

Zehnder ComfoAir Q350-600 and E300-400

ENVIRONMENTAL PRODUCT DECLARATION

CEN standard EN 15804 serves as the core PCR.
In compliance with ISO 14040:2006 and 14044: 2006

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always the best climate



Creating a future worth living

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Introduction

EPD is an abbreviation for “Environmental Product Declaration”. It is a report describing a product’s environmental performance over its entire life cycle. An EPD reports provides the results of a life cycle assessment (LCA), made by using the R<THINK

application. It provides environmental performance indicators for the ComfoAir Q350 - Q600 and E300 - 400 v1.0 manufactured by Zehnder Group Netherlands BV.

Zehnder

Taking action for the future

Construction’s carbon footprint urgently needs to be reduced. If we want to create a future worth living, we need to build and think differently. As an internationally active manufacturer of indoor climate solutions, we are therefore continuously working to make our products and systems even more sustainable. In doing so, we take the entire value chain into account – from development through purchasing and production to operation and disposal.

Sustainability is already taken into account at the very first step of our product development, taking three criteria into account:

- Preventing waste: Designing products whose parts can be easily replaced;
- Improving the basics: Developing easily applicable upgrades for our installed base;
- Conscious use of raw materials: Making use of recycled or biobased raw materials.

We measure our impact on the environment as well as on society in a fact-based, efficient and transparent manner and take responsibility for it. Our Environmental Product Declarations are an example of this.

Take a look at your product’s passport:

Due to increasing shortages of raw materials, minimal impact is becoming increasingly important when buying a new product. But what journey did your product take before you bought it?

Discover the specifications and origins of your newly bought product, and all the steps it took on its journey, in this EPD.

This EPD provides environmental performance indicators for Zehnder ComfoAir Q350-600 and E300-400.



„Brand statement
or quote.“

General information

Validity

Issue date: 01/09/2023
Valid until: 01/09/2028

Owner of the declaration



Manufacturer: Zehnder Group Netherlands BV
Address: Lingenstraat 2, 8028 PM Zwolle
E-mail: info@zehnder.nl
Website: www.Zehnder.nl
Production location: Zehnder Group Netherlands BV
Address production location: Lingenstraat 2. 8028 PM Zwolle

Verification of the declaration

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006.

The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

A blue ink signature, appearing to read "G. Vroege", is written over a light blue circular background.

Gert-Jan Vroege, Eco Intelligence

Product category rules

NMD Determination method Environmental performance Construction works v1.1 March 2022.

Comparability

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios

used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).



Product information



ComfoAir Q 600

Product description

This LCA includes the ComfoAir Q350, Q450, Q600, E300 and E400 heat recovery systems.

The differences between these boxes are software technical and therefore fall within the deviation of 10%. The ventilation unit has a heat recovery of up to 350 m³/h.

The product has a height of 850 mm, a width of 725 mm, a depth of 570 mm and weighs 56 kg. The unit complies with CE, EU conviction 1254/2014, EN-13141-7.

This is an LCA from A to D.

Description production proces

Assembly

The various components are supplied by suppliers from Europe to Zehnder.

In the assembly hall in Zwolle, the components are assembled into the end product. The components are delivered in wooden or iron crates or plastic containers. When these crates or containers are empty, they go back to the supplier where they are reused. The components are transported via an electric forklift or train to the assembly track or to the warehouse. On the assembly track, the various components are assembled into an end product. For the ComfoAir Q assembly runway there are 5 workstations. By going through the various workstations, components are turned into an end product. During the assemblage, tools such as an electric hand drill are used.

At the last workstation, the units are tested and packaged. The product is then prepared for shipment.

All relevant production processes in phase A3, such as internal transport, were included in this study according to the NMD Determination Method.

Waste during production

There is a few grams of plastic waste (label stickers). In addition, a very low percentage of component rejection. If during assembly or upon arrival of the goods it appears that they do not meet the specifications, it is checked whether the component can be reworked so that it falls within the specifications. In an exceptional case, it is returned to the supplier or scrapped.



Construction description

Depending on where the product is placed, most common in the attic, and whether there is a lifting aid system to get the product into the attic. Otherwise, the product will be lifted upwards. The scope of this LCA assumes that the system is installed manually.

The attachment depends on whether the product is installed on a frame or hung on the wall. Wall hanging is

the most common. When the product is hung on the wall, the bracket (included in the bill of materials) is attached to the wall with 2 screws. The unit is hung on the bracket. This requires a drill and manpower. When the product is placed on a frame, an additional frame is needed. This is an accessory that can be purchased and is not considered in the scope of this LCA.

