

Product Environmental Profile

SHRMa R32 – 33.50 kW - R32
MMY-SUG1201MT8P-E
Stand-alone VRF outdoor unit

Toshiba
Carrier Corporation



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1 – GENERAL INFORMATIONS

1.1 Commercial reference of the reference product

Reference product:	SHRMa R32 – 33.50 kW - MMY-SUG1201MT8P-E
Product family:	VRF (Variable Refrigerant Flow)
Product sub-category:	SHRMa R32 Stand-alone VRF outdoor unit
Technology:	Air/Air – VRF P>32 kW
Type:	Reversible
Function:	Heating and/or cooling capacity
Operational Efficiency:	SCOP: 4.62 / SEER: 8.23
Refrigerant:	R32
References covered:	8CV,10CV,14CV,16CV,18CV,20CV,22CV,24CV
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 14825 standard and during the 22-year reference lifetime of the product.”

Functional unit factor:

$$P_{rev} = (t_{heating} * P_h + t_{cooling} * P_c) / (t_{heating} + t_{cooling}) = 33.5$$

1.3 Declared Unit

“To produce heating or cooling thanks to VRF outdoor unit of 33.5 kW according to the appropriate usage scenario and during the 22-year reference lifetime of the product”

1.4 Additional environmental information

The environmental impacts of the product are assessed in accordance with ISO 14040 and 14044 standards using One Click LCA V0.44.6. This analysis covers 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 (LCA) supporting this product environmental profile (PEP) was conducted in accordance with the criteria outlined in PCR-ed4-EN-2021-09-06 and PSR-0013-ed3.1-EN-2025 06 17 under 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 to protect the product during transportation. Raw materials were sourced from suppliers in Asia and transported to the manufacturing facility via road and sea. Primary data provided by the manufacturer covers the calendar year 2023. This stage was modeled based on the weight of materials and the transport distances from supplier locations to the manufacturing site, using Toshiba's supplier list. Regional electricity production datasets from ecoinvent were used to account for energy consumption during manufacturing. Specific energy data from Toshiba's Thailand facility was applied to components and assemblies produced in-house for the Toshiba SHRMa R32, while generic ecoinvent datasets were used for externally sourced components. Waste generated during manufacturing—primarily from component assembly—is accounted for using Toshiba's data. In line with PCR-ed4-EN-2021 09 06 recommendations, a default transport distance of 100 kilometers to the waste processing facility was applied.

- 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 in France. 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.

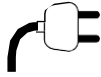
1.7 Installation



The product installation does not require specialized procedures and is largely manual. As per PSR-0013 (Section 3.2.3), energy use from portable hand tools is excluded. A conservative assumption has been applied for loading and unloading, accounting for a diesel-powered forklift consuming approximately 3 litres of diesel per hour; no other installation energy is required. 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 PSR-0013-ed3.1-EN-2025 06 17.

1 – GENERAL INFORMATIONS

1.8 Use



This stage encompasses all energy and materials related to product usage, maintenance, and the impact of operational energy use over the reference service life of 22 years. The use phase of the SHRMa R32 VRF includes refrigerant leakage (B1), maintenance (B2), operational energy use and atmospheric emissions (B6). The stages of repair (B3), replacement (B4), Refurbishment (B5) are not applicable for this assessment as per PSR-0013-ed3.1-EN-2025 06 17 guidelines. The product has no operational water consumption and generate condensate which is negligible; therefore, the water usage is zero.

Refrigerant leakage during the use phase (B1) of the equipment is calculated in accordance with the guidelines outlined in PSR-0013-ed3.1-EN-2025-06-17. For VRF systems, we followed example, which describes a non-hermetically sealed VRF system with one outdoor unit and six indoor units. In this scenario, we applied the case involving non-removable fittings not connected to brazed or permanent fittings. The total number of removable fittings associated with the units is 14, resulting in the calculation of annual fugitive emissions (Q_{fu}) as follows:

$$E_{fu} = Q_{fu} * DVR$$

E_{fu}= Momentary leakage = 1.54 kg

Q_{fu}= Amount of fugitive emissions in g or kg, = 5x14= 0.07 kg

DVR= Reference service lifetime = 22 years.

The maintenance frequency for the SHRMa R32 is considered low. Refrigerant is refilled early by a technician, with the quantity determined according to the guidelines outlined in PSR-0013-ed3.1-EN-2025 06 17. Transportation of the refrigerant is also accounted for during this stage. By default, the refill threshold to be considered is 90% of the total load. The number of refills, N, is calculated as follows

$$n = 1 + \frac{1 - S_r}{T_{fu}}$$

$$N = ENT SUP [RLT/n]$$

Where:

- n = Refill interval = 1 + (1 - S_r) / T_{fu}

- N = Total number of refills over the equipment's lifetime = ENT SUP [RLT / n]

According to the number of refills, the production of new refrigerant to be partial refill.

$$N * (1 - S_r) * C_t$$

S_r= refill threshold = 0.90

C_t= refrigerant charge = 6.00 kg

T_{fu}= Leakage rate = E_{fu}/ (DVR*C_t) = 1.2%

N= 2.30 ~ 3 (rounded off to nearest highest whole number)

Refrigerant refill = 1.80 kg

According to the breakdown of module B as defined in the product specific rules (PSR-0013-ed3.1-EN-2025 06 17), stages B3 (repair), B4 (replacement), and B5 (refurbishment) are not applicable to this assessment. The product has no operational water consumption and generate condensate which is negligible; therefore, the water usage is zero.

