

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

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|--------------------------|--------------------------------------|
| Owner of the Declaration | ASSA ABLOY Sicherheitstechnik GmbH |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-ASA-20150278-IAB1-EN |
| Issue date | 29.09.2015 |
| Valid to | 28.09.2020 |

Door Closer – DC300DA

ASSA ABLOY Sicherheitstechnik GmbH

www.bau-umwelt.com / <https://epd-online.com>



1. General Information

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|---|--|--|--|---|--|-------------------------------------|--|
| <p>ASSA ABLOY Sicherheitstechnik GmbH</p> <hr/> <p>Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-ASA-20150278-IAB1-EN</p> <hr/> <p>This Declaration is based on the Product Category Rules: Locks and fittings, 07.2014</p> <p>(PCR tested and approved by the independent expert committee (SVR))</p> <hr/> <p>Issue date 29.09.2015</p> <hr/> <p>Valid to 28.09.2020</p> <hr/> <p> Prof. Dr.-Ing. Horst J. Bossemayer (President of Institut Bauen und Umwelt e.V.)</p> <hr/> <p> Dr.-Ing. Burkhard Lehmann (Managing Director IBU)</p> | <p>Door Closer – DC300DA</p> <hr/> <p>Owner of the Declaration ASSA ABLOY Sicherheitstechnik GmbH Bildstockstraße 20, 72458 Albstadt, Germany</p> <hr/> <p>Declared product / Declared unit The declaration represents the Rack and Pinion door closer DC300DA, consisting of the following items: - A closer body - A link arm - Accessories</p> <hr/> <p>Scope: This declaration and its LCA study are relevant to ASSA ABLOY DC300DA door closer. The primary manufacturing processes are made by external suppliers and the final manufacturing processes and assembly for all door closer components occur at our ASSA ABLOY manufacturing factory in Wenzhou, China. 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 evidence.</p> <hr/> <p>Verification</p> <table border="1"> <tr> <td colspan="2">The CEN Standard EN 15804 serves as the core PCR</td> </tr> <tr> <td colspan="2">Independent verification of the declaration and data according to ISO 14025</td> </tr> <tr> <td><input type="checkbox"/> internally</td> <td><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <p> Dr. Wolfram Trinius (Independent verifier appointed by SVR)</p> | The CEN Standard EN 15804 serves as the core PCR | | Independent verification of the declaration and data according to ISO 14025 | | <input type="checkbox"/> internally | <input checked="" type="checkbox"/> externally |
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| Independent verification of the declaration and data according to ISO 14025 | | | | | | | |
| <input type="checkbox"/> internally | <input checked="" type="checkbox"/> externally | | | | | | |

2. Product

2.1 Product description

Product name: ASSA ABLOY DC300DA Rack and Pinion door closer.

Product characteristic: ASSA ABLOY's door closers are suitable for private homes, commercial or public sector and for heavy or lightweight doors. Rack and pinion door closers help to save energy in all seasons, optimizing the thermal efficiency of the door opening. The modular design simplifies planning, while the intelligent setting adjustment and installation features ensure easy installation. The door closer range is a joint development between companies in the ASSA ABLOY Group.

- CE marked
- Rack and Pinion mechanism - highly versatile and durable drive from a compact design
- Flexible installation on both left and right hand doors, door mounted or transom mounted
- Height-adjustable pinion for connection between door closer and arm

- A uniform design across the entire product range gives buildings style and aesthetic appeal
- Adjustable closing force
- Adjustable back check, which offers optimum protection for doors and walls by damped opening
- Adjustable delayed closing which is important for situations where extended closing time is needed for passing through a door (DC300DA)
- Thermodynamic valves for consistent performance
- Wide range of accessories
- Standard colors: silver EV1; white, similar to RAL9016; brown, similar to RAL8014; black, similar to RAL9005
- Integrated concealed mounting plate

2.2 Application

The ASSA ABLOY DC300DA rack and pinion overhead door closer can be used in private, commercial and public sectors in both light and heavy applications, such as:

- Fire & smoke protection and standard doors

- For interior doors
- For exterior doors

2.3 Technical Data

The declared door closer has following technical specifications and is applicable to the following door technical data with reference to the test standard.

