Environmental Product Declaration

Architectural Wood Door Leaf

INTERIOR FLUSH DOOR – STC ACOUSTIC CORE, WOOD VENEER AND HPDL FACING

GA Series

Shown above: Oshkosh Door Company leaf with wood veneer Face.
Manufactured in Oshkosh, Wisconsin.

Oshkosh Door

Oshkosh Door Company's heritage in the wood door industry extends back to the 1870's and conservation ideas started as early as 1910, when one of our founding fathers designed and patented a hollow core door. Not only did it consume less natural resources, it conserved on transportation energy as well. This was recognized by the Smithsonian as a permanent exhibit in DC.

From our founding to today we continue working towards more sustainable solutions in both products and manufacturing practices. We have implemented recycling programs for both internal and external reuse as well as installing energy saving options such as: sky lights to reduce the demand for artificial lighting, a dust collection system that only operates when dust is present and many other innovations that reduce our environmental impact.

Find more information at oshkoshdoor.com

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

Oshkosh Door

X Core, Wood Veneer and HPDL Facing
Flush Wood Doors

According to ISO 14025 and ISO21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Solutions, 333 Pfingsten Rd., Northbrook, IL 606011 https://www.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	UL Environment Environmental Product Declaration Program, GENERAL PROGRAM INSTRUCTIONS, VERSION 2.5, MARCH 2020
MANUFACTURER NAME AND ADDRESS	Oshkosh Door Company 2501 Universal Street, Oshkosh, WI 54904
DECLARATION NUMBER	4790620376.113.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	A single door leaf unit measuring 1.95 m2 (21 ft2) at a nominal 44.45 mm (1 3/4 in) thickness.
REFERENCE PCR AND VERSION NUMBER	*ISO 21930:2017* *NSF PCR for Interior Architectural Wood Door Leaves; Version 6*
DESCRIPTION OF PRODUCT APPLICATION/USE	Flush wood doors for commercial openings.
PRODUCT RSL DESCRIPTION (IF APPL.)	N/A
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	February 1, 2024
PERIOD OF VALIDITY	5 Year
EPD TYPE	Specific Product from a Specific Factory
EPD SCOPE	Cradle-to-gate.
YEAR(S) OF REPORTED PRIMARY DATA	2022
LCA SOFTWARE & VERSION NUMBER	LCA FE 10.7 (formerly GaBi)
LCI DATABASE(S) & VERSION NUMBER	MLC Database 2023.1 (formerly GaBi Database)
LCIA METHODOLOGY & VERSION NUMBER	IPCC AR5 + TRACI 2.1

The PCR review was conducted by:	Thomas Gloria, PhD.; Industrial Ecology Consultants Bill Stough; Bill Stough, LLC Michael Overcash, PhD.; Environmental Clarity
This declaration was independently verified in accordance with ISO 14025: 2006 and ISO 21930:2017. ☐ INTERNAL ☒ EXTERNAL	Cooper McCollum Cooper McCollum, UL Solutions
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Nicholas Hammond, Chandler Jacobson; WAP Sustainability
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis. Examples of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

1. Product Definition and Information

1.1. Description of Company/Organization

Oshkosh Door Company's heritage in the wood door industry extends back to the 1870's and conservation ideas started as early as 1910, when one of our founding fathers designed and patented a hollow core door. Not only did it consume less natural resources, it conserved on transportation energy as well. This was recognized by the Smithsonian as a permanent exhibit in DC.

From our founding to today we continue working towards more sustainable solutions in both products and manufacturing practices. We have implemented recycling programs for both internal and external reuse as well as installing energy saving options such as: sky lights to reduce the demand for artificial lighting, a dust collection system that only operates when dust is present and many other innovations that reduce our environmental impact.

