ROOFING
ENVIRONMENTAL PRODUCT DECLARATION - CRADLE-TO-GATE SIKAPLAN FASTENED

ASTM INTERNATIONAL

BUILDING TRUST

GENERAL INFORMATION

COMPANY
Sika Corporation – Roofing

PRODUCT TYPE
Single Ply Roofing Membrane

PRODUCT
Sikaplan Fastened roofing membrane, with finished thicknesses of 45 and 60 mils.

MANUFACTURING SITE
Canton, MA 02021

EPD SCOPE
- Cradle-to-Gate

EPD LIMITATIONS
- EPDs from different programs (using different PCR) may not be comparable
- Declarations based on the ASTM SPRM PCR [1] are not comparative assertions; that is, no claim of environmental superiority may be inferred or implied for cradle to gate declarations.

DECLARED UNIT
1 m^2 manufactured, Sikaplan Fastened

STANDARDS
The two declared Sikaplan Fastened roofing membrane thicknesses (45 and 60 mils) meet the following standards and requirements

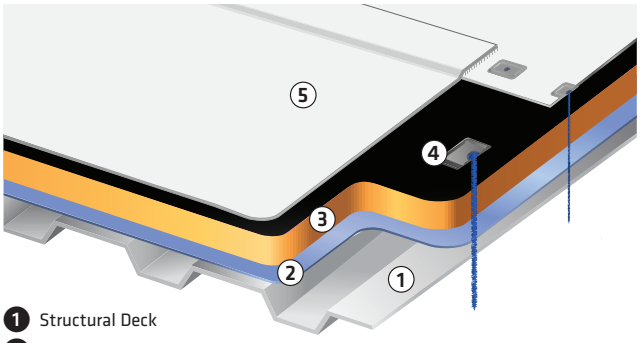
- ASTM D4434
- Title 24 Compliant*
- Cool Roof Rating Council® Listed*
- FM Approval
- Underwriters Laboratory Inc.
- Underwriters Laboratories of Canada

ORGANIZATION
Sika Corporation, based in Lyndhurst, NJ, is a leading manufacturer of products and systems for the construction and motor vehicle markets.

Sika Corporation's roofing division has more than 50 years of experience manufacturing high quality, thermoplastic (PVC), single-ply roofing and waterproofing systems for the non-residential market.

PRODUCT DESCRIPTION AND USE
With a track record of performance, Sikaplan roofing membranes are the products of choice for architects, specifiers and building owners who want the peace of mind that comes with buying from the performance leader.

Sikaplan Fastened roof membrane is a thermoplastic PVC membrane used in mechanically-attached systems. Sikaplan Fastened is polyester reinforced, which provides the high breaking and tearing strength needed to prevent excessive elongation and sheet deformation under the stresses produced by the wind uplift of the membrane in this type of system. A unique lacquer coating is applied to the top surface of the membrane which helps to reduce soiling.



