

Product Environmental Profile

**Toshiba 4-way cassette
MMU-UP0091MHP-E**

Toshiba

Carrier Corporation

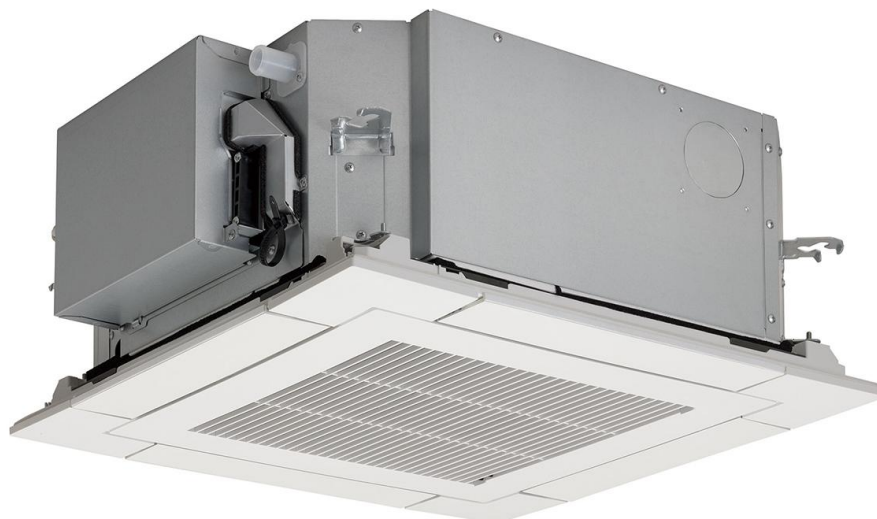


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1 – GENERAL INFORMATION

1.1 Commercial reference of the reference product

Reference product:	MMU-UP0091MHP-E
Product family:	HVAC
Product sub-category:	Toshiba 4-way cassette
Type:	Electric-powered HVAC system for heating and cooling
Function:	Heating and/or cooling capacity
References covered:	Indoor unit: MMU-UP0091MHP-E , MMU-UP0051MHP-E, MMU-UP0071MHP-E, MMU-UP0121MHP-E, MMU-UP0151MHP-E and MMU-UP0181MHP-E, MMU-UP0561HP-E, MMU-UP0481HP-E, MMU-UP0361HP-E, MMU-UP0301HP-E, MMU-UP0271HP-E, MMU-UP0241HP-E, MMU-UP0181HP-E, MMU-UP0151HP-E, MMU-UP0121HP-E and MMU-UP0091HP-E
Homogeneous environmental family:	The reference device is part of a range comprising several sizes with identical functions meeting the same standards, identical technology, and manufacturing processes, and operating in a similar way.

1.2 Functional Unit

To produce 1 kW of heating or 1 kW of cooling according to the appropriate usage scenario defined in the EN 148252 standard and during the 22-year reference lifetime of the product.

Functional factor:

$Prev = (theating * Ph + tcooling * Pc) / (theating + tcooling) = 3.12 \text{ kW}$

1.3 Declared Unit

To produce heating or cooling thanks to the Toshiba 4 way cassette unit of 3.2 kW heating or 2.8 kW of cooling according to the appropriate usage scenario and during the 22 year reference lifetime of the product

1.4 Additional environmental information

The environmental impacts are assessed for the product, conducted in accordance with ISO standards 14040 and 14044 using One Click LCA V0.45. This analysis encompasses all stages of the product's lifecycle, including manufacturing, distribution, installation (including packaging end of life), maintenance, disposal and benefits and loads beyond the system boundary.

1.5 Manufacturing

- Production



The Life Cycle Analysis on which this Product Environmental Profile (PEP) is based was conducted with respect to the criteria set by PCR-ed4-EN-2021-09-06 and PSR-0013-ed3.1-EN-2025-10-20 for the PEP ecopassport® Programme. The product's life cycle begins with the extraction and refining of raw materials, including metals, non-metals, plastics, electronics and packaging. These materials are processed into components through molding or machining and assembled into the final product using welding, soldering, or adhesion. Packaging materials are used for protection and transportation. The raw materials for the product were obtained from suppliers in China and Thailand. The materials are delivered to the manufacturing facility via road and sea transport. Primary data were provided by the manufacturer and represent all information for calendar year 2024. This stage is modelled based on the material weight and the distances from the supplier location to the manufacturing site, using the supplier list. Relevant regional electricity production datasets from Ecoinvent are employed to account for manufacturing energy consumption. Energy consumption data from the Thailand manufacturing facility is accounted for components and assemblies produced in-house for the boiler. For components obtained from external suppliers, generic Ecoinvent data is applied. During the manufacturing stage at the Thailand facility, waste is primarily generated from assembling product components and is accounted as per Toshiba. The transport distance of 100 kilometers to the waste processing facility is considered, as recommended in PCR.

- Energy model

Market for electricity, medium voltage (reference product: electricity, medium voltage), Thailand; Ecoinvent v3.11.

1.6 Distribution



At this stage, all units are shipped from the manufacturing facility in Thailand to installation sites across the globe. Transportation impacts associated with the delivery of the final product to the installation site (A4 stage) include direct exhaust emissions from fuel combustion as well as upstream environmental impacts from fuel production. Transportation distances are considered as per PCR-ed4-EN-2021-09-06 guidelines.

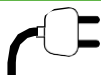
1.7 Installation



No energy is required for the installation of the product at the site, as the process relies primarily on manual labor and does not involve any specialized procedures or equipment. The disposal of packaging materials is accounted for during the installation phase, including transportation over a distance of 100 kilometers to the waste processing and disposal facility. Packaging waste treatment is modeled in accordance with PCR-ed4-EN-2021-09-06.

1 – GENERAL INFORMATIONS

1.8 Use



This stage includes all energy and materials related to product use, as well as the impact of operational energy consumption over the reference service life of 22 years. For the 4-way cassette, the use phase covers operational energy use and atmospheric emissions (B6). The stages of refrigerant leakage (B1) and maintenance (B2) are excluded from this assessment because the indoor unit is not connected to an outdoor unit and therefore does not contain any refrigerant. Additionally, the stages of repair (B3), replacement (B4), refurbishment (B5), and water consumption (B7) are not applicable, in accordance with PSR-0013-ed3.1-EN-2025 10 20 guidelines.

