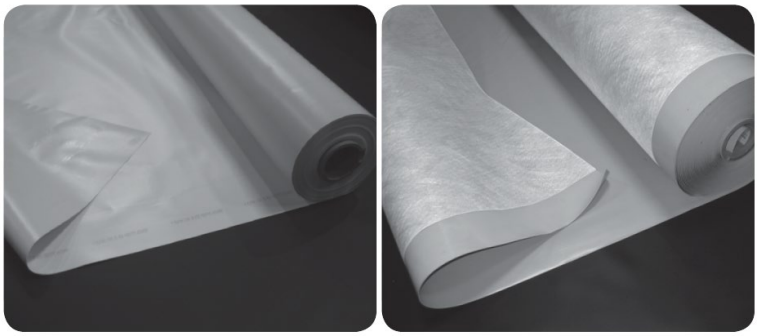
An Environmental Product Declaration

According to ISO 14025:2006 and ISO 21930:2017

A Corporate Average cradle-to-gate EPD for
Seaman Corporation's FiberTite® Single-Ply Roofing Membrane



ASTM International Certified Environmental Product Declaration

This document is a Type III environmental product declaration (EPD) for Seaman Corporation's FiberTite® polyester reinforced single-ply roofing membranes in 36, 45, 50, and 60-mil nominal thicknesses with and without fleece backing (1), as manufactured at its Wooster, OH and Bristol, TN facilities for the reference year 2021.

This declaration has been prepared in accordance with ISO 14025 (2), ISO 21930 (3), ISO 14040/44 (4), (5), the NSF International's Product Category Rules for Single-Ply Roofing Membranes (6) and ASTM's General Program Instructions for Type III EPD (7).

The intent of this document is to further the development of environmentally compatible and more sustainable construction methods by providing comprehensive environmental information related to potential impacts of Seaman Corporation's FiberTite roofing membranes in accordance with international standards.

Environmental Product Declaration Summary

General Information	
Owner of the EPD	**Seaman Corporation** 1000 Venture Blvd. Wooster, OH 44691 Link (URL) https://www.seamancorp.com/ Established in 1949, Seaman Corporation is a world leader of innovative, high performance coated fabrics in a number of markets for many different applications. Product lines include XR® Geomembrane liners and Shelter-Rite ® Architectural Fabrics, Truck Tarps, and Military Fabrics. Then, in 1979, FiberTite Roof Systems was born from the XR technology and has been become a worldwide market leader protecting operational security for critical facilities around the world. *The owner of the declaration is liable for the underlying information and evidence.*
Manufacturing Sites	Single-Ply Roofing Membranes Wooster, OH and Bristol, TN 1000 Venture Blvd, Wooster, OH 44691 225 N Industrial Dr, Bristol, TN 37620.
Product Group	Single-Ply Roofing Membranes

Product Name	Seaman Corporation's FiberTite roofing membrane with a finished nominal thickness of 36-mil, 45- mil, 50-mil, and 60-mil with and without fleece backing. 36 mil FiberTite — 36 mil FiberTite-FB 45 mil FiberTite-SM — 45 mil FiberTite-SM-FB 50 mil FiberTite-XT — 50 mil FiberTite-XT-FB 60 mil FiberTite-SM — 60 mil FiberTite-SM-FB
Product Definition	Single-ply roofing membranes are defined as thermoplastic or thermoset membranes of compounded synthetic materials manufactured in a factory for use in roofing.
Product Category Rule (PCR)	NSF International, Product Category Rule for Environmental Product Declarations for Single Ply Roofing Membranes, October 2019 (6). ISO 21930:2017 serves as the core PCR (3).
Certification Period	August 8th, 2022 – 5-year validity
Declared Unit	1 m^2 manufactured of Seaman Corporation's FiberTite single-ply roofing membrane(s)
ASTM Declaration Number	EPD – 353
EPD Information	
Program Operator	ASTM International 100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428-2959, USA https://www.astm.org/products-services/certification/environmental-product-declarations/epd-pcr.html

Declaration Type

This corporate average "Cradle-to-gate" EPD applies to the Seaman Corporation's FiberTite single-ply roofing membrane (all colors) in 36, 45, 50 and 60-mil nominal thicknesses with and without fleece backing. Production activities covered include *the extraction and upstream production, transport to factory and manufacturing* (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

Applicable Countries

United States and Canada

Product Applicability

Seaman Corporation's single-ply roof membrane is designed for low-slope roofing applications. It utilizes a unique four-layer technology that sets the performance standard in roofing with a proprietary, proven formula utilizing Elvaloy® Ketone Ethylene Ester (KEE) and provides unmatched puncture, chemical and UV resistance. FiberTite roof membranes can be used in adhered and mechanically fastened systems.

