Building with conscience.

EPD for Sto Exterior Coatings Over Concrete & Concrete Masonry Units (CMU)

Sto Exterior Coatings Over Concrete & Concrete Masonry is a decorative and protective finish system overconcrete and concrete masonry unit (CMU).

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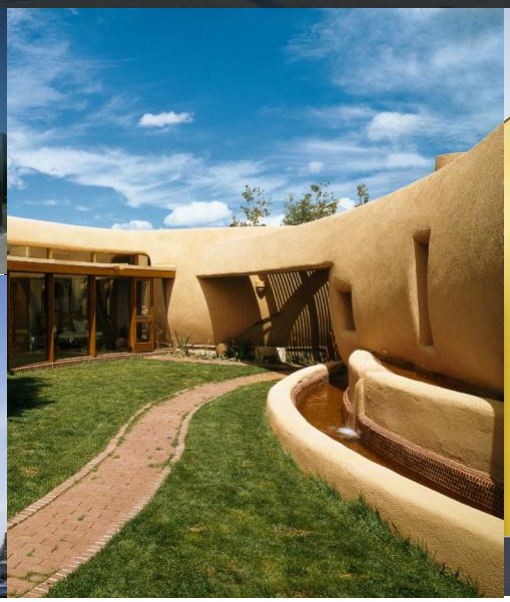
Building with conscience.

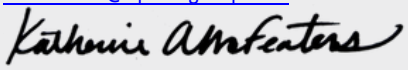
EPD for BTS® Plus

Sto BTS® Plus is a one-component, polymer-modified, cement based, dry powder material used as an adhesive and base coat in Sto Wall Claddings, including StoTherm ci Classic and StoTherm ci Lotusan Systems.



epstengroup Environmental Product Declaration

epstengroup Solutions for a Sustainable World

PCR Identification	PCR for Architectural Coatings: NAICS 325510 on the basis of ISO 21930:2007, NSF International, 2017. Valid through June 23, 2022
Compliance to ISO 14040/44, ISO 14025 and ISO 21930	Yes
Product Category	Exterior Coating
Manufacturer's 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
Declaration Number	01-004
Date of Certification	December 18th, 2019
Period of Validity	5 years from date of certification
Functional Unit	One square meter of covered and protected substrate for 60 years
Market-base life used in assessment	10 Years
Design life used in assessment	N/A
Test method employed for determination of design life	N/A
Amount of colorant needed	See table 3
Overall Data Quality Assessment Score	Good
Site(s) in which the results of the LCA are representative	STO manufacturing sites in Atlanta, Georgia; and Glendale, Arizona.
Information on where explanatory material can be obtained	See references at the end of this document.
LCA Software and Version Number	GaBi 9.2.0.58
LCI Database and Version Number	GaBi Database Version 8.7, Service Pack 39
This declaration was independently verified in accordance with ISO 14025: 2006 and the reference PCR: PCR for Architectural Coatings: NAICS 325510 ☐ Internal ☒ External	Kate McFeaters kmcfeaters@epstengroup.com 
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 14040/44 and the reference PCR by:	Kate McFeaters kmcfeaters@epstengroup.com 

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

Atlanta Plant

Glendale Plant

Product Identification

Sto BTS® Plus is offered in 47-lb bags and used as an undercoater. Thus, there are no finish or color base options provided.

Table 1: BTS® Plus Identification

Product Name	Product Number	Base Type	Finish Type
Sto BTS® Plus	80130	n/a	n/a

Product Description

Sto BTS® Plus is a one-component, polymer-modified, cement based, dry powder material used as an adhesive, skim coat and base coat in Sto Wall Claddings, including StoTherm ci Classic and StoTherm ci Lotusan Systems. According to the classification scheme developed by American Coating Association (ACA), BTS® Plus is treated in the study as an undercoater and as per PCR, it should only utilize the market-based lifetime (10 years for exterior undercoater).

Performance Features

One-component	High Polymer/ Cement Ratio	Vapor Permeable	Pre-blended
Polymer Modified	Creamy Smooth Consistency	High Build	Low Cement Ratio

Material Composition

The material compositions of BTS® Plus are listed below:

Table 2: Material composition for BTS® Plus

Ingredient	BTS® Plus
Additives	0-1%
Cement	40-45%
Colorant	0-1%
Polymer	2-3%
Silica	54-55%
Silicate	0-1%

Components related to Life Cycle Assessment

The functional unit for the LCA study was covering and protecting 1 square meter (m2) 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 the PCR. The market-based lifetime is 10 years. By default, BTS® Plus has a 5-year warranty. In case it is applied on Sto's wall systems, the warranty is extended to 10 years. The reference flow required for one functional unit is provided in Table 3.

Table 3: Market-based lifetime and reference flow

	Functional Unit [1 m^2]	Reference Flow [kg]	Tint needed* [kg]
Lifespan		Market-based Lifetime [10 years]	
BTS® Plus – Adhesive over Rough Masonry	1	40.39	N/A
BTS® Plus – Average		14.12	N/A

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 the PCR.

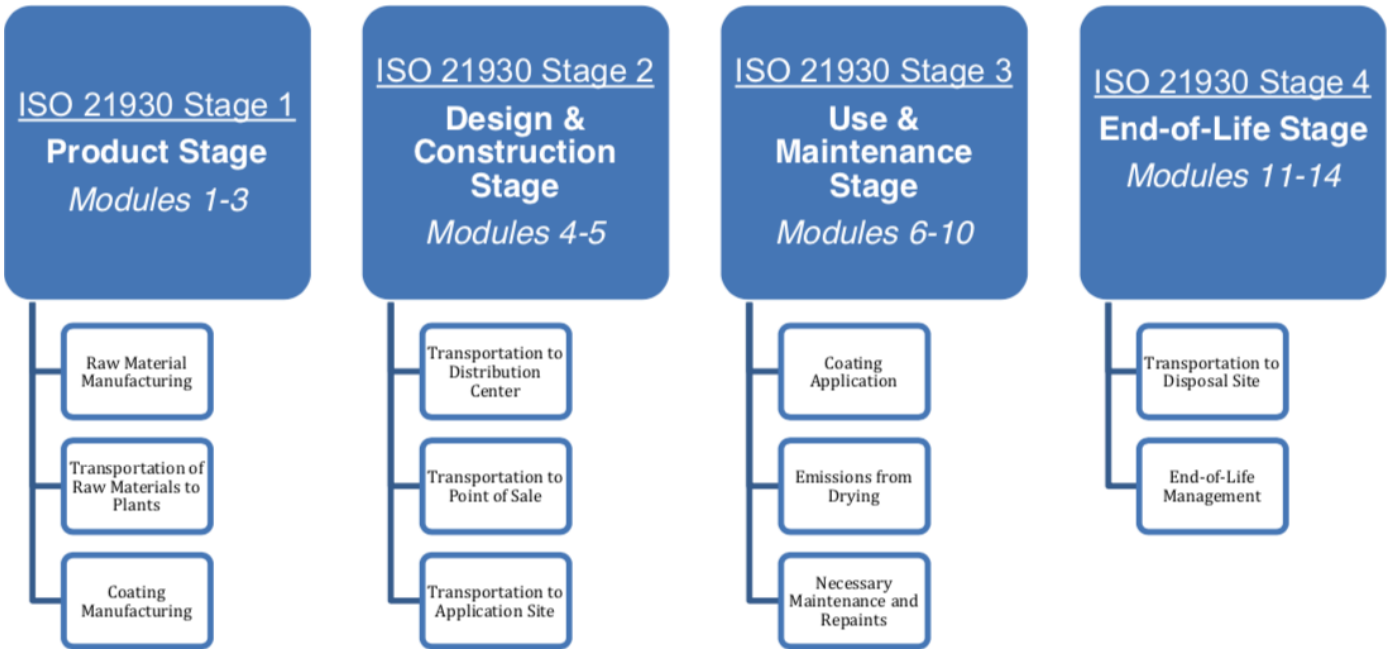


Figure 1: Life stages for the cradle-to-grave LCA

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 Sto's facilities in Atlanta, GA, and Glendale, AZ for the 2018 reference year. When primary data did not exist, secondary data were obtained from the Gabi V8.7 Database Service Pack 39. Overall, both primary and secondary data are considered good 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 were made in accordance with the PCR and include the transportation distances, the disposal of packaging material and the product at its end of life and 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.

Product Stage

BTS® Plus is a dry-powder product. It is manufactured in both the Atlanta, GA and Glendale, AZ facilities. The facility in Atlanta also supplies BTS® concentrate to Glendale facility, based on which BTS® Plus is produced. BTS® Plus is packaged in a paper bag at 47 pounds (21.3 kgs) per bag. This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by Sto.

Design and Construction Stage

The design and construction process stage starts with the packaged product leaving the production site and ends with being delivered to the application site.

During this stage, the finished product is moved from a shipping dock for distribution. The end gate is the application site after the purchaser acquires the finished product and transports it to the application site.

Use and Maintenance Stage

The use stage begins when the user prepares the product before applying it to a substrate and ends with any leftover coating and discarded packaging entering the end-of-life stage. Detailed application instructions are provided online. The application procedure includes mixing and applying. In the mixing process, BTS® Plus requires the addition of water at an average rate of 5.45 kg of water per 21.3-kg bag. As recommended, an electric drill/mixer and a spray pump are assumed to be used for mixing and application. The equipment is not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible, but electricity to power application tools has been included.

As prescribed in the PCR, 10% of the wet mass of BTS® Plus is assumed to be unused and properly disposed of.

End-of-Life Stage

Table 4: End-of_life Disposal Scenarios

Waste Flow	Recycling	Incineration	Landfilling
Paper Packaging	66.6%	6.01%	27.39%
Unused Product	0%	0%	100%
Post-Consumer Product	0%	0%	100%

In this stage, the disposal of installation waste, packaging waste and product waste at its end of life is included. The disposal pathway of each waste stream is modeled based on the recommendation of PCR and US EPA's latest waste management fact sheet.

