



DeepL

Subscribe to DeepL Pro to translate larger documents.

Visit [www.DeepL.com/pro](http://www.DeepL.com/pro) for more information.

# ENVIRONMENTAL PRODUCT DECLARATION

according to ISO 14025 and EN 15804+A2

Declaration holder	HD Wahl GmbH / ict GmbH
Publisher	Institute Building and Environment e.V. (IBU)
Programme holder	Institute Building and Environment e.V. (IBU)
Declaration number	EPD-HDW-20210299-IAE1-DE
Date of issue	15.09.2022
Valid until	14.09.2027

Plastic coating **Duraflon®** for factory finishing of aluminium and steel components

HD Wahl GmbH / ict GmbH



[www.ibu-epd.com](http://www.ibu-epd.com)



## 1. general information

<p><b>HD Wahl GmbH / ict GmbH</b></p> <p><b>Programme holder</b> IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p>	<p>Duraflon®</p> <p><b>Holder of the declaration</b> HD Wahl GmbH Dieselstr. 6-8 89343 Jettingen-Scheppach</p> <p>ict GmbH Rheinpromenade 9 40789 Monheim on the</p>
<p><b>Declaration number</b> EPD-HDW-20210299-IAE1-DE</p>	<p><b>Declared product/declared unit</b> Duraflon® applied to 1 m<sup>2</sup> surface, corresponding to 0.125 kg wet paint (conversion to 1 kg with factor 8).</p>
<p><b>This declaration is based on the product category rules:</b> Coatings with organic binders, 01.2019 (PCR tested and approved by the independent German Council of Economic Experts (SVR))</p>	<p><b>Scope:</b> This Environmental Product Declaration refers to Duraflon® (GSB AL 631 Premium, AAMA 2605) as an organic plastic coating, manufactured by the company ict GmbH in Düsseldorf and its application on components made of aluminium and steel in the HD Wahl factory, Jettingen - Scheppach.</p>
<p><b>Date of issue</b> 15.09.2022</p>	<p>The owner of the declaration is liable for the underlying information and evidence; any liability of the IBU with regard to manufacturer information, LCA data and evidence is excluded. The EPD was prepared according to the specifications of EN 15804+A2. In the following, the standard is simplified as EN 15804 designated.</p>
<p><b>Valid until</b> 14.09.2027</p>	<p><b>Verification</b></p> <p>The European Standard EN 15804 serves as the core PCR Independent verification of the declaration and claims</p> <p><input type="checkbox"/> intern <input checked="" type="checkbox"/></p>
<p></p> <p>Dipl. Ing. Hans Peters (Chairman of the Board of the Institut Bauen und Umwelt e.V.)</p>	<p></p> <p>Matthias Klingler, Independent Verifier</p>
<p></p> <p>Dr Alexander Röder (Managing Director of Institut Bauen und Umwelt)</p>	

## 2. product

### 2.1 Product description/Product definition

Duraflon is a highly weather-resistant, virtually maintenance-free paint surface based on organic fluoropolymer binders and special heat- and light-resistant pigments. Only colour pigments are used that have previously been tested for 10 years in Florida for suitability for outdoor construction use. The representative product type includes both the essential shares of white lacquers (50 % of the production volume) and metallic lacquers (40 % of the production volume).

Duraflon is not subject to EU harmonisation legislation. Regulation (EU) No 305/2011 (CPR) refers to construction materials. Coatings/varnishes are not mentioned. The respective national regulations at the place of use apply to the use of the product

and the technical provisions based on these regulations.

### 2.2 Application

Duraflon is ideally suited as a factory-applied liquid stove enamel for finishing steel and aluminium components and their alloys. It is used in the metal façade industry (profiles, façade elements, sun protection, etc.) for elements that have a high decorative demand.

Due to the extraordinarily good and proven resistance of fluoropolymer systems in terms of gloss and colour tone to atmospheric loads, the main area of application is in building construction with increased sustainability requirements for the metal façade.

### 2.3 Technical data

Product and test equipment monitoring is carried out in accordance with the quality guidelines *GSB AL 631 of GSB International e.V.* as well as *AAMA 2605* (American Architectural Manufacturers Association) by means of in-house and external monitoring. A quality management system according to *ISO 9001*, an environmental management system according to *ISO 14001* and an energy management system according to *ISO 50001* are in place.

#### Construction data

Designation	Value	Unit
Density	1,2 - 2,5	kg/m <sup>3</sup>
Solids content	100	%
Gloss (lacquers) ISO 2813	matte-glossy	GU
Lifting resistance (lacquers) ISO 4624	2,5 - 5	N/mm <sup>2</sup>
Salt spray resistance ISO 9227 (1000 hours)	GSB AL 631 Premium - O.K.	-
Condensation water exchange climate ISO 3231 (30 cycles/0.2 l SO <sub>2</sub> )	GSB AL 631 Premium - O.K.	-
Short-term weathering (if relevant from the application)	GSB AL 631 Premium UV B (313 nm) 1000h ≥ 90 %	-
Outdoor weathering (if from the Application relevant)	AAMA 2605-05	-
Colour retention ASTM D2244	max. 5	dE; colour bands ung 10 Years 45° South Florida
Gloss retention ASTM D523	min. 50	% Residual gloss; 10 years 45° South Florida
Chalking ASTM D4214	max. level 8	10 years 45° South Florida
Film degradation ASTM B244	max. 10	% Erosion; 10 years 45° South Florida
Curing time	≥ 20	min
Curing temperature	≥ 80	°C
Cupping test ISO 1520	GSB AL631 Premium ≥5	mm
Mandrel bending test ISO 1519	GSB AL 631 Premium ≤5	mm
Layer thickness ISO 2360	≥ 30	µm
Adhesive strength ISO 2409	GSB AL 631 Premium - GT0	-
Behaviour towards drilling and	GSB AL	

