# **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-20170185-IBA1-EN

Issue date 13.11.2017 Valid to 12.11.2022

**Prometal Honeycomb Core Steel Door** 

# **ASSA ABLOY Security Solutions Middle East**

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#### 1. General Information

# ASSA ABLOY Security Solutions Middle East

#### Programme holder

IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1

10178 Berlin Germany

#### **Declaration number**

EPD-ASA-20170185-IBA1-EN

# This Declaration is based on the Product Category Rules:

Windows and doors, 11.2014 (PCR tested and approved by the independent expert committee (SVR))

#### Issue date

13.11.2017

#### Valid to

12.11.2022

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

Dr.-Ing. Burkhart Lehmann

Dr.-Ing. Burkhart Lehmann (Managing Director IBU)

# Prometal Honeycomb Core Steel Door

#### **Owner of the Declaration**

Assa Abloy Security Solutions Middle East Jebel Ali Industrial Area 1 Street 11B P.O. Box: 37765 Dubai, United Arab Emirates

#### Declared product / Declared unit

The declaration represents 1 steel door set – Prometal Honeycomb Core Steel Door - consisting of the following items:

- Steel Frame
- Honeycomb core steel door leaf

#### Scope:

This declaration and its LCA study are relevant to the Prometal Honeycomb Core Steel Door manufactured in Prometal Metal Industries Factory (LLC) of Assa Abloy Security Solutions Middle East. The final assembly and production stage occurs in factory for the Prometal Honeycomb Core Steel Door in UAE.

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

internally internally

externally



(Independent verifier appointed by SVA)

### 2. Product

#### 2.1 Product description

Product name: Prometal Honeycomb Core Steel Door

#### **Product characteristic:**

- Prometal Honeycomb Core Steel Door consist of galvanized steel.
- Frame is 1.5 mm thick galvanized steel.
- Door Leaf is 1.2 mm thick galvanized steel.
- Infill of the leaf is Kraftpaper Honeycomb 180GSM
- Polvester Powder paint finish
- Complete door set is fire-rated for 120 minutes

## 2.2 Application

Prometal Honeycomb Core Steel Door consists of a fire-rated door set offered in various finishes for internal and external use.

# 2.3 Technical Data

The table presents the technical properties of Prometal Honeycomb Core Steel Door:



# **ASSA ABLOY**

Item	Value	Unit
Available Finishes	Polyester Powder Coated RAL colors	-
Size	Single door	-
Width	1100	mm
Height	2400	mm
Insert type	Kraftpaper Honeycomb 180GSM	-
Installation depth	150	mm
Possible opening types	Left and right	-
Material used (door frame)	1.5	mm

### 2.4 Placing on the market / Application rules

The standards that can be applied for Prometal Honeycomb Core Steel Door are:

- BS 476 Part 22
- ANSI UL 10C

#### 2.5 Delivery status

Prometal Honeycomb Core Steel Doors are delivered packed by 30 leafs and 12 frames per pallet

#### 2.6 Base materials / Ancillary materials

The average composition for Prometal Honeycomb Core Steel Doors are as following:

Component	Percentage in mass (%)
Steel	96.42
Polyester powder coating paint	2.42
Paper	0.67
Plastics	0.49
Total	100.0

#### 2.7 Manufacture

The manufacturing processes that occur in the factory for the Prometal Honeycomb Core Steel Door:

- 1) Shearing of steel sheets
- 2) Punching of hardware provisions on steel sheets
- 3) Bending of steel sheet to form frame profiles and
- 4) Welding of components to the frame and door leaf
- 5) Assembly of door leaf and frame by welding
- 5) Grinding & cleaning of the door set
- 6) Painting of frame and leaf
- 6) Packing of frame and leaf

The factory of Prometal Metal Industries Factory (LLC) has a certification of Quality Management system in accordance with ISO 9001:2008. Tier 1 suppliers are in UAE, Korea and India.

# 2.8 Environment and health during manufacturing

ASSA ABLOY is committed to producing and distributing door solutions with possibly small environmental impact, where health & safety is an important 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 (ISO 14001:2009).
- Code of Conduct covers human rights, labor practices and decent work.
- Any waste metals during machining are separated and recycled. The waste from the painting process is delivered to waste treatment plant.

#### 2.9 Product processing /Installation

Prometal Honeycomb Core Steel Doors are distributed through and installed by trained installation technicians, such as building technicians adhering to local/national standards and requirements. The product can also be installed directly from the end-user (professional or personal).

