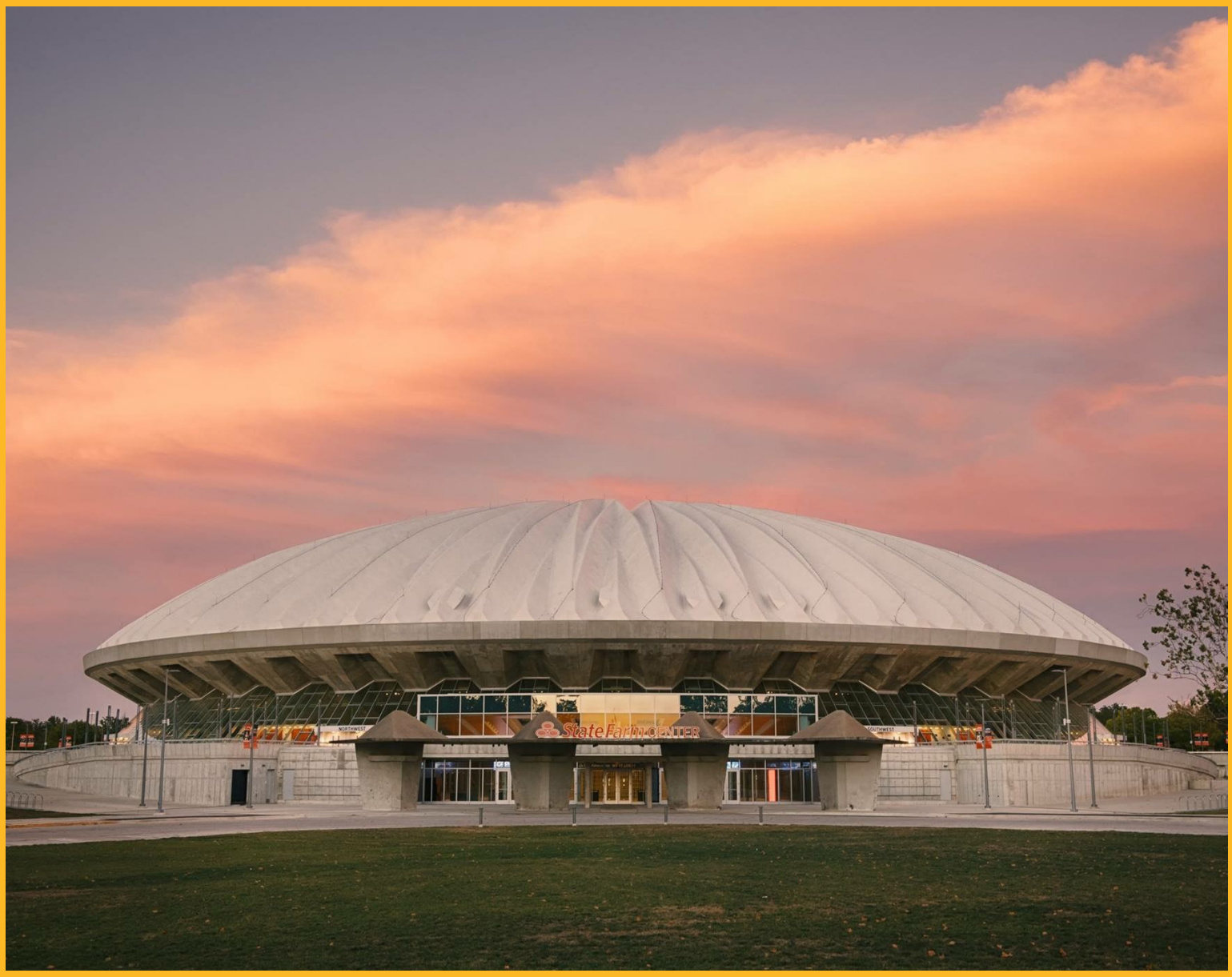



# ROOFING
# ENVIRONMENTAL PRODUCT DECLARATION - CRADLE-TO-GRAVE

Sikalastic®-641 Lo-VOC RoofPro Reemat Premium System

ASTM INTERNATIONAL

BUILDING TRUST

# GENERAL INFORMATION

**COMPANY**
Sika Corporation

**PRODUCT TYPE**
Polyurethane roof coating (liquid-applied)

**SYSTEM**
Sikalastic®-641 Lo-VOC RoofPro 15 (62 mils), RoofPro 20 (71 mils) and RoofPro 25 (85 mils) systems (Sika Reemat Premium System), consisting of an embedment layer of 32 sf/gal (all thicknesses), a Sika Reemat Premium reinforcement, and a top coat of 80 sf/gal (15) / 53 sf/gal (20) / 2 x 69 sf/gal (25).

