Environmental Product Declaration – KOOL SEAL® Freedom Flash Sealant[1]

Certified Environmental Product Declaration
www.nsf.org

Kool Seal ® FreedomFlash™ Revolutionary Roof Repair Sealant is a single-step, one component, fabric free flashing and seam sealer. Freedom Flash provides freedom from tape & fabric and adheres to a variety of roofing substrates. Available in white and gray colors.

The product image to the right is an example of one of the formulas covered by the EPD. A list of all relevant KOOL SEAL® Freedom Flash Sealant formulas are shown in Table 1 on page 2 of the EPD.

Program Operator	NSF Certification LLC
Declaration Holder	The Sherwin-Williams Company sustainability@sherwin.com
Declaration Number	EPD10819
Declared Product	KOOL SEAL® Freedom Flash Sealant
Product Category and Subcategory	Roof Coating – Sealant (Hybrid Polyurethane and Silicone)
Program Operator	NSF Certification LLC ncss@nsf.org
Reference PCR	RCMA PCR for Roof Coatings

Date of Issue	April 12, 2023
Period of Validity	5 Years

Contents of the Declaration	– Product definition and material characteristics – Overview of manufacturing process – Information about in-use conditions – Life cycle assessment results – Testing verifications

The PCR review was conducted by	Thomas P. Gloria, Ph. D. Industrial Ecology Consultants t.gloria@industrial-ecology.com

This EPD was independently verified by NSF Certification LLC in accordance with ISO 21930 and ISO 14025. ☐ **Internal** ☒ **External**	Jack Geibig – EcoForm igeibig@ecoform.com	Jack Geibig
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	Jack Geibig – EcoForm igeibig@ecoform.com	Jack Geibig

Functional Unit:	$1m^2$ of covered and protected substrate for a period of 20 years (the expected roof system lifespan extension provided by the coating)
LCA Software Used	GaBi (Most Recent Version)
Design Lifetime Used in Assessment	10 years

[1] *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.*

Test Methods Used to Calculate Design Life	N/A
Estimated Amount of Colorant	N/A
Data Quality Assessment Score	Very Good
Manufacturing Location(s)	Various Plants Throughout the United States

Product Definition:

The KOOL SEAL® Freedom Flash Sealant is a roof coating manufactured by The Sherwin-Williams Company, headquartered in Cleveland, Ohio. The KOOL SEAL® Freedom Flash Sealant is manufactured in a number of Sherwin-Williams facilities across the United States. This coating is designed to cover and protect roof surfaces. For information about specific products, please visit www.sherwin-williams.com.

Product Classification and Description:

The KOOL SEAL® Freedom Flash Sealant product listed below is included within this assessment. For information on other attributes of each of the specific formulations, please visit www.sherwin-williams.com.

Table 1. List of KOOL SEAL® Freedom Flash Sealant Formulas Assessed by LCA Model and Report.

Product System	System Type	Color	Product Code
KOOL SEAL® Freedom Flash Sealant	Sealant (Hybrid Polyurethane and Silicone)	White	66-921
		Gray	66-920

We did not include a primer or topcoat in this report. If one is required for certain substrate types or conditions, please refer to the appropriate acrylic or silicone roof coating EPD.

Under the Product Category Rule (PCR) for Roof Coatings, KOOL SEAL® Freedom Flash Sealant falls under the following heading:

- "a fluid-applied and adhered coating used for roof maintenance, roof repair, or as a component of a roof covering system or roof assembly."

Roof Coatings are manufactured in a way similar to other paint and coating products. Raw materials are manually added in appropriate quantities into a high-speed disperser which are mixed. The product is then moved via compressed air or gravity and filled into containers and transported to the distribution center and finally to the point of sale. A customer travels to the store to purchase the product and transports the coating to the site where it is applied. The applied coating adheres to the substrate where it remains until the substrate is disposed by the user. Any unused coating will be disposed of by the purchaser as well. Because the functional unit mandates a 20-year product life, any necessary recoats were accounted for in the LCA models.

