ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	DORMA Deutschland GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20140189-CBD1-EN
Issue date	28.10.2014
Valid to	27.10.2019

BTS 80, BTS 80 EMB, and RTS 80 EMB Series Concealed Door Closers

DORMA

Institut Bauen und Umwelt e.V.

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

General Information

DORMA

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

Declaration number
EPD-DOR-20140189-CBD1-EN

This Declaration is based on the Product Category Rules:
Locks and fittings , 07.2014
(PCR tested and approved by the independent expert committee)

Issue date
28.10.2014

Valid to
27.10.2019

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

Dr. Burkhart Lehmann
(Managing Director IBU)

BTS 80, BTS 80 EMB, and RTS 80 EMB Series Closers

Owner of the Declaration
DORMA Deutschland GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Declared product / Declared unit
The declaration represents one concealed door closer unit.

Scope:
The declaration and the background LCA report represent DORMA's BTS 80, BTS 80 EMB, and RTS 80 EMB Series concealed door closers. Raw materials and components are provided by suppliers and shipped to DORMA, where the closers are manufactured and assembled at DORMA facilities in Germany. The BTS 80 and RTS 80 differ in how they are mounted to the door (floor versus frame), but are otherwise identical products; the EMB versions include electromagnetic hold-open features. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The CEN Norm EN 15804 serves as the core PCR
Independent verification of the declaration according to ISO 14025
☐ internally ☒ externally

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

Product

Product description
DORMA's BTS 80, BTS 80 EMB, and RTS 80 EMB Series of concealed door closers represent the latest in builders hardware technology. The closers can be used in a number of different configurations, including standard, narrow, or wide doors, as well as left-hand and right-hand single- or double-action mounting (both single and double leaf doors, including double leaf doors in combination with a BSR door coordinator).

A compact body permits use where larger closers would be prohibitive, and a comprehensive selection of accessories ensures that they can be used successfully with a wide variety of door constructions and floor coverings. These products offer maximum reliability and quality. Benefits include:

- *For the trade:* Reduced stock requirements because of separate, interchangeable spindles, and slim product range offering all key functions.
- *For the installer:* Suitable for installation with left-hand or right-hand single and double action doors. Interchangeable spindles enable easy adaption to structural conditions—even when retrofitted.
- *For the architect:* Concealed installation for maximum visual elegance. All essential functions are provided, and the closers deliver proven, robust design capable of withstanding leaf weights up to 300 kg.
- *For the user:* A temperature-independent closing cycle and highly efficient mechanism gives maximum user convenience.

The BTS 80 EMB and RTS 80 EMB include a electrohydraulic hold-open function to meet fire protection and other user needs.

Application
These door closers can control exceptionally heavy single- and double-acting doors (both single and double leaf). They are appropriate for almost any design and can meet most materials, size, and weight requirements. Trouble-free performance under adverse climatic and traffic conditions makes these products dependable and a perfect choice for even the most rigorous applications.

The BTS 80 EMB and RTS 80 EMB Series are specifically designed to be used in fire/life safety applications where the hold open is electrically controlled by a fire alarm contact. When installed in conjunction with a maintained control switch, these products can be used as a hold open/privacy function.

Technical Data
The concealed door closers employ a cam and roller mechanism, and are capable of controlling interior or exterior doors weighing up to 300 kg. They have a mechanical backcheck at approximately 70°. Dual valve adjustment provides controlled closing speed from approximately 175° opening range, even in cold temperature conditions.

Certifications include /ISO 9001/, /ANSI A156.4/ for Grade 1, and /EN 1154/ (CE only for versions without hold-open).

Name	Value	Unit
Length	341	mm
Depth	78	mm
Height	60	mm
Weight	6.1	kg
Test standards and methods	EN 1154	
Power rating (EMB only)	2.3	W

Base materials / Ancillary materials

Name	Value	Unit
Iron	51	%
Steel	37	%
Oil	6	%
Zinc	4	%
Brass	1	%
Other	1	%

Reference service life
The reference service life of DORMA's BTS 80 and RTS 80 Series concealed door closers will ultimately depend on the traffic pattern and degree of usage of the door. These closers are rated to ANSI Grade 1, meaning they are designed to withstand a minimum of 1,500,000 cycles. A reference service life of 20 years is assumed when calculating Use Stage impacts of the BTS 80 EMB and RTS 80 EMB.

