ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**ASSA ABLOY Door Group, LLC / Ceco Door**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASA-20150149-IBA1-EN
Issue date	10.04.2015
Valid to	09.04.2020

Blast Resistant Door and Frame Assembly

ASSA ABLOY Door Group, LLC / Ceco Door

Institut Bauen und Umwelt e.V.

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

1. General Information

ASSA ABLOY Door Group, LLC/ Ceco Door

Programme holder

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

Declaration number

EPD-ASA-20150149-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

10.04.2015

Valid to

09.04.2020

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

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

Blast Resistant Door and Frame Assembly

Owner of the Declaration

ASSA ABLOY Door Group
Ceco Door
9159 Telecom Drive
Milan, TN 38358
USA

Declared product / Declared unit

This declaration represents 1 Blast Resistant Door and Frame Assembly prime painted.

Scope:

This declaration and its LCA study are relevant to Blast Resistant 1 3/4" (4.445 cm) hollow metal doors and frames manufactured from an option of 14 to 18 gauge cold rolled steel face sheets at a single manufacturing ASSA ABLOY Door Group site - Security Metal Products, Tijuana, BC, Mexico. All Blast Resistant opening component assembly and manufacturing processes are performed at our manufacturing factory - Security Metal Products, Tijuana, BC, Mexico. The Blast Resistant openings are marketed under the following ASSA ABLOY Door Group brands:

Ceco Door (Milan, TN, USA), Curries (Mason City, IA, USA), Fleming Door Products (Woodbridge, ON, CA) and Security Metal Products (Culver City, CA, USA.)

Verification

The CEN Standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025
☐ internally ☒ externally

Dr. Wolfram Trinius
(Independent verifier appointed by SVR)

2. Product

2.1 Product description

Product name: Blast Resistant Door and Frame Assembly

Product characteristics: The Blast Resistant Door and Frame Assembly provides extra protection against explosions and excessive force and meets US government, military, embassy safety and security objectives for blast resistance. The blast assemblies have been third party tested to reach 4 psi peak pressure/28 psi-msec impulse load, 6 psi peak pressure/42 psi-msec impulse load, or 12 psi peak pressure/89 psi-msec impulse load.

2.2 Application

Blast Resistant Door and Frame Assemblies are intended for protection of personnel, private property, and as required by the Department of Homeland Security, DOD/ATFP requirements, DOE, GSA Level C and D, and petrochemical industry standard (PIPITC.) Common applications are: Interior or exterior door openings for government buildings, military facilities, embassies, and transportation terminals.

2.3 Technical Data

Blast Resistant Door and Frame Assemblies conform to the Steel Door Institute guide specification, ANSI A250.8 Recommended Specifications for Standard Steel Doors and Frames and ANSI / NAAMM / HMMA 867-06 Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames; Available Sizes: 4'0" x 8'0" maximum single, 8'0" x 8'0" maximum pair. Blast Resistant Door and Frame Assemblies meet or exceed the criterial set forth by Blast Test Standards: ASTM F1642 & ASTM F2927, UFC 4-010-01 9 Feb 2012, GSA TS-01 Level C&D.

2.4 Placing on the market / Application rules

Blast Resistant Door and Frame Assemblies conform to the Steel Door Institute guide specifications and ASTM / ANSI American Standards, Underwriters Lab and Warnock Hersey Agency:

• ANSI /SDI A250.4-2011 Physical Endurance for Steel Doors, Frames & Frame Anchors Physical endurance testing

• UFC 4-010-01, DoD Minimum Antiterrorism Standard for Buildings
• ASTM F2248 Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass
• ASTM F2247 Standard Test Method for Metal Doors Used in Blast Resistant Applications
• ASTM F1642 Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

2.5 Delivery status

Finished Blast Resistant Door and Frame Assemblies are individually packaged then placed horizontally on wooden pallet and banded to pallet for shipment. Minimum of 1 and max 20 doors per pallet. Package Sizes: Package dimensions are proportionate to the door size: e.g. 3'0" x 7'0" door pallet will be 3'0" x 7'0" x 44" (20 doors + 4" high pallet) 4'0" x 8'0" maximum width, 20 doors/pallet = 44" height.

