

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

WinWin Sheets

from

Bygtjek A/S



EPD of multiple products, based on a representative product, but includes following products:

- WinWin Sheet 0.40 kg/m²
- WinWin Sheet 0.45 kg/m²

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-11049
Publication date:	2024-03-27
Valid until:	2029-02-28

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







General information

Programme information

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

<p>Declaration owner</p> 	<p>Bygtjek A/S</p> <p>Gammelgardsvej 3, 7130 Juelsminde, Denmark t: +45 4043 4324 e: info@bygtjek.dk w: https://bygtjek.dk/</p>
<p>EPD program operator</p> 	<p>The International EPD[®] System</p> <p>EPD International AB, Box 210 60 , SE-100 31 Stockholm, Sweden e: info@environdec.com w: https://www.environdec.com</p>
<p>LCA practitioner</p> 	<p>NIRAS A/S</p> <p>Natascha Falbe Frandsen and Jesper Jakobsen Sortemosevej 19, 3450 Allerød, Denmark e: niras@niras.dk w: https://www.niras.dk/</p>
<p>Third Party Verifier</p> 	<p>Life Cycle Assessment Consulting</p> <p>Linda Høibye Forupsvej 4 7120 Vejle Øst Denmark E: hoeibye@gmail.com</p>

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serve as the core Product Category Rules (PCR)

Product category rules (PCR):

PCR 2019:14 Construction products, version 1.3.1.

PCR review was conducted by: The Technical Committee of the International EPD[®] System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life cycle assessment (LCA)

LCA accountability: *Jesper Jakobsen & Natascha Falbe Frandsen, NIRAS A/S*

Third-party verification

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

EPD verification by accredited certification body

Third-party verification: *Linda Høibye, Life Cycle Assessment Consulting* is an approved certification body accountable for the third-party verification

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

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

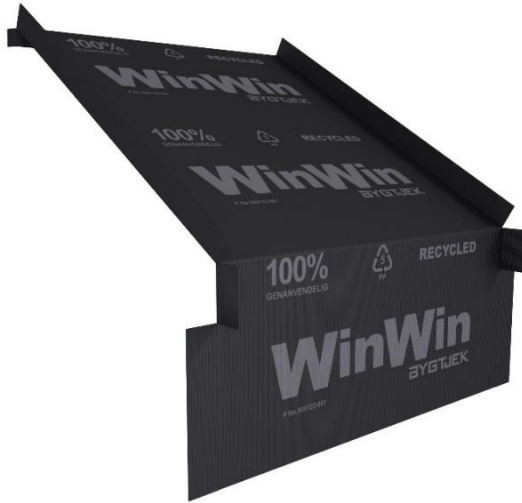
Owner of the EPD:	Bygtjek A/S
Contact:	Rasmus Jensen
Description of the organisation:	Bygtjek A/S is a supplier of standard and special building profiles as well as innovative accessory products for roofs and facades including WinWin sheets.
Product-related or management system-related certifications:	No
Name and location of production site:	Gammelgårdsvej 3, 7130 Juelsminde, Denmark

See <https://bygtjek.dk/> for additional company information.

Product information

Product name:	WinWin sheet
Geographical scope:	Denmark
Product description:	<p>Bygtjeks A/S' WinWin assortment is used as wind barriers in new buildings as well as in renovation projects where the roof meets the façade. The wind barriers from Bygtjek A/S are designed and developed in strong polypropylene (PP). The PP sheets are microperforated on both sides and are therefore open to diffusion for moisture exchange. The WinWin sheets guide the air into the roof structure and prevent the air from being blown into the insulation. This ensures that the effect of the insulation is maintained. The WinWin sheet's application temperature is from -20 degrees to +60 degrees and has a diffusion resistance of $0.89 \pm 10\%$ GPa·s·m²/kg. Further it is possible to get the WinWin sheets with clinker, which is a part of the sheet that are cut off at Bygtjek A/S to ensure additional bending and fastening of the sheets on the roof structure. See following figure an illustration of the clinker.</p> <p>The WinWin sheets are registered in the database for building products which can be used in Nordic Swan ecolabelled constructions.</p> <p>UN CPC code: 54530</p>

WinWin Sheets



LCA information

This EPD includes two of Bygtjek A/S' products.

