Environmental Product Declaration – FIRETEX FX2008 [1]

FIRETEX FX2008 is designed for in-shop application by airless spray, to provide fire resistance for up to 120 minutes on structural steel. After appropriate drying, FIRETEX FX2008 can resist normal weather conditions for up to 6 months without topcoat provided that the specific use does not lead to ponding water due to rainfall, condensation or other site circumstances. Once an approved topcoat has been applied as appropriate to the prevailing conditions, then durability will be substantially enhanced. For additional information, please visit www.sherwin.com.

The product image to the right is an example of one of the formulas covered by the EPD. A list of all relevant FIRETEX FX2008 formulas is shown in Table 1 on page 2 of the EPD.

Program Operator	NSF Certification LLC
Declaration Holder	Sherwin-Williams UK Ltd, Protective & Marine Division Tower Works, Kestor Street Bolton United Kingdom (sustainability@sherwin.com)
Declaration Number	EPD11227
Declared Product	FIRETEX FX2008
Product Category and Subcategory	Decorative Coatings
Program Operator	NSF Certification LLC ncss@nsf.org
Reference PCR	EN15804+A2

Date of Issue	6/9/2026
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	Harry van Ewijk, IVAM/SGS Owen Abbe, BRE Thomas Peverelli, EVEA

This EPD was independently verified by NSF Certification LLC in accordance with EN15804+A2. ☐ **Internal** ☒ **External**	Jack Geibig – EcoForm igeibig@ecoform.com	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	Jack Geibig – EcoForm igeibig@ecoform.com	

Declared Unit:	1m² of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building)
LCA Software Used	LCA for Experts (Most Recent Version)
Data Quality Assessment Score	Good
Manufacturing Location(s)	Bolton, UK

[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.*

Product Definition:

FIRETEX FX2008 is a part of a family intumescent coating manufactured by The Sherwin-Williams Company, headquartered in Cleveland, Ohio. FIRETEX FX2008 is manufactured in Bolton, UK. These coatings are designed to provide highly effective passive fire protection. For information about specific products, please visit www.sherwin-williams.com.

Product Classification and Description:

The FIRETEX FX2008 product listed below is included within this assessment. For information on other attributes of this formula, please visit www.sherwin-williams.com.

This EPD follows EN15804+A2 as its primary PCR. The PEFCR was used for additional details which are not included in EN145804+A2, such as transport distances. Table 1 has coating characteristics specific to FIRETEX FX2008.

Table 1. Coating Characteristics

Coating Name	FIRETEX FX2008
Waterborne/ Solvent borne	Solvent
Interior/Exterior Wall, Trim, Other	Fire Protection for Steel
Density (kg/L)	1.30
VOC (gVOC/kg)	265
Coverage (m2/L) (one layer)	2.50
Number of layers	1
Lifetime (yrs)	60
Declared Unit (kg/m2)	0.528

Intumescent 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. Coating for this intumescent specifically will travel to a fabrication shop for application. The substrate with the coating will be installed at the building. The applied coating adheres to the substrate where it remains until the substrate is disposed. Any unused coating will be disposed as well. Based on the type of coating, there will only be one coating applied over the lifetime of the building (60 years).

The composition of FIRETEX FX2008 coating is shown by % weight below.

- Water (0%)
- Resin (10%-15%)
- Extender Pigments (10%-15%)
- Titanium Dioxide (10%-15%)

– Additives (50%-60%)

Table 2. List of Hazardous ingredients in FIRETEX FX2008 formulas.

Ingredient	CAS #	Percentage
MELAMINE	108-78-1	≥5 - ≤10

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 to health or the environment and hence require reporting under the Global Harmonized Standard. The ranges reflect that many of these materials may only appear in one or two bases across the entire product line. For additional information about product hazards, please refer to the Safety Data Sheet for the specific FIRETEX FX2008 formula available on www.sherwin-williams.com.

