

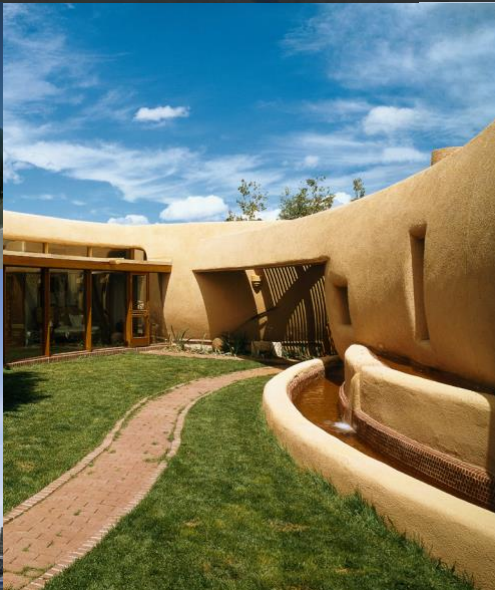


Building with conscience.





**EPD for StoGuard®  
Transition Membrane**

**StoGuard® Transition Membrane** is a flexible air barrier membrane for use on vertical above grade wall construction over properly prepared concrete, concrete masonry (CMU), glass mat gypsum sheathing and Exterior or Exposure I wood-based sheathing.





Manufacturer Name	Sto Corp. 3800 Camp Creek Parkway SW, Building 1400, Suite 120, Atlanta, GA 30331 www.stocorp.com   (800) 221-2397
EPD Program Operator	Epsten Group 101 Marietta St. Suite 2600, Atlanta, GA 30303 www.epstengroup.com
Compliance to ISO21930:2017	Yes
Product Name	StoGuard® Transition Membrane
Product's Intended Application and Use	Flexible air barrier membrane
Declaration Number	01-007
Date of Certification	December 18 <sup>th</sup> , 2019
Period of Validity	5 years from date of certification
Functional Unit	One square meter of covered substrate for 60 years
Reference Service Life used in assessment	10 Years
Overall Data Quality Assessment Score	Good
Manufacturing Location	Wörschach, Austria
LCA Software and Version Number	GaBi 9.2.0.58
LCI Database and Version Number	GaBi Database, Service Pack 39
ISO 21930: 2017 serves as the core PCR Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	Kate McFeaters <a href="mailto:kmcfeaters@epstengroup.com">kmcfeaters@epstengroup.com</a> 
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	WAP Sustainability Consulting, LLC
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Kate McFeaters <a href="mailto:kmcfeaters@epstengroup.com">kmcfeaters@epstengroup.com</a> 

### Comparability

In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.



## » Company

We believe in 'Building with conscience'.

That means ensuring that all building products are not only safe, effective and easy to install, but also environmentally responsible and sustainable. We know you're always looking for the smartest and newest technology to create energy efficient buildings with superior aesthetics.

That's exactly what our products help you achieve. Products like our wall systems, coatings and finishes are consistent favorites among design professionals, contractors and property owners alike. Whatever your needs or vision may be, we offer products for every type of building project; whether it's new construction, restoration or panelization, commercial or residential work.

An architect or specifier focuses on aesthetics and feasibility, a contractor needs products that are easy to work with, and a building owner requires high value and low costs on properties. Sto understands these unique needs, and delivers the smart, innovative materials and solutions that make this all possible. That's why Sto remains the innovative leader in integrated exterior wall systems.

When you combine that commitment to product support and innovation with value-added offerings like consultative design and color services through Sto Studio or training in proper application techniques through the Sto Institute, you get an integrated exterior wall system solution unmatched in the industry.

## » Manufacturing Sites Covered in this EPD

Manufacturing location is Wörschach, Austria.

