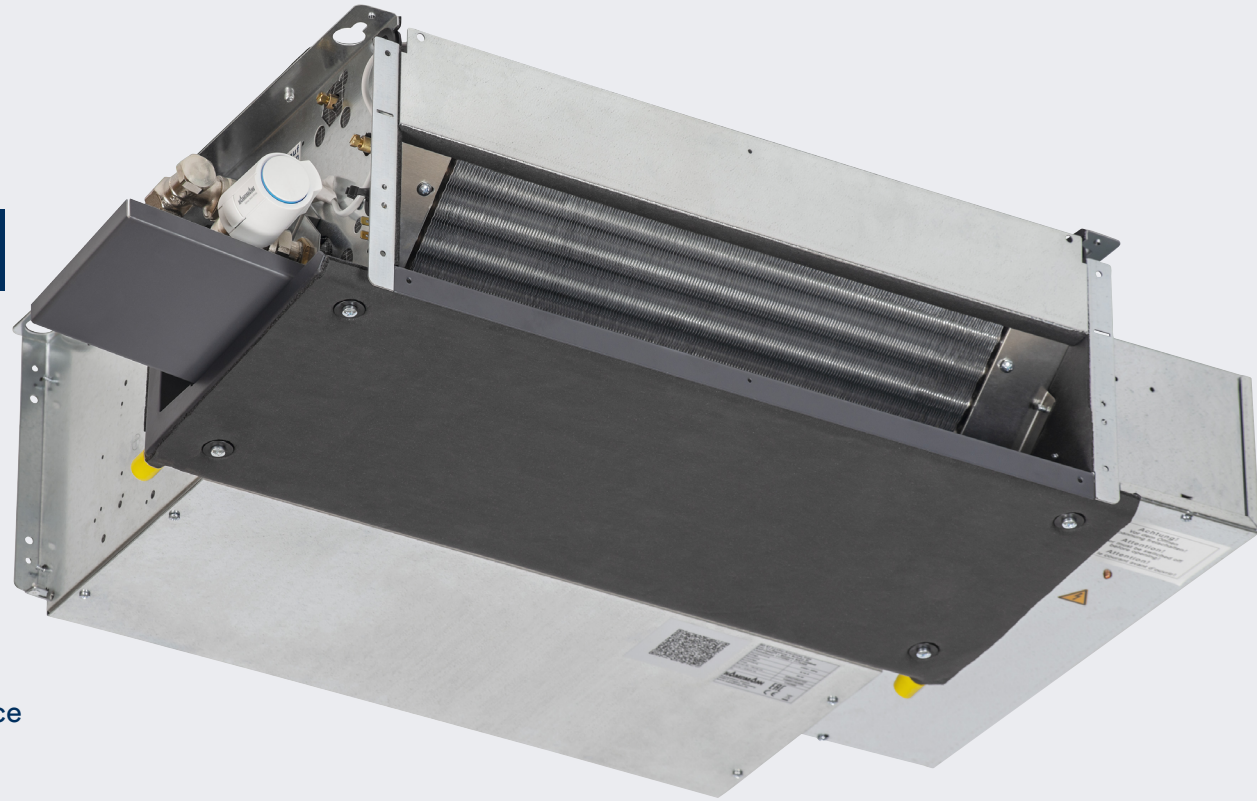


# Environmental Product Declaration

## Venkon - size 66



Manufactured by [Kampmann GmbH & Co. KG](#) in accordance  
with ISO 14025 and EN 15804:2012+A2:2019/AC:2021

Programme:	The International EPD <sup>®</sup> System
Programme Operator:	EPD International AB
S-P Code:	S-P-08927
Publication Date:	2023-06-20
Validity Date:	2028-06-19
Geographical Scope:	Global

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com).

