Environmental Product Declaration

in accordance with ISO 14025 and ISO 21930:2017

EAD-632W Operable Louver

Refer to the EPD Library at www.smartepd.com
for the latest EPD listing information.

GREENHECK
Building Value in Air.

General Information

Greenheck

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Product Name:	EAD-632W Operable Adjustable Blade Louver
Functional Unit:	100 m2 coverage of 100 square meters (1076.4 square feet) of building area for 75 years
Declaration Number:	SmartEPD-2025-049-0262-01.1
Date of Issue:	February 11, 2025
Expiration:	February 11, 2030
Last updated:	February 11, 2025
EPD Scope:	Cradle to grave A1 - A3, A4, A5, B1 - B7, C1 - C4
Market(s) of Applicability:	North America

General Organization Information

Greenheck is a global leader in engineering and manufacturing the industry's most comprehensive line of air movement, control, conditioning, and distribution products for nonresidential buildings. Greenheck energy-efficient products keep occupants comfortable, productive, and safe while supporting sustainability. In addition to fans and ventilators, other product lines include dampers, louvers, energy recovery ventilators, make-up air, lab exhaust, dedicated outdoor air systems, indoors air handlers, kitchen ventilation systems, grilles, registers and diffusers, and air terminal units.

Further information can be found at: https://www.greenheck.com/

Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

Reference Standards

Standard(s):	ISO 14025 and ISO 21930:2017
Core PCR:	UL Part A PCR for Building-Related Products and Services v.4 Date of issue: March 01, 2022

Sub-category PCR:	UL Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding Date of issue: October 23, 2018 Valid until: December 31, 2025
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.1.0, November 2022

Verification Information

LCA Author/Creator:	Jana Fogarty | TrueNorth Collective | info@truenorthcollective.net
EPD Program Operator:	Smart EPD | info@smartepd.com | www.smartepd.com 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External Mari Kirss | LCA Support | mari.kirss@lcasupport.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External Mari Kirss | LCA Support | mari.kirss@lcasupport.com

Product Information

Functional Unit:	100 m2 coverage of 100 square meters (1076.4 square feet) of building area for 75 years
Mass:	2170 kg
Reference Service Life:	75 Years
Product Specificity:	✗ Product Average ✓ Product Specific

Product Description

Louvers are essential to any successful building. They provide healthy air exchange, while ensuring unwanted elements, like rain, dirt, and animals remain outside. Louvers provide an extra architectural element to a building's exterior – giving an opportunity to improve the look of any building while meeting mechanical requirements. Louvers include an aluminum body, fasteners, and hardware. Various models may also contain steel, actuators, bearings, seals, and/or insulation. Aluminum is sawed, punched, machined, and welded for the specific project. Once the louver is assembled and welded, it can optionally be sent through the paint line before being packed and shipped to the installation site.

