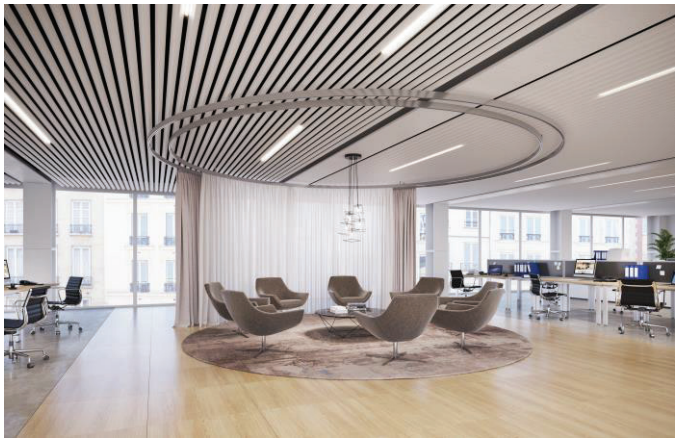
Environmental Product Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:
Interalu WEC® Ceiling

Provided by:
Interalu NV



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COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00512.2024

DATE OF ISSUE

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EXPIRY DATE

22-03-2029

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Ulbert Hofstra, SGS Intron. De LCA study has been done by An Janssen, Enperas NV. The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPD's of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate list of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
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Amsterdam

Ing. L. L. Oosterveen MSc. MBA
Managing Director MRPI

PRODUCT

Interalu WEC® Ceiling

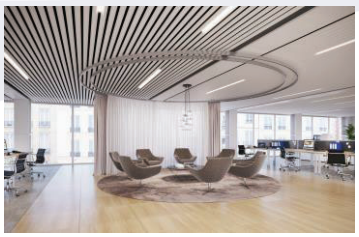
DECLARED UNIT/FUNCTIONAL UNIT

1m² of wave energetic ceiling (WEC® Ceiling) with a total thickness of 137 mm, an acoustic absorption between 0,50 and 0,85 and a reference service life of 50 years

DESCRIPTION OF PRODUCT

Climate control (suspended) ceiling for interior covering, consisting of steel parts, plastic tubes and ancillary materials. An acoustic insulation material can be added.

VISUAL PRODUCT



MORE INFORMATION

https://interalu.eu/be-nl/kennis/ontdek-wec

DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR(a)
Independent verification of the declaration an data according to EN15804+A2 (+indicators A1) internal: external: x
Third party verifier: Ulbert Hofstra, SGS Intron
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

The WEC® Ceiling is used as climate control (suspended) ceiling for interior covering.

WEC stands for Wave Energetic Ceiling. Its special design makes it possible to integrate the entire building in the energy plan through its use of night-time cooling. The cooling works with 65-70% radiation and 35-30% convection, 96 W/m² at Δt 10K. The heating works with 100% radiation, 77 W/m² at Δt 15K. The open structure of the WEC® ceiling offers several different possibilities for optimising acoustics. WEC® ceiling has an acoustic absorbance between 0,5 and 0,85, depending on the perforation of the panels and type of insulation.

The product consists of ceiling panels, supporting profiles, edge finishing and ancillary materials for installation of the product, such as ceiling anchors. The ancillary materials and energy use necessary for installing the climate ceiling are included in this EPD.

Furthermore, an acoustic insulation material can be added to the ceiling for acoustical reasons. Different types and dimensions of insulation material are possible, determining the specific characteristics of the WEC® Ceiling. In this EPD, the most currently used insulation scenario for the WEC® ceiling is considered: horizontal insulation with stone wool sealed with PE foil with a density of 100 kg/m³ and a thickness of 20 mm (i.e. 2 kg insulation per m²). This scenario has an acoustic absorbance of 0,50. In the results section of this EPD, distiction is made between the WEC® Ceiling parts and the acoustic stone wool insulation.

The nett weight per reference flow is 8,213 kg for the WEC® Ceiling and the acoustic insulation together. The nett weight per reference flow for the WEC® Ceiling is 6,185 kg/m², the nett weight per reference flow for the acoustic insulation is 2,028 kg/m² (i.e. 2,000 kg/m² stone wool and 0,028 kg/m² PE foil).

Production process:
For production of the WEC® Ceiling, the prefinished continuous hot dip galvanised steel strips for the panels are, if needed, perforated and then roll-formed to the correct sizes and wrapped. The prefinished continuous hot dip galvanised steel strips for the support profiles are punched to the correct module size, roll-formed and cut to a fixed length. They are packed in cardboard boxes. The prefinished continuous hot dip galvanised steel strips for the edge finishing profiles are rolled and cut to a fixed length. They are packed in metal transport containers together with the panels and support profiles and transported to the site for installation. Clips, ceiling anchors, fasteners and quick hangers are produced and packaged by third parties and delivered at the manufacturing site in Wilrijk. The PE-RT pipes and the acoustic insulation material are also produced and packaged by a third party, but directly transported to the installation site in case of larger quantities. They are also transported to the Interalu NV factory at Wilrijk in smaller quantities, so that Interalu always as a stock.