The product's operational energy use and environmental impact have been assessed over its service life of 22 years, with distribution to customers in France. Energy consumption during the operational phase is calculated using the formula specified in PSR-0013-ed3.1-EN-2025 06 17. The 4-way cassette consumes energy during its use phase, and the typical scenario for calculating environmental impacts related to this energy consumption is defined in PSR-0013-ed3.1-EN-2025 10 20.

The energy consumption $C_{indoor\ unit}$ in the use stage is calculated in heating and cooling mode use as follows:

$$C_{indoor\ unit} = P_{input} * (t_{heating} + t_{cooling}) * RLT$$

Where:

- $C_{indoor\ unit}$ = Total energy consumption = 1100 kWh
- P_{input} = 0.06 kW
- P_h = Heating capacity of the equipment (per European eco-design standards) = 3.2 kW
- P_c = Cooling capacity of the equipment (per European eco-design standards) = 2.8 kW
- $t_{heating}$ = Equivalent active mode hours in heating mode = 1400 hours
- $t_{cooling}$ = Equivalent active mode hours in cooling mode = 350 hours
- Type of Generator-air/air $P < 12\text{kW}$
- RLT = Reference lifetime of the equipment = 22 years

Energy model

Market for electricity, low voltage (Reference product: electricity, low voltage), France; Ecoinvent v3.11.

1.9 End of life



The deconstruction phase mainly involves manual labor, which has minimal environmental impact as per EN 15804:2012+A2:2019. The 4-way cassette is assumed to be transported by truck to a waste facility 100 km away for dismantling. At the end of a product's life, materials are disposed of through recycling, landfill, or incineration, with rates sourced from PCR-ed4-EN-2021-09-06 and other credible references. Steel is efficiently managed, with 80% recycled and 20% landfilled. Aluminum follows with 70% recycling and 30% landfill, while copper is recycled at 60%, with the remaining 40% going to landfill. In contrast, polypropylene (PP), a commonly used plastic, has a lower recycling rate of 20%, with 40% landfilled and 40% incinerated without energy recovery. Rubber is not recycled and is split evenly between landfill and incineration (50% each). Printed Circuit Boards (PCBs), based on the PCB E-Scrap Market report, have a low recycling rate of 12.5%, with 87.5% ending up in landfill. Lastly, cardboard, according to Packaging Dive, is highly sustainable with 91% recycled and 5% incinerated, with 4% landfill disposal. This data underscores the need for improved recycling systems, especially for plastics and electronics, while highlighting the success of metal and packaging material recovery.

1.10 Benefits and loads beyond the system boundary D

Module D accounts for potential benefits beyond the system boundary in accordance with EN 15804+A2, PEP PCR ed4 and PSR 0013 ed3.1. It includes substitution benefits from recycled outputs in A5 and C3, where recovered metals, plastics, PCBs and cardboard are assumed to replace equivalent virgin materials. Only recycling and energy recovery routes generate credits; landfill, non-energy incineration and refrigerant destruction do not. Burdens from collection, transport and sorting are already included in C1–C4, so Module D reports only the net avoided impacts and does not influence the primary life cycle results.

1.11 Technical description of the device

The Toshiba MMU-UP0091MHP-E is a compact 4-way cassette indoor unit designed for efficient air distribution in commercial spaces. It delivers a cooling capacity of 2.8 kW and heating capacity of 3.2 kW, operating quietly with sound levels as low as 29 dB. The unit includes a built-in drain pump with an 85 cm lift, 5-step fan speed control, and individual louver control for customized airflow. It supports wired and wireless remote controls and integrates easily into centralized control systems.

4-way cassette	Unit	MMU-UP0091HP-E	MMU-UP0121HP-E	MMU-UP0151HP-E	MMU-UP0181HP-E	MMU-UP0241HP-E
Cooling capacity	kW	2.80	3.60	4.50	5.60	7.10
Power consumption	kW	0.02	0.02	0.02	0.03	0.04
Sound pressure level (low/med/high) (Heating and cooling)	dB(A)	30/29/27	30/29/27	31/29/27	32/29/27	35/31/38
Heating capacity	kW	3.20	4.00	5.00	6.30	8.00
Sound Power level (low/med/high) (Heating and cooling)	dB(A)	45/44/42	45/44/42	46/44/42	47/44/42	50/56/43
Power supply	V/Ph+N/Hz	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50
Weight	Kgs	24	24	24	24	24

1 – GENERAL INFORMATIONS

4-way cassette	Unit	MMU-UP0271HP-E	MMU-UP0301HP-E	MMU-UP0361HP-E	MMU-UP0481HP-E	MMU-UP0561HP-E
Cooling capacity	kW	8.00	9.00	11.20	14.00	16.00
Power consumption	kW	0.04	0.04	0.09	0.11	0.11
Sound pressure level (low/med/high) (Heating and cooling)	dB(A)	34/39/47	38/33/30	43/38/32	46/38/33	46/40/33
Heating capacity	kW	9.00	10.00	12.50	16.00	18.00
Sound Power level (low/med/high) (Heating and cooling)	dB(A)	35/31/38	53/48/45	53/53/47	61/53/48	61/55/48
Power supply	V/Ph+N/Hz	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50
Weight	Kgs	24	24	29	29	29

4-way cassette	Unit	MMU-UP0091MHP-E	MMU-UP0051MHP-E	MMU-UP0071MHP-E	MMU-UP0121MHP-E	MMU-UP0151MHP-E	MMU-UP0181MHP-E
Cooling capacity	kW	2.8	1.7	2.2	3.6	4.5	5.6
Power consumption	kW	0.025	0.016	0.023	0.027	0.03	0.052
Sound pressure level (low/med/high) (Heating and cooling)	dB(A)	29/33/38	29/30/32	29/33/37	30/34/38	31/35/40	34/39/47
Heating capacity	kW	3	1.9	2.5	4	5	6.3
Sound Power level (low/med/high) (Heating and cooling)	dB(A)	44/48/53	44/45/47	44/48/52	45/49/53	46/50/55	49/54/62
Power supply	V/Ph+N/Hz	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50	220-240/1+N/50
Weight	Kgs	19.05	19.05	19.05	19.05	19.05	19.05

1.12 Sales scenarios

Sales of the device are distributed as follows:

Region name	Shares in Sales (%)	
France	100	%

This distribution affects the distance travelled during the phase and the electric mix used during the usage phase.

