ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	**OGRO Beschlagtechnik GmbH**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-OGR-20170197-IBA1-EN
Issue date	08.01.2018
Valid to	07.01.2024

Window handles

OGRO Beschlagtechnik GmbH

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

1. General Information

OGRO Beschlagtechnik GmbH

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

Declaration number
EPD-OGR-20170197-IBA1-EN

This Declaration is based on the Product Category Rules:
Building Hardware products, 02.2016
(PCR tested and approved by the SVR)

Issue date
08.01.2018

Valid to
07.01.2024

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

Dr. Burkhart Lehmann
(Managing Director IBU)

Window handles

Owner of the Declaration
OGRO Beschlagtechnik GmbH
Donnenberger Straße 2
42553 Velbert
Germany

Declared product / Declared unit
The declared unit is one (1 piece) window handle, including packaging materials. The average window handle including packaging weighs 0.228 kg.

Scope:
This Declaration is based on the average weighted by sales figures and covers both the aluminium and stainless steel variants.

As a top seller, the 4100 window handle represents the basis for calculating the representative LCA. The fitting and LCA results are representative of all OGRO window handles.

The LCA is based on data recorded for the period May to October 2017 at the production facility in Velbert, Germany.

This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-OGR-20170197-IBA1-DE. The verifier has no influence on the quality of the translation.

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/
☐ internally ☒ externally

Matthias Klingler
(Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

OGRO Beschlagtechnik GmbH manufactures door and window fittings made of aluminium and stainless steel for the premium real estate market. This Declaration concerns OGRO window fittings in both types of material.

OGRO product features:

Combinability
All of the models selected from the OGRO window handle range are also available as door handles.

Appearance
Like the door fittings, OGRO window handles have a standardised installation height of 9 mm. Accordingly, they comply with OGRO's demand for contemporary fittings in premium properties.

Technology

- All OGRO window handles correspond with /DIN 18267/: Window handles and /DIN EN 13126-3/: Building Hardware.
- OGRO window handles are pre-set at 35 mm by default; for windows in accordance with the standard governing energy-saving windows in line with /EnEV 2009/.

- Pin protrusion is variable and infinitely adjustable on site from 20 to 40 mm.
- All window handle models feature a high-quality Satino surface finish.
- New stable bearing with extra-long guide
- Easy and fast assembly as the underside of the window handle module is flat against the profiled or wooden surface.

Use of the product is subject to the respective national specifications at the place of use; in Germany, for example, the /state building codes/ and the technical specifications based on these Guidelines.

2.2 Application

OGRO window handles are suitable for practically all applications:

- For use on wooden, plastic or aluminium profiles
- For high-traffic areas and intensive use in buildings

2.3 Technical Data

The following test standards are of relevance for the product:

- /DIN 18267 – 2005 – 01/: Window handles
- /DIN 17440/: Steel and steel alloys
- /DIN EN 13126-3/: Building Hardware
- /DIN EN 1670/: Locks and fittings

Window handles are products which are not subject to any EU harmonisation legislation. Application is subject to the respective national guidelines at the place of use.

2.4 Delivery status

The window handles are packed individually or as multiples in PE bags for protection during transport and supplied in module packaging made of corrugated board.

2.5 Base materials / Ancillary materials

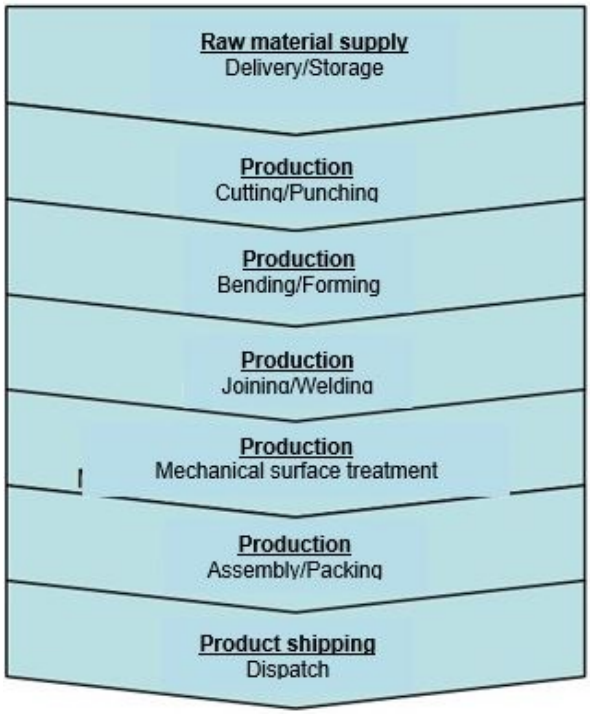
The average window handle largely comprises metallic components and a small percentage of plastic. The material composition of one average window handle (excl. packaging materials) is depicted in the following table as supplied in absolute mass and as a percentage by mass.