Reference service life:
The reference service life is estimated at 50 years.
The RSL is based on the Interalu product use recommendations ATG 3112 Thermoduct PE-RT and is valid under normal conditions.
The WEC® Ceiling does not require specific maintenance. No replacements are necessary over the lifetime of a building.

Installation:
Materials for fixation and energy use necessary for installation are included. First, holes are drilled into the concrete structure and ceiling anchors are installed. The upper part of a quick-release hanger is hooked into the ceiling anchor with a spring. The support profiles are suspended by inserting the support profile and sliding the quick release hanger on the spring. The edge trim is placed against the wall. The clips are clicked into the support profiles. The pipes are braided in the form of loops and the PE-RT pipe is clicked into the clips. The ceiling panels are clicked into the support profiles. The insulation is most often placed on top of the metal panels without fixation.

Various loose parts are delivered per truck and are assembled on-site by means of clamping and suspension.

The ancillary materials needed during installation of the products on site are a rotary hammer, a plate shear, small tools, Stanley knives, a saw machine and a drill bit. The impact of the production of these tools is, however, considered to be below cut-off.

Technical data/Physical characteristics
The technical characteristics of the WEC® ceiling are given in the table below. All values are fixed, except for the acoustic absorption a_w, which varies depending on the perforation of the ceiling panels and the type of acoustic insulation added. The acoustic absorption for the WEC® Ceiling with the reference stone wool insulation with PE foil is 0,50.

Technical property	Standard	Value	Unit	Comment
Modulation	EN 13964	100	mm	
Width	EN 13964	80	mm	
Height	EN 13964	40	mm	
Joint	EN 13964	20	mm	
Cooling	EN 14240	103	W/m²	at Δt = 10K, 65-70% radiation, 35-30% convection
Heating	EN 14037	83	W/m²	at Δt = 15K, 100% radiation
Acoustic absorption α_w	EN 11654	0,5	Hz	Depends on the perforation and type of insulation. Can vary between 0,5 and 0,85.
Reaction to fire	EN 13501-1	C-s2, d0	/	

Component > 1% of total mass	(%)
Pre-finished continuous hot dip galvanised steel	62%
PE-RT (temperature resistant polyethylene)	11%
HDPE (High Density Polyethylene Resin)	2%
Suspension/anchors (galvanised steel)	<1%
Stone wool insulation with PE foil	25%

SCOPE AND TYPE

This is a specific EPD for WEC® Ceiling produced by Interalu NV in Wilrijk, Belgium. The WEC® Ceiling is installed in The Netherlands and at its end-of-life waste is treated according to the Dutch end-of-life scenarios. As a result, the EPD is representative for the Dutch market.

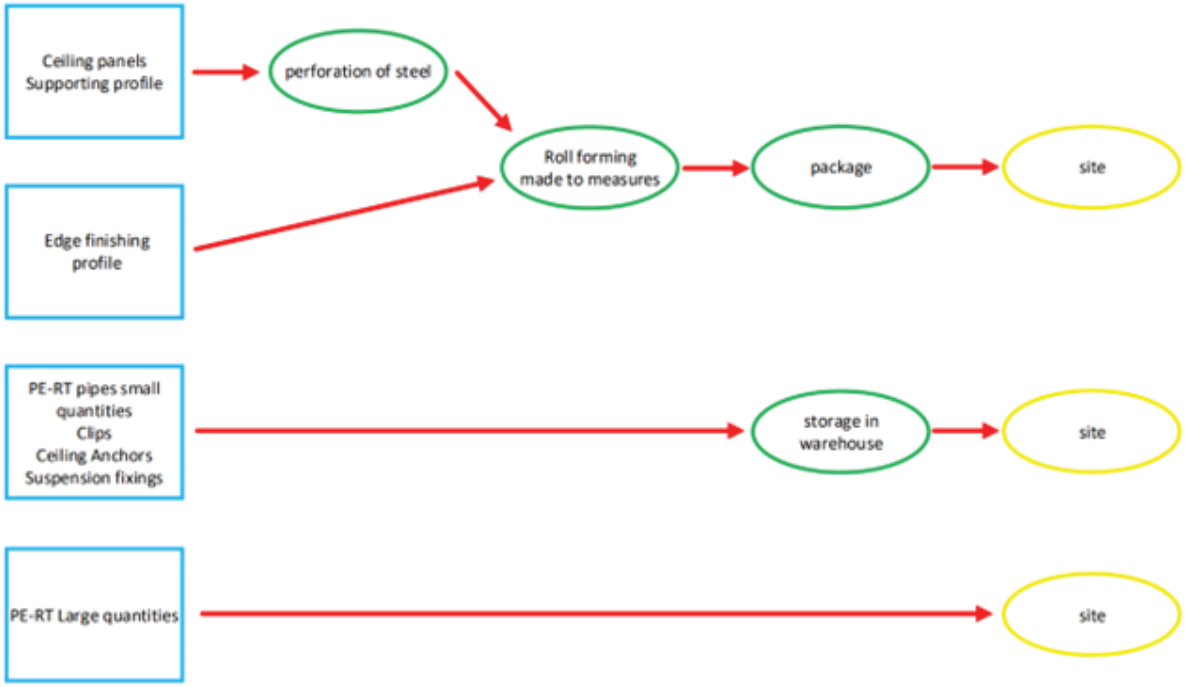
Company-specific data for the product stage have been collected by Interalu NV and were provided to Enperas NV through a data collection questionnaire. The LCI data has been checked by the EPD verifier (SGS Intron). Enperas NV uses publicly available generic data for all background processes, such as the production of electricity, transportation by means of a specific truck, etc. Primary data is used for modules A1, A2, A3 and A5. The rest of the study is based on scenarios (module A4, modules B1-B7, modules C1-C4 and module D).