Technical data

| Name | Value |
|---|--|
| Adjustable closing force | EN 3-6 |
| Door width up to | 1400 mm |
| Fire and smoke protections | Yes |
| DIN door swing directions | Left / right handed |
| Closing speed | Variable between 180° - 15° |
| Latching speed | Variable between 15° - 0° |
| Backcheck | Variable above 75° |
| Hold-open mode (with hold open link arm L191) | Adjustable 75°-150°, can be enabled and disabled |
| Delayed closing | Yes |
| Closer Weight | 1.9 kg |
| Closer Height | 60 mm |
| Closer Depth | 47 mm |
| Closer Length | 260 mm |
| Certified in compliance with | EN1154 |
| CE marking for building products | Yes |

2.4 Placing on the market / Application rules

For the placing on the market in the EU/EFTA (with the exception of Switzerland) the Regulation (EU) No. 305/2011 applies. The products need a Declaration of Performance taking into consideration /EN 1154:1996/A1:2002/AC:2006–Building hardware - Controlled door closing devices/ and the CE-marking. For the application and use of the products the respective national provisions apply.

2.5 Delivery status

Door closer body and link arm are delivered ready for installation in separate packages. The door closer unit including the packaging has the following dimensions: 280 x 75 x 65 mm. The link arm has the following dimensions: 330 x 40 x 35 mm

2.6 Base materials / Ancillary materials

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The average composition for ASSA ABLOY DC300DA, including the link arm is as follows:

| Component | Percentage in mass (%) |
|-----------------|------------------------|
| Aluminium | 40.6 |
| Brass | 0.4 |
| Plastics | 0.5 |
| Stainless Steel | 13.5 |
| Steel | 35.1 |
| Zinc | 3.5 |
| Other | 6.4 |
| Total | 100.0 |

2.7 Manufacture

The product components are manufactured by Tier 1 supplier. The final manufacturing and assembly processes occur at Shenfei Liyi Security Products Co. Ltd, ASSA ABLOY factory in China. The components

are manufactured from processes such as stamped steel, CNC machining and zinc and steel castings.

The factory of Shenfei has a certification of Quality Management system in accordance with ISO 9001:2008 standard.

Offcuts and scraps during the manufacturing process are directed to a recycling unit. Wastewater is cleared on-site and waste is sent for disposal.

Waste codes according to European Waste Catalogue and Hazardous Waste List - Valid from 1 January 2002:

EWC 12 01 01 Ferrous metal filings and turnings
EWC 12 01 03 Non-ferrous metal filings and turnings
EWC 08 02 01 Waste coating powders.

2.8 Environmental and health during manufacturing

ASSA ABLOY is committed to producing and distributing door closer solutions with minimal environmental impact, where health & safety is the primary focus for all employees and associates.

- Environmental operations, GHG, energy, water, waste, VOC, surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and Environment Management program effectiveness is evaluated.
- Code of Conduct covers human rights, labor practices and decent work. Management of ASSA ABLOY is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
- The factory of Shenfei Liyi has certification of Environmental Management to ISO 14001:2004 standard and Occupational Health and Safety to /OHSAS 18001:2007/ standard.
- Any waste metals during machining are separated and recycled. The waste from the water-based painting process is delivered to waste treatment plant

2.9 Product processing/installation

ASSA ABLOY DC300DA door closers are distributed through and installed by trained installation technicians, such as locksmiths, carpenters etc. adhering to local/national standards and requirements.

Door and frame preparations are made in door manufacturer's production sites or on site.

2.10 Packaging

ASSA ABLOY DC300DA door closers are packed in cardboard packaging. Packaging includes two paper sheets (installation instruction and drilling template) – all of which are fully recyclable.

| Component | Percentage in mass (%) |
|-----------------|------------------------|
| Cardboard/paper | 99.6 |
| Plastics | 0.4 |
| Total | 100.0 |

All materials incurred during installation are directed to a recycling unit.

Waste codes according to /European Waste Catalogue and Hazardous Waste List/ - Valid from 1 January 2002:

EWC 15 01 01 paper and cardboard packaging
EWC 15 01 02 plastic packaging
EWC 15 01 03 wooden packaging.

2.11 Condition of use

Annual inspection is recommended in order to guarantee correct functionality of the product and the door leaf. The inspection includes: checking, fixing screws to ensure they are properly tight, correct adjustments (closing speeds, force), compliance with local legal inspection standards and greasing all the moving parts of the arm.

2.12 Environment and health during use

There is no harmful emission potential. No damage to health or damage is expected under normal use corresponding to the intended use of the product.

