Environmental Product Declaration – Pipeclad® 2000 Series Powder Coatings

Pipeclad® 2000 thermosetting powder epoxy coating is engineered to be applied to pipelines. It is designed for use in single layer applications and as a primer layer for dual layer FBE and 3-layer PE/PP applications and as a girth weld coating.



Program Operator	NSF Certification, LLC
Declaration Holder	The Sherwin-Williams Company 1 Sherwin Way, Cleveland, OH 44113
Declaration Prepared by	Sherwin Williams Global Sustainability (sustainability@sherwin.com)
Declaration Number	EPD11397
Product Category	Powder Coating – 100% Solids
Multi-layer System or Single-Layer Product	Single-layer Product EPD
ACLCA EPD Type	Manufacturer Average, Product Specific
Reference PCR	ACA Sustainable Minds PCR for Powder Coatings Part B v.2.0, Dec 2025 Sustainable Minds PCR Part A v.4.0, Feb. 2026

Date of Issue	November 6, 2026
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., Chair Industrial Ecology Consultants t.gloria@industrial-ecology.com Jack Geibig Ecoform Jgeibig@ecoform.com C. Jason Pierce Blue Ridge Sustainability blueridgesustainabilityllc@gmail.com

This EPD was independently verified by NSF International in accordance with ISO 21930:2017 and ISO 14025. **☐ Internal ☒ External**	Jack Geibig - EcoForm jgeibig@ecoform.com
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	Jack Geibig - EcoForm jgeibig@ecoform.com

Declared Unit:	1 kg of manufactured coating
System Boundary	Cradle-to-Gate (A1-A3 only)
Data Quality Assessment Score	Good
Manufacturing Location(s)	Various Plants Throughout the United States
Software Program Used	LCAFE (most recent version available at time of report)
Particle Size Distribution (D90) (MU)	120-135
CSI MasterFormat® classification	099656

ISO21930:2017 – serves as the core PCR ACA PCR for Powder Coatings PCR review was conducted by: Thomas Gloria, Ph D., Jack Geibig, C. Jason Pierce Sustainable Minds – www.sustainableminds.com
Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006 ☐ internal **X** external
Jack Geibig - EcoForm

Product Definition:

Pipeclad® 2000 powder coatings are thermosetting epoxy coatings engineered to be applied to pipelines in interior and exterior settings. They are manufactured by The Sherwin-Williams Company, headquartered in Cleveland, Ohio. Pipeclad® 2000 powder coatings are manufactured in a number of Sherwin-Williams facilities across the United States and the data used by the LCA were representative of all Sherwin-Williams facilities in which powder coatings were produced. For information about specific products, please visit www.sherwin.com.

Product Classification and Description:

The Pipeclad® 2000 products listed below are included within this assessment. For information on other attributes of each of the specific formulations, please visit www.sherwin.com.

Table 1. List of Pipeclad® 2000 Formulas Assessed by LCA Model and Report.

Formula	Product/Part
720G020F	Pipeclad® 2000 Fast Gel
720G020X	Pipeclad® 2000 Extra Long Gel
PFG70020	Pipeclad® 2000 LAT Slow Gel

Pipeclad® 2000 coatings constitute one layer of powder coating. They are primarily used in outdoor settings, applied to pipelines. Indoor use is also possible.

Powder Coatings are manufactured in a way somewhat similar to other paint and coating products, with

some intermediate steps unique to powders. Raw materials are manually added in appropriate quantities into a high-speed disperser to create a consistent pre-mixed blend. This raw material blend is then moved to an extruder, which heats the resin and evenly distributes the additives and pigments within the resin blend, creating the coating. When the hot blend leaves the extruder, it proceeds onto chilled rollers which cool the material, and it is subsequently mechanically broken into flakes. 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 by the purchaser as well.

