

Product Environmental Profile

Toshiba Inverter Monosplit Air Conditioner

Outdoor Unit: RAS-07E2KVG-E

Indoor Unit: RAS-B07E2KVG-E

Toshiba
Carrier Corporation

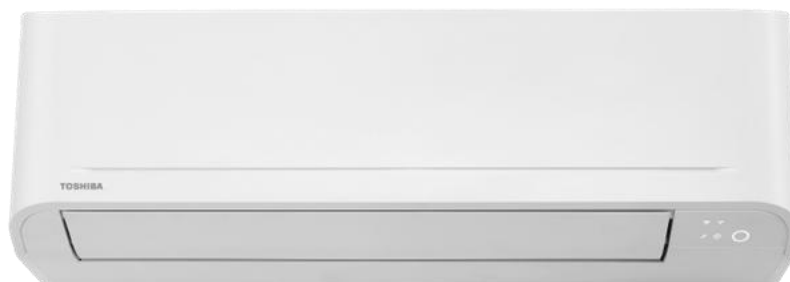


TABLE OF CONTENT

1.1	Commercial reference for the reference product	3
1.2	Functional Unit.....	3
1.3	Declared Unit.....	3
1.4	Additional environmental information	3
1.5	Manufacturing	3
	- Production.....	3
	- Energy model.....	3
1.6	Distribution	3
1.7	Installation	4
1.8	Use.....	4
1.9	End of life.....	5
1.10	Benefits and loads beyond the system boundary D	5
1.11	Technical description of the product	5
1.1	Sales scenarios	7
2.1	Reference product.....	8
2.2	Constituent materials	8
3.1	LCA impacts per Functional Unit.....	9
3.2	LCA impacts per Declared Unit	11
4.1	Extrapolation Coefficients.....	13
5.1	Declaration.....	15
5.2	Contact information.....	15
5.3	References.....	15

1 – GENERAL INFORMATIONS

1.1 Commercial reference for the reference product

Reference product	Toshiba Seiya Inverter Split Air Conditioner System
Product family	Split Air Conditioner System
Product sub-category	Toshiba Seiya RAS-07E2AVG-E, Outdoor Unit & RAS-B07E2KVG-E, Indoor Unit
Function	Heating and Cooling
Application	Residential
Technology	DC Rotary inverter-controlled compressor
Efficiency	SEER/SCOP: 6.90/4.60
Type	Air/Air – Reversible
Operational Efficiency	SEER/SCOP: 6.9/4.6
Refrigerant	R32
References covered	Outdoor Variants: RAS-05E2AVG-E, RAS-07E2AVG-E, RAS-10E2AVG-E, RAS-13E2AVG-E, RAS-16E2AVG-E, RAS-18E2AVG-E, RAS-24E2AVG-E Indoor Variants: RAS-B05E2KVG-E, RAS-B07E2KVG-E, RAS-B10E2KVG-E, RAS-B13E2KVG-E, RAS-B16E2KVG-E, RAS-18E2KVG-E, RAS-24E2KVG-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 cooling under typical usage conditions over the 17-year reference lifetime of the product, based on seasonal performance metrics in accordance with EN 14825 or equivalent international standards."

Total energy output calculation for functional unit

$Prev = (theating * Ph + tcooling * Pc) / (theating + tcooling) = 2.40kW$

1.3 Declared Unit

"To produce cooling of 2 kW or heating of 2.5 kW thanks to monosplit air conditioning system according to the appropriate usage scenario and during the 17-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 V0.44.6. 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-2025-06-17 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 impact extrusion, punching, pipe cutting and assembled into the final product. Packaging materials are used for protection. The raw materials for the product were obtained from around the globe. 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 data. Regional relevant datasets specific to the manufacturing site in Thailand were applied, ensuring that the environmental impacts are accurately accounted for based on the local energy mix. Energy consumption data from the Thailand manufacturing facility is accounted for components and assemblies produced in-house for the unit. During the manufacturing stage at the Thailand facility, waste is primarily generated from assembling product components and is accounted as per Toshiba plant level data. The transport distance of 100 kilometers to the waste processing facility is considered, as recommended in PCR-ed4-EN-2021-09-06.

- Energy model

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

1.6 Distribution



During this phase, all units are transported from the manufacturing facility in Thailand to installation sites in France. The transportation-related impacts assessed under stage (A4) include direct exhaust emissions from fuel combustion and the environmental effects associated with fuel production. Average transportation distances were determined based on typical routes from the Thailand manufacturing site to France location.

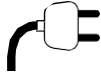
1 – GENERAL INFORMATIONS

1.7 Installation



No energy is required for the product installation at the site. The disposal of packaging materials is considered during the installation phase, including transportation over 100 km to the waste processing and disposal site. All metallic components are designated for recycling, while plastic and paper components are processed through recycling, incineration, and landfill methods. All packaging components are recycled and incinerated as per the recycling rates mentioned in the PSR-0013-ed3.1-EN-2025-06-17.

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 17 years. The use phase of the unit includes refrigerant leakage emissions (B1), refrigerant maintenance (B2), operational energy use (B6), and operational water use (B7). The stages of repair (B3), replacement (B4), and rehabilitation (B5) are not applicable for this assessment as per PSR-0013-ed3.1-EN-2025-06-17 guidelines.

Refrigerant leakage during the use phase (B1) of the equipment is calculated in accordance with the guidelines outlined in the PSR-0013-ed3.1-EN-2025-06-17 and is as below,

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

E_{fu} = Momentary leakage = 0.34 kg

Q_{fu} = Amount of fugitive emissions = 0.02 kg

DVR = Reference service lifetime = 17 years

Q_{fu} : The amount of annual fugitive emissions is estimated as below,

For a non-hermetically sealed monosplit system with 1 outdoor unit and 1 indoor unit,

- Total number of removable fittings linked to the units: 4
- $Q_{fu} = 5 \times 4 = 20\text{g/year}$

The maintenance for the Seiya unit, as estimated according to the guidelines outlined in PSR-0013-ed3.1-EN-2025-06-17 primarily involves refrigerant refilling. The transportation of the refrigerant to the installation site is also accounted in 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:

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

$$N = ENT \text{ SUP} [RLT/n]$$

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 = 0.34 kg

T_{fu} = Leakage rate = $Q_{fu} / C_t = 0.059$

$N = 6.3 \sim 7$ (rounded off to the next whole number)

Refrigerant refill = 0.238 kg

During operational energy use phase [B6] the impact of operational energy use has been considered. Electricity consumption is based on the sales data, which indicates that 100% of the units are distributed in France. Energy consumption during the operational phase is calculated as specified in PSR-0013-ed3.1-EN-2025-06-17, which defines the typical usage scenario for split air conditioning systems. Both the indoor and outdoor units consume electricity during their operational lifetime, and the corresponding environmental impacts are quantified as per guidelines.

