ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration ARGE; European Federation of Associations of Lock and Builders

Hardware Manufacturers

Programme holder Institut Bauen und Umwelt e.V. (IBU)

Publisher Institut Bauen und Umwelt e.V. (IBU)

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Valid to 13.09.2022

Door and windows handles

ARGE; European Federation of Associations of Lock and Builders Hardware Manufacturers

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Institut Bauen und Umwelt e.V.

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1. General Information

ARGE

Programme holder

IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany

Declaration number

EPD-ARG-20160192-IBG1-EN

This Declaration is based on the Product Category Rules:

Building Hardware products, 02.2016 (PCR tested and approved by the SVR)

Issue date

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Valid to

13.09.2022

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Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann (Managing Director IBU)

Door and windows handles

Owner of the Declaration

ARGE; European Federation of Associations of Lock and Builders Hardware Manufacturers Offerstraße 12, 42551 Velbert Germany

Declared product / Declared unit

1 kg of door or windows handle

Scope:

This ARGE EPD covers handles intended to be used in door and window assemblies of varying materials and applications. The reference product used to calculate the impact this product group has on the environment is a door handle composed primarily of brass and steel and has been selected for the LCA (Life Cycle Assessment) because it is the product with the highest impact for 1 kg of product. A validity scope analysis has also been carried out to determine the limiting factors for door and window handles covered by this EPD. In a preliminary study (simplified LCA), it has been confirmed that this EPD represents the worst case condition and it can therefore be used to cover all door and window handles manufactured in Europe by ARGE member companies.

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.

Verification

The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/

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The Went

Dr. Frank Werner (Independent verifier appointed by SVR)

2. Product

2.1 Product description

This EPD covers handle, mechanisms for the opening and maintaining in a closed position of doors or windows in buildings.

2.2 Application

These products are designed to be integrated into door or windows assemblies of varying materials and applications. They may be used on all kinds of doors and windows (both inside and outside).

2.3 Technical Data

Ideally, products should comply with a suitable technical specification. /EN 1906/ is an example of such a specification and some products will comply with this. The relevant grading structure is shown in the following table.

Name	Value	Unit
Category of use	1 - 4	Grade

Durability	6, 7	Grade
Test door mass	-	Grade
Suitability for fire resistance & smoke control doors	0, A, A1, B, B1, C, C1, D, D1	Grade
Safety	0, 1	Grade
Corrosion resistance	0-5	Grade
Security – burglar resistance	0-4	Grade
Type of operation	A, B, U	Grade

2.4 Application rules

For placing on the market in the EU/EFTA (with the exception of Switzerland) EU Regulation No 305/2011 "Construction products regulation" applies. Accordingly products shall be CE marked to /EN 1906/ - Lever handles and knob furniture, and shall have a Declaration of Performance

For application and use, additional national provisions may also apply.



2.5 Delivery status

The products are sold by unit. Deliveries of a single unit might be possible but will be an exception. Regular deliveries will cover a larger amount of door and window handles as they are put on the market as "B2B" product and not for a final customer.

2.6 Base materials / Ancillary materials

Composition of product analysed for this EPD:

The values given in the table below are for the product analysed for this EPD. Ranges of values for other products covered by the validity scope analysis are shown in brackets

Name	Value	Unit
Brass (0.00% – 74.15%)	74.15	%
Steel (0.00% - 89.48%)	24.97	%
Polyethylene high density (0.00% – 0.65%)	0.61	%
Polyoxomethylene (0.00% – 8.51%)	0.27	%
Aluminium (0.00% – 68.97%)	0	%
Stainless steel (0.00%– 62.45%)	0	%
Nylon 6 (0.00% – 27.54%)	0	%
Nylon 66 (0.00% – 0.21%)	0	%
Zinc based alloy (0.00% – 9.24%)	0	%
Zinc (0.00% – 93.41%)	0	%
Epoxy (0.00% – 18.19%)	0	%

Nylon 66 and Acetal as ancillary material.

The product contains no substances cited on the REACH list of hazardous substances.

Zinc-based alloy is an alloy of four separate metals: zinc, aluminium, magnesium and copper.

Steel is produced by combining iron with carbon as well as other elements depending on the desired characteristics. The subcomponents made of steel are formed by stamping.