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# EPD Information

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# Programme Information

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):

PCR 2019:14 Construction products, version 1.2.5, Construction EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works

PCR review was conducted by: The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

## Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third party verifier: Prof. Ing. Vladimír Kočí, Ph.D., LCA Studio, Šárecká 5,16000 Prague 6 - Czech Republic

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes  No

**Kampmann GmbH & Co. KG** has the sole ownership, liability, and responsibility for this EPD.

The International EPD® System

EPD International AB  
Box 210 60 SE-100 31  
Stockholm, Sweden  
[www.environdec.com](http://www.environdec.com)

# How to read this EPD?

An Environmental Product Declaration (EPD) is an ISO Type III Environmental Declaration based on ISO 14025 standard. An EPD transparently reports the environmental performance of products or services from a lifecycle perspective. The preparation of an EPD includes different stages, from acquiring raw materials to the end of life of the final product/service. EPDs are based on international standards and consider the entire value chain. Additionally, EPD is a third-party verified document. This EPD includes several sections described below.

## 1. General and Program Information

The first part of an EPD has information about the name of the manufacturer and product/service and other general information such as the validity and expiration dates of the document, the name of the program operator, geographical scope, etc. The second page states the standards followed and gives information about the program operator, third-party verifier, etc. The followed Product Category Rule (PCR) is indicated on the second page.

## 2. Company and Product/Service Information

Information about the company and the investigated product is given in this section. It summarizes the characteristics of the product provided by the manufacturer. It also includes information about the product such as product composition and packaging.

## 3. LCA Information

LCA information is one of the most important parts of the EPD as it describes the functional/declared unit, time representativeness of the study, database(s) and LCA software, along with system boundaries.

The table presented in this part has columns for each stage in the life cycle. The considered stages are marked 'X' whereas the ones that are not considered are labeled as 'NR'. Not all EPDs consider the full life cycle assessment for a product's entire life stages. The 'System Boundary' page is also the place where one can find detailed information about the stages and the assumptions made.

## 4. LCA Results

The results of the Life Cycle Assessment analysis are presented in table format. The first column in each table indicates the name of the impact category and their measurement units are presented in the second column. These tables show an amount at each life cycle stage to see the impact of different indicators on different stages. Each impact can be understood as what is released through the production of the declared unit of the material—in this case, 1 unit of Venkon size 66. The benefits of reuse/recycling of the declared product is reflected in this section.

The first impact in the table is global warming potential (GWP), which shows how much CO<sub>2</sub> is released at each stage. Other impacts include eutrophication potential, acidification potential, ozone layer depletion, land use related impacts, etc. The second table provides results for resource use and the third table is about the waste produced during the production. The fourth and final table shows the results for the GWP-GHG indicator, which is almost equivalent to the GWP-Total indicator mentioned previously. The only difference is that this indicator excludes the biogenic carbon content by following a certain methodology.

# About

About the Kampmann Group  
About Venkon

International sites



Headquarters

Kampmann GmbH & Co. KG  
Lingen (Ems)  
Germany



> Canada/USA  
> France

> Italy  
> Netherlands

> Austria  
> Poland

> Switzerland  
> Great Britain

## About the Kampmann Group

**The whole is more than  
the sum of its parts.  
The Kampmann Group  
shows why.**

Kampmann GmbH & Co. KG develops, produces and sells high-quality, customised systems for heating, cooling and ventilating buildings. Kampmann has set itself the goal of creating a feel-good climate in cooperation with its customers and partners. For this reason, the company's employees work for a good climate, for innovations, for sustainability and for cooperation with customers and partners in a spirit of partnership. In terms of sustainability, the goal for our products is to operate as efficient as possible, have a long service life, be versatile and be made of recyclable materials. The company is certified according to DIN EN 9001 and DIN EN ISO 50001.

The company's main site is located in Lingen (DE). In addition, the company has a production site in Łęczycza (PL). The product groups include trench units, fan coils, unit heaters, door air curtains, decentralised ventilation units and air diffusers. The areas of application are, for example, office buildings, commercial and industrial buildings, hotels, retail chains, sales buildings and multi functional halls.



# About Venkon

Fan coils, recirculating air. Heating, cooling and filtering for maximum comfort.