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

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

Where:

C_{tot} = Total energy consumption = 14,659 kWh

P_h = Heating Capacity of the equipment = 2.5 kW

P_c = Cooling Capacity of the equipment = 2 kW

SCOP = Seasonal coefficient of performance for heating = 4.6

SEER = Seasonal energy efficiency ratio for cooling = 6.9

Type of Generator-air/air P<12kW

$t_{heating}$ = Number of equivalent active mode hours of the device on active heating mode = 1400 hrs

$t_{cooling}$ = Number of equivalent active mode hours of the device on active cooling mode = 350 hrs

RLT = Reference lifetime = 17 years

- Energy model

Market for electricity, low voltage, France; ecoinvent v3.11

Toshiba Inverter Monosplit Air Conditioner

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 Toshiba Seiya unit 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, according to Packaging Dive, is highly sustainable with 93% recycled and 7% incinerated, with no 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

For the benefits and loads beyond the system boundary, we assume that recycled and incinerated waste with energy recovery is accounted for in the D stage. The recycled waste from stages A5 and C3 is aggregated and balanced beyond the boundary by considering the load and benefit as per the Life Cycle Assessment.

1.11 Technical description of the product

The technical details and standards of Toshiba Seiya, Residential Split-Type Air Conditioner are as follows:

- Cooling Capacity: Nominal 2.0 kW, with a range from 0.76 to 2.60 kW, suitable for rooms up to approximately 20 m².
- Heating Capacity: Nominal 2.5 kW, with a range from 0.82 to 3.30 kW, providing reliable year-round comfort.
- Energy Efficiency: Rated A++ for cooling and A+ for heating, with an EER of 6.90, ensuring low energy consumption.
- Refrigerant Type: Uses R32, a next-generation refrigerant with low global warming potential and high efficiency.
- Noise Levels: Indoor Unit: Operates between 19 dB(A) (quiet mode) and 38 dB(A). Outdoor Unit: Approximately 47 dB(A), designed for silent operation.
- Airflow Volume: Indoor unit delivers up to 500 m³/h, ensuring effective air distribution across the room.
- Power Supply: Operates on 220–240 V / 1 Phase / 50 Hz, compatible with standard residential electrical systems.
- Magic Coil Technology: Features a self-cleaning coil with acrylic resin coating to prevent dust and moisture buildup, enhancing hygiene and efficiency.
- IAQ Filter: Equipped with an anti-mold and deodorizing filter that improves indoor air quality by neutralizing odors and inhibiting microbial growth.
- Compliance Standards: Designed and manufactured in accordance with European energy and safety standards, including EN 1993-4-2:2009 and EN 10025 for structural and corrosion protection.
- Meets AHRI Standard 210/240 for performance rating of unitary air-conditioning and heat pump equipment.

