Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Orbital Shower system

from

Orbital systems AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-08231
Publication date:	2023-10-26
Valid until:	2028-10-26

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Product Category Rules Construction Products PCR 2019:14 v1.3.1 and UN CPC 42911
PCR review was conducted by: *Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se*
Life Cycle Assessment (LCA)
LCA accountability: *Isak Eklöv & Felix Jansson, Sweco*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *David Althoff Palm, Dalemarken AB* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
Orbital Systems AB

Contact:
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Adress:
Orbital Systems AB
Östergatan 32
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Sweden

Description of the organisation:
Orbital Systems is a climatech company making the smarter use of water possible.
Orbital Shower is a circular shower system that reduces and saves water and energy consumption. Using sensor technologies, the shower system evaluates water quality 20 times per second and filters out water that is too dirty to reuse.

Product-related or management system-related certifications:

CE:
Orbital Declaration of Conformity “DoC”

Product & Electrical Safety:
Household and similar electrical appliances – Safety:
EN 60335-1:2012;A11;A13;A1;A14;A2
EN 60335-2-35:2016;A1

EMC & RED & EMF:
Nemko:
EN 300 328 v2.2.2
EN 62233:2008
EN IEC 61000-6-2:2019
EN 301 489-1 v2.2.3
EN IEC 61000-6-3:2021
EN 301 489-17 v3.2.4
EN IEC 61000-6-4:2019
EN 50385:2017
EN IEC 61000-6-1:2019
ETSI EN 301 489-1 V2.2.3
ETSI EN 301 489-17 V3.2.4

Back flow prevention by:
Kiwa NL: BRL-K14011
Kiwa SE: Type Approval:
EN1717
EN13076

Products for safe connection to the water supply:
DVGW & TZW:
DVGW CERT W 540

Boverket Building Regulations (BBR):
Rise SE, Type Approval:
Chapter 8, 4 § 3 PBL

6:5331
6:5334, 6:9532
6:9531

Technical approval in wet room installations:
ETA Denmark TGA Type Approval: Nr:
SBI-Anvisning 252 kap. 1.6.

Industry recognition:
SäkerVatten

Manufacturer Scanfil, Åtvidaberg
ISO 9001:2015

Name and location of production site(s):
Scanfil Åtvidaberg AB
Örsätterfabriken
597 80 Åtvidaberg
Sweden

Product information

Product name:
Orbital Shower

Product identification and description:
OS8733-E. Recirculating Shower, saving water and energy.

UN CPC code:
42911 - Sinks, wash-basins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminium.

Geographical scope:
Europe

LCA information

Declared unit:
1 Orbital shower system for household use.

Conversion factor:
1 Orbital shower system to kg: 0,0235

Scenario:
The declared unit is based on 1 shower use per day with the duration 7 min and the water flow velocity 7 l/min for a period of 10 years. The total amount of showers the declared unit is based on is 3 650 and the amount of total shower minutes is 25 550.

Reference service life:
10 years, based on warranty for Orbital shower system.