2 – CONSTITUENT MATERIALS

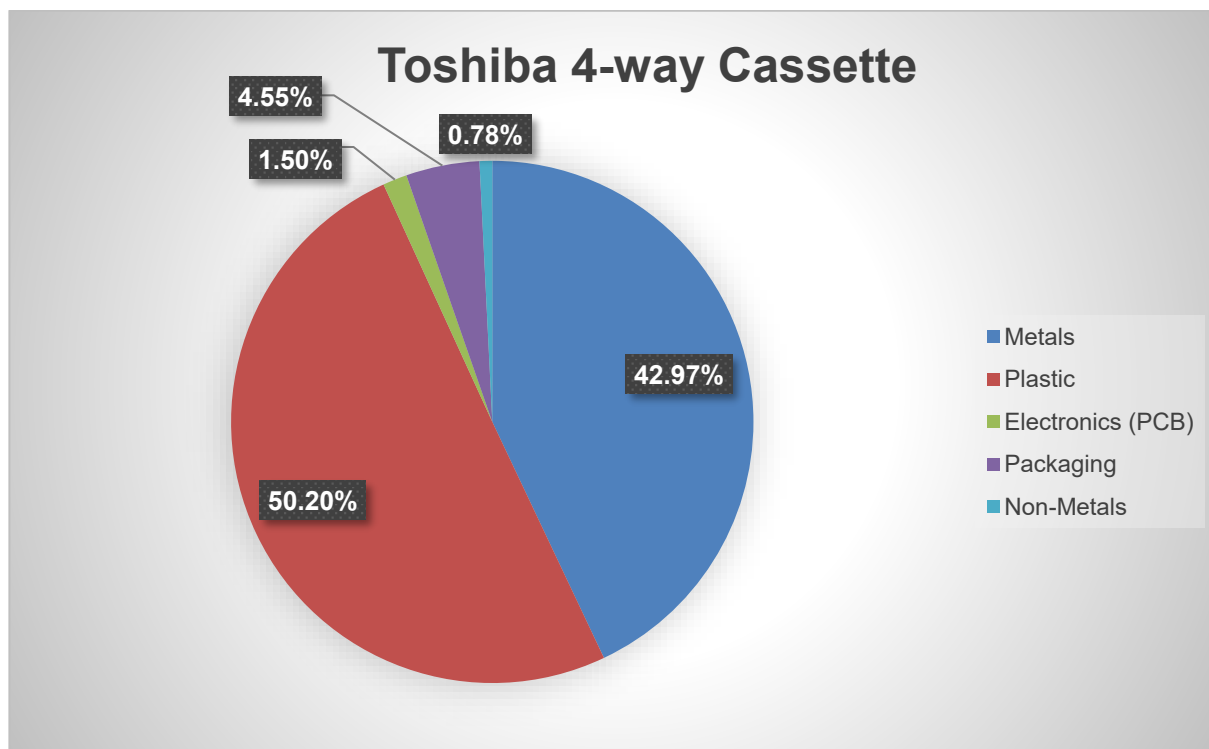
2.1 Reference product

Modelled total weight with other necessary details:

PEP Category		Material Category	Weight in [kg]	Weight in [%]	Overall Percentage, %	Post-consumer material, weight-%	Biogenic material, kg C / declared unit	Biogenic material, kg C / functional unit
Metals		Steel	10.22	30.01	42.97	0.00	0.00	0.00
		Lead wire	0.06	0.18		0.00	0.00	0.00
		Aluminum	1.65	4.85		0.00	0.00	0.00
		Copper	2.70	7.93		0.00	0.00	0.00
Non-metal		Rubber	0.27	0.78	0.78	0.00	0.00	0.00
Plastics		Plastics	17.09	50.20	50.20	0.00	0.00	0.00
Others	Packaging	EPS: Expanded Polystyrene	0.27	0.79	4.55	0.00	0.00	0.00
		Cardboard	1.28	3.76		0.00	0.64	0.21
	Electronic	Electronic (PCB)	0.51	1.50	1.50	0.00	0.00	0.00
Total			34.05	100.00	100.00	0.00	0.64	0.21

**1 kg biogenic carbon is equivalent to 44/12 kg of CO₂ (EN 16449:2014)

2.2 Constituent materials



3 – ENVIRONMENTAL IMPACTS

3.1 LCA impacts per Functional Unit

The impact results presented below were obtained using the methods defined in PCR-ed4-EN-2021-09-06 and PSR-0013-ed3.1-EN-2025 10 20. The results have been developed considering the supply of 1 kW of heating and hot water production. The real impact of the life cycle stages of the installed product in a real situation is to be calculated by the user of the result by multiplying the impact considered by the total heating capacity in kW.

