ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	DURAVIT AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DUR-20230210-IBC1-EN
Issue date	21.07.2023
Valid to	20.07.2028

Mineral cast bathtubs and wash basins (DuroCast® Plus / UltraResist)

Duravit AG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Duravit AG

Programme holder

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

Declaration number

EPD-DUR-20230210-IBC1-EN

This declaration is based on the product category rules:

Sanitary products made from composite materials, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

21.07.2023

Valid to

20.07.2028

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

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

Mineral cast bathtubs and wash basins (DuroCast® Plus / UltraResist)

Owner of the declaration

DURAVIT AG
Werderstraße 36
78132 Hornberg
Germany

Declared product / declared unit

1 m² of mineral cast surface of an average product including bathtubs and washbasins.

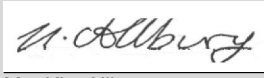
Scope:

This study is aimed to provide the life cycle impact assessment of Duravit sanitary mineral cast products, including packaging, produced at Bischwiller plant in France and worldwide distributed. The basis for the data collection is the year 2021-2022. Due to the identical production method, the object of the EPD is the average mineral cast production of the whole plant including bathtubs and washbasins, considering the total mass produced for the respective mineral cast products for the reference year 2021-2022. The system boundaries include the module A1-A3, C1-C4 and D, according to the requirements of the reference standard *EN 15804+A2:2019*, with an approach 'from cradle to gate with modules C1–C4 and module D'.
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



Mrs Kim Allbury,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The average sanitary DuroCast® product derives from a group of products including bathtubs and washbasins. Materials involved in mineral cast production are Aluminium trihydrate, UP-Resin, Titan dioxide, hollow spheres and Peroxide. Particularly, the study focuses on the average mineral cast product resulting from the total mass produced for the mineral cast products of the considered group in the reference year of 2021-2022. For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation *(EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *EN 14516:2006+A1:2010* - Baths for domestic purposes and *EN 14527:2006+A1:2010* - Shower trays for domestic purposes. For the application and use the respective national provisions apply.

2.2 Application

The sanitary DuroCast® group includes bathtubs and wash basins used in bathrooms. Bathtubs and wash basins are furnishings for bathrooms, which are used in particular for personal hygiene. Bathtubs can be converted into whirlpools by assembling further accessory parts.

2.3 Technical Data

Depending on the model, installation accessories used and the respective structural situation, bathtubs and wash basins by Duravit fulfil standards as per follows: *DINEN 4109, DIN EN 14516/14527, DIN EN 51097, DIN EN 14516, DIN EN 14527*.

The product dimensions on delivery are listed in the following table according to length (L) and width (W). No other technical data is of relevance for the sanitary mineral cast product group object of the study.

Technical data

Name	Value	Unit
Bathtubs L x W	1800 – 1900 x 800 – 900	mm
Wash basins L x W	1140 - 1340 x 460	mm
Temperature change resistance acc. to DIN EN 14516/EN 14527	CL1 + CL2	-
Chemical resistance acc. to DIN EN 14516/14527	CL1 + CL2	-
Anti-slip classification acc. to DIN 51097	-	-
Formaldehyde emissions acc. to EN 717-1	< 124	µg/m^3

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14516:2015* Bathtubs for domestic use.

2.4 Delivery status

The product weights on delivery, inluding packaging, are listed below:

- Bathtubs: 115.9 -167.9 kg
- Wash basins: 8.6 - 32.6 kg

2.5 Base materials/Ancillary materials

The list below provides an overview of the average composition (% by mass) of DuroCast®.

- Aluminium trihydrate: 0 - 57.68 %
- Calcium Carbonate: 0 - 54.06 %
- Hollow spheres: 1.52 - 5.54 %
- UP-Resin: 37.65 - 50.67 %
- Titan dioxide: 0 - 2.62 %
- Peroxide: 0.52 - 0.57 %

2.6 Manufacture

The manufacturing process can be described as follows: inspection is carried out on delivery of the respective raw materials. After acceptance, the raw materials are weighed online using a mixing plant and in line with the corresponding formula and homogenised as the mineral cast mass. The mass is cast in moulds after homogenisation. After the polymerisation of the material, the products are removed from the moulds and set on supporting moulds. Then the products are tempered in the furnace which reduces intrinsic stresses in the material. The furnace is powered exclusively by waste heat from the neighbouring sanitary ceramic production. After tempering, the products are reworked where, depending on the model and product group, they are joined, milled, ground and polished if necessary. Metal feet are always pre-assembled on bathtubs. For the purpose of quality assurance, all models are regularly examined for their resistance to chemicals, changes in temperature and tightness.

