



Building Permit Application
City of Portland, Oregon - Bureau of Development Services

1900 SW 4th Avenue, Portland, Oregon 97201 • 503-823-7310 • TTY 503-823-6868 • www.portlandoregon.gov/bds

12-192534 CO

Type of work

New construction Addition/alteration/replacement

Demolition Other:

Category of construction

1 & 2 family dwelling Commercial/industrial Accessory building

Multifamily Master builder Other:

Job site information and location

Job no.: Job address: 12020 SE Division St.

City/State/ZIP: Portland, OR 97216

Suite/bldg./apt. no.: Project name: Division Center

Cross street/directions to job site: 122nd Ave

Subdivision: Lot no. Tax map/parcel no.

Description of work

Commercial Re-roof

Reference RS / Combination Permit no.

Property owner **Tenant**

Name: Rim Co.

Address: 111 SW 5th Ave Ste 4000

City/State/ZIP: Portland, OR 97204

Phone: 503/244-2043 FAX:

Owner installation: This installation is being made on property that I own, which is not intended for sale, lease, rent, or exchange.

Owner signature: Date:

Contractor

Business name: Arrow Roofing & Sheet Metal Inc.

Address: PO Box 55097

City/State/ZIP: Portland, OR 97238

Phone: 503/460-2767 FAX: 503/460-2768

CCB lic. no. 115153

Authorized signature: Glendon Hopkins

Print name: Glendon Hopkins Date: 10/10/12

Applicant **Contact Person**

Business name: Arrow Roofing & Sheet Metal

Contact name: Al Perez

Address: 5610 NE 45th Ave

City/State/ZIP: Portland OR 97218

Phone: 503/460 2767 FAX: 503/460-2768

E-mail: al@arrowroofing.com

Authorized signature: Alfonso Perez

Print name: Alfonso Perez Date: 10/10/12

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete.

Office Use Only

Permit no:

Date received: 10/10/12

By: 12-192534-CO
TKZ.

Required Data: One and Two Family Dwelling

Permit fees* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation:	
Number of bedrooms:	
Number of bathrooms:	
Total number of floors:	
New dwelling area:	square feet
Garage/carport area:	square feet
Covered porch area:	square feet
Deck area:	square feet
Other structure area:	square feet

Required Data: Commercial Use

Permit fees* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation:	<u>\$235,000.00</u>
Existing building area:	<u>70,000</u> square feet
New building area:	<u>NONE</u> square feet
Number of stories:	<u>1</u>
Type of construction:	<u>RE-Roofing</u>
Occupancy groups	
Existing:	
New:	

Notice

All contractors and subcontractors are required to be licensed with the Oregon Construction Contractors Board under ORS 701 and may be required to be licensed in the jurisdiction in which work is being performed. If the applicant is exempt from licensing, the following reasons apply.

Statement of Fact: I certify that the facts and information set forth in this application are true and complete to the best of my knowledge. I understand that any falsification, misrepresentation or omission of fact (whether intentional or not) in this application or any other required document, as well as any misleading statement or omission, may be cause for revocation of permit and/or certificate of occupancy, regardless of how or when discovered.

Building Permit Fees*

Please refer to fee schedule

Fees due upon application	
Amount received	
Date received	

Sub-contractor information can be faxed to 503-823-7693.



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Date: **October 3, 2012**

Project: **57455**
Division Center Building "D" Exterior Altera

To: **Michelle Startt**
LRS Architects Inc
720 NW Davis, Suite 300
Portland, OR 97209

From: **Aaron Bruce**
1530 SW Taylor Street
Portland, OR 97205

Fax: **503-224-3638**
Phone: **503-248-5537**

REQUEST FOR INFORMATION - RFI

RFI-00002 Roof Weight Calculations

Specification Section

Co-Author Comp:

Drawing or Detail:

Co-Author Contact:

Sub Project:

Co-Author RFI No.:

Description of Request:

Please provide roof weight calculations from Nishkian Dean for all three roof sections of the Division Center project. They are needed to submit for a reroof permit from the city of Portland

Schedule Impact? **Potentially**

Cost Impact? **No**

Date Originated: **10/03/2012**

Reply Required By: **10/05/2012** to avoid potential schedule impacts.

Note: Contractor hereby reserves the right to make claim for extension of time and/or claim for additional cost, pursuant to AIA Document 201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, Article 8.3.2 and/or 12.3.1.

OWNER / ARCHITECT REPRESENTATIVE RESPONSE

See sheet #7 in Revision #1 calculations (attached here for reference) for check of loading on existing roof structure of Building D (former Albertsons). No other areas have been evaluated in this calculation.

Matt
Pruett,
P.E.

Digitally signed by Matt Pruet, P.E.
DN: cn=Matt Pruet, P.E., o=Nishkian Dean, ou=Nishkian.com, email=matt.pruett@nishkian.com, c=US
Date: 2012.10.03 15:56:42 -07'00'

00 nishkian.com
12-1922534 CO
12-1922534 CO

Approved _____ Approved With Note _____ Not Approved _____
Architect's Representative: _____ Date: _____
Engineer / Consultant: _____ Date: _____

CC: / Distribution:

Printed on 10/03/12 03:01 PM

NISHKIAN DEAN

CONSULTING AND STRUCTURAL ENGINEERS SINCE 1919

1022 SW Salmon Street, Suite 300, Portland, OR 97205
Tel: (503) 274-1843 Fax: (503) 273-5696



JOB DIVISION CTR NO. 1240
SHEET NO. 6 OF _____
CALCULATED BY MDP DATE 8/30/12
CHECKED BY _____ DATE _____
SCALE _____

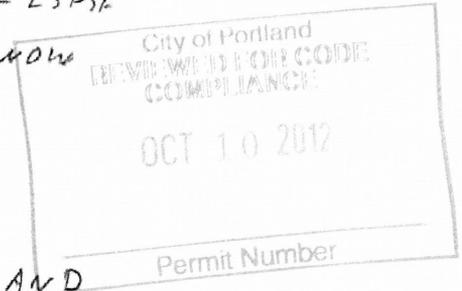
CHECK MAIN GRAVITY LOADING WITH RESPECT TO CHANGES

CHANGES:

• CHANGE IN OCCUPANCY CATEGORY FROM II → III

- RESULTS IN INCREASED SNOW LOAD → $I = 1.1$ (ASCE 7-05 TABLE 7-4)

- ADDITIONAL SNOW LOAD = $25 \text{ PSF} \times 1.1 - 25 \text{ PSF}$
 $= 2.5 \text{ PSF SNOW}$