2.6 Base materials / Ancillary materials

The composition of the steel door is as following:

Component	Percentage in mass (%)
Steel	97.7
PU core	1.5
Others	0.8
Total	100

2.7 Manufacture

Door production process utilizes cutting, forming, stamping, CNC, welding, grinding and electrostatic water based painting equipment. Door skins & components are fabricated from 18, 16, or 14 ga cold rolled steel conforming to ASTM A1008 or hot-dipped galvanized steel conforming to ASTM A924 and A653. Hinge & lock reinforcements are attached to bottom door skin, top skin is tack welded, then edge seams are welded. Hardware Reinforcements for most lock preps, including concealed hardware, 7 gauge steel hinge reinforcements. Hinge preparations are handed. Hinge edges are mortised for 4-1/2" or 5" high, standard and heavy weight hinges. Core: Polystyrene foam. Paint: Electrostatically applied water based prime base coat per ANSI A250.10.
All Blast Resistant opening component assembly and manufacturing processes are performed at the manufacturing factory - Security Metal Products, Tijuana, BC, Mexico

2.8 Environment and health during manufacturing

ASSA ABLOY Door Group and Ceco Door are committed to protecting human health and the environment; meeting or exceeding Federal, State, and local laws, regulations, codes, and guidelines; and employing sustainable pollution prevention practices. Painting and welding areas of manufacturing plant has extraction ventilation system to remove dust, volatile organic compound (VOC) and air borne materials. Sound abatement is implemented where possible and Personal Protective Equipment is provided. Waste water is pre-treated prior to dispensing into city water system.

• 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.

2.9 Product processing / Installation

Doors are typically installed into commercial applications per local, state and federal building codes, standards and requirements. Personal Protective Equipment should be provided at construction site.

2.10 Packaging

Blast Resistant Door and Frame Assemblies are individually wrapped in protective cardboard and banded with polyethylene to retain door protective packaging. Doors are stacked horizontally on wooden pallet and banded to pallet for shipment. (max 20 doors per pallet) Corrugated packaging is 100% recycled, Packaging material and polyethylene banding should be removed from packaging and collected separately for recycling.

Material	Value (%)
Wood	100.0
Total	100.0

2.11 Condition of use

Doors are only prime painted, unless the Customer orders the doors factory finish painted. Doors receive an environmentally friendly primer finish designed to provide a rust inhibiting substrate and is intended as a preparatory base for field painting. The primer finish is not designed to be the final layer of protection from outside elements. Primed doors should receive a finish paint topcoat per S.D.I. / NAAMM / HMMA standards for performance. Gasketing and thresholds are used to control the flow of air, smoke, heat or cold, water, and sound through the door opening. The location or intended use of the door assembly, the environment to which it is exposed, and the performance expected will dictate the selection of gasketing and threshold products and the amount of maintenance required. Typical maintenance is to service the painted surface by re-coating the doors as necessary (location and environment will vary the time). This is usually after about 5 years in the field (but can be longer depending on exposure and environment). Repairs or replacement are not usually necessary. No cleaning efforts need to be taken into consideration.

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 hollow metal doors often last 30 years or longer. Steel Door Institute test standard (ANSI/SDI A250.4- 2001) Level A requires 1,000,000 cycles - Blast door assemblies have cycle tested (open/closed) 1,000,000 cycles with no issues. The location and intended use of the steel door assembly, the environment to which it is exposed, and the cycling of the door assembly will determine the steel door assembly life expectancy.

2.14 Extraordinary effects

Fire

Fire Protection

There is no intended protection from fire with this product. There are no ingredients in the product that would start or increase intensity of a flame.

Water

No substances are used which have a negative impact on ecological water quality on contact by the door with water. Steel doors subjected to unforeseeable flooding conditions will increase the potential for developing surface rust. The door is designed for traditional locations and is not intended for flood protection.

Mechanical destruction

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

2.15 Re-use phase

The product is possible to reuse during the reference service life and be moved from one similar door opening to another. The majority, by weight, of door components is steel which can be recycled. In collaboration with the Steel Recycling Institute, customers can utilize a locator tool, allowing them to find a recycling center near them. The locator tool is hosted on the Steel Recycling Institute's website (www.recycle-steel.org); it simply asks the user for location information, and provides the nearest recycling location. The tool is free to use and allows the consumer to travel just a short distance and properly dispose their materials. This free program provides recycling and/or disposal of door and frame products that have reached the end of their life cycle and are beyond the product's warranty period.

2.16 Disposal

No disposal is foreseen for the Blast Resistant Door and Frame Assembly nor for the corresponding packaging.

2.17 Further information

For additional information on our products please visit our web sites:

ASSA ABLOY Door Security Solutions
www.assaabloydss.com,
or Ceco Door
www.cecodoor.com

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of Blast Resistant Door and Frame Assembly as specified in Part B requirements on the EPD for Windows and doors/IBU PCR Part B/.