LCA: Calculation rules

Declared Unit
The declared unit of this analysis is one concealed door closer.

Declared unit

Name	Value	Unit
Declared unit	-	1 piece/product
Mass of system (without packaging)	6.1	kg
Conversion factor to 1 kg	0.15	-

System boundary
Type of EPD: cradle-to-gate - with options. The following modules were considered in this analysis:

Product stage:
- Raw material supply (A1)
- Inbound transport (A2)
- Manufacturing (A3)

Construction process stage:
- Distribution (A4)
- Installation (A5)

Use stage:
- Building operational energy use (B6)

End-of-life stage:
- Disposal (C4)

Beyond system boundaries:
- Reuse, recovery, recycling potential (D)

The use stage (B6) is applicable to only the EMB closers. In all other aspects, the models are nearly identical.

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.

LCA: Scenarios and additional technical information

Additional information is provided for declared modules, including A4, A5, B6, C4, and D. In order to represent DORMA's global distribution network, sales-weighted averages are used to model transport to the building site and electricity consumption during BTS 80 EMB and RTS 80 EMB product use.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	31	l/100km
Transport distance	200 - 16000	km
Average transport distance	12230	km
Capacity utilisation (including empty runs)	85	%

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging)	0.4	kg

Reference service life

Name	Value	Unit
Reference service life	20	a

Operational energy use (B6) and Operational water use (B7)

Name	Value	Unit
Electricity consumption	403	kWh

End of life (C1-C4)

Name	Value	Unit
Recycling	5.3	kg
Landfilling	0.8	kg

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

Name	Value	Unit
Recycling rate, aluminum	60	%
Recycling rate, brass	52	%
Recycling rate, paper	90	%
Recycling rate, plastics	14	%
Recycling rate, steel and iron	88	%
Recycling rate, zinc	52	%

LCA: Results

The table below summarizes which modules are declared (as indicated by an "X"), and which are not declared (as indicated with "MND"). Environmental performance results are shown for one (1) concealed door closer. While results include module B6, this module is not applicable to the BTS 80 as it does not have an electrohydraulic hold-open function.

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 BOUNDARYS
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	MND	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 closer (6.1kg)*

Parameter	Unit	A1 - A3	A4	A5	B6	C4	D
Global warming potential	[kg CO_2-Eq.]	1.681E+1	1.400E+0	1.140E-1	2.930E+2	1.100E-2	-1.540E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.767E-8	6.260E-12	1.170E-13	5.090E-8	1.500E-13	4.610E-8
Acidification potential of land and water	[kg SO_2-Eq.]	4.514E-2	3.290E-2	1.510E-5	1.740E+0	7.020E-5	-2.680E-3
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	4.079E-3	3.540E-3	2.180E-5	1.390E-1	9.620E-6	-1.270E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	4.583E-3	1.320E-3	1.550E-5	1.140E-1	6.590E-6	-7.550E-4
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	1.111E-3	4.160E-8	6.000E-10	1.720E-5	4.150E-9	-3.520E-4
Abiotic depletion potential for fossil resources	[MJ]	1.812E+2	1.740E+1	4.340E-2	3.480E+3	1.450E-1	-1.690E+1

