Environmental Product Declaration

In accordance with ISO 14025 and EN 15804+A1 for:

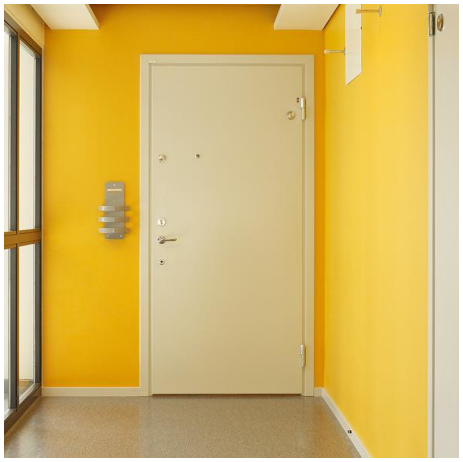
Steel door

from

Daloc

Programme:	The International EPD® System www.environdec.com
Programme operator:	EPD International AB
EPD owner	Daloc, Box 43 54521 Töreboda
EPD registration number:	S-P-01393
First date of publication:	2019-01-15
Validity date:	2024-01-14
Geographical scope:	Europe
PCR used	PCR 2012:01. Construction products and construction services. Version 2.2. of 2017-05-30

Steel door from carbon steel



Steel door from stainless steel

Steel door from carbon steel – glass

General information

Information about the organization

Owner of the EPD:
Daloc AB, +46 506-19000, daloc@daloc.se, Box 43 54521 Töreboda.

Product-related or management system-related certifications:
Daloc is quality- and environmental certified according to ISO 9001 and ISO 14001.

Name and location of production site:
Daloc AB, Töreboda.

About the company

The Daloc Group comprises several companies whose products and services complement each other. The Group develops, manufactures and markets steel and wooden doors. Daloc AB, Daloc Trädörrar AB, Orresta Dörr AB and Secor AB, which are franchisors to the Secor chain, operate under the parent company Daloc Futura AB. All products are manufactured in our state-of-the-art facilities in Sweden. The doors are sold via our dealers and our own sales offices in the Nordic countries and established channels in other European countries.

Product information

Product name:
Daloc Steeldoor S2X, S3X, S4X and S6X (model names). The customer can make specific choices about for instance to include glass or not. Based on this the three different product types have been generated (see *Product types)*.

Product description:
Steel door with high sound reduction and fire resistance combined with high burglar protection. The steel doors are common in hotels, apartments, hospitals and shops. The life span of the door is dependent on door model, operation, maintenance and surrounding environment. In correct condition the doors life span is expected to be more than 50 years (excluding wear parts, such as seals and hardware). Technical standards met and other product information can be seen for each door model in the door catalog on Dalocs website, https://www.daloc.se/arkitekter-byggare/dokumentation.html.

UN CPC code:
4212 – Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium.

Geographical scope:
Europe

LCA information

PCR used:
The PCR (Product category rules) that has been used in this EPD is *PCR 2012:01. Construction products and construction services. Version 2.2. of 2017-05-30*.

Declared unit:
One steel door delivered to the customer.

Time representativeness:
Most production data are from the years 2017 and 2018, the database data are from 2011 – 2017 and no data is older than 10 years.

Database(s) and LCA software used:
Databases used are mainly Ecoinvent 3.4 and Thinkstep´s own database from 2017. The LCA software used in is GaBi 8.

Data quality:
The quality of the data is judged to be good, since it is up to date data and it is collected directly from the production site.

System diagram:
A flowchart of the system is presented in the figure below.

