

ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	PPG Coatings Deutschland GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PPG-20190061-CAC1-EN
Issue date	11.06.2019
Valid to	10.06.2024

Sigma Coatings Matt Interior Wall Paints
BrandiColor Extrem
BrandiRapid
BrandiMatt
Mattlatex

Sigma Coatings

www.ibu-epd.com / <https://epd-online.com>



General Information

Sigma Coatings

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-PPG-20190061-CAC1-EN

This declaration is based on the product category rules:

Coatings with organic binders, 09.2017
(PCR checked and approved by the SVR)

Issue date

11.06.2019

Valid to

10.06.2024



Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)



Dr. Alexander Röder
(Managing Director IBU)

Matt Interior Wall Paints

Owner of the declaration

PPG Coatings Deutschland GmbH
An der Halde 1
D-44805 Bochum

Declared product / declared unit

1 kg Sigma Coatings matt interior wall paints

Scope:

This EPD is applicable to the following products:

- BrandiRapid
- BrandiColor Extrem
- BrandiMatt
- Mattlatex

The products produced at the PPG production site in Uithoorn, The Netherlands. The results are average values of the analyzed products.

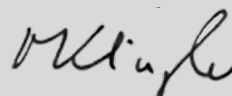
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The standard /EN 15804/ serves as the core PCR

Independent verification of the declaration and data according to /ISO 14025:2010/

internally externally



Matthias Klingler
(Independent verifier appointed by SVR)

Product

Product description / Product definition

Sigma Coatings matt interior wall paints are water-based emulsion paints for interior wall coatings. According to the European standard /EN 13300/, the products have a matt finish, have class 2 or 3 hiding power and class 2 or 3 wet abrasion resistance. In the wet state, the products have a free-flowing, viscous consistency with a homogeneous appearance. After extended periods of standing, a small amount of liquid may collect on the surface of the product. This can be remedied by stirring the paint until it becomes homogeneous again. This will in no way affect the properties of the product.

Sigma Coatings matt interior wall paints are available in many different shades. The color of the wet product gives an approximate impression of the color of the dried coating. Slight differences in color between the wet product and the dried coating may occur.

This declaration refers to a mass-weighted average of the quantities of BrandiRapid, BrandiColor Extrem, BrandiMatt and Mattlatex produced. For this EPD the

impact of the white color was calculated which gives a conservative estimate of the impact of the products.

For the placing on the market in the EU no harmonizing provisions exist.

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

Application

Sigma Coatings matt interior wall paints can be applied using a roller, brush, or by spray application techniques.

They are suitable for application on all surfaces in interior living and working areas. These include (but are not limited to):

- Plaster board
- Gypsum plaster
- Ingrain wall paper (*Rauhfaser*)
- Wall Paper
- Structured wall paper (*Strukturtapeten*)

- Glass fibre wall coatings (*Glasfasergewebe*)

The product is suitable for both new uncoated substrates and renovation projects where coating of previously painted surfaces is required.

Sigma Coatings matt interior wall paints are not recommended for exterior application, nor are they recommended for application in wet areas.

The substrate should be dry, solid and free of contaminants. Porous, crumbly, and absorbent surfaces should be pre-treated with a primer. Water soluble contaminants should be removed as much as possible. For best results surfaces contaminated with water soluble substances will benefit from the application of a stain isolating primer.

For best results the temperature of the surrounding environment and/or substrate should be above 5°C and less than 25°C.

Technical Data

Constructional data

Name	Value	Unit
Density	1300 - 1600	kg/m ³
Solids content /DIN EN ISO 3251:2008-06/	50 - 64	%
Water vapor diffusion equivalent air layer thickness (N/A)	-	m
Water vapour diffusion resistance factor (N/A)	-	-
Whiteness /ISO 11475:2004/	73 - 84	-
Brightness (N/A)	-	-
Gloss (at 60 degrees) /DIN EN ISO 2813:2015-02/	<5	%
Viscosity	4 - 5	m ² s ⁻¹
Colour change to BFS no. 26 (N/A)	-	-
Lifting strength (N/A)	-	N/mm ²
Salt spray resistance (N/A)	-	-
Sulphur dioxide and moisture condensation test (N/A)	-	-
Accelerated weathering (N/A)	-	-
Outdoor weathering (N/A)	-	-
Curing time (time to recoat at 20 degrees and 65% RH)	4	h
Curing temperature (N/A)	-	°C
Theoretical spreading rate in accordance to the layer thickness (µm) (Dry layer thickness)	-	m ² /kg
Hardness test (N/A)	-	mm
Mandrel bending test (N/A)	-	-
Indentation hardness (N/A)	-	-
Sound absorption coefficient (N/A)	-	%
Opacity /EN 13300/	Class 1 - 2	

