

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:



PPG Amerlock® 2/400

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
EPD registration number:	S-P-07123
Publication date:	2023-06-01
Valid until:	2028-05-22

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

EPD of construction products may not be comparable if they do not comply with EN 15804.



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification	
Product Category Rules (PCR)	
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR): <i>International EPD System, PCR for Construction Products, 2019:14, version 1.2.5.</i>	
PCR review was conducted by: <i>Claudia A. Peña, Director of Sustainability at ADDERE Research and Technology</i>	

Life Cycle Assessment (LCA)	
LCA accountability:	Aihua Huang, PPG Product Sustainability CoE
Third-party verification	
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:	
<input checked="" type="checkbox"/> EPD verification by individual verifier	
Third-party verifier:	<i>Jan Weinzettel, http://www.fernconsulting.cz, weinzettel@seznam.cz</i>
Approved by: The International EPD® System	
Procedure for follow-up of data during EPD validity involves third party verifier:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

EPD Type: Worst case. This EPD is based on the worst case life cycle impacts (of each reported life cycle impact category) of all variations of PPG Amerlock® 2/400, e.g., different colors and packaging sizes.

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company Information

Owner of the EPD: PPG Industries
Contact: Belkheir, Mohamed (mbelkheir@ppg.com)

Description of the organisation:
 PPG Industries, Inc. manufactures and distributes a broad range of paints, coatings and specialty materials. PPG was incorporated in Pennsylvania in 1883. PPG's vision is to be the world's leading coatings company by consistently delivering high-quality, innovative and sustainable solutions that customers trust to protect and beautify their products and surroundings. <https://www.ppgpmc.com/>

Product-related or management system-related certifications:
 PPG's EHS Policy incorporates the elements of voluntary global industry initiatives, including Responsible Care® and Coatings Care®, which help companies manage safe and environmentally responsible practices in the chemicals and coatings industries. At more than 40 of its facilities, PPG has received ISO 14001:2004 certification.

Name and location of production site(s):
 Kunshan, China; Jakarta, Indonesia; Ulsan, South Korea; Deurne, Belgium; Ostrow, Poland; Comex -PLANTA TEPEXPAN, Mexico; Columbia;

Product Information

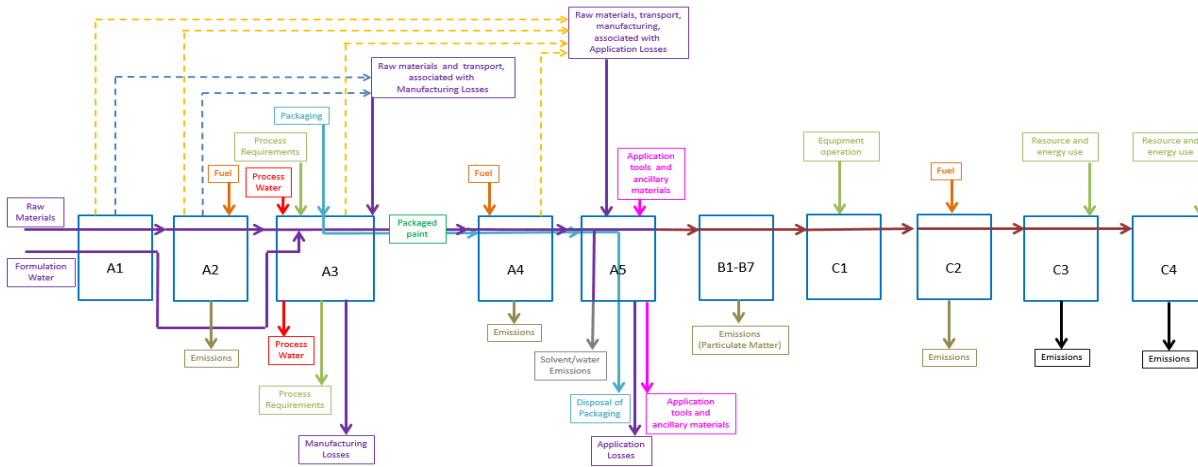
Product name: PPG Amerlock® 2/400
Product identification: Products are identified by name
Product description: Amerlock® 2/400 is a two-component, high solids epoxy coating.

UN CPC code: 35110
Geographical scope: Worldwide

LCA Information

Declared unit: The declared unit for this EPD is 1 m2 of substrate covered and protected by PPG Amerlock® 2/400 Coatings.
Reference service life: 20 years, based on C3 condition as specified in ISO 12944-9: 2018
Time representativeness: 2021-2022
Database(s) and LCA software used: Ecoinvent 3.8 (using the Cut-off processes/allocation model), Industry Data 2.0; Simapro v. 9.4.
Cut-off rules: Neglected flow in all modules is less than 1% of the energy use and total mass. Cut-off rules do not apply to Module A1, which is 100% modelled.
Allocation method: **Mass allocation:** A3 energy/material inputs and waste outputs are allocated by total products manufactured over 1 year
Description of system boundaries:
 The type of EPD is Cradle to Gate with Options (EPD Type b - Modules A1-A3, A4, A5, B1-B7, C1-C4, and D).