	Premium - i.O	
Mortar test ASTM C207	GSB AL 631 Premium - O.K. (incl. Metallicober-surfaces)	-
Adhesion of sealing compounds GSB AL 631	GSB AL 631 Premium - O.K.	-

Duraflon is not subject to EU harmonisation legislation. Regulation (EU) No 305/2011 (CPR) refers to construction materials. Coatings/lacquers are not mentioned.

The respective national regulations at the place of use and the technical regulations based on these regulations apply to the use of the product.

### 2.4 Delivery condition

The Duraflon coating is produced from a fluoropolymer wet paint and is a finished mixture of the raw materials to which solvents are added at the factory before application to adjust the processing viscosity.

After the stoving process, the coated components are factory-finished, VOC-free and can be further processed or assembled without restrictions.

### 2.5 Raw materials/auxiliary materials

The range of variation of the basic materials of the Duraflon coating is determined by different colour shades or the resulting different pigment volume concentrations (PVC). In any case, the composition of the Duraflon coating is 100% by weight.

Designation	Value	Unit
Fluoropolymer resin	≤ 65	Wt%
Ester mixture	≤ 30	Wt%
Crosslinker	≤ 12	Wt%
Titanium dioxide	≤ 25	Wt%
Iron oxide pigments (Fe <sub>2</sub> O <sub>3</sub> )	≤ 15	Wt%
Aluminium pigments (Al 99.5%)	≤ 15	Wt%

The following auxiliary substances and additives can be added if required:

Pyrogenic silica ≤ 1.5 %  
Acrylate Levelling agent ≤ 0.5 %

All ingredients of the preparation are pre-registered according to Regulation (EC) No 1907/2006 (REACH) and correspond to their intended use. No SVHC substances are used.

The product/product/at least part of the product contains substances on the *ECHA Candidate List of Substances of Very High Concern (SVHC)* (date 17.01.2022) above 0.1% by mass: no.

The product/product/at least one sub-product contains other CMR substances of category 1A or 1B not on the candidate list above 0.1% by mass in at least one sub-product: no.

Biocidal products have been added to the present construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No 528/2012): no.

## 2.6 Production

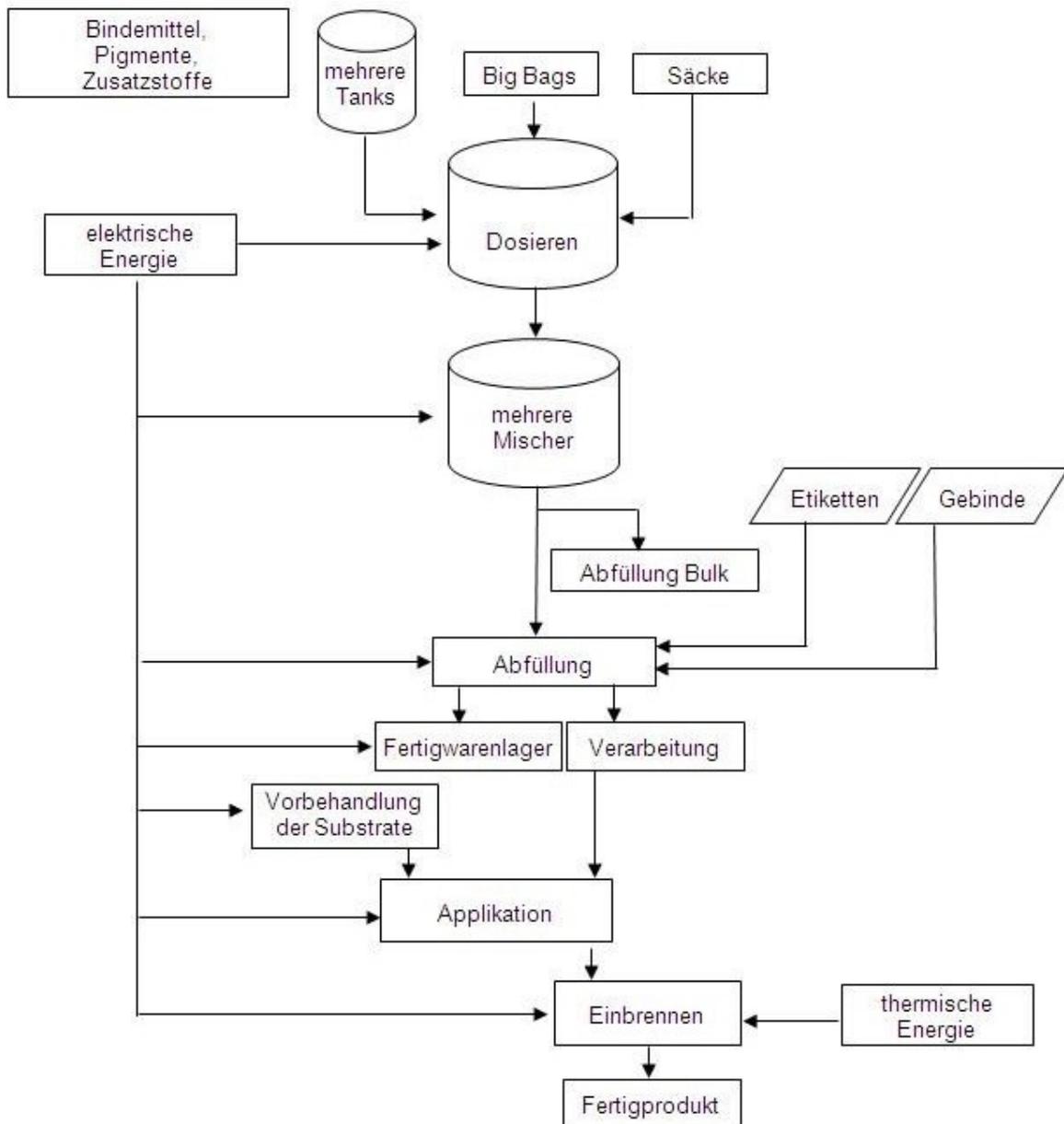
The recipes used are adapted to the respective colour shades and vary within the range described in chapter 2.5 Basic materials/auxiliary materials.

