

ENVIRONMENTAL PRODUCT DECLARATION

NATIONAL GUARD PRODUCTS

CONTINUOUS HINGES



At NGP, we are committed to providing products and services that are environmentally sound throughout the entire production process and the product life cycle.

Our environmental policy states:

#1 - We meet or exceed legal requirements and act with integrity, honesty, and transparency in everything we do.

#2 - We develop strategies to reduce consumption of resources, prevent pollution by understanding how our decisions and actions affect the continued long-term success of the company.

#3 - We continuously seek ways to improve the environment and to reduce risks that can cause accidents and pollution and expect the same of our suppliers.

#4 - We engage in open communication of sustainability programs with our stakeholders and adapt to the needs of our customers, associates, suppliers and vendors.



ENVIRONMENTAL PRODUCT DECLARATION






National Guard Products
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	National Guard Products	
DECLARATION NUMBER	4786853254.104.1	
DECLARED PRODUCT	Continuous Hinges	
REFERENCE PCR	Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Product Group, Builders Hardware UL9004. Version: April 3 rd , 2014	
DATE OF ISSUE	November 30, 2016	
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:	Panel Review	
	Panel Chair: Dr. Lindita Bushi	
	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	
	 Thomas Gloria, Industrial Ecology Consultants	
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	 Thomas Gloria, Industrial Ecology Consultants	

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Product Description

Company

National Guard Products is known as a leading manufacturer of weather-stripping, thresholds, lite kits, louvers and glass for commercial wood and steel doors. Founded in 1935, NGP has become an ever advancing industry innovator, manufacturing a complete line of door seals, door thresholds, gasketing, intumescent fire seals, smoke seals, sound seals, door sweeps, door shoes, automatic door bottoms, lite kits, louvers, metal edges, astragals and finger guard products.

Product

Continuous hinges are hinges that run the full height of a door. They are aluminum alloy 6063-T6 anodized after being machined for bearing application. The design of the product evenly distributes the weight of the door along the full length of the frame. Continuous hinges are ideal for high frequency and heavy weight doors in new construction and retrofit applications.

Continuous hinges are designed to be 1" shorter than the full height of the door. For a standard 3'x7' door, a typical continuous hinge length is 6'11".

National Guard Product Continuous Hinge Products are certified Grade 1 to ANSI/BHMA 156.26-2012 for 150 lb. and 300 lb. doors.

Product Characterization

The product is provided to the customer through a fax, phone or email ordering system. The product is shipped directly to customers in packaging material that includes cardboard box, shipping labels and plastic materials. The amount of packaging materials is dependent on the size of the customer's order. Installation instructional sheets are provided. Accessory materials, such as installation screws are provided with the product.

Technical Information

Declared unit: Declared unit is a 83" long hinge designed to be installed on a 7' tall door.

Application

General Standards:

1. ANSI/BHMA A156.26-2012

Other relevant standards include:

1. ANSI/UL10C: Postive Pressure Fire Tests of Door Assemblies - Fire-rated 90 minute on hollow metal (except steel stiffened) or wood door leafs up to 4' x 8' and steel stiffened doors up to 4' x 7'2".

Delivery Status

The dimension and quantities of the product at delivery are dependent on the requirements of the customer. NGP products are manufactured to customer specifications. For the purposes of this EPD it is assumed that the customer orders a 83" continuous hinge for a standard 7' tall door. The most common delivery sizes of the completed product in shipping boxes are 3.125" x 1.4375" x 87", 3.125" x 1.4375" x 121" and 3.25" x 3.50" x 121".



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Base Materials

	Light Weight Product			Heavy Weight Product		
	Light Weight Product (lbs)	Light Weight Product (kgs)	% of Light Weight Product	Heavy Weight Product (lbs)	Heavy Weight Product (kgs)	% of Heavy Weight Product
Aluminum	6.411	2.908	97.81%	9.158	4.154	98.45%
Bearings	0.138	0.063	2.11%	0.138	0.063	1.49%
Graphite Slip Plate #3	0.003	0.001	0.04%	0.003	0.001	0.03%
Stainless Steel Screw Set	0.003	0.001	0.04%	0.003	0.001	0.03%
Total	6.555	2.974	100%	9.301	4.219	100.00%

Manufacturing

Manufacturing occurs at NGP's Memphis location. The manufacturing processing includes cutting the aluminum base materials to size specifications and machining the final hinge product. Machining includes drilling to counter sink fasteners and notching to set bearings. The final product is anodized.