The overall composition of Pipeclad® 2000 Fast Gel can be described as:

- Resin (67.7%)
- Extenders/Pigments (39.4%)
- Additives (1.9%)

The overall composition of Pipeclad® 2000 Extra Long Gel can be described

- Resin (69%)
- Extenders/Pigments (29.3%)
- Additives (1.7%)

The overall composition of Pipeclad® 2000 LAT Slow Gel can be described

- Resin (64.7%)
- Extenders/Pigments (31.9%)
- Additives (3.3%)

Aside from the ingredients present in the table below, there are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting. For additional information about product hazards, please refer to the Safety Data Sheets for the specific powder coating formulas available on www.sherwin.com.

Table 2. List of Hazardous ingredients in the Pipeclad® 2000 formulas assessed.

Chemical/Material	CAS Number	Range (%)
Wollastonite	13983-17-0	25 - 50
Epoxy Polymer	Confidential	0 - 25
Epoxy Resin	68002-42-6	≤3
Dicyandiamide	461-58-5	≤3
Diamide	93-69-6	≤3
Titanium Dioxide	13463-67-7	≤1

Crystalline Silica, respirable powder	14808-60-7	<1

Note: Hazard classification is based on the Globally Harmonized System of Classification and Labelling of Chemicals as currently implemented by OSHA in compliance with the OSHA Hazard Communication Standard (29 CFR 1910.1200).

About Sherwin-Williams:

For 150 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. Pipeclad® 2000 powder coatings are 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 Pipeclad® 2000 powder coatings 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.
- **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).
- **LCA for Experts:** Software created by Sphera to model life cycle systems. The software contains Managed LCA Content are LCA databases containing ready-to-use Life Cycle Inventory profiles.
- **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.

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.
- **Commercial Project:** Projects not used for residential, manufacturing, processing, or assembly purposes. Common commercial project types include education, healthcare, hospitality, entertainment, and construction.
- **Generic data:** Defined by the ILCD Handbook[1] as "a generic data set has been developed using at least partly other information than 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."
- **Failure:** The physical degradation of the surfacing material which would require substantial or complete removal in order to return the substrate to serviceable condition.

[1] The European Commission, The European Platform on Life Cycle Assessment, International Life Cycle Data system, available at: https://eplca.jrc.ec.europa.eu/ilcd.html

- **Industrial Project:** Any project where the primary activity includes the manufacture, production, processing, assembly, or handling of goods or materials. This could include use conditions such as heavy wheeled traffic or the use of fixed or moving machinery. For example, in a maintenance facility or as an automotive shop.
- **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.
- **Powder Coating:** A fluid-applied and poured / formed in place and cured material coating used to protect and enhance horizontal substrates such as concrete, metal, and wood.
- **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).
- **Technical Service Lifetime**: The estimated lifetime of a coating based solely on its hiding and performance characteristics determined by industry consensus values.
- **Topcoat:** the final layer of coating put onto a surface over another layer(s).

Underlying Life Cycle Assessment Methodology:

Declared Unit:

Per the reference PCR, the declared unit for the study was 1 kg of powder coating.

Per the ACLCA Guidance for Determining EPD Types and Calculating and Communicating Data Specificity Through the Supply Chain v1, this EPD is manufacturer-average and product-specific.

Allocation Rules:

In *accordance* with the *reference* PCR, allocation was avoided whenever possible.

No outputs could feasibly be used as secondary materials. No coproducts are produced in the process studied, nor are coproducts expected in the manufacture of other products that will be covered by this tool; coproduct allocation is avoided.

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 for an individual product rather than a full product system. This includes only modules A1-A3 while all other modules were omitted from this study. Raw materials are manually added in appropriate quantities into a high-speed disperser to create a consistent pre-mixed blend. This raw material blend is then moved to an extruder, which heats the resin and evenly distributes the additives and pigments within the resin blend, creating the coating. When the hot blend leaves the extruder, it proceeds onto chilled rollers which cool material, and it is subsequently mechanically broken into flakes. 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. See diagram in Figure 1 below. It is subsequently 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. The system boundary ends with the final Powder Coating product packaged at the production gate before it is distributed to the end-user. This can be seen in Figure 2, below.