The typical composition of a KOOL SEAL® Freedom Flash Sealant is shown by % weight below:

- Calcium Carbonate (50%-65%)
- Titanium Dioxide (1-3%)
- Other Extender Pigments (<1%)
- Resin (20%-30%)
- Solvent (1%-3%)
- Additives (10%-15%)

Table 2. List of Hazardous ingredients in KOOL SEAL® Freedom Flash Sealant formulas.

Ingredient	Percentage	CAS #
Calcium Carbonate	≥50 - ≤75	1317-65-3
Polypropylene Glycol	≥10 - ≤25	25322-69-4
Titanium Dioxide	≤3	13463-67-7
Crystalline Silica, respirable powder	<1	14808-60-7
Dibutylbis(pentadionate)tin	≤0.3	22673-19-4
Light Stabilizer	≤0.3	52829-07-9

Table 2 represents hazardous materials as classified by the regulations of the primary manufacturing and distribution region of these products. Note that these ingredients may only appear in a single formula to multiple formulas within the KOOL SEAL® Freedom Flash Sealant system.

Other than the materials listed above in Table 2, there are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous under OSHA's Hazard Communication Standard. For additional information about product hazards, please refer to the Safety Data Sheet for KOOL SEAL® Freedom Flash Sealant available on www.sherwin-williams.com.

About Sherwin-Williams:

For more than 155 years, Sherwin-Williams has provided contractors, builders, property managers, architects and designers with the trusted products they need to build their business and satisfy customers. KOOL SEAL® Freedom Flash Sealant is just one more way we bring you industry-leading paint technology — innovation you can pass on to your customers. Plus, with more than 4,000 stores and 2,400 sales representatives across North America, personal service and expert advice is always available near jobsites. Find out more about KOOL SEAL® Freedom Flash Sealant at your nearest Sherwin-Williams store or to have a sales representative contact you, call 800-524-5979.

Definitions:

Acronyms & Abbreviated Terms:

- **ACA:** American Coating Association
- **ASTM**: A standards development organization that serves as an open forum for the development of international standards. ASTM methods are industry-recognized and approved test methodologies for demonstrating the durability of an architectural coating in the United States.
- **ecoinvent:** a life cycle database that contains international industrial life cycle inventory data on energy supply, resource extraction, material supply, chemicals, metals, agriculture, waste management services, and transport services.
- **EPA WARM model**: Unite States Environmental Protection Agency Waste Reduction Model.
- **EPD**: Environmental Product Declaration. EPDs are form of as Type III environmental declarations under ISO 14025. They are the summary document of data collected in the LCA as specified by a relevant PCR. EPDs can enable comparison between products if the underlying studies and assumptions are similar.
- **GaBi:** Created by PE INTERNATIONAL GaBi Databases are LCA databases that contain ready-to-use Life Cycle Inventory profiles.
- **LCA**: Life Cycle Assessment or Analysis. A technique to assess environmental impacts associated with all the stages of a product's life from cradle to grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling).
- **NCSS**: NSF International's National Center for Sustainability Standards
- **PCR**: Product Category Rule. A PCR defines the rules and requirements for creating EPDs of a certain product category.
- **TRACI**: Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts.
- **RCMA**: Roof Coatings Manufacturers Association

Terminology:

- **Adhesion:** the degree of attachment between two surfaces held together by interfacial forces.
- **Basecoats:** coatings applied to the surface after preparation and before the application of a finish coat.
- **Chalking:** The formation of a friable powder on the surface caused by the disintegration of the binding medium.
- **Design life:** The estimated lifetime of a coating based solely on its hiding and performance characteristics determined by results in certain ASTM durability tests.
- **Durability:** the capability of a building, assembly, component, product, or construction to maintain serviceability over at least a specified time.
- **Fabric/Mechanical Reinforcement Layer:** an optional layer of typically polyester fabric that mechanically reinforces the coating system around its perimeter or edges. Typically, these layers are applied on 5%-10% of the entire roofing surface area

