ENVIRONMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804

Owner of the Declaration | ASSA ABLOY
Programme holder | Institut Bauen und Umwelt e.V. (IBU)
Publisher | Institut Bauen und Umwelt e.V. (IBU)
Declaration number | EPD-ASA-20170152-IBA1-EN
Issue date | 27.09.2017
Valid to | 26.09.2022

UNION keyPRIME Cylinder
UNION – ASSA ABLOY

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1. General Information

**UNION – ASSA ABLOY**

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

**Declaration number**
EPD-ASA-20170152-IBA1-EN

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**keyPRIME Cylinder**

**Owner of the Declaration**
ASSA ABLOY UK
School Street
Willenhall, WV13 3PW
United Kingdom

**Declared product / Declared unit**
The declaration represents 1 piece of key to differ cylinder with 2 nickel silver keys of the following type: euro profile, double cylinder, 60mm overall length (ED3030).
It includes the following components of the cylinder: housing, plugs, pinning components and 2 nickel silver keys.

**Scope:**
This declaration and the corresponding LCA study are relevant to UNION keyPRIME Cylinder. The primary manufacturing processes are performed by factory in Czech Republic and the final manufacturing processes and assembly for the cylinder components occur at the manufacturing factory in Czech Republic. The owner of the declaration shall be liable for the underlying information and evidence; IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

**Verification**
The CEN Standard EN 15804 serves as the core PCR Independent verification of the declaration according to ISO 14025

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>☑</td>
<td>externally</td>
</tr>
</tbody>
</table>

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2. Product

2.1 Product description

**Product name:** UNION keyPRIME Cylinder

**Product characteristic:**
UNION keyPRIME is a patented key to differ euro double cylinder with 2 keys. It is a reversible, dimple key cylinder with 6 pins.

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the Building Codes of the countries and the corresponding national specifications.

2.2 Application

These cylinders are designed for various applications. The cylinders are typically installed in both commercial and residential buildings, such as:
- Schools, universities
- Hospitals, small practices
- Hotels, leisure centres
- Small private homes, residential block houses etc.
- Psychiatric wards
- Any high abuse applications

2.3 Technical Data

The table presents the technical properties of UNION keyPRIME cylinders according to the classification in EN 1303:2015:
UNION keyPRIME is a patented key to differ euro double cylinder with 2 keys. It is a reversible, dimple key cylinder with 6 pins.

The cylinder offers the following features:

- (patent protected, expected extension of new patent application till 2036)
- EN 1303:2015 1 6 - B - C 5 D *when used with security escutcheon
- Includes 5 minutes drill resistance, anti-pick and anti-bump features:
  * large, robust, reversible nickel silver key that is convenient to use and has no sharp edges

2.4 Delivery status
Delivered as a complete unit, inclusive of fully assembled cylinder and keys. Delivered in a box size 100 x 30 x 45 mm.

2.5 Base materials / Ancillary materials
The composition of the UNION keyPRIME cylinder in percentage (%) of total mass per unit is, as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage in mass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics</td>
<td>0.3</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>1.0</td>
</tr>
<tr>
<td>Steel</td>
<td>20.8</td>
</tr>
<tr>
<td>Brass</td>
<td>77.9</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

2.6 Manufacture
The primary manufacturing processes are made by Tier 1 suppliers. The components have origin in processes such as machining, sintering and pressing. The final manufacturing processes for cylinder occur at ASSA ABLOY Rychnov factory in Czech Republic.

The factory of Rychnov has a Quality Management system certified according to ISO 9001:2008.

2.7 Environment and health during manufacturing
ASSA ABLOY is committed to producing and distributing door opening 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 routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and to evaluate the effectiveness of the environmental management program.
- Code of Conduct covers human rights, labour practices and decent work. The management of ASSA ABLOY is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
- The factory of Rychnov is certified according to ISO 14001:2004 Environmental Management system and is certified according to OHSAS 18001:2007 Occupational Health and Safety.
- Any waste metals during machining are separated and recycled. Waste water from water-based painting processes is delivered to waste treatment plant.

