ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025 and EN 15804

Declaration holder	DORMA GmbH + Co. KG
Publisher	Institut Bauen und Umwelt (IBU)
Programme holder	Institut Bauen und Umwelt (IBU)
Declaration number	EPD-DOR-2012211-E
Issue date	18/12/2012
Validity	17/12/2017

ED 100 and ED 250 automatic swing door operators

DORMA GmbH + Co. KG

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com

1 General information

DORMA GmbH + Co. KG

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Rheinufer 108
D-53639 Königswinter

Declaration number
EPD-DOR-2012211-E

This Declaration is based on the Product Category Rules:
Automatic doors and gates, revolving door systems (valid: 29.06.2011).
(PCR-tested and approved by the independent Expert Committee (SVA))

Issue date
18/12/2012

Valid until
17/12/2017

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

Prof. Dr.-Ing. Hans-Wolf Reinhardt
(Chairman of the Expert Committee)

ED 100 and ED 250 automatic swing door operators

Holder of the Declaration
DORMA GmbH + Co. KG
Dorma Platz 1
58256 Ennepetal
GERMANY

Declared product/unit
The declared unit is the average for one (1) ED 100 and ED 250 automatic swing door operator, incl.
- an ED slide channel set,
- an ED BASIC cover and
- the respective packaging materials.

Area of applicability:
This EPD refers to the calculated average of DORMA ED 100 and ED 250 swing door operators. Deviations by the individual products from the calculated average are significantly below 10 %.
The production location for both products is DORMA headquarters in Ennepetal, Germany. The material and energy flows were taken into consideration accordingly.

Verification

The CEN EN 15804 standard serves as the core PCR.
Verification of the EPD by an independent third party in accordance with ISO 14025
☐ internal ☒ external

Dr.-Ing. Wolfram Trinius
(Independent auditor appointed by the SVA)

2 Product

2.1 Product description

The automatic swing door operators manufactured by DORMA are electromechanical swing door operators designed for single- or double-leaf swing doors. Depending on the width and weight of the door leaf, the ED 100 or the ED 250 is required. Both operators can be mounted with standard arm as push-version and with sliding channel as pull-version. Apart from the extended cover, an integrated door coordinator is also available for double-leaf operators, which is also easily fitted. By using the DORMA Upgrade Card, the functional scope can be adapted to a variety of door situations.

- Flexible configuration of the functions actually required
- Inexpensive transport and easy assembly thanks to lower weights
- Low-noise application thanks to multi-stage gear
- Elegant design: DORMA Contur Design with an operator height of only 70 mm

The two ED 100 and ED 250 variants are particularly distinguished by their drive units. For this reason, the ED 250 was taken into consideration in the analysis (maximum characteristics of a swing door operator). Only formation of the average for energy consumption during the usage phase follows the arithmetic average. Using this conservative implementation method, the LCA results are indicated as averages for both swing door operators (ED100 / 250).

2.2 Application

DORMA swing door operators are suitable for various applications:

- For single- or double-leaf swing doors
- Assembly on smoke and fire doors: as pull-version with slide channels and as push-version with standard arm
- Automation of doors with low traffic capacity (Low-Energy Mode) and heavily frequented doors (Full-Energy Mode)
- High torque for full-automatic swing doors with radar detector control
- Suitable for internal and external doors

2.3 Technical data

ED 100	
Max. power input	120 Watt
Closing force to EN 1154	EN 2 – 4 infinitely variable
Max. door-leaf weight for lintel depths of up to 300 mm	100 kg
Door-leaf width	700 – 1,100 mm
Max. opening speed	**50° (27*)/second
Max. closing speed	**50° (27*)/second
Axle extension	30/60 mm
Lintel depth for slide channel	± 30 mm
Lintel depth for standard arm	0 – 300 mm

ED 250	
Max. power input	240 Watt
Closing force to EN 1154	EN 4 – 6 infinitely variable
Max. door-leaf weight for lintel depths of up to 300 mm	250 kg to 1,400 mm door-leaf width 190 kg at 1,600 mm door-leaf width
Max. door-leaf weight for lintel depths from 301 to 500 mm	160 kg
Door-leaf width	700 – 1,600 mm
Door-leaf width for fire door	700 – 1,400 mm
Max. opening speed	**60° (27*)/second
Max. closing speed	**60° (27*)/second
Axle etension	30/60/90 mm
Lintel depth for slide channel	± 30 mm
Lintel depth for standard arm	0 – 500 mm

* Values in brackets indicate the maximum speed in Low-Energy Mode without Full-Energy or Fire Protection Upgrade Cards
** Depending on the door-leaf weight, automatically limited in accordance with DIN 18650, BS 7036-4 and ANSI 156.19.