Life-Cycle assessment

Functional unit

An air treatment system. Including air handling unit with optional heat wheel or counterflow plate exchanger, ventilation ducts and supply and exhaust grilles, internal pipes/tubes/conduits, finishing layers and any appendages and the fasteners. Excluding the air distribution system.
Reference unit: piece (p)

Life-cycle assessment information

Period for date	2023
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Conversion factors

Description	Value	Unit
Declared unit	1	p
Weight per declared unit	51.934	kg
Conversion factor to 1 kg	0.019255	p

Scope of declaration and system boundary

This is a Cradle to gate with options, modules C1-C4 and module D LCA. The life cycle stages included are as shown below: (X = module included, ND = module not declared)

Product Stage			Construction process sateg		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	N D	N D	N D	N D	X	X	X	X	X
Raw material supply	Transport	Manufacturing	Transport	Construction Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction / Demolition	Transport	Waste Processing Module	Disposal	Benefits and loads beyond the product system boundaries

Cut-off criteria

In the Life cycle assessment the following cut-off criteria are applied:

PRODUCT STAGE (A1-A3)

The production stage consists of the extraction of raw materials, transportation of the raw materials, processing the raw materials into materials and the production of the product. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are included.

The process maps maintained are from EcoInvent 3.6. These process data include infrastructure and capital goods. For the processes where capital goods are not included, it was determined that their contribution does not exceed 5% to each impact category.

CONSTRUCTION PROCESS STAGE (A4-A5)

This stage consists the transport of the product from production plant to the construction site.

It also includes the loss of material during construction. The additional needed production, transport and end-of-life of the lost material during construction is included.

The end-of-life of packaging material up to the end-of-waste state or disposal of final residues is also included.

The installation of the product including manufacture, transportation and end-of-life of ancillary materials and any energy or water use required for installation or operation of the construction site are taken into account.

USE STAGE (B1-B3)

This stage consists of the impacts arising from components of the building and construction works during their use.

The stage also covers the combination of all planned technical and associated administrative maintenance actions during the service life to maintain the product Zehnder ComfoAir Q350-600 en E300-400 installed in a building, in a construction works or its parts in a state in which it can perform its required functional and technical performance, as well as preserve the aesthetic qualities of the product. This will include preventative and regular maintenance activities.

Product replacement (B4) and renovation (B5) only apply when the product is considered in a lifespan (of a building, work , etc.). Operational water and energy use are not considered.

END OF LIFE STAGE (C1-C4)

When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D.

The default end-of-life scenarios of the annex (March 2022) to the NMD Determination method v1.1 have been used for the various materials in the product.

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-wastepoint up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage.

The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent.

In addition, the benefits of energy recovery are granted at this stage. The amount of avoided energy is based on the Lower Heating Values of the materials and the efficiencies of the incinerators as mentioned in the NMD Determination method v1.1 or EcoInvent 3.6 (2019).

Allocation

There is no allocation applied for the environmental profiles/datasets used in this LCA. For the sake of clarity, the generic processes which are not changed (e.g. Ecolnvent waste treatment processes) are not shown in this overview.

Reference time period

The process-specific data on composition and suppliers has been collected for the year 2022. The data related to energy consumption for the year 2020.

For energy consumption, 2020 has been used because it is the most reliable reflection of the reality related to corona and liver problems.

Data Quality

The data quality is based on the principle that the data quality of the data of the processes that take place at the producer of the product must be higher than that of the other processes.

Furthermore, the principle is applied that economic flows must approach reality as closely as possible within practically feasible limits for the implementer of the LCA. The data quality is assessed below, in section 4.1.1, with the data quality system for unit processes set out in Annex VI of the NMD Determination Method.

Guarantee of Origin

Energy and mass balance

The energy data has been measured at company level, in the year 2020. The entire energy consumption of the production location has been allocated to all products that have been produced. As a result, the energy balance is 100% balanced by definition.

The mass balance checks how the specified composition compares to the actual purchased raw materials for this product. The LCA calculation is done on the basis of the actual quantities of materials used.



Environmental impact data

Note: additional environmental impact data may be presented in annexes.