All significant resource extraction, manufacturing, transportation, application, and disposal steps for the creation of Powder Coatings were included. All relevant processes were accounted for in the LCA models. Both the modularity and “polluter pays” principles were followed. When transforming the inputs and outputs of combustible material into inputs and outputs of energy, the net caloric value specific to the material was applied based on scientifically accepted values.

Energy requirements for coating production were taken from a 12-month average of Sherwin-Williams data in 2025 from the plants that produce Powder Coating formulas. Since appliance-level data was unavailable, energy was evenly split between the devices used during the manufacturing process. Regional grid mixes from the US and Canada were selected based on the manufacturing locations used for the study and their contributions included based on a weighted average. A total of 2.4 MJ of energy was included in the manufacturing process per kg of manufactured product. Waste data was taken from plants that manufacture Powder Coatings over the 2025 calendar year. North American plants included in the analysis are facilities in Grimsby, Ontario (Canada), Covington, GA, Rockford, IL, Charlotte, NC, Grove City, OH, and Arlington, TX plants.

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

- capital goods
- system infrastructure including point-of-sale infrastructure
- personnel impacts
- research and development activities
- business travel
- any secondary packaging (pallets, for example)
- coating applicator

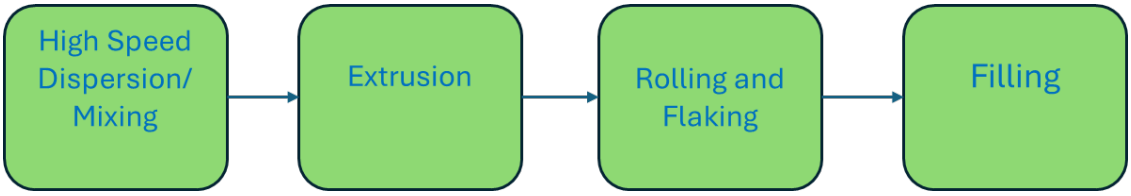


Figure 1. Diagram of manufacturing process.

PRODUCTION (A1 – A 3)		
A1	A2	A3
Extraction and Upstream Production	Transport to Factory	Manufacturing



Figure 2. Diagram of System Boundary Covered by LCA Models and Report. Modified from ISO 21930:2017.

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 to be captured by the LCA models. This formula was modeled to at least 98% of material content by weight. No significant flows were excluded from the LCA models and the 5% threshold prescribed by the PCR 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 2025 relevant facilities operation metrics.
Sphera/LCAFE	Content Version 2026.1
Ecoinvent	Version 3.11 – Most recent version available in LCAFE.
CEPE LCI	Most recent version of industry LCI. Last revised in 2024. Made up of refined data from Sphera and ecoinvent to make it more representative to coatings manufacturing. Primarily limited to EU data, although some processes are global.

Precision and Completeness:

Annual averages from the 2025 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. Energy and waste primary data were based on weighted averages of fourteen manufacturing facilities throughout the United States. Secondary data was primarily drawn from the most recent Sphera and Ecoinvent databases and CEPE's 2024 coating life cycle inventory. These databases were assessed in terms of overall completeness.

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.

This assessment was completed using an EPD calculator tool that has been externally verified by NSF Certification, LLC. This tool was not altered in any way from its original and verified form to generate the LCA results described in this EPD, and the results from the calculator were translated into the EPD by hand. Reproducibility is possible using the verified EPD Calculator tool or by reproducing the LCIs documented in the LCA Report.

Temporal Coverage:

Primary data was collected from the manufacturing facilities from the 2025 calendar year. Secondary data reflected the most up-do-date versions of the LCA databases mentioned above.

Geographic Coverage:

Pipeclad® 2000 powder coatings are manufactured by the Sherwin-Williams Company at facilities within North America. North American plants included in the analysis are facilities in Grimsby, Ontario (Canada), Covington, GA, Rockford, IL, Charlotte, NC, Grove City, OH, and Arlington, TX plants. Energy requirements for coating production were taken from a 12-month average of Sherwin-Williams data in 2025 from the plants that produce Powder Coating formulas. Since appliance-level data was unavailable, energy was evenly split between the devices used during the manufacturing process. Regional grid mixes from the US and Canada were selected based on the manufacturing locations used for the study and their contributions included based on a weighted average. Waste data was taken from plants that manufacture Powder Coatings over the 2025 calendar year. North American plants included in the analysis are facilities in Grimsby, Ontario (Canada), Covington, GA, Rockford, IL, Charlotte, NC, Grove City, OH, and Arlington, TX plants.