1. Structural Deck
2. Vapor Retarder (if required)
3. Insulation
4. Insulation Fastener
5. Sikaplan Fastened Membrane

* white only

PRODUCT SPECIFICATIONS

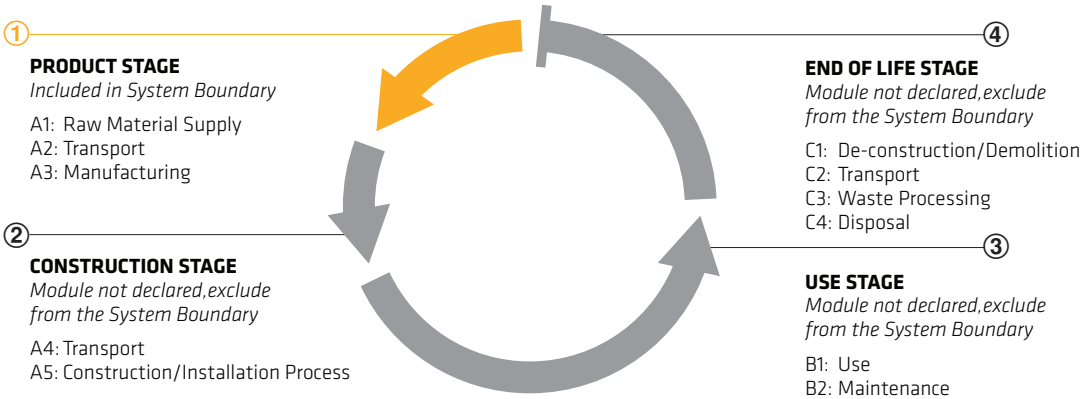
TECHNICAL DATA	UNITS	ASTM TEST METHOD	ASTM D4434 TYPE III REQUIREMENT	VALUE/TEST RESULTS	
				45 MILS (NOMINAL)	60 MILS (NOMINAL)
Weight	[kg/m2]	–	–	1.40	1.77
Total Recycled Content (both pre– and post–consumer)[3]	[%]	–	–	10[3]	
Reinforcing Material	–	–	–	Polyester	
Overall Thickness	[mil]	D751	45	45 (nominal)	60 (nominal)
Reflectivity (white)	[%]	ASTM C1549	–	0.83[4] - 0.64[5]	0.85[4] - 0.66[5]
Emissivity (white)	[%]	ASTM C1371	–	0.89[4] - Pending	
Solar reflective index (white)	–	–	–	104[4] - Pending	107[4] - Pending
Breaking Strength (M.D.), min.	[lbf/in]. (KN/m)	D751	200 (35)	230 (40)	303 (53)
Elongation at Break, min	–	D751	–		
Machine Direction	[%]		15	20	20
Cross Direction	[%]		15	20	20
Seam Strength, min., (% of original)[6]	[%]	D751	75	Pass	
Retention of Properties After Heat Aging	[%]	D3045	–	–	
Tensile Strength, min., (% of original)	[%]	D751	90	Pass	
Elongation, min., (% of original)	[%]	D751	90	Pass	
Tearing Strength (C.D.), min	[lbf] (N)	D1004	45 (200)	45 (200)	45 (200)
Low Temperature Bend, –40 °F (–40 °C)	–	D2136	Pass	Pass	
Accelerated Weathering Test (Fluorescent Light, UV exposure)	–	G154	5,000 hours	10,000 hours	
Cracking (7x magnification)		None	None	None	
Discoloration (by observation)		Negligible	Negligible	Negligible	
Crazing (7x magnification)		None	None	None	
Linear Dimensional Change (C.D.), %		D1204	0.5% max.	0.31	0.24
Weight Change After Immersion in Water,	%	D570	±3.0% max.	2.9	2.5
Static Puncture Resistance	Lbf (N)	D5602	Pass	Pass	
Dynamic Puncture Resistance	ft-lbf (J)	D5635	14.7 (20)	Pass	

[3] Pre-consumer material: roofing membrane trimmings from Sika's manufacturing process and market supplied post-industrial PVC scrap material. Post-consumer material: post-consumer Sika Sikaplan scrap material and old roofs (10% minimum content)

[4] New Membrane

[5] 3 year aged. Derived using the California Title 24 calculation method for aged solar reflectance per Section 110.8(i)2. of the 2013 Building Energy Efficiency Standard, page 102.

Life Cycle Stages



SYSTEM BOUNDARY

	INCLUDED	EXCLUDED
A1-A3	• Extraction and processing of raw materials, including fuels used in product manufacturing; • Transportation of raw materials including empty backhauls; • Manufacturing of the product; • Packaging of product ready for shipment; • Transportation from manufacturing site to recycling/reuse for pre-consumer wastes and unutilized by-products from manufacturing, including empty backhauls; and • Recycling/reuse of pre-consumer wastes and by-products of production.	Capital goods & infrastructure, production equipment, delivery vehicles, lab equipment personnel-related activities and energy and water use related to company management and sales have been excluded in the scope of the study

MATERIAL CONTENT DECLARATION

The material average percentage by weight for 1m2 for the Sikaplan Fastened 45 and 60 mils is provided.

