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**Aluminium covered windows
/ fixed windows outward
opened 75 mm sash
(BYKO – WA75)**



1. General information

Bitus Latvia SIA

Programme operator

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Germany

Declaration number

EPD-Kiwa-EE-000122-EN (Rev.1_29.05.2024)

This declaration is based on the Product Category Rules

Product category rules for windows and pedestrian doorsets (EN 17213)

Issue date

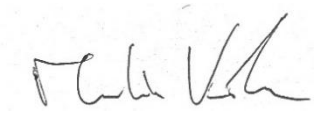
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Valid to

03.05.2026



Raoul Mancke
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BYKO – WA75

Owner of the declaration

Bitus Latvia SIA
Lāčplēša iela 75-5/6
Rīga, LV-1011
Latvia

Declared product / declared unit

1 m² of product

Scope

“Aluminium covered window / fixed window outward opened, 75 mm sash” (BYKO-WA75) is triple-glazed and has a thermal transmittance of 0,78 W/(m²*K). The dimensions (height x width) are made according to the customer's requirements. The calculation based on the assumption of The LCA results are scalable for the desired window dimension. The product is manufactured in Valmiera, Latvia, and marketed internationally. Kiwa-Ecobility Experts assumes no liability for manufacturer's information, LCA data and evidence.

Verification

The European standard EN 15804:2020-3 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025:2011-10

internal

external

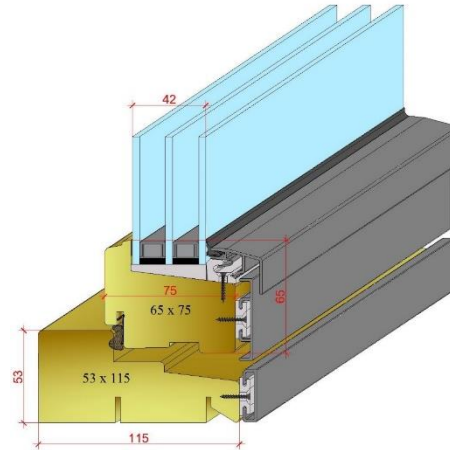


Joanna Zhuravlova, Ecomatters B.V.
(Third party verifier)

2. Product

2.1 Product description

All hardware is screwed in the sashes and frames. Window can be side / top opened and fixed. The dimension (height x width) are adapted according to customer requirements.



2.2 Application

The intended uses are in domestic and commercial locations.

2.3 Technical Data

For the description of the declared performances ((EU) No 305/2011) is used. The harmonized standard for windows and doors is EN 14351-1.

Characteristic	Value	Unit
Glass type	Flat glass, Triple glazing	-
Total weight*	50,6	kg
Thickness	75	mm
Glass surface*	0,67	m ²
Heat permeability, window (U_w -value) (EN 10077)	0,78	W/(m ² *K)
Safety equipment	n.a.	-
Sound insulation	n.a.	db
Air permeability (EN 1026)	Class 4	-
Water tightness (EN12208)	E ₁₁₀₀	-
Resistance to wind load (EN 12210)	Class C5	-
Racking (EN 14608)	Class 3	-
Torsion (EN 14609)	Class 4	-
Dangerous substances	None	

* Reference size 1m²

2.4 Placing on the market/ Application rules

For quality assurance purposes, windows and doors are regulated according to EN13249. and marked with a CE mark by the manufacturer. For the placing on the market the regulation (EU) No. 305/2011 and the performance characteristics EN 14351-1 apply.

2.5 Base materials / Ancillary materials

Raw material	Value	Unit
Wood	24,870	kg
Glass	20,074	kg
Steel	0,914	kg
Aluminium	2,047	kg
Plastics (TPE)	0,081	kg
Paint, impregnant, primer	3,367	kg
Argon	0,036	kg

2.6 Information on biogenic carbon content

Name	Value	Unit
Product	40,71	kg C
Packaging	2,58	kg C

2.7 Reference service life (RSL)

According to the PCR B, no RSL must or can be indicated, since not all modules B1-B5 are declared.

2.8 Manufacture

The production phase (A3) considers the following processes: cutting of wood, preplanning, moulding and tapening, chiseling, wood frame impregnation, assembly of wood components, painting, assembly of glass and hardware, packaging. See also simplified process flowchart (figure 1).