2.13 Reference service life

Door closer units are normally installed by trained technicians. In any case the installation must be done in line with instructions provided by the manufacturer. The ASSA ABLOY DC300DA was developed to comply with EN1154 standard and quality requirements, including durability testing to 500,000 cycles. The typical life time of a DC300DA is 15-20 years, dependent on frequency of cycles.

2.14 Extraordinary effects

Fire

ASSA ABLOY DC347 are tested for fire resistance and smoke protection doors according to /EN 1634-1/.

Water

Door closers include hydraulic oil and are designed for conventional use and are not intended for flood protection. Unforeseeable flooding conditions will increase the potential for developing surface rust.

Mechanical destruction

No danger to the environment can be anticipated during mechanical destruction.

2.15 Re-use stage

The following possibilities arise with reference to the material composition of the door closer.

Re-use:

The product is possible to re-use during the reference service life and be moved from one door to another.

Material Recycling

The majority, by weight, of components is aluminium alloy, steel which can be recycled. The plastic components can be used for energy recovery within a waste incineration process.

Waste codes according to /European Waste Catalogue and Hazardous Waste List/ - Valid from 1 January 2002:

EWC 16 02 13* discarded equipment containing hazardous components (2) other than those mentioned in 16 02 09 to 16 02 12

EWC 17 02 01 wood

EWC 17 02 03 plastic

EWC 17 04 01 copper, bronze, brass

EWC 17 04 02 aluminium

EWC 17 04 05 iron and steel

EWC 17 04 11 Cables with the exception of those outlined in 17 04 10

2.16 Disposal

No disposal is foreseen for the product nor for the corresponding packaging.

2.17 Further information

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3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of door closer DC300DA as specified in Part B requirements on the EPD PCR Locks and fittings.

Declared unit

| Name | Value | Unit |
|---------------------------|-------|----------------------------------|
| Declared unit | 1 | one piece of DC300DA door closer |
| Conversion factor to 1 kg | 0.542 | - |

3.2 System boundary

Type of the EPD: cradle to gate - with Options

The following life cycle stages were considered:

Production stage:

- A1 – Raw material extraction and processing
- A2 – Transport to the manufacturer and
- A3 – Manufacturing

Construction stage:

- A4 - Transport from the gate to the site
- A5 – Packaging waste processing

End-of-life stage:

- C2 – Transport to waste processing
- C3 – Waste processing
- C4 – Disposal (landfill)

This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

- D - Declaration of all benefits or recycling potential from EOL and A5.

3.3 Estimates and assumptions

In the End-of-Life stage a scenario with collection rate of 100% for all the recyclable materials was assumed.

3.4 Cut-off criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1% of mass or energy (if available). In case a specific flow contributing less than 1% in mass or energy is not available, worst case assumption proxies are selected to represent the respective environmental impacts.

Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

3.5 Background data

For life cycle modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by thinkstep AG, is used /GaBi 6 2013/. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation /GaBi 6 2013D/.

To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

3.6 Data quality

The requirements for data quality and background data correspond to the specifications of the /IBU PCR PART A/.

thinkstep AG performed a variety of tests and checks during the entire project to ensure high quality of the completed project. This obviously includes an extensive review of project-specific LCA models as well as the background data used.

The technological background of the collected data reflects the physical reality of the declared products. The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.

All relevant background datasets are taken from the GaBi 6 software database. The last revision of the used background data has taken place not longer than 10 years ago.

3.7 Period under review

The period under review is 2013/14 (12 month average).

3.8 Allocation

Regarding incineration, the software model for the waste incineration plant (WIP) is adapted according to the material composition and heating value of the combusted material. In this EPD the following specific life cycle inventories for the WIP are considered:

- Waste incineration of plastic
- Waste incineration of paper.

Regarding the recycling material of metals, the metal parts in the EoL are declared as end-of-waste status. Thus, these materials are considered in module D. Specific information on allocation within the background data is given in the GaBi dataset documentation.

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.