- WinWin sheet 0.40 kg/m².
- WinWin sheet 0.45 kg/m².

Declared unit: 1 m² of WinWin sheet with a diffusion resistance¹ of $0.89 \pm 10\% \text{ GPa} \cdot \text{s} \cdot \text{m}^2/\text{kg}$, a flexibility² at lower temperatures down to -25 degrees without any cracks and a lifespan of 25 years.³

The EPD of multiple products is based on a representative product since Bygtjek A/S have two different weight classifications of their WinWin sheets. Therefore, a scaling factor have been used to accommodate the different WinWin sheet types at Bygtjek A/S. The scaling factor can be applied to the results to account for. The results of this EPD are based on the WinWin sheet with the weight of 0.40 kg/m².

Name	Weight	Unit	Scaling factor
Density			
#450	0.45	kg/m ²	1.13
#400	0.40		1.00

Time representativeness: The declaration of the year covered by the data used for the LCA calculation is 01.01.2022 – 31.12.2022.

Database and LCA software used: SimaPro 9.3 / ecoinvent 3.9.1

¹ EN 12572:2016 – method C

² DS/EN 1109

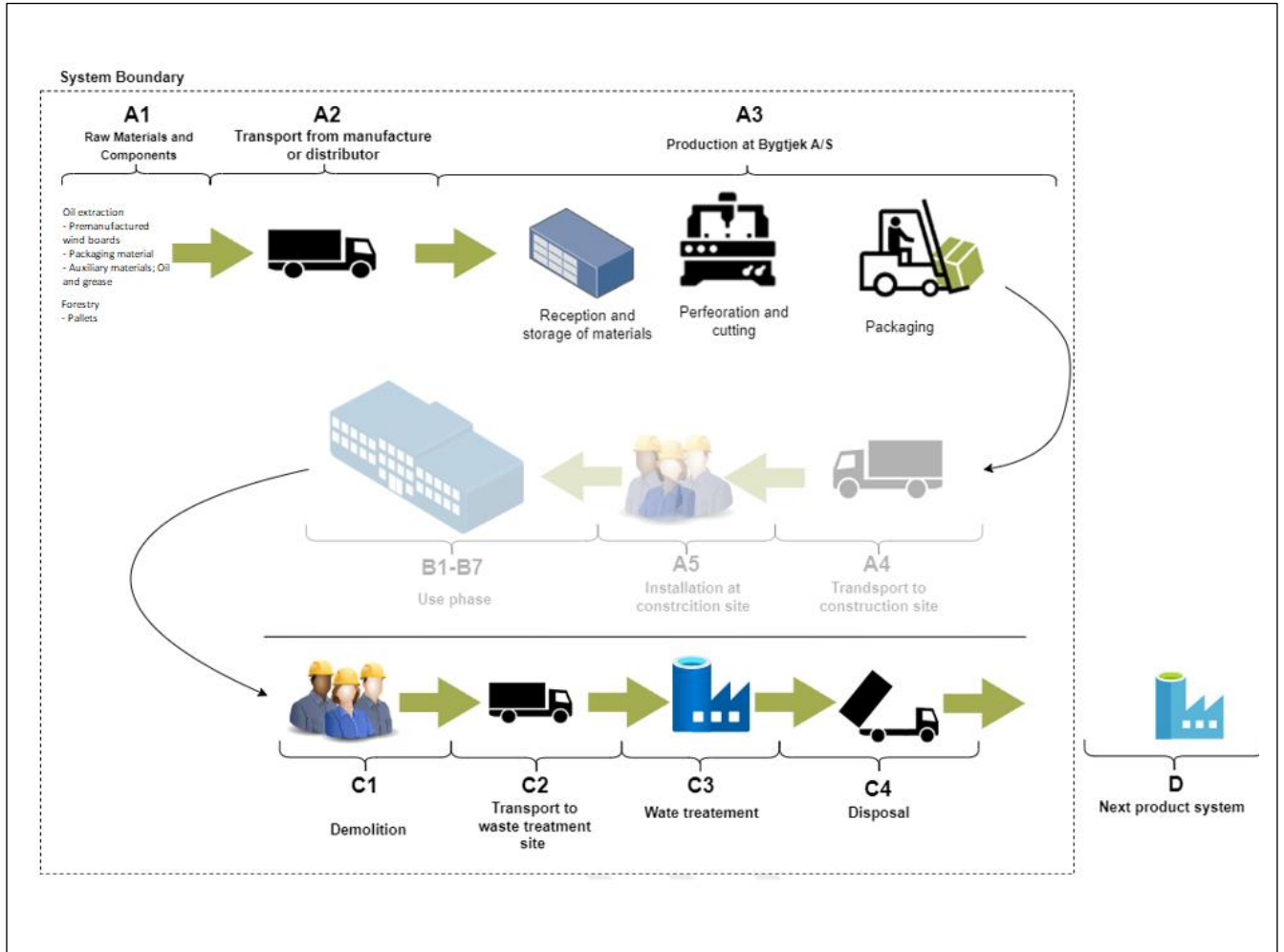
³ GPa refers to gigapascal

Description of system boundaries:

The life cycle of a building product is divided into three process modules according to the General Program Instructions (GPI) and four information modules according to EN 15804 and supplemented by an optional information module on potential loads and benefits beyond the building life cycle. Table 1 shows the system boundary and scope of the EPD. The scope of this EPD is cradle to gate with modules A1-A3, module C, module D.

Life cycle stages and modules (MND = module not declared)																	
	Product			Construction process		Use							End of life				Resource recovery
	Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Declared modules	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	Global	DK	DK	-	-	-	-	-	-	-	-	-	DK	DK	DK	DK	DK
Specific data used	4.93%																
Variation products	<10%																
Variation sites	N/A																

System diagram:



Content information

The LCI and LCIA results in this EPD relates to 1 m² of WinWin Sheet. Bygtjek A/S has three different weight classes on their products 450 g/m² and 400 g/m². However, only one set of results has been declared for in this EPD. The result set is based on Bygtjek A/S' WinWin sheet with the weight of 0.40 kg/m².

