ENVIRONMENTAL PRODUCT DECLARATION

AS-100 - Primer

Certified Environmental Product Declaration
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Program Operator	NSF Certification LLC 789 N. Dixboro, Ann Arbor, MI 48105 www.nsf.org
Manufacturer Name and Address	Bostik, Inc. Paulsboro New Jersey Plant, 2000 Nolte Drive, Paulsboro, NJ, 08066
Declaration Number	EPD10878
Declared Product and Functional Unit	AS-100 Primer 1 m^2 of covered and protected substrate for a period of 60 years
Reference PCR and Version Number	PCR for Architectural Coatings – 7-18-2015
Product's intended Application and Use	Flooring and Wall Applications
Product RSL	5 years (Market-based lifetime)
Markets of Applicability	North America
Date of Issue	10/13/2023
Period of Validity	5 years from date of issue
EPD Type	Product Specific
Range of Dataset Variability	N/A
EPD Scope	Cradle to Grave
Year of reported manufacturer primary data	2019
LCA Software and Version Number	GaBi 10.6.1.265
LCI Database and Version Number	GaBi Database Service Pack 2022.1
LCIA Methodology and Version Number	TRACI 2.1 IPCC AR6
The sub-category PCR review was conducted by:	Thomas Gloria, PhD Bill Stough Dr. Michael Overcash

This declaration was independently verified in accordance with ISO 14025: 2006. The PCR chosen conforms to ISO 21930:2017. **☐ Internal ☒ External**	Jack Geibig - EcoForm jgeibig@ecoform.com
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	WAP Sustainability Consulting
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Jack Geibig - EcoForm jgeibig@ecoform.com

Limitations:
Environmental declarations from different programs (ISO 14025) may not be comparable.
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.

Description of Company

Bostik is a world-class leader in sealing and bonding technologies. We create smart adhesive solutions for both industries and consumers, covering a broad range of markets such as construction, packaging, automotive, high tech, hygiene products, etc. The adhesive division of the Arkema Group, a specialty materials leader, Bostik benefits from unique research & development capabilities to help build a world that is safer, more sustainable, and adaptive. With over 2 billion USD annual sales and over 6,000 people, Bostik is present in more than 50 countries.

Product Definition and Characteristics

AS-100 is a premium interior and exterior acrylic primer designed for use with CMP's line of underlayment's and topping. AS-100 can be used on a wide variety of substrates including concrete, wood, well bonded VCT, Epoxy, Gypsum underlayment, cutback and other adhesive residues not affected by water. There is no colorant added to this product after the product leaves Bostik's manufacturing facility.

Product Classification and Description

Table 1: Technical Data

AS-100	
Color	Light green
VOC	0 g/L
Density (lbs/gallon)	8.57
Flammability ASTM E84	Flame Spread: -0-
	Fuel Contribution: -0-
	Smoke Development: -0-

Life Cycle Stages

Product Stage

Raw material manufacturing

Typical product composition provided by Bostik is summarized in Table 2.

Table 2: Product Composition

Ingredient Category	Material Composition
Polymer	20 – 40%
Glycol	0.1 – 1%
Water	60 – 80%
Proprietary Additives	1 - 2%

Transportation of raw materials to plants

The distances were modeled by materials and calculated using a supplier location and location of manufacturing. For materials where supplier data was not provided, a default distance of 750 miles was used per PCR default scenarios.

Coating manufacturing

The manufacturing process primarily consists of mixing and dispersing raw materials into a homogenous mixture. After that the product is packaged in pails and transported to the customer.

Design and Construction Stage

Transportation

In this stage, the product is transported from the manufacturing site to the distributor, and finally to the application site. The product is delivered to the customer via truck and transportation distances were calculated based on sales records provided by Bostik.

Use and Maintenance Stage

There is no use stage associated with this product as they are beneath flooring coverings. Any leftover product may be disposed of based on local regulations.

End of Life Stage

AS-100 is bonded to flooring substrates, therefore, when the substrate is removed or replaced, the product is disposed of with it. It was assumed at 100% of the product is sent to landfill. Packaging disposal is modeled based on US EPA data due to absence of primary data.

Life Cycle Assessment Methodology

Functional Unit

The functional unit according to the PCR is 1 m^2 of covered and protected substrate for a period of 60 years.

