

# Environmental Product Declaration



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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							

In accordance with ISO 14025:2006 & EN 15804:2012+A2:2019/AC:2021 for **Head shower kits, FM Mattsson 9000XE** 

From FM Mattsson Group

# 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 & independent, third-party verification

	CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR)	Product Category Rules (PCR): Construction products, 2019:14, version 1.2.5
	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 Organization: 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

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

EPDs within the same product category but from different programmers may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

## **Company information**

Owner Of The EPD	FM Mattsson Group
Contact	Phone: +46 250 59 60 00 Email: info@fmmattssongroup.com www.fmmattsson.com
Description Of The Organisation	<ul> <li>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.</li> <li>Our vision is to become customer's first choice in the bathroom and kitchen.</li> <li>In 2021 the business generated sales of more than 1.8 billion SEK from its companies in Sweden, Norway, Denmark, Finland, Benelux, UK, Germany and Italy and had 532 employees.</li> <li>FM Mattsson Group is listed on Nasdaq Stockholm.</li> </ul>
Product/Management System Related Certifications	ISO 9001:2015 ISO 14001:2015
Address Production Site	FM Mattsson Group Östnorsvägen 95 792 95 Mora, Sweden

#### Sustainable flows

Responsible use of water is about protecting vital resources and all our futures. At FM Mattsson, we are constantly working to identify new solutions that use and distribute water in ways that are sustainable both for the environment and for people.

Consumers, architects, property owners, builders, companies, municipalities, and governments – we all benefit from saving water and energy. And we all have a responsibility to protect our shared resources for future generations.

FM Mattsson develops energy-efficient products for the future - continuing over 150 years of development and a passion for sustainable solutions. The Research Institute of Sweden, RISE, carried out a two-year project analysing different energyefficient mixers from multiple brands, including FM Mattsson, in an apartment building (Folkeson et al., 2017). It was found that considerable savings can be made in both newly constructed and existing buildings – and that energy-efficient mixers offer hot water savings of up to 28 percent.

FM Mattsson also works to drive change in people's habits and their relationship with water, both privately and professionally. It is about simple changes, such as not wasting drinking water and reducing the amount of water being heated and hot water being consumed unnecessarily. Minor adjustments and new habits reduce energy consumption and create positive change –for people's personal finances and our planet.

The average person in Sweden consumes around 140 litres of water per day at home, of which approximately 60 litres is hot water. Therefore, FM Mattsson has developed the concept of sustainable water habits – a collection of tips and advice to save water and energy in day-to-day life.

A sustainable flow of water for the future, that's our mission.

## **Product information**

Product Name	Head shower kits, FM Mattsson 9000XE
Reference Product	The reference product Head shower kit 86870000 was chosen as the representative product based on high sales volume.
Product Identification	Head Shower kit consisting of thermostatic mixing valve according to EN 1111, head/hand shower according to EN 1112 and shower hose according to EN 1113
Product Description	FM Mattsson 9000XE Head shower kits include built-in features for limitation of water flow and temperature limitation to ensure a sustainable product life cycle with efficient use of water and energy during the usage phase and fulfills e.g. the flow rate requirements of the EU Taxonomy.
UN CPC Code	42911 - Sinks, washbasins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminium
Geographical Scope	Europe

## LCA information

Functional Unit/Declared Unit	One head shower kit, FM Mattsson 9000XE					
Reference Service Life <sup>1</sup>	10 years					
Time Representativeness	Bill-of-material from 2022. Operations in Mora represented with data from 2021.					
Cut-Off Criteria	All materials and energy used to manufacture the head shower kit are included.					
Databases and LCA Software Used	Ecoinvent 3.8 SimaPro 9.4.0.2					
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.					

<sup>1</sup> The reference service life is defined based on (Cordella M. et al., 2014).

# System diagram



# More information

LCA Practitioner	Uniben Tettey, RISE Research Institutes of Sweden				
Additional information	Modelling of all components from production bill-of-material. Supplier specific electricity mixes and corresponding GWP impact: China, Guangdong province 931 g CO2/kWh; China, Fujian province 860 g CO2/kWh; Hungary 450 g CO2/kWh; Lithuania 490 g CO2/kWh; Spain 323 g CO2/kWh; Denmark 292 g CO2/kWh; Sweden 46 g CO2/kWh; and European average 392 g CO2/kWh).				
Electricity used in module A3	Electricity for operations in Mora is 100% renewable based with a mix from hydro, wind and solar with a GWP impact of 11.4 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 indicator) & data variation

	Droduct stado			Constr proces		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	AЗ	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	СЗ	C4	D
Modules declared	x	х	х	ND	ND	ND	ND	ND	ND	ND	ND	х	x	x	х	х	x
Geography	Global /EU	Global /EU	SE										EU	EU	EU	EU	EU
Specific data used	90% for GWP in A1-A3				-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	<10% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites		0%, a	II A3 in or	ne site		-	-	-	-	-	-	-	-	-	-	-	-

# Modules explained

### 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.

#### A2 Transportation

This module relates to transport from raw material extraction and processing, and component manufacturing to FM Mattsson Mora.