2.9 Packaging

The window is wrapped in PE film and transported on wooden pallets.

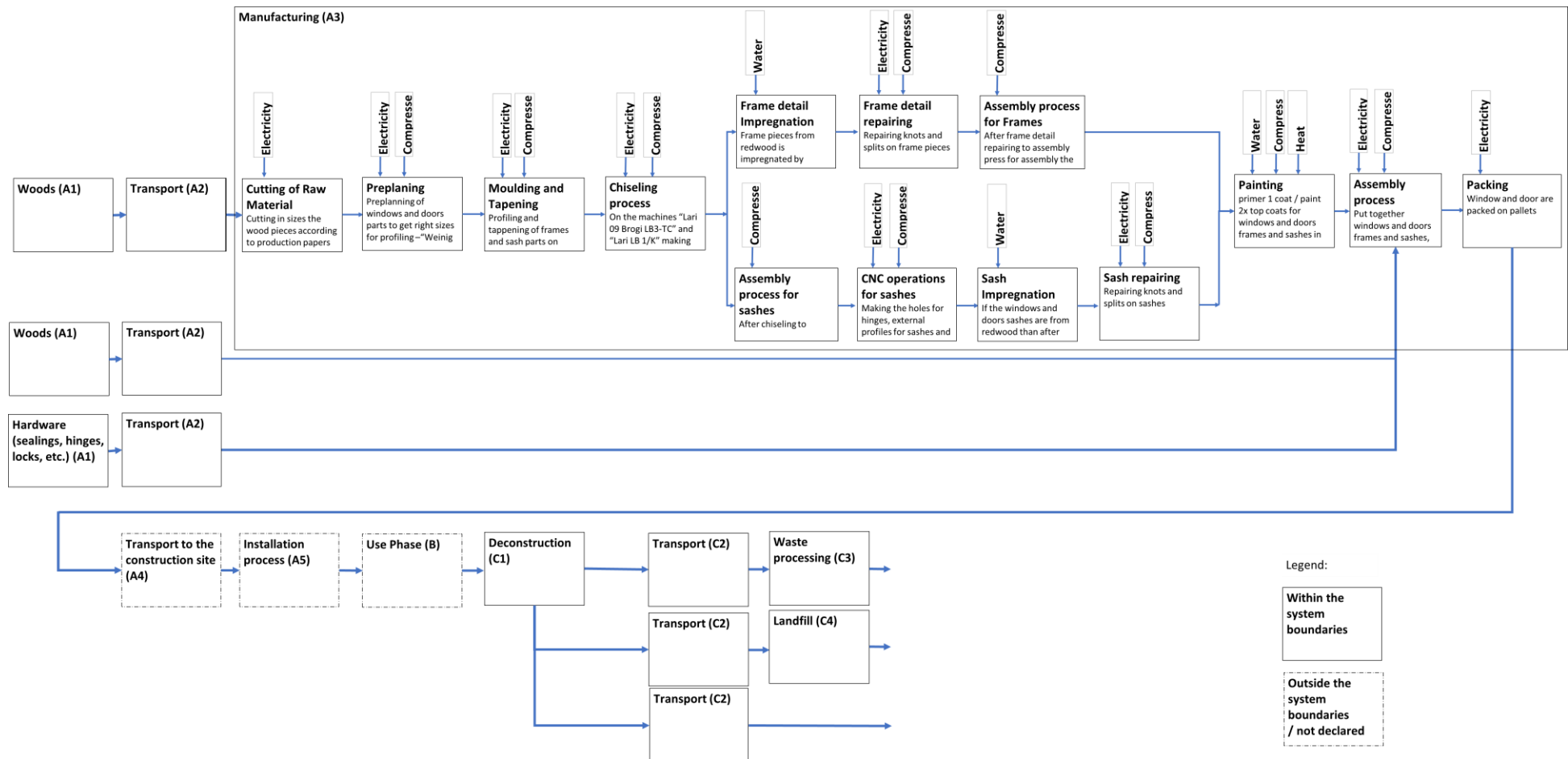


Figure 1: Simplified process flow chart of the manufacturing

3. LCA: Calculation rules

3.1 Declared unit

In accordance with PCR B (EN 17213), one square metre was chosen as the declared unit for this window. Further information for describing the declared unit be found in the tables below.