2.7 Environment and health during manufacturing

Methods conforming with the respective standards and laws governing health protection and environmental protection are guaranteed during the entire sanitary mineral cast manufacturing process. The production plant placed in Bischwiller (France) is certified according to *ISO 9001*, *ISO 14001* and *ISO 50001*. Furthermore, all raw materials, auxiliaries and consumables are approved in accordance with *REACH*.

2.8 Product processing/Installation

There are no particular requirements on machines to be used or dust extraction during installation. The tools required or the use of additional ancillary materials is listed in the assembly instructions supplied with each product.

2.9 Packaging

The products are packed in cardboard, which are then fixed to the pallets with stretch film. Because of their characteristics, all these packagings can be recycled at their end of life.

2.10 Condition of use

No particular features arise in the material composition of the product during use.

2.11 Environment and health during use

During the use of DuroCast® products, no indications of interactions between the product, the environment and health could be identified. Mineral cast is resistant to typical domestic cleaning agents. A voluntary examination for polycyclic aromatic hydrocarbons (PAH) in accordance with the *ZEK 01.4-08* standard established that the material is to be classified in category 2.

2.12 Reference service life

The use phase is not declared in this study.
If used and cared for appropriately the product may last up to several generations.

2.13 Extraordinary effects

Fire

DuroCast® is normally flammable (Class E) although mineral cast is only subject to edge flaming. The flame automatically extinguishes in only a few seconds on removal of the fire

source.

Fire protection

Name	Value
Building material class	E
Burning droplets	d0
Smoke gas development	s1

The above values are compliant with *EN 13501-1:2007+A1:2010* - Fire classification of construction products and building elements.

Water

In the event of unforeseen impact by water on DuroCast® products, no negative impacts are to be anticipated on either the product or the environment.

Mechanical destruction

No environmental effects are known in the event of mechanical destruction. No negative impacts on product function are to be anticipated in the event of minor superficial damage (scratches, minor chipping). Repairs can be carried out using the repair kit provided.

2.14 Re-use phase

Even if material recycling of mineral cast products is theoretically possible, however, it is very complex because of its multi-material composition and not currently commercially feasible.

2.15 Disposal

According to the company knowhow the product at its end of life is sent to a shredder followed by landfill disposal. Considering the *European Waste Index*, the key waste flows disposed at the end of life can be identified as follow:

- Cardboard: 150101 Paper and cardboard packaging
- Film: 150102 Plastic packaging
- Pallet:150103 Wooden packaging
- Cast mineral material: 170107 Mixtures of concrete, bricks, tiles and ceramic

2.16 Further information

Additional information available online at www.duravit.de

3. LCA: Calculation rules

3.1 Declared Unit

A declared unit of 1 m² of mineral cast surface of an average product including bathtubs and washbasins is used as the basis for calculating the life cycle assessment. All environmental impacts of the product are related to 1 m² of mineral cast (DuroCast®) surface. Because of the identical manufacturing method, an average DuroCast® production of the whole plant consisting of bathtubs and wash basins has been considered according to the total mass produced for the respective mineral cast products for the reference year 2021-2022. Product accessories are not considered within this study since the analysis of elements such as electronic parts and nozzles for bathtub systems would be beyond the scope of this study. Moreover, other accessories like feet and foot systems are also excluded since they are almost avoided in the products under study. The average thickness of the mineral cast surface can be distinguished as follows for the respective products:

- Bathtubs: 20 mm
- Wash basins: 22 mm

The density is 1.400 kg/m³ for bathtubs and 1.100 kg/m³ for wash basins, resulting in an average product weight (without packaging) equal to 28,18 kg per declared unit (1 m²). The packaging is defined with a weight of 12,91 kg per declared unit*.
*Additional technical information (i.e. specific dimensions and weight) about each single product (bathtubs and wash basins) making the average product are available at:
https://pro.duravit.com/pro/content/homepage/products/categories/overview~402880943a1b6e1b013a1bd065b4001f.com-n.html?categories=

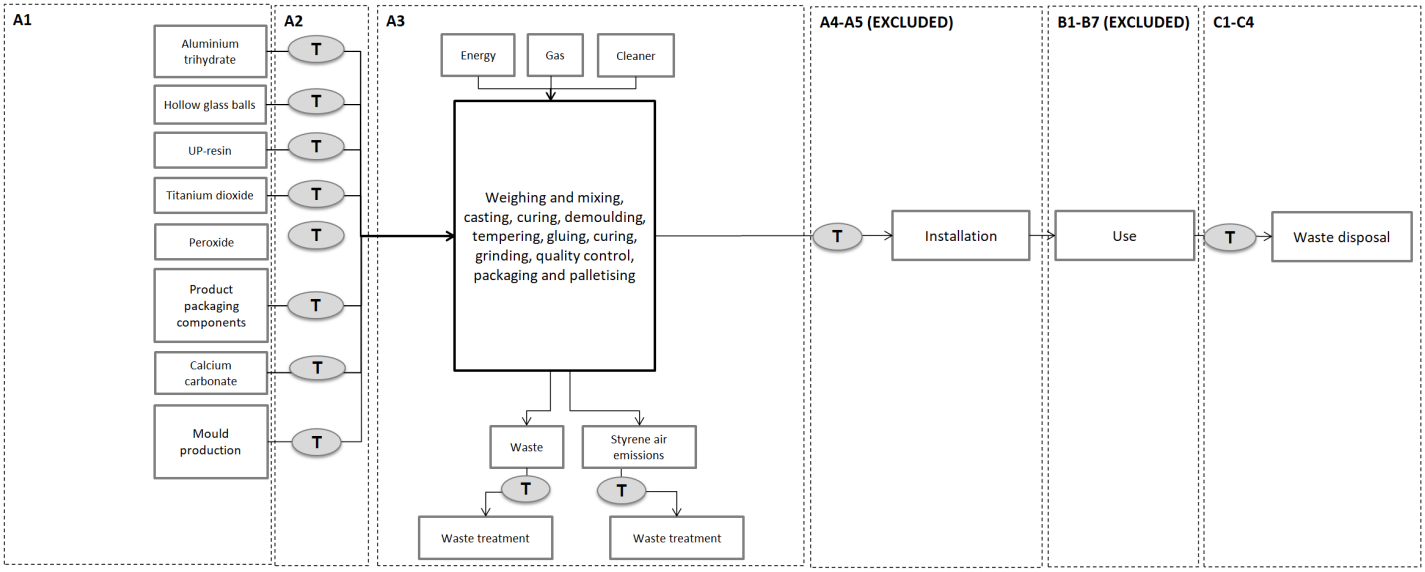
The conversion from mass (kg) of product to the equivalent surface (m^2) needs to be performed by multiplying the mass value by the conversion factor highlighted in the below table.

Declared unit

Name	Value	Unit
Declared unit : mineral cast surface	1	m^2
Mass : mineral cast surface of the declared unit	28.18	kg
Layer thickness : mineral cast surface	20 - 22	mm
Layer thickness steel body (only for enamel)	-	m
Conversion factor to 1 kg without accessory (mass per declared unit)	0.035	-
Grammage without accessory (mass per declared unit)	28.18	kg/m^2

3.2 System boundary

The system boundaries include the modules A1-A3, C1-C4 and D with an approach 'from cradle to gate with modules C1–C4 and module D'. Construction, maintenance and decommissioning of infrastructures (in terms of buildings) and the occupation of industrial land are not part of the assessment since their contribution is negligible. Moreover, the construction process stage (modules A4-A5) and use phase (modules B1-B7) are not included in the assessment. Particularly, because of the type of product assessed, C1 results are equal to zero.