• REMOVAL OF ROOF GRAVEL BALLAST AND APPLICATION OF NEW MATERIAL

- PER ATTACHED E-MAIL, (E) BALLAST WEIGHS $4-6 \text{ LB/FT}^2$ AND NEW SYSTEM WEIGHS $0.6-1.6 \text{ LB/FT}^2$

- THEREFORE, THE RANGE OF REMOVED WEIGHT RANGES FROM $2.4-5.6 \text{ LB/FT}^2$

• PER MAIN ROOF LOAD TAKE OFF, ROOF WEIGHT WITH NEW SYSTEM = 12 PSF
SNOW = 27.5 PSF } $39.5 \text{ PSF DEAD + SNOW}$

• COMPARE WITH PREVIOUS: $12 \text{ PSF} + 2.4 \text{ PSF} = 14.4 \text{ PSF DEAD}$

• NEW LOAD = $\frac{39.5}{37.4} \times 100\% = 100.3\%$

25 PSF SNOW
 $39.4 \text{ PSF DEAD + SNOW}$

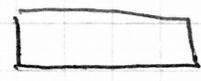
= LESS THAN 1% INCREASE ASSUMING WORST CONDITIONS

→ LESS THAN 5% INCREASE ALLOWED →

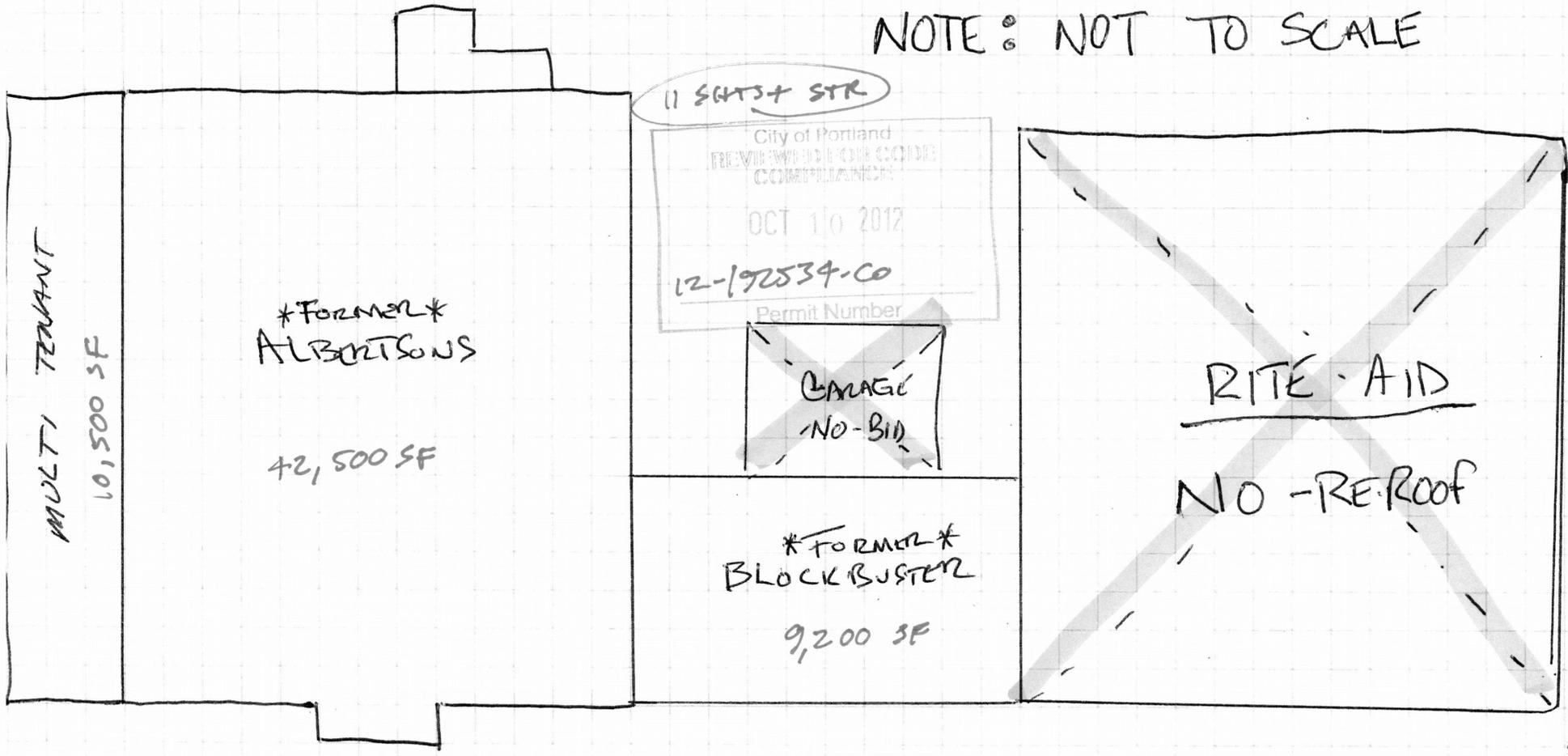
GRAVITY OKAY

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AREAS TO BE RE-ROOFED



NOTE: NOT TO SCALE



(1) SHTS+ STR

City of Portland
REVIEWED FOR CODE COMPLIANCE
OCT 10 2012
12-192534-CO
Permit Number

~~GARAGE
NO-BID~~

~~RITE-AID
NO-RE-ROOF~~

MULTI TENANT
10,500 SF

FORMER
ALBERTSONS

42,500 SF

FORMER
BLOCKBUSTER

9,200 SF

DIVISION CENTER
12020 SE DIVISION
PORTLAND OREGON

WORK IN
PUBLIC RIGHT - OF - WAY IS
NOT APPROVED AS PART OF
THIS BUILDING PERMIT

12-192534-CO



P.O. Box 55097 → Portland, OR 97238
 Phone: (503) 460-2767 → Fax: (503) 460-2768 → Toll Free: (866) 901-4155
www.arrow-roofing.com

PROPOSAL

R-6

August 29th 2012

Attn: Scott R.Howden

Rimco

111 SW 5th Ave Suite 4000

Portland, OR 97204

Ph: 503-224-2063 | Fx: 503-299-1040

**RE: Former Albertsons
 12020 SE Division
 Portland, OR**

We appreciate the opportunity to provide you with our quote on your project. We hereby propose to furnish all materials and perform all labor necessary for the completion of the following:

ITEM	SCOPE OF WORK	PRICE \$
Section # D (FORMER ALBERTSONS)		
WHITE .045 TPO (OVER EXISTING GRAVEL ROOF)		
1.	Remove loose gravel (approx. 200lb. per.10sqft).	
2.	Install new counter flashing. (standard colors).	
3.	Install 1 layer of visqueen.	
4.	Install one layer of fan fold.	
5.	Install .045 TPO (WHITE) mechanically attached.	
6.	Provide all necessary TPO accessories as to complete roof.	
7.	15-year Manufacturer's Warranty (Included).	
Section # C (FORMER BLOCKBUSTERS)		
WHITE .045 TPO (OVER EXISTING ROOF)		
1.	Clean roof of all debris.	
2.	Remove all skirt sheet metal and dispose	
3.	Install FR-10.	
4.	Install .045 TPO (WHITE) mechanically attached	
5.	Install new skirt metal (standard colors).	
6.	Provide all necessary TPO accessories as to complete roof.	
7.	15-year Manufacturer's Warranty (Included)	