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 SHMRa R32 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 06 17.

The energy consumption C_{tot} in the use stage is calculated in heating and cooling mode use as follow:

$$C_{tot}(in kWh) = \left(\frac{P_h}{SCOP * \left(1 + \frac{Fregul}{100}\right)} * t_{heating} + \frac{P_c}{SEER} * t_{cooling} \right) * RLT$$

Where:

- C_{tot} = Total energy consumption = 2.77E+05 kWh

- P_h = Heating capacity of the equipment (per European eco-design standards) = 33.5 kW

- P_c = Cooling capacity of the equipment (per European eco-design standards) = 33.5 kW

- SCOP = Seasonal Coefficient of Performance for heating (EN 14825) = 4.62

- SEER = Seasonal Energy Efficiency Ratio for cooling (EN 14825) = 8.23

- Type of generator: Air/Air VRF P>12 kW

- t_{heating} = Equivalent active mode hours in heating mode = 1400 hours

- t_{cooling} = Equivalent active mode hours in cooling mode = 600 hours

- RLT = Reference lifetime of the equipment = 22 years

- Fregul = 0 for heat pumps or air conditioners, VRF air/air

1 – GENERAL INFORMATIONS

- 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 SHRMA R32 VRF 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. Other ferrous metals like cast iron also show strong recycling performance at 80%, with 20% landfilled. 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. Oil, as referenced in PCR-ed4-EN-2021-09-06 is entirely incinerated (100%) without energy recovery. Lastly, Cardboard 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 – GENERAL INFORMATIONS

1.11 Technical description of the device

The Toshiba SHRMa R32 system incorporates advanced technical features and complies with relevant standards. All modules support 3-wire operation, and the 8, 10, and 12 hp units are compatible with 2-pipe configurations. Units ranging from 8 to 14 hp are equipped with one A3 twin rotary piston compressor, while 16 to 24 hp models feature two compressors. The system utilizes liquid injection and Dual Cane technology with carbon coating for enhanced performance. It offers auto-backup functionality and uninterrupted heating for up to 5 hours, along with ultra-short defrost cycles lasting only 3.5 minutes. Intelligent refrigerant management ensures optimal distribution to all indoor units, regardless of their location within the building. Additionally, intelligent oil management algorithms enable the shortest possible oil recovery cycles. The fast TU2C-Link system bus operates at 19,200 bps. For commissioning and service, the system includes wireless NFC WaveTool support for Android and iOS devices, and the DynaDoctor PC application for diagnostics and monitoring via USB. An optional TCB-SS1UU-E service link adapter allows data logging to a micro SDHC card (8 GB included) without requiring a PC.

Parameters	Units	SHRMa 12 CV	8 CV	10 CV	14 CV	16 CV	18 CV	20 CV	22 CV	24 CV
Reversible device	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SCOP	kW	4.62	4.44	4.67	4.30	4.65	4.49	4.29	4.26	4.04
Heating Capacity	kW	33.5	22.4	28.00	40.00	45.00	50.40	56.00	61.50	67.00
SEER	kW	8.23	8.90	8.69	8.08	8.64	8.32	8.29	7.88	6.66
Cooling capacity	kW	33.50	22.40	28.00	40.00	45.00	50.40	56.00	61.50	67.00
Refrigerant	-	R32	R32	R32	R32	R32	R32	R32	R32	R32
$t_{calorific}$	h	1400	1400	1400	1400	1400	1400	1400	1400	1400
$t_{trigoric}$	h	600	600	600	600	600	600	600	600	600
Refrigerant Charge	kg	6.00	6.00	6.00	6.00	9.00	9.00	9.00	9.00	9.00

