



PEP Ecopassport®

Product Environmental Profile – Thermafit™ Water-to-Water Modular Heat Pump Model WXM
DECEMBER 2025 RN TRNE-10010-V0.1.01-EN



Product Environmental Profile - PEP Ecopassport.
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations."

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Registration Number	TRNE-10010-V01.01-EN

Company Description

Trane Technologies® is a world leader in heating and cooling systems, services, and solutions. Together with our brands, Trane® and Thermo King®, we bring efficient and sustainable climate innovations to buildings, homes, and transportation.

Trane helps customers succeed by providing innovative solutions that optimize indoor environments through a broad portfolio of energy-efficient heating, ventilating, and air conditioning systems, buildings, contracting and energy services, parts support, and advanced controls for homes and commercial buildings.

Trane serves engineers, contractors, and building owners on all continents and in an array of markets including education, healthcare, government, industrial/ manufacturing, data centers, lodging, retail, and commercial real estate. With more than 900 U.S. patents to date, Trane creates comfortable and energy-efficient environments around the world.

Trane systems and services have a reputation for reliability, high quality, and advanced innovation; and are available through a powerful distribution network. Trane employees and distributors are respected industry-wide for their skills and performance in designing, manufacturing, marketing, and supporting commercial and residential systems.

Product Information	
Reference Product	Thermafit™ Water-to-Water Modular Heat Pump Model WXM 30
Product Description	<p>Thermafit® water-to-water heat pumps are the practical and sustainable choice to help reduce greenhouse gas emissions as the use of renewable energy grows.</p> <p>Efficient and electric</p> <p>Heat pumps move energy rather than generate energy so they can be three times more efficient than other forms of electric heating. That makes them a great way to go all-electric. Using less electricity helps to lower utility bills and can also help ease the grid's transition to clean energy sources.</p> <p>Sustainability features</p> <p>Achieve LEED credits and net-zero goals. WXM is ideal for applications with nearby cold water sources such as a lake, ground water, wastewater or geothermal bore fields. These renewable sources allow for the transfer of energy to power heat pumps for year-round heating and cooling.</p> <p>Noteworthy</p> <ul style="list-style-type: none">• Each unit has its own controller and a reversing valve on each refrigeration circuit.• The bank of modules can easily ramp up space cooling or heating to meet specific comfort needs.• Up to twelve modules can be connected in a bank to provide centralized plant benefits, including primary control, high efficiency reduced piping, simplified maintenance, acoustical advantages and air-distribution flexibility.• Dual refrigeration circuits allow for greater reliability. <p>Specifications</p> <ul style="list-style-type: none">• Capacity range: 20-80 Ton (262-1033 MBh) per module, 1-12 mod/bank• Refrigerant: R-454B• Compressor Design: Fixed speed scroll / Optional variable speed• Factory-Installed Optional Features: Tank and Pump Module, Variable Speed Drive, BMS Integration
Functional Unit	To produce 1 kW of cooling, according to the appropriate usage scenario defined the AHRI 550/590 standard and during the 22-year reference lifetime of the product
Declared Unit	To produce cooling thanks to water-to-water heating of 122.25 kW according to the appropriate usage scenario and during the 22-year lifetime of the product. <i>Note: the mathematical relationship between the functional and declared unit is such that the declared unit divided by its capacity in kW equals the functional unit.</i>
Other Products Covered	List of other products covered in this PEP is presented in the section which concerned the extrapolation rules
Reference Lifetime*	22 Years

*Reference lifetime was defined as 22 years by the Product Category Rules which governed this analysis.

Technical Characteristics	
Data Point	Thermafit™ Water-to-Water Modular Heat Pump Model WXM 30
Product Category	Heat Pump
Chiller Technology	Water to water
Reversible or Non-reversible	Reversible
Heating Capacity*	417 MBh 122.25 kW
Cooling Capacity*	29.83 tons 104.91 kW
COP*	4.66 kW/kW
IPLV*	0.583 kW/ton 6.03 kW/kW
Refrigerant Used	R-454B
Refill Threshold**	90%

* Capacities, IPLV, and COP at AHRI 550/590 conditions

**Refill threshold denotes the ratio of refrigerant (expressed as a %) at which a refill back up to the original charge takes place. Per the Product Category Rules, the refill threshold is considered 90% by default.