3.3 Estimates and assumptions

Some assumptions have been made as follows:

- Wood (packaging) was modelled considering EUR-flat pallet assuming a mass of 25 kg and a number of reuses equal to 20;
- road transport of calcium carbonate was assumed equal to 1000 km;
- road transport of wastes (production plant and EoL) has been modelled assuming a distance of 100 km from the treatment plant;
- EoL waste shredding treatment was modelled assuming an electricity consumption of 0.02852 kWh/kg derived from *Ecoinvent* dataset for plastic flake consumer electronics recycling by grinding/shredding.

When no datasets were available for the French context, European and global datasets were adopted.

3.4 Cut-off criteria

The consumption of paint (logo), glue, paper (instruction manual) and the respective transport to the French plant have been neglected. Moreover, also transportation of the moulds from Hornberg to Bischwiller has been excluded. Their total incidence, in fact, is less than 0,01 %.

3.5 Background data

Ecoinvent database v.3.8 was used for background processes. International and national literature have also been adopted, particularly about parameters like waste treatment scenarios.

3.6 Data quality

Data have been collected according to the following requirements:

- Time coverage: primary data cover a period of 12 months (November 2021 – October 2022). When general data and existent databases were used, the most recent available versions of them were chosen (not older than 10 years).
- Geographical coverage: data refer as much as possible to the specific geography context, e.g. for electricity consumption at Bischwiller plant has been considered the French national grid mix. For downstream modules, The European context has been considered as proxy for waste disposal at the EoL according to the fact that DuroCast products are mainly distributed in Europe.
- Technological coverage: data collected refer to the state of the art of the technologies used for the production of materials.
- Accuracy: data collected refer to specific consumption and measurements relating to the period considered (year 2021-2022).
- Completeness: the percentage of mass flow included in the study can be considered to be more than 99%.
- Representativeness: the degree to which the whole set of data reflects the real production system is good since information were collected specifically on site for the product under study.
- Consistency: the methodology applied in this study has been extended uniformly to the different parts of the analysis.
- Reproducibility: data were collected through the use of data collection forms (Excel file) filled directly by company operators. They contain all the necessary information allowing also, with sufficient accuracy, a third party to reproduce the results reported in the study report.
- Data sources: as previously explained, the data derive from primary sources and where it was not possible, from secondary sources like internationally recognized databases.
- Uncertainty: the uncertainty relating to data and hypotheses were assessed through an uncertainty analysis (Monte Carlo method).

Scoring from 1 to 5 (very good, good, fair, poor, very poor) has been adopted for the data quality levels according to the *EN 15804+A2:2019* at Annexe E (table E.2). The Data Quality Rating (DQR), instead, will correspond to a data quality level defined as follows:

- Overall data quality rating (DQR) from 1.6: excellent quality
- Overall data quality rating (DQR) from 1.6 to 2.0: very good quality
- Overall data quality rating (DQR) from 2.0 to 3.0: good quality
- Overall data quality rating (DQR) from 3 to 4.0: fair quality
- Overall data quality rating (DQR) > 4: poor quality

The value obtained for DQR (Data Quality Rating) in this study is equal to 2.31 (good quality).

3.7 Period under review

Primary data, covering the reference period November 2021 – October 2022, include particularly:

- Inbound transport of raw materials, packaging and auxiliaries to the production plant at Bischwiller.
- Waste produced during the production of the assessed product (type and quantity).
- Bill of materials for the whole yearly mineral cast production (type and quantity).
- Production processes involved in mineral cast production, including energy mix (electricity and heat) and water consumed at the plant.

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: Global

3.9 Allocation

The assignment of the production data has been carried out on site by Duravit, subtracting the number of materials consumed for other clients different from Duravit. Moreover, separate electricity meters for the Duravit production line enable precise indication of the annual electricity consumption for Duravit only. An allocation by mass (based on the annual production) was applied to the inventory flows of packaging, auxiliaries, chemicals, water, energy carriers and wastes.

