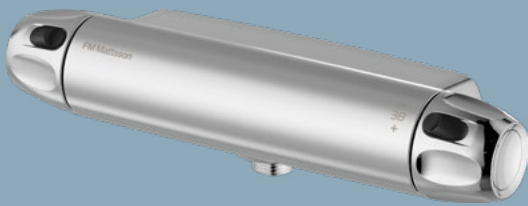


# Environmental Product Declaration



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**Programme** The International EPD® System

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**Programme Operator** EPD International AB

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**EPD Registration Number** S-P-05747

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**Publication Date** 2023-02-24

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**Valid Until** 2028-02-24

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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](http://www.environdec.com)

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

From  
**FM Mattsson Group**

# General information

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## Programme information

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**Programme**

The International EPD® System

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**Address**

EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden

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**Website**

[www.environdec.com](http://www.environdec.com)

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**E-mail**

[info@environdec.com](mailto:info@environdec.com)

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## Accountabilities for PCR, LCA & independent, third-party verification

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<b>Product Category Rules (PCR)</b>	<p>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</p> <p>Product Category Rules (PCR): Construction products, 2019:14, version 1.2.5</p> <p>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 <a href="mailto:info@environdec.com">info@environdec.com</a></p>
<b>Life Cycle Assessment (LCA)</b>	<p>LCA accountability: Uniben Tetley Organization: RISE Research Institutes of Sweden</p>
<b>Third-party verification</b>	<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by individual verifier</p> <p>Third-party verifier: Hannu Karppi, Ramboll Finland Oy</p> <p>Approved by: The International EPD® System</p>
<b>Procedure for follow-up of data during EPD validity involves third party verifier</b>	<p>Yes    No</p>

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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

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**Owner Of The EPD**

FM Mattsson Group

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**Contact**

Phone: +46 250 59 60 00  
Email: [info@fmmattssongroup.com](mailto:info@fmmattssongroup.com)  
[www.fmmattsson.com](http://www.fmmattsson.com)

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**Description Of The Organisation**

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.

Our vision is to become customer's first choice in the bathroom and kitchen.  
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.

FM Mattsson Group is listed on Nasdaq Stockholm.

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**Product/Management System Related Certifications**

ISO 9001:2015  
ISO 14001:2015

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**Address Production Site**

FM Mattsson Group  
Östnorsvägen 95  
792 95 Mora, Sweden

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## 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.

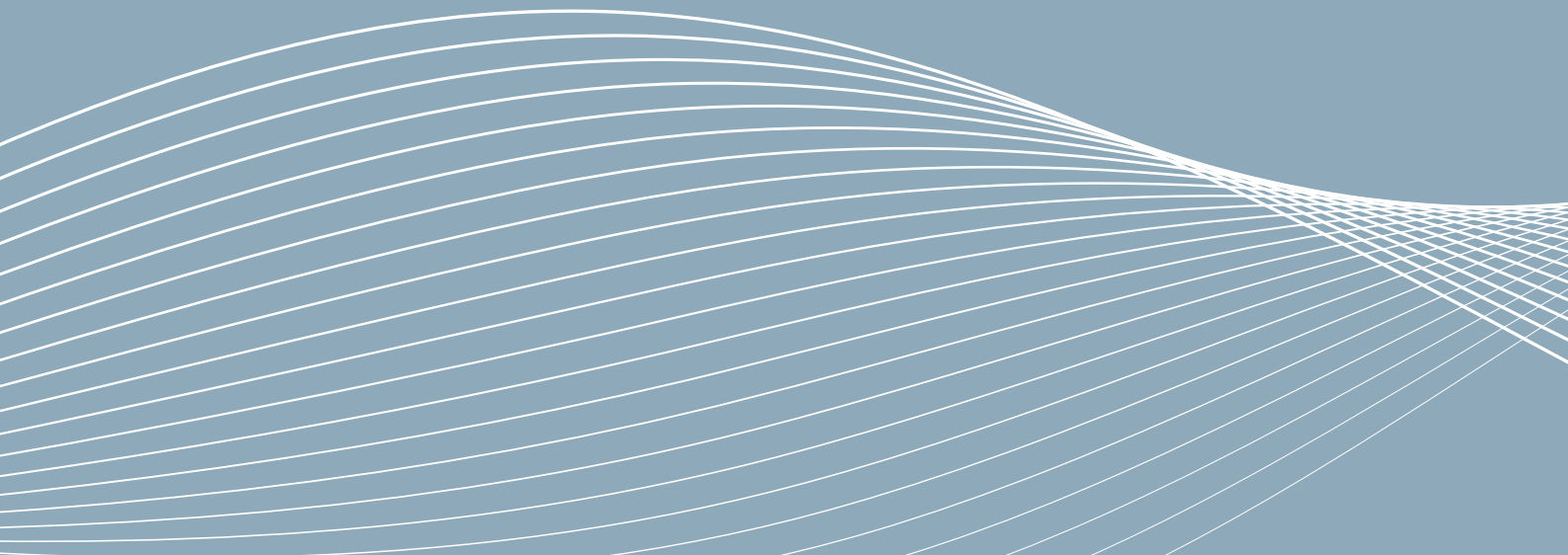
Consumers, architects, property owners, builders, companies, municipalities, and governments – we all benefit from saving water and energy. And we all have a responsibility to protect our shared resources for future generations.