Market-Based Life Used in Assessment

The market-based lifetime used for AS-100 is 5-years. Therefore, after initial installation in a building with an estimated service life (ESL) of 60 years there will be 11 replacements needed for each product in the study. As there are multiple use scenarios for AS-100, the most conversative estimate of application, a gallon covering 150ft^2 on highly porous substrates, was chosen. The mass of product per functional unit is shown in Table 3.

Table 3: Mass per functional unit

Product	Mass per functional unit (kg) for 1 coat
AS-100	0.264

Design-Based Life Used in Assessment

AS-100 does not merit the types of performance testing as outlined in the PCR to warrant a design-based lifetime.

System Boundary

This LCA is a Cradle-to-Grave study.

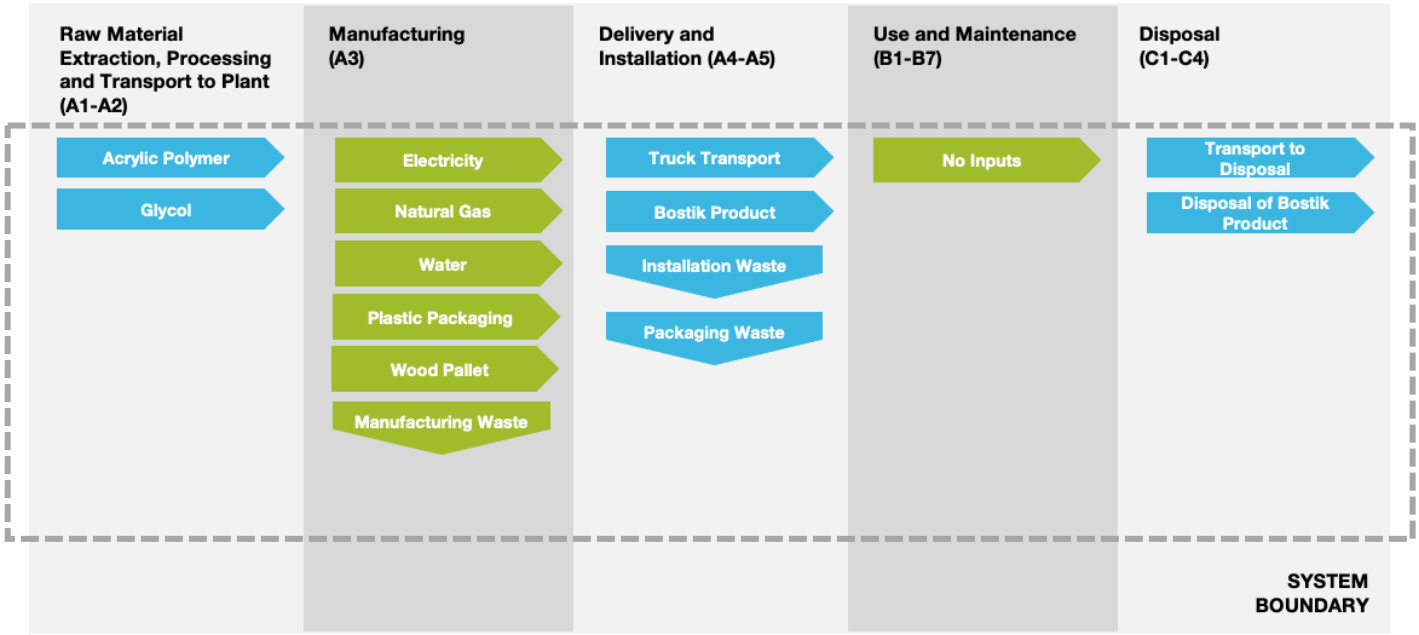

Figure 1: System Boundary

Estimates and Assumptions

All estimates and assumptions are within the requirements of ISO 14040/44. The majority of the estimations are within the primary data. The primary data was collected as annual totals including all utility usage and production information. For the LCA, the usage information was divided by the production volume to create an energy use per declared unit. Other assumptions are listed below:

- Availability of geographically more accurate datasets would have improved the accuracy of the study.
- Since this LCA uses the cut-off approach to recycled material in the product, no credit is given to product system but rather is exempted from the burden of extracting virgin material in place of using recycled material.
- Only known and quantifiable environmental impacts are considered.
- Due to the assumptions and value choices listed above, these do not reflect real-life scenarios and hence they cannot assess actual and exact impacts, but only potential environmental impacts.

