ENVIRONMENTAL PRODUCT DECLARATION

CALCULATION BASED ON
ISO 14025, EN 15804 AND EN 16578

CERAMIC
SANITARYWARE

LAUFEN

02/2020

1. GENERAL INFORMATION

LAUFEN BATHROOMS AG

Programme holder
Laufen Bathrooms AG
Wahlenstrasse 46
4242 Laufen, Switzerland

Declaration number
EPD-LB-2018001

This Declaration is based on the Product Category Rules
DIN EN 15804:2013

and the product category rules:
prEN 16578:2018

Issue date
25.10.2018

Valid to
24.10.2023

Joao Pedro Santos
Manufacturing Director

Josef Linner
Manager Quality Management

CERAMIC SANITARYWARE

Owner of the Declaration
Laufen Bathrooms AG
Wahlenstrasse 46
4242 Laufen, Switzerland

Declared product / Declared unit
The Environmental Product Declaration refers to the declared unit of 1 tonne sanitary ceramic for an average product such as washbasins, bidets, toilets, urinals, cisterns and shower trays.

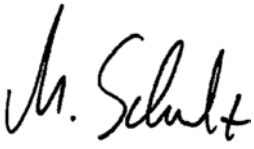
Scope
The object of this study is to draw up an LCA (Life Cycle Analysis) for Laufen Bathrooms AG sanitary ceramic, includ- ing packaging, produced at the production sites mentioned at 2.7. Owing to comparable manufacturing methods, an average product such as washbasins, bidets, toilets, uri- nals, cisterns and shower trays is formed on the basis of the overall sales volume of the respective products for 2015.
The owner of the declaration shall be liable for the underlying information, life cycle assessment data and evidences.

EN 16578 describes the rating of product categories. The results are as shown in chapter 9 of this document.

Verification
The CEN Norm EN 15804:2013 serves as the core PCR for this EPD.
The CEN Norm EN 16578:2018 serves as basis for the product rating in chapter 9. The installation-, use- and disposal scenarios described in this EPD are also based on this standard.

Independent verification of the declaration according to / ISO 14025/

☐ internally ☒ externally



M. Schulz
Independent verifyer

2. PRODUCT

2.1 PRODUCT DESCRIPTION

Ceramic sanitaryware encompasses mainly washbasins, bidets, toilets, urinals, cisterns and shower trays. These products are primarily made of materials such as clay, kaolin, quartz and feldspar. After preparation of the slurry, the mixture is cast or pressed, dried, glazed and then fired to form ceramic sanitaryware. A representative average sanitary ceramic product based on the overall mass volume manufactured in 2015 was used in calculating the environmental impact.

Für das Inverkehrbringen von Waschbecken, Bidets, WC, Urinalen, Spülkästen und Duschwannen in der EU / EFTA (mit Ausnahme der Schweiz) gilt die Verordnung (EU) Nr. 305 / 2011 des Europäischen Parlaments und des Rates vom 09. März 2011 zur Festlegung harmonisierter Bedingungen für die Vermarktung von Bauprodukten. Das Produkt benötigt eine Leistungserklärung unter Berücksichtigung der entsprechenden harmonisierten Produktnorm, die CE Kennzeichnung und die Herstellerunterlagen wie z.B. Montageanleitung. Für die Verwendung gelten die jeweiligen nationalen Bestimmungen.

2.2 APPLICATION

The group of ceramic sanitaryware comprising of washbasins, bidets, toilets, urinals, shower trays and cisterns including accessories like pedestal, syphon covers and shelves are products that characterize bathroom furnishings and are normally used for personal hygiene.

2.3 TECHNICAL DATA

Ceramic sanitaryware are manufactured in a wide variety of dimensions. This has no impact on this subject. The following (structural) technical data are representative examples (details as L x W x H):

Technical construction date (average values)

Name	Value	Unit
Washbasins	850 × 460 × 150	mm
Bidets	530 × 360 × 400	mm
Toilets	600 × 360 × 430	mm
Urinals	650 × 300 × 350	mm
Cisterns	380 × 170 × 370	mm
Shower Trays	900 × 900 × 80	mm

2.4 PLACING ON THE MARKET / APPLICATION RULES

Ceramic sanitaryware manufactured by the production sites of Laufen Bathrooms AG are subject to the following international standards.

EUROPE (EU):

Directive (EU) No. 305/2011 applies for placing the products on the market in the EU/EFTA. The products require a Declaration of Performance and CE marking taking into consideration: EN 997:2012 and EN 997/A1:2012 WC pans and WC suites with integral trap and/or
EN 13407:2006 and EN 13407 A1: 2014 Wall-hung urinals – Functional requirements and test methods and/or EN 14528:2007 Bidets – Functional requirements and test methods and/or
EN 14688:2006 Sanitary appliances – Washbasins – Functional requirements and test methods and/or EN 14527:2006 + A1:2010 Shower trays for domestic purposes.

AUSTRALIA (AS):

AS 1976: Vitreous china used in sanitary appliances
AS 1172.1: Pans
AS 1172.2: Cisterns
AS 3982: Urinals
AS / NZS 1730: Washbasins
AS 3494: Bidettes and bidets
AS / NZS 6400: Water efficient products – Rating and labelling

USA (ASME):
ASME A112.19.2 / CSA B45.1: Ceramic plumbing fixtures
ASME A112.19.14: Six-litre water closets equipped with a dual flushing device
ASME A112.19.19: Vitreous china non-water urinals

FRANCE (NF):
NF D14-601: Glazed sanitary ceramic, general requirements
NF D12-101: Ceramic WC pans
NF D12-203: Cistern for WC pans
NF D12-101: Ceramic bidets
NF D11-101: Ceramic wash basins
NF D11-201: Washbasin installation for handicapped persons

MALAYSIA (MS):
MS 147: Specification for quality of vitreous china sanitary appliances
MS 1522: Vitreous china water closet pans specification
MS 795-1: WC flushing cisterns – PART I: Specification
MS 795-2: WC flushing cisterns – PART II: Inlet Valves
MS 795-3: WC flushing cisterns – PART III: Flushing devices

SINGAPORE (SS):
SS 574 Part I: Dual flush low capacity water closet (WC) up to 4.5l / 3l, WC flushing cisterns
SS 574 Part II: Dual flush low capacity water closet (WC) up to 4.5l / 3l, WC pans

SAUDI ARABIA:
SASO 1473: Ceramic Sanitary Appliances – Western Water Closets
SASO 1474: Ceramic Sanitary Appliances – Methods of tests for Western Water Closets
SASO 1475: Ceramic Sanitary Appliances – Bidets
SASO 1476: Ceramic Sanitary Appliances – Wash Basins

PRC NATIONAL STANDARD / CHINA (GB):
GB 6952: Sanitary ware

PHILIPPINES (PNS):
PNS 156: Ceramic plumbing fixtures

INDONESIA (SNI):
SNI-03-797: Water closet

THAILAND (TIS):
TIS 792: Ceramic sanitary ware: water closets

2.5 DELIVERY STATUS

Average product weight on delivery, excl. packaging

Name	Product weight	Unit
Washbasins	16.7	kg
Bidets	19.5	kg
Toilets	23.0	kg
Urinals	17.2	kg
Cisterns	11.8	kg
Shower Trays	33.3	kg

2.6 BASE MATERIALS / ANCILLARY MATERIALS

Fine fire clay and vitreous china share the same production methods; whereby only the raw material composition is used in various ways during the production process. Fine fire clay, the non-linear shrinkage in the drying and firing process can be reduced to less than 10%. This expands the possibilities of shaping and allows e.g. the production of large washstands. Both materials, fine fire clay and vitreous china, were taken into account.