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

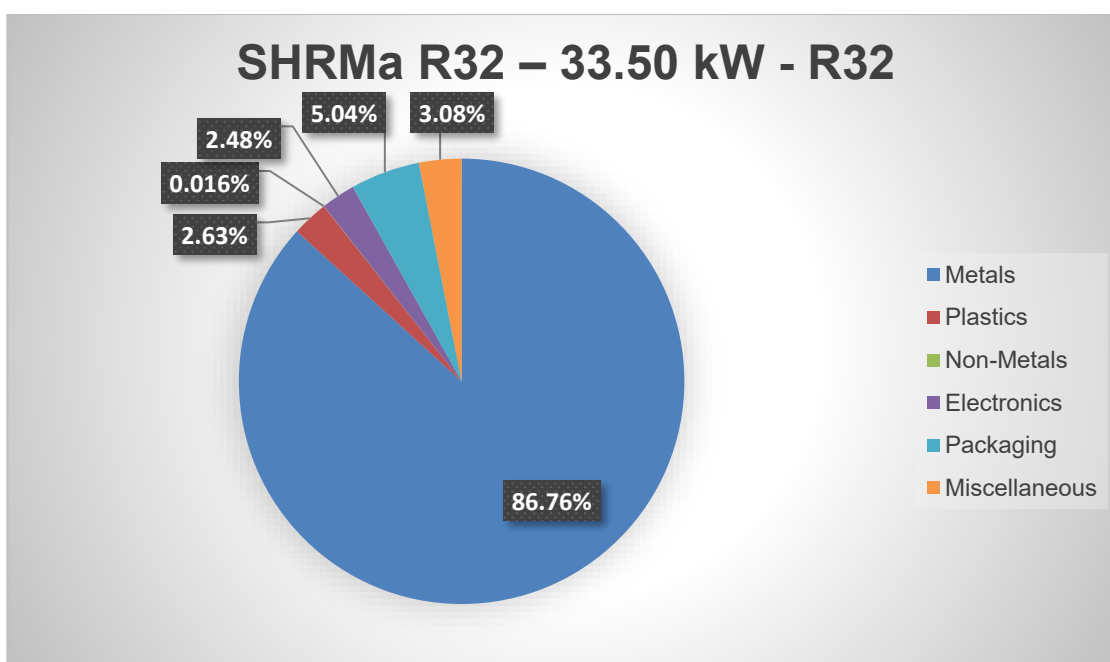
2.1 Reference product

Modelled total weight with other necessary details:

PEP Category		Material Category	Weight [kg]	Weight, [%]	Overall Percentage, [%]	Post-consumer material, weight-%	Biogenic material, kg C / declared unit	Biogenic material, kg C / Functional unit
Metals		Steel	141.53	57.92	86.76	0	0	0
		Copper	36.89	15.10		0	0	0
		Aluminium	24.81	10.15		0	0	0
		Cast iron	6.49	2.66		0	0	0
		Stainless steel	1.30	0.53		0	0	0
		Magnet	0.96	0.39		0	0	0
Plastics		Plastics	6.43	2.63	2.63	0	0	0
Others	Non-Metals	Rubber	0.04	0.02	10.61	0	0	0
	-	Electronics	6.05	2.48		0	0	0
	Packaging	Cardboard	12.32	5.04		0	6.16	0.18
	Miscellaneous	R32 refrigerant fluid	6.00	2.46		0	0	0
		Compressor oil	1.52	0.62		0	0	0
Total			244.34	100.00	100.00	0	6.16	0.18

**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 06 17. The results have been developed considering the supply of 1 kW of heating and cooling. The real impact of the life cycle stages of the installed product in real situation is to be calculated by the user of the result by multiplying the impact considered by the total heating and cooling capacity in kW.

