ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

GOLD RX 025/ 030 - SILVER C RX 025/ 030

Swegon Group AB

EPD HUB, HUB-3436

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Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 Dec 2023) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Swegon Group AB
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Contact details	info@swegon.se
Website	www.swegon.com

EPD STANDARDS, SCOPE, AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third-party verified EPD
Scope of the EPD	Cradle to gate with options, A4-B7, and modules C1-C4, D
EPD author	Elham Tamadon
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	GOLD RX 025/ 030 - SILVER C RX 025/ 030
Place of production	Kvänum, Sweden
Place(s) of installation and use	Global
Period for data	Calendar year 2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	13,8

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 finished Air Handling Unit
Declared unit mass	863 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	5,50E+03
GWP-total, A1-A3 ($kgCO_2e$)	5,50E+03
Secondary material, inputs (%)	70,8
Secondary material, outputs (%)	76,9
Total energy use, A1-A3 (kWh)	21400
Net freshwater use, A1-A3 (m^3)	86,7

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

People spend most of their time indoors, so we need a sound indoor climate for our health, well-being, and happiness. Swegon´s ambition is to achieve the world's best indoor environment with the least possible impact on the external environment. Our business models, services, products, and systems are all designed to provide the right solution for each project.

Swegon Group AB is a market-leading supplier in the indoor environment field, offering solutions for ventilation, heating, cooling, and climate optimization, as well as connected services and expert technical support. Swegon has subsidiaries and distributors worldwide and production plants in Europe, North America, and India.

PRODUCT DESCRIPTION

An air handling unit (AHU) helps maintain a high-quality indoor environment by controlling the supply of fresh and well/tempered air. Swegon's GOLD and SILVER C RX units are specifically designed for comfort ventilation. To ensure superior performance, Swegon designs and manufactures its key components, such as the rotary heat exchanger, fan impeller, and control equipment in-house.

Units equipped with rotary heat exchangers achieve optimal temperature and energy efficiency throughout the year. Heat exchangers with turbulent airflow are highly effective. This, combined with minimal installation space required, typically makes them the preferred choice for most applications. The turbulent airflow in the rotor, along with the Carry-Over Control functionality, makes Swegon RX units well-suited for VAV (Variable Air Volume) and DCV (Demand-Controlled Ventilation) systems. Additionally, Swegon's GOLD and SILVER C RX units are designed to minimize the risk of air and odor transmission between the airflows.

The reference weight of a Swegon RX AHU in size 025/ 030 is 863 kg, though the weight can vary depending on the configuration. In terms of material content, an AHU primarily consists of steel, aluminum, various types of polymers, insulation materials, and electronic components. AHUs have an expected lifespan of 20 years before they reach the end of their life cycle.
Further information can be found at www.swegon.com and https://www.swegon.com/products-and-services/air-handling/air-handling-units/gold/gold-rx/?unit=m3h

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	93,99	Europe & Asia
Minerals	3,30	Europe
Fossil materials	2,71	Europe
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	19,2

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 finished Air Handling Unit
Mass per declared unit	863 kg
Functional unit	-
Reference service life	20 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

The production of Air Handling Units (AHUs) is a highly coordinated process. It begins with the transformation of flat sheet metal through precise punching and bending, which forms the core casing of the AHU. Different sheets, varying in thickness, are shaped using specific press machines, moving through multiple buffers before reaching the assembly stage, where they become the structural foundation of the AHU.

At the same time, a rotor is carefully folded and rolled in a specialized machine, becoming the central component of the AHU. Fan impellers are produced by processing fan blades and sides through press machines and then will be cleaned. The components are then assembled into complete fans through laser cutting and welding, combining parts produced via punching and bending with externally purchased electronics.

Various external components are integrated into the assembly line. The AHU units progress from assembly to temporary storage on a motorized bearing system and finally to packing for delivery, ensuring consistent precision and quality throughout the production process.

Transportation activities in the A2 stage include the transportation of raw materials and packaging to the production sites.

