

Environmental Product Declaration (EPD)

794H PANEL DOORS

Milette Doors



Milette Doors is pleased to present this environmental product declaration (EPD) for 794H panel doors. This EPD was developed in compliance with CAN/CSA-ISO 14025 and has been verified by Lindita Bushi, Athena Sustainable Materials Institute. The LCA and the EPD were produced by Vertima and Ellio.

The EPD includes cradle-to-gate life cycle assessment (LCA) results.



For more information about Milette Doors, please go to <http://www.portesmilette.com/en>.

For any explanatory material, in regards to this EPD, please contact the program operator.

This environmental product declaration (EPD) is in accordance with CAN/CSA-ISO 14025 and the PCR noted below. EPDs from different programs may not be comparable.



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PROGRAM OPERATOR	CSA Group 178 Rexdale Blvd Toronto, ON Canada M9W 1R3 www.csagroup.org
PRODUCT	794H Panel Doors
EPD REGISTRATION NUMBER	7541-9431
EPD RECIPIENT ORGANIZATION	 <p>Milette Doors 100, avenue Industrielle St-Boniface, QC Canada G0X 2L0</p>
REFERENCE PCR	Interior Architectural Wood Door Leaves v2. ASTM International March 2015 to February 2020 UNCPC 31600
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PERIOD OF VALIDITY	February 28, 2022
The PCR review was conducted by:	Jamie Meil, Athena Sustainable Materials Institute (Chairperson) Jerry Heppes Sr., Door and Hardware Institute James Salazar, Coldstream Consulting
This EPD and related data were independently verified by an external verifier, Lindita Bushi, Athena Sustainable Materials Institute, according to CAN/CSA-ISO 14025:2006	 <hr/> Lindita Bushi, Athena Sustainable Materials Institute

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DESCRIPTION OF MILETTE DOORS

Milette Doors is a Canadian manufacturer of high quality doors manufactured with sustainable materials and a unique high-precision process, a devoted team of experienced wood craftsmen. This demonstrates Milette Doors' concern regarding the production of reliable and responsible products.

DESCRIPTION OF PRODUCT

Panel doors are interior doors that can be used both for residential and commercial applications (e.g. dentist's office door). The product range includes over hundred different models. Nevertheless, even though the wood design at the surface of the door might differ from one model to another, the core and raw materials remain the same for the product category.

The model 794H was considered to be representative of the whole product range of panel doors.

Therefore, the underlying LCA has been conducted for a specific product, the 794H door, manufactured at Milette Doors' plant. The manufacturing plant address is 100, avenue Industrielle, Saint-Boniface, QC G0X 2L0 Canada.

794H has dimensions of 30" x 80" x 1 3/8". It is composed of two stiles, one top rail, one bottom rail, three middle rails and four panels. The 794H door does not include any of the following: edge protectors and astragals, glass, louvers, light beads and frames, applied panels, applied molding, metal insets, or blocking. The raw material input is detailed in Table 1.

Table 1: Material composition of 1 unit of 794H door

Materials	Amount	Proportion	Oven-Dry (OD) weight
Pine, surfaced dry lumber	15.8 kg	58.9 %	14.8 kg
MDF*	6.18 kg	23.0 %	5.9 kg
FIBREX®**	3.79 kg	14.1 %	3.6 kg
Glue	0.61 kg	2.26 %	
White primer	0.47 kg	1.75 %	
TOTAL	26.8 kg	100%	

* Medium Density Fiberboard

** High Density MDF

794H panel doors do not comply with any particular standard or other product specifications.



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SCOPE OF EPD**Reference flow and declared unit**

The PCR suggests a declared unit of 1 panel door leaf. **Table 2** presents the reference flows associated to the declared unit, one 794H panel door leaf.

Table 2: Declared unit and reference flows – 794H panel door

Description	Value	Unit
Declared Unit	1	Panel door leaf
Mass of door	26.84	kg
Conversion factor to 1kg	0.04 [=1/26.84]	
Nominal size and thickness	762 × 2032 × 35 [30" × 80" × 1 3/8 "]	mm [inches]
Door area	1.55	m ²
Ratio to standard door	0.795 [=1.55/1.95]	

System boundaries

This EPD focuses on a Cradle-to-Gate life cycle impact assessment (LCIA) of 794H panel doors. Activities and processes related to 1) Raw materials acquisition, 2) Material transportation and 3) Door manufacturing are described in Figure 1.