About Sherwin-Williams:

For more than 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. FIRETEX FX2008 is just one more way we bring you industry-leading coating technology — innovation you can pass on to your customers.

Definitions:

Acronyms & Abbreviated Terms:

- **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.
- **EPD**: Environmental Product Declaration. EPDs are 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 for Experts:** Created by Sphera. Managed LCA Content 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 modules 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 for a certain product category.

Terminology:

- **Architectural coating:** a coating recommended for field application to stationary structures or their appurtenances at the site of installation, to portable buildings, to pavements, or to curbs. For purposes of this PCR an 'architectural coating' does not include adhesives and coatings for shop applications or original equipment manufacturing, nor does it include coatings solely for application to non-stationary structures, such as airplanes, ships, boats, and railcars.
- **Biologic growth or bio deterioration:** any undesirable change in material properties brought about by the activities of microorganisms.
- **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.
- **Primary materials**: resources extracted from nature. Examples include titanium dioxide ore, crude oil, etc. that are used to create basic materials used in the production of architectural coatings (e.g., titanium dioxide).
- **Resin/Binder:** acts as the glue or adhesive to adhere the coating to the substrate.
- **Secondary materials**: recovered, reclaimed, or recycled content that is used to create basic materials to be used in the production of architectural coatings.

Underlying Life Cycle Assessment Methodology:

Declared Unit:

Per the reference PCR, the declared unit for the study was covering and protecting $1m^2$ of substrate for a period of 60 years (the assumed lifetime of a building). The product has no additional functionalities beyond what is stated by the declared unit.

In the reference PEFCR, product life for decorative coatings is 60 years. In order to determine the design life of the FIRETEX FX2008 formula, the following durability test methodologies (which were stated in the reference PCR) were utilized:

– EAD 350402-00-1106:2017 - Reactive Coatings for Fire Protection of Steel Elements

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 module.

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 boundaries for this study are termed "cradle-to-gate with options." The system boundary began with the extraction of raw materials to be used in the FIRETEX FX2008 coating and its formulas are manufactured in a way similar to other architectural paint and 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 a fabrication shop. The fabrication shop applies the coating and allows it to cure fully on the substrate. The substrate is transported and installed in the building. The substrate holds the coating until both are disposed together. Any unused coating will be disposed by the customer as well. The system boundary ends with the end-of-life module. 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;
- all point of sale infrastructure; and
- the coating applicator.

Production			Construction		Use							End of Life				Benefits
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to Customer	Application stage	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy use	Operational Water use	Deconstruct/demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
X	X	X	X	X	MNA							X	X	X	X	X

Figure 1. Diagram of System Boundary for the EPD.

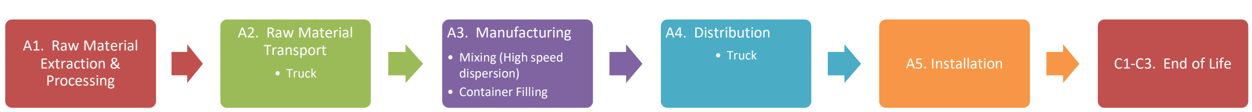

Figure 2. Flow Diagram of the life cycle modules included

A Modules

A1 Raw Material Supply

This life cycle module includes the production of raw materials required to produce the coating. Formulation was from internal systems. Environmental data from upstream suppliers was not available. Therefore, the raw material supply is modelled using the CEPE LCI database and Ecoinvent 3.10 (2024). Both databases are widely used and recognized within the LCA community.

A2 Transport of Raw Materials

This life cycle module includes the transport of raw materials from suppliers to the manufacturing site. Data on the distances and modes of transport for the transportation of raw materials including packaging materials was based on default values taken from the PEFCR for Decorative Paints. Actual weights of the materials transported are calculated and use Ecoinvent 3.10 datasets for emissions values. These are:

- Raw materials: 460km by lorry (>32 ton)
- Packaging materials: 250km by lorry (>32 ton)

A3 Manufacturing

This life cycle module describes the manufacturing process of the coating variations, including the production of packaging materials. Capital goods (the manufacturing of production equipment and infrastructure) are not included in the system boundary. To model the production process, data from the manufacturing site was provided for the year 2023.

