Environmental Product Declaration

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

Shower Systems based on reference product 57954

from

damixa

This EPD covers multiple products.

Programme:	The International EPD® System, www.environdec.com
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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): Construction products, 2019:14, version 1.3.1
PCR review was conducted by: *The Technical Committee of the International EPD® System. Chair of the PCR review: Claudia A. Peña. The review panel may be contacted via info@environdec.com*
Life Cycle Assessment (LCA)
LCA accountability: Uniben Tettey, RISE Research Institutes of Sweden
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: Hannu Karppi, Ramboll Finland Oy Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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Company information

Owner of the EPD: FM Mattsson Denmark ApS

Contact: Phone: +45 88330034
Mail: danmark@fmmattssongroup.com
Web: www.damixa.dk

Description of the organisation: Damixa is a Danish design and engineering company and our mission is to create timeless design combined with practical features and good workmanship.
In 2014, Damixa became a part of the Swedish FM Mattsson Group, who is market leading in mixers and shower systems in the Nordic region.
FM Mattsson Group conducts the sale, manufacturing and product development of water mixers and related products under the established brands of FM Mattsson, Mora, Damixa, Hotbath, Aqualla and Adamsez.
The group's vision is to be the customer's first choice in the bathroom, kitchen and beyond.
In 2022 the business generated sales of more than 1.9 billion SEK from its companies in Sweden, Norway, Denmark, Finland, Benelux, UK, Germany and Italy and had 559 employees.

FM Mattsson Group is listed on Nasdaq Stockholm.

Product-related or management system-related certifications: Designation according to EN 1111, EN 1112 and EN 1113.

Name and location of production site(s):

FM Mattsson Denmark ApS
Hvidkærvej 48
5250 Odense SV
Denmark

Product information

Product group name: Damixa Shower Systems.

This EPD covers the product group - Damixa Shower Systems. The EPD is based on the worst-case approach, where results per kg product for the worst-case product within the product group are declared. The criterion for defining the worst-case product is mainly based on the net weight of the included products in the product group.

Reference product and included products: This EPD covers the product group - Damixa Shower Systems and the reference wort-case product is 57954 Silhouet shower system. The complete list of products covered by this EPD is presented at the end of this document.

Product group identification: Damixa Shower Systems consisting of thermostatic shower mixer according to EN 1111, head- and hand shower according to EN 1112 and shower hose according to EN 1113.

Product group description: Damixa Shower Systems are meant for installation in bathrooms. The product consists of a thermostatic shower mixer, head- and hand shower, shower hose with anti-twist, and adjustable shower rails for improved installation.
The products include built-in features such as Rub-clean for easy cleaning of the spray nozzle. Eco-Click for limitation of water flow and anti-scalding temperature limitation.

UN CPC code: 42911 – Sinks, washbasins, baths and other sanitary ware and parts thereof, of iron, steel, copper, and aluminum.

Geographical scope: The processes in modules A1-A3 have been modelled for China and Europe. The use phase (module B7) and end-of-life (module C) of the product’s performance been modelled the European region.

