

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	Norton Door Controls
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ASA-20150069-IBA1-EN
Issue date	10.04.2015
Valid to	09.04.2020

Swinging door operator – Norton 6000 Series ASSA ABLOY /Norton Door Controls

www.bau-umwelt.com / <https://epd-online.com>



1. General Information

ASSA ABLOY

Programme holder

IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number

EPD-ASA-20150069-IBA1-EN

This Declaration is based on the Product Category Rules:

PCR Automatic doors, automatic gates, and revolving door systems (door systems), 07.2014

(PCR tested and approved by the independent expert committee (SVR))

Issue date

10.04.2015

Valid to

09.04.2020



Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)



Dr.-Ing. Burkhard Lehmann
(Managing Director IBU)

Swinging door operator – Norton 6000 Series

Owner of the Declaration

Norton Door Controls
3000 Hwy 74 East
Monroe, NC 28112
USA

Declared product / Declared unit

The declaration is valid for 1 Norton 6000 Series low energy swinging door operator, consisting of the following items:

- an operator assembly (2 pieces);
- arm or track assembly;
- accessories (instruction sheets, signage, mounting hardware, etc).

Scope:

This declaration and its LCA study are relevant to Norton 6000 low energy door operator.

The primary manufacturing processes are made by external suppliers and the final manufacturing processes and assembly for all door closer components occur at our manufacturing factory in Monroe, NC USA.

Verification

The CEN Standard EN 15804 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025

internally externally



Dr. Wolfram Trinius
(Independent verifier appointed by SVR)

2. Product

2.1 Product description

Product name: Norton 6000 Series Operator

Product characteristics: The Norton 6000 Series PowerMatic® operator combines intelligence, reliability and superior control in one package. Designed with the user in mind, this operator features simple to use electronics, an onboard power supply and easy integration into access control systems. It also includes:

- ease of installation and setup with simple instructions and LCD screen / joystick controller
- application versatility and ease of adjustment
- non-handed units

- push- or pull-side mounting
- interfaces with electric hardware and access control systems
- operates as mechanical surface closer during close cycle or if power is turned off
 - critical for fire-rated doors
 - clutch mechanism allows closer to function as a normal manual door closer
- operation activation options include:
 - wall switches
 - radio frequency devices
 - Push-and-Go
- obstruction detection in both closing and opening directions

- adjustable motor start delay
- adjustable vestibule delay
- adjustable hold open delay
- single pole double throw relay output
- blow open for smoke ventilation
- presence detector input
- On - Off - Infinite Hold Open selector mode switch

2.2 Application

Designed for moderate to high traffic applications, this operator has a two-piece sub-assembly for easy installation and LCD screen for clear and accurate read-out of operator settings. Available for push or pull side non-handed mounting, the Norton 6000 can be operated manually or activated via wall switches or radio frequency devices. This reliable unit ensures consistent opening and closing based on dual mode, electrohydraulic technology and is ideal for hospitals, office buildings, sports arenas or government facilities. And as structures become increasingly energy efficient, the Norton 6000 operator features a number of sustainable features and enhanced options to help minimize power usage and reduce air infiltration.

2.3 Technical Data

The product has the following technical properties:

Parameter	Value
Power Supply	120V AC +10%/-15%; 60Hz; 0.9A current draw
Auxiliary output power	24VDC @ 1.3A
Door Opening	6010/6050 (pull) - up to 110° 6020 (push - std arm) - up to 110° 6030 (push - std arm) - 110° to 180° 6060/6070 (push - heavy duty arm) - up to 110°
Door Weight	250 lbs (114 kg) max.
Door Swing Directions	Non-handed (left or right hand mounted)
Closing Speed	Variable between 180° - 10°
Latching Speed	Variable between 10° - 0°
Back check	Variable above 70°
Opening Angle	Up to 180° depending on arm application
Obstruction Detection	adjustable from 0 to 5 sec in both opening and closing cycles
Adjustable Motor Startup delay	adjustable from 0 to 10 sec
Adjustable Vestibule delay	adjustable from 0 to 30 sec
Adjustable Latch retraction	adjustable from 0 to 45 sec
Selector Mode Switch:	Off, On (activated by signal inputs), HO (infinite hold open)
Operates as mechanical closer during closing cycle if power is lost	
Single Pole Double Throw relay output	
Blow Open for smoke ventilation	
Presence Detector input	
Adjustments made through Joystick and settings shown on LCD screen	