Brass is an alloy of zinc and copper. Subcomponents made of brass are made by forging.

Nickel silver is an alloy of copper (~60%) with nickel (~20%) and zinc (~20%). Subcomponents made of nickel silver are formed by stamping.

Nylon 66 is a polyamide produced by the polycondensation of hexamethylenediamine and adipic acid in equal parts. This can then be combined with glass fibres to improve its mechanical properties. Subcomponents made of nylon are formed by injection moulding.

Acetal, or polyoxymethylene, is produced via polymerisation of anhydrous formaldehyde. Subcomponents made of acetal are also formed by injection moulding.

2.7 Manufacture

The production of a handle normally follows a 3 step procedure:

- 1. Preparation of semi- finished products components (as indicated in 2.6) on factory site or by external manufacturers.
- 2. Preassembly of assembly modules (on-site factory)
- 3. Final assembly (on-site factory)

The individual parts of the product are assembled manually.

2.8 Environment and health during manufacturing

Regular measurements of air quality and noise levels are performed by ARGE member manufacturers. Resulting levels shall be within compulsory safety limits. In areas where employees are exposed to chemical products, prescribed safety clothes and technical safety devices shall be provided. Regular health checks are mandatory for employees on production sites.

2.9 Product processing/Installation

The installation of the product could vary depending on the type of door and the specific situation but products shall not require energy consumption for installation.

2.10 Packaging

Normally each single product is packaged in paper. Door or window handles are then packed in a cardboard box and stacked on wooden pallets for transport to the customer (door or window manufacturers).

Waste from product packaging is collected separately for waste disposal (including recycling).

2.11 Condition of use

Once installed, the products shall require no servicing during their expected service lives. There shall be no consumption of water or energy linked to their use, and they shall not cause any emissions.

2.12 Environment and health during use

No environmental damage or health risks are to be expected during normal conditions of use

2.13 Reference service life

The Reference Service Life (RSL) for this product is 10 years. This is based on a mechanical endurance test as specified in /EN 1906/. The product is guaranteed to maintain its performance for at least 100 000 cycles of use.

2.14 Extraordinary effects

Fire

The product is suitable for use in a fire resisting and/or smoke control door/window set according to the classes specified in /EN 1906/.

Water

The declared product is intended to be used in buildings under normal conditions (indoor or outdoor use). It shall not emit hazardous substances in the event of flooding.

Mechanical destruction

Mechanical destruction of the declared product shall not materially alter its composition, or have any adverse effect on the environment

2.15 Re-use phase

Removal of door or window handle components (for reuse or re-cycling) shall have no adverse effect on the environment

2.16 Disposal

Door or window handle components should be recycled wherever possible, providing that there is no adverse effect on the environment.



The waste code in accordance with the /European Waste Code/ is 17 04 07.

2.17 Further information

Details of all types and variants to be shown on the manufacturers' websites listed on http://arge.org/members/members-directory.html.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit for all products covered by ARGE EPD is 1 kg (of product). Since individual products will rarely weigh exactly 1 kg it is necessary to establish the exact weight of the product then use this as a correction factor to determine the true values for 1 kg of product in the tables (Section 5).

A total of 11 typical products (based on sales figures) have been evaluated and the worst case results are used in section 5 of this EPD

Correction factor

Name	Value	Unit
Declared unit mass	1	kg
Mass of declared product	0.749	kg
Correction factor	Divide by 0,749	

3.2 System boundary

The type of the EPD covers "cradle-to-grave" requirements.

The analysis of the product life cycle includes the production and transport of the raw materials, manufacture of the product and the packaging materials, which are declared in modules A1-A3. Losses during production are considered as waste and are sent for recycling. No recycling processes are taken into account except transport and an electricity consumption for grinding the metals. When recycled metals are used as raw material, and only their transformation process is taken into account: not the extraction of the raw material.

A4 module represents the transport of the finished product to the installation site.

There is no waste associated with the installation of the product. The A5 module therefore represents only the disposal of the product packaging.

For the re-cycling requirements considered for this study, there are no inputs or outputs for stages B1-B7.

The End-of-Life (EoL) stages are also considered. The transportation to the EoL disposal site is taken into account in module C2. Module C4 covers the disposal of the door and window handles. Module C3 covers the recycling of the individual elements according to European averages, with the remaining waste divided between incineration and landfill. The same assumption as for waste to recycling in A3 is used here.