A4 Transport to Customer

This life cycle module covers the transport of the final coating product to regional distribution centers (RDC) and points of sale (PoS). Transport distances are based on the default values from the PEFCR for Decorative Paints. Capacity factors, utilization rates, and fuel consumption are standardized in Ecoinvent and no values were changed. Table 2 below shows the percentage of paint produced that is transported to each point of sale and via what means.

Table 2. Transportation Distances to Customer

	Amount (%)	Transport Mode	Distance (km)	Capacity
Transport to Regional Distribution Centre (RDC)	18	Lorry > 32t, diesel (5.09E-04 L)	350	0.528 kg / 15.96 tonne
Transport to Point of Sale (PoS)	27	Lorry > 32t, diesel (8.07E-04 L)	370	0.528 kg / 15.96 tonne

A5 Construction, Installation Module

This module covers the paint application, including the applications of paint and direct emissions released during application. No additional inputs, other than capital goods (e.g., spray machines, brushes, rollers, buckets, etc.), are required to apply the paint to the substrate. As mentioned, the use of energy during application (i.e., in spray painting) is negligible for the selected declared unit and therefore has not been included within the scope of the study.

The amount of coating used during application is the declared unit, i.e., the amount required for 1 m2 of coating, Table 1. Additional inputs for installation are in Table 3.

Table 3. Installation Resources

	Value	Explanation
Ancillary materials	0	No ancillary materials outside of capital goods were used onsite.
Net freshwater consumption	0	No water used onsite.
Other resources	0	No other resources used onsite.
Electricity consumption	0	Electricity would be negligible and primarily relate to the steel instead of the intumescent coating.
Waste materials at construction site	3.04E-02	Steel and iron waste streams.
Output materials resulting from on-site waste processings	0	No onsite processing.
Direct emission to ambient air, soil, and water	0	No direct emissions onsite.

Volatile Organic Content

Some of the raw materials used in the coating formulations contain a small amount of solvent. Due to this, it is assumed that all VOC content is emitted during coating application. The VOC content for each coating is provided by internal systems.

Coating Loss End-of-Life

Based on the PEFCR for Decorative Paints documentation, it is assumed that 11% of the coating is lost during the application process (i.e., wet coating left in containers and applicator). The transport of the coating that is lost during the application process is also included in the model. The distance to the waste treatment center (EoL of the waste paint) is based on the default values available in the PEFCR the waste treatment for Decorative Paints. The default value is 80 km by lorry (>32t).

Packaging End-of-Life

For the end-of-life of the packaging materials, the assumed scenarios are presented in Table 4 below. These scenarios are based on packaging waste statistics from Eurostat (n.d.). These exclusions align with LCA methodology and are not expected to materially affect the outcomes of this LCA study.

Table 4. End-of-life scenarios for** coating **packaging

Packaging Material	Municipal incineration w/o energy recovery	Landfill	Recycling
Steel tinplated	1.9%	21.3%	76.8%

B Modules

Omitted based on EN15804+A2 PCR. For this cradle-to-gate with options study, use module was deemed not to be relevant. Intumescence coatings, such as Firetex FX2008, are typically only applied once during the lifetime of the building.

C Modules

The End-of-life of coating products is reached when it is discarded along with the surface that it was applied to. Therefore, it is assumed that under normal circumstances the paint is not separated from the surface on which it was applied when disposed of.

C1 Deconstruction and Demolition

This module describes when the coating is considered waste. As no specific demolition or dismantling activities are applied to paints, no impact is allocated to this life cycle module.