The following table provides an overview of the average composition of ceramic sanitaryware taking into account both fine fire clay and vitreous china. The products declared in this EPD do not contain substances of the Candidate List of Substances of Very High Concern (SVHC, date: 27.06.2018) above 0.1% by mass.

Name	Value	Unit
Clay and Chamotte	49.5 %	% by mass
Kaolin	24.3 %	% by mass
Feldspar	13.0 %	% by mass
Gypsum	5.4 %	% by mass
Quartz	3.0 %	% by mass
Zirconia	1.2 %	% by mass
Others	3.6 %	% by mass

Packaging is calculated with an average weight evaluation per production site. For an average product, it needs 53.7 kg cardboard, 72.7 kg wood and 5.1 kg plastics for the packaging per declared unit (1 ton).

2.7 MANUFACTURE

The raw materials supplied are dried where necessary before storing in silos. Smaller volumes of components are supplied in sacks and/or big bags.

Slurry

Some of the raw materials require mechanical treatment in a grinding process. This is followed by preparing the slurry by mixing the raw materials with water and passing them through a sieve.

Glaze

The raw material is mixed with water before being sieved and then ground. Glue is added shortly before processing.

Mould construction

The casting moulds required for production are made of either plaster or a porous plastic.

Casting

Small batches are manufactured exclusively with plaster moulds in a manual hand mould process. Another production method involves the battery casting method, also with plaster moulds. The porous plastic moulds are used for high-pressure casting.

Remains and rejects are 100% recyclable and reintroduced back into the slurry preparation.

Drying

After casting, the ceramic products are processed through various drying methods depending on the respective complexity. Rejects are 100% recyclable and reintroduced back into the slurry preparation.

Glazing

The glaze is applied to the dry blank either manually or fully-automatically using robots. Surplus is collected, redirected and re-used in both methods.

Firing

In order to achieve a maximum kiln load, the glazed blanks are positioned manually on the firing trolley. The blanks are fired at over 1250°C in a tunnel kiln for approx. 14-24 hours.

Sorting

After firing, each product is subject to extensive individual examination. The Laufen logo is either fired on or applied by laser to perfect pieces before they get assembled, packed, stored and shipped.

Products which do not meet the quality requirements can often be touched up and fired again in a shuttle kiln or recycled.

Comments

- It is typical for production of ceramic sanitaryware, that one product model will be produced at several sites. All data are an average calculation based on the several manufacturing sites.
- In order to ensure consistent high quality, extensive inspections are carried out throughout all processes, starting at the delivery of the raw materials, and during all stages.
- Setter plates are required for many products during the firing process. These are mainly manufactured from recycled materials.
- The main goal is to produce as little waste as possible. Of the pieces declared as rejects, as many as possible are being recycled. The recycling rate is monitored and improved continuously.
- The production facility of Laufen Bathrooms AG are certified to /ISO 9001/ and /ISO 14001/.
- Within the water management framework, improvements to the internal water processing are reviewed with water consumption being the main priority.
- Within the energy management framework, improvements to the internal processes are reviewed with energy consumption being the priority.

Production sites

The following production sites delivered the necessary data for the EPD calculation of Laufen Bathrooms AG:

• Keramik LAUFEN AG	Wahlenstrasse 46	CH – 4242 Laufen
• LAUFEN Austria AG	Engelhofstraße 7-9	A – 4810 Gmunden
• LAUFEN Austria AG	Mariazeller Strasse 100	A – 3150 Wilhelmsburg
• LAUFEN c.z. s.r.o	Na Libuši 717	CZ – 39165 Bechyne
• LAUFEN c.z. s.r.o	Průmyslová 14	CZ – 670 40 Znojmo,
• Roca Polska Sp zoo	ul.Wyczolkowskiego, 20	PL – 44-109 Gliwice

2.8 ENVIRONMENT AND HEALTH DURING MANUFACTURING

Legal conformity in relation to occupational safety, health and environmental protection is maintained throughout the entire manufacturing process for ceramic sanitaryware at all production sites mentioned in chapter 2.7.

2.9 PRODUCT PROCESSING/INSTALLATION

There are no particular requirements on machines to be used. The manufacturing process complies with national legal requirements on dust extraction.

The installation tools required or the use of auxiliary materials are listed in the mounting instructions supplied with the product.

2.10 PACKAGING

Ceramic sanitaryware is packaged either in cardboard boxes and/or shrink-wrap or stacked on pallets and fixed by shrink-wrap..

2.11 CONDITION OF USE

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

2.12 ENVIRONMENT AND HEALTH DURING USE

As ceramic sanitaryware is fired at very high temperatures, it is solid and chemically stable.

The product has no negative impact on the environment and health during the entire service life.

2.13 REFERENCE SERVICE LIFE

On the assumption of proper use and care, a typical service life of 40 years can be achieved for ceramic sanitaryware.

2.14 EXTRAORDINARY EFFECTS

Fire

Ceramic sanitaryware is classified as construction product class A1, non-combustible in accordance with DIN 4102-1.

Water

In the event of unforeseen impact by water (e.g. flooding) on ceramic sanitaryware, no negative impacts are to be anticipated in terms of product function or the environment.

Mechanical destruction

In the event of minor, unforeseen mechanical damage, no impacts are to be anticipated in terms of ceramic sanitaryware product function.

2.15 RE-USE PHASE

Material recycling of ceramic sanitaryware is technically possible. The product can also be deposited.

2.16 DISPOSAL

Ceramic sanitaryware is currently reused together with building rubble in European countries.
The following /waste keys/ can be indicated for the respective components:

- wastes from manufacture of ceramic products = /1012/
- Paper and cardboard packaging = /150101/
- Plastic packaging = /150102/
- Construction and demolition waste: tiles, bricks and ceramic = /170103/

2.17 FURTHER INFORMATION

Additional information available at www.laufen.com.

