ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	VdL - Verband der deutschen Lack- und Druckfarbenindustrie e.V.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-VDL-20230163-IAG1-EN
Issue date	22.06.2023
Valid to	21.06.2028

Polyester Powder Coating

Verband der deutschen Lack- und Druckfarbenindustrie e.V.

Institut Bauen und Umwelt e.V.

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1. General Information

Verband der deutschen Lack- und Druckfarbenindustrie e.V.

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-VDL-20230163-IAG1-EN

This declaration is based on the product category rules:

Coatings with organic binders, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

22.06.2023

Valid to

21.06.2028

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Polyester Powder Coating

Owner of the declaration

VdL - Verband der deutschen Lack- und Druckfarbenindustrie e.V.
Mainzer Landstraße 55
60329 Frankfurt a. M.
Germany

Declared product / declared unit

1 kg polyester-based powder coating

Scope:

This association EPD applies to a specific polyester-based powder coating customary in the industry of the member companies of the Verband der deutschen Lack- und Druckfarbenindustrie e.V. (VdL). All the companies of the VdL's powder coatings specialist group mentioned in section 8 participated in the preparation of the Life Cycle Assessment for this association EPD. In terms of number, they represent 100% of the powder coatings manufacturers in the VdL.
The declared formulation describes an industry-standard powder coating with corresponding pigment and titanium dioxide contents as listed in section 2.5. The data relating to the declared unit results from the survey of powder coating manufacturers in the VdL. The members of the VdL are primarily based in Germany which is why Germany was used as a geographic reference in the EPD. Two of the manufacturing companies have their production facilities in Austria and Switzerland, respectively. The validity of this EPD for Austrian and Swiss production is outlined in section 3.3.

This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-VDL-20230163-IAG1-DE. The verifier has no influence on the quality of the translation.
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.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Matthias Schulz,
(Independent verifier)

2. Product

2.1 Product description/Product definition

This Environmental Product Declaration declares a specific polyester powder coating that is customary in the industry and is produced by the powder coating manufacturers (DACH region) organised in the Verband der deutschen Lack- und Druckfarbenindustrie e.V. (VdL). The formulation was determined on the basis of a survey of the powder coating manufacturers in the VdL.
The powder coating under review is an organic-based, thermally-hardening, duroplastic coating material which complies with the state of the art. The powder coating comprises polyester resin with the corresponding curing agent, additives, suitable filler and weather-resistant pigments. The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical regulations based on these regulations.

2.2 Application

The polyester powder coating under review here satisfies the requirements concerning weathering stability and therefore offers long-term protection in outdoor applications. This powder coating is primarily used for coating aluminium and steel for construction purposes in accordance with *EN 12206-1* and the specifications of the relevant quality associations, i.e. wherever attractive durable colours are required. In the construction sector, it can be primarily found in the area of bulk coatings for facade elements, window frames and doors.

2.3 Technical Data

The powder coating film described and applied in accordance with the specifications of the applicable technical data sheet (coating thickness, curing conditions) displays the following technical properties:

Name	Value	Unit
Density ISO 8130-2	1.2 - 1.7	kg/m^3
Solids content ISO 3251	100	%
Gloss measuring angle 60° ISO 2813*	20 - 90	GU (Gloss Unit)
Salt spray resistance NSS, ISO 9227*	>= 240 h, dmax 2 mm	-
Water condensation test in constant atmospheres ISO 6270-1*	>= 240 h, no bubbles	-
Permissible change in gloss. as per GSB/Qualicoat, accelerated weathering ISO 16474-3*	>= 200 h; > 50 % residual gloss	%
Curing time (powder coatings)	5 - 20	min
Curing temperature	160 - 200	°C
Theoretical spreading rate in accordance to the layer thickness (60 µm)	10 - 14	m^2/kg
Hardness test ISO 1520*	>= 2	mm
Mandrel bending test ISO 1519*	<= 10	mm

* refers to the applied and cured powder coating film on the suitable substrate

Other technical data in accordance with the *PCR: Coatings with organic binding agents* are not of relevance for the declared product.