MATERIAL AVERAGE PERCENTAGE BY WEIGHT FOR 1 M²: SIKAPLAN FASTENED 45 AND 60 [MILS]	
Raw Material Input	Total Weight by [%]
Lacquer	0.1
PVC Resin new material	40.6
PVC Resin recycled content	12.9
Plasticizer	26.8
Processing aid	0.2
Stabilizer	2.0
Fire retardants	8.4
Pigment	2.7
Polyester fabric (scrim reinforcement)	6.3
Total weight (Input)	**100**

PACKAGING MATERIAL	DECLARED PRODUCT [MILS]	
	45	**60**
Cardboard Core [kg]	0.05	0.05
Wooden Pellet [kg]	0.13	0.13
Shrink Wrap [kg]	0.0002	0.0002
Total [kg/m2]	0.18	0.18

LIFE CYCLE IMPACTS

RESULTS SIKAPLAN FASTENED	DECLARED PRODUCT	
CATEGORY INDICATOR	**45 MILS**	**60 MILS**
Global Warming Air, incl. biogenic carbon [kg CO2-eq.]	4.30	5.34
Acidification potential [kg SO2-Equiv.]	3.06E-02	3.88E-02
Eutrophication potential [kg N-Equiv.]	7.20E-04	8.95E-04
Smog creation potential [kg O3-Equiv.]	0.232	0.294
Ozone Depletion Potential [kg CFC-11 eq.]	5.036E-08	6.444E-08
TOTAL PRIMARY ENERGY CONSUMPTION		
Nonrenewable fossil [MJ]	107.11	133.15
Nonrenewable nuclear [MJ]	6.05	7.32
Renewable (solar, wind, hydropower, geothermal) [MJ]	2.02	2.33
Renewable (biomass) [MJ]	0.02	0.02
MATERIAL RESOURCES CONSUMPTION		
Nonrenewable materials [kg]	1.12	1.43
Renewable materials [kg]	0.18	0.18
Fresh water [l]	16.07	18.96
WASTE GENERATED		
Total [kg]	0.17	0.21

Additional Environmental Information

- The Sikaplan EnergySmart® membrane has a highly reflective, lacquer-coated surface that can reduce cooling and overall energy consumption in conditioned buildings. Sikaplan roof membranes meet the cool roof requirements of California's Building Energy Code (Title 24), LEED® and Green Globes.™
- Sika Roofing's Roof Recycling Program has diverted more than 45 million pounds of pre-consumer and post-consumer vinyl membrane from landfill, recycling it back into roofing and waterproofing membrane products.
- Sikaplan 5' and 10' membranes have been validated by UL Environment to contain an average of 10% recycled content.
- Sika roofing has been certified as compliant with strict environment, health and safety, and security standards established by the Responsible Care and ISO 14001: 2004.
- Sikaplan roof membranes help building owners achieve LEED and Green Globes certification

EPD VERIFICATION

This EPD was independently verified by ASTM in accordance with ISO 14025:

Internal ☐	**External** ☒	Jamie Meil, Research Principal Athena Sustainable Materials Institute 100-119 Ross Avenue Ottawa, Ontario, Canada K1Y0N6	**Signed:**
Program Operator		Timothy Brooke ASTM International 100 Bar Harbor Drive West Conshohocken, PA 19428 tbrooke@astm.org	**Signed:**

Declaration Holder	Sika Corporation		
Product group	**Date of Issue**	**Period of Validity**	**Declaration Number**
	03/01/2016	6 years	EPD031

DECLARATION TYPE

A "Cradle-to-Gate" EPD for two selected thicknesses of the Sikaplan Fastened roofing membrane (45 and 60 mils). The modules included are A1 to A3. The declaration is intended for use in Business to Business (B-B) communication.

PRODUCT APPLICABILITY AND CHARACTERISTICS

The declared Sikaplan Fastened roofing membrane thicknesses (45 and 60 mils) are designed for low-slope and steep slope roofing applications. The membranes include an internal polyester reinforcement to provide the tear resistance required for mechanically-fastened roof systems.

CONTENT OF THE DECLARATION

This declaration follows Section 11, Content of the EPD, ASTM International Product Category Rules for Preparing an Environmental Product Declaration for Single-Ply Roofing Membranes, November 2013.