2.4 Placing on the market/Application rules

General construction inspection approval

Approval number: Z-6.5-1890

Type approval

This is based on the following standards:

- Machinery Directive 2006/42/EC
- DIN EN ISO 13849-1
- DIN 18650-1
- DIN 18650-2
- BGR 232 (German Employer's Liability Insurance Association Rule)
- Low-Voltage Directive 2006/95/EC
- DIN EN 60335-1

2.5 Delivery status

ED 100/250	Weight	Dimensions in mm
Operator incl. packaging	8.90 kg	807 x 150 x 180
Slide channel incl. packaging	1.60 kg	410 x 85 x 45
Basic cover incl. packaging	2.20 kg	690 x 100 x 140
TOTAL	**12.70 kg**	

2.6 Base materials/Auxiliaries

The average for ED 100 and ED 250 swing door operators gives rise to the following mass percentages for the primary product components:

Component	Weight	Percentage
Steel components	5.05 kg	46 %
Aluminium components	3.00 kg	28 %
Cast zinc components	1.78 kg	16 %
Plastic components	0.76 kg	7 %
Circuit boards	0.20 kg	2 %
Cable	0.11 kg	1 %
TOTAL	**10.90 kg**	**100 %**

2.7 Production

The ED 100 and ED 250 swing door operators each comprise a swing door operator, a slide channel set and a cover made of high-quality aluminium.

The individual components made of steel and non-ferrous metals are largely manufactured in the Ennepetal plant (certified Quality Management system in accordance with DIN EN ISO 9001:2008). Electronic components in particular are bought in internally (incl. circuit boards) and externally (incl. drive motors). During assembly, the swing door operator, the slide channel sets and covers are assembled, packaged and stored separately. Quality checks throughout the process ensure the high quality standard of ED 100 and ED 250 swing door operators.

2.8 Environment and health during manufacturing

The Environment Management System in the Ennepetal plant is certified in accordance with DIN EN ISO 14001:2004. Industrial Safety is also certified in accordance with OHSAS 18001:2007.

2.9 Product processing/Installation

DORMA deploys its own, specially-trained teams for installing the product systems.

2.10 Packaging

The declared unit comprises the following packaging materials and their mass percentages:

Component	Weight	Percentage
Paper and cardboard	1.66 kg	92 %
Wood	0.09 kg	5 %
LDPE foil	0.05 kg	3 %
TOTAL	**1.80 kg**	**100 %**

Information on possible re-use of packaging materials is provided in section 2.16.

2.11 Condition of use

No auxiliary or consumable materials are incurred for maintenance and usage of the swing door operators. Repairs or replacements are not usually necessary. No cleaning efforts need to be taken into consideration.

2.12 Environment and health during use

There are no interactions between products, the environment and health.

2.13 Reference service life (RSL)

The reference service life amounts to 5 years. This complies with a total of 500,000 closing cycles with approx. 100,000 closing cycles per year in accordance with DIN 18263, Part 4.

2.14 Extraordinary effects

Fire

Irrelevant

Water

No substances are used which have a (negative) impact on ecological water quality on contact by the device with water. Electronic components must however be installed in protected indoor areas.

Mechanical destruction

No hazardous substance output can be anticipated during mechanical destruction.

2.15 Re-use phase

The following possibilities arise with reference to the material composition of the product system in accordance with section 2.6:

Re-use

During the reference service life, the swing door operators manufactured by DORMA can be dismantled and re-used elsewhere.

Material recycling

The materials suitable for material recycling largely comprise the metals processed in the product.

Energy recovery

The materials suitable for energy recovery largely comprise the plastics contained in the product.

Landfilling

As no substances, which are hazardous to the environment or health are contained in the product, the entire system can be landfilled if there are no waste recycling technologies available.
Disposal of the dismantled drive motor is subject to the WEEE Directive within Europe /2002/96/EG/.

2.16 Disposal

Offcuts and scraps during the manufacturing process

Offcuts and scraps incurred during the manufacturing phase are directed to metallurgical and energy recovery circuits. They are kept separately and collected for disposal by a disposal company.

Waste codes according to the European Waste Catalogue (EWC) /2001/118/EC/:

- EWC 07 02 03 Plastic waste
- EWC 12 01 01 Ferrous metal filings and turnings
- EWC 12 01 03 Non-ferrous metal filings and turnings

Packaging

The packaging components incurred during installation in the building are directed to energy recovery circuits.