C2 Transport

This life cycle module covers the transport of paint waste from the site of demolition to incineration. Due to a lack of primary data, this module was modelled using the default values for transportation to EoL distances in the PEFCR for Decorative Paints. This is 80 km via lorry (>32t).

C3 & C4 Waste Processing and Disposal

In this life cycle module, the processing of waste (C3) and the disposal of waste (C4) at waste treatment facilities, is considered. As there was no primary data available for the EoL scenario for the coatings, it is assumed that there is no specific waste processing as the dried paint will be treated along with the substrate it was applied to. Therefore, 100% of the dried coating is assumed to be incinerated, since the coatings are mostly applied on steel construction materials and steel is generally recycled in Europe, during which process the coating is incinerated.

D Modules

Module D provides the information on potential burdens and benefits from recycling and energy recovery of the coating and its packaging. Excluded from module D are the burdens and benefits from export of secondary fuels, as there are none, and export of energy due to landfilling (module D4) as there is insufficient data on this topic.

Incineration of Waste Paint during the Application Process (A5)

During the application of paint, an assumption is made that 11% of all coating is wasted. This assumption is in accordance with the PEFCR for Decorative Paint. Incineration of coating with energy recovery results in the substitution of primary fuels for electricity and heat generation. Formula D.8 from EN15804+A2 was used to calculate the loads and benefits related to the export of energy due to waste incineration.

Incineration of applied coating (C4)

The applied paint is assumed to be incinerated at end of life (EoL) during the steel recycling process. It is assumed that electricity and heat are recovered during this process, which leads to the substitution of primary fuels for electricity and heat generation. Formula D.8 from EN15804+A2 was used to calculate the loads and benefits related to the export of energy due to waste incineration.

4.3.3. Packaging

The incineration of tinplated steel from cans is not considered to provide a benefit as it does not result in energy or heat recovery. The share of the steel cans that are recycled, however, results in burdens and benefits. Aside from the fraction of packaging waste the degradation factor of the mate-rials needs to be considered to determine the final amount of recycled material that is created. For steel the degradation factor is 0%.

Formula D.6 from EN15804+A2 was used to calculate the loads and benefits related to the export of energy due to waste incineration.

The input of recycled material in module A3 for manufacturing the packaging needs to be deducted from the avoided amount of material to determine the absolute amount of avoided material. The amount of recycled packaging material is determined by investigating the chosen dataset from which it appeared that around 55.1% of steel has a recycled origin. Therefore, 55.1% of the steel input is deducted from the avoided amount.

Cut-Off Rules:

Some cut-offs were applied in this study. During the manufacturing process, the input of consumables and the packaging waste from raw materials were excluded from the system boundaries due to a lack of data on the composition of this waste. A negligible amount of waste steel generated during manufacturing is also excluded. Furthermore, application tools such as brushes, cloths, and buckets are not included in the assessment, as they are considered capital goods. Reconditioned drums were not modelled as a separate input in the manufacturing process, as these are generally reused over several years. Therefore, the materials used for the drums are cut-off from, but all inputs required for reconditioning the drums in the manufacturing site are included. Additionally, energy consumed during application—for example, by spray applicators—has not been included due to its insignificance. No other cut-offs of outputs, raw materials, or other inputs were made at any life cycle module.

Data Sources & Quality:

When primary data was unavailable, data was taken from either Ecoinvent 3.10 or CEPE's coating industry life cycle inventory. The data from 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 2023 relevant facilities operation metrics.
ecoinvent	Version 3.10 – Most recent version available in LCAFE.
CEPE LCI	Most recent version of industry LCI. Last updated in 2024. Made up of refined data from thinkstep 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 2024 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 Ecoinvent databases and CEPE's coating life cycle inventory. All of 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.

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

Temporal Coverage:

Primary data was collected from the manufacturing facilities from the 2023 calendar year. Secondary data reflected the most up-do-date versions of the LCA databases mentioned above.