#### 2.10 Packaging

Prometal Honeycomb Core Steel Doors are packed by 30 leafs and 12 frames per pallet with Polyethylene film (LDPE/PE-LD). Each corner protected by hard cardboard carton. The packaging is in total 2kgs and is fully recyclable.

100% of carton is made from recycled material

Material	Percentage in mass (%)
Cardboard	95.7
Plastics	4.3
Total	100.0

#### 2.11 Condition of use

Internal and external usage is possible. Cleaning with a soft cloth would be sufficient during the use stage.

### 2.12 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.

#### 2.13 Reference service life

Properly installed and maintained steel metal doors can be used up to 500,000 cycles under normal working conditions, 10 years depending on cycle frequency.

#### 2.14 Extraordinary effects

#### Fire

Regarding fire protection, the product is tested according to UL 10C by Fire Door Labelling Agency (BMTRADA) and is fire resistant up to 120 minutes.

#### Water

No substances are used which have a negative impact on ecological water quality on contact by the door with water.

#### **Mechanical destruction**

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



#### 2.15 Re-use stage

The product is possible to re-use during the reference service life and be moved from one location to another. The majority, by weight, of components is steel which can be recycled. The plastic components can be used for energy recovery within a waste incineration process.

### 2.16 Disposal

The product can be mechanically dissembled to separate the different materials. The majority, by weight, of components is steel which can be recycled. The door can be sent to a professional recycling

service provider. No disposal is foreseen for the product nor for the corresponding packaging. The plastic components can be used for energy recovery in an incineration plant.

#### 2.17 Further information

Prometal Metal Industries Factory (LLC) Jebel Ali Industrial Area 1 Street 11B P.O. Box: 37765 Dubai, UAE

Tel: +971 4 880 4888

Web: www.middleeast.assaabloy.com



#### 3. LCA: Calculation rules

#### 3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of Prometal honeycomb core steel door as specified in Part B requirements on the EPD for Windows and doors, (PCR tested and approved by the independent expert committee (SVR)).

#### **Declared unit**

Name	Value	Unit
Declared unit	74.457	1 piece of Prometal honeycomb core steel door
Conversion factor to 1 kg	0.0135	-

#### 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 and loads

#### 3.3 Estimates and assumptions

<u>Transportation:</u> 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. Transport by road over an average distance of 500 km was assumed.

<u>EoL</u>: 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 modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by thinkstep AG, is used /GaBi 6 2015/. The GaBi-database contains consistent and documented datasets which are documented in the online

GaBi-documentation /GaBi 6 2015D/.

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.

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

- 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 considered.



# 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).

Transport to the building site (A4)

Name	Value	Unit
Truck transport		
Litres of fuel diesel with maximum load (27t payload)	39.4	l/100km
Transport distance truck	500	km
Capacity utilization (incl. empty runs) of truck	85	%

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Paper packaging)	2	kg
Output substances following waste treatment on site (Plastics packaging)	0.09	kg

#### Reference service life

Name	Value	Unit
Reference service life	10	а

Transport to waste processing (C2)

Transport to waste processing (OZ)									
Name	Value	Unit							
Truck transport									
Litres of fuel diesel with maximum load (27t payload)	39.4	l/100km							
Transport distance truck	500	km							
Capacity utilization (incl. empty runs) of truck	85	%							

End of life (C2-C4)

Name	Value	Unit
Collected separately Steel and Plastics	72.15	kg
Incineration plastics	0.36	kg
Recycling Steel	71.79	kg
Landfilling of paint	1.8	kg

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

Name	Value	Unit
Collected separately waste type (including packaging)	74.54	kg
Recycling Steel	96.3	%
Reuse Paper	0.63	%
Incineration of Plastics	0.61	%
Construction waste for landfilling (no recycling potential)	2.43	%