- EWC 15 01 01 Paper and cardboard packaging
- EWC 15 01 02 Plastic packaging
- EWC 15 01 03 Wooden packaging

End of Life

All materials are directed to an energy or metallurgical recovery circuit.

- EWC 16 02 14 Used devices with the exception of those outlined in 16 02 09 to 16 02 13
- EWC 16 02 16 Components removed from used devices with the exception of those outlined in 16 02 15
- EWC 17 02 03 Plastics
- EWC 17 04 01 Copper, bronze, brass
- EWC 17 04 02 Aluminium
- EWC 17 04 04 Zinc
- EWC 17 04 05 Iron and steel
- EWC 17 04 11 Cables with the exception of those outlined in 17 04 10

2.17 Further information

More information on DORMA and automatic products is available from:

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3 LCA: Calculation rules

3.1 Declared unit

The declared unit is the average for one (1) ED 100 and ED 250 automatic swing door operator, incl. ED slide channel set, ED BASIC cover and packaging materials.

3.2 System limit

Type of EPD: cradle to gate with options.

Modules A1-4

The product stage commences with considering production of the requisite raw materials including all of the corresponding upstream chains and the requisite procurement transport. Transport associated with distribution was also taken into consideration.

Module B6

Average energy consumption for the two ED 100 and ED 250 automatic swing door operators in Full-Energy Mode is depicted using the arithmetic average.

Modules C2-3

The modules include the environmental impacts of waste treatment at the end of the product life cycle as well as the transport associated with this.

Module D

The value flows resulting from waste treatment which in turn serve as energy (waste incineration route) or material input (recycling) for a downstream product system are indicated here.

3.3 Estimates and assumptions

No estimates and assumptions were made which would be of relevance for interpreting the Life Cycle Assessment results.

3.4 Cut-off criteria

All data from the plant data survey during the period under review indicated in section 3.7 is taken into consideration with the result that material flows with a mass percentage of less than one per cent were also analysed. It can be assumed that the total of all neglected percentage shares does not exceed 5 % in the impact categories.

3.5 Background data

The current version 5 of the GaBi software system for life cycle engineering was used for modelling the life cycle. All of the background data used was taken from the current versions of various GaBi data bases and the ecoinvent data base (version 2.2). The data items contained in the data bases are documented online.

German data records were used for Modules A1-3 and the corresponding European data records were used for transport associated with distribution (A4), usage (B Modules) and disposal scenarios (C Modules).

Owing to a lack of data on waste treatment, various material flows are summarised under the data record which appears most suitable from a technical perspective.

The secondary and recycling shares can only be taken into consideration via the generic data records. Individual adaptation of these secondary shares is not possible with the modelling software used.

3.6 Data quality

Data on the products reviewed was collated on the basis of evaluations of internal production and environmental data, recording LCA-relevant data within the supplier chain and by measuring the relevant data for the provision of energy. The data collated has been examined for plausibility and consistency with the result that good data representativity can be assumed.

The background data used for the assessment is generally not older than 10 years.

3.7 Period under review

The LCA data was collated for the period from 1 January 2011 to 31 December 2011. As no product-specific data was recorded with a time reference, there are no details available, which would be of relevance for forming an average.

3.8 Allocation

The material flows required for the production of the product system were compiled with relation to the DORMA ERP system. The actual recycling shares could not be depicted with the software system used; generic data is applied here. All of the energy flows considered were measured on site.

Credits from material recycling of production waste were allocated to Module A1-3.

The credits from thermal recovery of distribution packaging as well as recycling and energy recovery of the dismantled product were allocated to Module D. Some data records do not indicate separate results for Modules C3 and D. As the credits prevail, the results were allocated analogously to Module D.

3.9 Comparability

As a general rule, a comparison or evaluation of EPD data is only possible when all of the data to be compared has been drawn up in accordance with EN 15804 and the building's context or product-specific characteristics are taken into consideration.

4 LCA: Scenarios and other technical information

Transport to the site (A4)

Means of transport:	
	truck combination/articulated truck PE
GLO:	container ship PE
Transport distance	1,378 km
Capacity utilisation (including empty runs)	85 %

The transport distance includes all distribution countries proportionately. Transport to the site is depicted using the country-specific data records.

Reference service life

Reference service life	5 years
Ambient temperature	-15 to +50 °C
Only for dry rooms	
	Max. rel. humidity 93 %
	non-condensing
Voltage supply	230 V AC 50 Hz +/-10%
Class of protection	IP 20

Operational energy use (B6)

Electricity consumption	72.5 kWh
Equipment output	316.5 kW

Electricity consumption was calculated for the entire reference service life of 5 years.