2.8 Product processing/Installation
UNION keyPRIME is distributed through and installed, by trained technicians, such as; locksmiths or security technicians. Preparation of doors and frames are conducted at the door manufacturer’s production site.

2.9 Packaging
These cylinders are packed in cardboard packaging. Packaging includes one box – all of which are fully recyclable.

<table>
<thead>
<tr>
<th>Material</th>
<th>Percentage in mass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard/Paper</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

2.10 Condition of use
Annual lubrication is recommended to guarantee quality operation of the cylinder.

2.11 Environment and health during use
There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

2.12 Reference service life
Approved for 100,000 cycles under normal working conditions and 15 years depending on cycle frequency and use of the door.

2.13 Extraordinary effects

Fire
Suitable for use in fire and smoke doors and is tested in accordance with EN 1634-1:2014 by Cambridge Fire Research.

Water
The product does not contain any substances that could be released and have an additional environmental impact on water in case of flood.

Mechanical destruction
No danger to the environment can be anticipated during mechanical destruction.
2.14 Re-use stage
It is possible to re-use the product during the reference
service life and it can be moved from one application to
another.

2.15 Disposal
The product can be mechanically disassembled to
separate the different materials. The majority, by
weight, of components are steel and brass, which can
be recycled. The cylinder can be sent to a
professional recycling service provider. No disposal is
foreseen for the product nor for the corresponding
packaging.

2.16 Further information
ASSA ABLOY UK
School Street
Willenhall, WV13 3PW
United Kingdom
www.uniononline.co.uk

3. LCA: Calculation rules

3.1 Declared Unit
The declaration refers to the functional unit of 1 piece
of UNION keyPRIME cylinder as specified in Part B
requirements on the EPD for Building Hardware
products.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass of declared Product</td>
<td>0.37</td>
<td>kg</td>
</tr>
<tr>
<td>Declared unit</td>
<td>-</td>
<td>1 piece of UNION keyPRIME cylinder</td>
</tr>
<tr>
<td>Conversion factor to 1 kg</td>
<td>2.70</td>
<td></td>
</tr>
</tbody>
</table>

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

The use stage:
- B2 – Maintenance

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 and loads

3.3 Estimates and assumptions
Transportation: Data on mode of transport and
distances, as reported by suppliers were used for
those materials and parts contributing more than 2% of
total product mass. In case of unknown transport
distances for parts and materials, contributing less
than 2% to the total product mass, transport by road
over an average distance of 500 km was assumed.

Fol: In the End-of-Life stage, for all the materials,
which can be recycled, a recycling scenario with 100%
collection rate 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 modelling 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 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.

3.7 Period under review
The period under review is 2015/16 (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
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Environmental Product Declaration UNION ASSA ABLOY – UNION keyPRIME cylinder

combusted material. In this EPD, the following specific life cycle inventories for the WIP are considered for:

- 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

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)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output substances following waste treatment on site (Paper packaging)</td>
<td>0.0022</td>
<td>kg</td>
</tr>
</tbody>
</table>

### Reference service life

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference service life</td>
<td>15</td>
<td>a</td>
</tr>
</tbody>
</table>

### Maintenance (B2)

Annual oiling of the cylinder is considered in this stage of the life cycle.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>0.0005</td>
<td>kg/a</td>
</tr>
</tbody>
</table>

### End of life (C2-C4)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected separately Plastics, Stainless Steel, Steel, Brass</td>
<td>0.372</td>
<td>kg</td>
</tr>
<tr>
<td>Recycling Stainless Steel</td>
<td>0.003</td>
<td>kg</td>
</tr>
<tr>
<td>Incineration of Plastic Parts</td>
<td>0.001</td>
<td>kg</td>
</tr>
<tr>
<td>Recycling Steel</td>
<td>0.076</td>
<td>kg</td>
</tr>
<tr>
<td>Recycling Brass</td>
<td>0.288</td>
<td>kg</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected separately waste type (including packaging)</td>
<td>0.370</td>
<td>kg</td>
</tr>
<tr>
<td>Recycling Stainless Steel</td>
<td>1</td>
<td>%</td>
</tr>
<tr>
<td>Recycling Steel</td>
<td>20.6</td>
<td>%</td>
</tr>
<tr>
<td>Reuse Paper</td>
<td>0.7</td>
<td>%</td>
</tr>
<tr>
<td>Incineration of Plastics</td>
<td>0.3</td>
<td>%</td>
</tr>
<tr>
<td>Recycling Brass</td>
<td>77.4</td>
<td>%</td>
</tr>
</tbody>
</table>
### Results of the LCA

Results shown below were calculated using CML 2000 – Apr. 2013 Methodology.