- **Generic data:** Defined by the ILCD handbook as "a generic data set has been developed using at least partly other information then those measured for the specific process. This other information can be stoichiometric or other calculation models, patents and other plans for processes or products, expert judgment etc. Generic processes can aim at representing a specific process or system or an average situation. Both specifically measured data and generic data can hence be used for the same purpose of representing specific or average processes or systems."
- **Intermediate processing:** the conversion of raw materials to intermediates (e.g. titanium dioxide ore into titanium dioxide pigment, etc.).
- **Pigment:** The material(s) that give a coating its color.
- **Primers:** materials applied to a surface to promote adhesion between the substrate and subsequent coats.
- **Primary materials:** Resources made from materials initially extracted from nature. Examples include titanium dioxide ore, petroleum, etc. that are used to create basic materials used in the production of coatings (e.g., pigment, solvents)
- **Resin / Binder:** Acts as the glue or adhesive to adhere the coating to the substrate.
- **Roof Coating:** A fluid-applied and fully adhered coating used for roof maintenance, roof repair, or as a component of a roof covering system or roof assembly.
- **Secondary materials:** Materials that contain recovered, reclaimed, or recycled content that is used to create basic materials for the production of coatings (e.g. aluminum scrap).
- **Topcoat:** the final layer of coating put onto a surface over another layer(s).

Underlying Life Cycle Assessment Methodology:

Functional Unit:

Per the reference PCR, the functional unit for the study was covering and protecting 1m^2 of substrate for a period of 20 years (the expected roof system lifespan extension provided by the coating). The product has no additional functionalities beyond what is stated by the functional unit.

In the reference PCR, the product life for roof coatings was calculated in terms of a design life (based on the coating type and quality designation prescribed in the reference PCR).

Roof repair sealants were not included as a coating type in the reference PCR; however, the UNIFLEX® One Flash Permanent Repair Sealant is a hybrid of polyurethane and silicone technologies. Therefore, we used the typical service life quality designation for a polyurethane coating (10 years) in this study as it has the lower service life of the two technologies it hybridizes. This is consistent with the reference PCR.

Roof repair sealants were not included as a coating type in the reference PCR; however, they are most comparable to the silicone coating type. Therefore, we used the typical service life quality designation for silicone coating (15 years) to determine the sealant's design life.

Table 3. Formula Lifetimes and Quantity of Coating Needed to Satisfy Functional Unit

Product Formula	66-921	66-920
Product Technology	Sealant (Hybrid Polyurethane and Silicone)	Sealant (Hybrid Polyurethane and Silicone)
Application Method	Knife/Spatula	Knife/Spatula
High Performance ASTM Test Method	N/A	N/A
Design Lifetime (classification)	Typical Service Life for Polyurethane	Typical Service Life for Polyurethane
Design Lifetime (years)	10	10
Total Quantity Needed using Design Life (kg)	5.23	5.22

Recommended coverage, thickness, and other technical information can be found on the Product Data Sheet, available at www.paintdocs.com.

Tinting:

As stated in the PCR, roof coatings are not typically formulated to be tinted at point of sale. Therefore, pigment impacts are captured in the LCA model of the formula itself.

Allocation Rules:

In accordance with the reference PCR, allocation was avoided whenever possible, however if allocation could not be avoided, the following hierarchy of allocation methods was utilized:

- Mass, or other biophysical relationship; and
- Economic value.

In the LCA models, mass allocation was ONLY used during packaging and end of life-stages.

Treatment of Biogenic Carbon:

In accordance with the reference PCR, global warming values were calculated and presented both including and excluding biogenic carbon.