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. For background data *Ecoinvent* database (Version 3.8) was used.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon content of wood-based products has been calculated according to *EN 16449*, Wood and wood-based products - Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	12.81	kg C

Considering biogenic carbon content in the product (as C), a value equal to 12 % of moisture content in wood has been assumed.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

Additional technical scenario information for module A5 (not declared in this study) are provided. Particularly, product packaging is represented by corrugated board box, stretch film (linear low-density polyethene LLDPE) and wood pallets characterized at their EoL according to the national scenario of each country where the product will be finally installed. Considering wood and corrugated board box are the packaging affecting the mass balance of GWP-biogenic, thus an amount of 2,20 kg CO_2 eq biogenic (residual value from net CO_2 eq biogenic balance) removed from the air because of them has to be considered balanced by an equivalent re-emission occurring in module A5.

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies to the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list of service life by *BNB* is declared.

End of life (C1 - C4)

Name	Value	Unit
Landfilling	28.18	kg

According to the characteristics of the product under study, which basically required dismantling operations mainly by hand, C1 has been assumed equal to zero. In C2, instead, a distance of 100 km has been assumend for the trasportation to the waste treatment plant. Considering C3 and C4, the product is basically disposed to landfill, allocated to module C4 together with a pre-treatment by waste shredding allocated to module C3.

5. LCA: Results

The following results for the 2021-2022 DuroCast® sanitary average product from the plant at Bischwiller (France) are given, unless otherwise indicated, per m² of mineral cast surface.

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 m² mineral cast surface (DuroCast® Plus / UltraResist)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	6.24E+01	2.86E+00	2.57E+01	0	3.49E+00	5.1E-03	1.49E-01	0
GWP-fossil	kg CO_2 eq	6.19E+01	2.85E+00	2.66E+01	0	3.48E+00	5.06E-03	1.48E-01	0
GWP-biogenic	kg CO_2 eq	4.45E-01	7.51E-03	-9.54E-01	0	3.52E-03	3.66E-05	2.19E+00	0
GWP-luluc	kg CO_2 eq	3.44E-02	1.18E-03	4.43E-02	0	3.07E-04	9.28E-06	1.4E-04	0
ODP	kg CFC11 eq	9.14E-06	6.67E-07	4E-06	0	7.54E-07	1.67E-10	6E-08	0
AP	mol H^+ eq	2.67E-01	1.78E-02	7.8E-02	0	2.11E-02	2.5E-05	1.4E-03	0
EP-freshwater	kg P eq	1.56E-02	1.9E-04	6.68E-03	0	5.19E-05	2.37E-06	1.36E-05	0
EP-marine	kg N eq	4.84E-02	6.2E-03	3.41E-02	0	9.03E-03	4.77E-06	4.85E-04	0
EP-terrestrial	mol N eq	5.14E-01	6.79E-02	2.56E-01	0	9.91E-02	4.77E-05	5.31E-03	0
POCP	kg NMVOC eq	1.89E-01	1.93E-02	7.44E-02	0	3.48E-02	1.29E-05	1.55E-03	0
ADPE	kg Sb eq	4.99E-04	9.44E-06	7.14E-05	0	2.96E-06	6.58E-09	3.38E-07	0
ADPF	MJ	1.4E+03	4.38E+01	2.24E+02	0	4.6E+01	6.6E-02	4.15E+00	0
WDP	m^3 world eq deprived	2.29E+01	1.38E-01	4.87E+00	0	2.22E-02	7.91E-04	1.86E-01	0

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² mineral cast surface (DuroCast® Plus / UltraResist)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	5.56E+01	7.45E-01	6.89E+01	0	2.9E-01	8.42E-03	4.36E-02	0
PERM	MJ	0	0	4.36E+01	0	0	0	0	0
PERT	MJ	5.56E+01	7.45E-01	1.12E+02	0	2.9E-01	8.42E-03	4.36E-02	0
PENRE	MJ	1.35E+03	4.38E+01	2.2E+02	0	4.6E+01	6.6E-02	4.15E+00	0
PENRM	MJ	5.73E+01	0	3.99E+00	0	0	0	0	0
PENRT	MJ	1.4E+03	4.38E+01	2.24E+02	0	4.6E+01	6.6E-02	4.15E+00	0
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	6.24E-01	4.82E-03	1.55E-01	0	5.42E-03	2.92E-05	4.41E-03	0