Performance values of the product in relation to its characteristics according to the applicable technical regulation (no CE marking).

2.4 Delivery status

The powder coating under review is supplied as ground powder. The powder coating is either packed in cardboard boxes lined with polyethylene (PE) bags (contents 15–25 kg), in cardboard containers with 20–25 bags (contents 400–500 kg) or in Big Bags (contents 400–700 kg). Other containers are available on request. The various containers are generally transported on wooden pallets which can be reused. The materials used for packaging and transport should be recycled or thermally utilised where possible.

2.5 Base materials/Ancillary materials

Name	Value	Unit
Binding agents (resins and hardeners)	70	%
Pigments (coloured and effect pigments)	3	%
Titanium dioxide	15	%
Extenders	10	%
Additives	2	%

The Declaration refers to the above composition of powder coating.

1) The product contains substances on the *ECHA Candidate List* of 10.06.2022 of Substances of Very High Concern (SVHC) for authorisation above 0.1% by mass: no.

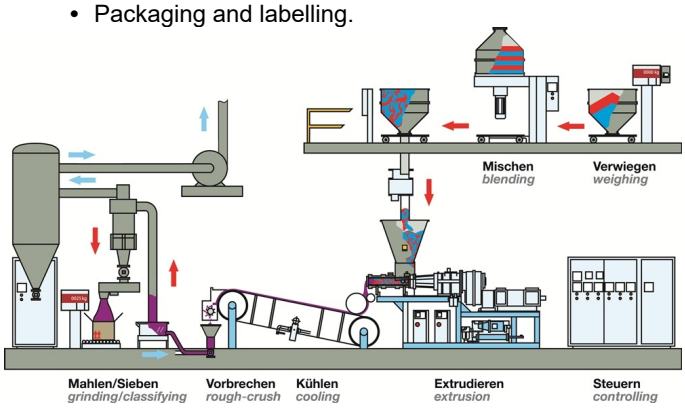
2) The product contains other CMR substances of category 1A or 1B, which are not on the *ECHA Candidate List* of 10.06.2022, above 0.1% by mass in at least one sub-product: no.

3) Biocidal products have been added to the present building product or it has been treated with biocidal products (it is thus a treated product within the meaning of the *Biocidal Products Regulation*): no.

2.6 Manufacture

Manufacturing a powder coating involves the following processing steps:

- Weighing of the raw materials
- Mechanical premixing
- Melt homogenisation in the extruder
- Rolling, cooling and crushing of the extrudate into chips
- Grinding and sieving
- Packaging and labelling.



2.7 Environment and health during manufacturing

In order to ensure protection of the environment and health, the following environmental management systems and legal specifications are considered within the framework of the manufacturing process.
Typical environmental management systems (specific details can be requested from the respective manufacturer):

- *ISO 14004*: General guidelines on principles, systems and supporting the techniques
- *ISO 14001:* International standard for specifying and implementing environmental requirements
- *EMAS Regulation and EC Eco-Audit Regulation:* voluntary participation of organisations in a Community eco-management and audit scheme.

As the manufacturing process does not include solvents, no foul air emissions are incurred.

Dust emissions are prevented by state-of-the-art filter technology.

The water used for cleaning the plants is cleaned and, where possible, redirected to the water cycle.

No soil contamination occurs.

Storage and handling of the raw materials, intermediates and finished products takes consideration of statutory guidelines.

Noise-generating aggregates are exclusively used in noise-insulating form with the result that the national limit values are maintained or fallen short of.

Reducing energy requirements per manufacturing unit is permanently pursued within the framework of an environmental or energy management system.

The use of substances classified as hazardous is avoided as far as technically possible. If the use of hazardous substances is technically necessary, it is ensured that the maximum occupational limit values are fallen short of and all statutory protective measures are taken into consideration.
Marking associated with hazardous substances is regulated by *CLP Regulation*. The handling of hazardous substances is regulated by occupational health and safety regulations.