Data Quality Assessment

The overall data quality is considered good.

Geographical Coverage

The geographical scope of the manufacturing portion of the life cycle is Paulsboro, NJ USA. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered excellent.

The geographical scope of the raw material acquisition is the United States. Customer distribution, site installation, and use portions of the life cycle is mostly the United States.

In selecting secondary data (i.e. GaBi Datasets), priority was given to the accuracy and representativeness of the data. When available and deemed of significant quality, country-specific data were used. However, priority was given to technological relevance and accuracy in selecting secondary data. This often led to the substitution of regional and/or global data for country-specific data. Overall geographic data quality is considered good.

Time Coverage

Primary data were provided by the manufacturer and represent all information for calendar year 2019. The project commenced in 2021. Due to deviation from business-as-usual manufacturing in 2020, attributed to the COVID-19 pandemic, utility data from 2019 were used. Using these data meets the PCR requirements. Time coverage of these primary data is considered good.
Data necessary to model cradle-to-gate unit processes was sourced from Sphera GaBi LCI datasets. Time coverage of the GaBi datasets varies from approximately 2019 to present. All datasets rely on at least one 1-year average data. Overall time coverage of the datasets is considered good and meets the requirement of the PCR.

Technological Coverage

Primary data provided by the manufacturer is specific to the technology the company uses in manufacturing their product. It is site-specific and considered of good quality. It is worth noting that the energy used in manufacturing the product includes overhead energy such as lighting, heating and sanitary use of water.
Data necessary to model cradle-to-gate unit processes was sourced from GaBi LCI datasets. Technological coverage of the datasets is considered good relative to the actual supply chain of the manufacturer. While improved life cycle data from suppliers would improve technological coverage, the use of lower-quality generic datasets does meet the goal of this LCA.

Completeness

The data included is considered complete. No known flows above 1% were excluded and the sum of all excluded flows totals less than 5%.

Period under Review

The period under review is calendar year 2019.

Allocation

General principles of allocation were based on ISO 14040/44. To derive per-unit values for manufacturing inputs, allocation based on total production by mass was adopted.

Cut-off Criteria

Materials inputs greater than 1% (based on total mass of the final product) were included with the scope of this analysis. Material inputs less than 1% were included if sufficient data was available to warrant and/or the material input was thought to have significant environmental impact.
The list of excluded materials and energy inputs include:

- Some minor additives have been excluded (0.8%). The exclusion of these materials has no major impacts on the overall results. However, to account for this difference, the inputs were scaled up to fill in the missing additives to total the composition to 100%.
- As the tools used during the installation of the product are multi-use tools and can be reused after each installation, the per-declared unit impacts are considered negligible and therefore are not included.
- Some material inputs may have been excluded within the GaBi datasets used for this project. All GaBi datasets have been critically reviewed and conform to the exclusion requirement of ISO 21930.

Life Cycle Impact Assessment

LCIA Description

The Life Cycle Impact Assessment (LCIA) relates the life cycle inventory to the potential environmental impacts. The PCR requires that the following key parameters of environmental impact assessment be declared based on the TRACI methodology (v2.1), except in the case of global warming potential which must be declared based on the IPCC (AR5) methodology.

- Climate change (GWP 100 years) [kg of CO_2-eq]
- Acidification of land and water sources (AP) [kg of SO_2-eq]
- Photochemical ozone creation (SFP, or "Smog Formation") [kg O_3 eq./kg of emission]
- Eutrophication (EP) [kg N eq./kg of emission]
- Depletion of stratospheric ozone (ODP) [kg CFC-11 eq./kg of emission]

Additionally, the PCR requires the following material and energy calculations to be declared:

- Depletion of Non-Renewable Energy Resources (MJ)
- Depletion of Non-Renewable Material Resources (kg)
- Use of Renewable Primary Energy (MJ)
- Use of Renewable Material Resources (kg)
- Consumption of Freshwater (m^3)
- Hazardous waste (kg) or
- Non-hazardous waste (kg)

Finally, the PCR requires a differentiation of use for material and energy resources in the following categories:

- Hydro/wind power (MJ)
- Fossil energy (MJ)
- Bio-energy (MJ)
- Nuclear-energy (MJ)
- Other-energy (MJ)
- Secondary fuels (MJ)
- Non-renewable resources (kg)
- Renewable resources (kg)
- Recycled materials (kg)
- Secondary raw materials (kg)
- Water (m^3)