Component	Mass	Percentage
Stainless steel	0.1317 kg	63%
Aluminium	0.0420 kg	20%
Steel	0.0206 kg	10%
Plastics	0.0150 kg	7%
Total	**0.2093 kg**	**100%**

2.6 Manufacture

Stainless steel

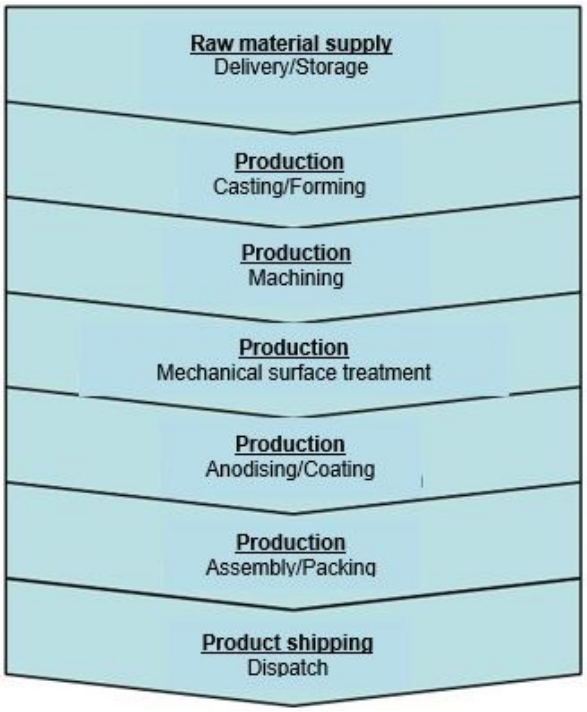
The stainless steel window handles are usually made from tubes. They are formed by bending or welding. A sheet metal / turned part is welded at one end and a turned and/or precision-cast part is welded at the other end.
The rosettes are manufactured from stainless steel sheeting using a punching and forming process.
The surface of the stainless steel window handles and rosettes
is achieved in various grinding steps.
After grinding, the stainless steel window handles are assembled in line with customer requirements before being packed individually or as multiples.



Aluminium

The aluminium window handles are manufactured as hole components in a permanent mould gravity pouring process. Using a variety of mechanical processing methods,
the functional surfaces are manufactured and visible surfaces prepared for subsequent grinding.

The rosettes are manufactured from aluminium sheeting using a punching and forming process.
Various grinding steps prepare the surface of the aluminium window handles and rosettes
for the subsequent anodising process.
The anodising process attributes the surface its natural colour. As an alternative, the hardware components can be dyed to customer requirements during anodising
or can be colour powder-coated.
After anodising, the aluminium window handles are packed individually or as multiples in line with customer requirements.



2.7 Environment and health during manufacturing

OGRO Beschlagtechnik GmbH is certified to /DIN EN ISO 9001/ and /DIN EN ISO 14001/.

Air
Waste air generated during production is cleaned in accordance with statutory specifications. Emissions are significantly lower than the limit values specified by the Technical Guidelines on Air Quality Control /TA Luft/.

Noise
Sound insulation measurements have indicated that all values recorded inside and outside the production facilities comply with statutory specifications.