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 energy-efficient mixers from multiple brands, including FM Mattsson, in an apartment building (Folkesson 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

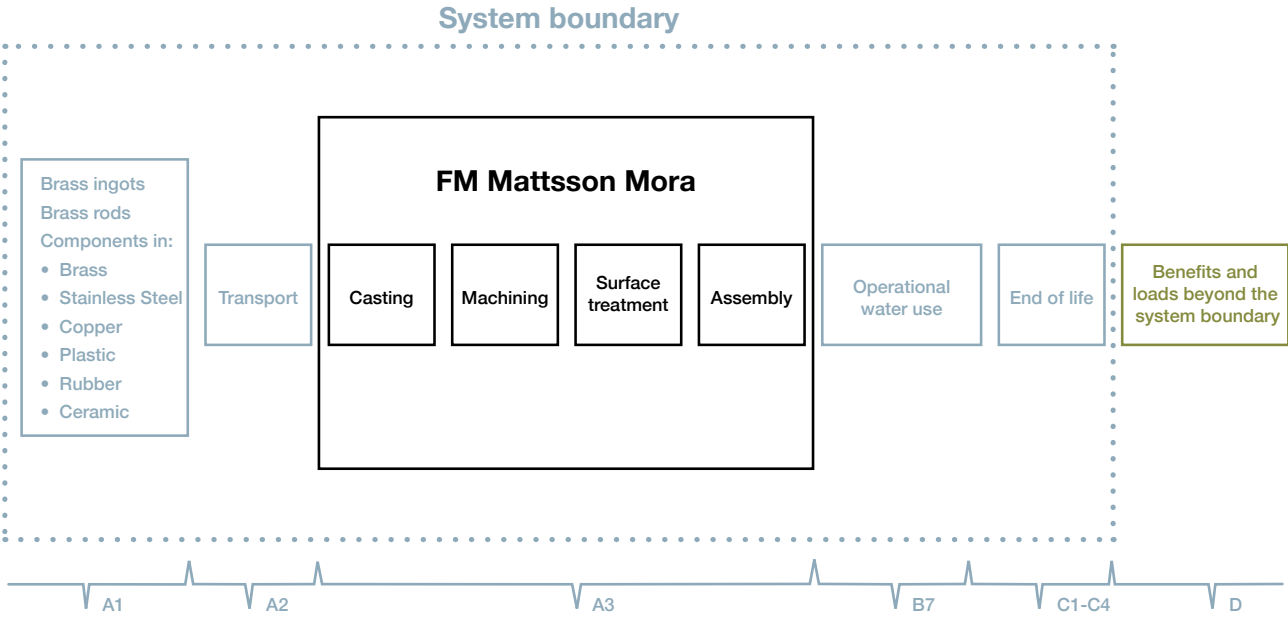
<b>Product Name</b>	Shower mixers, FM Mattsson 9000XE
<b>Reference Product</b>	The reference product Shower mixer 86800000 was chosen as the representative product based on high sales volume.
<b>Product Identification</b>	Thermostatic mixing valve for shower, vertical mounted, two hole exposed, according to EN 1111
<b>Product Description</b>	FM Mattsson 9000XE Shower mixers 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.
<b>UN CPC Code</b>	42911 - Sinks, washbasins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminium
<b>Geographical Scope</b>	Europe

