ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	dormakaba International Holding GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20210283-CBC1-EN
Issue date	25.02.2022
Valid to	24.02.2027

ES 400 System

Sliding Door Operator dormakaba

Institut Bauen und Umwelt e.V.

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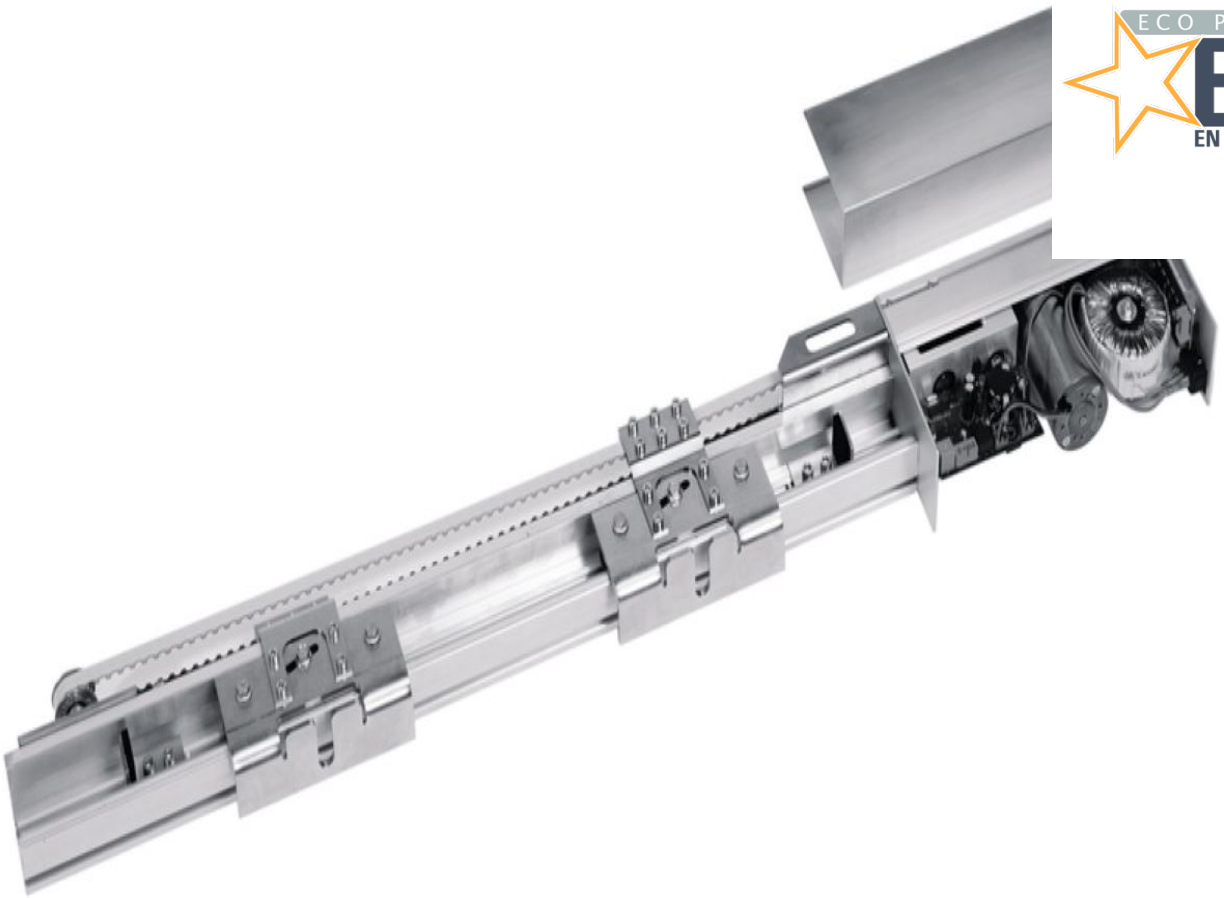