3. LCA: CALCULATION RULES

3.1 DECLARED UNIT

A declared unit of 1 ton is taken as a basis for calculating the LCA (Life Cycle Assessment) for ceramic sanitaryware. All environmental impacts by the product relate to 1 ton (t) of ceramic sanitaryware.
Chapter 2.5 provides an overview of the typical average mass per product group.

Packaging is calculated with an average of 53.7 kg cardboard, 72.7 kg wood and 5.1 kg plastics per declared unit (1 tonne) ceramic sanitaryware.

A manufacturer declaration for an average product at Laufen Bathrooms AG ceramic sanitaryware location(s) are drawn up as a basis for the environmental impacts. On account of comparable manufacturing methods, an average product representing washbasins, bidets, toilets, urinals, cisterns and shower trays is formed on the basis of the overall production volume of 2015.

3.2 SYSTEM BOUNDARY

The system boundaries contain all relevant process steps in connection with the production up to the disposal of the ceramic sanitaryware including the avoided environmental impacts in form of "credits" out of the system boundaries (cradle to grave with options). This means, that in accordance with the EN 15804 on which they are based, all processes of the production stage A1-D are considered.

As a general rule, the system can be divided into three main processes:

Module A1: Provision and production of preliminary products and packaging materials
Module A2: Transport of preliminary products and packaging materials to the plant
Module A3: Production of sanitary ceramic as well as processing and disposal of production waste.
Module A4: transport to construction site (end user) resp. retailer
Module A5: Installation in the building
Module B2: Maintenance: Consumption of cleaning agent to maintain the aesthetic quality of ceramics
Module B7: water use: to operate the ceramic sanitaryware in the building
Module C2: transport of ceramic sanitaryware to waste processing after the use phase
Module C3: waste processing for reuse, recovery and/or recycling
Module C4: disposal
Module D: potential benefits and loads of packaging and ceramic sanitaryware recycling beyond the product system

boundary

The images shown below depicts an overview of the system boundaries in this study:

Raw material production (A1)
Clay, Chamotte, Kaolin, Quartz, Feldspar, Zirconia

Transport of raw material (A2)

Production of Ceramic Sanitaryware (A3)
Slurry, Casting, Drying, Glazing, Firing, Sorting, Packaging

Transport to construction site (A4)

Installation in the building (A5))

Cleaning to maintain the aesthetic quality of ceramics (B2)

Water to operate the ceramic sanitaryware (B7)

transport of ceramic sanitaryware to waste processing (C2)

Recycling (C3)

Disposal (C4)

Potential benefits and loads beyond the product system boundary (D)

3.3 ESTIMATES AND ASSUMPTIONS

As the production processes are in direct responsibility of Laufen Bathrooms AG, the data accuracy can be classified as good. Very few assumptions were made.
Zirconium and feldspar, despite their relatively high mass fraction, were calculated using the latest Ecoinvent 3 data sets. Clay and chamotte were modeled on the basis of Ecoinvent datasets with GaBi datasets.

No suitable dataset could be found for some raw materials. Each of these materials make up less than 1% and therefore come under the cut off criteria but are considered with the following datasets anyway.

- Wollastonite = Quartz sand
- Nepheline = Quartz sand
- detergent based on vinegar or chlorine = acetic acid, chlorine mixture (1/6 amount of necessary chlorine detergent)
- PE foam and PS foam = PIR foam

Scenario B7-3 includes ceramics whose water consumption depends solely on the customer and their habits. This water consumption is neither influenced by Laufen nor measurable for the EPD and is therefore given as 0.

3.4 CUT-OFF CRITERIA

All data from the period described in chapter 3.7 are taken into account. Thus, material flows with a mass fraction of less than one percent were also recognized. It can be assumed that the sum of the neglected mass fractions does not exceed 5% of the total mass flow.

3.5 BACKGROUND DATA

For modeling the lifecycle, the software system for holistic balancing /GaBi/ was used. All background data records relevant for production and disposal were taken from various GaBi supplementary databases as well as from /ecoinvent/. The data records included in the databases are documented online.

3.6 DATA QUALITY

Data collection for the investigated products was carried out on the basis of evaluations of the internal production and environmental data, the collection of LCA-relevant data within the supply chain as well as through the measurement of relevant energy supply data. The collected data was checked for plausibility and consistency. A good representation is to be assumed.

The most recent GaBi database (8.6) was used. If no appropriate dataset was available in GaBi, /ecoinvent/ or /ELCD/ datasets were selected. This applies for feldspar and Zirconium. These datasets come from the Ecoinvent 3 database. The data sets were updated in 2017 and thus fulfill the requirements of / DIN EN 15804 / regarding the timeliness of the datasets.

3.7 PERIOD UNDER REVIEW

The period under review for the data collected on ceramic sanitaryware involves 2015.

3.8 ALLOCATION

The data provided by Laufen relate solely to ceramic sanitaryware included in the EPD. Allocation of input materials for the production of other non-EPD relevant products can thus be excluded.
The use of secondary materials in production is an internal loop of ceramic fracture that occurs during the firing process.

3.9 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 used background database has to be mentioned.

4. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

The standard scenarios defined in the PCR are used.

Table 1: Scenario for the specification of the transport processes to be used for module A4

Name	Value	Einheit
EURO 5 Truck with capacity of 3.5 tons	60	Km
Capacity utilization of 3.5 tons EURO 5 Truck (incl. empty runs)	50	%
EURO 5 Truck with capacity of 24 tons	654	Km
Capacity utilization of 24 tons EURO 5 Truck (incl. empty runs)	85	%
Transoceanic freight ship	514	Km

Table 2: Scenarios for installation of ceramic sanitaryware

Scenario	Material	Weight [g/t]
[g/t]	no auxiliary	0
A5-2	sanitary silicone	150
	PE foam (noise protection set)	375
	PE foam (Mounting tape)	250
	White portland cement mortar	250
	Mains water	8

The disposal of the packaging material is considered according to EU27; Eurostat 2011

Table 3: Scenario for cleaning of ceramic sanitary ware

Scenario	Proportion [%]	Detergent	Amount Detergent [ml/t]	Amount water [l/t]	Cleaning frequency [p.a.]
B2-1 (residential)	60	(natural) soap	5	25	52
	40	Detergent e.g. vinegar based	5	25	52
B2-2 (non-residential)	20	(natural) soap	5	25	104
	40	Detergent e.g. vinegar based	5	25	365
	40	Detergent e.g. chlorine based	5	25	180

Table 4: Scenario for cleaning of ceramic sanitaryware

Scenario	Product	(average) weight (kg)	Water consumption per year per unit [l]	Water consumption per year per person per ton [l]
B7-1.1	WC Dual Flush (6/3 Liter)	23	5475	238.043
B7-1.2	WC Dual Flush (4.5/3 Liter)	23	4934	214.521
B7-1.3	WC Dual Flush (4/2.6 Liter)	23	4307	187.261
B7-2.1	Urinal (3.0-2.1 Liter)	17,2	1825	106.105
B7-2.2	Urinal (1.1-2.0 Liter)	17,2	1095	63.663
B7-2.3	Urinal (0.5-1.0 Liter)	17,2	584	33954
B7-3	Further ceramic sanitary appliances 1)		0	0

[1)] The water consumption depends on the fitting and the user behavior.