The product under evaluation is manufactured at Swegon's production facility in Kvänum. Metal sheets processed in upstream modules are shaped at the Swegon facility, while certain components are supplied as finished parts and mounted directly on the product. The inventory for the production process accounts for all energy and heat flows, including electricity, as well as auxiliary energy demands for internal transports. Electricity demand at the facility is modeled using a site-specific renewable electricity mix, consisting entirely of hydropower, while biomass-based heat is supplied by district heating.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

For modelling the transportation of the finished product to the customers (A4), a distribution scenario based on yearly average sales volumes by the Swegon Kvänum facility has been provided. This scenario considers transport by road and boat. The transportation by road is modelled as 295 km with a 16-32 ton truck and a load capacity of 85%. The transportation by boat is modelled as 407 km with a container ship. Handling of packaging materials is considered in stage A5.

PRODUCT USE AND MAINTENANCE (B1-B7)

Since the product under study is an electrical product, based on regulations by Ecoplatform all B-modules need to be included but there is no guidance on how to perform this type of calculation, and no reference service life (RSL) is specified. Therefore, these calculations were based on defined scenarios by the product manufacturer according to the most common scenarios. The details relevant to the calculation of average energy consumption for this defined scenario are given in Annex 1.
It is worth mentioning that this is a simulated value, and the real value depends on several parameters, which can vary from application to application.
Temperatures and climate are irrelevant for this calculation since only fan power is included and no heating or cooling is added.

The values calculated for RX 025 and RX 030 are 8,800 and 9,500 kWh/year, respectively. And just like the end of life was estimated with European electricity, the same assumption was made here since most products end up within Europe.

Furthermore, some filter components need to be replaced (B4) annually. The remaining B-modules do not contribute to any impacts.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

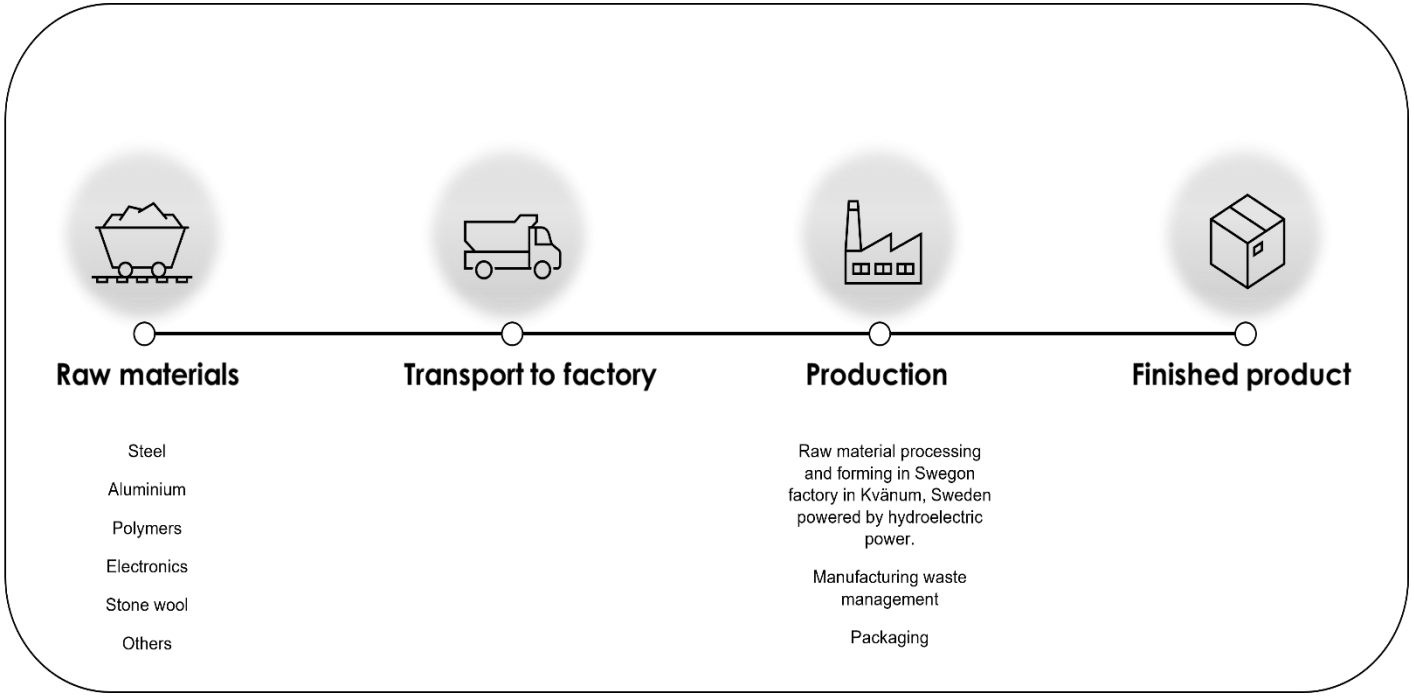
Module C comprises Deconstruction and Demolition (C1), Transport (C2), Waste Processing (C3), and Disposal (C4). The deconstruction of the Air Handling Unit (C1) is modeled based on typical processes for steel and aluminum elements using data from the literature. It is assumed that the entire product undergoes demolition. The product under study at the end of life is assumed to be transported 150 km with a 16-32 ton truck with a load capacity of 85% to the waste treatment facility. Waste processing (C3) represents the most probable scenario, reflecting current European practices and technologies. While the Environmental Product Declaration (EPD) applies globally, the chosen end-of-life scenario aligns with European practices, given that Europe is Swegon's primary market.
The material content of the AHU was analyzed to develop the waste scenario. It is assumed that the metal components, particularly steel and aluminum, will be recycled. Recycling rates of 85% for steel and 95% for aluminum were applied based on data from the literature (World Steel Association 2020, European Aluminium Association). For polymer components, the recycling rate is assumed as 24%, landfilling as 27%, and incineration with energy recovery as 49%, accounting for both electricity and heat recovery (Plastics Europe (2021)). Insulation material and electronic components are assumed to be landfilled (C4). Any non-recyclable steel and aluminum parts are also landfilled, while other materials are incinerated without energy recovery (C4).

