38.5 kg)	375 lbf x 330 lbf (559 x 492 kg/m)	400 lbf x 360 lbf (596 x 536 kg/m)	440 lbf x 390 lbf (656 x 581 kg/m)
Factory Seam Strength	ASTM D751	66 lbf (98.34 kg/m)	115 lbf (membrane failure) (171 kg/m)	145 lbf (membrane failure) (216 kg/m)	155 lbf (membrane failure) (231 kg/m)
Elongation at Break	ASTM D751	15%	30%	30%	30%
Heat Aging	ASTM D573	90% Retention of Breaking Strength and Elongation at Break	100%	100%	100%
Tear Strength	ASTM D3045 8" x 8" sample (203 mm x 203 mm)	55 lbf (81.95 kg/m)	90 lbf x 120 lbf (134 x 179 kg/m)	70 lbf x 130 lbf (104 x 194 kg/m)	100 lbf x 180 lbf (149 x 268 kg/m)
Puncture Resistance	FTM 101 C Method 2031	Not Established	>350 lb. (159 kg)	>380 lb. (172 kg)	>380 lb. (172 kg)
Cold Brittleness	ASTM D2137	-40°C	-40°C	-40°C	-40°C
Permeance	ASTM E96	Not Established	0.08 Perms	0.08 Perms	0.08 Perms
Dimensional Change	ASTM D1204 @ 158°F (70°C), 6 hrs.	±1%	0.2%	0.4%	0.4%
Water Absorption	ASTM D471 @ 158°F (70°C), 1 week	±3.0%	0.7%	0.7%	0.7%
Hydrostatic Resistance	ASTM D751 Method D	Not Established	390 psi	430 psi	430 psi
Ozone Resistance	ASTM D1149	No visible deterioration @ 7x magnification	No visible deterioration @ 7x magnification	No visible deterioration @ 7x magnification	No visible deterioration @ 7x magnification
Weather Resistance	ASTM G155 / D6878	10,080 KJ / (m² · nm) at 340 nm	>20,000 KJ / (m² · nm) at 340 nm	>25,000 KJ / (m² · nm) at 340 nm	>25,000 KJ / (m² · nm) at 340 nm
Heat Aging	ASTM D573	240°F (115°C), 32 weeks	60 weeks	60 weeks	60 weeks
Thickness Above Scrim	ASTM D7635	Min 30% of Total Thickness	15.8 mil (Nominal)	22.1 mil (Nominal)	31.4 mil (Nominal)
Available Guarantees			Up to 20 years	Up to 25 years	Up to 30 years

NOTE: Additional requirements apply. Contact GAF for more information. See applicable guarantee, available at gaf.com, for complete coverage and restrictions.

* White Membrane Only

† Certain data is provided in MD (machine direction) x CMD (cross machine direction) format.




‡ Values stated are approximate and subject to normal manufacturing variation. These values are not guaranteed and are provided solely as a guide.

Sustainability Ratings/Certifications

Cool Roof Rating Council (CRRC)					
Type	ASTM Test Method	Color	Product ID#	Initial	Aged
Solar Reflectance	ASTM C1549	White	0676-0027	0.76	0.68
Thermal Emittance	ASTM C1371	White	0676-0027	0.90	0.83
Solar Reflectance Index (SRI)	ASTM E1980	White	0676-0027	94	81
LEED Information (white only)					
Manufacturing Location	Mount Vernon, IN	New Columbia, PA	Cedar City, UT		



Applicable Standards/Approvals

 <p>Miami Dade County Product Control Approved</p>	 <p>FM Approved (Refer to FM www.RoofNav.com for actual assemblies)</p>	 <p>Classified by UL in accordance with ANSI/ UL 790. (Refer to UL Product iQ for actual assemblies).</p>
<p>UL Evaluation Report UL ER1306-01</p>	<p>Meets or exceeds the requirements of ASTM D6878.</p>	<p>State of Florida Approved</p>
<p>ICC-ES Evaluation Report ESR-4676 (Cedar City, UT only)</p>	<p>Meets or exceeds the requirements of the Texas Department of Insurance.</p>	<p>CRRC Rated - Can be used to comply with 2022 Title 24, Part 6, Cool Roof Requirements of the California Code of Regulations (White only)</p>

Product Data

Roll Size	Colors	Full Roll Size	Full Roll Weight (Average)	Half Roll Size	Half Roll Weight (Average)
45 mil	White, Tan, Gray	10' x 100' (3.05 x 30.5 m) (1,000 sq. ft. [92.9 sq.m])	272 lb. (123 kg)	5' x 100' (1.52 x 30.5 m) (500 sq. ft. [46.5 sq.m])	136 lb. (62 kg)
60 mil	White, Tan, Gray, Energy Tan, Energy Gray	10' x 100' (3.05 x 30.5 m) (1,000 sq. ft. [92.9 sq.m])	348 lb. (158 kg)	5' x 100' (1.52 x 30.5 m) (500 sq. ft. [46.5 sq.m])	174 lb. (79 kg)
80 mil	White, Tan, Gray	10' x 50' (3.05 x 15.24 m) (500 sq. ft. [46.5 sq.m])	232 lb. (105 kg)	5' x 50' (1.52 x 15.24 m) (250 sq. ft. [23.23 sq.m])	116 lb. (53 kg)
Storage	Store on pallets in a clean, dry area at temperatures below 100°F (38°C).				
Safety Warning	Membrane rolls are heavy. Employ at least two people to position and install.				

Note: Membrane rolls shipped horizontally on pallets, stacked pyramid-style and banded.

Distributed by:

GAF OlyBond500 Canisters™

Adhesive



Description:

OlyBond500 Canisters™ adhesive adheres a variety of insulation and cover board stocks to most roof substrates in both new and reroof applications, including jobs that require multiple insulation layers. The two-component, low-rise polyurethane foam canister system also secures fleece-back single-ply membranes.

Available in two convenient sizes: Small (SM) and Large (LG)

- **SM kits** — approximately 19 lb. (8.6 g) per canister/39 lb. (17.7 kg) per complete kit — ideal for repair work or small jobs
- **LG kits** — Part 1 – 48 lb. (21. kg) Part 2 – 44 lb. (20 kg),/approximately 100 lb. (45.4 kg) per complete kit

Features and Benefits:

- Low-odor, low-VOC; uses a low GWP (global warming potential), propellant no HFC
- Fast start-up and shutdown to help boost productivity
- Gun assembly trigger lock helps prevent accidental dispensing
- Does not require any additional application equipment
- Accessories Included:
 - **LG:** Disposable 25-ft. (7.62 m) hose and gun assembly
 - **SM:** Disposable 10-ft. (7.62 m) hose and gun assembly
- **BOTH:** Four mixing tips, and three 17-in. (431.8 mm) tip extenders for a wide-reach radius

Application:

When installed in accordance with GAF application instructions:

- **LG:** Can adhere up to 24 squares of fleece-back membrane and up to 35 squares per kit for insulation attachment
- **SM:** Can adhere up to 7 squares of fleece-back membrane and up to 10 squares per kit for insulation attachment

Results may vary depending upon application temperature range, porosity of substrate and insulation boards, type of substrate, bead size, etc.

Surfaces: (properly evaluated and prepared*)

- Roof decks and substrates
- Structural concrete
- Gypsum
- Cementitious wood fiber plank
- Lightweight insulating concrete
- Steel (22 gauge or thicker with approved cross section)
- Plywood (5/8" [15.9 mm] thick min.)
- Smooth and granule-surfaced BUR
- Smooth and granule-surfaced modified bitumen
- Existing sprayed-in-place polyurethane foam
- Base sheets
- Most vapor barriers (including asphaltic and fleece-top)

Roof insulation and cover board

- Polyisocyanurate and HD polyisocyanurate (4 ft. x 4 ft. [13.1 m x 13.1 m] boards only)
- Expanded polystyrene
- High-density wood fiber
- Gypsum cover boards
- Perlite
- Certain extruded polystyrene

Codes and Compliance:

- FM Approved per Approval Standard 4470. Refer to RoofNav.com for specific assemblies.



- Miami-Dade County Product Control Approved



- Classified by UL in accordance with ANSI/UL 790. Refer to UL Product iQ for specific assemblies.



- State of Florida Approved

Optional Accessories:

- Gun and Hose Replacement Kit — 5 lb. (2.27 kg) (LG Canisters only)
- Bag of Ten Mixing Tips — 3 lb. (1.36 kg)
- Bag of Ten Mix Tip Extension Tubes — 2 lb. (0.91 kg)

For safety information, refer to the Safety Data Sheet at gaf.com

For proper set up, storage, handling, and disposal of this product, refer to the product instructions included in the box or at gaf.com.

NOTE: Contains hydrofluoroolefin (HFO).

THIS PRODUCT IS FOR PROFESSIONAL AND OUTDOOR USE ONLY. KEEP ALL ADHESIVE CANISTERS OUT OF REACH OF CHILDREN.

OlyBond® is a registered trademark of OMG, Inc.

* For complete substrate preparation and application instructions for GAF guarantee-eligible systems, please consult the applicable system installation and specification manual available at gaf.com. Not all uses of this adhesive with these substrates will comply with applicable codes. For installations that comply with applicable codes, refer to agency listings.



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Distributed by:

GAF OlyBond500 Canisters™

Adhesive

PROPERTIES/CHARACTERISTICS/PACKAGING:

OlyBond500® Canisters Adhesive	
Ambient/Substrate Install Temperature	40°F - 100°F (4.4°C - 38°C)
Product Install Canister Temperature	70°F - 90°F (21.1°C - 35°C) ¹
Storage Conditions	Cool, dry 60°F - 90°F (16°C - 32°C)
Coverage Rate per Case/Set at 12" (305 mm) o.c. to Insulation / Cover Board & Spatter Pattern to Fleece-back TPO/PVC Membrane (See below)	LG: Up to 24 sq. for Fleece-back Membrane ² Up to 35 sq. for Insulation ² SM: Up to 7 sq. for Fleece-back Membrane ² Up to 10 sq. for Insulation ²
Tack Time/Set-Up Time @ approx. 70°F (21.1°C)	1 - 5 mins/10 - 15 mins ³
Dispensing Unit	Dual Canister (Part 1 & Part 2) with supplied hose and gun applicator
Packaging	LG: Two boxes: ■ Part 1 Canister (Includes 25 ft. Hose/Gun/4 Tips/3 Tip Extenders) ■ Part 2 Canister SM: Single box: ■ Part 1 & Part 2 Canister kit (includes 10 ft. (3 m) hose and gun/4 tips/3 tip extenders)
VOC Content	25 grams/L (mix using US EPA Test Method 24)
Weight	LG: Part 1 + Part 2 Canister Kit: 92 lb. (41.73) SM: Part 1 + Part 2 Canister Kit: 39 lb. (17.69 kg)
Shelf Life	16 months from date of manufacture in unopened containers

¹ Prior to application, store for approx. 36 to 72 hours at room temperature.