specified range. Other substances are not included.

1. Conveying the feedstock into the mixer
2. Shuffle
3. Filling, loading of the finished product and delivery

The basic materials - fluoropolymers, solvents, pigments and additives - are stored in tank farms, IBCs, big bags, drums and sacks.

Before coating, the surface is degreased, pickled and passivated. The Duraflon coating is adjusted to processing viscosity before application. The application is usually fully automatic. The coated components are dried and cross-linked in the baking oven.



## 2.7 Environment and health during production

During the entire manufacturing process, no occupational health and safety measures beyond those legally stipulated for commercial enterprises are required.

The company's health protection measures do not require any additional measures. Wherever dust can be generated during paint production in the factory, it is fed to a central filter system by means of appropriate extraction systems, taking into account the workplace limit values.

Solvent emissions: The solvent emissions

are far below the limit values specified in the *VOC Plant Directive* (31st Federal Immission Control Ordinance).

**Water/soil:** There is no pollution of water and soil. The cooling of the production equipment operates in a closed water cycle.

**Noise:** Noise protection measures are not required during paint production and application. As far as technically feasible, pure paint residues are incorporated into subsequent orders via a batch-in-batch system. Overspray in the form of dried paint residues is incinerated.

### 2.8 Product processing/installation

After the stoving process, the coated components are factory-finished, VOC-free and can be used for further processing or assembly without restrictions. The regulations of the professional associations apply.

### 2.9 Packing

In Germany, tins and steel containers that have been emptied of their residues are accepted free of charge by the collection points of the KBS system (Kreislaufsystem Blechverpackungen Stahl) and fed into a recycling process.

### 2.10 State of use

The most important component of the Duraflon surface is the fluorocarbon compound with a dissociation energy of 460 kJ/mol. Metal surfaces coated with Duraflon are characterised by unsurpassed resistance to the effects of weathering and environmentally induced contamination. Regular self-imposed tests and inspections or certifications by market-leading quality associations confirm this.

GSB: Florida 5 or 10 years

AAMA: 2605-20, Conformity

### 2.11 Environment and health during use

When used as intended according to the manufacturer's instructions, no health hazards are to be expected.

### 2.12 Reference useful life

The Duraflon surface is suitable for worldwide use without restrictions. Transport resp.

Assembly damage can be repaired with a special touch-up paint.

Duraflon is chemically inert and offers resistance to extreme environmental stresses and UV rays.

Duraflon's resistance to accumulations of dirt, fungi, spores and graffiti results in a surface with decades of surface integrity. This is of high

ecological and economic significance. Maintenance and cleaning costs in the area of the building envelope are minimised. This reduces the input of cleaning agents into the environment. Duraflon therefore contributes to the long-term stabilisation and increase of yield and market values. (Leaflet "Cleaning and care of Duraflon coated building components" available at [info@duraflon.de](mailto:info@duraflon.de)).

The estimated useful life is at least 50 years. (No calculation was made according to *ISO 15686*)

### 2.13 Exceptional effects Fire

The Duraflon surface is non-combustible and does not actively contribute to fire. The fire tests are carried out in connection with the building approval of the metal façade element in accordance with the requirements for building products (*EN 135011, A1*).

No fire class can be specified for the coating alone. A building element coated with Duraflon is understood as a non-homogeneous building product. The mass share of Duraflon in the total building element is  $\leq 1\%$  and is considered to be extremely non-substantial.

