

ENVIRONMENTAL PRODUCT DECLARATION

IVES

CONTINUOUS HINGES

IVES®



ALLEGION™

Allegion is pioneering safety by protecting people where they live and work – and protecting our environment at the same time. We promote the health and safety of our employees, customers and local community members worldwide through our commitment to conducting business in a safe and environmentally responsible manner.

Additionally, Allegion recognizes the value of the Leadership in Energy and Environmental Design (LEED) rating system to building environmentally safe and sustainable structures. By using Life Cycle Assessment and Environmental Product Declarations, we aim to provide our customers with the information they need to make decisions regarding their own sustainable building concepts and green solutions.

At Allegion, we value the importance of a cleaner world and are committed to being a responsible member of our global communities.



ENVIRONMENTAL PRODUCT DECLARATION





Ives
Continuous Hinges

According to ISO 14025

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. **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, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. **Comparability:** EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



PROGRAM OPERATOR	UL Environment	
DECLARATION HOLDER	Allegion	
DECLARATION NUMBER	4787103471.113.1	
DECLARED PRODUCT	Ives Continuous Hinges	
REFERENCE PCR	Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Product Group, Builders Hardware UL9004. Version: April 3rd, 2014.	
DATE OF ISSUE	January 31, 2017	
PERIOD OF VALIDITY	5 Years	
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications	
The PCR review was conducted by:	PCR Review Panel epd@ulenvironment.com	
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		
	Wade Stout, UL Environment	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		
	Thomas P. Gloria, Industrial Ecology Consultants	

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Product Description

Company

Allegion is a global pioneer in safety and security, with leading brands like aptiQ®, LCN®, Schlage®, Steelcraft® and Von Duprin®. Focusing on security around the door and adjacent areas, Allegion produces a range of solutions for homes, businesses, schools and other institutions. Allegion is a \$2 billion company, with products sold in almost 130 countries.

As a subsidiary of Allegion plc, Ives specializes in the manufacture and distribution of door hardware including architectural hinges, continuous hinges, door stops, floor stops, pull handles and plates, and door coordinators.

Product

Ives Continuous Hinges are designed to last the life of the building. The unique design distributes the weight of the door along the entire length of the frame, reducing the high amount of stress normally associated at top of door and frame on traditional hinge applications. Not only does this reduce hinge failure, it also keeps your door in constant alignment, eliminating the chance of door sag. These characteristics make continuous hinges suitable for high use/high traffic doors.

Continuous Hinges are available in two styles; aluminum geared steel or stainless steel pin and barrel.

Aluminum geared continuous hinges utilize a single gear section for the door side and a separate gear section for the frame side of the door opening. The two are held in place together by a full length cover channel and rotate on a series of bearings.

Steel Pin and Barrel continuous hinges share many of the same characteristics of a traditional hinge. Both have a center pin and rolled knuckles. However, a continuous Pin and Barrel hinge stretches along the entire length of the frame.

The standard application is one hinge per standard 3' x 7' door leaf. This LCA presents results for this application.

Product Characterization

The product is provided to the customer through a fax, phone, or online system. The product is shipped directly to customers in packaging material that includes a cardboard box, shipping labels and plastic materials. The amount of packaging materials are dependent on the size of the customer's order. No ancillary materials other than mounting screws are necessary for installation or use. Installation instructions and manuals are provided on-line.

Technical Information

Functional unit: One hinge per standard 3' x 7' door leaf.

Application

Products are designed for commercial applications and fall under the product standard category of ANSI/BHMA A156.26-2012.

Delivery Status

For shipping, each hinge is placed in a triangle prism cardboard box that runs the length of the entire hinge. Geared hinge boxes are secured with nylon strapping. Pin and barrel hinge boxes are secured with staples. Installation instructions, a packing list, and installation screws are provided as well.