² When installed in accordance with GAF's application instructions. Results may vary depending upon application temperature range, porosity of substrate and insulation boards, type of substrate, bead size, etc.

³ Values stated are approximate and may vary based on ambient temperature. These values are not guaranteed and are provided solely as a guide.

RIBBON SPATTER APPLICATION COVERAGE⁴

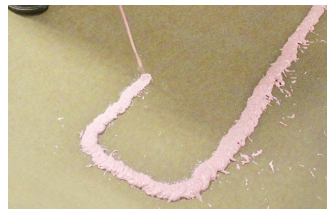
Ribbon Application (Insulation)			Spatter Application ⁴ (Fleece-Back Membrane)
4" (102 mm) on-center	6" (152 mm) on-center	12" (305 mm) on-center	2.83 lb. (1.36 kg) of adhesive per 100 sq. ft. of area
1,000 sq. ft. (92.9 sq. m) coverage	1,500 sq. ft. (139.35 sq. m) coverage	LG: 3,500 sq. ft. (325.15 sq. m) coverage SM: 1,000 sq. ft. (102.19 sq. m) coverage	LG: 2,400 sq. ft. (222.96 sq. m) coverage SM: 700 sq. ft. (65.03 sq. m) coverage

⁴ When installed in accordance with GAF's application instructions. Results may vary depending upon application temperature range, porosity of substrate and insulation boards, type of substrate, bead size, etc.

EXAMPLES OF PROPER ADHESIVE RATIO FOR BEAD APPLICATIONS FOR INSULATION



Without tip extension



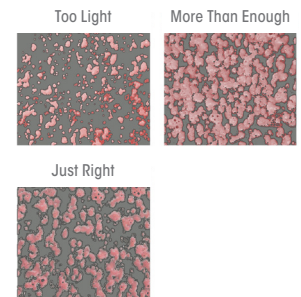
With tip extension

EXAMPLES OF PROPER ADHESIVE RATIO FOR BEAD APPLICATIONS:



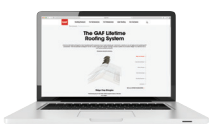
- A — On ratio
- B — Too much Part 1
- C — Too much Part 2

EXAMPLES OF PROPER ADHESIVE RATIO FOR FLEECE-BACK MEMBRANE:



Illustrations are provided for reference only.

For additional information, contact GAF at 877-423-7663 or designservices@gaf.com.



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Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

The GAF logo, consisting of the letters "GAF" in white, bold, sans-serif font, centered within a red square.

GAF, a Standard Industries company, is the leading roofing and waterproofing manufacturer in North America. For more than 135 years, GAF has been trusted to protect what matters most for families, communities and business owners with its innovative solutions and focus on customer service. GAF's leadership extends to its commitment to making a positive impact on its communities, industry, and planet. Learn more at www.GAF.com.

The perfect choice if you're looking to avoid the expense of removing an existing roofing system before installing a new one.



**Certified
Environmental
Product Declaration**
www.nsf.org

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930:2017. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g., Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	NSF International, 789 N. Dixboro Rd, Ann Arbor, MI 48105, www.nsf.org	
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	NSF Certification Policies for Environmental Product Declarations (EPD): November 1, 2022	
MANUFACTURER NAME AND ADDRESS	GAF 1 Campus Drive Parsippany, NJ 07054	
DECLARATION NUMBER	EPD10914	
DECLARED PRODUCT & DECLARED UNIT	GAF EverGuard® TPO Fleece-Back Membrane Declared Unit = 1 m ²	
REFERENCE PCR AND VERSION NUMBER	NSF International: Product Category Rule for Environmental Product Declarations for Single Ply Roofing Membranes, Version 2, Issued 2019 Valid through July 17, 2024	
DESCRIPTION OF PRODUCT APPLICATION/USE	Single Ply Roofing Membrane (TPO)	
PRODUCT RSL DESCRIPTION	N/A	
MARKETS OF APPLICABILITY	Global	
DATE OF ISSUE	02/02/2024 - 02/02/2029	
PERIOD OF VALIDITY	5 Years	
EPD TYPE	Product Specific	
DATASET VARIABILITY	N/A	
EPD SCOPE	Cradle-to-Gate with options	
YEAR(S) OF REPORTED PRIMARY DATA	2021	
LCA SOFTWARE & VERSION NUMBER	LCA for Experts v. 10.6 GAF EPD Generator Tool Version 1.0	
LCI DATABASE(S) & VERSION NUMBER	Sphera database & USLCI v2.0	
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1	
The sub-category PCR review was conducted by:		
This declaration was independently verified in accordance with ISO 14025: 2006, ISO 21930:2017, Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services, serves as the core PCR, with additional considerations from ISO 21930:2007 and CEN Norm EN 15804 (2012).	Jack Geibig, EcoForm, LLC jgeibig@ecoform.com	
<input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Sustainable Solutions Corporation	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Jack Geibig, EcoForm, LLC jgeibig@ecoform.com	

Environmental declarations from different programs (ISO 14025) may not be comparable.

Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building.

This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

General Information

Description of Company/Organization

Founded in 1886, GAF is the leading roofing manufacturer in North America. As a member of the Standard Industries family of companies, GAF is part of the largest roofing and waterproofing business in the world. The company's products include a comprehensive portfolio of roofing and waterproofing solutions for residential and commercial properties as well as for civil engineering applications. The full GAF portfolio of solutions is supported by an extensive national network of factory-certified contractors. GAF continues to be the leader in quality and offers comprehensive warranty protection on its products and systems. The company's success is driven by a commitment to empowering its people to deliver advanced quality and purposeful innovation. For more information about GAF, visit www.gaf.com.

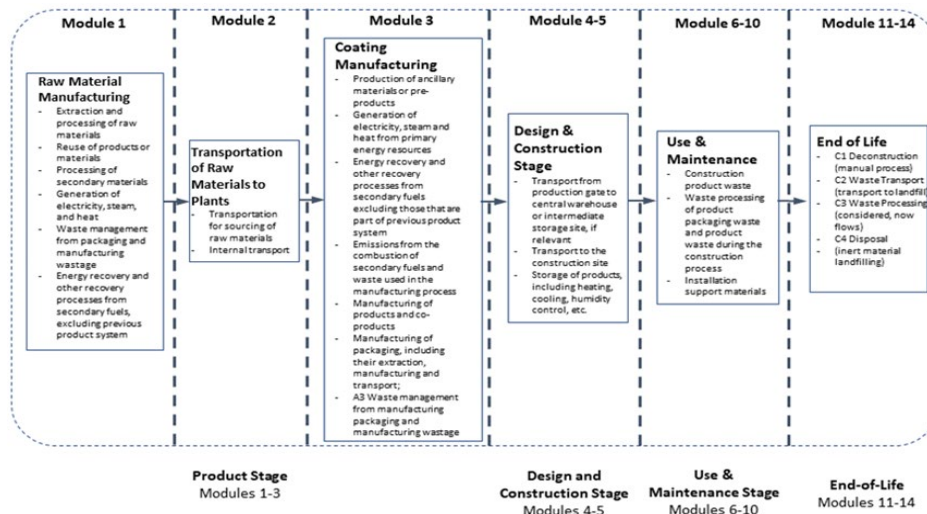
Product Description

EverGuard® TPO Fleece-Back membrane is a single-ply roofing product and is designed to be used as an outer roof layer, either in new construction or re-covering applications. It is made of two layers of thermoplastic polyolefin (TPO) bonded to a layer of polyester scrim in the middle. This configuration meets all the inherent properties and performance which TPO is known for, including excellent seam strength, long-term weathering, natural resistance to fungi, energy savings, and more.

The products included in this EPD are:

- EverGuard® TPO Fleece-Back 45-mil Membrane
- EverGuard® TPO Fleece-Back 60-mil Membrane
- EverGuard® TPO Fleece-Back 80-mil Membrane

Flow Diagram



Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Manufacturer Specific EPD

This product-specific EPD was developed based on the cradle-to-gate with options (modules A1-A5, C1-C4) Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, and disposal. Manufacturing data were gathered directly from company personnel. For any product group EPDs, an impact assessment was completed for each product. Product grouping was considered appropriate if the individual product impacts differed by no more than $\pm 10\%$ in any impact category. Average product representations were determined by conducting a weighted average of the manufacturing inventory based on total production in the reference year. Product formulations are consistent between different thicknesses of a product group and across various manufacturing sites.

Application

EverGuard® TPO Fleece-Back membrane is a single-ply roofing product and is designed to be used as an outer roof layer, either in new construction or re-covering applications.

Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The average composition of a EverGuard® TPO Fleece-Back Membrane Single Ply Roofing Membrane (TPO) is as follows:

Material	Percentage in mass (%)
	Value
TPO Resin	53-63%
Polyester Scrim	2-10%
UV Weathering Agent	1.5-3.5%
Filler	20-30%
Pigment	1-5%
Fleeceback	5-15%
Total	100.00%

***The GAF product modelled in this study contains no substances that are required to be reported as hazardous, nor are any such substances utilized in its production.*

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Technical Data

This product-specific EPD was developed based on the cradle-to-gate with options (modules A1-A5, C1-C4) Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, and disposal. Manufacturing data were gathered directly from company personnel. For any product group EPDs, an impact assessment was completed for each product. Product grouping was considered appropriate if the individual product impacts differed by no more than ±10% in any impact category. Average product representations were determined by conducting a weighted average of the manufacturing inventory based on total production in the reference year. Product formulations are consistent between different thicknesses of a product group and across various manufacturing sites.