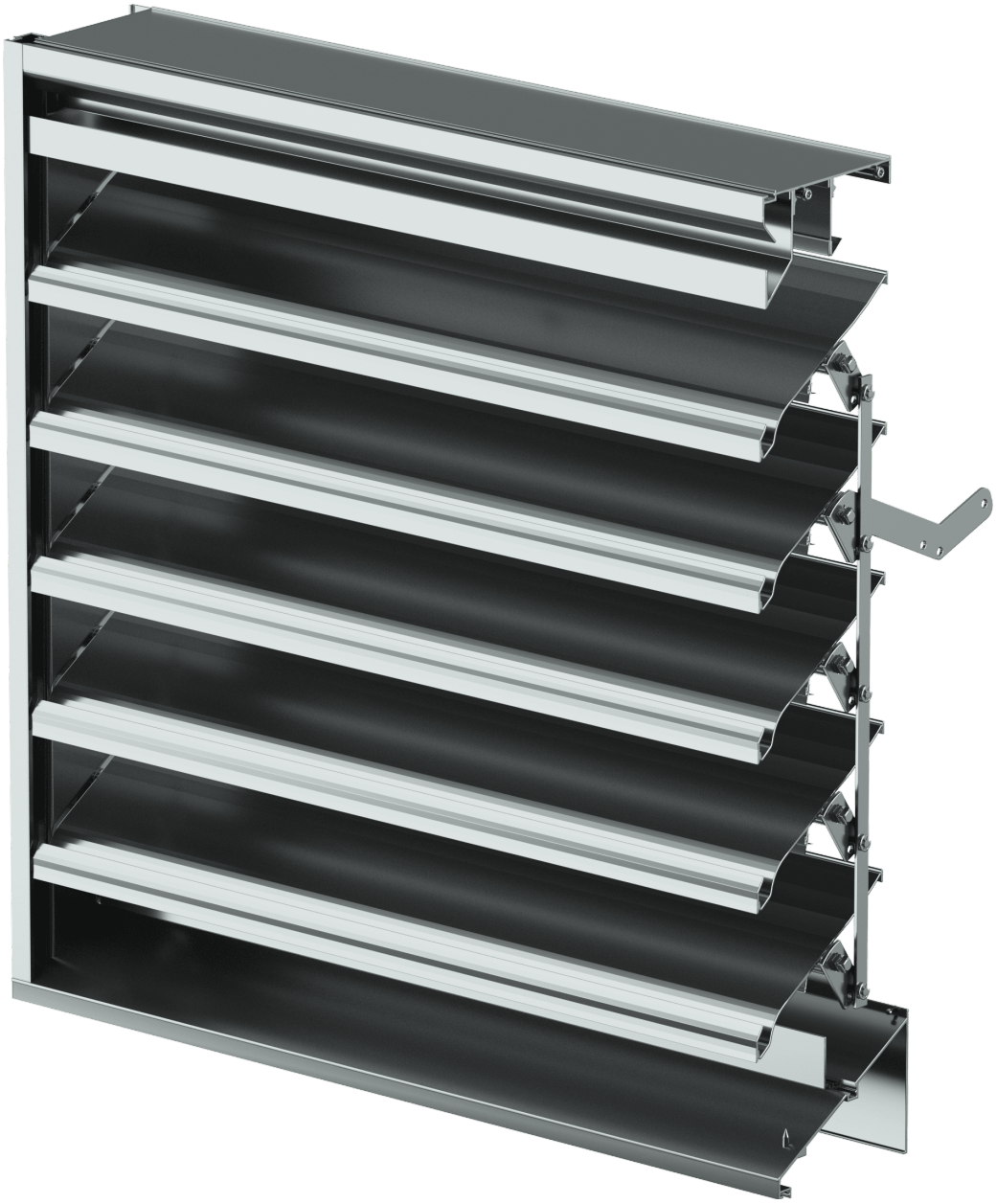
Further information can be found at: https://content.greenheck.com/public/DAMProd/Original/10014/EAD632W_submittal.pdf

Product Specifications

Product SKU(s):	EAD-632W
Product Classification Codes:	Masterformat - 08 01 44 EC3 - Cladding
Length:	10 m

Width:	10 m
Thickness:	152 mm

Product Composition Diagram



Material Composition

Material/Component Category	Origin	% Mass
Aluminum	US	89.21
Steel	US	4.13
Fasteners	US	0.99
Hardware	US	0.01
Vinyl	US	1.08
Rubber	US	1.08
Polypropylene	US	1.08
Actuator	US	2.3
Nylon	US	0.04
Polyethylene	US	0.09

Packaging Material	Origin	kg Mass
Plastic | LDPE	US	10.8
Metal | mild steel	US	3.98
Paper	US	2.32
Wood | pine	US	1420

Hazardous Materials
No regulated hazardous or dangerous substances are included in this product.

EPD Data Specificity

Primary Data Year: 7/1/2023-6/30/2024

Manufacturing Specificity:

- ✗ Industry Average
- ✗ Manufacturer Average
- ✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD

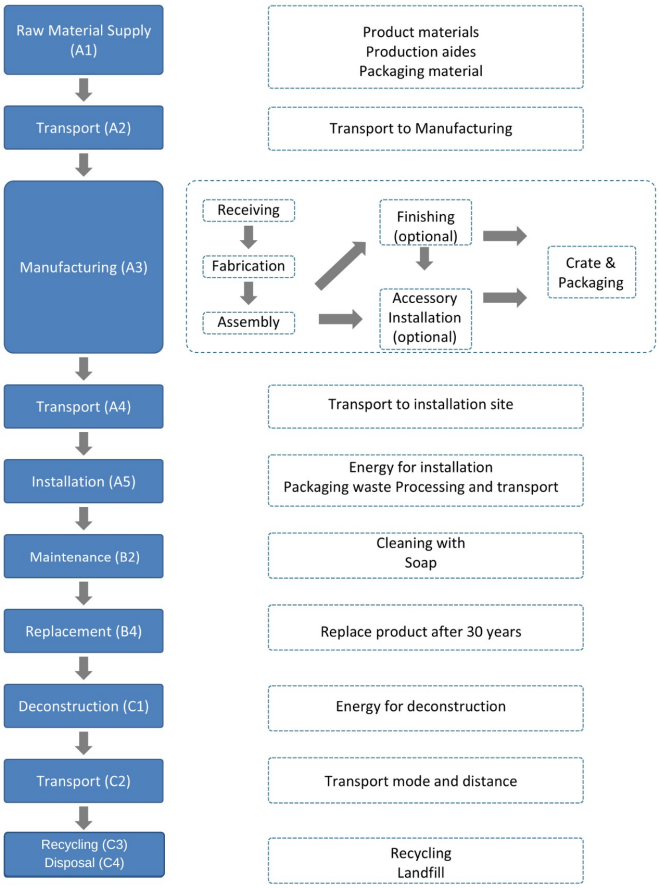
System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	✓
	B2	Maintenance	✓
	B3	Repair	✓
	B4	Replacement	✓
	B5	Refurbishment	✓
	B6	Operational Energy Use	✓
	B7	Operational Water Use	✓
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND

Plants

Greenheck
Shelby, NC, USA

Product Flow Diagram



Software and Database

LCA Software:	SimaPro v. 9.6		
LCI Foreground Database(s):	Ecoinvent v. 3.10	North America	mass allocation

LCI Background Database(s): Ecoinvent v. 3.10 | North America | mass allocation

Data Quality

Life cycle inventory data used in this study are evaluated based on three categories: precision and completeness, consistency and reproducibility, and representativeness.
Precision and completeness: Foreground data are sourced from primary information provided by the client and has been reviewed internally to ensure precision and completeness. In order to balance out seasonal variations, operations data over a 12-month period is used to represent production activities. In addition, key model input such as mass balance, energy balance and emission inventory are reviewed by TrueNorth Collective team.
Ecoinvent v3.10 cut-off by classification is used as the main database for background data. This version is published in 2023. Ecoinvent is widely used in research and industry to support life cycle assessment practices. Each version of this database goes through thorough review process and documentation of precision and completeness is available by the provider.
Consistency and reproducibility: To ensure consistency, primary data were collected at the same level of granularity. All input and output information, modelling assumptions and dataset choices are provided in this report for the purpose of reproducibility.
Representativeness: Refer to the sections above for details about representativeness.

Completeness Check: Detailed information on the inputs and outputs of the products were gathered with every effort made to perform a comprehensive analysis. An attempt was made to include as much detail as possible, even for processes that were found to be largely negligible in the environmental impact assessment. Processes were mass balanced before allocation to ensure all waste and emissions were captured. This was done to ensure completeness. Furthermore, all energy consumption that was understood as relevant for the comparison was included.

Consistency Check: The products were modeled in a consistent manner. System boundaries for all products were defined in a similar manner. Therefore, any differences in overall potential environmental impacts should not be due to inconsistent modeling or data.

Life Cycle Module Descriptions

A1 Extraction and Processing of Raw Materials
A1 roll up process contains the supplied materials needed per 100 m2 of product. The amount of materials per the Bill of Materials and the manufacturing scrap rates are used to calculate total materials supplied.

A2 Raw Material Transportation
Transportation is modeled by mode on a per kg of shipped material. Final amount is determined by the weight of supplied material from A1. The commodity for extruded aluminum makes up over 82% of the total mass purchased, so the suppliers of extruded aluminum and their transport modes & distances were used to represent the raw material transport for all materials purchased.

A3 Manufacturing
For A3 roll up process, each type of utility, waste, water, and packaging consumption in A3 Manufacturing is modeled by factors of usage per kg of aluminum production. Factors are multiplied by product's aluminum weight (kg), and if the part if painted, it receives similar impacts based on weight for the paint line.

A4 Product Distribution
Product Distribution is modeled by mode on a per kg of shipped product, the final amount is determined by the weight of packaged product. Products are shipped from the facility in Shelby, NC to customers.

A5 Installation
Installation includes installation fuel, electricity, packaging transport to EOL and EOL treatment of packaging. The installation process is assumed to use 1 gallon of diesel and 2 kWh of electricity per functional unit of product installed per the PCR. Since the product is custom made for the opening defined by the customer, it is assumed that not scrap is generated during installation.