1.2. Product Description

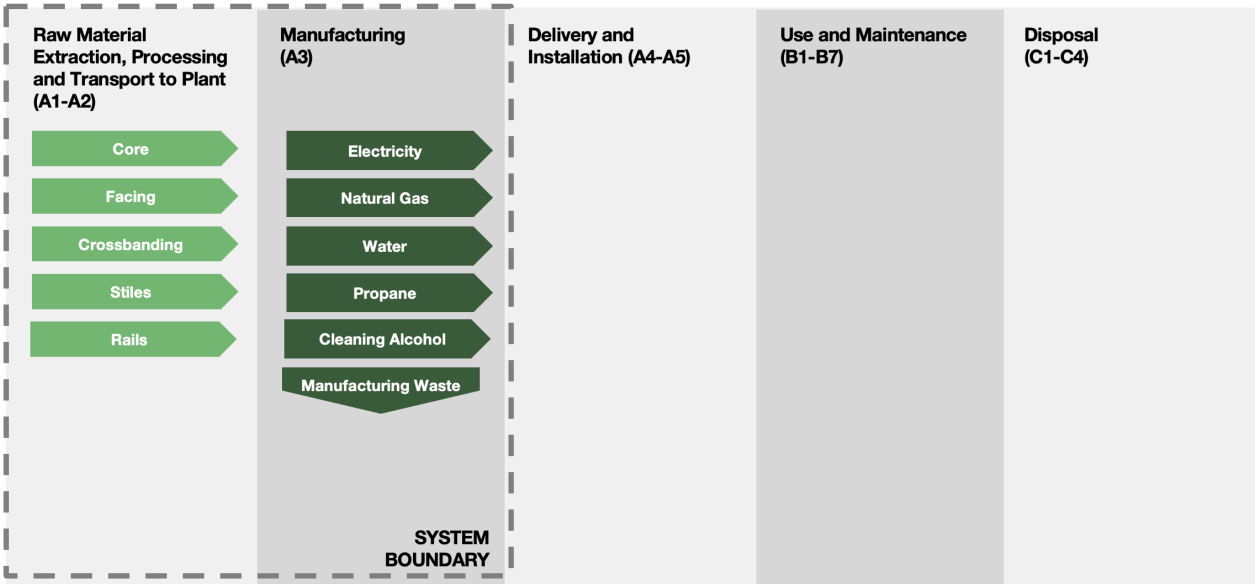
Product Identification

This Environmental Product Declaration covers Oshkosh Door Company flush wood doors with Acoustic cores and either Wood Veneer or High Pressure Decorative Laminate (HPDL) facing. The results represent the standard production of Acoustic Core door leaves with Wood Veneer and HPDL facing scaled to the appropriate dimensions as dictated by the PCR. Oshkosh Door product lines include FSC certified wood as detailed in Section 6.1.

Product Specification

- Acoustic Core
  - Acoustic Core with Wood Veneer Facing
  - Acoustic Core with HPDL Facing

Flow Diagram



1.3. Application

Oshkosh Door Company flush wood doors are suitable for all types of indoor commercial openings. With a variety of styles, these products can be used in any space.

1.4. Declaration of Methodological Framework

This EPD reports on a cradle-to-gate LCA study. All three upstream modules (A1, A2, and A3) were considered and modeled in full.

1.5. Technical Requirements

Oshkosh Door Company Acoustic Core Wood Veneer and HPDL doors are constructed to meet the following industry standards:

- Architectural Woodwordk Standards (AWS) Edition 2
- ANSI/WDMA I.S. 1A-2021 Industry Standard for Interior Architectural Wood Flush Doors

Per the PCR, this study modeled a 1.95 m^2 44.5 mm thick door which is consistent with typically manufactured sizes at Oshkosh Door Company.

1.6. Material Composition

Table 1. Material composition of a Acoustic Core door leaf

MATERIAL	% COMPOSITION	
	Wood Veneer Facing	HPDL Facing
Core		
STC medium density fiberboard	31	29
STC neoprene	26	24
STC particleboard	4	3
STC RigiCore EX	15	14
Stiles and Rails		
Laminated stile	10	9
Crossbanding		
HDF Crossbanding	10	10
Facing		
Wood Veneer	2	N/A
HPDL	N/A	10
Other		
Adhesive	2	2
	Mass [kg]	
Total mass per declared Unit	103.4	103.4

Unless indicated in the table above, the product does not contain hazardous substances per the applicable regional-specific legislation, as indicated in Section 2.8.6 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment.

1.7. Manufacturing

Oshkosh Door Company products are manufactured in strict accordance to all industry standards using a combination of old-world craftsmanship and cutting edge technology.

The general manufacturing process is as follows:

1. Raw materials received and allocated.
2. Cores sized.
3. Stiles and Rails bonded to core.
4. Crossband and Face material bonded to core.
5. Trimmed to final size.
6. Edge materials adhered and trimmed.
7. Machined to exacting hardware tolerances.
8. Factory finished using water-based, UV-cured stains and sealants.
9. Products individually inspected by trained personnel.
10. Products packaged for shipment.