Declared unit

Name	Value	Unit
Declared unit	1	piece of Blast Resistant Door and Frame Assembly
Conversion factor to 1 kg	0.01	
Area	1.95	sqm/pc
Ratio to reference door	0.728	Measuring 1.23 m x 2,18 m = 2,.68 sqm/pc (reference door based on EN14351-1)

3.2 System boundary

Type of the EPD: cradle to gate - with Options
The following life cycle phases were considered for Blast Resistant Door and Frame Assembly :

A1-A3 Production stage:

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

A4-A5 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 for recycling and,
- C4 – Disposal (landfill)

These information modules include provision and transport of all materials, products, as well as energy and water provisions, waste processing up to the end-of-waste state or disposal of final residues.

Module D:

- Declaration of all benefits or recycling potential from EoL and A5

3.3 Estimates and assumptions

Transport:
For materials and pre-products the actual means of transport and distances, provided by the suppliers, were considered.

EoL:
In the End-of-Life phase 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 PE INTERNATIONAL 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/.
PE INTERNATIONAL 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
• Waste incineration of wood

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.

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

In the EPD scenarios and/or technical information for Modules B2, B6, C1-C4 and D are given.

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Wood packaging)	53.01	kg

Reference service life

Name	Value	Unit
Reference service life	30	a

End of life (C1-C4)

Name	Value	Unit
Collected separately Steel, plastic parts	83.85	kg
Collected separately Plastics	1.41	kg
Recycling Steel	84.6	kg
Thermal Treatment Plastics	1.41	kg

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

Name	Value	Unit
Collected separately waste type Blast Resistant Door (with packaging)	138.83	kg
Recycling steel recycling	60.40	%
Reuse plastic parts (foam)	1.42	%
Reuse Packaging (wood) (from A5)	38.18	%

5. LCA: Results

Results shown below were calculated using CML 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 Blast Resistant Door and Frame Assembly

Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
Global warming potential	[kg CO_2-Eq.]	1.82E+02	3.30E+00	8.54E+01	3.30E+00	0.00E+00	4.92E+00	-1.69E+02
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.71E-08	1.58E-11	3.47E-10	1.58E-11	0.00E+00	1.48E-11	-9.41E-09
Acidification potential of land and water	[kg SO_2-Eq.]	9.36E-01	1.51E-02	9.04E-03	1.51E-02	0.00E+00	1.25E-03	-5.87E-01
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	9.14E-02	3.45E-03	1.60E-03	3.45E-03	0.00E+00	9.48E-05	-4.77E-02
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	1.08E-01	-4.87E-03	5.31E-04	-4.87E-03	0.00E+00	6.09E-05	-8.24E-02
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	2.81E-05	1.24E-07	1.13E-06	1.24E-07	0.00E+00	3.25E-07	-5.46E-06
Abiotic depletion potential for fossil resources	[MJ]	2.85E+03	4.56E+01	1.17E+01	4.56E+01	0.00E+00	2.08E+00	-1.77E+03

RESULTS OF THE LCA - RESOURCE USE: 1 piece of Blast Resistant Door and Frame Assembly

Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	1.08E+03	-	-	-	-	-	-
Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-
Total use of renewable primary energy resources	[MJ]	1.08E+03	1.80E+00	2.02E+00	1.80E+00	0.00E+00	1.52E-01	-2.49E+01
Non renewable primary energy as energy carrier	[MJ]	3.03E+03	-	-	-	-	-	-
Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-
Total use of non renewable primary energy resources	[MJ]	3.03E+03	4.57E+01	1.57E+01	4.57E+01	0.00E+00	2.31E+00	-1.79E+03
Use of secondary material	[kg]	1.20E+01	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]	1.14E+00	1.27E-03	2.22E-01	1.27E-03	0.00E+00	1.20E-02	-1.90E-01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of Blast Resistant Door and Frame Assembly

Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
Hazardous waste disposed	[kg]	2.47E-02	1.04E-04	2.11E-03	1.04E-04	0.00E+00	1.62E-04	5.20E-02
Non hazardous waste disposed	[kg]	9.06E+00	5.75E-03	1.21E+00	5.75E-03	0.00E+00	4.58E-01	-1.99E+00
Radioactive waste disposed	[kg]	7.06E-02	5.98E-05	1.58E-03	5.98E-05	0.00E+00	9.21E-05	-7.99E-03
Components for re-use	[kg]	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	0.00E+00	0.00E+00	1.37E+02	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	-
Exported electrical energy	[MJ]	0.00E+00	0.00E+00	1.00E+02	0.00E+00	0.00E+00	9.41E+00	-
Exported thermal energy	[MJ]	0.00E+00	0.00E+00	2.82E+02	0.00E+00	0.00E+00	2.58E+01	-

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).