### Water

The Duraflon coating is erosion-resistant. Under the influence of water (e.g. floods), no water-polluting ingredients can be washed out.

### Mechanical destruction

The Duraflon surface is impact resistant. The requirements of GSB International and the American Architectural Manufacturers Association are fully met or exceeded.

### 2.14 Post-use phase

The recycling potential of steel and aluminium when deconstructing buildings is not impaired by the prior finishing with Duraflon.

For a typical component made of aluminium for a metal façade, the mass proportion of the coating is less than 1 % of the total weight.

(3 mm sheet thickness corresponds to 8 kg/m<sup>2</sup>; application quantity 0.125 kg Duraflon non-crosslinked, 0.0475 kg/m<sup>2</sup> crosslinked)

### 2.15 Disposal

Metal components are typically recycled.

### 2.16 Further information

[www.duraflon.de](http://www.duraflon.de)

## 3. LCA: Calculation rules

### 3.1 Declared unit

The declaration refers to the production of the required quantity, pre-treatment and application of Duraflon on 1 m<sup>2</sup> substrate.

When applying to aluminium and galvanised steel surfaces, a typical application quantity incl. losses (overspray) of 0.125 kg

Duraflon needed on one square metre of surface. Density: 1.20-2.5 kg/m<sup>2</sup>

### Indication of the declared unit

Designation	Value	Unit
Declared unit	1	m <sup>2</sup>
Order quantity	0,125	kg/m <sup>2</sup>

### 3.2 System boundary

The production site of ict GmbH for lacquer manufacturing is Düsseldorf. The factory application of the fluoropolymer coating at HD Wahl GmbH takes place in Jettingen-Scheppach. The data recorded for the foreground system refers exclusively to these locations. The background system takes into account, as far as possible and available, the geographical allocation in the upstream chain and the processing location.

The life cycle assessment calculation comprises the phases

"Cradle to factory gate (with options)":

#### Modules A1-A3

##### Manufacturing phase:

Consideration of the upstream chain, the transport of the essential base materials and the processing to the paint product incl. packaging in tinplate containers at the company ict GmbH.

##### Transport:

Transport of the packaged paint from ict GmbH to HD Wahl GmbH.

##### Processing:

The application at the HD Wahl GmbH site takes into account:

- Disposal/recycling of the packaging
- Pre-treatment of the substrates (pre-anodisation)
- Application of the coating on the substrates, incl. stoving process and thermal afterburning of the solvents

#### Modules C1-C4 and D

Module C1 describes the dismantling process. Module C2 considers the transports to the disposal processes. The system boundary for lorry transports lies on the input side with the upstream processes of the fuels and on the output side with the emissions caused (exhaust gases). Module C3 contains the necessary processes for waste treatment at the end of the product life cycle. Duraflon is essentially a plastic. Accordingly, incineration of plastic is modelled in Module C3. No benefits/loads are considered in Module D. Module C4 describes the landfilling of non-recycled components of the product at the end of life. In this case, it is assumed that no substances are landfilled.

Influences of waste are taken into account in the modules in which they occur.

Scaling takes place directly via the area relationship and can be directly related to the specific component when applying the environmental product declaration.

### 3.3 Estimates and assumptions

No primary data is available from the supplier for the production of the tetrafluoroethylene resin. For estimation purposes, a data set available in the *GaBi 10.5 database* is used.

process for the production of tetrafluoroethylene (TFE).

For the regeneration process of the solvents used for the cleaning of the mixing plants at ict GmbH, assumptions are made for the consumption of thermal and electrical energy.

The effort and the energy released for the incineration of paint waste with low solvent residues at ict GmbH and the incineration of solvents produced at HD Wahl GmbH after the cleaning process are approximated by partial flow considerations of a calculation model for a waste incineration plant.

For the exhaust air values of the thermal afterburning, the carbon dioxide emissions are calculated, corresponding to a theoretically complete conversion of the solvents. Remaining unburnt hydrocarbon compounds, which are available via measured values of total carbon in the exhaust stack, are approximated by the environmental impacts for butyl acetate emissions.

### 3.4 Cut-off rules

All data from the farm data collection, i.e. all raw materials used according to the recipe, the thermal and electrical energy used are taken into account.

For the base materials and the packaging material, data on transport expenses are available from the manufacturer. The transport of the Duraflon product to the HD Wahl GmbH plant is also taken into account. Thus, material and energy flows with a share < 1 % are also taken into account.

Machinery, equipment and infrastructure needed in manufacturing are neglected.

No processes were considered in module C1, as the mass fraction of Duraflon in the entire component is significantly < 0.1 %.

### 3.5 Background data

In principle, the background database *GaBi 10.5* in the latest version 10.5 (content version 2021.2). If no suitable data sets were available in the *GaBi* background database, data sets from the *ecoinvent* database were used. The available data sets also support the evaluation period of 100 years with regard to the potential environmental impacts.

### 3.6 Data quality

The foreground data collected from the manufacturer are based on annual quantities or extrapolations from measurements at specific plants.