System diagram:



More Information

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

Module	Product stage			Construction process stage		Use stage	End of life stage				Resource recovery stage	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use, maintenance, repair, replacement, refurbishment, operational energy and water use	De-construction demolition	Transport	Waste processing	Disposal		
	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4		
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	19.1% Note 1			-	-	-	-	-	-	-	-	-
Variation – products	29.5% Note 2			-	-	-	-	-	-	-	-	-
Variation – sites	Not Applicable			-	-	-	-	-	-	-	-	-

Note 1: Based on GWP-GHG of Stage A3 divided by GWP-GHG for stages A1-A3. Data for A3 is specific to PPG facilities.

Note 2: Since EPD uses the maximum value of all products, this is based on the ratio of the GWP-GHG of the minimum product to the EPD reported value for Stages A1-A3, i.e., the variation is entirely below the reported result.

Acronym: GLO - Global

Content Information

Values in all tables are based on declared unit: 1 m² of substrate covered and protected by PPG Amerlock® 2/400, except weight-%

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C
Additives	4.39E-2~5.09E-2	-	-
Biocides	0	-	-
Binders	8.02E-2~8.23E-2	-	-
Fillers	8.77E-2~1.05E-1	-	-
Glycols, esters, ethers	0	-	-
Pigments	0~2.24E-3	-	-
Solvents	3.23E-2~3.75E-2	-	-
TiO ₂	0~3.22E-2	-	-
Water	0	-	-
Total	2.69E-1~2.85E-1	0	0% / 0

Packaging materials (Note 1)	Weight, kg	Weight-%, (of the product)	Weight biogenic carbon, kg C
Steel for cans/buckets	2.99E-02	11.0%	0.0
Polypropylene for cans/buckets	0.00E+00	0.0%	0.0
Cardboard for boxes and pallet interleaves	1.12E-03	0.4%	5.11E-04
Wood pallet	2.58E-02	9.4%	1.22E-02
Polyethylene for pallet wrap	1.03E-03	0.4%	0.0
TOTAL	5.66E-02	20.7%	1.27E-02

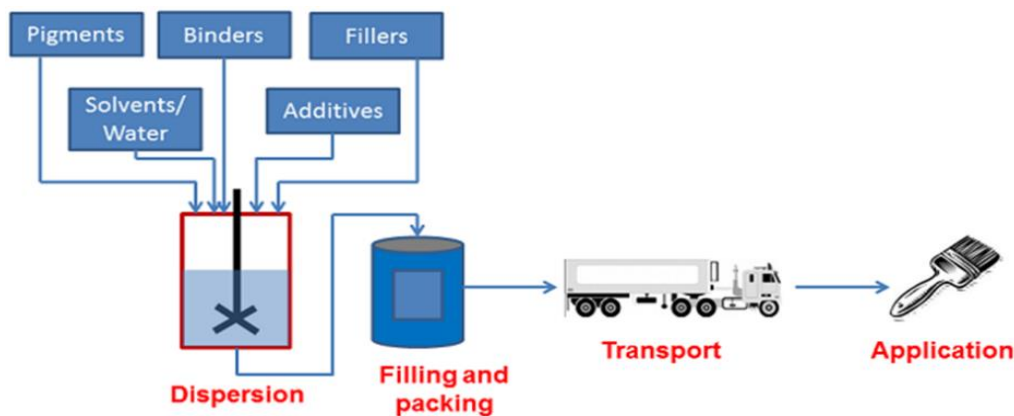
Note 1: Packaging weights are the maximum of the individual products included in the EPD. Packaging weight percentages are assessed on the maximum weight-% of packaging in all products included in this EPD. Packaging material biogenic carbon weight is the minimum of the individual products included in the EPD.

Biogenic carbon content	Product's biogenic carbon content at the factory gate kg C
Biogenic carbon content in product	0.00E+00
Biogenic carbon content in accompanying packaging	1.27E-02

Note: There are no dangerous substances from the candidate list of SVHC for authorisation in this product

Manufacturing Process

The manufacturing process for two-component coatings (base and hardener) primarily involves the mixing and dispersing of raw materials into a homogeneous mixture. Raw materials include pigments and fillers, which provide colour, hiding, and gloss control; resins/binders, which dry to form a solid film and adhere the coating to the substrate and additives, which assist with various coating properties. The two-component product is then shipped to the customers as a set for them to mix at the job site before application.