1.8. Packaging

Oshkosh Door Company works to minimize packaging wherever possible. The following represents the average packaging per door leaving the Oshkosh Door Company manufacturing facility.

Table 2. Average packaging of an Oshkosh Door flush wood door leaf

MATERIAL	MASS PER DOOR (KG)
Cardboard	0.0680
Paper	0.0454
Lumber	0.2041
Plywood	2.1298
Plastic Film	0.0454

2. Life Cycle Assessment Background Information

2.1. Declared Unit

Per the PCR the declared unit is a single door leaf unit measuring 1.95 m^2 (21 ft^2) at a nominal 44.45 mm (1 3/4 in) thickness. The reference flow to satisfy this declared unit is 103.4 kg of flush wood door leaf for the Wood Veneer facing and 103.4 kg of flush wood door leaf for the HPDL facing.

Table 3. Declared Unit Details

ITEM	WOOD VENEER FACING	HPDL FACING	UNIT
Mass of door leaf	103.4	103.4	kg
Nominal size	914*2134	914*2134	mm
Thickness	44	44	mm
Door area	1.95	1.95	m^2
Ratio of Standard Door	1	1	N/A

2.2. System Boundary

This EPD declares the impacts of a flush wood door leaf from cradle-to-gate. The applied system boundary represents the life cycle modules A1, A2, and A3 as defined by ISO 21930:2017 and shown in Table 3.

Table 4. Product stage information modules covered in this EPD

	PRODUCT STAGE			CONSTRUCT-ION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type	X	X	X														

2.3. Estimates and Assumptions

Oshosh Door Company has attempted to include all known mass and energy flows. Estimates and assumptions are within the requirements set by the PCR. Electricity, natural gas, propane, and cleaning supply data was collected at a facility wide level and allocated by mass to individual doors. This same methodology applied to the allocation of reported VOC emissions. Additionally, primary data was not available for the manufacturing process of completed inputs purchased by Oshkosh Door Company (e.g. cores). Secondary data regarding energy use and waste production was sourced from publicly available LCA reports to fill these gaps.

2.4. Cut-off Criteria

All inputs in which data was available were included. Material inputs greater than 1% (based on total mass of the final Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the declared unit.

The list of excluded materials and energy inputs include:

- Door accessories with masses in total of less than 1% of door mass.
- Materials in cores noted as “residual” on their corresponding Safety Data Sheets (SDSs).
- Some material inputs may have been excluded within the MLC datasets used for this project. All MLC datasets have been critically reviewed and conform to the exclusion requirement of ISO 21930, Section 7.1.8.
- Finishes, which are atypical of manufacturing at Oshkosh Door, are also excluded.

2.5. Data Sources

Primary data were collected by Oshkosh Door Company personnel from utility bills and material ordering invoices and

was used for all manufacturing processes. Whenever available, supplier data was used for raw materials used in the production process. This was supplemented with secondary data from publically available EPDs. When primary data did not exist, secondary data for raw material production was utilized from Sphera Managed LCA Content (MLC) Database Version 10.6.2.9, Service Pack 2023.1.

2.6. Data Quality

The geographical scope of the manufacturing portion of the life cycle is Oshkosh, Wisconson in the US. All primary data were collected from the manufacturer. The geographic coverage of primary data is considered excellent.

The primary data provided by the manufacturer represents all information for calendar year 2022. Using this data meets the PCR requirements. Time coverage of this data is considered very good. Primary data provided by the manufacturer is specific to the technology that Oshkosh Door Company uses in manufacturing their product. It is site-specific and considered of good quality.

It is worth noting that the electricity and water used in manufacturing the product includes overhead energy such as lighting, heating, and sanitary use of water. Sub-metering would improve the technological coverage of data quality. Data necessary to model cradle-to-gate unit processes was sourced from LCA for Experts (formerly GaBi) LCI datasets. Improved life cycle data from all suppliers would improve technological coverage.

2.7. Period under Review

The period under review is calendar year 2022.

2.8. Allocation

General principles of allocation were based on ISO 14040/44 and the PCR guidance. Where possible, allocation was avoided. When allocation was necessary it was done on a mass basis. Manufacturing inputs were allocated on a mass basis based on quantities produced at the facility. Allocation was most prevalent in the secondary LCA for Experts (formerly GaBi) datasets used to represent upstream processes. As a default, LCA for Experts (formerly GaBi) datasets use a physical mass basis for allocation.