1 – GENERAL INFORMATIONS

Parameters / Models	Nominal Cooling Capacity	Cooling Capacity Range	Power Input (Cooling)	SEER	Nominal Heating Capacity	Heating Capacity Range	Power Input (Heating)	SCOP	Refrigerant Type	Power Supply	Indoor Unit – (HxWxD)	Outdoor Unit – (HxWxD)	Weight
RAS-05B2AVG-E/ RAS-B05B2KVG-E	1.5	0.58–2.00	0.36	6.1	2	0.58–2.90	0.47	4	R32	220-240/1/50	288×770×225	530×660×240	29
RAS-05B2AVG-E2/ RAS-B05B2KVG-E2	1.5	0.58–2.00	0.36	6.1	2	0.58–2.90	0.47	4	R32	220-240/1/50	288×770×225	530×660×240	29
RAS-05E2AVG-E/ RAS-B05E2KVG-E	1.5	0.50–2.00	0.45	7	2	0.60–2.60	0.47	4.6	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-07B2AVG-E/ RAS-B07B2KVG-E	2	0.76–2.40	0.6	6.1	2.5	0.76–3.30	0.64	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-07B2AVG-E2/ RAS-B07B2KVG-E2	2	0.76–2.40	0.6	6.1	2.5	0.76–3.30	0.64	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-07E2AVG-E/ RAS-B07E2KVG-E	2	0.70–2.40	0.6	7	2.5	0.80–3.30	0.64	4.6	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-07J2AVSG-E1/ RAS-B07G3KVSG-E	2	0.80–2.60	0.55	8.6	2.5	0.80–3.20	0.66	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-07J2AVSG-E1/ RAS-B07G3KVSG-B-E	2	0.80–2.60	0.55	8.6	2.5	0.80–3.20	0.66	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-10B2AVG-E/ RAS-B10B2KVG-E	2.5	0.80–3.10	0.8	6.1	3.2	0.80–3.80	0.8	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-10B2AVG-E2/ RAS-B10B2KVG-E2	2.5	0.80–3.10	0.8	6.1	3.2	0.80–3.80	0.8	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-10E2AVG-E/ RAS-B10E2KVG-E	2.5	0.80–3.00	0.7	7	3.2	0.95–3.90	0.86	4.6	R32	220-240/1/50	288×770×225	530×660×240	31
RAS-10J2AVSG-E1/ RAS-B10G3KVSG-E	2.5	0.80–3.20	0.72	8.6	3.4	0.90–4.00	0.86	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-10J2AVSG-E1/ RAS-B10G3KVSG-B-E	2.5	0.80–3.20	0.72	8.6	3.4	0.90–4.00	0.86	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-13B2AVG-E/ RAS-B13B2KVG-E	3.3	1.00–3.60	1.17	6.1	3.6	0.76–4.50	1.02	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-13B2AVG-E2/ RAS-B13B2KVG-E2	3.3	1.00–3.60	1.17	6.1	3.6	0.76–4.50	1.02	4	R32	220-240/1/50	288×770×225	530×660×240	30
RAS-13E2AVG-E/ RAS-B13E2KVG-E	3.3	1.20–3.60	1.1	7	3.6	0.97–4.50	0.92	4.6	R32	220-240/1/50	288×770×225	530×660×240	31
RAS-13J2AVSG-E1/ RAS-B13G3KVSG-E	3.5	1.00–4.10	0.9	8.6	4.2	1.00–5.30	1.08	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-13J2AVSG-E1/ RAS-B13G3KVSG-B-E	3.5	1.00–4.10	0.9	8.6	4.2	1.00–5.30	1.08	5.1	R32	220-240/1/50	293×800×226	550×780×290	40
RAS-16B2AVG-E/ RAS-B16B2KVG-E	4.2	1.10–4.70	1.37	6.1	5	0.85–6.00	1.45	4	R32	220-240/1/50	293×798×230	550×780×290	38
RAS-16B2AVG-E2/ RAS-B16B2KVG-E2	4.2	1.10–4.70	1.37	6.1	5	0.85–6.00	1.45	4	R32	220-240/1/50	293×798×230	550×780×290	38
RAS-16E2AVG-E/ RAS-B16E2KVG-E	4.2	1.40–4.70	1.27	7	5	1.30–6.00	1.34	4.6	R32	220-240/1/50	293×798×230	550×780×290	39
RAS-16J2AVSG-E1/ RAS-B16G3KVSG-E	4.6	1.20–5.30	1.35	7.8	5.5	1.10–6.50	1.52	4.6	R32	220-240/1/50	293×800×226	550×780×290	43
RAS-16J2AVSG-E1/ RAS-B16G3KVSG-B-E	4.6	1.20–5.30	1.35	7.8	5.5	1.10–6.50	1.52	4.6	R32	220-240/1/50	293×800×226	550×780×290	43
RAS-18B2AVG-E/ RAS-B18B2KVG-E	5	1.10–5.50	1.73	6.1	5.4	1.10–6.00	1.65	4	R32	220-240/1/50	293×798×230	550×780×290	38
RAS-18B2AVG-E2/ RAS-B18B2KVG-E2	5	1.10–5.50	1.73	6.1	5.4	1.10–6.00	1.65	4	R32	220-240/1/50	293×798×230	550×780×290	38
RAS-18E2AVG-E/ RAS-B18E2KVG-E	5	1.45–5.50	1.5	7	5.4	1.35–6.00	1.5	4.4	R32	220-240/1/50	293×798×230	550×780×290	43
RAS-18J2AVSG-E1/ RAS-B18G3KVSG-E	5	1.20–6.00	1.42	7.8	6	1.10–6.50	1.59	4.6	R32	220-240/1/50	320×1053×245	550×780×290	48

1 – GENERAL INFORMATIONS

RAS-18J2AVSG-E1/ RAS-B18G3KVSG-B-E	5	1.20–6.00	1.42	7.8	6	1.10–6.50	1.59	4.6	R32	220-240/1/50	320×1053×245	550×780×290	48
RAS-22J2AVSG-E1/ RAS-B22G3KVSG-E	6.1	1.50–7.10	1.9	7.3	6.7	1.50–8.00	2.05	4.6	R32	220-240/1/50	320×1053×245	550×780×290	48
RAS-22J2AVSG-E1/ RAS-B22G3KVSG-B-E	6.1	1.50–7.10	1.9	7.3	6.7	1.50–8.00	2.05	4.6	R32	220-240/1/50	320×1053×245	550×780×290	48
RAS-24B2AVG-E/ RAS-B24B2KVG-E	7.1	1.70–7.70	2.3	6.1	8	1.70–8.80	2.1	4	R32	220-240/1/50	320×1053×245	630×800×300	57
RAS-24B2AVG-E2/ RAS-B24B2KVG-E2	7.1	1.70–7.70	2.3	6.1	8	1.70–8.80	2.1	4	R32	220-240/1/50	320×1053×245	630×800×300	57
RAS-24E2AVG-E/ RAS-B24E2KVG-E	7	2.30–7.70	2.18	6.3	7.5	1.80–8.20	2.58	4.1	R32	220-240/1/50	320×1053×245	550×780×290	52
RAS-24J2AVSG-E2/ RAS-B24G3KVSG-E	7	1.70–7.70	2.25	6.3	8	1.70–8.80	2.35	4.1	R32	220-240/1/50	320×1053×245	630×800×300	56
RAS-24J2AVSG-E2/ RAS-B24G3KVSG-B-E	7	1.70–7.70	2.25	6.3	8	1.70–8.80	2.35	4.1	R32	220-240/1/50	320×1053×245	630×800×300	56

1.1 Sales scenarios

Sales of the device are distributed as follows:

Region	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

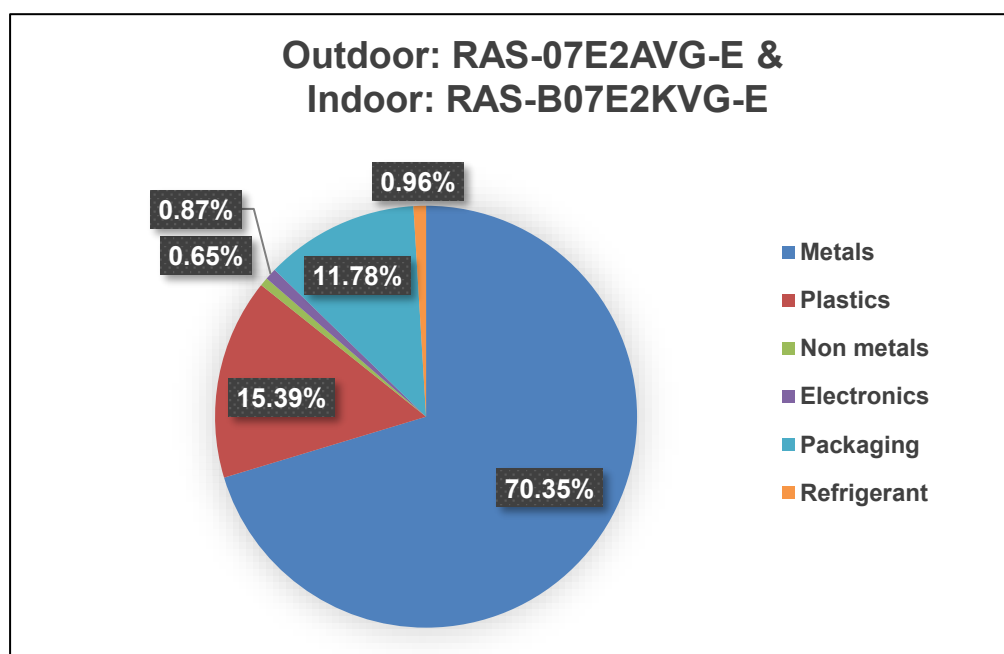
2.1 Reference product

Modelled total weight with other necessary details:

PEP Material Categories		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	17.80	50.17	70.35	0.00	0.00	0.00
		Copper	4.38	12.34		0.00	0.00	0.00
		Aluminium	1.79	5.05		0.00	0.00	0.00
		Cast iron	0.99	2.79		0.00	0.00	0.00
Plastics		Plastics	5.46	15.39	15.39	0.00	0.00	0.00
Others	Non-Metals	Compressor Oil	0.23	0.65	14.26	0.00	0.00	0.00
	Electronics	Electronics	0.31	0.87		0.00	0.00	0.00
	Packaging	Cardboard, EPS foam	4.18	11.78		0.00	2.01	1.01
	Miscellaneous	Refrigerant	0.34	0.96		0.00	0.00	0.00
Total			35.48	100%	100%	0.00%	2.01	1.01

Note: 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 or 1 kW of cooling. 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 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 & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
GWP – total ¹	kg CO ₂ eq./FU	8.04E+02	1.29E+02	5.71E+00	1.53E+00	6.47E+02	1.09E+02	8.25E-01	MND	MND	MND	5.38E+02	0.00E+00	1.99E+01	0.00E+00	2.92E-01	6.13E+00	1.35E+01	-3.69E+01
GWP – fossil	kg CO ₂ eq./FU	8.03E+02	1.30E+02	5.71E+00	1.43E-01	6.47E+02	1.09E+02	8.25E-01	MND	MND	MND	5.38E+02	0.00E+00	1.99E+01	0.00E+00	2.92E-01	6.13E+00	1.35E+01	-3.68E+01
GWP – biogenic	kg CO ₂ eq./FU	0.00E+00	-1.39E+00	-1.81E-19	1.39E+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./FU	8.71E-01	2.93E-01	2.84E-03	4.17E-05	5.50E-01	0.00E+00	4.17E-04	MND	MND	MND	5.50E-01	0.00E+00	2.49E-02	0.00E+00	1.06E-04	2.47E-02	4.38E-05	-9.46E-02
Ozone depletion pot.	kg CFC-11 eq./FU	1.83E-05	2.99E-06	8.33E-08	5.25E-10	1.51E-05	0.00E+00	5.00E-09	MND	MND	MND	1.51E-05	0.00E+00	9.23E-08	0.00E+00	5.75E-09	8.50E-08	1.57E-09	-2.95E-07
Acidification potential	mol H ⁺ eq./FU	6.32E+00	2.14E+00	9.08E-02	2.90E-04	4.06E+00	0.00E+00	4.17E-03	MND	MND	MND	4.06E+00	0.00E+00	2.92E-02	0.00E+00	6.25E-04	2.78E-02	7.50E-04	-8.00E-01
EP-freshwater ²	kg P eq./FU	5.26E-01	2.36E-01	3.12E-04	1.33E-05	2.86E-01	0.00E+00	4.63E-05	MND	MND	MND	2.86E-01	0.00E+00	3.49E-03	0.00E+00	1.98E-05	3.39E-03	7.38E-05	-6.71E-02
EP-marine	kg N eq./FU	1.08E+00	2.77E-01	2.25E-02	2.41E-04	7.72E-01	0.00E+00	8.29E-04	MND	MND	MND	7.71E-01	0.00E+00	1.11E-02	0.00E+00	1.54E-04	5.79E-03	5.17E-03	-9.25E-02
EP-terrestrial	mol N eq./FU	9.28E+00	2.55E+00	2.50E-01	9.08E-04	6.43E+00	0.00E+00	9.13E-03	MND	MND	MND	6.42E+00	0.00E+00	6.18E-02	0.00E+00	1.67E-03	5.67E-02	3.46E-03	-7.50E-01
POCP ("smog") ³	kg NMVOC eq./FU	2.95E+00	7.42E-01	7.25E-02	3.32E-04	2.11E+00	0.00E+00	3.15E-03	MND	MND	MND	2.11E+00	0.00E+00	2.06E-02	0.00E+00	1.03E-03	1.86E-02	9.83E-04	-2.24E-01
ADP-minerals & metals ⁴	kg Sb eq./FU	6.19E-02	3.59E-02	1.23E-05	4.29E-07	2.60E-02	0.00E+00	2.70E-06	MND	MND	MND	2.60E-02	0.00E+00	3.40E-05	0.00E+00	9.63E-07	3.28E-05	2.36E-07	-8.17E-03
ADP-fossil resources	MJ/FU	7.18E+04	1.65E+03	7.50E+01	6.04E-01	7.00E+04	0.00E+00	1.47E+01	MND	MND	MND	7.00E+04	0.00E+00	9.65E+01	0.00E+00	4.11E+00	9.13E+01	1.18E+00	-4.29E+02
Water use ⁵	m ³ eq. depr./FU	9.44E+02	5.13E+01	2.84E-01	2.10E-02	8.88E+02	0.00E+00	6.38E-02	MND	MND	MND	8.88E+02	0.00E+00	4.90E+00	0.00E+00	2.04E-02	4.71E+00	1.70E-01	-1.35E+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	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Particulate matter	Disease Incidence/FU	4.79E-05	1.21E-05	2.96E-07	1.28E-08	3.50E-05	0.00E+00	3.32E-08	MND	MND	MND	3.50E-05	0.00E+00	5.39E-07	0.00E+00	2.18E-08	5.08E-07	8.79E-09	-3.37E-06
Ionizing radiation ⁶	kBq U235 eq./FU	3.17E+03	9.29E+00	4.83E-02	1.71E-03	3.16E+03	0.00E+00	8.25E-03	MND	MND	MND	3.16E+03	0.00E+00	1.72E+00	0.00E+00	5.21E-03	1.71E+00	1.50E-03	-2.81E+00
Ecotoxicity (freshwater)	CTU eq./FU	6.15E+04	2.61E+04	8.92E+00	1.37E+01	3.51E+04	5.04E-03	7.88E-01	MND	MND	MND	3.51E+04	0.00E+00	2.68E+02	0.00E+00	5.50E-01	2.10E+02	5.67E+01	-7.13E+03
Human toxicity, cancer	CTUh/FU	6.63E-07	2.31E-07	1.08E-09	8.54E-11	4.09E-07	0.00E+00	3.85E-10	MND	MND	MND	4.08E-07	0.00E+00	2.23E-08	0.00E+00	4.88E-11	2.17E-08	5.75E-10	-8.92E-08
Human tox. non-cancer	CTUh/FU	3.99E-05	1.69E-05	3.36E-08	3.67E-09	2.28E-05	1.19E-10	2.88E-09	MND	MND	MND	2.28E-05	0.00E+00	1.17E-07	0.00E+00	2.60E-09	9.08E-08	2.39E-08	-6.75E-06
SQP ⁷	- /FU	5.23E+03	1.11E+03	2.68E+01	5.38E-01	3.97E+03	0.00E+00	1.89E+00	MND	MND	MND	3.97E+03	0.00E+00	1.22E+02	0.00E+00	2.56E+00	1.17E+02	1.97E+00	-3.55E+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	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Renew. PER as energy ⁸	MJ/FU	7.19E+03	1.63E+02	8.21E-01	-2.69E+01	7.04E+03	0.00E+00	2.49E+00	MND	MND	MND	7.04E+03	0.00E+00	1.07E+01	0.00E+00	7.13E-02	1.06E+01	2.92E-02	-3.99E+01
Renew. PER as material	MJ/FU	3.78E+01	4.46E+01	0.00E+00	-2.78E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.10E+01	0.00E+00	0.00E+00	2.10E+01	0.00E+00	-5.67E-01
Total use of renew. PER	MJ/FU	7.23E+03	2.07E+02	8.21E-01	-5.46E+01	7.04E+03	0.00E+00	2.49E+00	MND	MND	MND	7.04E+03	0.00E+00	3.17E+01	0.00E+00	7.13E-02	3.16E+01	2.92E-02	-4.05E+01
Non-re. PER as energy	MJ/FU	7.16E+04	1.53E+03	7.50E+01	-1.97E+00	7.00E+04	0.00E+00	1.47E+01	MND	MND	MND	7.00E+04	0.00E+00	-1.96E+01	0.00E+00	4.11E+00	5.00E+01	-7.38E+01	-4.13E+02
Non-re. PER as material	MJ/FU	2.70E+01	1.03E+01	0.00E+00	-3.61E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.03E+01	0.00E+00	0.00E+00	2.03E+01	0.00E+00	-8.75E+01
Total use of non-re. PER	MJ/FU	7.16E+04	1.54E+03	7.50E+01	-5.58E+00	7.00E+04	0.00E+00	1.47E+01	MND	MND	MND	7.00E+04	0.00E+00	7.75E-01	0.00E+00	4.11E+00	7.04E+01	-7.38E+01	-5.00E+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	3.34E-01	2.92E-01	2.68E-04	6.04E-06	4.06E-02	0.00E+00	2.21E-05	MND	MND	MND	4.06E-02	0.00E+00	1.07E-03	0.00E+00	2.40E-05	1.03E-03	1.73E-05	-1.46E-01
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	2.22E+01	1.31E+00	7.83E-03	-6.46E-06	2.07E+01	0.00E+00	4.25E-03	MND	MND	MND	2.07E+01	0.00E+00	1.20E-01	0.00E+00	5.63E-04	1.20E-01	-3.77E-04	-3.70E-01