End of Life (C1-C4)

For recycling	77.4 %
For energy recovery	22.6 %

The processes at the End of Life were modelled using European data records.

Re-use, recovery and recycling potential (D)

Metals are directed to material recycling, plastics and packaging materials are directed to energy recovery circuits, whereby transport and recovery rates within Europe were taken into consideration.

5 LCA: Results

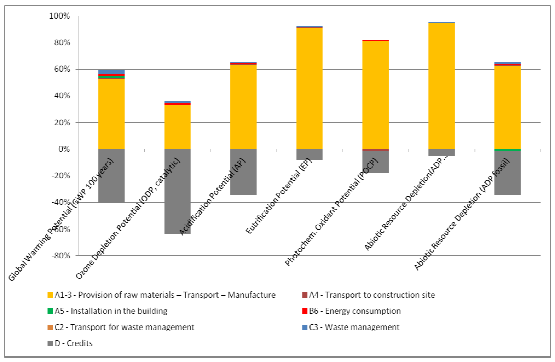
SYSTEM LIMITS (X = INCLUDED IN THE LCA; MND = MODULE NOT DECLARED)																
Production stage			Building construction stage		Usage stage							Disposal stage				Credits and encumbrances outside the system limit
Provision of raw materials	Transport	Manufacture	Transport to the site	Installation in the building	Use / Application	Maintenance	Repairs	Replacement	Renewal	Energy required for operating the building	Water required for operating the building	Dismantling / Demolition	Transport	Waste treatment	Landfilling	Reuse, recovery or 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	MND	X

Parameter	Unit	A1-3	A4	A5	B6	C2	C3	D
LCA RESULTS: ENVIRONMENTAL EFFECTS								
Global Warming Potential (GWP)	[kg CO_2 equiv.]	7.00E+01	6.26E-01	1.48E+00	1.52E+00	1.80E-02	4.17E+00	-5.39E+01
Ozone Depletion Potential (ODP)	[kg CFC11 equiv.]	2.33E-06	2.30E-10	9.43E-10	9.94E-08	6.66E-12	1.09E-07	-4.50E-06
Acidification Potential (AP)	[kg SO_2 equiv.]	5.04E-01	6.18E-03	-2.69E-04	6.48E-03	1.16E-04	7.25E-03	-2.75E-01
Eutrophication Potential (EP)	[kg PO_4^3 equiv.]	1.47E-01	1.12E-03	-1.79E-05	3.48E-04	2.79E-05	9.07E-04	-1.29E-02
Photochemical Ozone Creation Potential (POCP)	[kg ethene equiv.]	8.35E-02	-1.28E-03	-9.99E-05	3.94E-04	-4.71E-05	5.14E-04	-1.70E-02
Abiotic Depletion Potential for Elements (ADPE)	[kg Sb equiv.]	9.54E-03	2.37E-08	-8.14E-09	1.25E-07	7.09E-10	9.95E-07	-5.11E-04
Abiotic Depletion Potential of Fossil Fuels (ADPF)	[MJ]	9.90E+02	8.52E+00	-1.65E+01	1.73E+01	2.48E-01	2.78E+01	-5.35E+02
LCA RESULTS: USE OF RESOURCES								
Primary energy, renewable (PERE)	[MJ]	3.59E+02	2.94E-01	-1.21E-02	3.88E+00	9.73E-03	1.36E+00	-1.84E+02
Primary energy, renewable, used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy (PERT)	*[MJ]*	*3.59E+02*	*2.94E-01*	*-1.21E-02*	*3.88E+00*	*9.73E-03*	*1.36E+00*	*-1.84E+02*
Primary energy, non-renewable (PENRE)	[MJ]	1.15E+03	8.55E+00	-1.65E+01	2.66E+01	2.49E-01	3.40E+01	-7.01E+02
Primary energy, non-renewable, used as raw materials (PENRM)	[MJ]	6.29E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-09	-2.99E-08
Total use of non-renewable primary energy resources *(PENRT)*	*[MJ]*	*1.15E+03*	*8.55E+00*	*-1.65E+01*	*2.66E+01*	*2.49E-01*	*3.40E+01*	*-7.01E+02*
Use of Secondary Material (SM)	[kg]	6.31E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Renewable Secondary Fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-Renewable Secondary Fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Fresh Water resources (FW)	[m³]	-	-	-	-	-	-	-
LCA RESULTS: OUTPUT FLOWS AND WASTE CATEGORIES								
Hazardous Waste Disposed (HWD)	[kg]	-	-	-	-	-	-	-
Non-Hazardous Waste Disposed (NHWD)	[kg]	-	-	-	-	-	-	-
Radioactive Waste Disposed (RWD)	[kg]	-	-	-	-	-	-	-
Components for Re-Use (CRU)	[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 (MFR)	[kg]	3.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.37E+00
Materials for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	1.02E+00
Exported energy [electricity]	[MJ]	0.00E+00	0.00E+00	9.38E+00	0.00E+00	0.00E+00	0.00E+00	2.37E+01
Exported energy [thermal energy]	[MJ]	0.00E+00	0.00E+00	2.59E+01	0.00E+00	0.00E+00	0.00E+00	6.20E+01