2.9. Comparability

This EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-to-case basis.

3. Life Cycle Assessment Results

3.1. Life Cycle Impact Assessment Indicators

Table 5. LCIA Indicators

ABBREVIATION	PARAMETER	UNIT

GWPi	Global warming potential (100 years, includes biogenic CO_2) [IPCC AR5]	kg CO_2 eq
GWPe[1]	Global warming potential (100 years, excludes biogenic CO_2) [IPCC AR5]	kg CO_2 eq
AP	Acidification potential of soil and water [TRACI 2.1]	kg SO_2 eq
EP	Eutrophication potential [TRACI 2.1]	kg N eq
ODP	Depletion of stratospheric ozone layer [TRACI 2.1]	kg CFC 11 eq
Resources	Depletion of non-renewable fossil fuels	MJ, surplus energy
SFP	Smog formation potential [TRACI 2.1]	kg O_3 eq

[1]As addressed in Section 5, biogenic carbon can obscure GWP results in a cradle-to-gate study. As a result, GWPe should be the primary GWP indicator for users of this EPD.

Table 6. Resource Use, Waste, and Output Flow Indicators

ABBREVIATION	PARAMETER	UNIT
	Resource Use Parameters	
RPR_E	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
RPR_M	Use of renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
RPR_T	Total use of renewable primary energy resources	MJ, net calorific value (LHV)
$NRPR_E$	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
$NRPR_M$	Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value (LHV)
$NRPR_T$	Total use of non-renewable primary energy resources	MJ, net calorific value (LHV)
RE	Recovered energy	MJ, net calorific value (LHV)
ADP_E[1]	abiotic depletion potential for fossil resources used as energy	MJ, net calorific value (LHV)
ADP_M[1]	abiotic depletion potential for fossil resources used as materials	kg
FW	Net use of fresh water	m^3
	Additional ISO 21930:2017 Indicators	
SM	Use of Secondary Materials	kg
RSF	Renewable Secondary Fuels	MJ
NRSF	Nonrenewable Secondary Fuels	MJ
	Waste Parameters and Output Flows[2]	
HWD	Disposed-of-hazardous waste	kg
NHWD	Disposed-of non-hazardous waste	kg
HLRW	High-level radioactive waste, conditioned, to final repository	kg
ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
CRU	Components for reuse	kg
MR	Materials for recycling	kg

ABBREVIATION	PARAMETER	UNIT
MER	Materials for energy recovery	kg
EEE[3]	Exported electrical energy	MJ
EET[3]	Exported thermal energy	MJ

[1]The relevant PCR does not specify which assessment methodology should be used for these indicators. The EN15804+A2 methodology is internationally recognized and satisfies the requirement to report results "using one of the relevant, commonly used characterization methods." This methodology is used and is associated with the following disclaimer: "The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator."
[2]Significant data limitations currently exist within the LCI data used to generate waste metrics for Life Cycle Assessments and Environmental Product Declarations. The waste metrics were calculated in a way conformant with the requirements of ISO 21930:2017, but these values represent rough estimates and are for informational purposes only. As such, no decisions regarding actual cradle-gate waste performance between products should be derived from these reported values.
[3]To ensure completeness of the model, a conservative assumption of landfilling waste from manufacturing is included. Landfilling secondary datasets include output flows of exported electric and thermal energy from landfill gas capture, common in the USA All waste sent to landfill during the A3 lifecycle module is modeled as such resulting in Exported Electrical Energy (EEE) and Exported Thermal Energy (EET) results reported in the results of this LCA study; however, this is an assumption and may not reflect the actual disposal pathway and technologies of the relevant landfilling systems.