B2 Maintenance
B2 contains the volume of soap used over the life of the product. Per the PCR, 500 ml of 1% (v/v) sodium lauryl sulfate solution is used twice per year. For the 30-year life of the louver product, that equates to 30,000 ml of soap.

B4 Replacement
B4 captures all life cycle impacts to replace the product 1.5 times, so the overall service life of the product will match that of the building (75 years),

C1 Deconstruction
C1 contains the deconstruction fuel and deconstruction electricity. The deconstruction process is assumed to use 1 gallon of diesel and 2 kWh of electricity per functional unit of product deconstructed per the PCR Per the PCR, the product is assumed to travel 100 km via truck to final disposal. Per the PCR Part A, Section 2.8.5, 85% of metals are assumed to be recycled while the remaining 15% is sent to landfill. For non-metal materials, 100% of them are assumed to go to landfill.

C2 Transport to disposal
C2 EOL Transportation is modeled by mode on a per kg of product, the final mass amount is determined by the weight of the product.

C3 Waste Processing
C3 captures the recycling of materials from the product at the end of its life.

C4 Disposal of product
C4 Disposal is modeled by product material type and weight and the corresponding EOL treatment method.

LCA Discussion

Allocation Procedure

No multi-output allocation was necessary in the foreground of the study. Allocation of secondary data taken from ecoinvent v3.10 cut-off by classification has allocation applied to it.

This study uses the cut-off approach method for recycling. According to this approach, the first life of a material bears the environmental burdens of its production (e.g., raw material extraction and processing) and the second life (e.g., scrap input) bears the burdens of refurbishment (e.g., collection and refining of scrap). The burdens from recycling waste treatment are taken on by the next life of the product and are not included in this study.

Given that raw materials are key contributors to environmental performance, mass-based allocation of plant overhead utility consumption, resource use and waste generation was applied for Shelby, NC facility based on the total kilograms of aluminum processes.

Cut-off Procedure

For the processes within the system boundary, described in Study Boundaries, input and output flows of mass and energy greater than 1% (based on total mass of final product and total energy usage of the product system) or greater than 1% of environmental impacts were included within the scope of the analysis. Flows of less than 1% were included if sufficient data were available to warrant inclusion and/or the flow was thought to have significant environmental impact. Cumulative excluded flows and environmental impacts are less than 5% per module based on total mass, energy usage, and impacts of the product system. Where data gaps were identified, they are filled by conservative assumptions with average, generic, or proxy data and assumptions are documented. No known flows relevant to the product system are deliberately excluded from this LCA.

All upstream and downstream activities are included using a combination of primary and secondary data. While the majority of inventory data are sourced from primary resources, representative proxies are used to close gaps in the absence of primary data.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	Diesel
Liters of Fuel:	8.03E+00 l/100km
Transport Distance:	554 km
Packaging Mass:	1.44E+03 kg

Installation in to the building/construction site (A5)

A5 Module

Electricity Consumption:	2 kWh
Other Energy Carriers:	144 MJ
Mass of Packaging Waste Specified by Type:	1440 kg
Assumptions for scenario development:	Installation includes installation fuel, electricity, packaging transport to EOL and EOL treatment of packaging. The installation process is assumed to use 1 gallon of diesel and 2 kWh of electricity per functional unit of product installed per the PCR. Since the product is custom made for the opening defined by the customer, it is assumed that not scrap is generated during installation.

Reference Service Life (B1)

B1 Module

RSL:	30 Years

Outdoor Environment:

Greenheck Fan Corporation certifies that the louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Water Penetration, Air Performance, and Wind-Driven Rain ratings.
Louvers were tested in accordance with AMCA Standard 500-L.

Maintenance:

Per the PCR, 500 ml of 1% (v/v) sodium lauryl sulfate solution is used to clean the louver twice per year.

Maintenance (B2)

B2 Module

Maintenance Cycle:	60 Cycles/RSL 150 Cycles/ESL
Waste Materials from Maintenance:	75 kg
Maintenance Process Information:	B2 contains the volume of soap used over the life of the product. Per the PCR, 500 ml of 1% (v/v) sodium lauryl sulfate solution is used twice per year. Assume 500 grams per cleaning cycle, 2 cleaning cycles per year, 75 years.