2.4 Placing on the market / Application rules

The standards that can be applied for operators and relevant accessories are:

- ETL tested to UL/ULc standards for automatic doors used on fire and smoke barrier doors
- ETL tested to CSA C22.2 No 247 for operators and systems of doors
- ANSI/BHMA A156.19 certified
- Complies with ADA
- Meets requirements of UL10C for positive pressure
- California State Fire Marshall Listing 3266-0944:0110.

2.5 Delivery status

Operator units are delivered ready for installation in separate packages.

The operator unit including the packaging has the following dimensions: 889 mm x 210 mm x 184 mm.

2.6 Base materials / Ancillary materials

The average composition of Norton 6000 operator is as follows:

Component	Percentage in mass (%)
Aluminum	11.16
Brass	0.49
Steel	54.96
Zinc	1.31
Plastics	2.36
Electronic	1.73
Ele-mech	25.95
others	2.04
Total	100.0

2.7 Manufacture

The primary manufacturing processes are made by Tier 1 suppliers located in China, Taiwan, Mexico, and across USA and some primary and the final manufacturing processes for operator units occur at in factory Monroe, NC USA. Electronic component manufacturing processes are made by suppliers located in China, Japan, and USA.

Manufacturing of the operator unit consists of machining, die-casting, stamped steel, turning, and component manufacturing (springs, bearings, o-rings). Final manufacturing process includes turning, assembly, testing, painting, and packing of the door operator.

The factory of Monroe, NC USA has certification of Quality Management system in accordance with ISO 9001:2008.

Waste management at the Monroe, NC USA factory is in accordance with the plant's ISO9001 and ISO14001 standards:

- Office paper / cardboard recycling - covered under Solid Waste Recycling Program
- Plant paper / cardboard recycling - covered under Solid Waste Recycling Program
- General trash - covered by under Solid Waste Recycling Program

- Comingled recyclables - covered under Solid Waste Recycling Program
- Metals recycling - metal chips and dust - covered under Solid Waste Recycling Program
- Wood pallets - covered under Solid Waste Recycling Program

2.8 Environment and health during manufacturing

ASSA ABLOY and Norton Door Controls are 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 and Norton Door Controls are aware of their environmental roles and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.
- The factory in Monroe, NC USA has certification of Environmental Management to ISO 14001:2004.
- Any waste metals during machining are separated and recycled. The waste from the water-based painting process is delivered to waste treatment plant.

2.9 Product processing / Installation

Norton 6000 operators are sold through various distributors and wholesalers and are recommended 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.

2.10 Packaging

Norton 6000 operators are packed in cardboard packaging. Packaging includes two paper sheets (installation instruction and signage instructions) – all of which are fully recyclable.

More than 40% of carton is made from recycled material; 100% of paper documents are made from recycled material.

Material	Value (%)
Cardboard/paper	99.60
Plastic	0.40
Total	100.0

2.11 Condition of use

Annual inspection is recommended in order to guarantee correct functionality of the product and the door leaf. The inspection includes: checking, fixing screws to ensure they are properly tight, correct adjustments (closing speeds, force) and compliance with local legal inspection standards.

2.12 Environment 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.

2.13 Reference service life

Norton 6000 operator was developed to comply with ANSI/BHMA A156.19 standard and quality requirements. The warranty period of a Norton 6000 operator is 2 years, but the expected life is 10 years, dependent on frequency of cycles.

2.14 Extraordinary effects

Fire

Norton 6000 operator is tested for usage in fire and smoke protection doors per ETL to UL/ULc standards and CSA C22.2 No. 247.

Water

Operators include hydraulic oil and are designed for traditional locations and are not intended for flood protection. Unforeseeable flooding conditions will increase the potential for developing surface rust.