Life Cycle Assessment Results

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

Table 5: LCIA impact category and LCI Indicator keys

Abbreviation	Parameter	Unit
	TRACI 2.1	
AP	Acidification potential of soil and water	kg SO_2 eq
EP	Eutrophication potential	kg N eq
GWP	Global warming potential including biogenic carbon emission	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
POCP	Photochemical ozone creation potential	kg O_3 eq
	Resource Use Parameters	
RPR	Use of renewable primary energy	MJ, net calorific value (LHV)
RMR	Use of renewable Material Resources	kg
NRER	Depletion of Non-Renewable Energy Resources	MJ, net calorific value
NRMR	Depletion of Non-Renewable Material Resources	kg
FW	Consumption of Freshwater	m^3
	Waste Parameters	
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
	Biogenic Carbon Parameter	
BC	Biogenic Carbon	kg CO_2 eq
	Energy Differentiation Parameters	
HWP	Hydro/wind Power	MJ, net calorific value (LHV)
FE	Fossil Energy	MJ, net calorific value (LHV)
BE	Bio-energy	MJ, net calorific value (LHV)
NE	Nuclear Energy	MJ, net calorific value (LHV)
OE	Other Energy	MJ, net calorific value (LHV)

BTS® Plus – Adhesive over Rough Masonry

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	8.90E-02	1.56E-02	6.73E-04	1.07E-02
	EP [kg N eq]	9.00E-03	1.27E-03	3.03E-05	1.52E-03
	GWP [kg CO_2 eq]	3.86E+01	3.04E+00	2.42E-01	1.94E+00
	ODP [kg CFC 11 eq]	3.82E-12	2.89E-16	8.03E-16	6.57E-15
	POCP [kg O_3 eq]	1.61E+00	3.57E-01	5.67E-03	1.79E-01
	RPRE [MJ]	4.35E+01	1.33E+00	5.23E-01	2.22E+00
	NRPRE [MJ]	4.64E+02	4.30E+01	3.85E+00	2.99E+01
	FW [m3]	1.09E-01	5.13E-03	1.18E-02	3.47E-03
	RMR [kg]	2.05E-01	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	4.04E+01	0.00E+00	0.00E+00	0.00E+00
	HWD [kg]	7.01E-07	3.49E-07	1.73E-09	1.11E-07
	NHWD [kg]	4.33E+00	1.62E-03	3.30E-03	4.09E+01
	BC [kg CO_2 eq]	4.21E+00			
	HWP [MJ]	2.67E+00			
	FE [MJ]	3.97E+01			
	BE [MJ]	1.29E+00			
	NE [MJ]	1.04E+01			
	OE [MJ]	1.04E+00			

BTS® Plus – Average Substrate

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	3.11E-02	5.46E-03	2.35E-04	3.73E-03
	EP [kg N eq]	3.15E-03	4.45E-04	1.06E-05	5.30E-04
	GWP [kg CO_2 eq]	1.35E+01	1.06E+00	8.44E-02	6.78E-01
	ODP [kg CFC 11 eq]	1.34E-12	1.01E-16	2.81E-16	2.30E-15
	POCP [kg O_3 eq]	5.62E-01	1.25E-01	1.98E-03	6.26E-02
	RPRE [MJ]	1.52E+01	4.66E-01	1.83E-01	7.74E-01
	NRPRE [MJ]	1.62E+02	1.51E+01	1.35E+00	1.04E+01
	FW [m3]	3.82E-02	1.79E-03	4.12E-03	1.21E-03
	RMR [kg]	7.16E-02	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.41E+01	0.00E+00	0.00E+00	0.00E+00
	HWD [kg]	2.45E-07	1.22E-07	6.07E-10	3.88E-08
	NHWD [kg]	1.51E+00	5.68E-04	1.15E-03	1.43E+01
	BC [kg CO_2 eq]	1.47E+00			
	HWP [MJ]	9.34E-01			
	FE [MJ]	1.39E+01			
	BE [MJ]	4.51E-01			
	NE [MJ]	3.64E+00			
	OE [MJ]	3.65E-01			

Interpretation

Overall, the Product Stage is the major contributor to many impact categories including GWP. This is understandable as cement is a major ingredient of BTS® Plus and it is an energy-intensive material.

Reference

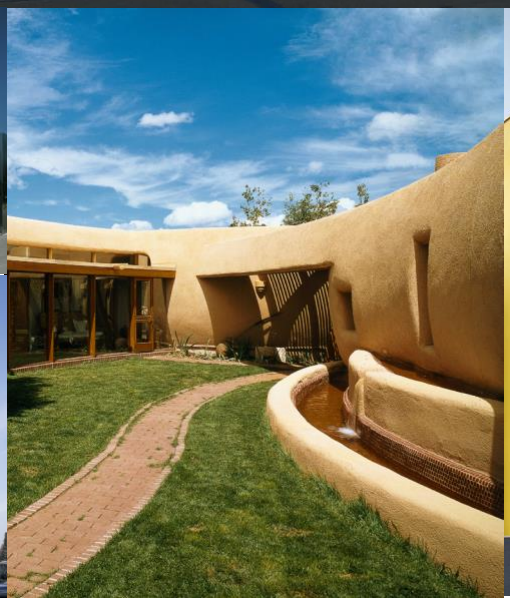
- Life Cycle Assessment, LCA report for Sto Corp. WAP Sustainability, September 2019
- PCR for Architectural Coatings: NAICS 325510. NSF International, 2017
- ISO14044:2006 Environmental Management–Life cycle assessment–Requirements and Guidelines.
- ISO 14025:2006 Environmental labels and declarations – 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.
- Advancing Sustainable Materials Management: 2015 Fact Sheet. US EPA. Available at https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf
- Product Bulletin – Sto BTS® Plus. Sto Corp. Available at https://www.stocorp.com/wp-content/content/Products_TechService/Base%20Coats%20and%20Adhesives/Product%20Bulletins/PB_80727_Sto_BTS_Plus_EN.pdf

Building with conscience.

EPD for Stolit®
in varied textures

Product Textures: 1.0, 1.0 Dark, 1.5, 1.5 Dark, Freeform, Freeform Dark, R1.5, R1.5 Dark

Stolit ® is a ready-mixed premium acrylic based exterior or interior textured wall finish enhanced with advanced polymer technology, designed for use as a finish coat over prepared vertical concrete, masonry or plaster substrates and in StoTherm® ci wall



epstengroup Environmental Product Declaration

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PCR Identification	PCR for Architectural Coatings: NAICS 325510 on the basis of ISO 21930:2007, NSF International, 2017. Valid through June 23, 2022
Compliance to ISO1 4040/44, ISO 14025 and ISO 21930	Yes
Product Category	Exterior Coating
Manufacturer's 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
Declaration Number	01-001
Date of Certification	December 18th, 2019
Period of Validity	5 years from date of certification
Functional Unit	One square meter of covered and protected substrate for 60 years
Market-base life used in assessment	10 Years
Design life used in assessment	5 Years
Test method employed for determination of design life	Product default warranty
Amount of colorant needed	See Table 3
Overall Data Quality Assessment Score	Good
Site(s) in which the results of the LCA are representative	STO manufacturing sites in Atlanta, Georgia; Glendale, Arizona; and Rutland, Vermont
Information on where explanatory material can be obtained	See references at the end of this document.
LCA Software and Version Number	GaBi 9.2.0.58
LCI Database and Version Number	GaBi Database Version 8.7, Service Pack 39
This declaration was independently verified in accordance with ISO 14025: 2006 and the reference PCR: PCR for Architectural Coatings: NAICS 325510 ☐ Internal ☒ External	Kate McFeaters kmcfeaters@epstengroup.com Kathrine McFeaters
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 14040/44 and the reference PCR by:	Kate McFeaters kmcfeaters@epstengroup.com Kathrine McFeaters

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.

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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

Atlanta Plant

Glendale Plant

Rutland Plant

Product Identification

Stolit® finishes are offered in various coarseness and color bases that allow more freedom in building exterior designing and finishing. Table 1 lists the products declared in this EPD.

Table 1: List of Stolit® Products

Product Name	Product Number	Base Type	Finish Type
Stolit® 1.0	80130	Tintable White	Fine
Stolit® 1.0 Dark Colors	82130	Deep	Fine
Stolit® 1.5	80131	Tintable White	Medium
Stolit® 1.5 Dark Colors	82131	Deep	Medium
Stolit® Freeform	80156	Tintable White	Freeform
Stolit® Freeform Dark Colors	82156	Deep	Freeform
Stolit® R1.5	80141	Tintable White	Swirl
Stolit® R1.5 Dark Colors	82141	Deep	Swirl

Product Description

Stolit® is a series of ready-mixed, acrylic-based exterior or interior textured wall finishes. Stolit® is used as a decorative and protective wall coating over prepared vertical above grade concrete, masonry and plaster substrates, and in StoTherm® ci Systems. In this study, Stolit® 1.0, 1.5, R1.5 and Freeform are included. Two tint bases are offered: standard and dark colors which respectively can be transcribed to tintable white base and deep base in the PCR.