This EPD was independently verified by ASTM in accordance with ISO 14025:	
Internal	**External**
	X

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West Conshohocken, PA 19428-2959, USA
https://www.astm.org/

EPD Project Report Information	
EPD Project Report	A Cradle-to-Gate Life Cycle Assessment of Seaman Corporation's Single-Ply PVC Roofing Membranes, June 2022 (Revised August 2023) (8).
Prepared by 	Lindita Bushi PhD, Mr. Jamie Meil and Mr. Grant Finlayson Athena Sustainable Materials Institute 119 Ross Avenue, Suite 100 Ottawa, Ontario, K1Y 0N6, Canada info@athenasmi.org
This EPD project report was independently verified by and in accordance with ISO 14025 and the reference PCR:	Thomas P. Gloria, Ph.D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728
PCR Information	
Program Operator	NSF International
Reference PCR	NSF International, Product Category Rules for Preparing an Environmental Product Declaration for Single Ply Roofing Membranes (6).
Date of Issue	October 2019
PCR review was conducted by:	Thomas P. Gloria, PhD (Chair), Industrial Ecology Consultants t.gloria@industrial-ecology.com Mr. Jack Geibig, EcoForm Mr. Bill Stough, Sustainable Research Group
EPD Explanatory material	For any explanatory material, regarding this EPD, please contact the program operator. ASTM International Environmental Product Declarations 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, http://www.astm.org

1 PRODUCT IDENTIFICATION

1.1 PRODUCT DEFINITION

Single ply roofing membranes are defined as thermoplastic or thermoset membranes of compounded synthetic materials manufactured in a factory for use in roofing (6). This EPD applies to the Seaman Corporation's FiberTite® single-ply roofing membranes (all colors), with a finished nominal thickness of 36, 45, 50 and 60 mils, as produced at its manufacturing facilities in Wooster, OH and Bristol, TN.

The formulation of Seaman Corporation's single-ply membrane includes optimal Elvaloy® KEE (Ketone Ethylene Ester) polymer content to allow the roofing membrane to maintain excellent flexibility, as well as chemical and UV resistance. The physical properties of the membrane are enhanced with a four-layer technology that includes a weft-inserted polyester base fabric that provide flexibility and durability.

Seaman Corporation's FiberTite roofing membrane contributes to LEED® credit requirements and is Cool Roof Rating Council-rated and Title 24 compliant. The FiberTite product line, offers a membrane for virtually any low-slope roofing specification. The membranes weld quickly, cleanly, and consistently. Seaman Corporation's FiberTite roofing membranes can be either installed as a mechanically fastened or adhered roofing system.

Table 1 summarizes key technical data for Seaman Corporation's FiberTite single-ply KEE roofing membrane by thickness. Seaman Corporation's FiberTite meets or exceeds the requirements of ASTM D6754, Standard Specification for Ketone Ethylene Ester Based Sheet Roofing (1). Further testing information and results can be found on the Seaman Corporation's website (9).

Table 1. Key technical data of declared thicknesses (9)

Single-ply roofing membranes	Technical data	Units	Values			
FiberTite KEE Membrane (no fleece backing)	Finished nominal thickness	mil	36	45	50	60
		mm	0.9	1.1	1.3	1.5
	Finished density	kg/m^2	1.0	1.4	1.4	1.8
FiberTite KEE Membrane (fleece backed)	Finished nominal thickness	mil	36	45	50	60
		mm	0.9	1.1	1.3	1.5
	Finished density	kg/m^2	1.2	1.5	1.6	1.9

1.2 PRODUCT STANDARDS

The Seaman Corporation's FiberTite roofing membrane, with a finished nominal thickness of 36, 45, 50, and 60-mil meet the following standards and requirements,

- ASTM D6754 Standard Specification for Ketone Ethylene Ester (KEE) Based Sheet Roofing (1)
- Cool Roof Rating Council® (select colors)
- FM Approvals
- Miami-Dade County Approval

- California's Building Energy Code (Title 24) Compliant
- Texas Department of Insurance.
- Underwriters Laboratory Inc.
- Underwriters Laboratories of Canada
- ICC Evaluation Service
- NEMO ETC Certified (ASTM D6754)

2 DECLARED UNIT

The declared product is 1 m^2 of Seaman Corporation's FiberTite single-ply PVC Roofing membrane, with a finished nominal thickness of 36, 45, 50, or 60-mil with and with fleece backing.