Module D accounts for the benefits from recovered and recycled waste streams. Each recycled material stream receives credits for avoiding the production of virgin raw materials, or in the case of incineration with energy recovery, avoiding the production of electricity and heat. Recycled steel and aluminum are credited for avoiding virgin material production, based on their respective recycling processes.

Ordinary steel is assumed to have 12.7% recycled content (according to the Worldsteel average), and for XCarb® recycled and renewably produced steel, the average recycled content, which includes external pre- and post-consumer scrap, is approximately 87% (based on the available XCarb® EPD by ArcelorMittal, S-P-11914). This amount is subtracted before crediting for the recycling process. Primary aluminum, which contains 0% scrap, was used for modeling.

Heat and electricity generated from the incineration process are credited as avoided production of the European district heating mix and electricity.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

This EPD is product and factory-specific and does not contain average calculations. The presented environmental impact data are specific for the GOLD RX 030 (in this specific configuration – Chinese aluminium with sorption coating for the rotary heat exchanger) product. Since AHUs can be customized to meet the needs of different applications. This EPD covers different configurations of an AHU. The variations influence the total weight and material composition. In summary, the variations concern:

- Two different sizes of the model are noted as 025 or 030 variants.
- Inclusion or exclusion of control equipment noted as “GOLD or “SILVER C respectively.
- Different weights, types, and origins of aluminium of the rotary heat exchanger.

The data and results presented in this EPD refer to GOLD RX 030, which has the highest GWP-GHG impact in this range and was chosen as the representative product. The list of included products in the EPD can be found in Annex 2.
Annex 3 presents the actual values (A1-A3) for core environmental impact indicators between the representative product and the lowest-impact product in this range (SILVER C RX 025 with European aluminium without coating for rotary heat exchanger).