LCA: Calculation rules

Declared Unit

The declared unit for the calculation is 1 kg of Sigma Coatings interior matt wall paints.

Declared unit

Name	Value	Unit
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Abrasion Resistance /EN 13300/	Class 2 - 3	
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Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

Base materials / Ancillary materials

Sigma Coatings matt interior wall paints comprise the following substances:

Name	Value	Unit
Inorganic fillers	15-50	%
Titanium Dioxide	5-20	%
Polymer	5-10	%
Water	35-70	%
Biocide	<0.5	%
Additives	0.5-1	%

This product/article/at least one partial article contains substances listed in the candidate list of substances of very high concern (SVHC) for authorisation (date: 27.06.2018) exceeding 0,1 percentage by mass:

NO

This product/article/at least one partial article contains other Carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass:

NO

Biocide products were added to this construction product or it has been treated with biocide products:

YES

The biocides included in this product and their function are:

- 2-methyl-4-isothiazolin-3-one (In-can)
- Benzothiazolone (In-can)
- Isothiazolone solution (In-can)
- 3-iodo-2-propynyl butyl carbamate (Dry film)
- Tetramethylol acetylenediurea (In-can)

Information on hazardous substances (if any) contained in this product can be found in the product specific Safety Data sheet. The latest version is available at the Sigma Coatings Website:

<https://www.sigmacoatings.de/sigmacoatings/produkte/innenwand/>

Reference service life

The RSL is dependent on the application scenario which has not been defined in this EPD. Therefore, no RSL is declared.

Gross density	1400 - 1550	kg/m ³
Declared unit	1	kg

System boundary

The system boundaries of the product LCA follow the modular design defined by /EN15804/. This cradle-to-gate with options study includes the Product stage (A1-A3).

A1 - Raw materials. This module includes all operations immediately up to the point before the products leave the gate of the supplier. Included in this module are:

- Extraction of the raw materials.
- Transport of the materials from the point of extraction to the site of processing, and any on-site or intermediate transport.
- Processing of the raw materials including the impact of the energy requirements and waste processing.

A2 -Transport of raw materials from the suppliers site to the product manufacturing site. This includes:

- The production of fuel and emissions for fuel consumption for the operation of the vehicle .
- An allocation for the construction, maintenance and disposal of the vehicle at the end of its life.
- An allocation for the construction and maintenance of road infrastructure.

A3 - This module includes all the activities involved in the production of Sigma Coatings interior matt wall paints. This includes:

- Energy requirements for processing.
- Disposal of any waste generated in the production process.
- Emissions, both direct and indirect, during the production process.
- The extraction of raw materials and processing into the final product for any packaging used.

A4 - Transport of packaged product to site of application. This includes:

- The production and emissions for fuel consumption for the operation of the vehicle including.
- An allocation for the construction, maintenance and disposal of the vehicle at the end of its life.
- An allocation for the construction and maintenance of road infrastructure.

A5 – Application Process. This includes:

- The manufacture of application tools and other ancillary materials including their raw materials and processing.
- Transport of the application tools and other ancillary materials from the site of manufacture to the site of installation.

- Life-cycle impacts of losses due to spills and residual product in packaging.
- Disposal of packaging.
- Disposal of waste from spills and residual product in packaging.
- Any direct volatile organic compound (VOC) emissions to the environment during drying of the coating.

C1 – Demolition Stage. This includes:

- An allocation for the construction, maintenance and disposal of the demolition machinery at the end of life.
- The production and emissions for fuel consumption for the operation of the vehicle during demolition.
- An allocation for the construction, maintenance and disposal of the demolition machinery at the end of life.