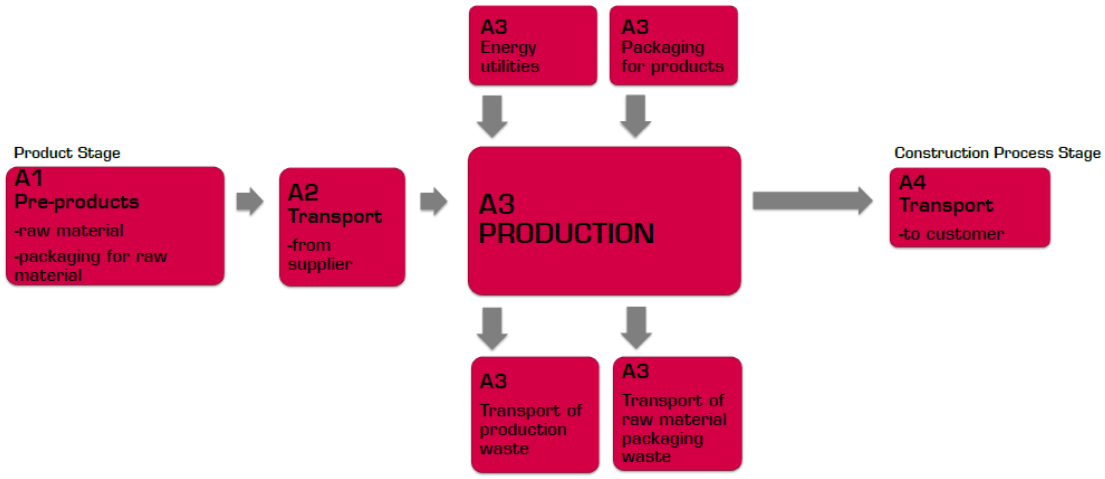


Figure 1 – Flow chart of the system

- Module A1: Several raw materials for the steel doors are produced, including packaging material.
- Module A2: Raw materials and packaging are transported to the production site at Daloc in Töreboda.
- Module A3: The raw materials are assembled in several production steps with steel doors as the output in the production process.
- Module A4: Transport of manufactured steel doors to customer.

Description of system boundaries and delimitations:
This study is a so called *cradle-to-gate with options* according to the definition in the PCR used. All life cycle impacts until the transport to the customer are included, see flowchart above. According to the PCR used the Polluter Pays Principle is applied in the system. For the waste management, this means that impacts occurring at the material recycling plant shall be allocated to the next life cycle. The life cycle starts by extracting raw materials used for the products, which in defining the boundary towards the nature.

The product is only produced at one production site, in Töreboda, Sweden, sold by Daloc AB.

There are several design options for the door to be produced. In order to capture the different options, results for three alternative design options are presented in the results, from *Alternative 1* to *Alternative 3*. This is further elaborated on in the section *Product types*.

Life cycle stages, included and excluded:
The life cycle stages included are A1-A4.

The life cycle stages excluded are A5, B1-B7, C1-C4 and D.

See table in the section presenting the *Product system*.

Allocations made:
No allocation is made for the steel door production.

Data used:
Site-specific production data have been retrieved for 2017 and 2018 from the production site. Some of the data are modelled by using EPDs in the model calculations (for instance Paroc AB, 2014). In some cases generic data has been used from databases such as Ecoinvent 3.4 and Thinksteps database from 2017.

100 % of the material used and declared by Daloc has been covered in the analysis, i.e. no cut-off or omissions have been made.

Raw materials:
The raw materials used in each product type are presented below, as percentage of total weight.

Raw material	Alternative 1 - Steel door from carbon steel (%)	Alternative 2 - Steel door from stainless steel (%)	Alternative 3 - Steel door from carbon steel – glass (%)
Mild steel	89	0	70
Stainless steel	0	84	2.9
Glass	0	0	19.2
Mineral wool	10.3	15	7.4
Adhesive	0.4	0.6	0.4
Waterbourne paint	0.2	0.3	0.1
Sealing	0.2	0.3	0.2
Total	**100**	**100**	**100**

Packaging:
Packaging materials are used both for protecting the raw material used and the product delivered to the customer. The main packaging materials for the raw material are corrugated board, wooden pallets and steel. The main raw materials for the products are corrugated board and wooden pallets.

Transportation:
The transportation included in this study are transport of raw materials and its packaging, products to customers and its packaging and waste materials from the production site. The transport is mainly carried out by truck and in some cases by boat. Weighted averages for all transport distances and modes for the raw materials were calculated per declared unit.

Energy utilities:
Both electricity and heat are used at the production sites. The specific mix used at the production has been collected from Daloc. Heat is produced in a plant located in the neighbour wooden door production, which is transferred to the steel door production. Heat is also generated from oil. About half of the electricity consumed is bought as hydropower certificates. The model calculation is based on Vattenfall´s EPD for hydropower and has a global warming potential of 1 kWh electricity 10.5 g

CO2e. The remainder is a residual electricity mix, based on 42.77% fossil, 40.55% nuclear and 16.68% renewable sources[1].

Secondary material:
The secondary materials used in the steel door production are mainly wood and recycled steel scrap.

Secondary fuel:
Secondary fuel used for the product is mainly heat from wood incinerated.

Direct emissions from production site:
There are four different solvents emitted to the air from the site. These are: 2-butoxietanol, 2-(2-butoxietoxi)etanol, 2-dimetylaminoetanol and 2-metylpropan-1-ol.