LCA information

Functional unit / declared unit: 1 kg of Damixa Shower System

Reference service life[1]: 10 years

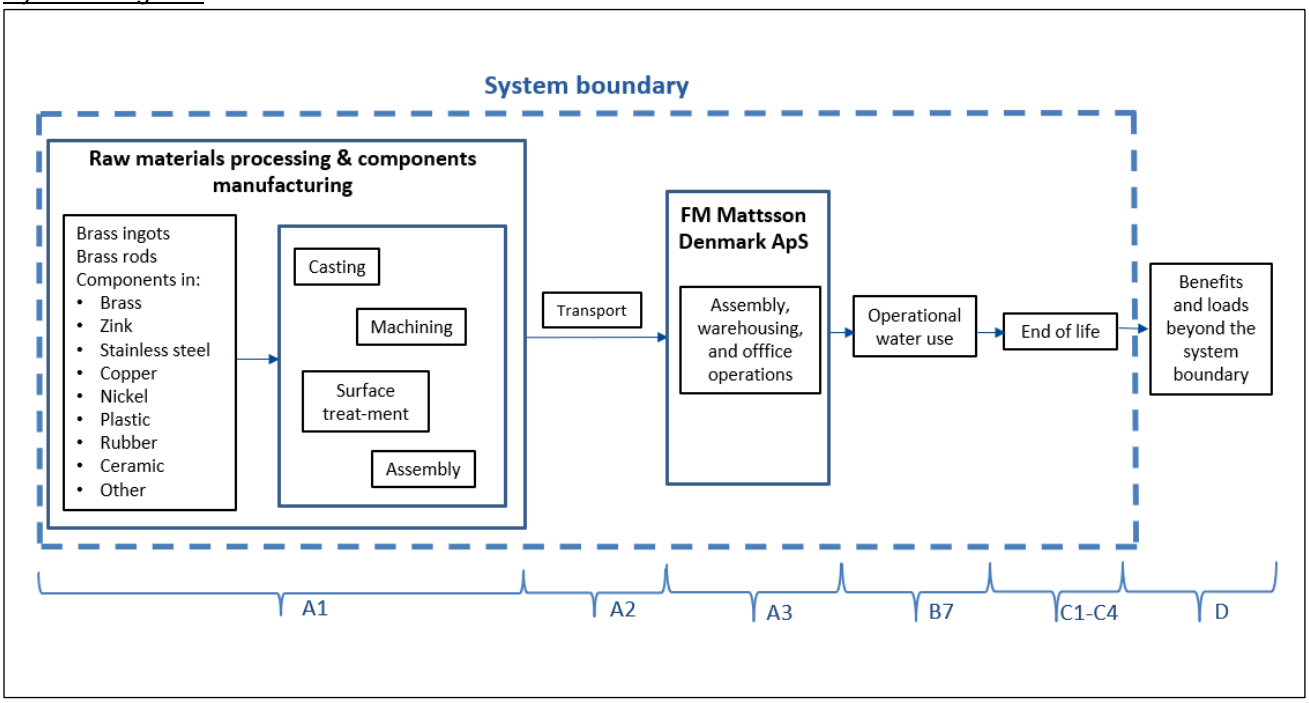
Time representativeness: The data used for the LCA calculation covers bill-of-materials as well as operations at FM Mattsson Denmark ApS for the year 2022.

Cut-off criteria: All materials and energy used to manufacture the shower systems are included.

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

Description of system boundaries: Cradle to gate (A1-A3) with options, i.e., also operational water use module B7, waste management modules C1–C4 and beyond end-of-life module D.

System diagram:



[1] The reference service life is defined based on Cordella M. et al. (2014).

More information

LCA Practitioner: Uniben Tettey, RISE Research Institutes of Sweden

Additional information: Modelling of all product components are based on production bill-of-material for the year 2022.

Supplier specific electricity mixes and corresponding GWP impact: China, southwest region – Main supplier, (90% grid electricity and 10% solar power): 301 g CO_2/kWh; China, southwest region – other suppliers: 326 g CO_2/kWh; China – unknown location: 983 g CO_2/kWh; Italy: 445 g CO_2/kWh.

Electricity used in module A3: Purchased electricity for operations at FM Mattsson Denmark ApS is 100% renewable based, from wind power with a GWP impact of 14.5 g CO2-eq/kWh.

Information about scenarios and additional technical information: Information about the scenario for operational water use for this product is provided under “Additional Information” below.

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	ND	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X
Geography	Global /EU	Global /EU	DK		EU							EU	EU	EU	EU	EU	EU
Specific data used	90% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	33% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%, all A3 in one site					-	-	-	-	-	-	-	-	-	-	-	-