Fan coils are used in comfort buildings of all types with high heating and cooling requirements as well as exacting user requirements. The fan coil Venkon is available in four sizes and can be versatilely combined with casings as a basic unit. The unit can be installed standing or hanging on the wall or ceiling. In addition, the unit can be mounted in shallow ceilings or wall-voids.

The Venkon has a convector through which hot water flows for heating and cold water flows for cooling. The convector consists of round copper pipes with aluminium fins and is available as a 2- and 4-pipe system. The fan is controlled by a stepless speed control via an external 0-10 V signal. In order to safely discharge the condensate produced, the units are equipped with a condensate tray and, if necessary, a condensate pump.

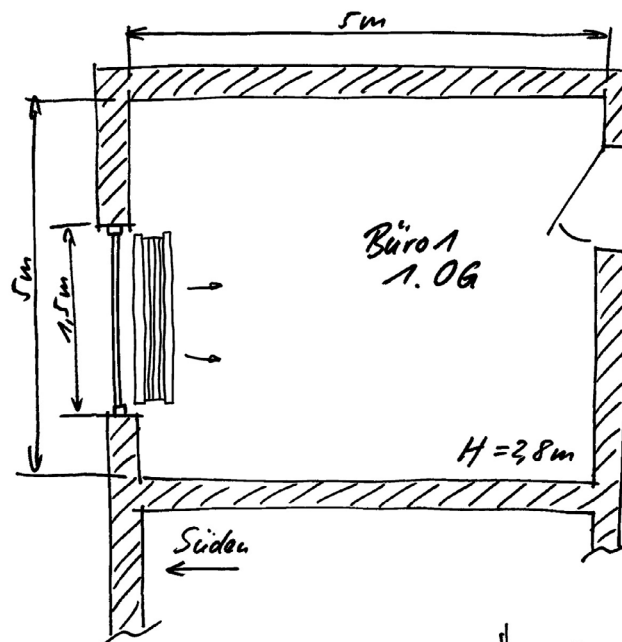
The units are also equipped with an electrotechnical control system in order to be able to regulate the units according to the customer's requirements.

The Venkon is used for buildings of all kinds, which require whisper-quiet cooling and/or heating from a visually discreet design.



# Venkon

size 66



The cooling and heat outputs have been calculated in line with DIN EN 1397 "Water-air fan convectors, test methods for establishing the performance". The specific requirements for cooling and heating mode are taken into account in DIN EN 1397.

Fan coils are very often used in acoustically sensitive areas. The units have therefore been optimised in terms of sound emissions.

The acoustic data were recorded in accordance with the provisions of DIN EN 16583 by DIN EN ISO 3744 and DIN EN ISO 3741 in the Kampmann GmbH & Co. KG laboratories.

Kühlleistungsberechnung (VDI 2078):

Transmission: 550 W

Strahlung: 950 W

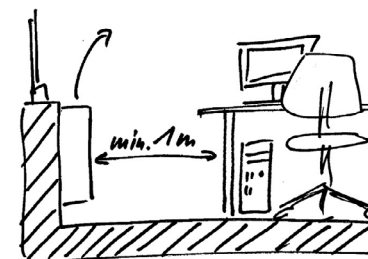
Personen: 1 x 150 W

intern (PC/Drucker): 300 W

$$\underline{\underline{1.950 \text{ W} \approx 78 \text{ W/m}^2}}$$

Systemtemperatur 7/12 27°C/50%

max. Schalldruckpegel: 25 dB(A)



Venkon EC Baugröße 63, Stufe 4 V

Kühlleistung = 1.957 Watt ✓

Schalldruckpegel = 24 dB(A) ✓



Kampmann GmbH & Co. KG produces the fan coil Venkon in four different sizes. This EPD is specific for Venkon - size 66\*. The product can be configured based on customer demand with two different pipe systems (2-pipe and 4-pipe) and can operate in different voltages. The environmental performance of different configurations were investigated and the results of this study are provided for the 4-pipe system at maximum fan speed (10 V). By disclosing the environmental performance of this reference product, the other product configurations are covered. Heat and cooling outputs for different systems are shown in the table below.