## » Product Description

StoGuard® Transition Membrane is applicator-friendly and cost-saving:

- StoGuard® Transition Membrane can be easily applied without the use of special tools or applicator training.
- Thanks to the durability of StoGuard® Transition Membrane, it will not tear or lose effectiveness while in service.
- Because StoGuard® Transition Membrane is a fully adhered product, it will not peel or suffer loss of adhesion along edges.
- StoGuard® Transition Membrane will not stain surfaces due to adhesive leaching or streaking.
- StoGuard® Transition Membrane does not require the use of primers or terminations mastics for proper installation.
- Because StoGuard® Transition Membrane is a flexible material, it can be used in a wide range of applications for both static and dynamic joint conditions. One product solves multiple job site conditions.
- StoGuard® Transition Membrane is compatible with all StoGuard® vapor permeable or vapor impermeable membranes.



## » Product Identification

StoGuard® Transition Membrane is offered in five different width options. It is a flexible air barrier membrane for use on vertical above grade wall construction over properly prepared concrete, concrete masonry (CMU), glass mat gypsum sheathing and Exterior or Exposure I wood-based sheathing. Table 1 lists the products declared in this EPD.

Table 1: List of StoGuard® Transition Membrane Products

Product Name	Product #	Width
StoGuard® Transition Membrane	81272	120 mm (4.75")
	81342	152 mm (6")
	81343	228 mm (9")
	81344	304 mm (12")
	81349	457 mm (18")

## » Performance Features

Waterproof	Flexible	Fully adhered membrane	No adhesive leaching	Compatible with other StoGuard® products
Fast and easy to install	Durable	UV-resistant	Versatile	Sustainability

## » Technical Details

Table 2: Technical Data

Performance	Test Method	Test Criteria	Result
Elongation*	ASTM D412	Measure	260%
Tensile Strength*	ASTM D412	Measure	60 psi (.41 MPa)
Tear and Adhesion Properties at 25% Elongation	ASTM C1523	No tearing or loss of adhesion after conditioning	Pass after dry, wet, frozen, and heat aged conditioning
Water Vapor Permeance	ASTM E96		1.48 perms (85 ng/Pa•s•m2)
Air Leakage**	ASTM E2178	≤ 0.02 L/m2•s @ 75 Pa (≤ 0.004 cfm/ft2 @ 1.57 psf)	Passed
Water Column	AATCC 127 (modified)	No leakage for 5 hours minimum	Passed
Adhesion	ASTM D4541	≥ 60 psi (414 kPa)	Passed on plywood, OSB, concrete, and CMU substrates. Exceeded strength of glass mat facing attachment when adhered to glass mat gypsum sheathing
Cyclic Elongation	Lab Method	500 cycles at 0% to 50% elongation and return	No loss of continuity of membrane or loss of bond at joint

\*Elongation and Tensile strength measured in transverse direction (perpendicular to length of roll).

\*\* Based on extrapolation of similar E2178 test data.

## » Material Composition

The material composition of StoGuard® Transition Membrane is listed below:

Table 3: Material composition of StoGuard® Transition Membrane

Ingredient	Mass %
Polyester	20-25%
Thermoplastic Elastomer	75-80%
Colorant	0.04%

## » Components related to Life Cycle Assessment

The functional unit for the EPD was covering 1 square meter (m<sup>2</sup>) of substrate for a period of 60 years—the assumed lifetime of a building. The reference flow required for the functional unit is calculated based on the product lifespan scenarios prescribed in ISO 21930:2017. The reference service life of the product is 10 years which is the warranty of Sto’s wall system. Because the impacts of the product applied on different substrates differ by more than 10%. The results will be reported separately for application on plywood and CMU, which is respectively the lower and upper band of the amount of installation material. The reference flow required for one functional unit is provided in Table 4.

Table 4: Reference flow and Functional Unit

Substrate	FUnctional Unit [1 m <sup>2</sup> ]	Product	Reference Flow of product [kg]	Installation Material	Reference Flow of installation material [kg]
Plywood	1	StoGuard®	2.4	Sto Gold Coat	5.6
CMU		Transition Membrane			12.06

## » Scope and Boundaries of the Life Cycle Assessment

The LCA was performed in accordance with ISO 14040 standards. The study is a cradle-to-grave LCA and includes the following life stages as prescribed in ISO 21930:2017.