System Boundary:

This LCA included all relevant steps in the coating manufacturing process as described by the reference PCR. The system boundary began with the extraction of raw materials to be used in the KOOL SEAL® Freedom Flash Sealant and its formulas are manufactured in a way similar to other coating products. The raw materials are manually added in appropriate quantities into a high-speed disperser which are mixed. The product is then moved via compressed air or gravity and filled into containers and shipped to a distribution center and then to the point of sale. A customer travels to the store to purchase the product and transports the coating to the site where it is applied. The applied coating adheres to the substrate where it remains until the substrate is disposed. Any unused coating will be disposed by the customer as well. Because the functional unit mandates a 20-year product life, multiple repaints were necessary and were accounted for by the LCA models. The system boundary ends with the end-of-life stage. This can be seen in Figure 1, below.

As described in the reference PCR, the following items were excluded from the assessment and they were expected to not substantially affect the results.

- personnel impacts;
- research and development activities;
- business travel;
- any secondary packaging (pallets, for example);
- all point of sale infrastructure; and
- the coating applicator.

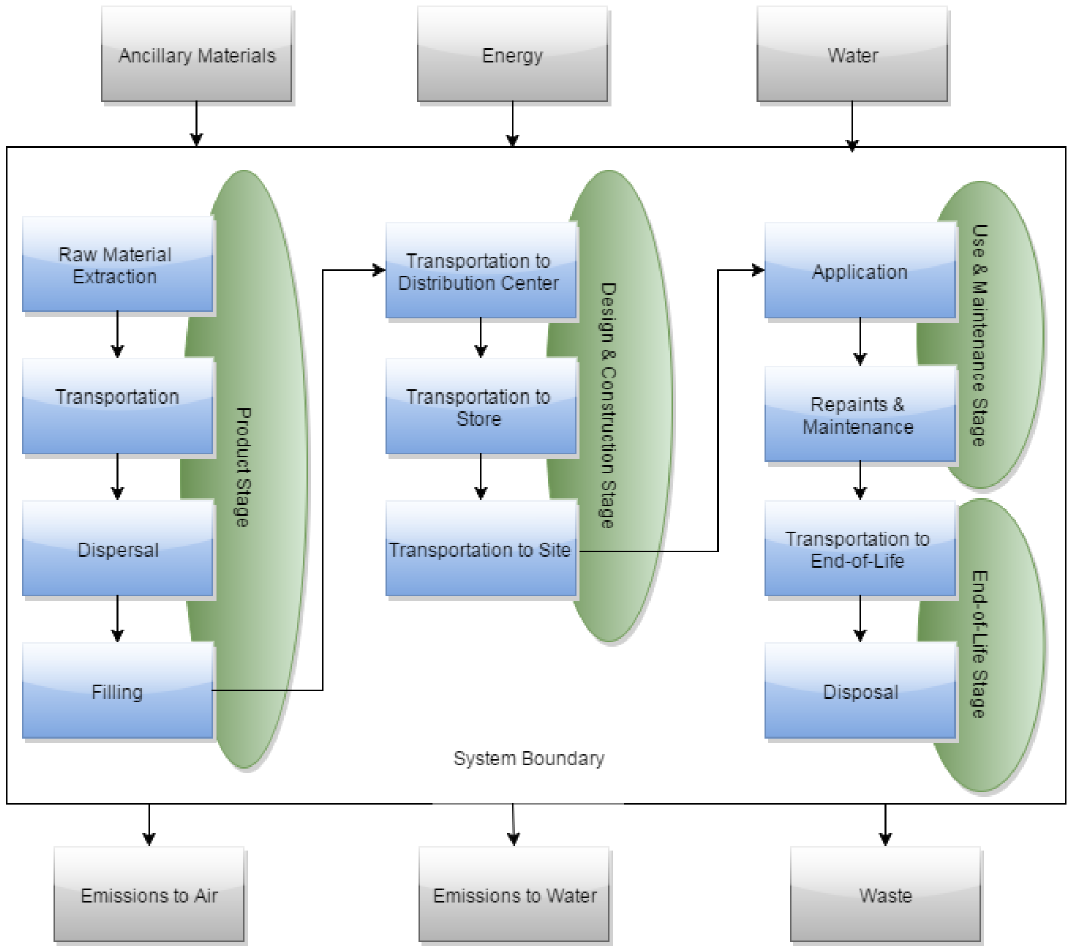

Figure 1. Diagram of System Boundary for the EPD.