Physical Properties	ASTM Test Method	ASTM D6878 Minimum	EverGuard® Typical Test Data*
Breaking Strength	ASTM D751 Grab Method	220 lbf/in. (38.5 kn/m)	400 lbf x 360 lbf (596 x 536 kg/m)
Factory Seam Strength	ASTM D751	66 lbf (98.34 kg/m)	145 lbf (membrane failure) (216 kg/m)
Elongation at Break	ASTM D751	15%	30%
Heat Aging	ASTM D573	90% Retention of Breaking Strength and	100%
Tear Strength	ASTM D751 8" x 8" (203 x 203 mm) Sample	55 lbf (81.95 kg/m)	70 lbf x 130 lbf (104 x 194 kg/m)
Puncture Resistance	FTM 101C Method 2031	Not Established	>380 lb. (172 kg)
Cold Brittleness	ASTM D2137	-40° C	-40° C
Permeance	ASTM E96	Not Established	<0.08 Perms
Dimensional Change	ASTM D1204 @158° F (70° C), 6 hrs.	+/-1%	0.4%
Water Absorption	ASTM D471 @158° F (70° C), 1 week	+/-3.0% (top coating only)	0.7%
Hydrostatic Resistance	ASTM D751 Method D	Not Established	430 psi
Ozone Resistance	ASTM D1149	No cracks @ 7 x magnification	No visible deterioration @ 7 x magnification
Reflectivity (white) Initial/Aged	ASTM C1549 ASTM E903	N/A N/A	0.76/0.68 81.9% Reflectance
Emissivity (white) Initial/Aged	ASTM C1371 ASTM E403	N/A N/A	0.90/0.83
Weather Resistance	ASTM G155/D6878	10,080 KJ/(m ² · nm) at 340 nm	>25,000 KJ/(m ² · nm) at 340 nm
Heat Aging	ASTM D573	≤1.5% Weight change after 8 Weeks @ 275° F	Pass
Thickness Above Scrim	ASTM D7635	0.015"	24.1 mil (Nominal)

*Values stated are approximate and subject to normal manufacturing variation. These values are not guaranteed and are provided solely as a guide.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Placing on the Market / Application Rules

The standards that can be applied for EverGuard® TPO Fleece-Back Membrane are:

- ASTM D751
- ASTM D573
- ASTM D2137
- ASTM E96
- ASTM D1204
- ASTM D6878

Properties of Declared Product as Shipped

After manufacturing, the product is prepared for shipment to the customer. The membrane is reeled on a cardboard core and wrapped in plastic film. Additional packaging materials include product labels, a cardboard protective sheet and steel strap. The product is then shipped on wooden pallets to the customer.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Methodological Framework

Declared Unit

The declaration refers to the declared unit of 1 m² as specified in the PCR.

Name	Value			Unit
	45-mil	60-mil	80-mil	
Declared unit	1 m ²			
Weight per declared unit	1.41	1.45	2.01	kg
Thickness to achieve Declared Unit	45	60	80	mm

System Boundary

This is a cradle-to-gate with options Environmental Product Declaration intended for Business-to-Business (B2B) purposes. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery- Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

Description of the System Boundary Stages Corresponding to the PCR

(X = Included; MND = Module Not Declared)

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Reference Service Life

The reference service life of GAF EverGuard® TPO Fleece-Back Membrane is not declared due to the exclusion of the use-phase.

Allocation

Co-product allocation was determined on a mass basis.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of GAF. Secondary data from the Sphera (GaBi Content Version 2022.1) and USLCI databases, 2012, were utilized when necessary. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the product category.

Data Quality

The data sources used are complete and representative of global systems in terms of the geographic and technological coverage and are a recent vintage (i.e., less than ten years old). The data used for primary data are based on direct information sources of the manufacturers. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty. When a material is not available in the available LCI databases, another chemical which has similar manufacturing and environmental impacts may be used as a proxy, representing the actual chemical.

Important data quality factors include precision (measured, calculated, or estimated), completeness (e.g., unreported emissions or excluded flows), consistency (uniformity of the applied methodology throughout the study), and reproducibility (ability for another researcher reproduce the results based on the methodological information provided). Each dataset has an overall rating from one to four, one being "very good" and four being "poor." The individual datasets were scored and aggregated to determine the data has an overall average rating of 2.1.

Period Under Review

The period under review is the full calendar year of 2021.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows ISO 21930:2017 Section 7.2.7.

Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to ISO 21930 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the PCR allows for EPD comparability only when all stages of a product's life cycle have been considered, and the same sub-category PCR, when applicable. Additionally, the functional/declared unit must also be comparable. However, variations and deviations are possible. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers as the EPD results may.

Units

The LCA results within this EPD are reported in SI units.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

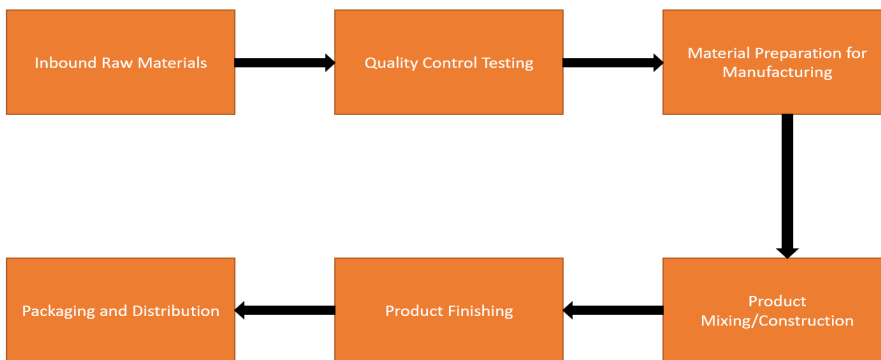
Life Cycle Inventory and Scenarios

Background data

For life cycle modeling of the considered products, the LCA for Experts v. 10.6 Software System for Life Cycle Engineering, developed by Sphera, is used. The Sphera and USLCI databases contain consistent and documented datasets which are documented online. To ensure comparability of results in the LCA, the basic data of the Sphera database were used for energy, transportation, and auxiliary materials.

Manufacturing

Single Ply Roofing Membrane (TPO) is manufactured in Cedar City, Utah; Gainesville, Texas; New Columbia, Pennsylvania; Mt. Vernon, Indiana and begins with the inbound reception of raw materials. The process begins with adding polymers, performance enhancing ingredients, and other option ingredients to a mixer. The inputs are blended, heated, and then extruded onto the top and bottom of a scrim to form laminated layers. The membrane is then cooled by passing through a series of rollers, wound into rolls or cut to size, and packaged for shipment. The table below describes which facility(ies) produce the product of the study. If multiple facilities produced the product, then a weighted average of total production was used to produce an average life cycle inventory from those facilities.



Product Type	Manufacturing location
TPO	Cedar City, UT
	Gainesville, TX
	Mount Vernon, IN
	New Columbia, PA

Packaging

The packaging material is composed primarily of plastic materials. Single ply roofing products are shipped on pallets and wrapped in plastic film.

Material	Quantity (% By Weight)
	Value
Cardboard	1.10%
Wood	23.34%
Paper	2.51%
Plastic	73.04%
Total	100.00%

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Transportation

Transport to Building Site (A4)		
Name	Value (45-mil / 60-mil / 80-mil)	Unit
Fuel type	Diesel	
Liters of fuel	38	l/100km
Transport distance	970	km
Capacity utilization (including empty runs)	90	%
Gross density of products transported	24 / 24 / 25	kg/m ³
Weight of products transported	-	kg
Volume of products transported	-	m ³
Capacity utilization volume factor	-	-

Product Installation

EverGuard® TPO Fleece-Back Membrane can be installed using various methods, including mechanically attached or adhesive adhered. Acceptable deck types include steel, wood, structural concrete & gypsum, light weighted insulating concrete and cementitious wood fiber. Note: Compliance with model building codes does not always ensure compliance with state or local building codes, which may be amended versions of these model codes. Always check with local building code officials to confirm compliance.

Installation Into the Building (A5)		
Name	Value (45-mil / 60-mil / 80-mil)	Unit
Auxiliary materials	-	kg
Water consumption	-	m ³
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	0.00	MJ
Product loss per declared unit	-	kg
Waste materials at construction site	0.26	kg
Output substance (recycle)	-	kg
Output substance (landfill)	1.10 / 1.45 / 2.01	kg
Output substance (incineration)	-	kg
Packaging waste (recycle)	0.08	kg
Packaging waste (landfill)	0.14	kg
Packaging waste (incineration)	0.04	kg
Biogenic carbon content of packaging	0.12	kg CO ₂ eq
Direct emissions to ambient air*, soil, and water	0.12	kg
VOC emissions	-	µg/m ³

*CO₂ emissions to air from disposal of packaging

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Disposal

The product is assumed to be 100% landfilled in the end-of-life disposal, in accordance with the PCR.

End of life (C1-C4)		
Name	Value (45-mil / 60-mil / 80- mil)	Unit
Collected separately	0.00	kg
Collected as mixed construction waste	1.10 / 1.45 / 2.01	kg
Reuse	0.00	kg
Recycling	0.00	kg
Landfilling	1.10 / 1.45 / 2.01	kg
Incineration with energy recovery	0.00	kg
Energy conversion	-	%
Removals of biogenic carbon	-	kg

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Results for the EverGuard® TPO Fleece-Back 45-mil Membrane

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	3.92E+00	1.27E-01	1.18E+00	0.00E+00	2.10E-02	0.00E+00	4.90E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	0.00E+00	4.81E-12	3.93E-10	0.00E+00	7.96E-13	0.00E+00	1.89E-15
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	0.00E+00	7.63E-04	9.70E-05	0.00E+00	1.26E-04	0.00E+00	3.57E-03
EP	Eutrophication potential	kg N-Eq.	0.00E+00	4.23E-05	-5.22E-04	0.00E+00	7.01E-06	0.00E+00	1.36E-03
SP	Smog formation potential	kg O ₃ -Eq.	3.96E+00	2.10E-02	3.21E-02	0.00E+00	3.48E-03	0.00E+00	9.56E-03
FFD	Fossil Fuel Depletion	MJ-surplus	9.86E-12	2.25E-01	2.67E+00	0.00E+00	3.72E-02	0.00E+00	1.13E-01

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	3.83E+00	1.27E-01	1.19E+00	0.00E+00	2.11E-02	0.00E+00	6.76E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	5.06E-12	4.80E-12	3.94E-10	0.00E+00	7.95E-13	0.00E+00	1.10E-13
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	9.06E-03	6.27E-04	1.75E-03	0.00E+00	1.04E-04	0.00E+00	1.33E-03
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	1.23E-03	1.12E-04	1.33E-04	0.00E+00	1.85E-05	0.00E+00	1.65E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.27E-03	7.32E-05	2.84E-04	0.00E+00	1.21E-05	0.00E+00	3.26E-04
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.08E-05	5.28E-11	3.23E-06	0.00E+00	8.75E-12	0.00E+00	2.65E-08
ADPF	Abiotic depletion potential for fossil resources	MJ	9.22E+01	1.62E+00	2.15E+01	0.00E+00	2.68E-01	0.00E+00	8.74E-01

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results below contain the resource use throughout the life cycle of the product.