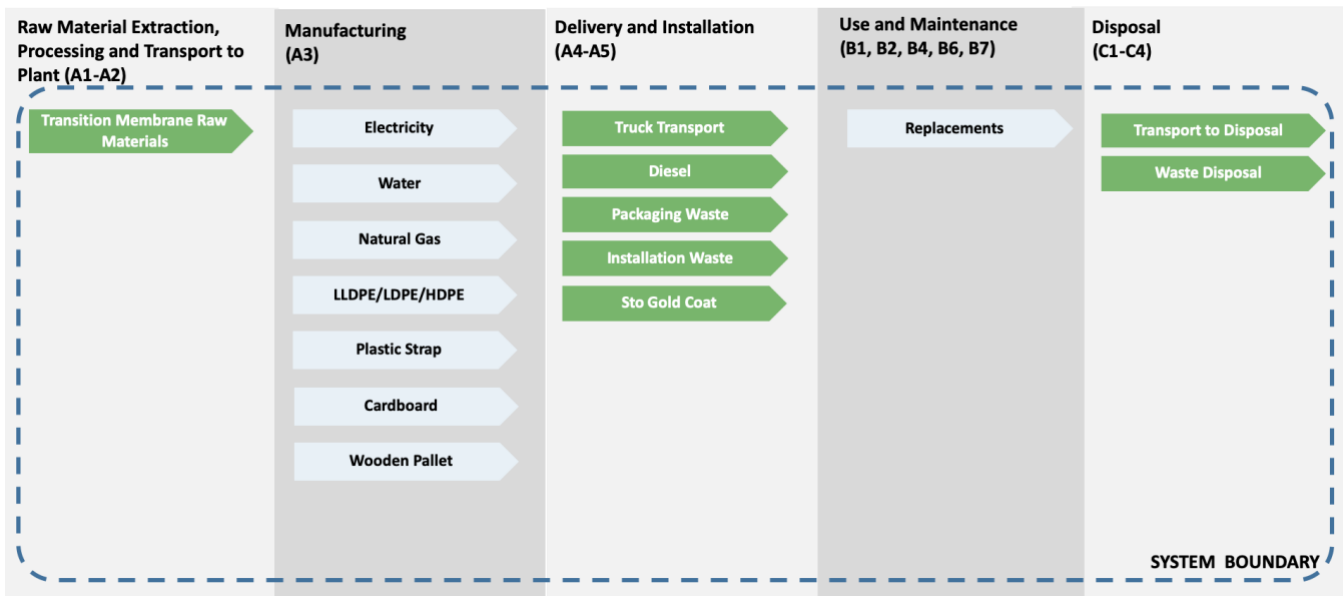


Figure 1: Life stages for the cradle-to-grave LCA

## » Cut-off Criteria

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit.

## » Data Quality

The overall data quality level was determined to be good. Primary data was collected from the manufacturing facility in Wörschach, Austria for the 2018 reference year. When primary data did not exist, secondary data were obtained from the Gabi V9.2.0.58 Database Service Pack 39. Overall, both primary and secondary data are considered acceptable quality in terms of geographic, temporal and technological coverage.

## » Estimates and Assumption

Assumptions were made to represent the cradle-to-grave environmental performance of Sto's products. These assumptions include up stream and downstream transportation distances, the disposal of packaging material, the method in which the product is disposed of at its end of life and relevant use phase assumptions.

## » Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. When allocation was necessary it was done on a physical mass basis. To derive a per unit value for manufacturing inputs such as electricity, water, and natural gas, a series of allocation calculations were adopted. The facility level of utility data was allocated based on production values of different types of products in the same manufacturing facility. Then the data is further allocated among products of different specifications based on the mass because it is believed the energy consumption and water consumption correlated better on a mass basis.