Venkon size 66	2-pipe system	4-pipe system
Heat output [W]	20520	12565
Cooling output [W]	8692	7257

### Product Composition

Required materials for the product and its packaging are shown in the table below with the weight percentages.

Material	Weight percentage (%)
Steel	59.3
Aluminium	20.7
Polypropylene (PP)	8.9
Copper	6.9
Printed circuit board (PCB)	1.3
Armaflex	0.9
Powder	0.6
Polyvinyl chloride (PVC)	0.4
Polyamide (PA)	0.3
Rubber	0.3
Polyolefin (PO)	0.1
Others (brass, plastics, tin, phosphor bronze etc.)	<0.3
<b>Packaging Material</b>	
Sawnwood	76.1
Paperboard	23.1
Packing Tape	0.8

\*EPDs for the other sizes are available separately.



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# System Boundary

# System Boundary



## A1 - Raw Material

This stage includes raw materials extraction and pre-treatment processes before production. Main materials used in the product are steel, wood, aluminium, copper, tin and various types of plastics. Environmental impacts of these materials are considered in this stage.

## A2 - Raw Material Transport

This stage is relevant for the delivery of raw materials to the production plant and within the plant. Highway transport is the dominant mean of transport at this stage. Transport routes and distances are supplier-specific and provided by the manufacturer.

## A3 - Manufacturing

The following production steps are included: production of the required sheet metal parts in the sheet metal prefabrication, final assembly of the sheet metal parts and the other components of the product, testing of products according to the quality management system DIN EN ISO 9001 and packing of the products for the final shipment.

## A4 - Transport to Site

This stage is relevant for the delivery of final product to the intended markets and customers. Highway, seaway and airway transportation are involved in this stage. The transport routes and distances are supplier-specific and provided by the manufacturer.

## A5 - Installation

This module considers the environmental impacts during the installation of the product within the building. In the general case, four steel screws and four plastic dowels are used during the installation. Their impacts are calculated and represented in this stage.

# System Boundary



## B2 - Maintenance

Maintenance of the product is necessary during the service life of the product. The recommended maintenance cycle for the product is cleaning it two times per year. During the cleaning, the ISO Coarse filter is vacuum cleaned. In addition, a common cleaning agent (around 10 ml per year) is also used. Thus, the impact of vacuuming and using a cleaning agent are considered and their impacts are represented by the functional unit.

## B4 - Replacement of Parts

According to the manufacturer, the fan and valves have to be replaced every 10 years and the PCB every 15 years. In addition, ISO coarse filter is replaced every 5 years. Thus, these impacts based on the material level are analysed and represented by the functional unit.

## B6 - Energy Use

Considering the optimum working conditions of the product both for heating and cooling demands and product's service life (20 years), product's energy use is determined. German electricity grid mix is considered. Thus, energy use-related impacts are represented by the functional unit.

## C1 - De-construction

This stage includes the impacts during the dismantling of Venkon from the building. It is assumed that no energy and additional material are needed for the dismantling of the product.

## C2 - Waste Transport

This stage includes the transportation of discarded products to the waste processing/disposal area. 50 km distance by trucks is assumed.

## C3 - Waste Processing

The product mainly consists of two parts: plastics and metals. Plastics are assumed to be 100% incinerated with heat recovery and metal parts such as steel, aluminium, copper and brass are assumed to be recycled with 76%.

## C4 - Disposal

The remaining metal parts (24% of the metals) are landfilled. Its impacts are included in this stage.

## D - Future reuse, recycling and energy recovery potentials

Metals that are recycled are assumed to substitute the use of virgin metals. In addition, the benefits of heat recovery from the incineration of plastics are included.

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# LCA Information

# LCA Information

## Functional Unit

1 unit of Venkon size 66 at 75 °C water inlet, 65 °C water outlet and 20 °C inlet air temperature for heating and 7 °C water inlet, 12 °C water outlet and 27 °C inlet air temperature for cooling at maximum fan speed (10 V).