Once manufacturing is completed, the final product is then placed in a box with a screw pack. There is only one hinge per box. Multiple boxed hinges may be shipped together on pallets if order is sufficiently large enough. Palletized shipments are wrapped in plastic film.

Electricity is the primary energy source utilized during manufacturing, although some natural gas is utilized.

Environment and Health During Manufacturing

NGP meets all federal and state standards related to the Environment and Health during manufacturing. Additionally National Guard Products employs a strict waste minimization and recycling program that reduces and recycles waste produced in the manufacturing process.

Packaging

Packaging is dependent on the size of the customer's order. Packaging typically includes cardboard box and plastic protective sleeves. Wooden pallet skids are utilized when a customer's order is large enough to warrant its use. All materials are recyclable at the site of installation.



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Product Installation

Product is installed using the screw packet supplied with the product. These screws are provided in a thin plastic sleeve. Unless hinges are field cut, this is the only waste generated in the installation phase. Screws can be installed using a manual or electric screwdriver. If an electric screwdriver is used electric energy becomes part of the life cycle footprint of the product. However, this energy use is minimal relative to other phases of the life cycle.

Full installation instructions are provided by National Guard Products with each order. Failure to install according to the manufacturer's installation instructions or the use of any fasteners other than those supplied by the manufacturer will void the warranty.

Environment and Health During Use

There are no environment and health considerations during use.

Re-use Stage

National Guard Products offers an end-of-use recycling program. Contact us regarding our end-of-use product recycling program.

Disposal

Although NGP recommends that products are recycled at the end of their useful life, continuous hinges can be disposed of in common municipal landfills without additional requirements.



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Life Cycle Assessment

Declared Unit

	Value (low weight product)	Value (Avg. weight product)	Value (High weight product)	Unit
Continuous Hinge	2.11	2.11	2.11	Meters
Weight per	2.973	3.596	4.218	Kg
Fasteners	.001	.001	.001	Kg
Declared Unit	2.974	3.597	4.219	Kg

System Boundary

According to table 3 of the PCR, 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 continuous hinges 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
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 mapped distance.
C3	EOL: Waste Processing	Waste processing not required. All waste can be processed as-is.
C4	EOL: Disposal	Assumes all products are sent to landfill. Landfill impacts modeled based on secondary data.
D	Benefits beyond system	Recycling benefits of Aluminum



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Estimates and Assumptions

Secondary data used in lieu of primary data for manufacturing. – Primary data for manufacturing energy could not be used because full manufacturing has not commenced. It was determined appropriate and accurate within the confines of the goal and scope of the LCA to substitute GaBi datasets for primary data that wasn't available.

Raw material dataset choices – The dataset choices for the bearings and graphite slip plate were not of high quality when compared to other dataset choices in the LCA. However, the choices were determined appropriate because the choices were made based on the best information available to the LCA practitioner. Additionally, the slip plate and the bearings have a small impact of the overall life cycle when compared to the aluminum raw materials.

Recycled content – A handful of National Guard Products' have recycled content. However, all products were model with virgin materials. This was considered a more conservative approach since products with recycled content were being averaged with products without recycled content.

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.

Cut-off Criteria

All inputs in which data were available were included.

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 functional unit.

List of excluded materials and energy inputs include:

- There were no excluded material and energy inputs in primary data. This was achieved due to the relative simplicity of the products supplied by National Guard Products.
- 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 Builder Hardware 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 7.2 was used to complete the assessment.

Data Quality

Geographical Coverage

The geographical scope of the manufacturing portion of the life cycle is Memphis, TN. This is National Guard Products' only manufacturing facility. No primary data were collected from this location. As described above, full manufacturing of continuous hinge products had not commenced when this study began. As such, proxy data from GaBi datasets was used. The geographic coverage of primary data is considered good.