## » Production Stage (A1-A3)

StoGuard® Transition Membrane is manufactured in Wörschach, Austria. This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by the manufacturer.

## » Transport to Construction Site (A4)

The product is assumed to be shipped from the manufacturing facility to distribution facilities in the US via truck and ocean freight transportation. From the distribution facilities, the product is shipped to construction sites by trucks. Table 5 gives the transportation details including the distances and the truck dataset used in the model. Transport distances are calculated based on the locations of the manufacturing facility, the distribution facilities, and customers' zip codes retrieved from the sales records.

Table 5: Transport Details

Parameter	Truck in US	Ocean Vessel	Truck in EU	Unit
Fuel type	Diesel	Heavy fuel oil	Diesel	-
Liters of fuel	39.0625	0.00023	33.1	l/100km
Vehicle type	Heavy duty diesel truck/ 50,000 lb payload	Container ship, 5,00 to 200,000 dwt payload capacity, ocean going	Truck-trailer, Euro 0-6 mix, 34 - 40t gross weight / 27t payload capacity	-
Transport distance from the manufacturing facility to the departure port	n/a	n/a	441	km
Transport from EU to the USA	n/a	14127.62	n/a	km
Transport from arrival port to distribution facilities	446.59	n/a	n/a	km
Transport distance from the distribution facilities to construction sites	636.45	n/a	n/a	km

## » Installation (A5)

StoGuard® Transition Membrane is installed with any of the StoGuard® fluid-applied air barrier products: Sto Gold Coat, Sto Emerald Coat, Sto AirSeal or Sto VaporSeal. It also may be installed using Sto Extra Seal cementitious air barrier material. In this EPD, Sto Gold Coat is used as the complementary installation material due to the availability of its LCA data. Detailed application instructions are provided online.

The installation process is manual. Thus no energy or additional material other than the product and Sto Gold Coat is required. The use amount of Sto Gold Coat is calculated based on the coverages on two substrates: plywood and CMU, which give a lower and upper band of the coverage area. The LCA study considered a 10% of product loss as waste in the installation process. Together with the product loss, the waste was also generated from the packaging material. In addition, VOC emissions from the curing of applied Sto Gold Coat was also taken into account.

Table 6: Installation (A5)

Parameter	Transition Membrane on Plywood	Transition Membrane on CMU	Unit
Product loss per functional unit		0.24	kg/ESL
Waste materials at the construction site before waste processing, generated by product installation	1.10E+00	2.07E+00	kg/ESL
Plastic material recycled	9.65E-02	1.82E-01	kg/ESL
Plastic material landfilled	7.99E-01	1.51E+00	kg/ESL
Plastic material incinerated	1.64E-01	3.10E-01	kg/ESL
Cardboard recycled		2.38E-03	kg/ESL
Cardboard landfilled		9.60E-04	kg/ESL
Cardboard incinerated		2.32E-04	kg/ESL
GWP based in biogenic carbon content of cardboard packaging		2.10E-4	kg CO <sub>2</sub> e/ESL
Wood material recycled		2.64E-03	kg/ESL
Wood material landfilled		1.10E-02	kg/ESL
Wood material incinerated		2.56E-03	kg/ESL
GWP based in biogenic carbon content of wood packaging		2.92E-02	kg CO <sub>2</sub> e/ESL
Steel material recycled	7.13E-03	1.54E-02	kg/ESL
Steel material landfilled	1.17E-02	2.53E-02	kg/ESL
Steel material incinerated	2.53E-03	5.44E-03	kg/ESL
Direct emissions to ambient air	2.04E-01	3.95E-01	kg/ESL

## » Use Stage (B1-B5 & B6-B7)

Since the product is applied under a wall surface, there are no use phase inputs required to maintain the performance of the product other than the replacement needed through the estimated service life (ESL) of a whole building. The ESL in the study is assumed to be 60 years which is a standard established and used in many PCRs of similar product categories such as architectural coating. The RSL of the product is determined by the warranty of the product, which is ten years. Therefore, after initial installation on a building with a 60-year service life, there will be five replacements needed. Besides the emissions to the air disclosed in the above table, there are no other emissions to air, soil or water, including those of any regulated substances.

