



EPD

# EverGuard Extreme® TPO

<b>COMPANY</b>	<b>GAF</b>
<b>PRODUCT TYPE</b>	Single ply roofing
<b>PRODUCT</b>	EverGuard Extreme® TPO
<b>MANUFACTURING SITES</b>	Gainesville, TX; Mt. Vernon, IN
<b>EPD SCOPE</b>	Cradle-to-gate
<b>DECLARED UNIT</b>	1 m <sup>2</sup>



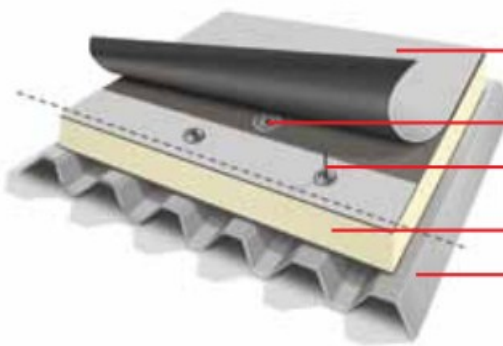
## ORGANIZATION

Founded in 1886, GAF has grown to become the largest roofing manufacturer in North America. GAF’s products include a comprehensive portfolio of residential and commercial roofing systems configurable for energy efficient, cool reflective, solar ready, rainwater catchment, and vegetative options, all supported by an extensive national network of factory-certified contractors. GAF products feature Advanced Protection® Technology, which provides superior durability and wind resistance while optimizing the use of materials, allowing GAF to offer extended warranties on many of its roofing systems and reduce material usage. This is one of a broad range of steps GAF has taken to support innovative green-building initiatives. In addition to successful and ongoing sustainability initiatives within its manufacturing operations, GAF’s industry-leading Certified Green Roofer Program, a producer responsibility effort which promotes asphalt shingle recycling, continues to grow. The company has also developed a mobile shingle recycling finder, available at [recycling.gaf.com](http://recycling.gaf.com), and offers options for recycling commercial roofing as well. More information about GAF’s sustainability programs and those of the roofing industry generally, is available at [www.gaf.com/green](http://www.gaf.com/green).

## MANUFACTURER

Address
<b>GAF</b> 1361 Alps Road Wayne, NJ 07470
Phone
1-973-628-3000
Email
TechnicalQuestions@gaf.com
Web
<a href="http://www.gaf.com">www.gaf.com</a>

## PRODUCT DESCRIPTION & USE



GAF manufactures a variety of single ply roofing products using Thermoplastic Polyolefin (TPO) roofing membrane technology. TPO provides superior performance against heat aging and UV degradation, the two key performance characteristics directly related to roof system longevity. Marketed under the EverGuard® and EverGuard Extreme® brands, GAF’s TPO roofing products offer exceptional seam strength and puncture resistance, long-term weathering, and easy installation.

EverGuard Extreme® TPO roof membranes are manufactured in 0.05 in, 0.06 in, 0.07 in, and 0.08 in thicknesses (“50 mil,” “60 mil,” “70 mil,” and 80 mil,” respectively). The sheets are supplied in rolls of various dimensions and consists of a woven polyester reinforcing mat sandwiched between two TPO sheets.

This EPD applies to the following product variations (including all color variations of product\*):

	Extreme TPO 50 mil				Extreme TPO 60 mil				Extreme TPO 70 mil				Extreme TPO 80 mil		
Product	Full Roll 10'x100'	Half Roll 5'x100'	Full Roll 8'x100'	Half Roll 4'x100'	Full Roll 10'x100'	Half Roll 5'x100'	Full Roll 8'x100'	Full Roll 10'x100'	Half Roll 5'x100'	Full Roll 8'x100'	Half Roll 4'x100'	Full Roll 10'x100'	Half Roll 5'x100'	Full Roll 8'x100'	
Roll Size	1000 ft <sup>2</sup>	500 ft <sup>2</sup>	800 ft <sup>2</sup>	400 ft <sup>2</sup>	1000 ft <sup>2</sup>	500 ft <sup>2</sup>	800 ft <sup>2</sup>	1000 ft <sup>2</sup>	500 ft <sup>2</sup>	800 ft <sup>2</sup>	400 ft <sup>2</sup>	1000 ft <sup>2</sup>	500 ft <sup>2</sup>	800 ft <sup>2</sup>	
GAF SKU	756L776	756M776	756P776	756N776	7569776	756D776	756E776	756T776	756Q776	756S776	756R776	820N776	820P776	821J776	

\* A list of color variations is available at [http://www.gaf.com/Roofing/Commercial/Products/Single\\_Ply\\_Roofing/EverGuard\\_TPO\\_Single\\_Ply\\_Membranes/EverGuard\\_Colored\\_TPO](http://www.gaf.com/Roofing/Commercial/Products/Single_Ply_Roofing/EverGuard_TPO_Single_Ply_Membranes/EverGuard_Colored_TPO)