Resource Use									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
RPR _E	Renewable primary energy as energy carrier	MJ	3.56E+00	0.00E+00	8.34E-01	0.00E+00	0.00E+00	0.00E+00	8.44E-02
RPR _M	Renewable primary energy resources as material utilization	MJ	1.12E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	Nonrenewable primary energy as energy carrier	MJ	6.67E+01	1.64E+00	2.24E+01	0.00E+00	2.71E-01	0.00E+00	8.94E-01
NRPR _M	Nonrenewable primary energy as material utilization	MJ	3.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m ³	4.71E-02	0.00E+00	5.28E-03	0.00E+00	0.00E+00	0.00E+00	1.99E-04

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	5.00E-06	0.00E+00	9.76E-10	0.00E+00	0.00E+00	0.00E+00	3.33E-11
NHWD	Non-hazardous waste disposed	kg	2.34E-01	0.00E+00	5.29E-02	0.00E+00	0.00E+00	0.00E+00	1.23E+00
HLRW	High-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg	1.82E-03	0.00E+00	3.45E-04	0.00E+00	0.00E+00	0.00E+00	7.81E-06
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	4.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Carbon Emissions and Removals									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO ₂	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO ₂	0.00E+00	0.00E+00	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

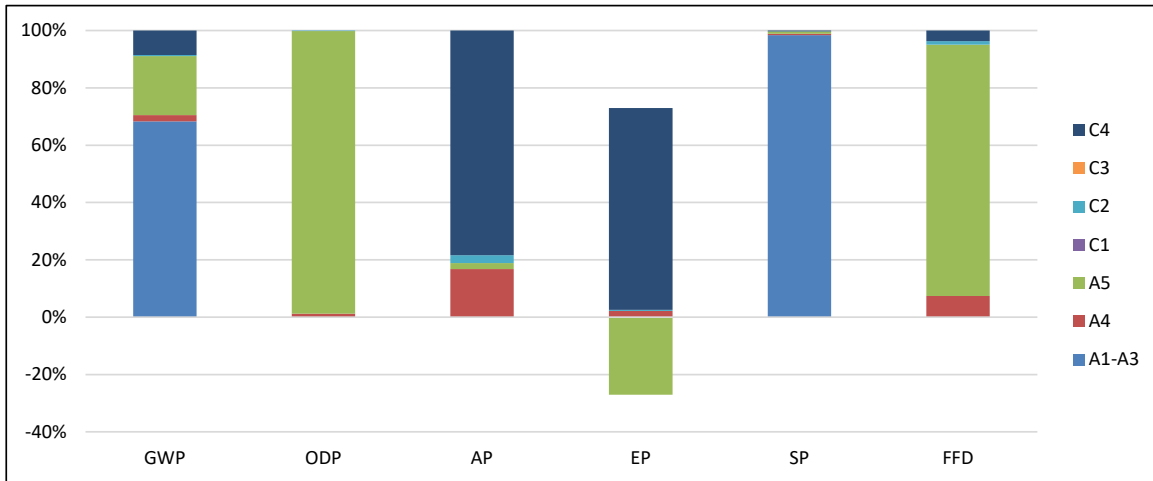
Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Interpretation for the EverGuard® TPO Fleece-Back 45-mil Membrane

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with natural gas use in the manufacturing of the product. The end-of-life disposal stage (C4) has significant impact in global warming potential, acidification, and eutrophication due to the 100% landfill assumption.



Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories:

- renewable primary energy resources as energy (fuel), (RPRE);
- renewable primary resources as material, (RPRM);
- non-renewable primary resources as energy (fuel), (NRPRE);
- non-renewable primary resources as material (NRPRM);
- secondary materials (SM);
- renewable secondary fuels (RSF);
- non-renewable secondary fuels (NRSF);
- recovered energy (RE);
- abiotic depletion potential for non-fossil mineral resources (ADPelements).
- land use related impacts, for example on biodiversity and/or soil fertility;
- toxicological aspects;
- emissions from land use change [GWP 100 (land-use change)];
- hazardous waste disposed;
- non-hazardous waste disposed;
- high-level radioactive waste;
- intermediate and low-level radioactive waste;
- components for reuse;
- materials for recycling;
- materials for energy recovery; and
- recovered energy exported from the product system.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Results for the EverGuard® TPO Fleece-Back 60-mil Membrane

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	4.91E+00	1.59E-01	1.18E+00	0.00E+00	2.62E-02	0.00E+00	6.12E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	0.00E+00	6.00E-12	3.93E-10	0.00E+00	9.93E-13	0.00E+00	2.36E-15
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	0.00E+00	9.52E-04	9.70E-05	0.00E+00	1.58E-04	0.00E+00	4.45E-03
EP	Eutrophication potential	kg N-Eq.	0.00E+00	5.28E-05	-5.22E-04	0.00E+00	8.73E-06	0.00E+00	1.70E-03
SP	Smog formation potential	kg O ₃ -Eq.	4.98E+00	2.62E-02	3.21E-02	0.00E+00	4.34E-03	0.00E+00	1.19E-02
FFD	Fossil Fuel Depletion	MJ-surplus	1.22E-11	2.80E-01	2.67E+00	0.00E+00	4.64E-02	0.00E+00	1.41E-01

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	4.82E+00	1.59E-01	1.19E+00	0.00E+00	2.63E-02	0.00E+00	8.44E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	6.20E-12	5.99E-12	3.94E-10	0.00E+00	9.91E-13	0.00E+00	1.38E-13
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	1.17E-02	7.82E-04	1.75E-03	0.00E+00	1.29E-04	0.00E+00	1.65E-03
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	1.52E-03	1.39E-04	1.33E-04	0.00E+00	2.31E-05	0.00E+00	2.06E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.51E-03	9.14E-05	2.84E-04	0.00E+00	1.51E-05	0.00E+00	4.07E-04
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.28E-05	6.59E-11	3.23E-06	0.00E+00	1.09E-11	0.00E+00	3.31E-08
ADPF	Abiotic depletion potential for fossil resources	MJ	1.14E+02	2.02E+00	2.15E+01	0.00E+00	3.35E-01	0.00E+00	1.09E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results below contain the resource use throughout the life cycle of the product.

Resource Use									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
RPR _E	Renewable primary energy as energy carrier	MJ	4.03E+00	0.00E+00	8.34E-01	0.00E+00	0.00E+00	0.00E+00	8.68E-02
RPR _M	Renewable primary energy resources as material utilization	MJ	1.12E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	Nonrenewable primary energy as energy carrier	MJ	5.71E+01	1.68E+00	2.24E+01	0.00E+00	2.79E-01	0.00E+00	9.19E-01
NRPR _M	Nonrenewable primary energy as material utilization	MJ	4.09E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m ³	5.77E-02	0.00E+00	5.28E-03	0.00E+00	0.00E+00	0.00E+00	2.05E-04

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	6.80E-06	0.00E+00	9.76E-10	0.00E+00	0.00E+00	0.00E+00	4.15E-11
NHWD	Non-hazardous waste disposed	kg	3.16E-01	0.00E+00	5.29E-02	0.00E+00	0.00E+00	0.00E+00	1.53E+00
HLRW	High-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg	2.33E-03	0.00E+00	3.45E-04	0.00E+00	0.00E+00	0.00E+00	9.75E-06
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	4.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Carbon Emissions and Removals									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO ₂	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO ₂	0.00E+00	0.00E+00	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

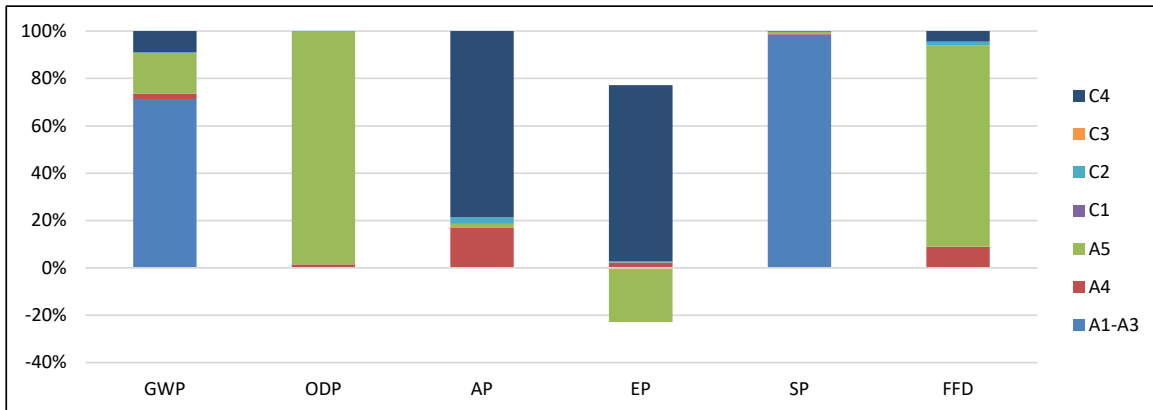
Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Interpretation for the EverGuard® TPO Fleece-Back 60-mil Membrane

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with natural gas use in the manufacturing of the product. The end-of-life disposal stage (C4) has significant impact in global warming potential, acidification, and eutrophication due to the 100% landfill assumption.



Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories:

- renewable primary energy resources as energy (fuel), (RPRE);
- renewable primary resources as material, (RPRM);
- non-renewable primary resources as energy (fuel) ,(NRPRE);
- non-renewable primary resources as material (NRPRM);
- secondary materials (SM);
- renewable secondary fuels (RSF);
- non-renewable secondary fuels (NRSF);
- recovered energy (RE);
- abiotic depletion potential for non-fossil mineral resources (ADPelements).
- land use related impacts, for example on biodiversity and/or soil fertility;
- toxicological aspects;
- emissions from land use change [GWP 100 (land-use change)];
- hazardous waste disposed;
- non-hazardous waste disposed;
- high-level radioactive waste;
- intermediate and low-level radioactive waste;
- components for reuse;
- materials for recycling;
- materials for energy recovery; and
- recovered energy exported from the product system.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Results for the EverGuard® TPO Fleece-Back 80-mil Membrane

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	6.50E+00	2.09E-01	1.18E+00	0.00E+00	3.47E-02	0.00E+00	8.07E-01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	0.00E+00	7.89E-12	3.93E-10	0.00E+00	1.31E-12	0.00E+00	3.12E-15
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	0.00E+00	1.25E-03	9.70E-05	0.00E+00	2.08E-04	0.00E+00	5.87E-03
EP	Eutrophication potential	kg N-Eq.	0.00E+00	6.94E-05	-5.22E-04	0.00E+00	1.15E-05	0.00E+00	2.24E-03
SP	Smog formation potential	kg O ₃ -Eq.	6.64E+00	3.45E-02	3.21E-02	0.00E+00	5.73E-03	0.00E+00	1.57E-02
FFD	Fossil Fuel Depletion	MJ-surplus	1.59E-11	3.69E-01	2.67E+00	0.00E+00	6.13E-02	0.00E+00	1.86E-01

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP	Global warming potential	kg CO ₂ -Eq.	6.43E+00	2.09E-01	1.19E+00	0.00E+00	3.48E-02	0.00E+00	1.11E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	8.05E-12	7.88E-12	3.94E-10	0.00E+00	1.31E-12	0.00E+00	1.82E-13
AP	Acidification potential for air emissions	kg SO ₂ -Eq.	1.59E-02	1.03E-03	1.75E-03	0.00E+00	1.71E-04	0.00E+00	2.18E-03
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	2.01E-03	1.83E-04	1.33E-04	0.00E+00	3.05E-05	0.00E+00	2.72E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	1.92E-03	1.20E-04	2.84E-04	0.00E+00	2.00E-05	0.00E+00	5.36E-04
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.60E-05	8.67E-11	3.23E-06	0.00E+00	1.44E-11	0.00E+00	4.36E-08
ADPF	Abiotic depletion potential for fossil resources	MJ	1.50E+02	2.66E+00	2.15E+01	0.00E+00	4.42E-01	0.00E+00	1.44E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results below contain the resource use throughout the life cycle of the product.

