

# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	JANSEN AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-JAN-20230475-CBA1-EN
Issue date	29.11.2024
Valid to	28.11.2029

**Janisol Arte 2.0 window width x height: 1230 mm x 1480 mm**  
**Jansen AG**

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**EPD**  
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## General Information

### Jansen AG

#### Programme holder

IBU – Institut Bauen und Umwelt e.V.  
Hegelplatz 1  
10117 Berlin  
Germany

#### Declaration number

EPD-JAN-20230475-CBA1-EN

#### This declaration is based on the product category rules:

Windows and doors , 01.08.2021  
(PCR checked and approved by the SVR)

#### Issue date

29.11.2024

#### Valid to

28.11.2029



Dipl.-Ing. Hans Peters  
(Chairman of Institut Bauen und Umwelt e.V.)



Florian Pronold  
(Managing Director Institut Bauen und Umwelt e.V.)

### Janisol Arte 2.0 window width x height: 1230 mm x 1480 mm

#### Owner of the declaration

JANSEN AG  
Industriestrasse 34  
9463 Oberriet  
Switzerland

#### Declared product / declared unit

1 m<sup>2</sup> Janisol Arte 2.0 window with a grammage of 32.00 kg/m<sup>2</sup>.  
The actual reference size of the declared window has dimensions of width x height: 1230 mm x 1480 mm.

#### Scope:

The environmental product declaration refers to a window type Janisol Arte 2.0 in specific dimension width x height. The characteristic values used for the system components Janisol Arte 2.0 window in the LCA are provided by Jansen AG.

The declared product is defined according to the profile series and product characteristics.

The location of the production site is Oberriet/Switzerland.  
This EPD was created with the help of a semi-automatic LCA-Tool.  
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

#### Verification

The standard EN 15804 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025:2011

internally  externally



Matthias Klingler,  
(Independent verifier)

## Product

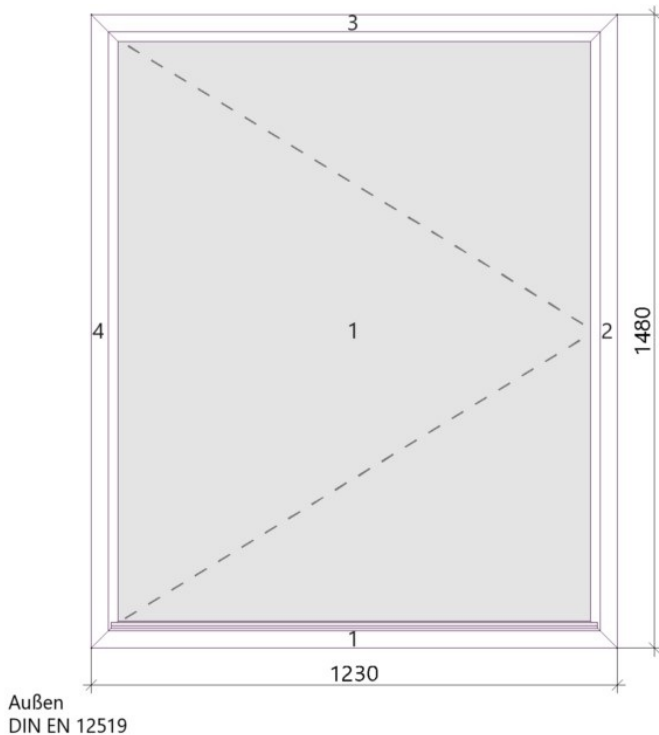
### Product description/Product definition

Janisol Arte 2.0 windows are made of steel, stainless steel or corten profiles with a depth of 60 mm. It enables the use of highly insulated glazings, with a sash height of up to 2400 mm. It is possible to have a side-hung opening type as well as top-hung or pivot windows. The new glazing bead system facilitates installation of the panes. Fabrication with push-in gasket or dry glazing takes place in the usual way, as with the Janisol and Janisol Arte 66 steel profiles. This declaration describes the following element in Janisol Arte 2.0:

**Product: Janisol Arte 2.0 window**  
**Width x height: 1230 mm x 1480 mm**  
**Face width sash: 45 mm**  
**Basic depth: 60mm / sash depth: 66 mm**  
**CE marking according to EN 14351-1**

The products require a declaration of performance taking into account the harmonized product standard EN 14351-1 windows and doors and a CE marking. The respective national regulations apply to the use.