Cut-Off Rules:

The cut-off rules prescribed by the reference PCR required a minimum of 95% of the total mass, energy, and environmental relevance be captured by the LCA models. All formulas were modeled to at least 99.9% of their material content by weight. No significant flows were excluded from the LCA models and the 5% total maximum threshold prescribed by the PCR and ISO 21930 clause 6.2.7.2 was not exceeded.

Data Sources & Quality:

When primary data was unavailable, data was taken from either Sphera, ecoinvent, or CEPE's coating industry life cycle inventory. The data from Sphera and ecoinvent are widely accepted by the LCA community and the CEPE database has been built using those databases as a foundation. A brief description of these databases is below:

Table 4. Overview of Databases used in LCA Models.

Database	Comments
Sherwin-Williams	Primary source data taken as an average monthly value over a 12-month average of 2021 relevant facilities operation metrics.
Sphera/GaBi	DB Version 10. 6.1
ecoinvent	Version 3.3 – Most recent version available in GaBi.
CEPE LCI	Most recent version of industry LCI. Last revised in 2018. Made up of refined data from Sphera and ecoinvent so that it is more representative of coating manufacturing. Primarily limited to EU data, although some processes are global.

Precision and Completeness:

Annual averages from the 2021 calendar year of primary data were used for all gate-gate processes and the most representative inventories were selected for all processes outside of Sherwin-Williams' direct operational control. Secondary data was primarily drawn from the most recent GaBi and ecoinvent databases and CEPE's coating life cycle inventory. All of these databases were assessed in terms of overall completeness.

Assumptions relating to application and disposal were conformant with the reference PCR. All data used in the LCA models was less than five years old. Pigment data was taken from ecoinvent and resin data was taken from primary sources and GaBi databases.

Consistency and Reproducibility:

In order to ensure consistency, primary source data was used for all gate-to-gate processes in coating manufacturing. All other secondary data were applied consistently and any modifications to the databases were documented in the LCA Report.

Reproducibility is possible using the LCIs documented in the LCA Report.

Temporal Coverage:

Primary data was collected from the manufacturing facilities from the 2021 calendar year. Secondary data reflected the most up-do-date versions of the LCA databases mentioned above.

Geographic Coverage:

KOOL SEAL® Freedom Flash Sealant is manufactured by the Sherwin-Williams Company entirely within the United States. Given that the facilities making KOOL SEAL® Freedom Flash Sealant are spread across the United States, the average US grid mix was used in the LCA models. KOOL SEAL® Freedom Flash Sealant products are purchased, used, and the unused portions are disposed by the customer throughout North America.

Life Cycle Impact Assessment:

The purpose of the Life Cycle Impact Assessment (LCIA) is to show the link between the life cycle inventory results and potential environmental impacts. As such, these results are classified and characterized into several impact categories which are listed and described below. The TRACI 2.1 method was used and the LCIA results are formatted to be conformant with the PCR, which was based on ISO 21930. The TRACI method is widely accepted for use in the US and was developed by the US EPA.

Table 5. Overview of Impact Categories[2]