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Polypropylene copolymer	0.40 kg/m ² 0.45 kg/m ²	0%	0 kg C/kg
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Shrink foil	0.00089	2%	0 kg C/kg
Stretch foil	0.00094	2%	0 kg C/kg
PP band	0.00084	1%	0 kg C/kg
Wood pallet	0.05	95%	0.024 kg C/kg
TOTAL		100%	0.024 kg C/kg

The WinWin sheets do not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

Further technical information about the WinWin sheets can be obtained by contacting the manufacturer or on the manufacturer's website:

<https://bygtjek.dk/da/katalog/win-win-plader/win-win-plader/>

Life Cycle stage

This EPD is based on a cradle-to-gate LCA with modules C1-C4 and module D, in which 100 weight-% has been accounted for. Additionally, the EPD does not include infrastructure/capital goods.

The use of the results of modules A1-A3 without considering the results of module C is discouraged as the full perspective of the life cycle and its impacts is neglected.

According to the PCR 2019:14 v1.11 the general rules for the exclusion of inputs and outputs follows the requirements in EN 15804+A2, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes. Further, the cut-off criteria of renewable and non-renewable primary energy usage shall be 1%.

Product stage (A1-A3) includes:

- A1 – Extraction and processing of raw materials
- A2 – Transport to the production site
- A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The WinWin Sheets are premanufactured by Bygtjek A/S' suppliers and are designed and developed in PP plastic.. Further some of the WinWin Sheets have clinker for extra bending and fastening. The premanufactured WinWin Sheets are subsequently transported to Bygtjek A/S.

At Bygtjek A/S the premanufactured WinWin sheets are microperforated on both sides and cut to the predetermined sizes. The electricity use at Bygtjek A/S' productions site is modelled with the use of a Danish residual mix. Subsequently the final product is shipped on pallets, wrapped in plastic film and secured with PP bands. The electricity mix used for Bygtjeks A/S' production in A3 is the Danish residual mix with the impact of 0.63 CO₂-eq per kWh using the impact category GWP-GHG. Further the electricity mix used for the waste management of the packaging materials is the based on the market mix in Denmark and Germany.