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 REVISED FOR CODE COMPLIANCE
 Gary Howden



P.O. Box 55097 → Portland, OR 97238
 Phone: (503) 460-2767 → Fax: (503) 460-2768 → Toll Free: (866) 901-4155
www.arrow-roofing.com

Section # E (MULTI TENANT)

WHITE .045 TPO (OVER EXISTING ROOF)

1. Clean roof of all debris
2. Remove all skirt sheet metal and dispose
3. Install FR-10.
4. Install .045 TPO (WHITE) mechanically attached.
5. Install new skirt metal (standard colors).
6. Provide all necessary TPO accessories as to complete roof.
7. 15-year Manufacturer's Warranty (Included)

TOTAL FOR ALL 3 SECTIONS \$235,000.00

ADD: For upgrading to .060 TPO from .045 TPO \$6,561.00
(Recommended).

- EXCLUSION (s):**
- ▶ Wood work-not listed
 - ▶ Sheet Metal-not listed

If you have any questions, please feel free to contact me at (503) 460-2767 or on my cell at (503) 572-9548.

Respectfully submitted,

Al Perez

Al Perez
 Division Manager

Signature of
 Acceptance: _____

Print Name & Title: _____

Dated: _____

****PROPOSAL IS GOOD FOR 14 DAYS****

PROVISIONS

The construction industry is experiencing rapidly escalating and unpredictable prices for petroleum-based roofing products, steel and transportation costs. The pricing of many roofing products is currently subject to sudden and significant changes beyond the control of roofing contractors. Because of the difficulty in obtaining firm prices from suppliers, we cannot provide fixed, firm prices for these products for future projects. If there is an increase in the price of petroleum-based, iso or steel products subsequent to executing this proposal/contract, the price set forth in this proposal/contract shall be increased to reflect the additional cost.

CONTRACT TERMS AND CONDITIONS

By signing this Proposal you are authorizing Arrow Roofing & Sheet Metal, Inc. to perform the work as indicated above.

TERMS OF PAYMENT

Applicant agrees to pay it's account within the terms of sale stated upon each invoice. Applicant further agrees to pay a service charge of 1.5% per month (18 percent per annum) on any amount(s) not paid within stated terms of sale/invoice. Applicant agrees to pay all cost of collection incurred including, but not limited to collection agency fees and attorney fees, whether or not any legal proceeding is initiated. In any action to collect indebtedness of applicant, the prevailing party shall be entitled to recover its costs, disbursements, and attorney fees in connection with such action and any appeal or review. Should it become necessary to file suit to enforce payment, applicant and guarantor(s) agree that such suit may be brought in the County of Multnomah, in which the Creditor has its principal place of business, State of Oregon.

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 COMMERCIAL
 PERMITS

Mechanically Attached Installation Specification

TPO & PVC

Part 1 – General

1.01 System Description

- A. Mechanically attached heat-welded thermoplastic sheet roof membrane system.
- B. EverGuard® PVC and EverGuard® TPO materials are not compatible with one another. DO NOT use EverGuard® PVC and EverGuard® TPO membranes, flashings, and flashing accessories together in the same roofing system.

1.02 Specification Designations

- A. See Plates.

1.03 Regulatory Requirements

- A. Conform to all applicable building and jurisdictional codes, including roof assembly wind uplift and fire resistance requirements and slope.
- B. Follow your local jurisdiction requirements for disposing of used and expired adhesives and sealants.

1.04 Delivery, Storage and Protection

- A. Deliver products to site in original containers with seals unbroken and labeled with manufacturers' name, product brand name and type.
- B. Store materials in weather protected environment, clear of ground and moisture, in accordance with GAF instructions.
- C. All materials stored outside shall be raised above ground or roof level on pallets, and covered with a tarpaulin or other waterproof material. Factory-installed plastic wrapping is not an adequate covering. Extreme heat conditions may require special storage requirements. Reference data sheets for product storage requirements.
- D. Follow GAF directions and requirements for protection of materials prior to and during installation.
- E. Do NOT use materials that are wet or damaged to the extent that they will no longer serve their intended purpose. All roof insulation that has been wet is considered damaged, even if later dried out. Remove all damaged materials from the jobsite.

1.05 Environmental Requirements & Restrictions

- A. Do not apply roofing materials during inclement or threatening weather.
- B. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.
- C. High or gusting winds make the installation of materials difficult.
- D. Material installation during periods of high ambient temperatures, typically above 90°F, can result in poor installation quality due to condensation on the membrane

surface, and excessively fast adhesive drying rates.

- E. Material installation during periods of low ambient temperatures, typically below 30°F, can result in poor installation quality due to increased material stiffness and vulnerability to damage and excessively slow adhesive drying rates. To avoid these problems:
 - 1. Store accessory materials in a warming box
 - 2. Use as soon as possible
 - 3. Allow adhesives to properly cure
 - 4. Adjust welder settings to insure proper welds for applicable ambient conditions

1.06 Working Environment

- A. Provide a safe working environment, including, but not limited to, adequate fall protection, restriction of unauthorized access to the work area, and protection of the building and its occupants.
- B. Safe work practices should be followed, including, but not limited to, keeping tools in good operating order, providing adequate ventilation if adhesives are used, and daily housekeeping to remove debris and other hazards.

Part 2 – Products

2.01 Membrane

- A. EverGuard® TPO (smooth reinforced) thermoplastic polyolefin membrane.
- B. EverGuard® TPO Fleece-Back thermoplastic polyolefin membrane
- C. EverGuard® PVC (smooth reinforced) thermoplastic membrane
- D. EverGuard® PVC Fleece-Back thermoplastic membrane

2.02 Flashing

- A. EverGuard® membrane flashings to be of same type, thickness and color as roofing membrane. EverGuard® Freedom™ TPO can be used with EverGuard® TPO membrane for flashing in the same thickness as the field membrane.
- B. EverGuard® TPO and PVC Fleece-Back membranes are optional flashing membranes for all EverGuard® TPO and PVC roofing systems, respectively. These membranes may be a solution when a contaminated substrate is encountered.

2.03 Flashing Accessories

- A. EverGuard® preformed flashing accessories to be of same type as roofing membrane.
 - 1. EverGuard® TPO and PVC laminated metal flashings to be a minimum of 25 mils TPO and 40 mils PVC of

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COMMUNITY DEVELOPMENT
CONSTRUCTION

Mechanically Attached Installation Specification

TPO & PVC

non-reinforced thermoplastic membrane of same type as roofing membrane, laminated to 24 ga. galvanized steel sheet metal.