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,21E+03	1,30E+02	1,67E+02	5,50E+03	5,51E+01	1,23E+02	0,00E+00	0,00E+00	0,00E+00	2,67E+03	0,00E+00	6,25E+04	0,00E+00	2,84E+00	2,43E+01	5,05E+01	2,45E+01	-2,35E+03
GWP – fossil	kg CO_2e	5,25E+03	1,30E+02	1,19E+02	5,50E+03	5,51E+01	3,89E+00	0,00E+00	0,00E+00	0,00E+00	2,67E+03	0,00E+00	6,22E+04	0,00E+00	2,82E+00	2,43E+01	4,98E+01	2,45E+01	-2,33E+03
GWP – biogenic	kg CO_2e	-5,03E+01	2,46E-02	4,67E+01	-3,51E+00	1,09E-02	1,19E+02	0,00E+00	0,00E+00	0,00E+00	2,23E+00	0,00E+00	1,39E+02	0,00E+00	6,33E-03	4,84E-03	7,68E-01	-3,89E-03	-2,29E+01
GWP – LULUC	kg CO_2e	4,13E+00	5,23E-02	1,93E+00	6,12E+00	2,05E-02	7,67E-04	0,00E+00	0,00E+00	0,00E+00	1,38E+00	0,00E+00	1,91E+02	0,00E+00	8,67E-03	8,67E-03	1,77E-02	1,26E-03	-7,15E-01
Ozone depletion pot.	kg CFC_{-11}e	2,61E-04	2,42E-06	1,27E-06	2,65E-04	1,07E-06	2,05E-08	0,00E+00	0,00E+00	0,00E+00	4,08E-03	0,00E+00	1,15E-03	0,00E+00	5,21E-08	4,78E-07	1,85E-07	4,85E-08	-9,58E-06
Acidification potential	mol H^+e	3,77E+01	1,13E+00	5,63E-01	3,94E+01	2,19E-01	6,09E-03	0,00E+00	0,00E+00	0,00E+00	7,07E+00	0,00E+00	3,66E+02	0,00E+00	1,66E-02	7,62E-02	1,61E-01	1,59E-02	-2,02E+01
EP-freshwater[2)]	kg Pe	2,07E+00	7,63E-03	3,50E-02	2,12E+00	3,57E-03	4,07E-04	0,00E+00	0,00E+00	0,00E+00	3,96E-01	0,00E+00	5,79E+01	0,00E+00	2,63E-03	1,62E-03	8,79E-03	2,77E-03	-1,15E+00
EP-marine	kg Ne	5,85E+00	2,84E-01	1,16E-01	6,25E+00	5,35E-02	8,91E-03	0,00E+00	0,00E+00	0,00E+00	1,37E+00	0,00E+00	5,74E+01	0,00E+00	2,61E-03	2,57E-02	3,90E-02	2,70E-01	-2,77E+00
EP-terrestrial	mol Ne	8,38E+01	3,13E+00	1,20E+00	8,82E+01	5,86E-01	2,46E-02	0,00E+00	0,00E+00	0,00E+00	1,36E+01	0,00E+00	5,14E+02	0,00E+00	2,34E-02	2,79E-01	4,16E-01	6,96E-02	-2,87E+01
POCP ("smog")[3)]	kg NMVOCe	1,88E+01	1,04E+00	4,12E-01	2,02E+01	2,61E-01	8,30E-03	0,00E+00	0,00E+00	0,00E+00	7,90E+00	0,00E+00	1,69E+02	0,00E+00	7,69E-03	1,19E-01	1,22E-01	2,35E-02	-8,89E+00
ADP-minerals & metals[4)]	kg Sbe	2,73E-01	3,59E-04	7,11E-04	2,74E-01	1,74E-04	3,58E-06	0,00E+00	0,00E+00	0,00E+00	1,00E-02	0,00E+00	8,39E-01	0,00E+00	3,81E-05	7,90E-05	9,12E-04	3,96E-06	-7,31E-03
ADP-fossil resources	MJ	5,57E+04	1,77E+03	3,21E+03	6,07E+04	7,68E+02	1,68E+01	0,00E+00	0,00E+00	0,00E+00	3,25E+04	0,00E+00	1,45E+06	0,00E+00	6,57E+01	3,42E+02	1,86E+02	4,09E+01	-2,34E+04
Water use[5)]	m^3e depr.	1,18E+03	7,98E+00	1,42E+02	1,33E+03	3,71E+00	6,95E-01	0,00E+00	0,00E+00	0,00E+00	6,22E+02	0,00E+00	3,94E+04	0,00E+00	1,79E+00	1,68E+00	4,31E+00	7,03E-01	-2,25E+02

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation 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) EN 15804+A2 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 – EN 15804+A2

