



**Environmental
Product
Declaration**

According to ISO14025 and EN15804+A2
(+indicators A1)

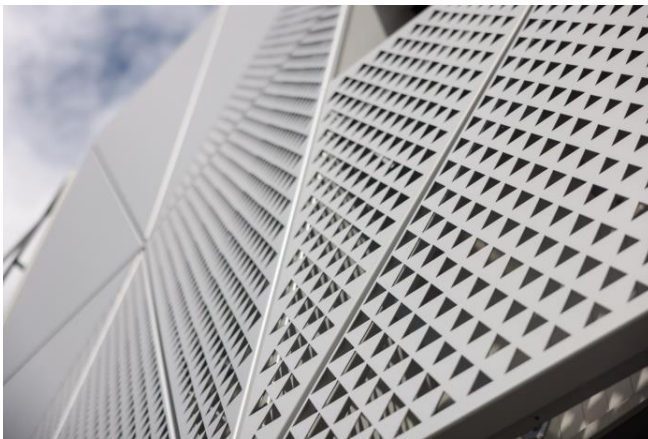


This declaration is for:
**Aldowa aluminium cassette ventilated
facade system – powder coated**

Provided by:
Aldowa B.V.



ALDOWA
LEAVE YOUR MARK



program operator
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COMPANY INFORMATION



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MRPI® REGISTRATION

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SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Gert-Jan Vroege, Eco Intelligence. The LCA study has been done by Benthe Vermaas, LBP|SIGHT. 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

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Managing Director MRPI

PRODUCT

Aldowa aluminium cassette ventilated facade system – powder coated.

DECLARED UNIT/FUNCTIONAL UNIT

1 m²

DESCRIPTION OF PRODUCT

Aldowa aluminium cassette ventilated facade system – powder coated is made of aluminium EN AW 5005. The environmental impact has been calculated of representative dimensions of 3000 x 1000 mm, and has been converted to 1 m².

VISUAL PRODUCT



MORE INFORMATION

<https://aldowa.nl/en/aldowa-green/>

DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR(a)
Independent verification of the declaration on data according to ISO14025 and EN15804+A2 (+indicators A1) internal: external: x
Third party verifier: Gert-Jan Vroege, Eco Intelligence
[a] PCR = Product Category Rules



DETAILED PRODUCT DESCRIPTION

1 m² Aldowa aluminium cassette ventilated facade system - powder coated, with representative dimensions of 3000 x 1000 converted to 1 m². Custom-made facade cassette system designed according to different principles:

1. Cassettes with a single flange, invisibly attached with the bed hook system to omega profiles (included)
2. Cassettes with a double flange, screwed onto profiles (included)

Cassettes are made of 3 mm thick EN AW 5005 aluminium and equipped with reinforcement profiles where necessary. Mounting materials and substructure are included. Wall brackets are not included, making the environmental statement representative for adjustment spaces of up to 10 mm.

The product card is scalable to the length and width (in mm) of the panel and the number of reinforcements per m² (depending on the width). For an overview of the number of reinforcements to be applied, and a detailed explanation of how to use the scaling, see the section "Scaling". The reference product has a size of 3000 x 1000 mm (converted to 1 m²) and a weight of 13.2 kg/m².

Production processes

Aldowa purchases EN AW 5005 AlMg1 aluminium plates. The aluminium panels, reinforcement profiles and omega profiles are produced from the aluminium plates by cutting, punching, bending and welding. Purchased EPDM hoses are cut to size.

The production processes use natural gas, electricity and rolling oil. The aluminium facade systems are packed with LDPE film and EPS.

After production at the Aldowa production location, the aluminium facade systems are transported to the surface treatment company, where they are powder coated.

Technical properties of AW5005 AlMg1	Value	Unit	Standard
Thickness	1.5-3	mm	VMRG , ISO9001
Yield strength	120	Mpa	VMRG , ISO9001
Tensile strength	145-185	Mpa	VMRG , ISO9001
Elongation	3	%	VMRG , ISO9001
Bending radius	2.5t	180°t	VMRG , ISO9001

Material composition

The Aldowa aluminium cassette ventilated facade systems – powder coated are produced in various dimensions. The material composition varies with varying dimensions, due to the relation between the flanges and the reinforcement profiles, and the width and length of the aluminium panels. Thereby, the material composition of the reference product (3000 x 1000 mm) is given in the table below.

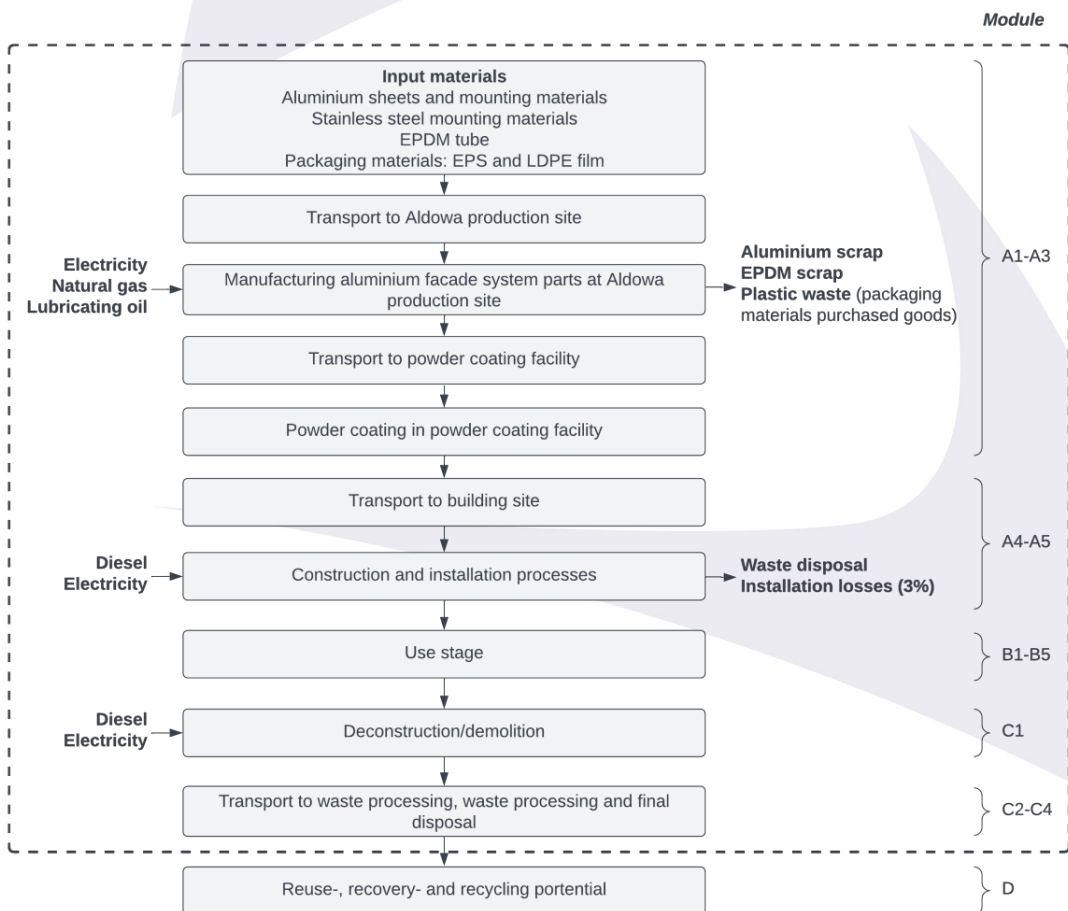
Component (> 1%)	%
Aluminium (AlMg1)	99%
Stainless steel	1%
EPDM	>1%

