

Environmental Product Declaration

Lacuna exterior folding door

This is an environmental product declaration (EPD) in accordance with ISO 14025 and EN 15804 for the product category of construction products.

The EPD is aimed at industries and the results presented are in accordance with the "Business-to-Business" communication format described in EN 15942.



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EPD developer: Danish Technological Institute

1 General information

Product	The EPD represents the environmental parameters of an average Lacuna exterior folding door.													
Manufacturer	Lacuna A/S Industrivej 2 DK-5550 Langeskov Denmark Contact: Henrik Brunsø (HB@lacuna.dk)													
Declared unit	Production of an average 2.7 x 2.2 m coated white Lacuna exterior folding door of mahogany and thermally modified beech containing three folding sections.													
Product category	The EPD is based on the product category of construction works accordant to EN 15804. The EPD is a "Cradle-to-gate"-LCA covering module A1-A3, i.e. raw material production, internal transportation and product manufacturing. See Figure 2 for an overview of the lifecycle modules of construction works.													
Comparability	This EPD is comparable with EPDs for similar products developed in accordance with the same standard.													
Developer of EPD	Emil Engelund Thybring Danish Technological Institute, Building & Construction Gregersensvej 1, 2630 Taastrup, Denmark www.dti.dk													
PCR program operator														
Verification	<table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="3">Independent verification of declaration according to EN ISO 14025: 2010</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>internal</td> <td><input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> <td>external</td> </tr> <tr> <td colspan="3">3. part verifier: Trine Henriksen, Danish Technological Institute</td> </tr> </table>		Independent verification of declaration according to EN ISO 14025: 2010			<input checked="" type="checkbox"/>	internal	<input type="checkbox"/>			external	3. part verifier: Trine Henriksen, Danish Technological Institute		
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		external												
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2 Product description

Use	Lacuna exterior folding doors are used in buildings as a mobile divider between indoor and outdoor climate.
Technical specifications	<p>Dimensions: 2.7 x 2.2 m door containing three sections</p> <p>Materials:</p> <ul style="list-style-type: none"> • Wood – mahogany and thermally modified beech, FSC certified for sustainability (Certificate Registration Code: SW-COC- 003535) • Coating – white water-based coating (colour RAL 9010) • Glazing – triple glazing (U-value 0.7 W/m²K) with warm edge spacers • Metals – acid resistant steel and aluminium <p>Thermal performance: Total U-value of door <= 0.78 W/m²K</p> <p>CE certified according to EN 14351-1:2006+A1:2010</p>
Main components and materials	An average Lacuna exterior folding door contains the materials; wood, water based paint, stainless steel, aluminium, glass, and synthetic resins. See Table 1 for material inputs and quality of applied data.
Health classifications	Not relevant
Reference Service Life	Not relevant, since use stage (module B in EN 15804) is not included in this EPD.
Links to explanatory material	ww.lacuna.dk

3 System boundaries

This EPD covers cradle to gate, which means that included processes are raw material production, internal transportation and manufacture. Figure 1 shows an overview of the processes included in this EPD. The product manufacturing takes place in Denmark.

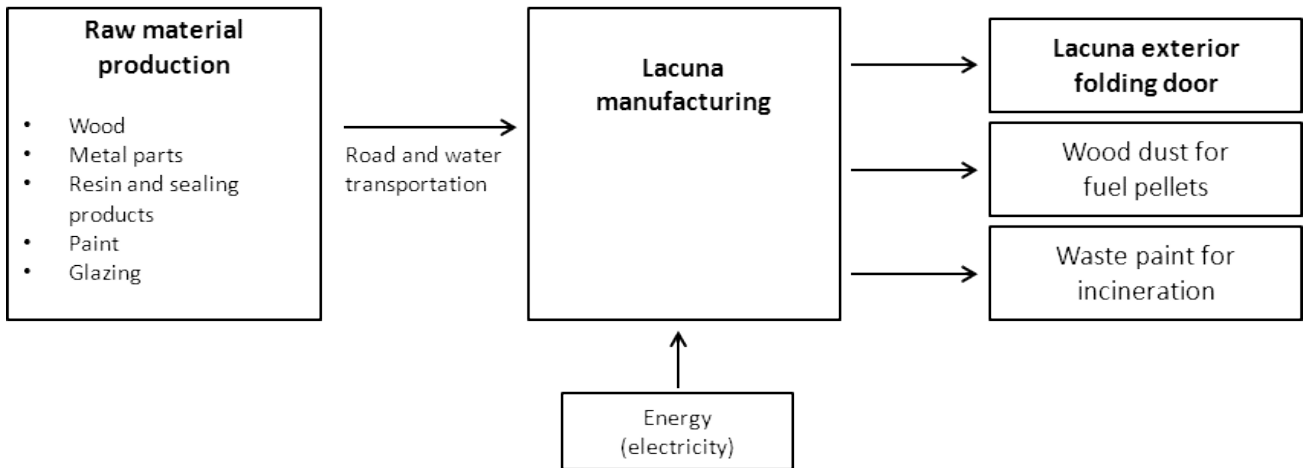


Figure 1 Production processes covered in the EPD for the production of Lacuna exterior folding doors.