Description	Value	Unit
Declared unit	1	m ²
Frame: Material type	Redwood / Orgeno Pine (Douglas)	-
Frame: Mass	15,900 / 8,970	kg
Glass: Material type	Flat glass, Triple glazing	-
Glass: Mass	20,07	kg
Seal: Material type	TPE / PU / PP / PE	-
Seal: Mass	0,081	kg
Hardware: Material type	Steel / Aluminium	-
Hardware: Mass	0,914 / 2,047	kg
Total Mass	50,591	kg
Configuration	4-15-4-15-4	-
Gas type	Argon	-
Conversion factor to 1 kg	0,0198	m ² /kg

3.2 System boundary

This Life cycle assessment is made for EPD type "Cradle to gate with modules C1-C4 and module D": The Environmental Product Declaration analyses the production stage (A1-A3), the End-of-Life stage (C1-C4) and the benefits and loads beyond the system boundary (D).

The window manufacturing process, the individual components such as framing materials or profiles, hardware, glass, seals are delivered to the manufacturing site.

The processes that are performed at the manufacturing site are: Shaping of profiles, e.g. grinding of wooden profiles, cutting extruded profiles into size (aluminium, etc.), assemble profiles, treatment and coating of profiles and finally combining the infill and hardware with the profiles into a complete element. C1 concerns the removal of the window, whereby no environmental impact is assumed. The resulting waste materials and quantities are included in the respective modules.

3.3 Estimates and assumptions

All installed raw materials of the products were analysed and the masses were determined. Production-specific energy consumption were measured and provided by Bitus Latvia SIA. Supplier Information regarding the transport distances were provided by Bitus Latvia SIA.

The production waste wood, metal and paint and other mixed production waste are collected separately. For plastics and steel, 100 per cent recycling is assumed, and for general production waste, 100 per cent landfilling is assumed, as waste incineration is not widespread in Latvia. Wood waste is thermally recovered at the site. For production waste that cannot be clearly allocated (seals, glass), a raw material-related production reject of 5 per cent was calculated. As the product is marketed internationally, no country-specific waste scenario can be considered. Therefore, the waste scenario of PCR B (Appendix B.3) was adopted. Removing the door or window does not result in any environmental impacts, so the value for module C1 is assumed to be zero.

3.4 Cut-off criteria

For process modules A1 to A3, all process-specific data was collected. All flows could be assigned potential environmental impacts through the Ecoinvent database. All flows that contribute more than 1 percent of the total mass, energy or environmental impact of the system have been included in the LCA. The sum of neglected processes does not exceed the 5 percent of total input mass for module A1-A3.

The following in- and outputs were neglected: Infrastructure of the manufacturing, production waste and municipal waste (except of wood, plastic, glass, waste water), lubricants and other ancillary materials.

3.5 Period under review

All process-specific data was collected for the operating year 2019.

3.6 Data quality

All process-specific data was collected for the 2019 operating year and is therefore up-to-date. The data is based on the annual average. In order to ensure comparability of the results, only consistent background data of the Ecoinvent database V3.5 was used in the LCA (e.g., records on energy, transportation, supplies and supplies), which refers to reference year 2018. The database is regularly reviewed and thus complies with the requirements of EN 15804 (background data not older than 10 years). All consistent datasets contained in the Ecoinvent database are documented and can be viewed in the online Ecoinvent documentation. The primary data were provided by Bitus Latvia SIA. The life cycle was modelled with the Nibe EPD App. Geographical reference space of the background data is Latvia. The overall representativeness and the precision for all datasets were determined with the Data Quality Ranking (DQR) formula, a ranking method based on the Product Environmental Footprint (PEF) approach.

3.7 Allocation

There are no co-products in the raw material supply phase, so no allocation methods were used at this stage. There are no allocations during the manufacturing phase at the plant.

3.8 Comparability

In principle, a comparison or evaluation of EPD data is only possible if all data sets to be compared have been created in accordance with EN 15804 and the building context or the product-specific performance characteristics have been taken into account.

4. LCA: Results

The following tables show the results of the impact assessment indicators, resource use, waste and other output streams. The results presented here refer to the declared average product.