The geographical scope of the raw material acquisition, customer distribution, site installation and use portions of the life cycle is the United States of America. Locations and shipping distance values were determined through the analysis of supplier documentation, including SDS/MSDS sheets. This data is considered good.



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Disposal and end-of-life geographic coverage (i.e. site of disposal location) was assumed based on research relating to the average distance an American lives from a landfill. This data is considered good.

Time Coverage

Primary data related to the product's bill of materials were provided by National Guard Products' associates and represent current product design.

Primary data related to energy use was not collected directly from site because of the limited manufacturing history of the product. As such, proxy data available in GaBi was used. It was confirmed that all proxy data used met the requirement of the PCR that the data be within the last 5 years. Time coverage of this data is considered very 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 2002 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.

Technological Coverage

Primary data related to manufacturing technology was not collected directly from the site because of the limited manufacturing history of the product. As such, proxy data available in GaBi was used. It was confirmed that all proxy data used was a reasonable substitution for the manufacturing technology that will be employed at National Guard Products. In selecting proxy data, technology coverage was given priority over geographical coverage. Technological coverage of this data is considered good.

Data necessary to model cradle-to-gate unit processes was sourced from thinkstep LCI datasets. Technological coverage of the datasets is considered good relative to the actual supply chain of National Guard Products. While improved life cycle data from suppliers would improve technological coverage, the use of lower quality generic datasets does meet the goal of this LCA.

Allocation Procedures

General principles of allocation were based on ISO14044. Where possible, allocation was avoided. When allocation was necessary, it was done on a physical mass basis.

LCA Results

The following tables disclose the life cycle results for NGP's Continuous Hinge product line. Impact categories were determined through reference to the BHMA Product Category Rules for Builder Hardware (UL9004).



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LCA Results - Light Weight Product

TRACI 2.1 – Light Weight Product

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.]	2.71E+01	7.11E-01	3.39E+00	MND	MND	3.93E-02	MND	1.35E+00	-3.31E+01
Ozone Depletion Air	[kg CFC 11-Equiv.]	1.36E-08	6.13E-12	4.64E-12	MND	MND	3.39E-13	MND	2.71E-12	-2.23E-08
Acidification	[kg SO ₂ -Equiv.]	1.20E-01	2.97E-03	1.16E-02	MND	MND	1.64E-04	MND	8.70E-03	-1.77E-01
Eutrophication	[kg N-Equiv.]	6.41E-03	2.88E-04	2.40E-03	MND	MND	1.59E-05	MND	3.37E-03	-3.91E-03
Smog Air	[kg O ₃ -Equiv.]	1.44E+00	9.26E-02	5.32E-02	MND	MND	5.12E-03	MND	2.34E-02	-1.81E+00
Abiotic Depletion for fossil resources	[MJ surplus energy]	3.65E+01	1.33E+00	5.06E-01	MND	MND	7.34E-02	MND	2.59E-01	-3.26E+01

CML 2001-April 2013 – Light Weight Product

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.]	2.71E+01	7.11E-01	3.39E+00	MND	MND	3.93E-02	MND	1.35E+00	-3.31E+01
Ozone Layer Depletion Potential	[kg R11-Equiv.]	1.28E-08	5.76E-12	4.36E-12	MND	MND	3.18E-13	MND	2.55E-12	-2.07E-08
Acidification Potential	[kg SO ₂ -Equiv.]	1.22E-01	2.28E-03	7.19E-03	MND	MND	1.26E-04	MND	3.16E-03	-1.86E-01
Eutrophication Potential	[kg Phosphate-Equiv.]	1.05E-02	5.88E-04	3.11E-03	MND	MND	3.25E-05	MND	3.73E-03	-9.99E-03
Photochem. Ozone Creation Potential	[kg Ethene-Equiv.]	8.38E-03	2.73E-04	1.98E-03	MND	MND	1.51E-05	MND	9.11E-04	-1.05E-02
Abiotic Depletion	[kg Sb-Equiv.]	1.72E-05	1.05E-07	8.65E-08	MND	MND	5.79E-09	MND	5.11E-08	-1.40E-05
Abiotic Depletion for fossil resources	[MJ surplus energy]	3.77E+02	9.83E+00	3.89E+00	MND	MND	5.44E-01	MND	2.01E+00	-3.41E+02