# 5. LCA: Results

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

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PER PERI PENI PENI PENI SM RS NRS FW RESU Hone Param	RE RM RT RE RM F P P P P P P P P P P P P P P P P P P	Renewal Total use Non-re Non-re Total us Use Use of no Use of no Use of no Radioa	ble primary carri- ble primary carri- ble primary as material of renewable primary energy conewable primaterial ut se of non-renewable energy results on renewable se of secondary enewable se of secondary enewable se of secondary enewable se of net from the LCA esteel de Paramete dous waste energy waste energy results on renewable se on renewable se on renewable se of net from the LCA esteel de paramete dous waste energy results on renewable se on renewable se of net from the LCA esteel de paramete dous waste energy results of the paramete energy results of the parameter energy	energy as er energy resutilization olle primary ces mary energialization newable psources ary materias escondary es escondary es escondary es es escondary es es escondary es	osource  / energy as  rgy as  rgy as  rgy as  / fuels  / fuels  / fueld  / fueld  / fuels  / fuels	y [I] s [I] y [I] [I] [I] [I] s [I]	MJ]	9.34E 0.00E 9.34E 2.60E 0.00E 2.60E 7.87E 0.00E 8.31E D WA E-02 E+00	+01	E+01 E+00 E+00 E+00 E-04 TEG	2.55E 3.38E- 0.00E+ 0.00E+ 2.61E- ORIE  A5 34E-05 87E-02	02 9.0 01 2.4 00 0.0 00 0.0 03 6.3 5.58E 3.08E		11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	C3	2.83E - 2.83E - 4.30E 0.00E 0.00E 2.23E metal  C4 3.00E-( 8.51E-(	:-02 :-01 +00 +00 :-03	2.03E+011.03E+03 0.00E+00 0.00E+00 -6.37E-02  D 7.89E-02 -1.67E+00
PER PERI PENI PENI PENI SM RS FW RESU Hone Param HW NHV RW	RRE RM RT M PER PROPERTY OF THE PROPERTY OF TH	Renewala Total use Non-re Non-re Total us Use of Use of no Use of no Hazaro Non-haza Radioa Com	ble primary carri- ble primary as material use of renewable primaterial use of non-renewable standardous waste dardous waste cardous waste carrious for the primaterial use of non-renewable standardous waste cardous waste carrious for the primaterial use of second renewable standardous waste cardous waste carrious for the primaterial use of th	energy as er energy resuttilization ole primary ces mary energarrier mary energilization newable psources ary materis secondary de secondary de secondary ole secondary et e secondary et	v energy as rrgy as all v fuels  UT FI  U [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [	y [I] s [I] y [I]	MJ]	9.34E 0.00E 9.34E 2.60E 0.00E 2.60E 7.87E 0.00E 8.31E D WA - A3 E-02 E+00	+00   +00	E+01 E+00 E+00 E+00 E-04 E-04 1 1 1 1 1 1 1 1.	2.55E 3.38E- 0.00E+ 0.00E+ 2.61E-  34E-05 87E-02 78E-05	02 9.4 00 0.6 00 0.6 00 0.6 00 0.6 5.58E 3.08E 3.21E	C2	0.00 0.00 0.00	C3	2.83E - 2.83E - 4.30E 0.00E 0.00E 0.00E 2.23E metal  C4 3.00E-( 8.51E-( 1.71E-(	:-02 :-01 +00 +00 :-03 :-03	2.03E+011.03E+03 0.00E+00 0.00E+00 -6.37E-02  D 7.89E-02 -1.67E+00 2.65E-02