Table 5: Scenario C2 Transportation

Name	Value	Unit
EURO 5 Truck with capacity of 3.5 tons	20	Km
Capacity utilization of 3.5 tons EURO 5 Truck (incl. empty runs)	50	%

Table 6: end-of-life-scenario (EOL scenario) for ceramic sanitaryware

Scenario	Amount of material [kg/t]
Material for Recycling (C3)	700
Material for landfill (C4)	300

Information to potential benefits and loads beyond the product system boundary (D)

The packaging of the product is utilized thermally in a waste incineration plant. 70% of the product is recycled at the end of its life by down cycling. The recycled material can be used as gravel in road construction only.
Module D contains the credits from the energetic utilization of the packaging as well as the avoided use of primary materials for gravel production.

5. RESULTS OF THE LCA (LIFE CYCLE ANALYSIS)

This section presents the LCA results for 1 t of ceramic sanitaryware.
These can be used for the developing specific scenarios in the context of a building analysis. The environmental impacts of the service life (B-modules) are calculated for one year, one person and one ton of the specific product according to the specified scenario
It should be taken into account that the LCA results are relative statements only. They do not make statements about:

- Endpoints of impact categories,
- Exceeding of thresholds,
- Safety margin or about,
- Risks.

The CML methodology (Centrum voor Milieukunde (Universität Leiden)) with the characterization factors (Version 2001 / Apr. 2013) is used to assess the potential environmental impact of ceramic sanitaryware. The present results of the CML categories relate to the potential environmental impacts over an analysis period of 100 years. Long-term emissions (> 100 years) are not included in the impact assessment.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED; MND = MODULE NOT INCLUDED)															
PRODUCTION STAGE			**CONSTRUC-TION PROCESS STAGE**		**USE STAGE**							**END OF LIFE STAGE**				**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDERIES**
Raw material supply	**Transport**	**Manufacturing**	Transport from gate to site	Assembly – Option 1	USE	Maintenance – Option 1	Repair	Replacement	Refurbishment	Operational energy use	Operational water use – Option 1	De-construction demolition	Transport	Water processing	Disposal	Reuse, Recovery, Recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

For the assessment of the complete environmental impact of ceramic sanitaryware, the scenarios A5, B2 and B7 and the relevant sub-scenario (A5-1, A5-2 or B2-1, B2-2 or B7-1.1, B7-1.2, etc.) must be taken into account.
There are no environmental impacts from modules B1, B3, B4, B5, B6 and C1. Hence they are not listed in the following table.

Parameter	Unit	A1	A2	A3	A1 – A3	A4	A5-1	A5-2	B2-1
RESULTS OF THE LCA: as per 1 ton ceramic sanitary ware									
Global warming potential (GWP)	[kg CO_2-Äq.]	9,24E+02	2,37E+01	1,15E+03	2,10E+03	2,94E+01	2,15E+02	2,18E+02	6,73E+00
Depletion potential of the stratospheric ozone layer (ODP)	[kg CFC11-Äq.]	2,97E-06	6,56E-13	5,41E-12	2,97E-06	8,04E-13	2,12E-07	2,25E-07	1,43E-08
Acidification potential of land and water (AP)	[kg SO_2-Äq.]	2,34E+00	1,01E-01	8,17E-01	3,26E+00	1,38E-01	6,59E-02	7,21E-02	8,06E-03
Eutrophication potential (EP)	[kg PO43--Äq.]	2,62E-01	2,60E-02	2,00E-01	4,88E-01	3,29E-02	1,45E-02	1,56E-02	1,05E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	[kg Ethen-Äq.]	1,75E-01	-4,23E-02	1,11E-01	2,44E-01	-5,03E-02	2,65E-03	3,67E-03	8,97E-04
Abiotic depletion potential for non-fossil resources (ADPE)	[kg Sb-Äq.]	2,48E-01	1,97E-06	1,08E-04	2,48E-01	2,40E-06	-1,89E-06	5,53E-05	9,79E-07
Abiotic depletion potential for fossil resources (ADPF)	[MJ]	1,12E+04	3,27E+02	1,90E+04	3,05E+04	4,01E+02	7,85E+01	1,40E+02	1,02E+01
RESULTS OF THE LCA - RESOURCE USE: as per 1 ton ceramic sanitary ware									
Use of renewable primary energy (PERE)	[MJ]	2,59E+03	1,81E+01	4,82E+01	2,66E+03	2,19E+01	2,37E+03	2,38E+03	9,67E+00
Use of renewable primary energy resources used as raw materials (PERM)	[MJ]	2,37E+03	0,00E+00	0,00E+00	2,37E+03	0,00E+00	-2,37E+03	-2,37E+03	0,00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	4,96E+03	1,81E+01	4,82E+01	5,03E+03	2,19E+01	6,22E+00	1,51E+01	9,67E+00
Use of non-renewable primary energy (PENRE)	[MJ]	1,27E+04	3,28E+02	1,90E+04	3,20E+04	4,02E+02	3,11E+02	3,78E+02	1,25E+01
Use of non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	2,19E+02	0,00E+00	0,00E+00	2,19E+02	0,00E+00	-2,19E+02	-2,19E+02	0,00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	1,29E+04	3,28E+02	1,90E+04	3,22E+04	4,02E+02	9,19E+01	1,59E+02	1,25E+01
Use of secondary material (SM)	[kg]	1,71E+02	0,00E+00	0,00E+00	1,71E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water (FW)	[m^3]	3,67E+00	3,33E-02	5,87E-01	4,30E+00	4,03E-02	5,69E-01	5,94E-01	7,30E-01
RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES: as per 1 ton ceramic sanitary ware									
Hazardous waste disposed (HWD)	[kg]	1,55E-05	1,90E-05	1,14E-05	4,59E-05	2,75E-02	1,12E-06	7,33E-06	4,43E-08
Non-hazardous waste disposed (NHWD)	[kg]	3,51E+01	2,75E-02	1,44E+02	1,79E+02	4,49E-04	1,93E+00	2,09E+00	2,04E+00
Radioactive waste disposed (RWD)	[kg]	8,73E-01	4,49E-04	6,27E-03	8,80E-01	0,00E+00	4,26E-03	6,30E-03	7,37E-04
Components for re-use (CRU)	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (MFR)	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy (EEE)	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,90E+02	2,90E+02	0,00E+00
Exported thermal energy	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,02E+02	7,02E+02	0,00E+00