Performance Features

Mildew Resistance	Ready Mixed	Moisture Resistance	Low VOC & Odor
Vapor Permeable	Integral Color	Water-based	

Material Composition

The material compositions of Stolit® are listed below:

Table 2: Material composition for Stolit®

Product	Additives	Colorant	Limestone	Acrylic resin	Silica	Silicate	Surfactant	Water
Stolit® R1.5 Dark Colors	0.77%	0.60%	47.76%	5.03%	26.66%	2.69%	0.08%	15.75%
Stolit® R1.5	0.77%	0.60%	47.69%	5.03%	26.60%	2.69%	0.08%	15.88%
Stolit® 1.0 Dark Colors	0.77%	0.60%	49.20%	5.04%	25.26%	2.69%	0.07%	15.71%
Stolit® 1.0	0.77%	0.60%	49.16%	5.03%	25.20%	2.69%	0.07%	15.80%
Stolit® 1.5 Dark Colors	0.59%	0.61%	64.85%	6.95%	7.91%	2.46%	0.18%	15.65%
Stolit® 1.5	0.59%	0.80%	64.55%	6.95%	8.01%	2.46%	0.18%	15.66%
Stolit® Freeform Dark Colors	0.77%	0.58%	67.26%	4.84%	8.18%	2.59%	0.07%	15.08%
Stolit® Freeform	0.74%	0.58%	67.23%	4.84%	8.18%	2.58%	0.07%	15.13%

Components related to Life Cycle Assessment

The functional unit for the LCA study was covering and protecting 1 square meter (m^2) 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 the PCR. The market-based lifetime is 10 years, and the design lifetime is determined either based on quality determined by ASTM tests or on the product warrant. By default, Stolit® finishes have a 5-year warranty. In case a finish is applied on Sto's wall systems, the warranty is extended to 10 years. In this EPD, default warranty is adopted as the design lifetime. The reference flow required for one functional unit is provided in Table 3.

Table 3: Market-based lifetime and reference flow

	Functional Unit	Reference Flow [kg]	Tint needed* [kg]	Reference Flow [kg]	Tint needed* [kg]
Lifespan		Design Lifetime [5 years]		Market-based Lifetime [10 years]	
Stolit® R1.5 Dark Colors	1	30.59	2.69	15.29	1.35
Stolit® R1.5	1	30.59	0.79	15.29	0.40
Stolit® 1.0 Dark Colors	1	29.58	2.60	14.80	1.30
Stolit® 1.0	1	29.58	0.77	14.80	0.38
Stolit® 1.5 Dark Colors	1	34.05	3.00	17.03	1.50
Stolit® 1.5	1	34.05	0.88	17.03	0.44
Stolit® Freeform Dark Colors	1	53.08	4.66	26.53	2.33
Stolit® Freeform	1	53.08	1.37	26.53	0.69

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 the PCR.

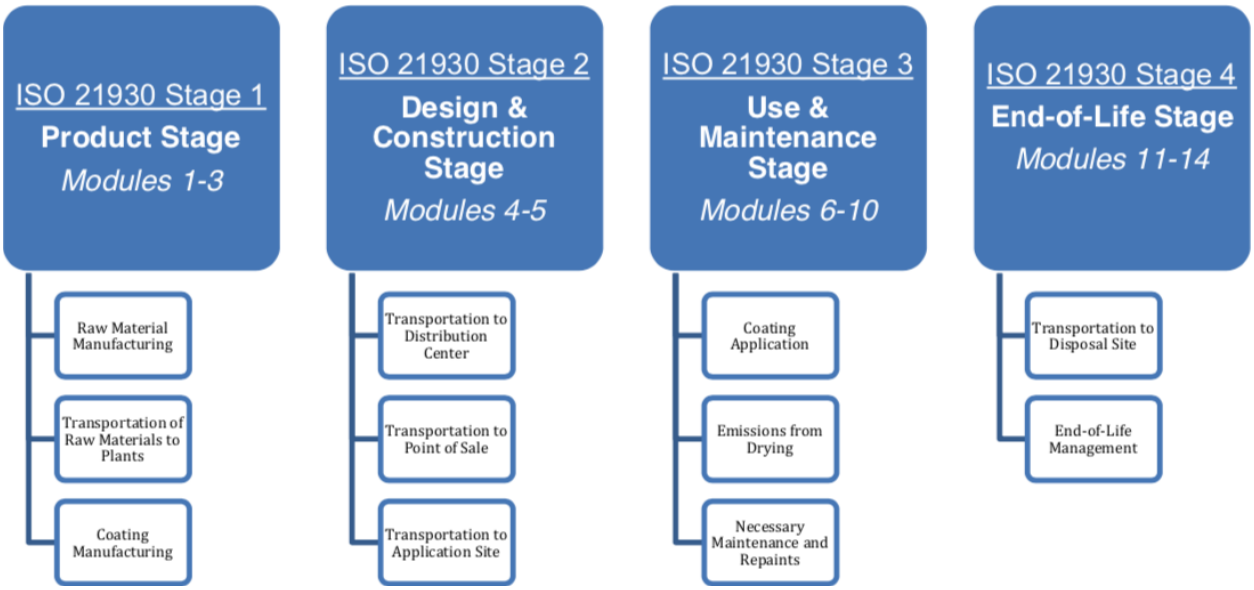

Figure 1: Life stages for the cradle-to-grave LCA

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 Sto's facilities in Atlanta, GA, Glendale, AZ and Rutland, VT for the 2018 reference year. When primary data did not exist, secondary data were obtained from the Gabi V8.7 Database Service Pack 39. Overall, both primary and secondary data are considered good 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 were made in accordance with the PCR and include the transportation distances, the disposal of packaging material and the product at its end of life and 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.

Product Stage

Stolit® is produced at Sto's Atlanta, GA, Glendale, AZ and Rutland, VT facilities. This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by Sto. Stolit® is supplied in 5-gallon pails.

Design and Construction Stage

The design and construction process stage starts with the packaged product leaving the production site and ends with being delivered to the application site.

During this stage, the finished product is moved from a shipping dock for distribution. The end gate is the application site after the purchaser acquires the finished product and transports it to the application site.

Use and Maintenance Stage

The use stage begins when the user prepares the product before applying it to a substrate and ends with any leftover coating and discarded packaging entering the end-of-life stage. Detailed application instructions are provided online. The application procedure includes mixing and applying. As recommended, an electric drill/mixer and a spray pump are assumed to be used for mixing and application. The equipment is not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible, but electricity to power application tools has been included.

As prescribed in the PCR, 10% of the wet mass of Stolit® is assumed to be unused and properly disposed of.

End-of-Life Stage

Table 4: End-of-life Disposal Scenarios

Waste Flow	Recycling	Incineration	Landfilling
Paper Packaging	66.6%	6.01%	27.39%
Steel Packaging	33.3%	12.01%	54.69%
Plastic Packaging	9.1%	16.36%	74.54%
Unused Product	0%	0%	100%
Post-Consumer Product	0%	0%	100%

In this stage, the disposal of installation waste, packaging waste and product waste at its end of life is included. The disposal pathway of each waste stream is modeled based on the recommendation of PCR and US EPA's latest waste management fact sheet.

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Life Cycle Assessment Results

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

Table 5: LCIA impact category and LCI Indicator keys

Abbreviation	Parameter	Unit
	TRACI 2.1	
AP	Acidification potential of soil and water	kg SO_2 eq
EP	Eutrophication potential	kg N eq
GWP	Global warming potential including biogenic carbon emission	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
POCP	Photochemical ozone creation potential	kg O_3 eq
	Resource Use Parameters	
RPR	Use of renewable primary energy	MJ, net calorific value (LHV)
RMR	Use of renewable Material Resources	kg
NRER	Depletion of Non-Renewable Energy Resources	MJ, net calorific value
NRMR	Depletion of Non-Renewable Material Resources	kg
FW	Consumption of Freshwater	m^3
	Waste Parameters	
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
	Biogenic Carbon Parameter	
BC	Biogenic Carbon	kg CO_2 eq
	Energy Differentiation Parameters	
HWP	Hydro/wind Power	MJ, net calorific value (LHV)
FE	Fossil Energy	MJ, net calorific value (LHV)
BE	Bio-energy	MJ, net calorific value (LHV)
NE	Nuclear Energy	MJ, net calorific value (LHV)
OE	Other Energy	MJ, net calorific value (LHV)

