Environmental Product Declaration

Sika Egypt

SikaWall 321Putty

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According to
EN 15804
ISO 21930
ISO 14025

1. General Information

Manufacturer Name:	Sika Egypt – Obour Factory 1st industrial zone (A) Section # 10, Block 13035 El-Obour City, Egypt
Program Operator:	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959, USA
Declaration Number:	EPD 183
Reference PCR:	IBU PCR Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project report according to EN 15804+A2:2019– Version 1.0 IBU PCR Part B: Requirements on the EPD for Reaction resins products – Version 1.7.
Date of Issuance:	February 24th, 2021
End of Validity:	February 24th, 2026
Product Name:	SikaWall 321 Putty
EPD Owner:	Sika Egypt
Product Group:	Reaction resin products
Declared Unit:	1 kg of SikaWall 321 Putty
EPD Scope:	Cradle-to-gate (A1, A2, and A3)
Verification:	The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration according to ISO 14025 and ISO 21930. ☐ internal ☒ external
LCA Reviewer and EPD Verifier:	Timothy S. Brooke ASTM International

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2. Product

2.1 Product Description

The declared product is SikaWall 321 Putty. SikaWall 321 Putty is ready to use wall putty, based on vinyl acrylate polymer emulsion, especially selected fillers, binding materials and antibacterial agents

2.2 Application

SikaWall 321 Putty may only be used by experienced professionals.

2.3 Technical Data

Table 1 provides technical data for SikaWall 321 Putty. Further technical data is available in Sika Egypt's SikaWall 321 Putty Technical Data Sheet.

Table 1: Technical Data

Name	Value	Unit
Density	1.75	kg/l

2.4 Delivery Status

The product is available in 10 kg units.

2.5 Base Materials

Table 2: Product Ingredients

Component	Ingredient Name	Value	
SikaWall 321 Putty	Styrene Acrylic	5-15	%
	Calcium Carbonate	50-80	%
	Water	10-30	%
	Other	< 5	%

2.6 Manufacture

The preparation of reaction resin products includes mixing of the chemical ingredients and packaging of the finished product.

2.7 Environment and Health Considerations during Manufacturing

Information not available.

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2.8 Product Processing/Installation
The product is installed in a manner and with equipment that is specific to the application for which it was purchased.

2.9 Packaging
The reaction resin products are filled into plastic pails and steel cans and staked on pallets using cardboard and plastic wrap.

2.10 Conditions of Use
Not applicable: Use phase is outside the scope of the underlying LCA.

2.11 Environment and Health Considerations During Use
Not applicable: Use phase is outside the scope of the underlying LCA.

2.12 Reference Service Life
Not applicable: Use phase is outside the scope of the underlying LCA.

2.13 Extraordinary Effects
No extraordinary effects are reported in this EPD.

2.14 Re-use Phase
Not applicable: End-of-life phase is outside the scope of the underlying LCA.

2.15 Disposal
Not applicable: End-of-life phase is outside the scope of the underlying LCA.

2.16 Further Information
No further information is reported in this EPD.

3. LCA Calculation Rules

3.1 Declared Unit

The declared unit is one kilogram SikaWall 321 Putty produced at Sika Egypt's Obour factory.

3.2 System Boundary

The system boundary for this study is limited to a cradle-to-gate focus. The following three life cycle stages as per the governing PCRs are included in the study scope (see also Table 4):

A1 Raw material supply (upstream processes): Extraction, handling, and processing of input materials.
A2 Transportation*:* Transportation of all input materials from the suppliers to the gate of the manufacturing facility.
A3 Manufacturing (core process): The preparation processes of reaction resin products at Sika Egypt's Obour faciliy. This phase also includes the operations of the manufacturing facility and all process emissions that occur at the production facility.

3.3 Estimates and Assumptions

All significant foreground data was gathered from the manufacturer based on measured values (i.e. without estimation).

3.4 Cut-off Criteria

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO14044:2006 and section 6 of the IBU PCR Part A:

- All inputs and outputs to a (unit) process were included in the calculation for which data is available. Data gaps were filled by conservative assumptions with average or generic data. Any assumptions for such choices were documented.
- In case of insufficient input data or data gaps for a unit process, the cut-off criteria were 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows, e.g. per module A1-A3 were a maximum of 5% of energy usage and mass. Conservative assumptions in combination with plausibility considerations and expert judgment were used to demonstrate compliance with these criteria.
- Particular care was taken to include material and energy flows known to have the potential to cause significant emissions into air and water or soil related to the environmental indicators of this standard. Conservative assumptions in combination with

plausibility considerations and expert judgment were used to demonstrate compliance with these criteria.