CORE ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
GWP – total ¹	kg CO ₂ eq/FU	4.23E+02	3.88E+02	0.00E+00	4.46E-01	2.71E+01	0.00E+00	0.00E+00	MND	MND	MND	2.71E+01	0.00E+00	7.69E+00	0.00E+00	1.98E-01	5.35E-01	6.96E+00	-1.87E+01
GWP – fossil	kg CO ₂ eq/FU	4.23E+02	3.88E+02	0.00E+00	1.09E-01	2.71E+01	0.00E+00	0.00E+00	MND	MND	MND	2.71E+01	0.00E+00	7.68E+00	0.00E+00	1.98E-01	5.29E-01	6.96E+00	-1.86E+01
GWP – biogenic	kg CO ₂ eq/FU	0.00E+00	-3.37E-01	0.00E+00	3.37E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – LULUC	kg CO ₂ eq/FU	7.64E-01	7.31E-01	0.00E+00	1.37E-05	2.79E-02	0.00E+00	0.00E+00	MND	MND	MND	2.79E-02	0.00E+00	4.99E-03	0.00E+00	7.08E-05	4.84E-03	7.82E-05	-2.53E-02
Ozone depletion pot.	kg CFC-11eq/FU	1.38E-05	1.30E-05	0.00E+00	2.72E-10	7.63E-07	0.00E+00	0.00E+00	MND	MND	MND	7.63E-07	0.00E+00	1.78E-08	0.00E+00	3.94E-09	1.08E-08	3.10E-09	-1.07E-07
Acidification potential	mol H ⁺ eq/FU	3.11E+00	2.90E+00	0.00E+00	9.49E-05	2.05E-01	0.00E+00	0.00E+00	MND	MND	MND	2.05E-01	0.00E+00	5.57E-03	0.00E+00	4.10E-04	3.37E-03	1.80E-03	-4.07E-01
EP-freshwater ²	kg Peq/FU	2.88E-01	2.73E-01	0.00E+00	5.51E-06	1.45E-02	0.00E+00	0.00E+00	MND	MND	MND	1.45E-02	0.00E+00	4.66E-04	0.00E+00	1.33E-05	3.07E-04	1.46E-04	-3.30E-02
EP-marine	kg Neq/FU	4.89E-01	4.36E-01	0.00E+00	2.04E-04	3.88E-02	0.00E+00	0.00E+00	MND	MND	MND	3.88E-02	0.00E+00	1.44E-02	0.00E+00	9.87E-05	6.60E-04	1.37E-02	-3.17E-02
EP-terrestrial	mol Neq/FU	4.99E+00	4.65E+00	0.00E+00	3.07E-04	3.24E-01	0.00E+00	0.00E+00	MND	MND	MND	3.24E-01	0.00E+00	1.59E-02	0.00E+00	1.07E-03	6.31E-03	8.53E-03	-3.78E-01
POCP ("smog") ³	kg NMVOCeq/FU	1.53E+00	1.42E+00	0.00E+00	1.16E-04	1.06E-01	0.00E+00	0.00E+00	MND	MND	MND	1.06E-01	0.00E+00	5.22E-03	0.00E+00	6.86E-04	2.20E-03	2.33E-03	-1.12E-01
ADP-minerals & metals ⁴	kg Sbeq/FU	2.28E-02	2.14E-02	0.00E+00	1.38E-07	1.31E-03	0.00E+00	0.00E+00	MND	MND	MND	1.31E-03	0.00E+00	8.98E-06	0.00E+00	6.57E-07	7.79E-06	5.35E-07	-3.97E-03
ADP-fossil resources	MJ/FU	8.64E+03	5.06E+03	0.00E+00	2.33E-01	3.56E+03	0.00E+00	0.00E+00	MND	MND	MND	3.56E+03	0.00E+00	1.44E+01	0.00E+00	2.78E+00	9.46E+00	2.13E+00	-2.03E+02
Water use ⁵	m ³ e depr/FU	3.06E+03	3.01E+03	0.00E+00	9.68E-03	4.49E+01	0.00E+00	0.00E+00	MND	MND	MND	4.49E+01	0.00E+00	1.09E+00	0.00E+00	1.38E-02	5.99E-01	4.74E-01	-6.12E+00

MND abbreviation stands for Module Not Declared

1. GWP = Global Warming Potential

2. EP = Eutrophication potential. Required characterization method and data are in kg P-eq. Multiply by 3.07 to get PO4e

3. POCP = Photochemical ozone formation

4. ADP = Abiotic depletion potential

5. EF 3.1 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Particulate matter	Incidence /FU	2.24E-05	2.06E-05	0.00E+00	4.07E-09	1.77E-06	0.00E+00	0.00E+00	MND	MND	MND	1.77E-06	0.00E+00	6.20E-08	0.00E+00	1.46E-08	3.30E-08	1.44E-08	-1.79E-06
Ionizing radiation ⁶	kBq U235eq/FU	2.02E+02	4.20E+01	0.00E+00	5.83E-04	1.60E+02	0.00E+00	0.00E+00	MND	MND	MND	1.60E+02	0.00E+00	1.58E-01	0.00E+00	3.59E-03	1.52E-01	2.91E-03	-1.02E+00
Ecotoxicity (freshwater)	CTUeq /FU	2.66E+04	2.33E+04	0.00E+00	3.75E+00	1.77E+03	0.00E+00	0.00E+00	MND	MND	MND	1.77E+03	0.00E+00	1.49E+03	0.00E+00	3.69E-01	2.88E+01	1.46E+03	-3.27E+03
Human toxicity, cancer	CTUh /FU	2.42E-07	2.20E-07	0.00E+00	3.14E-11	2.06E-08	0.00E+00	0.00E+00	MND	MND	MND	2.06E-08	0.00E+00	1.13E-09	0.00E+00	3.33E-11	3.62E-10	7.37E-10	-4.20E-08
Human tox. non-cancer	CTUh /FU	1.37E-05	1.25E-05	0.00E+00	1.17E-09	1.15E-06	0.00E+00	0.00E+00	MND	MND	MND	1.15E-06	0.00E+00	4.25E-08	0.00E+00	1.76E-09	1.02E-08	3.05E-08	-3.27E-06
SQP ⁷	- /FU	1.64E+03	1.41E+03	0.00E+00	1.77E-01	2.00E+02	0.00E+00	0.00E+00	MND	MND	MND	2.00E+02	0.00E+00	3.08E+01	0.00E+00	1.68E+00	2.65E+01	2.55E+00	-1.57E+02