Stolit® R1.5 Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	4.73E-02	6.12E-03	6.31E-03	4.41E-03
	EP [kg N eq]	2.75E-03	4.98E-04	2.30E-04	7.14E-04
	GWP [kg CO_2 eq]	1.36E+01	1.19E+00	2.99E+00	9.16E-01
	ODP [kg CFC 11 eq]	1.71E-09	1.13E-16	1.89E-14	2.49E-15
	POCP [kg O_3 eq]	5.46E-01	1.40E-01	8.05E-01	7.33E-02
	RPRE [MJ]	1.64E+01	5.22E-01	3.20E+00	7.57E-01
	NRPRE [MJ]	2.99E+02	1.69E+01	7.97E+01	1.11E+01
	FW [m3]	7.08E-02	2.01E-03	1.79E-02	1.42E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.59E+01	0.00E+00	1.35E+00	0.00E+00
	HWD [kg]	4.77E-06	1.37E-07	1.13E-08	4.58E-08
	NHWD [kg]	8.46E-01	6.36E-04	9.48E-03	1.70E+01
	BC [kg CO_2 eq]		1.53E+00		
	HWP [MJ]		9.79E-01		
	FE [MJ]		1.48E+01		
	BE [MJ]		4.84E-01		
	NE [MJ]		3.89E+00		
	OE [MJ]		3.90E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	9.46E-02	1.22E-02	1.26E-02	8.82E-03
	EP [kg N eq]	5.50E-03	9.96E-04	4.60E-04	1.43E-03
	GWP [kg CO_2 eq]	2.72E+01	2.38E+00	5.98E+00	1.83E+00
	ODP [kg CFC 11 eq]	3.42E-09	2.26E-16	3.78E-14	4.98E-15
	POCP [kg O_3 eq]	1.09E+00	2.80E-01	1.61E+00	1.47E-01
	RPRE [MJ]	3.28E+01	1.04E+00	6.40E+00	1.51E+00
	NRPRE [MJ]	5.98E+02	3.38E+01	1.59E+02	2.22E+01
	FW [m3]	1.42E-01	4.02E-03	3.58E-02	2.84E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.18E+01	0.00E+00	2.70E+00	0.00E+00
	HWD [kg]	9.54E-06	2.74E-07	2.26E-08	9.16E-08
	NHWD [kg]	1.69E+00	1.27E-03	1.90E-02	3.40E+01
	BC [kg CO_2 eq]		3.07E+00		
	HWP [MJ]		1.96E+00		
	FE [MJ]		2.97E+01		
	BE [MJ]		9.68E-01		
	NE [MJ]		7.78E+00		
	OE [MJ]		7.81E-01		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	6.36E-02	6.11E-03	1.93E-03	4.23E-03
	EP [kg N eq]	2.83E-03	4.98E-04	7.06E-05	7.05E-04
	GWP [kg CO_2 eq]	1.39E+01	1.19E+00	9.06E-01	8.76E-01
	ODP [kg CFC 11 eq]	1.71E-09	1.13E-16	5.66E-15	2.35E-15
	POCP [kg O_3 eq]	5.62E-01	1.40E-01	7.78E-01	6.97E-02
	RPRE [MJ]	1.67E+01	5.22E-01	9.95E-01	7.11E-01
	NRPRE [MJ]	3.03E+02	1.69E+01	2.38E+01	1.04E+01
	FW [m3]	7.24E-02	2.01E-03	5.40E-03	1.34E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.59E+01	0.00E+00	4.00E-01	0.00E+00
	HWD [kg]	4.77E-06	1.37E-07	3.48E-09	4.35E-08
	NHWD [kg]	8.54E-01	6.36E-04	2.91E-03	1.62E+01
	BC [kg CO_2 eq]		1.40E+00		
	HWP [MJ]		9.78E-01		
	FE [MJ]		1.48E+01		
	BE [MJ]		4.84E-01		
	NE [MJ]		3.89E+00		
	OE [MJ]		3.90E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.27E-01	1.22E-02	3.86E-03	8.46E-03
	EP [kg N eq]	5.66E-03	9.96E-04	1.41E-04	1.41E-03
	GWP [kg CO_2 eq]	2.78E+01	2.38E+00	1.81E+00	1.75E+00
	ODP [kg CFC 11 eq]	3.42E-09	2.26E-16	1.13E-14	4.70E-15
	POCP [kg O_3 eq]	1.12E+00	2.80E-01	1.56E+00	1.39E-01
	RPRE [MJ]	3.34E+01	1.04E+00	1.99E+00	1.42E+00
	NRPRE [MJ]	6.06E+02	3.38E+01	4.76E+01	2.08E+01
	FW [m3]	1.45E-01	4.02E-03	1.08E-02	2.68E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.18E+01	0.00E+00	8.00E-01	0.00E+00
	HWD [kg]	9.54E-06	2.74E-07	6.96E-09	8.70E-08
	NHWD [kg]	1.71E+00	1.27E-03	5.82E-03	3.24E+01
	BC [kg CO_2 eq]		2.80E+00		
	HWP [MJ]		1.96E+00		
	FE [MJ]		2.97E+01		
	BE [MJ]		9.68E-01		
	NE [MJ]		7.77E+00		
	OE [MJ]		7.80E-01		

Stolit® 1.0 Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	4.91E-02	5.91E-03	6.11E-03	4.27E-03
	EP [kg N eq]	2.80E-03	4.82E-04	2.23E-04	6.91E-04
	GWP [kg CO_2 eq]	1.42E+01	1.15E+00	2.90E+00	8.86E-01
	ODP [kg CFC 11 eq]	2.06E-09	1.09E-16	1.83E-14	2.41E-15
	POCP [kg O_3 eq]	5.64E-01	1.35E-01	7.79E-01	7.09E-02
	RPRE [MJ]	1.77E+01	5.05E-01	3.10E+00	7.33E-01
	NRPRE [MJ]	3.09E+02	1.63E+01	7.69E+01	1.07E+01
	FW [m3]	7.34E-02	1.94E-03	1.73E-02	1.37E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.54E+01	0.00E+00	1.30E+00	0.00E+00
	HWD [kg]	5.67E-06	1.32E-07	1.09E-08	4.43E-08
	NHWD [kg]	9.34E-01	6.12E-04	9.13E-03	1.65E+01
	BC [kg CO_2 eq]		1.57E+00		
	HWP [MJ]		9.48E-01		
	FE [MJ]		1.44E+01		
	BE [MJ]		4.69E-01		
	NE [MJ]		3.76E+00		
	OE [MJ]		3.78E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	9.82E-02	1.18E-02	1.22E-02	8.54E-03
	EP [kg N eq]	5.60E-03	9.64E-04	4.46E-04	1.38E-03
	GWP [kg CO_2 eq]	2.84E+01	2.30E+00	5.80E+00	1.77E+00
	ODP [kg CFC 11 eq]	4.12E-09	2.18E-16	3.66E-14	4.82E-15
	POCP [kg O_3 eq]	1.13E+00	2.70E-01	1.56E+00	1.42E-01
	RPRE [MJ]	3.54E+01	1.01E+00	6.20E+00	1.47E+00
	NRPRE [MJ]	6.18E+02	3.26E+01	1.54E+02	2.14E+01
	FW [m3]	1.47E-01	3.88E-03	3.46E-02	2.74E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.08E+01	0.00E+00	2.60E+00	0.00E+00
	HWD [kg]	1.13E-05	2.64E-07	2.18E-08	8.86E-08
	NHWD [kg]	1.87E+00	1.22E-03	1.83E-02	3.30E+01
	BC [kg CO_2 eq]		3.13E+00		
	HWP [MJ]		1.90E+00		
	FE [MJ]		2.87E+01		
	BE [MJ]		9.37E-01		
	NE [MJ]		7.53E+00		
	OE [MJ]		7.56E-01		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	6.54E-02	5.91E-03	1.86E-03	4.09E-03
	EP [kg N eq]	2.89E-03	4.82E-04	6.83E-05	6.82E-04
	GWP [kg CO_2 eq]	1.46E+01	1.15E+00	8.76E-01	8.48E-01
	ODP [kg CFC 11 eq]	2.06E-09	1.09E-16	5.47E-15	2.27E-15
	POCP [kg O_3 eq]	5.81E-01	1.35E-01	7.52E-01	6.74E-02
	RPRE [MJ]	1.81E+01	5.05E-01	9.63E-01	6.88E-01
	NRPRE [MJ]	3.13E+02	1.63E+01	2.31E+01	1.01E+01
	FW [m3]	7.53E-02	1.94E-03	5.22E-03	1.30E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.54E+01	0.00E+00	3.80E-01	0.00E+00
	HWD [kg]	5.65E-06	1.32E-07	3.37E-09	4.20E-08
	NHWD [kg]	9.41E-01	6.15E-04	2.81E-03	1.56E+01
	BC [kg CO_2 eq]		1.44E+00		
	HWP [MJ]		9.47E-01		
	FE [MJ]		1.44E+01		
	BE [MJ]		4.68E-01		
	NE [MJ]		3.76E+00		
	OE [MJ]		3.78E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.31E-01	1.18E-02	3.72E-03	8.18E-03
	EP [kg N eq]	5.78E-03	9.64E-04	1.37E-04	1.36E-03
	GWP [kg CO_2 eq]	2.92E+01	2.30E+00	1.75E+00	1.70E+00
	ODP [kg CFC 11 eq]	4.12E-09	2.18E-16	1.09E-14	4.54E-15
	POCP [kg O_3 eq]	1.16E+00	2.70E-01	1.50E+00	1.35E-01
	RPRE [MJ]	3.62E+01	1.01E+00	1.93E+00	1.38E+00
	NRPRE [MJ]	6.26E+02	3.26E+01	4.62E+01	2.02E+01
	FW [m3]	1.51E-01	3.88E-03	1.04E-02	2.60E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.08E+01	0.00E+00	7.60E-01	0.00E+00
	HWD [kg]	1.13E-05	2.64E-07	6.74E-09	8.40E-08
	NHWD [kg]	1.88E+00	1.23E-03	5.62E-03	3.12E+01
	BC [kg CO_2 eq]		2.88E+00		
	HWP [MJ]		1.89E+00		
	FE [MJ]		2.87E+01		
	BE [MJ]		9.37E-01		
	NE [MJ]		7.52E+00		
	OE [MJ]		7.55E-01		