RESULTS OF THE LCA - RESOURCE USE: 1 closer (6.1kg)*

Parameter	Unit	A1 - A3	A4	A5	B6	C4	D
Renewable primary energy as energy carrier	[MJ]	3.407E+1	2.240E-1	2.270E-3	3.260E+2	1.250E-2	1.150E-1
Renewable primary energy resources as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of renewable primary energy resources	[MJ]	3.407E+1	2.240E-1	2.270E-3	3.260E+2	1.250E-2	1.150E-1
Non renewable primary energy as energy carrier	[MJ]	2.240E+2	1.880E+1	4.950E-2	4.260E+3	1.630E-1	-1.660E+1
Non renewable primary energy as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of non renewable primary energy resources	[MJ]	2.240E+2	1.880E+1	4.950E-2	4.260E+3	1.630E-1	-1.660E+1
Use of secondary material	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Use of renewable secondary fuels	[MJ]	-1.164E-2	1.120E-4	3.310E-5	5.780E-2	2.720E-4	3.080E-4
Use of non renewable secondary fuels	[MJ]	-1.260E-1	1.180E-3	7.360E-5	6.050E-1	5.870E-4	3.040E-3
Use of net fresh water	[m^3]	5.685E+1	2.270E-1	-3.260E-2	1.640E+3	-5.790E-1	-1.800E+0

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 closer (6.1kg)*

Parameter	Unit	A1 - A3	A4	A5	B6	C4	D
Hazardous waste disposed	[kg]	2.901E-2	2.880E-5	1.510E-6	2.600E-1	6.810E-6	-3.860E-4
Non hazardous waste disposed	[kg]	1.279E+0	6.860E-4	2.730E-2	1.130E+0	8.160E-1	8.000E-2
Radioactive waste disposed	[kg]	1.228E-2	2.550E-5	8.020E-7	2.090E-1	2.650E-6	1.340E-4
Components for re-use	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for recycling	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for energy recovery	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported electrical energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported thermal energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0

* 1kg = 2.204 lbs.

Concealed closer environmental impacts are dominated by electricity consumption during closer operation (Module B6). The one exception is the abiotic depletion of elements, which is dominated by the use of copper, steel, and zinc to manufacture the closer (Module A1). In order to capture DORMA's global sales network, the LCA assumes a sales-weighted average grid mix based on the countries and regions where DORMA's BTS 80 EMB closers are sold. The analysis thus represents DORMA's specific situation as of 2013.

The percentage of electricity sourced from renewable energy, however, can vary greatly among regional grids. This will therefore impact the extent to which Module B6 dominates closer environmental performance. Given that approximately 403 kWh of electricity is consumed over a closer's lifetime (no maintenance is required or modeled), it is possible to re-calculate the environmental impact of Module B6 to obtain results for a specific country or region rather than rely on the DORMA average presented in this EPD.

In the case of the BTS 80 closer without the electrohydraulic hold-open function, Module B6 is irrelevant and Modules A1 - A3 dominate environmental impact. Raw materials supply (A1), which encompasses both material production and any component manufacturing that takes place upstream of DORMA, is typically the key driver. At DORMA, a few additional components are produced and the closers are assembled.

Finished products are subsequently shipped from DORMA's facility in Germany to various locations in Europe, Asia, and the Americas. As with product use, a sales-weighted average based on the countries and regions in which closers are sold is used to model transport to the construction site (Module A4). While these results represent DORMA's specific situation as of 2013, they too can be reevaluated for a specific country or region.

At the end-of-life, DORMA's closers are modeled as being recycled. A portion of each material type is recovered and the remainder landfilled. In this case, proxy data are used as often, global average or even regional specific data are not available. Waste disposal (Module C4) is consistently a minor contributor to environmental impact so dataset choice is not anticipated to affect conclusions.

References

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

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

EN 15804
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

ANSI A156.4
ANSI/BHMA A156.4 - 2013, Door controls — Closers

EN 1154
EN 1154:1997, Building hardware — Controlled door closing devices

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

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

ISO 9001
EN ISO 9001:2008, Certification — Quality management systems

ISO 14040
EN ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework

ISO 14044
EN ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines

PCR Part A
Institut Bauen und Umwelt e.V., 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. 2013. www.bau-umwelt.com

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 Locks and fittings. 2012. www.bau-umwelt.com

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**

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**

Author of the Life Cycle Assessment
PE INTERNATIONAL, Inc.
Milk St. 170
02109 Boston, MA
USA

Tel +1 617-247-4477
Fax +1 303-447-0909
Mail consulting@pe-international.com
Web **www.pe-international.com**

Owner of the Declaration
Dorma Deutschland GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Tel +49 (0)2333-793-0
Fax +49 (0)2333-793-4550
Mail dorma-deutschland@dorma.com
Web **www.dorma.com**