3 MATERIAL CONTENT

The average material composition by input material (in %) for 1m^2 for the Seaman Corporation's FiberTite roofing membrane is provided in Table 2.

Table 2. Average material content for 1 m^2 Seaman Corporation's FiberTite roofing membrane

Material input	**Material Content (in %)**	
	Non-fleece (bare back)	Fleece backed
PVC Resin & KEE co-polymer	52	48
Processing aids	15	14
Pigments	4	4
Fire retardant	11	10
Polyester reinforcement	14	13
Fleece backing	0	9
Others	3	3
Total weight (Input)	**100**	**100**

4 LIFE CYCLE STAGES

Figure 1 shows the life-cycle stages and information modules that are included within the cradle-to-gate LCA system boundary of this EPD. The boundary is “cradle-to-gate”, which includes the *Production stage* (A1 to A3 modules). *Construction, Use, and End-of-Life stages* - are excluded from the system boundary. The *Production stage* system boundary is shown in Figure 2. Per ISO 21930, 7.1.7.2.1 (3), the system boundary with nature (natural environment) includes those technical processes that provide the material and energy inputs into the system and the subsequent manufacturing and transport processes up to the to the factory gate, as well as the processing of any waste arising from those processes.

Production stage			**Construction stage**		**Use stage**							**End-of-life stage**			
Extraction and upstream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport to waste processing or disposal	Waste processing	Disposal of waste
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
X			MND												
X- module is included in system boundary; MND- module is not declared (excluded from system boundary)															