MND abbreviation stands for Module Not Declared

6. EF 3.1 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

7. SQP = Land use related impacts/soil quality.

3 – ENVIRONMENTAL IMPACTS

USE OF NATURAL RESOURCES

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Renew. PER as energy ^a	MJ/FU	1.47E+03	1.12E+03	0.00E+00	-6.57E+00	3.56E+02	0.00E+00	0.00E+00	MND	MND	MND	3.56E+02	0.00E+00	4.20E-01	0.00E+00	4.87E-02	3.08E-01	6.35E-02	-2.20E+01
Renew. PER as material	MJ/FU	5.26E+00	6.73E+00	0.00E+00	-6.73E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00	5.26E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ/FU	1.47E+03	1.12E+03	0.00E+00	-1.33E+01	3.56E+02	0.00E+00	0.00E+00	MND	MND	MND	3.56E+02	0.00E+00	5.69E+00	0.00E+00	4.87E-02	5.58E+00	6.35E-02	-2.20E+01
Non-re. PER as energy	MJ/FU	8.39E+03	5.03E+03	0.00E+00	-2.96E+00	3.56E+03	0.00E+00	0.00E+00	MND	MND	MND	3.56E+03	0.00E+00	-1.93E+02	0.00E+00	2.78E+00	6.28E+00	-2.02E+02	-2.01E+02
Non-re. PER as material	MJ/FU	2.49E+00	4.39E+00	0.00E+00	-4.39E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.49E+00	0.00E+00	0.00E+00	2.49E+00	0.00E+00	0.00E+00
Total use of non-re. PER	MJ/FU	8.39E+03	5.03E+03	0.00E+00	-7.37E+00	3.56E+03	0.00E+00	0.00E+00	MND	MND	MND	3.56E+03	0.00E+00	-1.90E+02	0.00E+00	2.78E+00	8.78E+00	-2.02E+02	-2.01E+02
Secondary materials	kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ/FU	8.36E-02	8.14E-02	0.00E+00	2.68E-06	2.05E-03	0.00E+00	0.00E+00	MND	MND	MND	2.05E-03	0.00E+00	1.36E-04	0.00E+00	1.63E-05	7.60E-05	4.33E-05	-4.39E-02
Non-ren. secondary fuels	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	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 net fresh water	m3/FU	7.13E+01	7.02E+01	0.00E+00	1.13E-04	1.04E+00	0.00E+00	0.00E+00	MND	MND	MND	1.04E+00	0.00E+00	1.51E-02	0.00E+00	3.78E-04	1.40E-02	7.76E-04	-1.68E-01

MND abbreviation stands for Module Not Declared

8) PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Hazardous waste	kg/FU	4.33E+01	4.04E+01	0.00E+00	2.98E-03	2.37E+00	0.00E+00	0.00E+00	MND	MND	MND	2.37E+00	0.00E+00	5.35E-01	0.00E+00	4.04E-03	7.63E-02	4.55E-01	-5.74E+00
Non-hazardous waste	kg/FU	1.18E+03	1.10E+03	0.00E+00	1.68E-01	7.66E+01	0.00E+00	0.00E+00	MND	MND	MND	7.66E+01	0.00E+00	1.10E+01	0.00E+00	8.53E-02	1.56E+00	9.36E+00	-1.36E+02
Radioactive waste	kg/FU	5.61E-02	1.02E-02	0.00E+00	1.44E-07	4.58E-02	0.00E+00	0.00E+00	MND	MND	MND	4.58E-02	0.00E+00	4.04E-05	0.00E+00	8.91E-07	3.88E-05	7.28E-07	-2.55E-04

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Components for re-use	kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	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	kg/FU	3.98E+00	0.00E+00	0.00E+00	3.91E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	3.59E+00	0.00E+00	0.00E+00	3.59E+00	0.00E+00	0.00E+00
Materials for energy rec	kg/FU	2.86E+00	0.00E+00	0.00E+00	5.38E-02	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.80E+00	0.00E+00	0.00E+00	0.00E+00	2.80E+00	0.00E+00
Exported energy	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MND abbreviation stands for Module Not Declared

ENVIRONMENTAL IMPACTS – TRACI 2.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ eq/FU	4.19E+02	3.85E+02	0.00E+00	1.36E-01	2.69E+01	0.00E+00	0.00E+00	MND	MND	MND	2.69E+01	0.00E+00	7.65E+00	0.00E+00	1.95E-01	5.35E-01	6.92E+00	-1.86E+01
Ozone Depletion	kg CFC-11eq/FU	1.56E-05	1.48E-05	0.00E+00	2.88E-10	8.01E-07	0.00E+00	0.00E+00	MND	MND	MND	8.01E-07	0.00E+00	1.88E-08	0.00E+00	4.13E-09	1.14E-08	3.24E-09	-1.20E-07
Acidification	kg SO ₂ eq/FU	2.58E+00	2.41E+00	0.00E+00	8.97E-05	1.67E-01	0.00E+00	0.00E+00	MND	MND	MND	1.67E-01	0.00E+00	4.85E-03	0.00E+00	3.49E-04	2.81E-03	1.69E-03	-3.21E-01
Eutrophication	kg Neq/FU	3.07E-01	2.86E-01	0.00E+00	5.42E-05	1.89E-02	0.00E+00	0.00E+00	MND	MND	MND	1.89E-02	0.00E+00	2.34E-03	0.00E+00	4.74E-05	1.12E-03	1.17E-03	-2.49E-02
POCP ("smog")	kg O ₃ eq/FU	2.79E+01	2.60E+01	0.00E+00	1.77E-03	1.80E+00	0.00E+00	0.00E+00	MND	MND	MND	1.80E+00	0.00E+00	9.40E-02	0.00E+00	7.47E-03	3.69E-02	4.97E-02	-1.86E+00
ADP-fossil	MJ/FU	2.30E+00	1.04E+00	0.00E+00	1.32E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.13E+00	0.00E+00	2.79E+00	-1.76E+00	1.00E-01	0.00E+00

MND abbreviation stands for Module Not Declared

3 – ENVIRONMENTAL IMPACTS

3.2 LCA impacts per Declared Unit

In the scope of building Life Cycle Analysis, the environmental impacts of the entire product over its reference service life should be considered, not the principal results of the PEP which correspond to the functional unit of the product. It is therefore necessary to multiply the principal results of the PEP by the FU Factor of the reference product, and if necessary, apply the extrapolation rules.