## LCA information

<b>Functional Unit/Declared Unit</b>	One shower mixer, FM Mattsson 9000XE
<b>Reference Service Life<sup>1</sup></b>	16 years
<b>Time Representativeness</b>	Bill-of-material from 2022. Operations in Mora represented with data from 2021.
<b>Cut-Off Criteria</b>	All materials and energy used to manufacture the shower mixer are included.
<b>Databases and LCA Software Used</b>	Ecoinvent 3.8 SimaPro 9.4.0.2
<b>Description of System Boundaries</b>	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

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**LCA Practitioner**

Uniben Tettesy, RISE Research Institutes of Sweden

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**Additional information**

Modelling of all components from production bill-of-material. Supplier specific electricity mixes and corresponding GWP impact: China, Guangdong province 931 g CO<sub>2</sub>/kWh; Lithuania 490 g CO<sub>2</sub>/kWh; Spain 323 g CO<sub>2</sub>/kWh; Denmark 292 g CO<sub>2</sub>/kWh; Sweden 46 g CO<sub>2</sub>/kWh; and European average 392 g CO<sub>2</sub>/kWh).

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

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**Information about scenarios and additional technical information**

Information about the scenario for operational water use for this product is provided under "Additional Information" below.

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# Modules declared

Geographical scope, share of specific data (in GWP-GHG indicator) & data variation

	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	
<b>Module</b>	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
<b>Modules declared</b>	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X	
<b>Geography</b>	Global /EU	Global /EU	SE										EU	EU	EU	EU	EU	
<b>Specific data used</b>	90% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Variation – products</b>	<10% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Variation – sites</b>	0%, all A3 in one site					-	-	-	-	-	-	-	-	-	-	-	-	-

# Modules explained

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## LCA modules

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### **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.

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### **A2 Transportation**

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

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### **A3 manufacturing**

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

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### **B7 Operational**

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

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### **C1 De-construction**

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

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### **C2 Waste Transport**

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

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### **C3 Waste processing**

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

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### **C4 Waste disposal**

This module relates to waste disposal processes such as landfilling or incineration. For the shower mixers 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.

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### **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 mixer. This includes benefits from recycling and waste incineration.

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# Content information

Product components	Weight, g	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Brass	1109.1	80	0
Stainless steel	12.0	50	0
Plastic	292.2	0	0
Rubber	3.4	0	0
Ceramic	9.7	0	0
Nickel	20.7	35	0
Copper	19.4	15	0
Chrome	0.9	15	0
<b>Total</b>	<b>1467.4</b>	<b>-</b>	<b>-</b>
Packaging materials	Weight, g	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg product
Corrugated board	288.0	19.6	0.10
Paper	33.3	2.3	0.01
<b>Total</b>	<b>321.3</b>	<b>21.9</b>	<b>0.11</b>