PER PER PENI PENI PENI SM RS NRS FW RESU Hone Param HW NHV RW	RE RM RT RE RT V V V V V V V V V V V V V V V V V V	Renewal Total use Non-re Non-re Total us Use of Use of no Use of no Reading Hazaro Non-haza Radioa Com	ble primary carri- ble primary carri- ble primary as material ut resour mewable primaterial ut se of non-re- energy resour renewables on secondarenewables.  Disconding the primaterial ut se of non-re- energy resour renewables on-renewables.  Disconding the primaterial ut se of non-re- energy resource and primaterial ut se of non-re- energy resource and primaterial ut se of non-re- energy resource and primaterial ut se of secondarenewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primary resource and primaterial ut se of non-renewables.  Disconding the primaterial ut se of non-renewables.  Di	energy as er energy resuttilization ple primary ces mary energization mewable posources arry materia secondary e s	source  / energy as  rrgy as  rimary  fuels  / dd [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [	y [I] s [I] y [I] [I] [I] [I] s [I]	MJ]	9.34E 0.00E 9.34E 2.60E 0.00E 2.60E 7.87E 0.00E 8.31E D WA E-02 E+00	+00   9.64   +00   9.64   +00   9.64   +00   9.64   +00   9.00   +00   9.00   +00   9.00   6.01   6.80   6.59   6.00   8.559   6.00   9	E+01 E+00 E+00 E+00 E-04 3.8 1.: 0 0.0.0	2.55E 3.38E- 0.00E+ 0.00E+ 2.61E- 34E-05 87E-02 78E-05	02 9.0 01 2.4 00 0.6 00 0.6 00 0.6 00 0.5 5.58E 3.08E 3.21E 0.00E	C2	11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	C300E+0000E+00 .00E+00 .00E+00 .00E+00 00E+00 00E+00 00E+00 00E+00	2.83E - 2.83E - 4.30E 0.00E 0.00E 2.23E  C4 3.00E-( 1.71E-( 0.00E+	:-02 :-01 +00 +00 :-03 :-03 :-02 :05 :00	- 2.03E+01
PER PERI PENI PENI PENI SM RS NRS FW RESU Hone Param HW NHV RW CR	RE RM RT RE RM FF PW	Renewal Total use Non-re Non-re Total us Use of Use of no Use of no Radioa Com Material	ble primary carri- ble primary carri- ble primary as material use of renewable primaterial ut see of non-renewable renewable on-renewable see of second.  Je of renewable primaterial ut see of non-renewable see of second.  Je of renewable see of second renewable see of second renewable see of second renewable see of net from the second renewable see of second renewable second re	energy as er energy resutilization ple primary ces mary energiation energy resutilization ple primary energiation energy energiation energy energiation energiatio	rgy as rrgy as all the first states of the fir	y [I] s [I] y [I] [I] [I] [I] s [I]	MJ]	9.34E 0.00E 9.34E 2.60E 0.00E 2.60E 7.87E 0.00E 0.00E 8.31E D WA - A3 E-02 E+00 E-02 E+00	+01   +00   +01   9.64   +03   +00   +00   0.00   +00   0	E+01 E+00 E+00 E+00 E-04 E-04 1 2.3 3.8 1.: 0.0.0.0 0.0.0	2.55E 3.38E- 0.00E+ 0.00E+ 2.61E- 34E-05 87E-02 78E-05 00E+00	02 9.0 01 2.4 00 0.6 00 0.6 00 0.6 00 0.6 5.58E 3.08E 3.21E 0.00E	C2	0.00 0.00 0.00 0.00 0.00 0.00	C3	2.83E - 2.83E - 4.30E 0.00E 0.00E 2.23E  C4 3.00E-( 8.51E-( 0.00E+	:-02 :-01 +00 +00 :-03 :-03 :-05 :02 :05 :00 :00	- 2.03E+01 - 1.03E+03 0.00E+00 0.00E+00 0.00E+00 -6.37E-02  D 7.89E-02 -1.67E+00 2.65E-02 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 95% and 99% 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 steel mainly due to the energy consumption on this process.

