Environmental Product Declaration

Norton 5800 Series ADAEZ®

Low Energy Door Operator

The 5800 Series ADAEZ is a regenerative power door operator for moderate to high traffic applications.

ASSA ABLOY is committed to providing products and services that are environmentally sound throughout the entire production process and the product lifecycle. Our unconditional aim is to make sustainability a central part of our business philosophy and culture, but even more important is the job of integrating sustainability into our business strategy. The employment of EPDs will help architects, designers and LEED-APs select environmentally preferable door openings.

ASSA ABLOY will continue our efforts to protect the environment and health of our customers/end users and will utilize the EPD as one means to document those efforts.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

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	ASSA ABLOY/Norton Door Controls
DECLARATION NUMBER	478714321.139.1
DECLARED PRODUCT	Norton 5800 Series ADAEZ®
REFERENCE PCR	Builders Hardware PCR UL 9004
DATE OF ISSUE	August 8, 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 manufacturing Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications
The PCR review was conducted by	Peer Review Panel, epd@ul.com
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ 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 Definition and Information

Product Description

Product name: 5800 Series ADAEZ® Low Energy Operator
Product characteristic: Door Operator
The 5800 Series Low Energy Operator is one of the word's only regenerative power door operators. Addtional features include:
- Mounts on door
- Regenerative drive or continuous duty operation
- Non-handed
- 95 degree door opening
- Push and pull side mounting
- RF Radio Frequency stainless steel push buttons
- Integral RF receiver
- 24 VDC input port
- Built-in ON/OFF Switch
- 2 Year Warranty
- Required mounting screws and installation instructions included

Application

The 5800 Series ADAEZ is ideal for commercial, high traffic and manual opening applications that occasionally require automatic operation. A regenerative drive system charges an onboard battery pack, eliminating the need for electrical

Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data	
Door Weight	250 lb maximum
Door Width	48" maximum
Opening Angle	95 degree maximum
Closer Height	8" (203 mm)
Closer Width	8" (203 mm)
Closer Depth	3.5" (89 mm)
Energy Savings (Verified by GreenCircle Certified)	91% efficient (plug-in) 100% efficient (wireless)

Placing on the Market / Application Rules

The standards that can be applied for the 5800 Series ADAEZ Low Energy Operator are:
- ANSI/BHMA A156.19 - American National Standard for Power Assist & Low Energy Power Operated Doors
- UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems
- UL 991 - Standard for Tests for Saftey-Related Controls Employing Solid-State Devices.
- UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies (90 min)
- Americans with Disabilities Act (A.D.A) and ANSI 117.1
- RCC 47CFR 15C and RSS210 (Wireless Interface Module ADA1028W)

Delivery Status

5800 Series ADAEZ Low Energy Operator are delivered in a cardboard box along with installation and operational instructions.

Base Materials / Ancilary Materials

Material	Percentage in mass (%)
Brass	0.11%
Stainless Steel	7.58%
Steel	43.35%
Aluminum	23.65%
Electronics/Mechanics	9.19%
Plastics	8.77%
Other	7.35%
Total	100.00%

Manufacture

The primary manufacturing processes are made by Tier 1 suppliers and the final manufacturing processes occur in Monroe, NC. The components come from processes like stamped steel, turning, and aluminum extrusion.

Environmental and Health During Manufacturing

ASSA ABLOY is committed to producing and distributing door opening solutions with minimal environmental impact, where health & safety is the primary focus for all employees and associates.
• Environmental operations, GHG, energy, water, waste, VOC, surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and environment management program effectiveness is evaluated.
• Code of Conduct covers human rights, labor practices and decent work. Management of ASSA ABLOY is aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
• Any waste metals during machining are separated and recycled. The waste from the water-based painting process is delivered to waste treatment plant.
• The factory in Monroe, NC has certification of Environmental Management to ISO 14001:2004 and Occupational Health and Safety to OHSAS 18001:2007.

Product Processing / Installation

Norton 5800 operators are sold through various distributors and wholesalers and are recommneded to be installed by trained installation technicians, such as locksmiths, carpenters, etc. adhering to local/national standards and requirements, but can also be installed by non-skilled laborers. In any case, the installation must be done in line with instructions provided by the manufacturer.

Packaging

5800 Series ADAEZ Low Energy Operator are delivered in a cardboard box along with installation and operational instructions.

Material	Quantity (% By Weight)
Cardboard	97%
Other	3%
Total	**100%**

Conditions of Use

An opening utilizing the 5800 ADAEZ Operator may be opened either manually or automatically. For applications with 25% or less automatic use and more than 80 door cycles per day, the Regenerative Drive System charges an onboard battery pack and requires no external power. For applications requiring automatic use for over 25% of door cycles, a 24VDC Power Supply may be used. No cleaning or annual maintenance is required, although a daily safety check should be performed.