Raw materials acquisition: This includes extraction from the forest of wood logs, transportation to saw mill and saw mill activities resulting in sawn and debarked rough green lumbers. Concerning other raw materials, this includes the manufacturing of MDF in Ontario (Canada) and of FIBREX® in New Brunswick (Canada), as well as manufacturing of glue and white primer.

Material transportation: This step includes the transportation of raw materials from Milette Doors' suppliers to the manufacturing plant, located in Saint-Boniface, QC (Canada).

Door manufacturing: This step includes energy requirements (electricity, heat), emissions to the environment, water consumption and waste production related to lumber drying, door parts manufacturing and door assembly. Door production generates losses, mainly of wood, MDF and FIBREX®, with a loss rate of 32.4% for wood and 37% for MDF/ FIBREX®. These losses are partly used internally for heat production, or sold as animal litter. Other wastes (typical household waste composition) are sent to landfill. This step also includes packaging materials to make the product ready for shipment, as well as the transportation of these materials to Milette Doors' manufacturing plant. Typically, doors are wrapped in plastic film and packed in cardboards before being transported on pallets.



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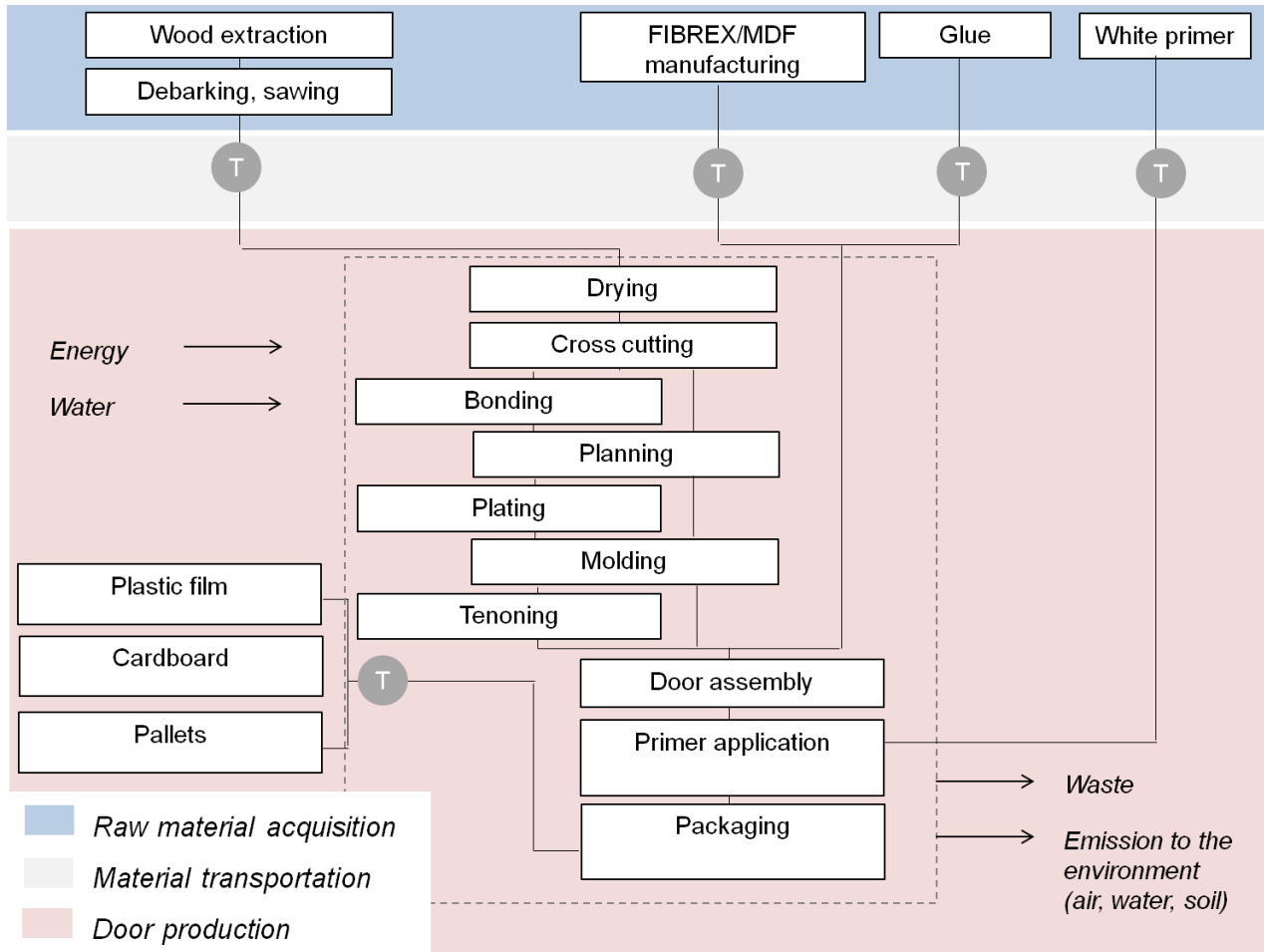