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 & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Hazardous waste	kg/FU	7.23E+01	2.10E+01	1.16E-01	7.42E-03	4.67E+01	0.00E+00	1.17E-02	MND	MND	MND	4.67E+01	0.00E+00	4.51E+00	0.00E+00	6.00E-03	3.55E+00	9.54E-01	-1.14E+01
Non-hazardous waste	kg/FU	2.31E+03	7.67E+02	1.94E+00	5.04E-01	1.52E+03	0.00E+00	2.51E-01	MND	MND	MND	1.52E+03	0.00E+00	2.06E+01	0.00E+00	1.26E-01	1.60E+01	4.50E+00	-2.87E+02
Radioactive waste	kg/FU	9.13E-01	4.29E-03	1.18E-05	4.17E-07	9.09E-01	0.00E+00	2.12E-04	MND	MND	MND	9.08E-01	0.00E+00	4.39E-04	0.00E+00	1.30E-06	4.38E-04	3.74E-07	-1.51E-03

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
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	9.98E+00	0.00E+00	0.00E+00	1.53E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	8.46E+00	0.00E+00	0.00E+00	8.46E+00	0.00E+00	0.00E+00
Materials for energy rec	kg/FU	1.12E+00	0.00E+00	0.00E+00	1.19E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+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

ENVIRONMENTAL IMPACTS – TRACI 2.1.