Environmental and Health During Use

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

Reference Service Life

The reference service life is 10 years

Extraordinary Effects

Fire
No negative environmental impact will result from exposure to fire. Suitable for use in fire and smoke doors (listed under UL10C - 90 min).

Water
Contains no substances that have any impact on water in case of flood. Electric operation of the device will be impacted

Mechanical Destruction
No danger to the environment can be anticipated during mechanical destruction.

Re-use Phase

The product can be moved from one door to another during the reference service life, thus enabling re-use.

Disposal

The product can be mechanically dissembled to separate the different materials. 84% of the materials used are recyclable. The remainder of components are disposed of according to standard municipal solid waste deposition.

Further Information

Norton Door Controls, an ASSA ABLOY Group company
3000 Highway 74 East
Monroe, NC 28112

Life Cycle Assessment

Declared Unit

The declaration refers to the functional unit of 1 unit (or piece) of Norton 5800 Series ADAEZ®, as specified in the Builders Hardware PCR

Name	Value	Unit
Declared unit	1	Door Operator
Mass	8.124	kg
Conversion factor to 1 kg	0.123	-

System Boundary

This is a cradle to gate with options Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Estimates and Assumptions

End of Life
In the End of Life phase, for all the materials which can be recycled, a recycling scenario with 100% collection rate was assumed.

Cut-off Criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1% of mass or energy (if available). In case a specific flow contributing less than 1% in mass or energy is not available, worst case assumption proxies are selected to represent the respective environmental impacts. Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

Background data

For life cycle modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by thinkstep, is used GaBi 6 2013. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation GaBi 6 2013D. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of 2016.

Allocation

Allocation was determined on a per unit basis.

Comparability

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental delarations from different programs may not be comparable. 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.

LCA: Modeling Scenarios and Additional Technical Information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared.

Installation into the building (A5)		
Name	**Value**	**Unit**
Auxiliary	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substance following waste treatment on-site	1.05	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	10	years

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	8.12	kg
Collected as mixed construction waste	0.00	kg
Reuse	0.00	kg
Recycling	4.85	kg
Energy recovery	0.65	kg
Landfilling	2.62	kg

LCA Results

Resutls shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	4.4E+01	6.0E-01	2.0E-01	3.8E-02	2.5E-03	8.8E-03	-8.0E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	4.1E-07	2.3E-11	4.5E-13	1.4E-12	8.5E-14	1.0E-14	2.6E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	2.8E-01	3.6E-03	1.1E-03	2.3E-04	1.5E-05	4.0E-05	-1.8E-02
EP	Eutrophication potential	kg N-Eq.	1.8E-02	2.0E-04	1.9E-04	1.3E-05	7.3E-07	1.5E-05	-1.6E-04
SP	Smog formation potential	kg O_3-Eq.	3.0E+00	1.0E-01	9.9E-03	6.2E-03	3.6E-04	1.6E-04	-1.9E-01
FFD	Fossil Fuel Depletion	MJ-surplus	4.5E+01	1.1E+00	6.4E-02	6.7E-02	4.0E-03	1.3E-03	-2.1E-02

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	4.4E+01	6.0E-01	1.2E+00	3.8E-02	2.5E-03	1.0E-02	-8.0E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	3.8E-07	2.3E-11	4.4E-13	1.4E-12	8.4E-14	9.7E-15	2.3E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	3.0E-01	3.0E-03	7.1E-04	1.9E-04	1.3E-05	1.5E-05	-1.8E-02
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	1.9E-02	5.3E-04	2.6E-04	3.3E-05	1.9E-06	1.7E-05	-5.7E-04
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	2.1E-02	3.5E-04	1.5E-04	2.2E-05	1.5E-06	4.1E-06	-3.8E-03
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	6.5E-04	2.5E-10	3.7E-08	1.6E-11	4.2E-12	4.2E-10	-7.5E-05
ADPF	Abiotic depletion potential for fossil resources	MJ	5.4E+02	7.6E+00	5.5E-01	4.8E-01	3.2E-02	1.1E-02	-8.5E+01

Results below contain the resource use throughout the life cycle of the product.