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

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² mineral cast surface (DuroCast® Plus / UltraResist)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
HWD	kg	1.09E-03	1.1E-04	3.57E-04	0	1.56E-05	2.3E-08	6.27E-06	0
NHWD	kg	1.16E+01	2.87E+00	2.88E+01	0	2.41E-01	3.44E-04	2.82E+01	0
RWD	kg	4.48E-03	2.95E-04	1.01E-03	0	3.23E-04	2.05E-07	2.72E-05	0
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	6.99E+00	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0

EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² mineral cast surface (DuroCast® Plus / UltraResist)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PM	Disease incidence	2.23E-06	2.54E-07	1.19E-06	0	4.74E-07	1.82E-10	2.73E-08	0
IR	kBq U235 eq	1.04E+01	2.25E-01	1.38E+00	0	2.08E-01	7.48E-04	1.84E-02	0
ETP-fw	CTUe	1.57E+03	3.45E+01	4.27E+02	0	2.5E+01	8.97E-02	2.62E+00	0
HTP-c	CTUh	1.05E-07	1.39E-09	1.48E-08	0	4.37E-10	1.13E-12	6.64E-11	0
HTP-nc	CTUh	1.92E-06	3.95E-08	2.03E-07	0	1.77E-08	4.33E-11	1.72E-09	0
SQP	SQP	2.01E+02	3.68E+01	3.45E+02	0	8.25E+00	9.72E-03	8.7E+00	0

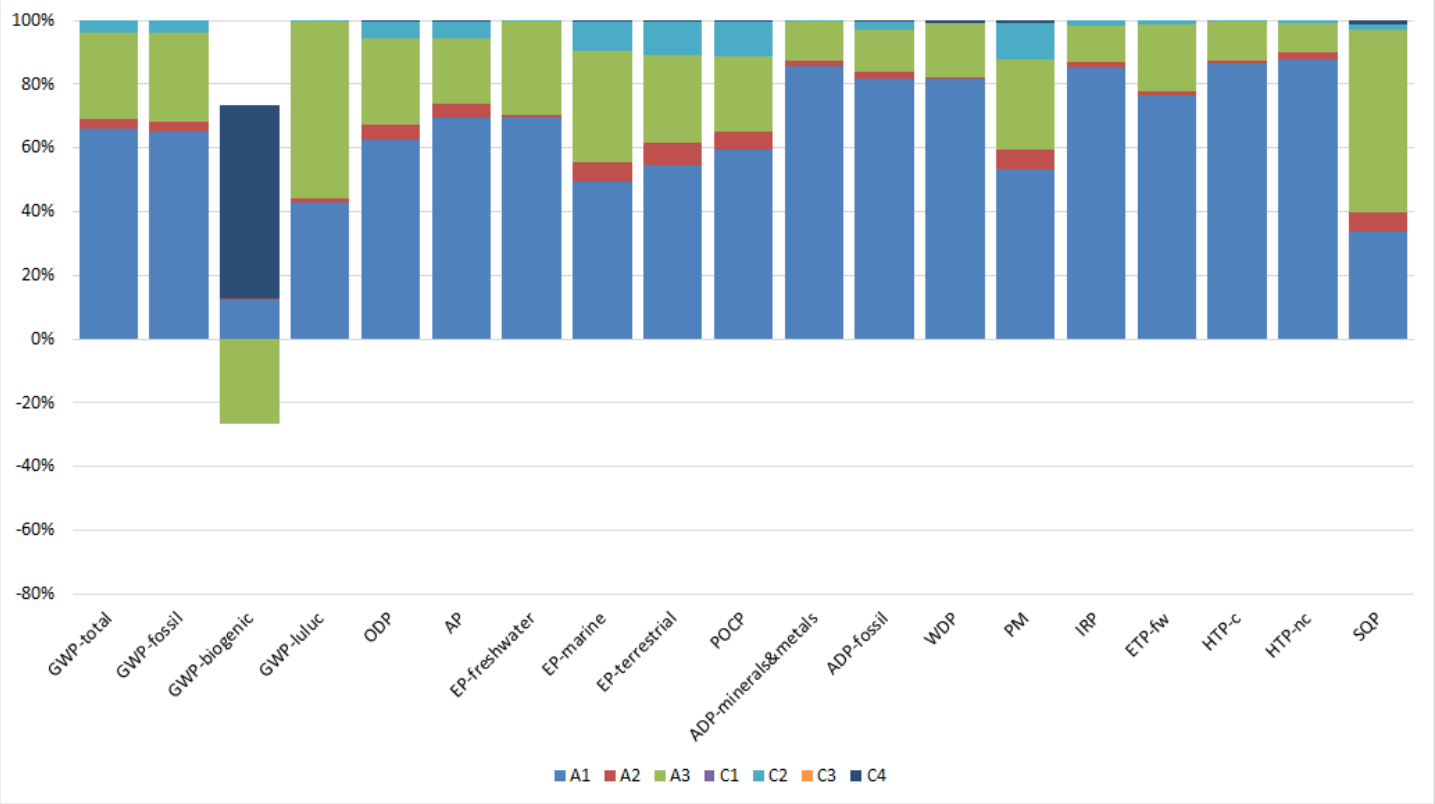
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