Production phase (module A1-A3) contributes between 65 and 100% to all impact assessment categories. Within the production phase, the main contribution for all the impact categories is the production of steel, with app. 83%, mainly due to the energy consumption on this process. Steel accounts with app. 98% 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 phase, there are loads and benefits (module D, negative values) considered. The benefits are considered beyond the system boundaries and are declared for the credits from the incineration of the wood (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., Königswinter (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

ANSI /SDI A250.4-2011
ANSI /SDI A250.4-2011: Physical Endurance for Steel Doors, Frames & Frame Anchors Physical Endurance Testing (American National Standard/Steel Door Institute)

ANSI/SDI A250.8
ANSI/SDI A250.8: Specifications for Standard Steel Doors and Frames (American National Standard/Steel Door Institute)

ANSI A250.10
ANSI A250.10: Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames (American National Standard)

ANSI/NAAMM/HMMA 867-06
ANSI/NAAMM/HMMA 867-06: Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames (American National Standard/National Association of Architectural Metals Manufacturers/Hollow Metal Manufacturers Association)

ASTM A653
ASTM A653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process (American Society for Testing and Materials)

ASTM A924
ASTM A924: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process (American Society for Testing and Materials)

ASTM A1008
ASTM A1008: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable (American Society for Testing and Materials)

ASTM F1642
ASTM F1642: Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings (American Society for Testing and Materials)

ASTM F2247
ASTM F2247: Standard Test Method for Metal Doors Used in Blast Resistant Applications (American Society for Testing and Materials)

ASTM F2248
ASTM F2248: Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass (American Society for Testing and Materials)

ASTM F2927
ASTM F2927: Standard Test Method for Door Systems Subject to Airblast Loadings (American Society for Testing and Materials)

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

DoD UFC 4-010-01
DoD UFC 4-010-01: Minimum Antiterrorism Standards for Buildings (Department of Defense Unified Facilities Criteria)

EN 15804
EN 15804:2012-04: 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, Echterdingen, 1992-2013.

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

GSA TS-01
GSA TS-01: Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings (US General Services Administration)

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 Blast Resistant Door and Frame Assembly

Parameter	Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	[kg CO_2-Eq.]	1.82E+02	3.30E+00	8.54E+01	3.30E+00	0.00E+00	4.92E+00	-1.69E+02
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.82E-08	1.68E-11	3.69E-10	1.68E-11	0.00E+00	1.57E-11	-1.00E-08
AP	Acidification potential of land and water	[kg SO_2-Eq.]	9.66E-01	1.97E-02	1.08E-02	1.97E-02	0.00E+00	1.47E-03	-5.92E-01
EP	Eutrophication potential	[kg N-eq.]	6.46E-02	1.40E-03	5.75E-04	1.40E-03	0.00E+00	4.48E-05	-3.45E-02
Smog	Ground-level smog formation potential	[kg O_3-eq.]	1.35E+01	4.06E-01	2.18E-01	4.06E-01	0.00E+00	1.15E-02	-8.53E+00
Resources		[MJ]	1.24E+02	6.55E+00	2.30E+00	6.55E+00	0.00E+00	2.14E-01	-5.19E+01

RESULTS OF THE LCA - RESOURCE USE: 1 piece of Blast Resistant Door and Frame Assembly

Parameter	Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	1.08E+03	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	1.08E+03	1.80E+00	2.02E+00	1.80E+00	0.00E+00	1.52E-01	-2.49E+01
PENRE	Non renewable primary energy as energy carrier	[MJ]	3.03E+03	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	3.03E+03	4.57E+01	1.57E+01	4.57E+01	0.00E+00	2.31E+00	-1.79E+03
SM	Use of secondary material	[kg]	1.20E+01	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]	1.14E+00	1.27E-03	2.22E-01	1.27E-03	0.00E+00	1.20E-02	-1.90E-01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of Blast Resistant Door and Frame Assembly

Parameter	Parameter	Unit	A1-3	A4	A5	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	2.47E-02	1.04E-04	2.11E-03	1.04E-04	0.00E+00	1.62E-04	5.20E-02
NHWD	Non hazardous waste disposed	[kg]	9.06E+00	5.75E-03	1.21E+00	5.75E-03	0.00E+00	4.58E-01	-1.99E+00
RWD	Radioactive waste disposed	[kg]	7.06E-02	5.98E-05	1.58E-03	5.98E-05	0.00E+00	9.21E-05	-7.99E-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	0.00E+00	0.00E+00	1.37E+02	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	1.00E+02	0.00E+00	0.00E+00	9.41E+00	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	2.82E+02	0.00E+00	0.00E+00	2.58E+01	-

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