2. Pre-formed Vent Boots with stainless steel clamping bands.
3. Pre-formed Universal Corners for TPO. Individual pre-formed inside outside corners for PVC.
4. Pre-formed Expansion Joint Covers for roof-roof and roof-wall expansion joints.
5. Membrane Flashing Strips for miscellaneous applications.
6. UN-55 Detailing Membranes for TPO flashing. UN-80 Detailing Membranes for PVC flashing. For miscellaneous penetrations in lieu of pre-formed accessories.
7. EverGuard® TPO Cover Strip for stripping in of flat metal edges.
8. EverGuard® Pre-formed Sealant Pans are available for irregularly-shaped penetrations and pitch pans.

2.04 Fasteners

- A. DRILL-TEC™ membrane fasteners and plates, insulation fasteners and plates, and flashing fasteners and termination bars. Refer to the Insulation Attachment Table and the appropriate Membrane Attachment Table at the end of this section for the correct type, length and diameter.

2.05 Adhesives and Sealants

- A. EverGuard® bonding adhesives, sealants and caulking.
 1. EverGuard® TPO and PVC Bonding Adhesive (solvent-based).
 2. EverGuard® H2O Bonding Adhesive (low VOC).
 3. EverGuard® 2-Part Pourable Sealant for use in sealant pans.
 4. EverGuard® Caulking for use in sealing termination bars and penetration clamping bands.
 5. EverGuard® TPO Cut Edge Sealant. EverGuard® PVC Cut Edge Sealant.
 6. EverGuard® Water Block for use in sealing behind termination bars and at drain flanges as a water cut-off.
 7. EverGuard® TPO Primer.

2.06 Traffic Protection

- A. EverGuard® TPO and PVC walkway rolls.

2.07 Insulation

- A. EnergyGuard® foam insulation of the following types. Minimum 1" thickness. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems.

1. EnergyGuard® and EnergyGuard® Ultra polyisocyanurate insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289 (min. 16 psi compressive strength).
2. EnergyGuard® extruded polystyrene insulation meeting or exceeding the requirements for ASTM C-578, Type II nominal 1.5 pound density.
3. EnergyGuard® expanded polystyrene insulation with plastic facer meeting or exceeding the requirements for ASTM C-578, Type II nominal 1.5 pound density.

2.08 Insulation – High Traffic Applications

- A. EnergyGuard® foam insulation of the following types. Minimum 1" thickness. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems.
 1. EnergyGuard® and EnergyGuard® Ultra polyisocyanurate insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289, (min. 25 psi compressive strength).
 2. EnergyGuard® extruded polystyrene insulation meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
 3. EnergyGuard® expanded polystyrene insulation with plastic facer meeting or exceeding the requirements for ASTM D-578, Type IX (min. 25 psi compressive strength).

2.09 Recover Board

- A. EnergyGuard® Perlite insulation, minimum 1/2", ASTM C-728
- B. High density wood fiber insulation, minimum 1/2", ASTM C-208, Class E
- C. EnergyGuard® foam recover board of the following types. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems, except for fan-fold recover board, which comes in 2' x 4' sections with a 50' total length.
 1. EnergyGuard® and EnergyGuard® Ultra 1/2" polyisocyanurate recover board insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289 (min. 16 psi compressive strength).
 2. EnergyGuard® 3/8" extruded polystyrene fan-fold recover board with plastic facer meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
 3. EnergyGuard® 1/2" extruded polystyrene recover board meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
4. EnergyGuard® 1/2" expanded polystyrene recover board with

Mechanically Attached Installation Specification

TPO & PVC

plastic facer meeting or exceeding the requirements for ASTM D-578, Type II (min. 15 psi compressive strength).

2.10 Base Sheets

- A. GAFGLAS® Stratavent® Eliminator™ Nailable Base Sheet
- B. GAFGLAS® #80 Ultima™ Base Sheet
- C. GAFGLAS® #75 Base Sheet

2.11 Protection Layer

- A. EverGuard® Polymat slipsheet, 3.0 oz/sq.yd.
- B. EverGuard® Polymat cushioning slipsheet, 6.0 oz/sq.yd.
- C. VersaShield™ products as protection layer in all sections (fully adhered, ballasted, etc.)

2.12 Other Accessories

- A. Subject to compliance with requirements, provide the following products not available from GAF:
 - 1. Wood Nailers: New wood nailers shall be #2 or better lumber. Do NOT use asphaltic or creosote-treated lumber.
 - 2. Roofing Nails: Galvanized or non-ferrous type and size as required to suit application.
 - 3. Temporary Sealant: Polyurethane foam sealant or similar as required to provide temporary watertight sealing of roofing.
 - 4. Air/Vapor Barrier: Polyethylene sheeting, min. 6 mil. for TPO only.
 - 5. Fire Barrier: Silicone-treated fiberglass-faced gypsum panels, min. 1/4" thick (gypsum roof from Georgia-Pacific).

Part 3 – Execution

3.01 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. All defects in the roof deck or substrate shall be corrected by the responsible parties before new roofing work commences. Verify that the deck surface is dry, sound, clean and smooth, free of depressions, waves, or projections.
- D. Protect building surfaces against damage and contamination from roofing work.
- E. Where work must continue over completed roof areas, protect the finished roofing system from damage.

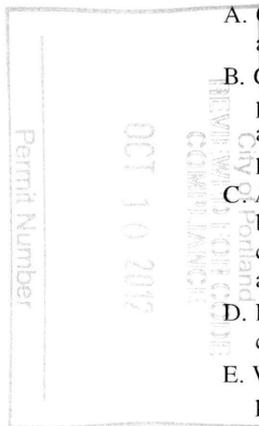
- F. Deck preparation is the sole responsibility of the building owner or roofing contractor. All defects in the roof deck or substrate shall be corrected before roofing work commences.

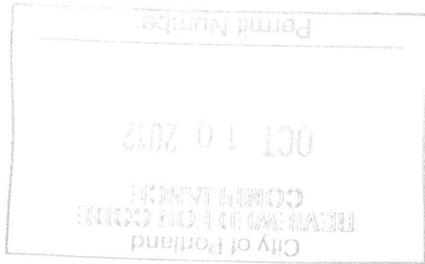
3.02 Preparation of Roofing Area – New and Tear-off Applications

- A. Remove all existing roofing materials to the roof decking, including flashings, metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants.
- B. Confirm quality and condition of roof decking by visual inspection and by fastener pull-out testing.
- C. Secure all loose decking. Remove and replace all deteriorated decking.
- D. Remove abandoned equipment and equipment supports.
- E. Confirm that height of equipment supports will allow the installation of full-height flashings.