SCOPE AND TYPE

This EPD is based on a Cradle-to-Grave LCA of Aldowa aluminium cassette ventilated facade systems – powder coated, produced in a single Aldowa B.V. production site in Rotterdam. The façade systems are installed in the Netherlands and at its end-of-life, it 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 production stage has been collected by Aldowa B.V. The LCI data has been evaluated by the LCA-practitioner and checked by the EPD verifier. Generic data has been used for the background processes, originating from the Ecoinvent 3.6 Cut-off database. For the calculation of the LCA results, the software program SimaPro 9.6.0.1 has been used.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USER STAGE						END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES	
Raw material 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	ND	ND	X	X	X	X	X
X= Modules Assessed ND= Not Declared																



REPRESENTATIVENESS

The data used for the LCA is representative for the production of the Aldowa aluminium cassette ventilated facade systems – powder coated, manufactured by Aldowa B.V. in Rotterdam, the Netherlands.

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.				1,97 E-03	6,97 E-06	6,13 E-05	0,00 E+00	4,10 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,08 E-07	2,54 E-06	1,70 E-05	7,44 E-07	-3,81 E-04
ADPF	MJ				2,86 E+03	4,17 E+00	8,88 E+01	0,00 E+00	3,89 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,16 E+00	1,52 E+00	4,15 E+00	5,02 E-01	-2,07 E+03
GWP	kg CO2 eq.				2,15 E+02	2,73 E-01	7,61 E+00	0,00 E+00	2,43 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,41 E-01	9,92 E-02	3,20 E-01	5,95 E-02	-1,59 E+02
ODP	Kg CFC11 eq.				9,04 E-06	4,84 E-08	2,98 E-07	0,00 E+00	3,39 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,02 E-08	1,76 E-08	3,79 E-08	3,98 E-09	-5,42 E-06
POCP	Kg ethene eq.				9,90 E-02	1,65 E-04	3,11 E-03	0,00 E+00	1,82 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,05 E-04	5,99 E-05	2,67 E-04	2,51 E-05	-6,71 E-02
AP	kg SO2 eq.				1,18 E+00	1,20 E-03	3,65 E-02	0,00 E+00	1,36 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	7,97 E-04	4,36 E-04	2,98 E-03	2,10 E-04	-9,13 E-01
EP	kg (PO4) 3- eq.				1,07 E-01	2,36 E-04	3,44 E-03	0,00 E+00	2,93 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,70 E-04	8,57 E-05	3,80 E-04	2,95 E-05	-7,53 E-02

Toxicity indicators for Dutch market

HTP	kg DCB-Eq				1,95 E+02	1,15 E-01	5,98 E+00	0,00 E+00	1,15 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,62 E-02	4,18 E-02	3,68 E-01	2,23 E-02	-1,61 E+02
FAETP	kg DCB-Eq				2,25 E+00	3,35 E-03	7,98 E-02	0,00 E+00	1,26 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,24 E-04	1,22 E-03	6,84 E-03	5,84 E-04	-1,09 E+00
MAETP	kg DCB-Eq				1,05 E+04	1,21 E+01	3,36 E+02	0,00 E+00	5,98 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,84 E+00	4,39 E+00	2,97 E+01	1,97 E+00	-7,82 E+03
TETP	kg DCB-Eq				4,44 E-01	4,06 E-04	1,43 E-02	0,00 E+00	5,54 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,46 E-04	1,48 E-04	1,15 E-03	8,72 E-05	-3,00 E-01
ECI	euro				3,56 E+01	3,29 E-02	1,15 E+00	0,00 E+00	3,89 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,76 E-02	1,20 E-02	6,85 E-02	6,40 E-03	-2,79 E+01
ADPF	kg Sb eq.				1,38 E+00	2,01 E-03	4,27 E-02	0,00 E+00	1,87 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,04 E-03	7,30 E-04	1,99 E-03	2,41 E-04	-9,97 E-01

- 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.				1,57 E+02	2,75 E-01	5,88 E+00	0,00 E+00	2,52 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,43 E-01	1,00 E-01	3,24 E-01	6,04 E-02	-1,26 E+02
GWP-fossil	kg CO2 eq.				1,55 E+02	2,75 E-01	5,80 E+00	0,00 E+00	2,46 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,43 E-01	1,00 E-01	3,23 E-01	6,03 E-02	-1,23 E+02
GWP-biogenic	kg CO2 eq.				0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
GWP-luluc)	kg CO2 eq.				2,62 E+00	1,01 E-04	7,85 E-02	0,00 E+00	6,01 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,23 E-05	3,67 E-05	3,43 E-04	2,77 E-05	-2,56 E+00
ODP	kg CFC11 eq.				1,29 E-05	6,07 E-08	4,21 E-07	0,00 E+00	3,91 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,46 E-08	2,21 E-08	4,40 E-08	4,76 E-09	-9,97 E-06
AP	mol H+ eq.				1,10 E+00	1,60 E-03	3,46 E-02	0,00 E+00	1,81 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,10 E-03	5,80 E-04	3,72 E-03	2,64 E-04	-9,58 E-01
EP-freshwater	kg PO4 eq.				4,54 E-03	2,78 E-06	1,39 E-04	0,00 E+00	8,01 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,96 E-06	1,01 E-06	2,09 E-05	1,31 E-06	-3,60 E-03
EP-marine	kg N eq.				1,40 E-01	5,62 E-04	4,78 E-03	0,00 E+00	6,60 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,46 E-04	2,04 E-04	8,20 E-04	6,41 E-05	-1,12 E-01
EP-terrestrial	mol N eq.				1,61 E+00	6,20 E-03	5,46 E-02	0,00 E+00	6,67 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,91 E-03	2,25 E-03	9,52 E-03	7,25 E-04	-1,28 E+00
POCP	kg NMVOC eq.				5,23 E-01	1,77 E-03	1,75 E-02	0,00 E+00	1,82 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,36 E-03	6,44 E-04	2,60 E-03	2,10 E-04	-4,17 E-01
ADP-minerals & metals	kg Sb eq.				1,94 E-03	6,97 E-06	6,03 E-05	0,00 E+00	4,09 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,08 E-07	2,54 E-06	1,70 E-05	7,44 E-07	-6,04 E-04
ADP-fossil	MJ, net calorific value				1,60 E+03	4,15 E+00	5,08 E+01	0,00 E+00	3,69 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,10 E+00	1,51 E+00	4,25 E+00	4,73 E-01	-1,22 E+03
WDP	m3 world eq. Deprived				5,02 E+01	1,48 E-02	1,53 E+00	0,00 E+00	5,95 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,06 E-02	5,40 E-03	4,30 E-02	1,48 E-02	-3,62 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]