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 2.2 method was used and the LCIA results are formatted to be conformant with the PCR, which was based on ISO 21930:2017. The TRACI method is widely accepted for use in the United States. This method is also listed in the reference PCR.

Table 4. 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 excluded from the analysis as it was not relevant are 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 Detail

The LCA results are documented and grouped separately below as defined by ISO 21930:2017.

- Total Impact (across the entire cradle-gate lifecycle)
- Product (Modules A1-A3)
    - A1 Extraction and Upstream Production
    - A2 Transport to Factory
    - A3 Manufacturing

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 impact categories were run for 720G020F, 720G020X, AND PFG70020 and shown below in Tables 5-6 and resource metrics in Table 7-8. LCIA results are relative and do not necessarily predict impacts on each respective category's end points, thresholds' exceedance, safety, and health risks.

Table 5. LCIA Results

LCIA Results-720G020F	Total	A1	A2	A3
IPCC AR6 GWP 100, excl biogenic CO2 [kg CO2 eq.]	7.05E+00	6.38E+00	2.62E-01	4.13E-01
IPCC AR6 GWP 100, incl biogenic CO2 [kg CO2 eq.]	7.00E+00	6.38E+00	2.66E-01	3.52E-01
TRACI 2.2, Global Warming Air, Total [kg CO2 eq.]	6.49E+00	6.04E+00	1.15E-01	3.41E-01
TRACI 2.2, Global Warming Air, LULUC [kg CO2 eq.]	3.79E-04	1.24E-04	1.58E-06	2.53E-04
TRACI 2.2, Global Warming Air, Fossil [kg CO2 eq.]	6.55E+00	6.04E+00	1.11E-01	4.02E-01
TRACI 2.2, Global Warming Air, Bio [kg CO2 eq.]	6.49E+00	6.04E+00	1.15E-01	3.41E-01
TRACI 2.2, Acidification Air [kg SO2 eq.]	1.71E-02	1.57E-02	5.73E-04	8.24E-04
TRACI 2.2, Eutrophication - freshwater [kg P eq.]	6.48E-05	6.29E-05	4.39E-09	1.87E-06
TRACI 2.2, Eutrophication - marine [kg N eq.]	7.47E-03	6.64E-03	4.04E-04	4.28E-04
TRACI 2.2, Ozone Depletion Air [kg CFC 11 eq.]	9.26E-10	7.79E-10	3.83E-12	1.44E-10
TRACI 2.2, Photochemical Oxidation Formation [kg O3 eq.]	2.03E-01	1.77E-01	1.26E-02	1.35E-02

LCIA Results-720G020X	Total	A1	A2	A3
IPCC AR6 GWP 100, excl biogenic CO2 [kg CO2 eq.]	7.15E+00	6.47E+00	2.62E-01	4.13E-01
IPCC AR6 GWP 100, incl biogenic CO2 [kg CO2 eq.]	7.09E+00	6.47E+00	2.66E-01	3.52E-01
TRACI 2.2, Global Warming Air, Total [kg CO2 eq.]	6.58E+00	6.13E+00	1.15E-01	3.41E-01
TRACI 2.2, Global Warming Air, LULUC [kg CO2 eq.]	3.72E-04	1.18E-04	1.58E-06	2.53E-04
TRACI 2.2, Global Warming Air, Fossil [kg CO2 eq.]	6.64E+00	6.13E+00	1.11E-01	4.02E-01
TRACI 2.2, Global Warming Air, Bio [kg CO2 eq.]	6.58E+00	6.13E+00	1.15E-01	3.41E-01
TRACI 2.2, Acidification Air [kg SO2 eq.]	1.74E-02	1.60E-02	5.73E-04	8.24E-04
TRACI 2.2, Eutrophication - freshwater [kg P eq.]	6.59E-05	6.40E-05	4.39E-09	1.87E-06
TRACI 2.2, Eutrophication - marine [kg N eq.]	7.58E-03	6.74E-03	4.04E-04	4.28E-04
TRACI 2.2, Ozone Depletion Air [kg CFC 11 eq.]	9.23E-10	7.76E-10	3.83E-12	1.44E-10
TRACI 2.2, Photochemical Oxidation Formation [kg O3 eq.]	2.06E-01	1.80E-01	1.26E-02	1.35E-02