3.03 Preparation of Roofing Area – Recover Applications

- A. Remove all stone ballast, loose gravel, and debris from the roof surface.
- B. Remove blisters and ridges from the roof membrane.
- C. When recovering over an existing single ply roof, that roof must be first cut into 10'x10' areas maximum first, before the application of new separator sheet and/or membrane.
- D. Remove all existing flashings, including metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants. If the wall/curb flashings are in good condition and tightly adhered to the substrate, new TPO flashing materials may be installed over these to a height of 24"; new PVC flashing materials may be installed over a separator layer of polymat or insulation board.
- E. It is strongly recommended that the building owner have a moisture survey performed to ascertain the condition and suitability of the existing roofing materials to receive a recover system. A survey is required if perlite or wood fiber insulation is used in a recover system. GAF will not be responsible for damage to the roofing system if it results from moisture in the existing roofing system. Remove and replace all existing roofing materials that contain moisture.
- F. Confirm quality and condition of roof decking by visual inspection if possible, and by fastener pull-out testing. Remove and replace all deteriorated decking.
- G. Remove abandoned equipment and equipment supports.
- H. Raise equipment supports to allow the installation of full-height flashings.





TPO DESIGN TABLE - RECOVER - MECHANICALLY ATTACHED

Existing Roofing System Type	Membrane Type		Insulation/Substrate								Insulation/Substrate Attachment		
	Smooth	Fleece (FB)	ISO	Gypsum Board	Wood fiber/ Perlite ²	EPS/XEPS	Fanfold	3/6 oz Polymat	FR 50/10	none	Mech. Attached	Adhesive	Hot ¹
Smooth BUR/MB	x		x	x	x	x	x	x	x		x	x	x
		x	x	x	x	x	x			x	x	x	x
Single Ply Membrane	x		x	x	x	x	x	x	x		x		
		x	x	x	x	x	x			x	x		
Granule Surfaced BUR/MB	x		x	x	x	x	x	x			x	x	x
		x	x	x	x	x	x			x	x	x	x
Gravel Surfaced BUR/MB	x		x	x	x	x	x				x	x	x
		x	x	x	x	x	x				x	x	x
Standing Seam Metal ³	x		x	x	x	x					x		
		x	x	x	x	x					x		

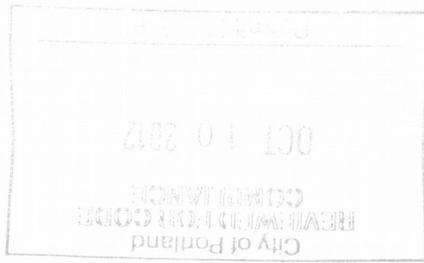
1. No hot attachment of polymat, XEPS, EPS, or Fanfold
2. Roof moisture scan required for use of perlite/wood fiber in recover roofing systems
3. XEPS is the only material allowed as flute fill with overlay board required.
4. Fanfold to be used as an overlay board only

PVC DESIGN TABLE - NEW CONSTRUCTION OR TEAR OFF - MECHANICALLY ATTACHED

Deck	Membrane Type		Insulation/Substrate								Insulation/Substrate Attachment		
	Smooth	Fleece	ISO	Gypsum Board	Wood fiber/Perlite	EPS/XEPS	Fanfold	3/6 oz. Polymat	FR 50/10	None	Mech Fast.	Adhesive	Hot ¹
Steel	X		X	X	X	X ³		X ³			X	X	
		X	X	X	X	X					X	X	
Wood	X		X	X	X	X ³	X ³	X	X		X	X	X ²
		X	X	X	X	X	X		X	X	X	X	X ²
Structural Concrete & Gypsum	X		X	X	X	X ³	X ³	X			X	X	X
		X	X	X	X	X	X			X	X	X	X
Lightweight Insulating Concrete	X		X	X	X	X ³	X ³	X			X	X	X ²
		X	X	X	X	X	X			X	X	X	X ²
Cementitious Wood Fiber	X		X	X	X	X ³	X ³	X			X	X	X ²
		X	X	X	X	X	X			X	X	X	X ²

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1. No hot attachment of polymat, XEPS, EPS, or Fanfold
2. Insulation/membrane can be installed in hot asphalt only when mopping to mechanically attached base sheet
3. XEPS/Fanfold in combination with a 3 oz. polymat separator
4. Fanfold to be used as an overlay board only



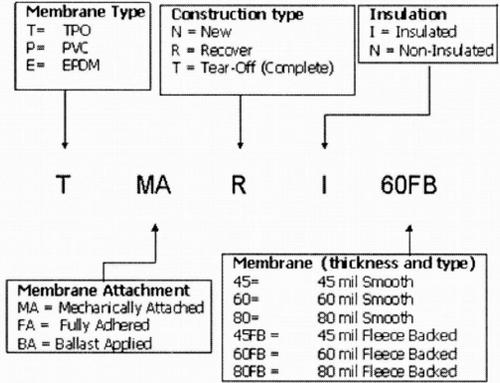
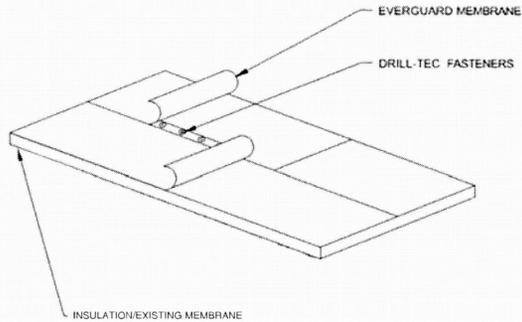
PVC DESIGN TABLE - RECOVER - MECHANICALLY ATTACHED

Exiting Roofing System Type	Membrane Type		Insulation/Substrate								Insulation/Substrate Attachment		
	Smooth	Fleece	ISO	Gypsum Board	Wood fiber/Perlite	EPS/XEPS	Fanfold	3/6 oz. Polymat	FR 50/10	None	Mech Fast.	Adhesive	Hot ¹
Smooth BUR/MB	X		X	X	X	X ⁴	X ⁴	X	X		X	X	X
		X	X	X	X	X	X			X	X	X	X
Single Ply Membrane	X		X	X	X	X ⁴	X ⁴	X	X		X		
		X	X	X	X	X	X			X	X		
Granule Surfaced BUR/MB	X		X	X	X	X ⁴	X ⁴	X			X	X	X
		X	X	X	X	X	X			X	X	X	X
Gravel Surfaced BUR/MB	X		X	X	X	X ⁴	X ⁴	X ⁴			X	X	X
		X	X	X	X	X	X				X	X	X
Standing Seam Metal ³	X		X	X	X	X ⁴		X ⁴			X		
		X	X	X	X	X					X		

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1. No hot attachment of polymat, XEPS, EPS, or Fanfold
2. Roof moisture scan required for use of perlite/wood fiber in recover roofing systems
3. XEPS only as flute material with overlay board
4. XEPS/Fanfold in combination with a 3 oz. polymat separator
5. Fanfold to be used as an overlay board only

