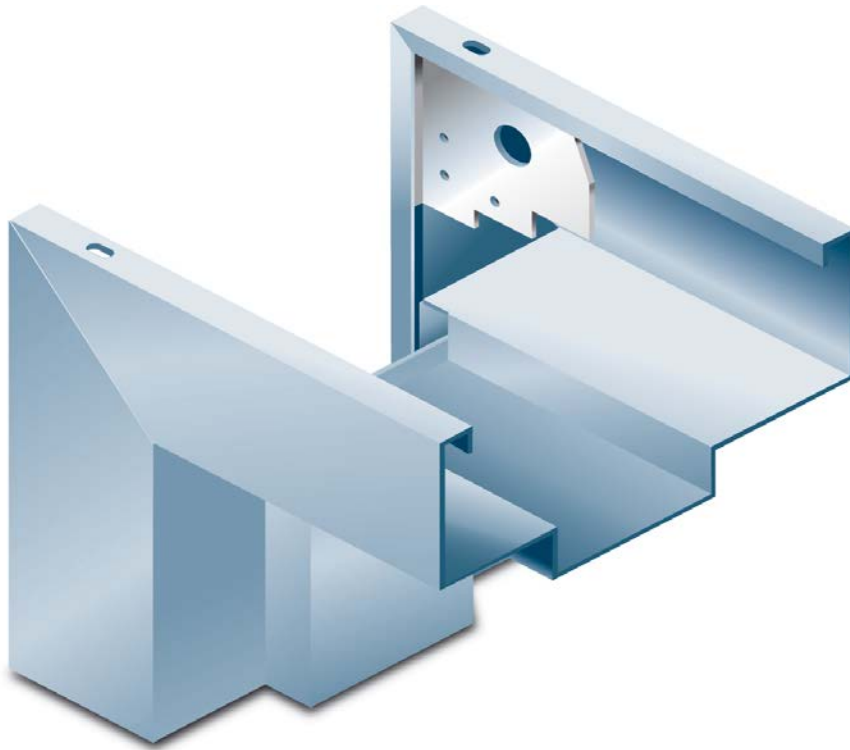


Environmental Product Declaration

ASSA ABLOY Standard Hollow Frame

Steel Frame



The Standard Hollow Frame is a versatile hollow steel frame.

ASSA ABLOY Door Group

ASSA ABLOY is committed to providing products and services that are environmentally sound throughout the entire production process and the product lifecycle. Our unconditional aim is to make sustainability a central part of our business philosophy and culture, but even more important is the job of integrating sustainability into our business strategy. The employment of EPDs will help architects, designers and LEED-APs select environmentally preferable door openings.

ASSA ABLOY will continue our efforts to protect the environment and health of our customers/end users and will utilize the EPD as one means to document those efforts.



Environmental Product Declaration

ASSA ABLOY Standard Hollow Frame

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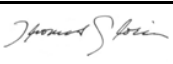
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According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	ASSA ABLOY Door Group
DECLARATION NUMBER	478714321.121.1
DECLARED PRODUCT	ASSA ABLOY Standard Hollow Frame
REFERENCE PCR	UL PCR for Commercial Steel Doors and/or Frames 9005 (2015)
DATE OF ISSUE	December 19, 2016
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	<p>Product definition and information about building physics</p> <p>Information about basic material and the material's origin</p> <p>Description of the product's manufacturing</p> <p>Indication of product processing</p> <p>Information about the in-use conditions</p> <p>Life cycle assessment results</p> <p>Testing results and verifications</p>
The PCR review was conducted by	Review Panel (epd@ulenvironment.com)
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Wade Stout, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	 Thomas P. Gloria, Industrial Ecology Consultants

¹ **Exclusions:** EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds, e.g., Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. **Accuracy of Results:** EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. **Comparability:** EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



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Product Definition and Information

Production Description

Product name: Standard Hollow Frame

This declaration represents a specific 3'x7'x 0.53" steel frame manufactured in the Mason City, IA facility.

Product characteristics:

- Hollow steel construction
- Rust inhibitive primer
- One year warranty on materials and craftsmanship
- Installation instructions available online

Application

The ASSA ABLOY Standard Hollow Metal Frame is used in commercial, educational, medical, and multi-family facilities.

Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data

Category	Rating
Thermal Transmittance:	Not applicable for a standard frame
Air Infiltration:	Not applicable for a standard frame
Indoor-Outdoor Sound Attenuation:	Not applicable for a standard frame
Deflection/Loading:	Not applicable for a standard frame
Fire Rating:	Up to and including 180 minutes in accordance with UL10B, UL10C, and NFPA 252.

Placing on the Market / Application Rules

Standard Hollow Frames conform to the certifications and sustainability regulations below:

- ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors
- ANSI/SDI A250.3 Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames
- ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
- ASTM A480/A480M Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- ASTM A568/A568M Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled Sheet
- ASTM A653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
- ASTM A924/A924M Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- ASTM A1008/A1008M Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- ASTM A1011/A1011M Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low Alloy with Improved Formability
- NFPA 252: Standard Methods of Fire Tests of Door Assemblies
- UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies



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Delivery Status

Standard Hollow Frames are placed horizontally on a wooden pallet with a cull board and one sheet of cardboard on the bottom. Cardboard corners and plastic wrap is then applied. One sheet of cardboard is placed on the top and 5 metal bands prepare the pallet for shipment.