Geographic Coverage:

FIRETEX Fx2008 is manufactured by the Sherwin-Williams Company entirely within Europe. Given that the facilities making FIRETEX FX2008 are spread across the United States, the average EU mixes and heats was used in the LCA models. FIRETEX FX2008 products are purchased, used, and the unused portions are disposed of by the customer throughout Europe.

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 EN15804/EF3.1 method was used, and the LCIA results are formatted to be conformant with the PCR, which was based on ISO 21930. The EN15804/EF3.1method is widely accepted for use in the EU and was developed by the European Commission.

Table 5. Overview of Impact Categories

Impact Category	*Parameter*	*Unit*	*Model*	*Disclaimer*
		Core Impact Indicators		
Climate change – total	Global warming potential, GWP-total	kg CO2 eq.	Baseline model of 100 years of the IPCC based on IPCC 2013	-
Climate change – fossil	Global warming potential fossil fuels, GWP-fossil	kg CO2 eq.	Baseline model of 100 years of the IPCC based on IPCC 2013	-
Climate change – biogenic	Global warming potential biogenic, GWP-biogenic	kg CO2 eq.	Baseline model of 100 years of the IPCC based on IPCC 2013	-
Climate change - land use and land use change	Global warming potential land use and land use change, GWP-luluc	kg CO2 eq.	Baseline model of 100 years of the IPCC based on IPCC 2013	-
Ozone depletion	Depletion potential of the stratospheric ozone layer, ODP	kg CFC 11eq	Steady-state ODPs, WMO 2014	-
Acidification	Acidification potential, Ac-cumulated Exceedance, AP	Mol H+eq	Accumulated exceedance, Seppala et al, 206; Posch et al, 2008	-
Eutrophication aquatic freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment, EP-freshwater	kg PO4 eq.	EUTREND model, Struijs et al, 2009, as implemented in ReCiPe	-
Eutrophication aquatic marine	Eutrophication potential, fraction of nutrients reaching marine end compartment, EP-marine	kg N eq.	EUTREND model, Struijs et al, 2009, as implemented in ReCiPe	-
Eutrophication terrestrial	Eutrophication potential, accumulated exceedance, EP - terrestrial	Mol N eq	Accumulated exceedance, Seppala et al, 206; Posch et al, 2008	-
Photochemical ozone formation	Formation potential of tropospheric ozone, POCP	kg MNVOC eq.	LOTUS-EUROS, Van Zelm et al., 2008, as applied in ReC-iPe	-
Depletion of abiotic resources – minerals and metals	Abiotic depletion potential for non-fossil resources (ADP – minerals & metals)	kg Sb equiv.	CML 2002, Guinee et al, 2002, and van Oers et al, 2002	1
Depletion of abiotic resources – fossil fuels	Abiotic depletion potential for fossil resources (ADP-fossil fuels)	MJ, net caloric value	CML 2002, Guinee et al, 2002, and van Oers et al, 2002	1
Water use	Water (user) deprivation potential, deprivation weighted water consumption (WDP)	m3 world-eq. deprived	Available WAter REmaining (AWARE) Boulay et al, 2016	1

- *Disclaimer 1*: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Life Cycle Impact Assessment Results:

The LCA results are documented and grouped separately below into the following modules as defined by EN15804+A2.

- Total Impact (across the entire cradle-to-gate lifecycle with options)
- A1 – Raw Material Production
- A2 – Raw Material Transport
- A3 – Manufacturing
- A4 – Product Transport
- A5 – Installation
- B – Use - *Omitted*
- C1- Deconstruction and Demolition - *Omitted*
- C2 – Waste Transport
- C3 – Waste Processing - *Omitted*
- C4 – Disposal
- D – Recycling/Reuse/Recovery

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 tables below. LCIA results for each life cycle module as defined by EN15804+A1 are shown graphically in Figure 2.

Table 6. LCA Results.