Assumptions beyond module A3

A4

Transportation distance is assumed to be 1,207km accordingly to American Coating Association's Architectural Coating PCR and Powder Coating PCR. Transportation mode is assumed to be by Euro 5 16-32 metric ton truck.

A5

The following sub modules and assumptions are included in A5

1. Cleaning process before application: water and energy consumption.
2. Application tools and ancillaries: spray gun tip.
3. Disposal of application waste: a conservative worst case estimate of 30% overspray is assumed. Environmental impacts of manufacturing and disposal of 30% products oversprayed is included in A5. Solid content of oversprayed products are assumed to be disposal as hazardous waste to incineration without energy recovery. Volatile emissions (e.g., solvents) from the overspray are assumed to be released to the atmosphere directly without treatment, in combination with volatile emissions from the drying/curing of the finished coating.
4. Primary Packaging (Steel, plastic and cardboards) are disposed as general waste. Pallet packaging is disposed as wood waste.
5. VOCs were modelled as direct emission to the environment and characterized by their characterization factors according to EUEA Method EN 15804 A2 EPD Ev-DEC 1.10 ei3.8 SP9.4.

B1-B7

PPG Amerlock® 2/400 coating is designed to last throughout its service life without deterioration. However, how asset (e.g., bridge) owners (e.g., city government) manage their asset is out of PPG's control. To be conservative, and reflect potential environmental releases of deteriorated coating from substrate, an assumption is made that 30% of coating solids content remained on the substrate is released as particulate matter to air and therefore contributes to the particulate matter impact category.

C1-C4

1. C1: Energy associated with demolition of the substrate structure is included.
2. C2: Transportation to disposal is assumed to 100 km and transportation mode is assumed to be by Euro 5 16-32 metric ton truck.
3. C3: It is assumed that, as the products are for industrial steel application, that they are coated over and not removed during the lifetime of the steel application. Hence at the end of the steel application's life, the product will be on the exterior of the steel. Industrial steel is often recycled/melted in a furnace.
4. C4: no other disposal options are considered.

D

No benefits and loads beyond the product system boundary were declared since no reuse or recovery occurs for protective and marine coating in general. In addition, since incineration without energy recovery is assumed to be the waste disposal option in C3 module, no "useful energy carrier" is considered leaving the product system. Therefore, no benefit is claimed in module D.

Documentation for calculating the Reference Service Life (RSL)

A 20 years reference service life is declared based on ISO 12944-9: 2018 testing under C3 conditions. In real life, the rate of corrosion will depend on exposure conditions and the defined coating system. No maintenance is assumed during the 20 years service life time as stated.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit (1 m² of substrate covered and protected by PPG Amerlock® 2/400)

Indicator	Unit	A1-A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
GWP - fossil	kg CO ₂ eq.	7.47E-01	4.95E-02	4.88E-01	0.00E+00	6.14E-05	1.20E-05	2.97E-01	0.00E+00	0.00E+00
GWP - biogenic	kg CO ₂ eq.	-2.16E-02	2.05E-05	3.08E-02	0.00E+00	1.50E-08	5.00E-09	4.36E-06	0.00E+00	0.00E+00
GWP - luluc	kg CO ₂ eq.	2.86E-02	1.97E-05	8.61E-03	0.00E+00	7.47E-09	4.79E-09	1.31E-06	0.00E+00	0.00E+00
GWP - total	kg CO ₂ eq.	7.46E-01	4.96E-02	5.23E-01	0.00E+00	6.14E-05	1.20E-05	2.97E-01	0.00E+00	0.00E+00
ODP	kg CFC 11 eq.	9.41E-08	1.15E-08	5.10E-08	0.00E+00	1.31E-11	2.77E-12	2.09E-10	0.00E+00	0.00E+00
AP	mol H ⁺ eq.	3.99E-03	2.05E-04	1.62E-03	0.00E+00	6.22E-07	4.98E-08	2.74E-05	0.00E+00	0.00E+00
EP - freshwater	kg P eq.	2.94E-05	3.50E-07	1.00E-05	0.00E+00	3.59E-10	8.47E-11	4.05E-08	0.00E+00	0.00E+00
EP - marine	kg N eq.	8.83E-04	6.07E-05	3.54E-04	0.00E+00	2.66E-07	1.48E-08	1.18E-05	0.00E+00	0.00E+00
EP-terrestrial	mol N eq.	7.79E-03	6.62E-04	3.32E-03	0.00E+00	2.99E-06	1.60E-07	1.31E-04	0.00E+00	0.00E+00
POCP	kg NMVOC eq.	3.16E-03	2.03E-04	1.26E-03	0.00E+00	8.24E-07	4.90E-08	3.25E-05	0.00E+00	0.00E+00
ADP - minerals & metals*	kg Sb eq.	8.28E-06	1.75E-07	3.01E-06	0.00E+00	4.74E-11	4.26E-11	1.19E-08	0.00E+00	0.00E+00
ADP - fossil*	MJ	1.33E+01	7.49E-01	5.60E+00	0.00E+00	8.38E-04	1.81E-04	2.30E-02	0.00E+00	0.00E+00
WDP*	m ³	4.52E-01	2.31E-03	3.16E-01	0.00E+00	1.73E-06	5.64E-07	4.84E-04	0.00E+00	0.00E+00

