

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-20220356-CBA3-EN
Issue date	14/04/2023
Valid to	13/04/2028

KTV Atrium Flex
dormakaba

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General Information

dormakaba

Programme holder

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

Declaration number

EPD-DOR-20220356-CBA3-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

14/04/2023

Valid to

13/04/2028



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



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

KTV Atrium Flex

Owner of the declaration

dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

Declared product / declared unit

1 piece of the product: KTV Atrium Flex All Glass Revolving Door, with four (4) door leaves and a diameter of 3000 mm and a height of 2200 mm, consisting of the following items:

- Drum wall
- Canopy construction
- Light ring
- Door wings
- Turnstile fittings
- KT FLEX Direct drive unit
- Electric accessories / sensors
- Floor ring
- Claddings
- Product packaging

Scope:

This Environmental Product Declaration refers to a specific KTV Atrium Flex All Glass Revolving Door manufactured by dormakaba. The production site is located in Sofia (Bulgaria).

Data represents 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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



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

Product

Product description/Product definition

The KTV Atrium Flex door range is a breakthrough in design with technology: The revolving door is driven by an electromagnetic direct drive - the dormakaba FLEX Direct Drive technology complements the design intent of modern architecture. It is unique, elegant and leaves an impression that is lasting and timeless.

For the use and application of the product the respective national provisions at the place of use apply. For the KTV Atrium Flex the standards which can be applied are the following:

- 2011/765/EU ROHS3 Directive
- ISO 13849-1: Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design.
- ISO 12100: Safety of machinery - Basic concepts - Risk assessment and risk reduction
- EN 16005: Power operated pedestrian doorsets - Safety in use - Requirements and test methods
- EN 61000 - 6 - 2: Electromagnetic compatibility (EMC). Part 6-2: Generic standards: Interference resistance for industrial environments
- EN 61000 - 6 - 3: Electromagnetic compatibility (EMC). Part 6-3: Generic standards: Emission standard for residential, commercial and light-industrial environments.
- EN 61000 - 3 - 2: Electromagnetic compatibility-3-2: Limits - Limits for harmonic current emissions
- EN 61000 - 3 - 3: Electromagnetic compatibility-3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems
- EN 55022: Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
- EN 60335 - 1: Safety of household and similar electrical appliances. Part 1: General requirements
- EN 60335-2-103: Household and similar electrical appliances. Safety-Particular requirements for drives for gates, doors and windows
- DIN 18650-1: Powered pedestrian doors. Part 1: Product requirements and test methods
- DIN 18650-2: Powered pedestrian doors. Part 2: Safety at powered pedestrian doors

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

Application

The KTV Atrium Flex is ideal for modern entrances. Typical applications include:

- Office / commercial buildings
- Airports

- Public buildings
- Hospitals
- Hotels

Automatic revolving doors are used to control the pedestrian flow in combination with an optimal thermal separation of the inside and outside climates during normal use.

Technical Data

Advanced German drive technology using innovative magnetic levitation technology, the door panels are directly driven by contactless magnetic fields, instead of conventional belt and gear system, realizing an extremely compact low-wear automation system that delivers quiet motion millions of times over.

Base materials/Ancillary materials

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

Name	Value	Unit
Glass	66	%
Packaging	10	%
Stainless steel	9	%
Aluminium	8	%
Steel	3	%
Plastic	2	%
Electronics	2	%

The KTV Atrium Flex includes partial articles which contain substances listed in the Candidate List of *REACH Regulation 1907/2006/EC* (date: 17.01.2023) exceeding 0.1 percentage by mass: yes

- Lead (Pb): 7439921(CASNo.) is included in some of the alloys used. The concentration of lead in each individual alloy does not exceed 4 % (by mass).
- Dodecamethylcyclotetrasiloxane: 540-97-6 (CASNo.) is included in the glue, exceeding 0,1% (by mass).
- 2,2,4,4,6,6,8,8,10,10-decampethylcyclopentasiloxane: 541-02-6 (CASNo.) is included in the glue, exceeding 0,1% (by mass).
- Octamethylcyclotetrasiloxane: 556-67-2 (CASNo.) is included in the glue, exceeding 0,1% (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 of the KTV Atrium Flex amounts to 20 years and depends on the application and frequency of use. Regular maintenance is advised to ensure the life expectancy of 20 years. For repairs and renewals, suitable spare parts are available. The product is tested and certified to EN 16005, meaning they are designed to withstand a minimum of 10 million cycles.