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 shower mixer, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	7.88E+00	7.37E-01	1.79E+00	1.04E+01	2.86E+03	0.00E+00	2.02E-02	7.88E-02	7.02E-01	-5.45E+00
GWP-biogenic	kg CO <sub>2</sub> eq.	-8.61E-02	7.31E-04	1.11E-01	2.58E-02	1.35E+02	0.00E+00	1.74E-05	7.49E-03	1.09E-01	4.10E-02
GWP-luluc	kg CO <sub>2</sub> eq.	7.67E-03	3.77E-04	2.36E-05	8.07E-03	1.68E+00	0.00E+00	8.08E-06	1.59E-04	1.46E-05	-1.43E-02
GWP-total	kg CO <sub>2</sub> eq.	7.81E+00	7.38E-01	1.91E+00	1.05E+01	3.00E+03	0.00E+00	2.02E-02	8.67E-02	8.11E-01	-5.43E+00
ODP	kg CFC 11 eq.	5.46E-07	1.61E-07	9.09E-08	7.98E-07	2.16E-04	0.00E+00	4.67E-09	5.03E-09	5.12E-09	-3.62E-07
AP	mol H+ eq.	1.00E-01	1.08E-02	5.38E-03	1.16E-01	1.47E+01	0.00E+00	5.74E-05	4.21E-04	2.18E-04	-4.11E-01
EP-freshwater	kg P eq.	3.61E-03	3.85E-05	4.82E-04	4.13E-03	1.28E+00	0.00E+00	1.32E-06	6.75E-05	6.16E-06	-3.27E-02
EP-marine	kg N eq.	9.21E-03	2.64E-03	1.65E-03	1.35E-02	8.32E+00	0.00E+00	1.17E-05	8.83E-05	1.11E-04	-2.18E-02
EP-terrestrial	mol N eq.	9.20E-02	2.92E-02	1.69E-02	1.38E-01	2.28E+01	0.00E+00	1.27E-04	7.88E-04	1.00E-03	-2.94E-01
POCP	kg NM-VOC eq.	2.92E-02	7.90E-03	4.18E-03	4.13E-02	8.76E+00	0.00E+00	4.88E-05	2.33E-04	2.52E-04	-8.07E-02
ADP-minerals & metals*	kg Sb eq.	4.61E-04	1.90E-06	1.14E-06	4.64E-04	4.99E-03	0.00E+00	7.16E-08	2.45E-07	1.19E-07	-1.01E-02
ADP-fossil*	MJ	1.04E+02	1.05E+01	1.41E+01	1.29E+02	3.63E+04	0.00E+00	3.06E-01	1.54E+00	1.76E-01	-7.69E+01
WDP*	m <sup>3</sup>	1.90E+01	2.69E-02	3.54E+02	3.73E+02	5.65E+03	0.00E+00	9.33E-04	1.64E-02	1.48E-01	-7.21E+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.

## Potential environmental impact - additional mandatory & voluntary indicators

Results per shower mixer, 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.	7.89E+00	7.38E-01	1.79E+00	1.04E+01	2.86E+03	0.00E+00	2.02E-02	7.90E-02	7.02E-01	-5.47E+00

## Use of resources

Results per shower mixer, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
PERE	MJ	1.63E+01	1.27E-01	2.80E+02	2.97E+02	4.28E+03	0.00E+00	4.38E-03	2.47E-01	1.35E-02	-2.09E+01
PERM	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	0.00E+00	0.00E+00
PERT	MJ	1.63E+01	1.27E-01	2.80E+02	2.97E+02	4.28E+03	0.00E+00	4.38E-03	2.47E-01	1.35E-02	-2.09E+01
PENRE	MJ	1.04E+02	1.05E+01	1.41E+01	1.29E+02	3.63E+04	0.00E+00	3.06E-01	1.54E+00	1.76E-01	-7.69E+01
PENRM	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	0.00E+00	0.00E+00
PENRT	MJ	1.04E+02	1.05E+01	1.41E+01	1.29E+02	3.63E+04	0.00E+00	3.06E-01	1.54E+00	1.76E-01	-7.69E+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	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	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	0.00E+00	0.00E+00
FW	m <sup>3</sup>	5.24E-02	1.41E-03	1.53E-02	6.91E-02	3.14E+02	0.00E+00	5.71E-05	3.34E-04	1.88E-04	-9.44E-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										

<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<sub>2</sub> is set to zero.

# Waste production & output flows

## Waste production

Results per shower mixer, 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	3.94E-01	3.94E-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	7.04E-01	7.04E-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	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

## Output flows

Results per shower mixer, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	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	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	1.35E+00	1.35E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+00	0.00E+00	0.00E+00
Materials for energy recovery	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	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	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	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; Folkesson 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 mixers 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 mixer 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, 3000 kg CO<sub>2</sub>-eq for 16 years of use by one person also includes water production and distribution, and waste water treatment.

Parameters for operational water use modelling for shower mixers, 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	°C
Outlet mixed water temperature	38	°C
Specific heat capacity of water	4.18	kJ/(kg·K)
Density of water	0.981	kg/l
Reference service life	16	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.