Steel accounts in total with approx. 97% 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

#### **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

#### **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 Windows and doors. www.bau-umwelt.com

#### ISO 14025

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

#### ISO 14001:2004

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

#### 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 14351-1+A1:2010

Windows and doors. Product standard, performance characteristics.

Windows and external pedestrian door sets without resistance to fire and/or smoke leakage characteristics.

#### GaBi 6 2013

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

#### 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/

#### EN 20140-3

Acoustics - Measurement of sound insulation in buildings and of building elements.

### ISO 10077-2:2012

Thermal performance of windows, doors and shutters. Calculation of thermal transmittance. Numerical method for frames

# ISO 10077-1:2005+Ap1:2010

Thermal performance of windows, doors and shutters - Calculation of thermal transmittance

#### **ISO 717-1**

Acoustics. Rating of sound insulation in buildings and of building elements. Airborne sound insulation

#### EN 12400:2004

Windows and pedestrian doors. Mechanical durability. Requirements and classification



# 9. Annex

Results shown below were calculated using TRACI Methodology.																
DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DEC													CLARED)			
PRODUCT STAGE  CONSTRUCTI ON PROCESS STAGE						l	USE STAG	E		END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM		
			017									-				BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement <sup>1)</sup>	Refurbishment <sup>1)</sup>	Operational energy	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	А3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
Х	Х	Х	Х	Х	MND	MND	MND	MND	MND	MND	MND	MND	Χ	Х	Х	Х
RESU	JLTS	OF TH	IE LCA	- EN	VIROI	NMEN	TAL II	MPACT:	One	piece	of Pro	metal	Hone	eycomb	core	steel door
Parai	neter		Param	eter		Unit		A1 - A3	Α	4	A5	C	2	СЗ	C4	D
G۱	VΡ	Globa	al warmin	ng potent	ial	[kg CO <sub>2</sub> -	Eq.]	2.14E+02	1.77	E+00	9.33E-01	1.77E	+00	0.00E+00	9.14E	-01 -1.17E+02
OI	OP	strato	etion pote spheric c	ozone lay	er [l	kg CFC1	1-Eq.]	2.78E-09	9.03	≣-12	4.16E-12	9.02E	-12	0.00E+00	2.93E-	-12 5.78E-10
А	·P	Acidific	ation pot and wa		and	[kg SO <sub>2</sub> -	Eq.]	9.27E-01	1.06	≣-02	2.63E-04	1.06E	-02	0.00E+00	2.73E	-04 -4.54E-01
Е	Р	Eutro	ophicatio	n potenti	al	[kg N-e	q.]	5.60E-02	7.49	≣-04	1.33E-05	7.48E	-04	0.00E+00	8.32E	-06 -2.73E-02
Sm	nog	Ground	d-level sm potent	_	tion	[kg O <sub>3</sub> -6	eq.]	1.28E+01	2.18	≣-01	5.09E-03	2.18E	-01	0.00E+00	2.15E	-6.72E+00
Reso	urces	Resour	rces – res	sources f	ossil	[MJ]		1.51E+02	3.52	E+00	3.31E-02	3.51E	+00	0.00E+00	3.98E	·02 1.44E+01
RESU		OF TH			SOUR			ne piece	_			_				
	neter	Rene		ameter	neray a		Unit	A1 - A3		\4	A5	C2		C3	C4	D
PE	PERE Renewable primary energy as energy carrier				us	[MJ]	9.34E+0	1			-				_	
		Renewable primary energy resources as material utilization				,		-								
PE	RM	resou	newable irces as i	primary material	energy utilizati	ion	[MJ]	0.00E+0		-	-	-		-	-	-
PE PE		resou Total	newable irces as i use of re energy	primary material enewabl resourd	energy utilizati e prima es	ion ary			)	- E-01	- 2.55E-02	9.63E	-01 (	- ).00E+00	- 2.83E-0	- 02 2.03E+01
PE		resou Total Non-re	newable irces as i use of re energy enewable energ	primary material enewabl resource primary gy carrie	energy utilizati e prima es es r energy	ion ary y as	[MJ]	0.00E+0	1 9.64	- E-01 -	- 2.55E-02 -	9.63E	-01 C	- 0.00E+00 -	- 2.83E-0	2 2.03E+01
PE	RT NRE	resou Total Non-re	newable irces as i use of re energy enewable energenewable materia	primary material enewable resource primary gy carrie primary al utilizat	energy utilizati e prima es r energy r r energy ion	y as	[MJ]	0.00E+0 9.34E+0	9.64	- E-01 -	- 2.55E-02 - -	9.63E	-01 C	- 0.00E+00 -	- 2.83E-0 - -	2 2.03E+01 -