LCIA Results

Table 4: LCI and LCIA results for AS-100, per functional unit

Impact Category	Product Stage	Design and Construction stage	Use and Maintenance Stage	End of Life Stage	Total
AP [kg SO_2 eq]	1.71E-03	3.05E-04	2.27E-02	4.94E-04	2.52E-02
EP [kg N eq]	1.37E-04	2.72E-05	1.87E-03	1.98E-04	2.23E-03
IPCC AR6 GWP [kg CO_2 eq]	8.90E-01	6.61E-02	1.08E+01	1.99E-01	1.20E+01
TRACI GWP [kg CO_2 eq]	8.72E-01	6.57E-02	1.06E+01	1.97E-01	1.17E+01
ODP [kg CFC 11 eq]	3.56E-14	1.24E-16	4.00E-13	5.38E-15	4.41E-13
SFP [kg O_3 eq]	3.63E-02	7.06E-03	4.90E-01	9.83E-03	5.43E-01
Material and Energy Resources Consumption					
Depletion of Non-Renewable Energy Resources [MJ]	1.60E+01	8.17E-01	1.91E+02	2.12E+00	2.10E+02
Depletion of Non-Renewable Material Resources [kg]	6.19E-03	5.71E-05	4.53E-01	6.36E-04	4.59E-01
Use of Renewable Material Resources [kg]	3.09E-03	5.60E-06	8.17E-02	1.62E-05	8.48E-02
Use of Renewable Primary Energy [MJ]	1.85E+00	3.18E-02	2.11E+01	2.19E-01	2.32E+01
Nonrenewable Fossil [MJ (HHV)]	4.54E-01	2.94E-02	5.55E+00	8.49E-02	6.12E+00
Nonrenewable Nuclear [MJ (HHV)]	4.19E-01	2.95E-02	5.05E+00	8.92E-02	5.59E+00
Renewable (Solar, Wind, Hydro, Geo) [MJ (HHV)]	1.92E-04	2.58E-05	2.45E-03	5.28E-05	2.72E-03
Renewable (Biomass) [MJ (HHV)]	2.68E-01	9.61E-03	3.12E+00	2.50E-02	3.42E+00
Secondary Fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable Resources [kg]	6.19E-03	5.71E-05	4.53E-01	6.36E-04	4.59E-01
Renewable Resources [kg]	3.09E-03	5.60E-06	8.17E-02	1.62E-05	8.48E-02
Recycled Materials [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Raw Materials [kg]	2.64E-02	0.00E+00	2.96E-01	0.00E+00	3.22E-01
FW [m^3]	6.75E-03	1.29E-04	7.74E-02	1.44E-03	8.57E-02
Output Flows and Waste Categories					
NHWD [%]	100	100	100	100	100
HWD [%]	0	0	0	0	0

Emissions to Water, Soil and Indoor Air

VOC testing have been conducted for AS-100 during its use phase. Compliance testing certificate can be found at https://www.scsglobalservices.com/certified-green-products-guide?q=bostik.

Table 5: VOC Testing

Exposure Scenario	Individual VOCs of Concern		Formaldehyde		TVOC
	Criterion	Compliant?	Criterion	Compliant?	Range
School Classroom	≤1/2 Chronic REL	YES	≤9.0 µg/m3	YES	> 0.5 mg/m3
Private Office	≤1/2 Chronic REL	YES	≤9.0 µg/m3	YES	> 0.5 mg/m3

Interpretation

Overall, across all impact categories, product manufacturing including raw material extraction and packaging contribute significantly to environmental impacts, apart from use and maintenance impacts due to re-application of products over the course of 60 years.
Within the product stage, most impacts across all products are from the extraction and processing of raw materials. Manufacturing including packaging contributes not more than 26% to product stage GWP impacts. End of life impacts can be attributed to emissions from landfilling of products.

Additional Environmental Information

AS-100 has a Health Product Declaration (HPD) which can be found at https://www.hpd-collaborative.org/hpd-public-repository/.

AS-100 has VOC Emission compliance testing for the following standards and codes:

- USGBC LEED Version 4/4.1, BD&C, ID&C, Residential BD&C Multifamily
- The WELL Building Standard, WELL v2, Feature X06
- ANSI/GBI 01-2019 Green Globes Assessment Protocol

More information on Bostik's products can be found on their website.

References

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