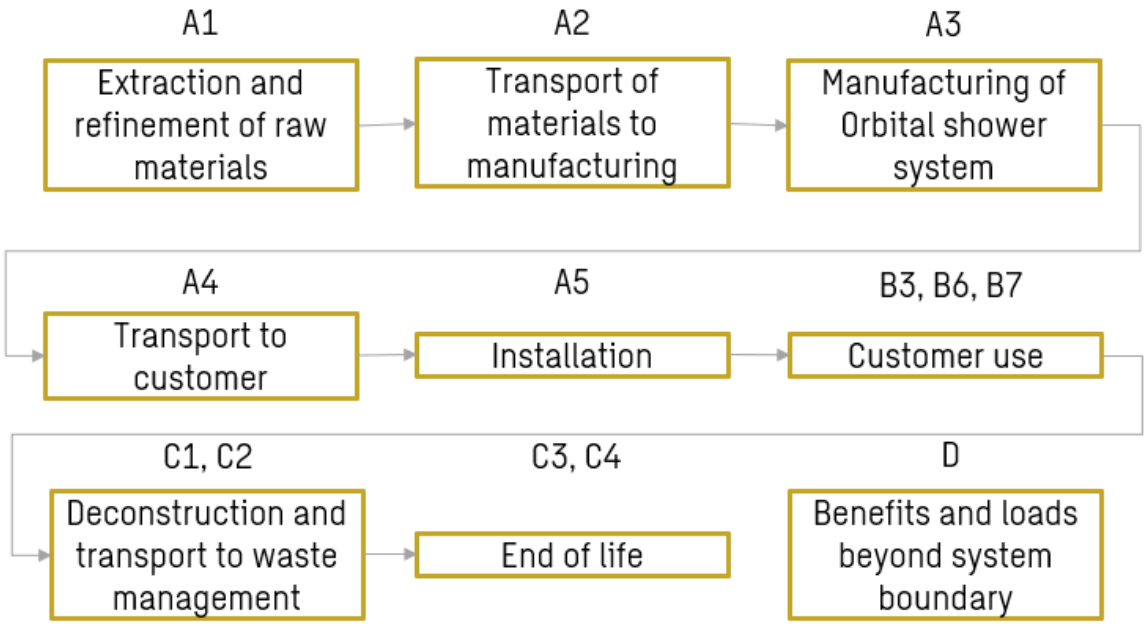
Time representativeness:
2023

Database(s) and LCA software used:
Ecoinvent 3.8, Simapro 9.5.0.0

Description of system boundaries:

Cradle-to-gate (A1-A3) with optional modules A4-A5, B3, B6-B7, C1-C4 and D included.

System diagram:



More information:
Infrastructure is included in the underlying datasets for upstream and downstream processes. Infrastructure for the core process is not included.

A1: Extraction and refinement of raw materials

Orbital shower system consist of eight main components and in total 92 different materials and many of the materials account for less than 1 % of the total weight. The main material used in the Orbital Shower system (27% of the total weight) is galvanized and powdered coated steel. PCBA is the single process with largest share of climate impact from A1 (55 %). The components are collected from a various of sources with different geographical origin. The environmental impact from packaging of input materials in A1 and waste scenario of this packaging is assumed to be low in comparison to the total life cycle and is treated as cut-off.

The PCBA is modelled with generic datasets for a printed wiring board and electronic components. The assumed distribution for the total electronic component weight is 25% active components and 75% passive components and was based on an expert assessment and not detailed data. The uncertainty of the distribution between the components and the generic datasets together with a high environmental impact in A1 is an uncertainty that should be taken into account.

A2: Transport of materials to core manufacturing

Transport of materials to the production facility have been estimated through specific data or assessments of transport distances, specific data for components weights, generic data for fuel consumption through truck sizes assumed to be euro class 5 and generic data for transoceanic tanker is used.

A3: Core manufacturing

The production unit where the Orbital Shower systems are manufactured is located in Åtvidaberg, Sweden. The different materials are assembled using mainly manual labor. Energy use during manufacturing is from heat and electricity use, mainly from heating and lighting.

The electricity used in A3 is from 100 % Swedish hydropower, the climate impact (GWP-GHG) for this process is 0,00408 kg CO2-eq./kWh. The heat comes from district heating produced through incineration of wood chips. The heat used in the Åtvidaberg facility has been allocated to represent the relative area used by Orbital Systems for manufacturing of the shower systems.

The Orbital Shower systems are transported in corrugated cardboard boxes to customer use. The weight of the packaging is 4,7 kg.

A4: Transport of the shower system to the customer

The transport distance for A4 have a conservative approach for distribution to a European market. The transport assumes a transport from Åtvidaberg, Sweden to Rome, Italy. A transport distance of 2500 km. The truck used is assumed to be a diesel truck of euro class 5, 16-32 metric ton with a load factor of 5,79 metric ton.

A5: Installation of the shower system including packaging materials

The installation in A5 is done by manual work and no significant energy use is needed. Waste for packaging material for the Orbital shower system is though included in A5, the waste is 4,7 kg corrugated board box.

B3: Reparation during the life cycle

Reparations during the life cycle for Orbital shower system consist of exchange of filter and fused quartz together with citric- and maleic acid for cleaning.

The filter is replaced once every 140 showers, in total 2,6 replacements per year and 26 replacements in total for the shower set during the 10-year lifetime. The filter consists of 439 g polypropylene. The fused quartz needs to be replaced with a 5-year interval, in total 2 times for the shower set. The fused quartz that is replaced weighs 90 g. The shower set needs to be cleaned every 14 days. This is done by a cleaning in place table (CIP). This CIP consists of 4 g maleic acid and 4 g citric acid. In total 1 042 g of each compound for the shower system expected lifetime.