LCIA Results-PGF70020	Total	A1	A2	A3
IPCC AR6 GWP 100, excl biogenic CO2 [kg CO2 eq.]	6.87E+00	6.20E+00	2.62E-01	4.13E-01
IPCC AR6 GWP 100, incl biogenic CO2 [kg CO2 eq.]	6.82E+00	6.20E+00	2.66E-01	3.52E-01
TRACI 2.2, Global Warming Air, Total [kg CO2 eq.]	6.33E+00	5.87E+00	1.15E-01	3.41E-01
TRACI 2.2, Global Warming Air, LULUC [kg CO2 eq.]	7.41E-04	4.86E-04	1.58E-06	2.53E-04
TRACI 2.2, Global Warming Air, Fossil [kg CO2 eq.]	6.38E+00	5.87E+00	1.11E-01	4.02E-01
TRACI 2.2, Global Warming Air, Bio [kg CO2 eq.]	6.33E+00	5.87E+00	1.15E-01	3.41E-01
TRACI 2.2, Acidification Air [kg SO2 eq.]	2.87E-02	2.73E-02	5.73E-04	8.24E-04
TRACI 2.2, Eutrophication - freshwater [kg P eq.]	1.02E-04	9.97E-05	4.39E-09	1.87E-06
TRACI 2.2, Eutrophication - marine [kg N eq.]	7.41E-03	6.58E-03	4.04E-04	4.28E-04
TRACI 2.2, Ozone Depletion Air [kg CFC 11 eq.]	1.02E-08	1.01E-08	3.83E-12	1.44E-10

TRACI 2.2, Photochemical Oxidation Formation [kg O3 eq.]	3.72E-01	3.46E-01	1.26E-02	1.35E-02