CORE ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
GWP – total ¹	kg CO ₂ eq	1.32E+03	1.21E+03	0.00E+00	1.39E+00	8.45E+01	0.00E+00	0.00E+00	MND	MND	MND	8.45E+01	0.00E+00	2.40E+01	0.00E+00	6.17E-01	1.67E+00	2.17E+01	-5.82E+01
GWP – fossil	kg CO ₂ eq	1.32E+03	1.21E+03	0.00E+00	3.40E-01	8.45E+01	0.00E+00	0.00E+00	MND	MND	MND	8.45E+01	0.00E+00	2.40E+01	0.00E+00	6.17E-01	1.65E+00	2.17E+01	-5.81E+01
GWP – biogenic	kg CO ₂ eq	0.00E+00	-1.05E+00	0.00E+00	1.05E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – LULUC	kg CO ₂ eq	2.38E+00	2.28E+00	0.00E+00	4.28E-05	8.69E-02	0.00E+00	0.00E+00	MND	MND	MND	8.69E-02	0.00E+00	1.56E-02	0.00E+00	2.21E-04	1.51E-02	2.44E-04	-7.88E-02
Ozone depletion pot.	kg CFC-11eq	4.29E-05	4.05E-05	0.00E+00	8.50E-10	2.38E-06	0.00E+00	0.00E+00	MND	MND	MND	2.38E-06	0.00E+00	5.56E-08	0.00E+00	1.23E-08	3.36E-08	9.67E-09	-3.35E-07
Acidification potential	mol H ⁺ eq	9.71E+00	9.05E+00	0.00E+00	2.96E-04	6.40E-01	0.00E+00	0.00E+00	MND	MND	MND	6.40E-01	0.00E+00	1.74E-02	0.00E+00	1.28E-03	1.05E-02	5.61E-03	-1.27E+00
EP-freshwater ²	kg P eq	8.99E-01	8.52E-01	0.00E+00	1.72E-05	4.51E-02	0.00E+00	0.00E+00	MND	MND	MND	4.51E-02	0.00E+00	1.45E-03	0.00E+00	4.15E-05	9.57E-04	4.55E-04	-1.03E-01
EP-marine	kg N eq	1.53E+00	1.36E+00	0.00E+00	6.36E-04	1.21E-01	0.00E+00	0.00E+00	MND	MND	MND	1.21E-01	0.00E+00	4.50E-02	0.00E+00	3.08E-04	2.06E-03	4.26E-02	-9.89E-02
EP-terrestrial	mol N eq	1.56E+01	1.45E+01	0.00E+00	9.59E-04	1.01E+00	0.00E+00	0.00E+00	MND	MND	MND	1.01E+00	0.00E+00	4.96E-02	0.00E+00	3.33E-03	1.97E-02	2.66E-02	-1.18E+00
POCP ("smog") ³	kg NMVOC eq	4.77E+00	4.42E+00	0.00E+00	3.63E-04	3.32E-01	0.00E+00	0.00E+00	MND	MND	MND	3.32E-01	0.00E+00	1.63E-02	0.00E+00	2.14E-03	6.87E-03	7.28E-03	-3.49E-01
ADP-minerals & metals ⁴	kg Sb eq	7.10E-02	6.69E-02	0.00E+00	4.30E-07	4.09E-03	0.00E+00	0.00E+00	MND	MND	MND	4.09E-03	0.00E+00	2.80E-05	0.00E+00	2.05E-06	2.43E-05	1.67E-06	-1.24E-02
ADP-fossil resources	MJ	2.69E+04	1.58E+04	0.00E+00	7.28E-01	1.11E+04	0.00E+00	0.00E+00	MND	MND	MND	1.11E+04	0.00E+00	4.48E+01	0.00E+00	8.68E+00	2.95E+01	6.66E+00	-6.32E+02
Water use ⁵	m ³ e depr.	9.53E+03	9.39E+03	0.00E+00	3.02E-02	1.40E+02	0.00E+00	0.00E+00	MND	MND	MND	1.40E+02	0.00E+00	3.39E+00	0.00E+00	4.31E-02	1.87E+00	1.48E+00	-1.91E+01

MND abbreviation stands for Module Not Declared

1. GWP = Global Warming Potential

2. EP = Eutrophication potential. Required characterization method and data are in kg P-eq. Multiply by 3.07 to get PO₄E

3. POCP = Photochemical ozone formation

4. ADP = Abiotic depletion potential

5. EF 3.1 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Particulate matter	Incidence	6.99E-05	6.42E-05	0.00E+00	1.27E-08	5.51E-06	0.00E+00	0.00E+00	MND	MND	MND	5.51E-06	0.00E+00	1.93E-07	0.00E+00	4.55E-08	1.03E-07	4.49E-08	-5.59E-06
Ionizing radiation ⁶	kBq U235 eq	6.29E+02	1.31E+02	0.00E+00	1.82E-03	4.98E+02	0.00E+00	0.00E+00	MND	MND	MND	4.98E+02	0.00E+00	4.93E-01	0.00E+00	1.12E-02	4.73E-01	9.08E-03	-3.19E+00
Ecotoxicity (freshwater)	CTUeq	8.30E+04	7.28E+04	0.00E+00	1.17E+01	5.53E+03	0.00E+00	0.00E+00	MND	MND	MND	5.53E+03	0.00E+00	4.66E+03	0.00E+00	1.15E+00	8.97E+01	4.57E+03	-1.02E+04
Human toxicity, cancer	CTUh	7.55E-07	6.87E-07	0.00E+00	9.81E-11	6.44E-08	0.00E+00	0.00E+00	MND	MND	MND	6.44E-08	0.00E+00	3.53E-09	0.00E+00	1.04E-10	1.13E-09	2.30E-09	-1.31E-07
Human tox. non-cancer	CTUh	4.28E-05	3.91E-05	0.00E+00	3.65E-09	3.59E-06	0.00E+00	0.00E+00	MND	MND	MND	3.59E-06	0.00E+00	1.32E-07	0.00E+00	5.49E-09	3.19E-08	9.51E-08	-1.02E-05
SQP ⁷	-	5.13E+03	4.41E+03	0.00E+00	5.52E-01	6.25E+02	0.00E+00	0.00E+00	MND	MND	MND	6.25E+02	0.00E+00	9.60E+01	0.00E+00	5.25E+00	8.28E+01	7.96E+00	-4.91E+02