PEN PEN	RT NRE NRM NRT	resou Total Non-re Non-re Total us	newable use of re energy enewable energe enewable materia se of non energy	primary material enewable resource primary gy carrie primary al utilizate renewa	energy utilizati e prima es v energy r v energy ion able prin	y as y as mary	[W1] [W1] [W1] [W1]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0	9.64 3 3 2.45	- - E+01	- - 3.38E-01	- 2.45E-	+01 (	- - 0.00E+00	- 4E-01	-1.03E+03
PEN PEN S	RT NRE NRM NRT	resou Total Non-re Non-re Total us	newable use of re energy enewable energe enewable materia se of non energy e of secon	primary material enewabl resource primary gy carrie primary al utilizat resource prodary n	energy utilizati e prima es r energy r energy ion able princes	y as y as mary	[kg] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0	9.64 3 3 2.45 0 0.00	- - E+01 E+00	- 3.38E-01 0.00E+00	2.45E-	+01 C	- - 0.00E+00	- 4E-01	-1.03E+03
PEN PEN S	RT NRE NRM NRT	resou Total Non-re Non-re Total us Us Use of	newable use of re energy enewable energ enewable materia se of non energy e of seco	primary material enewabl resource primary gy carrie primary al utilizat i-renewa resource pondary n oble seco	energy utilizati e prima es r energy r energy ion able primes naterial	y as y as mary uels	[W1] [W1] [W1] [W1]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0	9.644 3 2.45 0 0.00 0 0.00	E+01 E+00 E+00	- - 3.38E-01	2.45E- 0.00E-	+01 C +00 C +00 C	- - 0.00E+00	- 4E-01	-1.03E+03 00 0.00E+00 00 0.00E+00
PEN PEN PEN S R:	RT NRE NRM NRT M	resou Total Non-re Non-re Total us Us Use of	newable use of re energy enewable energ enewable materia se of non energy e of seco	primary material enewable resource primary gy carrie primary al utilizat i-renewa resource pondary n ble seco newable fuels	energy utilizati e prima ees r energy r r energy ion able primes naterial ndary fu	y as y as mary uels	[MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0 0.00E+0	3 2.45 0 0.00 0 0.00 0 0.00	E+01 E+00 E+00	- 3.38E-01 0.00E+00 0.00E+00	2.45E- 0.00E- 0.00E-	+01 C +00 C +00 C	- 0.00E+00 0.00E+00	- 4E-01 0.00E+0	-1.03E+03 00 0.00E+00 00 0.00E+00
PEN PEN S R: NR FF	RT NRE NRM NRT M SF SF W	resou Total Non-re Non-re Total us Use of Use of Use of	newable use of re energy enewable energy enewable materia se of non energy e of seco renewabl f non-ren f Jse of ne	primary material enewable resource primary gy carries primary al utilizat and resource primary al utilizat and resource primary and primar	energy utilizati e prima es v energy r v energy ion able primes es naterial ndary for second	y as y as mary uels	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0 0.00E+0 0.00E+0 8.31E-0	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80	E+01 E+00 E+00 E+00 E+00	- 3.38E-01 0.00E+00 0.00E+00 0.00E+00	2.45E- 0.00E- 0.00E- 0.00E- 6.79E	+01 C +00 C +00 C	- 0.00E+00 0.00E+00 0.00E+00	- 4E-01 0.00E+0 0.00E+0	-1.03E+03 00 0.00E+00 00 0.00E+00
PEN PEN S R: NR FF	RT NRE NRM NRT M SF SSF W JLTS Diece	resou Total Non-re Non-re Total us Use of Use of Use of	newable urces as i use of re energy enewable energ enewable materia se of non energy e of seco renewat f non-ren fi Jse of ne	primary material enewable resource primary gy carries primary al utilizat and resource primary al utilizat and resource primary and primar	energy utilizati e prima es v energy r v energy ion able primes es naterial ndary for second	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0 0.00E+0 0.00E+0 8.31E-0	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80	E+01 E+00 E+00 E+00 E-04	- 3.38E-01 0.00E+00 0.00E+00 0.00E+00	2.45E- 0.00E- 0.00E- 0.00E- 6.79E	+01 C +00 C +00 C	- 0.00E+00 0.00E+00 0.00E+00	- 4E-01 0.00E+0 0.00E+0	-1.03E+03 00 0.00E+00 00 0.00E+00