Core environmental impact indicators EN 15804+A2

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
AP	mol H+ eqv.	2,14E+00	9,62E-03	3,35E-02	6,64E-03	6,83E-02	0,00E+00	3,64E-02	3,75E-02	0,00E+00	3,87E-03	1,95E-02	3,01E-04	-2,13E-01	2,14E+00
GWP-total	kg CO2 eqv.	2,70E+02	1,66E+00	-2,72E+00	1,15E+00	1,81E+01	0,00E+00	1,48E+01	1,53E+01	0,00E+00	6,68E-01	5,96E+01	3,90E-01	-6,19E+01	3,17E+02
GWP-b	kg CO2 eqv.	2,90E+00	7,66E-04	-7,60E+00	5,29E-04	7,69E+00	0,00E+00	-1,17E-01	-1,21E-01	0,00E+00	3,08E-04	9,67E-02	3,89E-04	1,22E-01	2,97E+00
GWP-f	kg CO2 eqv.	2,67E+02	1,66E+00	4,83E+00	1,15E+00	1,04E+01	0,00E+00	1,49E+01	1,54E+01	0,00E+00	6,67E-01	5,95E+01	3,90E-01	-6,20E+01	3,14E+02
GWP-luluc	kg CO2 eqv.	2,09E-01	6,08E-04	5,28E-02	4,20E-04	8,08E-03	0,00E+00	6,26E-03	6,44E-03	0,00E+00	2,44E-04	3,15E-03	1,70E-05	-6,37E-03	2,80E-01
EP-m	kg N eqv.	2,79E-01	3,39E-03	7,06E-03	2,34E-03	9,70E-03	0,00E+00	6,20E-03	6,38E-03	0,00E+00	1,36E-03	5,59E-03	2,25E-04	-3,52E-02	2,86E-01
EP-fw	kg P eqv.	2,18E-02	1,67E-05	4,54E-04	1,16E-05	6,77E-04	0,00E+00	2,96E-04	3,05E-04	0,00E+00	6,73E-06	1,21E-04	6,23E-07	-1,55E-03	2,21E-02
EP-T	mol N eqv.	3,73E+00	3,74E-02	8,04E-02	2,58E-02	1,26E-01	0,00E+00	7,05E-02	7,26E-02	0,00E+00	1,50E-02	6,23E-02	1,10E-03	-4,35E-01	3,79E+00
ODP	kg CFC 11 eqv.	1,41E-05	3,66E-07	4,79E-07	2,53E-07	5,48E-07	0,00E+00	7,11E-07	7,32E-07	0,00E+00	1,47E-07	1,19E-06	1,06E-08	-6,02E-06	1,26E-05
POCP	kg NMVOC eqv.	1,13E+00	1,07E-02	2,20E-02	7,37E-03	3,81E-02	0,00E+00	2,74E-02	2,82E-02	0,00E+00	4,29E-03	1,64E-02	4,00E-04	-1,75E-01	1,11E+00
ADP-f	MJ	4,37E+03	2,50E+01	7,38E+01	1,73E+01	1,39E+02	0,00E+00	2,68E+02	2,76E+02	0,00E+00	1,01E+01	3,13E+01	8,14E-01	-8,72E+02	4,34E+03
ADP-mm	kg Sb-equiv.	7,30E-02	4,20E-05	3,17E-04	2,90E-05	2,21E-03	0,00E+00	8,36E-05	8,61E-05	0,00E+00	1,69E-05	5,20E-05	3,60E-07	-1,90E-02	5,69E-02
WDP	m3 world eqv.	1,09E+02	8,95E-02	2,22E+00	6,18E-02	3,42E+00	0,00E+00	5,38E+00	5,55E+00	0,00E+00	3,60E-02	1,86E+00	3,34E-02	-9,17E+00	1,18E+02

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

Additional environmental impact indicators

EN 15804+A2

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
ETP-fw	CTUe	1,71E+04	2,23E+01	2,55E+02	1,54E+01	5,44E+02	0,00E+00	1,40E+02	1,45E+02	0,00E+00	8,97E+00	4,92E+02	1,34E+01	-2,38E+03	1,63E+04
PM	disease incidence	1,62E-05	1,49E-07	3,85E-07	1,03E-07	5,40E-07	0,00E+00	2,56E-07	2,64E-07	0,00E+00	6,00E-08	1,55E-07	5,63E-09	-1,71E-06	1,64E-05
HTP-c	CTUh	6,19E-07	7,24E-10	7,16E-09	5,00E-10	2,05E-08	0,00E+00	3,48E-09	3,59E-09	0,00E+00	2,91E-10	3,31E-08	2,39E-11	-5,90E-08	6,30E-07
HTP-nc	CTUh	1,53E-05	2,44E-08	1,43E-07	1,69E-08	4,78E-07	0,00E+00	8,39E-08	8,64E-08	0,00E+00	9,81E-09	2,48E-07	9,62E-10	8,03E-08	1,64E-05
IR	kBq U235 eqv.	9,36E+00	1,05E-01	2,98E-01	7,24E-02	3,15E-01	0,00E+00	4,86E-01	5,00E-01	0,00E+00	4,22E-02	1,27E-01	3,23E-03	-2,44E-01	1,11E+01
SQP	Pt	1,19E+03	2,17E+01	7,15E+02	1,50E+01	6,04E+01	0,00E+00	3,73E+01	3,84E+01	0,00E+00	8,73E+00	1,16E+01	1,90E+00	-4,14E+02	1,69E+03