Figure 1: System boundaries of cradle-to-gate LCA of 794H panel doors

Calculation method

The SimaPro software v 8.0.4.30, developed by PRé Consultants, was used to calculate the inventory and to assess potential environmental impacts associated with the inventoried emissions.

Data sources

Inventory data was collected from the Millette Doors' manufacturing plant located in Saint-Boniface, QC, using a LCI questionnaire. Inventory data included both the overall annual production volumes at Millette Doors' manufacturing plant, as well as the annual production volume of the product under study, the amount of raw materials entering in the production of the 794H door, losses of these materials, distances and transportation mode for the raw materials supply, energy consumption, water consumption, waste production, and materials needed for packaging.



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Inventory data for wood extraction from forest (logs), transportation to saw mill and sawing (production of sawn lumber, rough, green) was provided by Athena [1], and is representative of a Canadian context. Inventory data for MDF production was also taken from Athena [2], and is representative of a Canadian context. When primary data was not available, the unit processes were selected either from the *ecoinvent* v3.1 database, one of the most comprehensive LCI databases currently available [3], or from the US LCI database [4], that is specific to a North American context

Data quality

This study is specific to a particular manufacturer: Millette Doors. Primary data, mostly obtained from the manufacturer, is representative of the current technologies and materials used by this company. As primary data was collected directly from the only plant where panel doors are manufactured, it can be stated that they are 100% representative of the technologies in use and of the geographical areas. Data was collected so as to be representative of a full year 2014. Secondary data was used only for upstream processes. For some processes, the *ecoinvent* database provided data representative of a Canadian context. These processes were used in priority. When necessary, the grid mix was changed for the grid mix of the province where the production takes place. When *ecoinvent* processes were not available for a North American context, processes were taken from the US LCI database.

Allocation

Data relative to energy consumption (electricity, heat), emissions to the environment, water consumption and waste production was provided for the whole manufacturing plant.

ISO 14040 allocation procedure states that whenever possible, allocation should be avoided by collecting data related to the process under study or by expanding the product system. In the present case, data was provided for the Saint-Boniface manufacturing plant as a total value, and not specifically for panel doors. According to ISO 14040, step 2 consists of partitioning the inputs and outputs between the different products in a way that reflects the physical relationship between them.

This manufacturing plant produces hundreds of different door models. Nevertheless, all these products are doors and go through similar manufacturing steps. Their economic value difference is less than a factor of 10. Therefore, mass allocation is suitable to estimate the share of the total energy that can be assigned to each product. Similarly, mass allocation was used to determine the share of water consumption and waste production that can be assigned to panel doors. As 794H door was considered representative of all panel doors, its mass was used for mass allocation.

Milette Doors**Cut-off methodology**

According to the PCR [5], if a mass flow or energy flow represents less than 1% of the cumulative mass or energy flow of the system, it may be excluded from system boundaries. However, these flows should not have a relevant environmental impact. Also, at least 95% of the energy usage and mass flow shall be included.

