ENVIRONMENTAL PRODUCT DECLARATION

according to ISO 14025 and EN 15804

Declaration holder	DORMA GmbH + Co. KG
Publisher	Institute Construction and Environment e.V. (IBU)
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Modular automatic drive system for sliding doors in the ES 200 product family

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.
Panoramastr. 1
10178 Berlin
GERMANY

Declaration number

EPD-DOR-2013511-EN

This Declaration is based on the Product Category Rules:

PCR Part A: Calculation rules for the Life Cycle Assessment and requirements on the Background Report, 2012-09
PCR Part B: Drive systems for automatic doors and gates, 04-2013
(PCR tested and approved by the independent Expert Committee (SVA))

Issue date

26.07.2013

Valid until

25.07.2018

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 (SVA))

ES 200 product family

Owner of the Declaration

DORMA GmbH + Co. KG
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58256 Ennepetal
GERMANY

Declared product/unit

The declared unit is one modular automatic drive system for sliding doors comprising:

- the averages of ES 200 Standard, ES 200-2D and ES 200 Easy drive units and
- the respective packaging materials.

Area of applicability:

This EPD refers to the entire life cycle of an ES 200 drive system. The various technical characteristics are depicted in section 2.3.

The production location is the DORMA production site in Ennepetal, Germany.

Product components are also procured from the DORMA location in Bonn. 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 as per ISO 14025

☐ internally ☒ externally

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

2 Product

2.1 Product description

The product family comprising the modular automatic ES 200 drive system also represents the ES 200 Standard, ES 200-2D and ES 200 Easy drive systems. Average values (material and energy flows) are achieved using the volumes of ES 200 variant sold during the reference period.

2.2 Application

The automatic ES 200 drive system is used as follows as an automatic drive for automating sliding door systems as well as automating escape and rescue routes:

Door parameters	ES 200 Standard	ES 200 2D	ES 200 Easy
Use in escape and rescue routes	-		-
Single-panel sliding door: - Opening width (clear width) [mm] - Door panel weight (max.) [kg]	700 – 3,000 1 x 200	900 – 1,800 1 x 150	700 – 3,000 1 x 120
Double-panel sliding door: - Opening width (clear width) - Door panel weight (max.)	800 – 3,000 2 x 160	900 – 3,000 2 x 130	800 – 3,000 2 x 100

2.3 Technical data

The following technical data is of relevance for the LCA:

Technical data	ES 200 Standard	ES 200 2D	ES 200 Easy
Height [mm]	100/150	100/150	100/150
Overall depth [mm]	180	180	180
Opening and closing force [N]	max. 150	max. 150	max. 150
Opening speed (incremental adjustment) [cm/s]	10 - 75		10 - 50
Closing speed (incremental adjustment) [cm/s]	10 - 50		10 - 40
Hold-open time [sec.]	0 - 180		0.5 - 30
Supply voltage / Frequency	230 V / 50-60 Hz	230 V / 50-60 Hz	230 V / 50-60 Hz
Wattage	250 W	250 W	180 W
Protection class	IP 20	IP 20	IP 20
Tested to low-voltage guidelines	•	•	•

2.4 Placing on the market / Application rules

The following standards are of relevance for placing on the market / application:

- DIN 18650-1/2: 2010 Powered pedestrian doors
  - Part 1: Product requirements and test methods
  - Part 2: Safety at powered pedestrian doors
- EN 16005: 2012 Power-operated pedestrian doorsets – Safety in use – Requirements and test methods
- AutSchR 1997 (also applies for the ES 200-2D)

2.5 Delivery status

One automatic ES 200 drive system (averaged by sales volume) has the following delivery status:

Components	Absolute	Percentage
Average ES 200	31.2 kg	85.7%
Average packaging	5.2 kg	14.3%
TOTAL	**36.4 kg**	**100.0%**

2.6 Base materials / Auxiliaries

The ES 200 product family comprises the following components:

Components	Percentage
Aluminium elements	49%
Steel elements	23%
Electronic elements	23%
Plastic elements	5%
TOTAL	**100%**

2.7 Production

The drive units in the ES 200 product family are manufactured in the Ennepetal plant and the requisite circuit boards are manufactured in the DORMA plant in Bonn. The certified Quality Management system in accordance with DIN EN ISO 9001:2008 safeguards the high quality standard of DORMA products and guarantees continuous improvement of the overall quality of processes and products at the DORMA locations.