**MANUFACTURING SITE**
Marion, OH 43302

**EPD SCOPE**
- Cradle-to-Grave

**EPD LIMITATIONS**
- EPDs from different programs (using different PCR) 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 or programs, as the EPD results may not be entirely comparable. Any EPD comparison shall 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

**FUNCTIONAL UNIT**
1 $m^2$ of covered and protected roofing membrane for a period of 20 years

**STANDARDS**
The three declared Sikalastic®-641 Lo-VOC RoofPro System thicknesses (RoofPro 15, 20 and 25) meet the following standards and requirements:

- Cool Roof Rating Council Listed*
- FM Approval
- Miami-Dade County Approval
- Meets ASTM D 7311-07

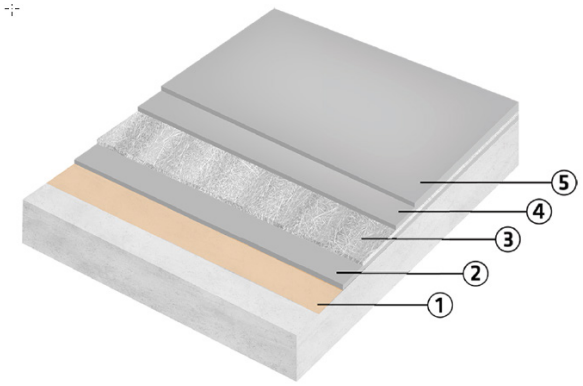
*White

**ORGANIZATION**
Sika Corporation, based in Lyndhurst, NJ, is a leading manufacturer of products and systems for the construction and motor vehicle markets. Sika Corporation's roofing division has more than 50 years of experience manufacturing high quality waterproofing systems.

**PRODUCT DESCRIPTION AND USE**
With a track record of performance of over 30 years, Sikalastic® RoofPro roofing and waterproofing membranes are the products of choice for architects, specifiers and building owners who want the peace of mind that comes with buying from the performance leader.

Sikalastic® RoofPro Systems are the highest performing waterproofing systems with over a 30 year track record able to enhance the appearance of buildings with up to 25 year system warranties. A wide range of colors enable architects and building owners to create eye catching roofs. Sikalastic® RoofPro cures to a seamless waterproofing membrane which not only reduces the risk of leakage and water ingress but conforms to the profile of the originally designed structure.

**INSTALLATION**
The Sikalastic®-641 Lo-VOC RoofPro system is a single component polyurethane coating that is cold applied on site; it cures to provide completely seamless waterproofing protection with an aesthetically pleasing finish. The membrane is fully reinforced with a glass fiber mat or polyester fleece, which is easily molded around detail areas following speed of application.




1. Primer
2. Base Layer
3. Reinforcement
4. Top Layer
5. 2. Top Layer*

*Only for Sikalastic® RoofPro 25

**USE PHASE**

It is assumed that neither maintenance, replacement nor repair is required for the roofing system. Thus, the use phase only includes a refurbishment (the same amount as the original top coat is applied again after the end of the reference service life). Within a study period of 20 years, this implies one recoating in case of the RoofPro 15 system, which has a service life of 15 years.

**END OF LIFE**

When the Sikalastic®-641 Lo-VOC RoofPro system reaches the end of its life, the system may be primed and additional material applied. When the building is demolished at the end of the building service life, the Sikalastic®-641 Lo-VOC membrane system is attached to the substrate and is therefore generally taken to landfill. The demolition process concerns mainly the structure of which the membrane system is a minor part. Therefore, for this stage no other steps are considered necessary except for the transportation to landfill and the landfilling process.