The main LCI source used in this EPD is the Ecoinvent v3.6 Cut-off database.

For the calculation of the LCA results, the software program SimaPro 9.5.0.1 (PRé Consultants, 2023) has been used, as well as the Enperas Quadrant LCA tool for Interalu ceilings (Enperas, 2023). The EF3.0 characterisation factors from EC-JRC were applied where relevant.

PRODUCT STAGE		CONSTRUCTION PROCESS STAGE			USER STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Ramaterial supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery – Recycling-potential
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
X= Modules Assessed ND= Not Declared																

PROCESS FLOW - climat ceilings



REPRESENTATIVENESS

The data used for the LCA are representative for the production of the WEC® Ceiling, manufactured by Interalu NV in Wilrijk, Belgium.

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	4,15 E-04	7,93 E-07	4,97 E-06	4,21 E-04	2,79 E-07	1,26 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,49 E-07	1,17 E-08	4,20 E-08	-2,87 E-06
ADPF	MJ	2,94 E+02	4,34 E+00	1,91 E+01	3,17 E+02	2,28 E+00	9,90 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,21 E+00	2,30 E-01	8,28 E-01	-1,18 E+02
GWP	kg CO2 eq.	1,71 E+01	2,91 E-01	1,00 E+00	1,83 E+01	1,49 E-01	9,72 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,95 E-02	1,50 E-02	2,90 E+00	-7,79 E+00
ODP	Kg CFC11 eq.	1,05 E-06	5,18 E-08	1,26 E-07	1,23 E-06	2,76 E-08	4,00 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,47 E-08	1,05 E-09	9,66 E-09	-4,79 E-07
POCP	Kg ethene eq.	2,13 E-02	1,55 E-04	6,99 E-04	2,22 E-02	8,95 E-05	6,84 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,77 E-05	4,60 E-06	8,06 E-05	-1,12 E-02
AP	kg SO2 eq.	8,12 E-02	7,54 E-04	4,16 E-03	8,61 E-02	6,42 E-04	2,70 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,42 E-04	4,26 E-05	4,91 E-04	-2,33 E-02
EP	kg (PO4) 3- eq.	1,00 E-02	1,16 E-04	6,83 E-04	1,08 E-02	1,28 E-04	3,52 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,83 E-05	9,09 E-06	1,18 E-04	-3,20 E-03

Toxicy indicators for Dutch market

HTP	kg DCB-Eq	4,78 E+01	1,10 E-01	3,47 E-01	4,83 E+01	6,38 E-02	1,47 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,40 E-02	2,41 E-03	9,89 E-02	-3,70 E+00
FAETP	kg DCB-Eq	2,05 E-01	2,97 E-03	2,12 E-02	2,29 E-01	1,87 E-03	9,27 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,96 E-04	5,31 E-05	1,64 E-02	1,53 E-02
MAETP	kg DCB-Eq	5,10 E+02	1,11 E+01	2,12 E+01	5,43 E+02	6,67 E+00	2,11 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,56 E+00	2,12 E-01	3,11 E+01	-4,00 E+01
TETP	kg DCB-Eq	1,19 E-01	4,42 E-04	7,41 E-03	1,27 E-01	2,26 E-04	3,88 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,21 E-04	6,50 E-05	8,46 E-05	2,38 E-01
ECI	euro	5,70 E+00	3,04 E-02	1,10 E-01	5,84 E+00	1,80 E-02	1,85 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,60 E-03	1,27 E-03	1,61 E-01	-8,65 E-01
ADPF	kg Sb eq.	1,41 E-01	2,09 E-03	9,20 E-03	1,53 E-01	1,09 E-03	4,76 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,84 E-04	1,10 E-04	3,98 E-04	-5,69 E-02