2.8 Product processing/Installation

On account of the marking requirement and in order to avoid installation and/or application errors, each OGRO product is accompanied by assembly instructions for the specific product. These instructions outline how the product is to be secured to the window and how it should be used on an everyday basis. The up-to-date assembly instructions are included in the product packaging and can also be found in our download area. The current approval certificates, tender texts and general information such as catalogue drawings are also available in various formats in our download area.

2.9 Packaging

The fittings are supplied individually or as multiples in PE bags using module packaging made of corrugated board.

2.10 Condition of use

No material impact relationships are known during use and can therefore be excluded.

2.11 Environment and health during use

There are no impact relations between the product, the environment and health during use. The product does not contain any pollutants. Emissions can therefore be excluded.

2.12 Reference service life

The window handles are designed in line with the respective standards and guidelines, and meet the statutory warranty requirements.
The reference service life for basic fittings ≥ 50 years in accordance with /BBSR 2017/.

Influences on ageing when applied in accordance with the rules of technology
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2.13 Extraordinary effects

Fire
There are no approvals for window handles in accordance with the fire safety standard. Fire-resistant windows are firmly closed and can not be opened using the
window handle.

Fire protection

Name	Value
Building material class	A1
Burning droplets	D0
Smoke gas development	S1

Water
The window handle function is not impaired by contact with water.

Mechanical destruction
No environmental impact is known in the event of unforeseen mechanical destruction.

2.14 Re-use phase

The following re-use options arise for the product system:

Re-use
Individual components can be replaced as necessary.

Material recycling
The metal components of the window handles can be recycled separately and redirected to the raw material circuit.

Energetic recycling
The plastic components and packaging
materials can be directed to waste incineration taking consideration of national specifications.

Landfilling
As the product does not contain any substances which are hazardous to the environment or human health, the entire system can be landfilled in the absence of waste recycling technologies.

2.15 Disposal

Packaging
The packaging materials must be disposed of in accordance with the national packaging ordinance:

- /EWC 15 01 01/ Paper and cardboard packaging
- /EWC 15 01 02/ Plastic packaging

Disposal phase
Where the respective waste technology is available, all

materials are directed to an energy recovery or metallurgical recycling process:

- /EWC 17 02 03/ Plastic
- /EWC 17 04 02/ Aluminium
- /EWC 17 04 05/ Iron and steel

2.16 Further information

Further information on technical data and other product variants can be obtained from the following sources:

OGRO Beschlagtechnik GmbH
Donnenberger Straße 2
42553 Velbert

Web: www.ogro.de

3. LCA: Calculation rules

3.1 Declared Unit

This Declaration refers to an average OGRO window handle, including packaging materials.
The average is weighted on the basis of sales figures and thereby covers both the aluminium and stainless steel variants.
As a top seller, the 4100 model represents the basis for calculating the representative LCA.

Declared unit

Name	Value	Unit
Declared unit	1	piece/product
Product weight	0.209	kg
Packaging materials	0.019	kg
Mass of declared Product	0.228	kg
Conversion factor to 1 kg	4.386	-

3.2 System boundary

Apart from production, this EPD also considers installation and disposal of the product. The Declaration is therefore from the "cradle to plant gate, with options".
The following modules are considered in accordance with EN 15804:

Product stage (A1-A3):
The extraction and processing of raw materials, including all of the corresponding upstream chains, provision of electricity, steam and heat from primary energy resources, including the extraction, refinement and transport thereof, as well as the requisite procurement transport to the plant gate and manufacturing of packaging, are considered in this module.

Transport to site (A4):
This module summarises the average distribution routes by truck and ship.

Installation on site (A5):
This module analyses the disposal of packaging incurred as waste during product installation.

Transport to EoL (C2):
This module analyses the average truck transports of product components for recycling and/or incineration.

Waste processing (C3):
This module considers the collection, processing and recycling efforts for materials during recycling or incineration.

Re-use, recovery and recycling potential (D):
The value streams arising from material recycling and energetic utilisation of the packaging materials (A5) and product components (C3) for a downstream product system are outlined in this module.

3.3 Estimates and assumptions

The most realistic data sets were selected.
The distribution countries were recorded proportionately and the transport distance averaged accordingly (A4).
A truck utilisation capacity (including empty runs) of 85% was assumed for transport to the site.