Figure 3. LCIA Impact Distribution by ISO 21930 Modules

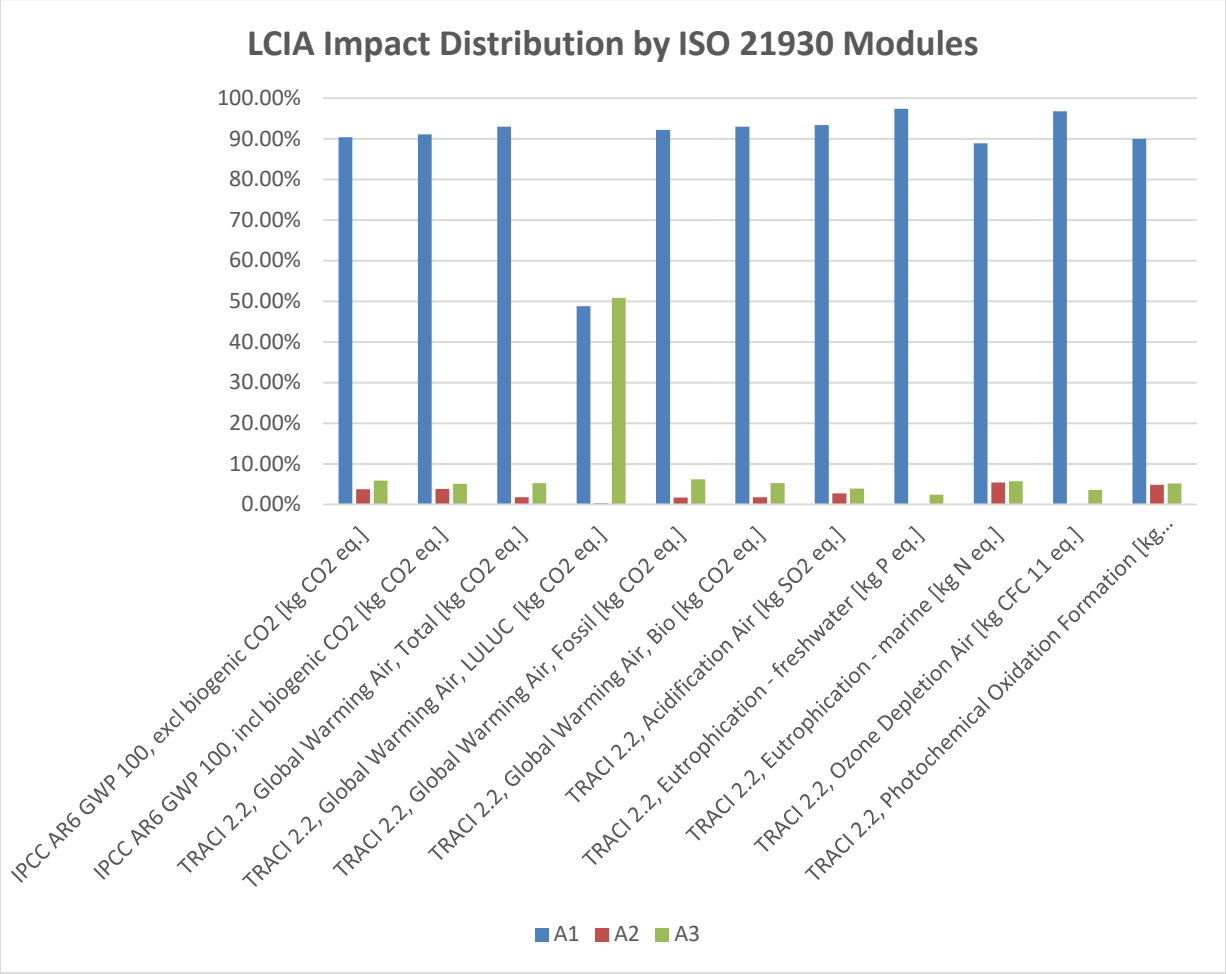


Table 7. Resource Metrics

Resource Metrics-720G020F	TOTAL	Module A1	Module A2	Module A3
Non-renewable primary resources used as energy carrier (NRPRe) [MJ]	9.83E+01	9.13E+01	2.61E+00	4.41E+00
Non-Renewable Primary Resources with Energy Content Used as a Material (NRPRM) (kg)	2.27E+00	2.10E+00	6.29E-02	1.07E-01
Renewable primary resources used as energy carrier (RPRe) [MJ]	4.08E+00	2.04E+00	4.92E-02	2.00E+00
Renewable Primary Resources with Energy Content Used as a Material (RPRM) (kg)	8.16E-03	8.16E-03	3.20E-12	3.55E-07
Abiotic Depletion Potential for Fossil Resources Used as Energy (MJ)	9.13E+01	8.52E+01	2.53E+00	3.56E+00
Recovered Energy from disposal of waste in previous systems (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (FW) [m3]	2.46E-01	2.45E-01	9.27E-05	1.36E-03
Biogenic CO2 removals for packaging (BCRK)	9.78E-02	0.00E+00	0.00E+00	9.78E-02
Biogenic CO2 emissions for packaging (BCEK)	3.67E-02	0.00E+00	0.00E+00	3.67E-02
Biogenic CO2 removals for product (BCRP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions for product (BCEP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion of waste from renewable sources used in production processes	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion Components for reuse (CRU)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling (MFR)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for energy recover (MER)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Energy exported from the product system (EE)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Materials (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous Waste (kg)	1.0E-03	0.00E+00	0.00E+00	1.0E-03
Non-hazardous Waste (kg)	9.9E-02	0.00E+00	0.00E+00	9.9E-02