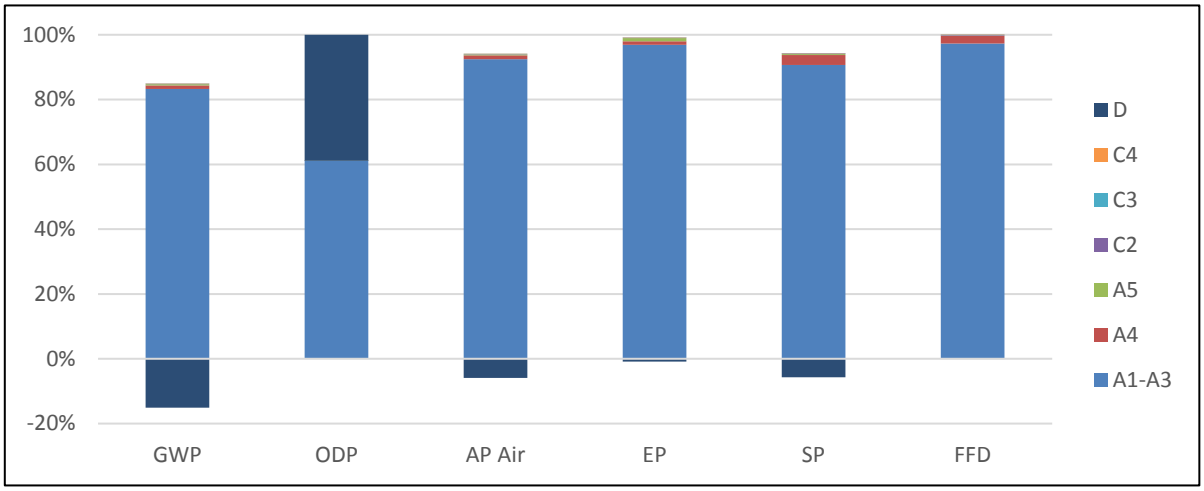
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	MJ	8.8E+01	0.0E+00	7.0E-02	0.0E+00	0.0E+00	9.0E-04	4.0E+00
PERM	Renewable primary energy resources as material utilization	MJ	2.0E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	Total use of renewable primary energy resources	MJ	1.1E+02	0.0E+00	7.0E-02	0.0E+00	0.0E+00	9.0E-04	4.0E+00
PENRE	Nonrenewable primary energy as energy carrier	MJ	6.1E+02	7.7E+00	5.8E-01	4.8E-01	3.3E-02	1.1E-02	-7.7E+01
PENRM	Nonrenewable primary energy as material utilization	MJ	2.0E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	Total use of nonrenewable primary energy resources	MJ	6.3E+02	7.7E+00	5.8E-01	4.8E-01	3.3E-02	1.1E-02	-7.7E+01
SM	Use of secondary material	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	7.1E+01	0.0E+00	3.7E-02	0.0E+00	0.0E+00	4.9E-04	-2.1E-02

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	**Parameter**	**Unit**	**A1-A3**	**A4**	**A5**	**C2**	**C3**	**C4**	**D**
HWD	Hazardous waste disposed	kg	2.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-3.9E-03
NHWD	Non-hazardous waste disposed	kg	1.4E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-01
RWD	Radioactive waste disposed	kg	2.3E-02	0.0E+00	1.4E-05	0.0E+00	0.0E+00	1.9E-07	2.4E-03
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MFR	Materials for recycling	kg	1.3E+00	0.0E+00	1.0E+00	0.0E+00	2.4E-02	0.0E+00	3.7E-02
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported electrical energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported thermal energy	MJ	6.1E-05	0.0E+00	9.8E-01	0.0E+00	0.0E+00	3.1E-03	0.0E+00

The production life cycle stage (A1-A3) dominates the impacts across all impact categories, with the exception of ozone depletion. This is due to the upstream production of metals and electronics used in the product, along with electricity use in the manufacturing of the product. Potential benefits are due to the potential avoided burden of recycled materials after disposal.



References

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- ISO 14044 — ISO 14044:2006-10, Environmental management — Life cycle assessment — Requirements and guidelines.
- EN 15804 — EN 15804:2012-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product
- ULE 2013 — UL Environment, General Program Instructions, 2013.
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- CML 2001 — Center of Environmental Science of Leiden University impact categories and characterisation methods for impact assessment (CML)
- ANSI/BHMA A156.19 — American National Standard for Power Assist & Low Energy Power Operated Doors
- UL 325 — Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems
- UL 991 — Standard for Test for Saftey-Related Controls Employing Solid-State Devices
- UL 10C — Standard for Positive Pressure Fire Tests of Doors and Assemblies
- A.D.A — Americans with Disabilities Act
- ANSI 117.1 — Standard for Accessible Buildings and Facilities
- FCC 47CFR — Code for Federal Regulations, Title 47, Part 15, Subpart C - Intentional Radiators
- RSS-210 — Radio Standard Specification - License Exempt Radio Apparatus: Category I Equipment