Resource Use									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
RPR _E	Renewable primary energy as energy carrier	MJ	5.76E+00	0.00E+00	8.34E-01	0.00E+00	0.00E+00	0.00E+00	1.20E-01
RPR _M	Renewable primary energy resources as material utilization	MJ	1.12E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPR _E	Nonrenewable primary energy as energy carrier	MJ	7.74E+01	2.33E+00	2.24E+01	0.00E+00	3.87E-01	0.00E+00	1.27E+00
NRPR _M	Nonrenewable primary energy as material utilization	MJ	5.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	Energy recovered from disposed waste	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	m ³	8.09E-02	0.00E+00	5.28E-03	0.00E+00	0.00E+00	0.00E+00	2.84E-04

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	9.59E-06	0.00E+00	9.76E-10	0.00E+00	0.00E+00	0.00E+00	5.47E-11
NHWD	Non-hazardous waste disposed	kg	4.40E-01	0.00E+00	5.29E-02	0.00E+00	0.00E+00	0.00E+00	2.02E+00
HLRW	High-level radioactive waste	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ILLRW	Intermediate- and low-level radioactive waste	kg	3.15E-03	0.00E+00	3.45E-04	0.00E+00	0.00E+00	0.00E+00	1.29E-05
CRU	Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	Materials for recycling	kg	5.96E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	Recovered energy exported from system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

Carbon Emissions and Removals									
Parameter	Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO ₂	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO ₂	0.00E+00	0.00E+00	1.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO ₂	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All use phase and disposal stages have been considered and only those with non-zero values have been reported

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

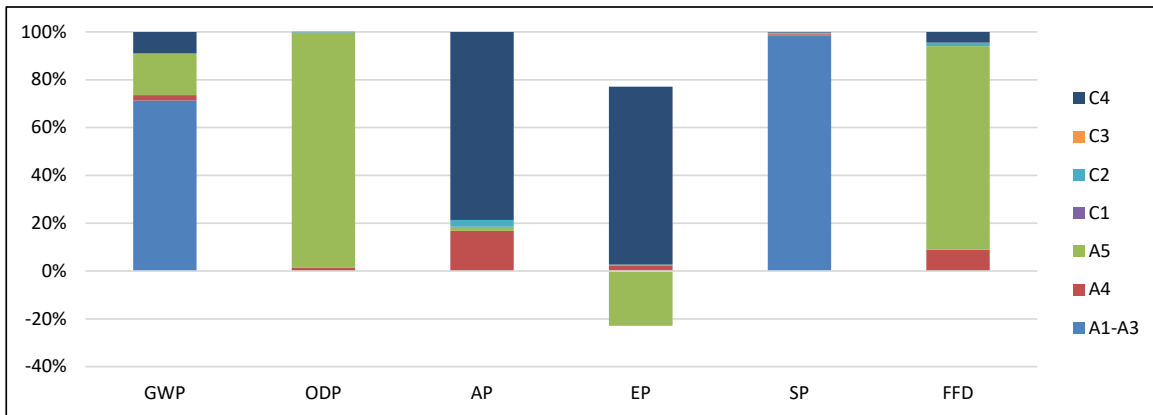
Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

LCA Interpretation for the EverGuard® TPO Fleece-Back 80-mil Membrane

The production life cycle stage (A1-A3) dominates the impacts across all impact categories. This is due to the upstream production of materials used in the product, along with natural gas use in the manufacturing of the product. The end-of-life disposal stage (C4) has significant impact in global warming potential, acidification, and eutrophication due to the 100% landfill assumption.



Emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in these categories:

- renewable primary energy resources as energy (fuel), (RPRE);
- renewable primary resources as material, (RPRM);
- non-renewable primary resources as energy (fuel), (NRPRE);
- non-renewable primary resources as material (NRPRM);
- secondary materials (SM);
- renewable secondary fuels (RSF);
- non-renewable secondary fuels (NRSF);
- recovered energy (RE);
- abiotic depletion potential for non-fossil mineral resources (ADPelements).
- land use related impacts, for example on biodiversity and/or soil fertility;
- toxicological aspects;
- emissions from land use change [GWP 100 (land-use change)];
- hazardous waste disposed;
- non-hazardous waste disposed;
- high-level radioactive waste;
- intermediate and low-level radioactive waste;
- components for reuse;
- materials for recycling;
- materials for energy recovery; and
- recovered energy exported from the product system.

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Additional Environmental Information

Environmental and Health During Manufacturing

During the manufacturing of EverGuard® TPO Fleece-Back Membrane, all legal regulations regarding emissions to air, wastewater discharge, solid waste disposal and noise emissions are followed.

Environmental and Health During Installation

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

Extraordinary Effects

Fire

Resistance by the roofing system to fire applied to the exterior roof surface is important. Typically, a UL Class B or C rating is required by building code. Also, depending on the use and size of the building and the construction type, fire resistance to fire originating from within the building may be required. This is normally expressed in the form of hourly ratings, and usually requires the use of a specialized roof assembly. Refer to current EverGuard® listings in the appropriate UL directory to verify roof assembly requirements for specific fire ratings.

Water

No environmental impacts are expected due to water exposure of properly installed EverGuard® TPO Fleece-Back Membrane.

Mechanical Destruction

EverGuard® TPO Fleece-Back Membrane has excellent mechanical strength. The breaking strength and elongation at break performance are measured by ASTM D751.

Delayed Emissions

Global warming potential is calculated using the TRACI 2.1 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

Environmental Activities and Certifications

N/A

Further Information

GAF
1 Campus Drive
Parsippany, NJ 07054

Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

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Environmental Product Declaration

GAF EverGuard® TPO Fleece-Back Membrane

Single Ply Roofing Membrane (TPO)



According to
ISO 14025, ISO 14044,
and ISO 21930:2017

Contact Information

Study Commissioner



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GAF
Safety Data Sheet
SDS # 2001
SDS Date: February 2024

SECTION 1: PRODUCT AND COMPANY INFORMATION

PRODUCT NAME: EverGuard® TPO (All Thicknesses)
TPO FB Membranes and Accessories (UN Detailing Membrane)
Coated Metal Membrane
Pre-Formed Corners & Vent Boots
Split Pourable Sealer Pocket
Flashing Strips
UN T-Patches
EverGuard® TPO Coated Drain.

MANUFACTURER: GAF

ADDRESS: 1 Campus Drive, Parsippany, NJ 07054

**24-HOUR EMERGENCY
PHONE (CHEMTREC):** 800 – 424 – 9300

INFORMATION ONLY: 877 – GAF – ROOF

PREPARED BY: Corporate EHS

SECTION 2: HAZARDS IDENTIFICATION

As defined in the OSHA Hazard Communication Standard, 29 CFR 1910.1200, the products listed below are considered articles and do not require an SDS. In addition, articles are not included in the scope of the Globally Harmonization System (GHS). As such, the GHS labeling elements are not included on this SDS. All components listed for this product are bound within the product. When handled as intended and under normal conditions of use, there is no evidence that any of the ingredients are released in amounts that pose a significant health risk. Although these products are not subject to the OSHA Standard or GHS labeling elements, GAF would like to disclose as much health and safety information as possible to ensure that this product is handled and used properly. This SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and be made available for employees and other users of this product. In addition, the recommendations for handling and use of these products should be included in worker training programs.

PRIMARY ROUTE OF EXPOSURE: None.

SIGNS & SYMPTOMS OF EXPOSURE

EYES: Vapor from this product during heat welding may irritate eyes.

SKIN: Exposure to hot surfaces during heat welding may cause thermal burns.

INGESTION: Not applicable.

INHALATION:	Inhalation of vapor from this product during heat welding may cause respiratory tract irritation.
ACUTE HEALTH HAZARDS:	See above.
CHRONIC HEALTH HAZARDS:	None known.
CARCINOGENICITY:	Not applicable.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

			OCCUPATIONAL EXPOSURE LIMITS		
CHEMICAL NAME	CAS #	% (BY WT)	OSHA	ACGIH	OTHER
Trade Secret	-	100	NE	NE	NE

NE= Not Established

SECTION 4: FIRST AID MEASURES

FIRST AID PROCEDURES

EYES:	No known effect on eye contact, rinse with water if irritation occurs.
SKIN:	No known effect on skin contact; rinse with water if irritation occurs.
INHALATION:	Allow the victim to rest in a well ventilated area. Seek medical attention if necessary.
INGESTION:	Do not ingest. Contact poison control and seek medical attention immediately.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: Treat symptomatically and supportively.

SECTION 5: FIRE FIGHTING PROCEDURES

SUITABLE EXTINGUISHING MEDIA:	Dry chemical, carbon dioxide, water spray or foam.
HAZARDOUS COMBUSTION PRODUCTS:	Toxic gases or vapors, such as carbon monoxide and other organic compounds may be released in a fire.
RECOMMENDED FIRE FIGHTING PROCEDURES:	Small Fire: Use Dry Chemical, carbon dioxide, water spray or foam. Large Fire: Use water spray, fog or foam. DO NOT use water jet. All fires produce toxic gases. Fire fighters should use self-contained breathing apparatus and full protective gear.
UNUSUAL FIRE & EXPLOSION HAZARDS:	Flammable when exposed to external ignition sources such as sparks, heat, and open flames.

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: Use appropriate tools to put the spilled solid in a waste disposal container.

Dispose in accordance with all applicable regulations.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: Keep the product dry. Store in a cool, well ventilated area.

OTHER PRECAUTIONS: Keep away from sources of ignition.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS / VENTILATION: This product is combustible. Use adequate ventilation when heat welding this product.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134, ANSI Z88.2 requirements must be followed whenever workplace conditions warrant use of a respirator.

EYE PROTECTION: Use safety glasses when appropriate.

SKIN PROTECTION: Use impervious gloves and clothing when appropriate.