PEN PEN S RS	RT NRE NRM NRT M SF SF W JLTS Diece	resou Total Non-re Non-re Total us Use of Use of OF TH	newable urces as i use of re energy enewable energ enewable materia se of non energy e of seco renewat f non-ren fi Jse of ne	primary material enewable resource primary gy carries primary al utilizat an-renewar resource primary in the pr	energy utilizati e prima es v energy r v energy ion able prin es naterial ndary fi second	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80	E+01 E+00 E+00 E+00 E-04 ATEC	- 3.38E-01 0.00E+00 0.00E+00 0.00E+00 2.61E-03	2.45E- 0.00E- 0.00E- 0.00E- 6.79E	+01 C +00 C +00 C +00 C	- 0.00E+00 0.00E+00 0.00E+00 0.00E+00	4E-01 0.00E+1 0.00E+1 0.00E+1 2.23E-0	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 03 -6.37E-02
PEN PEN PEN S RS NR FI RESU One	RT NRE NRT M SF SF W JLTS Diece neter	resou Total Non-re Non-re Total us Use of Use of Use of Haz	use of reenergy enewable energy enewable energy enewable materia se of non- energy e of seccorrenewable f non-ren f Use of ne	primary material enewable resource primary gy carries primary al utilization resource primary al utilization resource primary in the primary	energy utilizati e prima es r energy r r energy ion able prim es naterial ndary fr second water TPUT ycom	y as y as well a	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 0.00E+0 0.00E+0 0.00E+0 MD WAS	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80	E+01 E+00 E+00 E+00 E-04 ATEG	3.38E-01 0.00E+00 0.00E+00 0.00E+00 2.61E-03 SORIES	2.45E- 0.00E- 0.00E- 0.00E- 6.79E	+00 C C C C C C C C C C C C C C C C C C	- - 0.00E+00 0.00E+00 0.00E+00 0.00E+00	- 4E-01 0.00E++ 0.00E++ 2.23E-0	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 00 0.00E+00 03 -6.37E-02
PEN PEN SS RS NR FFI RESU One p	RT NRE NRT M SF SF W JLTS Diece neter //D //D	resou Total Non-re Non-re Total us Use of Use of Use of Haz Non-re	newable use of re energy enewable materia se of non energy e of seco renewabl f non-ren f Jse of ne  IE LCA pmetal  Para  zardous v	primary material enewable resource primary gy carries primary al utilizat a resource ondary noble seconewable fuels et fresh value ameter waste dies waste dies waste	energy utilizati e prima es v energy r v energy ion able prin es naterial ndary fi second water TTPUT ycom	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 0.00E+0 0.00E+0 0.00E+0 4.11E-02	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80 TE C.	E+01 E+00 E+00 E+00 E-04 ATEG	3.38E-01 0.00E+00 0.00E+00 0.00E+03 2.61E-03 ORIES A5 2.34E-05	2.45E- 0.00E- 0.00E- 0.00E- 6.79E	+01 C +00 C +00 C +00 C -04 C -04 C -03 (		- 4E-01 0.00E++ 0.00E++ 2.23E-(	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 03 -6.37E-02  D 05 7.89E-02 02 -1.67E+00
PEN PEN S R: NR F RESU One   Param	RT NRE NRT M SF SF W JLTS Diece neter //D //D	resou Total Non-re Non-re Total us Use of Use of Use of Haz Non-re	use of reenergy enewable energy enewable materia se of non-ren f Jse of non-ren g Para zardous nazardous	primary material enewable resource primary gy carries primary all utilization resource primary all utilization resource primary in the secondary in the seconda	energy utilizati e prima es r energy r r energy ion able prim es naterial ndary fr second water TPU ycom	y as y as wary wells dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0 0.00E+0 8.31E-0 ND WAS I door A1-A3 4.11E-02 3.94E+00	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80 TE C.	- E+01 E+00 E+00 E+00 E-04 ATEC	3.38E-01 0.00E+00 0.00E+00 0.00E+00 2.61E-03 CORIES A5 2.34E-05 3.87E-02	2.45E- 0.00E- 0.00E- 0.00E- 6.79E 5.58E 3.08E	+01 C +00 C +00 C -04 C -05 C		- 4E-01 0.00E++ 0.00E++ 2.23E-0 C4 3.00E- 8.51E-	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 01 -6.37E-02  D 05 7.89E-02 02 -1.67E+00 05 2.65E-02