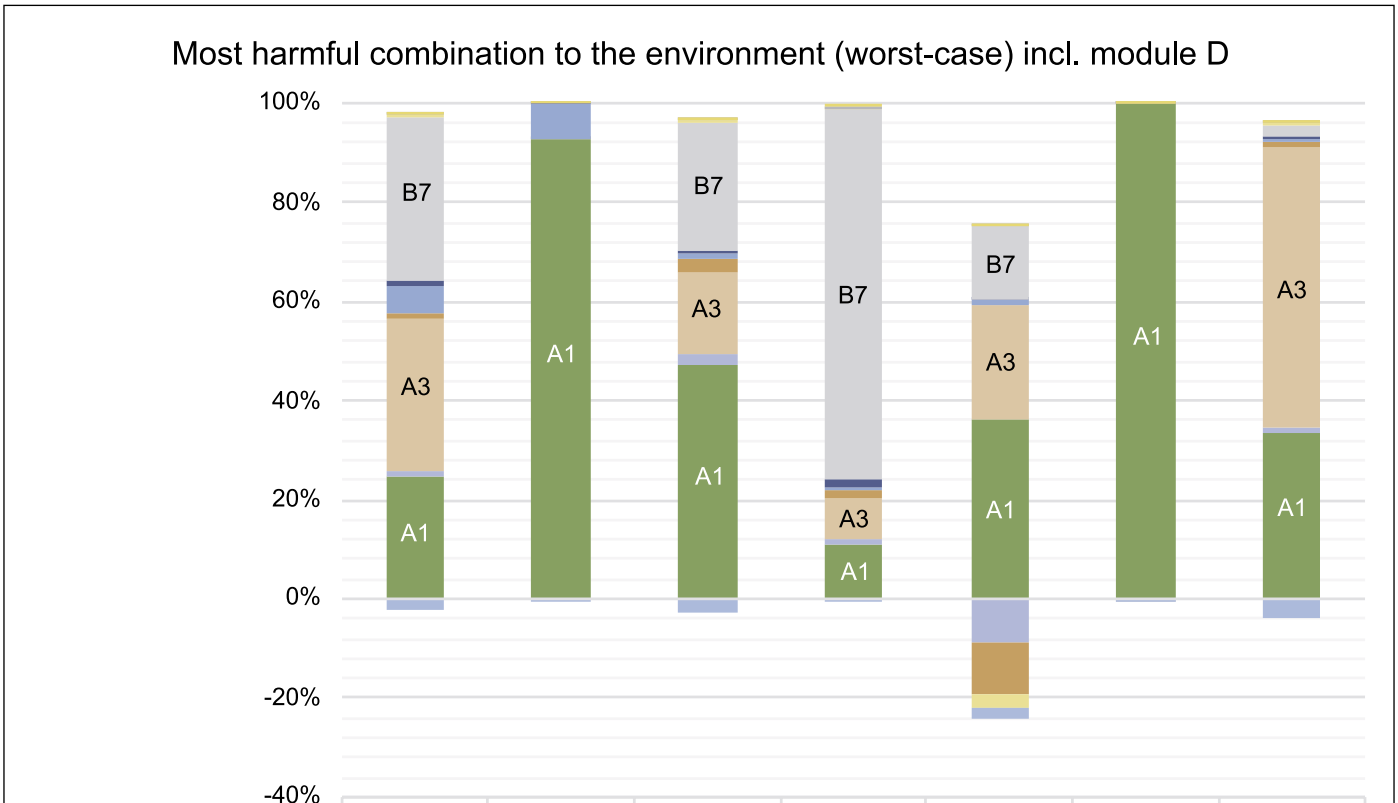
B2-2	B7-1.1	B7-1.2	B7-1.3	B7-2.1	B7-2.2	B7-2-3	B7-3	C2	C3	C4	D
3,16E+01	1,23E+03	1,10E+03	9,65E+02	5,47E+02	3,28E+02	1,75E+02	0,00E+00	7,56E+00	1,77E+00	4,78E+00	-8,84E+01
9,32E-09	1,91E-10	1,72E-10	1,50E-10	8,49E-11	5,10E-11	2,72E-11	0,00E+00	2,08E-13	7,95E-13	1,08E-12	-1,59E-10
3,30E-02	1,26E+00	1,13E+00	9,87E-01	5,60E-01	3,36E-01	1,79E-01	0,00E+00	3,21E-02	1,26E-02	2,83E-02	-1,35E-01
4,51E-02	1,77E+00	1,60E+00	1,40E+00	7,91E-01	4,74E-01	2,53E-01	0,00E+00	8,22E-03	3,04E-03	3,90E-03	-1,60E-02
2,19E-03	7,00E-02	6,30E-02	5,52E-02	3,13E-02	1,88E-02	1,00E-02	0,00E+00	-1,34E-02	1,38E-03	2,20E-03	-1,08E-02
5,15E-07	-4,91E-05	-4,43E-05	-3,86E-05	-2,19E-05	-1,31E-05	-6,98E-06	0,00E+00	6,24E-07	2,33E-06	1,83E-06	-2,48E-05
4,81E+01	9,13E+02	8,22E+02	7,17E+02	4,07E+02	2,44E+02	1,30E+02	0,00E+00	1,03E+02	3,44E+01	6,17E+01	-1,22E+03
1,45E+01	3,48E+02	3,14E+02	2,74E+02	1,55E+02	9,30E+01	4,97E+01	0,00E+00	5,72E+00	2,40E+00	7,93E+00	-2,74E+02
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
1,45E+01	3,48E+02	3,14E+02	2,74E+02	1,55E+02	9,30E+01	4,97E+01	0,00E+00	5,72E+00	2,40E+00	7,93E+00	-2,74E+02
5,73E+01	1,25E+03	1,12E+03	9,83E+02	5,56E+02	3,34E+02	1,78E+02	0,00E+00	1,04E+02	3,58E+01	6,41E+01	-1,50E+03
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
5,73E+01	1,25E+03	1,12E+03	9,83E+02	5,56E+02	3,34E+02	1,78E+02	0,00E+00	1,04E+02	3,58E+01	6,41E+01	-1,50E+03
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,79E+02
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
7,11E-01	1,09E+01	9,78E+00	8,57E+00	4,84E+00	2,91E+00	1,55E+00	0,00E+00	1,05E-02	1,08E-02	1,22E-02	-3,60E-01
2,09E-07	7,96E-06	7,17E-06	6,26E-06	3,54E-06	2,12E-06	1,13E-06	0,00E+00	6,00E-06	1,16E-06	1,10E-06	-1,75E-06
9,39E+00	3,74E+02	3,37E+02	2,94E+02	1,67E+02	1,00E+02	5,34E+01	0,00E+00	8,69E-03	7,58E-03	3,01E+02	-6,35E-01
3,53E-03	1,33E-01	1,20E-01	1,04E-01	5,93E-02	3,55E-02	1,89E-02	0,00E+00	1,42E-04	5,48E-04	9,27E-04	-1,10E-01
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,00E+02	0,00E+00	0,00E+00
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