	FIRETEX FX2008
GWP Inc Bio Carb (kg CO2e)	2.88E+00
GWP Exc Bio Carb (kg CO2e)	2.85E+00
Acidification (Mole of H+ eq)	1.47E-02
Eutrophication, freshwater (kg P eq)	2.21E-03
Eutrophication, marine (kg N eq)	2.21E-03
Ozone depletion (kg CFC-11 eq)	6.87E-08
Photochemical ozone formation, human health (kg NMVOC eq.)	8.70E-03

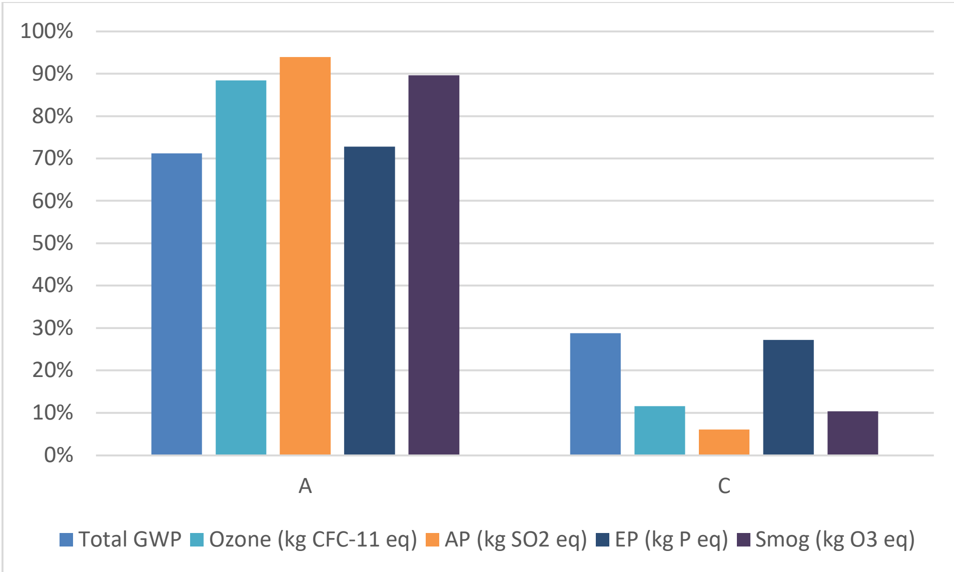

Figure 2. Impact Category Result Breakdown by EN15804+A2 Module FIRETEX FX2008 Formulation.