Overview of LCA Impact Categories	
Impact Category Name	***Description of Impact Category***
Global Warming Potential 	*"Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities" (US Environmental Protection Agency 2008b).* *Biogenic carbon was both included and excluded in the analysis as stipulated by the PCR.*
Ozone Depletion Potential 	*Ozone within the stratosphere provides protection from radiation, which can lead to increased frequency of skin cancers and cataracts in the human populations. Additionally, ozone has been documented to have effects on crops, other plants, marine life, and human-built materials. Substances which have been reported and linked to decreasing S-10637-OP-1-0 REVISION: 0 DATE: 6/22/2012 Page 13 | 24 Document ID: S-10637-OP-1-0 Date: 7/24/2012 the stratospheric ozone level are chlorofluorocarbons (CFCs) which are used as refrigerants, foam blowing agents, solvents, and halons which are used as fire extinguishing agents (US Environmental Protection Agency 2008j).*
Acidification Potential 	*Acidification is the increasing concentration of hydrogen ion (H+) within a local environment. This can be the result of the addition of acids (e.g., nitric acid and sulfuric acid) into the environment, or by the addition of other substances (e.g., ammonia) which increase the acidity of the environment due to various chemical reactions and/or biological activity, or by natural circumstances such as the change in soil concentrations because of the growth of local plant species n (US Environmental Protection Agency 2008q).*
Smog Formation Potential 	*Ground level ozone is created by various chemical reactions, which occur between nitrogen oxides (NOx) and volatile organic compounds (VOCs) in sunlight. Human health effects can result in a variety of respiratory issues including increasing symptoms of bronchitis, asthma, and emphysema. Permanent lung damage may result from prolonged exposure to ozone. Ecological impacts include damage to various ecosystems and crop damage. The primary sources of ozone precursors are motor vehicles, electric power utilities and industrial facilities (US Environmental Protection Agency 2008e).*
Eutrophication Potential 	*Eutrophication is the "enrichment of an aquatic ecosystem with nutrients (nitrates, phosphates) that accelerate biological productivity (growth of algae and weeds) and an undesirable accumulation of algal biomass" (US Environmental Protection Agency 2008d).*

[2] See EPA TRACI References for Additional Details

Life Cycle Impact Assessment Results:

The LCA results are documented and grouped separately below into the following stages as defined by ISO 21930.

- Total Impact (across the entire cradle-grave lifecycle)
- Product Stage (Stage 1)
- Construction & Design Stage (Stage 2)
- Use & Maintenance Stage (Stage 3)
- End-Of-Life Stage (Stage 4)

No weighting or normalization was done to the results. At this time, it is not recommended to weight the results of the LCA or the subsequent EPD. It is important to remember that LCA results show potential and expected impacts and these should not be used as firm thresholds/indicators of safety and/or risk. As with all scientific processes, there is uncertainty within the calculation and measurement of all impact categories and care should be taken when interpreting the results.

Results:

The results of the LCA are shown in the table below. LCIA results for each life cycle stage as defined by ISO 21930 are shown graphically in Figure 2. The LCA results for both the white and gray KOOL SEAL® Freedom Flash Sealants are the same, therefore the table below represents the results for either color.

Table 6. Total LCIA Results for the functional unit Design Life Scenario for KOOL SEAL® Freedom Flash Sealant

	Total Stage 1-4	Stage 1	Stage 2	Stage 3	Stage 4
LCIA Impact Categories					
GWP Inc. Bio Carb (kg CO2e)	11.1	8.83	2.14	8.36E-05	1.37E-01
GWP Exc. Bio Carb (kg CO2e)	11.2	8.89	2.18	8.00E-05	1.45E-01
Acidification (kg SO2e)	4.68E-02	4.19E-02	4.42E-03	1.94E-07	4.92E-04
Eutrophication (kg N e)	2.09E-02	2.02E-02	6.48E-04	1.09E-07	1.06E-05
Ozone Depletion (kg CFC -11e)	5.54E-07	5.54E-07	3.56E-15	6.06E-18	-1.56E-14
Smog Formation (kg O3e)	0.567	0.455	1.02E-01	2.73E-06	9.62E-03
Energy, Resource, and Waste Results					
Non-Renew. Energy (MJ)	236	203	31.9	1.43E-03	1.32
Use of Renewable Primary Energy (MJ)	13.3	11.6	1.53	1.75E-04	0.236
Use of Non-Renew Mat. Resources (kg)	5.08	4.11	9.25E-01	3.79E-05	4.36E-02
Use of Renewable Mat. Resources (kg)	2.12E-01	2.12E-01	1.58E-09	1.66E-13	2.89E-10
Consumption of Freshwater (m3)	1.26	1.25	7.42E-03	5.23E-04	3.41E-04
Hydro Power (MJ)	0	0	0	0	0
Bio Energy (MJ)	0	0	0	0	0
Fossil Energy (MJ)	220	187	31.7	1.33E-03	1.31
Nuclear Energy (MJ)	16.2	16.0	1.99E-01	9.72E-05	9.41E-03
Other Energy (MJ)	0	0	0	0	0
Secondary Fuels (MJ)	0	0	0	0	0
Recycled Materials (kg)	0	0	0	0	0
Secondary Raw Materials (kg)	0	0	0	0	0
Non-Hazardous Waste	79.50%	N/A	N/A	N/A	N/A
Hazardous Waste	20.50%	N/A	N/A	N/A	N/A