<b>Energy mix for operational water heating modelling</b>	
<b>Energy source</b>	<b>Share, %</b>
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
<b>Total</b>	<b>100</b>
Corresponding GWP	346 g CO <sub>2</sub> -eq/kWh



# Differences versus previous versions

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

## References

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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, <https://doi.org/10.1016/j.energy.2017.06.123>.

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EPD International (2019): Product Category Rules (PCR) Construction products 2019:14, version 1.2.5

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 [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Share\\_of\\_fuels\\_in\\_the\\_final\\_energy\\_consumption\\_in\\_the\\_residential\\_sector\\_by\\_type\\_of\\_end-use,\\_EU,\\_2020\\_\(%25\)\\_v5.png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Share_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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[www.environdec.com](http://www.environdec.com)

**FM Mattsson**



# Environmental Product Declaration



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**Programme** The International EPD® System

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**Programme Operator** EPD International AB

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**EPD Registration Number** S-P-07822

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**Publication Date** 2023-02-24

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**Valid Until** 2028-02-24

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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](http://www.environdec.com)

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

From  
**FM Mattsson Group**

# General information

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## Programme information

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**Programme**

The International EPD® System

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**Address**

EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden

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**Website**

[www.environdec.com](http://www.environdec.com)

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**E-mail**

[info@environdec.com](mailto:info@environdec.com)

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## Accountabilities for PCR, LCA & independent, third-party verification

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<b>Product Category Rules (PCR)</b>	<p>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</p> <p>Product Category Rules (PCR): Construction products, 2019:14, version 1.2.5</p> <p>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 <a href="mailto:info@environdec.com">info@environdec.com</a></p>
<b>Life Cycle Assessment (LCA)</b>	<p>LCA accountability: Uniben Tetley Organization: RISE Research Institutes of Sweden</p>
<b>Third-party verification</b>	<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by individual verifier</p> <p>Third-party verifier: Hannu Karppi, Ramboll Finland Oy</p> <p>Approved by: The International EPD® System</p>
<b>Procedure for follow-up of data during EPD validity involves third party verifier</b>	<p>Yes   No</p>

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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

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**Owner Of The EPD**

FM Mattsson Group

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**Contact**

Phone: +46 250 59 60 00  
Email: [info@fmmattssongroup.com](mailto:info@fmmattssongroup.com)  
[www.fmmattsson.com](http://www.fmmattsson.com)

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**Description Of The Organisation**

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.

Our vision is to become customer's first choice in the bathroom and kitchen.  
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.

FM Mattsson Group is listed on Nasdaq Stockholm.

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**Product/Management System Related Certifications**

ISO 9001:2015  
ISO 14001:2015

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**Address Production Site**

FM Mattsson Group  
Östnorsvägen 95  
792 95 Mora, Sweden

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## 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.

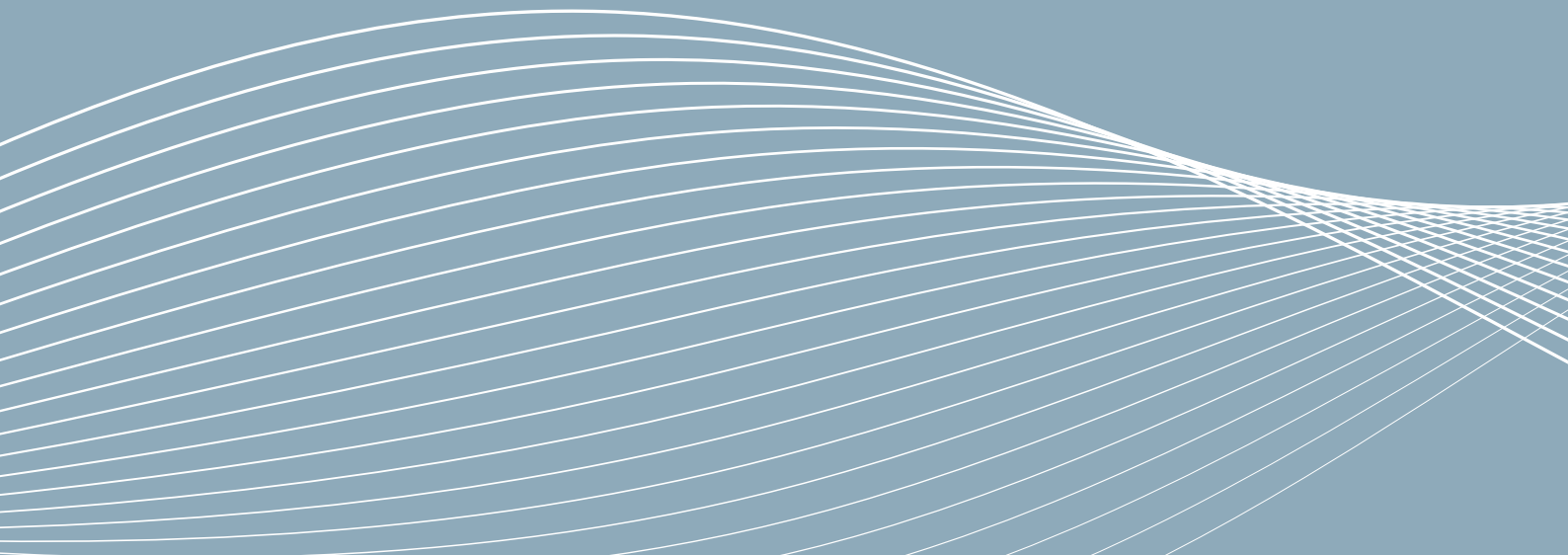
Consumers, architects, property owners, builders, companies, municipalities, and governments – we all benefit from saving water and energy. And we all have a responsibility to protect our shared resources for future generations.