#### A3 manufacturing

This module covers the relevant production processes for the 9000XE head shower kits at FM Mattsson Mora. The processes cover casting, machining, surface treatment and assembling of components. Treatment of waste and wastewater are also included.

#### **B7** Operational

This module covers the production, heating and wastewater treatment of tap water use over the reference service life of one head shower kit used by one person. Further details on the scenario for operational water use are given in "Additional Information" below.

#### C1 De-construction

This module relates to the dismantling of the head shower kit at the end-of-life. It is assumed that the dismantling is done manually and the related impacts are assumed to be negligible.

#### C2 Waste Transport

This module relates to the transport of the dismantled head shower kit to final waste disposal. An average distance of 100 km from demolition site to waste processing site is assumed.

#### C3 Waste processing

This module covers impacts related to sorting and recycling processes for the relevant material components of the head shower kit. It is assumed that 90% of the brass and non-brass metals as well as 74% of the packaging wastes are recovered for recycling.

#### C4 Waste disposal

This module relates to waste disposal processes such as landfilling or incineration. For the head shower kit it is assumed that the remaining material components i.e. plastics, rubber, etc. as well as the remaining 10% of the brass and non-brass metals and 26% of the packaging wastes are incinerated.

#### D Benefits and loads beyond system boundary

This module covers benefits and loads associated with recovery/ recycling beyond the defined system boundary for the head shower kit. This includes benefits from recycling and waste incineration.

# **Content information**

Product components	Weight, g	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg		
Brass	1354.5	80	0		
Zink	100.0	0	0		
Stainless steel	1104.8	50	0		
Plastic	1021.7	1021.7 0			
Rubber	14.3	0	0		
Ceramic	9.7	0	0		
Nickel	150.9	35	0		
Copper	39.9	15	0		
Chrome	2.5	15	0		
Total	3798.3	-	-		
Packaging materials	Weight, g	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg product		
Corrugated board	135.0	35.5	0.19		
Paper	33.3	0.9	0.004		
Total	1390.3	36.7	0.19		

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit						
Lead	231-100-4	7439-92-1	<0.1						
This product do not contain substances which exceed the limits for registration at the European Chemicals Agency regarding the Candidate List of Substances of Very High Concern for authorization.									

# Environmental information

### Potential environmental impact - mandatory indicators according to EN 15804

	Results per head shower kit, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D	
GWP- fossil	kg CO <sub>2</sub> eq.	5.68E+01	2.11E+00	1.96E+00	6.08E+01	1.79E+03	0.00E+00	5.53E-02	2.54E-01	2.42E+00	-1.14E+01	
GWP- biogenic	kg CO <sub>2</sub> eq.	-4.41E-01	1.36E-03	1.21E-01	-3.18E-01	8.47E+01	0.00E+00	4.23E-05	3.15E-02	5.16E-01	2.71E-01	
GWP- luluc	kg CO <sub>2</sub> eq.	3.75E-02	1.15E-03	2.57E-05	3.87E-02	1.05E+00	0.00E+00	2.24E-05	4.74E-04	4.95E-05	-2.79E-02	
GWP- total	kg CO <sub>2</sub> eq.	5.64E+01	2.11E+00	2.08E+00	6.06E+01	1.87E+03	0.00E+00	5.54E-02	2.87E-01	2.94E+00	-1.11E+01	
ODP	kg CFC 11 eq.	6.72E-06	4.55E-07	9.92E-08	7.28E-06	1.35E-04	0.00E+00	1.25E-08	1.79E-08	1.76E-08	-7.73E-07	
AP	mol H+ eq.	6.37E-01	3.65E-02	5.86E-03	6.80E-01	9.17E+00	0.00E+00	1.59E-04	1.35E-03	7.85E-04	-5.80E-01	
EP- freshwater	kg P eq.	1.83E-02	1.04E-04	5.26E-04	1.90E-02	8.02E-01	0.00E+00	3.80E-06	2.00E-04	2.06E-05	-4.58E-02	
EP- marine	kg N eq.	6.61E-02	8.95E-03	1.80E-03	7.68E-02	5.20E+00	0.00E+00	3.23E-05	3.05E-04	4.02E-04	-3.54E-02	
EP- terrestrial	mol N eq.	6.81E-01	9.93E-02	1.84E-02	7.99E-01	1.43E+01	0.00E+00	3.52E-04	2.75E-03	3.65E-03	-4.51E-01	
POCP	kg NM- VOC eq.	2.07E-01	2.65E-02	4.56E-03	2.38E-01	5.48E+00	0.00E+00	1.34E-04	8.33E-04	9.06E-04	-1.25E-01	
ADP- minerals & metals*	kg Sb eq.	1.58E-03	5.11E-06	1.25E-06	1.59E-03	3.12E-03	0.00E+00	1.95E-07	8.60E-07	4.09E-07	-1.37E-02	
ADP- fossil*	MJ	6.08E+02	2.96E+01	1.54E+01	6.53E+02	2.27E+04	0.00E+00	8.32E-01	4.74E+00	6.08E-01	-1.69E+02	
WDP*	m <sup>3</sup>	2.64E+02	7.22E-02	3.86E+02	6.51E+02	3.53E+03	0.00E+00	2.65E-03	4.95E-02	6.92E-01	-1.15E+01	
Acronyms	land use an Exceedance potential, fra = Formation	d land use ch e; EP-freshwa action of nutri n potential of	ange; ODP = ater = Eutroph ents reaching tropospheric o	Depletion por ication potent marine end c ozone; ADP- r	tential of the s tial, fraction of compartment; minerals & me	c = Global Wa stratospheric of f nutrients rea EP-terrestrial etals = Abiotic vation potentia	ozone layer; A ching freshwa = Eutrophica depletion pot	P = Acidificat ter end comp tion potential, cential for non-	ion potential, partment; EP-1 Accumulated fossil resourc	Accumulated marine = Eutro Exceedance ces; ADP-foss	ophication ; POCP	