Figure 2 shows the system boundaries for construction works in general, as defined in EN 15804, where the inclusion of the product stage (module A1-A3) in an EPD is obligatory.

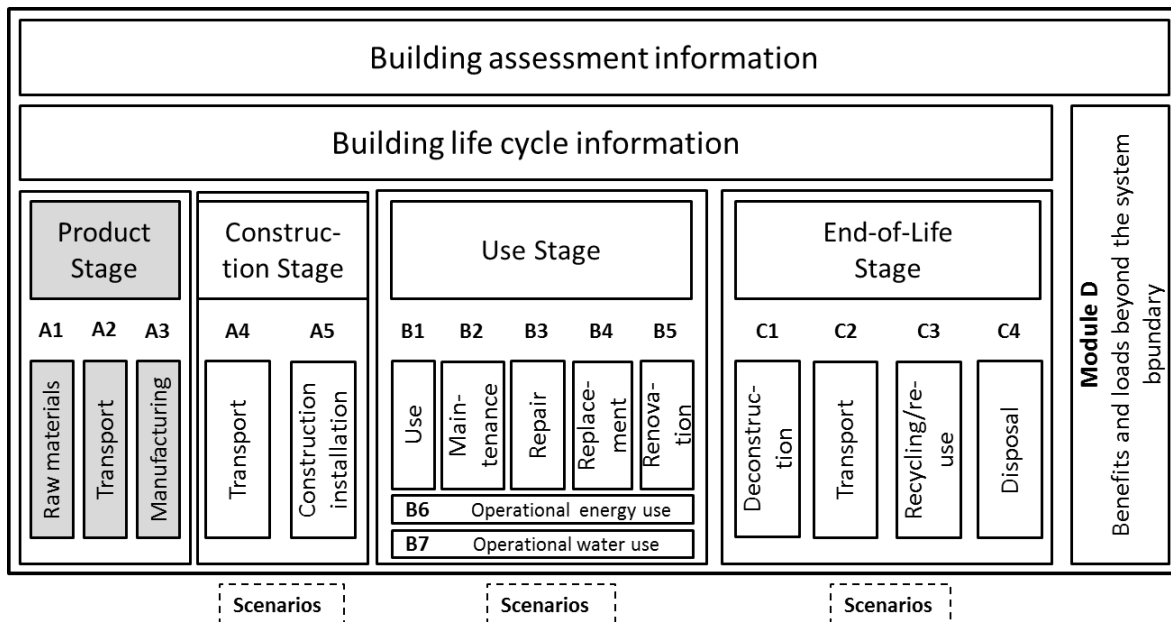


Figure 2 Modular framework of EPD's in accordance with EN 15804 for construction works. The grey-colored modules are included in this EPD

4 Applied data

Regarding the manufacturing of Lacuna exterior folding doors the applied data is based on annual consumption figures from the Lacuna production site. Where specific data from the material suppliers was not available, the GaBi 6.0 software database (version 5.56, service pack 22) was used to provide generic background data.

Table 1 shows the material inputs ending up in an average Lacuna exterior folding door as well as their relative masses in the door. Furthermore, the quality of the data applied in the EPD is shown, i.e. whether it is specific data provided by producers or generic data taken from GaBi 6.0 software.

Table 1 The table shows 1) the relative masses of materials in Lacuna exterior folding doors; 2) Quality of data applied: “Specific” (provided by Lacuna A/S or material supplier) or “Generic” (data from GaBi 6.0 database)

Materials in Lacuna exterior folding door and data quality				
	Relative mass (%)	Data quality		
		<i>Raw material production process</i>	<i>Amount of material</i>	<i>Manufacturing process</i>
Wood	34.6	Generic	Specific	Generic
Metal parts	6.2	Specific	Specific	Specific
Resins and sealing products	0.4	Generic	Specific	Generic
Paint	6.2	Generic	Specific	Specific
Glazing	52.7	Generic	Specific	Generic

5 Environmental profile

5.1 Environmental impacts

The input data to the EPD constitute the inventory used to estimate potential environmental impacts from the production of an average Lacuna exterior folding door. The environmental impacts are caused by the transportation, consumption of natural resources (water, wood), materials (stainless steel, aluminium, paint) and energy (electricity, thermal, fuels) as well as the emissions linked to the consumption and transportation. The results are shown in Table 2. The negative ODP value is due to waste incineration of the wood fraction of the door, which – in the applied GaBi dataset for waste incineration of wood products – contains negative outputs of substances that cause ODP. Section 6 explains the seven impact categories.