C2 - Transport at End of Life. This includes:

- The production and emissions for fuel consumption for the operation of the vehicle including.
- An allocation for the construction, maintenance and disposal of the vehicle at the end of its life.
- An allocation for the construction and maintenance of road infrastructure.

C4 - Disposal. This includes:

- Construction and maintenance of landfill site.
- Direct environmental emissions from landfill site.

Impact indicators were calculated using /SimaPro V.8.4/.

To calculate the impact categories the characterisation factors published in /EN 15804:2012+A1: 2013/ (Annex C) were used. These characterisation factors were published as the "baseline" by /CML/ (Institute of Environmental Sciences, Faculty of Science, University of Leiden, Netherlands) in the 2012 version.

Upstream data was modelled using the /Ecoinvent/ LCI database version 3.3 using the *Allocation, cut-off by classification* dataset.

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

The information declared in this EPD is for 1 kg of Sigma Coatings interior matt wall paints, and as such the following scenarios are considered for 1kg product.

Transport to the building site (A4)

Transport is assumed to be via a EURO4 freight lorry 16-32 tonnes.

The transport distance is based on the assumptions of the /EeB Guide/.

Name	Value	Unit
Transport distance	300	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	1400 - 1550	kg/m ³
Fuel Consumption	37.4	g/100km

Installation into the building (A5)

The installation of a product is very dependent on a number of factors such as the application tool, the area to be applied, etc.

For the purpose of the study it will be assumed that the coating is being applied to an interior wall substrate by roller and the paint is decanted into a roller tray to apply the paint to the roller. To protect the floor from spatter and spills a disposable plastic sheet is used.

It is assumed the entire paint job will be a room approximately 4m by 5m and 2.5 m high, thus 50 m² (doors and windows ignored). It is assumed that one plastic sheet shall be sufficient to protect the floor from drops and spills for the entire job, and that the roller and roller tray will be disposed of after completion of the job.

It is assumed 1% of the product will be lost during the application stage due to spills and residual product in the bucket.

Due to the different spreading rate for the product and the defined area of the job, different quantities of tools and ancillary materials are required to apply the product when considering the declared unit of 1 kg. The ranges of the amounts of materials required are indicated in the table below. These are expressed as ranges derived from the individual values determined for each product covered in this EPD.

Name	Value	Unit
VOC in the air	<0.0002	kg
Roller for application (Supply and disposal)	90-115	g
Polypropylene sheeting for application (Supply and disposal)	95-120	g
Polypropylene roller tray (Supply and disposal)	170-220	g
Application losses from drips, spills and residual product in packaging (Assume 3% landfill and 97% incineration)	1	%
Disposal of polypropylene primary packaging (Assume % landfill, 79% incineration with energy recovery, 18% incineration without energy recovery).	310-370	g
Disposal of wooden pallet (Assume 25% recycling, 59%	400-435	g

incineration with energy recovery, 13% incineration without energy recovery and 3% landfill).		
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Exported energy is based on lower calorific values of the materials incinerated. Partition of energy between thermal and electrical is based on the ratio used in the Ecoinvent model for the incineration of the material.

The reference service life for a coatings product is very dependent on the area of application (walls in busy areas, ceilings, etc.). For this reason no reference service life is claimed and no maintenance or replacement activities (B1-B4) are included in the analysis. The LCA results for the scenarios in this EPD are therefore calculated for "1 kg of paint for the duration of its service life".

End of life (C1-C4)

Interior wall paints generally stay on the site of application until the end of life of the building. At the end of life of the building the paint is not removed but becomes part of the demolished building waste. For this study it is assumed the mineral substrate is landfilled.

Transport distance for waste (30 km) is based on the assumptions of the /EeB Guide/.

