

**Declaration Owner****Lynden Door, Inc.**

2077 Main Street

Lynden, WA 98264

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Products

- Architectural (LD) Series Wood Doors
- Standard Construction Series Wood Doors
- Interior Commercial (IC) Series Wood Doors

UNSPSC Code 30171504

CSI Code 08 14 00

Declared Unit

The declared unit is one wood door leaf, measuring 21 ft² (1.95 m²) at a nominal 1-3/4 inch (44.45 mm) thickness.

EPD Number and Period of Validity

SCS-EPD-07669

EPD Valid February 22, 2022 through February 21, 2027

Version Date: June 6, 2022

Product Category Rule

Product Category Rules for Preparing an Environmental Product Declaration for Interior Architectural Wood Door Leaves.

ASTM/NSF Sustainability. Valid until June 30, 2022

Program Operator

SCS Global Services

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Version Date:	June 6, 2022
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, SCS Global Services
LCA Software:	openLCA v1.10 and ecoinvent v3.6 database
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	<input checked="" type="checkbox"/> internal <input type="checkbox"/> external
LCA Reviewer:	 Ilan MacAdam-Somer, SCS Global Services
Product Category Rule:	Product Category Rules for Preparing an Environmental Product Declaration for Interior Architectural Wood Door Leaves. ASTM/NSF Sustainability. Valid until June 30, 2022
PCR Review conducted by:	Jamie Meil, Athena Sustainable Materials Institute (Review Chair) Email: jamie.meil@athenasmi.org
Independent verification of the declaration and data, according to ISO 14025 and the PCR	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
EPD Verifier:	 Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	Lynden Door, Inc.2 Product2 Life Cycle Assessment Stages and Reported EPD Information6 Life Cycle Inventory7 Life Cycle Impact Assessment9 Supporting Technical Information.....9 Additional Environmental Information 11 References 12

Disclaimers: This EPD conforms to ISO 14025, 14040, 14044, and 21930:2007.

Scope of Results Reported: The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.

Accuracy of Results: Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.

Comparability: The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

Lynden Door, Inc.

Lynden Door, Inc. is a family owned and operated business based in the Pacific Northwest. We manufacture residential, commercial, and architectural flush wood doors. Our purpose is to conduct our business in a way that honors God and reflects well on the owners, employees and their families, customers, vendors and our community.

We are dedicated to bringing to market wood door products of the highest quality, with the most responsive, efficient service available. As an equal opportunity employer, Lynden Door provides our employees a safe and healthy workplace with an opportunity to grow in skill level and job responsibility.

We are also committed to being a responsible member of our community and a caretaker of our environment. Being an environmental caretaker includes being a pioneer in the use of agricultural fiber components, an FSC® Chain of Custody producer, reducing water use in our manufacturing process and increasing recycling of waste materials used in the construction of our doors.

Lynden Door has been supplying quality flush wood doors since 1978 and our intent is to continue to improve our capabilities into the next generation and beyond.

Product

PRODUCT DESCRIPTION

The product system includes the cradle-to-gate impacts of Lynden Door's wood door leave products described below, including product packaging. The wood door leaves are constructed from a variety of materials, including various engineered and solid woods, adhesives, surfaces (i.e., wood veneers, plastic laminates), and coatings (e.g., paints, stain).

The products assessed include wood door leaves from Lynden Door's Architectural, Interior Commercial and Standard Construction Series. Lynden's wood door leaf product series are described below:

- **Architectural (LD) Series:** Doors designed for commercial and institutional applications meeting specific standards Architectural (LD) Series of construction. LD Series doors meet or exceed standards as listed by WDMA I.S. 1-A Performance Standards, AWI, AWMAC Section 1300 and WI Section 12. Modern architecture often calls for doors capable of meeting high standards and offering complex design solutions for both the aesthetic and functional aspects of the project. Multiple configurations within a given project are common and purpose-built modifications may be included.
- **Interior Commercial (IC) Series:** Doors designed for applications where an architectural door (LD Series) would typically be specified, but where the application is less rigorous than the architectural standard. Doors are built with a bonded core assembly with the application of a residential or light commercial door face. 5-year limited warranty on interior doors.
- **Standard Construction Series:** Interior passage & bifold doors designed for residential and light commercial applications. Standard Construction doors offered with hollow core or particleboard core.