For end-of-life modules (C1 to C4) the system boundaries from the /XP P01-064/CN/ standard have been followed, see annex H.2 and H.6 of this standard document for figures and further details.

In practice, the end-of-life has been modelled as follows:

 When a material is sent for recycling, generic transport and electric consumption of a shredder is taken into account (corresponding to the process "Grinding, metals"). Only then is the material considered to have attained the "end-of-waste" state. - Each type of waste is modelled as transport to the treatment site with a distance of 30 km (source: /FD P01-015/). Parts sent for recycling include electricity consumption (grinding) and a flow ("Materials for recycling, unspecified").

Four scenarios for the end-of-life of the products have been declared for this EPD:

- 1. 100% of the product going to landfill
- 2. 100% of the product going to incineration
- 3. 100% of the product going to recycling
- 4. Mixed scenario consisting of the previous three scenarios, values depend on the amount of waste going for recycling.

Module D has not been declared.

3.3 Estimates and assumptions

The LCA data of the declared handle has been calculated by the production data of a total of 3 ARGE member companies, collecting data on 11 different products. These companies had been chosen by ARGE as being representative by means of their production processes and their market share. The handle chosen as representative for this calculation follows the "worst case" principle as explained under section 6. LCA interpretation.

3.4 Cut-off criteria

The cut -off criteria considered are 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows per module shall be a maximum of 5% of energy usage and mass.

For this study, all input and output flows have been considered at 100%, including raw materials as per the product composition provided by the manufacturer and packaging of raw materials as well as the final product. Energy and water consumptions have also been considered at 100% according to the data provided. With the approach chosen, no significant environmental impacts are known to have been cut-off.

3.5 Background data

For life cycle modelling of the considered product, all relevant background datasets are taken from the ecoinvent 3.1 – Alloc Rec database. The life cycle analysis software used is SimaPro (V8.0.5), developed by PRé Consulting.

3.6 Data quality

The objective is to evaluate the environmental impact of the product over its entire life. Time factor and life cycle inventory data used comes from:

Data collected specifically for this study on the ARGE manufacturers' sites. Data sets are based on 1-year averaged data (time period: January 2013 to December 2013).

In the absence of collected data, generic data from the ecoinvent V3 database. This is updated regularly and is representative of current processes (the entire database having been updated in 2014).



3.7 Period under review

The data of the LCA is based on the annual production data of several ARGE member companies from 2013. Other values, e.g. for the processing of the base materials, are taken from the/ ecoinvent v3/.1 Alloc Rec where the dataset age varies for each dataset, see ecoinvent documentation for more information.

3.8 Allocation

The products are produced in numerous production sites. All data was provided by the manufacturers of

the products per unit and then divided by the mass of the product to give a value per kg of product produced. The assumptions relating to the EoL of the product are described in the section System Boundaries.

3.9 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 used background database has to be mentioned.

4. LCA: Scenarios and additional technical information

The following technical information is the basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment for Modules Not Declared (MND).

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0045	l/100km
Transport distance	3500	km
Capacity utilisation (including empty runs)	36	%

Installation into the building (A5)

Name	Value	Unit
Material loss	0.137	kg

Reference service life

Name	Value	Unit
Reference service life (condition of use: see §2.13)	10	а

End of life (C1-C4)

Name	Value	Unit
Collected separately (All scenarii)	1	kg
Recycling (Mixed scenario)	0.609	kg
Energy recovery (Mixed scenario)	0.18	kg
Landfilling (Mixed scenario)	0.211	kg
Incineration (100% incineration scenario) Scenario 1	1	kg
Landfilling (Landfill scenario) Scenario 2	1	kg
Recycling (100% recycling scenario) Scenario 3	1	kg

It is assumed that a 16-32 ton truck is used to transport the product over the (up to) 30 km distance between the dismantling site and the next treatment site (source: FD P01-015).

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

As Module D has not been declared, materials destined for recycling have been accounted for in the indicator "Materials for recycling" however no benefit has been allocated.