With the exception of pre-treatment, the data originally collected and checked for plausibility were taken over from the previous background report as part of the EPD update, as there were no significant changes according to the manufacturers. The primary data were provided by the company HD Wahl GmbH. The quality and representativeness of the collected data can therefore be considered high. The data refer to

The data for pre-treatment also refer to the year 2021.

The data quality of the background data used was rated as good in terms of technical, geographical and temporal representativeness. The majority of the background data used is from the reference year 2020.

### 3.7 Period under review

The data basis for this LCA is based on data collected in 2014. The period under consideration is 12 months. The validity of the data basis from 2014 was confirmed by the manufacturer as part of the update of the environmental product declaration.

### 3.8 Allocation

Allocation in the foreground data  
All required energies, raw materials and supplies could be clearly allocated to the declared product. No by-products are created and no allocation is required.

### Allocation for waste materials

Waste paint and solvents produced during paint application are recycled for energy recovery. The resulting electrical and thermal energy is accounted for within the corresponding module A1-A3. An R1 value < 0.6 is assumed for all waste incineration plants. The credits are made using European average data for electrical energy and thermal energy from natural gas.

### 3.9 Comparability

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

The background database used is *GaBi 10.5*, Content Version 2021.2.

## 4. LCA: scenarios and further technical information

### Characteristic product properties

#### Biogenic carbon

The biogenic carbon content of the product and its packaging is less than 5 % of the total mass. Thus, the biogenic carbon content is not indicated.

#### Reference service life

Designation	Value	Unit
Lifetime according to specification Manufacturer	50	a

#### End of life journey (C1-C4)

Designation	Value	Unit
As mixed construction waste collected	0,0475	kg

## 5. LCA: Results

In the following, the results of the indicators of impact assessment, resource use, waste and other output flows are shown in relation to the production of the required quantity and the application of Duraflon on 1 m<sup>2</sup> surface. For the application on aluminium and galvanised steel surfaces, a typical application quantity of 0.125 kg of Duraflon is required on one square metre of surface.

The additional indicators according to EN 15804+A2 are optional. The indicators are not shown in the EPD ("ND").

### Important notice:

EP-freshwater: This indicator was calculated as "kg P-eq." in accordance with the characterisation model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; <http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>)).

### INDICATION OF SYSTEM BOUNDARIES (X = INCLUDED IN LIFE CYCLE ASSESSMENT; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Production stage			Stage of the construction of the Building		Use stage								Disposal stage				Credits and debits outside the System boundary
Raw material supply	Transport	Production	Transport from the manufacturer	Assembly	Use/Application	Maintenance	Repair	Replacement	Renewal	Energy consumption for the operation of the	Use of water for the operation of the Building	Deconstruction/de	Transport	Waste treatment	Removal	Reuse, recovery or recycling potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X	

### RESULTS OF THE ECO BALANCE - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m<sup>2</sup> Surface coating

Core indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO <sub>2</sub> -eq.]	2,83E+0	0,00E+0	2,88E-4	1,21E-1	0,00E+0	0,00E+0
Global warming potential - fossil	[kg CO <sub>2</sub> -eq.]	2,83E+0	0,00E+0	2,85E-4	1,21E-1	0,00E+0	0,00E+0
Global warming potential - biogenic	[kg CO <sub>2</sub> -eq.]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Global warming potential - luluc	[kg CO <sub>2</sub> -eq.]	2,67E-3	0,00E+0	2,32E-6	7,35E-6	0,00E+0	0,00E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-eq.]	1,36E-9	0,00E+0	5,61E-20	6,39E-17	0,00E+0	0,00E+0
Acidification potential, cumulative exceedance	[mol H <sup>+</sup> -eq.]	5,12E-3	0,00E+0	9,42E-7	2,08E-5	0,00E+0	0,00E+0
Eutrophication potential - freshwater	[kg PO <sub>4</sub> -eq.]	1,54E-5	0,00E+0	8,44E-10	9,32E-9	0,00E+0	0,00E+0
Eutrophication potential - salt water	[kg N-eq.]	1,12E-3	0,00E+0	4,33E-7	4,69E-6	0,00E+0	0,00E+0
Eutrophication potential, cumulative exceedance	[mol N-eq.]	1,20E-2	0,00E+0	4,83E-6	9,62E-5	0,00E+0	0,00E+0
Formation potential for tropospheric ozone	[kg NMVOC eq.]	3,85E-3	0,00E+0	8,49E-7	1,31E-5	0,00E+0	0,00E+0
Potential for the scarcity of abiotic resources - non-fossil resources	[kg Sb-eq.]	7,50E-5	0,00E+0	2,52E-11	8,72E-10	0,00E+0	0,00E+0
Potential for the scarcity of abiotic resources - fossil fuels	[MJ]	4,00E+1	0,00E+0	3,78E-3	5,60E-2	0,00E+0	0,00E+0
Water withdrawal potential (user)	[m <sup>3</sup> World Eq. withdrawn]	1,05E-2	0,00E+0	2,64E-6	1,23E-2	0,00E+0	0,00E+0