## System Boundary

Cradle to grave and module D (A + B + C + D)

## Cut-Off Rules

1% cut-off is applied. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

## REACH Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

## Background Data

For all LCA modelling and calculation, Ecoinvent database (v3.9.1) and SimaPro (v9.5) LCA software were used.

## LCA Modelling, Calculation and Data Quality

The results of the LCA with the indicators as per EPD requirements are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while freshwater use is calculated with selected inventory flows in SimaPro according to the PCR. There are no co-product allocations within the LCA study underlying this EPD. The regional energy datasets were used for all energy calculations. For use phase energy calculations, environmental impacts are calculated for one year of operation and German electricity grid mix is used.

## Period Under Review

The data used for LCA study concerns the year 2022.

## Allocations

Energy consumption and raw material transportation were weighted according to 2022 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the total waste generation in 2022.

# LCA Information

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads	
	Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / Demolition	Transport	Waste Processing	Disposal	Future reuse, recycling or energy recovery potentials	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules Declared	X	X	X	X	X	NR	X	NR	X	NR	X	NR	X	X	X	X	X	
Geography	GLO	GLO	DE	GLO	GLO	-	GLO	-	GLO	-	DE	-	GLO	GLO	GLO	GLO	GLO	
Specific Data Used	>90%					-	-	-	-	-	-	-	-	-	-	-	-	
Variation - Products	0%					-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	0%					-	-	-	-	-	-	-	-	-	-	-	-	-

(X = Module included, NR = Not relevant)