Environment



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Base Materials

Table 1: Base Materials, Steel Pin and Barrel Hinge

Material	% of Final Product
Stainless Steel / Steel	98%
Plastic	2%
Total	100%

Table 2: Base Materials, Aluminum Geared Hinge

Material	% of Final Product
Aluminum	97%
Plastic	3%
Total	100%

Manufacture

Ives Geared Continuous Hinges are fabricated in the US and assembled in Indiana. Manufacturing includes extruding, machining, and anodizing of the aluminum to form the hinge design. Holes are then pressed out of the product so that screws can be used to fasten the product to the door and frame. Plastic bearings are inserted into the gear sections and aluminum covers are used to secure the assembly. Products are shipped with materials for mounting, including screws and mounting instructions.

Ives Pin and Barrel Continuous Hinges are manufactured by a supplier in Canada. Manufacturing includes pressing and bending of stainless steel to form the hinge design. Holes are then pressed out of the product so that screws can be used to fasten the product to the door and frame. For steel substrates only, the hinge is also primer painted. Products are then boxed and palletized for shipping to Allegion in the US. Products are shipped with materials for mounting, including screws and mounting instructions.



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Environment and Health During Manufacturing

Allegion and Ives meet all federal and state standards related to the Environment and Health during manufacturing. Additionally, Ives suppliers employ a strict waste minimization and recycling program that reduces and recycles waste produced in the manufacturing process.

Beyond what is regulated, there are no additional environmental and health considerations during the production of goods.

Packaging

For shipping, each hinge is placed in a triangle prism cardboard box that runs the length of the entire hinge. Geared hinge boxes are secured with nylon strapping. Pin and barrel hinge boxes are secured with staples. Installation instructions, a packing list, and installation screws are provided as well.

Pin and Barrel hinges are then combined on a pallet. The pallet is then shrink wrapped for shipping to the US. Once it arrives in the US, the pallet is broken down and individual hinges are housed in an Allegion facility.

Both Geared and Pin and Barrel hinges are then distributed to customers based on order. Products are shipped to customers via UPS, FedEx, or a common carrier.

Product Installation

In general, installation is achieved through the hand tightening of mounting screws that are included with hinge.

Environment and Health During Use

There are no environmental or health considerations during the use of the product.

Re-use Stage

Ives products may be recycled or reused at the end of life. The LCA that this EPD is created from takes the conservative approach by assuming that all products are disposed of within the system boundary. However, potential recycling is calculated in *Module D – Benefits Beyond System Boundary*.

Disposal

It is assumed that all products are landfilled at the end of their life. The distance waste is transported to the landfill is assumed to be 100 miles.

Further Information

Additional information regarding Allegion's sustainability program and environmental legal compliance can be found at <http://us.allegion.com/communities/architects/solutions/Pages/green.aspx>



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Life Cycle Assessment

Declared Unit

Table 3: Declared Unit. Steel Pin and Barrel Hinge

Name	Value (Standard Units. lbs.)	Value (Metric Units. Kg)
Unit	1 Hinge	1 Hinge
Weight per Declared Unit, excluding fasteners	8.00	3.63
Fasteners (pieces x weight/piece)	.22	.1
Declared Unit	8.22	3.73

Table 4: Declared Unit. Aluminum Geared Hinge

Name	Value (Standard Units. lbs.)	Value (Metric Units. Kg)
Unit	1 Hinge	1 Hinge
Weight per Declared Unit, excluding fasteners	5.27	2.39
Fasteners (pieces x weight/piece)	.22	.10
Declared Unit	5.49	2.49



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System Boundary

An LCA for products in which a functional life is not declared can be one of three options. These options include a Cradle to Shipping Gate LCA, a Cradle to Building LCA or a Cradle to Building-with EOL Stage LCA.

This particular LCA is a Cradle to Building-with EOL stage LCA.

A summary of the life cycle stages included in this LCA is presented in the following table.