LCA MODULES	
A1 Raw material supply: This module relates to raw material extraction and processing, processing of secondary material input (e.g. recycling processes), transport to component manufacturing and component manufacturing.	**C1 De-construction:** This module relates to the dismantling of the shower systems at the end-of-life. It is assumed that the dismantling is done manually and the related impacts are assumed to be negligible.
A2 Transportation: This module relates to transport from raw material extraction and processing, and component manufacturing to suppliers and FM Mattsson Denmark ApS.	**C2 Waste Transport:** This module relates to the transport of the dismantled shower system to final waste disposal. An average distance of 100 km from demolition site to waste processing site is assumed.
A3 manufacturing: This module covers operational activities at FM Mattsson Denmark ApS. The processes cover assembly, warehousing and office operations for the shower systems at FM Mattsson Denmark ApS.	**C3 Waste processing:** This module covers impacts related to sorting and recycling processes for the relevant material components of the shower systems. It is assumed that 90% of the brass and non-brass metals as well as 74% of the packaging wastes are recovered for recycling. The remaining portions of the brass, non-brass metals as well as all the plastics and rubber components are assumed to be incinerated with energy recovery.
A5 Construction installation: This module covers transport of cardboard and paper packaging wastes to waste management and their incineration. It is assumed that 26% of the packaging waste is incinerated.	**C4 Waste disposal:** This module relates to waste disposal processes such as landfilling. For the shower systems it is assumed that the ceramic components in the studied products are landfilled.
B7 Operational: This module covers the production, heating and wastewater treatment of tap water use over the reference service life of one shower system used by one person. Further details on the scenario for operational water use are given in “Additional Information” below.	**D Benefits and loads beyond system boundary:** This module covers benefits and loads associated with recovery/recycling beyond the defined system boundary for the shower system. This includes benefits from recycling and waste incineration.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Brass	0.517	74	0
Zinc	0.095	0	0
Stainless steel	0.133	55	0
Copper	0.006	0	0
Nickel	0.009	0	0
Chromium	0.000	0	0
Plastic	0.226	0	0
Rubber	0.014	0	0
TOTAL	1.000		0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Corrugated board	0.228	22.8	0.114
Paper	0.009	0.9	0.005
TOTAL	0.237	23.7	0.119

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional unit

Lead	231-100-4	7439-92-1	0.97

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per kg shower system									
Indicator	**Unit**	**A1-A3**	**A5**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	1.58E+01	2.13E-02	2.19E+02	0.00E+00	1.90E-02	6.46E-01	0.00E+00	-1.74E+00
GWP-biogenic	kg CO_2 eq.	-5.26E-01	2.16E-01	1.67E+01	0.00E+00	1.88E-05	3.21E-02	0.00E+00	2.17E-02
GWP-luluc	kg CO_2 eq.	2.48E-02	8.20E-06	1.35E-01	0.00E+00	9.19E-06	2.07E-04	0.00E+00	-6.01E-03
GWP-total	kg CO_2 eq.	1.58E+01	1.24E-01	2.36E+02	0.00E+00	1.90E-02	6.79E-01	0.00E+00	-1.72E+00
ODP	kg CFC 11 eq.	7.55E-05	6.45E-10	3.62E-06	0.00E+00	4.02E-10	4.62E-09	0.00E+00	-2.50E-08
AP	mol H^+ eq.	2.74E-01	1.04E-04	9.33E-01	0.00E+00	4.04E-05	7.01E-04	0.00E+00	-5.45E-02
EP-freshwater	kg P eq.	1.53E-02	2.53E-06	1.05E-01	0.00E+00	1.31E-06	6.73E-05	0.00E+00	-4.44E-03
EP-marine	kg N eq.	2.74E-02	4.47E-05	5.86E-01	0.00E+00	1.02E-05	2.46E-04	0.00E+00	-4.16E-03
EP-terrestrial	mol N eq.	3.02E-01	4.26E-04	1.45E+00	0.00E+00	1.04E-04	1.98E-03	0.00E+00	-4.90E-02
POCP	kg NMVOC eq.	9.44E-02	1.53E-04	7.23E-01	0.00E+00	6.27E-05	6.42E-04	0.00E+00	-1.43E-02
ADP-minerals&metals*	kg Sb eq.	2.59E-03	8.19E-08	2.23E-04	0.00E+00	6.04E-08	7.67E-07	0.00E+00	-8.00E-04
ADP-fossil*	MJ	2.08E+02	2.32E-01	2.76E+03	0.00E+00	2.62E-01	2.28E+00	0.00E+00	-2.20E+01
WDP*	m^3	4.85E+01	1.99E-03	8.94E+01	0.00E+00	1.10E-03	2.90E-02	0.00E+00	-1.25E+00
Acronyms	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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** 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 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.

As this EPD includes module C, the use of the results of modules A1-A3 without considering the results of module C is discouraged.

Additional mandatory and voluntary impact category indicators

Results per kg shower system									
Indicator	**Unit**	**A1-A3**	**A5**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2]	kg CO_2 eq.	1.59E+01	2.13E-02	2.19E+02	0.00E+00	1.90E-02	6.47E-01	0.00E+00	-1.75E+00