Mechanical destruction

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

2.15 Re-use phase

It is possible to re-use the product during the reference service life and it can be moved from one door to another. The majority, by weight, of components is steel and aluminum alloy, both can be recycled. The plastic components can be used for energy recovery within a waste incineration process.

Norton Door Controls has a Product End-of-Life Recycle Program where product can be returned to Norton for proper recycling/ disposal. Once received product is separated and recycled/ disposed of according to the Solid Waste Recycling Program guidelines.

2.16 Disposal

Lacquer and lubricants contained in the product were treated as a waste for landfill.

2.17 Further information

Norton Door Controls
3000 Hwy 74 East
Monroe, NC 28112 USA
Tel: +800-438-1951

www.nortondoortcontrols.com

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the functional unit of 1 piece of Norton 6000 Series Operator as specified in Part B requirements on the EPD for Doors, windows, shutters, and related products/IBU PCR Part B/.(PCR Automatic doors, automatic gates, and revolving door systems (door systems).

Declared unit

Name	Value	Unit
Declared unit	13.52 Kg	piece of operator
Conversion factor to 1 kg	0.074	

3.2 System boundary

Type of the EPD: cradle to gate - with Options
 The following life cycle phases were considered for Door Closer:

Production stage:

- A1 – Raw material extraction and processing
- A2 – Transport to the manufacturer and
- A3 – Manufacturing

A4-A5 Construction stage:

- A4 - Transport from the gate to the site
- A5 – Packaging waste processing

Use stage related to the operation of the building includes:

- B6 – Operational energy use

End-of-life stage:

- C2 – Transport to waste processing
- C3 – Waste processing for recycling and
- C4 – Disposal (landfill)

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.

- D - Declaration of all benefits or recycling potential from EOL and A5

3.3 Estimates and assumptions

In the End-of-Life phase a scenario with collection rate of 100% for all the recyclable materials was assumed.

3.4 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.

3.5 Background data

For life cycle modeling of the considered products, the GaBi 6 Software System for Life Cycle Engineering, developed by PE INTERNATIONAL AG, 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.

3.6 Data quality

The requirements for data quality and background data correspond to the specifications of the /IBU PCR PART A/.

PE INTERNATIONAL performed a variety of tests and checks during the entire project to ensure high quality of the completed project. This obviously includes an extensive review of project-specific LCA models as well as the background data used.

The technological background of the collected data reflects the physical reality of the declared products. The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.

All relevant background datasets are taken from the GaBi 6 software database. The last revision of the used background data has taken place not longer than 10 years ago.

3.7 Period under review

The period under review is 2013/14 (12 month average).

3.8 Allocation

Regarding incineration, the software model for the waste incineration plant (WIP) is adapted according to the material composition and heating value of the combusted material. In this EPD the following specific life cycle inventories for the WIP are considered:

- Waste incineration of plastic
- Waste incineration of paper
- Waste incineration of wood
- Waste incineration of electronic wastes.

Regarding the recycling material of metals, the metal parts in the EoL are declared as end-of-waste status.

Thus, these materials are considered in module D. Specific information on allocation within the background data is given in the GaBi dataset documentation.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the 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.

4. LCA: 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 (MND).

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (Paper packaging)	2.51	kg
Output substances following waste treatment on site (Plastic packaging)	0.02	kg

Reference service life

Name	Value	Unit
Reference service life	10	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	496.7	kWh
Days per year in use	365	d
Hours per day in on mode	2	h
Power consumption in on mode in W	108	W
Hours per day in stand-by mode	22	h
Power consumption in stand-by mode in W	10.8	W

End of life (C1-C4)

Name	Value	Unit
Collected separately Zinc, Brass, Copper, Steel, Stainless Steel, Plastic, Electro mechanics	13.25	kg
Collected as mixed construction waste for landfilling	0.28	kg
Reuse plastic parts	0.32	kg
Recycling Zinc, Brass, Copper, Steel, Stainless Steel, Electro mechanics	12.93	kg
Landfilling	0.28	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Collected separately waste type Operator (including packaging)	16.04	kg
Recycling Aluminum	9.41	%
Recycling Zinc	1.10	%
Recycling Brass	0.41	%
Recycling Steel	46.35	%
Recycling Plastic	1.99	%
Recycling Electronic	1.46	%
Recycling Electro mechanics	21.88	%
Reuse Packaging (paper) (from A5)	15.62	%
Reuse Packaging (plastic) (from A5)	0.06	%
Loss Construction waste for landfilling (no recycling potential)	1.72	%