CORE ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufacturing	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	
GWP – total ¹	kg CO ₂ eq/FU	8.38E+02	5.55E+01	2.50E+00	6.48E-01	7.61E+02	3.55E+01	5.04E-01	MND	MND	MND	7.25E+02	0.00E+00	1.75E+01	0.00E+00	1.47E-01	3.37E+00	1.40E+01	-2.47E+01
GWP – fossil	kg CO ₂ eq/FU	8.38E+02	5.58E+01	2.50E+00	3.40E-01	7.61E+02	3.55E+01	5.04E-01	MND	MND	MND	7.25E+02	0.00E+00	1.75E+01	0.00E+00	1.47E-01	3.37E+00	1.40E+01	-2.47E+01
GWP – biogenic	kg CO ₂ eq/FU	1.41E-21	-3.07E-01	5.16E-20	3.07E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.41E-21	0.00E+00	-3.22E-21	0.00E+00	1.41E-21	0.00E+00
GWP – LULUC	kg CO ₂ eq/FU	9.17E-01	1.62E-01	1.16E-03	4.15E-05	7.47E-01	0.00E+00	2.58E-04	MND	MND	MND	7.46E-01	0.00E+00	7.80E-03	0.00E+00	6.63E-05	7.73E-03	1.22E-05	-2.74E-02
Ozone depletion pot.	kg CFC-11eq/FU	2.11E-05	5.61E-07	4.18E-08	5.01E-09	2.04E-05	0.00E+00	3.55E-09	MND	MND	MND	2.04E-05	0.00E+00	4.23E-08	0.00E+00	2.17E-09	3.91E-08	4.33E-10	-1.37E-07
Acidification potential	mol H ⁺ eq/FU	6.67E+00	1.11E+00	4.39E-02	2.95E-03	5.50E+00	0.00E+00	2.53E-03	MND	MND	MND	5.49E+00	0.00E+00	1.39E-02	0.00E+00	3.55E-04	1.34E-02	1.43E-04	-5.16E-01
EP-freshwater ²	kg Peq/FU	5.02E-01	1.13E-01	1.17E-04	1.34E-05	3.88E-01	0.00E+00	3.25E-05	MND	MND	MND	3.88E-01	0.00E+00	1.70E-03	0.00E+00	1.15E-05	1.67E-03	1.18E-05	-4.18E-02
EP-marine	kg Neq/FU	1.19E+00	1.28E-01	1.09E-02	1.38E-03	1.05E+00	0.00E+00	5.34E-04	MND	MND	MND	1.04E+00	0.00E+00	4.03E-03	0.00E+00	8.81E-05	2.86E-03	1.08E-03	-4.09E-02
EP-terrestrial	mol Neq/FU	1.01E+01	1.21E+00	1.21E-01	1.49E-02	8.72E+00	0.00E+00	5.88E-03	MND	MND	MND	8.72E+00	0.00E+00	3.02E-02	0.00E+00	9.52E-04	2.87E-02	6.18E-04	-4.87E-01
POCP ("smog") ³	kg NMVOCeq/FU	3.25E+00	3.46E-01	3.49E-02	4.48E-03	2.86E+00	0.00E+00	2.07E-03	MND	MND	MND	2.86E+00	0.00E+00	1.01E-02	0.00E+00	5.01E-04	9.34E-03	2.02E-04	-1.44E-01
ADP-minerals & metals ⁴	kg Sb ₂ eq/FU	4.75E-02	1.22E-02	4.99E-06	2.21E-07	3.52E-02	0.00E+00	1.91E-06	MND	MND	MND	3.52E-02	0.00E+00	1.68E-05	0.00E+00	4.81E-07	1.63E-05	4.09E-08	-4.93E-03
ADP-fossil resources	MJ/FU	9.57E+04	6.45E+02	3.25E+01	4.39E+00	9.49E+04	0.00E+00	8.75E+00	MND	MND	MND	9.49E+04	0.00E+00	4.66E+01	0.00E+00	2.07E+00	4.42E+01	3.61E-01	-2.66E+02
Water use ⁵	m ³ e depr/FU	1.23E+03	2.14E+01	1.24E-01	1.48E-02	1.20E+03	0.00E+00	3.97E-02	MND	MND	MND	1.20E+03	0.00E+00	1.99E+00	0.00E+00	9.76E-03	1.96E+00	2.16E-02	-7.76E+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	Manufacturing	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	
Particulate matter	Incidence /FU	5.38E-05	5.85E-06	1.21E-07	8.36E-08	4.75E-05	0.00E+00	2.36E-08	MND	MND	MND	4.75E-05	0.00E+00	2.96E-07	0.00E+00	1.14E-08	2.83E-07	2.46E-09	-2.34E-06
Ionizing radiation ⁶	kBq U235eq/FU	4.27E+03	3.25E+00	2.74E-02	2.70E-03	4.27E+03	0.00E+00	5.88E-03	MND	MND	MND	4.27E+03	0.00E+00	7.97E-01	0.00E+00	1.70E-03	7.94E-01	3.52E-04	-1.34E+00
Ecotoxicity (freshwater)	CTUeq/FU	6.19E+04	1.23E+04	3.31E+00	3.79E+00	4.75E+04	1.64E-03	5.61E-01	MND	MND	MND	4.75E+04	0.00E+00	2.10E+03	0.00E+00	3.22E-01	1.01E+02	2.00E+03	-4.09E+03
Human toxicity, cancer	CTUh/FU	6.89E-07	1.23E-07	4.84E-10	4.12E-11	5.53E-07	0.00E+00	2.74E-10	MND	MND	MND	5.52E-07	0.00E+00	1.30E-08	0.00E+00	2.44E-11	1.28E-08	1.60E-10	-5.37E-08
Human tox. non-cancer	CTUh/FU	4.01E-05	9.28E-06	1.39E-08	8.75E-10	3.07E-05	3.88E-11	2.05E-09	MND	MND	MND	3.07E-05	0.00E+00	5.53E-08	0.00E+00	1.31E-09	4.69E-08	7.10E-09	-4.12E-06
SQP ⁷	- /FU	5.91E+03	4.87E+02	1.05E+01	3.88E-01	5.37E+03	0.00E+00	1.34E+00	MND	MND	MND	5.37E+03	0.00E+00	3.53E+01	0.00E+00	1.35E+00	3.31E+01	8.00E-01	-1.89E+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	9.63E+03	8.06E+01	4.00E-01	-5.88E+00	9.55E+03	0.00E+00	1.37E+00	MND	MND	MND	9.55E+03	0.00E+00	6.13E+00	0.00E+00	2.87E-02	6.09E+00	6.00E-03	-2.79E+01
Renew. PER as material	MJ/FU	1.32E+01	1.47E+01	0.00E+00	-6.09E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	4.60E+00	0.00E+00	0.00E+00	4.60E+00	0.00E+00	-1.26E-01
Total use of renew. PER	MJ/FU	9.65E+03	9.55E+01	4.00E-01	-1.20E+01	9.55E+03	0.00E+00	1.37E+00	MND	MND	MND	9.55E+03	0.00E+00	1.08E+01	0.00E+00	2.87E-02	1.07E+01	6.00E-03	-2.80E+01
Non-re. PER as energy	MJ/FU	9.56E+04	6.30E+02	3.25E+01	4.39E+00	9.49E+04	0.00E+00	8.75E+00	MND	MND	MND	9.49E+04	0.00E+00	2.80E+01	0.00E+00	2.07E+00	3.67E+01	-1.07E+01	-2.65E+02
Non-re. PER as material	MJ/FU	5.45E+00	3.34E+00	0.00E+00	-4.96E-02	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.16E+00	0.00E+00	0.00E+00	2.16E+00	0.00E+00	-9.64E+00
Total use of non-re. PER	MJ/FU	9.56E+04	6.33E+02	3.25E+01	4.33E+00	9.49E+04	0.00E+00	8.75E+00	MND	MND	MND	9.49E+04	0.00E+00	3.01E+01	0.00E+00	2.07E+00	3.88E+01	-1.07E+01	-2.75E+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	1.22E-01	6.60E-02	1.07E-04	6.06E-06	5.49E-02	0.00E+00	1.57E-05	MND	MND	MND	5.49E-02	0.00E+00	6.12E-04	0.00E+00	1.19E-05	5.97E-04	3.04E-06	-3.91E-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	2.87E+01	5.76E-01	3.25E-03	2.81E-04	2.81E+01	0.00E+00	2.45E-03	MND	MND	MND	2.81E+01	0.00E+00	5.10E-02	0.00E+00	2.85E-04	5.16E-02	-9.31E-04	-2.12E-01