6. LCA: INTERPRETATION

The following dominance analysis aims to provide an interpretation of the results from the LCA:

Graph of the results

Figure 1: Most harmful combination to the environment (maximum environmental impact) per 1 t of ceramic sanitaryware

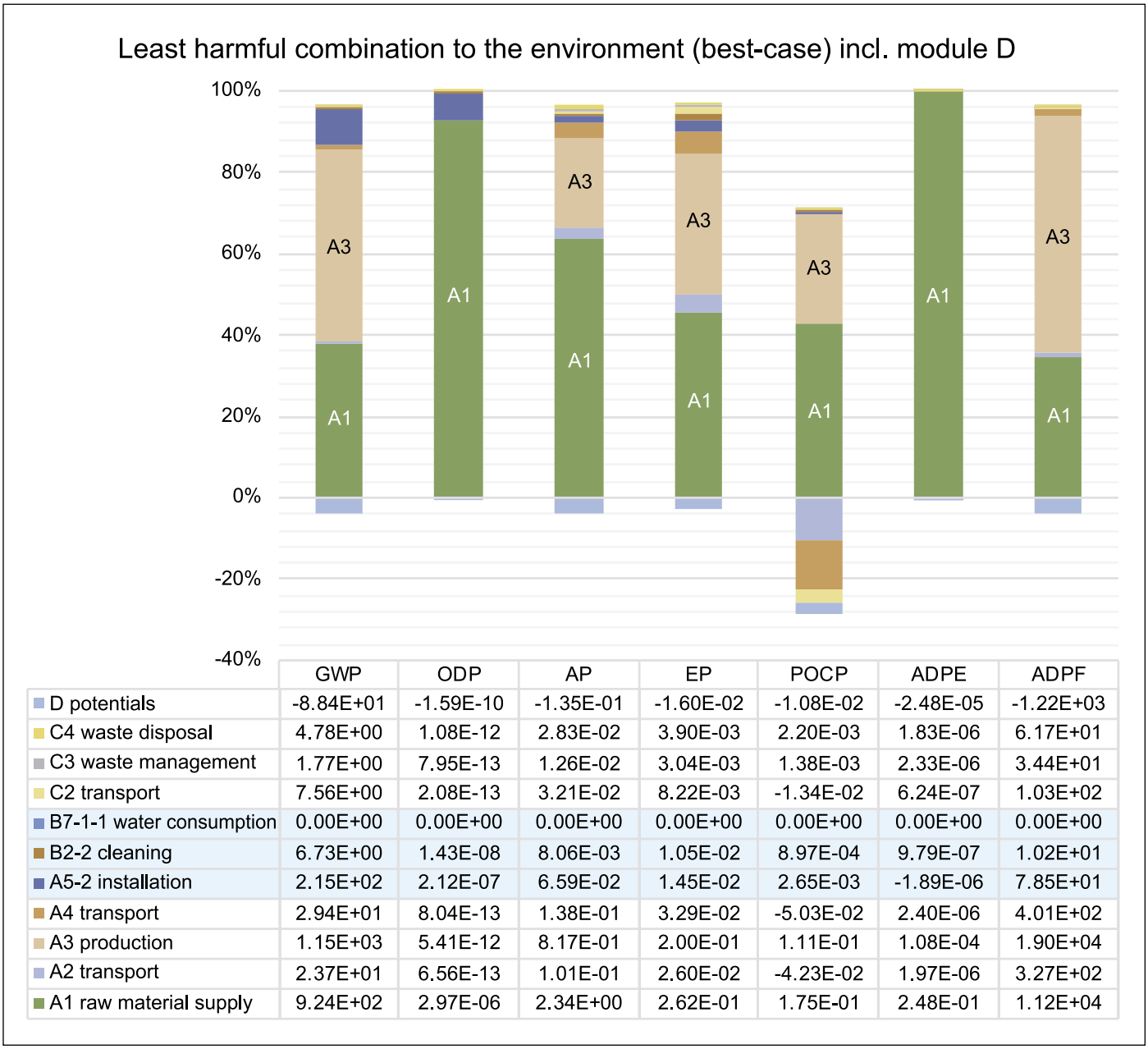


	GWP	ODP	AP	EP	POCP	ADPE	ADPF
D potentials	-8.84E+01	-1.59E-10	-1.35E-01	-1.60E-02	-1.08E-02	-2.48E-05	-1.22E+03
C4 waste disposal	4.78E+00	1.08E-12	2.83E-02	3.90E-03	2.20E-03	1.83E-06	6.17E+01
C3 waste management	1.77E+00	7.95E-13	1.26E-02	3.04E-03	1.38E-03	2.33E-06	3.44E+01
C2 transport	7.56E+00	2.08E-13	3.21E-02	8.22E-03	-1.34E-02	6.24E-07	1.03E+02
B7-1-1 water consumption	1.23E+03	1.91E-10	1.26E+00	1.77E+00	7.00E-02	-4.91E-05	9.13E+02
B2-2 cleaning	3.16E+01	9.32E-09	3.30E-02	4.51E-02	2.19E-03	5.15E-07	4.81E+01
A5-2 installation	2.18E+02	2.25E-07	7.21E-02	1.56E-02	3.67E-03	5.53E-05	1.40E+02
A4 transport	2.94E+01	8.04E-13	1.38E-01	3.29E-02	-5.03E-02	2.40E-06	4.01E+02
A3 production	1.15E+03	5.41E-12	8.17E-01	2.00E-01	1.11E-01	1.08E-04	1.90E+04
A2 transport	2.37E+01	6.56E-13	1.01E-01	2.60E-02	-4.23E-02	1.97E-06	3.27E+02
A1 raw material supply	9.24E+02	2.97E-06	2.34E+00	2.62E-01	1.75E-01	2.48E-01	1.12E+04

Table 7: Summary of the combination most harmful to the environment

	GWP in kg CO_2-ÄQ	ODP in kg CFC11-ÄQ	AP in kg SO_2-ÄQ	EP in kg $(PO4)^3$-ÄQ	POCP in kg Ethen-ÄQ	ADPE in kg Sb-ÄQ	ADPF in MJ
A1 – C4	3617	0,000003	4,83	2,37	0,26	0,2478	32230

Figure 2: The most ecologically friendly combination to the environment (minimum environmental impact) per 1 t of ceramic sanitaryware