2.8 Environment and health during production

The Environment Management system in the DORMA production facilities is certified according to DIN EN ISO 14001:2004, and industrial safety is certified to OHSAS 18001:2007.

2.9 Product processing / Installation

DORMA deploys specially-trained assembly teams to install the product systems.

2.10 Packaging

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

Components	Percentage
Paper and cardboard	90%
Wood	10%
LDPE foil	< 1%
TOTAL	**100%**

More information on the possible re-use of packaging is provided in section 2.16.

2.11 Condition of use

No auxiliaries or consumables are incurred during maintenance and use of the automatic drive system product family. Repairs or refurbishments are considered in accordance with the online list of wear parts recommended by DORMA (status: 10.2009). The exchange of wear parts is indicated for a period of one year.

Energy expenditure was considered on the basis of 100,000 closing cycles per year (DORMA empirical value). This lies within the endurance test comprising 1,000,000 closing cycles carried out by TÜV Nord from which an overall operating life of at least 10 years can be derived.

2.12 Environment and health during use

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

2.13 Reference service life

The reference service life amounts to 10 years. This complies with 1,000,000 closing cycles.

2.14 Extraordinary effects

Water

No hazardous substances are emitted into the environment on contact with water.

Mechanical destruction

No environmental hazards are anticipated on mechanical destruction.

2.15 Re-use phase

With reference to the material composition of the product system in accordance with section 2.6, the following possibilities are available:

Material recycling

The materials suitable for material recycling primarily comprise the metallurgical materials processes in the product.

Energy recovery

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

Landfilling

The entire system can be landfilled in the absence of waste recycling technologies.

2.16 Disposal

Scrap incurred during the production phase

The scrap incurred during the production phase is directed to material recycling. Scrap is collected separately by material type and disposed of. Waste codes in accordance with the European Waste Catalogue (EWC) 2001/118/EC:

- EWC 12 01 01 Ferrous metal filings and turnings

Packaging

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

- 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 recovery or metallurgical recycling process.

- EWC 16 02 14 Used devices with the exception of those included in 16 02 09 to 16 02 13
- EWC 16 02 16 Components removed from used devices with the exception of those included in 16 02 15
- EWC 16 06 01 Lead batteries
- EWC 17 02 03 Plastic
- EWC 17 04 02 Aluminium
- EWC 17 04 05 Iron and steel
- EWC 17 04 11 Cables with the exception of those included in 17 04 10

Disposal of the drive unit in Europe is subject to the WEEE Guideline 2002/96/EC.

2.17 Further information

Contact data for more detailed information:
Please refer to the last page of this Declaration.

3 LCA: Calculation rules

3.1 Declared unit

The declared unit is the average for one (1) modular automatic drive system for sliding doors as averages of the ES 200 Standard, ES 200-2D and ES 200 Easy variants, including the respecting packaging materials.

Name and supplement	Value	Unit
Declared unit	1	pces.
Conversion factor to 1 kg	36.4	kg/pce.

3.2 System boundary

Type of EPD: cradle to grave (with options)
The following modules are considered in accordance with EN 15804:

Modules A1-5
The product stage commences with consideration of the material and energy flows required for manufacturing the product, including all of the associated upstream chains and requisite transport associated with procurement. Transport to the construction site and energy recovery of the packaging materials are also considered.

Module B3
This module covers the activities required for adapting the product installed in a building, structure or component in such a way that its functional, technical and aesthetic qualities are retained over the entire operating life.

Module B6
This module includes the energy consumption for operating an average drive unit (ES 200).

Modules C2-3
These modules include the environmental impact associated with waste treatment at the end of life including the associated transport.

Module D
Evidence of credits incurred by waste treatment as a result of energetic (MVA route) or material recycling (recycling route) of packaging (A5), spare parts (B3) and the product at the End of Life (C3).

3.3 Estimates and assumptions

The service life is based on the empirical value of 100,000 closing cycles per year with the result that the certified 1,000,000 closing cycles lead to a total service life of 10 years.