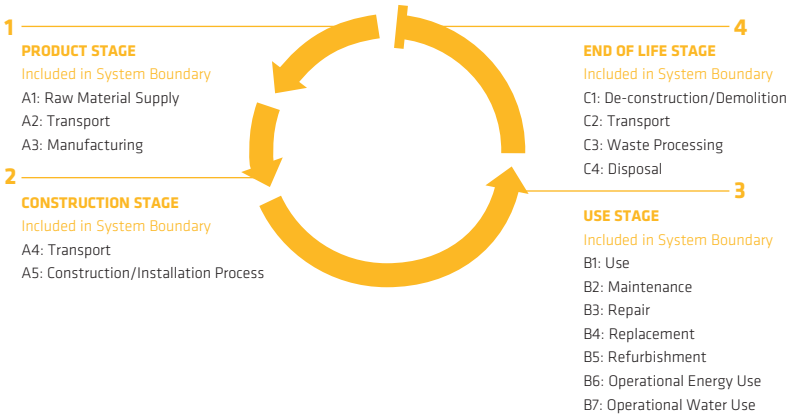
## PRODUCT SPECIFICATIONS

| TECHNICAL DATA | UNITS | ASTM TEST METHOD | VALUE / TEST RESULTS ROOFPRO-20 WITH REEMAT |
|---|---|---|---|
| Tensile strength | psi | ASTM D-751 Proc. B | 1030 |
| Elongation at Break | % | ASTM D-751 | 21 |
| Tear Strength | lbf/in | ASTM D-624 | 300 |
| Resistance to Static Puncture | lbf | ASTM D-5602 | > 55 |
| External Fire Performance | - | ASTM E 108 | Class A |
| Solar Reflectance | % | ASTM C-1549 (White) | 85.8 |
| Thermal Emittance | - | ASTM C-1371 (White) | 0.86 |
| Solar Reflectance Index | - | ASTM E-1980 (White) | 108 |
| Service Temperature | °F | - | -22 – 176 intermittent |

Note: Physical properties (Tensile Strength, Elongation at Break, Tear Strength and Resistance to Static Puncture) are also applicable for RoofPro 15 and 25, with a deviation of ± 10%.

# LIFE CYCLE STAGES

## STAGES INCLUDED IN THIS LIFE CYCLE ASSESMENT (LCA)




## SYSTEM BOUNDARY

| | INCLUDED | EXCLUDED |
|---|---|---|
| **A1-A3** | • Extraction and processing of raw materials, including fuels used in product manufacturing;<br>• Transportation of raw materials including empty backhauls;<br>• Manufacturing of the product;<br>• Packaging of the product ready for shipment;<br>• Transportation from the manufacturing site to landfill/ incineration for pre-consumer waste and unutilized byproducts from manufacturing, including empty backhauls; and<br>• Landfill/ incineration of pre-consumer waste. | • Capital goods & infrastructure, production, equipment, delivery vehicles, lab equipment, personnel-related activities and energy and water use related to company management and sales, have been excluded in the scope of the study. |
| **A4-A5** | • Transportation of product from manufacturing site to building site, including empty backhauls;<br>• Installation on the building site including material losses (5 %) and installation of Reemat Fiberglass Mat (0.225 kg/m$^2$ plus 9% overlap), and<br>• Disposal (landfill/ incineration) of waste produced on the building site. | |
| **B1-B7** | • The considered time frame is assumed to be 20 years according to the PCR and the number of recoats are declared accordingly (B4: replacement). After the end of the service life, a reapplication of the original amount of the top coat is required.<br>• As the systems RoofPro 20 and RoofPro 25 (reference service life of 20 years or 25 years, respectively) satisfy the 20 years period, no refurbishment is required for these systems. In case of RoofPro 15, the product reference service life (15 years) is less than the assumed study period (20 years), and therefore the aggregated product stage, construction product stage and end of life stage impacts associated with the recoating are included.<br>• According to the PCR, the recoating is rounded up to the nearest two decimal places. The impacts of the replacement necessary during the study period are calculated by multiplying the impacts of one replacement by the ratio of the study period over the reference service life minus 1. In case of the RoofPro 15 system, the impacts of one refurbishment are multiplied by 0.33, thus normalizing the impacts over the remainder of the 20 years study period.<br>• It is assumed that no use inputs/outputs (B1), maintenance (B2), repair (B3), refurbishment (B5) or operational water (B6) and energy (B7) use is required for the roofing system. | |
| **C1-C4** | • Dismantling/demolition of the roof system (assumed to be carried out manually using hand tools);<br>• Average transport of the system from building site to landfill , including empty backhauls; and<br>• Landfilling process. | |