Table 7. Biogenic Carbon Indicators

ABBREVIATION	PARAMETER	UNIT
BCRP	Biogenic Carbon Removal from Product	kg CO_2
BCEP	Biogenic Carbon Emission from Product	kg CO_2
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2
BCEK	Biogenic Carbon Emission from Packaging	kg CO_2
BCEW	Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	kg CO_2
CCE	Calcination Carbon Emissions	kg CO_2
CCR	Carbonation Carbon Removals	kg CO_2
CWNR	Carbon Emissions from Combustion of Waste from Non- Renewable Sources used in Production Processes	kg CO_2

3.2. Life Cycle Impact Assessment Results

Table 8. LCIA Results for Acoustic Core with Wood Veneer Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
		IPCC AR5		
GWPi [kg CO_2 eq]	9.62E+01	9.92E+00	7.85E+01	1.85E+02
GWPe [kg CO_2 eq]	1.50E+02	9.92E+00	7.98E+01	2.39E+02
		TRACI 2.1		
AP [kg SO_2 eq]	6.02E-01	4.52E-02	8.46E-02	7.32E-01
EP [kg N eq]	6.05E-02	4.00E-03	1.46E-02	7.91E-02
ODP [kg CFC-11 eq]	1.33E-06	2.53E-14	4.65E-09	1.33E-06
Resources [MJ]	5.74E+02	1.83E+01	8.17E+01	6.74E+02

SFP [kg O_3 eq]	1.38E+01	1.05E+00	1.59E+00	1.64E+01

Table 9. LCIA Results for Acoustic Core with HPDL Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
IPCC AR5				
GWPi [kg CO_2 eq]	1.09E+02	8.48E+00	7.88E+01	1.96E+02
GWPe [kg CO_2 eq]	1.66E+02	8.48E+00	7.98E+01	2.54E+02
TRACI 2.1				
AP [kg SO_2 eq]	6.37E-01	3.86E-02	8.46E-02	7.60E-01
EP [kg N eq]	7.14E-02	3.42E-03	1.46E-02	8.94E-02
ODP [kg CFC-11 eq]	1.29E-06	2.17E-14	4.65E-09	1.29E-06
Resources [MJ]	5.94E+02	1.56E+01	8.17E+01	6.91E+02
SFP [kg O_3 eq]	1.43E+01	8.94E-01	1.59E+00	1.68E+01

3.3. Life Cycle Inventory Results

Table 10. LCI Results for Acoustic Core with Wood Veneer Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
Resource Use Parameters				
RPR_E [MJ, LHV]	2.88E+02	5.50E+00	1.26E+02	4.20E+02
RPR_M [MJ, LHV]	6.41E+02	0.00E+00	4.54E+01	6.87E+02
RPR_T [MJ, LHV]	9.29E+02	5.50E+00	1.72E+02	1.11E+03
$NRPR_E$ [MJ, LHV]	3.21E+03	1.38E+02	9.81E+02	4.33E+03
$NRPR_M$ [MJ, LHV]	1.21E+03	0.00E+00	2.00E+00	1.22E+03
$NRPR_T$ [MJ, LHV]	4.43E+03	1.38E+02	9.83E+02	5.55E+03
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$ADPF_E$ [MJ, LHV]	2.77E-04	7.22E-07	3.66E-06	2.82E-04
$ADPF_M$ [kg]	4.23E+03	1.37E+02	9.34E+02	5.31E+03
FW [m^3]	1.50E+00	1.89E-02	2.85E-01	1.80E+00
Additional ISO 21930:2017 Indicators				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Parameters and Output Flows				
HWD [kg]	3.38E-05	3.97E-10	8.95E-06	4.28E-05
NHWD [kg]	0.00E+00	0.00E+00	7.59E+00	7.59E+00
HLRW [kg]	6.45E-02	3.96E-04	1.76E-02	8.25E-02
ILLRW [kg]	6.59E-05	4.70E-07	2.09E-05	8.74E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

IMPACT CATEGORIES	A1	A2	A3	A1-A3
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	9.16E-01	9.16E-01
EET [MJ]	0.00E+00	0.00E+00	4.31E-01	4.31E-01

Table 11: LCI Results for Acoustic Core with HPDL Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
Resource Use Parameters				
RPR_E [MJ, LHV]	6.18E+02	4.70E+00	1.26E+02	7.49E+02
RPR_M [MJ, LHV]	5.70E+02	0.00E+00	4.54E+01	6.16E+02
RPR_T [MJ, LHV]	1.19E+03	4.70E+00	1.72E+02	1.37E+03
$NRPR_E$ [MJ, LHV]	3.29E+03	1.18E+02	9.81E+02	4.39E+03
$NRPR_M$ [MJ, LHV]	1.29E+03	0.00E+00	2.00E+00	1.29E+03
$NRPR_T$ [MJ, LHV]	4.58E+03	1.18E+02	9.83E+02	5.68E+03
RE [MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$ADPF_E$ [MJ, LHV]	2.64E-04	6.17E-07	3.66E-06	2.68E-04
$ADPF_M$ [kg]	4.38E+03	1.17E+02	9.34E+02	5.43E+03
FW [m^3]	1.88E+00	1.61E-02	2.85E-01	2.18E+00
Additional ISO 21930:2017 Indicators				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste Parameters and Output Flows				
HWD [kg]	3.73E-06	3.40E-10	8.95E-06	1.27E-05
NHWD [kg]	0.00E+00	0.00E+00	7.59E+00	7.59E+00
HLRW [kg]	6.86E-02	3.38E-04	1.76E-02	8.65E-02
ILLRW [kg]	7.32E-05	4.02E-07	2.09E-05	9.46E-05
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE [MJ]	0.00E+00	0.00E+00	9.16E-01	9.16E-01
EET [MJ]	0.00E+00	0.00E+00	4.31E-01	4.31E-01