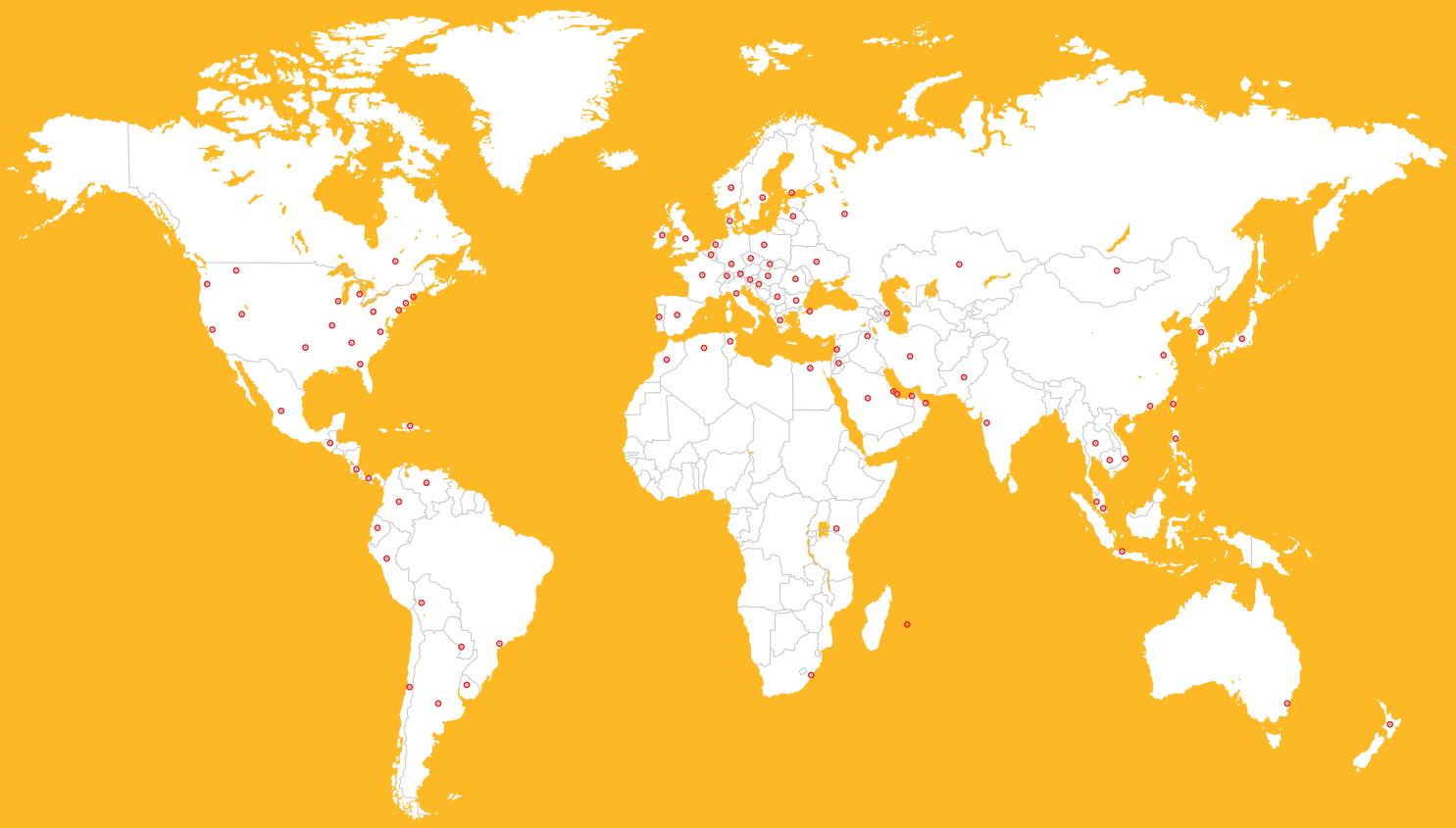
EPD PROJECT REPORT INFORMATION

EPD PROJECT REPORT	A "Cradle-to-Gate" Life Cycle Assessment for two thicknesses of Sikaplan Fastened (45 and 60 mils), 01/31/2016
LCA AND EPD PREPARED BY:	Corporate Poduct Sustainability Sika Services AG Tüffenwies 16 8050 Zurich Switzerland product.sustainability@ch.sika.com

PCR INFORMATION

PROGRAM OPERATOR	ASTM International
REFERENCE PCR	ASTM International, Product Category Rules for Preparing an Environmental Product Declaration for Single Ply Roofing Membranes
DATE OF ISSUE	November 2013
PCR REVIEW WAS CONDUCTED BY:	Francois Charron-Doucet Quantis International Email : francois.charron@quantis-intl.com

GLOBAL BUT LOCAL PARTNERSHIP



WHO WE ARE

Sika AG, located in Baar, Switzerland, is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry.

The corporation has subsidiaries in 84 countries, employs 16,000 people worldwide, and has more than 160 manufacturing facilities around the globe.

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