Results are discussed below providing also their graphycal representation:



Above results highlight that module A1 (extraction and provision of the raw materials) is the one characterized by the most part of the environmental impacts with an average incidence of 64 % (values varying between 12 % and 88 %). The second largest contribution to the total impacts comes from module A3, with an average incidence of 23 % (values varying between -26 % and 58 %), where manufacturing processes dominate the impact categories SQP (58 %), GWP-luluc (55 %) and EP-marine (35 %). Module C2 (EoL transport) is characterized by an average impact of 4 % (values varying between 0 % and 11 %). Other remaining modules' contribution is less relevant. The total use of renewable and non-renewable primary energy also reveals a similar situation as this is also dominated by the module A1 extraction and provision of raw materials phase, with an average incidence of 57 % followed by A3 characterized by

an average incidence of 40 %.A quantitative assessment was also performed to evaluate the variability due to the different bill of material composition, particularly considering the variability among baths (aluminium trihydrate based versus calcium carbonate based) and washbasins (aluminium trihydrate based). Results from the analysis highlight a potential average range of variability if compared to the final value of the average product assessed in this study of -11% / +17,7%.

7. Requisite evidence

- Directive *(UE) n. 305/2011/ (CPR)* for placing the product on the UE/EFTA market
- Sound insulation class acc. to *DINEN 4109*
- Chemical resistance acc. to *DIN EN 14516/14527*
- Anti-slip classification acc. to *DIN EN 51097*
- Temperature change resistance acc. To *DIN EN 14516/DIN EN 14527*

8. References

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ISO 9001:2015 Quality management systems — Requirements.

ISO 14001
ISO 14001:2015/ Environmental Management Systems – Requirements with Guidance for Use.

ISO 14025
ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14040
ISO 14040:2006/Amd 1:2020 Environmental management - Life cycle assessment - Principles and framework.

ISO 14044
ISO 14044:2006/Amd 2:2017 Environmental management - Life cycle assessment – Requirements and guidelines.

EN 717-1
EN 717-1: 2004Wood-based Panels – Determination of Formaldehyde Release – Formaldehyde emission by the chamber method.

EN 13501
EN 13501-1:2007+A1:2010 - Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

EN 14516
EN 14516:2006+A1:2010 - Baths for domestic purposes.

EN 14527
EN 14527:2006+A1:2010 -
Shower trays for domestic purposes.

EN 15804
EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the
product category of construction works.

EN 16449
EN 16449:2014 Wood and wood-based products
- Calculation of the biogenic carbon content of wood and conversion to carbon
dioxide.

DIN 4109
DIN 4109:1989 AMD 1 2001 - Sound insulation in buildings - Requirements and verifications.

DIN 51097
DIN 51097:1992 Testing of floor coverings - Determination of the anti-slip properties - Wet-loaded barefoot areas - Walking method - Ramp test.

REACH
Regulation (EC) No 1907/2006, Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Reg. (UE) 305/2011
Regulation of the European Parliament and of the Council (EU) No 305/2011 of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106 / EEC, Official Journal EU No L 88, 4.4.2011.

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Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

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