Replacement (B4)

B4 Module

Reference Service Life:	30 Years

Further assumptions for scenario development:	The installation process and the deconstruction process are assumed to use 1 gallon of diesel and 2 kWh of electricity per functional unit of product installed per the PCR. There is expected to be 1.5 replacements of the product to match the 75-year life of the building.
Other Energy Carriers:	4.32E+02 MJ

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected Separately:	1990 kg
Collected with Mixed Construction Waste:	123 kg

Recovery

Recycling:	1740 kg
Landfill:	431 kg

Disposal

Product or Material for Final Disposal:	2110 kg

Assumptions for scenario development:

The deconstruction process is assumed to use 1 gallon of diesel and 2 kWh of electricity per functional unit of product deconstructed per the PCR Per the PCR, the product is assumed to travel 100 km via truck to final disposal. Per the PCR Part A, Section 2.8.5, 85% of metals are assumed to be recycled while the remaining 15% is sent to landfill. For non-metal materials, 100% of them are assumed to go to landfill.

Results

Environmental Impact Assessment Results

TRACI 2.1, CML 2016 v4.8

per 100 m2 of product coverage of 100 square meters (1076.4 square feet) of building area for 75 years.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Method	Unit	A1	A2	A3	A1A2A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
GWP-total	TRACI 2.1	kg CO2 eq	2.16e+4	4.02e+2	2.97e+3	2.50e+4	2.04e+2	6.93e+1	0	7.63e-1	0	3.80e+4	0	0	0	1.46e+1	2.19e+1	0	2.70e+0
ODP	TRACI 2.1	kg CFC 11 eq	3.92e-4	7.01e-6	3.98e-5	4.39e-4	3.56e-6	6.09e-7	0	1.30e-8	0	6.66e-4	0	0	0	2.35e-7	3.82e-7	0	8.33e-8
AP	TRACI 2.1	kg SO2 eq	1.35e+2	8.88e-1	8.12e+0	1.44e+2	4.51e-1	2.30e-1	0	3.15e-3	0	2.18e+2	0	0	0	1.61e-1	4.84e-2	0	1.72e-2
EP-fw	TRACI 2.1	kg N eq	1.22e+2	3.79e-1	7.26e+0	1.29e+2	1.92e-1	1.00e-1	0	5.40e-3	0	1.94e+2	0	0	0	1.64e-2	2.06e-2	0	3.22e-3
POCP	TRACI 2.1	kg O3 eq	1.45e+3	1.60e+1	1.74e+2	1.64e+3	8.13e+0	6.66e+0	0	3.00e-2	0	2.49e+3	0	0	0	5.07e+0	8.73e-1	0	4.59e-1
ADP-fossil	CML 2016 v4.8	MJ	1.24e+3	4.46e+0	8.24e+1	1.32e+3	2.26e+0	3.06e-1	0	1.21e-2	0	1.99e+3	0	0	0	6.49e-2	2.43e-1	0	3.12e-2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicators

per 100 m2 of product coverage of 100 square meters (1076.4 square feet) of building area for 75 years.

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
PERE	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERM	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERT	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRE	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRM	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRT	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RPRE	MJ	1.70e+4	7.94e+1	5.52e+4	7.24e+4	4.03e+1	7.05e+0	0	1.74e+1	0	1.09e+5	0	0	0	2.79e+0	4.33e+0	0	6.13e-1
RPRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RPRT	MJ	1.70e+4	7.94e+1	5.52e+4	7.24e+4	4.03e+1	7.05e+0	0	1.74e+1	0	1.09e+5	0	0	0	2.79e+0	4.33e+0	0	6.13e-1
NRPRE	MJ	1.65e+5	6.00e+2	2.05e+4	1.86e+5	3.05e+2	4.61e+1	0	2.26e+0	0	2.80e+5	0	0	0	1.39e+1	3.27e+1	0	4.28e+0
NRPRM	MJ	2.93e+3	0	0	2.93e+3	0	0	0	0	0	4.39e+3	0	0	0	0	0	0	0
NRPRT	MJ	1.68e+5	6.00e+2	2.05e+4	1.89e+5	3.05e+2	4.61e+1	0	2.26e+0	0	2.84e+5	0	0	0	1.39e+1	3.27e+1	0	4.28e+0
ADP-fossil	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	1.73e+3	0	0	1.73e+3	0	0	0	0	0	2.60e+3	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m3	0	0	6.73e-3	6.73e-3	0	0	0	0	0	1.01e-2	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

For RPRM and NRPRM indicators, packaging is not included.

Waste and Output Flow Indicators

per 100 m2 of product coverage of 100 square meters (1076.4 square feet) of building area for 75 years.

Indicator	Unit	A1	A2	A3	A1A2A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHWD	kg	0	0	1.44e+2	1.44e+2	0	4.60e+2	0	0	0	1.55e+3	0	0	0	0	0	0	4.31e+2
RWD	kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HLRW	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ILLRW	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	3.99e+2	3.99e+2	0	9.77e+2	0	0	0	4.60e+3	0	0	0	0	0	1.69e+3	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MNER	kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Carbon Emissions and Removals

per 100 m2 of product coverage of 100 square meters (1076.4 square feet) of building area for 75 years.

Indicator	Unit	A1	A2	A3	A1A2A3
BCRP	kg CO2	0	0	0	0
BCEP	kg CO2	0	0	0	0
BCRK	kg CO2	0	0	-2.61e+3	-2.61e+3
BCEK	kg CO2	0	0	0	0
BCEW	kg CO2	ND	ND	ND	ND
CCE	kg CO2	ND	ND	ND	ND
CCR	kg CO2	ND	ND	ND	ND
CWNR	kg CO2	ND	ND	ND	ND

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

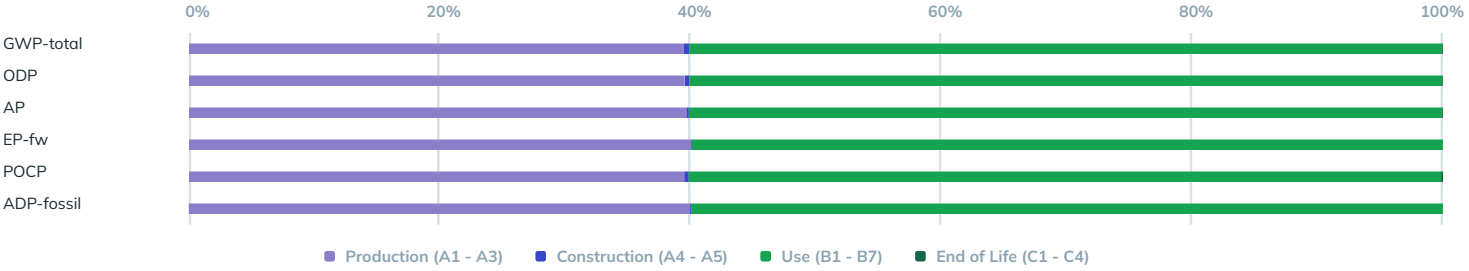
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Impact Scaling Factors

Product Name and/or Product Attribute	Product Specific Functional/Declared Unit Multiplier

Interpretation

The analysis of Greenheck's Louver products provides useful insights regarding the cradle-to-grave environmental impacts. The LCA results also identify where substantial impacts are occurring to allow further process and materials improvements to be implemented by the reporting company. The cradle-to-grave impacts for all products are dominated by the A1 Raw Materials Extraction and Processing stage. This stage accounts for 75%-93% of the impacts throughout the products' lifecycle. After this the second largest contributor is the A3 Manufacturing stage. This stage accounts for 6-19% of the lifecycle impacts. The A2 Raw Material Transportation stage accounts for 0.4-3.5% of the impacts, with the other stages accounting for <2%. The trends are similar among the other products assessed. Another key driver of the impacts is the B4 Replacement stage, this is due to the 1.5 replacement products needed to satisfy the 75-year requirement for the functional unit.



Additional Environmental Information

Extruded aluminum used to produce each louver has an average recycled content of 75-80%

Biodiversity impacts: This product has no potential effects on ecosystems and wildlife

Toxicity: This product has no impacts on human health or the environment relative to toxicity

Geographical factors: This product does not have environmental impacts related to the location

Environmental performance data: This products performance does not significantly affects the environment

Environmental management: There are currently no environmental systems or certifications relative to this product

Environmental programs: There are currently no recycling or recovery programs specific to this product

LCA-derived data: There is no relevant life cycle data not included in typical LCA formats.

Use instructions: Follow instruction on product information sheets (link in product description)

Health and environmental risks: There are no risk assessments related to the product

Materials of concern: There are no significant environmental materials in the product

Waste management: See end of life (C1-C4) section for preferred disposal methods

Incident risks: There are no potential environmental risks from incidents involving this product

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