5. LCA: Results

Results shown below were calculated using CML Methodology.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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 the gate to the site	Assembly	Use	Maintenance	Repair	Replacement ⁽¹⁾	Refurbishment ⁽¹⁾	Operational energy use	Operational water use	De-construction 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	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 piece of Norton 6000

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
Global warming potential	[kg CO ₂ -Eq.]	1.02E+02	4.58E-01	3.57E+00	3.34E+02	4.58E-01	8.88E-02	1.68E+00	-3.38E+01
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.08E-07	2.19E-12	1.63E-11	1.15E-07	2.19E-12	6.08E-11	5.45E-12	5.74E-09
Acidification potential of land and water	[kg SO ₂ -Eq.]	6.35E-01	2.10E-03	8.14E-04	1.13E+00	2.09E-03	4.19E-04	7.17E-04	-1.83E-01
Eutrophication potential	[kg (PO ₄) ³⁻ -Eq.]	4.25E-02	4.79E-04	1.41E-04	6.02E-02	4.78E-04	2.36E-05	8.63E-05	-1.01E-02
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	4.26E-02	-6.76E-04	5.76E-05	6.89E-02	-6.76E-04	2.49E-05	4.90E-05	-1.36E-02
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	7.35E-03	1.73E-08	6.56E-08	4.41E-05	1.73E-08	1.23E-08	1.75E-07	-3.27E-03
Abiotic depletion potential for fossil resources	[MJ]	1.22E+03	6.32E+00	1.00E+00	3.85E+03	6.32E+00	1.01E+00	1.29E+00	-3.21E+02

RESULTS OF THE LCA - RESOURCE USE: 1 piece of Norton 6000

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	2.34E+02	-	-	-	-	-	-	-
Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
Total use of renewable primary energy resources	[MJ]	2.34E+02	2.49E-01	9.33E-02	3.77E+02	2.49E-01	2.89E-01	1.12E-01	-7.77E+01
Non renewable primary energy as energy carrier	[MJ]	1.39E+03	-	-	-	-	-	-	-
Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
Total use of non renewable primary energy resources	[MJ]	1.39E+03	6.34E+00	1.17E+00	4.87E+03	6.34E+00	1.58E+00	1.42E+00	-3.67E+02
Use of secondary material	[kg]	3.05E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	[m ³]	6.15E-01	1.76E-04	1.04E-02	1.71E+00	1.76E-04	7.13E-04	2.95E-03	-2.33E-01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of Norton 6000

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
Hazardous waste disposed	[kg]	6.49E-02	1.44E-05	8.08E-05	3.80E-03	1.44E-05	2.19E-04	1.06E-04	-1.70E-03
Non hazardous waste disposed	[kg]	7.68E+00	7.97E-04	9.13E-02	1.55E+00	7.97E-04	5.10E-04	3.11E+00	-3.12E+00
Radioactive waste disposed	[kg]	6.61E-02	8.30E-06	6.85E-05	4.01E-01	8.30E-06	2.28E-04	4.96E-05	-1.82E-02
Components for re-use	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
Materials for recycling	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.17E+01	0.00E+00	-
Materials for energy recovery	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
Exported electrical energy	[MJ]	0.00E+00	0.00E+00	4.53E+00	0.00E+00	0.00E+00	0.00E+00	2.74E+00	-
Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.28E+01	0.00E+00	0.00E+00	0.00E+00	7.53E+00	-

6. LCA: Interpretation

This chapter contains an interpretation of the Life Cycle Impact Assessment categories. Stated percentages in the whole interpretation are related to the overall life cycle, excluding credits (module D).