Figure 1 Life Cycle Stages and Modules

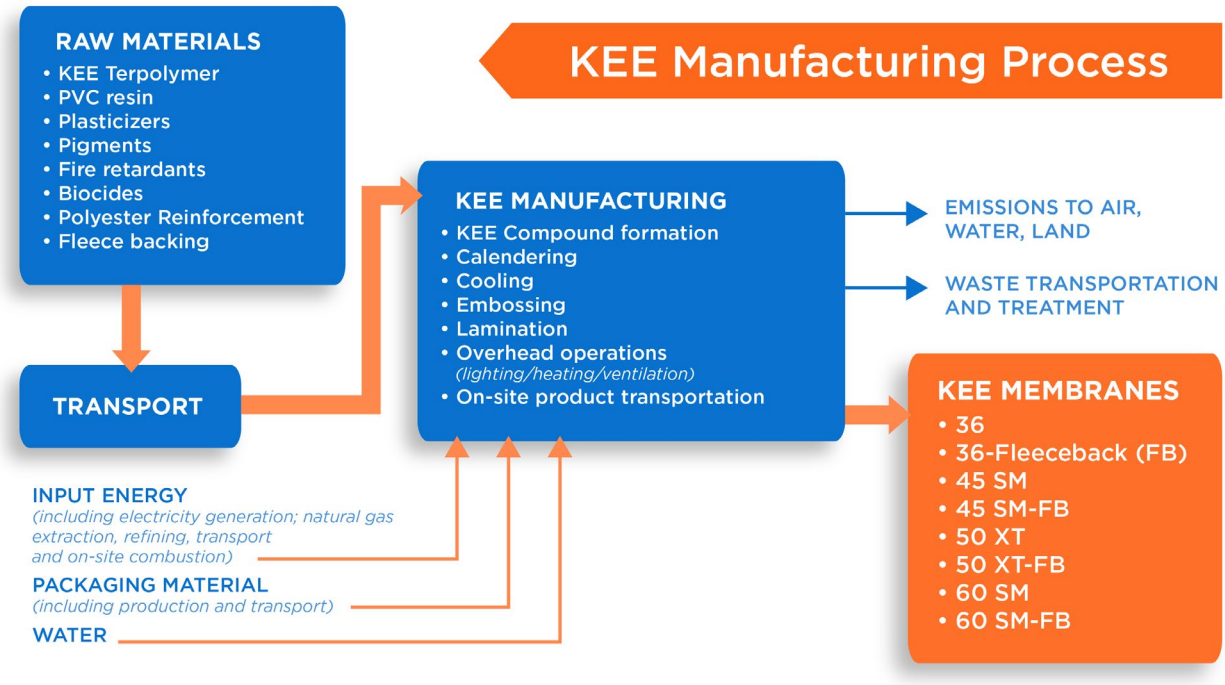

Figure 2 Seaman's Corporation's Roofing Membrane System Boundaries

5 LIFE CYCLE INVENTORY

5.1 DATA COLLECTION, SOURCES, AND CALCULATIONS

LCI data collection was based on one customized LCI survey. The LCI survey covered the primary data for the facility for the 2021 reference year (12 consecutive months). Data calculation procedures follow ISO 14044 (5), and NSF PCR for Single Ply Roofing Membranes (6). Per ISO 21930, 7.2.2 (3), when transforming the inputs and outputs of combustible material into inputs and outputs of energy, the net calorific value (lower heating value) of fuels is applied according to scientifically based and accepted values specific to the combustible material.

5.2 DATA QUALITY REQUIREMENTS AND ASSESSMENTS

A detailed description of collected data and the data quality assessment regarding the NSF PCR requirements (6) and ISO 14044 (5) is provided in the LCA project report. Data quality is assessed based on its representativeness (technology coverage, geographic coverage, time coverage), completeness, consistency, reproducibility, transparency, and uncertainty (Table 3).

Table 3. Data Quality Requirements and Assessments

Data Quality Requirements	Description
Technology Coverage	Data represents the prevailing technology at Seaman Corporation's plants in Wooster, OH and Bristol, TN. Whenever available, North American typical or average industry LCI datasets were utilized for all upstream and core material and processes. *Technological representativeness is characterized as "high".*
Geographic Coverage	The geographic region considered is the U.S. *Geographical representativeness is characterized as "high".*
Time Coverage	Activity data are representative. - Roofing membrane manufacturing process- primary data collected for reference year 2021 (12 months) - In-bound/ out-bound transportation data- primary data collected for reference year 2021 (12 months) - Polyester scrim reinforcement production- primary data collected at Wooster, OH plant for reference year 2021 (12 months) - Fleece backing production- SDS and confidential data provided by Seaman Corporation (2021) - Generic data: the most appropriate LCI datasets were used as found in the US LCI Database, ecoinvent v.3.5 database for US and Global, 2018. US LCI database "dummies" (empty/missing LCI datasets) are substituted with ecoinvent v3.5 LCI datasets. *Temporal representativeness is characterized as "medium" to "high".*

Data Quality Requirements	Description
Completeness	All relevant, specific processes, including inputs (raw materials, energy, and ancillary materials) and outputs (emissions and production volume) were considered and modeled. The relevant background materials and processes were taken from the US LCI Database (adjusted for known data placeholders), ecoinvent v 3.5 LCI database for US, and modeled in SimaPro software v.9.2, 2021 (10). The completeness of the cradle-to-gate process chain in terms of process steps is rigorously assessed for all membranes and documented in project report.
Consistency	To ensure consistency, the input/output LCI modeling of the single-ply roofing membranes used the same LCI modeling structure, which consisted of input raw, secondary, ancillary, and packaging materials, intermediate products, energy flows, water resource inputs, product outputs, co-products, by-products, emissions to air, water and soil, and solid and liquid waste disposal. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the facility level and selected process levels to maintain a high level of consistency.
Reproducibility	Internal reproducibility is possible since the data and the models are stored and available in *Athena Seaman LCI database* developed in SimaPro, 2021 (10). A high level of transparency is provided throughout the reviewed LCA project report as the LCI profile is presented for each of the declared products as well as major upstream inputs. Key primary (manufacturer specific) and secondary (generic) LCI data sources are summarized in the supporting LCA project report.
Transparency	Activity and LCI datasets are transparently disclosed in the project report, including data sources.
Uncertainty	A *sensitivity check* was conducted to assess the reliability of the EPD results and conclusions by determining how they are affected by uncertainties in the data or assumptions on calculation of LCIA and energy indicator results. The LCA background report includes the results of a *sensitivity analysis* and *Monte Carlo uncertainty analysis of background data sets.*

5.3 ALLOCATION RULES

Both manufacturing facilities produce high-performance fabrics for other uses besides the roofing membranes of interest and as per the PCR, allocation based on the mass of membrane products produced was necessary. “Mass” based, plant specific formulation for 1m^2 of single-ply roofing membranes were used to calculate the input raw the ancillary materials consumed. “Mass” was used as the physical parameter for allocating flows between the products of interest and other co-products to calculate the input energy flows (electricity, natural gas, propane, etc.), shipping and packaging materials, lubricants, hydraulic fluid, greases, and heating oil, total water consumption, process emissions to air and waste flows. No burden is allocated to the by-product of the declared product system such as off-spec roofing membranes. In addition, allocation related to transport is based on the mass of transported inputs and outputs.