Module Name	Description	Summary of Included Elements
A1	Product Stage: Raw Material Supply	Raw Material sourcing and processing as defined by secondary data.
A2	Product Stage: Transport	Shipping from supplier to manufacturing site. Fuel use requirements estimated based on product weights and mapped distance.
A3	Product Stage: Manufacturing	Energy, water and material inputs required for manufacturing gasketing and thresholds from raw materials. Packaging Materials included as well.
A4	Construction Process Stage: Transport	Shipping from manufacturing site to project site. Fuel use requirements estimated based on product weights and mapped distance.
A5	Construction Process Stage: Installation	Installation and packaging material waste.
B1	Use Stage: Use	Module Not Declared
B2	Use Stage: Maintenance	Module Not Declared
B3	Use Stage: Repair	Module Not Declared
B4	Use Stage: Replacement	Module Not Declared
B5	Use Stage: Refurbishment	Module Not Declared
B6	Use Stage: Operational Energy Use	Module Not Declared
B7	Use Stage: Operational Water Use	Module Not Declared
C1	EOL: Deconstruction	No inputs required for deconstruction.
C2	EOL: Transport	Shipping from project site to landfill. Fuel use requirements estimated based on product weight and estimated distance.
C3	EOL: Waste Processing	Module Not Declared
C4	EOL: Disposal	Assumes all products are sent to landfill. Landfill impacts modeled based on secondary data.
D	Benefits beyond system	Recycling benefits of metal parts.



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Estimates and Assumptions

Recycled content – Allegion products may contain recycled content, most notably recycled steel and aluminum, which are two of the most recycled materials throughout the globe. The specific amount of recycled content may vary based on the availability of materials to suppliers at the time of sourcing. Data sets sourced from GaBi include assumptions based on typical aluminum and steel recycled content and have been calculated based on expert evaluation and critical review. It was determined appropriate and a conservative approach to use default recycled content values in the GaBi aluminum and steel datasets.

Landfilling at End of Life – All products were considered to be landfilled at end of life. While recycling is an option, the choice of landfilling represents a conservative estimation of the end of life pathway in lieu of having actual verifiable data of end of life recycling.

The inclusion of overhead energy, water and waste data was determined appropriate due to the method in which Allegion tracks energy use.

Cut-off Criteria

All inputs in which data were available were included.

Material inputs greater than 1% (based on total mass of the individual components of the 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.

List of excluded materials and energy inputs include:

- There were no excluded material and energy inputs in primary data.
- Some material and energy inputs may have been excluded within the GaBi datasets used for this project. All GaBi datasets have been critically reviewed and conform to the exclusion requirement of the PCR.

No hazardous and toxic releases, which are mandatory to be monitored and reported to the U.S TRI, are released from the facility.

Background Data

All background data was sourced from GaBi databases. GaBi version 6.4.1.20 was used to complete the assessment.

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Data Quality

Geographical Coverage

The geographical scope of the manufacturing portion of the life cycle is Canada. For this LCA, country specific energy datasets for Canada were not available. Thus, US energy datasets were used as proxy. Life Cycle phases that occur in the US (i.e. shipping and installation) use US based background LCA data. Overall, the geographic coverage of primary data is considered good.

Time Coverage

Primary data were provided by Ives hinge suppliers and represent calendar year 2014. Calendar year 2014 was the most recently completed 12-month period year at the beginning of the study. Using 2014 data meets the PCR requirement that manufacturer specific data be within the last 5 years. Time coverage of this data is considered good.

Data necessary to model cradle-to-gate unit processes was sourced from Thinkstep LCI datasets. Time coverage of the GaBi datasets varies from approximately 2009 to present. All datasets rely on at least one 1-year average data. Overall time coverage of the datasets is considered good and meets the requirement of the PCR that all data be updated within a 10-year period. The specific time coverage of secondary datasets can be referenced in the dataset references table in each supplemental LCA report.

Technological Coverage

The technological coverage of the data is considered decent. Because Canadian suppliers manufacture Ives products it was difficult to validate process specific data from these suppliers. The suppliers had proprietary data concerns since they produce products for a variety of customers. Additionally, the supplier did not provide product specific bill of materials, but rather provided only the weights of materials associated with the final product without disclosing supplier names and addresses. However, because Continuous Hinge products are relatively simple, we have assumed that the supply chain and manufacturing process is relatively simple as well and determined that the technological data coverage, although not perfect, is adequate to meet the goal and scope of the LCA.