Table 8. Resource Metrics

	A1-A3	A4	A5	C1	C2	C3	C4	D
1. Environmental impact indicators								
01 Climate Change - total [kg CO2 eq.]	1.84E+00	5.14E-02	1.59E-01	-	9.87E-04	-	8.27E-01	-4.65E-01
02 Climate Change, fossil [kg CO2 eq.]	1.82E+00	5.13E-02	1.58E-01	-	9.86E-04	-	8.24E-01	-4.63E-01
03 Climate Change, biogenic [kg CO2 eq.]	-2.02E-03	2.65E-05	5.41E-04	-	5.09E-07	-	2.75E-03	-1.84E-03
04 Climate Change, land use and land use change [kg CO2 eq.]	2.05E-02	1.76E-05	2.36E-05	-	3.37E-07	-	1.29E-04	-1.78E-04
05 Ozone depletion [kg CFC-11 eq.]	5.82E-08	1.03E-09	1.52E-09	-	1.98E-11	-	7.95E-09	-1.76E-08
06 Acidification [Mole of H+ eq.]	1.35E-02	1.66E-04	1.62E-04	-	3.18E-06	-	8.87E-04	-6.05E-04
07 Eutrophication, freshwater [kg P eq.]	5.88E-04	3.49E-06	4.52E-05	-	6.70E-08	-	2.38E-04	-5.57E-05
08 Eutrophication, marine [kg N eq.]	1.88E-03	5.66E-05	4.15E-05	-	1.09E-06	-	2.25E-04	-1.72E-04
09 Eutrophication, terrestrial [Mole of N eq.]	1.97E-02	6.12E-04	3.77E-04	-	1.18E-05	-	2.07E-03	-1.72E-03
10 Photochemical ozone formation, human health [kg NMVOC eq.]	7.37E-03	2.70E-04	1.66E-04	-	5.18E-06	-	8.95E-04	-9.32E-04
11 Resource use, mineral and metals [kg Sb eq.]	2.94E-05	1.38E-07	1.68E-07	-	2.66E-09	-	1.17E-06	-2.47E-07
12 Resource use, fossils [MJ]	3.97E+01	7.46E-01	7.60E-01	-	1.43E-02	-	3.99E+00	-7.68E+00
13 Water use [m^3 world equiv.]	1.81E+01	4.78E-03	1.22E-02	-	9.19E-05	-	6.44E-02	-5.64E-02
2. Resource use indicators								
01 Use of renewable primary energy (PERE) [MJ]	2.04E+00	1.18E-02	4.13E-02	-	2.28E-04	-	2.25E-01	-2.91E-01
03 Total use of renewable primary energy resources (PERT) [MJ]	2.04E+00	1.18E-02	4.13E-02	-	2.28E-04	-	2.25E-01	-2.91E-01
04 Use of non-renewable primary energy (PENRE) [MJ]	3.97E+01	7.46E-01	7.60E-01	-	1.43E-02	-	3.99E+00	-7.68E+00

	A1-A3	A4	A5	C1	C2	C3	C4	D
06 Total use of non-renewable primary energy resources (PENRT) [MJ]	3.97E+01	7.46E-01	7.60E-01	-	1.43E-02	-	3.99E+00	-7.68E+00
08 Use of renewable secondary fuels (RSF) [MJ]	0.00E+00	0.00E+00	0.00E+00	-	0.00E+00	-	0.00E+00	0.00E+00
09 Use of non renewable secondary fuels (NRSF) [MJ]	0.00E+00	0.00E+00	0.00E+00	-	0.00E+00	-	0.00E+00	0.00E+00
10 Use of net fresh water (FW) [m3]	6.26E-01	1.11E-04	2.85E-04	-	2.14E-06	-	1.50E-03	-1.31E-03
3. Output flows and waste categories								
01 Hazardous waste disposed (HWD) [kg]	1.24E-02	7.33E-04	1.38E-02	-	1.41E-05	-	7.19E-02	-3.31E-03
02 Non-hazardous waste disposed (NHWD) [kg]	7.44E-04	0.00E+00	0.00E+00	-	0.00E+00	-	0.00E+00	0.00E+00
03 Radioactive waste disposed (RWD) [kg]	2.43E-05	0.00E+00	0.00E+00	-	0.00E+00	-	0.00E+00	0.00E+00
5. Optional indicators								
5a. Optional indicators detailed								
01 Particulate matter [Disease incidences]	1.11E-07	3.94E-09	1.71E-09	-	7.56E-11	-	9.44E-09	-3.62E-09
02 Ionising radiation, human health [kBq U235 eq.]	**1.41E-01**	**9.04E-04**	**3.77E-03**	**-**	**1.74E-05**	**-**	**2.00E-02**	**-3.35E-02**
03 Ecotoxicity, freshwater [CTUe]	1.44E+01	1.77E-01	2.37E+00	-	3.39E-03	-	1.24E+01	-2.03E+00
04 Human toxicity, cancer [CTUh]	9.56E-09	3.18E-10	3.24E-10	-	6.12E-12	-	1.71E-09	-6.63E-09
05 Human toxicity, non-cancer [CTUh]	3.59E-08	4.46E-10	4.57E-10	-	8.56E-12	-	2.63E-09	-1.38E-09
06 Land Use [Pt]	1.46E+01	7.48E-01	1.09E-01	-	1.44E-02	-	6.48E-01	-3.27E-01
5b. Additional Metrics								
Primary Energy Raw Materials (PERM) [kg]	7.43E-01	1.70E-02	1.68E-02	-	3.26E-04	-	8.83E-02	-3.87E-02