Description of the system boundary																	
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 manufacturer to place of use	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishmen	Operational energy use	Operational water use	De-construction / demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
																	A1
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
X=Module declared MND=Module not declared																	
Results of the LCA – Environmental impact: 1 m ² window - 75 mm sash (BYKO-WA75)																	
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D	Total							
Core environmental impact indicators (EN 15804)																	
ADP-f	MJ	8,99E+02	6,58E+01	3,67E+02	0,00E+00	3,09E+00	2,45E+00	-3,71E+02	9,79E+02	1,23E+01							
ADP-e	kg Sb-eqv.	4,28E-04	1,20E-05	2,96E-05	0,00E+00	7,62E-07	8,71E-08	-1,10E-04	3,63E-04	2,24E-06							
AP	mol H+ eqv.	6,34E-01	2,43E-02	1,86E-01	0,00E+00	8,70E-03	7,60E-04	-2,94E-01	5,64E-01	4,55E-03							
EP-fw	kg PO4 eqv.	6,08E-03	6,37E-05	7,45E-04	0,00E+00	1,22E-05	1,40E-06	-1,58E-03	5,33E-03	1,19E-05							
EP-m	kg N eqv.	1,00E-01	8,51E-03	2,71E-02	0,00E+00	3,98E-03	3,07E-04	-5,04E-02	9,16E-02	1,59E-03							
EP-t	mol N eqv.	1,17E+00	9,42E-02	4,23E-01	0,00E+00	4,57E-02	2,97E-03	-6,56E-01	1,09E+00	1,77E-02							
GWP-b	kg CO2 eqv.	-7,41E+01	1,23E-03	-9,56E+00	0,00E+00	3,92E+01	1,41E-01	-1,14E-02	-4,43E+01	2,31E-04							
GWP-f	kg CO2 eqv.	7,95E+01	4,24E+00	2,34E+01	0,00E+00	5,03E-01	8,24E-02	-4,03E+01	6,82E+01	7,95E-01							
GWP-luluc	kg CO2 eqv.	1,43E+00	1,26E-03	1,27E-01	0,00E+00	1,02E-04	2,00E-05	-1,59E-01	1,40E+00	2,36E-04							
GWP-total	kg CO2 eqv.	6,82E+00	4,25E+00	1,40E+01	0,00E+00	3,97E+01	2,23E-01	-4,05E+01	2,53E+01	7,96E-01							
ODP	kg CFC 11 eqv.	5,68E-06	9,87E-07	3,74E-06	0,00E+00	4,08E-08	3,57E-08	-1,62E-06	9,05E-06	1,85E-07							
POCP	kg NMVOC eqv.	3,19E-01	2,68E-02	8,29E-02	0,00E+00	1,19E-02	8,80E-04	-1,61E-01	2,86E-01	5,02E-03							
WDP	m3 world eqv.	1,96E+01	4,68E-01	5,01E+00	0,00E+00	1,24E+00	2,66E-02	-6,75E+00	1,97E+01	8,77E-02							
Additional environmental impact indicators (EN 15804)																	
ETP-fw	CTUe	2,25E+03	4,72E+01	2,38E+02	0,00E+00	8,85E+00	2,96E+01	6,48E+01	-1,46E+03	1,18E+03							
HTTP-c	CTUh	1,01E-07	1,79E-09	2,05E-08	0,00E+00	3,35E-10	8,12E-09	3,47E-11	-5,52E-08	7,64E-08							
HTTP-nc	CTUh	1,95E-06	6,01E-08	2,09E-07	0,00E+00	1,13E-08	2,64E-08	1,05E-09	-1,05E-06	1,21E-06							
IR	kBq U235 eqv.	2,46E+00	2,80E-01	1,79E+00	0,00E+00	5,24E-02	9,70E-03	1,06E-02	-5,87E-01	4,01E+00							
PM	disease incidence	7,48E-06	3,85E-07	1,71E-06	0,00E+00	7,21E-08	7,13E-08	1,55E-08	-3,47E-06	6,26E-06							
SQP	-	6,83E+03	5,48E+01	1,29E+03	0,00E+00	1,03E+01	1,18E+00	5,19E+00	-2,00E+03	6,19E+03							
ADP-e =Depletion of abiotic resources-elements ADP-f =Depletion of abiotic resources-fossil fuels AP =Acidification of soil and water EP-fw =Eutrophication, freshwater (EP-fw) EP-m =Eutrophication marine (EP-m) EP-T =Eutrophication, terrestrial (EP-T) GWP-b =Global warming potential - Biogenic (GWP-b) GWP-f =Global warming potential - Fossil (GWP-f) GWP-luluc =Global warming potential - Land use and land use change (GWP-luluc) GWP-total =Global warming potential (GWP-total) ODP =Ozone layer depletion POCP =Photochemical oxidants creation WDP =Water use (WDP) ETP-fw =Ecotoxicity, freshwater HTP-c =Human toxicity, cancer (HTP-c) HTP-nc =Human toxicity, non-cancer (HTP-nc) IR =Ionising radiation, human health (IR) PM =Particulate Matter (PM) SQP =Land use (SQP)																	