In the present study, cut-off methodology was used for wood wastes: a part of wood and MDF losses are recycled internally for heat production. The rest of the sawdust and wood wastes are sold (low economic value, i.e. by-product) to be recycled as animal litter. Cut-off methodology was applied and no end-of-life was considered for these wastes. Similarly, no end-of-life was applied to wood waste and by products resulting from the sawing stage that are sold or given away to be used as hog fuel or other purposes.

Exclusions

No data concerning the construction, maintenance or dismantling of the capital assets, daily transport of the employees, office work, business trips and other activities from Milette Doors' employees was included in the model. The model only takes into account processes associated with infrastructures that are already included in the *ecoinvent* modules.

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ENVIRONMENTAL IMPACTS

The five impact indicators required by the PCR[1], namely global warming potential (GWP), acidification potential, eutrophication potential, smog creation potential and ozone depletion potential, were calculated using the TRACI 2.1 impact assessment methodology developed by Bare and Gloria [6].

Table 3 presents the LCIA results for one 794H door unit using TRACI methodology, as well as primary energy consumption, consumption of renewable and non renewable material, water consumption and waste production.

Table 3: LCIA results for one 794H panel door unit

Environmental indicator	Unit	One 794H panel door unit
Global Warming Potential	kg CO ₂ eq	20.5
Acidification potential	kg SO ₂ eq	0.19
Eutrophication potential	kg N eq	0.040
Smog creation potential	kg O ₃ eq	2.97
Ozone depletion potential	kg CFC-11 eq	9.53 E-07
<i>Primary energy consumption</i>		
Non-renewable fossil	MJ	361
Non-renewable nuclear	MJ	76.2
Renewable (biomass)	MJ	123
Renewable (solar, wind, hydroelectric and geothermal)	MJ	122
Feedstock, energy, renewable	MJ	459
<i>Resources consumption</i>		
Non-renewable materials	kg	3.2
Renewable materials	kg	46.4
Fresh water	L	131
<i>Waste generated</i>		
Non-hazardous	kg	3.53
Hazardous	kg	0.01

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Interpretation

Figure 2 and Figure 3 present the relative contribution of raw materials acquisition, material transportation and door manufacturing to the LCIA impacts and to energy consumption.

Raw materials acquisition contributes for more than 70% of the impacts to global warming, acidification, eutrophication and ozone depletion. Raw materials acquisition is also the main contributor to energy consumption, except for renewable energy other than from biomass, where production stage is the main source of energy consumption.

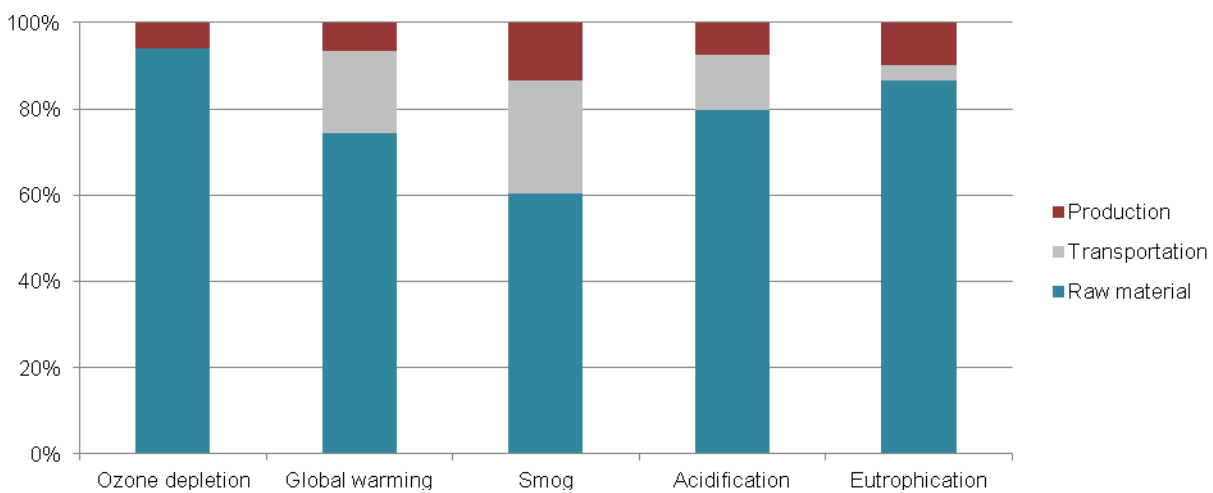


Figure 2: Contribution of life cycle stages to the environmental impacts of one 794H panel door unit - TRACI Indicators