Stolit® 1.5 Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	5.54E-02	6.81E-03	7.02E-03	4.91E-03
	EP [kg N eq]	3.14E-03	5.55E-04	2.56E-04	7.95E-04
	GWP [kg CO_2 eq]	1.61E+01	1.32E+00	3.33E+00	1.02E+00
	ODP [kg CFC 11 eq]	1.90E-09	1.26E-16	2.11E-14	2.77E-15
	POCP [kg O_3 eq]	6.28E-01	1.55E-01	8.97E-01	8.16E-02
	RPRE [MJ]	2.01E+01	5.81E-01	3.56E+00	8.44E-01
	NRPRE [MJ]	3.51E+02	1.88E+01	8.86E+01	1.23E+01
	FW [m3]	8.38E-02	2.24E-03	1.99E-02	1.58E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.77E+01	0.00E+00	1.50E+00	0.00E+00
	HWD [kg]	5.30E-06	1.52E-07	1.25E-08	5.10E-08
	NHWD [kg]	1.06E+00	7.07E-04	1.05E-02	1.90E+01
	BC [kg CO_2 eq]		1.78E+00		
	HWP [MJ]		1.09E+00		
	FE [MJ]		1.65E+01		
	BE [MJ]		5.39E-01		
	NE [MJ]		4.33E+00		
	OE [MJ]		4.35E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.11E-01	1.36E-02	1.40E-02	9.82E-03
	EP [kg N eq]	6.28E-03	1.11E-03	5.12E-04	1.59E-03
	GWP [kg CO_2 eq]	3.22E+01	2.64E+00	6.66E+00	2.04E+00
	ODP [kg CFC 11 eq]	3.80E-09	2.52E-16	4.22E-14	5.54E-15
	POCP [kg O_3 eq]	1.26E+00	3.10E-01	1.79E+00	1.63E-01
	RPRE [MJ]	4.02E+01	1.16E+00	7.12E+00	1.69E+00
	NRPRE [MJ]	7.02E+02	3.76E+01	1.77E+02	2.46E+01
	FW [m3]	1.68E-01	4.48E-03	3.98E-02	3.16E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.54E+01	0.00E+00	3.00E+00	0.00E+00
	HWD [kg]	1.06E-05	3.04E-07	2.50E-08	1.02E-07
	NHWD [kg]	2.12E+00	1.41E-03	2.10E-02	3.80E+01
	BC [kg CO_2 eq]		3.56E+00		
	HWP [MJ]		2.18E+00		
	FE [MJ]		3.31E+01		
	BE [MJ]		1.08E+00		
	NE [MJ]		8.66E+00		
	OE [MJ]		8.70E-01		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	7.53E-02	6.81E-03	2.14E-03	4.71E-03
	EP [kg N eq]	3.32E-03	5.55E-04	7.86E-05	7.84E-04
	GWP [kg CO_2 eq]	1.67E+01	1.32E+00	1.01E+00	9.75E-01
	ODP [kg CFC 11 eq]	1.90E-09	1.26E-16	6.30E-15	2.61E-15
	POCP [kg O_3 eq]	6.69E-01	1.55E-01	8.66E-01	7.76E-02
	RPRE [MJ]	2.05E+01	5.81E-01	1.11E+00	7.92E-01
	NRPRE [MJ]	3.59E+02	1.88E+01	2.65E+01	1.16E+01
	FW [m3]	8.63E-02	2.24E-03	6.01E-03	1.50E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.77E+01	0.00E+00	4.40E-01	0.00E+00
	HWD [kg]	5.33E-06	1.52E-07	3.88E-09	4.84E-08
	NHWD [kg]	1.07E+00	7.07E-04	3.23E-03	1.80E+01
	BC [kg CO_2 eq]		1.64E+00		
	HWP [MJ]		1.09E+00		
	FE [MJ]		1.65E+01		
	BE [MJ]		5.39E-01		
	NE [MJ]		4.33E+00		
	OE [MJ]		4.35E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.51E-01	1.36E-02	4.28E-03	9.42E-03
	EP [kg N eq]	6.64E-03	1.11E-03	1.57E-04	1.57E-03
	GWP [kg CO_2 eq]	3.34E+01	2.64E+00	2.02E+00	1.95E+00
	ODP [kg CFC 11 eq]	3.80E-09	2.52E-16	1.26E-14	5.22E-15
	POCP [kg O_3 eq]	1.34E+00	3.10E-01	1.73E+00	1.55E-01
	RPRE [MJ]	4.10E+01	1.16E+00	2.22E+00	1.58E+00
	NRPRE [MJ]	7.18E+02	3.76E+01	5.30E+01	2.32E+01
	FW [m3]	1.73E-01	4.48E-03	1.20E-02	3.00E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.54E+01	0.00E+00	8.80E-01	0.00E+00
	HWD [kg]	1.07E-05	3.04E-07	7.76E-09	9.68E-08
	NHWD [kg]	2.14E+00	1.41E-03	6.46E-03	3.60E+01
	BC [kg CO_2 eq]		3.29E+00		
	HWP [MJ]		2.18E+00		
	FE [MJ]		3.31E+01		
	BE [MJ]		1.08E+00		
	NE [MJ]		8.66E+00		
	OE [MJ]		8.69E-01		

Stolit® Freeform Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	8.88E-02	1.06E-02	1.10E-02	7.66E-03
	EP [kg N eq]	4.96E-03	8.64E-04	3.99E-04	1.24E-03
	GWP [kg CO_2 eq]	2.51E+01	2.06E+00	5.20E+00	1.59E+00
	ODP [kg CFC 11 eq]	-8.37E-13	1.96E-16	3.28E-14	4.32E-15
	POCP [kg O_3 eq]	1.01E+00	2.42E-01	1.40E+00	1.27E-01
	RPRE [MJ]	2.98E+01	9.05E-01	5.56E+00	1.32E+00
	NRPRE [MJ]	5.54E+02	2.93E+01	1.38E+02	1.92E+01
	FW [m3]	1.29E-01	3.49E-03	3.10E-02	2.46E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	2.76E+01	0.00E+00	2.33E+00	0.00E+00
	HWD [kg]	7.85E-07	2.37E-07	1.95E-08	7.95E-08
	NHWD [kg]	1.47E+00	1.10E-03	1.64E-02	2.96E+01
	BC [kg CO_2 eq]		2.71E+00		
	HWP [MJ]		1.70E+00		
	FE [MJ]		2.58E+01		
	BE [MJ]		8.40E-01		
	NE [MJ]		6.75E+00		
	OE [MJ]		6.77E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.78E-01	2.12E-02	2.20E-02	1.53E-02
	EP [kg N eq]	9.92E-03	1.73E-03	7.98E-04	2.48E-03
	GWP [kg CO_2 eq]	5.02E+01	4.12E+00	1.04E+01	3.18E+00
	ODP [kg CFC 11 eq]	-1.67E-12	3.92E-16	6.56E-14	8.64E-15
	POCP [kg O_3 eq]	2.02E+00	4.84E-01	2.80E+00	2.54E-01
	RPRE [MJ]	5.96E+01	1.81E+00	1.11E+01	2.64E+00
	NRPRE [MJ]	1.11E+03	5.86E+01	2.76E+02	3.84E+01
	FW [m3]	2.58E-01	6.98E-03	6.20E-02	4.92E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	5.51E+01	0.00E+00	4.66E+00	0.00E+00
	HWD [kg]	1.57E-06	4.74E-07	3.90E-08	1.59E-07
	NHWD [kg]	2.94E+00	2.20E-03	3.28E-02	5.92E+01
	BC [kg CO_2 eq]		5.42E+00		
	HWP [MJ]		3.40E+00		
	FE [MJ]		5.15E+01		
	BE [MJ]		1.68E+00		
	NE [MJ]		1.35E+01		
	OE [MJ]		1.35E+00		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	1.20E-01	1.06E-02	3.34E-03	7.35E-03
	EP [kg N eq]	5.13E-03	8.64E-04	1.23E-04	1.22E-03
	GWP [kg CO_2 eq]	2.58E+01	2.06E+00	1.57E+00	1.52E+00
	ODP [kg CFC 11 eq]	-8.35E-13	1.96E-16	9.82E-15	4.08E-15
	POCP [kg O_3 eq]	1.05E+00	2.42E-01	1.35E+00	1.21E-01
	RPRE [MJ]	3.05E+01	9.05E-01	1.73E+00	1.23E+00
	NRPRE [MJ]	5.63E+02	2.93E+01	4.14E+01	1.81E+01
	FW [m3]	1.33E-01	3.49E-03	9.37E-03	2.33E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	2.76E+01	0.00E+00	6.90E-01	0.00E+00
	HWD [kg]	7.89E-07	2.37E-07	6.04E-09	7.54E-08
	NHWD [kg]	1.49E+00	1.10E-03	5.04E-03	2.81E+01
	BC [kg CO_2 eq]		2.49E+00		
	HWP [MJ]		1.70E+00		
	FE [MJ]		2.58E+01		
	BE [MJ]		8.40E-01		
	NE [MJ]		6.74E+00		
	OE [MJ]		6.77E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	2.40E-01	2.12E-02	6.68E-03	1.47E-02
	EP [kg N eq]	1.03E-02	1.73E-03	2.46E-04	2.44E-03
	GWP [kg CO_2 eq]	5.16E+01	4.12E+00	3.14E+00	3.04E+00
	ODP [kg CFC 11 eq]	-1.67E-12	3.92E-16	1.96E-14	8.16E-15
	POCP [kg O_3 eq]	2.10E+00	4.84E-01	2.70E+00	2.42E-01
	RPRE [MJ]	6.10E+01	1.81E+00	3.46E+00	2.46E+00
	NRPRE [MJ]	1.13E+03	5.86E+01	8.28E+01	3.62E+01
	FW [m3]	2.66E-01	6.98E-03	1.87E-02	4.66E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	5.51E+01	0.00E+00	1.38E+00	0.00E+00
	HWD [kg]	1.58E-06	4.74E-07	1.21E-08	1.51E-07
	NHWD [kg]	2.98E+00	2.20E-03	1.01E-02	5.62E+01
	BC [kg CO_2 eq]		4.98E+00		
	HWP [MJ]		3.39E+00		
	FE [MJ]		5.15E+01		
	BE [MJ]		1.68E+00		
	NE [MJ]		1.35E+01		
	OE [MJ]		1.35E+00		

Interpretation

For all the products in study, the majority of the environmental impacts come from the Product Stage, which includes raw material sourcing, transportation and manufacturing. The only exception is POCP whose dominant source is Use & Maintenance Stage because of VOC emission in the curing process. From a functional unit perspective, the lifetime of the product and the coverage rate play a major role in scaling the impacts. This explains why products of coarse finishes have a higher impact than those of fine finishes.