## MATERIAL CONTENT DECLARATION

The material average percentage by weight for 1 m² manufactured Sikalastic®-641 Lo-VOC membrane (in RoofPro system with Reemat reinforcement) is provided.

| MATERIAL AVERAGE PERCENTAGE BY WEIGHT FOR 1 M² | | PACKAGING MATERIAL (BASE COAT AND TOP COAT) | DECLARED THICKNESS | | |
|---|---|---|---|---|---|
| **RAW MATERIAL INPUT** | **TOTAL WEIGHT BY [%]** | | **RoofPro 15 (62 mils)** | **RoofPro 20 (71 mils)** | **RoofPro 25 (85 mils)** |
| Polymers (including Hardener) | 20-40 | Metal container / lid [kg] | 0.15 | 0.17 | 0.20 |
| Additives | < 10 | Wooden Pallet [kg] | 0.07 | 0.08 | 0.09 |
| Pigments | 5-15 | **Total [kg/m²]** | **0.21** | **0.24** | **0.29** |
| Fillers | 22-40 | | | | |
| Solvent | 15-30 | | | | |
| **Total weight (Input)** | **100** | | | | |

## LIFE CYCLE IMPACTS

The results displayed below apply to the Sikalastic®-641 Lo-VOC RoofPro system with Reemat reinforcement (RoofPro 15, RoofPro 20 and RoofPro 25).

| **RESULTS Sikalastic®-641 Reemat RoofPro 15** | **FUNCTIONAL UNIT OF 1 M² INSTALLED SYSTEM CRADLE TO GRAVE, RSL=15 YEARS** | | | | |
|---|---|---|---|---|---|
| | **TOTAL** | **PRODUCT STAGE** | **DESIGN & CONSTRUCTION STAGE** | **USE & MAINTENANCE STAGE** | **END OF LIFE STAGE** |
| **CATEGORY INDICATOR** | | **A1-A3** | **A4-A5** | **B4** | **C1-C4** |
| Climate change (GWP 100 years) excl. biogenic carbon [kg CO2-eq.] | **1.24E+01** | 9.79E+00 | 1.52E+00 | 1.04E+00 | 5.21E-02 |
| Climate change (GWP 100 years) incl. biogenic carbon [kg CO2-eq.] | **1.27E+01** | 9.98E+00 | 1.60E+00 | 1.06E+00 | 5.24E-02 |
| Acidification of land and water sources (AP) [kg SO2-eq.] | **4.81E-02** | 3.66E-02 | 7.24E-03 | 3.91E-03 | 3.36E-04 |
| Smog formation potential (SFP) [kg O3-eq.] | **8.38E-01** | 4.87E-01 | 2.73E-01 | 7.09E-02 | 6.99E-03 |
| Eutrophication (EP) [kg N-eq.] | **7.06E-03** | 5.84E-03 | 5.83E-04 | 6.08E-04 | 2.69E-05 |
| Depletion of stratospheric ozone (ODP) [kg CFC-11-eq.] | **4.58E-06** | 3.97E-06 | 2.09E-07 | 3.99E-07 | 3.22E-13 |
| **RESOURCE USE[1,2]** | | | | | |
| Non-Renewable Energy Resources [MJ] | **2.59E+02** | 2.13E+02 | 2.37E+01 | 2.19E+01 | 7.50E-01 |
| Fossil energy [MJ] | **2.45E+02** | 2.01E+02 | 2.23E+01 | 2.07E+01 | 7.28E-01 |
| Nuclear energy [MJ] | **1.40E+01** | 1.15E+01 | 1.33E+00 | 1.16E+00 | 2.24E-02 |
| Other energy [MJ] | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Non-Renewable Material Resources [kg] | **1.43E+00** | 1.03E+00 | 2.96E-01 | 1.03E-01 | 0.00E+00 |
| Renewable Primary Energy [MJ] | **1.21E+01** | 1.01E+01 | 9.63E-01 | 1.02E+00 | 7.35E-02 |
| Hydro/ wind power [MJ] | **4.84E+00** | 3.97E+00 | 4.63E-01 | 4.01E-01 | 1.46E-02 |
| Bio-energy [MJ] | **2.54E-01** | 2.20E-01 | 1.16E-02 | 2.22E-02 | 0.00E+00 |
| Renewable Material Resources [kg] | **7.67E-02** | 6.67E-02 | 3.33E-03 | 6.69E-03 | 0.00E+00 |
| Consumption of Freshwater [m3] | **7.04E-02** | 6.23E-02 | 2.00E-03 | 5.97E-03 | 1.13E-04 |
| **WASTE GENERATED** | | | | | |
| Hazardous waste [%] | **0.05** | 0.19 | 0.03 | 0.05 | 0.00 |
| Non-hazardous waste [%] | **99.95** | 99.81 | 99.97 | 99.95 | 100.00 |