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1,80 E+01	2,94 E-01	1,15 E+00	1,94 E+01	1,50 E-01	1,12 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,02 E-02	1,52 E-02	2,90 E+00	-8,30 E+00
GWP-fossil	kg CO2 eq.	1,81 E+01	2,94 E-01	1,01 E+00	1,94 E+01	1,50 E-01	1,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,02 E-02	1,52 E-02	2,90 E+00	-8,16 E+00
GWP-biogenic	kg CO2 eq.	-8,92 E-02	1,55 E-04	1,35 E-01	4,59 E-02	6,45 E-05	1,15 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,44 E-05	3,78 E-05	7,64 E-05	-1,42 E-01
GWP-luluc)	kg CO2 eq.	1,03 E-02	1,37 E-04	2,65 E-03	1,31 E-02	5,32 E-05	4,01 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,84 E-05	3,95 E-06	1,14 E-05	-5,43 E-04
ODP	kg CFC11 eq.	1,00 E-06	6,47 E-08	9,97 E-08	1,17 E-06	3,46 E-08	3,89 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,85 E-08	1,16 E-09	1,17 E-08	-4,83 E-07
AP	mol H+ eq.	1,00 E-01	9,24 E-04	5,28 E-03	1,06 E-01	8,56 E-04	3,36 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,57 E-04	5,63 E-05	6,96 E-04	-2,90 E-02
EP-freshwater	kg PO4 eq.	9,93 E-04	2,99 E-06	4,11 E-05	1,04 E-03	1,24 E-06	3,19 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,60 E-07	7,32 E-07	8,01 E-07	-2,49 E-04
EP-marine	kg N eq.	1,68 E-02	1,90 E-04	1,15 E-03	1,81 E-02	3,06 E-04	6,05 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,63 E-04	1,80 E-05	3,02 E-04	-6,01 E-03
EP-terrestrial	mol N eq.	2,08 E-01	2,13 E-03	1,21 E-02	2,22 E-01	3,37 E-03	7,36 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,80 E-03	2,05 E-04	3,37 E-03	-6,91 E-02
POCP	kg NMVOC eq.	8,13 E-02	7,89 E-04	3,25 E-03	8,53 E-02	9,65 E-04	2,75 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,15 E-04	5,47 E-05	9,19 E-04	-3,54 E-02
ADP-minerals & metals	kg Sb eq.	4,15 E-04	7,93 E-07	4,95 E-06	4,21 E-04	2,79 E-07	1,27 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,49 E-07	1,17 E-08	4,20 E-08	-2,86 E-06
ADP-fossil	MJ, net calorific value	2,65 E+02	4,40 E+00	2,65 E+01	2,96 E+02	2,31 E+00	9,23 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,23 E+00	2,00 E-01	8,09 E-01	-8,74 E+01
WDP	m3 world eq. Deprived	6,94 E+00	1,44 E-02	9,40 E-01	7,89 E+00	7,08 E-03	2,40 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,78 E-03	1,34 E-03	1,79 E-02	-8,46 E-01

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of the stratospheric ozone layer
AP = Acidification Potential, Accumulated Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclamer [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

ENVIRONMENT IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1,25 E-06	1,75 E-08	4,58 E-08	1,31 E-06	1,36 E-08	4,13 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,24 E-09	8,00 E-10	1,10 E-08	-4,60 E-07
IRP	kBq U235 eq.	5,58 E-01	1,93 E-02	1,58 E-01	7,36 E-01	1,01 E-02	2,33 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,38 E-03	4,90 E-04	3,08 E-03	-9,89 E-03
ETP-fw	CTUe	7,60 E+02	3,86 E+00	1,85 E+01	7,83 E+02	1,87 E+00	2,39 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,99 E-01	1,94 E-01	1,17 E+00	-2,08 E+02
HTP-c	CTUh	1,12 E-07	1,4 9E-10	5,67 E-10	1,13 E-07	6,67 E-11	3,45 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,56 E-11	4,83 E-12	3,86 E-10	-3,22 E-09
HTP-nc	CTUh	8,44 E-07	4,05 E-09	1,17 E-08	8,59 E-07	2,23 E-09	2,65 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,19 E-09	1,19 E-10	3,06 E-09	9,37 E-07
SQP	----	8,48 E+01	2,60 E+00	1,94 E+01	1,07 E+02	1,97 E+00	3,42 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,05 E+00	1,18 E-01	7,88 E-01	-2,94 E+01

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclamer [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 possible nuclear accidents, occupational exposure nor due to radioactive waste.

Disclamer [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.