Table 12. Carbon Emissions and Removals for Acoustic Core with Wood Veneer Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
Biogenic Carbon Indicators				
BCRP [kg CO_2]	5.44E+01	0.00E+00	0.00E+00	5.44E+01
BCEP [kg CO_2]	6.11E-01	0.00E+00	3.84E+00	4.45E+00
BCRK [kg CO_2]	0.00E+00	0.00E+00	4.25E+00	4.25E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

IMPACT CATEGORIES	A1	A2	A3	A1-A3
CCR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 13: Carbon Emissions and Removals for Acoustic Core with HPDL Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3
Biogenic Carbon Indicators				
BCRP [kg CO_2]	5.85E+01	0.00E+00	0.00E+00	5.85E+01
BCEP [kg CO_2]	5.70E-01	0.00E+00	4.06E+00	4.63E+00
BCRK [kg CO_2]	0.00E+00	0.00E+00	4.25E+00	4.25E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

4. LCA Interpretation

Across all impact categories and facing options raw material extraction and processing makes up the majority of impacts. For Oshkosh GP Core products, the A3 (Manufacturing) life cycle module also plays a significant role especially pertaining to Global Warming Potential (GWP). This may be attributable to the press technology used in the Oshkosh Door Company facility.

Biogenic carbon plays a significant role in the GWP impacts of these products. The inclusion of biogenic carbon in GWP results decreases overall GWP impacts. This is attributable to wood in these products and to the fact that this is a cradle-to-gate study. While most of the mass of an SCL core is wood, the remainder is made up of polymeric diphenylmethane diisocyanate and paraffin wax both of which are carbon intensive materials. With regards to the latter, this study captures the uptake of biogenic carbon in raw materials but does not account for the emission of that carbon at the product's end of life. As a result, the GWPe (GWP 100 excl. biogenic) factor should be used as the default GWP impact result in this report.

5. Biogenic Carbon

As discussed in Section 4, biogenic carbon plays a significant role in the LCA results for these products. As a cradle-to-gate LCA, this shows the impacts of biogenic carbon only up to the factory gate. Given that biogenic carbon is an inherent property of a material, the result of this LCA scope is that this study only shows the uptake of carbon in the product and packaging. The emission of this biogenic carbon occurs outside of the scope of this study; however, per ISO 21930, the flows of biogenic carbon leaving the system boundary must be reported. Below, Tables 14 and 15 illustrate the flow of biogenic carbon through this product system from cradle-to-grave. Module A5 (Installation) illustrates the emission of biogenic carbon from the disposal of packaging. Modules C3/C4 (Waste Processing/Disposal) illustrate the emissions from the product at end of life under the assumption of 100% emission. Note that for modules A5 and C3/C4 illustrate only the emissions of biogenic carbon and do not reflect any other activities or impacts.

Table 14: Flows of Biogenic Carbon for Acoustic Core with Wood Veneer Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3	A5	C3/C4
			IPCC AR5			
GWPi [kg CO_2 eq]	9.62E+01	9.92E+00	7.85E+01	1.85E+02	4.25E+00	5.44E+01
GWPe [kg CO_2 eq]	1.50E+02	9.92E+00	7.98E+01	2.39E+02	0.00E+00	0.00E+00
			Biogenic Carbon Indicators			
BCRP [kg CO_2]	5.44E+01	0.00E+00	0.00E+00	5.44E+01	0.00E+00	0.00E+00
BCEP [kg CO_2]	6.11E-01	0.00E+00	3.84E+00	4.45E+00	0.00E+00	5.44E+01
BCRK [kg CO_2]	0.00E+00	0.00E+00	4.25E+00	4.25E+00	0.00E+00	0.00E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.25E+00	0.00E+00