Comprehensive collection of the packaging materials (A5) and the product system at the EoL (C3) without collection losses was assumed. The route from the demolition site to the disposal company (C2) is estimated at 75 km. A utilisation capacity (including empty runs) of 50% is assumed.

3.4 Cut-off criteria

All operating data was taken into consideration in Modules A1-A3. Accordingly, material flows have also been analysed with a mass percentage of less than 1%.
Plants, infrastructure and secondary and tertiary packaging required during manufacturing are not analysed.

3.5 Background data

The latest version 8.1 of the software system for comprehensive analysis /GaBi/ was used for modelling the life cycle. The production process was modelled using the manufacturer-specific data. Generic background data sets were used for the upstream and downstream processes. These were taken from the current version of the GaBi data base.

3.6 Data quality

The data on the products under review was recorded using analyses of internal production and environmental data, LCA-relevant data within the supplier chain and analyses of relevant data for the provision of energy. The data surveyed has been examined for plausibility and consistency. Good data representativity can be assumed.
The background data used for the assessment is not older than 10 years.

3.7 Period under review

The material and energy data on which the LCA is based was recorded between January and June 2012 at the production facility in Velbert, Germany, and updated and adapted to the current situation between May and October 2017.

3.8 Allocation

The material flows required for manufacturing the product system were compiled individually from the OGRO Beschlagtechnik GmbH ERP system. The requisite energy data was converted to the piece numbers produced using measurement data. Allocations in the LCA data sets used are documented accordingly in the data sets.

The potentials arising from energetic utilisation of the product and its packaging (Modules C3 and A5) are allocated to Module D.

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.

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4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules or can be used for developing specific scenarios within the context of a building assessment.

Transport to the building site (A4)

Name	Value	Unit
Truck	-	
Diesel consumption	0.00201	kg
Transport distance	541	km
Capacity utilisation	85	%

Installation into the building (A5)

Name	Value	Unit
Auxiliary	0	kg
Water consumption	0	m^3
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg
Output substances following waste treatment on site	0.0187	kg
Dust in the air	0	kg
VOC in the air	0	kg

End of life (C1-C4)

Name	Value	Unit
Overall product collected separately	0.209	kg
Recycling	0.194	kg
Waste incineration	0.015	kg

Re-use, recovery and recycling potential (D), relevant scenario details

Module D includes possible potentials from incineration processes for packaging waste (A5) and plastic components of the product as well as from material recycling of the metallic product components (C3). A waste incineration plant with an R1 value > 0.6 is assumed.

5. LCA: Results

The LCA results for one window handle are depicted in this section. Please note that the LCIA results only indicate possible impact.

These results in the CML categories refer to potential environment impact over an analysis period of 100 years. Long-term emissions (> 100 years) are not taken into consideration in the estimated impact.
The characterisation factors of the /CML/ (Institute of Environmental Sciences, Faculty of Science, University of Leiden, The Netherlands), version 2001 - April 2013 are used.
Note: Impact estimate results are only relative statements which do not make any claims concerning the end points of the impact categories, exceeding threshold values or risks.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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	MND	MND	MND	X	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 Window handle

Parameter	Unit	A1-A3	A4	A5	C2	C3	D
Global warming potential	[kg CO_2-Eq.]	1.32E+0	7.01E-3	3.00E-2	1.34E-3	5.62E-2	-5.88E-1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	-4.00E-10	2.35E-15	7.46E-15	4.50E-16	2.81E-10	1.18E-9
Acidification potential of land and water	[kg SO_2-Eq.]	6.93E-3	1.66E-5	5.68E-6	3.57E-6	8.05E-5	-2.21E-3
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	4.46E-4	3.98E-6	1.10E-6	8.62E-7	1.07E-5	-1.36E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	4.39E-4	-5.42E-6	2.57E-7	-1.24E-6	5.38E-6	-1.98E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	2.11E-4	5.64E-10	5.10E-10	1.08E-10	3.41E-8	-7.87E-7
Abiotic depletion potential for fossil resources	[MJ]	1.59E+1	9.69E-2	8.63E-3	1.85E-2	3.42E-1	-6.18E+0