MND abbreviation stands for Module Not Declared

a) 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	7.74E+01	1.15E+01	4.51E-02	6.06E-03	6.33E+01	0.00E+00	8.30E-03	MND	MND	MND	6.33E+01	0.00E+00	2.53E+00	0.00E+00	3.61E-03	2.16E+00	3.70E-01	-7.58E+00
Non-hazardous waste	kg/FU	2.45E+03	3.91E+02	7.76E-01	1.56E-01	2.05E+03	0.00E+00	1.77E-01	MND	MND	MND	2.05E+03	0.00E+00	8.82E+00	0.00E+00	6.78E-02	7.55E+00	1.21E+00	-1.73E+02
Radioactive waste	kg/FU	1.23E+00	2.11E-03	6.78E-06	6.72E-07	1.23E+00	0.00E+00	1.15E-04	MND	MND	MND	1.23E+00	0.00E+00	2.05E-04	0.00E+00	4.18E-07	2.04E-04	8.66E-08	-3.34E-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	5.32E+00	0.00E+00	0.00E+00	3.34E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	4.99E+00	0.00E+00	0.00E+00	4.99E+00	0.00E+00	0.00E+00
Materials for energy rec	kg/FU	1.41E-01	0.00E+00	0.00E+00	1.85E-02	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.23E-01	0.00E+00	0.00E+00	4.60E-02	7.67E-02	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	8.24E+02	5.49E+01	2.47E+00	3.55E-01	7.51E+02	3.10E+01	2.35E-01	MND	MND	MND	7.19E+02	0.00E+00	1.58E+01	0.00E+00	1.44E-01	3.34E+00	1.23E+01	-2.45E+01
Ozone Depletion	kg CFC-11eq/FU	2.22E-05	6.18E-07	4.42E-08	5.28E-09	2.15E-05	0.00E+00	3.76E-09	MND	MND	MND	2.15E-05	0.00E+00	4.49E-08	0.00E+00	2.29E-09	4.15E-08	4.54E-10	-1.52E-07
Acidification	kg SO ₂ eq/FU	5.41E+00	8.78E-01	3.73E-02	2.73E-03	4.48E+00	0.00E+00	9.88E-04	MND	MND	MND	4.48E+00	0.00E+00	1.18E-02	0.00E+00	3.07E-04	1.13E-02	1.44E-04	-4.09E-01
Eutrophication	kg Neq/FU	6.37E-01	1.25E-01	1.59E-03	2.21E-04	5.08E-01	0.00E+00	1.23E-04	MND	MND	MND	5.07E-01	0.00E+00	2.59E-03	0.00E+00	3.82E-05	2.47E-03	9.16E-05	-3.19E-02
POCP ("smog")	kg O ₃ eq/FU	5.48E+01	5.73E+00	7.13E-01	8.99E-02	4.81E+01	0.00E+00	2.46E-02	MND	MND	MND	4.81E+01	0.00E+00	1.75E-01	0.00E+00	6.33E-03	1.65E-01	3.70E-03	-2.41E+00
ADP-fossil	MJ/FU	1.02E+02	6.42E+01	3.25E+01	9.82E-02	3.28E+00	0.00E+00	3.28E+00	MND	MND	MND	0.00E+00	0.00E+00	2.19E+00	0.00E+00	2.07E+00	0.00E+00	1.44E-01	0.00E+00