MND abbreviation stands for Module Not Declared

6. EF 3.1 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator

7. SQP = Land use related impacts/soil quality

3 – ENVIRONMENTAL IMPACTS

USE OF NATURAL RESOURCES

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Renew. PER as energy ⁸	MJ	4.57E+03	3.48E+03	0.00E+00	-2.05E+01	1.11E+03	0.00E+00	0.00E+00	MND	MND	MND	1.11E+03	0.00E+00	1.31E+00	0.00E+00	1.52E-01	9.60E-01	1.98E-01	-6.86E+01
Renew. PER as material	MJ	1.64E+01	2.10E+01	0.00E+00	-2.10E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.64E+01	0.00E+00	0.00E+00	1.64E+01	0.00E+00	0.00E+00
Total use of renew. PER	MJ	4.59E+03	3.50E+03	0.00E+00	-4.15E+01	1.11E+03	0.00E+00	0.00E+00	MND	MND	MND	1.11E+03	0.00E+00	1.78E+01	0.00E+00	1.52E-01	1.74E+01	1.98E-01	-6.86E+01
Non-re. PER as energy	MJ	2.62E+04	1.57E+04	0.00E+00	-9.25E+00	1.11E+04	0.00E+00	0.00E+00	MND	MND	MND	1.11E+04	0.00E+00	-6.01E+02	0.00E+00	8.68E+00	1.96E+01	-6.29E+02	-6.28E+02
Non-re. PER as material	MJ	7.78E+00	1.37E+01	0.00E+00	-1.37E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	7.78E+00	0.00E+00	0.00E+00	7.78E+00	0.00E+00	0.00E+00
Total use of non-re. PER	MJ	2.62E+04	1.57E+04	0.00E+00	-2.30E+01	1.11E+04	0.00E+00	0.00E+00	MND	MND	MND	1.11E+04	0.00E+00	-5.93E+02	0.00E+00	8.68E+00	2.74E+01	-6.29E+02	-6.28E+02
Secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ	2.61E-01	2.54E-01	0.00E+00	8.37E-06	6.40E-03	0.00E+00	0.00E+00	MND	MND	MND	6.40E-03	0.00E+00	4.23E-04	0.00E+00	5.10E-05	2.37E-04	1.35E-04	-1.37E-01
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	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 net fresh water	m ³	2.22E+02	2.19E+02	0.00E+00	3.53E-04	3.26E+00	0.00E+00	0.00E+00	MND	MND	MND	3.26E+00	0.00E+00	4.72E-02	0.00E+00	1.18E-03	4.36E-02	2.42E-03	-5.25E-01

MND abbreviation stands for Module Not Declared

8. PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Hazardous waste	kg	1.35E+02	1.26E+02	0.00E+00	9.31E-03	7.38E+00	0.00E+00	0.00E+00	MND	MND	MND	7.38E+00	0.00E+00	1.67E+00	0.00E+00	1.26E-02	2.38E-01	1.42E+00	-1.79E+01
Non-hazardous waste	kg	3.69E+03	3.42E+03	0.00E+00	5.23E-01	2.39E+02	0.00E+00	0.00E+00	MND	MND	MND	2.39E+02	0.00E+00	3.43E+01	0.00E+00	2.66E-01	4.88E+00	2.92E+01	-4.24E+02
Radioactive waste	kg	1.75E-01	3.19E-02	0.00E+00	4.49E-07	1.43E-01	0.00E+00	0.00E+00	MND	MND	MND	1.43E-01	0.00E+00	1.26E-04	0.00E+00	2.78E-06	1.21E-04	2.27E-06	-7.95E-04

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
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	MND	MND	MND	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	kg	1.24E+01	0.00E+00	0.00E+00	1.22E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.12E+01	0.00E+00	0.00E+00	1.12E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	8.92E+00	0.00E+00	0.00E+00	1.68E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	8.75E+00	0.00E+00	0.00E+00	0.00E+00	8.75E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MND abbreviation stands for Module Not Declared

ENVIRONMENTAL IMPACTS – TRACI 2.1

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Global Warming Pot.	kg CO ₂ eq	1.31E+03	1.20E+03	0.00E+00	4.25E-01	8.38E+01	0.00E+00	0.00E+00	MND	MND	MND	8.38E+01	0.00E+00	2.39E+01	0.00E+00	6.07E-01	1.67E+00	2.16E+01	-5.79E+01
Ozone Depletion	kg CFC-11eq	4.87E-05	4.61E-05	0.00E+00	9.00E-10	2.50E-06	0.00E+00	0.00E+00	MND	MND	MND	2.50E-06	0.00E+00	5.86E-08	0.00E+00	1.29E-08	3.56E-08	1.01E-08	-3.75E-07
Acidification	kg SO ₂ eq	8.05E+00	7.51E+00	0.00E+00	2.80E-04	5.21E-01	0.00E+00	0.00E+00	MND	MND	MND	5.21E-01	0.00E+00	1.51E-02	0.00E+00	1.09E-03	8.77E-03	5.26E-03	-1.00E+00
Eutrophication	kg N eq	9.58E-01	8.92E-01	0.00E+00	1.69E-04	5.90E-02	0.00E+00	0.00E+00	MND	MND	MND	5.90E-02	0.00E+00	7.30E-03	0.00E+00	1.48E-04	3.50E-03	3.65E-03	-7.77E-02
POCP ("smog")	kg O ₃ eq	8.69E+01	8.10E+01	0.00E+00	5.51E-03	5.61E+00	0.00E+00	0.00E+00	MND	MND	MND	5.61E+00	0.00E+00	2.93E-01	0.00E+00	2.33E-02	1.15E-01	1.55E-01	-5.79E+00
ADP-fossil	MJ	7.19E+00	3.26E+00	0.00E+00	4.13E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	3.51E+00	0.00E+00	8.69E+00	-5.49E+00	3.13E-01	0.00E+00

MND abbreviation stands for Module Not Declared

4 – EXTRAPOLATION TO OTHER SIZES IN THE RANGE

4.1 Extrapolation Coefficients

The products mentioned in the LCA report belong to the same homogeneous environmental family as the reference product. The group of products shall have the following characteristics:

- Same main functionality,
- Same product standards,
- Similar manufacturing technology: same type of materials and manufacturing processes.