Base Materials / Ancillary Materials

The composition of the Standard Hollow Frame is as follows:

Component	Percentage in mass (%)
Steel	98.84%
Others	1.16%
Total	100.00%

Manufacture

Metal frame products are manufactured primarily from cold rolled or galvanized steel sheet or coil. The production of frames involves stamping and bending of the steel, in addition to welding and painting processes.

Environmental and Health During Manufacturing

ASSA ABLOY Door Group is 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 the manufacturing plant has extraction ventilation system to remove the dust, 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 Environmental 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 and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.

Installation

Frames 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.

Packaging

Standard Hollow Frames are placed horizontally on a wooden pallet with a cull board and one sheet of cardboard on the bottom. Cardboard corners and plastic wrap is then applied. One sheet of cardboard is placed on the top and 5 metal bands prepare the pallet for shipment. The corrugated packaging is 100% recycled, Packaging material and polyethylene banding should be removed from packaging and collected separately for recycling.

Component	Percentage in mass (%)
Wood	55.00%
Cardboard/paper	36.00%
Plastic	9.00%
Steel	0.00%
Total	100%



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Conditions of Use

Frames arrive ready to install with welded in or slip in anchors. No further machining is required. A finish coating may be applied. The location of the frame and the amount of use dictates the amount of maintenance or service required to maintain the frame in good working condition. No cleaning efforts need to be taken into consideration. Repairs or replacement are generally not necessary.

Environmental 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.

Reference Service Life

Properly installed and maintained steel frames have a service life of 30 years.

Extraordinary Effects

Fire

No danger to the environment can be anticipated during exposure to fire.

Water

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

Re-use Phase

Frames are not typically reused once installed.

Disposal

The majority of components are steel and can be recycled.

Further Information

ASSA ABLOY Door Group
1502 12th St. NW
Mason City, IA 50401

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Life Cycle Assessment

Declared Unit

The declaration refers to the declared unit of 1 Standard Hollow Frame

Name	Value	Unit
Declared unit	1	unit of frame
Mass	16.64	kg
Conversion factor to 1 kg	0.060	-

System Boundary

This is a cradle to gate with options Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /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

Description of the System Boundary Stages Corresponding to the PCR

(X = Included; MND = Module Not Declared)

*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.

Estimates and Assumptions

End of Life

In the end of life phase, for all the materials which can be recycled, a recycling scenario with 100% collection rate was assumed.

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.

Background data

For life cycle modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by thinkstep, 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.

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Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of 2014.

Allocation

Allocation was determined on a per unit basis.

Comparability

A comparison or an evaluation of EPD data is only possible if all 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. Environmental declarations from different programs may not be comparable. Full conformance with the PCR for Commercial Steel Doors and/or Steel Frames allows EPD comparability only when all stages of a product's life cycle have been considered. However, variations and deviations are possible.

LCA: Modeling 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.

Installation into the building (A5)		
Name	Value	Unit
Auxiliary	-	kg
Water consumption	-	m ³
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substance following waste treatment on-site	0.25	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference Service Life		
Name	Value	Unit
Reference Service Life	30	years

End of life (C1-C4)		
Name	Value	Unit
Collected separately	16.64	kg
Collected as mixed construction waste	0.00	kg
Reuse	0.00	kg
Recycling	16.45	kg
Energy recovery	-	kg
Landfilling	0.19	kg



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LCA Results

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO ₂ -Eq.	4.4E+01	2.0E+00	4.1E-02	1.5E-01	0.0E+00	5.0E-02	-2.0E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.1E-09	7.5E-11	1.5E-11	5.8E-12	0.0E+00	3.0E-13	7.0E-07
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.7E-01	1.2E-02	2.6E-04	9.3E-04	0.0E+00	4.0E-05	-4.9E-02
EP	Eutrophication potential	kg N-Eq.	9.1E-03	6.6E-04	9.5E-05	5.1E-05	0.0E+00	2.8E-06	-3.6E-04
SP	Smog formation potential	kg O ₃ -Eq.	2.2E+00	3.3E-01	1.2E-03	2.6E-02	0.0E+00	9.3E-04	-4.7E-01
FFD	Fossil Fuel Depletion	MJ-surplus	2.4E+01	3.5E+00	1.2E-02	2.7E-01	0.0E+00	6.2E-03	3.2E+00

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO ₂ -Eq.	4.4E+01	2.0E+00	6.6E-02	1.5E-01	0.0E+00	5.0E-02	-2.0E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	9.9E-10	7.5E-11	1.4E-11	5.8E-12	0.0E+00	2.8E-13	6.4E-07
AP Air	Acidification potential for air emissions	kg SO ₂ -Eq.	1.6E-01	9.8E-03	1.0E-04	7.6E-04	0.0E+00	3.4E-05	-4.8E-02
EP	Eutrophication potential	kg(PO ₄) ³ -Eq.	1.4E-02	1.7E-03	1.1E-04	1.4E-04	0.0E+00	5.6E-06	-1.3E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	2.1E-02	1.4E-03	2.7E-05	1.1E-04	0.0E+00	2.6E-06	-1.1E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	7.9E-04	8.3E-10	-3.1E-09	6.4E-11	0.0E+00	2.9E-09	-2.1E-04
ADPF	Abiotic depletion potential for fossil resources	MJ	5.1E+02	2.5E+01	9.0E-02	2.0E+00	0.0E+00	5.2E-02	-2.1E+02

Results below contain the resource use throughout the life cycle of the product.