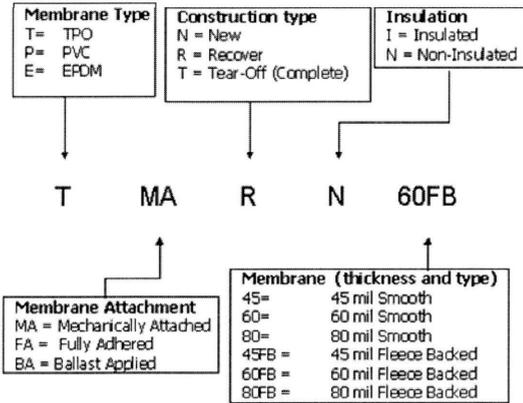
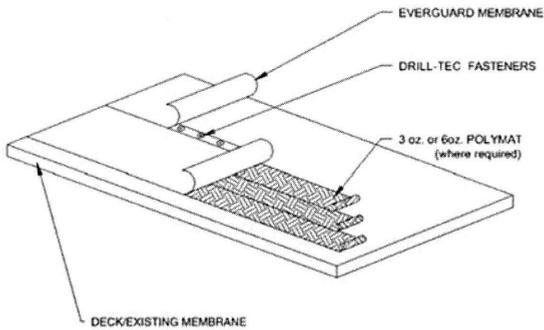
INSULATED TPO MECHANICALLY ATTACHED SYSTEMS SPECIFICATION PLATE



Specification Number	Attachment Type	Construction Type	Insulation	TPO Thickness	Guarantee Length Up To (Years)
T-MA-N-I-45	Mechanically Attached	New	Yes	.045	12
T-MA-N-I-60				.060	15
T-MA-N-I-80				.080	20
T-MA-T-I-45	Mechanically Attached	Tear Off	Yes	.045	12
T-MA-T-I-60				.060	15
T-MA-T-I-80				.080	20
T-MA-R-I-45	Mechanically Attached	Recover	Yes	.045	12
T-MA-R-I-60				.060	15
T-MA-R-I-80				.080	20
T-MA-N-I-45FB	Mechanically Attached	New	Yes	.045 FB	12
T-MA-N-I-60FB				.060 FB	15
T-MA-N-I-80FB				.080FB	20
T-MA-T-I-45FB	Mechanically Attached	Tear Off	Yes	.045 FB	12
T-MA-T-I-60FB				.060 FB	15
T-MA-T-I-80FB				.080FB	20
T-MA-R-I-45FB	Mechanically Attached	Recover	Yes	.045 FB	12
T-MA-R-I-60FB				.060 FB	15
T-MA-R-I-80FB				.080FB	20

Refer to Insulation Attachment and Membrane Attachment Tables for attachment requirements. Mechanically attached systems require the use of half sheets.

NON-INSULATED TPO MECHANICALLY ATTACHED SYSTEMS SPECIFICATION PLATE

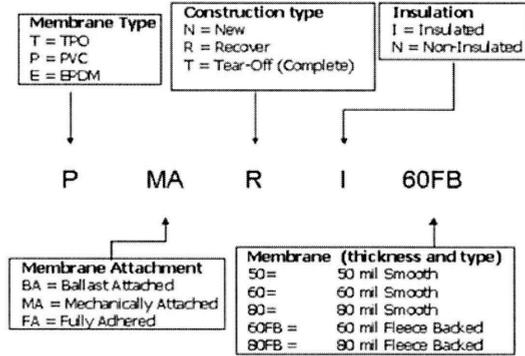
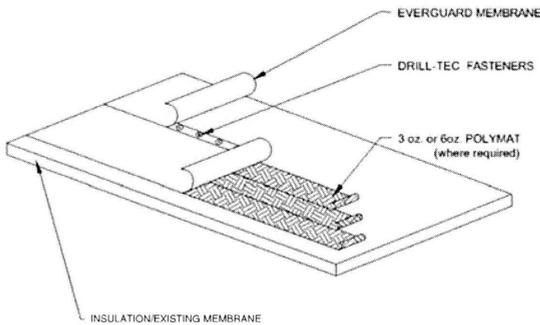


Specification Number	Attachment Type	Construction Type	Insulation	TPO Thickness	Guarantee Length Up To (Years)
T-MA-N-N-45	Mechanically Attached	New	No	.045	12
T-MA-N-N-60				.060	15
T-MA-N-N-80				.080	20
T-MA-T-N-45	Mechanically Attached	Tear Off	No	.045	12
T-MA-T-N-60				.060	15
T-MA-T-N-80				.080	20
T-MA-R-N-45	Mechanically Attached	Recover	No*	.045	12
T-MA-R-N-60				.060	15
T-MA-R-N-80				.080	20
T-MA-N-N-45FB	Mechanically Attached	New	No	.045 FB	12
T-MA-N-N-60FB				.060 FB	15
T-MA-N-N-80FB				.080FB	20
T-MA-T-N-45FB	Mechanically Attached	Tear Off	No	.045 FB	12
T-MA-T-N-60FB				.060 FB	15
T-MA-T-N-80FB				.080FB	20
T-MA-R-N-45FB	Mechanically Attached	Recover	No	.045 FB	12
T-MA-R-N-60FB				.060 FB	15
T-MA-R-N-80FB				.080FB	20

* Separator Sheet required; 3/6 oz polymat or StormSafe™.
 Refer to Insulation Attachment and Membrane Attachment Tables for attachment requirements.
 Mechanically attached systems require the use of half sheets.

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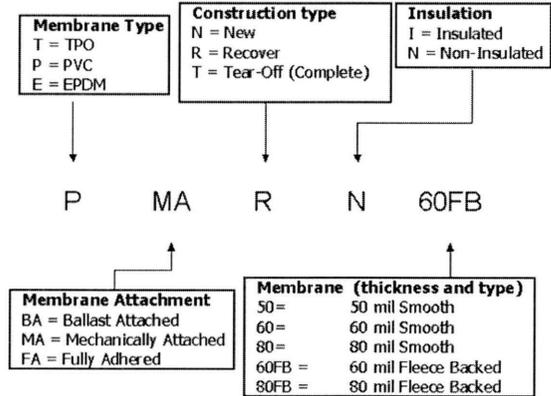
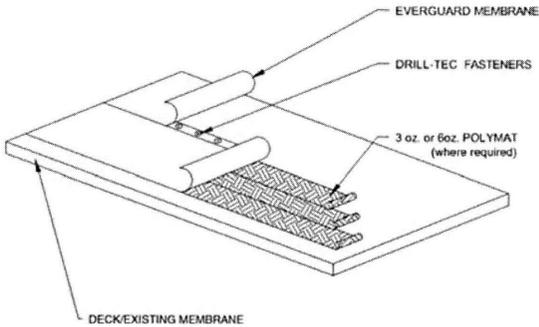
INSULATED PVC MECHANICALLY ATTACHED SYSTEMS SPECIFICATION PLATE