The production phase (modules A1-A3) contributes between 23% and 78% to the overall results for all the environmental impact assessment categories hereby considered, except for the abiotic depletion potential (ADPE), for which the contribution from the production phase accounts for app. 99% - this impact category describes the reduction of the global amount of non-renewable raw materials, therefore, as expected, it is mainly related with the extraction of raw materials (A1). Within the production phase, the main contribution for all the impact categories is the production of steel, with app. 90%, mainly due to the energy consumption on this process. Steel accounts with app. 55% to the overall mass of the product, therefore, the impacts

are in line with the mass composition of the product. The environmental impacts for the transport (A2) have a negligible impact within this stage. To reflect the use phase (module B6), the energy consumption was included and it has a major contribution for all the impact assessment categories considered - between 21% and 76%, with the exception of ADPE (1%). This is a result of 2 hours of operation in on mode and 22 hours of operation in stand-by mode per day per 365 days in a year.

In the end-of-life phase, there are loads and benefits (module D, negative values) considered. The benefits are considered beyond the system boundaries and are declared for the recycling potential of the metals and for the credits from the incineration process (energy substitution).

7. Requisite evidence

Not applicable in this EPD.

8. References

Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin (pub.):
Generation of Environmental Product Declarations
(EPDs);

General principles

for the EPD range of Institut Bauen und Umwelt e.V.
(IBU), 2013-04
www.bau-umwelt.de

IBU PCR Part A

IBU PCR Part A: Institut Bauen und Umwelt e.V.,
Königswinter (pub.): Product Category Rules for
Construction Products from the range of Environmental
Product Declarations of Institut Bauen und Umwelt
(IBU), Part A: Calculation Rules for the Life Cycle
Assessment and Requirements on the Background
Report. April 2013
www.bau-umwelt.de

IBU PCR Part B

IBU PCR Part B: PCR Guidance-Texts for Building-
Related Products and Services. From the range of
Environmental Product Declarations of Institute
Construction and Environment e.V. (IBU). Part B:
Requirements on the EPD for Automatic doors, automatic
gates, and revolving door systems (door systems),.
www.bau-umwelt.com

ADA Compliant

ADA Compliant: Americans with Disabilities Act 2010
Standard for Accessible Design

ANSI/BHMA A156.19

ANSI/BHMA A156.19-2013: Power Assist and Lower
Energy Operated Doors

CSA C22.2 No. 247

CSA C22.2 No. 247: Canadian Standards Association
standard for Operators and Systems of Doors, Gates,
Draperies, and Louvers

CSFM 3266.0944:0110

CSFM 3266.0944:0110: California State Fire Marshal
Listing for Door Operators

DIN EN 1154

DIN EN 1154: Building hardware - Controlled door
closing devices - Requirements and test methods
(includes amendment A1:2002)

DIN EN ISO 9001

DIN EN ISO 9001:2008: Quality management systems
- Requirements; Trilingual version EN ISO 9001:2008

DIN EN ISO 14001

DIN EN ISO 14001: Environmental management
systems - Requirements with guidance for use
(ISO 14001:2004 + Cor. 1:2009)

DIN EN ISO 14025

DIN EN ISO 14025:2011-10: Environmental labels and
declarations — Type III environmental declarations —
Principles and procedures

EN 15804

EN 15804:2012+A1:2014: Sustainability of
construction works - Environmental product
declarations - Core rules for the product category of
construction products

Norton®

ASSA ABLOY

ETL tested to UL325

Tested to / Compliant with UL325 Door, Drapery, Gage, Louver, and Window Operators and Systems

GaBi 6 2013

GaBi 6 2013: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2013.

GaBi 6 2013D

GaBi 6 2013D: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2013.
<http://documentation.gabi-software.com/>

UL10C

UL10C Positive Pressure Fire Test of Door Assemblies

9. Annex

Results shown below were calculated using TRACI Methodology.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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 the gate to the site	Assembly	Use	Maintenance	Repair	Replacement ¹⁾	Refurbishment ¹⁾	Operational energy use	Operational water use	De-construction 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	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 piece of Norton 6000

Parameter	Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
GWP	Global warming potential	[kg CO ₂ -Eq.]	1.02E+02	4.58E-01	3.57E+00	3.34E+02	4.58E-01	8.88E-02	1.68E+00	-3.38E+01
ODP	Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.34E-07	2.33E-12	1.73E-11	1.23E-07	2.33E-12	6.46E-11	5.80E-12	6.11E-09
AP	Acidification potential of land and water	[kg SO ₂ -Eq.]	6.16E-01	2.74E-03	9.86E-04	1.05E+00	2.74E-03	3.96E-04	8.34E-04	-1.75E-01
EP	Eutrophication potential	[kg N-eq.]	2.50E-02	1.92E-04	5.54E-05	4.11E-02	1.92E-04	1.56E-05	4.38E-05	-4.93E-03
Smog	Ground-level smog formation potential	[kg O ₃ -eq.]	6.74E+00	5.63E-02	2.29E-02	8.98E+00	5.63E-02	3.59E-03	1.30E-02	-1.80E+00
Resources		[MJ]	9.53E+01	9.08E-01	1.18E-01	2.27E+02	9.08E-01	7.18E-02	1.45E-01	-1.80E+01

RESULTS OF THE LCA - RESOURCE USE: 1 piece of Norton 6000

Parameter	Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	[MJ]	2.34E+02	-	-	-	-	-	-	-
PERM	Renewable primary energy resources as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PERT	Total use of renewable primary energy resources	[MJ]	2.34E+02	2.49E-01	9.33E-02	3.77E+02	2.49E-01	2.89E-01	1.12E-01	-7.77E+01
PENRE	Non renewable primary energy as energy carrier	[MJ]	1.39E+03	-	-	-	-	-	-	-
PENRM	Non renewable primary energy as material utilization	[MJ]	0.00E+00	-	-	-	-	-	-	-
PENRT	Total use of non renewable primary energy resources	[MJ]	1.39E+03	6.34E+00	1.17E+00	4.87E+03	6.34E+00	1.58E+00	1.42E+00	-3.67E+02
SM	Use of secondary material	[kg]	3.05E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	Use of renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	Use of non renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	Use of net fresh water	[m ³]	6.15E-01	1.76E-04	1.04E-02	1.71E+00	1.76E-04	7.13E-04	2.95E-03	-2.33E-01

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 piece of Norton 6000

Parameter	Parameter	Unit	A1-3	A4	A5	B6	C2	C3	C4	D
HWD	Hazardous waste disposed	[kg]	6.49E-02	1.44E-05	8.08E-05	3.80E-03	1.44E-05	2.19E-04	1.06E-04	-1.70E-03
NHWD	Non hazardous waste disposed	[kg]	7.68E+00	7.97E-04	9.13E-02	1.55E+00	7.97E-04	5.10E-04	3.11E+00	-3.12E+00
RWD	Radioactive waste disposed	[kg]	6.61E-02	8.30E-06	6.85E-05	4.01E-01	8.30E-06	2.28E-04	4.96E-05	-1.82E-02
CRU	Components for re-use	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
MFR	Materials for recycling	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.17E+01	0.00E+00	-
MER	Materials for energy recovery	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-
EEE	Exported electrical energy	[MJ]	0.00E+00	0.00E+00	4.53E+00	0.00E+00	0.00E+00	0.00E+00	2.74E+00	-
EET	Exported thermal energy	[MJ]	0.00E+00	0.00E+00	1.28E+01	0.00E+00	0.00E+00	0.00E+00	7.53E+00	-

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Institut Bauen
und Umwelt e.V.

Publisher

Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@bau-umwelt.com
Web www.bau-umwelt.com



Institut Bauen
und Umwelt e.V.

Programme holder

Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@bau-umwelt.com
Web www.bau-umwelt.com



PE INTERNATIONAL
SUSTAINABILITY PERFORMANCE

Author of the Life Cycle Assessment

PE INTERNATIONAL AG
Hauptstraße 111
70771 Leinfelden-Echterdingen
Germany

Tel +49 711 34 18 17 22
Fax +49 711 34 18 17 25
Mail consulting@pe-international.com
Web www.pe-international.com

Norton®

ASSA ABLOY

Norton Door Controls
3000 Hwy 74 East
Monroe, NC 28112
USA

Tel +1 800-438-1951
Fax +1 800-338-0965
Web www.nortondoortcontrols.com
www.assaabloydss.com