Resource use indicators

Results per kg shower system									
Indicator	**Unit**	**A1-A3**	**A5**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.21E+01	8.07E-03	3.38E+02	0.00E+00	4.12E-03	2.89E-01	0.00E+00	-5.87E+00
PERM	MJ	3.77E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.77E+00	0.00E+00	0.00E+00
PERT	MJ	5.58E+01	8.07E-03	3.38E+02	0.00E+00	4.12E-03	-3.49E+00	0.00E+00	-5.87E+00
PENRE	MJ	2.08E+02	2.32E-01	2.76E+03	0.00E+00	2.62E-01	2.28E+00	0.00E+00	-2.20E+01
PENRM	MJ	6.04E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.04E+00	0.00E+00	0.00E+00
PENRT	MJ	2.14E+02	2.32E-01	2.76E+03	0.00E+00	2.62E-01	-3.76E+00	0.00E+00	-2.20E+01
SM	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
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
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
FW	m^3	6.21E-01	1.28E-04	4.14E+01	0.00E+00	7.94E-05	4.60E-03	0.00E+00	-2.46E-02
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								

[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per kg shower system									
Indicator	**Unit**	**A1-A3**	**A5**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	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
Non-hazardous waste disposed	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
Radioactive waste disposed	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

Output flow indicators

Results per kg shower system									
Indicator	**Unit**	**A1-A3**	**A5**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	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
Material for recycling	kg	0.00E+00	1.75E-01	0.00E+00	0.00E+00	0.00E+00	2.90E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	6.16E-02	0.00E+00	0.00E+00	0.00E+00	2.03E-01	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.99E-01
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.41E+00

Additional environmental information

Overall, the results for the potential environmental impacts over the entire life cycle of the shower systems show that the use phase (B7) related to operational water use is by far the most significant contributor. It illustrates the importance of the use phase in reducing environmental impacts associated with sanitary fitting products. Design of energy-efficient products, choice of renewable energy sources during the use phase as well as appropriate user behaviour can play a significant role in lowering the use phase impacts. Studies have shown that up to 40% energy savings can be realized through energy-efficient taps and showers (Dodoo et al. 2017; Folkeson et al., 2017).

Operational water use scenario

For this product, the scenario for operational water use has been modelled based on average performance parameters for shower systems derived from a study by Cordella M. et al. (2014), on different sanitary products within the EU and information from the European Water Label (EWL, 2022). The parameters used to estimate the water use for the shower systems as well as the energy mix for water heating are given in the tables below. Based on the given parameters and assumptions, the annual average water consumption for this product is 2 555 liters per person. About 90% of this is assumed to be hot water use and the corresponding annual energy use to heat the water is about 60 kWh. Note that the corresponding climate impact for module B7, 236 kg CO2-eq is based on an assumed flow rate of 1 liter/minute for 10 years of use by one person and also includes water production and distribution, as well as waste water treatment. In order to estimate the climate impact for B7 for a specific shower system, the climate impact result of 236 kg CO2-eq should be multiplied by its actual nominal flow rate and further information on the nominal flow rates of the listed shower systems is available at www.damixa.dk

Parameters used to model the operational water use for the shower systems

Parameter	Value	Unit
Reference flow	1	l/minute
Use cycles	1	Per person/day
Duration of use cycle	7	Minute
Share of hot water use	90	%
Cold water inlet temperature	15	ºC
Outlet mixed water temperature	38	ºC
Specific heat capacity of water	4.18	kJ/(kg·K)
Density of water	0.981	kg/l

The energy mix for the operational water use scenario is modelled based on data for different fuel mixes for water heating in EU households for 2020 (Eurostat, 2022). In 2020, 15% of the total final energy use in the EU was for water heating in the residential sector.

Energy mix for operational water heating modelling	
Energy source	**Share, %**
Solid fossil fuels and peat	8.97
Natural gas	22.18
Oil and petroleum products	16.78
Renewables and biofuels	11.84
Electricity	13.79
Heat	26.44
Total	100
Corresponding GWP	346 g CO2-eq/kWh

Differences versus previous versions

This is the first version of the EPD so there are no differences versus previous versions of the EPD.

References

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This EPD cover a group of products – Damixa Shower Systems, and is based on the reference product 57954 Silhouet shower system which, as a worst case, represents all the shower systems listed below:

Series	Article number	Description	Weight (g)
Core	59954	Shower system, 150cc	3721
Core	59959	Shower system, 160cc	3418
Pine	57970	Shower system, 150cc	4688
Pine	57973	Shower system, 160cc	4429
Mora LionX	391900	Shower system, 150cc	4688
Viskan	49830000	Shower system, 160cc	4429
Silhouet	57954	Shower system, 150cc	4650
Silhouet	57959	Shower system, 160cc	4413

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