Impact results are presented as a production-weighted average separately for the Architectural (LD) Series doors and for the Standard Construction and Interior Commercial Series doors. The various door core types and facings considered in the assessment are summarized in Table 1.

Table 1. Lynden wood door leaf products included in the EPD scope.

Product Series	Product Name	Core	Available Facing
Architectural (LD)	LD45AG FD-5	Agfiber Core	Wood Veneer
			High pressure decorative laminate
			Medium density overlay
	LD4500 FD-5 LD6000 FD-5 LD9000 FD-5	Mineral Core	Wood Veneer
			High pressure decorative laminate
			Medium density overlay
	LD2000 PC-5	Particle Board	Wood Veneer
			High pressure decorative laminate
			Medium density overlay
	LD3500 SCLC-5	Structural Composite Lumber	Wood Veneer
			High pressure decorative laminate
			Medium density overlay
LD3000 SLC-5	Stave Lumber	Wood Veneer	
		High pressure decorative laminate	
		Medium density overlay	
Standard Construction	H8/H4	Hollow Core	Wood Veneer
			Fiberboard, prefinished
	GP90	Mineral Core	Wood Veneer
			Fiberboard, prefinished
	P8/P4	Particle Board	Wood Veneer
			Fiberboard, prefinished
Interior Commercial (IC)	IC350	Structural Composite Lumber	Wood Veneer
			Fiberboard, prefinished

The Lynden wood door products are fabricated at the manufacturer's facility in Lynden, Washington State using similar material components from multiple suppliers. In general, door leaf manufacturing processes encompassing primarily the assembly of the door cores, stile and rails, with the surfacing materials applied using a variety of adhesives. The doors are finished with various coatings and stains, packaged and palletized for shipment. It is assumed the processes are independent of the specific door leaf model.

Manufacturing data, including electricity and resource use, at the production facility were provided for 2019.

PRODUCT CHARACTERISTICS

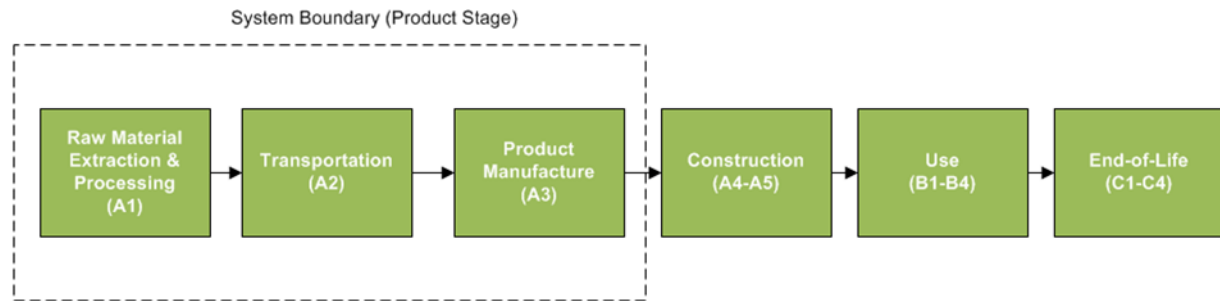
Technical specifications of the products can be found on the manufacturer's website (www.lyndendoor.com/resources/)

PRODUCT APPLICATION

Lynden Door products serve a wide range of architectural and commercial applications including health care and hospitality, education, public spaces and government, military, office and mixed use/multi-family.

PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.



FUNCTIONAL UNIT

The scope of the LCA study is cradle-to-gate (i.e., raw material extraction through product manufacture). In accordance with the PCR, a declared unit is used in lieu of the functional unit as the study scope does not cover the complete life cycle and thus the performance of the product (e.g., product lifetime) is not defined. The declared unit is 1.95 m² (21 ft²) of door leaf at a nominal 44.45 mm (1-3/4") thickness. The reference flow in the LCA model is equivalent to the declared unit.



MATERIAL CONTENT**Table 2.** Material component summary for the Lynden wood door leave products by mass (per declared unit) and as a percentage of total mass.