LCA: Calculation rules

Declared Unit

The declared unit is 1 piece of the product: KTV Atrium Flex

Name	Value	Unit
Declared unit for revolving door system*	6.6	m ²
Mass of the entire system	1615.72	kg
Grammage of the components	244.8	kg/m ²
Dimension for revolving door, diameter	3000	mm
Dimensions for revolving door, height	2200	mm
Layer thickness	1	m

* Area represents the cross-sectional area of the door, which is designed to fit in an opening of 3000 mm wide by 2200 mm high.

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.

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

Information on describing the Biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in accompanying packaging	68.08	kg C

Transport to the building site (A4)

Additional technical information for the declared modules.

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

The product is transported via truck from the production site in Bulgaria to the European sales markets. In order to allow scaling to a specific point of installation 100 km are declared.

Installation into the building (A5)

Name	Value	Unit
Waste packaging (paper and plastic)	1,2	kg
Wooden pallets	160	kg

Reference service life

Name	Value	Unit
Life Span according to the manufacturer	20	a

Operational energy use (B6)

Name	Value	Unit
Electricity consumption (per year)	177.05	kWh
Days per year in use	365	days
On mode per day	2,5	h
Idle mode per day	10,5	h
Off mode per day	11	h
On mode power	31,49	W
Idle mode power	18,9	W
Off mode power	18,9	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.

Name	Value	Unit
Collected separately waste type waste type	1451.5	kg
Recycling	333	kg
Energy recovery	38.5	kg
Landfilling	1080	kg
Transport to waste management	50	km

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. Glass and electromechanics are landfilled. Region for the End of Life is: Global.

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

Collection rate is 100%.

Name	Value	Unit
Recycling	100	%

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = 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 KTV Atrium Flex

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	4.76E+03	1.41E+01	2.62E+02	1.43E+03	0	6.35E+00	9.8E+01	1.65E+01	-1.68E+03
GWP-fossil	kg CO ₂ eq	4.96E+03	1.35E+01	4.86E+00	1.43E+03	0	6.07E+00	9.8E+01	1.64E+01	-1.67E+03
GWP-biogenic	kg CO ₂ eq	-2.03E+02	6.24E-01	2.57E+02	4.75E+00	0	2.81E-01	2E-03	5.6E-02	2.99E-01
GWP-luluc	kg CO ₂ eq	3.46E+00	3.22E-04	3E-03	2.07E+00	0	1.45E-04	6E-03	4.7E-02	-1.52E+00
ODP	kg CFC11 eq	2.63E-09	1.43E-15	3.83E-14	3.14E-11	0	6.41E-16	4.94E-14	6.09E-14	-6.92E-09
AP	mol H ⁺ eq	2.87E+01	1.4E-02	4.4E-02	3.15E+00	0	6E-03	1.7E-02	1.18E-01	-6.63E+00
EP-freshwater	kg P eq	4.31E-03	2.89E-06	6.72E-06	4E-03	0	1.3E-06	7.88E-06	2.82E-05	-1E-03
EP-marine	kg N eq	5.66E+00	4E-03	1.3E-02	6.99E-01	0	2E-03	4E-03	3E-02	-9.49E-01
EP-terrestrial	mol N eq	6.35E+01	4.8E-02	1.81E-01	7.34E+00	0	2.2E-02	7.9E-02	3.33E-01	-1.03E+01
POCP	kg NMVOC eq	1.42E+01	1.2E-02	3.5E-02	1.92E+00	0	5E-03	1.1E-02	9.2E-02	-2.92E+00
ADPE	kg Sb eq	7.7E-02	4.05E-07	6.06E-07	4.13E-04	0	1.82E-07	6.78E-07	1.48E-06	-3.1E-02
ADPF	MJ	6.5E+04	1.92E+02	6.62E+01	2.51E+04	0	8.61E+01	4.54E+01	2.15E+02	-2.26E+04
WDP	m ³ world eq deprived	1.09E+03	2.6E-02	2.88E+01	3.11E+02	0	1.2E-02	1E+01	1.72E+00	-3.28E+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 KTV Atrium Flex