As a general rule, the principle of avoidance, reduction and legally-compliant disposal applies for waste.

The relevant legal specifications governing fire safety and explosion protection are maintained.

All employees are trained at regular intervals on the contents of the items listed above.

2.8 Product processing/Installation

In its corresponding formulation, the powder coating under review can be processed on all coating systems available on the market using corona or tribo charging.
Effect powder coatings are usually processed by means of corona charging.

Guidelines to be considered:

- VDE provisions and the corresponding European standards *EN 16985*.

Powder coatings do not contain any solvents.

The overspray can be recovered and re-used using the corresponding plant technology.

2.9 Packaging

The powder coating under review is usually packed in cardboard containers lined with PE bags or in Big Bags. The various containers are generally transported on wooden pallets which can be reused. The materials used for packaging and transport should be recycled or thermally utilised where possible.

2.10 Condition of use

In buildings, powder coatings are used as coatings on facades, metallic surfaces or similar. Powder-coated surfaces display a stable and constant composition during use. The decorative and practical properties displayed by powder coatings in interior or exterior applications permit a long service life on the part of the coated objects.

2.11 Environment and health during use

When powder coatings are processed as designated by the manufacturer and taking consideration of the applicable safety information, no negative impacts are to be anticipated for man or the environment in accordance with the current state of knowledge.

2.12 Reference service life

When processed as designated and taking consideration of the information supplied by the manufacturer (cleaning recommendations, potential restrictions concerning areas of application), the service life of powder-coated surfaces complies with the service life of the coated parts.

2.13 Extraordinary effects

Fire

In line with *EN 13501-1*, powder-coated construction products are 'non-homogenous construction products'. The powder coating and/or coating manufactured is defined as a 'non-substantial component' of the construction product. Reaction to fire must be examined individually and classified in a fire class by the manufacturer of the manufactured product.

Water

When the powder coating is processed as designated, a hazard to water is not to be anticipated in accordance with the current state of knowledge in the event of unforeseen contact with water.

Mechanical destruction

In terms of mechanical destruction, powder coatings comply with the requirement profile of the coated parts. Negative impact on the environment in the event of unforeseen mechanical destruction is not to be anticipated.

2.14 Re-use phase

Material reuse of hardened powder coatings is not possible. Powder coatings can be removed using mechanical, chemical and thermal processes. Powder coatings removed by mechanical or chemical processes can then be directed to approved plants following thermal utilisation.

2.15 Disposal

Waste code in accordance with *EWC*: 080112 or 080201. The EWC to be applied is to be specified by the waste producer.

Possible disposal methods for powder coating waste are:
1. Material utilisation, e.g. in composite materials
2. Thermal utilisation in approved systems.

2.16 Further information

More detailed information on the powder coating under review can be found in the respective product information, safety data

sheets and on the product manufacturers' websites.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 kg.
The Declaration is based on an industry-standard specific formulation for a powder coating with polyester resin as the main component.

Details on declared unit

Name	Value	Unit
Declared unit	1	kg

With regard to the variability of the production process, the geographical representativeness, and the influence of background data and preliminary products compared to the environmental impacts caused by the actual production, the results can be considered robust.

The formulations are the same for all companies. Minimal variances result only from the use of different colour pigments (3%). All other basic materials are the same.

3.2 System boundary

Type of EPD: cradle to factory gate with Modules C1–C4 and Module D (A1–A3, C, D).

The LCA includes the provision of raw materials (Module A1), transport to the production site (Module A2), and the manufacturing processes of the powder coating, including packaging (Module A3).

The coating process is not the subject of the study.

Only the packaging material contains biogenic carbon. At the end of life, the product is transported for disposal (Module C2) and subsequently disposed of (Module C4).

3.3 Estimates and assumptions

Data sets on the upstream chains associated with manufacturing basic materials are taken from the GaBi database. Materials for which there are no inventories available are approximated with data sets of similar chemicals or estimated by merging available data sets.