	GWP	ODP	AP	EP	POCP	ADPE	ADPF
D potentials	-8.84E+01	-1.59E-10	-1.35E-01	-1.60E-02	-1.08E-02	-2.48E-05	-1.22E+03
C4 waste disposal	4.78E+00	1.08E-12	2.83E-02	3.90E-03	2.20E-03	1.83E-06	6.17E+01
C3 waste management	1.77E+00	7.95E-13	1.26E-02	3.04E-03	1.38E-03	2.33E-06	3.44E+01
C2 transport	7.56E+00	2.08E-13	3.21E-02	8.22E-03	-1.34E-02	6.24E-07	1.03E+02
B7-1-1 water consumption	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2-2 cleaning	6.73E+00	1.43E-08	8.06E-03	1.05E-02	8.97E-04	9.79E-07	1.02E+01
A5-2 installation	2.15E+02	2.12E-07	6.59E-02	1.45E-02	2.65E-03	-1.89E-06	7.85E+01
A4 transport	2.94E+01	8.04E-13	1.38E-01	3.29E-02	-5.03E-02	2.40E-06	4.01E+02
A3 production	1.15E+03	5.41E-12	8.17E-01	2.00E-01	1.11E-01	1.08E-04	1.90E+04
A2 transport	2.37E+01	6.56E-13	1.01E-01	2.60E-02	-4.23E-02	1.97E-06	3.27E+02
A1 raw material supply	9.24E+02	2.97E-06	2.34E+00	2.62E-01	1.75E-01	2.48E-01	1.12E+04

Table 8: Summary of the most ecologically friendly combination (minimum environmental impact) per 1 t of ceramic sanitaryware

	GWP in kg CO_2-ÄQ	ODP in kg CFC11-ÄQ	AP in kg SO_2-ÄQ	EP in kg (PO4)3-ÄQ	POCP in kg Ethen-ÄQ	ADPE in kg Sb-ÄQ	ADPF in MJ
A1 – C4	2363	0,000003	3,53	0,56	0,19	0,2478	31218

Figures 1 and 2 show the parameters with major influence to the environmental profile for ceramic sanitaryware. Scenarios with maximum and minimum environmental impacts are shown.

Module A1 is mainly driven by the environmental impact from electricity generation (27%) and the procurement of raw materials, especially chamotte and caoline (each approx. 6%).
Module A2 represents the transport of raw materials to the production site which has a relatively small impact on the result of the LCA.
The A3 module is characterized mainly by the environmental impact due to the required thermal energy (53%).

In detail: The "global warming potential" (GWP: greenhouse effect) is dominated by the firing process (A3) and the power consumption (in A1). But in addition to the manufacturing process (A3), the installation (A5) and especially the water consumption during use (B7-1-1) have a clearly noticeable effect (it is almost as high as the manufacturing process in A3 and thus as high as the firing- and drying processes together). The main reason for this is the wastewater treatment in module (B7-1-1). The influences of the other modules are negligible in the category GWP.

This also applies to the environmental impact "acidification potential of soil and water" (AP) and “eutrophication potential” (EP). For the EP, the module B7 has (in its maximum option B7-1-1) by far the most significant influence on the overall result; this is equal for all the other B7 options as well.
The B7 module has a medium influence on “Tropospheric ozone concentration increase” (POCP).
The mining of raw materials (A1) has only a small impact on the overall result in many environmental impact categories (with the exception of ADPE, as only raw materials are used in this category).

Modules A5 and B7 may be credited to ADPE because of the burning processes. Within waste incineration processes, raw materials are recovered from the ashes, which can lead to credit. The credit only concerns the burning of wooden packaging, but not cardboard and plastic. The ADPE value is positive for A5-2, as there are additional material expenditure in this module that cover the negative value from the wood waste incineration plant.
For B7 the same effect can be seen by the waste water treatment (incineration of sewage slurry).

Generally, the influence of A2 (Transport of raw materials) is very small, except the “potential of photochemical oxidants with tropospheric ozone” (POCP).

The Abiotic Depletion Potential of non-Fossil Resources (ADPE) is dominated by the production of gypsum by about 80%. The “Abiotic Depletion Potential Fossil” Resources (ADPF) is equally dominated by A3 due to the combustion of natural gas in the firing process.

The incorporation of the products (A5) has a significant influence of approx. 10% on the GWP; but it is negligible for the other environmental impacts. Debits are caused by the energetic utilization of the packaging materials. Installation materials play a minor role.

Despite the different options, modules A5 and B2 are not very different from each other; as they are dominated by A1-A3 and B7 (B7-1-1).

Electricity and heat from energy recovery in A5 will not be compensated with the emissions. These are shown separately in module D, as well as the avoided loads from ceramic recycling (module C3). Module B2 has no significant influence as all transport processes C3 and C4. The "credits" of recycling and incineration are low compared to the resulting emissions.

The environmental effects within the LAUFEN plants differ due to a very different product portfolio, production methods and material composition. Therefore, the already determined average of all plants will be compared with the most ecological and the least ecological one, in order to estimate the "scope of fluctuation" of the results.

The dominant element of Laufen Bathrooms AG's LCA is its energy consumption. The different performance of the below mentioned plants is also due to the degree of difficulty of manufactured products and due to the operational facilities used.

Enviromental impact categories	**Average**	**Plant: LS**	**%**	**Plant: LG**	**%**
Global Warming potential(GWP 100)	2,10E+03	1,72E+03	-18	3,59E+03	+71
Ozone Depletion Potential (ODP)	2,97E-06	1,54E-06	-48	5,04E-06	+70
Acidification potential of ground and water (AP)	3,26E+00	3,73E+00	+14	4,00E+00	+23
Eutrophication potential (EP)	4,88E-01	4,37E-01	-10	6,90E-01	+41
Tropospheric ozone concentration increase (POCP)	2,44E-01	2,46E-01	+1	3,56E-01	+46
Abiotic resource depletion - non focile minerals (ADP)	2,48E-01	1,55E-01	-38	3,63E-01	+46
Abiotic resource depletion – focile fuels (ADP)	3,05E+04	2,29E+04	-25	5,58E+04	+83

For the plant LG, the LCA data are approx. 20% up to 80% above the average values. Here, too, a narrower range of values is difficult to specify due to the reason that the other plants use the same materials but in very different quantities.

The values of the other plants are within this specified range.

7. REQUISITE EVIDENCE

Regarding the REACH compliance, for ceramic sanitaryware of Laufen Bathrooms AG, this is an area where there is no obligation to register, or any obligation to produce safety data-sheets.
Regarding the use of dangerous substances, for ceramic sanitaryware of Laufen Bathrooms AG, this is an area where there is no obligation to declare any substances, or any obligation to produce safety data-sheets.
Sustainability of products: The evaluation of sustainability can be given in EN 16578 by means of a ranking system. For details see chapter 9.