With this declaration the following element is declared:



### Application

The Janisol Arte 2.0 opening element can be integrated for building ventilation and light transmission.

### Technical Data

## LCA: Calculation rules

### Declared Unit

The declared unit is a 1 m<sup>2</sup> of Janisol Arte 2.0 window element. The actual reference size of the declared window element has

According to the CE marking, the following structural data for the element must be stated:

### Constructional data

Name	Value	Unit
Resistance to wind load acc. to EN 12210	C5	class
Water tightness acc. to EN 12208	9A	class
Sound insulation class acc. to EN ISO 10140	up to Rw 45 dB (-1; -5)	-
Heat transfer coefficient acc. to DIN EN ISO 10077-2	1.9	W/(m <sup>2</sup> K)
Air permeability acc. to EN 12207	4	class
Mechanical strength acc. to EN 13115	4	class
Impact resistance acc. to EN 13049	4	class
Burglar resistance acc. to EN 1627	3	class
Mechanical durability test acc. to EN 12400	4	class

Product according to the CPR, based on EN: Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to EN 14351-1, windows. Other constructional data are not relevant for this product.

### Base materials/Ancillary materials

JANSEN Janisol Arte 2.0 window is made of the following materials:

- Glazing approx. 54%
- Steel approx. 32%
- Plastics and fillers approx. 12%
- Aluminium 2%

The percentages relate to the most frequently sold product with an opening of 1.82 m<sup>2</sup>. The percentages stated may vary depending on the product type and dimensions.

Does the product or at least one part product contain materials from the ECHA candidate list of materials which are especially problematic for approval: Substances of Very High Concern – SVHC (date 27.06.2024) above a mass % of 0.1: no.

This product/article/at least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no.

### Reference service life

According to SBR 2011 regarding the specific material characteristics of steel the reference service life is 75 years (SBR 2011). The practical service life may well be longer. Conditions for a long service life are regular maintenance, care and upkeep of the product. The specified service life is independent of the manufacturer's warranty.

dimensions of 1230 mm x 1480 mm.

### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Grammage	32	kg/m <sup>2</sup>
Layer thickness	0.06	m

For inhomogeneous components made of different materials, the conversion to other dimensions with factors leads to deviations compared to the exact calculation. The frame percentage is 17.04% and the ground reference is 0.074m<sup>2</sup>.

### System boundary

Type of EPD according to *EN 15804*: "cradle to gate with options, modules C1–C4, and module D". The following modules are declared: A1–A3, C, D and additional modules: A4 + A5.

### Production (modules A1-A3):

This module considers the provision of all relevant window components (i.e. metal profiles/ components, glass units and plastic parts/profiles) and raw materials including their transport to the declared production plant. This considers the manufacturing and assembly of these components, including waste processing up to the end-of-waste state. The impact of packaging materials is also covered by this module.

### Transport to the construction site (module A4):

A distance of 100 km is considered for the transport of the packed finished product via truck. The transport distance can be modified project-specific if required by linear scaling.

### Installation (module A5):

Treatment and disposal of packaging material is considered in this module. Credits for potential avoided burdens due to energy substitution of electricity and thermal energy generation are declared in module D under European conditions and affects only the rate of primary materials (no secondary materials).

### End of Life (EoL) stage (modules C1-C4):

Module C1 - considers manual deconstruction (without environmental burdens).

Module C2 - considers 50 km truck transport to waste processing. The transport distance can be modified project-specific if required by linear scaling.

Modules C3 and C4 - consider waste processing and/or disposal with the following scenarios:

Scenario 0: 100% thermal treatment of all raw materials with heating value including plastic system parts and 100% recycling of metal system components (C3). Landfill of all materials without heating value (except metals) including glazing (C4).

Scenario 1 (module C3/1): 100% recycling of plastic system parts and 100% recycling of metal system components. Landfill of all materials without heating value (except metals) including glazing (C4/1).

Modules C4 & C4/1 are identical.