High-level radioactive waste, conditioned, to final repository (HLRW) [kg]	2.06E-07	6.86E-08	2.61E-08	1.12E-07
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW) [kg]	3.86E-04	6.17E-05	2.18E-05	3.03E-04

Resource Metrics-720G020X	TOTAL	Module A1	Module A2	Module A3
Non-renewable primary resources used as energy carrier (NRPRe) [MJ]	9.97E+01	9.27E+01	2.61E+00	4.41E+00
Non-Renewable Primary Resources with Energy Content Used as a Material (NRPRM) (kg)	2.30E+00	2.13E+00	6.29E-02	1.07E-01
Renewable primary resources used as energy carrier (RPRe) [MJ]	4.07E+00	2.02E+00	4.92E-02	2.00E+00
Renewable Primary Resources with Energy Content Used as a Material (RPRM) (kg)	8.33E-03	8.33E-03	3.20E-12	3.55E-07
Abiotic Depletion Potential for Fossil Resources Used as Energy (MJ)	9.26E+01	8.65E+01	2.53E+00	3.56E+00
Recovered Energy from disposal of waste in previous systems (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (FW) [m3]	2.51E-01	2.49E-01	9.27E-05	1.36E-03
Biogenic CO2 removals for packaging (BCRK)	9.78E-02	0.00E+00	0.00E+00	9.78E-02
Biogenic CO2 emissions for packaging (BCEK)	3.67E-02	0.00E+00	0.00E+00	3.67E-02
Biogenic CO2 removals for product (BCRP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions for product (BCEP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion of waste from renewable sources used in production processes	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion Components for reuse (CRU)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling (MFR)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for energy recover (MER)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Energy exported from the product system (EE)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Materials (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous Waste (kg)	1.0E-03	0.00E+00	0.00E+00	1.0E-03
Non-hazardous Waste (kg)	9.9E-02	0.00E+00	0.00E+00	9.9E-02
High-level radioactive waste, conditioned, to final repository (HLRW) [kg]	2.02E-07	6.47E-08	2.61E-08	1.12E-07
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW) [kg]	3.82E-04	5.80E-05	2.18E-05	3.03E-04

Resource Metrics- PGF70020	TOTAL	Module A1	Module A2	Module A3
Non-renewable primary resources used as energy carrier (NRPRe) [MJ]	9.72E+01	9.02E+01	2.61E+00	4.41E+00
Non-Renewable Primary Resources with Energy Content Used as a Material (NRPRM) (kg)	2.22E+00	2.05E+00	6.29E-02	1.07E-01
Renewable primary resources used as energy carrier (RPRe) [MJ]	3.95E+00	1.91E+00	4.92E-02	2.00E+00
Renewable Primary Resources with Energy Content Used as a Material (RPRM) (kg)	1.67E-02	1.67E-02	3.20E-12	3.55E-07
Abiotic Depletion Potential for Fossil Resources Used as Energy (MJ)	9.01E+01	8.41E+01	2.53E+00	3.56E+00
Recovered Energy from disposal of waste in previous systems (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (FW) [m3]	2.32E-01	2.30E-01	9.27E-05	1.36E-03
Biogenic CO2 removals for packaging (BCRK)	9.78E-02	0.00E+00	0.00E+00	9.78E-02
Biogenic CO2 emissions for packaging (BCEK)	3.67E-02	0.00E+00	0.00E+00	3.67E-02
Biogenic CO2 removals for product (BCRP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions for product (BCEP)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion of waste from renewable sources used in production processes	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic CO2 emissions from combustion Components for reuse (CRU)	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Material for recycling (MFR)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for energy recover (MER)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Energy exported from the product system (EE)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Secondary Materials (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous Waste (kg)	1.0E-03	0.00E+00	0.00E+00	1.0E-03
Non-hazardous Waste (kg)	9.9E-02	0.00E+00	0.00E+00	9.9E-02
High-level radioactive waste, conditioned, to final repository (HLRW) [kg]	1.75E-07	3.76E-08	2.61E-08	1.12E-07
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW) [kg]	3.60E-04	3.54E-05	2.18E-05	3.03E-04

Biogenic CO2 emissions for packaging (BCEK) expected in Module A5:	
720G020F	**6.11E-02**
720G020X	**6.11E-02**
PGF70020	**6.11E-02**

Table 8. Waste Generation Values and Data Sources[3]

Gate-Gate Waste Generation		
Non-Hazardous Waste	0.099 kg/kg of product	Primary Data taken from average waste creation during Powder Coating manufacturing Plants in 2025.
Hazardous Waste	0.001 kg/kg of product	Primary Data taken from average waste creation during Powder Coating manufacturing Plants in 2025.