8. REFERENCES

The literature referred to in the Environmental Product Declaration must be quoted in full from the following sources. Standards already fully quoted in the EPD do not need to be listed here again.
prEN 16578 was used as PCR document.
DIN EN ISO 14025: 2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures
ISO 14040: 2006, Environmental management – Life Cycle Assessment – Principles and framework
ISO 14044: 2006, Environmental management – Life Cycle Assessment – Requirements and guideline
EN 15804: 2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products
prEN 16578: 2018 Ceramics sanitary appliances — Sustainability assessment
ecoinvent – Database for ecobalancing, version 2.2. Swiss Centre for Life Cycle Inventories, St. Gallen.

Europe (EN):
EN 997: 2012 and EN 997/AC:2012 WC pans and WC suites with integral trap and/or
EN 13407: 2006 Wall-hung urinals – Functional requirements and test methods/ and/or
EN 14528: 2007 Bidets – Functional requirements and test methods and/or
EN 14688: 2006 Sanitary appliances – Washbasins – Functional requirements and test methods and/or
EN 14527: 2006 + A1:2010 Shower trays for domestic purposes

ELCD – European Reference Life Cycle Database, version 2.0. European Commission, Joint Research Centre – Institute for Environment and Sustainability and DG Environment – Directorate G (2008)
GaBi – GaBi 8.6: softwaresystem for holistic balancing, LBP [Institut für Kunststoffprüfung und Kunststoffkunde] University of Stuttgart and Thinkstep AG, Leinfelden-Echterdingen, 1992 – 2018
JRC - European Reference Life Cycle Database, version 2.0. European Commission, Joint Research Centre – Institute for Environment and Sustainability and DG Environment – Directorate G (2008)
Waste keys – COMMISSION DECISION of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (2014/955/EU)

Abbreviations:
PCR = Product Category Rules
EPD = Environmental Product Declaration
LCA = Life Cycle Analysis
CML = Centrum voor Milieukunde (Universität Leiden)

9. PRODUCT RATING ACCORDING EN 16578

9.1. PRINCIPLE OF RATING

EN 16578 chapter PC describes the rating of products as shown below.

The valuation principles are based on a "two pillar model".
These "two pillars" include on the one hand the production and installation in the building of sanitaryware products and on the other hand their fresh water consumption during the use phase.

Pillar A	"Production and Construction" covers the requirements of modules A1 to A5/1 according to EN 15804.
Pillar B	"Fresh water consumption" during the use phase meets the requirements of EN 16578 (PB 2.2.9 - Table PB 6)

The weighting factors for the two pillars are in accordance with EN 16578 (Chapter PC.3.3) as follows:

Pillar A	with factor 2 (Raw material, transportation, production, transport to the markets and installation)
Pillar B	with Factor 1 (Fresh water consumption)

For the purposes of assessment, the manufacturer's products may be grouped into categories, where it is considered that the results for the assessed characteristics from any one product within the category are representative for the same characteristics for all products within that same category, e.g. WC of type 5, WC of type 6, WCs suites of type 6 or washbasins.
The concluding results for each requirement shall be reported according the evaluation scheme in EN 16578 annex B. The classification allows rating-classes from S1 to S9 with S9 to be the highest level.

Correlation of achieved sustainability value to sustainability class

Rating value range (%)	Sustainability Class
< 79	S1
≥ 79 und < 87	S2
≥ 87 und < 96	S3
≥ 96 und < 104	S4
≥ 104 und < 113	S5
≥ 113 und < 121	S6
≥ 121 and < 130	S7
≥ 131 and < 140	S8

The ceramic sanitaryware mentioned in chapters 9.2 to 9.4 are groups of products according to their performance. The performance of each single product is shown within the declaration of performance.
The DoP (Declarations of Performance) of Laufen Bathrooms AG are published at www.laufen.com.

9.2. RATING OF WCS AND WC SUITES

For the product rating according to EN 16578 chapter PC (Rating System) all manufactured WC´s and WC suites are taken into account, based on the LCA-data according EN 16578 / EN 15804 shown in chapter 5 (Results) of this EPD.

Table 9.1 show the product rating of certain WC pans and suites.

Rating according EN 16578	**WC 1**	**WC 2**	**WC 3**	**WC 4**
Average flush volume of WCs	3.75 l 6 / 3 litres	3.50 l 5 / 3 litres	3,38 l 4.5 / 3 litres	2,50 l 4 / 2 litres
Name / Type of Product	WC	WC	WC	WC
Pillar A: production and construction related requirements	100 %	100 %	100 %	100 %
Pillar B. Use phase related requirements	83 %	100 %	108 %	167 %
Rating value	95 %	100%	103 %	122 %
Sustainability Class	**S 3**	**S 4**	**S 4**	**S 7**

Table 9.1: WC 1 to WC 4 (WC pans, WC suites, shower toilet)

9.3. RATING OF URINALS

For the product rating according to EN 16578 chapter PC (Rating System) all manufactured urinals are taken into account, based on the LCA-data according EN 16578 / EN 15804 shown in chapter 5 (Results) of this EPD.

Table 9.2 shows the product rating of certain urinals.

Rating according prEN 16578	**Urinal 1**	**Urinal 2**	**Urinal 3**	**Urinal 4**
Average flush volumes of urinals	2.5 l 2.1 – 3 litres	1.5 l 1.1 – 2 litres	0.8 l 0.5 – 1 litres	0 litre
Pillar A: production and construction related requirements	100 %	100 %	100 %	100 %
Pillar B. Use phase related requirements	50 %	100 %	138 %	170 %
Rating value	**83 %**	**100 %**	**113 %**	**123 %**
Sustainability Class	**S 2**	**S 4**	**S 5**	**S 7**

Table 9.2: Urinal 1 to Urinal 4

9.4. RATING OF FURTHER CERAMIC SANITARY APPLIANCES

For the product rating according to EN 16578 chapter PC (Rating System) all manufactured washbasin, bidets, shower tray and accesories are taken into account, based on the LCA-data according EN 16578 / EN 15804 shown in chapter 5 (Results) of this EPD.

Table 9.3 shows the rating of further ceramic sanitaryware products like washbasin, bidets, shower trays and accessories. Accessories are products such as: pedestals, syphon covers and shelves.

Rating according prEN 16578	**Washbasin**	**Bidet**	**Shower Tray**	**Accessories**
Pillar A: production and construction related requirements	100 %	100 %	100 %	100 %
Pillar B. Use phase related requirements	170 %	170 %	170 %	170 %
Rating value	**123 %**	**123 %**	**123 %**	**123 %**
Sustainability Class	**S 7**	**S 7**	**S 7**	**S 7**

Table 9.3: Further ceramic sanitary appliances.

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Stand : 14.11.2018