EoL scenario 0 (modules C3 and C4)

Collected separately waste type (window element) 32.00 kg

Recycling (C3) 10.92 kg

Energy recovery (C3) 1.42 kg

Landfilling (C4) 19.80 kg

EoL scenario 1 (modules C3/1 and C4/1)

Collected separately (window element) 32.00 kg

Recycling (C3/1) 12.19 kg

Energy recovery (C3/1) 0.15 kg

Landfilling (C4/1) 19.80 kg

### Benefits and loads beyond the product system boundary (module D):

Considers credits and loads from the recycling of the metal components (duplicated in D and D/1) and the recycling of the plastic system parts/profiles (D/1). Avoided burdens from the thermal treatment of all raw materials with heating value (including plastic system parts/ profiles) (D) and packaging treatment (duplicated in D and D/1) under European conditions are considered. This affects only the rate of primary materials (no secondary materials).

### Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

### Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The following background database has been used for the LCA calculation: Sphera LCA software (*GaBi ts*) content update package (CUP) version 2022.2

## LCA: Scenarios and additional technical information

### Characteristic product properties of biogenic carbon

No biogenic carbon is reported in the product. The biogenic carbon content in the accompanying packaging for 1 m<sup>2</sup> Janisol Arte 2.0 window is declared below.

### Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.00588	kg C

The following technical information is a basis for the declared modules. The values refer to the declared unit of 1 m<sup>2</sup> of

Janisol Arte 2.0 window.

### Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.063	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%
Gross weight of packed products transported	32.02	kg

### Installation into the building (A5)

Name	Value	Unit
Polyethylene (waste packaging to incineration)	0.00127	kg
Cardboard box (waste packaging to incineration)	0.00606	kg
Wood (waste packaging to incineration)	0.00799	kg

According to SBR 2011 regarding the specific material characteristics of steel windows and doors, the reference service life is 75 years (SBR 2011). The practical service life may well be longer. Conditions for a long service life are regular maintenance, care and upkeep of the product. The specified service life is independent of the manufacturer's warranty.

#### Reference service life

Name	Value	Unit
Life Span (according to SBR 2011)	75	a

Reference service life according to the table "service life" of building components for life cycle analyses according to SBR 2011.

#### End of life (C1-C4)

For the End-of-Life stage two scenarios are considered. Scenario 0 considers 100% thermal treatment of all raw materials with heating value including plastic system parts and 100% recycling of metal system components (C3). Landfill of all materials without heating value (except metals) including glazing (C4).

Scenario 1 considers 100% recycling of plastic system parts and 100% recycling of metal system components (C3/1). Landfill of all materials without heating value (except metals) including glazing (C4/1). Modules C4 and C4/1 are identical. The recycling of plastics scenario declared in this EPD is currently considered a scenario that is not widely available in reality due to economic viability limitations associated with higher costs of sorting smaller shares of plastics such as those

present in the declared product.

Name	Value	Unit
End of Life scenario 0 (modules C3 and C4)		
Collected separately waste type (window element)	32	kg
Recycling (C3)	10.92	kg
Energy recovery (C3)	1.42	kg
Landfilling (C4)	19.8	kg
End of Life scenario 1 (modules C3/1 and C4/1)		
Collected separately (window element)	32	kg
Recycling (C3/1)	12.19	kg
Energy recovery (C3/1)	0.15	kg
Landfilling (C4/1)	19.8	kg

#### Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D includes the credits and loads from the recycling of the metal components (duplicated in D and D/1) and the recycling of the plastic system parts/profiles (D/1). Avoided burdens from the thermal treatment of all raw materials with heating value (including plastic system parts/profiles) (D) and packaging treatment (duplicated in D and D/1) under European conditions are considered. This affects only the rate of primary materials (no secondary materials). A waste incineration plant with R1-value > 0.6 is assumed.

For recycling, a collection rate of 100% is considered.



## LCA: Results

Results provided in this section are presented in relation to 1 m<sup>2</sup> of window type Jansen Janisol Arte 2.0 (reference dimensions 1230 mm x 1480 mm).

For the End-of-Life stage, two scenarios are considered:

C3 - considers 100% recycling of metal system components (duplicated in D and D/1) and 100% thermal treatment of all raw materials with heating value including plastic system parts.

C3/1 - considers 100% recycling of metal system components (duplicated in D and D/1) and 100% recycling of plastic system parts.

