ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	dormakaba International Holding GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20230214-CBA1-EN
Issue date	21.08.2023
Valid to	20.08.2028

Automatic revolving door KTC 2

dormakaba

Institut Bauen und Umwelt e.V.

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General Information

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Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-DOR-20230214-CBA1-EN

This declaration is based on the product category rules:

Automatic doors, automatic gates, and revolving door systems, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

21.08.2023

Valid to

20.08.2028

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

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Automatic revolving door KTC 2

Owner of the declaration

dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Declared product / declared unit

1 piece of the product: Automatic Revolving Door KTC 2 diameter 4,8m and clear passage height 2,4m, consisting of the following items:

- Two wings
- Integrated sliding door
- Automatic sliding door operator
- Canopy
- Showcases
- Drum walls
- Product packaging

Scope:

This Environmental Product Declaration refers to a specific revolving door manufactured by dormakaba.The production site is located in Suzhou (China).

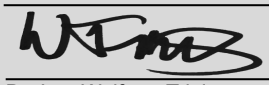
The data represent the year 2022.

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 14025:2011
☐ internally ☒ externally



Dr.-Ing. Wolfram Trinius,
(Independent verifier)

Product

Product description/Product definition

The automatic revolving door KTC 2 combines extensive functions, robust technology and attractive design

KTC 2 revolving door systems with integrated automatic sliding door offers a wide range of adjustment possibilities. Due to changing access requirements of large buildings over the course of the day and during the evening a versatile door system that is quickly adaptable to requirements is the ideal solution.

KTC 2 high-capacity doors are designed and manufactured to suit individual requirements and are reliable at the same time. The door systems allows entry in a short period of time and are securely looked whenever needed. For the use and application of the product the respective national provisons at the place of use apply. For the automatic revolving door KTC 2 the standards which can be applied are the following:

- *ISO 13849-1*
- *ISO 12100*
- *DIN 18650-1*
- *DIN 18650-2*
- *EN 16005*
- *EN 60335-1*
- *EN 61000*
- *2011/65/EU ROHS3 Directive*
- *Machinery Directive 2006/42/EC*

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

Application

Automatic revolving doors may be used to provide a comfortable entry and exit in many applications in the facade of or within a building.

The KTC 2 is ideal for the use in:

- Hotels
- Healthcare settings
- Airports and transportation facilities
- Commercial office buildings
- Institutional and educational buildings
- Retail stores

Technical Data

The automatic revolving door KTC 2 has following technical properties:

Name	Value	Unit
Power consumption on mode	184,8	W
Power consumption idle mode	80,8	W
Power consumption off mode	80,8	W
Internal diameter of the drum	3000-5400	mm
Width of the door unit	3210-5610	mm

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision which can be applied are mentioned above.

Base materials/Ancillary materials

The major material composition including the packaging of the product is listed below:

Name	Value	Unit
Glass	34	%
Aluminium	34	%
Steel	23	%
Wood	3	%
Plastic	2	%
Electronic	2	%
Paper	2	%

The product includes partial articles which contain substances listed in the Candidate List of *REACH Regulation 1907/2006/EC* (date: 14.06.2023) exceeding 0.1 percentage by mass: yes

- Lead (Pb): 7439-92-1 (CASNo) is included in the battery and some of the alloys used. The concentration in each individual alloy does not exceed 4% (by mass).

The Candidate List can be found on the ECHA website address: https:echa.europa.eu/de/home.

Reference service life

The reference service life for the automatic revolving door KTC 2 amounts to 20 years and depends on the application and frequency of use. For repairs and renewals, suitable spare parts are available. The revolving door is tested and certified to *EN 16005*, meaning they are designed to withstand a minimum of 1.000.000 cycles.