Component	LD Series ¹		Standard Construction Series ¹	
	kg	Percent	kg	Percent
Product				
Agfiber core	1.51	2.5%	0.00	0%
Mineral core	2.92	4.9%	0.301	0.93%
Engineered wood	50.9	85%	27.6	86%
Honeycomb paper core	0.00	0%	0.174	0.54%
High pressure decorative laminate	2.47	4.1%	0.00	0%
Wood	0.735	1.2%	3.55	11%
Catalysts/Adhesives	1.30	2.2%	0.612	1.9%
Paint/Primer	1.31x10 ⁻³	0.0022%	2.01x10 ⁻²	0.062%
Total Product	59.9	0.00	32.3	0.00
Packaging				
Wood - pkg	0.822	64%	0.570	63%
Pulp	0.443	34%	0.311	35%
Plastic	2.28x10 ⁻²	1.8%	1.77x10 ⁻²	2%
Total Packaging	1.29	0.00	0.898	0.00

¹ Production-weighted material composition

Product materials were reviewed for the presence of any toxic or hazardous chemicals. Based on a review of the product components provided by the manufacturer, no regulated chemicals were identified in the product or product components.

Life Cycle Assessment Stages and Reported EPD Information

The EPD represents the potential environmental impacts from the production of the wood door leaf products (i.e., cradle-to-gate). The production stage of the product life cycle includes:

- **A1** – The extraction and processing of raw materials and the manufacture of material components (e.g., particleboard, wood veneer).
- **A2** – The transportation of raw materials from source to manufacturing site.
- **A3** – The manufacturing of wood door leaves. Packaging is included in this module.

An overview of the life cycle stages included is shown in the figure below. Product installation, use, maintenance, and disposal are not included.

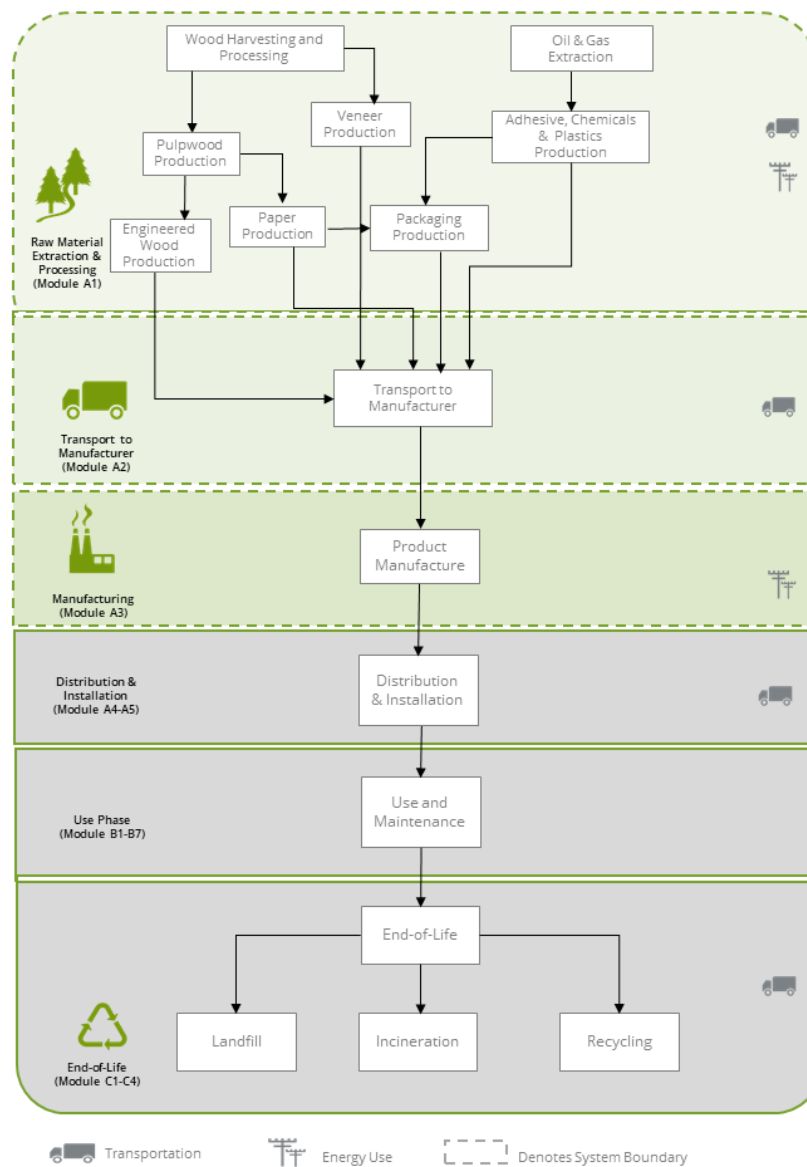


Figure 1. Flow diagram representing the major processes in the production stage of wood door leaves. Processes within the dotted lines are included in the system boundaries. A1, A2, and A3 are within the LCA system boundaries.