C4 and C4/1 - considers landfill of all materials without heating value (except metals) including glazing. Modules C4 and C4/1 are identical.

D - considers credits and loads from the recycling of the metal components (duplicated in D and D/1). Avoided burdens from packaging treatment (duplicated in D and D/1) and thermal treatment of all raw materials with heating value (including plastic system parts/profiles) are considered.

D/1 - considers credits and loads from the recycling of the metal components (duplicated in D and D/1) and the recycling of the plastic system parts/profiles. Avoided burdens from packaging treatment (duplicated in D and D/1) are considered.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)**

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the 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	MND	MND	MNR	MNR	MNR	X	MND	X	X	X	X	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m<sup>2</sup> Janisol Arte 2.0 window (32.00 kg/m<sup>2</sup>)

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C3/1	C4	C4/1	D	D/1
GWP-total	kg CO <sub>2</sub> eq	5.85E+01	1.93E-01	2.57E-02	0	0	9.66E-02	2.92E+00	1.12E-01	2.97E-01	2.97E-01	-1.08E+01	-1.11E+01
GWP-fossil	kg CO <sub>2</sub> eq	5.83E+01	1.91E-01	4.38E-03	0	0	9.57E-02	2.92E+00	1.12E-01	2.96E-01	2.96E-01	-1.08E+01	-1.11E+01
GWP-biogenic	kg CO <sub>2</sub> eq	2.03E-01	8.08E-04	2.13E-02	0	0	4.04E-04	2.19E-04	2.85E-05	9.95E-04	9.95E-04	-4.53E-03	1.71E-03
GWP-luluc	kg CO <sub>2</sub> eq	1.93E-02	1.07E-03	6.97E-08	0	0	5.34E-04	9.5E-06	4.52E-06	5.45E-04	5.45E-04	-3.29E-04	-5.69E-04
ODP	kg CFC11 eq	1.45E-10	1.15E-14	2.21E-15	0	0	5.74E-15	2.47E-13	4.15E-14	6.95E-13	6.95E-13	-7.15E-12	-6.39E-12
AP	mol H <sup>+</sup> eq	2.46E-01	1.82E-04	4.81E-06	0	0	9.12E-05	1.68E-03	2.8E-05	2.1E-03	2.1E-03	-2.59E-02	-2.68E-02
EP-freshwater	kg P eq	6.93E-05	5.72E-07	5.97E-10	0	0	2.86E-07	8.63E-08	3.1E-08	5.01E-07	5.01E-07	-3.4E-06	-4.26E-06
EP-marine	kg N eq	7.11E-02	5.68E-05	1.61E-06	0	0	2.84E-05	8.11E-04	9.85E-06	5.36E-04	5.36E-04	-4.11E-03	-4.51E-03
EP-terrestrial	mol N eq	8.24E-01	6.83E-04	2.23E-05	0	0	3.41E-04	9.36E-03	1.36E-04	5.89E-03	5.89E-03	-3.79E-02	-4.19E-02
POCP	kg NMVOC eq	1.99E-01	1.59E-04	4.34E-06	0	0	7.95E-05	2.08E-03	2.65E-05	1.63E-03	1.63E-03	-1.59E-02	-1.86E-02
ADPE	kg Sb eq	1.92E-04	1.6E-08	5.4E-11	0	0	8.01E-09	6.62E-09	9.69E-10	3.03E-08	3.03E-08	-2.16E-05	-2.18E-05
ADPF	MJ	7.42E+02	2.56E+00	6.07E-03	0	0	1.28E+00	8E-01	7.69E-02	3.87E+00	3.87E+00	-1.11E+02	-1.38E+02
WDP	m <sup>3</sup> world eq deprived	4.56E+00	1.72E-03	2.93E-03	0	0	8.59E-04	2.99E-01	2.28E-02	3.24E-02	3.24E-02	-1.91E+00	-1.72E+00