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 experience 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				1,30 E-05	2,47 E-08	4,20 E-07	0,00 E+00	3,41 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,60 E-08	8,99 E-09	4,67 E-08	4,11 E-09	-8,78 E-06
IRP	kBq U235 eq.				7,55 E+00	1,74 E-02	2,36 E-01	0,00 E+00	1,08 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	6,96 E-03	6,32 E-03	2,12 E-02	1,85 E-03	-6,46 E+00
ETP-fw	CTUe				4,13 E+03	3,70 E+00	1,34 E+02	0,00 E+00	5,07 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,65 E+00	1,35 E+00	1,83 E+01	2,45 E+02	-3,34 E+03
HTP-c	CTUh				3,85 E-07	1,20 E-10	1,17 E-08	0,00 E+00	1,88 E-09	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	9,54 E-11	4,37 E-11	4,46 E-10	6,41 E-11	-3,26 E-07
HTP-nc	CTUh				5,50 E-06	4,05 E-09	1,70 E-07	0,00 E+00	4,93 E-08	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-09	1,47 E-09	2,12 E-08	1,43 E-09	-4,82 E-06
SQP	----				1,31 E+03	3,60 E+00	4,04 E+01	0,00 E+00	1,41 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,33 E-01	1,31 E+00	8,55 E+00	6,98 E-01	-1,15 E+03

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]

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

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 experience 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				3,46 E-04	1,05 E-05	1,80 E-05	0,00 E+00	7,32 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,26 E-06	3,82 E-06	1,28 E-05	8,23 E-07	7,55 E-03
NHWD	kg				7,27 E+00	2,63 E-01	3,11 E-01	0,00 E+00	1,74 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,14 E-03	9,57 E-02	1,25 E-01	4,20 E-01	1,24 E+00
RWD	kg				9,17 E-04	2,73 E-05	4,12 E-05	0,00 E+00	1,42 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,02 E-05	9,91 E-06	2,52 E-05	2,24 E-06	1,85 E-04
CRU	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg				9,81 E+00	0,00 E+00	7,16 E-01	0,00 E+00	5,16 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,87 E-05	0,00 E+00	1,24 E+01	0,00 E+00	0,00 E+00
MER	kg				1,31 E+00	0,00 E+00	3,59 E-01	0,00 E+00	3,00 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,83 E-06	0,00 E+00	5,33 E-03	0,00 E+00	0,00 E+00
EEE	MJ				1,01 E+01	0,00 E+00	2,72 E+00	0,00 E+00	2,03 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,92 E-04	0,00 E+00	2,61 E-02	0,00 E+00	0,00 E+00
ETE	MJ				1,73 E+01	0,00 E+00	4,68 E+00	0,00 E+00	3,50 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	3,30 E-04	0,00 E+00	4,49 E-02	0,00 E+00	0,00 E+00

HWD = Hazardous Waste Disposed
 NHWD = Non Hazardous Waste Disposed
 RWD = Radioactive Waste Disposed
 CRU = Components for reuse
 MFR = Materials for recycling
 MER = Materials for energy recovery
 EEE = Exported Electrical Energy
 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				9,11 E+02	5,20 E-02	2,74 E+01	0,00 E+00	3,75 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-02	1,89 E-02	6,66 E-01	3,50 E-02	-8,77 E+02
PERM	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ				9,11 E+02	5,20 E-02	2,74 E+01	0,00 E+00	3,75 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-02	1,89 E-02	6,66 E-01	3,50 E-02	-8,77 E+02
PENRE	MJ				1,64 E+03	4,41 E+00	5,21 E+01	0,00 E+00	3,96 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,25 E+00	1,60 E+00	4,51 E+00	4,83 E-01	-1,22 E+03
PENRM	MJ				1,74 E-01	0,00 E+00	5,22 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ				1,64 E+03	4,41 E+00	5,21 E+01	0,00 E+00	3,96 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,25 E+00	1,60 E+00	4,51 E+00	4,83 E-01	-1,22 E+03
SM	kg				9,33 E+00	0,00 E+00	2,80 E-01	0,00 E+00	1,54 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,45 E-05	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	ND	ND	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3				2,57 E+00	5,06 E-04	7,79 E-02	0,00 E+00	1,48 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	3,68 E-04	1,84 E-04	2,04 E-03	1,49 E-04	-2,20 E+00

- 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

BIOGENIC 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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
BCCpa	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

- BBCpr = Biogenic carbon content in product
- BCCpa = Biogenic carbon content in packaging



CALCULATION RULES

The reference year of this study is 2022. The LCA was carried out in accordance with the requirements and guidelines of the NMD "Bepalingsmethode Milieuprestatie Bouwwerken" (Environmental Performance Assessment Method for Construction Works) (version 1.1, March 2022) and the NMD-Verification protocol (version 1.2, August 2024). The NMD-Assessment method is based on ISO 14040 - ISO14044 and NEN-EN 15804:2012 + A2 (2019).

Allocation

Since it's impossible to gather individual energy consumption data for each product manufactured in the plant, allocation methods are employed. These allocations rely on the annual production rate and are executed with high accuracy and precision. To determine the values per 1 kg of the considered product, the total product weight per annual production is taken into account. As the factory manufactures various types of aluminium panels, of which the production processes are similar, the annual production percentages are utilized for allocation purposes. This involves allocating the annual total energy consumption (both natural gas and electricity), oil usage, and waste generation per product based on the ratio of the declared product's annual production to the factory's total annual production. Due to the fixed formulation of the product, there's no need to allocate raw materials considering the total annual production.