Resource use and environmental information: 1 m ² window - 75 mm sash (BYKO-WA75)										
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D	Total
PERE	MJ	6,50E+02	6,89E-01	1,43E+02	0,00E+00	1,29E-01	1,46E-01	3,61E-02	-4,54E+02	3,40E+02
PERM	MJ	3,48E+02	0,00E+00	5,84E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,62E-02	4,06E+02
PERT	MJ	9,98E+02	6,89E-01	2,01E+02	0,00E+00	1,29E-01	1,46E-01	3,61E-02	-4,54E+02	7,47E+02
PENRE	MJ	9,30E+02	6,99E+01	3,83E+02	0,00E+00	1,31E+01	3,31E+00	2,61E+00	-3,94E+02	1,01E+03
PENRM	MJ	3,40E+01	0,00E+00	1,04E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,44E+01
PENRT	MJ	9,64E+02	6,99E+01	3,93E+02	0,00E+00	1,31E+01	3,31E+00	2,61E+00	-3,94E+02	1,05E+03
SM	Kg	4,51E-01	0,00E+00	6,95E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,20E-01
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,66E-01	1,24E-02	1,75E-01	0,00E+00	2,33E-03	1,36E-02	2,81E-03	-2,94E-01	5,77E-01
HWD	Kg	1,21E-02	4,18E-05	2,35E-04	0,00E+00	7,83E-06	7,98E-06	1,06E-06	-2,15E-03	1,02E-02
NHWD	Kg	1,31E+01	4,00E+00	3,32E+00	0,00E+00	7,50E-01	3,34E-01	1,56E+01	-6,42E+00	3,07E+01
RWD	Kg	2,69E-03	4,42E-04	1,71E-03	0,00E+00	8,29E-05	1,11E-05	1,63E-05	-6,22E-04	4,34E-03
CRU	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	Kg	0,00E+00	0,00E+00	4,32E-01	0,00E+00	0,00E+00	2,81E+00	0,00E+00	0,00E+00	3,25E+00
MER	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	2,86E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,85E+02	2,14E+02
EET	MJ	0,00E+00	0,00E+00	1,81E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E+02	1,35E+02
EEE	MJ	0,00E+00	0,00E+00	1,05E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,81E+01	7,86E+01

PERE=renewable primary energy ex. raw materials | PERM=renewable primary energy used as raw materials | PERT=renewable primary energy total | PENRE=non-renewable primary energy ex. raw materials | PENRM=non-renewable primary energy used as raw materials | PENRT=non-renewable primary energy total | SM=use of secondary material | C= Carbon content | RSF=use of renewable secondary fuels | NRSF=use of non-renewable secondary fuels | FW=use of net fresh water | 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 | EE=Exported energy | EET=Exported Energy Thermic | EEE=Exported Energy Electric

Disclaimer on ADP-e, ADP-f, WDP, ETP-fw, HTP-c, HTP-nc, SQP: The results of these environmental impact indicators must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

Disclaimer on IR: This impact category mainly addresses the potential effect of low dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposures, nor does it consider radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator.