[1] Total Primary Energy (gross value) includes both feedstock energy and process energy.

[2] The nonrenewable and renewable material resources were calculated by summing up the mass of the main components with high heating values.

| RESULTS Sikalastic®-641 Reemat RoofPro 20 | FUNCTIONAL UNIT OF 1 M² INSTALLED SYSTEM CRADLE TO GRAVE, RSL=20 YEARS | | | | |
|---|---|---|---|---|---|
| | TOTAL | PRODUCT STAGE | DESIGN & CONSTRUCTION STAGE | USE & MAINTENANCE STAGE | END OF LIFE STAGE |
| **CATEGORY INDICATOR** | | **A1-A3** | **A4-A5** | **B4** | **C1-C4** |
| Climate change (GWP 100 years) excl. biogenic carbon [kg CO2-eq.] | **1.30E+01** | 1.13E+01 | 1.68E+00 | 0.00E+00 | 5.90E-02 |
| Climate change (GWP 100 years) incl. biogenic carbon [kg CO2-eq.] | **1.32E+01** | 1.14E+01 | 1.76E+00 | 0.00E+00 | 5.94E-02 |
| Acidification of land and water sources (AP) [kg SO2-eq.] | **5.01E-02** | 4.19E-02 | 7.83E-03 | 0.00E+00 | 3.80E-04 |
| Smog formation potential (SFP) [kg O3-eq.] | **8.75E-01** | 5.59E-01 | 3.09E-01 | 0.00E+00 | 7.92E-03 |
| Eutrophication (EP) [kg N-eq.] | **7.37E-03** | 6.69E-03 | 6.56E-04 | 0.00E+00 | 3.05E-05 |
| Depletion of stratospheric ozone (ODP) [kg CFC-11-eq.] | **4.80E-06** | 4.56E-06 | 2.40E-07 | 0.00E+00 | 3.65E-13 |
| **RESOURCE USE[1,2]** | | | | | |
| Non-Renewable Energy Resources [MJ] | **2.71E+02** | 2.44E+02 | 2.60E+01 | 0.00E+00 | 8.50E-01 |
| Fossil energy [MJ] | **2.56E+02** | 2.31E+02 | 2.46E+01 | 0.00E+00 | 8.25E-01 |
| Nuclear energy [MJ] | **1.47E+01** | 1.32E+01 | 1.43E+00 | 0.00E+00 | 2.54E-02 |
| Other energy [MJ] | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Non-Renewable Material Resources [kg] | **1.48E+00** | 1.18E+00 | 3.04E-01 | 0.00E+00 | 0.00E+00 |
| Renewable Primary Energy [MJ] | **1.26E+01** | 1.15E+01 | 1.04E+00 | 0.00E+00 | 8.33E-02 |
| Hydro/ wind power [MJ] | **5.06E+00** | 4.55E+00 | 4.95E-01 | 0.00E+00 | 1.65E-02 |
| Bio-energy [MJ] | **2.66E-01** | 2.53E-01 | 1.33E-02 | 0.00E+00 | 0.00E+00 |
| Renewable Material Resources [kg] | **8.02E-02** | 7.64E-02 | 3.82E-03 | 0.00E+00 | 0.00E+00 |
| Consumption of Freshwater [m3] | **7.35E-02** | 7.13E-02 | 2.01E-03 | 0.00E+00 | 1.28E-04 |
| **WASTE GENERATED** | | | | | |
| Hazardous waste [%] | **0.05** | 0.19 | 0.03 | 0.00 | 0.00 |
| Non-hazardous waste [%] | **99.95** | 99.81 | 99.97 | 0.00 | 100.00 |

[1] Total Primary Energy (gross value) includes both feedstock energy and process energy.