4. LCA: Scenarios and additional technical information

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

Installation into the building (A5)

| Name | Value | Unit |
|--|-------|------|
| Output substances following waste treatment on site (Paper packaging) | 0.518 | kg |
| Output substances following waste treatment on site (Plastics packaging) | 0.002 | kg |

Reference service life

| Name | Value | Unit |
|------------------------|---------|------|
| Reference service life | 15 - 20 | a |

End of life (C2-C4)

| Name | Value | Unit |
|---|-------|------|
| Collected separately Aluminum, brass, plastics, steel, zinc | 1.73 | kg |
| Collected as mixed construction waste | 0.12 | kg |
| Reuse plastics parts | 0.009 | kg |
| Recycling Aluminum, brass, steel, zinc | 1.72 | kg |
| Construction waste for landfilling | 0.12 | kg |

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

| Name | Value | Unit |
|---|-------|------|
| Collected separately waste type Door closer (including packaging) | 2.37 | kg |
| Recycling Aluminium | 31.70 | % |
| Recycling Brass | 0.30 | % |
| Recycling Copper | 0.03 | % |
| Recycling Steel | 27.36 | % |
| Recycling Stainless Steel | 10.56 | % |
| Recycling Zinc | 2.76 | % |
| Thermal Treatment (plastics) | 0.40 | % |
| Loss Construction waste for landfilling (no recycling potential) | 4.94 | % |
| Reuse Packaging (paper) (from A5) | 21.87 | % |
| Reuse Packaging (plastics) (from A5) | 0.08 | % |

5. LCA: Results

Results shown below were calculated using CML2001 – Apr. 2013 Methodology.

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 ⁽¹⁾ | Refurbishment ⁽¹⁾ | 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 | MND | MND | MND | MND | MND | MND | X | X | X | X |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 piece of DC300DA Series Door Closer

| Parameter | Unit | A1 - A3 | A4 | A5 | C2 | C3 | C4 | D |
|--|---|----------|----------|----------|----------|----------|----------|-----------|
| Global warming potential | [kg CO ₂ -Eq.] | 1.67E+01 | 6.78E-01 | 4.50E-01 | 3.32E-01 | 0.00E+00 | 3.25E-02 | -2.98E+00 |
| Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 6.22E-09 | 2.61E-12 | 2.06E-12 | 1.32E-12 | 0.00E+00 | 9.80E-14 | 2.25E-10 |
| Acidification potential of land and water | [kg SO ₂ -Eq.] | 9.30E-02 | 1.61E-02 | 1.03E-04 | 7.04E-03 | 0.00E+00 | 8.29E-06 | -1.30E-02 |
| Eutrophication potential | [kg (PO ₄) ³⁻ - Eq.] | 7.99E-03 | 1.73E-03 | 1.79E-05 | 7.80E-04 | 0.00E+00 | 6.27E-07 | -4.78E-04 |
| Formation potential of tropospheric ozone photochemical oxidants | [kg Ethen Eq.] | 7.28E-03 | 6.53E-04 | 7.27E-06 | 2.13E-04 | 0.00E+00 | 4.03E-07 | -9.86E-04 |
| Abiotic depletion potential for non fossil resources | [kg Sb Eq.] | 6.05E-03 | 1.95E-08 | 8.12E-09 | 9.91E-09 | 0.00E+00 | 2.15E-09 | -8.59E-04 |
| Abiotic depletion potential for fossil resources | [MJ] | 2.02E+02 | 8.58E+00 | 1.26E-01 | 4.25E+00 | 0.00E+00 | 1.38E-02 | -3.07E+01 |

RESULTS OF THE LCA - RESOURCE USE: 1 piece of DC300DA Door Closer

| Parameter | Unit | A1 - A3 | A4 | A5 | C2 | C3 | C4 | D |
|--|-------------------|----------|----------|----------|----------|----------|----------|-----------|
| Renewable primary energy as energy carrier | [MJ] | 4.71E+01 | - | - | - | - | - | - |
| Renewable primary energy resources as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - |
| Total use of renewable primary energy resources | [MJ] | 4.71E+01 | 1.05E-01 | 1.18E-02 | 6.85E-02 | 0.00E+00 | 1.01E-03 | -1.54E+01 |
| Non renewable primary energy as energy carrier | [MJ] | 2.55E+02 | - | - | - | - | - | - |
| Non renewable primary energy as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - |
| Total use of non renewable primary energy resources | [MJ] | 2.55E+02 | 8.61E+00 | 1.48E-01 | 4.26E+00 | 0.00E+00 | 1.53E-02 | -4.32E+01 |
| Use of secondary material | [kg] | 2.45E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of non renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Use of net fresh water | [m ³] | 1.47E-01 | 1.04E-04 | 1.31E-03 | 6.10E-05 | 0.00E+00 | 7.95E-05 | -3.91E-02 |