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Global Warming Pot.	kg CO ₂ eq./FU	7.84E+02	1.30E+02	5.63E+00	2.59E-01	6.29E+02	9.58E+01	3.30E-01	MND	MND	MND	5.33E+02	0.00E+00	1.85E+01	0.00E+00	2.87E-01	6.08E+00	1.21E+01	-3.66E+01
Ozone Depletion	kg CFC-11 eq./FU	1.95E-05	3.40E-06	8.79E-08	5.58E-10	1.59E-05	0.00E+00	5.29E-09	MND	MND	MND	1.59E-05	0.00E+00	9.73E-08	0.00E+00	6.04E-09	8.96E-08	1.65E-09	-3.21E-07
Acidification	kg SO ₂ eq./FU	5.12E+00	1.70E+00	7.75E-02	2.74E-04	3.31E+00	0.00E+00	1.39E-03	MND	MND	MND	3.31E+00	0.00E+00	2.46E-02	0.00E+00	5.33E-04	2.34E-02	7.08E-04	-6.29E-01
Eutrophication	kg N eq./FU	6.90E-01	3.07E-01	3.42E-03	1.92E-04	3.74E-01	0.00E+00	1.73E-04	MND	MND	MND	3.74E-01	0.00E+00	5.66E-03	0.00E+00	7.08E-05	5.13E-03	4.63E-04	-9.13E-02
POCP ("smog")	kg O ₃ eq./FU	5.00E+01	1.25E+01	1.47E+00	5.08E-03	3.56E+01	0.00E+00	3.45E-02	MND	MND	MND	3.56E+01	0.00E+00	3.58E-01	0.00E+00	1.16E-02	3.26E-01	2.02E-02	-3.63E+00
ADP-fossil	MJ/FU	6.23E+01	1.39E+01	7.50E+01	2.73E-01	4.63E+00	0.00E+00	4.63E+00	MND	MND	MND	0.00E+00	0.00E+00	3.15E+01	0.00E+00	4.11E+00	-3.60E+01	3.35E-01	-3.73E+01

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	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
GWP – total ¹	kg CO ₂ eq.	1.93E+03	3.10E+02	1.37E+01	3.68E+00	1.55E+03	2.62E+02	1.98E+00	MND	MND	MND	1.29E+03	0.00E+00	4.78E+01	0.00E+00	7.00E-01	1.47E+01	3.24E+01	-8.86E+01
GWP – fossil	kg CO ₂ eq.	1.93E+03	3.12E+02	1.37E+01	3.43E-01	1.55E+03	2.62E+02	1.98E+00	MND	MND	MND	1.29E+03	0.00E+00	4.78E+01	0.00E+00	7.00E-01	1.47E+01	3.24E+01	-8.83E+01
GWP – biogenic	kg CO ₂ eq.	0.00E+00	-3.34E+00	-4.34E-19	3.34E+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.	2.09E+00	7.04E-01	6.81E-03	1.00E-04	1.32E+00	0.00E+00	1.00E-03	MND	MND	MND	1.32E+00	0.00E+00	5.97E-02	0.00E+00	2.54E-04	5.93E-02	1.05E-04	-2.27E-01
Ozone depletion pot.	kg CFC-11 eq.	4.38E-05	7.17E-06	2.00E-07	1.26E-09	3.62E-05	0.00E+00	1.20E-08	MND	MND	MND	3.62E-05	0.00E+00	2.22E-07	0.00E+00	1.38E-08	2.04E-07	3.76E-09	-7.07E-07
Acidification potential	mol H ⁺ eq.	1.52E+01	5.13E+00	2.18E-01	6.95E-04	9.75E+00	0.00E+00	1.00E-02	MND	MND	MND	9.74E+00	0.00E+00	7.01E-02	0.00E+00	1.50E-03	6.68E-02	1.80E-03	-1.92E+00
EP-freshwater ²	kg P eq.	1.26E+00	5.66E-01	7.48E-04	3.20E-05	6.86E-01	0.00E+00	1.11E-04	MND	MND	MND	6.86E-01	0.00E+00	8.36E-03	0.00E+00	4.75E-05	8.14E-03	1.77E-04	-1.61E-01
EP-marine	kg N eq.	2.60E+00	6.65E-01	5.41E-02	5.79E-04	1.85E+00	0.00E+00	1.99E-03	MND	MND	MND	1.85E+00	0.00E+00	2.67E-02	0.00E+00	3.70E-04	1.39E-02	1.24E-02	-2.22E-01
EP-terrestrial	mol N eq.	2.23E+01	6.11E+00	6.00E-01	2.18E-03	1.54E+01	0.00E+00	2.19E-02	MND	MND	MND	1.54E+01	0.00E+00	1.48E-01	0.00E+00	4.00E-03	1.36E-01	8.30E-03	-1.80E+00
POCP ("smog") ³	kg NMVOC eq.	7.07E+00	1.78E+00	1.74E-01	7.96E-04	5.07E+00	0.00E+00	7.56E-03	MND	MND	MND	5.06E+00	0.00E+00	4.95E-02	0.00E+00	2.47E-03	4.47E-02	2.36E-03	-5.37E-01
ADP-minerals & metals ⁴	kg Sb eq.	1.49E-01	8.61E-02	2.94E-05	1.03E-06	6.23E-02	0.00E+00	6.49E-06	MND	MND	MND	6.23E-02	0.00E+00	8.16E-05	0.00E+00	2.31E-06	7.87E-05	5.67E-07	-1.96E-02
ADP-fossil resources	MJ	1.72E+05	3.97E+03	1.80E+02	1.45E+00	1.68E+05	0.00E+00	3.53E+01	MND	MND	MND	1.68E+05	0.00E+00	2.32E+02	0.00E+00	9.86E+00	2.19E+02	2.82E+00	-1.03E+03
Water use ⁵	m ³ eq. depr.	2.27E+03	1.23E+02	6.82E-01	5.05E-02	2.13E+03	0.00E+00	1.53E-01	MND	MND	MND	2.13E+03	0.00E+00	1.18E+01	0.00E+00	4.90E-02	1.13E+01	4.08E-01	-3.23E+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	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Particulate matter	Disease Incidence	1.15E-04	2.90E-05	7.10E-07	3.08E-08	8.40E-05	0.00E+00	7.96E-08	MND	MND	MND	8.39E-05	0.00E+00	1.29E-06	0.00E+00	5.24E-08	1.22E-06	2.11E-08	-8.09E-06
Ionizing radiation ⁶	kBq U235 eq.	7.61E+03	2.23E+01	1.16E-01	4.10E-03	7.58E+03	0.00E+00	1.98E-02	MND	MND	MND	7.58E+03	0.00E+00	4.12E+00	0.00E+00	1.25E-02	4.10E+00	3.60E-03	-6.74E+00
Ecotoxicity (freshwater)	CTU eq.	1.48E+05	6.26E+04	2.14E+01	3.28E+01	8.43E+04	1.21E-02	1.89E+00	MND	MND	MND	8.43E+04	0.00E+00	6.42E+02	0.00E+00	1.32E+00	5.05E+02	1.36E+02	-1.71E+04
Human toxicity, cancer	CTUh	1.59E-06	5.55E-07	2.60E-09	2.05E-10	9.81E-07	0.00E+00	9.24E-10	MND	MND	MND	9.80E-07	0.00E+00	5.36E-08	0.00E+00	1.17E-10	5.21E-08	1.38E-09	-2.14E-07
Human tox. non-cancer	CTUh	9.57E-05	4.06E-05	8.07E-08	8.81E-09	5.47E-05	2.86E-10	6.92E-09	MND	MND	MND	5.47E-05	0.00E+00	2.82E-07	0.00E+00	6.25E-09	2.18E-07	5.74E-08	-1.62E-05
SQP ⁷	-	1.25E+04	2.66E+03	6.43E+01	1.29E+00	9.52E+03	0.00E+00	4.53E+00	MND	MND	MND	9.52E+03	0.00E+00	2.92E+02	0.00E+00	6.15E+00	2.81E+02	4.72E+00	-8.52E+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	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Renew. PER as energy ^a	MJ	1.73E+04	3.90E+02	1.97E+00	-6.46E+01	1.69E+04	0.00E+00	5.98E+00	MND	MND	MND	1.69E+04	0.00E+00	2.56E+01	0.00E+00	1.71E-01	2.54E+01	7.00E-02	-9.57E+01
Renew. PER as material	MJ	9.08E+01	1.07E+02	0.00E+00	-6.66E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	5.04E+01	0.00E+00	0.00E+00	5.04E+01	0.00E+00	-1.36E+00
Total use of renew. PER	MJ	1.73E+04	4.97E+02	1.97E+00	-1.31E+02	1.69E+04	0.00E+00	5.98E+00	MND	MND	MND	1.69E+04	0.00E+00	7.60E+01	0.00E+00	1.71E-01	7.58E+01	7.00E-02	-9.71E+01
Non-re. PER as energy	MJ	1.72E+05	3.66E+03	1.80E+02	-4.73E+00	1.68E+05	0.00E+00	3.53E+01	MND	MND	MND	1.68E+05	0.00E+00	-4.71E+01	0.00E+00	9.86E+00	1.20E+02	-1.77E+02	-9.92E+02
Non-re. PER as material	MJ	6.47E+01	2.46E+01	0.00E+00	-8.66E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	4.88E+01	0.00E+00	0.00E+00	4.88E+01	0.00E+00	-2.10E+02
Total use of non-re. PER	MJ	1.72E+05	3.69E+03	1.80E+02	-1.34E+01	1.68E+05	0.00E+00	3.53E+01	MND	MND	MND	1.68E+05	0.00E+00	1.86E+00	0.00E+00	9.86E+00	1.69E+02	-1.77E+02	-1.20E+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	7.99E-01	6.98E-01	6.42E-04	1.45E-05	9.75E-02	0.00E+00	5.30E-05	MND	MND	MND	9.74E-02	0.00E+00	2.53E-03	0.00E+00	3.28E-05	2.46E-03	4.15E-05	-3.50E-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	5.30E+01	2.94E+00	1.88E-02	-1.55E-05	4.97E+01	0.00E+00	1.02E-02	MND	MND	MND	4.97E+01	0.00E+00	2.87E-01	0.00E+00	8.68E-04	2.87E-01	-9.04E-04	-8.89E-01