## PRODUCT SPECIFICATIONS

Physical Properties	ASTM Test Method	ASTM 6878 Minimum	EverGuard Extreme® Typical Test Data
Nominal Thickness	ASTM D-751	0.039" (min.)	0.050", 0.060", 0.070", and 0.080"
Breaking Strength	ASTM D-751 Grab Method	220 lbf/in.	290 lbf x 270 lbf (low) to 360 lbf x 340 lbf (high)
Seam Strength	ASTM D-751	66 lbf	100 - 140 lbf (membrane failure).
Elongation at Break	ASTM D-751	15%	30%
Heat Aging	ASTM D-573	90% Retention of Breaking Strength and Elongation at Break	100%
Tear Strength	ASTM D-751 8"x8" Sample	55 lbf	60 lbf x 150 lbf (low) to 124 lbf x 140 lbf (high)
Puncture Resistance	FTM 101C Method 2031	Not Established	290 - 380 lbs.
Cold Brittleness	ASTM D-2137	-40° C	-40° C
Permeance	ASTM E-96	Not Established	0.01 - 0.07 Perms
Dimensional Change	ASTM D-1204 @158 F, 6 hrs.	+/- 1%	0.4%
Water Absorption	ASTM D-471 @158 F, 1 week	+/- 3%	0.7%
Hydrostatic Resistance	ASTM D-751 Method D	Not Established	390 - 430 psi
Ozone Resistance	ASTM D-1149	No visible deterioration @ 7 x magnification	No visible deterioration @ 7 x magnification
Reflectivity (white)	ASTM C1549	N/A	0.76 - 0.84
Emissivity (white)	ASTM C1371	N/A	0.84 - 0.9
Weather Resistance	ASTM G155, 80°C BPT, 50°C chamber air temp., no cracks and crazing observed when the exposed specimen wrapped around a 3" mandrel and inspected at 7x magnification	10,080 kJ/(m <sup>2</sup> •nm) at 340 nm	>30,240 kJ/(m <sup>2</sup> •nm) at 340 nm

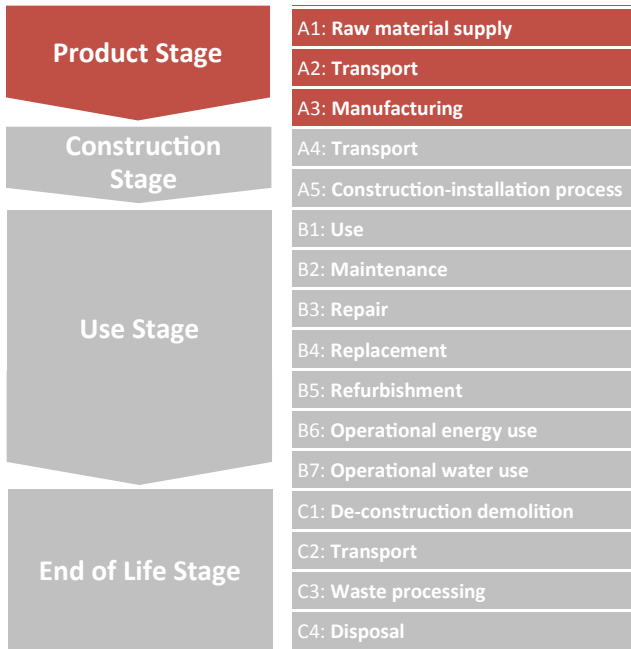
1. Certain data is provided in MD (machine direction)xCMD (cross machine direction) format.
2. Data is based upon typical product performance, and is subject to normal manufacturing tolerance and variance

## APPLICABLE STANDARDS

<input checked="" type="checkbox"/> UL Listed	<input checked="" type="checkbox"/> CRRC Listed
<input checked="" type="checkbox"/> FM Approved	<input checked="" type="checkbox"/> Title 24 Compliant*
<input checked="" type="checkbox"/> Dade County Product Approval	<input checked="" type="checkbox"/> ENERGY STAR® Listed
<input checked="" type="checkbox"/> Florida Building Code Approved	<input checked="" type="checkbox"/> ASTM D6878

\* White, Energy Tan and Energy Gray Membrane Only

## LIFE CYCLE STAGES



■ Stages included in life cycle assessment (LCA)  
■ Stages excluded from LCA

## SYSTEM BOUNDARY

Included	Excluded
<ul style="list-style-type: none"> <li>Raw materials extraction (including fuels used in product production),</li> <li>Transportation of raw materials</li> <li>Processing of materials</li> <li>Transportation of processed materials, including empty backhauls,</li> <li>Manufacturing of product</li> <li>Packaging with product ready for shipment</li> <li>Disposal/reuse/recycling of pre-consumer wastes and utilized by-products</li> <li>Transportation of pre-consumer wastes and utilized by-products for disposal/ reuse/ recycling</li> </ul>	<ul style="list-style-type: none"> <li>Production, manufacture, and construction of manufacturing capital goods and infrastructure with an expected lifespan of over five years;</li> <li>Production and manufacture of membrane production equipment, delivery vehicles, and laboratory equipment with expected lifespan of over five years</li> <li>Personnel-related activities (travel, furniture, and office supplies)</li> <li>Energy and water use related to company management and sales activities</li> <li>Maintenance of equipment</li> <li>Transportation of finished product</li> <li>Construction stage</li> <li>Use stage</li> <li>End-of-life stage</li> </ul>