No energy is assumed to be used; the reparation is done by manual labor.

B6 and B7: Operational energy and water use

In this EPD the scenario for B6 and B7 is remodelled from a test by Rise and is based on average operational water use on a European market. The scenario is modelled as the following Table (parameters for water use) according to a study from European Commission Joint Research Centre by Cordella. Et al. (2014). The declared unit is based on 1 shower use per day with the duration 7 min and the water flow velocity 7 l/min for a period of 10 years. The total amount of showers the declared unit is based on is 3 650, in total 25 550 shower minutes. The total water use for the declared unit is 40 880 l. A test for recirculation rate and energy consumption have been conducted by Rise, but only for 10- and 20-minute showers. The recirculation rate and energy saving possibility is not linear though. The scenario in this LCA is rescaled from a 10-minute shower and might not reflect the actual recirculation rate and energy saving and the environmental impact could be higher in this case.

Electricity use for standby is calculated based on output effect of 33 W and 24 hours standby per day, total amount for the declared unit is 2 884 kWh. Electricity use for water re-heating is 0,37 kWh / shower, total amount for the declared unit is 1 351 kWh. Electricity use for recirculation is 0,2 kWh / shower, total amount for the declared unit is 730 kWh. Electricity use for external heat cycle is 0,19 kWh / shower, total amount for the declared unit is 694 kWh.

These parameters are only for the use of the shower system for household use. Regarding other use, for example public bath house and gyms, the scenario and parameters does not apply. For these other uses, a complementary electricity consumption for internal heat cycle is needed.

Parameters for water use		
Parameter	**Value**	**Unit**
Flow velocity	7	l/min
Shower use	1	person/day
Shower time	7	min
Reference service life	10	years
Inlet temperature	8	°C
Shower temperature	38	°C
Recirculation rate	77,1	%

The energy mix used for operational hot water in B6 is based on statistics from Eurostat. The data is taken directly from *Share of fuels in the final energy consumption in the residential sector for water heating, 2021* (Eurostat 2021). The share of fuel type is presented in the Table Share of energy use for water heating in Europe below.

Share of energy use for water heating in Europe 2021	
Fuel type	**Share (%)**

Solid fossil fuels, peat, peat products, oil shale and oils sands	1,4
Natural gas	43,1
Oil and petroleum products	9,2
Renewables and biofuels	13,9
Electricity	19,2
Heat	13,3
Solid fossil fuels, peat, peat products, oil shale and oils sands	1,4

C1: Deconstruction of the shower system

Deconstruction of the shower system is done manually and doesn't require any significant energy use.

C2: Transport of the product to waste management after use

For transport to waste management, a scenario where the products are collected, sorted, and incinerated has been assumed which includes an estimated transport distance of 50km.

C3 and C4: Waste processing and waste disposal

Waste scenario after use is set to represent the most likely case for waste management of each specific material for the shower system. The waste processing and disposal is modelled through generic datasets to match a European average waste process. The market datasets that use aggregated waste life cycle data have been modified to correctly distribute the environmental impact related to the two relevant modules (C3 and C4).

Scrap steel waste is assumed to be landfilled to 99 % and incinerated to 1 %. All plastic and rubber waste are assumed to be incinerated to 99 % and landfilled to 1 %. Aluminium and copper waste is assumed to be incinerated to 100 %. Bronze and electronic scrap is assumed to be recycled to 100 %.

D: Benefits and loads beyond the system boundary

The only credit taken into account in module D is gold from PCBA. Based on Swedish national statistics the recycling rate is estimated to 80%. Based on a generic dataset representing global market-based production of gold from Ecoinvent the recycling rate used as input is 3,9%.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	ND	ND	x	ND	ND	x	x	x	x	x	x	x
Geography	EUR/ GLO	EUR/ GLO	SE	EUR	EUR	-	-	EUR/ GLO	-	-	EUR	EUR	EU R	EUR/ GLO	EUR/ GLO	EUR/ GLO	GLO
Specific data used	6 % A1-A3			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

The Orbital shower system do not contain any dangerous substances from the candidate list of SVHC for Authorization.