Life Cycle Inventory

In accordance with the PCR, the following aggregated inventory flows are included in the LCA:

- Primary energy consumption
- Use of renewable and nonrenewable material resources
- Consumption of freshwater
- Hazardous Waste
- Non-hazardous Waste

All results are calculated using the OpenLCA v1.10 model using primary and secondary inventory data. Classification for *Use of Renewable Material Resources* is based on review of elementary flows and resources considered renewable on a human time scale. Elementary flows related to use of minerals, and land occupation were not included. Water consumption is also not included as this is reported separately.

Table 3. Results for resource use, wastes, and output flows for the declared unit for **LD Series** wood door leaves. MND = Module Not Declared.

Parameter	Units	A1-A3	A4-A5	B1-B7	C1-C4	D
Primary Energy Consumption						
Primary energy demand	MJ, HHV	1,860	MND	MND	MND	MND
Nonrenewable, fossil	MJ, HHV	938	MND	MND	MND	MND
Nonrenewable, nuclear	MJ, HHV	38.2	MND	MND	MND	MND
Renewable	MJ, HHV	31.0	MND	MND	MND	MND
Renewable, biomass	MJ, HHV	850	MND	MND	MND	MND
Material resources						
Nonrenewable materials	kg	0.00	MND	MND	MND	MND
Renewable materials	kg	1,030	MND	MND	MND	MND
Use fresh water	m ³	3.25	MND	MND	MND	MND
Wastes						
Hazardous waste disposed	kg	1.43x10 ⁻³	MND	MND	MND	MND
Nonhazardous waste disposed	kg	16.9	MND	MND	MND	MND

Table 4. Results for resource use, wastes, and output flows for the declared unit for **Standard Construction Series** wood door leaves. MND = Module Not Declared.

Parameter	Units	A1-A3	A4-A5	B1-B7	C1-C4	D
Primary Energy Consumption						
Primary energy demand	MJ, HHV	942	MND	MND	MND	MND
Nonrenewable, fossil	MJ, HHV	480	MND	MND	MND	MND
Nonrenewable, nuclear	MJ, HHV	19.9	MND	MND	MND	MND
Renewable	MJ, HHV	18.1	MND	MND	MND	MND
Renewable, biomass	MJ, HHV	424	MND	MND	MND	MND
Material resources						
Nonrenewable materials	kg	0.00	MND	MND	MND	MND
Renewable materials	kg	592	MND	MND	MND	MND
Use fresh water	m ³	2.03	MND	MND	MND	MND
Wastes						
Hazardous waste disposed	kg	5.91x10 ⁻⁴	MND	MND	MND	MND
Nonhazardous waste disposed	kg	6.38	MND	MND	MND	MND

Life Cycle Impact Assessment

Life cycle impact assessment is the process of converting the life cycle inventory results into a representation of environmental and human health impacts. For example, emissions such as carbon dioxide, methane, and nitrous oxide (inventory) together contribute to climate change (impact assessment). The impact assessment for the EPD is conducted in accordance with requirements of the PCR. Impact category indicators are estimated using the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI version 2.1). The LCIA and inventory flow results are calculated using OpenLCA v1.10 software.

Table 5. Production weighted average Life Cycle Impact Assessment (LCIA) results for the **LD Series** wood door leaves.

Impact Indicator	Units	A1-A3	A4-A5	B1-B7	C1-C4	D
Global warming	kg CO ₂ eq	62.0	MND	MND	MND	MND
Acidification	kg SO ₂ eq	0.341	MND	MND	MND	MND
Eutrophication	kg N eq	0.183	MND	MND	MND	MND
Smog formation	kg O ₃ eq	6.08	MND	MND	MND	MND
Ozone depletion	kg CFC-11 eq	8.72x10 ⁻⁶	MND	MND	MND	MND
Fossil fuel depletion	MJ, surplus	99.8	MND	MND	MND	MND

Table 6. Production weighted average Life Cycle Impact Assessment (LCIA) results for the **Standard Construction Series** wood door leaves.