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | PM=Particulate Matter (PM) | HTP-c=Human toxicity, cancer (HTP-c) | HTP-nc=Human toxicity, non-cancer (HTP-nc) | IR=Ionising radiation, human health (IR) | SQP=Land use (SQP)

Classification of disclaimers to the declaration of core & additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	AAcidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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 possiblenuclear 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.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Core environmental impact indicator

EN 15804+A1

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
ADPE	Kg Sb	7,30E-02	4,20E-05	3,17E-04	2,90E-05	2,21E-03	0,00E+00	8,36E-05	8,61E-05	0,00E+00	1,69E-05	5,20E-05	3,60E-07	-1,90E-02	5,69E-02
GWP	Kg CO ₂ eqv.	2,59E+02	1,64E+00	4,78E+00	1,14E+00	1,01E+01	0,00E+00	1,47E+01	1,51E+01	0,00E+00	6,61E-01	5,94E+01	3,34E-01	-6,03E+01	3,07E+02
ODP	Kg CFC-11 eqv.	1,40E-05	2,92E-07	4,70E-07	2,02E-07	5,32E-07	0,00E+00	7,32E-07	7,54E-07	0,00E+00	1,17E-07	1,19E-06	8,52E-09	-5,53E-06	1,28E-05
POCP	Kg Ethene eqv.	2,66E-01	9,92E-04	3,72E-03	6,85E-04	8,54E-03	0,00E+00	6,05E-03	6,23E-03	0,00E+00	3,99E-04	1,41E-03	8,05E-05	-4,58E-02	2,48E-01
AP	Kg SO ₂ eqv.	1,75E+00	7,23E-03	2,58E-02	4,99E-03	5,57E-02	0,00E+00	3,02E-02	3,11E-02	0,00E+00	2,91E-03	1,51E-02	2,29E-04	-1,74E-01	1,75E+00
EP	Kg PO ₄₃₋ eqv.	1,94E-01	1,42E-03	5,92E-03	9,81E-04	6,49E-03	0,00E+00	3,38E-03	3,49E-03	0,00E+00	5,71E-04	2,82E-03	1,08E-04	-1,88E-02	2,01E-01

ADPE=Depletion of abiotic resources-elements | GWP=Global warming | ODP=Ozone layer depletion | POCP=Photochemical oxidants creation | AP=Acidification of soil and water | EP=Eutrophication

National annex NMD

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
ADPF	Kg Sb	2,20E+00	1,21E-02	3,40E-02	8,35E-03	7,01E-02	0,00E+00	1,24E-01	1,28E-01	0,00E+00	4,86E-03	1,67E-02	3,95E-04	-5,01E-01	2,10E+00
HTP	kg 1,4 DB	3,08E+02	6,93E-01	2,73E+00	4,78E-01	9,84E+00	0,00E+00	2,01E+00	2,07E+00	0,00E+00	2,78E-01	5,03E+00	2,83E-02	-2,63E+01	3,05E+02
FAETP	kg 1,4 DB	6,43E+00	2,02E-02	1,72E-01	1,40E-02	2,13E-01	0,00E+00	6,60E-02	6,80E-02	0,00E+00	8,13E-03	2,11E-01	1,90E-02	-4,32E-01	6,79E+00
MAETP	kg 1,4 DB	2,25E+04	7,27E+01	2,28E+02	5,02E+01	7,48E+02	0,00E+00	1,90E+02	1,95E+02	0,00E+00	2,92E+01	6,58E+02	1,93E+01	-1,91E+03	2,28E+04
TETP	kg 1,4 DB	1,76E+00	2,45E-03	7,10E-02	1,69E-03	5,59E-02	0,00E+00	9,90E-03	1,02E-02	0,00E+00	9,84E-04	1,24E-02	6,71E-05	6,63E-01	2,59E+00

ADPF=Depletion of abiotic resources-fossil fuels | HTP=Human toxicity | FAETP=Ecotoxicity. fresh water | MAETP=Ecotoxicity. marine water (MAETP) | TETP=Ecotoxicity. terrestric

Resource use and environmental infomation

Indicators describing resource use and environmental information based on life cycle inventory (LCI)