General Information

dormakaba

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

Declaration number
EPD-DOR-20210283-CBC1-EN

This declaration is based on the product category rules:
Drive systems for automatic doors and gates, 11.2017
(PCR checked and approved by the SVR)

Issue date
25.02.2022

Valid to
24.02.2027

Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

ES 400 System - Sliding Door Operator

Owner of the declaration
dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Declared product / declared unit
1 piece of the product: ES 400 System - sliding door operator, consisting of the following items:
- one (1) ES 420 drive unit kit double leaf
- one (1) ES 400 slide rail complete 3m
- two (2) ES 400 adapter unit heavy load single leaf
- packaging

Scope:
This declaration is a specific product declaration. This EPD refers to the entire lifecycle of a representative ES 420 drive system for double leaf doors. This Environmental Product Declaration is also representative for the ES 410 door operator of single leaf doors. The production location is the DORMA production site in Zusmarshausen and Ennepetal, Germany. Green electricity is used at the production facilities.
The material and energy flows were taken into consideration accordingly.
The year of data collection is 2021.

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.
The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2010*
☐ internally ☒ externally

Dr.-Ing. Wolfram Trinius
(Independent verifier)

Product

Product description/Product definition
As a compact and innovative sliding door operator, the ES 400 is especially suitable for application in hospitals, institutes or laboratories.

Thanks to its simple and low-maintenance design, it guarantees easy handling and reliable function as well as a long life cycle.

The ES 410 effortlessly operates single-panel doors with a weight of up to 200 kg at a passage width of up to 3 m, while the ES 420 is especially suitable for double-panel doors with a door-panel weight of up to 2x125 kg.

Features
- Compact design
- Excellent operating dynamics
- Applicable for heavy doors in stainless steel design
- Self-learning
- Parameterisation via software
- Push & Go function
- Separate input for control via fire detection system
- Integrated airlock function for up to 3 door sets
- Automatic changeover to manual closing

For the placing on the market in the European Union/European Free Trade Associaton (EU/EFTA) (with the exception of Switzerland) the following legal provisions apply:

- *DIN 18650:2010*
- *DIN EN 16005: 2012*
- *DIN EN 60335-1, -2-103: 2007*
- *DIN EN 61000-1-2:2017*
- *DIN EN ISO 13849-1: 2016*
- *DIN EN 61508-2: 2011*
- *2011/65/EU ROHS3 Directive*

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above.

Application
Following parameter are applicable for single and double leaf doors:

Door parameters

Single-panel sliding door (ES 410)	
– Clear passage width (LW)	700 – 3000 mm
– Max. weight per door panel	1 x 200 kg
– with adapter unit weight leaf	1 x 250 kg
Double-panel sliding door (ES 420)	
– Clear passage width LW	800 – 3000 mm
– Max. weight per door panel	2 x 125 kg
Double-panel sliding door (ES 415)	
– Clear passage width LW	1000 – 3000 mm
– Max. weight per door panel	2 x 130 kg

Technical Data
The technical specification of the ES 400 system is as follows:

Technical operator data

Height		132 mm
Installation depth	ES 410/ES 420	65 mm
	ES 415	138 mm
Max. opening and closing force 150 N		●
Opening speed (adjustable)		10 – 50 cm/s
Closing speed (adjustable)		10 – 50 cm/s
Hold-open time		
– Nurse opening of Nurse-Bed-Function		0 – 60 s
(partial open)		0 – 60 s
– Bed opening of Nurse-Bed-Function		
Supply voltage, frequency		230 V, 50/60 Hz
Power consumption		180 W
Class of protection		IP 20
Temperature range		+ 0 – + 40 °C
Compliant with the Low Voltage Directive		●
Manufactured to ISO 9001		●

Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU:

- *DIN 18650:2010*
- *DIN EN 16005: 2012*
- *DIN EN 60335-1, -2-103: 2007*
- *DIN EN 61000-1-1:2017*
- *DIN EN ISO 13849-1: 2016*
- *DIN EN 61508-2: 2011*
- *2011/65/EU ROHS3 Directive*

Delivery status:

The declared ES 400 automatic drive system includes one average ES 400 (including one ES 420 drive unit kit double leaf, one ES 400 slide rail complete 3m and one ES 400 adapter unit heavy load single leaf) and packaging with a weight of 18 kg.