Construction process stage (A4-A5) includes:

Modules are not relevant for this product.

Use stage (B1-B7) includes:

Modules are not relevant for this product.

End of Life (C1-C4) includes:

In module C1, the deconstruction of the products is assumed to be done with an excavator where the construction is demolished. This process is included in the study. The end-of-life scenario is based on a Danish waste scenario.

The demolished WinWin sheets are subsequently transported to waste treatment. The transport distance varies based on the waste treatment process. A transport distance of 50 km is assumed for municipal incineration and the recycling scenario.

The EOL scenario which is applied in this study is:

End-of-life scenario	Proportion (%)
Reuse	0
Recycling	17
Incineration	83
Landfill	0

Re-use, recovery and recycling potential (D) includes:

The WinWin sheets have potential benefits and load beyond the system boundary. This consists of the waste PP plastic, which is both sent for recycling and energy recovery.

Energy recovery is done through municipal incineration with fly ash extraction. Electricity generated through the waste incineration at the CHP plant is assumed to replace the average Danish electricity and district heating mix.

Recycling is performed through mechanical recycling and the substitution from this process is replacing the PP granulates used in the WinWin sheet.

Allocation

The allocation of electricity is performed in two steps.

1. The energy consumption for the machinery at Bygtjek's production sites are distributed according to the actual consumption for the WinWin sheets.
2. Economic allocation (all remaining electricity, mainly used for heating and internal transport as well as the all the water use).

The remaining electricity consumed for heating and internal transportation is allocated by using the rules for economic allocation since the individual products sold at Bygtjek A/S are above or near 25% is which is regarded as a high difference in revenue as stated in EN 15804+A2 in section 6.4.3.2. One other product group at Bygtjek A/S has a difference of less than 25 % from the WinWin sheets. Here the economic allocation of the product group with the higher economic share has been chosen for WinWin Sheets.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory impact category indicators according to EN 15804

ENVIRONMENTAL IMPACTS PER 1m ² WinWin Sheet							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1.33E+00	4.80E-04	3.75E-03	8.65E-01	0.00E+00	-4.33E-01
GWP-fossil	kg CO ₂ eq.	1.28E+00	4.79E-04	3.74E-03	8.64E-01	0.00E+00	-4.13E-01
GWP-biogenic	kg CO ₂ eq.	4.21E-02	6.36E-07	3.40E-06	8.21E-04	0.00E+00	-1.91E-02
GWP-luluc	kg CO ₂ eq.	9.78E-04	1.27E-07	1.83E-06	3.69E-05	0.00E+00	-8.09E-04
GWP-GHG	kg CO ₂ eq.	1.24E+00	4.79E-04	3.74E-03	8.63E-01	0.00E+00	-3.94E-01
ODP	kg CFC 11 eq.	1.04E-08	4.74E-11	8.15E-11	6.75E-10	0.00E+00	-9.60E-09
AP	mol H ⁺ eq.	4.80E-03	2.12E-06	1.10E-05	1.66E-04	0.00E+00	-1.79E-03
EP-freshwater	kg P eq.	2.39E-04	2.83E-08	2.63E-07	1.01E-05	0.00E+00	-1.98E-04
EP-marine	kg N eq.	1.01E-03	4.28E-07	3.55E-06	6.79E-05	0.00E+00	-4.18E-04
EP-terrestrial	mol N eq.	1.02E-02	3.73E-06	3.72E-05	7.05E-04	0.00E+00	-5.27E-03
POCP	kg NMVOC eq.	4.06E-03	4.35E-06	1.65E-05	1.81E-04	0.00E+00	-1.39E-03
ADPm ¹	kg Sb eq.	1.40E-06	3.36E-10	1.21E-08	6.60E-08	0.00E+00	-2.05E-06
ADPf ¹	MJ	3.60E+01	2.92E-02	5.31E-02	3.35E-01	0.00E+00	-9.35E+00
WDP ¹	m ³ world eq. deprived	3.15E-01	3.66E-05	2.17E-04	1.08E-02	0.00E+00	-1.35E-01
Caption	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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use						
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. ³ Only values or the letters "ND" (not declared). No blank cells, hyphens or other symbols. The value 0 only for parameters that have been calculated to be 0. "ND" is only for parameters that are not quantified because of no data available. Footnotes shall be used to explain and limitation to the result value.						