Cut-off

In line with paragraph 6.3.6 of the EN15804:A2, all significant input and output streams must be included in the calculations.

- A cut-off process may not contribute to more than 1% of the energy usage and may not exceed 1% of the mass. Processes excluded from the calculations may not contribute to more than 5% of the total energy usage or total mass.
- The sum of the processes excluded from the calculations, may not contribute to more than 5% of the total energy usage or total mass.

In line with EN 15804 the following processes are not considered within the system boundaries of this LCA:

- Overhead processes, like office departments, personal transportation, etc.
- Production, maintenance and the end-of-life stage of capital goods like buildings, machinery, etc.

It is not to be expected for the above-mentioned processes to contribute significantly to the environmental profile of the Aldowa aluminium facade systems.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Production processes, A1-A3

Aldowa purchases EN AW 5005 aluminium plates. The aluminium panels, reinforcement profiles and omega profiles are produced from the aluminium plates by cutting, punching, bending and welding. Purchased EPDM hoses are cut to size.

The production processes use natural gas, electricity and rolling oil. The aluminium facade systems are packed with LDPE film and EPS.

After production at the Aldowa production location, the aluminium facade systems are transported to the surface treatment company, where they are powder coated.

Construction and installation, A4-A5

In line with the Bepalingsmethode, the façade systems are transported by freight lorry and cover a distance of 150 km.

In accordance with the Bepalingsmethode, it is assumed that 3% of the facade systems are lost during the construction stage. The packaging material released during the installation stage is processed in this stage, in accordance with the prescribed set of scenario values for the end-of-life stage by the Bepalingsmethode (see table below).

Electric and diesel-powered equipment is used for the installation of the facade systems.

Usage, B1-B5

No emissions are released during the use stage. The facade systems must be cleaned once a year. The anodized systems can be cleaned with just water, the powder-coated systems must also be cleaned with a cleaning agent.

End of life, C1-C4

At the end of the lifespan of the facade systems, the products are dismantled and collected in containers. The products are then transported to a sorting location, where they are dismantled and the individual materials are sorted. The individual materials can be recycled, incinerated or landfilled.

The Bepalingsmethode prescribes standard values for end-of-life processing scenarios for individual products. The fixed scenarios of the NMD have been adopted in this LCA, and are shown in the table below.

Environmental costs and benefits outside the system boundary, D

This life stage is based on the end-of-life processing scenarios, and is in line with the requirements and guidelines as stated in the Bepalingsmethode. The recycling/incineration loads and benefits, after reaching end-of-waste, of the product materials, losses during construction and that of the packaging materials (A5) are included in module D.

Material for waste processing and disposal	Landfill (%)	Incineration (%)	Recycling (%)	C2 transport distance (km)
Aluminium	3	3	94	54,5
Stainless steel	1	0	99	50,5
EPDM	10	85	5	140
LDPE (packaging material)	10	85	5	140
EPS (packaging material)	0	35	65	85

DECLARATION OF SVHC

The product does not contain materials listed in the "Candidate list of Substances of Very High Concern for authorization".

REFERENCES

- [1] The NMD "Bepalingsmethode Milieuprestatie Bouwwerken" (Environmental Performance Assessment Method for Construction Works) (version 1.1, March 2022) and the NMD-Verification protocol (version 1.2, August 2024).
- [2] NEN-EN 15804 Duurzaamheid van bouwwerken - Milieuverklaringen van producten - Basisregels voor de productgroep bouwproducten;
- [3] ISO, 2006. "Environmental management. Life cycle assessment - Principles and framework". ISO 14040:2006;
- [4] ISO, 2006. "Environmental management. Life cycle assessment – Requirements and Guidelines". ISO 14044:2006;
- [5] International Organization for Standardization, ISO/TR 14025, "Environmental labels and declarations – Type III environmental declarations", ISO/TR 14025:2000.

REMARKS

None.



SCALING

Aldowa produces custom-made aluminium facade systems. Due to the wide variety of dimensions that are produced, the environmental declarations of the aluminium facade systems are scalable to the dimensions (length and width) of the panels. The minimal length and width of the aluminium panels is both 150 mm, the maximum length is 3800 mm, and the maximum width is 2800 mm. The reference dimension of which the environmental profile above is calculated, is 3000 x 1000 mm.

The environmental declarations of the aluminium facade systems are composed of three environmental profiles:

1. A non-scalable environmental profile for 1 m² of facade system, which is independent of the dimensions.
2. A scalable environmental profile for the flanges in kg. The mass of the flanges per m² depends on the length and width of the panel.
3. A scalable environmental profile for the number of reinforcements per square meter of panel in amount of reinforcements, which is dependent on the width of the panel.

How to calculate the environmental profile for a specific dimension

To obtain the environmental profile of a specific dimension, one must sum the three individual environmental profiles based on the specific dimensions. Therefore,

$EPT, specific = EP_{Non-scalable} + EPS, specific + EPR, specific$,

With EPT, specific the total environmental profile of the facade system of the specific dimensions, EP_{Non-scalable} the non-scalable environmental profile, EPS, specific the environmental profile of the flanges for specific dimensions, and EPR, specific the environmental profile of the reinforcements for specific dimensions. All three environmental profiles are given in tables below.

Non-scalable environmental profile

The non-scalable environmental profile is independent of the dimensions of the panel, and therefore always has to be applied once.

Flanges

The weight of the flanges is 0,813 kg per meter in width, plus 1,220 kg per meter in length. Therefore, to calculate the environmental profile of the flanges, one must use the following formula:

$EPS, specific = EPS, 1 \text{ kg} \times (0,813 \times w \text{ (mm)} + 1,220 \times l \text{ (mm)})$,

Where EPS, 1 kg the environmental profile for 1 kg of flange, w = width of panel in mm, and l the length of the panel in mm.

Reinforcements

When a building is higher than 15 m, and/or when the width of the panel is at least 800 mm, a reinforcement profile is applied per 600 mm in width. This means that extra materials are used for the production of the facade system. To apply the environmental impact of this material surcharge in the environmental profile of the aluminium facade systems, the number of reinforcements per square meter of panel must be multiplied by the environmental profile of one reinforcement. Therefore,

$EPR, specific = EPR, one \times n$,

Where EPR, one is the environmental profile of one reinforcement, and n the number of reinforcements per m². The table below shows the number of reinforcements per square meter of panel that must be entered in the scaling module.