Reference

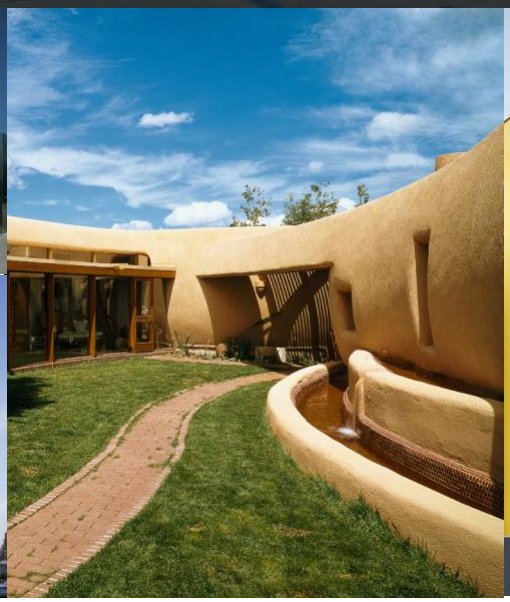
- Life Cycle Assessment, LCA report for Sto Corp. WAP Sustainability, September 2019
- PCR for Architectural Coatings: NAICS 325510. NSF International, 2017
- ISO14044:2006 Environmental Management–Life cycle assessment–Requirements and Guidelines.
- ISO 14025:2006 Environmental labels and declarations – 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.
- Advancing Sustainable Materials Management: 2015 Fact Sheet. US EPA. Available at https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf
- Product Bulletin – Stolit® Acrylic Textured Finish. Sto Corp. Available at http://www.stocorp.com/wp-content/content/Products_TechService/Finishes/Product%20Bulletins/PB_80130-82156_Stolit_Finishes_EN.pdf

Building with conscience.

EPD for Stolit® Lotusan® in varied textures

Product Textures: 1.0, 1.0 Dark, 1.5, 1.5 Dark, Freeform, Freeform Dark.

Stolit® Lotusan® is a ready-mixed exterior textured finish that mimics the self-cleaning capabilities of the lotus leaf. Replicating the lotus plant's ability to send raindrops rolling gently off its leaves, Stolit® Lotusan® resists dirt pick-up while keeping walls clean and attractive. Stolit® Lotusan® with Lotus-Effect® technology is designed for use as a finish coat over prepared vertical concrete, masonry or plaster substrates and in StoTherm® ci Lotusan® wall claddings.



epstengroup Environmental Product Declaration

epstengroup Solutions for a Sustainable World

PCR Identification	PCR for Architectural Coatings: NAICS 325510 on the basis of ISO 21930: 2007, NSF International, 2017. Valid through June 23, 2022
Compliance to to ISO 14040/44, ISO 14025 and ISO 21930	Yes
Product Category	Exterior Coating
Manufacturer's 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
Declaration Number	01-002
Date of Certification	December 18th, 2019
Period of Validity	5 years from date of certification
Functional Unit	One square meter of covered and protected substrate for 60 years
Market-base life used in assessment	10 Years
Design life used in assessment	5 Years
Test method employed for determination of design life	Product default warranty
Amount of colorant needed	See Table 3
Overall Data Quality Assessment Score	Good
Site(s) in which the results of the LCA are representative	STO manufacturing sites in Atlanta, Georgia; Glendale, Arizona; and Rutland, Vermont
Information on where explanatory material can be obtained	See references at the end of this document.
LCA Software and Version Number	GaBi 9.2.0.58
LCI Database and Version Number	GaBi Database Version 8.7, Service Pack 39
This declaration was independently verified in accordance with ISO 14025: 2006 and the reference PCR: PCR for Architectural Coatings: NAICS 325510 ☐ Internal ☒ External	Kate McFeaters kmcfeaters@epstengroup.com Kathrine McFeaters
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 kmcfeaters@epstengroup.com Kathrine McFeaters

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

Atlanta Plant

Glendale Plant

Rutland Plant

Product Identification

Stolit® Lotusan® finishes are offered in various coarseness and color bases that allow more freedom in building exterior designing and finishing. Table 1 lists the products declared in this EPD.

Table 1: List of Stolit® Lotusan® Products

Product Name	Product Number	Base Type	Finish Type
Stolit® Lotusan® 1.0	80190	Tintable White	Fine
Stolit® Lotusan® 1.0 Dark Colors	82190	Deep	Fine
Stolit® Lotusan® 1.5	80191	Tintable White	Medium
Stolit® Lotusan® 1.5 Dark Colors	82191	Deep	Medium
Stolit® Lotusan® Freeform	80193	Tintable White	Freeform
Stolit® Lotusan® Freeform Dark Colors	82193	Deep	Freeform

Product Description

Stolit® Lotusan® is a series of ready mixed, textured wall coating with Lotus-Effect® technology that mimics the self-cleaning capabilities of the lotus leaf. Stolit® Lotusan® with Lotus-Effect® technology is designed for use as a finish coating over prepared vertical above-grade concrete, masonry or plaster substrates and in StoTherm® Lotusan® Wall Claddings including StoTherm® ci Lotusan®. In this study, Lotusan® 1.0, 1.5 and Freeform are included. Same as Stolit®, two tint bases are offered.

Performance Features

Mildew Resistance	Ready Mixed	Moisture Resistance	Low VOC & Odor
Vapor Permeable	Integral Color	Water-based	Super Hydrophobic

Material Composition

The material compositions of Stolit® Lotusan® are listed below:

Table 2: Material composition for Stolit® Lotusan®

	Additives	Colorant	Limestone	Acrylic resin	Silica	Silicate	Surfactant	Water
Stolit® Lotusan® 1.0 Dark Colors	4.68%	0.60%	49.26%	5.01%	21.66%	2.68%	0.05%	15.45%
Stolit® Lotusan® 1.0	4.69%	0.60%	49.24%	5.04%	21.45%	2.70%	0.05%	15.62%
Stolit® Lotusan® 1.5 Dark Colors	4.68%	0.60%	49.98%	4.99%	20.88%	2.85%	0.05%	15.37%
Stolit® Lotusan® 1.5	4.68%	0.60%	49.72%	4.98%	21.37%	2.66%	0.05%	15.35%
Stolit® Lotusan® Freeform Dark Colors	4.73%	0.64%	60.60%	5.37%	8.37%	2.87%	0.11%	16.56%
Stolit® Lotusan® Freeform	4.73%	0.64%	60.06%	5.36%	8.36%	2.87%	0.13%	17.10%

Components related to Life Cycle Assessment

The functional unit for the LCA study was covering and protecting 1 square meter (m^2) 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 the PCR. The market-based lifetime is 10 years, and the design lifetime is determined either based on quality determined by ASTM tests or on the product warrant. By default, Stolit® Lotusan® finishes have a 5-year warranty. In case a finish is applied on Sto's wall systems, the warranty is extended to 10 years. In this EPD, default warranty is adopted as the design lifetime. The reference flow required for one functional unit is provided in Table 3.

Table 3: Market-based lifetime and reference flow

	Functional Unit	Reference Flow [kg]	Tint needed* [kg]	Reference Flow [kg]	Tint needed* [kg]
Lifespan		Design Lifetime [5 years]		Market-based Lifetime [10 years]	
Stolit® Lotusan® 1.0 Dark Colors	1	29.16	2.60	14.58	1.30
Stolit® Lotusan® 1.0	1	29.16	0.77	14.58	0.38
Stolit® Lotusan® 1.5 Dark Colors	1	33.56	3.00	16.79	1.50
Stolit® Lotusan® 1.5	1	33.56	0.88	16.79	0.44
Stolit® Lotusan® Freeform Dark Colors	1	52.32	4.66	26.16	2.33
Stolit® Lotusan® Freeform	1	52.32	1.37	26.16	0.69

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 the PCR.

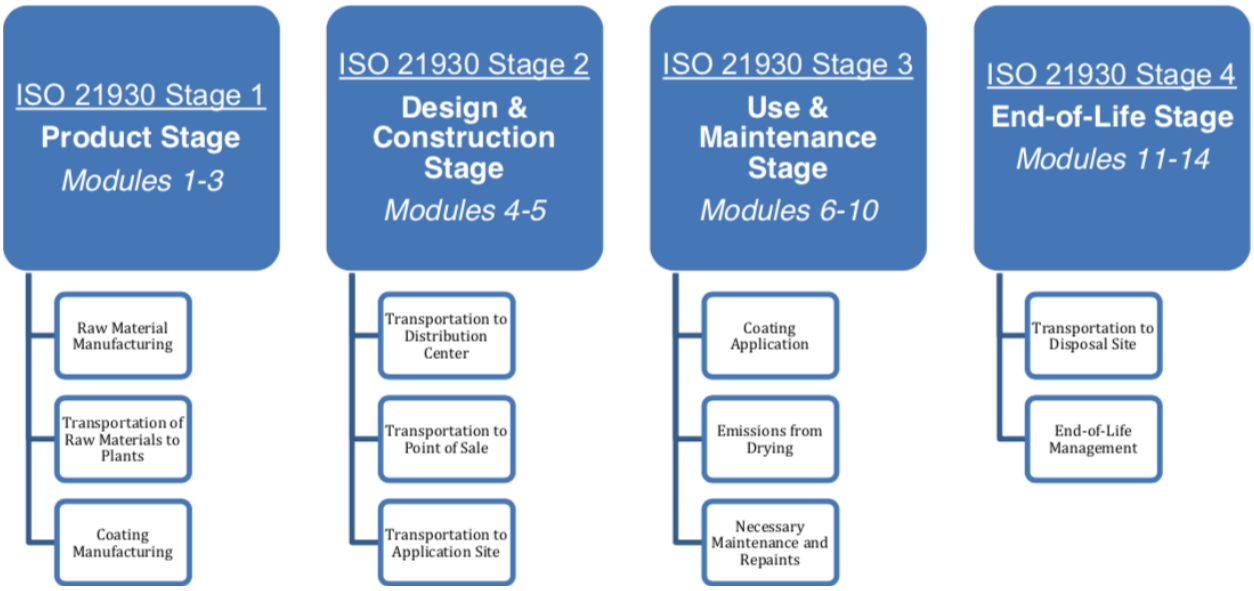


Figure 1: Life stages for the cradle-to-grave LCA

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 Sto's facilities in Atlanta, GA, Glendale, AZ and Rutland, VT for the 2018 reference year. When primary data did not exist, secondary data were obtained from the Gabi V8.7 Database Service Pack 39. Overall, both primary and secondary data are considered good 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 were made in accordance with the PCR and include the transportation distances, the disposal of packaging material and the product at its end of life and 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.