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 & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Hazardous waste	kg	1.73E+02	5.03E+01	2.79E-01	1.78E-02	1.12E+02	0.00E+00	2.80E-02	MND	MND	MND	1.12E+02	0.00E+00	1.08E+01	0.00E+00	1.44E-02	8.51E+00	2.29E+00	-2.74E+01
Non-hazardous waste	kg	5.54E+03	1.84E+03	4.65E+00	1.21E+00	3.64E+03	0.00E+00	6.02E-01	MND	MND	MND	3.64E+03	0.00E+00	4.94E+01	0.00E+00	3.03E-01	3.83E+01	1.08E+01	-6.88E+02
Radioactive waste	kg	2.19E+00	1.03E-02	2.84E-05	1.00E-06	2.18E+00	0.00E+00	5.09E-04	MND	MND	MND	2.18E+00	0.00E+00	1.05E-03	0.00E+00	3.11E-06	1.05E-03	8.97E-07	-3.63E-03

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & 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	2.40E+01	0.00E+00	0.00E+00	3.66E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.03E+01	0.00E+00	0.00E+00	2.03E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	2.70E+00	0.00E+00	0.00E+00	2.86E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.41E+00	0.00E+00	0.00E+00	0.00E+00	2.41E+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

ENVIRONMENTAL IMPACTS – TRACI 2.1.

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits & Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Global Warming Pot.	kg CO ₂ eq.	1.88E+03	3.13E+02	1.35E+01	6.21E-01	1.51E+03	2.30E+02	7.93E-01	MND	MND	MND	1.28E+03	0.00E+00	4.44E+01	0.00E+00	6.89E-01	1.46E+01	2.91E+01	-8.78E+01
Ozone Depletion	kg CFC-11 eq.	4.67E-05	8.16E-06	2.11E-07	1.34E-09	3.81E-05	0.00E+00	1.27E-08	MND	MND	MND	3.81E-05	0.00E+00	2.33E-07	0.00E+00	1.45E-08	2.15E-07	3.95E-09	-7.71E-07
Acidification	kg SO ₂ eq.	1.23E+01	4.09E+00	1.86E-01	6.58E-04	7.94E+00	0.00E+00	3.33E-03	MND	MND	MND	7.94E+00	0.00E+00	5.91E-02	0.00E+00	1.28E-03	5.61E-02	1.70E-03	-1.51E+00
Eutrophication	kg N eq.	1.66E+00	7.36E-01	8.21E-03	4.60E-04	8.98E-01	0.00E+00	4.16E-04	MND	MND	MND	8.98E-01	0.00E+00	1.36E-02	0.00E+00	1.70E-04	1.23E-02	1.11E-03	-2.19E-01
POCP ("smog")	kg O ₃ eq.	1.20E+02	3.00E+01	3.53E+00	1.22E-02	8.55E+01	0.00E+00	8.29E-02	MND	MND	MND	8.54E+01	0.00E+00	8.59E-01	0.00E+00	2.78E-02	7.83E-01	4.85E-02	-8.72E+00
ADP-fossil	MJ	1.50E+02	3.34E+01	1.80E+02	6.56E-01	1.11E+01	0.00E+00	1.11E+01	MND	MND	MND	0.00E+00	0.00E+00	7.56E+01	0.00E+00	9.87E+00	-8.63E+01	8.04E-01	-8.94E+01