OTHER PROTECTIVE EQUIPMENT: Work shoes.

WORK HYGIENIC PRACTICES: Use proper protective equipment at all times and wash after handling material.

EXPOSURE GUIDELINES: Not applicable.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE & ODOR:	Solid plastic sheet with characteristic odor. May be colored.		
FLASH POINT:	>301 °C (573.8 °F)	LOWER EXPLOSIVE LIMIT:	No Data
METHOD USED:	Closed Cup	UPPER EXPLOSIVE LIMIT:	No Data
EVAPORATION RATE:	No Data	BOILING POINT:	No Data
pH (undiluted product):	No Data	MELTING POINT:	175 °C (350 °F)
SOLUBILITY IN WATER:	Insoluble in water (cold/hot)	SPECIFIC GRAVITY:	1.35 (Water = 1)
VAPOR DENSITY:	No Data	PERCENT VOLATILE:	No Data
VAPOR PRESSURE:	No Data	MOLECULAR WEIGHT:	No Data

VOC (LBS/GAL):	Not Applicable		
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SECTION 10: STABILITY AND REACTIVITY

THERMAL STABILITY: **STABLE** **UNSTABLE**

CONDITIONS TO AVOID (STABILITY): None known.

INCOMPATIBILITY (MATERIAL TO AVOID): None known.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Gases or vapors such as carbon monoxide, carbon dioxide, or oxides of nitrogen, and other organic compounds may be released in a fire.

HAZARDOUS POLYMERIZATION: Will not occur

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation Unlikely under normal conditions
Skin Contact Unlikely under normal conditions
Eye Contact Unlikely under normal conditions
Ingestion Unlikely under normal conditions.

Acute and Chronic Toxicity No data available
Immediate Effects No immediate effects known.
Delayed Effects No delayed effects known.

Irritation/Corrosivity Data May cause skin irritation with repeated contact. No other effects known.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity No data available
Component Analysis - Aquatic Toxicity No data available
Persistence and Degradability No information available for the product.
Bioaccumulative Potential No information available for the product.
Mobility No information available for the product.

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Comply with federal, state and local regulations for disposal.

SECTION 14: TRANSPORTATION INFORMATION

DOT
 Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS**TSCA:** Not applicable.**CERCLA:** Not applicable.**SARA****311/312 HAZARD CATEGORIES:** Not applicable.**313 REPORTABLE INGREDIENTS:** Not applicable.**CALIFORNIA PROPOSITION 65:** Not applicable.

SECTION 16: OTHER INFORMATION

ADDITIONAL COMMENTS: None.**DATE OF PREVIOUS SDS:** May 2023**CHANGES SINCE PREVIOUS SDS:** Revised Section 4.

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the date compiled. However, no representation, warranty or guarantee, expressed or implied, is made as to its accuracy, reliability, or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his particular use. We do not accept liability for any loss or damage that may occur from the use of this information. Nothing herein shall be construed as a recommendation for uses which infringe valid patents or as extending a license of valid patents.

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: OlyBond500 Canisters, Part 1

Supplier: GAF
 1 Campus Drive
 Parsippany, NJ 07054
 USA
 Phone: 1-877-GAF-ROOF

24-hour Emergency Response Number:
 Chemtrec: 800-424-9300

Product Use(s): One component of a two-component polyurethane system

2. HAZARDS IDENTIFICATION

Classifications: Acute Toxicity, Inhalation: Hazard Category 4
 Respiratory Sensitization: Hazard Category 1
 Skin Sensitization: Hazard Category 1
 Skin Irritation: Hazard Category 2
 Eye Irritation: Hazard Category 2B
 Specific Target Organ Toxicity, Single Exposure: Hazard Category 3
 Specific Target Organ Toxicity, Repeated Exposure: Hazard Category 2
 Gases Under Pressure: Compressed Gas
 Physical Hazards Not Otherwise Classified: None
 Health Hazards Not Otherwise Classified: None

Symbols: Health Hazard
 Exclamation Point
 Gas Cylinder



Signal Word: Danger

Hazard May be harmful if inhaled.
 Statements: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 May cause respiratory irritation.
 May cause an allergic skin reaction.
 Causes eye and skin irritation.
 May cause damage to the respiratory system and/or skin through prolonged or repeated exposure.
 Contains gas under pressure; may explode if heated.

Precautionary Statements: Do not breathe mist, spray, or vapors.
 Use only outdoors or in a well-ventilated area.
 In case of inadequate ventilation wear proper respiratory protection.
 Wear protective gloves and eye protection.
 Wash hands and forearms thoroughly after handling.
 Contaminated work clothing must not be allowed out of the workplace.

IF INHALED: remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms or if you feel unwell, call a doctor or Poison Control Center.

Precautionary Statements: (continued) **IF ON SKIN:** Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. If skin irritation or rash occurs, get medical advice/attention.

IF IN EYES: Rinse cautiously with water for at several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

Get medical advice/attention if you feel unwell.

Protect from sunlight. Store in a well-ventilated place.

Store locked up in a well-ventilated place. Keep container tightly closed.

Dispose of contents/container in accordance with applicable regulations.

Other Hazards None known

EMERGENCY OVERVIEW

Overexposure to components of this product by inhalation may cause respiratory irritation, asthma-like symptoms, and/or respiratory sensitization.

Skin contact may cause irritation and/or allergy-like symptoms, and eye contact may cause irritation. Avoid skin and eye contact, using proper personal protective equipment as needed. See Section #7 for recommendations on proper handling and work practices, and Section #8 for recommendations on personal protective equipment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS Number</u>	<u>Percentage</u>	<u>Impurities</u>
4,4'-Methylenediphenyl Diisocyanate	101-68-8	25-50	None known
Diphenylmethane Diisocyanate, Isomers and Homologues	9016-87-9	>50	None known
Trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9	10-25	None known

4. FIRST AID MEASURES

Eyes: Hold eyes open and flush with lukewarm water for at least 15 minutes. Seek immediate medical assistance.

Skin: Remove contaminated clothing. Wash affected areas with soap and water for at least five minutes. If irritation persists or a rash occurs, seek medical attention. Launder or dry-clean clothing before reuse.

Ingestion: DO NOT induce vomiting. If the subject is conscious, wash mouth with water. Seek immediate medical assistance. Do not attempt to give anything by mouth to an unconscious or convulsive person.

Inhalation: If signs and symptoms of respiratory toxicity are observed, remove subject from area and seek immediate medical attention. Keep the subject warm and at rest. If necessary, administer oxygen or perform artificial respiration if necessary and qualified personnel are available to do so.

Guidance for Physician or Poison Control Center: Inhalation exposure can irritate the respiratory tract and induce respiratory sensitization. Treatment of acute irritation and bronchial constriction should be done according to symptoms. Eye contact can cause irritation. Skin contact can cause moderate irritation and may elicit an allergic response among susceptible individuals. Treat eye and skin irritation or injury according to symptoms. Extended medical treatment may be necessary for individuals exhibiting respiratory sensitization and/or skin disorders.

5. FIREFIGHTING MEASURES

Extinguishing Media: Water spray, carbon dioxide, dry chemical or chemical foam. DO NOT use water jet.

Fire and Explosion Hazards: The container may burst if exposed to elevated temperatures, spilling the contents. Material reacts slowly with water, releasing carbon dioxide which can cause pressure buildup and rupture of closed containers. If present in a fire or explosion, potential decomposition byproducts include carbon monoxide, oxides of nitrogen, isocyanates, hydrogen cyanide, hydrogen fluoride, and carbonyl halides.

Firefighting Instructions: If fighting a fire in which this product is present, wear a self-contained breathing apparatus with full-facepiece operated in pressure-demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Methods and Materials: Absorb spilled material with a sorbent such as sawdust or calcium silicate hydrate. When absorbed, transfer to an impervious container. Neutralize with solution of 8-10% sodium carbonate and 2% liquid detergent in water (10:1 ratio of solution to product). Do not seal container, as CO₂ will be released. Neutralize in a well-ventilated area for at least 48 hours before sealing containers for disposal.

Personal Precautions: Avoid contact with skin, eyes, and mucous membranes. Wear appropriate personal protective equipment (see Section #8) during cleanup and decontamination. Restrict unauthorized personnel during cleanup and disposal operations.

Environmental Precautions: Prevent spills from entering sewers or contaminating soil.

7. HANDLING AND STORAGE

Handling Precautions: Containers should be kept tightly closed to prevent contact with moisture and other chemicals. Do not reuse empty containers for any purpose. When handling the product, avoid contact with eyes, skin,



SAFETY DATA SHEET 2256

Rev. 4, 25 September 2023

and clothing, using protective equipment as needed. Do not use this product around children and secure it away from children.

Work and Hygiene Practices:

To prevent ingestion or contact following use of the product, wash hands and face before eating, drinking, applying cosmetics, or using tobacco. Remove contaminated clothing and protective equipment before entering eating/drinking areas.

Storage Precautions:

Keep containers tightly sealed during storage. Store in a dry, well-ventilated area away from sources of ignition and incompatible materials (see Section #10). Protect from heat and direct sunlight. Recommended temperature for storage is 55-85°F. (12.8-29.4°C.).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Ingredient	OSHA PEL	ACGIH TLV	Other
4,4'-Methylenediphenyl Diisocyanate	0.02 ppm Ceiling	0.005 ppm	
Diphenylmethane Diisocyanate, Isomers and Homologues	None	None	
Trans-1,3,3,3-Tetrafluoroprop-1-ene	None	None	800 ppm (manufacturer recommended)

Ingredients

Ingredient

Biological Limit(s)

Biological Limits:

4,4'-Methylenediphenyl Diisocyanate

No ACGIH BEIs or other biological limits

Diphenylmethane Diisocyanate, Isomers and homologues

No ACGIH BEIs or other biological limits

Trans-1,3,3,3-Tetrafluoroprop-1-ene

No ACGIH BEIs or other biological limits

Engineering Controls:

Use appropriate ventilation (dilution or local exhaust) whenever natural ventilation is restricted or inadequate to maintain concentrations of all components within their applicable standards.

Eye/Face Protection:

Wear eye protection adequate to prevent eye contact with the product. Plastic-frame spectacles with side shields, chemical goggles, or a face shield are recommended.

Skin Protection:

Wear protective gloves and clothing to prevent skin irritation or injury from contact with the product. Glove materials known to be effective against permeation by isocyanates include butyl rubber, nitrile rubber, and polychloroprene.