#### Description of the System Boundary (X = Included in LCA; MND = Module Not Declared)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>A1 - A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>B7</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWP Global warming potential</td>
<td>[kg CO₂-Eq.]</td>
<td>2.36E+00</td>
<td>8.85E-03</td>
<td>3.12E-03</td>
<td>7.91E-03</td>
<td>8.80E-03</td>
<td>0.00E+00</td>
<td>2.75E-03</td>
<td>2.47E-01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODP Depletion potential of the stratospheric ozone layer</td>
<td>[kg CFC11-Eq.]</td>
<td>3.63E-11</td>
<td>4.24E-14</td>
<td>1.43E-14</td>
<td>4.79E-13</td>
<td>4.21E-14</td>
<td>0.00E+00</td>
<td>8.27E-15</td>
<td>-1.09E-11</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP Acidification potential of land and water</td>
<td>[kg SO₂-Eq.]</td>
<td>1.36E-02</td>
<td>4.05E-05</td>
<td>7.10E-07</td>
<td>4.70E-05</td>
<td>4.03E-05</td>
<td>0.00E+00</td>
<td>7.00E-07</td>
<td>-1.42E-03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP Eutrophication potential</td>
<td>[kg (PO₄)³⁻-Eq.]</td>
<td>8.42E-04</td>
<td>9.25E-06</td>
<td>1.24E-07</td>
<td>2.23E-06</td>
<td>9.20E-06</td>
<td>0.00E+00</td>
<td>5.30E-08</td>
<td>-9.93E-05</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>POCP Formation potential of tropospheric ozone photochemical oxidants</td>
<td>[kg Ethene Eq.]</td>
<td>8.47E-04</td>
<td>1.31E-05</td>
<td>5.04E-08</td>
<td>6.50E-06</td>
<td>1.30E-05</td>
<td>0.00E+00</td>
<td>3.40E-08</td>
<td>-1.24E-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADPE Abiotic depletiation potential for non-fossil resources</td>
<td>[kg Sb Eq.]</td>
<td>3.15E-04</td>
<td>3.33E-10</td>
<td>5.62E-11</td>
<td>8.88E-10</td>
<td>3.32E-10</td>
<td>0.00E+00</td>
<td>1.81E-10</td>
<td>-1.73E-04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADPF Abiotic depletiation potential for fossil resources</td>
<td>[MJ]</td>
<td>2.03E+01</td>
<td>1.22E-01</td>
<td>8.73E-04</td>
<td>3.87E-01</td>
<td>1.21E-01</td>
<td>0.00E+00</td>
<td>1.16E-03</td>
<td>2.69E+00</td>
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</tr>
</tbody>
</table>