5.4 CUT OFF RULES

The cut-off criteria as per NSF PCR, Section 7.1.6 (6) and ISO 21930, 7.1.8 (3) were followed. All input/output data reported by the Wooster, OH and Bristol, TN manufacturing plants were included in the LCI modelling. None of the reported flow data were excluded based on the cut-off criteria. No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this EPD. Any plant specific data gaps for the reference year (e.g., input hydraulic fluids, lubricants, greases, or heated oil) were filled in with plant generic data from 2018. Safety Data Sheet (SDSs) were confidentially provided by Seaman Corporation for each additive e.g., processing aid (also referred to as the plasticizer), fire retardant, stabilizer, fleece backing, etc. Any data gaps in the SDS are filled in with proxy and conservative generic LCI datasets, as appropriate.

This EPD excludes the following processes:

- Capital goods and infrastructure, and
- Personnel related activity (travel, furniture, office operations and supplies).

6 LIFE CYCLE ASSESSMENT RESULTS

Tables 4 and 5 present the "cradle-to-gate" LCA results for 1 m^2 of 36, 45, 50, and 60-mil Seaman Corporation's FiberTite without and with fleece backing roofing membrane, respectively.

As per the NSF PCR, the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), version 2.1, 2012 (11) impact categories are used as they provide a North American context for the mandatory category indicators to be included in this EPD. *These are relative expressions only and do not predict category impact endpoints, the exceeding of thresholds, safety margins or risks* [4], [5]. Additional mandatory resource use, waste categories and output flows are also reported as per the PCR. [7] "*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*: RPR_E, RPR_M, $NRPR_E$, $NRPR_M$, SM, RSF, NRSF, RE, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, EE" (6).

Table 4. Production stage (A1-A3) EPD results for 1 m^2 of 36, 45, 50, and 60-mil Seaman Corporation's FiberTite single-ply roofing membrane – without fleece backing

Impact category and inventory indicators	Unit	FiberTite® Roofing Membranes (non-fleece backed)			
		36-mil FT	45-mil FT-SM	50-mil FT-XT	60-mil FT-SM
Global warming potential, GWP 100[1)]	kg CO_2 eq	**4.3**	**5.3**	**5.4**	**6.7**
Ozone depletion potential, ODP[1)]	kg CFC-11 eq	**4.9E-07**	**6.8E-07**	**6.6E-07**	**9.1E-07**
Smog formation potential, SFP[1)]	kg O_3 eq	**0.30**	**0.40**	**0.39**	**0.51**
Acidification potential, AP[1)]	kg SO_2 eq	**0.024**	**0.032**	**0.033**	**0.042**
Eutrophication potential, EP[1)]	kg N eq	**0.073**	**0.113**	**0.104**	**0.153**
Fossil fuel depletion, FFD[1)]	MJ surplus	**1.0E+01**	**1.2E+01**	**1.3E+01**	**1.5E+01**