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Resource Use – Light Weight Product

Results of the LCA - Resource Use										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	1.61E+02	1.63E-01	2.13E-01	MND	MND	9.04E-03	MND	1.31E-01	-1.28E+02
PERM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PERT	MJ, net calorific value	1.61E+02	1.63E-01	2.13E-01	MND	MND	9.04E-03	MND	1.31E-01	-1.28E+02
PENRE	MJ, net calorific value	4.64E+02	9.89E+00	3.98E+00	MND	MND	5.46E-01	MND	2.07E+00	-4.25E+02
PENRM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	4.64E+02	9.89E+00	3.98E+00	MND	MND	5.46E-01	MND	2.07E+00	-4.25E+02
SM	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00
FW	M ³	2.72E+02	3.20E-02	1.06E-01	MND	MND	1.77E-03	MND	6.77E-02	-2.52E+02

Key			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of nonrenewable 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 nonrenewable primary energy excluding non-renewable primary energy resources used as raw materials	NRSF	Use of nonrenewable secondary fuels
PENRM	Use of nonrenewable primary energy resources used as raw materials	FW	Net use of fresh water



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Outputs and Waste – Light Weight Product

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	MND	0.00E+00	MND	0.00E+00	0.00E+00
NHWD	Kg	4.69E+01	9.39E-02	3.85E+00	MND	MND	5.19E-03	MND	2.77E+00	-5.71E+01
RWD	Kg	3.40E-02	2.08E-05	3.37E-05	MND	MND	1.15E-06	MND	2.10E-05	3.44E-02
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MET	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
EEE	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00

Key			
HWD	Disposed-of hazardous waste	MFR	Materials for recycling
NHWD	Disposed-of nonhazardous 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 – Heavy Weight Product

TRACI 2.1 – Heavy Weight Product

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.]	3.96E+01	8.29E-01	3.39E+00	MND	MND	5.58E-02	MND	1.91E+00	-4.70E+01
Ozone Depletion Air	[kg CFC 11-Equiv.]	1.93E-08	7.14E-12	4.64E-12	MND	MND	4.80E-13	MND	3.85E-12	-3.17E-08
Acidification	[kg SO ₂ -Equiv.]	1.65E-01	3.46E-03	1.16E-02	MND	MND	2.33E-04	MND	1.23E-02	-2.51E-01
Eutrophication	[kg N-Equiv.]	7.87E-03	3.36E-04	2.40E-03	MND	MND	2.26E-05	MND	4.79E-03	-5.55E-03
Smog Air	[kg O ₃ -Equiv.]	1.96E+00	1.08E-01	5.32E-02	MND	MND	7.26E-03	MND	3.33E-02	-2.57E+00
Abiotic Depletion for fossil resources	[MJ surplus energy]	4.93E+01	1.55E+00	5.06E-01	MND	MND	1.04E-01	MND	3.67E-01	-4.63E+01

CML 2001-April 2013 – Heavy Weight Product

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.]	3.96E+01	8.29E-01	3.39E+00	MND	MND	5.58E-02	MND	1.91E+00	-4.70E+01
Ozone Layer Depletion Potential	[kg R11-Equiv.]	1.81E-08	6.72E-12	4.36E-12	MND	MND	4.52E-13	MND	3.62E-12	-2.94E-08
Acidification Potential	[kg SO ₂ -Equiv.]	1.68E-01	2.66E-03	7.19E-03	MND	MND	1.79E-04	MND	4.48E-03	-2.64E-01
Eutrophication Potential	[kg Phosphate-Equiv.]	1.36E-02	6.86E-04	3.11E-03	MND	MND	4.61E-05	MND	5.29E-03	-1.42E-02
Photochem. Ozone Creation Potential	[kg Ethene-Equiv.]	1.14E-02	3.19E-04	1.98E-03	MND	MND	2.14E-05	MND	1.29E-03	-1.49E-02
Abiotic Depletion	[kg Sb-Equiv.]	2.25E-05	1.22E-07	8.65E-08	MND	MND	8.21E-09	MND	7.25E-08	-1.98E-05
Abiotic Depletion for fossil resources	[MJ surplus energy]	5.15E+02	1.15E+01	3.89E+00	MND	MND	7.71E-01	MND	2.86E+00	-4.84E+02