Acronyms	<p>GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p>									
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* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit

Indicator	Unit	A1-A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
<u>GWP-GHG[1]</u>	kg CO ₂ eq.	7.07E-01	4.99E-02	4.78E-01	0.00E+00	6.19E-05	1.21E-05	3.02E-01	0.00E+00	0.00E+00
Particulate Matter	disease inc.	4.63E-08	4.34E-09	1.91E-08	5.79E-03	1.65E-11	1.06E-12	2.31E-10	0.00E+00	0.00E+00
Ionizing radiation, human health (IRP)	kBq U235 eq.	2.44E-02	3.31E-03	1.40E-02	0.00E+00	3.63E-06	8.03E-07	4.35E-05	0.00E+00	0.00E+00
Eco-toxicity - freshwater (ETP-fw)	CTUe	2.80E+01	5.92E-01	1.02E+01	0.00E+00	5.67E-04	1.44E-04	9.44E-02	0.00E+00	0.00E+00
Human toxicity, cancer effect (HTP-c)	CTUh	1.59E-09	1.96E-11	1.00E-09	0.00E+00	2.28E-14	4.82E-15	3.17E-10	0.00E+00	0.00E+00
Human toxicity, non-cancer effects (HTP-nc)	CTUh	1.88E-08	6.32E-10	7.24E-09	0.00E+00	4.17E-13	1.54E-13	1.27E-09	0.00E+00	0.00E+00
Land use related impacts/Soil quality (SQP)	dimensionless	9.23E+00	5.30E-01	3.19E+00	0.00E+00	1.09E-04	1.30E-04	1.24E-02	0.00E+00	0.00E+00

Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017

Note 1: GWP-GHG is calculated as GWP - total minus any climate change impact (positive or negative) caused by biogenic carbon emission or uptake.

Use of resources

Results per declared unit

Indicator	Unit	A1-A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
PERE	MJ	1.67E+00	1.07E-02	5.33E-01	0.00E+00	6.82E-06	2.60E-06	7.21E-04	0.00E+00	0.00E+00
PERM	MJ	3.86E-01	0.00E+00	1.16E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.03E+00	1.07E-02	6.42E-01	0.00E+00	6.82E-06	2.60E-06	7.21E-04	0.00E+00	0.00E+00
PENRE	MJ	1.19E+01	7.49E-01	5.33E+00	0.00E+00	8.37E-04	1.81E-04	2.30E-02	0.00E+00	0.00E+00
PENRM	MJ	1.98E+00	0.00E+00	4.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.34E+01	7.49E-01	5.61E+00	0.00E+00	8.37E-04	1.81E-04	2.30E-02	0.00E+00	0.00E+00
SM	kg	3.49E-02	0.00E+00	1.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.26E-02	8.31E-05	8.04E-03	0.00E+00	5.81E-08	2.02E-08	2.28E-05	0.00E+00	0.00E+00

Acronyms

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste production

Results per declared unit

Indicator	Unit	A1-A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	7.24E-02	5.55E-04	3.27E-02	0.00E+00	1.29E-06	1.35E-07	7.60E-03	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	1.60E+00	4.41E-02	5.41E-01	0.00E+00	5.44E-06	1.08E-05	1.86E-03	0.00E+00	0.00E+00
Radioactive waste disposed	kg	2.66E-05	5.19E-06	1.84E-05	0.00E+00	6.48E-09	1.26E-09	6.16E-08	0.00E+00	0.00E+00

Output flows

Results per declared unit

Indicator	Unit	A1-A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other Environmental Performance Indicators

None included

Additional Environmental Information

None included

Additional Social and Economic Information

None included

Information Related to Sector EPD

Not applicable

Differences Versus Previous Versions

References

General Programme Instructions of the International EPD System® , Version 4.0

ISO 12944-9: 2018, Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures

ISO 14044:2006-10, Environmental Management — Life Cycle Assessment — Requirements and Instructions (ISO 14044:2006); EN ISO 14044:2006

EN 15804+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the construction products product category

Product Category Rule for Environmental Product Declarations: Architecture Coating, NSF International, National Center for Sustainability Standards

Product Category Rule for Environmental Product Declarations: Powder Coating, NSF International, National Center for Sustainability Standards

PPG Amerlock® 2/400 Product Data Sheet