Respiratory Protection:

If an exposure level to a component exceeds an applicable standard, use a NIOSH-approved respirator of a class and configuration effective for



SAFETY DATA SHEET 2256

Rev. 4, 25 September 2023

protection from the component(s) generated. Where exposures exceed the OSHA *Permissible Exposure Limit (PEL)*, an airline respirator or self-contained breathing apparatus (SCBA) is recommended. Consult OSHA regulations (29CFR1910.134) and/or American National Standard Z88.2 (ANSI, New York, NY 10036, USA) for guidance.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: cream-colored liquid	Lower Explosive Limit: not determined
Odor: aromatic	Upper Explosive Limit: not determined
Odor threshold: not determined	Vapor pressure: 4271 hPa@20°C (propellant)
pH: not applicable	Vapor density: not determined
Melting point: not determined.	Evaporation Rate: not determined
Freezing point: not determined	VOCs (per EPA Method 24): <5 g/L
Boiling point: not determined	Relative density (H ₂ O): approx. 1.23
Boiling range: not applicable (aerosol)	Solubility (H ₂ O): reactive
Flash Point: not applicable (aerosol)	Oil-water partition coefficient: not determined
Autoignition Point: not determined	Decomposition temperature: not determined
Flammability Class: not applicable (aerosol)	Viscosity: not determined

10. STABILITY AND REACTIVITY

Stability:	Stable
Reactivity:	May react with water and incompatible materials
Hazardous Polymerization:	May occur at temperatures >392°F./200°C.
Risk of Dangerous Reactions:	None reasonably foreseeable
Incompatible Materials:	Water, alcohols, acids, alkalis, and amines
Potential Decomposition Byproducts:	Carbon monoxide, carbon dioxide, nitrogen oxides, isocyanates, hydrogen cyanide, hydrogen fluoride, and carbonyl halides.

11. TOXICOLOGICAL INFORMATION

<u>Ingredients Toxicology Data</u>	<u>LD₅₀ Oral</u>	<u>LD₅₀ Dermal</u>	<u>LC₅₀</u>
4,4'-Methylenediphenyl Diisocyanate	>10,000 mg/kg (rat)	No data available	2.24 mg/l. for 1 hour (rat)
Diphenylmethane Diisocyanate, Isomers and Homologues	No data available	No data available	No data available
Trans-1,3,3,3-Tetrafluoroprop-1-ene	No data available	No data available	>207000 ppm/4h (rat)

Primary Route(s) of Entry: Inhalation; ingestion

Eye Hazards: This product may cause eye irritation.

Skin Hazards: This product may cause mild to moderate skin irritation and has the potential to cause skin sensitization among susceptible individuals.

Ingestion Hazards:	The product is nontoxic by ingestion, but ingestion may cause nausea, vomiting, and/or gastrointestinal irritation.
Inhalation Hazards:	Inhalation of toxicologically-significant quantities of ingredients is unlikely when the product is used in a well-ventilated area and in accordance with instructions.
Symptoms Related to Overexposure:	Inhalation overexposure to isocyanates may cause respiratory irritation, breathing difficulties, and asthma-like symptoms.
Delayed Effects from Long Term Overexposure:	Long-term inhalation overexposure to this product may result in respiratory damage, which may be irreversible.
Carcinogenicity:	A single inhalation study exposing rats to aerosolized polymeric 4,4'-Methylenediphenyl Diisocyanate identified a single malignant pulmonary tumor among sixty animals exposed at the highest exposure level. Observations of pulmonary fibrosis and other pathological anomalies in the test animals precluded definitive determination as to the cause(s) of the tumor. Epidemiological studies of humans occupationally exposed to the isocyanates in this product have found no strong association or consistent pattern with respect to carcinogenicity.
Germ Cell Mutagenicity:	No ingredients have been determined to be germ cell mutagens.
Reproductive Toxicity:	No ingredients have been determined to be damaging to fertility or to the unborn child.
Acute Toxicity Estimates:	LD ₅₀ (oral): >10,000 mg/kg LD ₅₀ (dermal): >9,400 mg/kg LC ₅₀ : 2.24 mg/L/1 hr as aerosol
Interactive Effects of Components:	No data available

12. ECOLOGICAL INFORMATION

4,4'-Methylene-diphenyl Diisocyanate	Aquatic Toxicity to Fish: LC ₅₀ >1,000 mg/l. for 96 h. (zebra fish) Aquatic Toxicity to Invertebrates: EC ₅₀ >1,000 mg/l. for 24 h. (daphnia) Aquatic Toxicity to Plants: EC ₅₀ >1,640 mg/l. for 72 h. (algae) Aquatic Toxicity to Microorganisms: EC ₅₀ >100 mg/l. for 3 h. (bacteria) Toxicity to Terrestrial Organisms: EC _{No} = 1,000 mg/kg for 14 d. (worms) No data available for Persistence and Degradability, Bioaccumulation Potential, or Mobility in Soil.
Diphenylmethane Diisocyanate, Isomers and homologues	No data available for Aquatic Toxicity to Fish, Invertebrates, Plants, or Microorganisms, Toxicity to Terrestrial Organisms, Persistence and Degradability, Bioaccumulation Potential, or Mobility in Soil.
Trans-1,3,3,3-Tetrafluoroprop-1-ene	Aquatic Toxicity to Fish: LC ₅₀ >117 mg/l. for 96 h. (carp) Aquatic Toxicity to Invertebrates: EC ₅₀ >160 mg/l. for 48 h. (daphnia) Aquatic Toxicity to Plants: EC ₅₀ >170 mg/l. for 72 h. (algae)

Not readily biodegradable. No bioaccumulation is expected. No data available for Aquatic Toxicity to Microorganisms, Toxicity to Terrestrial Organisms, or Mobility in Soil.

Ozone Depletion Potential: This product neither contains nor is manufactured with any ingredients known to deplete the ozone layer.

13. DISPOSAL CONSIDERATIONS

Do not discharge waste product into sanitary or storm sewers or allow it to contaminate soil. Empty containers should be decontaminated prior to disposal. Consult applicable Federal, State/Provincial, and local regulations.

14. TRANSPORTATION INFORMATION

Proper Shipping Name: Chemical Under Pressure, n.o.s.
 (trans-1,3,3,3-Tetrafluoroprop-1-ene, Nitrogen)
 Identification Number: UN3500
 Hazard Class: 2.2
 Packing Group: not applicable

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA Information: All ingredients of this product are listed in the TSCA Registry.

SARA Hazard Classes: Refer to Section 2 for the OSHA Hazard Classification

EPCRA Section 313 Notification: This product contains these ingredients in concentrations $\geq 1\%$ (for carcinogens $\geq 0.1\%$) regulated under Section 313 of the *Emergency Planning and Community Right-To-Know Act* of 1986 or 40 CFR 372:

1. 4,4'-Methylenediphenyl Diisocyanate (CASRN 101-68-8)
2. Diphenylmethane Diisocyanate, Isomers and Homologues (CASRN 9016-87-9)

CERCLA Information: Under requirements of the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), 4,4'-Methylene Bisphenyl Isocyanate (CASRN 101-68-8) has a *Reportable Quantity* of 5,000 lbs. Any spill or release above this *RQ* must be reported to the National Response Center (800-424-8802).

Canadian Regulatory Information

All ingredients in this product are listed in the Domestic Substances List (DSL) or the Nondomestic Substances List (NDSL).

This product has been classified in accordance with Canada's *Hazardous Products Regulations* (SOR/DORS/2015-15).

16. OTHER INFORMATION

Hazardous Materials Information System (HMIS III) Ratings (Legend):	<u>Health</u> 2* (moderate hazard, “*” indicating potential for chronic effects)	<u>Flammability</u> 0 (minimal hazard)	<u>Physical Hazard</u> 1 (slight hazard)	<u>PPE</u> See Note
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Note regarding PPE: GAF recommends use of protective eyewear and skin protection (Personal Protection Index "B") as standard PPE for the anticipated conditions of use of this product. However, HMIS recommends that its ratings be used only in conjunction with a fully implemented HMIS program, and that specific PPE codes should be created by the user, who is familiar with the actual conditions under which the product is used. We cannot anticipate every condition of the product's use, and it is the user's responsibility to evaluate the hazards pertinent to its specific operations, and to determine the specific PPE required.

National Fire Protection Association (NFPA) Ratings:	<u>Health</u>	<u>Flammability</u> 0	<u>Reactivity</u> 2 1
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Revision Information: Publication Date: 25 September 2023
 Date of Prior SDS: 23 November 2020
 Section(s) Revised: 3, 5, 8, 9, 10, 11, 12, 14

DISCLAIMER

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the date compiled. However, no representation, warranty or guarantee, expressed or implied, is made as to its accuracy, reliability, or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his particular use. We do not accept liability for any loss or damage that may occur from the use of this information. Nothing herein shall be construed as a recommendation for uses which infringe valid patents or as extending a license of valid patents.



SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: OlyBond500 Canisters, Part 2

Supplier: GAF
1 Campus Drive
Parsippany, NJ 07054
USA
Phone: 1-877-GAF-ROOF

24-hour Emergency Response Number:
Chemtrec: 800-424-9300

Product Use(s): One component of a two-component polyurethane system

2. HAZARDS IDENTIFICATION

Classifications: Acute Oral Toxicity: Hazard Category 4
Gases Under Pressure: Compressed Gas
Physical Hazards Not Otherwise Classified: None
Health Hazards Not Otherwise Classified: None

Symbols: Exclamation Point
Gas Cylinder



Signal Word: Warning

Hazard Statements: Harmful if swallowed.
Contains gas under pressure; may explode if heated.

Precautionary Statements: Wash hands and forearms thoroughly after handling.
Do not eat, drink or smoke when using this product.
IF SWALLOWED: Call a Poison Center or doctor if you feel unwell. Rinse mouth.
Protect from sunlight. Store in a well-ventilated place.
Dispose of contents/container in accordance with applicable regulations.

EMERGENCY OVERVIEW

Harmful if swallowed. There are no known serious health effects from inhalation or skin contact. See Section #7 for recommendations on proper handling and work practices, and Section #8 for recommendations on personal protective equipment.