Table 7: Replacement (B4)

Parameter	Value	Unit
Reference Service Life (RSL)	10	Years
Estimated Service Life (ESL)	60	Years
Replacement cycle	5	(ESL/RSL)-1
Declared product properties	As per Product Identification section	-
Design application parameters	As per technical details in Table 2	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Industry Standard	-

## » End-of-Life Stage (C1-C4)

In this stage, the product at its end of life is transported to the waste disposal facility and processed. Included in this stage are the following:

- Deconstruction – There are no impacts during this stage as the product is manually removed.
- Transportation to disposal – Estimated fuel requirements made based on weight of product and average distance to landfill.
- Waste processing for landfilling – This process is included in the landfilling process.
- Waste disposal – Due to the fact that all the products in study are installed as part of a wall system including the external coating/finish, and are not able to be dismantled based on their material type, it is reasonable to assume that the products at their end-of-life stage are landfilled.

Table 8: End-of-Life Parameters

Parameter	Transition Membrane on Plywood	Transition Membrane on CMU	Unit
Collected with mixed construction waste	6.98	12.6	kg/ESL
Landfilling	100	100	%
Product for final deposition	6.98	12.6	kg/ESL



## » Life Cycle Assessment Results

As prescribed by ISO 21930:2017, TRACI 2.1 impact characterization methodology and IPCC 5th assessment report are adopted to calculate the environment impacts. Table 9 provides the acronym key of the impact indicators declared in this EPD.

Table 9: LCIA impact category and LCI Indicator keys

Abbreviation	Parameter	Unit
<b>TRACI 2.1</b>		
AP	Acidification potential of soil and water	kg SO <sub>2</sub> eq
EP	Eutrophication potential	kg N eq
GWP	Global warming potential including biogenic carbon emission	kg CO <sub>2</sub> eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
POCP	Photochemical ozone creation potential	kg O <sub>3</sub> eq
ADP-Fossil Fuel	Abiotic depletion potential for fossil resources (An indicator derived from CML 2001-Jan 2016)	MJ, net calorific value
<b>Resource Use Parameters</b>		
RPR <sub>E</sub>	Renewable primary energy as energy carrier	MJ, net calorific value
RPR <sub>M</sub>	Renewable primary energy resources as material utilization	MJ, net calorific value
NRPR <sub>E</sub>	Non-renewable primary energy as energy carrier	MJ, net calorific value
NRPR <sub>M</sub>	Non-renewable primary energy as material utilization	MJ, net calorific value
SM	Use of secondary material	kg
RSF	Use of renewable secondary fuels	MJ, net calorific value
NRSF	Use of non-renewable secondary fuels	MJ, net calorific value
RE	Recovered energy	MJ, net calorific value
FW	Use of fresh water	m <sup>3</sup>
<b>Waste Parameters</b>		
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
HLRW	High-level radioactive waste disposed	kg
ILLRW	Intermediate and low-level radioactive waste disposed	kg
<b>Carbon Removal and Emission Parameter</b>		
BCRP	Biogenic Carbon Removal from Product	kg CO <sub>2</sub> eq
BCEP	Biogenic Carbon Emission from Product	kg CO <sub>2</sub> eq
BCRK	Biogenic Carbon Removal from Packaging	kg CO <sub>2</sub> eq
BCEK	Biogenic Carbon Emission from Packaging	kg CO <sub>2</sub> eq
BCEW	Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO <sub>2</sub> eq
CCE	Calcination Carbon Emissions	kg CO <sub>2</sub> eq
CCR	Carbonation Carbon Removals	kg CO <sub>2</sub> eq
CWNR	Carbon Emissions from Combustion of Waste from Non- Renewable Sources used in Production Processes	kg CO <sub>2</sub> eq

