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-2012221-E
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Validity	17/12/2017

ST FLEX Automatic Sliding Doors
DORMA GmbH + Co. KG

www.bau-umwelt.com

Institut Bauen
und Umwelt e.V.

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-2012221-E

This Declaration is based on the Product Category Rules:
Automatic doors and gates, and 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 (SVA))

Automatic Sliding Doors ST FLEX product family

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

Declared product/unit
The declared unit is one (1) m² (37.9 kg) of the ST FLEX automatic sliding door system comprising:

- the average values for the ES 200 Standard, ES 200-2D and ES 200 Easy operators,
- two sliding panels,
- two side screens and
- the respective packaging materials.

Area of applicability:
This EPD refers to the entire life cycle of a DORMA ST FLEX sliding door system. The various technical characteristics are outlined in section 2.3.

The production location is the DORMA production facility in Zusmarshausen, Germany. Product components are also procured from the DORMA facilities in Ennepetal and 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 in accordance with ISO 14025
☐ internal ☒ external

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

2 Product

2.1 Product description

The ST FLEX product family stands for automatic sliding door systems manufactured by DORMA GmbH + Co. KG. The automatic sliding door systems comprise a sliding door operator including sensors and control unit, which can open on one or two sides and can be configured with or without side screens.

Representative for the product family of automatic sliding door systems (ST FLEX, TST FLEX and ST FLEX Green), the ST FLEX serves as a basis for calculation with the average values based on the sales percentages attributable to DORMA ES 200 Standard (30 %), ES 200-2D (60 %) and ES 200 Easy (10 %) operator systems.

A separate Environmental Product Declaration is available for the ST Flex Green, which displays particularly low UD values of 1.4 to max. 1.8 (heat transition coefficient). This was calculated using the ES 200 Easy operator system.

2.2 Application

On request, automatic sliding door systems from DORMA are manufactured for the individual dimensions of various building projects. The operator systems under review are designed for the following application:

Door parameter	Design
Double-panel sliding door	
- Clear opening width (LW)	800 – 3000 mm
- Max. door panel weight	2 x 100 - 160 kg

Details are available in the respective product catalogues.

2.3 Technical Data

Technical data on the operator systems relating to the ST FLEX sliding door system product family:

Parameter	ES 200 Standard	ES 200-2D	ES 200 Easy
Height	100 / 150 mm	100 / 150 mm	100 / 150 mm
Installation depth	180 mm	180 mm	180 mm
Max. opening and closing force 150 N	●	●	●
Opening speed (incrementally variable)	10 – 75 cm/s		10 – 50 cm/s
Closing speed (incrementally variable)	10 – 50 cm/s		10 – 40 cm/s
Hold-open time	0 – 180 sec.		0.5 – 30 sec.
Supply voltage, frequency	230 V, 50/60 Hz	230 V, 50/60 Hz	230 V, 50/60 Hz
Power input	250 W	250 W	180 W
Class of protection	IP 20	IP 20	IP 20
Tested in accordance with the Low-Voltage Directive and the EMC Directive	●	●	●

2.4 Placing on the market/Application rules

The following rules apply for placing the ST FLEX product family on the market:

- EN 16005: Power-operated Pedestrian doorsets - Safety in Use - Requirements and Test Methods
- DIN 18650-1, -2: Powered Pedestrian Doors - Part 1: Product Requirements and Test Methods
  Part 2: Safety at Powered Pedestrian Doors
- DIN EN ISO 13849-1: Safety of Machinery – Safety-Related Parts of Control Systems – Part 1: General Principles for Design
- IEC 60335-2-103: Household and Similar Electrical Appliances - Safety - Part 2-103: Particular Requirements for Drives for Gates, Doors and Windows
- E DIN EN 60335-2-103: Safety of Electrical Appliances for Households and Similar Purposes, Part 2-103: Particular Requirements for Drives for Gates, Doors and Windows

AutSchR 1997 (German guidelines for automatic sliding doors in escape routes) also applies for DORMA ST 200-2D only. TÜV-Nord certificates are available for the respective products tested.
Placing on the market/Application rules concerning the ST Flex Green can be inspected in the separate Environmental Product Declaration.