Constituent Materials >> Total weight of the reference product: 726 kg					
Plastics as % of weight	Metals as % of weight		Others as % of weight		
Product only: 726 kg					
Polycarbonate	0.12%	Steel	77.70%	Refrigerant	1.50%
Other plastics	0.52%	Cast Iron	10.98%	Other miscellaneous	1.56%
		Copper	5.35%		
		Other Metals	2.26%		
Packaging only: 0 kg					
	0%		0%		0%
Total plastics	0.65%	Total metals	96.29%	Total others	3.06%

Life Cycle Stages	
Manufacturing	The manufacturing stage includes the production of raw and intermediate materials, as well as transportation to the manufacturer's last logistic platform for WXM heat pumps. The final assembly of the product is carried out at Trane's plant in Newberry, South Carolina, USA. As a member of SteelZero, Trane has pledged to procure, specify or stock 50% net-zero steel by 2030 and 100% net-zero steel by 2050. The main process steps for production include cutting, rolling, machining, brazing, welding, painting, sub- and final assemblies, and end-of-the-line testing.
Distribution	The transport from Trane's manufacturing facility to the customer was considered. The distance was calculated using averages for all shipped orders in 2024.
Installation	The installation stage includes diesel consumed by machinery used to move and place the product during installation.
Use	The use stage is conducted in alignment with the PSR, which models energy use of this air-to-water heat pump associated with comfort heating and cooling applications over its 22-year lifetime. The conditions outlined AHRI Standard 550/590 were used to set product capacity and efficiency. Refrigerant leak, replacement parts, and electricity usage are considered in this stage. Default refrigerant leak amounts from the PSR were used.
End of Life	The end-of-life stage includes transportation to the end-of-life facility of the disposal of product. End of life fates were modeled by material for the region where they are being disposed, in this case the United States.
Benefits and loads beyond the system boundaries	Throughout the life cycle of the product, net loads and benefits beyond system boundaries are included.

Data Quality and Software	
Geographical Representativeness	The geographical scope of this PEP across all life cycle stages (manufacturing, distribution, installation, customer use, and end of life) is North America (United States and Canada). Overall geographical representativeness is considered good.
Temporal Representativeness	Primary data was collected from 2024. Secondary data refers to the Ecoinvent database published in 2023. The temporal coverage for each secondary process used in the LCA model is specified in the documentation section of individual Ecoinvent datasets.
Technological Representativeness	Overall technology representativeness is considered good.
Software and Database Used	Sima Pro desktop 9.6.0.1 Ecoinvent Database Version 3.10

Energy Model Used											
Manufacturing		Manufacturing electricity considers the eGRID specific region from which the product is being manufactured in Ecoinvent's datasets (market for electricity, medium voltage (US-SERC)).									
Distribution		No energy consumption occurs during the distribution stage.									
Installation		No energy consumption occurs during the installation stage.									
Use		Use stage electricity is modeled using an average North American grid mix dataset (market group for electricity, medium voltage (RNA)).									
End of Life		No energy consumption occurs during the end-of-life stage.									
Benefits and loads beyond the system boundaries		End of life benefits consider average North American electricity (market group for electricity, medium voltage (RNA)).									