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	12,852	0	0
Stainless steel	8,290	0	0
Plastics and synthetic rubber	8,388	0	0
Other metals	5,026	0	0
Cables	1,288	0	0
Electronics (Incl. PCBA)	0,740	0	0
Organic chemicals	0,497	0	0
Glass	0,047	0	0
Ceramics	0,032	0	0
Cut-off material	0,009	0	0
Total weight of Orbital shower system	37,290	-	-
Packaging materials			
Cardboard packaging material	4,7	0	47 %, 0,47 kg/kg
Total weight of Orbital shower system incl. packaging	41,990	-	-

The cut-off material is below 0,1 % of the total weight and is extrapolated with the material aluminium to reach 100 % completeness. The aluminium is chosen as extrapolation factor as it is the material contributing to the highest GWP after PCBA.

There is no information regarding post-consumer material in any of the input materials and is therefore not included.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per declared unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B3**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	4,17E+02	1,78E+01	9,96E+00	3,56E+01	2,11E+03	6,09E+01	0,00E+0	3,17E-01	1,26E+01	9,83E+00	-2,14E+00
GWP-fossil	kg CO_2 eq.	3,95E+02	1,77E+01	1,67E-01	3,54E+01	1,99E+03	3,98E+01	0,00E+0	3,16E-01	1,26E+01	9,82E+00	-2,13E+00
GWP-biogenic	kg CO_2 eq.	2,22E+01	4,68E-02	9,79E+00	1,80E-01	1,20E+02	2,10E+01	0,00E+0	8,35E-04	4,99E-03	4,52E-03	-1,37E-02
GWP-luluc	kg CO_2 eq.	6,49E-01	6,95E-03	8,80E-05	6,07E-02	4,29E+00	3,54E-02	0,00E+0	1,24E-04	1,80E-04	3,82E-04	-4,07E-03
GWP-GHG	kg CO_2 eq.	3,95E+02	1,77E+01	1,67E-01	3,54E+01	1,99E+03	3,99E+01	0,00E+0	3,16E-01	1,26E+01	9,82E+00	-2,13E+00
ODP	kg CFC 11 eq.	3,64E-05	4,10E-06	2,30E-08	1,98E-06	1,17E-04	2,40E-06	0,00E+0	7,31E-08	1,32E-07	1,25E-07	-1,20E-07
AP	mol H^+ eq.	4,78E+00	7,19E-02	1,65E-03	1,88E-01	1,10E+01	4,00E-01	0,00E+0	1,28E-03	6,01E-03	4,33E-03	-2,06E-02
EP-freshwater	kg P eq.	5,05E-01	1,14E-03	2,14E-05	7,17E-03	1,84E+00	9,52E-02	0,00E+0	2,03E-05	9,63E-05	8,95E-05	-7,93E-03
EP-marine	kg N eq.	8,07E-01	2,16E-02	3,51E-03	4,57E-02	1,82E+00	1,71E+00	0,00E+0	3,86E-04	4,59E-03	3,85E-03	-5,11E-03
EP-terrestrial	mol N eq.	8,02E+00	2,37E-01	6,12E-03	3,84E-01	1,62E+01	1,02E+00	0,00E+0	4,22E-03	2,55E-02	1,74E-02	-6,06E-02
POCP	kg NMVOC eq.	1,65E+00	5,86E-02	2,92E-03	7,06E-02	4,18E+00	1,61E-01	0,00E+0	1,05E-03	1,17E-02	4,68E-03	-1,26E-02
ADPm*	kg Sb eq.	1,35E-01	6,16E-05	4,91E-07	3,67E-04	1,73E-02	5,23E-04	0,00E+0	1,10E-06	2,41E-06	2,29E-06	-2,96E-03
ADPf*	MJ	5,22E+03	2,68E+02	1,81E+00	1,02E+03	4,10E+04	4,89E+02	0,00E+0	4,77E+00	8,75E+00	8,23E+00	-2,84E+01
WDP*	m^3	1,44E+02	7,76E-01	1,15E-01	3,58E+01	5,16E+02	1,66E+03	0,00E+0	1,38E-02	1,85E+00	1,86E+00	-5,73E-01

Acronyms

GWP-total = Globale Warming Potential – total; GWP-fossil = Global Warming Potential – fossil fuels; GWP-biogenic = Global Warming Potential – biogenic; GWP-luluc = Global Warming Potential – land use and land use change; ODP = Ozone Depletion; AP = Acidifcation; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

The results for A1-A3 should also consider the results from module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Additional mandatory and voluntary impact category indicators according to EN 15804

Results per declared unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B3**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	3,00E-05	1,53E-06	7,11E-08	1,61E-06	3,85E-05	3,46E-06	0,00E+0	2,73E-08	2,19E-05	1,04E-06	-1,45E-07