Allocation Procedures

General principles of allocation were based on ISO14040/44. Where possible, allocation was avoided. When allocation was necessary it was done on a physical mass basis.

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LCA Results - Steel Pin and Barrel Hinge

The following tables disclose the life cycle results for Ives Continuous Hinges. Impact categories were determined through reference to the BHMA Product Category Rules for Builder Hardware (UL9004).

TRACI 2.1 - Steel Pin and Barrel Hinge

Results of the LCA - Environmental Impact, TRACI 2.1										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Air, incl. biogenic carbon	[kg CO ₂ -Equiv.]	1.49E+01	5.01E-01	7.21E-01	MND	0.00E0	4.93E-02	MND	3.38E-02	-5.52E+00
Ozone Depletion Air	[kg CFC 11-Equiv.]	9.87E-07	4.32E-12	9.61E-13	MND	0.00E0	4.24E-13	MND	6.80E-14	1.92E-07
Acidification	[kg SO ₂ -Equiv.]	1.59E-01	2.09E-03	2.44E-03	MND	0.00E0	2.06E-04	MND	2.18E-04	-1.34E-02
Eutrophication	[kg N-Equiv.]	2.05E-02	2.03E-04	5.03E-04	MND	0.00E0	2.00E-05	MND	8.46E-05	-9.75E-05
Smog Air	[kg O ₃ -Equiv.]	9.23E-01	6.52E-02	1.14E-02	MND	0.00E0	6.41E-03	MND	6.00E-04	-1.30E-01
Abiotic Depletion for fossil resources	[MJ surplus energy]	1.53E+01	9.36E-01	1.04E-01	MND	0.00E0	9.20E-02	MND	6.49E-03	8.76E-01

CML 2001-April 2013 - Steel Pin and Barrel Hinge

Results of the LCA - Environmental Impact, CML2001 - Apr. 2013										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Potential	[kg CO ₂ -Equiv.]	1.50E+01	5.02E-01	7.78E-01	MND	0.00E0	4.94E-02	MND	3.64E-02	-5.57E+00
Ozone Layer Depletion Potential	[kg R11-Equiv.]	9.06E-07	4.06E-12	9.04E-13	MND	0.00E0	3.99E-13	MND	6.39E-14	1.77E-07
Acidification Potential	[kg SO ₂ -Equiv.]	1.77E-01	1.61E-03	1.51E-03	MND	0.00E0	1.89E-05	MND	2.28E-05	-2.95E-03
Eutrophication Potential	[kg Phosphate-Equiv.]	6.23E-03	4.15E-04	6.54E-04	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
Photochem. Ozone Creation Potential	[kg Ethene-Equiv.]	1.25E-02	1.93E-04	4.12E-04	MND	0.00E0	6.85E-01	MND	5.18E-02	-5.20E+01
Abiotic Depletion	[kg Sb-Equiv.]	9.86E-02	7.37E-08	1.78E-08	MND	0.00E0	1.13E-02	MND	3.28E-03	3.00E+00
Abiotic Depletion for fossil resources	[MJ surplus energy]	1.61E+02	6.93E+00	8.04E-01	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00



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Resource Use - Steel Pin and Barrel Hinge

Results of the LCA - Resource Use										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	5.12E+01	1.15E-01	4.40E-02	MND	0.00E0	1.13E-02	MND	3.28E-03	3.00E+00
PERM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
PERT	MJ, net calorific value	5.12E+01	1.15E-01	4.40E-02	MND	0.00E0	1.13E-02	MND	3.28E-03	3.00E+00
PENRE	MJ, net calorific value	1.98E+02	6.97E+00	8.21E-01	MND	0.00E0	6.85E-01	MND	5.18E-02	-5.20E+01
PENRM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	1.98E+02	6.97E+00	8.21E-01	MND	0.00E0	6.85E-01	MND	5.18E-02	-5.20E+01
SM	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
RSF	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
NRSF	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
FW	M ³	1.38E+00	2.26E-02	2.19E-02	MND	0.00E0	2.22E-03	MND	1.70E-03	-1.31E-02