The extrapolation coefficients for similar commercial references are as follows

Stages/Models/Indoor unit		MMU-UP0051MHP-E	MMU-UP0071MHP-E	MMU-UP0121MHP-E	MMU-UP0151MHP-E	MMU-UP0181MHP-E	MMU-UP0091MHP-E
Functional Unit	Manufacturing stage	0.90	0.69	0.43	0.34	0.27	1.00
	Distribution stage	0.90	0.69	0.43	0.34	0.27	1.00
	Installation stage	1.68	1.28	0.80	0.64	0.51	1.00
	B1 Stage	0.00	0.00	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	1.00
	B6 stage	1.07	1.18	0.86	0.76	1.05	1.00
	C stage	0.87	0.66	0.41	0.33	0.26	1.00
	D stage	0.90	0.69	0.43	0.34	0.27	1.00
Declared Unit	Manufacturing stage	0.54	0.54	0.54	0.54	0.54	1.00
	Distribution stage	0.54	0.54	0.54	0.54	0.54	1.00
	Installation stage	1.00	1.00	1.00	1.00	1.00	1.00
	B1 Stage	0.00	0.00	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	0.00
	B6 stage	0.64	0.92	1.08	1.20	2.08	1.00
	C stage	0.52	0.52	0.52	0.52	0.52	1.00
	D stage	0.54	0.54	0.54	0.54	0.54	1.00

Stages/Models/Indoor unit		MMU-UP0091HP-E	MMU-UP0121HP-E	MMU-UP0151HP-E	MMU-UP0181HP-E	MMU-UP0241HP-E	MMU-UP0271HP-E
Functional Unit	Manufacturing stage	0.55	0.44	0.35	0.31	0.24	0.22
	Distribution stage	0.55	0.44	0.35	0.31	0.24	0.22
	Installation stage	1.00	0.80	0.64	0.51	0.40	0.35
	B1 Stage	0.00	0.00	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	1.00
	B6 stage	0.84	0.67	0.59	0.53	0.57	0.51
	C stage	0.53	0.42	0.34	0.30	0.24	0.21
	D stage	0.55	0.44	0.35	0.31	0.24	0.22
Declared Unit	Manufacturing stage	0.55	0.55	0.55	0.61	0.61	0.61
	Distribution stage	0.55	0.55	0.55	0.61	0.61	0.61
	Installation stage	1.00	1.00	1.00	1.00	1.00	1.00
	B1 Stage	0.00	0.00	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	1.00
	B6 stage	0.84	0.84	0.92	1.04	1.44	1.44
	C stage	0.53	0.53	0.53	0.59	0.59	0.59
	D stage	0.55	0.55	0.55	0.61	0.61	0.61

4 – EXTRAPOLATION TO OTHER SIZES IN THE RANGE

Stages/Models/Indoor unit		MMU-UP0301HP-E	MMU-UP0361HP-E	MMU-UP0481HP-E	MMU-UP0561HP-E
Functional Unit	Manufacturing stage	0.19	0.21	0.15	0.13
	Distribution stage	0.19	0.21	0.15	0.13
	Installation stage	0.32	0.28	0.20	0.18
	B1 Stage	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00
	B6 stage	0.55	1.00	0.90	0.79
	C stage	0.19	0.21	0.15	0.13
	D stage	0.19	0.21	0.15	0.13
Declared Unit	Manufacturing stage	0.61	0.75	0.75	0.75
	Distribution stage	0.61	0.75	0.75	0.75
	Installation stage	1.00	1.00	1.00	1.00
	B1 Stage	0.00	0.00	0.00	0.00
	B2 stage	1.00	1.00	1.00	1.00
	B6 stage	1.72	3.52	4.48	4.48
	C stage	0.59	0.74	0.74	0.74
	D stage	0.61	0.75	0.75	0.75

The extrapolation coefficients are given for the environmental impact of the functional unit, i.e., the emission of 1 kW of cooling capacity. For each stage of the life cycle, the environmental impacts of the product in question are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient.

5 – DECLARATION AND CONTACT INFORMATION

5.1 Declaration

Registration number: TACE-00002-V01.01-EN	Drafting rules: « PEP-PCR-ed4-EN-2021 09 06 » Supplemented by « PSR-0013-ed3.1-EN-2025-10-20 »
Vérifier accreditation number: VH42	Information and reference documents: www.pep-ecopassport.org
Date of issue: 07-2026	Validity period: 5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006	
Internal : ☐	External : ☒
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain)	
PEP are compliant with NF C08-100-1:2016 and EN 50693 :2019 or NF E38-500:2022	
The elements of the present PEP cannot be compared with elements from another program.	
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"	



5.2 Contact information

The illustrations in this document are provided for information only and do not form part of any sales offer or contact. The manufacturer reserves the right to change any product specifications without notice.

PEP Owner

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5.3 References

1. EN 14511 – Air Conditioners, Heat Pumps, and Chillers Performance Standard.
2. EN 14825 – Seasonal Performance and Part-Load Testing Standard.
3. EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
4. EN 16147--Heat pumps with electrically driven compressors.
5. F-Gas-European regulation n° 517/2014 relating to fluorinated greenhouse gases.
6. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
7. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
8. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
9. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
10. PCR-ed4-EN-2021 09 06; Product Category Rules for Electrical, Electronic and HVAC-R Products.
11. PSR-0013-ed3.1-EN-2025 06 17; SPECIFIC RULES FOR THERMODYNAMIC GENERATORS WITH ELECTRIC COMPRESSION FOR SPACE HEATING AND/OR COOLING AND/OR THE PRODUCTION OF DOMESTIC HOT WATER.
12. Regulation (EU) 1516/2007- REGULATION (EC) No 1516/2007 OF THE COMMISSION dated 19 December 2007 establishing, pursuant to Regulation (EC) No 842/2006 of the European Parliament and of the Council.
13. Regulation (EU) No. 813/2013- REGULATION (EU) No. 813/2013 of the Commission dated 2 August 2013 in application of Directive 2009/125/EC of the European Parliament.