Environmental Product Declaration

VT INDUSTRIES Architectural Wood Doors

ARCHITECTURAL WOOD DOOR LEAF Revised March 8, 2021

Since 1956, VT Industries has followed the principles of craftsmanship, attention to detail, and service. These principles remain the driving force behind everything VT offers, helping us become the industry leader in the manufacturing of architectural wood doors.

At VT Industries, we are constantly adapting our manufacturing techniques and using sustainable materials to ensure environmental responsibility. All of our doors are manufactured in state-of-the-art, highly automated facilities using low-emitting, sustainable materials to ensure our doors last the life of a building.

VT leads the industry with environmental innovation and education, and plans to maintain this leadership position. We continue to adapt our processes by involving all employees and encouraging them to find ways to make our business more effective and efficient.

NSF Certified Environmental Product Declaration www.nsf.org

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ENVIRONMENTAL PRODUCT DECLARATION VERIFICATION

NSF Certified Environmental Product Declaration www.nsf.org

EPD Information			
Program Operator		NSF Certification LLC 789 N. Dixboro, Ann Arbor, MI 48105 nsfsustainability.org	
Declaration Holder		VT Industries	
Product Architectural Wood Door Leaf	Approved March 8, 2021	Valid Until March 8, 2026	Declaration Number EPD10536
Independent verification of the declaration and data, according to ISO 14025:2006. ☐ Internal ☒ External		 Tony Favilla afavilla@nsf.org	
This life cycle assessment was independently verified by in accordance with ISO 14044 and the reference PCR:		 Jack Geibig jgeibig@ecoform.com	
LCA Information			
Basis LCA		EPD Background Report: Architectural Wood Door Leaves, February 10, 2021	
LCA Preparer		Sphera Vicki Rybl vrybl@sphera.com	
PCR Information			
Program Operator		NSF Certification/ASTM International	
Reference PCR		Interior Architectural Wood Door Leaves	
Date of Issue		March 27, 2015	
PCR review was conducted by:		Jamie Meil (Chairperson) Athena Sustainable Materials Institute jamie.meil@athenasmi.org	

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VT Industries Architectural Wood Doors

PRODUCT DESCRIPTION

VT Architectural Wood Door leaves are intended for interior commercial applications: healthcare, hospitality, multi- family, education, and government. Wood door leaves are predominantly composed of engineered wood core; however, core materials can vary depending on the desired application. Also, surface applications of veneer, laminate, and finishes vary depending on the desired aesthetics.

VT doors are GREENGUARD GOLD Certified and SCS Indoor Advantage Gold. Certification confirms our products are low-emitting, contributing to healthy indoor air quality and building occupant wellness. GREENGUARD and Indoor Advantage Certification standards are the referenced measure of product emissions in numerous green building initiatives.

VT Industries is Forest Stewardship Council (FSC®) Chain-of-Custody (COC) Certified promoting responsible forest management. FSC certified doors are available upon request. Our agrifiber core, a rapidly renewable wheat-based product, lowers the need to harvest virgin wood materials and reduces pressure on the world's forests.

Our wood doors assist in achieving multiple Leadership in Energy and Environmental Design (LEED®) credits. Under the LEED New Construction (NC) rating system, Environmental Product Declaration (EPD), recycled content, regional materials, rapidly renewable materials, certified wood, and low-emitting material credits are all relevant to architectural wood doors. VT can assist with additional sustainable building rating systems, including CHPS, WELL Building, and Living Building Challenge.

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PRODUCT CHARACTERISTICS

The declared product represents the production-weighted average wood door leaf manufactured by VT Industries. This declaration incorporates production at the Holstein, IA, Neenah, WI, and Two Rivers, WI facilities.

Applicable CSI MasterFormat Divisions are:

081400
081500
081600

Standards:

ANSI/WDMA I.S. 1A
Industry Standard for Interior Architectural Wood Flush Doors

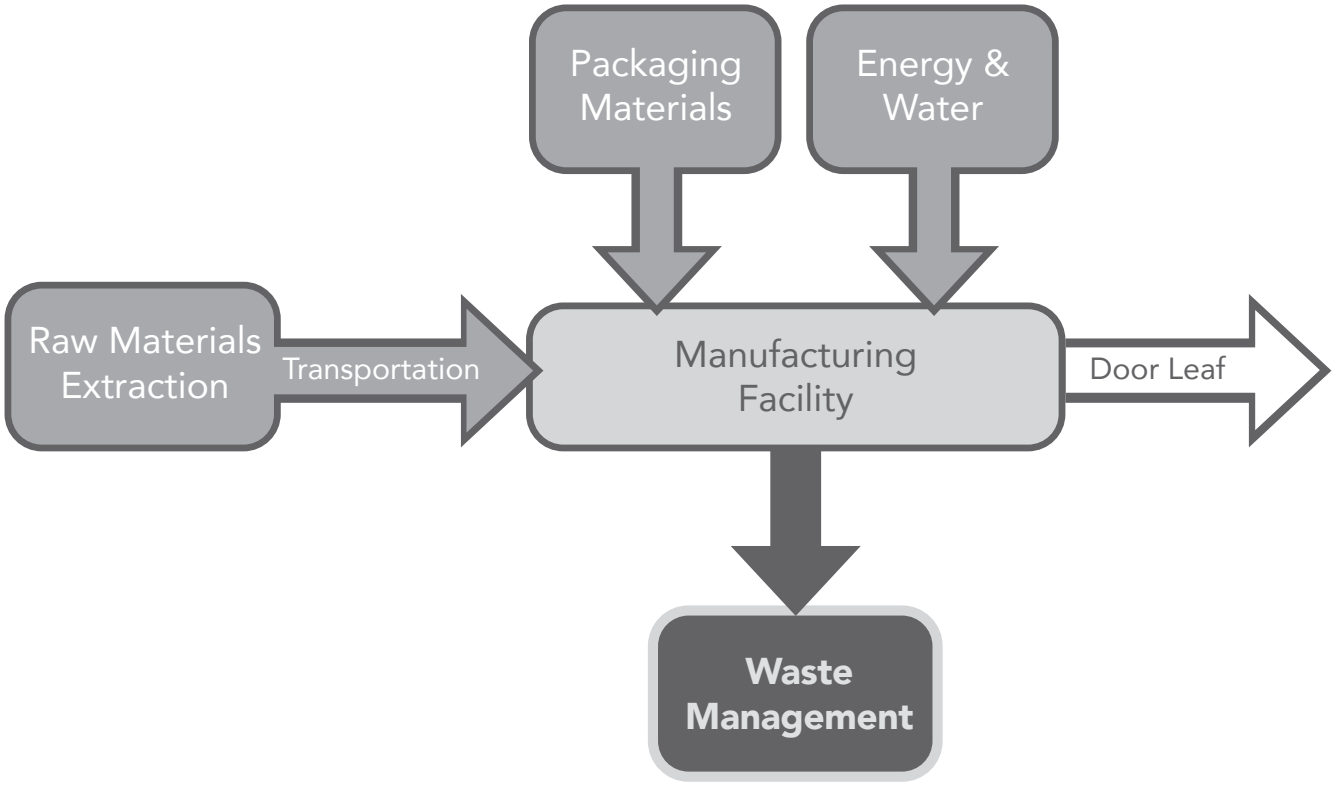
ANSI/WDMA I.S. 6A
Industry Standard for Interior Architectural Stile & Rail Doors

Door Type	Core Type	Face Material Options	Factory Finish
Flush Wood Veneer, Flush High Pressure Decorative Laminate (HPDL), Stile & Rail	Particleboard, Stave Lumber, Composite Lumber, MineralFire Composite, Lead Lined, Sound Acoustical, Medium Density Fiberboard, Bullet Resistant	Wood Veneer, High Pressure Decorative Laminate (HPDL), High Impact Vinyl, High Density Fiberboard (HDF), Medium Density Overlay (MDO),Bamboo, Engineered Veneer	Stained, Primed, Painted, Unfinished

MANUFACTURING PROCESS

VT Architectural Wood Doors are manufactured to order in highly-automated facilities, using hot-press technology

- Cores are cut to size
- Inner stile & rails are bonded to core
- Crossbands are applied to both faces
- Edge materials are adhered and trimmed
- Face materials are individually pressed
- Doors are machined to exacting tolerances to accept hardware
- Factory finished using UV cured stains and sealants
- Doors are individually poly-bagged and packaged for shipment



LIFE CYCLE ASSESSMENT (LCA) - DECLARED UNIT

As per the guiding Product Category Rule (PCR), the declared unit is defined as *21 sq.ft. (1.95m^2) of door leaf at a nominal 44.45 mm (1-3/4 in.) thickness.*

The reference flow to satisfy this declared unit is 55.3 kg of production weighted wood door leaf.

LCA - SYSTEM BOUNDARIES

This EPD declares the impacts of a production weighted wood door leaf from ***cradle-to-gate***. Therefore, post-manufacturing activites are not considered in this declaration. The system boundary translates to life cycle modules A1, A2, and A3 as defined by EN 15804, as shown in Figure 1.

Product Stage			Construction Stage		Use Stage					End-of-Life Stage			
A1	**A2**	**A3**	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
Raw materials supply	**Transport**	**Manufacturing**	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction	Transport	Waste processing	Disposal
X	**X**	**X**	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 1: Cradle-to-gate system boundary per EN15804 life cycle modules. The declared modules shown in bold text and exluded modules in gray text (X = included in LCA; MND = module not declared)

EPDs may enable comparison between products but do not themselves compare products, as stated in ISO 14025 Sections 4 and 6.7.2. It shall be stated in EPDs created using these PCR that only EPDs prepared from cradle-to-grave life cycle results and based on the same function, reference service life (RSL), and quantified by the same functional unit can be used to assist purchasers and users in making informed comparisons between products. EPDs based on cradle-to-gate information modules shall not be used for comparisons unless using a functional unit and complying with all of the requirements set out in ISO 14025, Section 6.7.2. EPDs based on a declared unit shall not be used for comparisons. This EPD covers only the cradle-to-gate impacts of interior architectural wood door leaves using a declared unit and the results cannot be used to compare between products per the guiding PCR. EPDs from different programs (using different PCRs) may not be comparable.

LCA - MATERIAL CONTENT/BASE MATERIALS

The representative wood door leaf product is predominantly comprised of engineered wood materials. However, ancillary materials which provide various functions such as sound transmission control, structural support, aesthetics, surface protection, and others are also presented in Table 1.

Table 1:
Material composition for production-weighted average wood door leaf product

Material	% content by mass
Engineered Wood	79.7%
Lumber	1.75%
Mineral Fire Core	7.74%
Laminates	3.11%
Paint	1.25%
Adhesive	1.78%
Lead	0.153%
Intumescent	0.119%
Other	4.37%

LCA - PARAMETERS TO BE DECLARED IN THE EPD

In accordance to the guiding PCR, TRACI 2.1 impact characterization methodology is used to calculate the declared environmental impacts. Additional inventory metrics are also calculated per the guiding PCR. The declared impacts and inventory metrics are summarized in Table 2.

Table 2:

TRACI 2.1 impacts and inventory metrics per 21 sq. ft. of average door leaf categorized by EN 15804 modules

Type	Unit	A1 - A3
TRACI 2.1 Impacts		
Global Warming Potential (GWP)	kg CO2 eq.	82.3
Acidification Potential (AP)	kg SO_2 eq.	0.538
Eutrophication Potential (EP)	kg N eq.	0.0259
Smog Formation Potential (SFP)	kg O_3 eq.	6.40
Ozone Depletion Potential (ODP)	kg CFC-11 eq.	0.000000190
Total primary energy consumption		
Non-renewable, fossil	MJ	1,250
Non-renewable, nuclear	MJ	123
Renewable (solar, wind, hydroelectric, and geothermal)	MJ	182
Renewable (biomass)	MJ	187
Material resources consumption		
Non-renewable material resources	kg	129
Renewable material resources	kg	504
Net fresh water (inputs minus outputs)	L	385
Wastes		
Hazardous waste generated	kg	-
Non-hazardous waste generated	kg	1.46

SUSTAINABILITY PROGRAMS AND INITIATIVES

UL GREENGUARD Certification Program

Interior products have a significant impact on indoor air quality, and can emit hundreds of chemicals into the air that building occupants breathe. GREENGUARD Certification helps provide assurance that products are low-emitting, and contribute to healthier interiors.

Representative samples of products that have achieved GREENGUARD Certification have been test- ed and certified to meet some of the world's most rigorous, third-party chemical emissions standards—helping reduce indoor air pollution and the risk of chemical exposure while aiding in the creation of healthier indoor environments.

GREENGUARD Certification has been widely adopted as a trusted standard for low-emitting products. In fact, more than 400 green building codes, standards, guidelines, procurements policies, and rating systems recognize or reference GREENGUARD Certified products. To confirm continuous low emissions performance, GREENGUARD Certified products are required to undergo regular compliance testing on critical components. To view VT Industries Architectural Wood Door compliance certificates visit spot.ul.com

SCS Global Indoor Advantage Gold

SCS Global Indoor Advantage Gold which is compliant to CA 01350 test method. These test methods adhere to American Society for Testing and Materials (ASTM) Practice D5116 for small-scale chamber product testing and ASTM Practice D6670 for full-scale chamber testing. The test methods determine individual volatile organic compounds (VOC) emissions based on the California Office of Environmental Health Hazard Assessment's (OEHHA) Chronic Reference Exposure Levels (CRELs). All interior flush and stile and rail door constructions from Neenah and Two Rivers are included in our SCS Indoor Advantage Gold certification.

SUSTAINABILITY PROGRAMS AND INITIATIVES

VT Industries, Inc.

FSC www.fsc.org FSC® C005590

The mark of responsible forestry

Eggers Division LLC

FSC www.fsc.org FSC® C019991

The mark of responsible forestry

FOREST STEWARDSHIP COUNCIL (FSC) CHAIN OF CUSTODY

The Forest Stewardship Council (FSC®) promotes environmentally appropriate, socially beneficial, and economically viable management of the world's forests. FSC Chain of Custody (COC) is the path taken by raw materials, processed materials, and products, from the forest to the consumer, including all successive stages of processing, transformation, manufacturing, and distribution.

The main objective of FSC COC certification is to ensure that FSC certified material is tracked through the supply chain between operations and production processes within operations. Only FSC COC certified operations are allowed to label products with the FSC trademarks.

A certified COC up to the final point of sale enables end customers to identify and choose FSC certified products knowing there is a system in place to verify the sources of the wood used to manufacture the products. The FSC label thus provides the link between responsible production and consumption. (FSC-C005590, SCS-COC-004128 – Holstein, IA) (FSC-C019991, NC-COC-00729 – Two Rivers, WI)

OTHER ENVIRONMENTAL INFORMATION: CARBON SEQUESTRATION

As per the guiding PCR, the carbon sequestration in wood components are presented. The net Global Warming Potential credit for carbon storage is calculated using the FPInnovations PCR Carbon Sequestration Calculator, which adheres to guidance set by ISO 14047 and adopted by the International Council of Forest and Paper Associations (ICFPA).

Per the PCR, carbon sequestration in wood components of the door are reported separately from the GWP presented in the LCIA results. The net GWP including atmospheric carbon embodied in the product is calculated using the FPInnovations PCR Carbon Sequestration Calculator (FPInnovations and Athena Sustainable Materials Institute, 2013). The calculator adheres to the discounted method explained in ISO 14047, example 3, and has been adopted by the International Council of Forest and Paper Associations (ICFPA).

Per Table 1, 79.7% of the average wood door product is composed of engineered and natural wood products. Therefore 79.7% of the 55.3 kg reference flow, or 44.1 kg, is considered in the calculator. However, approximately 10% of the engineered wood products are expected to consist of resinous compounds (Puettmann, Oneil, & Wilson, 2013), therefore this mass is subtracted from the 44.1 kg to obtain a wood mass of 39.7 kg. This mass is assumed to represent the oven dry mass. The calculator inputs and outputs are presented in Table 3.

Table 3:

FPInnovations carbon sequestration calculator user input and output results

User inputs	Unit	Description
Nonstructural panels		Choose similar product if not in list - do not enter new product name
39.7	oven dry kg	Wood mass only; no resins or moisture
50%		50% provided as default; alternative factors provided on parameters tab
Calculator Outputs	**Unit**	**Description**
Initial Greenhouse Gas Credit		
-72.8	**kg CO_2eq.**	**Carbon sequestered in product at manufacturing gate**
Greenhouse Gas Emissions		
6.27	*kg CO_2*	*Carbon dioxide emissions from recycled wood (accounted as 100% CO2 emission)*
6.27	*kg CO_2*	*Carbon dioxide emissions from combusted wood waste*
4.53	*kg CO_2*	*Carbon dioxide emissions from aerobic landfills*
1.14	*kg CO_2*	*Carbon dioxide emissions from fugitive landfill gas*
5.83	*kg CO_2*	*Carbon dioxide emissions from combusted landfill gas*
24.1	**kg CO_2**	**Total carbon dioxide emissions**
0.340	*kg CH_4*	*Methane emissions from fugitive landfill gas*
0.340	**kg CH_4**	**Total methane emissions**
Net Global Warming Potential Credit		
-40.3	**kg CO_2eq.**	**Sequestration, net of greenhouse gas emissions**

According to the FPInnovations calculator, net **43.7 kgCO_2-equivalent** is sequestered per declared unit at cradle-to-gate.

REFERENCES

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Sphera. (2020). GaBi LCA Database Documentation. Retrieved from Sphera Solutions, Inc.: http://www.gabi-software.com/america/support/gabi/

GLOSSARY OF TERMS

Environmental Product Declaration (EPD)
Document providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information.

Product Category Rules (PCR)
Document outlining set of specific rules, requirements and guidelines for developing EPDs for one or more product categories

Life Cycle Assessment (LCA)
Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.

Cradle-to-Gate
An LCA with a system boundary which includes supply chain stages from raw material extraction to the end of product manufacturing.

Global Warming Potential (GWP)
A measure of greenhouse gas emissions, such as CO2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare.

Acidification Potential (AP)
A measure of emissions that cause acidifying effects to the environment. The acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline and the deterioration of building materials.

Eutrophication Potential (EP)
Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which nitrogen (N) and phosphorus (P). Nutrient enrichment may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. In aquatic ecosystems increased biomass production may lead to depressed oxygen levels, because of the additional consumption of oxygen in biomass decomposition.

Smog Formation Potential (SFP)
A measure of emissions of precursors that contribute to ground level smog formation (mainly ozone O3), produced by the reaction of VOC (volatile organic carbons) and carbon monoxide in the presence of nitrogen oxides under the influence of UV light. Ground level ozone may be injurious to human health and ecosystems and may also damage crops.

Ozone Depletion Potential (ODP)
A measure of air emissions that contribute to the depletion of the stratospheric ozone layer. Depletion of the ozone leads to higher levels of UVB (ultraviolet B) rays reaching the earth's surface with detrimental effects on humans and plants.

Carbon Sequestration
Uptake and long term storage, typically 100 years or more, of carbon dioxide from the atmosphere.

Greenhouse Gas Emissions
Air emissions which are identified to contribute to Global Warming Potential impacts.

TRACI 2.1 (Tool for the Reduction and Assessment of Chemical and other environmental Impacts)
Impact assessment methodology developed by USEPA for characterizing impacts for United States.