#### Results of the LCA - Environmental Impact: One piece of UNION keyPRIME cylinder

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>A1 - A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
<th>B7</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERE Renewable primary energy as energy carrier</td>
<td>[MJ]</td>
<td>2.03E+01</td>
<td>1.22E-01</td>
<td>8.73E-04</td>
<td>3.87E-01</td>
<td>1.21E-01</td>
<td>0.00E+00</td>
<td>1.16E-03</td>
<td>2.69E+00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERM Renewable primary energy resources as material utilization</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PERT Total use of renewable primary energy resources</td>
<td>[MJ]</td>
<td>2.73E+01</td>
<td>2.22E+01</td>
<td>1.02E+03</td>
<td>1.22E-01</td>
<td>1.22E-01</td>
<td>0.00E+00</td>
<td>1.29E-03</td>
<td>2.73E+00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PENRE Non-renewable primary energy as energy carrier</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PENRM Non-renewable primary energy as material utilization</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PENRT Total use of non-renewable primary energy resources</td>
<td>[MJ]</td>
<td>2.73E+01</td>
<td>2.22E+01</td>
<td>1.02E+03</td>
<td>1.22E-01</td>
<td>1.22E-01</td>
<td>0.00E+00</td>
<td>1.29E-03</td>
<td>2.73E+00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM Use of secondary material</td>
<td>[kg]</td>
<td>2.03E+01</td>
<td>1.22E+01</td>
<td>8.73E-04</td>
<td>3.87E-01</td>
<td>1.21E-01</td>
<td>0.00E+00</td>
<td>1.16E-03</td>
<td>2.69E+00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSF Use of renewable secondary fuels</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td></td>
</tr>
<tr>
<td>NRF Use of non-renewable secondary fuels</td>
<td>[MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
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<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
</tr>
<tr>
<td>FW Use of net fresh water</td>
<td>[m³]</td>
<td>7.62E-03</td>
<td>3.39E-06</td>
<td>9.07E-06</td>
<td>5.98E-06</td>
<td>3.38E-06</td>
<td>0.00E+00</td>
<td>6.71E-06</td>
<td>1.45E-03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 96% 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 brass and steel, with approx. 98%, mainly due to the energy consumption on this process. Stainless steel and steel account with the majority of 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):
www.ibu-epd.com

**General principles**
For the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013-04
www.ibu.epd.com

**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 Building Hardware Products. www.ibu.epd.com

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

**EN 15804**

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

**ISO 9001**
Quality management systems

**OHSAS 18001:2007**
Occupational Health and Safety Assessment Series

**EN 1634-1**
Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance test for door and shutter assemblies and openable windows.

**EN 1303:2015**
Building hardware - Cylinders for locks - Requirements and test methods

**GaBi 6 2013**

**GaBi 6 2013D**
Results shown below were calculated using TRACI Methodology.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Unc</th>
<th>A1 - A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWP</td>
<td>Global warming potential [kg CO₂-Eq.]</td>
<td>2.36E+00</td>
<td>8.85E-03</td>
<td>3.12E-03</td>
<td>7.91E-03</td>
<td>8.80E-03</td>
<td>0.00E+00</td>
<td>2.75E-03</td>
<td>2.47E-01</td>
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<tr>
<td>ODP</td>
<td>Depletion potential of the stratospheric ozone layer [kg CFC11-Eq.]</td>
<td>3.83E-11</td>
<td>4.50E-14</td>
<td>1.52E-14</td>
<td>5.10E-13</td>
<td>4.48E-14</td>
<td>0.00E+00</td>
<td>8.80E-15</td>
<td>-1.16E-11</td>
<td></td>
</tr>
<tr>
<td>AP</td>
<td>Acidification potential of land and water [kg SO₂-Eq.]</td>
<td>1.28E-02</td>
<td>5.29E-05</td>
<td>8.61E-07</td>
<td>4.31E-05</td>
<td>5.26E-05</td>
<td>0.00E+00</td>
<td>8.21E-07</td>
<td>-1.38E-03</td>
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<tr>
<td>EP</td>
<td>Eutrophication potential [kg N-eq.]</td>
<td>4.72E-04</td>
<td>3.74E-06</td>
<td>4.96E-08</td>
<td>1.50E-06</td>
<td>3.72E-06</td>
<td>0.00E+00</td>
<td>2.50E-08</td>
<td>-5.42E-05</td>
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</tr>
<tr>
<td>Smog</td>
<td>Ground-level smog formation potential [kg O₃-eq.]</td>
<td>1.19E-01</td>
<td>1.09E-03</td>
<td>2.01E-05</td>
<td>3.55E-04</td>
<td>1.08E-03</td>
<td>0.00E+00</td>
<td>6.45E-06</td>
<td>-1.62E-02</td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>Resources – resources fossil [MJ]</td>
<td>6.36E-01</td>
<td>1.76E-02</td>
<td>1.02E-04</td>
<td>5.54E-02</td>
<td>1.75E-02</td>
<td>0.00E+00</td>
<td>1.20E-04</td>
<td>-1.37E-01</td>
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</tbody>
</table>