4 – EXTRAPOLATION TO THE 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	Functional Unit									Declared Unit								
	Manufacturing	Distribution	Installation	B1	B2	B6	B7	C	D	Manufacturing	Distribution	Installation	B1	B2	B6	B7	C	D
RAS-B05B2AVG-E/ RAS-B05B2KVG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-B05B2AVG-E2/ RAS-B05B2KVG-E2	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-B05E2AVG-E/ RAS-B05E2KVG-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-B07B2AVG-E/ RAS-B07B2KVG-E	1.33	1.33	1.72	1.00	1.00	1.00	0.76	0.76	1.16	0.77	0.77	1.00	1.00	1.00	1.00	0.76	0.76	0.69
RAS-07B2AVG-E2/ RAS-B07B2KVG-E2	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
RAS-07E2AVG-E/ RAS-B07E2KVG-E	1.57	1.37	1.37	1.15	1.00	1.00	0.89	0.89	2.45	0.91	0.79	0.79	1.15	1.00	1.00	0.89	0.89	1.47
RAS-07J2AVSG-E1/ RAS-B07G3KVSGB-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-07J2AVSG-E1 /RAS-B07G3KVSGB-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-10B2AVG-E/ RAS-B10B2KVG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-10B2AVG-E2/ RAS-B10B2KVG-E2	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-10E2AVG-E/ RAS-B10E2KVG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-10J2AVSG-E1/ RAS-B10G3KVSGB-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-10J2AVSG-E1/ RAS-B10G3KVSGB-E	1.33	1.33	1.72	1.00	1.00	1.00	0.76	0.76	1.16	0.77	0.77	1.00	1.00	1.00	1.00	0.76	0.76	0.69
RAS-13B2AVG-E/ RAS-B13B2KVG-E	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
RAS-13B2AVG-E2/ RAS-B13B2KVG-E2	1.57	1.37	1.37	1.15	1.00	1.00	0.89	0.89	2.45	0.91	0.79	0.79	1.15	1.00	1.00	0.89	0.89	1.47
RAS-13E2AVG-E/ RAS-B13E2KVG-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-13J2AVSG-E1/ RAS-B13G3KVSGB-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-13J2AVSG-E1/ RAS-B13G3KVSGB-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-16B2AVG-E/ RAS-B16B2KVG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99

4 – EXTRAPOLATION TO THE OTHER SIZES IN THE RANGE

RAS-16B2AVG-E2/ RAS-B16B2KVG-E2	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-16E2AVG-E/ RAS-B16E2KVG-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-16J2AVSG-E1/ RAS-B16G3KVSG-E	1.33	1.33	1.72	1.00	1.00	1.00	0.76	0.76	1.16	0.77	0.77	1.00	1.00	1.00	1.00	0.76	0.76	0.69
RAS-16J2AVSG-E1/ RAS-B16G3KVSG-B-E	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
RAS-18B2AVG-E/ RAS-B18B2KVG-E	1.57	1.37	1.37	1.15	1.00	1.00	0.89	0.89	2.45	0.91	0.79	0.79	1.15	1.00	1.00	0.89	0.89	1.47
RAS-18B2AVG-E2/ RAS-B18B2KVG-E2	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-18E2AVG-E/ RAS-B18E2KVG-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-18J2AVSG-E1/ RAS-B18G3KVSG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-18J2AVSG-E1/ RAS-B18G3KVSG-B-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-22J2AVSG-E1/ RAS-B22G3KVSG-E	1.61	1.66	1.71	0.96	0.96	1.00	1.13	1.13	1.66	0.94	0.96	0.99	0.96	0.96	1.00	1.13	1.13	0.99
RAS-22J2AVSG-E1/ RAS-B22G3KVSG-B-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-24B2AVG-E/ RAS-B24B2KVG-E	1.33	1.33	1.72	1.00	1.00	1.00	0.76	0.76	1.16	0.77	0.77	1.00	1.00	1.00	1.00	0.76	0.76	0.69
RAS-24B2AVG-E2/ RAS-B24B2KVG-E2	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
RAS-24E2AVG-E/ RAS-B24E2KVG-E	1.57	1.37	1.37	1.15	1.00	1.00	0.89	0.89	2.45	0.91	0.79	0.79	1.15	1.00	1.00	0.89	0.89	1.47
RAS-24J2AVSG-E2/ RAS-B24G3KVSG-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
RAS-24J2AVSG-E2/ RAS-B24G3KVSG-B-E	1.72	1.72	1.72	1.00	1.00	1.00	1.00	1.00	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

The extrapolation coefficients are given for the environmental impact of the functional unit, i.e., the emission of 1 kW of heating or cooling power. 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-00008-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 is 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

TOSHIBA

Suwachai Phoyen
suwachai.phoyen@carrier.com

CARRIER AIR CONDITIONING
THAILAND CO, LTD.
144/9 Moo 5, Bangkadi Industrial
Park, Tivanon Road, Tambol
Bangkadi, Amphur
Muangpathumthani,
Thailand

LCA Consultancy

HCLTech

Bhagya N, Deepak Kumar Kolke,
Shashikumar M S.

LCA Practioners

HCL Technologies Ltd
SEZ, 129 Jigani, Bommasandra
Jigani Link Rd, Industrial Area,
Bengaluru,
Karnataka - 560 105
India

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.