6 LCA: Interpretation

ENVIRONMENTAL IMPACTS

An evaluation of the LCA results allows the following interpretation of the CML results:



The phase of extracting raw materials and manufacturing has a dominant influence on all environmental impacts. In particular, the drive unit installed in the product and the aluminium used are responsible for this. On the other hand, energy use during manufacturing is only of subordinate significance as it is provided in full by hydropower.

During the usage phase, the use of electrical energy across the reference service life of 5 years is quite significant. A European power mix was used for this calculation. The results of this phase largely depend on the choice of energy sources. Accordingly, the results would be reduced significantly by using electrical energy from 100 % renewable energies.

The credits, which are particularly attributable to material recycling of aluminium, decisively reduce the environmental impacts at the end of the product life cycle.

Transport associated with procurement and distribution (Modules A2 and A4) as well as waste treatment (Module C3) only account for a minor share of the potential environmental impacts.

COMMENTS

The Expert Committee (SVA) at IBU clearly defined the calculation rules for declaring waste in its last meeting on 4 October 2012. The basis for background data used in the data bases must be revised accordingly. This Environmental Product Declaration therefore follows the interim solution approved by the SVA and is drawn up without a waste declaration.

The background data used does not represent proof of the indicator for use of fresh water resources. The Declaration is therefore disclosed without any content and value regarding fresh water.

7 Requisite evidence

This Environmental Product Declaration does not require any evidence in relation to the material composition in the product and its area of application.

8 References

Institute Construction and Environment e.V. (Institut Bauen und Umwelt e.V.), Königswinter (pub.):

General Principles for the EPD Programme of the Institute Construction and Environment e.V., 2011-06

Product Category Rules for Construction Products Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 2011-07

Product Category Rules for Construction Products Part B: Requirements on the EPD for automatic doors, automatic gates, and revolving door systems

www.bau-umwelt.de

2001/118/EC: European Waste Catalogue (EWC) – Commission Decision of 16 January 2001 amending Decision 2000/532/EG as regards the list of wastes.

2002/96/EC: Directive 2020/96/EC of the EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE).

2006/95/EC: DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

CEN/TR 15941:2010-03: Sustainability of construction works – Environmental product declarations – Methodology for selection and use of generic data; German version CEN/TR 15941:2010

DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures (ISO 14025:2006)

DIN EN ISO 14044:2006-10, Environmental management – Life cycle assessment – Requirements and guidelines (ISO 14044:2006)

DIN EN 15804:2012-04, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

DIN EN ISO 13849-1:2008-12, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design (ISO 13849-1:2006)

DIN 18650-1:2010-06, Powered pedestrian doors – Part 1: Product requirements and test methods

DIN 18650-2:2010-06, Powered pedestrian doors – Part 2: Safety at powered pedestrian doors

DIN EN 60335-1; VDE 0700-1:2012-10:2012-10, Household and similar electrical appliances – Safety – Part 1: General requirements (IEC 60335-1:2010, modified)

DIN 18263-4:1997-05, Building hardware – Controlled door closing devices – Part 4: Automatic swing-door operator

DIN EN ISO 9001:2008-12, Quality management systems – Requirements (ISO 9001:2008); Trilingual version EN ISO 9001:2008

DIN EN ISO 14001:2009-11, Environmental management systems – Requirements with guidance for use (ISO 14001:2004 + Cor. 1:2009); German and English version EN ISO 14001:2004 + AC:2009

Ecoinvent: LCA data base (life cycle inventory analysis data), version 2.2. Swiss Centre for Life Cycle Inventories, St. Gallen

GaBi 5: Software and Databasis for Life Cycle Engineering. LBP, University of Stuttgart und PE International, 2011.

OHSAS 18001:2007, Occupational health and safety management systems - Requirements

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