\* 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.

## Potential environmental impact - additional mandatory & voluntary indicators

	Results per head shower kit, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D	
GWP- GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	5.68E+01	2.11E+00	1.96E+00	6.09E+01	1.79E+03	0.00E+00	5.53E-02	2.54E-01	2.42E+00	-1.14E+01	

### Use of resources

Results per head shower kit, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
PERE	MJ	1.21E+02	3.30E-01	3.06E+02	4.27E+02	2.67E+03	0.00E+00	1.13E-02	7.32E-01	4.67E-02	-4.80E+01
PERM	MJ	0.00E+00									
PERT	MJ	1.21E+02	3.30E-01	3.06E+02	4.27E+02	2.67E+03	0.00E+00	1.13E-02	7.32E-01	4.67E-02	-4.80E+01
PENRE	MJ	6.08E+02	2.96E+01	1.53E+01	6.53E+02	2.27E+04	0.00E+00	8.32E-01	4.74E+00	6.08E-01	-1.68E+02
PENRM	MJ	0.00E+00									
PENRT	MJ	6.08E+02	2.96E+01	1.53E+01	6.53E+02	2.27E+04	0.00E+00	8.32E-01	4.74E+00	6.08E-01	-1.68E+02
SM	kg	0.00E+00									
RSF	MJ	0.00E+00									
NRSF	MJ	0.00E+00									
FW	m <sup>3</sup>	3.16E-01	3.55E-03	1.67E-02	3.36E-01	1.96E+02	0.00E+00	1.23E-04	1.00E-03	6.08E-04	-1.52E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources; permetails; perme										

<sup>1</sup> 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 production & output flows

### Waste production

Results per head shower kit, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	0.00E+00	4.29E-01	4.29E-01	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	7.68E-01	7.68E-01	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									

## **Output flows**

Results per head shower kit, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00									
Material for recycling	kg	0.00E+00	0.00E+00	1.47E+00	1.47E+00	0.00E+00	0.00E+00	0.00E+00	3.34E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00									
Exported energy, electricity	MJ	0.00E+00									
Exported energy, thermal	MJ	0.00E+00									

# Additional information

Overall, the results for the entire life cycle indicate that the use phase (B7) related to operational water use is by far the most significant contributor to the environmental impacts of this product. 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 this regard. 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 head shower kits 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 head shower kit 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 20 440 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 estimated to 482 kWh. Note that the corresponding climate impact in B7, 1870 kg CO2-eq for 10 years of use by one person also includes water production and distribution, and waste water treatment.

Parameters for operational water use modelling for head shower kits, FM Mattsson 9000XE								
Parameter	Value	Unit						
Reference flow	8	l/minute						
Use cycles	1	cycles/person/day						
Duration of use cycle	7	Minute						
Share of hot water use	90	%						
Cold water inlet temperature	15	٥C						
Outlet mixed water temperature	38	۰C						
Specific heat capacity of water	4.18	kJ/(kg·K)						
Density of water	0.981	kg/l						
Reference service life	10	years						

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 CO <sub>2</sub> -eq/kWh					

Environmental Product Declaration: Head shower kits, FM Mattsson 9000XE

# Differences versus previous versions

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

## References

Cordella Mauro, Garbarino Elena, Calero Maria, Mathieux Fabrice, Wolf Oliver. (2014) MEErP preparatory study on taps and Showers. Final report EUR 26939 EN. European Commission Joint Research Centre.

Dodoo et al. (2017) Final energy savings and cost-effectiveness of deep energy renovation of a multi-storey residential building, Energy, Volume 135, 2017, Pages 563-576, ISSN 0360-5442, <u>https://doi.org/10.1016/j.energy.2017.06.123</u>.

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Eurostat, 2022. Share of fuels in the final energy consumption in the residential sector by type of end-use, EU, 2020. Accessed on 18-10-2022 via <a href="https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Share">https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Share</a> of fuels in the final energy consumption in the residential sector by type of end-use, EU, 2020 (%25) v5.png

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