	A1-A3	A4	A5	C1	C2	C3	C4	D
Primary Energy Renewable Raw Materials (PERNRM) [kg]	5.05E-02	1.68E-04	5.70E-04	-	3.22E-06	-	3.35E-03	-2.97E-03
Secondary Materials (SM) [kg]	0.00E+00	0.00E+00	0.00E+00	-	0.00E+00	-	0.00E+00	0.00E+00

C1 and C3 were considered in this assessment, but there are no relevant impacts for these modules

Table 9. Outflow and Biogenic Metrics

		A1-A3	A4	A5	C1	C2	C3	C4	D
Outflow	Components for Reuse (kg)	0	0	0	0	0	0	0	0
	Materials for Recycling (kg)	0	0	0	0	0	0	0	0
	Materials for Energy Recovery (kg)	0	0	0	0	0	0	0	0
	Exported Energy (MJ)	0	0	0	0	0	0	0	0
Biogenic	Biogenic Carbon in Product	0	0	0	0	0	0	0	0
	Biogenic Carbon in Packaging	2.47E-03	0	0	0	0	0	0	0

Interpretation:

The majority of the environmental impact was from the raw materials used to make the coatings (Module A1). The primary contributors to the majority of raw material impacts were the polymers and the flame retardant additive ammonium polyphosphate (greater than thirty percent and twenty percent respectively). Other significant but lesser contributors were the pigment titanium dioxide and solvent ingredients including xylene and toluene.

C4 (waste disposal) contributes about a third of the impacts for "Climate Change – Total (kg CO2 eq)," "Climate Change – Fossil (kg CO2 eq)," and "Eutrophication Potential (kg N eq)." The only other module/metric which has not been discussed is about a third of the impact for "Resource use, mineral and metals (kg Sb eq)" which is attributed to the steel can production for packaging. All other module/metric combinations contribute less than 20% of the impact. The most common places for this impact to be are A3 (manufacturing) or C4 (disposal). Transportation impacts summation (A2+A4+C2) does not exceed 5%.

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 Ecoinvent database 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:

As an Intumescent coating, it is solvent based and therefore does have VOC Emissions. However, it is applied offsite at a fabrication shop. All VOC emissions occur there as the coating cures. By the time the material is installed into a building, there will be no indoor air emissions.

The following testing has been performed:

- EN16516
- AgBB (MVV TB/ABG)
- CDPH - emissions testing

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.

References:

Environmental Product Declaration for ProMar 200 Zero VOC. Available at http://info.nsf.org/Certified/Sustain/ProdCert/EPD10070.pdf. Published November, 2015.

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.*

CEPI Eurokraft, 2021. Continuous improvement of environmental footprint of paper sacks. [online]. Available at: https://www.cepi-eurokraft.org/wp-content/up-loads/2024/01/2024_Fact-sheet_ESG_carbon-footprint-2021.pdf [Last accessed 11 June 2024].

Eurostat, n.d. *Waste statistics - packaging waste*. European Commission. Retrieved July 29, 2025, from https://ec.europa.eu/eurostat/cache/metadata/en/env_waspac_esms.htm

EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 11/2013.

Lamlom, S. H., & Savidge, R. A., 2003. A reassessment of carbon content in wood: Variation within and between 41 North American species. *Biomass and Bioenergy, 25*(4), 381–388.

Product Environmental Footprint Category Rules - Decorative Paints version 1.0, 2018. Developed by the Technical Secretariat Decorative Paints of the Europe an Council of the Paint, Printing Ink and Artists' Colours Industry.

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The Ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: http://link.springer.com/10.1007/s11367-016-1087-8

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