Waste:
Wastes are generated from the packaging used for the raw materials as well as from the production. Packaging material for raw materials are mainly wooden pallets, cardboard and steel. Production waste could consist of for example scrap-metal and mineral wool. Due to losses in the production process, more raw materials has to be produced than that is used in the final product.

Scenario for module A4:
According to the PCR followed scenario description for module A4 shall be included. Below table presents the details on the product transport to the customers.

Vehicle type used for transport	**Vehicle load capacity**	**Fuel type and consumption**	**Capacity utilisation (%)**	**Distance to construction site (km)**	**Bulk density of transported products**
Long distance truck	17 tonne payload	Diesel, 3.7 l/10 km.	85	440	Unknown.

Product types:
Daloc is manufacturing different types of steel doors. To cover a broad product portfolio the result is presented for three different types of steel doors. These are:

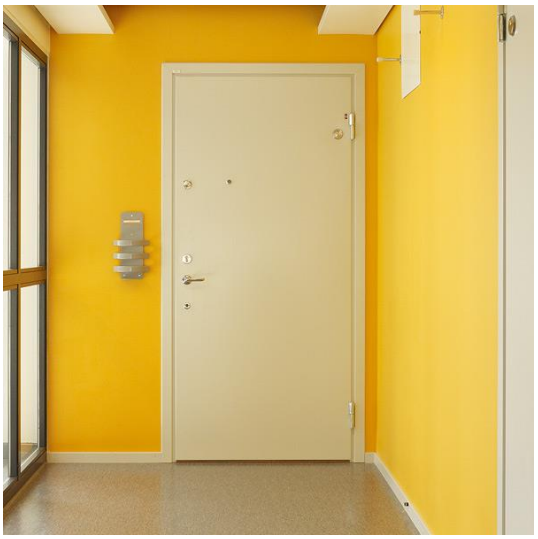
[1] https://www.ei.se/sv/for-energiforetag/el/ursprungsmarkning-av-el/#hanchor1

- **Alternative 1**

Steel door from carbon steel

Description:

The door leaf is made of steel sheet from carbon steel with no glass on it. It is insulated with mineral wool. Weight: 98 kg. See picture below.



- **Alternative 2**

Steel door from stainless steel

Description:

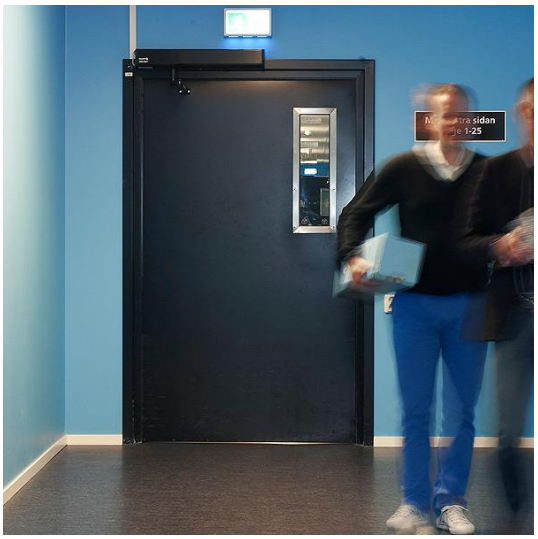
The door leaf is made of stainless steel with no glass on it. Weight: 69 kg. See picture below.

- **Alternative 3**

Steel door from carbon steel – glass

Description:

The door leaf is made of steel sheet from stainless steel with a glass sheet on it. It is insulated with mineral wool. Weight: 105 kg. See picture below.



Separate tables for these three alternatives are presented in the section *Environmental Performance*.

Co-products:

No co-products produced.

Recycling of product:

When the product no longer will be used, remove it by removing the fasteners used during installation. For further information on waste management, see the construction product declarations available on Dalocs website, https://www.daloc.se/.

More information:

This Environmental Product Declaration (EPD) has been carried out by IVL Swedish Environmental Research Institute. This EPD is in accordance with ISO 14025 and EN 15804. It is a third party externally verified document that reports environmental data of products based on Life Cycle Assessment (LCA) and other relevant information.

Guidance on safe and effective installation, use and disposal of the product can be supplied by Daloc.

For more information about Daloc see https://www.daloc.se/

Product system

The life cycle stages included in the analysis is illustrated in the table below, according to EN15804. If a stage is included, it is indicated with an ”X” and if it is not included ”MND” (Module Not Declared) is noted.