Product Stage

Stolit® Lotusan® is produced at Sto's Atlanta, GA, Glendale, AZ and Rutland, VT facilities. This stage includes an aggregation of raw material extraction, supplier processing, delivery, manufacturing and packaging by Sto. Stolit® Lotusan® is supplied in 5-gallon pails.

Design and Construction Stage

The design and construction process stage starts with the packaged product leaving the production site and ends with being delivered to the application site.

During this stage, the finished product is moved from a shipping dock for distribution. The end gate is the application site after the purchaser acquires the finished product and transports it to the application site.

Use and Maintenance Stage

The use stage begins when the user prepares the product before applying it to a substrate and ends with any leftover coating and discarded packaging entering the end-of-life stage. Detailed application instructions are provided online. The application procedure includes mixing and applying. As recommended, an electric drill/mixer and a spray pump are assumed to be used for mixing and application. The equipment is not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible, but electricity to power application tools has been included.

As prescribed in the PCR, 10% of the wet mass of Stolit® is assumed to be unused and properly disposed of.

End-of-Life Stage

Waste Flow	Recycling	Incineration	Landfilling
Paper Packaging	66.6%	6.01%	27.39%
Steel Packaging	33.3%	12.01%	54.69%
Plastic Packaging	9.1%	16.36%	74.54%
Unused Product	0%	0%	100%
Post-Consumer Product	0%	0%	100%

In this stage, the disposal of installation waste, packaging waste and product waste at its end of life is included. The disposal pathway of each waste stream is modeled based on the recommendation of PCR and US EPA's latest waste management fact sheet.

Life Cycle Assessment Results

As prescribed by the PCR, TRACI 2.1 impact characterization methodology and IPCC 5th assessment report are adopted to calculate the environment impacts. Table 4 provides the acronym key of the impact indicators declared in this EPD.

Table 4: LCIA impact category and LCI Indicator keys

Abbreviation	Parameter	Unit
	TRACI 2.1	
AP	Acidification potential of soil and water	kg SO_2 eq
EP	Eutrophication potential	kg N eq
GWP	Global warming potential including biogenic carbon emission	kg CO_2 eq
ODP	Depletion of stratospheric ozone layer	kg CFC 11 eq
POCP	Photochemical ozone creation potential	kg O_3 eq
	Resource Use Parameters	
RPR	Use of renewable primary energy	MJ, net calorific value (LHV)
RMR	Use of renewable Material Resources	kg
NRER	Depletion of Non-Renewable Energy Resources	MJ, net calorific value
NRMR	Depletion of Non-Renewable Material Resources	kg
FW	Consumption of Freshwater	m^3
	Waste Parameters	
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
	Biogenic Carbon Parameter	
BC	Biogenic Carbon	kg CO_2 eq
	Energy Differentiation Parameters	
HWP	Hydro/wind Power	MJ, net calorific value (LHV)
FE	Fossil Energy	MJ, net calorific value (LHV)
BE	Bio-energy	MJ, net calorific value (LHV)
NE	Nuclear Energy	MJ, net calorific value (LHV)
OE	Other Energy	MJ, net calorific value (LHV)

Stolit® Lotusan® 1.0 Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	6.23E-02	5.83E-03	6.11E-03	4.19E-03
	EP [kg N eq]	3.64E-03	4.75E-04	2.23E-04	6.81E-04
	GWP [kg CO_2 eq]	1.45E+01	1.13E+00	2.90E+00	8.70E-01
	ODP [kg CFC 11 eq]	-5.00E-13	1.08E-16	1.83E-14	2.35E-15
	POCP [kg O_3 eq]	8.08E-01	1.33E-01	1.15E+00	6.94E-02
	RPRE [MJ]	4.25E+01	4.97E-01	3.10E+00	7.14E-01
	NRPRE [MJ]	2.95E+02	1.61E+01	7.69E+01	1.04E+01
	FW [m3]	7.57E-02	1.91E-03	1.73E-02	1.34E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.52E+01	0.00E+00	1.30E+00	0.00E+00
	HWD [kg]	8.52E-07	1.30E-07	1.09E-08	4.34E-08
	NHWD [kg]	1.83E+00	6.06E-04	9.13E-03	1.61E+01
	BC [kg CO_2 eq]		5.29E+00		
	HWP [MJ]		9.34E-01		
	FE [MJ]		1.42E+01		
	BE [MJ]		4.62E-01		
	NE [MJ]		3.71E+00		
	OE [MJ]		3.72E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.25E-01	1.17E-02	1.22E-02	8.38E-03
	EP [kg N eq]	7.28E-03	9.50E-04	4.46E-04	1.36E-03
	GWP [kg CO_2 eq]	2.90E+01	2.26E+00	5.80E+00	1.74E+00
	ODP [kg CFC 11 eq]	-1.00E-12	2.16E-16	3.66E-14	4.70E-15
	POCP [kg O_3 eq]	1.62E+00	2.66E-01	2.30E+00	1.39E-01
	RPRE [MJ]	8.50E+01	9.94E-01	6.20E+00	1.43E+00
	NRPRE [MJ]	5.90E+02	3.22E+01	1.54E+02	2.08E+01
	FW [m3]	1.51E-01	3.82E-03	3.46E-02	2.68E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.03E+01	0.00E+00	2.60E+00	0.00E+00
	HWD [kg]	1.70E-06	2.60E-07	2.18E-08	8.68E-08
	NHWD [kg]	3.66E+00	1.21E-03	1.83E-02	3.22E+01
	BC [kg CO_2 eq]		1.06E+01		
	HWP [MJ]		1.87E+00		
	FE [MJ]		2.83E+01		
	BE [MJ]		9.23E-01		
	NE [MJ]		7.42E+00		
	OE [MJ]		7.45E-01		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	8.00E-02	5.83E-03	1.86E-03	4.01E-03
	EP [kg N eq]	3.36E-03	4.75E-04	6.83E-05	6.72E-04
	GWP [kg CO_2 eq]	1.50E+01	1.13E+00	8.76E-01	8.31E-01
	ODP [kg CFC 11 eq]	-4.92E-13	1.08E-16	5.47E-15	2.22E-15
	POCP [kg O_3 eq]	7.67E-01	1.33E-01	1.12E+00	6.59E-02
	RPRE [MJ]	4.13E+01	4.98E-01	9.63E-01	6.69E-01
	NRPRE [MJ]	2.93E+02	1.61E+01	2.31E+01	9.85E+00
	FW [m3]	7.61E-02	1.92E-03	5.22E-03	1.27E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.52E+01	0.00E+00	3.80E-01	0.00E+00
	HWD [kg]	8.49E-07	1.30E-07	3.37E-09	4.11E-08
	NHWD [kg]	1.84E+00	6.06E-04	2.81E-03	1.53E+01
	BC [kg CO_2 eq]		5.20E+00		
	HWP [MJ]		9.33E-01		
	FE [MJ]		1.42E+01		
	BE [MJ]		4.61E-01		
	NE [MJ]		3.71E+00		
	OE [MJ]		3.72E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.60E-01	1.17E-02	3.72E-03	8.02E-03
	EP [kg N eq]	6.72E-03	9.50E-04	1.37E-04	1.34E-03
	GWP [kg CO_2 eq]	3.00E+01	2.26E+00	1.75E+00	1.66E+00
	ODP [kg CFC 11 eq]	-9.84E-13	2.16E-16	1.09E-14	4.44E-15
	POCP [kg O_3 eq]	1.53E+00	2.66E-01	2.24E+00	1.32E-01
	RPRE [MJ]	8.26E+01	9.96E-01	1.93E+00	1.34E+00
	NRPRE [MJ]	5.86E+02	3.22E+01	4.62E+01	1.97E+01
	FW [m3]	1.52E-01	3.84E-03	1.04E-02	2.54E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.03E+01	0.00E+00	7.60E-01	0.00E+00
	HWD [kg]	1.70E-06	2.60E-07	6.74E-09	8.22E-08
	NHWD [kg]	3.68E+00	1.21E-03	5.62E-03	3.06E+01
	BC [kg CO_2 eq]		1.04E+01		
	HWP [MJ]		1.87E+00		
	FE [MJ]		2.83E+01		
	BE [MJ]		9.23E-01		
	NE [MJ]		7.41E+00		
	OE [MJ]		7.44E-01		

Stolit® Lotusan® 1.5 Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	6.98E-02	6.71E-03	7.02E-03	4.82E-03
	EP [kg N eq]	3.76E-03	5.47E-04	2.56E-04	7.84E-04
	GWP [kg CO_2 eq]	1.68E+01	1.31E+00	3.33E+00	1.00E+00
	ODP [kg CFC 11 eq]	-5.83E-13	1.24E-16	2.11E-14	2.70E-15
	POCP [kg O_3 eq]	8.62E-01	1.53E-01	1.32E+00	7.99E-02
	RPRE [MJ]	4.70E+01	5.73E-01	3.56E+00	8.22E-01
	NRPRE [MJ]	3.32E+02	1.85E+01	8.86E+01	1.20E+01
	FW [m3]	8.52E-02	2.21E-03	1.99E-02	1.54E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.75E+01	0.00E+00	1.50E+00	0.00E+00
	HWD [kg]	9.85E-07	1.50E-07	1.25E-08	4.99E-08
	NHWD [kg]	2.10E+00	6.98E-04	1.05E-02	1.86E+01
	BC [kg CO_2 eq]		6.13E+00		
	HWP [MJ]		1.08E+00		
	FE [MJ]		1.63E+01		
	BE [MJ]		5.32E-01		
	NE [MJ]		4.27E+00		
	OE [MJ]		4.29E-01		