Key			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERM	Use of renewable primary energy resources used as raw materials	SM	Use of secondary materials
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	RSF	Use of renewable secondary fuels
PENRE	Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	NRSF	Use of non renewable secondary fuels
PENRM	Use of non renewable primary energy resources used as raw materials	FW	Net use of fresh water



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Outputs and Waste - Steel Pin and Barrel Hinge

Results of the LCA - Waste and Output Flows										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
NHWD	Kg	5.22E+01	6.61E-02	7.88E-01	MND	0.00E0	6.51E-03	MND	6.95E-02	-1.48E+01
RWD	Kg	8.61E-04	1.47E-05	6.98E-06	MND	0.00E0	-1.44E-06	MND	-5.27E-07	-1.87E-03
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	-2.41E-05	MND	-6.49E-02	0.00E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	6.51E-03	MND	6.95E-02	-1.48E+01
MET	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	1.44E-06	MND	5.27E-07	1.87E-03
EEE	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
EET	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00

Key			
HWD	Disposed-of-hazardous waste	MFR	Materials for recycling
NHWD	Disposed-of non-hazardous waste	MET	Materials for energy recovery
RWD	Disposed-of Radioactive waste	EEE	Exported electrical energy
CRU	Components for reuse	EET	Exported thermal energy



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LCA Results - Aluminum Geared Hinge

The following tables disclose the life cycle results for Ives Continuous Hinges. Impact categories were determined through reference to the BHMA Product Category Rules for Builder Hardware (UL9004).

TRACI 2.1 - Aluminum Geared Hinge

Results of the LCA - Environmental Impact, TRACI 2.1										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Air, incl. biogenic carbon	[kg CO ₂ -Equiv.]	1.52E+01	3.68E-01	7.21E-01	MND	0.00E0	3.29E-02	MND	3.38E-02	-1.28E+01
Ozone Depletion Air	[kg CFC 11-Equiv.]	1.31E-09	3.17E-12	9.61E-13	MND	0.00E0	2.83E-13	MND	6.80E-14	-1.15E-09
Acidification	[kg SO ₂ -Equiv.]	8.67E-02	1.53E-03	2.44E-03	MND	0.00E0	1.37E-04	MND	2.18E-04	-6.93E-02
Eutrophication	[kg N-Equiv.]	2.28E-03	1.49E-04	5.03E-04	MND	0.00E0	1.33E-05	MND	8.47E-05	-1.35E-03
Smog Air	[kg O ₃ -Equiv.]	7.16E-01	4.79E-02	1.14E-02	MND	0.00E0	4.28E-03	MND	6.01E-04	-6.02E-01
Abiotic Depletion for fossil resources	[MJ surplus energy]	1.62E+01	6.87E-01	1.04E-01	MND	0.00E0	6.14E-02	MND	6.49E-03	-1.28E+01

CML 2001-April 2013 - Aluminum Geared Hinge

Results of the LCA - Environmental Impact, CML2001 - Apr. 2013										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global Warming Potential	[kg CO ₂ -Equiv.]	1.52E+01	3.69E-01	7.78E-01	MND	0.00E0	3.30E-02	MND	3.64E-02	-1.28E+01
Ozone Layer Depletion Potential	[kg R11-Equiv.]	1.23E-09	2.98E-12	9.04E-13	MND	0.00E0	2.66E-13	MND	6.40E-14	-1.08E-09
Acidification Potential	[kg SO ₂ -Equiv.]	9.33E-02	1.18E-03	1.51E-03	MND	0.00E0	1.26E-05	MND	2.29E-05	-4.38E-03
Eutrophication Potential	[kg Phosphate-Equiv.]	4.48E-03	3.04E-04	6.54E-04	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
Photochem. Ozone Creation Potential	[kg Ethene-Equiv.]	5.57E-03	1.41E-04	4.12E-04	MND	0.00E0	4.57E-01	MND	5.19E-02	-1.48E+02
Abiotic Depletion	[kg Sb-Equiv.]	1.84E-04	5.41E-08	1.78E-08	MND	0.00E0	7.56E-03	MND	3.29E-03	-5.63E+01
Abiotic Depletion for fossil resources	[MJ surplus energy]	1.52E+01	3.69E-01	7.78E-01	MND	0.00E0	3.30E-02	MND	3.64E-02	-1.28E+01