Product stage			Construction process stage		Use stage							End of life stage					Resource recovery stage
Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal		Reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND		MND

Content declaration

For construction product EPDs compliant with EN 15804, the content declaration shall list, as a minimum, substances contained in the products that are listed in the “Candidate List of Substances of Very High Concern for Authorisation” when their content exceeds the limits for registration with the European Chemicals Agency.

No substances occur on the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) in the products of the EPD.

Environmental performance

Alternative 1 – Steel door from carbon steel

Below results are representative for 1 steel door (alternative 1) delivered to the customer.

Potential environmental impact

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	238	4.3	11	253	2.6	256
Acidification potential (AP)	kg SO_2 eq.	0.60	0.02	0.03	0.65	0.01	0.66
Eutrophication potential (EP)	kg PO_4^{3-} eq.	0.06	3.7E-03	0.01	0.07	1.5E-03	0.07
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	0.09	-2.0E-03[2]	0.05	0.13	-2.0E-03	0.13
Ozone layer depletion potential (ODP)	kg R11-e	-7.9E-07[3]	1.1E-13	1.5E-07	-6.3E-07	7.2E-14	-6.3E-07
Abiotic depletion potential – Elements	kg Sb eq.	1.0E-03	3.1E-07	4.8E-06	1.1E-03	2.2E-07	1.1E-03
Abiotic depletion potential – Fossil resources	MJ, net calorific value	2475	58	130	2662	36	2698

* Additional information

Use of resources

PARAMETER		UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	142	2.6	708	852	2.0	854
	Used as raw materials	MJ, net calorific value	0.8	0	136	136	0	136
	TOTAL	MJ, net calorific value	143	2.6	843	988	2.0	990
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	2549	58	207	2814	36	2850
	Used as raw materials	MJ, net calorific value	0.17	2.5E-03	2.1E-03	0.17	1.9E-03	0.17
	TOTAL	MJ, net calorific value	2549	58	207	2814	36	2850
Secondary material		kg	20	0	2.7	22	0	22
Renewable secondary fuels		MJ, net calorific value	-	-	51	-	-	51
Non-renewable secondary fuels		MJ, net calorific value	-	-	-	-	-	-
Net use of fresh water		m^3	0.27	4.8E-03	0.07	0.35	3.6E-03	0.35

* Additional information

Waste production and output flows

Waste production

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	1.6E-03	2.7E-06	0.92	0.92	2.1E-06	0.92
Non-hazardous waste disposed	kg	16	3.9E-03	12	28	3.0E-03	28
Radioactive waste disposed	kg	0.01	7.7E-05	0.03	0.04	4.9E-05	0.04

* Additional information

[2] Probably an overestimation in the NO-emissions to air and an underestimation in the NO_2 emissions to air in the Thinkstep data set used. NO has a reducing POCP effect as it reduces the ozone level. The same can be found for all transports, i.e. A2 and A4 for all products.
[3] Negative value based on dataset from Worldsteel for carbon steel.

Alternative 2 – Steel door from stainless steel

Below results are representative for 1 steel door (alternative 2) delivered to the customer.

Potential environmental impact

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	300	3.2	11	314	1.9	315
Acidification potential (AP)	kg SO_2 eq.	3.1	0.01	0.03	3.2	4.3E-03	3.2
Eutrophication potential (EP)	kg PO_4^{3-} eq.	0.14	2.5E-03	0.01	0.15	1.1E-03	0.15
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	0.18	-1.8E-03	0.05	0.23	-1.5E-03	0.23
Ozone layer depletion potential (ODP)	kg R11-e	1.2E-05	8.4E-14	1.5E-07	1.2E-05	5.2E-14	1.2E-05
Abiotic depletion potential – Elements	kg Sb eq.	0.01	2.4E-07	4.8E-06	0.01	1.6E-07	0.01
Abiotic depletion potential – Fossil resources	MJ, net calorific value	3285	43	130	3457	26	3483

* Additional information

Use of resources

PARAMETER		UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	399	2.1	708	1109	1.4	1110
	Used as raw materials	MJ, net calorific value	52	0	136	188	0	188
	TOTAL	MJ, net calorific value	451	2.1	843	1296	1.4	1298
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	3789	43	207	4040	26	4065
	Used as raw materials	MJ, net calorific value	0.02	2.0E-03	2.1E-03	0.02	1.4E-03	0.02
	TOTAL	MJ, net calorific value	3789	43	207	4040	26	4065
Secondary material		kg	31	0	2.7	34	0	34
Renewable secondary fuels		MJ, net calorific value	-	-	51	-	-	51
Non-renewable secondary fuels		MJ, net calorific value	-	-	-	-	-	-
Net use of fresh water		m^3	5.2	3.8E-03	0.07	5.2	2.6E-03	5.2