### RESULTS OF THE LIFE CYCLE ASSESSMENT - INDICATORS TO DESCRIBE THE USE OF RESOURCES according to EN 15804+A2: 1 m<sup>2</sup> surface coating

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as an energy source	[MJ]	8,25E+0	0,00E+0	2,18E-4	1,58E-2	0,00E+0	0,00E+0
Renewable primary energy for material use	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Total renewable primary energy	[MJ]	8,25E+0	0,00E+0	2,18E-4	1,58E-2	0,00E+0	0,00E+0
Non-renewable primary energy as an energy source	[MJ]	3,33E+1	0,00E+0	3,80E-3	6,85E+0	0,00E+0	0,00E+0
Non-renewable primary energy for material use	[MJ]	6,79E+0	0,00E+0	0,00E+0	-6,79E+0	0,00E+0	0,00E+0
Total non-renewable primary energy	[MJ]	4,01E+1	0,00E+0	3,80E-3	5,60E-2	0,00E+0	0,00E+0
Use of secondary materials	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Renewable secondary fuels	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Non-renewable secondary fuels	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Net use of freshwater resources	[m <sup>3</sup> ]	8,76E-3	0,00E+0	2,49E-7	2,95E-4	0,00E+0	0,00E+0

**RESULTS OF THE ECOBALANCE - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:**  
1 m<sup>2</sup> Surface coating

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste to landfill	[kg]	1,05E-8	0,00E+0	2,00E-13	1,20E-11	0,00E+0	0,00E+0
Non-hazardous waste disposed of	[kg]	7,29E-2	0,00E+0	5,96E-7	1,25E-2	0,00E+0	0,00E+0
Radioactive waste disposed of	[kg]	1,03E-3	0,00E+0	6,89E-9	1,91E-6	0,00E+0	0,00E+0
Components for reuse	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Substances for recycling	[kg]	8,09E-4	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Substances for energy recovery	[kg]	5,22E-2	0,00E+0	0,00E+0	4,75E-2	0,00E+0	0,00E+0
Exported electrical energy	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
Exported thermal energy	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

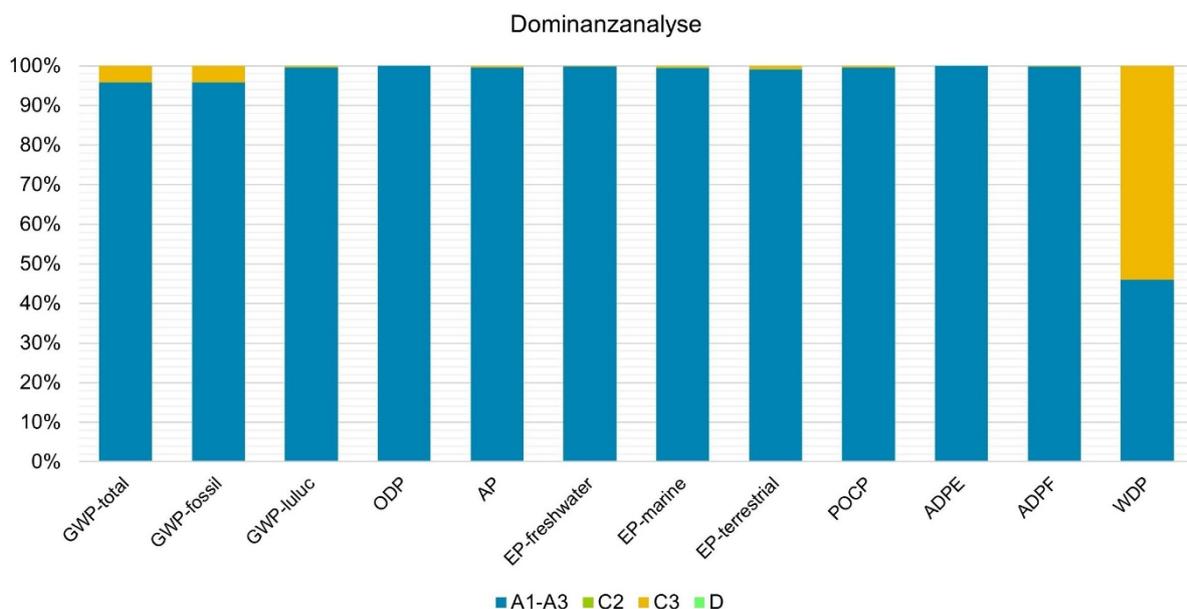
**RESULTS OF THE ECO BALANCE - additional impact categories according to EN 15804+A2-optional:**  
1 m<sup>2</sup> Surface coating

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Potential occurrence of diseases due to Particulate matter emissions	[Sickness falls]	ND	ND	ND	ND	ND	ND
Potential effect from human exposure to U235	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
Potential toxicity comparison unit for ecosystems	[CTUe]	ND	ND	ND	ND	ND	ND
Potential toxicity comparison unit for humans - carcinogenic effect	[CTUh]	ND	ND	ND	ND	ND	ND
Potential toxicity comparison unit for humans - not carcinogenic effect	[CTUh]	ND	ND	ND	ND	ND	ND
Potential soil quality index	[-]	ND	ND	ND	ND	ND	ND

Limitation Note 1 - applies to the indicator "Potential effect 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 withdrawal 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 must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

## 6. LCA: Interpretation



### Environmental impacts

The dominance analysis shows that most of the environmental impact categories considered are dominated by the manufacturing phase (modules A1-A3). One exception is water use (WDP), which is dominated by the combustion of the paint (module C3).