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	1.37E+04	6.04E-01	2.11E+03	1.11E+04	0	2.72E-01	1.18E+01	2.82E+01	-7.96E+03
PERM	MJ	2.09E+03	0	-2.09E+03	0	0	0	0	0	0
PERT	MJ	1.58E+04	6.04E-01	1.24E+01	1.11E+04	0	2.72E-01	1.18E+01	2.82E+01	-7.96E+03
PENRE	MJ	6.37E+04	1.92E+02	6.63E+01	2.51E+04	0	8.62E+01	1.37E+03	2.16E+02	-2.26E+04
PENRM	MJ	1.32E+03	0	0	0	0	0	-1.32E+03	0	0
PENRT	MJ	6.51E+04	1.92E+02	6.63E+01	2.51E+04	0	8.62E+01	4.54E+01	2.16E+02	-2.26E+04
SM	kg	7.61E+01	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	4.57E+01	1E-03	6.78E-01	1.28E+01	0	4.87E-04	2.4E-01	5.4E-02	-2.14E+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 KTV Atrium Flex

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	kg	1.46E-04	1.86E-08	8.01E-08	1.04E-05	0	8.36E-09	1.73E-07	3.29E-06	-7.37E-05
NHWD	kg	7.03E+02	2E-02	5.16E+00	1.78E+01	0	9E-03	1.02E+01	1.08E+03	-2.94E+02
RWD	kg	1.81E+00	2.06E-04	4E-03	3.8E+00	0	9.25E-05	2E-03	2E-03	-1.57E+00
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	3.32E+02	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	3.65E+02	0	0	0	1.82E+02	0	0
EET	MJ	0	0	6.57E+02	0	0	0	4.17E+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 KTV Atrium Flex

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	Disease incidence	2.81E-04	7.11E-08	2.99E-07	2.64E-05	0	3.2E-08	2.23E-07	1.46E-06	-1.16E-04
IR	kBq U235 eq	3.09E+02	2.9E-02	5.78E-01	6.24E+02	0	1.3E-02	1.52E-01	2.52E-01	-3.1E+02
ETP-fw	CTUe	5.4E+04	1.36E+02	3.14E+01	1.07E+04	0	6.1E+01	1.7E+01	1.23E+02	-9.37E+03
HTP-c	CTUh	2.11E-04	2.55E-09	2.4E-09	2.96E-07	0	1.15E-09	1.48E-09	1.82E-08	-1.6E-06
HTP-nc	CTUh	1.35E-04	1.09E-07	1.5E-07	1.09E-05	0	4.91E-08	1.49E-07	2.01E-06	-1.14E-05
SQP	SQP	3.86E+04	4.92E-01	1.84E+01	7.98E+03	0	2.21E-01	1.36E+01	4.49E+01	-1.92E+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

ISO 14025

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

EN 15804

EN 15804+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

DIN 18650-1

DIN 18650-1/: Powered pedestrian doors. Part 1: Product requirements and test methods.

DIN 18650-2

DIN 18650-2/: Powered pedestrian doors. Part 2: Safety at powered pedestrian doors

EN 16005

EN 16005: Power operated pedestrian doorsets - Safety in use - Requirements and test methods.

EN 55022

EN 55022: Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

EN 60335

EN 60335 - 1: Safety of household and similar electrical appliances. Part 1: General requirements.

EN 60335-2-103

EN 60335-2-103: Household and similar electrical appliances. Safety. Particular requirements for drives for gates, doors and windows.

EN 61000-3-2

EN 61000-3-2: Electromagnetic compatibility-3-2: Limits - Limits for harmonic current emissions.

EN 61000-3-3

EN 61000-3-3: Electromagnetic compatibility-3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems.

EN 61000-6-2

EN 61000-6-2: Electromagnetic compatibility (EMC). Part 6-2: Generic standards: Interference resistance for industrial environments.

EN 61000-6-3

EN 61000-6-3: Electromagnetic compatibility (EMC). Part 6-3: Generic standards: Emission standard for residential, commercial and light-industrial environments.

ISO 9001

ISO 9001: Quality management systems.

ISO 12100

ISO 12100: Safety of machinery - Basic concepts - Risk assessment and risk reduction.

ISO 13849-1

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

IEC 60335-2-103

IEC 60335-2-103: Household and similar electrical appliances. Safety. Part 2-103: Particular requirements for drives for gates, doors and windows.

REACH Regulation

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

RoHS 2011/65/EU

RoHS 2011/65/EU, Directive on the restriction of the use of

certain hazardous substances in electrical and electronic equipment.

European Chemicals Agency (ECHA)

<https://echa.europa.eu/de/home>

Further References**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/gabidatabase-2020-lci-documentation/>).

LCA-tool dormakaba

LCA tool, 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: Requirements on the EPD 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



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dormakaba International Holding GmbH
DORMA Platz 1
58256 Ennepetal
Germany

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info.de@dormakaba.com
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