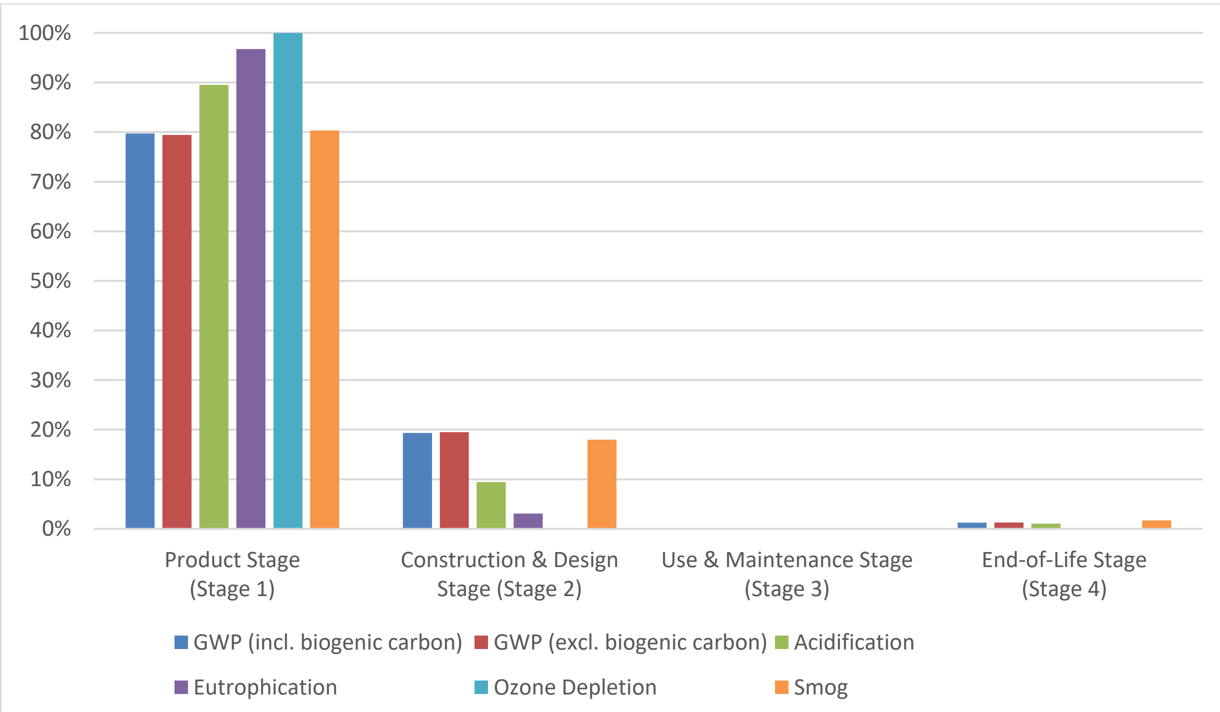

Figure 2. Impact Category Result Breakdown by ISO 21930 Stage for KOOL SEAL® Freedom Flash Sealant Formulation

Interpretation:

For KOOL SEAL® Freedom Flash Sealant, the raw materials were responsible for the largest environmental impact across all impact categories. Specifically, the pigments and resins were the most impactful raw materials. Manufacturing, packaging, use, and disposal were only responsible for a small percent of overall impact. Transportation impacts were significant for several impact categories, but still much smaller than those of the raw materials. Because the product contains some VOC, this led to a slight spike in smog formation during the use phase.