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of DC300DA Door Closer

| Parameter | Unit | A1 - A3 | A4 | A5 | C2 | C3 | C4 | D |
|-------------------------------|------|----------|----------|----------|----------|----------|----------|-----------|
| Hazardous waste disposed | [kg] | 1.78E-02 | 1.24E-05 | 1.02E-05 | 6.66E-06 | 0.00E+00 | 1.07E-06 | -1.32E-03 |
| Non hazardous waste disposed | [kg] | 2.04E+00 | 3.24E-04 | 1.13E-02 | 2.14E-04 | 0.00E+00 | 3.03E-03 | -5.78E-01 |
| Radioactive waste disposed | [kg] | 2.11E-02 | 1.08E-05 | 8.63E-06 | 5.36E-06 | 0.00E+00 | 6.09E-07 | -5.05E-03 |
| Components for re-use | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling | [kg] | 0.00E+00 | 0.00E+00 | 3.18E-01 | 0.00E+00 | 3.67E+00 | 0.00E+00 | 0.00E+00 |
| Materials for energy recovery | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported electrical energy | [MJ] | 0.00E+00 | 0.00E+00 | 5.69E-01 | 0.00E+00 | 0.00E+00 | 6.23E-02 | 0.00E+00 |
| Exported thermal energy | [MJ] | 0.00E+00 | 0.00E+00 | 1.61E+00 | 0.00E+00 | 0.00E+00 | 1.71E-01 | 0.00E+00 |

6. LCA: Interpretation

This chapter contains an interpretation of the Life Cycle Impact Assessment categories. Stated percentages in the whole interpretation are related to the overall life cycle, excluding credits (module D).

The production stage (modules A1-A3) contributes between 76% and 100% to the overall results for all the environmental impact assessment categories hereby considered. Within the production stage, the main contribution for all the impact categories is the production of stainless steel, aluminium and steel, with mainly due to the energy consumption on these processes. These materials account with almost 88 %

to the overall mass of the product, therefore, the impacts are in line with the mass composition of the product. The environmental impacts for the transport (A2) have a negligible impact within this stage.

In the end-of-life stage, there are loads and benefits (module D, negative values) considered. The benefits are considered beyond the system boundaries and are declared for the recycling potential of the metals and for the credits from the incineration process (energy substitution).

7. Requisite evidence

Not applicable in this EPD.

8. References

Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin (pub.):
Generation of Environmental Product Declarations (EPDs);

General principles

for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013-04
www.bau-umwelt.de

IBU PCR Part A

IBU PCR Part A: Institut Bauen und Umwelt e.V., Berlin (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. April 2013
www.bau-umwelt.de

IBU PCR Part B

IBU PCR Part B: PCR Guidance-Texts for Building-Related Products and Services. From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part B: Requirements on the EPD for Locks and fittings.
www.bau-umwelt.com

Building hardware

Door fittings for use by children, elderly and disabled people in domestic and public buildings - A guide for specifiers; German version CEN/TR 15894:2009

ANSI/BHMA A156.4

ANSI/BHMA A156.4-2013: Standard for Door Controls - Door Closers

EN 1154 EN 1154:1996/A1:2002/AC:2006 Building hardware - Controlled door closing devices - Requirements and test methods

DIN EN 1634-1

Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

DIN EN ISO 9001

DIN EN ISO 9001:2008: Quality management systems - Requirements; Trilingual version EN ISO 9001:2008

DIN EN ISO 14001

DIN EN ISO 14001: Environmental management systems - Requirements with guidance for use (ISO 14001:2004 + Cor. 1:2009)

DIN EN ISO 14025

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

EN 15804

EN 15804:2012+A1:2014: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

GaBi 6 2013

GaBi 6 2013: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Leinfelden-Echterdingen, 1992-2013.

GaBi 6 2013D

GaBi 6 2013D: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Leinfelden-Echterdingen, 1992-2013. <http://documentation.gabi-software.com/>

OHSAS 18001

Occupational health and safety management systems. Requirements

9. Annex

Results shown below were calculated using TRACI Methodology.