Width (mm)	Amount of reinforcements per panel	Amount of reinforcements per m ²
<800	0	0,000
800	1	1,250
900	1	1,111
1000	1	1,000
1100	1	0,909
1200	2	1,667
1300	2	1,538
1400	2	1,429
1500	2	1,333
1600	2	1,250
1700	2	1,176
1800	3	1,667
1900	3	1,579
2000	3	1,500
2100	3	1,429
2200	3	1,364
2300	3	1,304
2400	4	1,667
2500	4	1,600
2600	4	1,538



RESULTS FOR NON-SCALABLE PROFILE

ENVIRONMENTAL IMPACT of 1 m² non-scalable environmental profile (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.				1,49 E-03	5,25 E-06	4,66 E-05	0,00 E+00	4,10 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,08 E-07	1,91 E-06	1,27 E-05	6,88 E-07	-2,81 E-04
ADPF	MJ				2,16 E+03	3,14 E+00	6,76 E+01	0,00 E+00	3,89 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,16 E+00	1,14 E+00	3,09 E+00	4,13 E-01	-1,55 E+03
GWP	kg CO2 eq.				1,62 E+02	2,05 E-01	5,77 E+00	0,00 E+00	2,43 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,41 E-01	7,47 E-02	2,34 E-01	5,43 E-02	-1,19 E+02
ODP	Kg CFC11 eq.				6,92 E-06	3,65 E-08	2,33 E-07	0,00 E+00	3,39 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,02 E-08	1,33 E-08	2,83 E-08	3,35 E-09	-4,05 E-06
POCP	Kg ethene eq.				7,51 E-02	1,24 E-04	2,38 E-03	0,00 E+00	1,82 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,05 E-04	4,51 E-05	1,99 E-04	2,11 E-05	-5,02 E-02
AP	kg SO2 eq.				8,90 E-01	9,04 E-04	2,77 E-02	0,00 E+00	1,36 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	7,97 E-04	3,29 E-04	2,22 E-03	1,82 E-04	-6,83 E-01
EP	kg (PO4) 3- eq.				8,07 E-02	1,78 E-04	2,64 E-03	0,00 E+00	2,93 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,70 E-04	6,46 E-05	2,84 E-04	2,55 E-05	-5,63 E-02

Toxicity indicators for Dutch market

HTP	kg DCB-Eq				1,44 E+02	8,65 E-02	4,42 E+00	0,00 E+00	1,15 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,62 E-02	3,15 E-02	2,74 E-01	1,99 E-02	-1,19 E+02
FAETP	kg DCB-Eq				1,82 E+00	2,53 E-03	6,41 E-02	0,00 E+00	1,26 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,24 E-04	9,19 E-04	5,10 E-03	5,19 E-04	-8,16 E-01
MAETP	kg DCB-Eq				7,92 E+03	9,09 E+00	2,54 E+02	0,00 E+00	5,98 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,84 E+00	3,30 E+00	2,22 E+01	1,80 E+00	-5,85 E+03
TETP	kg DCB-Eq				3,30 E-01	3,06 E-04	1,09 E-02	0,00 E+00	5,54 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,46 E-04	1,11 E-04	8,53 E-04	7,68 E-05	-2,25 E-01
ECI	euro				26,53	0,02	0,86	0,00 E+00	0,39	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,02	0,01	0,05	0,01	-20,70
ADPF	kg Sb eq.				1,04 E+00	1,51 E-03	3,25 E-02	0,00 E+00	1,87 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,04 E-03	5,50 E-04	1,49 E-03	1,99 E-04	-7,46 E-01

- 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.]



ENVIRONMENTAL IMPACT of 1 m² non-scalable environmental profile (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.				1,19 E+02	2,07 E-01	4,47 E+00	0,00 E+00	2,52 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,43 E-01	7,54 E-02	2,37 E-01	5,50 E-02	-9,40 E+01
GWP-fossil	kg CO2 eq.				1,17 E+02	2,07 E-01	4,41 E+00	0,00 E+00	2,46 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,43 E-01	7,54 E-02	2,37 E-01	5,50 E-02	-9,21 E+01
GWP-biogenic	kg CO2 eq.				0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
GWP-luluc)	kg CO2 eq.				1,96 E+00	7,59 E-05	5,88 E-02	0,00 E+00	6,01 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,23 E-05	2,76 E-05	2,56 E-04	2,36 E-05	-1,91 E+00
ODP	kg CFC11 eq.				9,84 E-06	4,57 E-08	3,26 E-07	0,00 E+00	3,91 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,46 E-08	1,66 E-08	3,28 E-08	3,99 E-09	-7,46 E-06
AP	mol H+ eq.				8,32 E-01	1,20 E-03	2,64 E-02	0,00 E+00	1,81 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,10 E-03	4,37 E-04	2,77 E-03	2,29 E-04	-7,17 E-01
EP-freshwater	kg PO4 eq.				3,45 E-03	2,09 E-06	1,06 E-04	0,00 E+00	8,01 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,96 E-06	7,60 E-07	1,56 E-05	1,15 E-06	-2,69 E-03
EP-marine	kg N eq.				1,05 E-01	4,24 E-04	3,71 E-03	0,00 E+00	6,60 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,46 E-04	1,54 E-04	6,11 E-04	5,51 E-05	-8,34 E-02
EP-terrestrial	mol N eq.				1,21 E+00	4,67 E-03	4,24 E-02	0,00 E+00	6,67 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,91 E-03	1,70 E-03	7,09 E-03	6,25 E-04	-9,60 E-01
POCP	kg NMVOC eq.				3,95 E-01	1,33 E-03	1,35 E-02	0,00 E+00	1,82 E-02	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,36 E-03	4,85 E-04	1,94 E-03	1,80 E-04	-3,12 E-01
ADP-minerals & metals	kg Sb eq.				1,46 E-03	5,25 E-06	4,58 E-05	0,00 E+00	4,09 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	8,08 E-07	1,91 E-06	1,27 E-05	6,88 E-07	-4,48 E-04
ADP-fossil	MJ, net calorific value				1,22 E+03	3,13 E+00	3,92 E+01	0,00 E+00	3,69 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,10 E+00	1,14 E+00	3,17 E+00	3,92 E-01	-9,13 E+02
WDP	m3 world eq. Deprived				3,83 E+01	1,12 E-02	1,17 E+00	0,00 E+00	5,95 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,06 E-02	4,07 E-03	3,20 E-02	1,43 E-02	-2,70 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]

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 experience with the indicator.