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Resource Use - Aluminum Geared Hinge

Results of the LCA - Resource Use										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	6.85E+01	8.45E-02	4.40E-02	MND	0.00E0	7.56E-03	MND	3.29E-03	-5.63E+01
PERM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
PERT	MJ, net calorific value	6.85E+01	8.45E-02	4.40E-02	MND	0.00E0	7.56E-03	MND	3.29E-03	-5.63E+01
PENRE	MJ, net calorific value	1.85E+02	5.11E+00	8.21E-01	MND	0.00E0	4.57E-01	MND	5.19E-02	-1.48E+02
PENRM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	1.85E+02	5.11E+00	8.21E-01	MND	0.00E0	4.57E-01	MND	5.19E-02	-1.48E+02
SM	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
RSF	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
NRSF	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
FW	M ³	6.20E+01	1.66E-02	2.19E-02	MND	0.00E0	1.48E-03	MND	1.70E-03	-6.11E+01

Key			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of non renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERM	Use of renewable primary energy resources used as raw materials	SM	Use of secondary materials
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	RSF	Use of renewable secondary fuels
PENRE	Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials	NRSF	Use of non renewable secondary fuels
PENRM	Use of non renewable primary energy resources used as raw materials	FW	Net use of fresh water



ENVIRONMENTAL PRODUCT DECLARATION



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Outputs and Waste - Aluminum Geared Hinge

Results of the LCA - Waste and Output Flows										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
NHWD	Kg	4.62E+01	4.86E-02	7.88E-01	MND	0.00E0	4.34E-03	MND	6.96E-02	-4.08E+01
RWD	Kg	3.35E-03	1.08E-05	6.98E-06	MND	0.00E0	-9.62E-07	MND	-5.28E-07	2.71E-03
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	-1.61E-05	MND	-6.49E-02	3.27E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	4.34E-03	MND	6.96E-02	-4.08E+01
MET	Kg	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	9.62E-07	MND	5.28E-07	-2.71E-03
EEE	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00
EET	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	0.00E0	0.00E+00	MND	0.00E+00	0.00E+00

Key			
HWD	Disposed-of-hazardous waste	MFR	Materials for recycling
NHWD	Disposed-of non-hazardous waste	MET	Materials for energy recovery
RWD	Disposed-of Radioactive waste	EEE	Exported electrical energy
CRU	Components for reuse	EET	Exported thermal energy



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Comparability of EPDs

Results presented in this EPD are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Results are not intended to be used to determine superiority of one product over another.

Environmental declarations from different programs may not be comparable.

Life Cycle Assessment Interpretation

A Dominance Analysis evaluates each life cycle stage and compares the impacts from that stage to the sum of the impacts calculated for all declared modules. A Dominance Analysis was completed for the TRACI and CML results. Module D was excluded from the Dominance Analysis.

The dominance analysis shows that the Production Stage (A1-A3) of the life cycle is responsible for the majority of impacts (75-99%, on average) across all impact categories. A1-A3 includes the extraction, processing and sourcing of all materials. The Transportation phase (A4) and the Installation phase (A5) are the second and third most impactful stages.

It is important to note that data quality may have an impact on the results of an LCA. Overall data quality is considered good. Improvements can be made through the modification of datasets to incorporate more regional specificity, both in terms of energy and technology. Additionally, the extrusion of both metals and plastics were treated using a generic dataset linked to region specific energy, water and waste data. Utilizing Allegion-specific upstream data provided by suppliers would lead to improvement in data quality. However, the data used in this assessment was considered appropriate in relation to the goal, scope and budget of the project.

References

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3. Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Product Group, Builders Hardware UL9004. Version: April 3rd, 2014.
4. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.