[2] The nonrenewable and renewable material resources were calculated by summing up the mass of the main components with high heating values.

| RESULTS Sikalastic®-641 Reemat RoofPro 25 | FUNCTIONAL UNIT OF 1 M² INSTALLED SYSTEM CRADLE TO GRAVE, RSL=25 YEARS | | | | |
|---|---|---|---|---|---|
| | TOTAL | PRODUCT STAGE | DESIGN & CONSTRUCTION STAGE | USE & MAINTENANCE STAGE | END OF LIFE STAGE |
| **CATEGORY INDICATOR** | | **A1-A3** | **A4-A5** | **B4** | **C1-C4** |
| Climate change (GWP 100 years) excl. biogenic carbon [kg CO2-eq.] | **1.54E+01** | 1.34E+01 | 1.90E+00 | 0.00E+00 | 6.94E-02 |
| Climate change (GWP 100 years) incl. biogenic carbon [kg CO2-eq.] | **1.57E+01** | 1.36E+01 | 2.01E+00 | 0.00E+00 | 6.98E-02 |
| Acidification of land and water sources (AP) [kg SO2-eq.] | **5.90E-02** | 4.99E-02 | 8.72E-03 | 0.00E+00 | 4.47E-04 |
| Smog formation potential (SFP) [kg O3-eq.] | **1.04E+00** | 6.65E-01 | 3.62E-01 | 0.00E+00 | 9.30E-03 |
| Eutrophication (EP) [kg N-eq.] | **8.77E-03** | 7.97E-03 | 7.66E-04 | 0.00E+00 | 3.58E-05 |
| Depletion of stratospheric ozone (ODP) [kg CFC-11-eq.] | **5.71E-06** | 5.42E-06 | 2.86E-07 | 0.00E+00 | 4.27E-13 |
| **RESOURCE USE[1,2]** | | | | | |
| Non-Renewable Energy Resources [MJ] | **3.21E+02** | 2.90E+02 | 2.95E+01 | 0.00E+00 | 9.99E-01 |
| Fossil energy [MJ] | **3.03E+02** | 2.75E+02 | 2.79E+01 | 0.00E+00 | 9.70E-01 |
| Nuclear energy [MJ] | **1.73E+01** | 1.57E+01 | 1.57E+00 | 0.00E+00 | 2.98E-02 |
| Other energy [MJ] | **0.00E+00** | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | |
|---|---|---|---|---|---|
| Non-Renewable Material Resources [kg] | **1.72E+00** | 1.40E+00 | 3.15E-01 | 0.00E+00 | 0.00E+00 |
| Renewable Primary Energy [MJ] | **1.50E+01** | 1.37E+01 | 1.16E+00 | 0.00E+00 | 9.79E-02 |
| Hydro/ wind power [MJ] | **5.98E+00** | 5.41E+00 | 5.42E-01 | 0.00E+00 | 1.94E-02 |
| Bio-energy [MJ] | **3.17E-01** | 3.01E-01 | 1.58E-02 | 0.00E+00 | 0.00E+00 |
| Renewable Material Resources [kg] | **9.56E-02** | 9.10E-02 | 4.55E-03 | 0.00E+00 | 0.00E+00 |
| Consumption of Freshwater [m3] | **8.72E-02** | 8.50E-02 | 2.02E-03 | 0.00E+00 | 1.50E-04 |
| **WASTE GENERATED** | | | | | |
| Hazardous waste [%] | **0.05** | 0.19 | 0.03 | 0.00 | 0.00 |
| Non-hazardous waste [%] | **99.95** | 99.81 | 99.97 | 0.00 | 100.00 |

[1] Total Primary Energy (gross value) includes both feedstock energy and process energy.

[2] The nonrenewable and renewable material resources were calculated by summing up the mass of the main components with high heating values.

## INTERPRETATION OF THE RESULTS

The results for the Gradle-to-Grave assessment of the Sikalastic®-641 Reemat System show that most of the impacts come from modules A1-A3 with a share of at least 80% across all indicators. An exception is the smog formation potential, where the installation module (A5) also has a significant impact (35%). In case of RoofPro 15, a refurbishment is necessary after 15 years to satisfy the study period of 20 years. Therefore, impacts from raw materials and production also occur in module B4 for this system thickness.