The German residual grid mix (without renewable energies with guarantee of origin) used in the production phase represents a worst-case scenario for most environmental indicators, so that the scope of this EPD also includes Austria and Switzerland in addition to Germany. This is due to the slightly higher potential environmental impacts of the German residual grid mix (without renewable energies with guarantee of origin) compared to the impacts of the residual grid mixes for Austria and Switzerland. This methodical approach ensures the validity of the EPD for production in any one of these three countries.

3.4 Cut-off criteria

All operating data, i.e. all of the starting materials used in accordance with the formulation, transport thereof to the plant, the thermal and electrical energy used, packaging materials, all direct production waste as well as all emission measurements available were taken into consideration in the analysis. Accordingly, material and energy flows with a share of less than one per cent were also considered. Machinery, plants and infrastructure required in the manufacturing process were not considered.
Transport expenses for packaging and cleaning granulate are not taken into account.
Likewise special waste accounting for 0.03% and internally recycled powder coating accounting for 0.66% are cut off.

3.5 Background data

The software system for holistic balancing *GaBi* Software ts 10.6.2.9 developed by Sphera GmbH is used for modelling the life cycle of the declared product. The respective database is GaBi 2022, version 2022.2.

3.6 Data quality

The data quality can be regarded as good. The primary data was collated in full taking consideration of all relevant flows. The background data was taken from the *GaBi* databases. The databases were last updated in 2022.

Declared formulation: a specific composition is declared in the EPD. This composition reflects the declared product and was already determined in 2016 on the basis of a survey of member companies and confirmed again for 2022.

3.7 Period under review

Collation of the primary data refers to the period 2021 (annual average).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

3.9 Allocation

Primary data:
The production process does not produce any by-products. Accordingly, no resources or environmental loads were allocated to ancillary products in the LCA model on which the LCA is based.

Background data:
The data sets used are listed in the background report. The allocation methods used in background data (materials and energy) originating from the *GaBi* 2022 databases are documented online at http://www.gabi-software.com/deutsch/support/gabi/.

3.10 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. The background data comes from the *GaBi* database with GaBi ts software version CUP 2022.2.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The calculation of the biogenic carbon content is based on the assumption that the absolutely dry wood and board mass consists of 50% biogenic carbon.
None of the products investigated contains biogenic carbon. Only the packaging material contains biogenic carbon.

The product is declared including 0.029 kg paper packaging, 0.005 kg PE film and 0.036 kg wood.

End of Life (C1–C4)

- Module C1: Manual deconstruction (no environmental loads)
- Module C2: An average transport distance of 50 km by truck is assumed.
- Module C4: As a disposal scenario, it is assumed that powder coating that is on the metal surface during disposal is thermally disposed of when the metal is recycled (melting/incineration). No credits were considered for incineration based on energy substitution, only the resulting emissions.

Name	Value	Unit
For thermal utilisation without energy recovery	1	kg

Reuse, recovery and recycling potential (D), relevant scenario details

Module D is declared. However, since no benefits are generated for the next product systemof Module A5 or Module C4, it was set to 0.

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg polyester powder coating

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	4.48E+00	0	4.31E-03	0	2.3E+00	0
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	4.45E+00	0	4.12E-03	0	2.3E+00	0
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	2.76E-02	0	1.91E-04	0	2.01E-04	0
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	4.75E-04	0	6.71E-08	0	1.18E-05	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.38E-11	0	6.26E-16	0	3.33E-13	0
Acidification potential of land and water (AP)	mol H^+ eq	6.97E-03	0	1.34E-05	0	6.75E-04	0
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1E-05	0	8.56E-10	0	8.81E-08	0
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.87E-03	0	6.45E-06	0	2.09E-04	0
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.01E-02	0	7.08E-05	0	3.22E-03	0
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	7.4E-03	0	1.24E-05	0	5.44E-04	0
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	5.74E-07	0	2.29E-10	0	8.13E-09	0
Abiotic depletion potential for fossil resources (ADPF)	MJ	9.08E+01	0	5.77E-02	0	5.76E-01	0
Water use (WDP)	m^3 world eq deprived	1.51E-01	0	4.73E-06	0	2.34E-01	0