## ENERGY

Energy Source		50 Mil	60 Mil	70 Mil	80 Mil
Nonrenewable, fossil	MJ	83.6	96.2	110.3	130.4
Nonrenewable, nuclear	MJ	5.3	6.0	7.0	8.3
Renewable, wind, solar, geothermal	MJ	0.48	0.55	0.65	0.76
Renewable, biomass	MJ	1.9	1.9	1.9	2.0
<b>Total</b>	<b>MJ</b>	<b>91.2</b>	<b>104.7</b>	<b>119.8</b>	<b>141.4</b>

## ADDITIONAL ENVIRONMENTAL INFORMATION

Resource Consumption		45 Mil	60 Mil	70 Mil	80 Mil
Nonrenewable materials	kg	2.4	2.8	3.1	3.6
Renewable materials	kg	0.12	0.12	0.11	0.11
Freshwater	l	11.3	13.0	15.0	17.6
Waste Generated	kg	0.30	0.33	0.37	0.42

## LIFE CYCLE IMPACTS

Atmosphere & Water		50 Mil	60 Mil	70 Mil	80 Mil
Climate change	kg CO2 eq	3.3	3.8	4.4	5.2
Acidification	kg SO2 eq	0.015	0.017	0.019	0.022
Eutrophication	kg N eq	0.004	0.005	0.005	0.006
Smog	kg O3 eq	0.16	0.19	0.21	0.24
Ozone depletion	kg CFC-11 eq	6.1 x 10 <sup>-8</sup>	7.0 x 10 <sup>-8</sup>	8.2 x 10 <sup>-8</sup>	9.6 x 10 <sup>-8</sup>

## MATERIAL CONTENT DECLARATION

Product Material	50 Mil	60 Mil	70 Mil	80 Mil
TPO Resin	0.90 kg	1.07 kg	1.24 kg	1.48 kg
Fire Retardant	0.24 kg	0.28 kg	0.32 kg	0.39 kg
White Pigment	0.04 kg	0.04 kg	0.05 kg	0.06 kg
UV Absorber	0.06 kg	0.08 kg	0.09 kg	0.10 kg
Polyester Scrim	0.09 kg	0.09 kg	0.09 kg	0.09 kg
All Other Materials	0.01 kg	0.01 kg	0.01 kg	0.01 kg

Packaging Material	50 Mil	60 Mil	70 Mil	80 Mil
Cardboard Core	0.068 kg	0.068 kg	0.068 kg	0.068 kg
Wooden Pallet	0.027 kg	0.027 kg	0.022 kg	0.022 kg
LLDPE Film	0.004 kg	0.004 kg	0.004 kg	0.004 kg

**Declared Unit:** 1 m<sup>2</sup>

**EPD VERIFICATION**

EPD Information			
Program Operator		NSF International	
Declaration Holder		GAF	
Product: <b>EverGuard Extreme® TPO</b>	Date of Issue: <b>12/18/2013</b>	Period of Validity <b>12/18/2013—12/18/2019</b>	Declaration Number <b>EPD10006</b>
This EPD was independently verified by NSF International in accordance with ISO 14025:			
<input type="checkbox"/> Internal	<input checked="" type="checkbox"/> External	Thomas Bruursema NSF International 789 N. Dixboro Rd Ann Arbor, MI 48105 Bruursema@nsf.org	

LCA Information	
Basis LCA	Life Cycle Assessment Report for Thermoplastic Polyolefin (TPO) Roofing Products November 12, 2013
LCA Preparer	Meister Consultants Group, Inc. and Industrial Ecology Consultants 98 North Washington Street, Suite 302, Boston, MA 02114 USA office@mc-group.com
This life cycle assessment was critically reviewed in accordance with ISO 14044 by:	
	Brad McAllister WAP Sustainability Consulting 1612 5th Avenue North, Suite A Nashville Tennessee 37208 T 615.713.2001 brad@wapsustainability.com

PCR Information	
Program Operator	ASTM International 100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428 USA www.astm.org
Reference PCR	PCR for Single Ply Roofing Membranes
Date of Issue	November 20, 2013
PCR review was conducted by:	François Charron-Douce Quantis International

Notes Regarding Use of this EPD	Version No.
	1

*EPDs based on cradle-to-gate information modules shall not be used for comparisons unless such comparisons are made in a building context using a functional unit, and comply with all of the requirements set out in ISO 14025, section 6.7.2. EPDs based on a declared unit shall not be used for comparisons.*

*EPDs from different programs or based on different PCRs may not be comparable.*

*The life-cycle activities and related processes include production stages only and as such are intended for Business-to-Business (BtoB) use only. See Section 6.2 of the applicable PCR.*