This product is formulated to be mixed with another component (OlyBond Canisters Part 1) that, if handled improperly, may cause potentially serious health effects such as respiratory irritation, asthma-like symptoms, and/or respiratory sensitization. Do not handle or mix the two components together until you have read and understood that information in the *Safety Data Sheets* for both components.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS Number</u>	<u>Percentage</u>	<u>Impurities</u>
Diethylene Glycol	111-46-6	1-10	None known
Polypropylene Glycol	25322-69-4	30-40	None known



SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

Trans-1,3,3,3-Tetrafluoroprop-1-ene

29118-24-9

10-15

None known

4. FIRST AID MEASURES

- Eyes:** Hold eyes open and flush with lukewarm water for at least 15 minutes. Seek immediate medical assistance.
- Skin:** Remove contaminated clothing. Wash affected areas with soap and water for at least five minutes. If irritation occurs or persists, seek medical attention. Launder or dry-clean clothing before reuse.
- Ingestion:** DO NOT induce vomiting. If the subject is conscious, wash mouth and give 2 or more cups of milk or water. Seek immediate medical assistance. Do not attempt to give anything by mouth to an unconscious or convulsive person.
- Inhalation:** If signs and symptoms of respiratory toxicity are observed, remove subject from area and seek immediate medical attention. Keep the subject warm and at rest. If necessary, administer oxygen or perform artificial respiration if necessary and qualified personnel are available to do so.
- Guidance for Physician or Poison Control Center:** None of the components of this product are acutely toxic by inhalation. Harmful if swallowed. Eye contact can cause mild irritation. Skin contact can cause mild irritation. Ingestion is unlikely to occur in industrial use, but if ingestion occurs it may cause nausea, vomiting, and gastrointestinal irritation. Chronic ingestion can cause kidney injury.

5. FIREFIGHTING MEASURES

- Extinguishing Media:** Water spray, carbon dioxide, dry chemical or chemical foam. DO NOT use water jet.
- Fire and Explosion Hazards:** The container may burst if exposed to elevated temperatures, spilling the contents. This product may ignite if exposed to sources of ignition at temperatures above its flash point. If present in a fire or explosion, potential thermal decomposition byproducts include carbon monoxide, hydrogen fluoride, carbonyl halides, smoke, and irritant decomposition byproducts.
- Firefighting Instructions:** If fighting a fire in which this product is present, wear a self-contained breathing apparatus with full-facepiece operated in pressure-demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

- Methods and Materials:** Absorb spilled material with a sorbent such as sawdust, vermiculite, or calcium silicate hydrate. When absorbed, transfer to an impervious container.
- Personal Precautions:** Avoid contact with skin, eyes, and mucous membranes. Wear appropriate personal protective equipment (see Section #8) during cleanup and decontamination.



SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

Environmental Precautions: Prevent spills from entering sewers or contaminating soil.

7. HANDLING AND STORAGE

Handling Precautions: Containers should be kept tightly closed to prevent contact with moisture and other chemicals. Do not reuse empty containers for any purpose. When handling the product, avoid contact with eyes, skin, and clothing, using protective equipment as needed. Do not use this product around children and secure it away from children.

Work and Hygiene Practices: To prevent ingestion or contact following use of the product, wash hands and face before eating, drinking, applying cosmetics, or using tobacco. Remove contaminated clothing and protective equipment before entering eating/drinking areas.

Storage Precautions: Store containers tightly sealed in a dry, well-ventilated, area away from incompatible materials (see Section #10). Recommended temperature range for storage is 55-85°F. (12.8-29.4°C.).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Ingredient	OSHA PEL	ACGIH TLV	Other
Diethylene Glycol	None	None	10 mg/m3 AIHA WEEL
Polypropylene Glycol	None	None	
Trans-1,3,3,3-Tetrafluoroprop-1-ene	None	None	800 ppm (manufacturer recommended)

Ingredients	<u>Ingredient</u>	<u>Biological Limit(s)</u>
Biological Limits:	Diethylene Glycol	No ACGIH BEIs or other biological limits
	Polypropylene Glycol	No ACGIH BEIs or other biological limits
	Trans-1,3,3,3-Tetrafluoroprop-1-ene	No ACGIH BEIs or other biological limits

Engineering Controls: Use appropriate ventilation (dilution or local exhaust) whenever this product is used in conjunction with OlyBond Canisters, Part 1 in conditions where natural ventilation is restricted.

Eye/Face Protection: Wear eye protection adequate to prevent eye contact with the product. Plastic-frame spectacles with side shields, chemical goggles, or a face shield are recommended.

Skin Protection: Wear protective gloves and clothing to prevent skin irritation or injury from contact with the product. Glove materials known to be effective against permeation by this product include butyl rubber, nitrile rubber, and polyvinyl



SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

alcohol.

Respiratory Protection:

If an exposure level to a component exceeds an applicable standard, use a NIOSH-approved respirator of a class and configuration effective for protection from the component(s) generated. Consult OSHA regulations (29CFR1910.134) and/or American National Standard Z88.2 (ANSI, New York, NY 10036, USA) for guidance.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: red viscous liquid	Lower Explosive Limit: not determined
Odor: mildly sweet	Upper Explosive Limit: not determined
Odor threshold: not determined	Vapor pressure: >200 psi
pH: not determined	Vapor density: not determined
Melting point: not determined	Evaporation Rate: not determined
Freezing point: not determined	VOCs (per EPA Method 24): <5 g/L
Boiling point: not determined	Relative density (H ₂ O): approx. 1.03
Boiling range: not applicable (aerosol)	Solubility (H ₂ O): partial
Flash Point: not applicable (aerosol)	Oil-water partition coefficient: not determined
Autoignition Point: not determined	Decomposition temperature: not determined
Flammability Class: not applicable (aerosol)	Viscosity: not determined

10. STABILITY AND REACTIVITY

Stability:	Stable
Reactivity:	Polymerizes with isocyanate-containing substances
Hazardous Polymerization:	Will not occur
Risk of Dangerous Reactions:	None reasonably foreseeable
Incompatible Materials:	Oxidizing agents
Potential Decomposition Byproducts:	Carbon monoxide, carbon dioxide, hydrogen fluoride, carbonyl halides, smoke, and irritant decomposition byproducts

11. TOXICOLOGICAL INFORMATION

<u>Ingredients Toxicology Data</u>	<u>LD₅₀ Oral</u>	<u>LD₅₀ Dermal</u>	<u>LC₅₀</u>
Diethylene Glycol	14,850 mg/kg (rat)	11,890 mg/kg (hamster)	No data available
Polypropylene Glycol	500-2000 mg/kg (rat)	>10,000 mg/kg (rabbit)	No data available
Trans-1,3,3,3-Tetrafluoroprop-1-ene	No data available	No data available	>207000 ppm/4h (rat)

Primary Route(s) of Entry: Inhalation; ingestion

Eye Hazards: This product may cause mild eye irritation.

Skin Hazards: This product may cause mild skin irritation. Irritation may be more pronounced on abraded skin.



SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

Ingestion Hazards:	Ingestion may cause nausea, vomiting, and/or gastrointestinal irritation.
Inhalation Hazards:	Inhalation of toxicologically-significant quantities of ingredients is unlikely when the product is used in a well-ventilated area and in accordance with instructions.
Symptoms Related to Overexposure:	Inhalation overexposure may cause respiratory irritation.
Delayed Effects from Long Term Overexposure:	Long-term ingestion may damage the kidneys and the gastrointestinal system.
Carcinogenicity:	No ingredients are classified as potential or confirmed human carcinogens by OSHA, NTP, or IARC.
Germ Cell Mutagenicity:	No ingredients have been determined to be germ cell mutagens.
Reproductive Toxicity:	No ingredients have been determined to be damaging to fertility or to the unborn child.
Acute Toxicity Estimates:	LD ₅₀ (oral): 1124 mg/kg LD ₅₀ (dermal): >10,000 mg/kg LC ₅₀ : no data available
Interactive Effects of Components:	No data available

12. ECOLOGICAL INFORMATION

Diethylene Glycol	Aquatic Toxicity to Fish: LC ₅₀ = >100 mg/l. for 96 h. (fathead minnows) Aquatic Toxicity to Invertebrates: EC ₅₀ = >10,000 mg/l. for 48 h. (daphnia) Readily biodegradable.
Polypropylene Glycol	Aquatic Toxicity to Fish: LC ₅₀ = >100 mg/l. for 96 h. (bluegill sunfish) Aquatic Toxicity to Invertebrates: EC ₅₀ = >100 mg/l. for 48 h. (daphnia) Not readily biodegradable
Trans-1,3,3,3-Tetrafluoroprop-1-ene	Aquatic Toxicity to Fish: LC ₅₀ >117 mg/l. for 96 h. (carp) Aquatic Toxicity to Invertebrates: EC ₅₀ >160 mg/l. for 48 h. (daphnia) Aquatic Toxicity to Plants: EC ₅₀ >170 mg/l. for 72 h. (algae) Not readily biodegradable. No bioaccumulation is expected. No data available for Aquatic Toxicity to Microorganisms, Toxicity to Terrestrial Organisms, or Mobility in Soil.
Ozone Depletion Potential:	This product neither contains nor is manufactured with any ingredients known to deplete the ozone layer.

13. DISPOSAL CONSIDERATIONS

Do not discharge waste product into sanitary or storm sewers or allow it to contaminate soil. Empty containers should be decontaminated prior to disposal. Consult applicable Federal, State/Provincial, and local regulations.



14. TRANSPORTATION INFORMATION

Proper Shipping Name: Chemical Under Pressure, n.o.s.
(trans-1,3,3,3-Tetrafluoroprop-1-ene, Nitrogen)
Identification Number: UN3500
Hazard Class: 2.2
Packing Group: not applicable

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA Information: All ingredients of this product are listed in the TSCA Registry.
SARA Hazard Classes: Refer to Section 2 for the OSHA Hazard Classification
EPCRA Section 313 Notification: This product contains no ingredients in concentrations $\geq 1\%$ ($\geq 0.1\%$ for carcinogens) regulated under Section 313 of the *Emergency Planning and Community Right-To-Know Act* of 1986 or 40 CFR 372.

Canadian Regulatory Information

All ingredients in this product are listed in the Domestic Substances List (DSL) or the Nondomestic Substances List (NDSL).
This product has been classified in accordance with Canada's *Hazardous Products Regulations* (SOR/DORS/2015-15).

16. OTHER INFORMATION

Hazardous Materials Information System (HMIS III) Ratings (Legend):	<u>Health</u> 1 (slight hazard)	<u>Flammability</u> 1 (slight hazard)	<u>Physical Hazard</u> 0 (minimal hazard)	<u>PPE</u> See Note
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Note regarding PPE: GAF recommends use of protective eyewear and skin protection (Personal Protection Index "B") as standard PPE for the anticipated conditions of use of this product. However, HMIS recommends that its ratings be used only in conjunction with a fully implemented HMIS program, and that specific PPE codes should be created by the user, who is familiar with the actual conditions under which the product is used. We cannot anticipate every condition of the product's use, and it is the user's responsibility to evaluate the hazards pertinent to its specific operations, and to determine the specific PPE required.

16. OTHER INFORMATION (continued)

National Fire Protection Association (NFPA) Ratings:	<u>Health</u> 1	<u>Flammability</u> 1	<u>Reactivity</u> 0
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SAFETY DATA SHEET 2257

Rev. 4, 25 September 2023

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 Section(s) Revised: 3, 5, 8, 9, 10, 11, 12, 14

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