IRP[1]	[kBq U235 eq.]	4,45E+01	1,38E+00	8,97E-03	2,83E+00	1,06E+03	9,81E+00	0,00E+0	2,45E-02	4,41E-02	4,18E-02	-2,83E-01
ETP-fw*	[CTUe]	4,17E+04	2,09E+02	1,58E+01	1,62E+03	2,58E+04	2,14E+04	0,00E+0	3,73E+00	2,29E+03	8,17E+01	-5,75E+02
HTP-c*	[CTUh]	2,04E-06	6,77E-09	1,44E-09	1,74E-08	7,82E-07	2,33E-07	0,00E+0	1,21E-10	3,78E-07	2,49E-08	-4,05E-10
HTP-nc*	[CTUh]	3,93E-05	2,19E-07	2,29E-08	4,19E-07	2,46E-05	5,55E-06	0,00E+0	3,91E-09	1,78E-07	4,59E-08	-4,89E-08
SQP*	-	3,79E+03	1,84E+02	1,80E+00	1,40E+02	7,39E+03	2,13E+02	0,00E+0	3,28E+00	1,16E+01	1,08E+01	-2,11E+01

Acronyms

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality

[1]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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

The results for A1-A3 should also consider the results from module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Resource use indicators

Results per declared unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B3**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9,90E+02	3,77E+00	6,35E+01	1,12E+02	8,01E+03	1,10E+02	0,00E+0	6,73E-02	2,80E-01	2,65E-01	-2,82E+00
PERM	MJ	6,35E+01	0,00E+00	-6,35E+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
PERT	MJ	1,05E+03	3,77E+00	6,06E-02	1,12E+02	8,01E+03	1,10E+02	0,00E+0	6,73E-02	2,80E-01	2,65E-01	-2,82E+00
PENRE	MJ	5,29E+03	2,84E+02	1,94E+00	2,41E+03	4,32E+04	5,14E+02	0,00E+0	5,07E+00	2,87E+02	8,77E+00	-3,02E+01
PENRM	MJ	2,78E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,78E+02	0,00E+00	0,00E+00
PENRT	MJ	5,57E+03	2,84E+02	1,94E+00	2,41E+03	4,32E+04	5,14E+02	0,00E+0	5,07E+00	9,33E+00	8,77E+00	-3,02E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Acronyms

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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators

Results per declared unit												
	Unit	**A1-A3**	**A4**	**A5**	**B3**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
CR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	0,00E+00	0,00E+00	0,00E+00
MR	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	2,58E+00	0,00E+00	0,00E+00
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+0	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	1,25E+00	0,00E+00	0,00E+00
ETE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+0	3,74E+00	0,00E+00	0,00E+00

Acronyms

CR Components for reuse; **MR** Materials for recycling; **MER** Materials for energy recovery; **EEE** Exported electric energy; **ETE** Exported thermal energy

Output flow indicators

Results per declared unit												
	Unit	**A1-A3**	**A4**	**A5**	**B3**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
HW	[kg]	3,87E-02	6,99E-04	3,89E-06	3,94E-04	3,21E-02	1,16E-02	0,00E+0	1,25E-05	2,26E-05	2,09E-05	-2,00E-04
NHW	[kg]	1,07E+02	1,38E+01	1,45E+00	2,11E+00	1,44E+02	1,79E+01	0,00E+0	2,46E-01	2,60E+01	2,35E+01	-9,66E-02
RW	[kg]	2,00E-02	1,81E-03	8,75E-06	1,15E-03	2,87E-01	2,79E-03	0,00E+0	3,23E-05	4,89E-05	4,69E-05	-9,37E-05

Acronyms

HW Hazardous waste disposed; **NHW** Non-hazardous waste disposed; **RW** Radioactive waste disposed;

The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used. To quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Additional environmental information

Orbital Shower water and energy savings

Orbital Shower aims to save water and energy. The actual saving depends mainly on the following parameters such as:

- Shower length
- Shower flow
- Shower temperature
- Usage of soap, shampoo, conditioner

In a test by Rise, the performance of Orbital Shower during a shower with the following conditions was evaluated:

- 10 minute shower session
- 38 °C shower temperature
- 10 lpm shower flow
- Using 2 in 1 Soap and shampoo
- Household use

See Rise report: 22-1134160-01-1 for further details.

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