ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	KONE Corporation
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-KON-20240362-CBA2-EN
Issue date	08.08.2022
Valid to	07.08.2027

Automatic Revolving Door 30A

KONE

www.ibu-epd.com | https://epd-online.com

General Information

KONE

Programme holder

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

Declaration number

EPD-KON-20240362-CBA2-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

08.08.2022

Valid to

07.08.2027

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 30A

Owner of the declaration

KONE Corporation
Keilasatama 3
02150 ESPOO
Finland

Declared product / declared unit

The declaration represents one Automatic Revolving Door 30A, with four (4) door leaves with a diameter of 3000 mm and a height of 2200 mm, consisting of the following items:

1. Drum wall
2. Canopy construction
3. Door wings
4. Turnstile fittings
5. Direct drive unit
6. Electric accessories / sensors
7. Floor ring
8. Product packaging

Scope:

This EPD is a specific product declaration for the automatic revolving door 30A. The underlying life cycle assessment is based on the entire life cycle of this specific revolving door. The revolving door is manufactured at the production site in Sofia (Bulgaria). Data represents the year 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 14025:2011
☐ internally ☒ externally

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

Product

Product description/Product definition

The revolving door range 30A is designed for installation in entrance areas where interior environmental control coupled with elegant aesthetics are desired. The revolving doors hold back noise, dust and dirt, reliably protect employees near the entrances from drafts, and help to keep heating cost down. They also allow a smooth flow of traffic.

Revolving doors offer a number of benefits for installers, architects, specifiers and user among others:

- