FORTE OPENING SOLUTIONS

VERIFIED by SCS GLOBAL SERVICES ENVIRONMENTAL PRODUCT DECLARATION BASED ON LCA

Declaration Owner
Forte Opening Solutions
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Suite 220
Tampa, Florida 33634 www.forteopenings.com

Product

This declaration represents the production-weighted average wood door frame, manufactured by Forte Opening Solutions in London, Ontario, Canada.

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Declared Unit

The declared unit is a wood door frame, measuring 21 ft2 (1.95 m2) at a nominal 1-3/4 inch (44.45 mm) thickness. Results represent a production weighted average wood door frame.

EPD Number and Period of Validity

SCS-EPD-07659
EPD Valid February 16, 2022 through February 15, 2027
Version Date: November 6, 2024

Product Category Rule

ISO 21930:2017. Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.

Program Operator

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SCSglobal SERVICES

Declaration Owner:	Forte Op
Address:	4301 An
Declaration Number:	SCS-EPD
Declaration Validity Period:	EPD Vali

Version Date:	November 6, 2024
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA 1.10 software and the Ecoinvent v3.7 database
Product RSL:	n/a
Markets of Applicability:	Global
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Gate
LCIA Method and Version:	TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Product Category Rule:	ISO 21930:2017. Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
PCR Review conducted by:	ISO Technical Committee
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930:2017.*

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.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

1. Forte Opening Solutions

Forte™ Opening Solutions is a leading provider of built-to-order wood doors and components, serving a wide range of commercial and institutional markets, including healthcare, hospitality, education, and government. With a rich legacy of 134 years and a portfolio that brings together iconic brands like Marshfield DoorSystems, Algoma Hardwoods, Mohawk Doors, Baillargeon, and Harring, Forte offers tailored wood door solutions, ranging from authentic stile and rail designs to highly customizable veneer options. Our rebranding from Masonite Architectural to Forte Opening Solutions marks an exciting new chapter in our journey, symbolizing our strength, expertise, and ongoing commitment to providing seamless customer experiences. Forte stands for more than just doors—it represents a dedication to delivering optimal performance, exceptional aesthetics, and trusted support at every touchpoint.

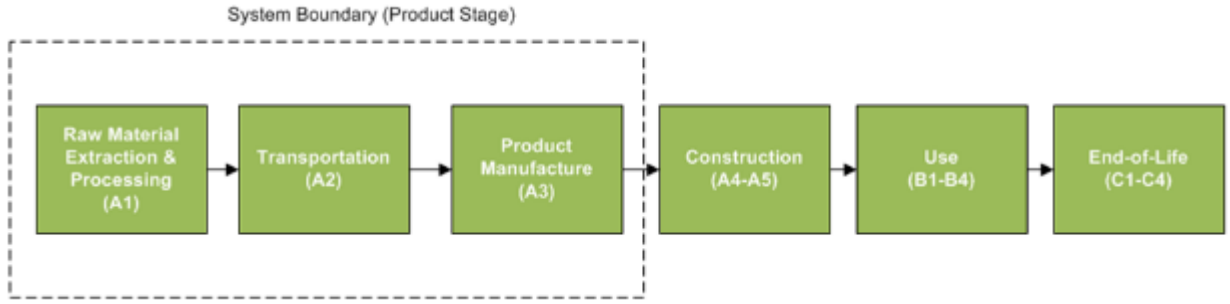
2. Product

2.1 PRODUCT DESCRIPTION

The door frame is a crucial component, providing the structural support that ensures the door functions properly. It consists of key elements: the sill, the horizontal beam below the door; the head, the beam running above the door; and the jambs, vertical beams on either side. Jambs are available in various profiles, including flat, t-stop, single rabbet, and double rabbet, offering flexibility for different needs. These components not only keep the door securely in place but also prevent unwanted elements from entering. Performance results are based on a production-weighted average across different styles and sizes of wood door frames.

2.2 PRODUCT FLOW DIAGRAM

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



2.3 APPLICATION

The products are intended for use in various architectural and commercial applications including health care and hospitality, education, public spaces and government, military, office and mixed use/multi-family.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, upstream transportation and product manufacture, including packaging. The life cycle phases included in the product system boundary are shown below. Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

Table 1. *Life cycle phases included in the Forte Opening Solutions Wood Door Frame product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module Included | MND = Module Not Declared

The EPD conforms to ISO 14040/44 and the PCR. The impact indicators considered for the assessment include:

- Potential for Global Warming,
- Acidification Potential,
- Eutrophication Potential,
- Photochemical Ozone (Smog) Formation Potential,
- Ozone Depletion Potential,
- Fossil Fuel Depletion Potential.

2.5 TECHNICAL DATA

Technical specifications of the Forte Opening Solutions' products included in the LCA scope, as well as product performance testing results, are available on the manufacturer's website (https://www.forteopenings.com/technical-resources?tags=productDataSheetsPds).

2.6 MATERIAL COMPOSITION

The material composition of a production-weighted representative door frame is shown below in Table 2.

Table 2. *Material composition of a production-weighted average wood door frame.*

Material Type	Average Weight (kg)	Value (%)
Engineered Wood	10.3	50%
Wood	10.3	50%
TOTAL (Product)	**20.6**	**100%**

No substances required to be reported as hazardous are associated with the production of this product

2.7 MANUFACTURING

The Forte Opening Solutions door frame products are manufactured at the company's production facility in London, Ontario, Canada. Resource use at the production facility is allocated to the product based on product weight as a fraction of the total facility production (mass-based allocation).

Electricity use at the manufacturer's facility is modeled based on the Ecoinvent regional electricity supply mix for Ontario, Canada. Electricity and resources (e.g., natural gas, propane) used at the manufacturing facility are allocated to the products based on annual production data for 2020.

2.8 PACKAGING

The Forte Opening Solutions products are packaged for shipment using plastic wrap, corrugate board and wood pallets.

Table 3. *Material content for the product packaging in kg per declared unit and as a percentage of total mass.*

Material Type	Average Weight (kg)	Value (%)
Corrugated	$9.07x10^{-2}$	32%
Plastics	$1.95x10^{-2}$	6.8%
Pallet	0.177	62%
TOTAL (Packaging)	**0.287**	**100%**

2.9 FURTHER INFORMATION

Further information on the products can be found on the manufacturers' website at www.forteopenings.com.

3. LCA: Calculation Rules

3.1 DECLARED UNIT

The declared unit for the product system is one wood door frame for a nominal door size measuring 21 ft^2 (1.95 m^2) at a nominal 1-3/4 inch (44.45 mm) thickness. The reference flow and declared unit for the products are summarized in Table 4.

Table 4. *Declared unit and reference flows for the Forte Opening Solutions wood door frame products.*

Property	Unit	Forte Opening Solutions Wood Door Frame
Mass	kg/unit	20.6
Thickness to achieve declared unit	mm	n/a
Density	kg/m^2	10.6

3.2 UNITS

All data and results are presented using SI units.

3.3 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.4 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, transportation, and product manufacture, including packaging. The life cycle phases included in the EPD scope are described in Table 5 and illustrated in Figure 1.

Table 5. *The modules and unit processes included in the scope for the Forte Opening Solutions product system.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the door frame product system components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of products and packaging (incl. upstream unit processes)
A4	Transport (to the building site)	Module Not Declared
A5	Construction-installation process	Module Not Declared
B1	Product use	Module Not Declared
B2	Product maintenance	Module Not Declared
B3	Product repair	Module Not Declared
B4	Product replacement	Module Not Declared
B5	Product refurbishment	Module Not Declared
B6	Operational energy use by technical building systems	Module Not Declared
B7	Operational water uses by technical building systems	Module Not Declared
C1	Deconstruction, demolition	Module Not Declared
C2	Transport (to waste processing)	Module Not Declared
C3	Waste processing for reuse, recovery and/or recycling	Module Not Declared
C4	Disposal	Module Not Declared
D	Reuse-recovery-recycling potential	Module Not Declared

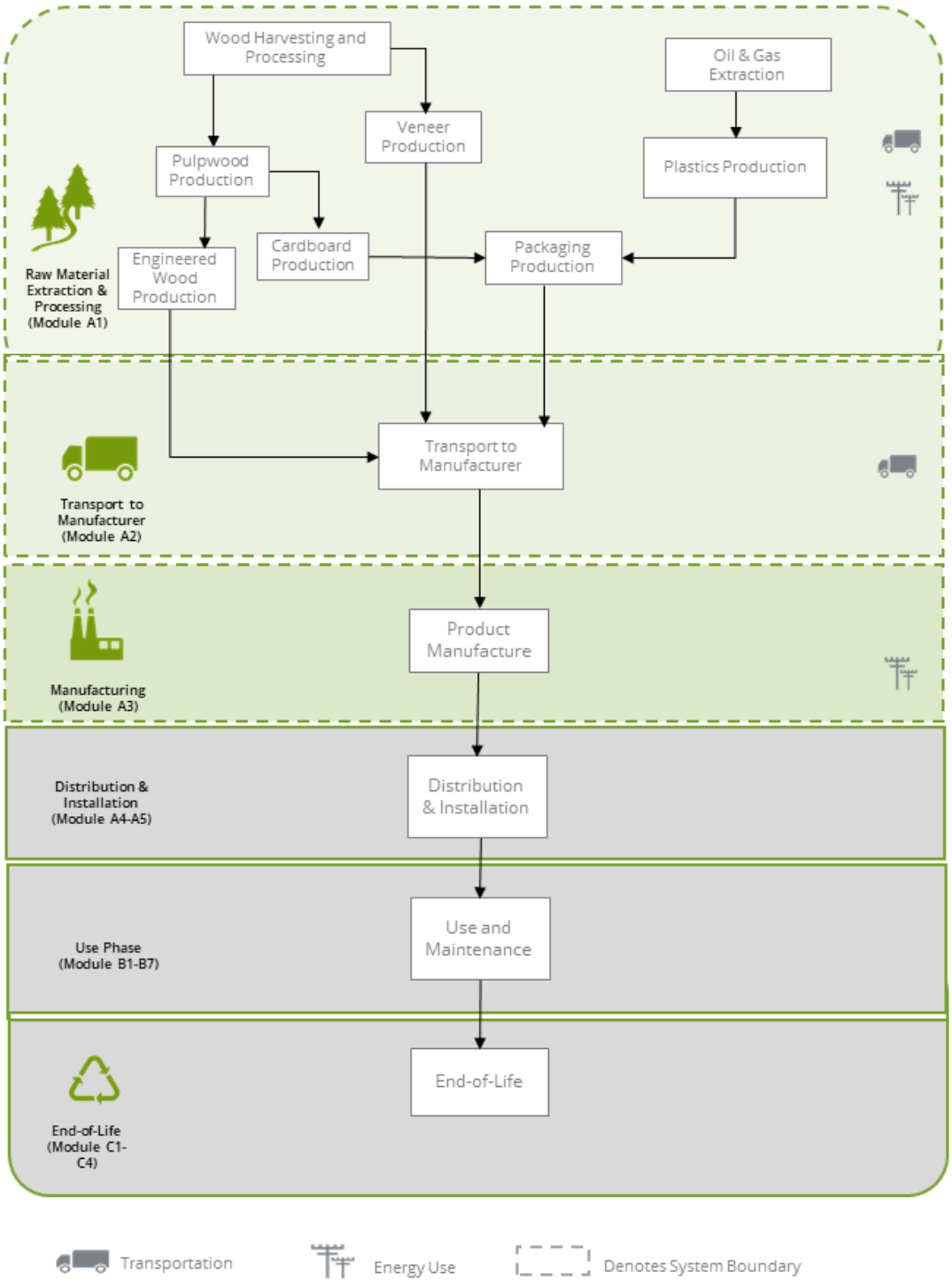


Figure 1. *Flow Diagram for the life cycle of the Forte Opening Solutions Wood Door Frame product system.*

3.5 ESTIMATES AND ASSUMPTIONS

- Forte Opening Solutions' manufacturing facility is located in London, Ontario, Canada. Ecoinvent inventory datasets for the applicable regional electricity grid mixes were used to model resource use and emissions from electricity use at the manufacturing facility.
- Electricity and resource use at the production facilities were allocated to the products based on annual facility production data for calendar year 2020 provided by the manufacturer. Impacts are allocated to the product based on production volume.
- Primary data for upstream component materials were not available. Representative LCI datasets from the ecoinvent LCI database and published literature were used as appropriate.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

3.6 DATA SOURCES

Primary data were provided by Forte Opening Solutions for their manufacturing facility. The sources of secondary LCI data are the Ecoinvent LCI database.

Table 6. *Data sources for the Forte Opening Solutions Door Frame product system.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Medium density fiberboard	medium density fibre board production, uncoated | medium density fibreboard | Cutoff, S/RoW	EI v3.7	2020
Hardwood	sawnwood production, hardwood, dried (u=10%), planed | sawnwood, hardwood, dried (u=10%), planed | Cutoff, S/RoW	EI v3.7	2020
PACKAGING			
Wood	EUR-flat pallet production | EUR-flat pallet | Cutoff, S/RoW	EI v3.7	2020
Pulp	containerboard production, linerboard, kraftliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.7	2020
LDPE	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.7	2020
RESOURCES			
Grid electricity – London, ON	market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/CA-ON	EI v3.7	2020
Natural gas	heat production, natural gas, at boiler modulating >100kW | heat, district or industrial, natural gas | Cutoff, S/RoW	EI v3.7	2020
Diesel	diesel, burned in building machine | diesel, burned in building machine | Cutoff, S/GLO	EI v3.7	2020
Fuel oil	heat production, light fuel oil, at industrial furnace 1MW | heat, district or industrial, other than natural gas | Cutoff, S/CA-QC	EI v3.7	2020
Propane	heat production, propane, at industrial furnace >100kW | heat, district or industrial, other than natural gas | Cutoff, S/RoW	EI v3.7	2020
TRANSPORTATION			
Road transport	transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.7	2020

3.7 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 7. *Data quality assessment for the Forte Opening Solutions product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	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 2020.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	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.
Technology Coverage: Specific technology or technology mix	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.
Precision: Measure of the variability of the data valuesfor each data expressed	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.
Completeness: Percentage of flow that is measured or estimated	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.
Representativeness: Qualitative assessment of the degreeto which the data set reflects the true population of interest	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.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly tothe various components of the analysis	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.
Reproducibility: Qualitative assessment of the extent to which information about the methodologyand data values would allow an independent practitioner to reproduce theresults reported in the study	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.
Sources of the Data Description of all primary and secondary data sources	Data representing energy use at the Forte Opening Solutions 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 datasets, Ecoinvent v3.7 LCI data are used.
Uncertainty of the Information Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the product and packaging is low. Actual supplier data for upstream operations was not available for all suppliers and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.8 PERIOD UNDER REVIEW

The period of review is calendar year 2020.

3.9 ALLOCATION

Manufacturing resource use was allocated to the products based the mass of the product). Impacts from transportation were allocated based on the mass of material and distance transported.

3.10 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.

4. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1.

TRACI 2.1 Impact Category	Unit
Global Warming Potential **(GWP)**	kg CO_2 eq
Ozone Depletion Potential **(ODP)**	kg CFC 11 eq
Acidification Potential **(AP)**	kg SO_2 eq
Eutrophication Potential **(EP)**	kg N eq
Smog Formation Potential **(SFP)**	kg O_3 eq
Fossil Fuel Depletion Potential **(FFD)**	MJ Surplus, LHV

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development, however the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary resources used as energy carrier (fuel)	MJ, LHV	HWD: Hazardous waste disposed	kg
RPR_M: Renewable primary resources with energy content used as material	MJ, LHV	NHWD: Non-hazardous waste disposed	kg
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	HLRW: High-level radioactive waste, conditioned, to final repository	kg
$NRPR_M$: Non-renewable primary resources with energy content used as material	MJ, LHV	ILLRW: Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
SM: Secondary materials	kg	CRU: Components for re-use	kg
RSF: Renewable secondary fuels	MJ, LHV	MR: Materials for recycling	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	MER: Materials for energy recovery	kg
RE: Recovered energy	MJ, LHV	EE: Recovered energy exported from the product system	MJ, LHV
FW: Use of net freshwater resources	m^3	-	-

Table 8. *Production-weighted average Life Cycle Impact Assessment (LCIA) results for the* ***Forte Opening Solutions Wood Door Frame*** *products per declared unit. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
TRACI				
Global Warming Potential	kg CO_2 eq	5.84	7.25	15.4
	%	21%	25%	54%
Ozone Depletion Potential	kg CFC-11 eq	$3.16x10^{-2}$	$3.29x10^{-2}$	$1.17x10^{-2}$
	%	41%	43%	15%
Acidification Potential	kg SO_2 eq	$1.64x10^{-2}$	$8.07x10^{-3}$	0.177
	%	8.2%	4%	88%
Eutrophication Potential	kg N eq	0.545	0.796	0.177
	%	36%	52%	12%
Smog Formation Potential	kg O_3 eq	$5.05x10^{-7}$	$1.69x10^{-6}$	$3.96x10^{-7}$
	%	20%	65%	15%
Fossil Fuel Depletion Potential	MJ surplus	8.77	15.4	5.48
	%	30%	52%	19%
Resources				
Renewable primary resources used as energy carrier (fuel)	MJ	273	1.21	51.8
	%	84%	0.37%	16%
Renewable primary resources with energy content used as material	MJ	196	0.00	0.00
	%	100%	0%	0%
Non-renewable primary resources used as an energy carrier (fuel)	MJ	INA	INA	INA
Non-renewable primary resources with energy content used as material	MJ	INA	INA	INA
Secondary materials	kg	0.00	0.00	0.00
Renewable secondary fuels	MJ	Negligible	Negligible	Negligible
Non-renewable secondary fuels	MJ	Negligible	Negligible	Negligible
Recovered energy	MJ	0.00	0.00	0.00
Use of net freshwater resources	m^3	0.430	$7.65x10^{-2}$	3.44
	%	11%	1.9%	87%
Wastes				
Hazardous waste disposed	kg	$1.00x10^{-4}$	$2.86x10^{-4}$	$1.68x10^{-4}$
	%	18%	52%	30%
Nonhazardous waste disposed	kg	0.929	5.16	26.2
	%	2.9%	16%	81%
High-level radioactive waste, conditioned, to final repository	kg	$1.93x10^{-5}$	$5.70x10^{-6}$	$5.91x10^{-3}$
	%	0.33%	0.096%	100%
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	$1.46x10^{-4}$	$7.11x10^{-4}$	$2.00x10^{-3}$
	%	5.1%	25%	70%
Components for re-use	kg	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00
Materials for energy recovery	kg	Neg.	Neg.	Neg.
Recovered energy exported from the product system	MJ	Neg.	Neg.	Neg.

Neg. = Negligible | INA = Indicator not Assessed

5. LCA: Interpretation

The interpretation phase conforms to ISO 14044 with further guidance from the ILCD General Guide for Life Cycle Assessment. The interpretation included the use of evaluation and sensitivity checks to steer the iterative process during the assessment, and a final evaluation including completeness, sensitivity, and consistency checks, at the end of the study.