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Resource Use – Heavy Weight Product

Results of the LCA - Resource Use										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	2.13E+02	1.91E-01	2.13E-01	MND	MND	1.28E-02	MND	1.86E-01	-1.81E+02
PERM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PERT	MJ, net calorific value	2.13E+02	1.91E-01	2.13E-01	MND	MND	1.28E-02	MND	1.86E-01	-1.81E+02
PENRE	MJ, net calorific value	6.37E+02	1.15E+01	3.98E+00	MND	MND	7.75E-01	MND	2.93E+00	-6.03E+02
PENRM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	6.37E+02	1.15E+01	3.98E+00	MND	MND	7.75E-01	MND	2.93E+00	-6.03E+02
SM	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00
FW	M ³	3.89E+02	3.73E-02	1.06E-01	MND	MND	2.51E-03	MND	9.60E-02	-3.57E+02

Key			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of nonrenewable 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 nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	NRSF	Use of nonrenewable secondary fuels
PENRM	Use of nonrenewable primary energy resources used as raw materials	FW	Net use of fresh water



ENVIRONMENTAL PRODUCT DECLARATION



National Guard Products
Continuous Hinges

According to ISO 14025

Outputs and Waste – Heavy Weight Product

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	MND	0.00E+00	MND	0.00E+00	0.00E+00
NHWD	Kg	6.59E+01	1.09E-01	3.85E+00	MND	MND	7.36E-03	MND	3.93E+00	-8.10E+01
RWD	Kg	4.81E-02	2.43E-05	3.37E-05	MND	MND	1.63E-06	MND	2.98E-05	4.89E-02
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MET	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
EEE	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00

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



ENVIRONMENTAL PRODUCT DECLARATION



National Guard Products
Continuous Hinges

According to ISO 14025

LCA Results -Average Weight Product

TRACI 2.1 – Average Weight Product

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.]	3.33E+01	7.70E-01	3.39E+00	MND	MND	4.75E-02	MND	1.63E+00	-4.01E+01
Ozone Depletion Air	[kg CFC 11-Equiv.]	1.64E-08	6.63E-12	4.64E-12	MND	MND	4.10E-13	MND	3.28E-12	-2.70E-08
Acidification	[kg SO ₂ -Equiv.]	1.42E-01	3.21E-03	1.16E-02	MND	MND	1.98E-04	MND	1.05E-02	-2.14E-01
Eutrophication	[kg N-Equiv.]	7.14E-03	3.12E-04	2.40E-03	MND	MND	1.93E-05	MND	4.08E-03	-4.73E-03
Smog Air	[kg O ₃ -Equiv.]	1.70E+00	1.00E-01	5.32E-02	MND	MND	6.19E-03	MND	2.83E-02	-2.19E+00
Abiotic Depletion for fossil resources	[MJ surplus energy]	4.29E+01	1.44E+00	5.06E-01	MND	MND	8.88E-02	MND	3.13E-01	-3.95E+01