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# LCA Results



# LCA Results

Impact Category	Unit	A1-A3	A4	A5	B2	B4	B6	C1	C2	C3	C4	D
GWP - Fossil	kg CO <sub>2</sub> eq	2.37E+02	5.37E+00	5.70E-01	5.90E-02	3.64E+00	7.07E+01	0.00E+00	1.91E-01	9.60E+00	6.76E-02	-9.19E+01
GWP - Biogenic	kg CO <sub>2</sub> eq	-1.33E+00	2.07E-03	2.91E-03	-5.07E-03	1.32E-02	7.31E+00	0.00E+00	1.52E-04	1.14E-01	4.57E-03	-1.73E-01
GWP - Luluc	kg CO <sub>2</sub> eq	1.62E+00	1.16E-03	3.92E-04	2.40E-03	9.97E-03	1.17E-01	0.00E+00	9.30E-05	3.02E-05	3.25E-05	-1.03E+00
GWP - Total	kg CO <sub>2</sub> eq	2.37E+02	5.37E+00	5.73E-01	5.63E-02	3.66E+00	7.81E+01	0.00E+00	1.91E-01	9.71E+00	7.22E-02	-9.31E+01
ODP	kg CFC-11 eq	4.72E-06	9.61E-08	5.71E-09	2.95E-09	5.79E-08	6.50E-07	0.00E+00	4.33E-09	6.39E-09	1.90E-09	-2.47E-06
AP	mol H+ eq	2.67E+00	2.22E-02	2.39E-03	2.87E-04	7.92E-02	1.55E-01	0.00E+00	4.72E-04	1.30E-03	4.76E-04	-1.50E+00
EP - Freshwater	kg P eq	2.19E-01	1.83E-04	1.79E-04	5.19E-05	6.19E-03	1.03E-01	0.00E+00	1.41E-05	1.78E-05	6.91E-06	-1.24E-01
EP - Marine	kg N eq	2.86E-01	8.46E-03	5.43E-04	8.65E-05	6.16E-03	5.05E-02	0.00E+00	1.29E-04	6.40E-04	1.86E-04	-1.20E-01
EP - Terrestrial	mol N eq	3.09E+00	9.04E-02	4.99E-03	6.22E-04	7.28E-02	3.66E-01	0.00E+00	1.32E-03	6.74E-03	2.01E-03	-1.40E+00
POCP	kg NMVOC	1.12E+00	3.11E-02	2.11E-03	1.75E-04	2.29E-02	1.02E-01	0.00E+00	7.70E-04	1.82E-03	7.09E-04	-5.30E-01
**ADPE	kg Sb eq	2.75E+01	5.58E-06	2.24E-06	4.01E-07	9.44E-04	1.19E-04	0.00E+00	5.33E-07	1.82E-07	1.82E-07	-1.45E-02
**ADPF	MJ	3.16E+03	7.44E+01	1.20E+01	9.38E-01	6.21E+01	1.07E+03	0.00E+00	2.89E+00	5.82E-01	1.59E+00	-1.22E+03
**WDP	m <sup>3</sup> depriv.	4.77E+01	2.05E-01	2.87E-01	3.53E-02	1.75E+00	2.61E+00	0.00E+00	1.38E-02	3.40E-02	4.72E-02	-2.08E+01
PM	disease inc.	1.93E-05	2.02E-07	4.37E-08	2.69E-09	3.00E-07	6.86E-07	0.00E+00	1.89E-08	1.04E-08	1.04E-08	-7.71E-06
*IR	kBq U-235 eq	2.80E+01	4.99E-02	2.82E-02	8.88E-03	3.35E-01	1.70E+01	0.00E+00	3.65E-03	2.33E-03	5.81E-03	-1.32E+01
**HTP - C	CTUh	8.76E-07	1.15E-09	5.51E-09	3.27E-11	1.81E-08	1.53E-08	0.00E+00	8.48E-11	1.29E-09	1.47E-08	-4.60E-07
**HTP - NC	CTUh	2.45E-05	5.75E-08	2.58E-08	7.49E-10	9.45E-07	4.72E-07	0.00E+00	2.07E-09	8.48E-09	1.01E-06	-1.62E-05
**SQP	Pt	1.94E+03	2.91E+01	1.24E+00	4.95E-01	2.90E+01	1.52E+02	0.00E+00	2.94E+00	2.11E-01	3.42E+00	-4.57E+02
<b>Acronyms</b>	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.											
<b>Legend</b>	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, A5: Installation, B2: Maintenance, B4: Replacement, B6: Operational Energy Use, C1: Deconstruction / Demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.											
<b>*Disclaimer 1</b>	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.											
<b>**Disclaimer 2</b>	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.											

Resource use												
Impact Category	Unit	A1-A3	A4	A5	B2	B4	B6	C1	C2	C3	C4	D
PERE	MJ	7.34E+02	5.60E-01	3.94E-01	2.73E-01	5.90E+00	2.15E+02	0.00E+00	4.23E-02	3.41E-02	1.18E-01	-3.15E+02
PERM	MJ	6.48E-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
PERT	MJ	7.34E+02	5.60E-01	3.94E-01	2.73E-01	5.90E+00	2.15E+02	0.00E+00	4.23E-02	3.41E-02	1.18E-01	-3.15E+02
PENRE	MJ	3.18E+03	7.44E+01	1.20E+01	9.43E-01	6.21E+01	1.07E+03	0.00E+00	2.89E+00	5.82E-01	1.59E+00	-1.22E+03
PENRM	MJ	5.64E+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
PENRT	MJ	3.19E+03	7.44E+01	1.20E+01	9.43E-01	6.21E+01	1.07E+03	0.00E+00	2.89E+00	5.82E-01	1.59E+00	-1.22E+03
SM	kg	2.94E-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
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
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
FW	m <sup>3</sup>	2.41E+00	8.85E-03	1.14E-02	1.78E-03	6.89E-02	4.08E-01	0.00E+00	5.75E-04	4.76E-03	1.75E-03	-7.05E-01

**Acronyms** PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy resources used as raw materials, PENRT: Total use of non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water.