## » StoGuard® Transition Membrane on Plywood -- Results

### TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO <sub>2</sub> eq]	1.75E-03	1.69E-03	9.76E-03	0.00E+00	0.00E+00	0.00E+00	6.73E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.54E-06	0.00E+00	2.54E-04	MND
EP [kg N eq]	1.71E-04	6.90E-05	3.44E-04	0.00E+00	0.00E+00	0.00E+00	2.99E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.83E-07	0.00E+00	1.30E-05	MND
GWP [kg CO <sub>2</sub> eq]	1.17E+00	9.20E-02	1.96E+00	0.00E+00	0.00E+00	0.00E+00	1.64E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.02E-03	0.00E+00	5.53E-02	MND
ODP [kg CFC 11 eq]	-1.52E-13	-3.88E-16	1.74E-11	0.00E+00	0.00E+00	0.00E+00	8.62E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.63E-17	0.00E+00	-2.91E-15	MND
POCP [kg O <sub>3</sub> eq]	3.17E-02	3.38E-02	7.11E-02	0.00E+00	0.00E+00	0.00E+00	7.09E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-04	0.00E+00	5.09E-03	MND
ADP-fossil fuel [MJ]	3.18E+01	1.20E+00	3.81E+01	0.00E+00	0.00E+00	0.00E+00	3.60E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.27E-02	0.00E+00	8.62E-01	MND

### Resource Use

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
RPR <sub>e</sub> [MJ]	3.00E+00	2.55E-02	1.74E+00	0.00E+00	0.00E+00	0.00E+00	2.41E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-03	0.00E+00	6.74E-02	MND
RPR <sub>m</sub> [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRPR <sub>e</sub> [MJ]	3.33E+01	1.21E+00	4.09E+01	0.00E+00	0.00E+00	0.00E+00	3.82E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.29E-02	0.00E+00	8.84E-01	MND
NRPR <sub>m</sub> [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m <sup>3</sup> ]	4.74E-03	7.57E-05	1.06E-02	0.00E+00	0.00E+00	0.00E+00	7.74E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.15E-06	0.00E+00	1.05E-04	MND

### Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	2.54E-08	1.22E-08	3.95E-08	0.00E+00	0.00E+00	0.00E+00	4.03E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.48E-10	0.00E+00	3.10E-09	MND
NHWD [kg]	1.18E-02	3.43E-05	2.61E-01	0.00E+00	0.00E+00	0.00E+00	7.68E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-06	0.00E+00	1.26E+00	MND
HLRW [kg]	7.91E-07	2.76E-09	1.30E-06	0.00E+00	0.00E+00	0.00E+00	1.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-10	0.00E+00	1.08E-08	MND
ILLRW [kg]	5.92E-04	2.06E-06	1.08E-03	0.00E+00	0.00E+00	0.00E+00	8.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.50E-08	0.00E+00	8.56E-06	MND

## » StoGuard® Transition Membrane on CMU – Results

### TRACI Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
AP [kg SO <sub>2</sub> eq]	1.75E-03	1.69E-03	1.89E-02	0.00E+00	0.00E+00	0.00E+00	1.14E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-05	0.00E+00	4.24E-04	MND
EP [kg N eq]	1.71E-04	6.90E-05	6.56E-04	0.00E+00	0.00E+00	0.00E+00	4.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-06	0.00E+00	2.16E-05	MND
GWP [kg CO <sub>2</sub> eq]	1.17E+00	9.20E-02	3.77E+00	0.00E+00	0.00E+00	0.00E+00	2.57E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.04E-03	0.00E+00	9.23E-02	MND
ODP [kg CFC 11 eq]	-1.52E-13	-3.88E-16	3.37E-11	0.00E+00	0.00E+00	0.00E+00	1.68E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.72E-17	0.00E+00	-4.85E-15	MND
POCP [kg O <sub>3</sub> eq]	3.17E-02	3.38E-02	1.37E-01	0.00E+00	0.00E+00	0.00E+00	1.06E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.57E-04	0.00E+00	8.49E-03	MND
ADP-fossil fuel [MJ]	3.18E+01	1.20E+00	7.38E+01	0.00E+00	0.00E+00	0.00E+00	5.42E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.12E-02	0.00E+00	1.44E+00	MND