LCA: Calculation rules

Declared Unit

The declared unit is 1 piece of the product: KTC 2

Name	Value	Unit
Declared unit	1	pce.
Mass reference of declared product	2445	kg/pce

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, deconstruction, 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.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

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, SP40

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate, and it shall be separately declared for the product and for any accompanying packaging.
If the total mass of biogenic carbon containing materials is less than 5 % of the total mass of the product and accompanying packaging, the declaration of biogenic carbon content may be omitted. The mass of packaging containing biogenic carbon shall always be declared.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

Information on describing the biogenic carbon content at factury gate

Name	Value	Unit
Biogenic carbon content in product	39.21	kg C
Biogenic carbon content in accompanying packaging	18.41	kg C

Transport to the building site (A4)

The following technical scenario information is required for the declared modules

Name	Value	Unit
Litres of fuel	0.00276	l/100km
Capacity utilisation (including empty runs)	55	%
Transport distance via medium truck	100	km
Transport distance via ship	1000	km

The product is transported via truck and ship. The main distribution regions are Europe and China. In order to allow scaling to a specific point of installation 100 km are declared.

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	20	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption for 1 year	935.97	kWh
Days per year in use	365	days
On mode per day	6	h
Idle mode per day	4	h
Off mode per day	14	h
On mode	184,8	W
Idle mode	80,8	W
Off mode	80,8	W

End of life (C1-C4)

C1: The product expansion depends on the building. The product share is so low that no environmental burden is assumed.
C2: Transport to waste management 50 km.

Name	Value	Unit
Collected separately waste type	2390	kg
Recycling	1430	kg
Energy recovery	44.3	kg
Landfilling	911	kg

The product is disassembled in a recycling process. Material recycling is then assumed for the metals and electronics. The plastic components are assumed to be incinerated with energy recovery. Electromechanics and minor proportions of residues arising from the recycling process are landfilled. Region for the End of Life is: Global.

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

Name	Value	Unit
Recycling	100	%

The collection rate is 100%.

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LCA: Results

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	MND	MND	MNR	MNR	MNR	X	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece KTC 2

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.15E+04	2.14E+01	8.87E+01	1.74E+04	0	1.06E+01	2.68E+02	1.39E+01	-5.32E+03
GWP-fossil	kg CO_2 eq	2.17E+04	2.04E+01	1.96E+01	1.74E+04	0	1.01E+01	1.2E+02	1.38E+01	-5.31E+03
GWP-biogenic	kg CO_2 eq	-2.09E+02	9.45E-01	6.91E+01	-6.22E+00	0	4.66E-01	1.47E+02	4.7E-02	-1.63E+01
GWP-luluc	kg CO_2 eq	5.56E+00	4.87E-04	2E-03	2.31E+01	0	2.4E-04	8E-03	4E-02	-8.88E-01
ODP	kg CFC11 eq	1.42E-08	2.16E-15	2.18E-14	5.3E-11	0	1.07E-15	7.77E-14	5.13E-14	-4.04E-08
AP	mol H^+ eq	1.23E+02	2E-02	2.3E-02	1.45E+02	0	1E-02	4.2E-02	9.9E-02	-1.99E+01
EP-freshwater	kg P eq	9.14E-03	4.38E-06	3.93E-06	1E-02	0	2.16E-06	1.22E-05	2.37E-05	-3E-03
EP-marine	kg N eq	2E+01	7E-03	8E-03	1.99E+01	0	3E-03	1.2E-02	2.6E-02	-2.64E+00
EP-terrestrial	mol N eq	2.19E+02	7.2E-02	1.04E-01	2.18E+02	0	3.6E-02	1.97E-01	2.8E-01	-2.86E+01
POCP	kg NMVOC eq	5.92E+01	1.8E-02	2.1E-02	5.96E+01	0	9E-03	3.2E-02	7.7E-02	-8.39E+00
ADPE	kg Sb eq	1.05E-01	6.13E-07	3.25E-07	1E-03	0	3.03E-07	1.11E-06	1.24E-06	-2E-02
ADPF	MJ	2.16E+05	2.9E+02	3.06E+01	1.86E+05	0	1.43E+02	8.68E+01	1.81E+02	-7.49E+04
WDP	m^3 world eq deprived	3.14E+03	4E-02	1.06E+01	3.52E+03	0	2E-02	2.75E+01	1.45E+00	-2.63E+02