Components	Absolute	Percentage
Average ES 400	16,57 kg	92,06%
Average Packaging	1,43 kg	7,94%
Total	**18,00 kg**	**100%**

Base materials/Ancillary materials
The product composition of the ES 410/420 is as follows:

Name	Value	Unit
Aluminium	50	%
Electronical components	30	%
Steel	10	%
Plastic	10	%

The product contains partial articles which contain substances
listed in the Candidate List of REACH Regulation 1907/2006/EC (date: 17.01.2022) exceeding 0.1 percentage by mass: no

Reference service life
The life cycle of the ES 400 drive system is about 5 years, depending on the application and frequency of use. Regular maintenance is advised to ensure the life expectancy of 5 years. For repairs or renewals, suitable spare parts are available. The drive is tested to 200,000 cycles according to *EN 16005*.

LCA: Calculation rules

Declared Unit
The declared unit is 1 piece of the product: 16.6 kg

Declared unit

Name	Value	Unit
Declared unit	1	pce.

Mass (total system) (excl. packaging)	16.6	kg
conversion factor [Mass/Declared Unit]	16.6	-

System boundary
The type of EPD is: cradle to gate with options, modules C1–C4, and module D (A1–A3 + C + D and additional modules: A4 + A5 + B6)

Production - Module A1-A3
The product stage includes:
— A1, raw material extraction, processing and mechanical treatments, processing of secondary material input (e.g. recycling processes),
— A2, transport to the manufacturer,
— A3, manufacturing and assembly including provision of all materials, products and energy, as well as waste processing up to the end-of waste state.

Construction stage - Modules A4-A5
The construction process stage includes:
— A4, transport to the building site;
— A5, installation into the building;
including provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the construction process stage.

Use stage - Module B6
The use stage related to the operation of the building includes:
— B6, operational energy use

End-of-life stage– Modules C1-C4 and D
The end-of-life stage includes:
— C1, de-construction, demolition:
— C2, transport to waste processing;
— C3, waste processing for reuse, recovery and/or recycling;
— C4, disposal;
including provision and all transport, provision of all materials, products and related energy and water use.
Module D (Benefits and loads beyond the system boundary) includes:
— D, recycling potentials, expressed as net impacts and benefits.

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.

Background database: GaBi ts, SP40, CUP 2020.1

LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon

Information on describing the Biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	0.07	kg C
Biogenic Carbon Content in accompanying packaging	0.52	kg C

The following technical scenario information is required for the declared modules

Transport from the gate to the site (A4)

Name	Value	Unit
Litres of fuel (per 1 kg)	0.00276	l/100km
Capacity utilisation (including empty runs)	55	%
Transport distance via medium truck	100	km

Transport distance is declared for a distance of 100km by truck in order to allow scaling to a specific point of installation.

Installation into the building (A5)

Name	Value	Unit
Waste packaging (paper and plastic)	1.41	kg

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	5	a

Operational energy use (B6)
The use stage is declared for 5 years

Name	Value	Unit
Electricity consumption for 1 year	199.75	kWh
Days per year in use	365	days
On mode per day	1.8	h
Idle mode per day	22.2	h
On mode power	30.24	W
Idle mode power	22.2	W

End of life (C1-C4)

Name	Value	Unit
Recycling	15.86	kg
Energy recovery	0.56	kg
Landfilling	0.27	kg
Transport to waste management	50	km

The product is disassembled in a recycling process. Material recycling is then assumed for the metals, electronic and electromechanics. The plastic components are assumed to be incinerated with energy recovery. Minor proportions of residues arising from the recycling process are landfilled (1%).
Region for the End of Life is: Global.