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

### RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m<sup>2</sup> Janisol Arte 2.0 window (32.00 kg/m<sup>2</sup>)

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PERE	MJ	1.12E+02	1.46E-01	2.13E-01	0	0	7.28E-02	1.51E-01	2.52E-02	5.81E-01	5.81E-01	-8.09E+00	-5.7E+00
PERM	MJ	2.12E-01	0	-2.12E-01	0	0	0	0	0	0	0	0	0
PERT	MJ	1.13E+02	1.46E-01	1.39E-03	0	0	7.28E-02	1.51E-01	2.52E-02	5.81E-01	5.81E-01	-8.09E+00	-5.7E+00
PENRE	MJ	7.08E+02	2.57E+00	6.43E-02	0	0	1.28E+00	3.55E+01	3.48E+01	3.88E+00	3.88E+00	-1.11E+02	-1.38E+02
PENRM	MJ	3.47E+01	0	-5.82E-02	0	0	0	-3.47E+01	-3.47E+01	0	0	0	0
PENRT	MJ	7.43E+02	2.57E+00	6.07E-03	0	0	1.28E+00	8.01E-01	7.69E-02	3.88E+00	3.88E+00	-1.11E+02	-1.38E+02
SM	kg	6.07E+00	0	0	0	0	0	0	0	0	0	5.12E+00	5.78E+00
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0
FW	m <sup>3</sup>	2E-01	1.65E-04	6.89E-05	0	0	8.23E-05	7.01E-03	5.14E-04	9.84E-04	9.84E-04	-6.12E-02	-6.56E-02

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

## RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m2 Janisol Arte 2.0 window (32.00 kg/m2)

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C3/1	C4	C4/1	D	D/1
HWD	kg	7.9E-08	1.23E-11	5.93E-13	0	0	6.15E-12	1.05E-10	4.97E-12	1.99E-10	1.99E-10	7.22E-09	5.19E-09
NHWD	kg	3.82E+00	3.68E-04	3.89E-04	0	0	1.84E-04	2.82E-02	1.41E-02	1.98E+01	1.98E+01	8.77E-01	9.09E-01
RWD	kg	2.13E-02	3.16E-06	3.46E-07	0	0	1.58E-06	3.53E-05	5.39E-06	4.31E-05	4.31E-05	-2.4E-03	-9.21E-04
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	3.27E-01	0	0	0	0	0	1.09E+01	1.22E+01	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	2.94E-02	0	0	0	4.97E+00	1.24E-01	0	0	0	0
EET	MJ	0	0	5.26E-02	0	0	0	8.93E+00	2.59E-01	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

## RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m2 Janisol Arte 2.0 window (32.00 kg/m2)

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PM	Disease incidence	1.89E-06	1.1E-09	2.53E-11	0	0	5.52E-10	5.28E-09	6.92E-10	2.58E-08	2.58E-08	-3.38E-07	-3.42E-07
IR	kBq U235 eq	3.41E+00	4.63E-04	5.63E-05	0	0	2.32E-04	5.44E-03	6.47E-04	4.79E-03	4.79E-03	-2.6E-01	2.42E-02
ETP-fw	CTUe	1.19E+03	1.78E+00	2.79E-03	0	0	8.89E-01	3.03E-01	5.63E-02	2.17E+00	2.17E+00	-1.46E+01	-3.46E+01
HTP-c	CTUh	4.09E-08	3.58E-11	1.83E-13	0	0	1.79E-11	2.05E-11	1.79E-12	3.31E-10	3.31E-10	-4.48E-09	-4.84E-09
HTP-nc	CTUh	2.62E-06	1.85E-09	6.88E-12	0	0	9.27E-10	7.45E-10	6.8E-11	3.67E-08	3.67E-08	-1.39E-07	-1.6E-07
SQP	SQP	1.46E+02	8.81E-01	1.76E-03	0	0	4.41E-01	1.79E-01	2.72E-02	8.05E-01	8.05E-01	-2.62E+00	-2.08E+00

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. 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. This EPD was created using a software tool.

## References

### Standards

#### EN 14351-1

EN 14351-1: 2016, Windows and doors - Product standard, performance characteristics - Part 1: windows and external pedestrian doorsets

#### EN 12210

EN 12210: 2016 Windows and doors - Resistance to wind loads - classification

#### EN ISO 10140

EN ISO 10140-1: 2021 Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products

#### DIN EN ISO 10077

DIN EN ISO 10077-2: 2017 Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames

#### EN 12207

EN 12207: 2016 Windows and doors - Air permeability - Classification

#### EN 13115

EN 13115: 2020 Windows - Classification of mechanical properties - Racking, torsion and operating forces

#### EN 13049

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