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg polyester powder coating

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	6.57E+00	0	3.35E-04	0	1.21E+00	0
Renewable primary energy resources as material utilization (PERM)	MJ	1.05E+00	0	0	0	-1.05E+00	0
Total use of renewable primary energy resources (PERT)	MJ	7.62E+00	0	3.35E-04	0	1.56E-01	0
Non renewable primary energy as energy carrier (PENRE)	MJ	7.38E+01	0	5.78E-02	0	1.76E+01	0
Non renewable primary energy as material utilization (PENRM)	MJ	1.7E+01	0	0	0	-1.7E+01	0
Total use of non renewable primary energy resources (PENRT)	MJ	9.08E+01	0	5.78E-02	0	5.76E-01	0
Use of secondary material (SM)	kg	0	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m^3	1.91E-02	0	2.85E-07	0	5.52E-03	0

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg polyester powder coating

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	1.85E-08	0	1.93E-13	0	6.14E-11	0
Non hazardous waste disposed (NHWD)	kg	8.76E-02	0	6.95E-06	0	4.88E-02	0
Radioactive waste disposed (RWD)	kg	1.26E-03	0	5.13E-08	0	1.72E-05	0
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	0	0
Exported thermal energy (EET)	MJ	0	0	0	0	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kg polyester powder coating

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	6.97E-08	0	7.17E-11	0	3.68E-09	0
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	1.59E-01	0	4.6E-06	0	1.7E-03	0
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	5.73E+01	0	4.59E-02	0	2.19E-01	0

Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	1.79E-09	0	8.61E-13	0	2.36E-11	0
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	1.63E-07	0	4.33E-11	0	1.5E-09	0
Soil quality index (SQP)	SQP	1.49E+01	0	2.51E-04	0	1.62E-01	0

Limitation note 1 – applies to the indicator 'Potential impact from human exposure to U235'. This impact category mainly addresses the potential effect of low-dose ionising radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposure, nor does it consider effects due to the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

Limitation note 2 – applies to the indicators: 'Potential for depletion of abiotic resources – non-fossil resources', 'Potential for depletion of abiotic resources – fossil fuels', 'Water depletion potential (user)', 'Potential toxicity comparison unit for ecosystems', 'Potential toxicity comparison unit for humans – carcinogenic effect', 'Potential toxicity comparison unit for humans – non-carcinogenic effect', 'Potential soil quality index'. The results of this environmental impact indicator need to be used with caution as the uncertainties in these results are high or as there is limited experience with the indicator.

6. LCA: Interpretation

The loads in the production phase are dominated by the upstream chain associated with the raw material supply. The use of ancillaries and energy has a minor influence. Transport has a negligible influence. The environmental loads within raw material supply (A1) are primarily dominated by the binding agent and titanium dioxide in the various environmental impact categories. As in all other impact categories, the binding agent is the main cause of Acidification Potential of Soil and Water (AP) and Abiotic Depletion Potential of non-fossil resources (ADP elements).

The End-of-Life scenario (C4), which considers the waste incineration plant process, also shows relevant impacts.

7. Requisite evidence

The powder coating outlined in this EPD is used in interior applications, among others. Evidence in terms of consumer protection inside buildings is not of relevance for powder coatings as they involve preliminary products which are only used following application on a substrate in the building.