Reuse, recovery and/or recycling potentials (D), relevant scenario information
Collection rate is 100%.

LCA: Results

Disclaimer:

EP-freshwater: This indicator has been calculated as “kg P eq” as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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	Refurbishment	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	ND	ND	MNR	MNR	MNR	X	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ES 400 drive system

Core Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	4.86E+1	1.58E-1	2.02E+0	4.04E+2	0.00E+0	7.28E-2	1.78E+0	2.93E-2	-1.41E+1
GWP-fossil	[kg CO_2-Eq.]	5.09E+1	1.51E-1	6.30E-2	4.02E+2	0.00E+0	6.96E-2	1.43E+0	2.91E-2	-1.41E+1
GWP-biogenic	[kg CO_2-Eq.]	-2.22E+0	7.00E-3	1.96E+0	1.34E+0	0.00E+0	3.22E-3	3.55E-1	9.95E-5	-3.20E-2
GWP-luluc	[kg CO_2-Eq.]	4.49E-2	3.60E-6	3.37E-5	5.83E-1	0.00E+0	1.66E-6	8.36E-5	8.38E-5	-3.99E-3
ODP	[kg CFC11-Eq.]	1.37E-9	1.60E-17	3.68E-16	8.84E-12	0.00E+0	7.34E-18	7.58E-16	1.08E-16	-7.28E-11
AP	[mol H^+-Eq.]	2.20E-1	1.51E-4	5.65E-4	8.88E-1	0.00E+0	6.96E-5	3.03E-4	2.09E-4	-5.70E-2
EP-freshwater	[kg PO_4-Eq.]	1.27E-4	3.24E-8	7.18E-8	1.07E-3	0.00E+0	1.49E-8	1.20E-7	5.00E-8	-8.35E-6
EP-marine	[kg N-Eq.]	3.68E-2	4.82E-5	2.04E-4	1.97E-1	0.00E+0	2.22E-5	7.30E-5	5.38E-5	-7.36E-3
EP-terrestrial	[mol N-Eq.]	3.97E-1	5.36E-4	2.54E-3	2.07E+0	0.00E+0	2.46E-4	1.39E-3	5.91E-4	-7.92E-2
POCP	[kg NMVOC-Eq.]	1.14E-1	1.36E-4	5.40E-4	5.40E-1	0.00E+0	6.26E-5	2.01E-4	1.63E-4	-2.41E-2
ADPE	[kg Sb-Eq.]	2.64E-3	4.54E-9	5.80E-9	1.16E-4	0.00E+0	2.09E-9	1.05E-8	2.61E-9	-3.11E-4
ADPF	[MJ]	6.60E+2	2.15E+0	6.40E-1	7.07E+3	0.00E+0	9.86E-1	7.33E-1	3.82E-1	-1.89E+2
WDP	[m^3 world-Eq deprived]	6.23E+0	2.97E-4	2.50E-1	8.76E+1	0.00E+0	1.36E-4	1.82E-1	3.05E-3	-1.12E+0

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ES 400 drive system

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	[MJ]	1.95E+2	6.77E-3	1.71E+1	3.13E+3	0.00E+0	3.11E-3	2.78E+0	5.00E-2	-6.79E+1
PERM	[MJ]	1.96E+1	0.00E+0	-1.70E+1	0.00E+0	0.00E+0	0.00E+0	-2.59E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.15E+2	6.77E-3	1.17E-1	3.13E+3	0.00E+0	3.11E-3	1.85E-1	5.00E-2	-6.79E+1
PENRE	[MJ]	6.45E+2	2.15E+0	8.55E-1	7.07E+3	0.00E+0	9.87E-1	1.66E+1	3.82E-1	-1.89E+2
PENRM	[MJ]	1.60E+1	0.00E+0	-2.15E-1	0.00E+0	0.00E+0	0.00E+0	-1.58E+1	0.00E+0	0.00E+0
PENRT	[MJ]	6.61E+2	2.15E+0	6.40E-1	7.07E+3	0.00E+0	9.87E-1	7.33E-1	3.82E-1	-1.89E+2
SM	[kg]	1.13E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	3.91E-1	1.21E-5	5.89E-3	3.62E+0	0.00E+0	5.58E-6	4.34E-3	9.63E-5	-1.33E-1