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 BOUNDARYS |
|---------------------|-----------|---------------|-------------------------------------|----------|-----------|-------------|--------|---------------------------|-----------------------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|--|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement ¹⁾ | Refurbishment ¹⁾ | 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 | MND | MND | MND | MND | MND | MND | X | X | X | X |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 piece of DC 347 Series Door Closer

| Parameter | Parameter | Unit | A1-3 | A4 | A5 | C2 | C3 | C4 | D |
|-----------|--|---------------------------|----------|----------|----------|----------|----------|----------|-----------|
| GWP | Global warming potential | [kg CO ₂ -Eq.] | 1.67E+01 | 6.78E-01 | 4.50E-01 | 3.32E-01 | 0.00E+00 | 3.25E-02 | -2.98E+00 |
| ODP | Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 6.62E-09 | 2.78E-12 | 2.19E-12 | 1.40E-12 | 0.00E+00 | 1.04E-13 | 2.39E-10 |
| AP | Acidification potential of land and water | [kg SO ₂ -Eq.] | 9.35E-02 | 1.72E-02 | 1.24E-04 | 7.55E-03 | 0.00E+00 | 9.72E-06 | -1.22E-02 |
| EP | Eutrophication potential | [kg N-eq.] | 5.82E-03 | 6.03E-04 | 7.16E-06 | 2.75E-04 | 0.00E+00 | 2.96E-07 | -3.57E-04 |
| Smog | Ground-level smog formation potential | [kg O ₃ -eq.] | 1.34E+00 | 3.17E-01 | 2.90E-03 | 1.40E-01 | 0.00E+00 | 7.64E-05 | -1.10E-01 |
| Resources | Resources – fossil resources | [MJ] | 1.43E+01 | 1.23E+00 | 1.48E-02 | 6.11E-01 | 0.00E+00 | 1.42E-03 | -1.94E+00 |

RESULTS OF THE LCA - RESOURCE USE: 1 piece of DC 347 Series Door Closer

| Parameter | Parameter | Unit | A1-3 | A4 | A5 | C2 | C3 | C4 | D |
|-----------|--|-------------------|----------|----------|----------|----------|----------|----------|-----------|
| PERE | Renewable primary energy as energy carrier | [MJ] | 4.71E+01 | - | - | - | - | - | - |
| PERM | Renewable primary energy resources as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - |
| PERT | Total use of renewable primary energy resources | [MJ] | 4.71E+01 | 1.05E-01 | 1.18E-02 | 6.85E-02 | 0.00E+00 | 1.01E-03 | -1.54E+01 |
| PENRE | Non renewable primary energy as energy carrier | [MJ] | 2.55E+02 | - | - | - | - | - | - |
| PENRM | Non renewable primary energy as material utilization | [MJ] | 0.00E+00 | - | - | - | - | - | - |
| PENRT | Total use of non renewable primary energy resources | [MJ] | 2.55E+02 | 8.61E+00 | 1.48E-01 | 4.26E+00 | 0.00E+00 | 1.53E-02 | -4.32E+01 |
| SM | Use of secondary material | [kg] | 2.45E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | Use of renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | Use of non renewable secondary fuels | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | Use of net fresh water | [m ³] | 1.47E-01 | 1.04E-04 | 1.31E-03 | 6.10E-05 | 0.00E+00 | 7.95E-05 | -3.91E-02 |

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

1 piece of DC 347 Series Door Closer

| Parameter | Parameter | Unit | A1-3 | A4 | A5 | C2 | C3 | C4 | D |
|-----------|-------------------------------|------|----------|----------|----------|----------|----------|----------|-----------|
| HWD | Hazardous waste disposed | [kg] | 1.78E-02 | 1.24E-05 | 1.02E-05 | 6.66E-06 | 0.00E+00 | 1.07E-06 | -1.32E-03 |
| NHWD | Non hazardous waste disposed | [kg] | 2.04E+00 | 3.24E-04 | 1.13E-02 | 2.14E-04 | 0.00E+00 | 3.03E-03 | -5.78E-01 |
| RWD | Radioactive waste disposed | [kg] | 2.11E-02 | 1.08E-05 | 8.63E-06 | 5.36E-06 | 0.00E+00 | 6.09E-07 | -5.05E-03 |
| CRU | Components for re-use | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | - |
| MFR | Materials for recycling | [kg] | 0.00E+00 | 0.00E+00 | 3.18E-01 | 0.00E+00 | 3.67E+00 | 0.00E+00 | - |
| MER | Materials for energy recovery | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | - |
| EEE | Exported electrical energy | [MJ] | 0.00E+00 | 0.00E+00 | 5.69E-01 | 0.00E+00 | 0.00E+00 | 6.23E-02 | - |
| EET | Exported thermal energy | [MJ] | 0.00E+00 | 0.00E+00 | 1.61E+00 | 0.00E+00 | 0.00E+00 | 1.71E-01 | - |



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