ENVIRONMENTAL IMPACT of 1 m² non-scalable environmental profile (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				9,75 E-06	1,86 E-08	3,22 E-07	0,00 E+00	3,41 E-07	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,60 E-08	6,77 E-09	3,48 E-08	3,46 E-09	-6,56 E-06
IRP	kBq U235 eq.				5,72 E+00	1,31 E-02	1,80 E-01	0,00 E+00	1,08 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	6,96 E-03	4,76 E-03	1,58 E-02	1,57 E-03	-4,84 E+00
ETP-fw	CTUe				3,12 E+03	2,79 E+00	1,02 E+02	0,00 E+00	5,07 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,65 E+00	1,01 E+00	1,36 E+01	1,84 E+02	-2,50 E+03
HTP-c	CTUh				2,87 E-07	9,04 E-11	8,77 E-09	0,00 E+00	1,88 E-09	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	9,54 E-11	3,29 E-11	3,32 E-10	5,85 E-11	-2,42 E-07
HTP-nc	CTUh				4,14 E-06	3,05 E-09	1,28 E-07	0,00 E+00	4,93 E-08	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-09	1,11 E-09	1,58 E-08	1,28 E-09	-3,62 E-06
SQP	----				9,88 E+02	2,71 E+00	3,04 E+01	0,00 E+00	1,41 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,33 E-01	9,86 E-01	6,37 E+00	5,92 E-01	-8,60 E+02

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]

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

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 experience with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES of 1 m² non-scalable environmental profile (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg				2,70 E-04	7,92 E-06	1,51 E-05	0,00 E+00	7,32 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,26 E-06	2,88 E-06	9,56 E-06	7,14 E-07	5,66 E-03
NHWD	kg				5,41 E+00	1,98 E-01	2,33 E-01	0,00 E+00	1,74 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	5,14 E-03	7,21 E-02	9,28 E-02	3,18 E-01	1,07 E+00
RWD	kg				7,39 E-04	2,05 E-05	3,50 E-05	0,00 E+00	1,42 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,02 E-05	7,46 E-06	1,88 E-05	1,87 E-06	1,41 E-04
CRU	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg				7,35 E+00	0,00 E+00	5,35 E-01	0,00 E+00	5,16 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	4,87 E-05	0,00 E+00	9,26 E+00	0,00 E+00	0,00 E+00
MER	kg				9,80 E-01	0,00 E+00	2,68 E-01	0,00 E+00	3,00 E-05	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,83 E-06	0,00 E+00	2,66 E-03	0,00 E+00	0,00 E+00
EEE	MJ				7,51 E+00	0,00 E+00	2,02 E+00	0,00 E+00	2,03 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,92 E-04	0,00 E+00	1,30 E-02	0,00 E+00	0,00 E+00
ETE	MJ				1,29 E+01	0,00 E+00	3,49 E+00	0,00 E+00	3,50 E-03	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	3,30 E-04	0,00 E+00	2,25 E-02	0,00 E+00	0,00 E+00

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



RESOURCE USE of 1 m² non-scalable environmental profile (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ				6,83 E+02	3,91 E-02	2,06 E+01	0,00 E+00	3,75 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-02	1,42 E-02	4,97 E-01	3,13 E-02	-6,56 E+02
PERM	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ				6,83 E+02	3,91 E-02	2,06 E+01	0,00 E+00	3,75 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,38 E-02	1,42 E-02	4,97 E-01	3,13 E-02	-6,56 E+02
PENRE	MJ				1,25 E+03	3,32 E+00	4,02 E+01	0,00 E+00	3,96 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,25 E+00	1,21 E+00	3,36 E+00	3,97 E-01	-9,09 E+02
PENRM	MJ				8,70 E-02	0,00 E+00	2,61 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ				1,25 E+03	3,32 E+00	4,02 E+01	0,00 E+00	3,96 E+01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	2,25 E+00	1,21 E+00	3,36 E+00	3,97 E-01	-9,09 E+02
SM	kg				6,98 E+00	0,00 E+00	2,09 E-01	0,00 E+00	1,54 E-04	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	1,45 E-05	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	ND	ND	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m ³				1,95 E+00	3,81 E-04	5,90 E-02	0,00 E+00	1,48 E-01	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	3,68 E-04	1,38 E-04	1,51 E-03	1,28 E-04	-1,65 E+00

- 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

BIOGENIC CARBON CONTENT of 1 m² non-scalable environmental profile (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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
BCCpa	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

- BBCpr = Biogenic carbon content in product
- BCCpa = Biogenic carbon content in packaging



RESULTS FOR SCALABLE FLANGES PROFILE

ENVIRONMENTAL IMPACT of 1 kg of flanges - scalable (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.				1,41 E-04	5,13 E-07	4,34 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,86 E-07	1,29 E-06	1,72 E-08	-2,80 E-05
ADPF	MJ				2,12 E+02	3,07 E-01	6,42 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,12 E-01	3,14 E-01	2,71 E-02	-1,59 E+02
GWP	kg CO2 eq.				1,60 E+01	2,01 E-02	5,59 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,29 E-03	2,29 E-02	1,58 E-03	-1,22 E+01
ODP	Kg CFC11 eq.				6,42 E-07	3,56 E-09	1,98 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,29 E-09	2,87 E-09	1,93 E-10	-4,16 E-07
POCP	Kg ethene eq.				7,25 E-03	1,21 E-05	2,20 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	4,40 E-06	2,02 E-05	1,23 E-06	-5,13 E-03
AP	kg SO2 eq.				8,82 E-02	8,83 E-05	2,67 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,21 E-05	2,25 E-04	8,49 E-06	-6,99 E-02
EP	kg (PO4) 3- eq.				7,87 E-03	1,73 E-05	2,42 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,30 E-06	2,88 E-05	1,22 E-06	-5,77 E-03

Toxicity indicators for Dutch market

HTP	kg DCB-Eq				1,37 E+01	8,45 E-03	4,15 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,07 E-03	2,78 E-02	7,28 E-04	-1,18 E+01
FAETP	kg DCB-Eq				1,29 E-01	2,47 E-04	4,73 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	8,96 E-05	5,18 E-04	1,86 E-05	-8,37 E-02
MAETP	kg DCB-Eq				7,83 E+02	8,88 E-01	2,48 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,22 E-01	2,25 E+00	4,99 E-02	-6,00 E+02
TETP	kg DCB-Eq				3,22 E-02	2,99 E-05	9,77 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,09 E-05	8,66 E-05	3,20 E-06	-2,31 E-02
ECI	euro				2,57	0,00	0,08	0,00 E+00	0,00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00	0,00	0,01	0,00	-2,09
ADPF	kg Sb eq.				1,02 E-01	1,48 E-04	3,09 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	5,36 E-05	1,51 E-04	1,30 E-05	-7,64 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.]