MND abbreviation stands for Module Not Declared

3 – ENVIRONMENTAL IMPACTS

3.1 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 principle results of the PEP which correspond to the functional unit of the product. It is therefore necessary to multiply the principle 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	Manufacturing	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	
GWP – total ¹	kg CO ₂ eq	2.81E+04	1.86E+03	8.38E+01	2.17E+01	2.55E+04	1.19E+03	1.69E+01	MND	MND	MND	2.43E+04	0.00E+00	5.88E+02	0.00E+00	4.91E+00	1.13E+02	4.70E+02	-8.27E+02
GWP – fossil	kg CO ₂ eq	2.81E+04	1.87E+03	8.38E+01	1.14E+01	2.55E+04	1.19E+03	1.69E+01	MND	MND	MND	2.43E+04	0.00E+00	5.88E+02	0.00E+00	4.91E+00	1.13E+02	4.70E+02	-8.26E+02
GWP – biogenic	kg CO ₂ eq	-6.06E-20	-1.03E+01	1.73E-18	1.03E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	-6.06E-20	0.00E+00	-1.08E-19	0.00E+00	4.74E-20	0.00E+00
GWP – LULUC	kg CO ₂ eq	3.07E+01	5.42E+00	3.87E-02	1.39E-03	2.50E+01	0.00E+00	8.64E-03	MND	MND	MND	2.50E+01	0.00E+00	2.62E-01	0.00E+00	2.22E-03	2.59E-01	4.10E-04	-9.17E-01
Ozone depletion pot.	kg CFC-11eq	7.06E-04	1.88E-05	1.40E-06	1.68E-07	6.84E-04	0.00E+00	1.19E-07	MND	MND	MND	6.84E-04	0.00E+00	1.40E-06	0.00E+00	7.27E-08	1.31E-06	1.45E-08	-4.59E-06
Acidification potential	mol H ⁺ eq	2.23E+02	3.73E+01	1.47E+00	9.88E-02	1.84E+02	0.00E+00	8.48E-02	MND	MND	MND	1.84E+02	0.00E+00	4.66E-01	0.00E+00	1.19E-02	4.49E-01	4.78E-03	-1.73E+01
EP-freshwater ²	kg P eq	1.68E+01	3.77E+00	3.93E-03	4.49E-04	1.30E+01	0.00E+00	1.09E-03	MND	MND	MND	1.30E+01	0.00E+00	5.69E-02	0.00E+00	3.84E-04	5.61E-02	3.96E-04	-1.40E+00
EP-marine	kg N eq	3.99E+01	4.29E+00	3.66E-01	4.61E-02	3.50E+01	0.00E+00	1.79E-02	MND	MND	MND	3.50E+01	0.00E+00	1.35E-01	0.00E+00	2.95E-03	9.58E-02	3.63E-02	-1.37E+00
EP-terrestrial	mol N eq	3.38E+02	4.04E+01	4.06E+00	5.00E-01	2.92E+02	0.00E+00	1.97E-01	MND	MND	MND	2.92E+02	0.00E+00	1.01E+00	0.00E+00	3.19E-02	9.60E-01	2.07E-02	-1.63E+01
POCP ("smog") ³	kg NMVOC eq	1.09E+02	1.16E+01	1.17E+00	1.50E-01	9.58E+01	0.00E+00	6.94E-02	MND	MND	MND	9.57E+01	0.00E+00	3.37E-01	0.00E+00	1.68E-02	3.13E-01	6.76E-03	-4.84E+00
ADP-minerals & metals ⁴	kg Sb eq	1.59E+00	4.10E-01	1.67E-04	7.42E-06	1.18E+00	0.00E+00	6.41E-05	MND	MND	MND	1.18E+00	0.00E+00	5.62E-04	0.00E+00	1.61E-05	5.45E-04	1.37E-06	-1.65E-01
ADP-fossil resources	MJ	3.20E+06	2.16E+04	1.09E+03	1.47E+02	3.18E+06	0.00E+00	2.93E+02	MND	MND	MND	3.18E+06	0.00E+00	1.56E+03	0.00E+00	6.92E+01	1.48E+03	1.21E+01	-8.91E+03
Water use ⁵	m ³ e depr.	4.11E+04	7.16E+02	4.16E+00	4.96E-01	4.03E+04	0.00E+00	1.33E+00	MND	MND	MND	4.03E+04	0.00E+00	6.65E+01	0.00E+00	3.27E-01	6.55E+01	7.22E-01	-2.60E+02