RESULTS OF THE LCA - RESOURCE USE: 1 Window handle

Parameter	Unit	A1-A3	A4	A5	C2	C3	D
Renewable primary energy as energy carrier	[MJ]	3.23E+0	4.88E-3	2.52E-1	9.32E-4	1.61E-2	-1.83E+0
Renewable primary energy resources as material utilization	[MJ]	2.51E-1	0.00E+0	-2.51E-1	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	3.48E+0	4.88E-3	1.29E-3	9.32E-4	1.61E-2	-1.83E+0
Non-renewable primary energy as energy carrier	[MJ]	1.66E+1	9.72E-2	9.79E-2	1.86E-2	7.43E-1	-6.90E+0
Non-renewable primary energy as material utilization	[MJ]	4.60E-1	0.00E+0	-8.80E-2	0.00E+0	-3.72E-1	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.71E+1	9.72E-2	9.87E-3	1.86E-2	3.71E-1	-6.90E+0
Use of secondary material	[kg]	2.00E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.73E-1
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	1.04E-2	9.04E-6	8.28E-5	1.73E-6	1.17E-4	-6.27E-3

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 Window handle

Parameter	Unit	A1-A3	A4	A5	C2	C3	D
Hazardous waste disposed	[kg]	7.24E-7	5.11E-9	1.01E-10	9.76E-10	1.56E-10	-1.42E-7
Non-hazardous waste disposed	[kg]	3.11E-1	7.43E-6	6.03E-4	1.42E-6	1.24E-2	-7.62E-2
Radioactive waste disposed	[kg]	4.75E-4	1.33E-7	4.91E-7	2.54E-8	1.20E-5	-3.12E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.94E-1	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	4.27E-2	0.00E+0	5.23E-2	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	9.96E-2	0.00E+0	1.21E-1	0.00E+0

6. LCA: Interpretation

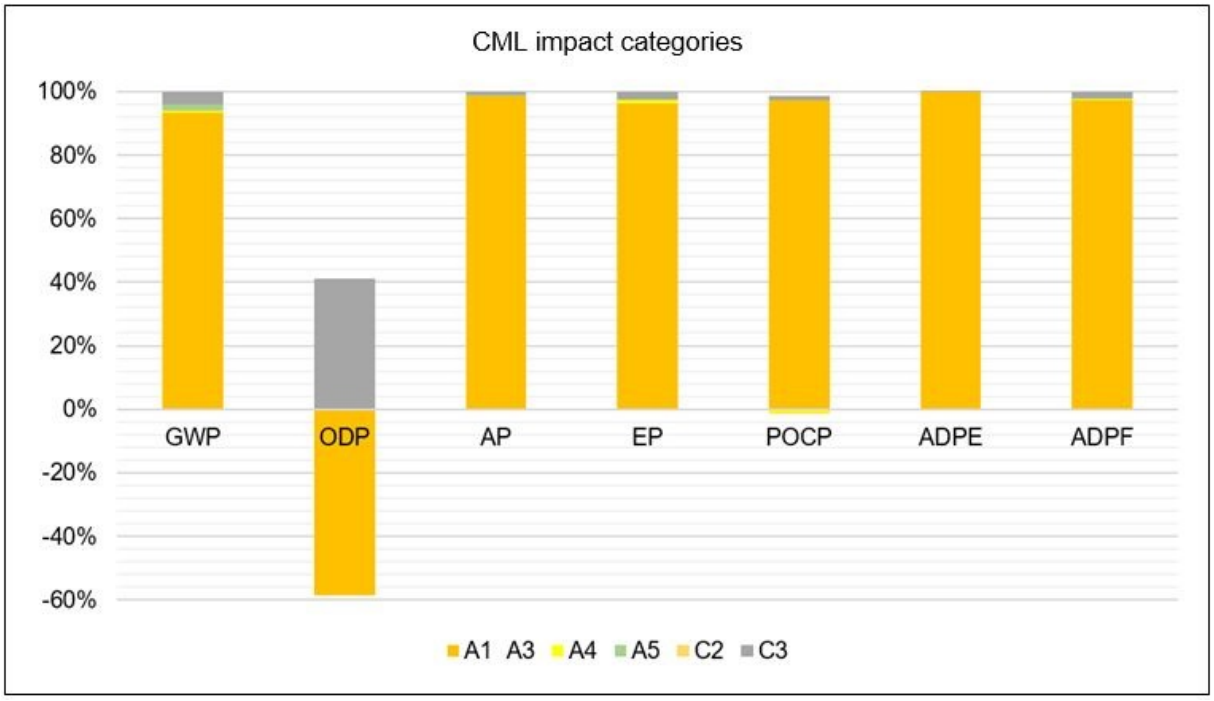
All impact categories are dominated by Modules A1-A3. This is due to the high percentage of metallurgical components, especially the extraction of stainless steel and aluminium, in accordance with the LCIA, and the associated upstream chains. The use of natural gas during the product stage also makes a particular contribution to the global warming potential (**GWP**).