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	2,49 E-03	3,55 E-05	6,81 E-05	2,60 E-03	1,54 E-05	7,98 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,23 E-06	6,93 E-07	5,01 E-06	-6,30 E-04
NHWD	kg	5,06 E+00	1,86 E-01	1,94 E-01	5,44 E+00	1,55 E-01	2,46 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,26 E-02	6,05 E-04	1,99 E+00	3,26 E-01
RWD	kg	3,38 E-04	1,99 E-06	1,17 E-04	4,58 E-04	8,24 E-07	1,41 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,39 E-07	2,80 E-07	3,42 E-07	4,66 E-05
CRU	kg	0,00 E+00	0,00 E+00	1,89 E-02	1,89 E-02	0,00 E+00	9,63 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,11 E-01	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	6,85 E-02	6,85 E-02	0,00 E+00	1,99 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,69 E+00	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	7,34 E-02	7,34 E-02	0,00 E+00	5,97 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,93 E+00	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	1,47 E-01	1,47 E-01	0,00 E+00	1,19 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,86 E+00	0,00 E+00

HWD = Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
MFR = Materials for recycling
EEE = Exported Electrical Energy
NHWD = Non Hazardous Waste Disposed
CRU = Components for reuse
MER = Materials for energy recovery
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,07 E+01	8,77 E-02	1,99 E+00	2,28 E+01	3,81 E-02	1,36 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,03 E-02	2,45 E-02	2,34 E-02	0,00 E+00
PERM	MJ	1,74 E+00	0,00 E+00	6,13 E-01	2,35 E+00	0,00 E+00	-2,06 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,41 E+00
PERT	MJ	2,24 E+01	8,77 E-02	2,60 E+00	2,51 E+01	3,81 E-02	-7,01 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,03 E-02	2,45 E-02	2,34 E-02	2,41 E+00
PENRE	MJ	2,10 E+02	4,59 E+00	2,04 E+01	2,35 E+02	2,45 E+00	1,27 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E+00	1,74 E-01	3,01 E+01	1,35 E+00
PENRM	MJ	4,79 E+01	0,00 E+00	5,59 E+00	5,35 E+01	0,00 E+00	-4,92 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-1,72 E+00	-2,93 E+01	3,65 E+00
PENRT	MJ	2,58 E+02	4,59 E+00	2,60 E+01	2,88 E+02	2,45 E+00	7,77 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E+00	-1,55 E+00	8,16 E-01	5,00 E+00
SM	kg	8,56 E-01	0,00 E+00	0,00 E+00	8,56 E-01	0,00 E+00	2,57 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,13 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	1,67 E-01	6,75 E-04	3,71 E-02	2,05 E-01	3,46 E-04	6,33 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,84 E-04	7,35 E-05	9,15 E-04	-7,76 E-03

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable energy 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 resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non renewable secondary fuels
FW = Use of net fresh water

BIOGEEN CARBON CONTENT per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	Kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
BCCpa	kg C	5,52 E-02	0,00 E+00	7,51 E-02	1,30 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

TABLES FOR INSULATION SEPARATELY

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	3,73 E-06	4,49 E-07	9,59 E-08	4,27 E-06	7,23 E-08	1,37 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,87 E-08	8,85 E-10	1,70 E-08	-8,82 E-07
ADPF	MJ	3,23 E+01	1,86 E+00	1,54 E+00	3,57 E+01	5,88 E-01	1,16 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,96 E-01	3,71 E-02	6,14 E-01	-5,62 E+00
GWP	kg CO2 eq.	2,16 E+00	1,26 E-01	4,88 E-02	2,33 E+00	3,86 E-02	1,22 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,60 E-02	2,67 E-03	1,06 E-01	-2,93 E-01
ODP	Kg CFC11 eq.	1,52 E-07	2,19 E-08	2,19 E-09	1,76 E-07	7,15 E-09	6,34 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,82 E-09	4,26 E-10	7,07 E-09	-5,20 E-08
POCP	Kg ethene eq.	3,29 E-03	6,07 E-05	4,40 E-05	3,39 E-03	2,31 E-05	1,08 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,56 E-05	2,47 E-06	3,73 E-05	-2,22 E-04
AP	kg SO2 eq.	1,76 E-02	3,08 E-04	1,65 E-04	1,80 E-02	1,66 E-04	5,82 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,12 E-04	1,85 E-05	2,59 E-04	-1,78 E-03
EP	kg (PO4) 3- eq.	1,41 E-03	4,47 E-05	1,89 E-05	1,48 E-03	3,31 E-05	5,34 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,23 E-05	4,19 E-06	5,71 E-05	-3,36 E-04
Toxicy indicators for dutch market																			
HTP	kg DCB-Eq	1,64 E+00	4,42 E-02	1,21 E-02	1,70 E+00	1,65 E-02	5,57 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,11 E-02	9,16 E-04	1,70 E-02	-1,93 E-01
FAETP	kg DCB-Eq	1,73 E-02	1,19 E-03	3,52 E-04	1,88 E-02	4,83 E-04	8,83 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,25 E-04	1,32 E-05	6,33 E-04	-4,85 E-03
MAETP	kg DCB-Eq	4,48 E+01	4,38 E+00	6,42 E-01	4,98 E+01	1,73 E+00	2,20 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,16 E+00	4,65 E-02	1,56 E+00	-9,93 E+00
TETP	kg DCB-Eq	2,41 E-03	1,97 E-04	6,06 E-05	2,66 E-03	5,84 E-05	9,05 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,94 E-05	2,92 E-06	4,03 E-05	-1,0 1E-03
ECI	euro	3,53 E-01	1,27 E-02	4,65 E-03	3,70 E-01	4,66 E-03	2,16 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,14 E-03	3,41 E-04	8,66 E-03	-4,42 E-02
ADPF	kg Sb eq.	1,55 E-02	8,95 E-04	7,38 E-04	1,72 E-02	2,83 E-04	5,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,91 E-04	1,79 E-05	2,95 E-04	-2,70 E-03