Within A1-A3, at least 90% of the impacts come from raw materials extraction across all impact categories. The production process and the packaging were found to have a minor relative impact. Among the raw materials, the polymers, pigments/ fillers as well as the solvents have the most significant contribution to environmental impacts.

## DATA QUALITY

Primary data was collected from Sika Corporation for the production plant in Marion, OH. When primary data was unavailable (upstream and downstream processes), the data was obtained from GaBi databases 2018, US LCI Database and ecoinvent v3.4 LCI database. The overall data quality was assessed as good, considering time-related, geographical and technology coverage as well as completeness and consistency.

## ADDITIONAL ENVIRONMENTAL INFORMATION

- Sikalastic®-641 Lo-VOC RoofPro Systems have a VOC content <50 g/l and compliant with California SCAQMD.
- Sikalastic® RoofPro Systems have a high solar reflectivity (in white) that can reduce cooling and overall energy consumption in conditioned buildings. Sikalastic® RoofPro Systems exceed the cool roof requirements of ENERGYSTAR® California's Building Energy Code (Title 24), LEED® and Green Globes®.
- Sikalastic® RoofPro Systems help building owners achieve LEED® and Green Globes® certification with properties positively valued in the certification systems, such as low VOC content or high solar reflectivity.

## EPD VERIFICATION

**This EPD was independently verified by ASTM in accordance with ISO 14025.**

| | | | |
|---|---|---|---|
| **Internal** ☐ | **External** ☒ | Lindita Bushi, Ph.D., Senior Research Associate<br>Athena Sustainable Materials Institute<br>100-119 Ross Avenue<br>Ottawa, Ontario, Canada K1Y0N6<br>lindita.bushi@athenasmi.org | **Signed:** Lindita Bushi |
| **Program Operator** | | Timothy Brooke<br>ASTM International<br>100 Bar Harbor Drive<br>West Conshohocken, PA 19428<br>tbrooke@astm.org | **Signed:** |

| | | | |
|---|---|---|---|
| **Declaration Holder** | Sika Corporation | | |
| **Product group** | **Date of Issue** | **Expiration Date** | **Declaration Number** |
| | 9/6/2019 | Extension: 9/6/2025 | EPD-113 |

**DECLARATION TYPE**

A "Cradle-to-Grave" EPD for Sikalastic®-641 Lo-VOC RoofPro 15, RoofPro 20 and RoofPro 25 (Reemat Premium System).

The modules included are A1 -A3, A4-A5, B1-B7 and C1-C4. The declaration is intended for use in Business to Business (B2B) communication.

**PRODUCT APPLICABILITY AND CHARACTERISTICS**

The declared Sikalastic®-641 Lo-VOC RoofPro systems are designed for low-slope and steep slope roofing applications. They are intended for use in industrial, commercial and institutional applications. The system includes a fiberglass reinforcement to form a tough, resilient membrane that conforms and bonds tightly to the substrate surface.

**CONTENT OF THE DECLARATION**

This declaration follows the content requirements of NSF Product Category Rules Environmental Product Declarations for Roof Coatings, valid through November 15, 2021.