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 KTC 2

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	1.62E+04	9.14E-01	6.06E+02	3.28E+04	0	4.51E-01	1.5E+03	2.38E+01	-3.45E+04
PERM	MJ	2.08E+03	0	-6E+02	0	0	0	-1.48E+03	0	0
PERT	MJ	1.82E+04	9.14E-01	6.21E+00	3.28E+04	0	4.51E-01	2.02E+01	2.38E+01	-3.45E+04
PENRE	MJ	2.14E+05	2.9E+02	3.32E+02	1.86E+05	0	1.43E+02	1.72E+03	1.81E+02	-7.5E+04
PENRM	MJ	1.94E+03	0	-3.01E+02	0	0	0	-1.64E+03	0	0
PENRT	MJ	2.16E+05	2.9E+02	3.06E+01	1.86E+05	0	1.43E+02	8.68E+01	1.81E+02	-7.5E+04
SM	kg	4.18E+02	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m^3	7.95E+01	2E-03	2.5E-01	9.35E+01	0	8.1E-04	6.51E-01	4.6E-02	-6.11E+01

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 KTC 2

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	kg	6.63E-04	2.82E-08	6.44E-08	1.13E-04	0	1.39E-08	2.31E-07	2.77E-06	-3.5E-04
NHWD	kg	3.38E+03	3E-02	4.07E+00	7.14E+01	0	1.5E-02	1.33E+01	9.12E+02	-1.32E+03
RWD	kg	1.49E+00	3.12E-04	1E-03	2.46E+00	0	1.54E-04	4E-03	2E-03	-8.21E+00
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	1.37E+03	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.4E+02	0	0	0	4.34E+02	0	0
EET	MJ	0	0	2.7E+02	0	0	0	8.88E+02	0	0

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; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 piece KTC 2

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	Disease incidence	3.02E-03	1.08E-07	1.5E-07	2E-03	0	5.31E-08	3.76E-07	1.23E-06	-3.2E-04
IR	kBq U235 eq	1.98E+02	4.5E-02	2.1E-01	2E+02	0	2.2E-02	4.73E-01	2.12E-01	-1.66E+03
ETP-fw	CTUe	1.02E+05	2.06E+02	1.37E+01	3.72E+04	0	1.01E+02	3.45E+01	1.04E+02	-2.75E+04
HTP-c	CTUh	2.52E-05	3.87E-09	8.3E-10	3.37E-06	0	1.91E-09	2.71E-09	1.54E-08	-1.34E-06
HTP-nc	CTUh	2.46E-04	1.65E-07	5.15E-08	1.53E-04	0	8.16E-08	2.12E-07	1.69E-06	-3.9E-05
SQP	SQP	2.6E+04	7.45E-01	8.41E+00	2.87E+04	0	3.68E-01	2.53E+01	3.78E+01	-2.25E+03

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 “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

This EPD was created using a software tool.

References

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

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

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

EN 60335
EN 60335-1, 2103:2020-08, Household and similar electrical appliances - Safety - Part 1: General requirements

EN 61000
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

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

Machinery Directive
Directive 2006/42/EC of the European Parliament and of the Council on machinery, and amending Directive 95/16/EC

REACH
Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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
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/gabidatabase2020lcidocumentation/)

LCA-tool dormakaba
LCA tool, version ENS (doors)
Tool No.: IBU-DOR-202107-LT1-EN
Developed by Sphera Solutions GmbH

PCR Part A
PCR – Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report 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 for Automatic doors, automatic gates, and revolving door systems,
08.2021, Institut Bauen und Umwelt e.V., www.ibu-epd.com.

Publisher

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

+49 2333 793-0
info.de@dormakaba.com
www.dormakaba.com

Owner of the Declaration

dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

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