ENVIRONMENTAL IMPACT of 1 kg of flanges - scalable (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.				1,15 E+01	2,03 E-02	4,23 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,36 E-03	2,19 E-02	1,64 E-03	-9,65 E+00
GWP-fossil	kg CO2 eq.				1,14 E+01	2,02 E-02	4,19 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,35 E-03	2,32 E-02	1,62 E-03	-9,52 E+00
GWP-biogenic	kg CO2 eq.				-6,67 E-02	9,35 E-06	-2,04 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,40 E-06	-1,33 E-03	1,80 E-05	6,67 E-02
GWP-luluc)	kg CO2 eq.				2,00 E-01	7,42 E-06	6,01 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,70 E-06	2,60 E-05	1,26 E-06	-1,96 E-01
ODP	kg CFC11 eq.				9,43 E-07	4,47 E-09	2,89 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,62 E-09	3,33 E-09	2,35 E-10	-7,65 E-07
AP	mol H+ eq.				8,18 E-02	1,17 E-04	2,48 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	4,27 E-05	2,81 E-04	1,07 E-05	-7,34 E-02
EP-freshwater	kg PO4 eq.				3,28 E-04	2,04 E-07	9,92 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,42 E-08	1,58 E-06	4,84 E-08	-2,76 E-04
EP-marine	kg N eq.				1,04 E-02	4,14 E-05	3,21 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,50 E-05	6,20 E-05	2,73 E-06	-8,54 E-03
EP-terrestrial	mol N eq.				1,19 E-01	4,56 E-04	3,69 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,66 E-04	7,20 E-04	3,05 E-05	-9,83 E-02
POCP	kg NMVOC eq.				3,86 E-02	1,30 E-04	1,19 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	4,73 E-05	1,97 E-04	9,21 E-06	-3,19 E-02
ADP-minerals & metals	kg Sb eq.				1,39 E-04	5,13 E-07	4,26 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,86 E-07	1,29 E-06	1,72 E-08	-4,51 E-05
ADP-fossil	MJ, net calorific value				1,15 E+02	3,05 E-01	3,51 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,11 E-01	3,22 E-01	2,47 E-02	-9,35 E+01
WDP	m3 world eq. Deprived				3,62 E+00	1,09 E-03	1,09 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,97 E-04	3,24 E-03	1,50 E-04	-2,81 E+00

- 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]

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 experience with the indicator.

ENVIRONMENTAL IMPACT of 1 kg of flanges - scalable (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				9,77 E-07	1,82 E-09	2,96 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,61 E-10	3,53 E-09	1,99 E-10	-6,71 E-07
IRP	kBq U235 eq.				5,57 E-01	1,28 E-03	1,69 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	4,65 E-04	1,60 E-03	8,64 E-05	-4,95 E-01
ETP-fw	CTUe				3,03 E+02	2,72 E-01	9,76 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	9,89 E-02	1,38 E+00	1,87 E+01	-2,56 E+02
HTP-c	CTUh				2,78 E-08	8,83 E-12	8,41 E-10	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,21 E-12	3,37 E-11	1,71 E-12	-2,46 E-08
HTP-nc	CTUh				4,11 E-07	2,98 E-10	1,25 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,08 E-10	1,60 E-09	4,59 E-11	-3,72 E-07
SQP	----				9,88 E+01	2,65 E-01	3,02 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	9,62 E-02	6,47 E-01	3,23 E-02	-8,81 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]

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

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 experience with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES of 1 kg of flanges - scalable (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg				2,05 E-05	7,74 E-07	7,90 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,81 E-07	9,70 E-07	3,29 E-08	5,81 E-04
NHWD	kg				4,19 E-01	1,94 E-02	1,91 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,04 E-03	9,40 E-03	3,08 E-02	1,35 E-01
RWD	kg				5,02 E-05	2,00 E-06	1,77 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	7,28 E-07	1,90 E-06	1,12 E-07	1,48 E-05
CRU	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg				7,53 E-01	0,00 E+00	5,45 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	9,40 E-01	0,00 E+00	0,00 E+00
MER	kg				9,96 E-02	0,00 E+00	2,72 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ				7,63 E-01	0,00 E+00	2,06 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
ETE	MJ				1,31 E+00	0,00 E+00	3,54 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

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



RESOURCE USE of 1 kg of flanges - scalable (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ				6,90 E+01	0,00 E+00	2,07 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-6,78 E+01
PERM	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ				6,92 E+01	3,82 E-03	2,08 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,39 E-03	5,04 E-02	1,14 E-03	-6,72 E+01
PENRE	MJ				1,10 E+02	0,00 E+00	3,31 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	-1,01 E+02
PENRM	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ				1,18 E+02	3,24 E-01	3,58 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,18 E-01	3,41 E-01	2,63 E-02	-9,30 E+01
SM	kg				7,13 E-01	0,00 E+00	2,14 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	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	ND	ND	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3				1,91 E-01	3,72 E-05	5,75 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,35 E-05	1,53 E-04	6,46 E-06	-1,69 E-01

- 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

BIOGENIC CARBON CONTENT of 1 kg of flanges - scalable (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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
BCCpa	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

- BBCpr = Biogenic carbon content in product
- BCCpa = Biogenic carbon content in packaging

RESULTS FOR SCALABLE PROFILE OF REINFORCEMENTS

ENVIRONMENTAL IMPACT of one piece of reinforcement per m² - scalable (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.				3,07 E-04	1,09 E-06	9,43 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	ND	0,00 E+00	3,97 E-07	2,75 E-06	3,53 E-08	-6,57 E-05
ADPF	MJ				4,40 E+02	6,54 E-01	1,33 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,38 E-01	6,71 E-01	5,56 E-02	-3,27 E+02
GWP	kg CO2 eq.				3,33 E+01	4,28 E-02	1,16 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,55 E-02	5,74 E-02	3,28 E-03	-2,52 E+01
ODP	Kg CFC11 eq.				1,34 E-06	7,59 E-09	4,12 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,76 E-09	6,14 E-09	3,96 E-10	-8,58 E-07
POCP	Kg ethene eq.				1,51 E-02	2,58 E-05	4,58 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	9,38 E-06	4,32 E-05	2,52 E-06	-1,06 E-02
AP	kg SO2 eq.				1,83 E-01	1,88 E-04	5,53 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,83 E-05	4,82 E-04	1,74 E-05	-1,44 E-01
EP	kg (PO4) 3- eq.				1,63 E-02	3,70 E-05	5,01 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,34 E-05	6,17 E-05	2,51 E-06	-1,19 E-02