5. LCA: Interpretation

5.1 Indicators of impact assessment by impact category

The following figure shows the influence of the different life stages. As shown in figure below, the raw material (A1) and the manufacture (A3) have the greatest influence on the life cycle of BYKO-WA75. In a further dominance analysis, the following inputs could be identified as drivers of environmental impacts. Aluminium, glass, hardware. Potential credits come mainly from the material recovery of aluminium. From the graph shown above, it can be deduced that, in principle, the module raw material supply (A1) has the greatest influence on the life cycle assessment. For windows with aluminium cladding, A1 is more dominant. At the same time, the credit from recycling aluminium is correspondingly higher. For GWP biogenic, it is noticeable that the sum is negative. Theoretically, the value should be close to zero in total, since the biogenic carbon is released back into the atmosphere during incineration. This discrepancy is due to the fact that the data sets do not match optimally. While in the wood products a 2,97 CO₂ is stored by biomass build-up, in the combustion process only a CO₂ emission of 1,46 of kg wood is calculated. The packaging material (wooden pallets) also contributes with a negative input, while the CO₂ emission from combustion is not included, as this is assigned to the undeclared module A5.

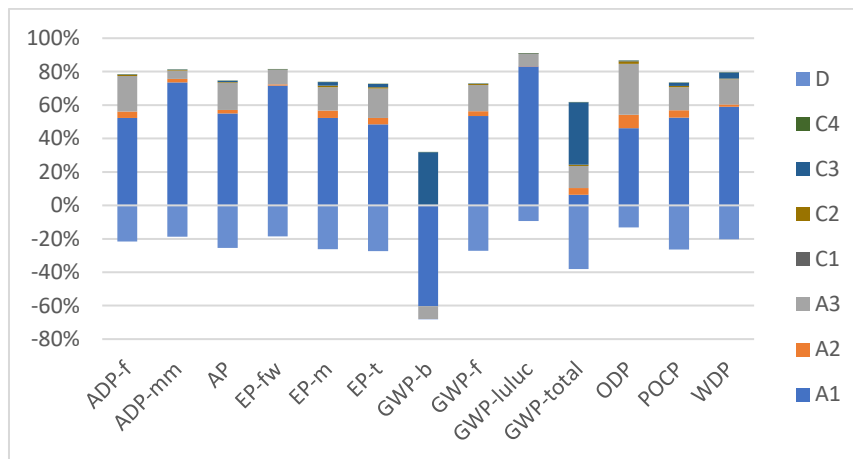


Figure 2: Influence of the information modules on the main impact categories – BYKO-WA75

5.2 Information on data quality

The data quality can be classified as good overall. All relevant process-specific data could be collected in the operational data collection. Consistent data sets from the Ecoinvent database were available for almost all inputs and outputs. The background data meet the requirements of EN 15804, and the production data were recorded for the 2019 operating year. The quantities of raw materials and supplies used as well as energy consumption were recorded for the entire operating year. The life cycle assessment was carried out for all the product items listed. It can be assumed that the data for the declared average product are well representative.

Data quality was calculated using the Data Quality Rating method according to the PEF approach. The DQRs range from 1,75 to 2,0 for the most abundant inputs in terms of mass, and from 2,0 to 2,5 for smaller inputs. As noted in the interpretation (GWP biogenic), partial data sets are not entirely consistent with each other.

6. References

- EN 14351-1:2016-12: Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets
- EN 15804:2020: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products
- EN 17213:2018: Windows and doors – Environmental Product Declarations – Product category rules for windows and pedestrian doorsets
- European Commission Joint Research Centre Institute for Prospective Technological Studies (JCR 2014): End-of-waste criteria for waste plastic for conversion, Seville, 2014, doi:10.2791/13033
- CML-IA April 2013 – Charakterisierungsfaktoren entwickelt durch Institut of Environmental Sciences (CML): Universität Leiden, Niederlande - <http://www.cml.leiden.edu/software/data-cmlia.html>
- Klöpffer, W., Grahl B.: Ökobilanz (LCA) – Ein Leitfaden für die Ausbildung und Beruf, Wiley-VCH Verlag, Weinheim, 2007
- ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006
- ISO 14044:2006, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006
- ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures EN 13249
- Protocol EPD-online - 25011.16.03.015 - Protocol EPD online - NMD, version 1.2, November 2016, NIBE
- Stichting Bouwkwaliiteit (SBK 2019): Determination Method for determining the environmental performance of buildings and civil engineering works over their entire service life, based on EN 15804, Rijswijk, Version "3.0 January 2019" incl. amendments July 2019, Jan 2020
- Stichting Bouwkwaliiteit: verification protocol - inclusion data in the Dutch environmental database, Rijswijk, Final Version 3.0, January 2019

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