2.5 Delivery status

As an automatic sliding door involves a customised door system, shapes and sizes can vary considerably. The ST FLEX product family under review has the following delivery scope:

Characteristic	Dimensions
Clear height	2.10 m
Total height	2.20 m
Clear width	2.00 m
Total width	4.10 m
Surface area	9.02 m²

The components associated with these dimensions have the following weights:

Components	Weight
1 x operator (Ø)	58.8 kg
2 x sliding panel	136.6 kg
2 x side screen	141.4 kg

The drive system is supplied in a separate box; the sliding panels and side screens are supplied on frames.

2.6 Base materials/Auxiliaries

The sliding door system product family displays the following mass percentages:

Component	Percentage
Glass panes	71 %
Aluminium components	20 %
Steel components	4 %
Plastic components	3 %
Electronic components	2 %
TOTAL	**100 %**

2.7 Production

The ST FLEX sliding panels and side screens are manufactured in the DORMA plant in Zusmarshausen. Electronic components in particular are also manufactured within the DORMA Group. The operators are manufactured in the Ennepetal plant while the accompanying circuit boards are manufactured in the Bonn plant. The certified Quality Management system to DIN EN ISO 9001 safeguards the high quality standard of DORMA products.

2.8 Environment and health during manufacturing

The Environment Management system in the DORMA production facilities is certified to DIN EN ISO 14001 while Occupational Health & Safety is certified to OHSAS 18001.

2.9 Product processing/Installation

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

2.10 Packaging

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

Component	Percentage
Paper and cardboard	90 %
Wood	10 %
LDPE foil	< 1 %

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

2.11 Condition of use

No auxiliary or consumable materials are incurred for maintenance and usage of the sliding door system product family. Repairs or replacements are taken into consideration in accordance with recommendations by DORMA and the list of parts subject to wear which is freely available (data status: October 2009).

The energy required for the operators under review is integrated in the analysis over the reference service life of 10 years.

2.12 Environment and health during manufacturing

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

2.13 Reference service life (RSL)

The reference service life amounts to 10 years. This complies with a total of 1,000,000 closing cycles with approx. 100,000 closing cycles per year.

2.14 Extraordinary effects

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

Mechanical destruction
No danger to the environment 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:

Material recycling
The materials suitable for material recycling largely comprise the TSG glazing and metallurgical materials processed in the product.

Energy recovery
The materials suitable for material recycling largely comprise the plastics contained in the product.

Landfilling
The entire system can be landfilled in the absence of the appropriate waste recovery technologies.

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 collected separately and disposed of according to material type.

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 16 06 01 Lead batteries
- EWC 17 02 02 Glass
- EWC 17 02 03 Plastics
- EWC 17 04 02 Aluminium
- EWC 17 04 05 Iron and steel
- EWC 17 04 11 Cables with the exception of those outlined in 17 04 10

Disposal of the operator is subject to the WEEE Directive within Europe /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 one (1) m² (37.9 kg) of the automatic ST FLEX sliding door system comprising:

- the average values for the ES 200 Standard, ES 200-2D and ES 200 Easy operators,
- two sliding panels,
- two side screens and
- the respective packaging materials.

The side screens are not part of the moving automatic door but rather form a part of the overall automatic door system and have been taken into consideration in the declared unit.

3.2 System limit

Type of EPD: cradle to grave

Modules A1-5
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 B3
This module covers the combination of all planned technical and otherwise associated administrative activities necessary for repairing, revising, adjusting or modifying the product installed in a building, structure or component during its reference service life in such a way as to retain its requisite functional, technical and aesthetic quality.

Module B6
This module contains the average energy consumption value for operating the ES 200 operators.

Modules C2-3

These 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 or assumptions were made which would be of relevance for interpreting the Life Cycle Assessment results.

3.4 Cut-off criteria

All of the relevant modules in accordance with EN 15804 were taken into consideration. All of the data from the plant data survey is taken into account with the result that material flows with a mass percentage of less than one per cent were also analysed. The total of mass percentages ignored therefore remains significantly below 5 % of the overall mass.