Table 15: Flows of Biogenic Carbon for Acoustic Core with HPDL Facing

IMPACT CATEGORIES	A1	A2	A3	A1-A3	A5	C3/C4
			IPCC AR5			
GWPi [kg CO_2 eq]	1.09E+02	8.48E+00	7.88E+01	1.96E+02	4.25E+00	5.85E+01
GWPe [kg CO_2 eq]	1.66E+02	8.48E+00	7.98E+01	2.54E+02	0.00E+00	0.00E+00
			Biogenic Carbon Indicators			
BCRP [kg CO_2]	5.85E+01	0.00E+00	0.00E+00	5.85E+01	0.00E+00	0.00E+00
BCEP [kg CO_2]	5.70E-01	0.00E+00	4.06E+00	4.63E+00	0.00E+00	5.85E+01
BCRK [kg CO_2]	0.00E+00	0.00E+00	4.25E+00	4.25E+00	0.00E+00	0.00E+00
BCEK [kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.25E+00	0.00E+00

6. Additional Environmental Information

6.1. Environmental Activities and Certifications

GREENGUARD Certification

All Oshkosh Door Company products are GREENGUARD and GREENGUARD Gold Certified. This third-party certification assures our doors are low-emitting and contribute to healthy indoor environments.

GREENGUARD Certification establishes acceptable indoor air standards for indoor products, environments, and buildings. GREENGUARD Gold Certification offers stricter certification criteria, considers safety factors to account for sensitive individuals (such as children and the elderly), and ensures that a product is acceptable for use in environments such as schools and healthcare facilities.

GREENGUARD certified products are referenced standards in numerous sustainable building initiatives including: Leadership in Energy and Environmental Design (LEED®), Collaborative for High Performance Schools (CHPS), Green Guide for Health Care (GGHC), Sustainable Building Industry Council (SBIC) and many others. For more information on the GREENGUARD Certification Program emission standards visit greenguard.org.

FSC® Certification

Oshkosh Door Company is Forest Stewardship Council® (FSC) Chain-of-Custody (COC) certified (SCS-COC-000588) promoting responsible forest management.

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 permitted to label products with the FSC trademarks.

A certified Chain of Custody 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.

Almost all Oshkosh Door Company products are available as FSC certified.

7. References

Athena Institute. (2011). *A Cradle-to-Gate Life Cycle Assessment of ½" Regular and 5 / 8" Type X Gypsum Wallboard.*

CORRIM. (2018). *Cradle to Gate Life Cycle Assessment of North American Particleboard Production.*

CORRIM. (2020). *Life Cycle Assessment for the Production of PNW Laminated Veneer Lumber.*

IPCC. (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

ISO. (2006). *ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures.* Geneva: International Organization for Standardization.

ISO. (2006). *ISO 14040/Amd 1:2020: Environmental management - Life cycle assessment - Principles and framework.* Geneva: International Organization for Standardization.

ISO. (2006). *ISO 14044/Amd 1:2017/Amd 2:2020: Environmental Management - Life cycle assessment - Requirements and Guidelines.* Geneva: International Organization for Standardization.

ISO. (2017). *ISO 21930: Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.* Geneva: International Organization for Standardization.

NSF International. (2022). *PCR for Interior Architectural Wood Door Leaves.* National Center for Sustainability Standards.

United States Environmental Protection Agency. (2023, June 23). *U.S. EPA*. Retrieved from U.S. EPA eGRID Power Profiler: https://www.epa.gov/egrid/power-profiler#/MROE

United States Environmental Protection Agency. (2023, June 16). *U.S. EPA EGRID Power Profiler NWPP*. Retrieved from U.S. EPA EGRID Power Profiler: https://www.epa.gov/egrid/power-profiler#/NWPP

US EPA. (2012). *TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Version 2.1 - User Guide*. Retrieved from https://nepis.epa.gov/Adobe/PDF/P100HN53.pdf

8. Contact Information

8.1. Study Commissioner

Oshkosh Door Company
2501 Universal Street
Oshkosh, WI 54904
920.233.6161

8.2. LCA Practitioner

WAP Sustainability Consulting
1701 Market Street
Chattanooga, TN 37408
info@WAPSustainability.com