3.5 Background Data and 3.6 Data Quality

Data was gathered for the primary material and energy inputs used in the production of the reaction resin product for calendar year 2019. Table 3 describe each LCI data source for raw materials (A1), transportation by mode (A2) and the core manufacture process (A3). Table 3 also includes a data quality assessment for all secondary data on the basis of the technological, temporal, and geographical representativeness as per the IBU PCR.

Table 3: Secondary Data Sources and Data Quality Assessment

A1: Raw Material Inputs				
Inputs	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Ammonium solution	ecoinvent 3: Ammonium carbonate {RoW}| market for ammonium carbonate | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Biocide	ecoinvent 3: Chemical, organic {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Calcium carbonate	ecoinvent 3: Calcium carbonate, precipitated {RoW}| market for calcium carbonate, precipitated | Cut-off, U	Global	2015	**Technology:** very good Process models average global technology **Time:** very good Data is <5 years old **Geography:** very good Data is representative of global conditions.
Defoamer (water base)	ecoinvent 3: Fatty acid {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

Hydroxymethyl cellulose	ecoinvent 3: Carboxymethyl cellulose, powder {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Styrene acrylic	ecoinvent 3: Styrene {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Texanol	ecoinvent 3: Chemical, organic {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Zinc oxide	ecoinvent 3: Zinc oxide {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

A2: Transportation

Inputs	LCI Data Source	Geography	Year	Data Quality Assessment
Trucking	ecoinvent 3: Transport, freight, lorry 16-32 metric ton, euro3 {RoW}| market for transport, freight, lorry 16-32 metric ton, EURO3 | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

A3: Manufacturing

Energy	LCI Data Source	Geography	Year	Data Quality Assessment
Grid Electricity	ecoinvent 3: Electricity, low voltage {EG}| market for electricity, low voltage | Cut-off, U	Egypt	2014	**Technology**: very good Process models average Egypt technology **Time:** good Data is <10 years old **Geography**: very good Data is representative of Egypt electricity.

Diesel Electricity	ecoinvent 3: Diesel, burned in diesel-electric generating set, 10MW {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

Ancillary Material	LCI Data Source	Geography	Year	Data Quality Assessment
Lubricating oil and Grease	ecoinvent 3: Lubricating oil {RoW}| market for lubricating oil | Cut-off, U	Global		**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

Packaging	LCI Data Source	Geography	Year	Data Quality Assessment
Cardboard packaging	ecoinvent 3: Corrugated board box {RoW}| market for corrugated board box | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** very good Data is <5 years old **Geography:** very good Data is representative of global conditions.
Wooden pallet	ecoinvent 3: EUR-flat pallet {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** very good Data is <5 years old **Geography:** very good Data is representative of global conditions.
Plastic packaging film	ecoinvent 3: Packaging film, low density polyethylene {RoW}| production | Cut-off, U	Global	2010	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

Plastic pails	ecoinvent 3: Polyethylene, high density, granulate {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Steel cans	ecoinvent 3: Tin plated chromium steel sheet, 2 mm {RoW}| production | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Water	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Water	ecoinvent 3: Water, decarbonised, at user {GLO}| market for | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.
Waste	**LCI Data Source**	**Geography**	**Year**	**Data Quality Assessment**
Landfill	ecoinvent 3: Waste paperboard {RoW}| treatment of, sanitary landfill | Cut-off, U	Global	2011	**Technology:** very good Process models average global technology **Time:** good Data is <10 years old **Geography:** very good Data is representative of global conditions.

3.7 Period under Review

Data was gathered for the primary material and energy inputs used in the production for calendar year 2019.

3.8 Allocation

At Sika Egypt's Obour facility several reaction resin products are produced. Since the primary data for manufacturing was only available on a facility level, the environmental load among the products produced is allocated according to its mass.
For waste that is recycled, the 'recycled content approach' was chosen. The recycling of waste generated by the product system is cut off.

3.9 Comparability

This LCA was created using industry average data for upstream materials. Data variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency and fuel types used.

4. LCA: Scenarios and additional technical information

4.1 Biogenic Carbon Content

The product does not contain any biogenic carbon. The packaging includes biogenic carbon in the form of cardboard and this packaging is less than 5% of the combined product and packaging mass, estimated to be 20-40kg/t.