The disposal of packaging materials (A5) makes a relevant contribution to the **GWP** but is irrelevant in the other indicators. The **GWP** is also noticeably influenced by utilisation of the product components (C3).

The loads avoided in terms of ozone depletion potential (**ODP**) in Modules A1-3 are based on the use

of secondary steel but their absolute figures are of little significance.

The greatest loads attributable to distribution (A4) and disposal transport (C2) are caused by emissions which contribute to the eutrification potential (**EP**). In relation to the remaining modules, they are not however of significance in any category. The nitrogen monoxide emissions incurred during transport have a negative influence on the photochemical ozone creation potential (**POCP**), which leads to avoided loads.



As an average of two different products was formed for calculating the CML indicators, the values for specific products deviate from the results of the weighted average depicted in the above graphic.

A sensitivity analysis for the **GWP** as the most common impact category revealed a relative deviation of +108% from the weighted average for the aluminium variant. The relative deviation by the stainless steel variant is -28%.

7. Requisite evidence

This Environmental Product Declaration does not require any evidence relating to the material composition of the product and its area of applicability.

8. References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);
General Principles
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www.ibu-epd.de

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

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

Product Category Rules for Construction Products, Part A: Calculation rules for the Life Cycle Assessment and requirements on the Background Report, version 1.6, 11/2017

Product Category Rules for Building Products, Part B: Requirements on the EPD for locks and fittings, version 1.0, 02/2016

BBSR: Service lives of components for Life Cycle Analyses in accordance with the evaluation system for sustainable building, 2017

CML: LCIA characterisation factors by the Centrum voor Milieukunde (CML) at the University of Leiden, The Netherlands; version 2001 - April 2013

DIN 17440: Steel and steel alloys

DIN 18267:2005-01: Window handles: Clickable and lockable window handles

DIN EN 13126-3:2012-02: Building hardware - Hardware for windows and door height windows - Requirements and test methods - Part 3: Handles, primarily for tilt and turn, Tilt-first and turn-only hardware; German version EN 13126-3:2011

DIN EN 1670:2007-06: Building hardware - Corrosion resistance - Requirements and test methods

DIN EN ISO 14001:2015-11: Environmental management systems - Requirements with guidance for use (ISO 14001:2015); German and English version EN ISO 14001:2015

DIN EN ISO 14025:2011-10: Environmental designations and declarations – Type III environmental declarations – Basic principles and processes; German and English versions EN ISO 14025:2011

DIN EN ISO 9001:2015-11: Quality management systems – Requirements (ISO 9001:2015); German and English versions EN ISO 9001:2015

EnEV 2009: Energy-saving ordinance for buildings Ordninance on energy-saving thermal insulation and energy-saving plant technology for buildings

European Waste Catalogue (EWC)

GaBi 8.1: Software and data base for comprehensive analysis, LBP [Lehrstuhl für Bauphysik] University of Stuttgart and thinkstep AG, Leinfelden-Echterdingen, 1992 – 2015

Green electricity certificate of the Stadtwerke Soest dated 04.01.2016

TA Luft: First general administrative specification under federal pollution control law Technical Instructions on Air Quality

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