3.5 Background data

"GaBi 5" – the software system for comprehensive analysis was used for modelling the lifecycle for manufacture and disposal. All of the background data records of relevance for manufacturing and disposal were taken from various GaBi 4 data bases as well as the ecoinvent data base. The data records are documented online.

German data records were generally 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). Where no European data was available, German data was relied on.

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.

3.6 Data quality

The background data from the GaBi data bases used for the analysis is for the reference year 2010; data used from the ecoinvent data base originates from the period 1998 to 2002. Accordingly, some data is older than 10 years but still applies as the most suitable data available for modelling the product under review. The ecoinvent data can be classified as conservative based on available empirical values.

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 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.

3.7 Period under review

The LCA data was collated for the period from 1 January 2011 to 31 December 2011. The averages for the ES 200 operator range are based on the inclusion of volumes sold during the period under review.

3.8 Allocation

The material flows were compiled with relation to the DORMA ERP system. All of the energy flows considered in this context were measured on site.

The credits for the dismantled product were allocated to Module D. Some data records do not indicate separate results for Modules C3 and D. The results for these data items 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
	17.3 t useful load, Euro 3
Transport distance	340 km
Capacity utilisation (including empty runs)	85 %

In establishing the transport distance, all of the distribution countries were included proportionately.

Installation in the building (A5)

Waste treatment on site:

Plastic protective foil	0.03 kg
Wooden pallets and paper	5.09 kg

Disposal transport:

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

Reference service life

Reference service life	10 years

Repairs

Repair cycle as per "Manufacturer's guidelines on wear parts" supplied by DORMA

Material loss	21.1 kg

Operational energy use (B6)

Electricity consumption	114.09 kWh
Equipment output	180 – 250 W

Electricity consumption was calculated for the entire reference service life of 10 years.

End of life (C1-C4)

For recycling	96.6 %
For energy recovery	3.3 %

The processes at the End of Life are modelled using data representing the European average.

Re-use, recovery and recycling potential (D)

Metals and insulated glass are directed to material recycling, plastics and packaging materials are directed to energy recovery circuits.