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.40E-01	1.34E-02	1.40E-02	9.64E-03
	EP [kg N eq]	7.52E-03	1.09E-03	5.12E-04	1.57E-03
	GWP [kg CO_2 eq]	3.36E+01	2.62E+00	6.66E+00	2.00E+00
	ODP [kg CFC 11 eq]	-1.17E-12	2.48E-16	4.22E-14	5.40E-15
	POCP [kg O_3 eq]	1.72E+00	3.06E-01	2.64E+00	1.60E-01
	RPRE [MJ]	9.40E+01	1.15E+00	7.12E+00	1.64E+00
	NRPRE [MJ]	6.64E+02	3.70E+01	1.77E+02	2.40E+01
	FW [m3]	1.70E-01	4.42E-03	3.98E-02	3.08E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.49E+01	0.00E+00	3.00E+00	0.00E+00
	HWD [kg]	1.97E-06	3.00E-07	2.50E-08	9.98E-08
	NHWD [kg]	4.20E+00	1.40E-03	2.10E-02	3.72E+01
	BC [kg CO_2 eq]		1.23E+01		
	HWP [MJ]		2.15E+00		
	FE [MJ]		3.26E+01		
	BE [MJ]		1.06E+00		
	NE [MJ]		8.54E+00		
	OE [MJ]		8.58E-01		

Stolit® Lotusan® 1.5

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	9.14E-02	6.71E-03	2.14E-03	4.62E-03
	EP [kg N eq]	3.86E-03	5.47E-04	7.86E-05	7.74E-04
	GWP [kg CO_2 eq]	1.72E+01	1.31E+00	1.01E+00	9.57E-01
	ODP [kg CFC 11 eq]	-5.68E-13	1.24E-16	6.30E-15	2.55E-15
	POCP [kg O_3 eq]	8.80E-01	1.53E-01	1.29E+00	7.58E-02
	RPRE [MJ]	4.74E+01	5.73E-01	1.11E+00	7.70E-01
	NRPRE [MJ]	3.35E+02	1.85E+01	2.65E+01	1.13E+01
	FW [m3]	8.69E-02	2.21E-03	6.01E-03	1.46E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	1.75E+01	0.00E+00	4.40E-01	0.00E+00
	HWD [kg]	9.78E-07	1.50E-07	3.88E-09	4.73E-08
	NHWD [kg]	2.12E+00	6.98E-04	3.23E-03	1.76E+01
	BC [kg CO_2 eq]		5.98E+00		
	HWP [MJ]		1.07E+00		
	FE [MJ]		1.63E+01		
	BE [MJ]		5.31E-01		
	NE [MJ]		4.27E+00		
	OE [MJ]		4.29E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	1.83E-01	1.34E-02	4.28E-03	9.24E-03
	EP [kg N eq]	7.72E-03	1.09E-03	1.57E-04	1.55E-03
	GWP [kg CO_2 eq]	3.44E+01	2.62E+00	2.02E+00	1.91E+00
	ODP [kg CFC 11 eq]	-1.14E-12	2.48E-16	1.26E-14	5.10E-15
	POCP [kg O_3 eq]	1.76E+00	3.06E-01	2.58E+00	1.52E-01
	RPRE [MJ]	9.48E+01	1.15E+00	2.22E+00	1.54E+00
	NRPRE [MJ]	6.70E+02	3.70E+01	5.30E+01	2.26E+01
	FW [m3]	1.74E-01	4.42E-03	1.20E-02	2.92E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	3.49E+01	0.00E+00	8.80E-01	0.00E+00
	HWD [kg]	1.96E-06	3.00E-07	7.76E-09	9.46E-08
	NHWD [kg]	4.24E+00	1.40E-03	6.46E-03	3.52E+01
	BC [kg CO_2 eq]		1.20E+01		
	HWP [MJ]		2.15E+00		
	FE [MJ]		3.26E+01		
	BE [MJ]		1.06E+00		
	NE [MJ]		8.54E+00		
	OE [MJ]		8.57E-01		

Stolit® Lotusan® Freeform Dark Colors

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	1.13E-01	1.05E-02	1.10E-02	7.51E-03
	EP [kg N eq]	6.53E-03	8.52E-04	3.99E-04	1.22E-03
	GWP [kg CO_2 eq]	2.57E+01	2.04E+00	5.20E+00	1.56E+00
	ODP [kg CFC 11 eq]	-7.86E-13	1.93E-16	3.28E-14	4.22E-15
	POCP [kg O_3 eq]	1.46E+00	2.39E-01	2.06E+00	1.25E-01
	RPRE [MJ]	7.50E+01	8.93E-01	5.56E+00	1.28E+00
	NRPRE [MJ]	5.27E+02	2.89E+01	1.38E+02	1.88E+01
	FW [m3]	1.35E-01	3.44E-03	3.10E-02	2.41E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	2.72E+01	0.00E+00	2.33E+00	0.00E+00
	HWD [kg]	1.54E-06	2.34E-07	1.95E-08	7.78E-08
	NHWD [kg]	3.15E+00	1.09E-03	1.64E-02	2.89E+01
	BC [kg CO_2 eq]		9.44E+00		
	HWP [MJ]		1.68E+00		
	FE [MJ]		2.54E+01		
	BE [MJ]		8.28E-01		
	NE [MJ]		6.65E+00		
	OE [MJ]		6.68E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	2.26E-01	2.10E-02	2.20E-02	1.50E-02
	EP [kg N eq]	1.31E-02	1.70E-03	7.98E-04	2.44E-03
	GWP [kg CO_2 eq]	5.14E+01	4.08E+00	1.04E+01	3.12E+00
	ODP [kg CFC 11 eq]	-1.57E-12	3.86E-16	6.56E-14	8.44E-15
	POCP [kg O_3 eq]	2.92E+00	4.78E-01	4.12E+00	2.50E-01
	RPRE [MJ]	1.50E+02	1.79E+00	1.11E+01	2.56E+00
	NRPRE [MJ]	1.05E+03	5.78E+01	2.76E+02	3.76E+01
	FW [m3]	2.70E-01	6.88E-03	6.20E-02	4.82E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	5.44E+01	0.00E+00	4.66E+00	0.00E+00
	HWD [kg]	3.08E-06	4.68E-07	3.90E-08	1.56E-07
	NHWD [kg]	6.30E+00	2.18E-03	3.28E-02	5.78E+01
	BC [kg CO_2 eq]		1.89E+01		
	HWP [MJ]		3.35E+00		
	FE [MJ]		5.08E+01		
	BE [MJ]		1.66E+00		
	NE [MJ]		1.33E+01		
	OE [MJ]		1.34E+00		

Stolit® Lotusan® Freeform

	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Market-based lifetime	AP [kg SO_2 eq]	1.42E-01	1.05E-02	3.34E-03	7.20E-03
	EP [kg N eq]	5.78E-03	8.52E-04	1.23E-04	1.21E-03
	GWP [kg CO_2 eq]	2.60E+01	2.04E+00	1.57E+00	1.49E+00
	ODP [kg CFC 11 eq]	-6.63E-13	1.93E-16	9.82E-15	3.98E-15
	POCP [kg O_3 eq]	1.27E+00	2.39E-01	2.01E+00	1.18E-01
	RPRE [MJ]	7.24E+01	8.93E-01	1.73E+00	1.20E+00
	NRPRE [MJ]	5.15E+02	2.89E+01	4.14E+01	1.77E+01
	FW [m3]	1.35E-01	3.44E-03	9.37E-03	2.28E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	2.72E+01	0.00E+00	6.90E-01	0.00E+00
	HWD [kg]	1.46E-06	2.34E-07	6.04E-09	7.37E-08
	NHWD [kg]	3.17E+00	1.09E-03	5.04E-03	2.74E+01
	BC [kg CO_2 eq]		9.24E+00		
	HWP [MJ]		1.67E+00		
	FE [MJ]		2.54E+01		
	BE [MJ]		8.28E-01		
	NE [MJ]		6.65E+00		
	OE [MJ]		6.68E-01		
	Indicator	1. Product Stage	2. Design & Construction Stage	3. Use & Maintenance Stage	4. End-of-Life Stage
Design lifetime	AP [kg SO_2 eq]	2.84E-01	2.10E-02	6.68E-03	1.44E-02
	EP [kg N eq]	1.16E-02	1.70E-03	2.46E-04	2.42E-03
	GWP [kg CO_2 eq]	5.20E+01	4.08E+00	3.14E+00	2.98E+00
	ODP [kg CFC 11 eq]	-1.33E-12	3.86E-16	1.96E-14	7.96E-15
	POCP [kg O_3 eq]	2.54E+00	4.78E-01	4.02E+00	2.36E-01
	RPRE [MJ]	1.45E+02	1.79E+00	3.46E+00	2.40E+00
	NRPRE [MJ]	1.03E+03	5.78E+01	8.28E+01	3.54E+01
	FW [m3]	2.70E-01	6.88E-03	1.87E-02	4.56E-03
	RMR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRMR [kg]	5.44E+01	0.00E+00	1.38E+00	0.00E+00
	HWD [kg]	2.92E-06	4.68E-07	1.21E-08	1.47E-07
	NHWD [kg]	6.34E+00	2.18E-03	1.01E-02	5.48E+01
	BC [kg CO_2 eq]		1.85E+01		
	HWP [MJ]		3.35E+00		
	FE [MJ]		5.08E+01		
	BE [MJ]		1.66E+00		
	NE [MJ]		1.33E+01		
	OE [MJ]		1.34E+00		

Interpretation

For all the products in study, the majority of the environmental impacts come from the Product Stage, which includes raw material sourcing, transportation and manufacturing. The only exception is POCP whose dominant source is Use & Maintenance Stage because of VOC emission in the curing process. From a functional unit perspective, the lifetime of the product and the coverage rate play a major role in scaling the impacts. This explains why products of coarse finishes have a higher impact than those of fine finishes.

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