PEN PEN SS RSS NR FFI RESU One p Paran HW NHV	RT NRE NRM NRT M SF SSF W JLTS Diece neter //D WD //D RU	resour Total  Non-re  Non-re  Total us  Use of  Use of  Use of  Haz  Non-re	newable urces as i use of re energy enewable energy enewable materia se of non- energy e of secon formerable formerable renewable materia se of non- energy e of secon formewable formerable  Para zardous v mazardous lioactive	primary material enewable resource primary gy carries primary al utilizat an-renewable resource primary al utilizat an-renewable resource primary in the pri	energy utilizati e prima es v energy r v energy ion able prim es naterial ndary fr second water TTPUT ycom sposed disposed	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 0.00E+0 0.00E+0 0.00E+0 4.11E-02 3.94E+00 2.44E-02	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80 TE C.  A 5.591 3.091	E+01 E+00 E+00 E+00 E-04 ATEG	3.38E-01 0.00E+00 0.00E+00 0.00E+00 2.61E-03 ORIES A5 2.34E-05 3.87E-02 1.78E-05	2.45E- 0.00E- 0.00E- 0.00E- 6.79E 5.58E 3.08E 3.21E	+01 C +00 C +00 C +00 C -04 C -04 C -03 C +00 C -03 C +00 C -05 C +00 C -05 C +00 C		- 4E-01 0.00E++ 0.00E++ 0.00E++ 2.23E-C  C4  3.00E- 8.51E- 1.71E-	-1.03E+03 -0.00E+00 -0.00E
PEN PEN S RS RS NR PEN	RT NRE NRT M SF SF W JLTS Diece neter //D //D RU TR	resou Total Non-re Non-re Total us Use of Use of Use of Haz Non-re	newable use of re energy enewable energy enewable materia se of non- energy de of seccor renewable f non-ren f Use of ne Para zardous v nazardous lioactive	primary material enewable resource primary gy carrie e primary al utilizat a resource primary al utilizat a resource primary no prim	energy utilizati e prima es r energy r r energy ion able prim es naterial ndary fr second water  TPUT ycom sposed disposed e-use cling	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 7.87E+0 0.00E+0 8.31E-0 ND WAS I door A1 - A3 4.11E-02 3.94E+00 2.44E-02 0.00E+00	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80 TE C A 5.591 3.091 0.006	E+01 E+00 E+00 E+00 E-04 ATEC	3.38E-01 0.00E+00 0.00E+00 0.00E+00 2.61E-03 CORIES A5 2.34E-05 3.87E-02 1.78E-05 0.00E+00	2.45E- 0.00E- 0.00E- 0.00E- 6.79E 5.58E 3.08E 3.21E 0.00E-	+01 C +00 C +00 C -04 C -05 C -05 C -05 C +00 C -05 C +00 C -05 C		- 4E-01 0.00E++ 0.00E++ 0.00E++ 2.23E-0 C4 3.00E- 8.51E- 1.71E- 0.00E+	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 01 0.00E+00 02 0.00E+00 03 -6.37E-02 05 7.89E-02 00 -1.67E+00 00 -
PEN PEN S RS NR F RESU One p Paran HW NHV RW	RT NRE NRM NRT M SF SSF W JLTS Diece neter //D WD //D RU ER ER	resour Total  Non-re  Non-re  Total us  Use of  Use of  Use of  And  Mate	newable use of re energy enewable energy enewable materials e of secon renewable f non-ren f Jse of ne paradous v mazardous v mazardous Materials	primary material enewable resource primary gy carrie e primary al utilizat a resource ondary noble seconewable fuels et fresh waste di us waste di nts for recy energy i	energy utilizati e prima es v energy r v energy ion able prim es naterial ndary fr second water TPUT ycom sposed disposed e-use cling	y as y as mary uels dary	[MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ] [MJ]	0.00E+0 9.34E+0 2.60E+0 0.00E+0 2.60E+0 0.00E+0 0.00E+0 0.00E+0 3.31E-0 A1-A3 4.11E-02 3.94E+00 2.44E-02 0.00E+00	3 2.45 0 0.00 0 0.00 0 0.00 1 6.80 TE C. A 5.591 3.091 0.006	E+01 E+00 E+00 E+00 E-04 ATEC	3.38E-01 0.00E+00 0.00E+00 0.00E+03 2.61E-03 CORIES A5 2.34E-05 3.87E-02 1.78E-05 0.00E+00 0.00E+00	2.45E- 0.00E- 0.00E- 0.00E- 6.79E  5.58E 3.08E 3.21E 0.00E- 0.00E-	+01 C +00 C +00 C -04 C -04 C -05 (		- 4E-01 0.00E++ 0.00E++ 0.00E++ 2.23E-C  C4 3.00E- 8.51E- 1.71E- 0.00E+	-1.03E+03 00 0.00E+00 00 0.00E+00 00 0.00E+00 03 -6.37E-02  D 05 7.89E-02 02 -1.67E+00 05 2.65E-02 00 - 00 -



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Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin

Fax +49 (0)30 3087748- 29 Mail info@ibu-epd.com Web www.ibu-epd.com Germany

Tel



#### Programme holder

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

+49 (0)30 - 3087748- 0 Tel +49 (0)30 – 3087748 - 29 Fax Mail info@ibu-epd.com www.ibu-epd.com

+971 4 880 4888

+49 (0)30 3087748- 0



### Author of the Life Cycle Assessment

thinkstep AG Tel +49 (0)711 341817-0 Hauptstraße 111-113 Fax +49 (0)711 341817-25 info@thinkstep.com 70771 Leinfelden-Echterdingen Mail www.thinkstep.com Germany Web



#### Owner of the Declaration

Dubai, UAE

Assa Abloy Security Solutions Middle Jebel Ali Industrial Area 1 Street 11B P.O. Box: 37765

Mail ae.prometal@assaabloy.com Web www.middleeast.assaabloy.com

Tel