In modules A1-A3, the processing of the paint in particular contributes to the potential environmental impacts. The indicators Global Warming Potential total (GWP-total) and Global Warming Potential fossil (GWP-fossil) are influenced by processing by 62 %. The thermal and electrical energy required for the processes has the greatest influence here. The indicators Global Warming Potential luluc (GWP-luluc), Eutrophication Potential Saltwater (EP-marine), Eutrophication Potential Land (EP-terrestrial), Potential for the Formation of Tropospheric Ozone (POCP), Potential for the

abiotic depletion of abiotic resources - fossil fuels (ADPF) and water use (WDP) are dominated by energy consumption for processing in modules A1-A3. The acidification potential of soil and water (AP) and the potential for the degradation of abiotic non-fossil resources (ADPE) are dominated by the data sets used for the chemicals for paint production and pre-treatment. Eutrophication potential freshwater (EP-freshwater) is dominated by the data sets for the treatment of waste generated during paint application.

#### Primary energy

For both renewable (PERT) and non-renewable primary energy (PENRT), the influences are largely in the application of the coating.

## 7. Evidence

### 7.1 VOC emissions

The information given refers to the production of the Duraflon coating at ict GmbH and to the factory application at the coating plant HD Wahl GmbH.

The AgBB: Health assessment of emissions of volatile organic compounds from building products does not apply here.

It relates to construction products that are pollute the **indoor air** with VOCs. This does not apply to Duraflon because it is used on the building façade.

### 7.2 Leaching behaviour

The leaching behaviour for Duraflon is not relevant and was accordingly not investigated.

No substances can be washed out of the finished Duraflon surface.

### 7.3 Toxicity of the fire gases

The Duraflon surface is non-combustible and does not actively contribute to fire. The fire tests are carried out in connection with the building approval of the metal façade element in accordance with the requirements for building products (*EN 135011, A1*).

However, no fire class can be specified for the coating alone. A building element coated with Duraflon is understood as a non-homogeneous building product. The mass proportion of Duraflon in the total building element is usually  $\leq 1$

% and is considered extremely non-substantial.

## 8. References

### Standards

#### ISO 1519

DIN EN ISO 1519:2011-04, Paints and varnishes - Mandrel bending test (cylindrical mandrel).

#### ISO 1520

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

#### ISO 2360

DIN EN ISO 2360:2017-12, Non-conductive coatings on non-magnetic metallic base materials  
- Measuring the layer thickness - eddy current method.

#### ISO 2409

DIN EN ISO 2409:2019-09, Paints and varnishes - Cross-cut test.

#### ISO 2813

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

#### ISO 3231

ISO 3231:1993-01, Paints and varnishes; Determination of resistance to moisture, atmospheres containing sulphur dioxide.

#### ISO 4624

DIN EN ISO 4624:2016-08, Paints and varnishes - Peel test for the determination of adhesion.

#### ISO 9001

DIN EN ISO 9001:2015,  
Quality management systems - Requirements.

#### ISO 9227

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

#### EN 13501-1

DIN EN 13501-1:2019-05, Classification of construction products and types of construction for their reaction to fire.

#### ISO 14001

DIN EN ISO 14001:2015,  
Environmental management systems -  
Requirements with guidance for application.

**ISO 14025**

EN ISO 14025:2011, Environmental labels and  
declarations - Type III environmental declarations -  
Principles and procedures.

**ISO 14040**

DIN EN ISO 14040:2021-02, Environmental  
management - Life cycle assessment - Principles and  
framework.

**ISO 14044**

DIN EN ISO 14044:2018-05, Environmental  
management - Life cycle assessment - Requirements  
and guidance.

**ISO 15686**

ISO 15686:2011-05, Building construction and  
structures - Design for durability.

**EN 15804**

EN 15804:2012+A2:2019, Sustainability of  
construction works - Environmental product  
declarations - Basic rules for the product category  
construction product.

**ISO 22479**

DIN EN ISO 22479:2019-05, Corrosion of metals and  
alloys - Testing with sulphur dioxide in a moist  
atmosphere.

**ISO 50001**

DIN EN ISO 50001:2018,  
Energy management systems - Requirements with  
guidance for application.

**Further**

**literature AAMA**

**2605**

AAMA 2605-20, Voluntary Specification, Performance  
Requirements and Test Procedures for Superior  
Performing Organic Coatings on Aluminum  
Extrusions and Panels, Version: Fenestration &  
Glazing Industry Alliance (FGIA), 1900 E Golf Rd,  
Suite 1250 Schaumburg, IL 60173 (USA), 2021.