Impact category and inventory indicators	Unit	FiberTite® Roofing Membranes (non-fleece backed)			
		36-mil FT	45-mil FT-SM	50-mil FT-XT	60-mil FT-SM
Abiotic depletion potential, fossil ADPf[2)]	MJ LHV	**77.4**	**91.6**	**100.8**	**115.7**
Renewable primary resources used as an energy carrier (fuel), RPR_E	MJ LHV	**3.2**	**4.4**	**4.1**	**5.7**
Renewable primary resources with energy content used as material, RPR_M[3)]	MJ LHV	**-**[5)]	**-**	**-**	**-**
Non-renewable primary resources used as an energy carrier (fuel), $NRPR_E$	MJ LHV	**64.1**	**71.9**	**81.8**	**90.1**
Non-renewable primary resources with energy content used as material, $NRPR_M$[3)]	MJ LHV	**22.6**	**30.4**	**30.1**	**38.6**
Secondary materials, SM[3)]	kg	**0**	**0**	**0**	**0**
Renewable secondary fuels, RSF[3)]	MJ LHV	**-**	**-**	**-**	**-**
Non-renewable secondary fuels, NRSF[3)]	MJ LHV	**-**	**-**	**-**	**-**
Recovered energy, RE[3)]	MJ LHV	**-**	**-**	**-**	**-**
Consumption of freshwater, FW[3)]	m^3	**9.4E-04**	**9.4E-04**	**9.2E-04**	**1.2E-03**
Hazardous waste disposed, HWD[3)]	kg	**0.009**	**0.010**	**0.008**	**0.014**
Non-hazardous waste disposed, NHWD[3)]	kg	**8.0E-02**	**8.1E-02**	**7.8E-02**	**1.0E-01**
High-level radioactive waste, conditioned, to final repository, HLRW[3)] [4)]	m^3	**4.8E-09**	**5.5E-09**	**5.7E-09**	**6.6E-09**
Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW[3)] [5)]	m^3	**7.0E-08**	**8.2E-08**	**8.5E-08**	**1.0E-07**
Components for re-use, CRU[3)]	kg	**-**	**-**	**-**	**-**
Materials for recycling, MR[3)]	kg	**0.043**	**0.057**	**0.059**	**0.072**
Materials for energy recovery, MER[3)]	kg	**-**	**-**	**-**	**-**
Recovered energy exported from the product system, EE[3)]	MJ LHV	**-**	**-**	**-**	**-**

Table 5. Production Stage (A1-A3) EPD results for 1 m^2 of 36, 45, 50, and 60-mil Seaman Corporation's FiberTite® single-ply roofing membrane –fleece-backed

Impact category and inventory indicators	Unit	FiberTite® Roofing Membranes (fleece backed)			
		36-mil FT-FB	45-mil FT-SM-FB	50-mil FT-XT-FB	60-mil FT-SM-FB
Global warming potential, GWP 100[1)]	kg CO_2 eq	**5.5**	**6.5**	**6.7**	**7.6**
Ozone depletion potential, ODP[1)]	kg CFC-11 eq	**6.1E-07**	**8.0E-07**	**7.7E-07**	**9.9E-07**
Smog formation potential, SFP[1)]	kg O_3 eq	**0.34**	**0.44**	**0.44**	**0.55**
Acidification potential, AP[1)]	kg SO_2 eq	**0.029**	**0.037**	**0.038**	**0.046**
Eutrophication potential, EP[1)]	kg N eq	**0.076**	**0.117**	**0.108**	**0.155**
Fossil fuel depletion, FFD[1)]	MJ surplus	**1.3E+01**	**1.5E+01**	**1.6E+01**	**1.7E+01**
Abiotic depletion potential, fossil ADPf[2)]	MJ LHV	**97.5**	**111.6**	**120.9**	**131.7**
Renewable primary resources used as an energy carrier (fuel), RPR_E	MJ LHV	**4.0**	**5.2**	**4.4**	**6.3**
Renewable primary resources with energy content used as material, RPR_M[3)]	MJ LHV	**-**[5)]	**-**	**-**	**-**
Non-renewable primary resources used as an energy carrier (fuel), $NRPR_E$	MJ LHV	**87.1**	**94.6**	**104.8**	**108.2**
Non-renewable primary resources with energy content used as material, $NRPR_M$[3)]	MJ LHV	**23.0**	**30.9**	**30.5**	**38.9**
Secondary materials, SM[3)]	kg	**0**	**0**	**0**	**0**
Renewable secondary fuels, RSF[3)]	MJ LHV	**-**	**-**	**-**	**-**
Non-renewable secondary fuels, NRSF[3)]	MJ LHV	**-**	**-**	**-**	**-**
Recovered energy, RE[3)]	MJ LHV	**-**	**-**	**-**	**-**
Consumption of freshwater, FW[3)]	m^3	**1.3E-03**	**1.3E-03**	**1.4E-03**	**1.3E-03**
Hazardous waste disposed, HWD[3)]	kg	**0.053**	**0.053**	**0.053**	**0.053**
Non-hazardous waste disposed, NHWD[3)]	kg	**1.4E-01**	**1.4E-01**	**1.4E-01**	**1.3E-01**
High-level radioactive waste, conditioned, to final repository, HLRW[3)] [4)]	m^3	**6.4E-09**	**7.1E-09**	**7.4E-09**	**7.9E-09**
Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW[3)] [5)]	m^3	**9.2E-08**	**1.0E-07**	**1.1E-07**	**1.2E-07**
Components for re-use, CRU[3)]	kg	**-**	**-**	**-**	**-**
Materials for recycling, MR[3)]	kg	**0.049**	**0.062**	**0.064**	**0.077**
Materials for energy recovery, MER[3)]	kg	**-**	**-**	**-**	**-**
Recovered energy exported from the product system, EE[3)]	MJ LHV	**-**	**-**	**-**	**-**