Since the raw materials were responsible for the largest chunk of the impact, product performance and durability were especially important.

Generally speaking, the longer a coating lasts, the better its environmental performance will be. Ultimately, the end-user should decide which lifetime is more appropriate for their decision-making.

Study Completeness:

Completeness estimates are somewhat subjective as it is impossible for any LCA or inventory to be 100% complete. However, based on expert judgment, it is believed that given the overall data quality that the study is at least 95% complete. As such, at least 95% of system mass, energy, and environmental relevance were covered.

Uncertainty:

Because a large number of data sets are linked together in the LCA models, it is unknown how many of the data sets have goals that are dissimilar to this LCA. As such, it is difficult to estimate overall uncertainty of the LCA models. However, primary source data was used whenever possible and the most appropriate secondary data sources were used throughout the models. The Sphera and ecoinvent databases are widely accepted by the LCA community and CEPE's LCI Database is based off Sphera and ecoinvent data, just optimized/corrected for coating manufacturing processes.

Since the reference PCR stipulated the majority of the crucial LCA assumptions, Sherwin-Williams is comfortable with the methodology of the LCA and feel they reflect best-practices.

Limitations:

LCA is not a perfect tool for comparisons and impact values are constantly changing due to shifts in the grid mix, transportation, fuels, etc. Because of this, care should be taken when applying or interpreting these results. This being said, the relative impacts between products should be more reliable and less sensitive versus the specific impact category and metric values.

As stated in the LCA report, there were cases where analogue chemicals had to be used in the LCA models. This occurred when no LCI data was available for an intermediate chemical/material. This was typically limited to additives representing a very small amount of the overall formula (less than a percent), but still may impact the results. Likewise, there were cases where data had to be used from a different region or technology. These instances were uncommon and noted in the Data Quality section of the report and were not expected to have a serious effect on the results, but still may limit the study.

Emissions to Water, Soil, and to Indoor Air:

VOC determination was done using the federally accepted methods outlined by the EPA in the Federal Register. Additional information on VOCs can be found on the environmental data sheets for the specific www.sherwin.com.

Critical Review:

Since the goal of the LCA was to generate an EPD, it was submitted for review by NSF Certification LLC. NSF commissioned Mr. Jack Geibig of EcoForm to conduct the formal review of the LCA report.

Additional Environmental Information:

VOC Content	
0 g/L	**Determined by EPA VOC Regulatory Calculation**

Preferred End-of Life Options for KOOL SEAL® Freedom Flash Sealant:

Safe and proper disposal of excess materials shall be done in accordance with applicable federal, state, and local codes. See SDS Section 13 for more information.

References:

ASTM International, West Conshohocken, PA, 2014, www.astm.org.

EPA VOC Calculation Rules. http://www3.epa.gov/ttn/atw/183e/aim/fr1191.pdf

ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures.*

ISO 14040:2006 *Environmental management - Life cycle assessment – Principles and framework.*

ISO 14044:2006 *Environmental management - Life cycle assessment – Requirements and guidelines.*

ISO 21930:2007 *Sustainability in building construction – Environmental declaration of building products.*

PaintCare - http://www.paintcare.org/

Roof Coatings Manufacturers Association (RCMA) Product Category Rule for Roof Coatings. Available at via NSF International.

Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI) TRACI version 2.1. The Environmental Protection Agency. August 2012.

Various Sherwin-Williams EPDs Based off Interior Latex EPD Calculator – Available at http://info.nsf.org/Certified/Sustain/listings.asp?ProdCat=EPD

Sherwin-Williams Website. http://www.sherwin-williams.com.