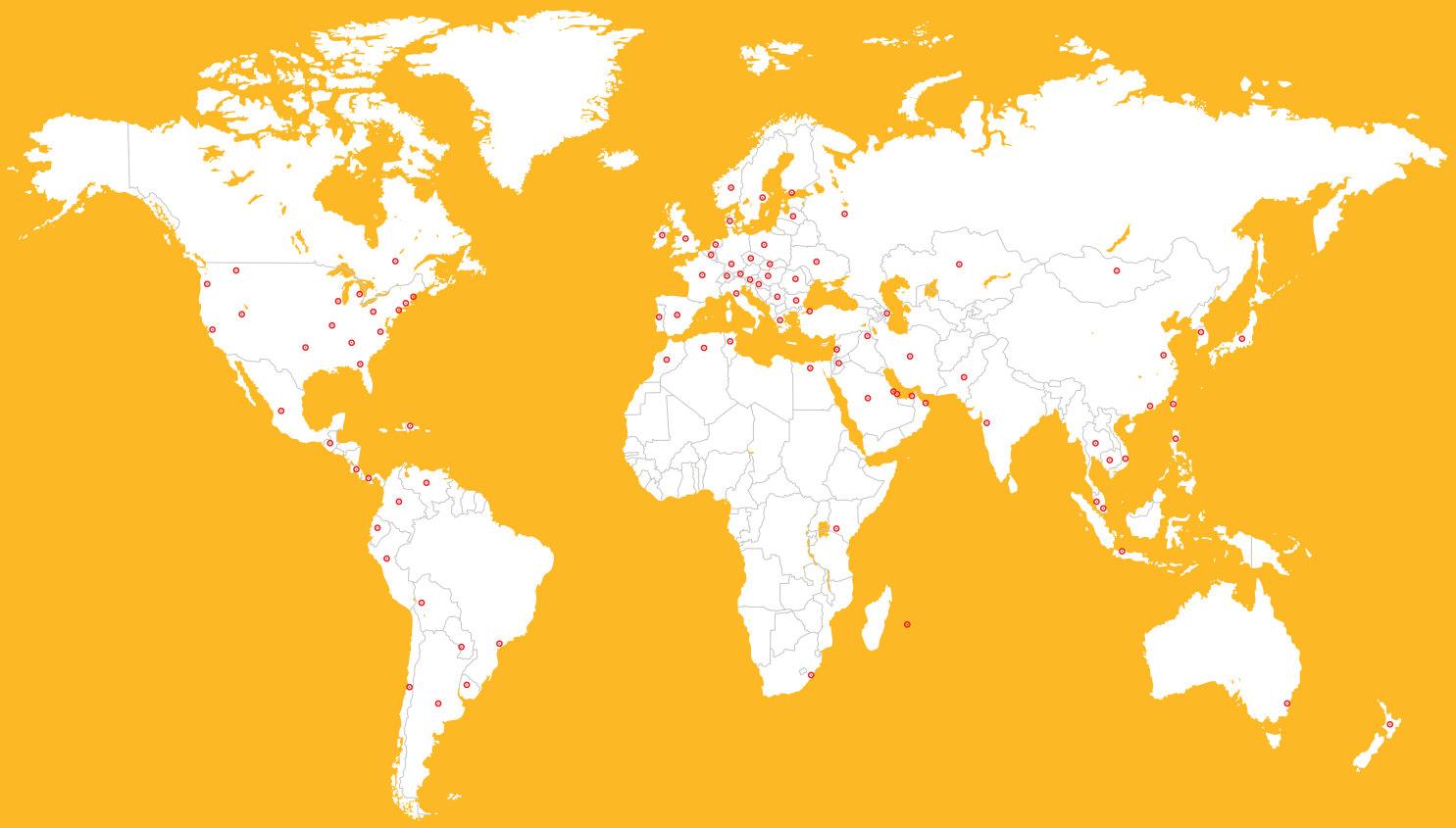
## EPD PROJECT REPORT INFORMATION

| | |
|---|---|
| **EPD PROJECT REPORT** | A "Cradle-to-Grave" Life Cycle Assessment for Four Sika LAM Roofing Systems, 03.09.2019. |
| **LCA AND EPD PREPARED BY:** | Global Product Sustainability<br>Sika Technology AG<br>Tüffenwies 16<br>8050 Zurich<br>Switzerland<br>product.sustainability@ch.sika.com |

## PCR INFORMATION

| | |
|---|---|
| **PROGRAM OPERATOR** | ASTM International |
| **REFERENCE PCR PART A** | NSF Product Category Rules for Environmental Product Declarations for Roof Coatings |
| **DATE OF ISSUE** | Valid through November 15, 2021 |
| **REFERENCE PCR PART B** | Thomas P. Gloria, Ph. D. (Industrial Ecology Consultants)<br>t.gloria@industrial-ecology.com<br><br>Mr. Bill Stough (Sustainable Research Group)<br><br>Dr. Michael Overcash (Environmental Clarity) |

# GLOBAL BUT LOCAL PARTNERSHIP



**WHO WE ARE**

Sika AG, located in Baar, Switzerland, is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry.

The corporation has subsidiaries in 84 countries, employs 16,000 people worldwide, and has more than 160 manufacturing facilities around the globe.



ENERGY STAR® for roofing products is only valid in the United States.
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Green Globes® is a trademark of the Green Building Initiative.

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**BUILDING TRUST**