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	Manufacturing	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	
Particulate matter	Incidence	1.80E-03	1.96E-04	4.07E-06	2.80E-06	1.59E-03	0.00E+00	7.90E-07	MND	MND	MND	1.59E-03	0.00E+00	9.92E-06	0.00E+00	3.81E-07	9.47E-06	8.24E-08	-7.83E-05
Ionizing radiation ⁶	kBq U235 eq	1.43E+05	1.09E+02	9.19E-01	9.03E-02	1.43E+05	0.00E+00	1.97E-01	MND	MND	MND	1.43E+05	0.00E+00	2.67E+01	0.00E+00	5.71E-02	2.66E+01	1.18E-02	-4.48E+01
Ecotoxicity (freshwater)	CTUeq	2.07E+06	4.13E+05	1.11E+02	1.27E+02	1.59E+06	5.49E-02	1.88E+01	MND	MND	MND	1.59E+06	0.00E+00	7.04E+04	0.00E+00	1.08E+01	3.40E+03	6.70E+04	-1.37E+05
Human toxicity, cancer	CTUh	2.31E-05	4.11E-06	1.62E-08	1.38E-09	1.85E-05	0.00E+00	9.17E-09	MND	MND	MND	1.85E-05	0.00E+00	4.36E-07	0.00E+00	8.19E-10	4.30E-07	5.37E-09	-1.80E-06
Human tox. non-cancer	CTUh	1.34E-03	3.11E-04	4.64E-07	2.93E-08	1.03E-03	1.30E-09	6.87E-08	MND	MND	MND	1.03E-03	0.00E+00	1.85E-06	0.00E+00	4.38E-08	1.57E-06	2.38E-07	-1.38E-04
SQP ⁷	-	1.98E+05	1.63E+04	3.53E+02	1.30E+01	1.80E+05	0.00E+00	4.50E+01	MND	MND	MND	1.80E+05	0.00E+00	1.18E+03	0.00E+00	4.53E+01	1.11E+03	2.68E+01	-6.34E+03

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	Manufacturing	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 ⁸	MJ	3.23E+05	2.70E+03	1.34E+01	-1.97E+02	3.20E+05	0.00E+00	4.59E+01	MND	MND	MND	3.20E+05	0.00E+00	2.05E+02	0.00E+00	9.61E-01	2.04E+02	2.01E-01	-9.34E+02
Renew. PER as material	MJ	4.42E+02	4.92E+02	0.00E+00	-2.04E+02	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.54E+02	0.00E+00	0.00E+00	1.54E+02	0.00E+00	-4.21E+00
Total use of renew. PER	MJ	3.23E+05	3.20E+03	1.34E+01	-4.01E+02	3.20E+05	0.00E+00	4.59E+01	MND	MND	MND	3.20E+05	0.00E+00	3.60E+02	0.00E+00	9.61E-01	3.59E+02	2.01E-01	-9.38E+02
Non-re. PER as energy	MJ	3.20E+06	2.11E+04	1.09E+03	1.47E+02	3.18E+06	0.00E+00	2.93E+02	MND	MND	MND	3.18E+06	0.00E+00	9.39E+02	0.00E+00	6.92E+01	1.23E+03	-3.59E+02	-8.87E+03
Non-re. PER as material	MJ	1.83E+02	1.12E+02	0.00E+00	-1.66E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	7.24E+01	0.00E+00	0.00E+00	7.24E+01	0.00E+00	-3.23E+02
Total use of non-re. PER	MJ	3.20E+06	2.12E+04	1.09E+03	1.45E+02	3.18E+06	0.00E+00	2.93E+02	MND	MND	MND	3.18E+06	0.00E+00	1.01E+03	0.00E+00	6.92E+01	1.30E+03	-3.59E+02	-9.20E+03
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	4.07E+00	2.21E+00	3.59E-03	2.03E-04	1.84E+00	0.00E+00	5.26E-04	MND	MND	MND	1.84E+00	0.00E+00	2.05E-02	0.00E+00	3.99E-04	2.00E-02	1.02E-04	-1.31E+00
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	9.61E+02	1.93E+01	1.09E-01	9.41E-03	9.40E+02	0.00E+00	8.20E-02	MND	MND	MND	9.40E+02	0.00E+00	1.71E+00	0.00E+00	9.56E-03	1.73E+00	-3.12E-02	-7.09E+00