### Waste & Output Flows

Impact Category	Unit	A1-A3	A4	A5	B2	B4	B6	C1	C2	C3	C4	D
HWD	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
NHWD	kg	8.10E+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
RWD	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
CRU	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
MFR	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	2.52E+01	0.00E+00	0.00E+00
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	3.88E+00	0.00E+00	0.00E+00
EE (Electrical)	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
EE (Thermal)	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

**Acronyms** HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy thermal.

### Climate impact

Indicator	Unit	A1-A3	A4	A5	B2	B4	B6	C1	C2	C3	C4	D
*GWP-GHG	kg CO <sub>2</sub> eq	2.42E+02	5.38E+00	5.73E-01	6.19E-02	3.67E+00	7.18E+01	0.00E+00	1.91E-01	9.60E+00	6.79E-02	-9.31E+01

GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology  
 \* The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013

**Legend** A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, A5: Installation, B2: Maintenance, B4: Replacement, B6: Operational Energy Use, C1: Deconstruction / Demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary.

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# Glossary of Terms, References & Contact

# Glossary of Terms

Global Warming Potential, GWP	Global warming is a concept expressing warming of the atmosphere leading to climate change. One of the human activities which has the greatest effect on global warming is the burning of fossil fuels such as petroleum, coal and natural gas. In LCA, global warming is expressed in terms of the equivalent weight of carbon dioxide (CO <sub>2</sub> ) emitted.
Ozone Depletion Potential, ODP	Ozone layer depletion is a concept expressing the reduction of ozone in the stratosphere and depletion of the ozone layer (the 'ozone hole') as a consequence of emissions of man-made resources such as CFCs, HCFCs, chlorine, bromine, etc. Damage to the ozone layer reduces its ability to prevent UV light entering the earth's atmosphere, increasing the amount of carcinogenic UVB light hitting the earth's surface. In LCA, ozone layer depletion is expressed in terms of the equivalent weight of CFC-11 emitted.
Acidification Potential, AP	Acidification is an impact category expressing the toxic impact that acidifying substances have on soil, underground water-courses, ground water, organisms, ecosystems and materials. Reaction of acidic gases with water in the atmosphere creates 'acid rain'. The formation of acid rains causes a reduction in biodiversity. In LCA, acidification is expressed in terms of the equivalent weight of sulphur dioxide (SO <sub>2</sub> ) emitted.
Eutrophication Potential, EP	It is an abnormal proliferation of vegetation in the aquatic ecosystems caused by the addition of nutrients into rivers, lakes or ocean which determinates a lack of oxygen. The eutrophication potential is mainly influenced by emission into water of phosphates and nitrates. Its occurrence can lead to damage to ecosystems, increasing mortality of aquatic fauna and flora and to loss of species that are dependent on low-nutrient environments. In LCA, EP is expressed in mass of P eq.
Formation potential of tropospheric ozone photochemical oxidants, POCP	POCP is the formation of reactive substances (mainly ozone) which are injurious to human health and ecosystems and which also may damage crops. This problem is also indicated with "summer smog". In LCA, POCP is expressed in kg C <sub>2</sub> H <sub>4</sub> eq.
Abiotic Depletion Potential, ADP	In LCA, resource depletion is one of the impact categories expressing how much of the world's natural resources (petroleum, iron ore, etc.) are used up. It has global, regional and local aspects of impact and expresses the amount of mineral/ fossil fuel used. In LCA, fossil and non-fossil resource depletion are expressed in terms of the MJ and Sb eq. respectively.

# References

ISO 9001:2015/ Quality Management Systems

ISO 50001:2018/ Energy Management Systems

GPI/ General Programme Instructions of the International EPD® System. Version 4.0.

ISO 14020:2000/ Environmental Labels and Declarations — General principles

EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006)

PCR for Construction Products and Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 1.2.5 DATE 2022-11-01

The International EPD® System/ The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. [www.environdec.com](http://www.environdec.com)

Ecoinvent / Ecoinvent Centre, [www.ecoinvent.org](http://www.ecoinvent.org)

SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, [www.pre-sustainability.com](http://www.pre-sustainability.com)

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