Environmental Impacts

EN 15804 + A2 Environmental Impact Indicators, per kW corresponding to the functional unit												
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D
Climate change - total	GWP	5.00E+03	kg CO ₂ eq	3.32E+01	5.98E-01	7.16E-01	4.78E-01	2.34E+00	4.95E+03	2.70E-04	6.61E+00	-7.06E+00
Climate change - fossil fuels	GWPf	4.95E+03	kg CO ₂ eq	3.27E+01	5.98E-01	7.16E-01	4.78E-01	2.33E+00	4.91E+03	2.27E-04	5.57E+00	-7.02E+00
Climate change - biogenics	GWPs	3.16E+01	kg CO ₂ eq	4.63E-01	6.96E-05	8.57E-05	0.00E+00	4.73E-04	3.01E+01	4.31E-05	1.04E+00	-2.24E-02
Climate change - land use and land use transformation	GWPlu	1.49E+01	kg CO ₂ eq	2.95E-02	1.72E-05	2.10E-05	0.00E+00	7.96E-05	1.49E+01	2.11E-07	7.83E-05	-8.32E-03
Ozone depletion	ODP	9.63E-05	kg CFC-11 eq	7.00E-05	7.91E-09	9.65E-09	0.00E+00	3.59E-08	2.62E-05	1.09E-11	1.06E-08	-3.27E-08
Acidification	AP	1.33E+01	mole of H+ eq	3.49E-01	1.57E-03	2.00E-03	0.00E+00	9.14E-03	1.29E+01	2.24E-06	2.21E-03	-1.11E-01
Eutrophication, freshwater	Epf	3.41E-01	kg P eq	2.60E-03	1.46E-06	1.65E-06	0.00E+00	5.34E-06	3.38E-01	1.02E-08	2.66E-05	-4.60E-04
Eutrophication, marine aquatic	Epm	1.99E+00	kg of N eq	3.39E-02	5.64E-04	7.46E-04	0.00E+00	3.68E-03	1.95E+00	2.18E-07	2.07E-03	-7.67E-03
Eutrophication, terrestrial	Ept	2.24E+01	mole of N eq	4.01E-01	6.19E-03	8.18E-03	0.00E+00	4.08E-02	2.20E+01	2.43E-06	8.38E-03	-9.71E-02
Photochemical ozone formation	POCP	9.20E+00	kg NMVOC eq	1.32E-01	2.34E-03	3.03E-03	0.00E+00	1.55E-02	9.04E+00	8.34E-07	3.21E-03	-3.20E-02
Abiotic resource depletion – elements	ADPe	3.91E-03	kg Sb eq	3.67E-03	3.49E-08	4.09E-08	0.00E+00	1.37E-07	2.45E-04	7.63E-09	2.76E-07	-1.26E-03
Abiotic resource depletion – fossil fuels	ADPf	9.41E+04	MJ	3.63E+02	7.87E+00	9.43E+00	0.00E+00	3.09E+01	9.37E+04	2.87E-03	8.59E+00	-7.17E+01
Water use	WU	1.21E+03	m ³ world eq	8.35E+00	7.25E-03	8.58E-03	0.00E+00	2.90E-02	1.20E+03	2.53E-02	-2.27E-01	-2.35E+00

Note: characterization factors use the -1/+1 biogenic carbon storage assessment methodology

Inventory Flow Indicators, per kW corresponding to the functional unit

		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	PERE	1.31E+04	MJ	4.61E+01	1.26E-02	1.56E-02	0.00E+00	6.60E-02	1.30E+04	2.38E-04	9.97E-02	-9.16E+00
Use of renewable primary energy resources used as raw materials	PERM	5.37E+00	MJ	5.37E+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
Total use of renewable primary energy resources	PERT	1.31E+04	MJ	5.15E+01	1.26E-02	1.56E-02	0.00E+00	6.60E-02	1.30E+04	2.38E-04	9.97E-02	-9.16E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	PENRM	6.40E+00	MJ	6.40E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.93E-01
Use of non-renewable primary energy resources used as raw materials	PENRE	9.41E+04	MJ	3.63E+02	7.87E+00	9.43E+00	0.00E+00	3.09E+01	9.37E+04	2.87E-03	8.59E+00	-7.17E+01
Total use of non-renewable primary energy resources	PENRT	9.41E+04	MJ	3.70E+02	7.87E+00	9.43E+00	0.00E+00	3.09E+01	9.37E+04	2.87E-03	8.59E+00	-7.22E+01
Use of secondary materials	USM	0.00E+00	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
Use of renewable secondary fuels	URSF	0.00E+00	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
Use of non-renewable secondary fuels	UNRSF	0.00E+00	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
Net use of fresh water	NUFW	5.85E+01	m ₃	2.73E-01	2.64E-04	3.15E-04	0.00E+00	1.15E-03	5.82E+01	5.90E-04	-5.08E-03	-7.08E-02
Hazardous waste disposed	HWD	2.49E+00	kg	4.71E-02	6.40E-05	7.61E-05	0.00E+00	2.62E-04	2.43E+00	1.49E-07	7.91E-03	-1.45E-03
Non-hazardous waste disposed	NHWD	5.44E+01	kg	1.98E+00	3.27E-04	3.81E-04	0.00E+00	1.25E-03	4.66E+01	3.13E-06	5.84E+00	-1.54E-01
Radioactive waste disposed	RWD	5.23E-01	kg	5.80E-04	2.83E-07	3.51E-07	0.00E+00	1.46E-06	5.23E-01	4.52E-09	2.96E-06	-5.94E-05
Components for re-use	CRU	0.00E+00	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
Materials for recycling	MFR	5.43E+00	kg	1.19E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.25E+00	0.00E+00
Materials for energy recovery	MER	0.00E+00	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
Exported energy	EE	6.16E-01	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.16E-01	0.00E+00