5. LCA: Results

Life cycle impact assessment (LCIA) is the phase in which the set of results of the inventory analysis – the inventory flow table – is further processed and interpreted in terms of environmental impacts and resource use inventory metrics. As specified in the IBU PCR, Table 4 and 5 below summmarizes the LCA results for the cradle-to-gate (A1-A3) product system.

Table 4: Description of the System Boundary (x: included in LCA; mnd: module not declared)																			
Product			Construction Installation		Use							End-of-life				Benefits of Loads Beyond the System Boundary		
Raw Material supply	Transport	Manufacturing	Transport	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-Construction/ Demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	mnd	mnd	mnd	mnd	mnr	mnr	mnr	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd	mnd

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Table 5. Life Cycle Impact Assessment Results for 1kg SikaWall 321 Putty						
Environmental Indicator	**Abbrev.**	**Units**	**Total**	**A1**	**A2**	**A3**
Impact Categories						
Global warming potential	**GWP - total**	kg CO2-eq	1.72E+00	1.42E+00	9.60E-03	2.93E-01
Global warming potential - fossil fuels	**GWP - fossil**	kg CO2-eq	1.77E+00	1.46E+00	9.69E-03	2.97E-01
Global warming potential - biogenic	**GWP - biogenic**	kg CO2-eq	-6.61E-02	-7.16E-03	3.75E-06	-5.90E-02
GWP land use & land use change	**GWP - luluc**	kg CO2-eq	8.09E-03	7.80E-03	3.49E-06	2.83E-04
Depletion potential of the stratospheric ozone layer	**ODP**	kg CFC-11-eq	9.24E-08	7.34E-08	1.69E-09	1.73E-08
Acidification potential of land and water	**AP**	kg SO2-eq	5.84E-03	4.27E-03	4.87E-05	1.51E-03
Acidification potential, accumulated exceedance	**AP**	mol H+-eq	7.09E-03	5.18E-03	6.59E-05	1.84E-03
Eutrophication potential	**EP**	kg PO4-eq	2.04E-03	1.52E-03	1.18E-05	5.11E-04
Eutrophication, fraction of nutrients reaching freshwater end compartment	**EP-Freshwater**	kg PO4-eq	4.51E-04	3.42E-04	8.17E-07	1.09E-04
Eutrophication, fraction of nutrients reaching marine end compartment	**EP- Marine**	kg N-eq	1.45E-03	1.07E-03	2.52E-05	3.52E-04
Eutrophication, accumulated exceedance	**EP- Terrestrial**	mol N-eq	1.46E-02	1.06E-02	2.76E-04	3.76E-03
Formation potential of tropospheric ozone photochemical oxidants	**POCP**	kg ethene-eq	1.41E-03	1.31E-03	1.50E-06	9.54E-05
Formation potential of tropospheric ozone photochemical oxidants	**POCP**	kg NMVOC-eq	6.63E-03	5.33E-03	7.59E-05	1.22E-03
Abiotic Depletion Potential for Non-Fossil Resources	**ADPE**	kg Sb eq	3.26E-05	2.07E-05	2.55E-07	1.17E-05
Abiotic Depletion Potential for Fossil Resources	**ADPF**	MJ Surplus	1.85E+01	1.50E+01	1.42E-01	3.33E+00
Water user deprivation potential, deprivation weighted water consumption	**WDP**	m^3 world- Eq deprived	3.51E-01	2.80E-01	4.63E-04	7.11E-02
Inventory Metrics - Resources						
Use of renewable primary energy as energy	**PERE**	MJ	2.67E+00	1.14E+00	1.60E-03	1.53E+00
Use of renewable primary energy as a material	**PERM**	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy	**PERT**	MJ	2.67E+00	1.14E+00	1.60E-03	1.53E+00
Use of non-renewable primary energy as energy	**PENRE**	MJ	2.11E+01	1.71E+01	1.53E-01	3.83E+00
Use of non-renewable primary energy as a material	**PENRM**	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy	**PENRT**	MJ	2.11E+01	1.71E+01	1.53E-01	3.83E+00
Use of secondary materials	**SM**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	**RSF**	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	**NRSF**	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of freshwater resources	**FW**	m3	8.49E-03	6.69E-03	2.46E-05	1.78E-03