5 LCA: Results

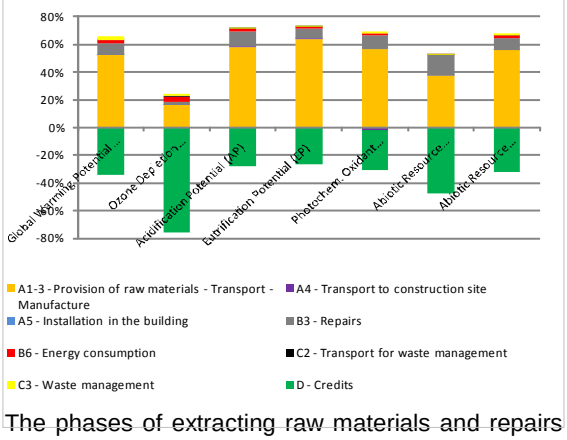
SYSTEM LIMITS (X = INCLUDED IN THE LCA; MND = MODULE NOT DECLARED)																
Production stage			Building construction stage		Usage stage							Disposal stage				Credits and encumbrances outside the system limit
Provision of raw materials	Transport	Manufacture	Transport to the site	Installation in the building	Use/ Application	Maintenance	Repairs	Replace-ment	Renewal	Energy required for operating the building	Water required for operating the building	Dismantling/ Demolition	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	MND	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 EFFECTS									
Global Warming Potential (GWP)	[kg CO_2 equiv.]	1.45E+02	6.08E-01	8.02E-01	2.28E+01	6.18E+00	6.82E-02	6.73E+00	-9.58E+01
Ozone Depletion Potential (ODP)	[kg CFC11 equiv.]	1.75E-06	2.25E-10	3.62E-10	2.33E-07	4.04E-07	8.00E-09	1.78E-07	-8.08E-06
Acidification Potential (AP)	[kg SO_2 equiv.]	9.42E-01	3.98E-03	1.90E-04	1.77E-01	2.63E-02	3.90E-04	1.01E-02	-4.54E-01
Eutrophication Potential (EP)	[kg PO_4^3 equiv.]	6.94E-02	9.58E-04	3.15E-05	7.22E-03	1.41E-03	1.11E-04	9.77E-04	-2.89E-02
Photochemical Ozone Creation Potential (POCP)	[kg ethene equiv.]	5.37E-02	-1.62E-03	1.91E-05	9.06E-03	1.60E-03	-7.23E-06	7.12E-04	-2.77E-02
Abiotic Depletion Potential for Elements (ADPE)	[kg Sb equiv.]	2.48E-03	2.40E-08	1.51E-08	9.95E-04	5.07E-07	1.26E-07	2.60E-06	-3.12E-03
Abiotic Depletion Potential of Fossil Fuels (ADPF)	[MJ]	1.66E+03	8.40E+00	4.80E-01	2.35E+02	7.04E+01	9.96E-01	4.58E+01	-9.50E+02
LCA RESULTS: USE OF RESOURCES									
Primary energy, renewable (PERE)	[MJ]	4.14E+02	3.29E-01	2.77E-02	5.26E+01	1.58E+01	2.05E-02	2.38E+00	-3.28E+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	0.00E+00
Total use of renewable primary energy (PERT)	*[MJ]*	4.14E+02	3.29E-01	2.77E-02	5.26E+01	1.58E+01	2.05E-02	2.38E+00	-3.28E+02
Primary energy, non-renewable (PENRE)	[MJ]	1.89E+03	8.43E+00	5,36E-01	2.72E+02	1.08E+02	1.04E+00	5.62E+01	-1.22E+03
Primary energy, non-renewable, used as raw materials (PENRM)	[MJ]	3.55E-03	0.00E+00	0.00E+00	3,53E-05	0.00E+00	3.87E-06	2.49E-03	-1.37E-06
Total use of non-renewable primary energy resources *(PENRT)*	*[MJ]*	1.89E+03	8.43E+00	5,36E-01	2.72E+02	1.08E+02	1.04E+00	5.62E+01	-1.22E+03
Use of Secondary Material (SM)	[kg]	1.23E+05	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 (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
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	0.00E+00
Materials For Recycling (MFR)	[kg]	1.04E+00	0.00E+00	0.00E+00	1.70E+00	0.00E+00	0.00E+00	3.55E+01	0.00E+00
Materials for Energy Recovery (MER)	[kg]	1.64E-02	0.00E+00	5.66E-01	7.50E-01	0.00E+00	0.00E+00	1.77E+00	0.00E+00
Exported energy [electricity]	[MJ]	5.52E-02	0.00E+00	9.99E-01	1.84E+00	0.00E+00	0.00E+00	4.28E+00	0.00E+00
Exported energy [thermal energy]	[MJ]	1.34E-01	0.00E+00	2.82E+00	4.62E+00	0.00E+00	0.00E+00	1.09E+01	0.00E+00

6 LCA: Interpretation

ENVIRONMENTAL EFFECTS

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



The phases of extracting raw materials and repairs have a dominant influence on all environmental impacts. In particular, the drive unit installed in the product and the high mass percentages of glass and aluminium processed in the sliding panels and side screens 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.

The results of the ozone depletion potential (ODP) are conspicuous as higher credits than encumbrances are ascertainable. This is primarily attributable to selection of the "PE: Aluminium Extrusion Profile Mix" data item in Modules A1-A3 and offsetting "EAA: Massel Mix (2005) as a credit) in Module D.

During the usage phase, the use of electrical energy over the reference service life of 10 years is apparent but does not have any significant influence on the result. A European power mix (EU-27) was used for this calculation.

Waste management also has an impact on practically every impact category. But the environmental impacts, especially those associated with thermal recovery of the plastics contained in the product, are not of relevance for any of the categories analysed.

The transport associated with procurement and distribution (A2 and A4) hardly have any effect on the CML indicators.

Credits are primarily incurred by material recycling of the TSG glazing as well as the aluminium and steel components. Electricity and natural gas are also offset against the system for energy recovery of the plastic components.

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.):

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www.bau-umwelt.de

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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).

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

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

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

DIN EN 16005:2013-01, Power operated pedestrian doorsets - Safety in use - Requirements and test methods; German version EN 16005:2012

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

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

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

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