Figure 2 presents the contribution analyses for the Forte Opening Solutions Wood Door Frame products. In general, the raw material and processing and upstream transport phases are the highest contributors to estimated impacts. Both Global Warming and Eutrophication potential impacts are dominated by the manufacturing phase

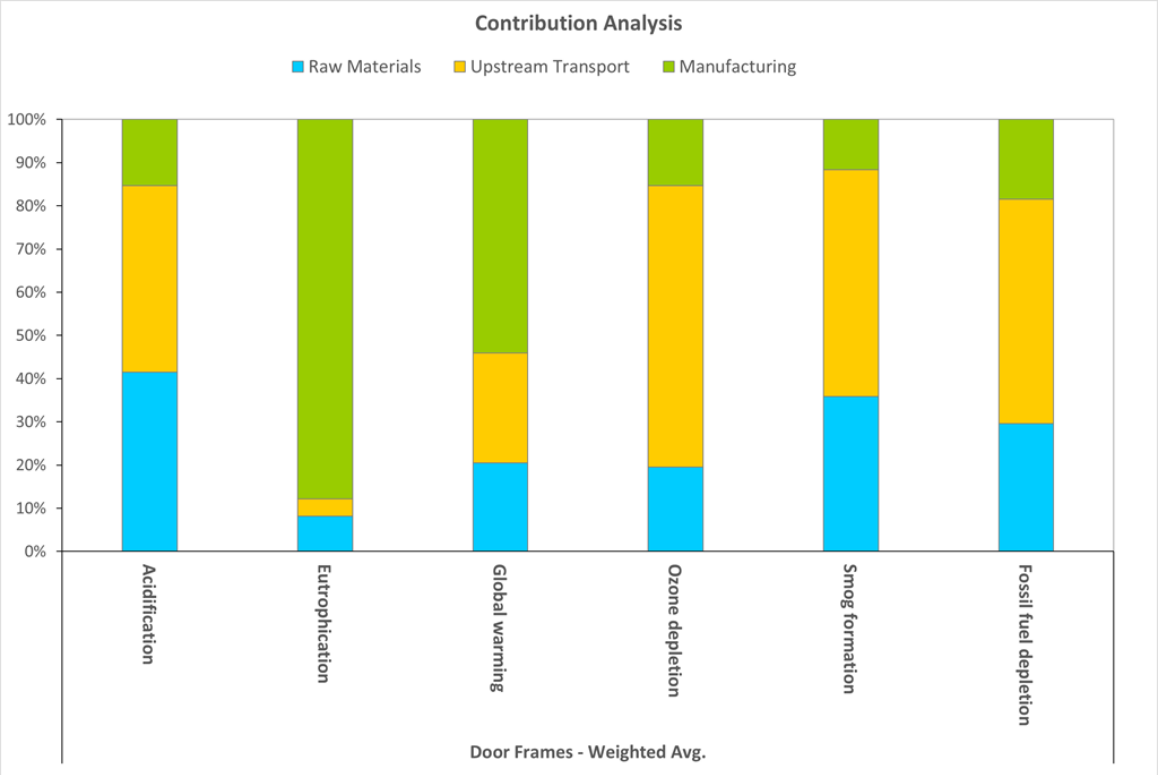


Figure 2. *Contribution analysis for the Forte Opening Solutions Wood Door Frame products.*

6. References

1. Life Cycle Assessment of Wood Door Leaves and Frames. February 2022.
2. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
3. ISO 14040: 2006 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: 2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
6. SCS Type III Environmental Declaration Program: Program Operator Manual. V11.0 November 2021. SCS Global Services.
7. 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
8. Ecoinvent Centre (2020) ecoinvent data from v3.7. Swiss Center for Life Cycle Inventories, Dübendorf, 2020, http://www.ecoinvent.org

FORTE™

OPENING SOLUTIONS

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