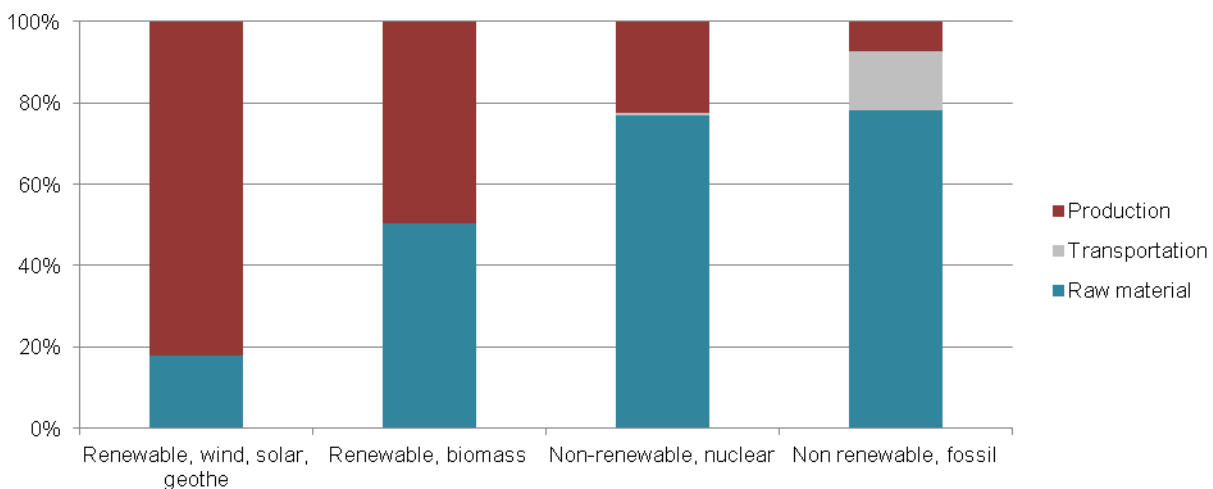


Figure 3: Contribution of life cycle stages to the environmental impacts of one 794H panel door unit - Energy consumption



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ADDITIONAL ENVIRONMENTAL INFORMATION**Biogenic carbon sequestration**

In accordance with the PCR [1], carbon sequestration of 794H panel doors is reported as additional environmental information in Table 4, but is not included in the global warming potential (GWP) impact measure since it is a cradle-to-gate EPD. Carbon sequestration in wood products has been calculated using the FPInnovations' Carbon Sequestration Calculator (<https://fpinnovations.ca/ResearchProgram/environment-sustainability/epd-program/Pages/default.aspx>). This tool takes into account the biogenic carbon stored in wood, as well as the biogenic CO₂ and CH₄ emissions related to Gate-to-Grave processes that are not included in a Cradle-to-Gate LCA: wood recycling, landfilling or combustion. The present study does not claim net sequestration credit against Cradle-to-Gate carbon footprint.

Table 4: Parameters used in the FPInnovations' Carbon Sequestration Calculator

Parameter	1 panel door unit
Oven dry mass	23.2 kg
Carbon content of wood	50%
Initial GHG credit*	- 42.53 kg CO ₂ eq
Total CO ₂ emissions	12.38 kg CO ₂ eq
Total CH ₄ emissions	0.17 kg CH ₄
Net Global GWP credit	- 25.85 kg CO₂ eq

* A 44/12 molecular weight ratio is applied, so GHG credit = - (23.2 * 50% * 44/12) = -42.53 kg CO₂ eq

Others

MDF products come from FSC®-Certified suppliers. Pine wood is purchased from two suppliers. One of them is specialized in North American Pine production and FSC®-Certified. MDF products are made of post-consumer wood residues.

Log sawing, for lumber production, produces by-products (bark, saw dust, pulp chips and chipper fines) that are recovered as hog fuel or other purposes.



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