Name	Value	Unit
Collected as mixed construction waste	0.52 - 0.62	kg
Landfilling	0.52 - 0.62	kg

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	MND	X	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg Sigma Coatings interior matt wall paints

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4
Global warming potential	[kg CO ₂ -Eq.]	1.32E+0	5.21E-2	3.41E-1	1.26E-4	2.75E-3	4.97E-2
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.69E-7	9.76E-9	7.17E-9	2.20E-11	5.15E-10	1.47E-9
Acidification potential of land and water	[kg SO ₂ -Eq.]	1.15E-2	2.03E-4	6.53E-4	9.30E-7	1.07E-5	3.16E-5
Eutrophication potential	[kg (PO ₄) ³⁻ -Eq.]	8.21E-4	3.65E-5	7.78E-5	1.99E-7	1.93E-6	7.54E-6
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.15E-3	2.92E-5	1.21E-4	1.46E-7	1.54E-6	1.37E-5
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	8.89E-6	1.64E-7	1.62E-7	7.00E-11	8.62E-9	7.21E-9
Abiotic depletion potential for fossil resources	[MJ]	1.90E+1	7.92E-1	3.59E+0	1.79E-3	4.18E-2	1.26E-1

RESULTS OF THE LCA - RESOURCE USE: 1 kg Sigma Coatings interior matt wall paints

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4
Renewable primary energy as energy carrier	[MJ]	1.79E+0	1.18E-2	9.74E-1	1.49E-5	6.22E-4	3.91E-3
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	-8.02E-1	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	2.68E+0	1.18E-2	1.72E-1	1.49E-5	6.22E-4	3.91E-3
Non-renewable primary energy as energy carrier	[MJ]	1.81E+1	8.11E-1	5.46E+0	1.81E-3	4.27E-2	1.35E-1
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0	-1.41E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	2.13E+1	8.11E-1	4.05E+0	1.81E-3	4.27E-2	1.35E-1
Use of secondary material	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	2.54E-2	1.52E-4	2.27E-3	2.83E-7	8.03E-6	1.59E-4

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

1 kg Sigma Coatings interior matt wall paints

Parameter	Unit	A1-A3	A4	A5	C1	C2	C4
Hazardous waste disposed	[kg]	2.02E-1	4.78E-4	8.01E-3	1.69E-6	2.52E-5	1.17E-4
Non-hazardous waste disposed	[kg]	7.77E-1	4.22E-2	5.02E-2	1.10E-5	2.23E-3	5.69E-1
Radioactive waste disposed	[kg]	7.47E-5	5.57E-6	4.82E-6	1.23E-8	2.94E-7	8.91E-7
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	1.06E-2	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	5.25E-1	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	1.07E+0	0.00E+0	0.00E+0	0.00E+0

References

/IBU 2016/

IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.
www.ibu-epd.de

/ISO 14025/

DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/

/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product

Declarations — Core rules for the product category of construction products

/PCR Part A (Version 1.7)/

Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements on the project report. Version 1.7; 03-2018

/PCR Part B (Version 1.1)/

Institut Bauen und Umwelt e.V.: Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Coatings with organic binders. Version 1.1, 08.09.2017.

/SimaPro/

SimaPro LCA software developed by PRé
www.pre-sustainability.com

/Ecoinvent/ Life Cycle Inventory Database

www.ecoinvent.org

/Institute of Environmental Science, Leiden (CML)/

<http://www.cml.leiden.edu/>

/DIN EN ISO 3251:2008-06/

DIN EN ISO 3251:2008-06: Paints, varnishes and plastics - Determination of non-volatile-matter content (ISO 3251:2008); German version EN ISO 3251:2008.

/ISO 11475:2004/

ISO 11475:2004: Paper and board -- Determination of CIE whiteness, D65/10 degrees (outdoor daylight)

/DIN EN ISO 2813:2015-02/

DIN EN ISO 2813:2015-02: Paints and varnishes - Determination of gloss value at 20°, 60° and 85° (ISO 2813:2014); German version EN ISO 2813:2014.

/EN 13300:2001/

European Committee For Standardization: Paints and varnishes. Water-borne coating materials and coating systems for interior walls and ceilings. Classification. 2001.

/REACH/

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

/EeBGuide Project/

Operational Guidance for Life Cycle Assessment Studies of the Energy Efficient Buildings initiative
<http://www.eebguide.eu>

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