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,53E-04	8,27E-06	7,86E-06	4,69E-04	3,89E-06	1,06E-07	0,00E+00	0,00E+00	0,00E+00	7,30E-05	0,00E+00	1,30E-03	0,00E+00	5,92E-08	1,93E-06	2,20E-06	2,76E-07	-1,42E-04
Ionizing radiation[6]	kBq U235e	1,78E+02	1,97E+00	1,62E+02	3,42E+02	9,51E-01	8,58E-02	0,00E+00	0,00E+00	0,00E+00	1,06E+02	0,00E+00	4,00E+04	0,00E+00	1,82E+00	4,30E-01	1,65E+00	3,97E-02	-9,40E+01
Ecotoxicity (freshwater)	CTUe	4,19E+04	2,13E+02	6,65E+02	4,27E+04	9,93E+01	6,22E+00	0,00E+00	0,00E+00	0,00E+00	6,11E+03	0,00E+00	2,21E+05	0,00E+00	1,00E+01	4,50E+01	1,23E+02	1,30E+03	-4,84E+03
Human toxicity, cancer	CTUh	3,71E-06	2,33E-08	1,09E-07	3,84E-06	9,41E-09	7,60E-10	0,00E+00	0,00E+00	0,00E+00	3,69E-07	0,00E+00	2,10E-05	0,00E+00	9,55E-10	4,13E-09	1,45E-08	3,90E-09	-6,19E-07
Human tox. non-cancer	CTUh	9,73E-05	9,73E-07	1,74E-06	1,00E-04	4,67E-07	4,55E-08	0,00E+00	0,00E+00	0,00E+00	1,51E-05	0,00E+00	1,09E-03	0,00E+00	4,95E-08	2,15E-07	8,52E-07	6,66E-07	-8,50E-06
SQP[7]	-	1,93E+04	8,70E+02	6,62E+03	2,67E+04	4,39E+02	1,76E+01	0,00E+00	0,00E+00	0,00E+00	4,35E+03	0,00E+00	3,22E+05	0,00E+00	1,46E+01	2,09E+02	4,14E+02	7,96E+01	-7,46E+03

6) EN 15804+A2 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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	1,43E+04	2,73E+01	3,37E+03	1,77E+04	1,30E+01	-5,72E+02	0,00E+00	0,00E+00	0,00E+00	1,48E+03	0,00E+00	3,97E+05	0,00E+00	1,80E+01	5,85E+00	3,42E+01	6,23E-01	-1,28E+03
Renew. PER as material	MJ	5,47E+02	0,00E+00	6,94E+01	6,16E+02	0,00E+00	-6,16E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,26E+02
Total use of renew. PER	MJ	1,49E+04	2,73E+01	3,44E+03	1,83E+04	1,30E+01	-1,19E+03	0,00E+00	0,00E+00	0,00E+00	1,48E+03	0,00E+00	3,97E+05	0,00E+00	1,80E+01	5,85E+00	3,42E+01	6,23E-01	-1,15E+03
Non-re. PER as energy	MJ	5,48E+04	1,77E+03	2,71E+03	5,93E+04	7,68E+02	-6,36E+01	0,00E+00	0,00E+00	0,00E+00	1,19E+04	0,00E+00	1,45E+06	0,00E+00	6,57E+01	3,42E+02	-5,01E+02	-2,46E+03	-2,34E+04
Non-re. PER as material	MJ	6,43E+02	0,00E+00	5,62E+01	6,99E+02	0,00E+00	-1,26E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,19E+02	-1,55E+02	-2,15E+02
Total use of non-re. PER	MJ	5,55E+04	1,77E+03	2,77E+03	6,00E+04	7,68E+02	-1,89E+02	0,00E+00	0,00E+00	0,00E+00	1,19E+04	0,00E+00	1,45E+06	0,00E+00	6,57E+01	3,42E+02	-9,19E+02	-2,61E+03	-2,36E+04
Secondary materials	kg	6,11E+02	8,28E-01	3,30E+00	6,15E+02	3,57E-01	1,36E-02	0,00E+00	0,00E+00	0,00E+00	6,34E+00	0,00E+00	2,39E+02	0,00E+00	1,09E-02	1,56E-01	2,55E-01	1,36E-02	3,28E+02
Renew. secondary fuels	MJ	1,71E+01	8,56E-03	2,09E+01	3,80E+01	4,28E-03	1,22E-04	0,00E+00	0,00E+00	0,00E+00	1,09E+00	0,00E+00	1,91E+00	0,00E+00	8,68E-05	1,97E-03	1,20E-02	2,54E-04	-7,30E-02
Non-ren. secondary fuels	MJ	1,08E-07	0,00E+00	0,00E+00	1,08E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	8,18E+01	2,15E-01	4,70E+00	8,67E+01	1,01E-01	-6,40E-02	0,00E+00	0,00E+00	0,00E+00	1,42E+01	0,00E+00	1,25E+03	0,00E+00	5,68E-02	4,62E-02	1,05E-01	-1,48E-01	-8,19E+00