Specification Number	Attachment Type	Construction Type	Insulation	PVC Thickness	Guarantee Length Up To (Years)
P-MA-N-I-50	Mechanically Attached	New	Yes	.050	12
P-MA-N-I-60				.060	15
P-MA-N-I-80				.080	20
P-MA-T-I-50	Mechanically Attached	Tear Off	Yes	.050	12
P-MA-T-I-60				.060	15
P-MA-T-I-80				.080	20
P-MA-R-I-50	Mechanically Attached	Recover	Yes	.050	12
P-MA-R-I-60				.060	15
P-MA-R-I-80				.080	20
P-MA-N-I-60FB	Mechanically Attached	New	Yes	.060 FB	15
P-MA-N-I-80FB				.080FB	20
P-MA-T-I-60FB	Mechanically Attached	Tear Off	Yes	.060 FB	15
P-MA-T-I-80FB				.080FB	20
P-MA-R-I-60FB	Mechanically Attached	Recover	Yes	.060 FB	15
P-MA-R-I-80FB				.080FB	20

Refer to Insulation Attachment and Membrane Attachment Tables for attachment requirements. Mechanically attached systems require the use of half sheets.

NON-INSULATED PVC MECHANICALLY ATTACHED SYSTEMS SPECIFICATION PLATE



Specification Number	Attachment Type	Construction Type	Insulation	PVC Thickness	Guarantee Length Up To (Years)
P-MA-N-N-50	Mechanically Attached	New	No	.050	12
P-MA-N-N-60				.060	15
P-MA-N-N-80				.080	20
P-MA-T-N-50	Mechanically Attached	Tear Off	No	.050	12
P-MA-T-N-60				.060	15
P-MA-T-N-80				.080	20
P-MA-R-N-50	Mechanically Attached	Recover	No*	.050	12
P-MA-R-N-60				.060	15
P-MA-R-N-80				.080	20
P-MA-N-N-60FB	Mechanically Attached	New	No	.060 FB	15
P-MA-N-N-80FB				.080FB	20
P-MA-T-N-60FB	Mechanically Attached	Tear Off	No	.060 FB	15
P-MA-T-N-80FB				.080FB	20
P-MA-R-N-60FB	Mechanically Attached	Recover	No*	.060 FB	15
P-MA-R-N-80FB				.080FB	20

*Separator Sheet required; 3/6 oz. polymat or StormSafe™.
 Refer to Insulation Attachment and Membrane Attachment Tables for attachment requirements.
 Mechanically attached systems require the use of half sheets.

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 City of Portland
 COMMUNITY DEVELOPMENT

Mechanically Attached Installation Specification

TPO & PVC

Part 1 – General

1.01 System Description

- A. Mechanically attached heat-welded thermoplastic sheet roof membrane system.
- B. EverGuard® PVC and EverGuard® TPO materials are not compatible with one another. DO NOT use EverGuard® PVC and EverGuard® TPO membranes, flashings, and flashing accessories together in the same roofing system.

1.02 Specification Designations

- A. See Plates.

1.03 Regulatory Requirements

- A. Conform to all applicable building and jurisdictional codes, including roof assembly wind uplift and fire resistance requirements and slope.
- B. Follow your local jurisdiction requirements for disposing of used and expired adhesives and sealants.

1.04 Delivery, Storage and Protection

- A. Deliver products to site in original containers with seals unbroken and labeled with manufacturers' name, product brand name and type.
- B. Store materials in weather protected environment, clear of ground and moisture, in accordance with GAF instructions.
- C. All materials stored outside shall be raised above ground or roof level on pallets, and covered with a tarpaulin or other waterproof material. Factory-installed plastic wrapping is not an adequate covering. Extreme heat conditions may require special storage requirements. Reference data sheets for product storage requirements.
- D. Follow GAF directions and requirements for protection of materials prior to and during installation.
- E. Do NOT use materials that are wet or damaged to the extent that they will no longer serve their intended purpose. All roof insulation that has been wet is considered damaged, even if later dried out. Remove all damaged materials from the jobsite.

1.05 Environmental Requirements & Restrictions

- A. Do not apply roofing materials during inclement or threatening weather.
- B. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day.
- C. High or gusting winds make the installation of materials difficult.
- D. Material installation during periods of high ambient temperatures, typically above 90°F, can result in poor installation quality due to condensation on the membrane

surface, and excessively fast adhesive drying rates.

- E. Material installation during periods of low ambient temperatures, typically below 30°F, can result in poor installation quality due to increased material stiffness and vulnerability to damage and excessively slow adhesive drying rates. To avoid these problems:
 - 1. Store accessory materials in a warming box
 - 2. Use as soon as possible
 - 3. Allow adhesives to properly cure
 - 4. Adjust welder settings to insure proper welds for applicable ambient conditions

1.06 Working Environment

- A. Provide a safe working environment, including, but not limited to, adequate fall protection, restriction of unauthorized access to the work area, and protection of the building and its occupants.
- B. Safe work practices should be followed, including, but not limited to, keeping tools in good operating order, providing adequate ventilation if adhesives are used, and daily housekeeping to remove debris and other hazards.

Part 2 – Products

2.01 Membrane

- A. EverGuard® TPO (smooth reinforced) thermoplastic polyolefin membrane.
- B. EverGuard® TPO Fleece-Back thermoplastic polyolefin membrane
- C. EverGuard® PVC (smooth reinforced) thermoplastic membrane
- D. EverGuard® PVC Fleece-Back thermoplastic membrane

2.02 Flashing

- A. EverGuard® membrane flashings to be of same type, thickness and color as roofing membrane. EverGuard® Freedom™ TPO can be used with EverGuard® TPO membrane for flashing in the same thickness as the field membrane.
- B. EverGuard® TPO and PVC Fleece-Back membranes are optional flashing membranes for all EverGuard® TPO and PVC roofing systems, respectively. These membranes may be a solution when a contaminated substrate is encountered.

2.03 Flashing Accessories

- A. EverGuard® preformed flashing accessories to be of same type as roofing membrane.
 - 1. EverGuard® TPO and PVC laminated metal flashings to be a minimum of 25 mils TPO and 40 mils PVC of

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COMMUNITY

Mechanically Attached Installation Specification

TPO & PVC

non-reinforced thermoplastic membrane of same type as roofing membrane, laminated to 24 ga. galvanized steel sheet metal.

2. Pre-formed Vent Boots with stainless steel clamping bands.
3. Pre-formed Universal Corners for TPO. Individual pre-formed inside outside corners for PVC.
4. Pre-formed Expansion Joint Covers for roof-roof and roof-wall expansion joints.
5. Membrane Flashing Strips for miscellaneous applications.
6. UN-55 Detailing Membranes for TPO flashing. UN-80 Detailing Membranes for PVC flashing. For miscellaneous penetrations in lieu of pre-formed accessories.
7. EverGuard® TPO Cover Strip for stripping in of flat metal edges.
8. EverGuard® Pre-formed Sealant Pans are available for irregularly-shaped penetrations and pitch pans.