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,22 E+00	1,27 E-01	3,92 E-02	2,38 E+00	3,89 E-02	2,19 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,62 E-02	2,70 E-03	1,06 E-01	-3,27 E-01
GWP-fossil	kg CO2 eq.	2,21 E+00	1,27 E-01	5,05 E-02	2,39 E+00	3,89 E-02	1,24 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,62 E-02	2,70 E-03	1,06 E-01	-2,98 E-01
GWP-biogenic	kg CO2 eq.	2,54 E-03	6,98 E-05	-1,1 3E-02	-8,65 E-03	1,67 E-05	9,53 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,12 E-05	1,31 E-06	5,50 E-05	-2,81 E-02
GWP-luluc)	kg CO2 eq.	7,15 E-04	7,08 E-05	4,50 E-05	8,30 E-04	1,38 E-05	2,68 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,27 E-06	2,77 E-07	5,43 E-06	-4,05 E-04
ODP	kg CFC11 eq.	1,41 E-07	2,72 E-08	2,05 E-09	1,70 E-07	8,96 E-09	6,42 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,03 E-09	5,33 E-10	8,85 E-09	-4,73 E-08
AP	mol H+ eq.	2,17 E-02	3,72 E-04	2,00 E-04	2,23 E-02	2,21 E-04	7,25 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,49 E-04	2,58 E-05	3,59 E-04	-2,62 E-03
EP-freshwater	kg PO4 eq.	8,47 E-05	1,43 E-06	1,53 E-06	8,77 E-05	3,20 E-07	2,71 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,15 E-07	2,55 E-08	3,62 E-07	-1,14 E-05
EP-marine	kg N eq.	1,91 E-03	6,62 E-05	3,55 E-05	2,01 E-03	7,92 E-05	8,33 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,34 E-05	1,12 E-05	1,49 E-04	-4,71 E-04
EP-terrestrial	mol N eq.	3,66 E-02	7,48 E-04	3,98 E-04	3,78 E-02	8,73 E-04	1,39 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,88 E-04	1,24 E-04	1,65 E-03	-9,52 E-03
POCP	kg NMVOC eq.	1,10 E-02	2,88 E-04	1,72 E-04	1,14 E-02	2,50 E-04	4,13 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,68 E-04	3,39 E-05	4,57 E-04	-1,49 E-03
ADP-minerals & metals	kg Sb eq.	3,73 E-06	4,49 E-07	9,55 E-08	4,27 E-06	7,23 E-08	1,37 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,87 E-08	8,85 E-10	1,70 E-08	-8,82 E-07
ADP-fossil	MJ, net calorific value	2,81 E+01	1,88 E+00	1,58 E+00	3,15 E+01	5,97 E-01	1,04 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,02 E-01	3,69 E-02	6,12 E-01	-6,67 E+00
WDP	m3 world eq. Deprived	5,25 E-01	6,73 E-03	4,96 E-02	5,82 E-01	1,83 E-03	1,83 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,23 E-03	7,44 E-05	1,24 E-02	-1,64 E-01

GWP-total = Global Warming Potential total
GWP-fossil = Global Warming Potential fossil fuels
GWP-biogenic = Global Warming Potential biogenic
GWP-luluc = Global Warming Potential land use and land use change
ODP = Depletion potential of the stratospheric ozone layer
AP = Acidification Potential, Accumulated Exceedence
EP-freshwater = Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine = Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial = Eutrophication Potential, Accumulated Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclamer [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