5. LCA: Results

In Table 1 "Description of the system boundary", the declared modules are indicated with an "X"; all modules that are not declared within the EPD but where additional data are available are indicated with "MND". Those data can also be used for building assessment scenarios. The values are declared with three valid digits in exponential

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PERIPERING PENERS PENER	GWI Eutr	P = Globrophication OF The Unit	1 pal warmion potential pal warmion pal warmion potential pal warm	0 ng potetial; PO A - R A4 .12E-1 .00E+0 .12E-1 .13E+0 .00E+0 .00E+0 .00E+0 .00E+0	A5 1.30E-2 1.06E+1 2.16E-1 6.52E-2 1.00E+0 0.00E+0 0.00E+0	ODP = Deprimation properties of the control of the	Jetion potential ources; JSE: 1 C2 9.61E-4 0.00E+0 0.00E+0 7.82E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0	otential of tropos ADPF = kg of C2/1 9.61E-4 0.00E+0 9.61E-4 0.00E+0 0.0	f the straspheric of Abiotic of A	atosphe bozone p depletio or W C2/3 9.61E-4 0.00E+C 9.61E-4 0.00E+C 7.82E-2 0.00E+C 0.	c3 8.84E 1.00E	real layer remical ntial for what have remical of the case of the	r; AP = poxidan fossil r r r dle	0 = Acidits; AC resour 0E+0 0E+0 0E+0 0E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0	C3/3 1.72E-2 0.00E+0 1.72E-2 1.95E-1 0.00E+0 1.95E-1 0.00E+0 0.00E+0	C4 4.51E-5 0.00E+(4.51E-5 0.00E+(0.00E+(0.00E+(0.00E+(0.00E+(0.00E+(C4/1 1.14E-2 0.00E+(1.14E-2 3.86E-1 0.00E+(0	C4/2 2.11E-2 0.00E+C 3.53E-1 0.00E+C 0.00E+C 0.00E+C	C4/3 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E
PERIPENS SM RSF	GWI Eutr JLTS Eter E M	P = Globrophication OF The state of the sta	1 pal warmion potential variation potential va	0 ng potetial; PO A - RI A4 .12E-1 .00E+0 .12E-1 .13E+0 .00E+0 .00E+0 .00E+0 .00E+0 .72E-3 enewal	1.72E-ential; ODCP = Fo ESOU A5 1.30E-2 1.06E+1 2.16E-1 6.52E-2 1.51E-1 0.00E+0 0.00E+0 0.00E+0 0.00E-4 ble prim	ODP = Deprimation properties of the control of the	0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	otential of tropos ADPF = kg of C2/1 9.61E-4: 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	f the straspheric conditions of the	atosphe bzone p depletio C2/3 9.61E-4 0.00E+C 7.82E-2 0.00E+C 0.00E+C 0.00E+C 1.48E-5	eric ozzehotoch hotoch n pote indo C3 8.84E 0.0.00E 8.84E 1.00E 0.0.00E 1.00E 0.0.00E 1.00E 0.0.00E 1.00E	can layer la	r; AP = poxidan fossil ri	0 = Acidits; AC resour 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+	C3/3 1.72E-2 0.00E+0 1.95E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 d.srav	c4 4.51E-5 0.00E+0 4.51E-5 9.99E-4 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 v mater	C4/1 1.14E-2 0.00E+0 1.14E-2 3.86E-1 00.00E+0 0.00E+0 0.00E+0 1.17E-3 ials; PE	2.11E-2 2.11E-2 3.53E-1 0.00E+C 3.53E-1 0.00E+C 0.00E+C 0.00E+C 0.00E+C	0 c4/3 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E 0.00E
PERIPERING PENERS PENER	GWILTS GUILTS E V T T T F F T T T T T T T T	P = Globrophication of The Unit	1 2al warmion potential on pote	0 Ing pote tial; PO A - R A4 .12E-1 .00E+0 .00E+0 .00E+0 .00E+0 .00E+0 .00E+0 .72E-3 enewal anergy rimary energy	A5 1.30E-2 1.06E+1 1.06E+1 1.00E+1 1.0	DP = Deprimation properties of the control of the c	0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	0.00E+0(0.00E+	f the straspheric of Abiotic of A	atosphe pozone p depletio C2/3 9.61E-4 0.00E+C 9.61E-4 7.82E-2 0.00E+C 0.00E+C 0.00E+C 1.48E-5 e prima = Tota rry ener RT = Tota NRSF =		can laye lemical nitial for what laye lemical nitial for can laye lemical nitial for can laye lemical nitial	7; AP = poxidant fossil r r r r r r r r r r r r r r r r r r r	0 = Acidits; AC esour 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+	C3/3 1.72E-2 0.00E+0 1.72E-2 1.95E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 d as raway enerwy matele primaia	c4 4.51E-5 0.00E+0 4.51E-5 9.99E-4 0.00E+0 0.00E+0 1.96E-6 w mater regridately resorrals; PEry energy	C4/1 1.14E-2 0.00E+0 1.14E-2 1.14E-2 3.86E-1 0.00E+0 0.00E+0 1.17E-3 ials; PEI	C4/2 2.11E-2 0.00E+0 2.11E-2 3.53E-1 0.00E+0 0.00E+	0 er; EP for nor 0.00E 0