Notes:

[1)] Calculated as per U.S EPA TRACI 2.1, v1.05, SimaPro v 9.2 GWP-100 (10), excludes biogenic CO_2 removals and emissions associated with any biobased products, including bio-based packaging. There is no biogenic content in the declared products. CO_2 emissions from calcination and carbonation are not applicable to the declared products; 100-year time horizon GWP factors are

provided by the IPCC 2013 Fifth Assessment Report (AR5), TRACI 2.1, v1.05 (11). FFD is required in LEED V4.1 MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations (12).

[2)] Calculated as per CML-IA Baseline v3.05, SimaPro v 9.2 (10). ADP_f is also required in LEED v4.0/v4.1 MR2 Credit: Building Product Disclosure and Optimization – Environmental Product Declarations (13), (12).

[3)] Calculated as per ACLCA ISO 21930 Guidance (14), respective sections 6.2 to 10.8.

[4)] It should be noted that the foreground system (Seaman Corporation roofing membrane manufacturing process) does not generate any HLRW or ILLRW. High, intermediate or low-level radioactive waste is generated by electricity production (spent fuel from reactors, routine facility maintenance and operations)" (ISO 21930:2017, clause 7.2.14).. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors." (ISO 21930:2017, clause 7.2.14).

[5)] "-"N/A for this product system. "*Not all LCA datasets for upstream materials include these impact categories and thus results may be incomplete. Use caution when interpreting data in these categories"* (6).

7 INTERPRETATION

The Seaman Corporation's FiberTite® EPD results represent a "cradle-to-gate" environmental profile per 1 m^2 for each declared single-ply roofing membrane thickness as manufactured at its Wooster, OH and Bristol, TN plants for the reference year 2021.

Module A1 Extraction and upstream production contributes the largest share of the LCIA category indicator results – accounting for between 73% and 98% of the *Production stage* (A1 to A3) potential environmental burdens. *Module A3 Manufacturing* is the second largest contributor (<20%) to the overall potential environmental impacts of the membrane manufacture. Approximately 95% of the total primary energy is derived from *non-renewable primary energy resource* ($NRPR_E$) for all membrane types. *Module A2 transportation* significantly contributes to the smog formation potential but otherwise contributed less than 10% to the other environmental indicator metrics.

8 ADDITIONAL ENVIRONMENTAL INFORMATION

- Select FiberTite roofing membranes comply with efficiency programs requiring the use of a highly reflective roof like California Title 24, U.S. Green Building Council's (USBGC) Leadership in Energy and Environmental Design (LEED) rating system, the International Green Construction Code (IgCC), IECC, and Green Building Institute's Green Globes.
- FiberTite Roof Systems, when designed and installed properly, can help increase energy efficiency, especially the building's peak energy demand.

9 DECLARATION TYPE

This “Cradle-to-gate” EPD applies to Seaman Corporation’s FiberTite roofing membranes (all colors) of 36, 45, 50, and 60-mil nominal thicknesses with and without fleece backing. Production activities covered include *the extraction and upstream production, transport to factory, manufacturing* (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

The three declared thicknesses (36, 45, 50, and 60-mil with and without fleece backing) of FiberTite roofing membrane fall under the description:
- *A product-specific EPD, from multiple manufacturer’s plants*.

10 EPD COMPARABILITY LIMITATION STATEMENT

- *Only EPDs prepared from cradle-to-grave life cycle results and based on the same function, RSL, quantified by the same functional unit, and meeting all the conditions for comparability listed in ISO 14025:2006 and ISO 21930:2017 can be used to make comparison between products*.
- Declarations based on the NSF Product category rules are not comparative assertions; that is, no claim of environmental superiority may be inferred or implied.

11 REFERENCES

1. ASTM D 6754 Standard Specification for Ketone Ethylene Ester (KEE) Based Sheet Roofing.

2. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.

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