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 energy-efficient mixers from multiple brands, including FM Mattsson, in an apartment building (Folkesson 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

<b>Product Name</b>	Shower sets, FM Mattsson 9000XE
<b>Reference Product</b>	The reference product Shower set 86700000 was chosen as the representative product based on high sales volume.
<b>Product Identification</b>	Shower Set consisting of hand shower according to EN 1112 and shower hose according to EN 1113
<b>Product Description</b>	FM Mattsson 9000XE Shower sets include built-in features for limitation of water flow 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.
<b>UN CPC Code</b>	42911 - Sinks, washbasins, baths and other sanitary ware and parts thereof, of iron, steel, copper or aluminium
<b>Geographical Scope</b>	Europe

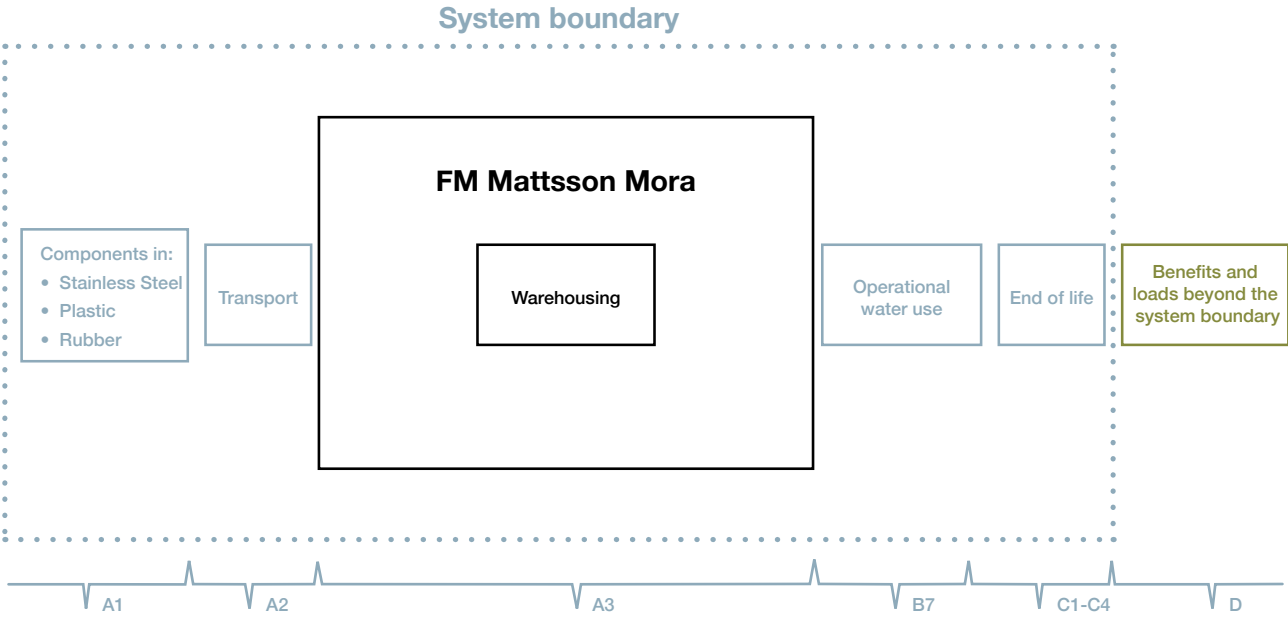
## LCA information

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

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**LCA Practitioner**

Uniben Tetthey, RISE Research Institutes of Sweden

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**Additional information**

Modelling of all components from production bill-of-material.  
Supplier specific electricity mixes and corresponding GWP impact:  
China, Fujian province 860 g CO<sub>2</sub>/kWh; European average 392 g  
CO<sub>2</sub>/kWh).

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**Information about scenarios and additional  
technical information**

Information about the scenario for operational water use for this  
product is provided under "Additional Information" below.

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# Modules declared

## Geographical scope, share of specific data (in GWP-GHG indicator) & data variation

	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	
<b>Module</b>	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
<b>Modules declared</b>	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X	
<b>Geography</b>	Global /EU	Global /EU	SE										EU	EU	EU	EU	EU	
<b>Specific data used</b>	90% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Variation – products</b>	<10% for GWP in A1-A3					-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Variation – sites</b>	0%, all A3 in one site					-	-	-	-	-	-	-	-	-	-	-	-	-

# Modules explained

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## LCA modules

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### **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.

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### **A2 Transportation**

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

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### **A3 manufacturing**

This module covers the relevant production processes for the 9000XE shower sets at FM Mattsson Mora. Since the processes for the shower sets only include warehousing, zero environmental impact have been assigned.

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### **B7 Operational**

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

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### **C1 De-construction**

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

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### **C2 Waste Transport**

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

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### **C3 Waste processing**

This module covers impacts related to sorting and recycling processes for the relevant material components of the shower set. It is assumed that 90% of the stainless steel and other metal components as well as 74% of the packaging wastes are recovered for recycling.

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### **C4 Waste disposal**

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

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### **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 set. This includes benefits from recycling and waste incineration.

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# Content information

Product components	Weight, g	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Stainless steel	397.1	50	0
Plastic	376.4	0	0
Rubber	7.2	0	0
Nickel	71.3	35	0
Copper	12.4	15	0
Chrome	0.9	15	0
<b>Total</b>	<b>865.3</b>	<b>-</b>	<b>-</b>
Packaging materials	Weight, g	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg product
Corrugated board	641.0	74.1	0.41
Paper	28.0	3.2	0.02
<b>Total</b>	<b>669.0</b>	<b>77.3</b>	<b>0.43</b>