CML 2001-April 2013 – Average Weight Product

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.]	3.33E+01	7.70E-01	3.39E+00	MND	MND	4.75E-02	MND	1.63E+00	-4.01E+01
Ozone Layer Depletion Potential	[kg R11-Equiv.]	1.55E-08	6.24E-12	4.36E-12	MND	MND	3.85E-13	MND	3.08E-12	-2.51E-08
Acidification Potential	[kg SO ₂ -Equiv.]	1.45E-01	2.47E-03	7.19E-03	MND	MND	1.53E-04	MND	3.82E-03	-2.25E-01
Eutrophication Potential	[kg Phosphate-Equiv.]	1.20E-02	6.37E-04	3.11E-03	MND	MND	3.93E-05	MND	4.51E-03	-1.21E-02
Photochem. Ozone Creation Potential	[kg Ethene-Equiv.]	9.89E-03	2.96E-04	1.98E-03	MND	MND	1.83E-05	MND	1.10E-03	-1.27E-02
Abiotic Depletion	[kg Sb-Equiv.]	1.98E-05	1.13E-07	8.65E-08	MND	MND	7.00E-09	MND	6.18E-08	-1.69E-05
Abiotic Depletion for fossil resources	[MJ surplus energy]	4.46E+02	1.06E+01	3.89E+00	MND	MND	6.57E-01	MND	2.44E+00	-4.12E+02



ENVIRONMENTAL PRODUCT DECLARATION



National Guard Products
Continuous Hinges

According to ISO 14025

Resource Use – Average Weight Product

Results of the LCA - Resource Use										
Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ, net calorific value	1.87E+02	1.77E-01	2.13E-01	MND	MND	1.09E-02	MND	1.58E-01	-1.54E+02
PERM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PERT	MJ, net calorific value	1.87E+02	1.77E-01	2.13E-01	MND	MND	1.09E-02	MND	1.58E-01	-1.54E+02
PENRE	MJ, net calorific value	5.50E+02	1.07E+01	3.98E+00	MND	MND	6.61E-01	MND	2.50E+00	-5.14E+02
PENRM	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	5.50E+02	1.07E+01	3.98E+00	MND	MND	6.61E-01	MND	2.50E+00	-5.14E+02
SM	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00
FW	M ³	3.31E+02	3.47E-02	1.06E-01	MND	MND	2.14E-03	MND	8.19E-02	-3.05E+02

Key			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of nonrenewable primary energy resources (primary energy and primary energy resources used as raw materials)
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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 nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	NRSF	Use of nonrenewable secondary fuels
PENRM	Use of nonrenewable primary energy resources used as raw materials	FW	Net use of fresh water



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National Guard Products
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Outputs and Waste – Average Weight Product

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	MND	0.00E+00	MND	0.00E+00	0.00E+00
NHWD	Kg	5.64E+01	1.02E-01	3.85E+00	MND	MND	6.28E-03	MND	3.35E+00	-6.91E+01
RWD	Kg	4.11E-02	2.25E-05	3.37E-05	MND	MND	1.39E-06	MND	2.54E-05	4.16E-02
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
MET	Kg	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	MND	0.00E+00	0.00E+00
EEE	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	MND	MND	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	MND	0.00E+00	MND	0.00E+00	0.00E+00

Key			
HWD	Disposed-of hazardous waste	MFR	Materials for recycling
NHWD	Disposed-of nonhazardous 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

The comparison of the environmental performance of Builders Hardware using the EPD information shall be based on the product's use in and its impacts on or within the building, and shall consider the complete life cycle with all information modules.

Full conformance with the PCR for North American Builders Hardware products allows EPD comparability only when all stages of a Builders Hardware product's life cycle have been considered. However, variations and deviations are possible.

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 results for continuous hinge products.

For Continuous Hinge products the A1-A3 life cycle stage (extraction, processing, sourcing of raw material and manufacturing) is responsible for the vast majority of impacts (60-90%) across all impact categories. Most of this impact comes from the aluminum body of the continuous hinge. The A5 stage (shipping to customer) is the second most impactful life cycle stage.



ENVIRONMENTAL PRODUCT DECLARATION



National Guard Products
Continuous Hinges

According to ISO 14025

References

1. *Life Cycle Assessment, National Guard Products, Product Categories Continuous Hinges. WAP Sustainability Consulting. May. 2016.*
2. Product Category Rule (PCR) for preparing an Environmental Product Declaration (EPD) for Product Group, Builders Hardware UL9004. Version: April 3rd, 2014.
3. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
4. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.