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,07E+03	2,53E+00	9,94E+00	1,08E+03	1,11E+00	1,54E-01	0,00E+00	0,00E+00	0,00E+00	8,90E+01	0,00E+00	3,66E+03	0,00E+00	1,66E-01	4,94E-01	1,59E+00	3,54E-01	-5,20E+02
Non-hazardous waste	kg	1,06E+04	4,95E+01	3,24E+02	1,10E+04	2,29E+01	1,12E+02	0,00E+00	0,00E+00	0,00E+00	6,33E+03	0,00E+00	2,83E+05	0,00E+00	1,29E+01	1,04E+01	6,06E+01	2,76E+02	-4,07E+03
Radioactive waste	kg	2,49E-01	4,88E-04	3,48E-02	2,85E-01	2,36E-04	2,19E-05	0,00E+00	0,00E+00	0,00E+00	2,66E-02	0,00E+00	1,03E+01	0,00E+00	4,66E-04	1,07E-04	4,22E-04	9,74E-06	-2,22E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	2,67E+02	2,67E+02	0,00E+00	1,65E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,52E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	3,05E+01	3,05E+01	0,00E+00	1,61E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E+01	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,62E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,75E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,35E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,55E+02	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	5,23E+03	1,29E+02	1,21E+02	5,48E+03	5,47E+01	4,96E+00	0,00E+00	0,00E+00	0,00E+00	2,66E+03	0,00E+00	6,22E+04	0,00E+00	2,83E+00	2,41E+01	5,05E+01	2,42E+01	-2,31E+03
Ozone depletion Pot.	kg CFC_{-11}e	1,94E-04	1,92E-06	1,11E-06	1,97E-04	8,55E-07	1,65E-08	0,00E+00	0,00E+00	0,00E+00	2,72E-03	0,00E+00	9,57E-04	0,00E+00	4,35E-08	3,81E-07	1,53E-07	3,89E-08	-9,07E-06
Acidification	kg SO_2e	3,00E+01	9,05E-01	4,74E-01	3,14E+01	1,75E-01	4,52E-03	0,00E+00	0,00E+00	0,00E+00	5,89E+00	0,00E+00	3,12E+02	0,00E+00	1,42E-02	5,79E-02	1,29E-01	1,15E-02	-1,73E+01
Eutrophication	kg PO_4^3e	5,62E+00	1,24E-01	6,65E-01	6,41E+00	3,15E-02	1,94E-03	0,00E+00	0,00E+00	0,00E+00	6,48E+00	0,00E+00	4,03E+01	0,00E+00	1,83E-03	1,47E-02	2,07E-02	1,42E-02	-1,29E+00
POCP (“smog”)	kg C_2H_4e	2,09E+00	5,43E-02	3,69E-02	2,18E+00	1,35E-02	6,15E-04	0,00E+00	0,00E+00	0,00E+00	4,53E-01	0,00E+00	1,70E+01	0,00E+00	7,71E-04	5,51E-03	8,04E-03	2,03E-03	-1,19E+00
ADP-elements	kg Sbe	2,74E-01	3,51E-04	7,48E-04	2,75E-01	1,70E-04	3,42E-06	0,00E+00	0,00E+00	0,00E+00	9,91E-03	0,00E+00	8,37E-01	0,00E+00	3,80E-05	7,72E-05	9,09E-04	3,70E-06	-7,11E-03
ADP-fossil	MJ	5,20E+04	1,74E+03	1,05E+03	5,48E+04	7,52E+02	1,54E+01	0,00E+00	0,00E+00	0,00E+00	3,05E+04	0,00E+00	7,43E+05	0,00E+00	3,37E+01	3,34E+02	1,58E+02	4,02E+01	-2,19E+04