ENVIRONMENT IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1,15 E-07	6,00 E-09	1,76 E-09	1,22 E-07	3,51 E-09	4,51 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,36 E-09	6,67 E-10	8,07 E-09	-1,88 E-08
IRP	kBq U235 eq.	8,04 E-02	8,23 E-03	2,16 E-03	9,08 E-02	2,61 E-03	3,10 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,76 E-03	1,50 E-04	2,47 E-03	-4,75 E-02
ETP-fw	CTUe	4,83 E+01	1,72 E+00	5,46 E-01	5,05 E+01	4,84 E-01	1,61 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,26 E-01	2,40 E-02	4,30 E-01	-7,69 E+00
HTP-c	CTUh	9,75 E-09	5,97 E-11	2,12 E-11	9,83 E-09	1,72 E-11	3,17 E-10	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,16 E-11	8,09 E-13	4,87 E-11	-1,56 E-09
HTP-nc	CTUh	2,71 E-08	1,72 E-09	3,80 E-10	2,92 E-08	5,77 E-10	1,03 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,89 E-10	1,96 E-11	4,11 E-10	-4,40 E-09
SQP	----	1,25 E+01	9,30 E-01	1,43 E+00	1,49 E+01	5,10 E-01	5,24 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,44 E-01	8,02 E-03	6,37 E-01	-5,57 E+00

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclamer [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 possible nuclear accidents, occupational exposure nor due to radioactive waste.

Disclamer [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.

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	6,33 E-05	1,23 E-05	9,26 E-07	7,65 E-05	3,99 E-06	2,88 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,69 E-06	2,40 E-07	3,68 E-06	-1,55 E-05
NHWD	kg	1,39 E-01	6,16 E-02	1,60 E-03	2,03 E-01	4,01 E-02	6,61 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,70 E-02	6,23 E-05	1,80 E+00	-5,2 6E-02
RWD	kg	3,83 E-05	9,51 E-07	9,57 E-07	4,02 E-05	2,13 E-07	1,25 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,44 E-07	1,01 E-08	1,43 E-07	-2,24 E-05
CRU	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,74 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,0 0E+00	0,00 E+00	2,67 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,01 E-01	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,29 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,33 E-02	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,58 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,47 E-01	0,00 E+00

HWD = Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
MFR = Materials for recycling
EEE = Exported Electrical Energy
NHWD = Non Hazardous Waste Disposed
CRU = Components for reuse
MER = Materials for energy recovery
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,89 E+00	4,14 E-02	-1,98 E+00	9,50 E-01	9,86 E-03	6,81 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,65 E-03	7,53 E-04	9,90 E-03	0,00 E+00
PERM	MJ	0,00 E+00	0,00 E+00	2,19 E+00	2,19 E+00	0,00 E+00	-1,90 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,32 E+00
PERT	MJ	2,89 E+00	4,14 E-02	2,05 E-01	3,14 E+00	9,86 E-03	-1,22 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,65 E-03	7,53 E-04	9,90 E-03	1,32 E+00
PENRE	MJ	2,74 E+01	1,94 E+00	7,64 E-01	3,01 E+01	6,33 E-01	1,64 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,27 E-01	3,73 E-02	1,36 E+00	0,00 E+00
PENRM	MJ	1,19 E+00	0,00 E+00	8,24 E-01	2,01 E+00	0,00 E+00	-7,46 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-4,31E-02	-7,33 E-01	2,08 E-01
PENRT	MJ	2,86 E+01	1,94 E+00	1,59 E+00	3,21 E+01	6,33 E-01	8,93 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,27 E-01	-5,81 E-03	6,23 E-01	2,08 E-01
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	2,07 E-02	3,00 E-04	1,29 E-03	2,23 E-02	8,94 E-05	7,21 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,02 E-05	4,06 E-06	3,87 E-04	-7,76 E-03

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable energy 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 resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non renewable secondary fuels
FW = Use of net fresh water

BIOGEEN CARBON CONTENT per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	Kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00
BCCpa	kg C	0,00 E+00	0,00 E+00	6,98 E-02	6,98 E-02	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Allocation:

At Interalu NV, different ceiling types are produced. Only facility level data were available for the use of electricity, natural gas, etc. The facility level data have been allocated to the analysed product using their respective annual production volume (expressed in m² ceiling or kg ceiling if relevant; physical relationship). Material inputs and outputs, which were not available at the product level, were allocated similarly.

Considered to be below cut-off:

The following processes/materials are not considered in this LCA study due to missing data and/or low volumes or weights of the materials:

- Transportation of the packaging of the raw materials to the production site in module A2;
- Transportation of the ancillary materials to the production site in module A3;
- Packaging of the ancillary materials in module A3;
- Metal transport containers for panels and support profiles in module A3 because reused several times;
- Installation tools in module A5;
- Environmental impacts caused by the personnel of the production plants, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes or environmental effects caused by commuter traffic.

In all cases, it is assumed that the cut-off criteria of EN 15804 are met.

Manufacturer specific data have been collected for the year 2021.

SENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1 – RAW MATERIAL SUPPLY

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

A2 – TRANSPORT TO THE MANUFACTURER

The raw materials are transported to the manufacturing site of the WEC® Ceiling by truck (freight, lorry, 16-32 ton, EURO 6 or 3,5-7,5 ton, EURO 6). EURO 6 trucks are the most used in Belgium (Statbel, 2021).

A3 – MANUFACTURING

This module takes into account the production process of the WEC® Ceiling. The prefinished continuous hot dip galvanised steel strips for the panels are, if needed, perforated and then roll-formed to the correct sizes and wrapped. The prefinished continuous hot dip galvanised steel strips for the support profiles are punched to the correct module size, roll-formed and cut to a fixed length. They are packed in cardboard boxes. The prefinished continuous hot dip galvanised steel strips for the edge finishing profiles are rolled and cut to a fixed length. They are packed in metal transport containers together with the panels and support profiles and transported to the site for installation. Clips, ceiling anchors, fasteners and quick hangers are produced and packaged by third parties and delivered at the manufacturing site in Wilrijk. The PE-RT pipes and the acoustic insulation material are also produced and packaged by a third party, but directly transported to the installation site. They are transported in smaller quantities to the manufacturing site in Wilrijk as well, so that Interalu NV always has a stock. Production losses are also taken into account. The waste treatment of the packaging of the raw materials is modelled according to the default end-of-life scenarios in Belgium.

A4 – TRANSPORT TO THE BUILDING SITE

The final products (i.e. WEC® Ceiling parts and acoustic insulation material) are for 100% transported from the factory in Wilrijk to the installation site in The Netherlands (Utrecht) over a distance of 134 km by a truck, unspecified, according to the requirements within the Dutch NMD determination method.

A5 - INSTALLATION IN THE BUILDING

At the construction site, energy is consumed for fixation of the WEC® Ceiling parts. The acoustic insulation material is generally loosely laid upon the ceiling structure. Furthermore, packaging materials are released. The waste treatment of the packaging is modelled according to the default end-of-life scenarios of the Dutch NMD determination method. Additionally, 3% material losses are taken into account.

B - USE STAGE
B1: WEC® ceiling does not have any impact during its entire use phase.
B2: Impact of cleaning (water and soap) of WEC® ceiling is assumed to be below cut-off.
B3: WEC® ceiling does not require any repair during its entire service life.
B4: WEC® ceiling does not require any replacement during its entire service life.
B5: WEC® ceiling does not require any refurbishment during its entire service life.
B6: WEC® ceiling is connected to the central heating system (similar to underfloor heating). Water is pumped and heated by the central heating system and flows through the WEC® ceiling. The impact related to the heating and the pumping is fully allocated to the central heating system.
B7: WEC® ceiling is connected to the central heating system (similar to underfloor heating). Water is pumped and heated by the central heating system and flows through the WEC® ceiling. The impact related to the heating and the pumping is fully allocated to the central heating system.

C1-C4: END-OF-LIFE
The default end-of-life (EOL) scenarios of the Dutch NMD determination method have been applied to the different components of the WEC® Ceiling, i.e. steel parts and plastic parts, and to the stone wool insulation with PE foil.
C1: It is assumed that no impacts are related to the demolition of the product, since the fixations remain in place and all other parts can be easily dismantled manually.
C2: Transport of final product components to sorting, landfill and incineration according to the Dutch default scenarios.
C3-C4: EOL of final product components according to the Dutch default scenarios: steel parts are 87% recycled, 12% reused and 1% landfilled, plastic parts are 5% recycled, 85% incinerated and 10% landfilled and stone wool insulation is 10% recycled, 5% incinerated and 85% landfilled.

MODULE D - LOADS AND BENEFITS BEYOND THE SYSTEM BOUNDARIES
In module D, following waste streams originating from the final product are considered after their end-of-waste point: the main metal (steel, 87% recycled), the different plastic parts (5% recycled and 85% incinerated) and the insulation material with PE foil (stone wool, 5% incinerated and 10% recycled; PE foil, 5% recycled and 85% incinerated). For packaging waste: wooden packaging (40% recycled and 40% incinerated), plastic packaging (20% recycled and 75% incinerated) and core board packaging (97% recycled and 3% incinerated). The EOL waste treatments are according to the Dutch default scenarios for the different waste materials within the NMD determination method.

DECLARATION OF SVHC
The product does not contain materials listed in the “Candidate list of Substances of Very High Concern for authorisation”

REFERENCES

- ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- ISO 14025:2006: Environmental labels and Declarations-Type III Environmental Declarations-Principles and procedures.
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- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: http://link.springer.com/10.1007/s11367-016-1087-8
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- Enperas, 2023, Quadrant LCA tool for Interalu ceilings, third party verified, version xxxx
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REMARKS
None.