TRACI 2.1 Environmental Impact Indicators, per kW corresponding to the functional unit

		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D
Ozone depletion	OD	1.42E-04	kg CFC-11 eq	8.71E-05	8.34E-09	1.02E-08	0.00E+00	3.80E-08	5.53E-05	1.19E-11	1.14E-08	-4.34E-08
Global warming	GW	4.92E+03	kg CO ₂ eq	3.24E+01	5.91E-01	7.08E-01	4.18E-01	2.31E+00	4.88E+03	2.39E-04	5.58E+00	-6.91E+00
Smog	SG	1.24E+02	kg O ₃ eq	2.02E+00	3.59E-02	4.75E-02	7.79E-05	2.38E-01	1.21E+02	1.37E-05	4.82E-02	-4.75E-01
Acidification	A	1.13E+01	kg SO ₂ eq	2.80E-01	1.41E-03	1.81E-03	0.00E+00	8.33E-03	1.10E+01	1.82E-06	2.00E-03	-8.74E-02
Eutrophication	E	2.76E+00	kg N eq	2.87E-02	9.60E-05	1.22E-04	0.00E+00	5.45E-04	2.73E+00	1.23E-07	1.85E-03	-4.70E-03
Carcinogenics	C	1.47E-05	CTUh	1.37E-06	4.30E-10	5.37E-10	0.00E+00	3.89E-09	1.33E-05	4.13E-12	1.07E-08	-3.68E-07
Non carcinogenics	NC	2.21E-04	CTUh	2.38E-05	9.41E-08	1.04E-07	0.00E+00	5.81E-08	1.97E-04	7.65E-11	1.98E-07	-7.77E-06
Respiratory effects	RE	7.65E+00	kg PM _{2.5} eq	4.74E-02	2.39E-04	2.88E-04	0.00E+00	1.12E-03	7.60E+00	2.78E-07	3.47E-04	-1.45E-02
Ecotoxicity	EX	9.21E+02	CTUe	2.17E+02	1.95E+00	2.15E+00	0.00E+00	5.10E-01	6.97E+02	3.46E-04	2.26E+00	-8.11E+01
Fossil fuel depletion	FFD	5.92E+03	MJ surplus	2.70E+01	1.11E+00	1.33E+00	0.00E+00	4.36E+00	5.89E+03	2.51E-04	1.15E+00	-4.13E+00

EN 15804 + A2 Environmental Impact Indicators, per device corresponding to the reference product

		Total Life Cycle Impacts (Excluding Module D)	Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D	
Climate change - total	GWP	6.11E+05	kg CO ₂ eq	4.06E+03	7.31E+01	8.76E+01	5.85E+01	2.85E+02	6.05E+05	3.30E-02	8.08E+02	-8.62E+02
Climate change - fossil fuels	GWPF	6.05E+05	kg CO ₂ eq	4.00E+03	7.30E+01	8.76E+01	5.85E+01	2.85E+02	6.00E+05	2.77E-02	6.81E+02	-8.59E+02
Climate change - biogenics	GWPb	3.86E+03	kg CO ₂ eq	5.65E+01	8.51E-03	1.05E-02	0.00E+00	5.78E-02	3.68E+03	5.27E-03	1.27E+02	-2.74E+00
Climate change - land use and land use transformation	GWPlu	1.83E+03	kg CO ₂ eq	3.60E+00	2.11E-03	2.56E-03	0.00E+00	9.73E-03	1.82E+03	2.58E-05	9.57E-03	-1.02E+00
Ozone depletion	ODP	1.18E-02	kg CFC-11 eq	8.56E-03	9.67E-07	1.18E-06	0.00E+00	4.39E-06	3.20E-03	1.33E-09	1.30E-06	-4.00E-06
Acidification	AP	1.62E+03	mole of H+ eq	4.27E+01	1.92E-01	2.45E-01	0.00E+00	1.12E+00	1.58E+03	2.74E-04	2.70E-01	-1.35E+01
Eutrophication, freshwater	Epf	4.17E+01	kg P eq	3.17E-01	1.78E-04	2.02E-04	0.00E+00	6.53E-04	4.13E+01	1.25E-06	3.25E-03	-5.62E-02
Eutrophication, marine aquatic	Epm	2.44E+02	kg of N eq	4.15E+00	6.90E-02	9.12E-02	0.00E+00	4.50E-01	2.38E+02	2.66E-05	2.53E-01	-9.38E-01
Eutrophication, terrestrial	Ept	2.74E+03	mole of N eq	4.91E+01	7.56E-01	1.00E+00	0.00E+00	4.99E+00	2.69E+03	2.97E-04	1.02E+00	-1.19E+01
Photochemical ozone formation	POCP	1.12E+03	NMVOC eq	1.62E+01	2.86E-01	3.70E-01	0.00E+00	1.89E+00	1.11E+03	1.02E-04	3.92E-01	-3.91E+00
Abiotic resource depletion – elements	ADPe	4.78E-01	kg Sb eq	4.48E-01	4.27E-06	5.00E-06	0.00E+00	1.68E-05	3.00E-02	9.33E-07	3.38E-05	-1.54E-01
Abiotic resource depletion – fossil fuels	ADPf	1.15E+07	MJ	4.44E+04	9.62E+02	1.15E+03	0.00E+00	3.78E+03	1.15E+07	3.51E-01	1.05E+03	-8.76E+03
Water use	WU	1.47E+05	m ³ world eq	1.02E+03	8.87E-01	1.05E+00	0.00E+00	3.54E+00	1.46E+05	3.09E+00	-2.78E+01	-2.87E+02