* Additional information

Waste production and output flows

Waste production

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	1.5E-03	2.2E-06	0.9	0.92	1.5E-06	0.92
Non-hazardous waste disposed	kg	9.7	3.1E-03	12	21	2.2E-03	21
Radioactive waste disposed	kg	0.03	5.7E-05	0.03	0.06	3.5E-05	0.06

* Additional information

Alternative 3 – Steel door from carbon steel – glass

Below results are representative for 1 steel door (alternative 3) delivered to the customer.

Potential environmental impact

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Global warming potential (GWP)	kg CO_2 eq.	241	4.2	11	256	2.8	258
Acidification potential (AP)	kg SO_2 eq.	0.87	0.01	0.03	0.91	0.01	0.92
Eutrophication potential (EP)	kg PO_4^{3-} eq.	0.07	3.5E-03	0.01	0.09	1.6E-03	0.09
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	0.08	-2.1E-03	0.05	0.13	-2.2E-03	0.13
Ozone layer depletion potential (ODP)	kg R11-e	2.1E-09	1.1E-13	1.5E-07	1.5E-07	7.6E-14	1.5E-07
Abiotic depletion potential – Elements	kg Sb eq.	1.3E-03	3.0E-07	4.8E-06	1.3E-03	2.3E-07	1.3E-03
Abiotic depletion potential – Fossil resources	MJ, net calorific value	2542	56	130	2728	38	2766

* Additional information

Use of resources

PARAMETER		UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	157	2.6	708	867	2.1	869
	Used as raw materials	MJ, net calorific value	3.8	0	136	139	0	139
	TOTAL	MJ, net calorific value	161	2.6	843	1006	2.1	1008
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	2650	56	207	2913	38	2952
	Used as raw materials	MJ, net calorific value	0.15	2.5E-03	2.1E-03	0.15	2.1E-03	0.15
	TOTAL	MJ, net calorific value	2650	56	207	2914	38	2952
Secondary material		kg	18	0	2.7	21	0	21
Renewable secondary fuels		MJ, net calorific value	-	-	51	-	-	51
Non-renewable secondary fuels		MJ, net calorific value	-	-	-	-	-	-
Net use of fresh water		m^3	0.56	4.8E-03	0.07	0.64	3.9E-03	0.64

* Additional information

Waste production and output flows

Waste production

PARAMETER	UNIT	A1	A2	A3	A1-A3	A4	A1-A4*
Hazardous waste disposed	kg	1.3E-03	2.7E-06	0.92	0.92	2.2E-06	0.92
Non-hazardous waste disposed	kg	15	3.9E-03	12	27	3.2E-03	27
Radioactive waste disposed	kg	0.02	7.5E-05	0.03	0.05	5.2E-05	0.05

* Additional information

Global warming potential (GWP)

The raw materials (module A1) were identified as hotspot for the product for several environmental impact categories. To exemplify this, the Global warming potential for the different alternatives are presented in the pie charts below. A1 is subdivided and the raw materials are separately presented, (e.g. mild steel and adhesives etc.) and modules A2 – A4 are presented aggregated.