Additional mandatory and voluntary impact category indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1m ² WinWin Sheet							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PM	[Disease incidence]	6.49E-08	1.76E-11	2.92E-10	9.95E-10	0.00E+00	-1.65E-08
IRP ²	[kBq U235 eq.]	8.58E-02	1.29E-05	7.13E-05	4.38E-03	0.00E+00	-8.63E-02
ETP-fw ¹	[CTUe]	2.20E+00	1.27E-02	2.62E-02	2.09E-01	0.00E+00	-1.10E+00
HTP-c ¹	[CTUh]	2.79E-10	1.73E-13	1.70E-12	2.57E-11	0.00E+00	-1.73E-10
HTP-nc ¹	[CTUh]	6.00E-09	3.31E-12	3.75E-11	1.01E-09	0.00E+00	-4.86E-09
SQP ¹	-	ND	ND	ND	ND	ND	ND
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality						

Disclaimers	¹ 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
	² 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
	³ Only values or the letters "ND" (not declared). No blank cells, hyphens or other symbols. The value 0 only for parameters that have been calculated to be 0. "ND" is only for parameters that are not quantified because of no data available. Footnotes shall be used to explain and limitation to the result value..

RESOURCE USE PER 1m ² WinWin Sheet*							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6.21E-01	1.04E-04	8.27E-04	1.83E-01	0.00E+00	-5.54E+00
PERM	[MJ]	9.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.61E+00	1.04E-04	8.27E-04	1.83E-01	0.00E+00	-5.54E+00
PENRE	[MJ]	2.27E+01	2.92E-02	5.31E-02	3.34E-01	0.00E+00	-9.34E+00
PENRM	[MJ]	1.34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	3.60E+01	2.92E-02	5.31E-02	3.34E-01	0.00E+00	-9.34E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	1.04E-01	1.67E-05	2.61E-03	6.74E-03	0.00E+00	-2.85E-02
FW	[m ³]	3.15E-01	3.66E-05	2.17E-04	1.08E-02	0.00E+00	-1.35E-01
Caption	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 = Net use of fresh water						
Disclaimers	¹ Only values or the letters "ND" (not declared). No blank cells, hyphens or other symbols. The value 0 only for parameters that have been calculated to be 0. "ND" is only for parameters that are not quantified because of no data available. Footnotes shall be used to explain and limitation to the result value.						

*to calculate the primary energy into energy used as raw material and energy used as energy carrier options A has been used according to the PCR 2019:14 for construction products annex 3.

Waste Indicators

WASTE CATEGORIES AND OUTPUT FLOWS PER 1m ² WinWin Sheet							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.00E-05	1.94E-07	3.38E-07	1.44E-06	0.00E+00	-1.05E-05
NHWD	[kg]	1.08E-01	1.67E-05	2.61E-03	6.74E-03	0.00E+00	-2.85E-02
RWD	[kg]	2.15E-05	2.95E-09	1.73E-08	1.03E-06	0.00E+00	-2.07E-05
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	3.77E-02	0.00E+00	0.00E+00	6.80E-02	0.00E+00	0.00E+00
MER	[kg]	2.30E-02	0.00E+00	0.00E+00	3.32E-01	0.00E+00	0.00E+00
EEE	[MJ]	2.88E-01	0.00E+00	0.00E+00	3.09E-02	0.00E+00	0.00E+00
EET	[MJ]	1.08E+00	0.00E+00	0.00E+00	1.16E-01	0.00E+00	0.00E+00
Caption	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						
Disclaimers	¹ Only values or the letters "ND" (not declared). No blank cells, hyphens or other symbols. The value 0 only for parameters that have been calculated to be 0. "ND" is only for parameters that are not quantified because of no data available. Footnotes shall be used to explain and limitation to the result value.						

References

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

Product Category Rules (PCR)

PCR 2019:14 Construction Products, v1.3.1

EN 15804

DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

ISO 14044

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"