Note: characterization factors use the -1/+1 biogenic carbon storage assessment methodology

Inventory Flow Indicators, per device corresponding to the reference product

		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	PERE	1.60E+06	MJ	5.64E+03	1.54E+00	1.91E+00	0.00E+00	8.06E+00	1.59E+06	2.91E-02	1.22E+01	-1.12E+03
Use of renewable primary energy resources used as raw materials	PERM	6.56E+02	MJ	6.56E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	PERT	1.60E+06	MJ	6.29E+03	1.54E+00	1.91E+00	0.00E+00	8.06E+00	1.59E+06	2.91E-02	1.22E+01	-1.12E+03
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	PENRM	7.83E+02	MJ	7.83E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.25E+01
Use of non-renewable primary energy resources used as raw materials	PENRE	1.15E+07	MJ	4.44E+04	9.62E+02	1.15E+03	0.00E+00	3.78E+03	1.15E+07	3.51E-01	1.05E+03	-8.76E+03
Total use of non-renewable primary energy resources	PENRT	1.15E+07	MJ	4.52E+04	9.62E+02	1.15E+03	0.00E+00	3.78E+03	1.15E+07	3.51E-01	1.05E+03	-8.83E+03
Use of secondary materials	USM	0.00E+00	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
Use of renewable secondary fuels	URSF	0.00E+00	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
Use of non-renewable secondary fuels	UNRSF	0.00E+00	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
Net use of fresh water	NUFW	7.15E+03	m3	3.34E+01	3.23E-02	3.85E-02	0.00E+00	1.41E-01	7.12E+03	7.21E-02	-6.21E-01	-8.66E+00
Hazardous waste disposed	HWD	3.04E+02	kg	5.76E+00	7.82E-03	9.31E-03	0.00E+00	3.21E-02	2.97E+02	1.82E-05	9.67E-01	-1.77E-01
Non-hazardous waste disposed	NHWD	6.65E+03	kg	2.43E+02	4.00E-02	4.66E-02	0.00E+00	1.53E-01	5.70E+03	3.83E-04	7.13E+02	-1.89E+01
Radioactive waste disposed	RWD	6.40E+01	kg	7.09E-02	3.46E-05	4.29E-05	0.00E+00	1.78E-04	6.39E+01	5.52E-07	3.61E-04	-7.26E-03
Components for re-use	CRU	0.00E+00	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
Materials for recycling	MFR	6.64E+02	kg	1.45E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.19E+02	0.00E+00
Materials for energy recovery	MER	0.00E+00	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
Exported energy	EE	7.53E+01	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.53E+01	0.00E+00

TRACI 2.1 Environmental Impact Indicators, per device corresponding to the reference product