3.4 Cut-off criteria

All of the relevant modules to EN 15804 were taken into consideration. All of the data from the operational data survey is taken into consideration. Accordingly, material flows have also been analysed with a mass percentage of less than one per cent. The total mass percentages not taken into consideration therefore remains significantly less than 1% of the overall mass utilisation. It can be assumed that the total of all neglected processes does not exceed 5% in the impact categories.

3.5 Background data

"GaBi 5" – the software system for comprehensive analysis – was used for modelling the life cycle for manufacturing and waste disposal. All of the background data records of relevance for manufacturing and disposal were taken from various GaBi data bases as well as the ecoinvent data base (version 2.2). The data records are documented online. German data records were used for Modules A1-3 and European data records were used for distribution transport (A4), use (B Modules) and disposal scenarios (C Modules), wherever available.
The background data records from the GaBi data bases used for the analysis pertain to the reference year 2010. Some of the ecoinvent data records used are more than 10 years old but are still regarded as the most suitable data for analysis in accordance with DIN CEN/TR 15941:2010. The ecoinvent data records can be classified as conservative on account of empirical values available.
The secondary and recycling material shares can only be considered using generic data records. An individual adjustment of these secondary shares is not possible with the analysis software used.

3.6 Data quality

The data on the products under review was recorded using analyses of internal production and environmental data, LCA-relevant data within the supplier chain and analyses of relevant data for the provision of energy. The data surveyed has been examined for plausibility and consistency. Good data representativity can be assumed.

3.7 Period under review

The life cycle data was recorded for the period 1 January 2011 to 31 December 2011. The average values obtained for the ES 200 drive system series refers to the product volumes of individual variants sold during the period under review.

3.8 Allocation

The material flows were compiled on a production unit basis from the DORMA ERP system. All of the energy flows considered within this context were measured on site.
The credits for the reconverted product were attributed to Module D. Some data items do not indicate separate results for Modules C3 and D. Owing to the credit overhang, the results were attributed 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 context or product-specific characteristics are taken into consideration.

4 LCA: Scenarios and other technical information

Transport to site (A4)

Means of transport	Truck 17.3 t useful load, Euro 3
Transport distance	340 km
Capacity utilisation (including empty runs)	85%

All of the distribution countries were recorded disproportionately in establishing the transport distance.

Construction installation process (A5)

Waste treatment on site:

Plastic protective foil	0.02 kg
Cardboard and paper	5.15 kg

Disposal transport:

Means of transport	Truck 17.3 t useful load, Euro 3
Transport distance	50 km
Capacity utilisation (including empty runs)	85%

Reference service life

Reference service life	10 years

Repairs (B3)

Material loss	1.49 kg

Repair cycle as per "Manufacturer guidelines on wear parts" provided by DORMA (status: 10.2009), indicated for a total operating period of 10 years

Operational energy use (B6)

Equipment output	180 - 250 W
Door weight	278 kg
Opening angle:	
- ES 200 Standard and 2D	10 – 75 cm/sec.
- ES 200 Easy	10 – 50 cm/sec.
Number of cycles per year	100,000
Weighted energy consumption	10 kWh

Electricity consumption (10 kWh) refers to one year of usage (100,000 closing cycles).

End of Life (C1-C4)

For recycling	87%
For energy recovery	13%

The processes at the End-of-Life stage are modelled using data records which represent the European average.

Re-use, recovery and recycling potential (D)

The metals are redirected to material recycling while plastic and packaging materials are directed to an energetic recycling route.