Parameters describing resource use

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
PERE	MJ	1,79E+02	3,13E-01	7,85E+01	2,16E-01	7,95E+00	0,00E+00	1,23E+01	1,27E+01	0,00E+00	1,26E-01	3,10E+00	1,59E-02	-7,42E+01	2,20E+02
PERM	MJ	7,61E-01	0,00E+00	7,26E+01	0,00E+00	2,20E+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	7,56E+01
PERT	MJ	2,69E+02	3,13E-01	1,52E+02	2,16E-01	1,28E+01	0,00E+00	1,23E+01	1,27E+01	0,00E+00	1,26E-01	3,14E+00	1,61E-02	-7,42E+01	3,88E+02
PENRE	MJ	2,92E+03	2,66E+01	6,85E+01	1,83E+01	9,59E+01	0,00E+00	1,94E+02	2,00E+02	0,00E+00	1,07E+01	3,29E+01	8,56E-01	-9,34E+02	2,63E+03
PENRM	MJ	8,64E+02	0,00E+00	5,74E+00	0,00E+00	2,61E+01	0,00E+00	9,22E+01	9,50E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,00E+01	1,06E+03
PENRT	MJ	4,67E+03	2,66E+01	7,87E+01	1,83E+01	1,49E+02	0,00E+00	2,87E+02	2,95E+02	0,00E+00	1,07E+01	3,33E+01	8,65E-01	-9,53E+02	4,62E+03
SM	Kg	1,16E+01	0,00E+00	5,82E-02	0,00E+00	3,51E-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	1,20E+01
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	M3	3,02E+00	3,05E-03	7,15E-02	2,10E-03	9,64E-02	0,00E+00	1,16E-01	1,19E-01	0,00E+00	1,23E-03	6,01E-02	8,54E-04	-1,78E-01	3,31E+00

PERE=renewable primary energy ex. raw materials | PERM=renewable primary energy used as raw materials | PERT=renewable primary energy total | PENRE=nonrenewable primary energy ex. raw materials | PENRM=non-renewable primary energy used as raw materials | PENRT=non-renewable primary energy total | SM=use of secondary material | RSF=use of renewable secondary fuels | NRSF=use of non-renewable secondary fuels | FW=use of net fresh water

Other environmental information describing waste categories

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
HWD	Kg	2,55E-02	6,34E-05	4,17E-04	4,38E-05	8,99E-04	0,00E+00	1,72E-04	1,77E-04	0,00E+00	2,55E-05	3,68E-03	1,22E-06	-8,59E-04	3,01E-02
NHWD	Kg	3,84E+01	1,59E+00	7,09E-01	1,10E+00	1,52E+00	0,00E+00	9,42E-01	9,70E-01	0,00E+00	6,38E-01	1,06E+00	3,32E+00	-3,88E+00	4,64E+01
RWD	Kg	8,40E-03	1,64E-04	3,06E-04	1,13E-04	2,96E-04	0,00E+00	4,38E-04	4,52E-04	0,00E+00	6,61E-05	1,12E-04	4,86E-06	-4,88E-04	9,86E-03

HWD=hazardous waste disposed | NHWD=non hazardous waste disposed | RWD=radioactive waste disposed

Environmental information

describing output flows

Impact category	Unit	A1	A2	A3	A4	A5	B1	B2	B3	C1	C2	C3	C4	D	Total
CRU	Kg	0,00E+00	0,00E+00	1,36E-02	0,00E+00	8,21E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,72E+00	0,00E+00	0,00E+00	2,82E+00
MFR	Kg	0,00E+00	0,00E+00	1,10E-01	0,00E+00	4,27E+00	0,00E+00	1,41E-01	1,45E-01	0,00E+00	0,00E+00	2,23E+01	0,00E+00	0,00E+00	2,70E+01
MER	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
EE	MJ	0,00E+00	0,00E+00	1,86E+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	4,70E+02	4,72E+02
EET	MJ	0,00E+00	0,00E+00	1,17E+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	2,97E+02	2,99E+02
EEE	MJ	0,00E+00	0,00E+00	6,82E-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	1,73E+02	1,73E+02

CRU=Components for re-use | MFR=Materials for recycling | MER=Materials for energy recovery | EE=Exported energy | EET=Exported Energy Thermic | EEE=Exported Energy Electric

References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A1
EN 15804+A1: 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

NMD-verification protocol
NMD-verification protocol version 1.0, July 2020, foundation NMD

NMD Determination method
NMD Determination method Environmental performance Construction works v1.1 March 2022, foundation NMD

Learn more about Environmental Product Declarations: <https://www.environdec.com/all-about-epds/the-epd>
Discover our worldwide actions to reduce our impact: Zehnder Group Sustainability Report (2022)