		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	Water Use B7	End of Life C1-C4	Module D
Ozone depletion	OD	1.74E-02	kg CFC-11 eq	1.06E-02	1.02E-06	1.25E-06	0.00E+00	4.65E-06	6.76E-03	1.46E-09	1.40E-06	-5.30E-06
Global warming	GW	6.01E+05	kg CO2 eq	3.96E+03	7.22E+01	8.66E+01	5.12E+01	2.82E+02	5.96E+05	2.93E-02	6.83E+02	-8.45E+02
Smog	SG	1.51E+04	kg O3 eq	2.47E+02	4.39E+00	5.81E+00	9.53E-03	2.90E+01	1.49E+04	1.67E-03	5.89E+00	-5.81E+01
Acidification	A	1.38E+03	kg SO2 eq	3.42E+01	1.72E-01	2.21E-01	0.00E+00	1.02E+00	1.34E+03	2.22E-04	2.45E-01	-1.07E+01
Eutrophication	E	3.38E+02	kg N eq	3.50E+00	1.17E-02	1.50E-02	0.00E+00	6.67E-02	3.34E+02	1.50E-05	2.27E-01	-5.75E-01
Carcinogenics	C	1.79E-03	CTUh	1.68E-04	5.26E-08	6.56E-08	0.00E+00	4.76E-07	1.63E-03	5.05E-10	1.30E-06	-4.50E-05
Non carcinogenics	NC	2.70E-02	CTUh	2.91E-03	1.15E-05	1.27E-05	0.00E+00	7.10E-06	2.40E-02	9.35E-09	2.43E-05	-9.50E-04
Respiratory effects	RE	9.35E+02	kg PM2.5 eq	5.80E+00	2.93E-02	3.52E-02	0.00E+00	1.37E-01	9.29E+02	3.40E-05	4.24E-02	-1.78E+00
Ecotoxicity	EX	1.13E+05	CTUh	2.66E+04	2.39E+02	2.62E+02	0.00E+00	6.23E+01	8.52E+04	4.23E-02	2.76E+02	-9.92E+03
Fossil fuel depletion	FFD	7.24E+05	MJ surplus	3.30E+03	1.36E+02	1.63E+02	0.00E+00	5.33E+02	7.20E+05	3.07E-02	1.41E+02	-5.05E+02

Extrapolation Factors

WXM products are part of a homogenous family of Trane heat pumps. Additional products covered by this PEP are detailed below, with the reference product denoted in blue.

WXM 20
WXM 25
WXM 30
WXM 40
WXM 50
WXM 60

For products other than the reference product, the environmental impacts can be calculated using the extrapolation rules below. The following tables contain factors to be used in the extrapolation of LCIA results for the WXM Heat Pumps covered in this report. These scaling factors are intended to allow interested parties to determine the environmental impacts of WXM products of interest.

Extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the emission of 1 kW cooling power. For each stage of the life cycle, the environmental impacts of the product concerned are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column should be calculated by adding the environmental impacts of each stage of the life cycle.

To use these scaling factors, individuals should:

1. Identify the LCIA result of interest and product of interest.
2. Multiply the results in the reference product's environmental impact indicator table, found on page 4-7, by the corresponding cell in the table that pertains to the product of interest, found below.

Product	Extrapolation Factors – Declared Unit									Extrapolation Factors – Functional Unit								
	A1-A3	A4	A5	B1	B2	B6	B7	C1-C4	D	A1-A3	A4	A5	B1	B2	B6	B7	C1-C4	D
WXM 20	0.87	0.87	1.00	1.00	1.00	0.67	1.00	0.87	0.87	1.34	1.34	1.53	1.53	1.53	1.03	1.53	1.34	1.34
WXM 25	0.94	0.94	1.00	1.00	1.00	0.85	1.00	0.94	0.94	1.10	1.10	1.18	1.18	1.18	1.01	1.18	1.10	1.10
WXM 30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
WXM 40	1.12	1.12	1.00	1.00	1.00	1.25	1.00	1.12	1.12	0.93	0.93	0.83	0.83	0.83	1.03	0.83	0.93	0.93
WXM 50	1.12	1.12	1.00	1.00	1.00	1.58	1.00	1.12	1.12	0.73	0.73	0.65	0.65	0.65	1.02	0.65	0.73	0.73
WXM 60	1.19	1.19	1.00	1.00	1.00	2.06	1.00	1.19	1.19	0.58	0.58	0.49	0.49	0.49	1.02	0.49	0.58	0.58

Comparability

EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows PEP comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.

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Registration number: TRNE-10010-V01.01-EN	Drafting rules: "PEP-PCR-ed4-EN-2021 09 06" Supplemented by: "PSR-0013-ed3.0-EN-2023 06 06"
Verifier accreditation number: VH44	Information and reference documents: www.pep-ecopassport.org
Date of issue: 12-2025	Validity period: 5 years
Independent verification of the declaration and data in compliance with ISO 14025:2006	
Internal: The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain) PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 The components of the present PEP may not be compared with components from any other program.	External: <input checked="" type="checkbox"/>
Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"	

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