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
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 shower set, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	2.56E+01	4.29E-01	0.00E+00	2.60E+01	1.56E+03	0.00E+00	1.49E-02	7.39E-02	8.88E-01	-1.73E+00
GWP-biogenic	kg CO <sub>2</sub> eq.	-2.89E-01	2.35E-04	0.00E+00	-2.88E-01	7.41E+01	0.00E+00	1.05E-05	1.34E-02	2.43E-01	1.51E-01
GWP-luluc	kg CO <sub>2</sub> eq.	1.50E-02	2.25E-04	0.00E+00	1.53E-02	9.20E-01	0.00E+00	6.09E-06	1.16E-04	1.77E-05	-4.86E-03
GWP-total	kg CO <sub>2</sub> eq.	2.53E+01	4.29E-01	0.00E+00	2.57E+01	1.64E+03	0.00E+00	1.49E-02	8.80E-02	1.13E+00	-1.59E+00
ODP	kg CFC 11 eq.	5.57E-06	9.39E-08	0.00E+00	5.66E-06	1.18E-04	0.00E+00	3.34E-09	6.15E-09	6.43E-09	-1.44E-07
AP	mol H+ eq.	2.85E-01	6.01E-03	0.00E+00	2.91E-01	8.02E+00	0.00E+00	4.31E-05	3.89E-04	3.01E-04	-1.51E-02
EP-freshwater	kg P eq.	6.93E-03	2.28E-05	0.00E+00	6.95E-03	7.01E-01	0.00E+00	1.05E-06	4.89E-05	7.30E-06	-1.09E-03
EP-marine	kg N eq.	3.02E-02	1.45E-03	0.00E+00	3.17E-02	4.55E+00	0.00E+00	8.76E-06	1.01E-04	1.55E-04	-3.16E-03
EP-terrestrial	mol N eq.	3.13E-01	1.61E-02	0.00E+00	3.29E-01	1.25E+01	0.00E+00	9.54E-05	9.24E-04	1.41E-03	-2.82E-02
POCP	kg NM-VOC eq.	9.37E-02	4.37E-03	0.00E+00	9.80E-02	4.79E+00	0.00E+00	3.63E-05	2.91E-04	3.47E-04	-8.12E-03
ADP-minerals & metals*	kg Sb eq.	4.20E-04	1.16E-06	0.00E+00	4.21E-04	2.73E-03	0.00E+00	5.23E-08	2.94E-07	1.49E-07	-5.99E-05
ADP-fossil*	MJ	2.60E+02	6.12E+00	0.00E+00	2.66E+02	1.99E+04	0.00E+00	2.23E-01	1.26E+00	2.24E-01	-3.16E+01
WDP*	m <sup>3</sup>	8.17E+01	3.73E-02	0.00E+00	8.17E+01	3.09E+03	0.00E+00	7.27E-04	1.26E-02	3.25E-01	-8.73E-01
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.

## Potential environmental impact - additional mandatory & voluntary indicators

Results per shower set, 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.	2.56E+01	4.29E-01	0.00E+00	2.60E+01	1.56E+03	0.00E+00	1.49E-02	7.41E-02	8.88E-01	-1.74E+00

## Use of resources

Results per shower set, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	B7	C1	C2	C3	C4	D
PERE	MJ	5.70E+01	7.25E-02	0.00E+00	5.71E+01	2.34E+03	0.00E+00	2.92E-03	1.77E-01	1.72E-02	-1.04E+01
PERM	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	0.00E+00	0.00E+00
PERT	MJ	5.70E+01	7.25E-02	0.00E+00	5.71E+01	2.34E+03	0.00E+00	2.92E-03	1.77E-01	1.72E-02	-1.04E+01
PENRE	MJ	2.60E+02	6.12E+00	0.00E+00	2.66E+02	1.98E+04	0.00E+00	2.23E-01	1.26E+00	2.24E-01	-3.16E+01
PENRM	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	0.00E+00	0.00E+00
PENRT	MJ	2.60E+02	6.12E+00	0.00E+00	2.66E+02	1.98E+04	0.00E+00	2.23E-01	1.26E+00	2.24E-01	-3.16E+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	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	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	0.00E+00	0.00E+00
FW	m <sup>3</sup>	1.36E-01	8.38E-04	0.00E+00	1.36E-01	1.72E+02	0.00E+00	2.78E-05	2.53E-04	2.08E-04	-1.25E-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										

<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<sub>2</sub> is set to zero.

# Waste production & output flows

## Waste production

Results per shower set, 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	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	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	0.00E+00	0.00E+00

## Output flows

Results per shower set, FM Mattsson 9000XE											
Indicator	Unit	A1	A2	A3	A1-A3	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	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.52E-01	0.00E+00	0.00E+00
Materials for energy recovery	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	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	0.00E+00	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	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; Folkesson 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 sets 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 set 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 17 885 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 422 kWh. Note that the corresponding climate impact in B7, 1640 kg CO<sub>2</sub>-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 shower sets, FM Mattsson 9000XE		
Parameter	Value	Unit
Reference flow	7	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	°C
Outlet mixed water temperature	38	°C
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.

<b>Energy mix for operational water heating modelling</b>	
<b>Energy source</b>	<b>Share, %</b>
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
<b>Total</b>	<b>100</b>
Corresponding GWP	346 g CO <sub>2</sub> -eq/kWh

# Differences versus previous versions

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

## References

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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, <https://doi.org/10.1016/j.energy.2017.06.123>.

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