**RESULTS OF THE LCA - RESOURCE USE: One piece of UNION keyPRIME cylinder**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Unc</th>
<th>A1 - A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>PERE</td>
<td>Renewable primary energy as energy carrier [MJ]</td>
<td>1.98E+00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>PERM</td>
<td>Renewable primary energy resources as material utilization [MJ]</td>
<td>0.00E+00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PERT</td>
<td>Total use of renewable primary energy resources [MJ]</td>
<td>1.98E+00</td>
<td>4.81E-03</td>
<td>8.14E-05</td>
<td>2.45E-03</td>
<td>4.78E-03</td>
<td>0.00E+00</td>
<td>8.51E-05</td>
<td>-1.41E-01</td>
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</tr>
<tr>
<td>PENRE</td>
<td>Non-renewable primary energy as energy carrier [MJ]</td>
<td>2.73E+01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>PENRM</td>
<td>Non-renewable primary energy as material utilization [MJ]</td>
<td>0.00E+00</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
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<tr>
<td>PENRT</td>
<td>Total use of non-renewable primary energy resources [MJ]</td>
<td>2.73E+01</td>
<td>1.22E-01</td>
<td>1.02E-03</td>
<td>3.92E-01</td>
<td>1.22E-01</td>
<td>0.00E+00</td>
<td>1E-03</td>
<td>-2.73E+00</td>
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<tr>
<td>SM</td>
<td>Use of secondary material [kg]</td>
<td>4.49E-01</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
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<td>0.00E+00</td>
<td>0.00E+00</td>
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<tr>
<td>RSF</td>
<td>Use of renewable secondary fuels [MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
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<tr>
<td>NRSF</td>
<td>Use of non-renewable secondary fuels [MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
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<td>0.00E+00</td>
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<tr>
<td>FW</td>
<td>Use of net fresh water [m³]</td>
<td>6.72E-03</td>
<td>3.39E-06</td>
<td>9.07E-06</td>
<td>5.98E-06</td>
<td>3.38E-06</td>
<td>0.00E+00</td>
<td>8.71E-06</td>
<td>-1.45E-03</td>
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</table>

**RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of UNION keyPRIME cylinder**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Unc</th>
<th>A1 - A3</th>
<th>A4</th>
<th>A5</th>
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<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWD</td>
<td>Hazardous waste disposed [kg]</td>
<td>5.56E-04</td>
<td>2.79E-07</td>
<td>7.04E-08</td>
<td>1.77E-06</td>
<td>2.77E-07</td>
<td>0.00E+00</td>
<td>9.02E-08</td>
<td>3.35E-05</td>
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</tr>
<tr>
<td>NHWD</td>
<td>Non-hazardous waste disposed [kg]</td>
<td>1.79E-01</td>
<td>1.54E-05</td>
<td>7.83E-05</td>
<td>2.62E-05</td>
<td>1.53E-05</td>
<td>0.00E+00</td>
<td>2.56E-04</td>
<td>2.81E-03</td>
<td></td>
</tr>
<tr>
<td>RWD</td>
<td>Radioactive waste disposed [kg]</td>
<td>2.71E-03</td>
<td>1.60E-07</td>
<td>5.98E-08</td>
<td>1.85E-06</td>
<td>1.59E-07</td>
<td>0.00E+00</td>
<td>5.14E-08</td>
<td>-1.72E-05</td>
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</tr>
<tr>
<td>CRU</td>
<td>Components for re-use [kg]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>-</td>
</tr>
<tr>
<td>MFR</td>
<td>Materials for recycling [kg]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>2.20E-03</td>
<td>0.00E+00</td>
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<tr>
<td>MER</td>
<td>Materials for energy recovery [kg]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>-</td>
</tr>
<tr>
<td>EEE</td>
<td>Exported electrical energy [MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>3.94E-03</td>
<td>0.00E+00</td>
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<td>0.00E+00</td>
<td>5.26E-03</td>
<td>-</td>
</tr>
<tr>
<td>EET</td>
<td>Exported thermal energy [MJ]</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>1.11E-02</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>1.44E-02</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>