### Resource Use

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
RPR <sub>E</sub> [MJ]	3.00E+00	2.55E-02	3.36E+00	0.00E+00	0.00E+00	0.00E+00	3.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-03	0.00E+00	1.13E-01	MND
RPR <sub>M</sub> [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRPR <sub>E</sub> [MJ]	3.33E+01	1.21E+00	7.91E+01	0.00E+00	0.00E+00	0.00E+00	5.76E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.16E-02	0.00E+00	1.48E+00	MND
NRPR <sub>M</sub> [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m <sup>3</sup> ]	4.74E-03	7.57E-05	2.04E-02	0.00E+00	0.00E+00	0.00E+00	1.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.59E-06	0.00E+00	1.75E-04	MND

### Waste

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD [kg]	2.54E-08	1.22E-08	7.64E-08	0.00E+00	0.00E+00	0.00E+00	5.99E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.81E-10	0.00E+00	5.17E-09	MND
NHWD [kg]	1.18E-02	3.43E-05	4.65E-01	0.00E+00	0.00E+00	0.00E+00	1.29E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.70E-06	0.00E+00	2.11E+00	MND
HLRW [kg]	7.91E-07	2.76E-09	2.51E-06	0.00E+00	0.00E+00	0.00E+00	1.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-10	0.00E+00	1.80E-08	MND
ILLRW [kg]	5.92E-04	2.06E-06	2.10E-03	0.00E+00	0.00E+00	0.00E+00	1.35E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-07	0.00E+00	1.43E-05	MND

## Carbon removal and Emission

Indicator	Transition Membrane on plywood	Transition Membrane on CMU
BCRP [kg CO2 eq]	5.86E-02	6.10E-02
BCEP [kg CO2 eq]	5.95E-02	6.13E-02
BCRK [kg CO2 eq]	5.51E-03	5.96E-03
BCEK [kg CO2 eq]	2.05E-03	2.37E-03
BCEW [kg CO2 eq]	0.00E+00	0.00E+00
CCE [kg CO2 eq]	0.00E+00	0.00E+00
CCR [kg CO2 eq]	0.00E+00	0.00E+00
CWNR [kg CO2 eq]	0.00E+00	0.00E+00

### » Interpretation

In one reference service life of the product, the stage that contributes the most environmental impact is the installation stage. Unlike many products, the impact derived from the production of the declared product is exceeded by those from the installation of Sto Transition Membrane. This also explains the significant differences in impacts between substrate types. From the perspective of a whole building lifespan, the vast majority of the impacts are derived from the number of replacements needed. This is directly related to the impacts associated with the manufacture of new installation material and new products that are used to replace the original. Improving the relatively short lifespan of the products is essential to reducing the overall impact of the product.

### » Reference

- Life Cycle Assessment, LCA report for Sto Corp. WAP Sustainability, October 2019
- ISO14044:2006 Environmental Management–Life cycle assessment–Requirements and Guidelines.
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
- ISO 21930:2007 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.
- Sto Studio. Sto Corp, 2019. Available at <https://www.stocorp.com/sto-studio-us/>
- Product Bulletin – StoGuard Transition Membrane. Sto Corp. Available at [https://www.stocorp.com/wp-content/content/Products\\_TechService/Air%20Moisture%20Barriers/Product%20Bulletins/PB\\_81272\\_StoGuard\\_Transition\\_Membrane\\_EN.pdf](https://www.stocorp.com/wp-content/content/Products_TechService/Air%20Moisture%20Barriers/Product%20Bulletins/PB_81272_StoGuard_Transition_Membrane_EN.pdf)