MND abbreviation stands for Module Not Declared

8. PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact Category	Unit	Total	Manufacturing	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	2.59E+03	3.86E+02	1.51E+00	2.03E-01	2.12E+03	0.00E+00	2.78E-01	MND	MND	MND	2.12E+03	0.00E+00	8.47E+01	0.00E+00	1.21E-01	7.22E+01	1.24E+01	-2.54E+02
Non-hazardous waste	kg	8.21E+04	1.31E+04	2.60E+01	5.23E+00	6.87E+04	0.00E+00	5.94E+00	MND	MND	MND	6.87E+04	0.00E+00	2.96E+02	0.00E+00	2.27E+00	2.53E+02	4.04E+01	-5.81E+03
Radioactive waste	kg	4.12E+01	7.06E-02	2.27E-04	2.25E-05	4.11E+01	0.00E+00	3.86E-03	MND	MND	MND	4.11E+01	0.00E+00	6.85E-03	0.00E+00	1.40E-05	6.83E-03	2.90E-06	-1.12E-02

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufacturing	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	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	1.78E+02	0.00E+00	0.00E+00	1.12E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.67E+02	0.00E+00	0.00E+00	1.67E+02	0.00E+00	0.00E+00
Materials for energy rec	kg	4.73E+00	0.00E+00	0.00E+00	6.20E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	4.11E+00	0.00E+00	0.00E+00	1.54E+00	2.57E+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	Manufacturing	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	2.76E+04	1.84E+03	8.27E+01	1.19E+01	2.51E+04	1.04E+03	7.87E+00	MND	MND	MND	2.41E+04	0.00E+00	5.29E+02	0.00E+00	4.84E+00	1.12E+02	4.12E+02	-8.22E+02
Ozone Depletion	kg CFC-11eq	7.44E-04	2.07E-05	1.48E-06	1.77E-07	7.20E-04	0.00E+00	1.26E-07	MND	MND	MND	7.20E-04	0.00E+00	1.50E-06	0.00E+00	7.67E-08	1.39E-06	1.52E-08	-5.10E-06
Acidification	kg SO ₂ eq	1.81E+02	2.94E+01	1.25E+00	9.14E-02	1.50E+02	0.00E+00	3.31E-02	MND	MND	MND	1.50E+02	0.00E+00	3.94E-01	0.00E+00	1.03E-02	3.80E-01	4.82E-03	-1.37E+01
Eutrophication	kg N eq	2.14E+01	4.20E+00	5.34E-02	7.41E-03	1.70E+01	0.00E+00	4.13E-03	MND	MND	MND	1.70E+01	0.00E+00	8.69E-02	0.00E+00	1.28E-03	8.26E-02	3.07E-03	-1.07E+00
POCP ("smog")	kg O ₃ eq	1.84E+03	1.92E+02	2.39E+01	3.01E+00	1.61E+03	0.00E+00	8.23E-01	MND	MND	MND	1.61E+03	0.00E+00	5.86E+00	0.00E+00	2.12E-01	5.53E+00	1.24E-01	-8.07E+01
ADP-fossil	MJ	3.43E+03	2.15E+03	1.09E+03	3.29E+00	1.10E+02	0.00E+00	1.10E+02	MND	MND	MND	0.00E+00	0.00E+00	7.32E+01	0.00E+00	6.93E+01	0.00E+00	4.83E+00	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	8 CV	10 CV	14 CV	16 CV	18 CV	20 CV	22 CV	24 CV	12 CV-Reference
Functional Unit	Manufacturing stage	1.52	1.21	0.85	1.05	0.94	0.92	0.84	0.77	1.00
	Distribution stage	1.52	1.21	0.85	1.05	0.94	0.92	0.84	0.77	1.00
	Installation stage	1.94	1.55	1.09	0.91	0.81	0.73	0.66	0.61	1.00
	B1 Stage	1.50	1.20	0.84	0.50	0.44	0.40	0.36	0.33	1.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	B6 stage	1.02	0.98	1.06	0.98	1.02	1.06	1.08	1.16	1.00
	C stage	1.50	1.20	0.84	1.06	0.94	0.93	0.85	0.78	1.00
	D stage	1.52	1.21	0.85	1.05	0.94	0.92	0.84	0.77	1.00
Declared Unit	Manufacturing stage	1.01	1.01	1.01	1.41	1.41	1.54	1.54	1.54	1.00
	Distribution stage	1.01	1.01	1.01	1.41	1.41	1.54	1.54	1.54	1.00
	Installation stage	1.30	1.30	1.30	1.22	1.22	1.22	1.22	1.22	1.00
	B1 Stage	1.00	1.00	1.00	0.67	0.67	0.67	0.67	0.67	1.00
	B2 stage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	B6 stage	0.68	0.82	1.27	1.32	1.53	1.77	1.97	2.32	1.00
	C stage	1.30	1.30	1.30	1.22	1.22	1.22	1.22	1.22	1.00
	D stage	1.01	1.01	1.01	1.41	1.41	1.54	1.54	1.54	1.00

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: TOSH-00004-V01.01-EN	Drafting rules: PEP-PCR-ed4-EN-2021 09 06 » Supplemented by « PSR-0013-ed3.1-EN-2025 06 17»
Verifier 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 (Demain)	
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 from 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.
14. Hyster XT forklift - What is the fuel consumption of a diesel forklift?