2.04 Fasteners

- A. DRILL-TEC™ membrane fasteners and plates, insulation fasteners and plates, and flashing fasteners and termination bars. Refer to the Insulation Attachment Table and the appropriate Membrane Attachment Table at the end of this section for the correct type, length and diameter.

2.05 Adhesives and Sealants

- A. EverGuard® bonding adhesives, sealants and caulking.
1. EverGuard® TPO and PVC Bonding Adhesive (solvent-based).
 2. EverGuard® H2O Bonding Adhesive (low VOC).
 3. EverGuard® 2-Part Pourable Sealant for use in sealant pans.
 4. EverGuard® Caulking for use in sealing termination bars and penetration clamping bands.
 5. EverGuard® TPO Cut Edge Sealant. EverGuard® PVC Cut Edge Sealant.
 6. EverGuard® Water Block for use in sealing behind termination bars and at drain flanges as a water cut-off.
 7. EverGuard® TPO Primer.

2.06 Traffic Protection

- A. EverGuard® TPO and PVC walkway rolls.

2.07 Insulation

- A. EnergyGuard™ foam insulation of the following types. Minimum 1" thickness. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems.

1. EnergyGuard™ and EnergyGuard™ Ultra polyisocyanurate insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289 (min. 16 psi compressive strength).
2. EnergyGuard™ extruded polystyrene insulation meeting or exceeding the requirements for ASTM C-578, Type II nominal 1.5 pound density.
3. EnergyGuard™ expanded polystyrene insulation with plastic facer meeting or exceeding the requirements for ASTM C-578, Type II nominal 1.5 pound density.

2.08 Insulation – High Traffic Applications

- A. EnergyGuard™ foam insulation of the following types. Minimum 1" thickness. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems.
1. EnergyGuard™ and EnergyGuard™ Ultra polyisocyanurate insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289, (min. 25 psi compressive strength).
 2. EnergyGuard™ extruded polystyrene insulation meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
 3. EnergyGuard™ expanded polystyrene insulation with plastic facer meeting or exceeding the requirements for ASTM D-578, Type IX (min. 25 psi compressive strength).

2.09 Recover Board

- A. EnergyGuard™ Perlite insulation, minimum 1/2", ASTM C-728
- B. High density wood fiber insulation, minimum 1/2", ASTM C-208, Class E
- C. EnergyGuard™ foam recover board of the following types. Board size to be 4' x 8' panels for mechanical attachment, and 4' x 4' for adhered attachment and tapered systems, except for fan-fold recover board, which comes in 2' x 4' sections with a 50' total length.
1. EnergyGuard™ and EnergyGuard™ Ultra 1/2" polyisocyanurate recover board insulation with glass-based facer meeting or exceeding the requirements for ASTM C-1289 (min. 16 psi compressive strength).
 2. EnergyGuard™ 3/8" extruded polystyrene fan-fold recover board with plastic facer meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
 3. EnergyGuard™ 1/2" extruded polystyrene recover board meeting or exceeding the requirements for ASTM D-578, Type IV (min. 25 psi compressive strength).
 4. EnergyGuard™ 1/2" expanded polystyrene recover board with

Mechanically Attached Installation Specification

TPO & PVC

plastic facer meeting or exceeding the requirements for ASTM D-578, Type II (min. 15 psi compressive strength).

2.10 Base Sheets

- A. GAFGLAS® Stratavent® Eliminator™ Nailable Base Sheet
- B. GAFGLAS® #80 Ultima™ Base Sheet
- C. GAFGLAS® #75 Base Sheet

2.11 Protection Layer

- A. EverGuard® Polymat slipsheet, 3.0 oz/sq.yd.
- B. EverGuard® Polymat cushioning slipsheet, 6.0 oz/sq.yd.
- C. VersaShield™ products as protection layer in all sections (fully adhered, ballasted, etc.)

2.12 Other Accessories

- A. Subject to compliance with requirements, provide the following products not available from GAF:
 - 1. Wood Nailers: New wood nailers shall be #2 or better lumber. Do NOT use asphaltic or creosote-treated lumber.
 - 2. Roofing Nails: Galvanized or non-ferrous type and size as required to suit application.
 - 3. Temporary Sealant: Polyurethane foam sealant or similar as required to provide temporary watertight sealing of roofing.
 - 4. Air/Vapor Barrier: Polyethylene sheeting, min. 6 mil. for TPO only.
 - 5. Fire Barrier: Silicone-treated fiberglass-faced gypsum panels, min. 1/4" thick (gypsum roof from Georgia-Pacific).

Part 3 – Execution

3.01 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. All defects in the roof deck or substrate shall be corrected by the responsible parties before new roofing work commences. Verify that the deck surface is dry, sound, clean and smooth, free of depressions, waves, or projections.
- D. Protect building surfaces against damage and contamination from roofing work.
- E. Where work must continue over completed roof areas, protect the finished roofing system from damage.

- F. Deck preparation is the sole responsibility of the building owner or roofing contractor. All defects in the roof deck or substrate shall be corrected before roofing work commences.

3.02 Preparation of Roofing Area – New and Tear-off Applications

- A. Remove all existing roofing materials to the roof decking, including flashings, metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants.
- B. Confirm quality and condition of roof decking by visual inspection and by fastener pull-out testing.
- C. Secure all loose decking. Remove and replace all deteriorated decking.
- D. Remove abandoned equipment and equipment supports.
- E. Confirm that height of equipment supports will allow the installation of full-height flashings.

3.03 Preparation of Roofing Area – Recover Applications

- A. Remove all stone ballast, loose gravel, and debris from the roof surface.
- B. Remove blisters and ridges from the roof membrane.
- C. When recovering over an existing single ply roof, that roof must be first cut into 10'x10' areas maximum first, before the application of new separator sheet and/or membrane.
- D. Remove all existing flashings, including metal edgings, drain leads, pipe boots, and pitch pockets, and clean substrate surfaces of all asphalt and adhesive contaminants. If the wall/curb flashings are in good condition and tightly adhered to the substrate, new TPO flashing materials may be installed over these to a height of 24"; new PVC flashing materials may be installed over a separator layer of polymat or insulation board.
- E. It is strongly recommended that the building owner have a moisture survey performed to ascertain the condition and suitability of the existing roofing materials to receive a recover system. A survey is required if perlite or wood fiber insulation is used in a recover system. GAF will not be responsible for damage to the roofing system if it results from moisture in the existing roofing system. Remove and replace all existing roofing materials that contain moisture.
- F. Confirm quality and condition of roof decking by visual inspection if possible, and by fastener pull-out testing. Remove and replace all deteriorated decking.
- G. Remove abandoned equipment and equipment supports.
- H. Raise equipment supports to allow the installation of full-height flashings.