5 LCA: Results

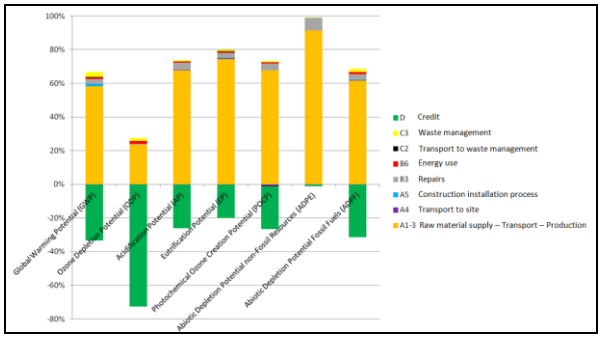
SYSTEM BOUNDARIES (X = INCLUDED IN THE LCA; MND = MODULE NOT DECLARED)																
Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Production	Transport to site	Construction installation process	Use / Application	Maintenance	Repairs	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste treatment	Landfilling	Re-use, 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	X	MND	MND	X	MND	MND	X	X	MND	X

Parameter	Unit	A1-3	A4	A5	B3	B6	C2	C3	D
LCA RESULTS – ENVIRONMENTAL IMPACT									
Global Warming Potential (GWP)	[kg CO_2 equiv.]	2.84E+02	5.83E-01	7.30E+00	1.40E+01	4.92E+00	1.74E-01	1.44E+01	-1.63E+02
Ozone Depletion Potential (ODP)	[kg CFC11 equiv.]	4.89E-06	2.16E-10	3.30E-09	1.09E-07	3.21E-07	6.47E-11	3.52E-07	-1.51E-05
Acidification Potential (AP)	[kg SO_2 equiv.]	1.93E+00	3.82E-03	1.73E-03	1.25E-01	2.10E-02	1.12E-03	2.13E-02	-7.48E-01
Eutrification Potential (EP)	[kg PO_4^3 equiv.]	1.26E-01	9.20E-04	2.88E-04	5.14E-03	1.13E-03	2.71E-04	1.77E-03	-3.38E-02
Photochemical Ozone Creation Potential (POCP)	[kg ethene equiv.]	1.16E-01	-1.56E-03	1.74E-04	6.87E-03	1.27E-03	-4.57E-04	1.52E-03	-4.38E-02
Abiotic Depletion Potential non-Fossil Resources (ADPE)	[kg Sb equiv.]	1.34E-02	2.30E-08	1.38E-07	1.11E-03	4.03E-07	6.88E-09	4.52E-06	-1.59E-04
Abiotic Depletion Potential Fossil Fuels (ADPF)	[MJ]	3.03E+03	8.06E+00	4.38E+00	1.75E+02	5.60E+01	2.41E+00	9.48E+01	-1.54E+03
LCA RESULTS – USE OF RESOURCES									
Renewable primary energy as energy carrier (PERE)	[MJ]	8.76E+02	3.16E-01	2.52E-01	1.02E+01	1.25E+01	9.44E-02	4.74E+00	-6.11E+02
Renewable primary energy as material utilisation (PERM)	[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
Total use of renewable primary energy sources (PERT)	*[MJ]*	8.76E+02	3.16E-01	2.52E-01	1.02E+01	1.25E+01	9.44E-02	4.74E+00	-6.11E+02
Non-renewable primary energy as energy carrier (PENRE)	[MJ]	3.53E+03	8.09E+00	4.90E+00	1.91E+02	8.59E+01	2.42E+00	1.15E+02	-2.09E+03
Non-renewable primary energy as material utilisation (PENRM)	[MJ]	2.42E-02	0.00E+00	0.00E+00	3.09E-04	0.00E+00	0.00E+00	4.05E-09	-1.03E-07
Total use of non-renewable primary energy sources (PENRT)	*[MJ]*	3.53E+03	8.09E+00	4.90E+00	1.91E+02	8.59E+01	2.42E+00	1.15E+02	-2.09E+03
Use of secondary materials (SM)	[kg]	2.11E+01	0.00E+00	0.00E+00	1,36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	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	0.00E+00
Net use of fresh water (FW)	[m^3]	-	-	-	-	-	-	-	-
LCA RESULTS – OUTPUT FLOWS AND WASTE CATEGORIES:									
Hazardous waste for disposal (HWD)	[kg]	-	-	-	-	-	-	-	-
Disposed of, non-hazardous waste (NHWD)	[kg]	-	-	-	-	-	-	-	-
Disposed of, radioactive waste (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	0.00E+00
Materials for recycling (MFR)	[kg]	4.20E+03	0.00E+00	0.00E+00	8,36E-01	0.00E+00	0.00E+00	2.71E+04	0.00E+00
Materials for energy recovery (MER)	[kg]	0.00E+00	0.00E+00	5.17E+03	6.57E-01	0.00E+00	0.00E+00	4.07E+03	0.00E+00
Exported energy [electricity]	[MJ]	0.00E+00	0.00E+00	9.09E+00	2.07E+00	0.00E+00	0.00E+00	1.15E+01	0.00E+00
Exported energy [thermal energy]	[MJ]	0.00E+00	0.00E+00	2.56E+01	6.07E+00	0.00E+00	0.00E+00	3.16E+01	0.00E+00