[3] Per the Reference PCR "Significant data limitations currently exist within the LCI data used to generate waste metrics for Life Cycle Assessments and Environmental Product Declarations. The waste metrics were calculated in a way conformant with the requirements of ISO 21930:2017, but these values represent rough estimates and are for informational purposes only. As such, no decisions regarding actual cradle-gate waste performance between products should be derived from these reported values."

Interpretation:

The majority of the environmental impact was from the raw materials used to make the coatings (Module A1). The materials with the largest impacts were the polymer resins. This was not surprising given the amount of resources needed to manufacture these intermediate products and also that they typically represent a substantial portion of the formulation (in this case >80%). Generally, the resins were responsible for greater than 50% of the total impacts depending on formula and/or specific impact category. The greatest single contributor to impact was a confidential epoxy polymer, associated with secondary data ('Epoxy Solid') from CEPE's 2024 database. A dominance analysis via a figure will be provided in the product-specific EPDs. Though transportation contributed more than manufacturing, the overall impact of both the transportation and manufacturing steps were minimal in comparison to the raw material impacts. The only exception is that Module A3 showed the largest contribution to LUC GWP specifically, though this was a very small contributor to overall GWP.

It is important to remember that these results are not necessarily designed to support direct comparison although they are compliant with all ISO guidelines to be eligible to do so. EPDs created from different programs may not be compatible. Cases may exist where the selection of different assumptions or methodologies could lead to incompatible results.

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 much 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 being 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 current 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.

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 may still 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 LCA report and were not expected to have a serious effect on the results, but still may limit the study.

Note also that EPDs are comparable only if they comply with ISO 21930, use the same sub-category PCR (ACA Sustainable Minds PCR for Powder Coatings Part B v.2.0, Dec 2025 in conjunction with Sustainable Minds PCR Part A v.4.0, Feb. 2026), include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. LCIA results are relative and do not necessarily predict impacts on each respective category's end points, thresholds' exceedance, safety, and health risks.

Emissions to Water, Soil, and to Indoor Air:

Powder coatings are 100% solids coatings and are not expected to emit significant quantities of VOCs or SVOCs.

EPDs are comparable only if they comply with the Sustainable Minds PCR Part A and ACA/Sustainable Minds Powder Coatings PCR Part B referenced in this document, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. Even in such cases comparability may still be limited by underlying datasets, etc.

Critical Review:

EPD submitted for review by NSF Certification, LLC. NSF has commissioned Mr. Joseph Geibig of EcoForm to conduct the formal review of the EPD.

Additional Environmental Information:

***Product Performance**:*

Although a declared unit was utilized for this EPD, it should be noted that some powder coating layers and systems will last longer and/or require less coating to achieve the same hide as a more other powder coating layers and systems. Such may be characterized by significantly lower environmental impacts across the life cycle if less product needs to be used. Given this, users of this EPD data should consider product performance when making sustainability decisions.

Safe and proper disposal of excess materials shall be done in accordance with applicable federal, state, and local codes.

References:

Sustainable Minds PCR Part A Version 4.0. *Available at Part A | Sustainable Minds. Published Feb. 2026*

American Coating Association Product Category Rule for Powder Coatings (Sustainable Minds Part B: Product group definition | Powder coatings | Part B #25-006). *Available at* https://www.paint.org/download/255098/?tmstv=1767822202*. Published Dec. 2025.*

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 21930:2017 *Sustainability in building construction – Environmental declaration of building products.*

© 2026 The Sherwin-Williams Company