Inventory Metrics – Waste and Outputs						
Disposed of Hazardous Waste	**HWD**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Disposed of Non-Hazardous Waste	**NHWD**	kg	2.00E-03	0.00E+00	0.00E+00	2.00E-03
Disposed of Radioactive Waste	**RWD**	m3	1.73E-08	1.37E-08	3.77E-10	3.25E-09
Components for Reuse	**CRU**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling	**MFR**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for Energy Recovery	**MER**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported Electrical Energy (Waste to Energy)	**EEE**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported Thermal Energy (Waste to Energy)	**ETE**	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00

6. Interpretation

Figure 1 shows the relative contribution to the cumulative impacts of the A1 through A3 phases of the cradle-to-gate life cycle. For SikaWall 321 Putty, the raw material supply (A1) is the major contributor to the overall impact (40-93%) across the selected impact categories. This is since A1 incorporates all the upstream extraction and production of the chemical inputs. Transportation (A2) impacts are insignificant in all declared product profiles (0-2%). The manufacturing (A3) is moderate and for most impact categories lower than 20%. Major A3 impacts came from the steel can packaging. The raw materials for the steel can are also the reason for a relatively high contribution of A3 to 'Abiotic Depletion Potential for Non-Fossil Resources' (37%).

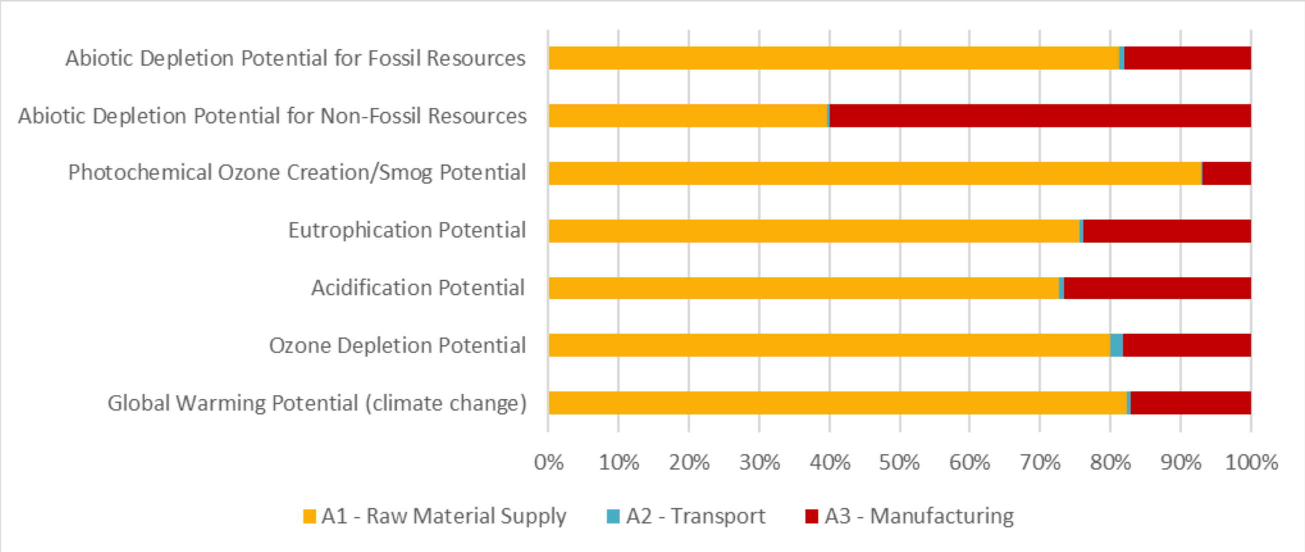

Figure 1. Contribution analysis for SikaWall 321 Putty

7. Requisite Evidence

No environemental claims beyond the LCA results are made in this EPD and thus no additional evidence is required.

8. References

1. Athena Institute: 2020 - A Cradle-to-Gate Life Cycle Assessment of Six Reaction Resin Products Manufactured by Sika Egypt
2. EN 15804+A1:2013 Sustainability of construction works – Environmental product declarations –Core rules for the product category of construction products.
3. EN 15804+A2:2019 Sustainability of construction works- Environmental product declarations- Core rules for the product category of construction products.
4. IBU PCR Part A: Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project report according to EN 15804+A2:2019– Version 1.0
5. IBU PCR Part B: Requirements on the EPD for Reaction resin products, Version 1.7
6. ISO 21930: 2017 Building construction – Sustainability in building construction – Environmental declaration of building products.
7. ISO 14025: 2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
8. ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines.
9. ISO 14040: 2006 Environmental management - Life cycle assessment - Principles and framework.