Table 2 Potential environmental impacts from the production of one average Lacuna exterior folding door.

Environmental impacts per door		
Impact category	Unit	Value
Global warming (GWP)	[kg CO ₂ -eq.]	384.0
Ozone layer depletion (ODP)	[kg CFC-11-eq.]	-2.87e-6
Acidification of soil and water (AP)	[kg SO ₂ -eq.]	2.280
Eutrophication (EP)	[kg PO ₄ -eq.]	0.299
Photochemical oxidants creation (POCP)	[kg ethen-eq.]	0.134
Depletion of abiotic elements (ADP-elements)	[kg Sb-eq.]	1.05e-2
Depletion of abiotic, fossil resources (ADP-fossil)	[MJ, net calorific]	7.46e3

5.2 Resource consumption

Renewable and non-renewable resources are used to produce Lacuna folding doors. Table 3 shows the consumption of energy and materials. The term "secondary" refers to resources recovered from previous use or waste. Secondary materials substitute primary materials extracted from natural, primary sources.

Table 3 Consumption of resources in the production of one average Lacuna exterior folding door.

Resource consumption per door		
Type of resource	Unit	Value
Renewable energy, primary	[MJ]	4.15e3
Non-renewable energy, primary	[MJ]	7.44e3
Renewable energy, secondary	[MJ, net calorific]	0
Non-renewable energy, secondary	[MJ, net calorific]	0
Secondary material	[kg]	0
Water	[m ³]	1.04e3

5.3 Waste

Regarding waste three different categories are included in accordance with CEN EN 15804; hazardous waste, non-hazardous waste and radioactive waste. Table 4 shows the generation of waste in all processes from extraction of raw materials to the production of Lacuna exterior folding doors.

Table 4 Waste leaving the production system of Lacuna A/S per one average Lacuna exterior folding door.

Waste per door		
Waste category	Unit	Value
Hazardous waste	[kg]	2.26
Non-hazardous waste	[kg]	1.68e3
Radioactive waste*	[kg]	0.34

* From consumption of electricity provided by the average Danish electricity grid-mix, which includes import of nuclear power produced in Germany (production of nuclear power generates radioactive waste)

5.4 Other output flows

Besides waste, output flows that are applicable for reuse, recycling or energy recovery can be generated. Table 5 shows the output flows from the production of Lacuna exterior folding doors..

Table 5 Output flows leaving the production system of Lacuna A/S per one average Lacuna exterior folding door.

Other output flows per door		
Flow category	Unit	Value
Components for reuse	[kg]	0
Materials for recycling	[kg]	0.279
Materials for energy recovery	[kg]	36.1
Energy exported	[MJ]	0

6 Additional environmental information

Environmental benefits and loads beyond the system boundary of the EPD can be described in module D of the modulary framework of EN 15804, as shown in Figure 2.

6 List of words

Environmental impact category	Explanation
Global warming (GWP)	Increase in the global atmospheric mean temperature. Caused by increased concentration of greenhouse gases, which absorb and reflect heat from the Earth surface.
Ozone layer depletion (ODP)	Ozone layer depletion in the upper part of the atmosphere. Caused by emission of substances, e.g. CFCs, which have long life times in the atmosphere and are ozone degradable.
Acidification of soil and water (AP)	Drop in the pH value of natural terrestrial and water systems. Caused by emitted acids and acidifying substances.
Eutrophication (EP)	Disturbed nutrition balance in soil and water recipients due to increased emissions of nutrients, e.g. nitrogen. This may lead to oxygen depletion.
Photo chemical oxidants creation (POCP)	Ozone generation (smog) in lower part of the atmosphere, which is toxic to human beings and vegetation.
Depletion of abiotic elements (ADP-elements)	Non-renewable resources are metals and minerals. Consumption is relative to the amount of available Sb-reserves; Sb is an atom designated Stibium.
Depletion of abiotic, fossil resources (ADP-fossil)	Fossil fuels such as oil, gas and coal, which originates from underground material. The characterization factors are the net calorific value at the point of extraction of the fossil fuel.
Other	
Re-use	Direct application of a used product/material in its original form, e.g. reuse of bottles.
Recycling	Application of a used product/material in new form, e.g. after melting.
Energy recovery	Recovery of a used product/material's energy content, e.g. via waste combustion.
Hazardous waste	Covers a range of fractions which constitute fire, health and environmental hazards.
Non-hazardous waste	Covers household waste and industrial waste similar to household waste.
Radioactive waste	Contains atoms that are able to emit ionizing radiations, e.g. waste from nuclear power plants.