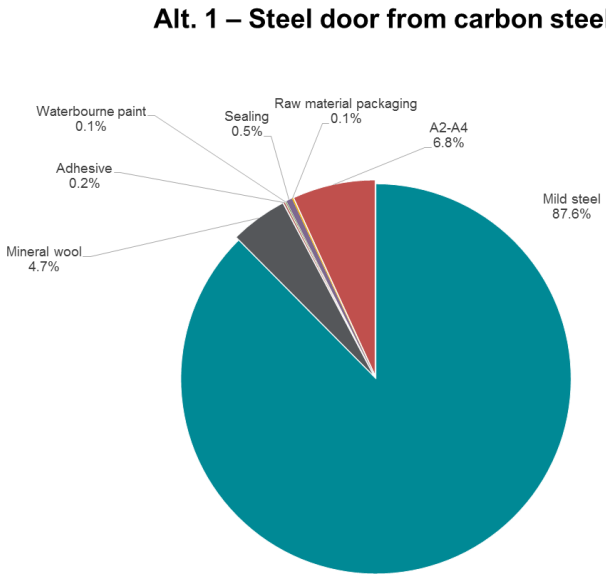


Figure 2 – Alternative 1 – Steel door from carbon steel

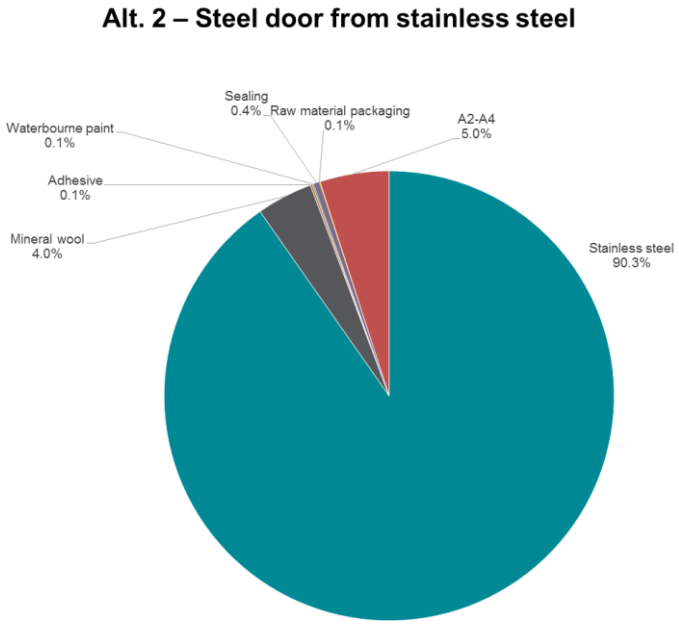


Figure 3 – Alternative 2 – Steel door from stainless steel

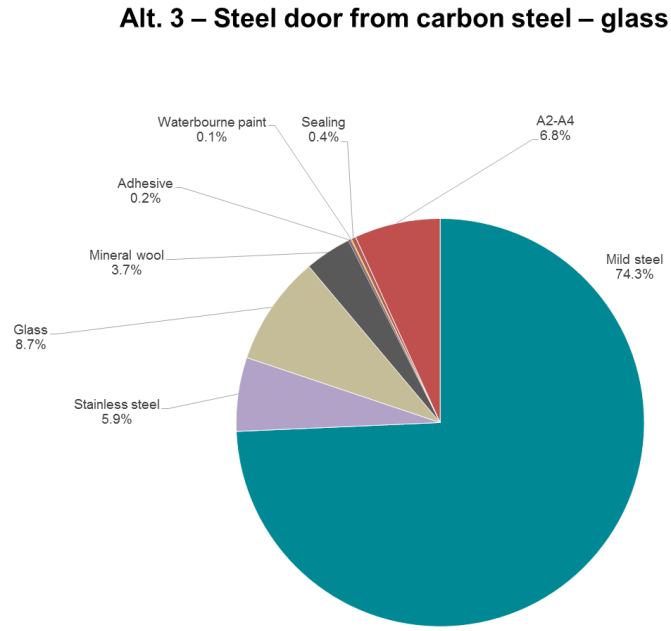


Figure 4 – Alternative 3 – Steel door from carbon steel – glass

Additional environmental information

Four different volatile organic compounds (VOC) are used in the production[4]. Most of the VOC are emitted to air in the door manufacturing before the use-phase. Measurements according to SS-EN ISO 16000-9:2006 regarding volatile organic compounds (VOC and VVOC/SVOC), carcinogenic substances and formaldehyde after 28 days have been performed on the steel doors. The tested doors are in compliance with the tested requirements of M1 and with the Recommended class according to Byggvarubedömningen (RISE, 2018).

[4] 2-butoxietanol, 2-(2-butoxietoxi)etanol, 2-dimetylaminoetanol, 2-metylpropan-1-ol.

Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Environmental product declarations within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
EPD registration number:	S-P-01393
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Valid until:	2024-01-14
Product Category Rules:	PCR 2012:01. Construction products and construction services. Version 2.2 of 2017-05-30
Product group classification:	UN CPC 4212 – Doors, windows and their frames and thresholds for doors, of iron, steel or aluminium.
Reference year for data:	2017
Geographical scope:	Europe

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2012:01. Construction products and construction services. Version 2.2 of 2017-05-30.
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Carl-Otto Nevén, NEVÉN Miljökonsult, carlotto.neven@bredband.net Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

References

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