ENVIRONMENTAL IMPACTS – ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Radioactive waste, high	kg	1,23E-02	1,23E-04	6,18E-03	1,86E-02	5,87E-05	5,11E-06	0,00E+00	0,00E+00	0,00E+00	7,19E-03	0,00E+00	2,32E+00	0,00E+00	1,05E-04	2,66E-05	1,02E-04	2,79E-06	-6,50E-03
Radioactive waste, int/low	kg	3,24E-02	3,65E-04	2,87E-02	6,14E-02	1,77E-04	1,68E-05	0,00E+00	0,00E+00	0,00E+00	1,94E-02	0,00E+00	7,95E+00	0,00E+00	3,61E-04	8,02E-05	3,20E-04	6,95E-06	-1,57E-02

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	5,26E+03	1,30E+02	1,21E+02	5,51E+03	5,51E+01	3,89E+00	0,00E+00	0,00E+00	0,00E+00	2,67E+03	0,00E+00	6,24E+04	0,00E+00	2,83E+00	2,43E+01	4,98E+01	2,45E+01	-2,33E+03

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

THIRD-PARTY VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Imane Uald Lamkaddam as an authorized verifier for EPD Hub Limited
06.06.2025

ANNEX 1

The air handling unit under study relies on electric power to operate its fans and recovers heat through a rotary heat exchanger. Several project-specific factors, including air volume, external pressure drop, operating hours, climate and outdoor conditions, supply and extract temperatures, electricity source, and other variables, influence its performance. To accurately determine the environmental impact of this product, it's essential to calculate energy consumption and heat recovery based on these specific factors. These calculations can be performed using our Swegon AHU Design software. For more information, please visit www.swegon.com. The table below shows the details relevant to the average energy consumption calculation for the defined scenario.

Scenario	Parameter	Unit	RX 030
Design airflow rate (100%)	Design airflow rate	m^3/s	1.92
	Operating hours	h/ year	1404
	External statistics pressure (on supply)	Pa	250
	External statistics pressure (on extract)	Pa	250
Airflow rate (75%)	Design airflow rate	m^3/s	1.40
	Operating hours	h/ year	1612
	External statistics pressure (on supply)	Pa	140
	External statistics pressure (on extract)	Pa	140
Airflow rate (50%)	Design airflow rate	m^3/s	1
	Operating hours	h/ year	1612
	External statistics pressure (on supply)	Pa	90
	External statistics pressure (on extract)	Pa	90
Airflow rate (25%)	Design airflow rate	m^3/s	0.50
	Operating hours	h/ year	2392
	External statistics pressure (on supply)	Pa	85
	External statistics pressure (on extract)	Pa	85
Airflow rate (0%)	Design airflow rate	m^3/s	0
	Operating hours	h/ year	1740
	External statistics pressure (on supply)	Pa	-
	External statistics pressure (on extract)	Pa	-
Operating hours weighted mean airflow rate		m^3/s	0.88
Operating hours weighted external static pressure*		Pa	211

*The pressure is calculated based on the annual average SFP (Specific Fan Power) from all sold RX models in 2024. The annual average SFP is 1.61 kW /m^3.s.

ANNEX 2

Covered products in this EPD, with their corresponding weights, defined inclusion or exclusion of control equipment, as well as aluminium type and origin of the rotary heat exchanger, are listed in the below table.

Product name	Weight (kg)	Control equipment	Aluminium type in rotor
GOLD RX 030	848	**Included**	European, No coating
	853		European, Epoxy coating
	863		**Chinese, Sorption coating**
GOLD RX 025	809	Included	European, No coating
	814		European, Epoxy coating
	824		Chinese, Sorption coating
SILVER C RX 030	845	Excluded	European, No coating
	850		European, Epoxy coating
	860		Chinese, Sorption coating
SILVER C RX 025	806	Excluded	European, No coating
	811		European, Epoxy coating
	821		Chinese, Sorption coating

Note: The product variant marked in **bold text** is the modelled/ representative product.