6 LCA: Interpretation

ENVIRONMENTAL IMPACT

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



The phase of extraction of raw materials and production (Cradle to Gate, A1-3) has a dominant influence on all environmental impacts. This is particularly attributable to the use of aluminium as a material as well as magnetic components. The replacement of wear parts (B2) also performs in a similar manner where the replacement of magnets and accumulators in particular ensures a noticeable result overall while operational energy during production (A3) is only of subordinate significance as it is provided in full by hydro-power.

The results of the ozone depletion potential (ODP) are conspicuous as higher credits than loads can be detected. This is primarily attributable to the discrepancy in ODP values between the aluminium data record used for production (A1-3) and the aluminium data record used for credits (D). Other impact indicators (GWP, AP, EP etc.) are not affected by this and have significantly lower environmental loads than the aluminium data record used on the input side (A1-3). The data record used for the credits can therefore be classified as suitable despite its higher ODP load.

During the use phase, the application of electrical energy over a period of one year or 100,000 closing cycles is apparent but does not exert any significant influence on the result. A European power mix was used for these calculations (EU-27).

Waste management also has an affect on practically every impact category. But the environmental impacts, especially of thermal recycling of plastics contained in the product, are not decisive for any of the categories analysed.

Procurement and distribution transport (A2 and A4) hardly have any effect on the CML indicators.

Credits primarily arise through material recycling of aluminium and steel components. Electricity and natural gas are also offset against the system for energy recovery of plastic components.

COMMENTS

The Expert Committee (SVA) at IBU clearly defined the calculation rules for declaring waste at its meeting on 4 October 2012. The data on which the background data used is based must be revised accordingly. This Environmental Product Declaration therefore pursues the transition solution approved by the SVA and is created without a waste declaration.

Nor do the background data records account for the indicator for net use of fresh water resources. The Declaration does not therefore include any values for fresh water.

7 Requisite evidence

The endurance test for compliance with the number of 1,000,000 closing cycles is confirmed by the certificate from TÜV Nord (reg. no. 10 799 385798).

8 References

2001/118/EC: Commission decision dated 16 January 2001 on amending Decision 2000/532/EC on a waste directory

2002/96/EC: Directive 2020/96/EC of the EUROPEAN PARLIAMENT AND COUNCIL dated 27 January 2003 on used electric and electronic equipment

AutSchR 1997: Directive governing automatic sliding doors in rescue routes, December 1997

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GaBi 5: Software and data base for comprehensive analysis. LBP, University of Stuttgart and PE International, 2011

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PCR 2012, Part B: Institut Bauen und Umwelt e.V., Königswinter (pub.): PCR instructions for building-related products and services in the building product group of drive systems for automatic doors and gates, 2013-04

DIN EN ISO 9001: Quality management systems – Requirements (ISO 9001:2008); trilingual version EN ISO 9001:2008

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

DIN EN ISO 14025: Environmental designations and declarations – Type III Environmental Declarations –

Basic principles and processes (ISO 14025:2006); German and English versions DIN EN ISO 14025:2011

DIN EN ISO 14044: Environment Management – Life Cycle Assessment – Requirements and Instructions (ISO 14044:2006); German and English versions EN ISO 14044:2006

DIN EN 15804: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products; German version EN 15804:2012

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

DIN EN 16005: Power-operated pedestrian doorsets – Safety in use – Requirements and test methods; German version EN 16005:2012

OHSAS 18001: Occupational health and safety – Management systems – Requirements, 2007

DIN 18650-1: Automatic Door Systems – Part 1: Product requirements and test methods, 2010

DIN 18650-2: Automatic Door Systems – Part 2: Safety at powered pedestrian doors, 2010

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