Resource Use									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	MJ, lower calorific value	2.8E+01	0.0E+00	3.0E-03	0.0E+00	0.0E+00	6.5E-03	1.1E+01
PERM	Renewable primary energy resources as material utilization	MJ, lower calorific value	4.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	Total use of renewable primary energy resources	MJ, lower calorific value	3.2E+01	0.0E+00	3.0E-03	0.0E+00	0.0E+00	6.5E-03	1.1E+01
PENRE	Nonrenewable primary energy as energy carrier	MJ, lower calorific value	5.3E+02	2.5E+01	9.3E-02	2.0E+00	0.0E+00	5.6E-02	-1.9E+02
PENRM	Nonrenewable primary energy as material utilization	MJ, lower calorific value	3.5E+02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	Total use of nonrenewable primary energy resources	MJ, lower calorific value	8.8E+02	2.5E+01	9.3E-02	2.0E+00	0.0E+00	5.6E-02	-1.9E+02
SM	Use of secondary material	MJ, lower calorific value	3.6E+02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m ³	3.3E+01	0.0E+00	4.2E-03	0.0E+00	0.0E+00	7.5E-03	-3.7E-02

Environment



Environmental Product Declaration

ASSA ABLOY Standard Hollow Frame

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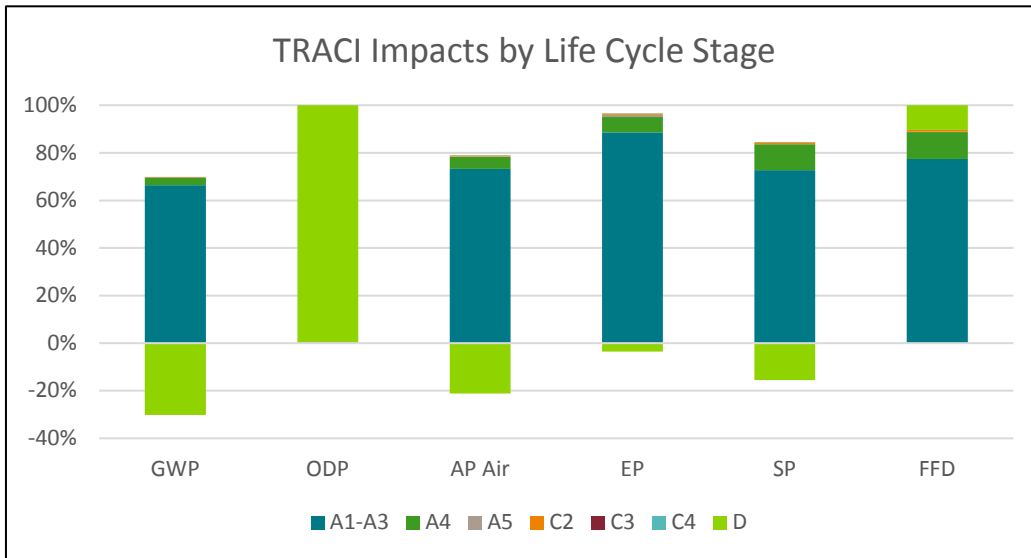
According to ISO 14025

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-02
NHWD	Non-hazardous waste disposed	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.0E-01
RWD	Radioactive waste disposed	kg	5.6E-03	0.0E+00	9.1E-07	0.0E+00	0.0E+00	1.6E-06	6.7E-03
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MFR	Materials for recycling	kg	1.8E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.0E-01
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported electrical energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported thermal energy	MJ	0.0E+00	0.0E+00	-1.3E-02	0.0E+00	0.0E+00	-3.6E-02	0.0E+00

Interpretation

The production (A1-A3) life cycle stage drives the results in all of the environmental impact categories. Manufacturing impacts (A3) are primarily driven by electricity use. Raw materials, particularly steel drives the production stage (A1), as this material is the primary material within the product. Transportation impacts (A2) are a distant secondary driver of impacts.



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References

- | PCR Part A UL Environment and 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. July 2014, version 1.3
- | PCR Part B UL Environment and Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Commercial Steel Doors and/or Steel Frames UL 9005. Version March 2015.
- | ISO 14025 ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- | ISO 14040 ISO 14040:2009-11, Environmental management — Life cycle assessment — Principles and framework.
- | ISO 14044 ISO 14044:2006-10, Environmental management — Life cycle assessment — Requirements and guidelines.
- | EN 15804 EN 15804:2012-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product
- | ULE 2013 UL Environment, General Program Instructions, 2013.