**ASTM B244**

ASTM B244 - 09, Standard Test Method for  
Measurement of Thickness of Anodic Coatings on  
Aluminum and of Other Nonconductive Coatings on  
Nonmagnetic Basis Metals with Eddy-Current  
Instruments, Version: B0244-09R21, West  
Conshohocken, PA (USA): ASTM International, 2014.

**ASTM C207**

ASTM C207, Standard Specification for Hydrated Lime  
for Masonry Purposes, Version: C0207- 18, West  
Conshohocken, PA (USA): ASTM International, 2018.

**ASTM D2244**

ASTM D2244 - 09b, Standard Practice for Calculation

of Color Tolerances and Color Differences from  
Instrumentally Measured Color Coordinates, Version:  
D2244-09b, West Conshohocken, PA (USA), 2021.

**ASTM D4214**

ASTM D4214 - 07, Standard Test Methods for  
Evaluating the Degree of Chalking of Exterior Paint  
Films, Version: D4214-07, West Conshohocken, PA  
(USA): ASTM International, 2015.

**ASTM D523**

ASTM D523 - 08, Standard Test Method for Specular  
Gloss, Version: D523-08, West Conshohocken, PA  
(USA): ASTM International, 2014.

**ecoinvent 3.6**

ecoinvent 3.6, Database on Life Cycle Assessment  
Inventories (Life Cycle Inventory data). Zurich:  
ecoinvent Association, 2020.

**EPD-HDW**

EPD--HDW--20140159--IAE1--DE, HD Wahl GmbH/ict  
GmbH: Kunststoffbeschichtung Duraflon® für die  
werksseitige Veredelung von Bauteilen aus Aluminium  
und Stahl, Institut Bauen und Umwelt e.V., 2014.

**GaBi 10.5**

GaBi 10.5: Software System and Database for Life  
Cycle Engineering, Sphera Solutions GmbH,  
Leinfelden-Echterdingen, 2021.

**GSB AL 631**

GSB AL 631, Quality guideline of the Gütegemeinschaft  
für die Stückbeschichtung von Bauteilen e.V., valid for  
the coating of components made of aluminium and its  
alloys used in the construction industry, April 2017.

**IBU 2021**

IBU: General EPD Programme Guidance of the Institut  
Bauen und Umwelt e.V. (IBU). Version 2.0, Institut  
Bauen und Umwelt e.V., Berlin.

**PCR Part A**

Product category rules for building-related products  
and services. Part A: Calculation rules for life cycle  
assessment and  
Requirements for the project report according to EN  
15804+A2:2019, version 1.2 , Berlin: Institut Bauen  
und Umwelt e.V. (ed.), 2021.

**PCR Part B**

Product category rules for building-related products  
and services. Part B: EPD requirements for coatings  
with organic binders, Version 1.0, Berlin: Institut Bauen  
und Umwelt e.V., 2013.

**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), establishing a  
European Chemicals Agency, amending Directive  
1999/45/EC; and

repealing Council Regulation (EEC) No 793/93, Commission Regulation (EC) No 1488/94, Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

**Regulation (EU) No 305/2011**

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02011R0305-20210716&from=EN>

**VOC Plant Directive**

31st Ordinance on the Implementation of the Federal Immission Control Act (Ordinance on the Limitation of Emissions of Volatile Organic Compounds from the Use of Organic Solvents in Certain Installations) of 21 August 2001 (Federal Law Gazette I p. 2180), last amended by Article 13 of the Act of 27 July 2021 (Federal Law Gazette I p. 3146).

**Publisher**

Institute Building and Environment  
e.V.  
Panoramastr.1  
10178 Berlin  
Germany

Tel +49 (0)30 3087748- 0  
Fax +49 (0)30 3087748- 29  
Mail [info@ibu-epd.com](mailto:info@ibu-epd.com)  
Web [www.ibu-epd.com](http://www.ibu-epd.com)

**Programme holder**

Institute Building and Environment  
e.V.  
Panoramastr.1  
10178 Berlin  
Germany

Tel +49 (0)30 3087748- 0  
Fax +49 (0)30 3087748- 29  
Mail [info@ibu-epd.com](mailto:info@ibu-epd.com)  
Web [www.ibu-epd.com](http://www.ibu-epd.com)

**brands & values**<sup>®</sup>  
sustainability consultants

**Creator of the LCA**

brands & values GmbH  
Altenwall 14  
28195 Bremen  
Germany

Tel+49 421 70 90 84 33  
Fax+49 421 70 90 84 35  
Mail [info@brandsandvalues.com](mailto:info@brandsandvalues.com)  
Web [www.brandsandvalues.com](http://www.brandsandvalues.com)

**Declaration holder**

ict GmbH  
Rhine promenade 9  
40789 Monheim on the Rhine  
Germany

Tel +49 2173 265 03 27  
Fax -  
Mail [mm@ict-rhine.com](mailto:mm@ict-rhine.com)  
Web [www.ict-rhine.com](http://www.ict-rhine.com)

HD Wahl GmbH  
Dieselstr. 6-8  
89343 Jettingen-Scheppach  
Germany

Tel +49(0)8225/999  
Fax +49(0)8225/999-10  
Mail [info@hdwahl.de](mailto:info@hdwahl.de)  
Web <http://www.hdwahl.de>