Toxicity indicators for Dutch market

HTP	kg DCB-Eq				3,46 E+01	1,80 E-02	1,05 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,54 E-03	5,94 E-02	1,49 E-03	-2,80 E+01
FAETP	kg DCB-Eq				2,70 E-01	5,26 E-04	9,96 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,91 E-04	1,11 E-03	4,15 E-05	-1,73 E-01
MAETP	kg DCB-Eq				1,63 E+03	1,89 E+00	5,17 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,87 E-01	4,81 E+00	1,05 E-01	-1,24 E+03
TETP	kg DCB-Eq				7,41 E-02	6,37 E-05	2,25 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,31 E-05	1,85 E-04	6,56 E-06	-4,71 E-02
ECI	euro				5,89	0,01	0,19	0,00 E+00	0,00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00	0,00	0,01	0,00	-4,64
ADPF	kg Sb eq.				2,12 E-01	3,15 E-04	6,40 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,14 E-04	3,23 E-04	2,67 E-05	-1,57 E-01

- 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.]



ENVIRONMENTAL IMPACT of one piece of reinforcement per m² - scalable (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.				2,42 E+01	4,32 E-02	8,90 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,57 E-02	5,80 E-02	3,36 E-03	-2,01 E+01
GWP-fossil	kg CO2 eq.				2,38 E+01	4,32 E-02	8,78 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,57 E-02	5,79 E-02	3,36 E-03	-1,97 E+01
GWP-biogenic	kg CO2 eq.				0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
GWP-luluc)	kg CO2 eq.				4,10 E-01	1,58 E-05	1,23 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	5,74 E-06	5,55 E-05	2,58 E-06	-4,01 E-01
ODP	kg CFC11 eq.				1,95 E-06	9,53 E-09	5,98 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,46 E-09	7,13 E-09	4,83 E-10	-1,57 E-06
AP	mol H+ eq.				1,70 E-01	2,50 E-04	5,16 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	9,09 E-05	6,02 E-04	2,20 E-05	-1,51 E-01
EP-freshwater	kg PO4 eq.				6,88 E-04	4,35 E-07	2,08 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,58 E-07	3,37 E-06	9,90 E-08	-5,71 E-04
EP-marine	kg N eq.				2,17 E-02	8,82 E-05	6,72 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,20 E-05	1,33 E-04	5,62 E-06	-1,77 E-02
EP-terrestrial	mol N eq.				2,49 E-01	9,72 E-04	7,72 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,53 E-04	1,54 E-03	6,26 E-05	-2,03 E-01
POCP	kg NMVOC eq.				8,07 E-02	2,78 E-04	2,49 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,01 E-04	4,21 E-04	1,89 E-05	-6,61 E-02
ADP-minerals & metals	kg Sb eq.				3,02 E-04	1,09 E-06	9,27 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	3,97 E-07	2,75 E-06	3,53 E-08	-1,01 E-04
ADP-fossil	MJ, net calorific value				2,41 E+02	6,51 E-01	7,35 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,36 E-01	6,88 E-01	5,08 E-02	-1,93 E+02
WDP	m3 world eq. Deprived				7,49 E+00	2,33 E-03	2,26 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	8,46 E-04	7,02 E-03	3,15 E-04	-5,74 E+00

- 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]

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 experience with the indicator.



ENVIRONMENTAL IMPACT of one piece of reinforcement per m² - scalable (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				2,03 E-06	3,88 E-09	6,17 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,41 E-09	7,54 E-09	4,08 E-10	-1,39 E-06
IRP	kBq U235 eq.				1,15 E+00	2,73 E-03	3,50 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	9,90 E-04	3,42 E-03	1,77 E-04	-1,02 E+00
ETP-fw	CTUe				6,34 E+02	5,80 E-01	2,04 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,11 E-01	2,96 E+00	3,83 E+01	-5,31 E+02
HTP-c	CTUh				6,36 E-08	1,88 E-11	1,92 E-09	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	6,84 E-12	7,21 E-11	3,50 E-12	-5,35 E-08
HTP-nc	CTUh				8,59 E-07	6,35 E-10	2,62 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,31 E-10	3,42 E-09	9,40 E-11	-7,49 E-07
SQP	----				2,04 E+02	5,65 E-01	6,24 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,05 E-01	1,38 E+00	6,64 E-02	-1,81 E+02

- 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]

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

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 experience with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES of one piece of reinforcement per m² - scalable (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg				5,16 E-05	1,65 E-06	1,92 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	5,99 E-07	2,08 E-06	6,76 E-08	1,18 E-03
NHWD	kg				1,35 E+00	4,13 E-02	5,43 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,50 E-02	2,03 E-02	6,42 E-02	3,66 E-03
RWD	kg				1,16 E-04	4,27 E-06	4,05 E-06	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	1,55 E-06	4,07 E-06	2,30 E-07	2,63 E-05
CRU	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg				1,54 E+00	0,00 E+00	1,14 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	2,01 E+00	0,00 E+00	0,00 E+00
MER	kg				2,12 E-01	0,00 E+00	5,81 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	2,66 E-03	0,00 E+00	0,00 E+00
EEE	MJ				1,63 E+00	0,00 E+00	4,39 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	1,30 E-02	0,00 E+00	0,00 E+00
ETE	MJ				2,80 E+00	0,00 E+00	7,56 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	2,25 E-02	0,00 E+00	0,00 E+00

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

RESOURCE USE of one piece of reinforcement per m² - scalable (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ				1,43 E+02	8,15 E-03	4,28 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,96 E-03	1,08 E-01	2,33 E-03	-1,38 E+02
PERM	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ				1,43 E+02	8,15 E-03	4,28 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,96 E-03	1,08 E-01	2,33 E-03	-1,38 E+02
PENRE	MJ				2,46 E+02	6,91 E-01	7,50 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,51 E-01	7,29 E-01	5,40 E-02	-1,92 E+02
PENRM	MJ				8,70 E-02	0,00 E+00	2,61 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ				2,46 E+02	6,91 E-01	7,50 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,51 E-01	7,29 E-01	5,40 E-02	-1,92 E+02
SM	kg				1,48 E+00	0,00 E+00	4,44 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	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	ND	ND	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3				3,93 E-01	7,93 E-05	1,18 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	ND	ND	0,00 E+00	2,88 E-05	3,37 E-04	1,34 E-05	-3,45 E-01

- 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

BIOGENIC CARBON CONTENT of one piece of reinforcement per m² - scalable (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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
BCCpa	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	ND	ND	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

- BBCpr = Biogenic carbon content in product
- BCCpa = Biogenic carbon content in packaging