Impact Indicator	Units	A1-A3	A4-A5	B1-B7	C1-C4	D
Global warming	kg CO ₂ eq	31.1	MND	MND	MND	MND
Acidification	kg SO ₂ eq	0.185	MND	MND	MND	MND
Eutrophication	kg N eq	8.56x10 ⁻²	MND	MND	MND	MND
Smog formation	kg O ₃ eq	3.24	MND	MND	MND	MND
Ozone depletion	kg CFC-11 eq	4.04x10 ⁻⁶	MND	MND	MND	MND
Fossil fuel depletion	MJ, surplus	52.4	MND	MND	MND	MND

Supporting Technical Information

Data sources

Unit processes are developed with OpenLCA v1.10 software, drawing upon data from multiple sources. Primary data were provided by Lynden Door for their manufacturing processes. The primary sources of secondary LCI data are from the Ecoinvent v3.7 Life-Cycle Inventory Database.

Data Quality

Table 7. Data quality assessment of Life Cycle Inventory.

Data Quality Parameter	Data Quality Discussion
<p>Time-Related Coverage: Age of data and the minimum length of time over which data is collected</p>	<p>The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old (typically 2016). All the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2019.</p>
<p>Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study</p>	<p>The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American or European operations. Data representative of European operations are considered sufficiently similar to actual processes.</p>
<p>Technology Coverage: Specific technology or technology mix</p>	<p>For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.</p>
<p>Precision: Measure of the variability of the data values for each data expressed</p>	<p>Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.</p>
<p>Completeness: Percentage of flow that is measured or estimated</p>	<p>The LCA model included all known mass and energy flows for production of the wood door leaf products. In some instances, surrogate data used to represent upstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.</p>
<p>Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest</p>	<p>Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.</p>
<p>Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis</p>	<p>The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.7 data where available. Different portions of the product life cycle are equally considered.</p>
<p>Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study</p>	<p>Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.</p>
<p>Sources of the Data: Description of all primary and secondary data sources</p>	<p>Data representing energy use at the Lynden manufacturing facility represents an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data the Ecoinvent LCI databases are used.</p>
<p>Uncertainty of the Information: Uncertainty related to data, models, and assumptions</p>	<p>Uncertainty related to materials in the products and packaging is low. Primary data for upstream processes were not available; as such, the study relied upon use of existing representative datasets for these cases. These representative datasets contained relatively recent data (~10 years, or more recent), but in some instances lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are relatively high. The impact assessment method includes impact potentials that lack characterization of providing and receiving environments or tipping points.</p>

Allocation

Annual facility-level electricity and fuel use data were provided by the manufacturer for 2019 for their facility in Lynden, WA. Resource use (e.g., fuels and electricity) at the Lynden manufacturing facility is allocated to the product based on the total volume of doors produced and assuming the manufacturing processes are equivalent for each specific door type assessed.

Impacts from transportation were allocated based on the mass of material and distance transported.

Cut-off criteria

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact must be included in the inventory. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

Additional Environmental Information

Lynden Door, Inc. is certified for FSC® Mix chain of custody (FSC-C103189). To view the certification, please visit: http://www.lyndendoor.com/wp-content/uploads/2017/11/FCOC_CRT_LyndenDoor_Fnl_102417.pdf



References

1. Life Cycle Assessment of Architectural Wood Door Leaves. Prepared for Lynden Door, Inc. February 2022.
2. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
3. ISO 14040: 2006/Amd. 1:2020 Environmental Management – Life cycle assessment – Principles and Framework
4. ISO 14044: 2006/Amd. 1:2017/Amd.2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 21930:2007 Sustainability in building Construction – Environmental declaration of building products.
6. Product Category Rules for Preparing an Environmental Product Declaration for Interior Architectural Wood Door Leaves. ASTM/ NSF Sustainability. Valid until June 30, 2022
7. SCS Type III Environmental Declaration Program: Program Operator Manual. V11 November 2021. SCS Global Services.
8. Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). Dr. Bare, J., <https://www.epa.gov/chemical-research/tool-reduction-and-assessment-chemicals-and-other-environmental-impacts-traci>
9. Ecoinvent Centre (2020) Ecoinvent data from v3.7. Swiss Center for Life Cycle Inventories, Dübendorf, 2020 <http://www.Ecoinvent.org>



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