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ES 400 drive system

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	[kg]	2.76E-6	2.08E-10	9.57E-10	2.93E-6	0.00E+0	9.58E-11	2.56E-9	5.82E-9	-2.87E-6
NHWD	[kg]	7.29E+0	2.20E-4	6.42E-2	5.02E+0	0.00E+0	1.01E-4	1.50E-1	1.92E+0	-2.30E+0
RWD	[kg]	3.11E-2	2.31E-6	3.35E-5	1.07E+0	0.00E+0	1.06E-6	2.87E-5	4.35E-6	-1.65E-2
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.07E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	3.32E-1	0.00E+0	3.06E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	6.03E-1	0.00E+0	5.56E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ES 400 drive system

Indicator	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	[Disease Incidence]	2.46E-6	7.96E-10	3.14E-9	7.44E-6	0.00E+0	3.66E-10	3.48E-9	2.59E-9	-8.25E-7
IR	[kBq U235-Eq.]	5.11E+0	3.30E-4	5.17E-3	1.76E+2	0.00E+0	1.51E-4	2.88E-3	4.47E-4	-3.22E+0
ETP-fw	[CTUe]	2.52E+2	1.52E+0	3.03E-1	3.02E+3	0.00E+0	6.99E-1	2.80E-1	2.18E-1	-6.02E+1
HTP-c	[CTUh]	2.91E-7	2.86E-11	1.61E-11	8.35E-8	0.00E+0	1.32E-11	2.36E-11	3.23E-11	-3.68E-9
HTP-nc	[CTUh]	7.88E-7	1.22E-9	7.09E-10	3.08E-6	0.00E+0	5.63E-10	2.24E-9	3.56E-9	-1.06E-7
SQP	[-]	3.98E+2	5.52E-3	1.70E-1	2.25E+3	0.00E+0	2.54E-3	2.18E-1	7.96E-2	-8.50E+0

Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator IRP
This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP
The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

References

Standards

DIN 18650
DIN 18650:2010, Powered pedestrian doors - Product requirements and test methods

DIN EN 60335
DIN EN 60335-1, -2-103:2020-08, Household and similar electrical appliances - Safety - Part 1: General requirements

DIN EN 61000
DIN EN 61000-1-2:2017-07, Electromagnetic compatibility (EMC) - Part 1-2: General - Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena

DIN EN 61508
DIN EN 61508-2:2011-02, Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems

DIN EN ISO 13849
DIN EN ISO 13849-1:2021-08, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

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

Further References

2011/65/EU ROHS3 Directive
Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

IBU 2021
General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. www.ibu-epd.com

GaBi ts software
Sphera Solutions GmbH
Gabi Software System and Database for Life Cycle Engineering 1992-2020
Version 10.0.0.71
University of Stuttgart
Leinfelden-Echterdingen

GaBi ts documentation
GaBi life cycle inventory data documentation (https://www.gabisoftware.com/support/gabi/gabidatabase-2020-lci-documentation/).

LCA-tool dormakaba
LCA tool, version 1.0. ENS (drive system)
Developed by Sphera Solutions GmbH.

PCR Part A
PCR – Part A: Calculation Rules for the Life Cycle Assessment
and Requirements on the Project Re-port
according to EN 15804+A2:2019, Version 1.0, Institut Bauen und Umwelt e.V., www.ibu-epd.com.

PCR Part B
PCR – Part B: Requirements on the EPD for Building Hardware product, version 1.2, Institut Bauen und Umwelt e.V., www.ibu-epd.com, 2020.

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