ANNEX 3

The actual value (A1-A3) for core environmental impact indicators between the representative product (GOLD RX 030 with - Chinese aluminium with sorption coating for the rotary heat exchanger) and the lowest-impact product in this range (SILVER C RX 025 with European aluminium without coating for rotary heat exchanger) is presented in the below table.

Environmental impact indicator	Unit	Results of declared product/ variant with the highest impact (A1-A3)	Results of the lowest-impact variant (A1-A3)	Variation (%)
GWP-GHG	kg CO_2 eq.	5.51E+03	3.57E+03	35.21%
GWP-total	kg CO_2 eq.	5.50E+03	3.56E+03	35.27%
GWP-fossil	kg CO_2 eq.	5.50E+03	3.56E+03	35.27%
GWP-biogenic	kg CO_2 eq.	-3.51E+00	-8.99E+00	156.13%
GWP-luluc	kg CO_2 eq.	6.12E+00	6.49E+00	6.05%
ODP	kg CFC-11 eq.	2.65E-04	2.53E-04	4.53%
AP	mol H+ eq.	3.94E+01	2.54E+01	35.53%
EP-freshwater	kg P eq.	2.12E+00	1.55E+00	26.89%
EP-marine	kg N eq.	6.25E+00	3.87E+00	38.08%
EP-terrestrial	mol N eq.	8.82E+01	6.25E+01	29.14%
POCP	kg NMVOC eq.	2.02E+01	1.28E+01	36.63%
ADP-minerals & metals	kg Sb eq.	2.74E-01	2.15E-01	21.53%
ADP-fossil resources	MJ	6.07E+04	4.42E+04	27.18%
Water use	m^3e depr.	1.33E+03	1.13E+03	15.04%

ANNEX 4

To illustrate how the results of the use phase can be affected by different factors like energy supply, system performance, regulatory requirements, and so on, switching the electricity source among Nordic countries has been selected for further study.

The Global Warming Potential (GWP-GHG) values in Module B6 exhibit considerable variation across different countries. Norway demonstrates the lowest impact, with a value of 229 kg CO_2 eq, followed by Sweden at 349 kg CO_2 eq. In contrast, Denmark and Finland have values that are more than four times higher than Sweden's, emphasizing the importance of electricity supply during a unit's operational period.

		Module B6				
Environmental impact indicator	**Unit**	**Sweden**	**Norway**	**Denmark**	**Finland**	**EU average**
GWP-GHG	kg CO_2 eq.	3.49E+02	2.29E+02	1.48E+03	1.47E+03	3.12E+03
GWP-total	kg CO_2 eq.	3.55E+02	2.32E+02	1.48E+03	1.47E+03	3.13E+03
GWP-fossil	kg CO_2 eq.	3.14E+02	2.27E+02	1.47E+03	1.44E+03	3.11E+03
GWP-biogenic	kg CO_2 eq.	5.70E+00	3.94E+00	6.31E+00	5.27E+00	6.97E+00
GWP-luluc	kg CO_2 eq.	3.53E+01	1.06E+00	6.30E+00	2.79E+01	9.55E+00
ODP	kg CFC-11 eq.	9.40E-06	6.13E-06	3.15E-05	2.77E-05	5.73E-05
AP	mol H+ eq.	3.85E+00	3.15E+00	8.84E+00	7.44E+00	1.83E+01
EP-freshwater	kg P eq.	2.78E-01	2.40E-01	1.08E+00	5.55E-01	2.89E+00
EP-marine	kg N eq.	5.67E-01	2.74E-01	1.59E+00	1.30E+00	2.87E+00
EP-terrestrial	mol N eq.	5.79E+00	3.34E+00	1.91E+01	1.39E+01	2.57E+01
POCP	kg NMVOC eq.	1.54E+00	1.01E+00	4.78E+00	4.15E+00	8.46E+00
ADP-minerals & metals	kg Sb eq.	3.77E-02	3.61E-02	4.63E-02	3.85E-02	4.20E-02
ADP-fossil resources	MJ	4.20E+04	2.75E+03	2.37E+04	6.35E+04	7.24E+04
Water use	m^3e depr.	2.32E+03	1.19E+04	2.66E+03	1.76E+03	1.97E+03

*Note that the results presented above have been calculated for 1 year of use.