PERIOR PENING RSF NRS FW	GWULTS EE MM T F rene of see	P = Globrophication OF The Complete State of	1 pal warmion potential part of potential part o	0 ng potetial; PO A - R A4 12E-1 00E+0 13E+0 00E+0 00E+0 00E+0 072E-3 enewal nergy r rimary energy r sel; RSF	1.72E-ential; OECP = Fo ESOU A5 1.30E-2 1.06E+1 2.16E-1 6.52E-2 1.51E-1 0.00E+0 0.00E+0 1.03E-4 ble primesource energy resource = Use	DP = Deprimation prosider residence in the control of the control	0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	otential of tropos ADPF = kg of C2/1 9.61E-4: 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	f the straspheric control of the straspheric con	9.61E-4 7.82E-2 0.00E+C 0.00E+	indo C3 8.84E 0.00E 8.84E 1.00E 0.00E 1.00E 0.00E 3.36E ry ene gy ress E Use of	cane laye lemical intial for what had been care as a case of the c	r; AP = poxidan fossil r indle	0 = Acidits; AC esour 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+	C3/3 1.72E-2 0.00E+0 1.72E-2 1.95E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 d as raway enerwy matele primaia	c4 4.51E-5 0.00E+0 4.51E-5 9.99E-4 0.00E+0 0.00E+0 1.96E-6 w mater regridately resorrals; PEry energy	C4/1 1.14E-2 0.00E+0 1.14E-2 1.14E-2 3.86E-1 0.00E+0 0.00E+0 1.17E-3 ials; PEI	C4/2 2.11E-2 0.00E+0 2.11E-2 3.53E-1 0.00E+0 0.00E+	0.00E
Caption PER PERI PERI PENI PENI SM RSF NRS FW Caption	GWM Eutrr E E V V V T T F F F F F F F F F F F F F F F	P = Globrophication OF The Unit [M.] 6 [M.] 1 [M.] 1 [M.] 1 [M.] 1 [M.] 1 [M.] 1 [M.] 0 [M.	1 pal warmion potential variation va	0 Ing potetial; PO A - RI A4 12E-1 00E+0 13E+0 00E+0 00E+0 00E+0 00E+0 72E-3 nergy rrimary energy al; RSF A - O w har	A5 1.30E-2 1.06E+1 1.06E+1 1.06E+1 1.06E+1 1.06E+1 1.00E+0 0.00E+0 0.00E+0 1.03E-4 1.0	DP = Deprimation processing results of the control	0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	0.00E+0(0.00E+	f the straspheric of Abiotic of A	9.61E-4 0.00E+0 0.00E+	### cozc	me layenemical nitial for what had been missed on the layenemical nitial for what had been missed on the layenemical nitial for what had been missed on the layenemical nitial for missed on the layenemical nitial nitial nitial for missed on the layenemical nitial	7; AP = poxidan fossil r r AP = poxidan fossil r r AP = poxidan fossil r r r r r r r r r r r r r r r r r r r	0 = Acidits; AL esour = 3/2 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+	C3/3 1.72E-2 0.00E+0 1.72E-2 1.95E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 d as ravary enerwy mate	potentia biotic de 4.51E-5 0.00E+0 4.51E-5 9.99E-4 0.00E+0 0.00E+0 0.00E+0 1.96E-6 v mater gy resorials; PEry energary fuels	C4/1 1.14E-2 0.00E+0 1.14E-2 1.14E-2 3.86E-1 0.00E+0 0	2.11E-2 0.00E+C 2.11E-2 0.00E+C	0 er; EP for nor nor nor nor nor nor nor nor nor n
PERIOR PENING RSF NRS FW	GWILTS GWM T T F F F F F F F F F F F	P = Globrophication OF Ti Unit [MJ] 6 [MJ] 1 [MJ] 1 [MJ] 1 [MJ] 2 [MJ] 0	1 pal warmion potential pal warmion pal wa	0 ng potetial; PO A - RI A4 .12E-1 .00E+0 .12E-1 .13E+0 .00E+0 .00E+0 .00E+0 .00E+0 .72E-3 enewal nergy rrimary energy energy al; RSF	1.72E-ential; ODCP = For ESOU A5 1.30E-2 1.06E+1 - 1.06E+1 2.16E-1 6.52E-2 1.51E-1 0.00E+0 0.00E+0 0.00E+0 1.03E-4 ble prime esource energy resource = Use UTPU 1.72E-1 1.72E-	DP = Deprimation processing results of the control	Deletion proportion proportion in the proportion propor	otential of tropos ADPF = kg of C2/1 9.61E-4 0.00E+0 0	f the straspheric control of the straspheric con	atosphe bzone p depletio Or W C2/3 9.61E-4 0.00E+C 9.61E-4 7.82E-2 0.00E+C 0.00E+C 1.48E-5 e prima = Tota iry ener RT = To NRSF = vater C2/3	se Use of C3	ca/ case of renewater of renewa	r; AP = poxidan fossil r	0 = Acidits; AC esour 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+0 0E+	C3/3 C3/3 1.72E-2 0.00E+0 1.72E-2 1.95E-1 0.00E+0 0.00E+0 0.00E+0 d as rawary enerw matele primal eleconda	c4 4.51E-5 0.00E+0 4.51E-5 9.99E-4 0.00E+0 0.00E+0 0.00E+0 1.96E-6 v mater gy resorials; PE ry energary fuels	C4/1 1.14E-2 0.00E+C 1.14E-2 3.86E-1 0.00E+C 0.00E+C 0.00E+C 1.17E-3 ials; PEI urces; FENRM = gy resou ;; FW = C C4/1	and wat obtential C4/2 2.11E-2 0.00E+C 3.53E-1 0.00E+C 0.00E+C 0.00E+C 0.00E+C Use of n	0 er; EP for nor C4/3 0.00E 0.
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Other end of life scenarios have been calculated in order to build specific end of life scenario at the building level:



- scenario 1: the product is considered to be 100% incinerated
- scenario 2: the product is considered to be 100% landfilled
- scenario 3: the product is considered to be 100% recycled

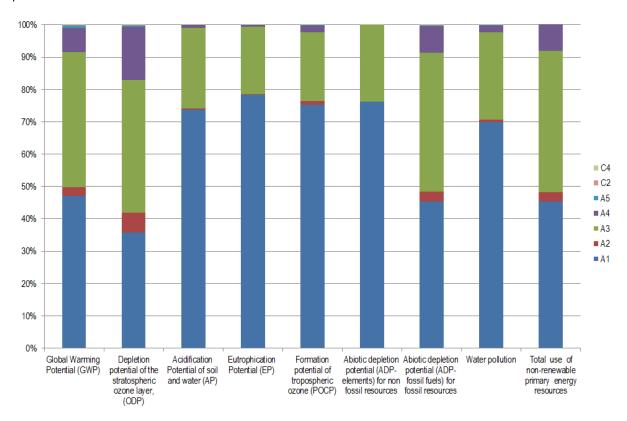
6. LCA: Interpretation

This chapter contains an interpretation of the Life Cycle Impact Assessment categories. When expressed as a percentage, the impact refers to its magnitude expressed as a percentage of total product impact across all modules, with the exception of module D.

Raw material extraction (A1) and production (A3) phases are the main contributors to all indicators. Their

impacts come from brass extraction and product packaging (cardboard). Transport phase (A4) to building site is a non-negligible contributor to the impacts, especially for the ODP indicator.

The results are conservative as complying with the composition given in section 2.6.



7. Requisite evidence

No testing results are required by the PCR part B.

8. References

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FD P01-015

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Ecoinvent 3.1 – Allocation Recycling database.

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EN 15804

EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products



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