8. References

Standards:

EN 12206-1
DIN EN 12206-1:2021-07, Paints and varnishes – Coating of aluminium and aluminium alloys for architectural purposes – Part 1: Coatings prepared from thermosetting coating powder

EN 13501-1
DIN EN 13501-1:2019-05, Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests

EN 15804
DIN EN 15804:2022-03, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

EN 16985
DIN EN 16985:2019-04, Spray booths for organic coating material – Safety requirements

ISO 1519
DIN EN ISO 1519:2011-04, Paints and varnishes – Bend test (cylindrical mandrel)

ISO 1520
DIN EN ISO 1520:2007-11, Paints and varnishes – Cupping test

ISO 2813
DIN EN ISO 2813:2015-02, Paints and varnishes – Determination of gloss value at 20 degrees, 60 degrees and 85 degrees

ISO 3251
DIN EN ISO 3251:2019-09, Paints, varnishes and plastics – Determination of non-volatile matter content

ISO 6270-1
DIN EN ISO 6270-1:2018-04, Paints and varnishes – Determination of resistance to humidity – Part 1: Condensation (single-sided exposure)

ISO 8130-2
DIN EN ISO 8130-2:2021-10, Coating powders – Part 2: Determination of density by gas comparison pycnometer (referee method)

ISO 9227
DIN EN ISO 9227:2017-07, Corrosion tests in artificial atmospheres – Salt spray tests

ISO 14001
DIN EN ISO 14001:2015-11, Environmental management systems – Requirements with guidance for use

ISO 14004
DIN EN ISO 14004:2016-08, Environmental management systems – General guidelines on implementation

ISO 16474-3
DIN EN ISO 16474-3:2021-04, Paints and varnishes – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps

Other sources:

Biocidal Products Regulation
Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

CLP Regulation

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006

ECHA Candidate List
Candidate List of Substances of Very High Concern for Authorisation (ECHA Candidate List), dated 10.06.2022, published in accordance with Article 59 (10) of the REACH Regulation. Helsinki: European Chemicals Agency.

EC Eco-Audit Regulation
Regulation (EC) No. 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No. 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC

EMAS Regulation
Regulation (EC) No. 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

EWC
European Waste Code (EWC), No. 080112 – paint and varnish waste with the exception of those covered by 08 01 11, European Waste Code (EWC), No. 080201 – Coating powder waste, Regulation on the European Waste Catalogue (EWC) dated 10 December 2001

GaBi documentation
GaBi life cycle inventory data documentation; https://www.gabisoftware.com/support/gabi/gabidatabase2020lcidocumentation/

GaBi
Sphera Solutions GmbH, GaBi Software System and Database for Life Cycle Engineering, CUP version: 2022.2, University of Stuttgart, Leinfelden Echterdingen

IBU 2021
General EPD range instructions of Institut Bauen und Umwelt e.V. (IBU), version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021; www.ibu-epd.com

PCR, Part A
Product Category Rules for building-related products and services. Part A: Calculation rules for the Life Cycle Assessment and requirements on the Project Report, Berlin: Institut Bauen und Umwelt e.V. (pub.), version 1.3, 08/2022 (www.ibu-epd.com)

PCR: Coatings with organic binding agents
Product Category Rules for building-related products and services. Part B: Requirements on the EPD for coatings with organic binding agents, Institut Bauen und Umwelt e.V., www.ibu-epd.com, version 1, 04/2023.

The specialist group for powder coatings of the Verband der deutschen Lack- und Druckfarbenindustrie e.V. (German Paint and Printing Ink Industry Association (VdL)), which is made up of the following companies, was involved in the preparation of the EPD:

Akzo Nobel Powder Coatings GmbH, production sites: Arnsberg, Reutlingen

Axalta Coating Systems Germany GmbH, production site: Essenbach-Altheim

CWS Powder Coatings GmbH, production site: Düren

Emil Frei GmbH & Co. KG, production site: Bräunlingen-Döggingen

Ganzlin Beschichtungspulver GmbH, production site: Ganzlin

Helios Coatings Deutschland GmbH, production site: Buchholz

INVER GmbH, production sites: none in DACH

Karl Bubenhofer AG Farbenfabrik, production site: Arnegg (CH)

Karl Wörwag Lack- und Farbenfabrik GmbH & Co. KG, production sites Renningen

RIPOL GmbH, production sites: none in DACH

TIGER Coatings GmbH & Co. KG, Pproduction site: Wels (A)

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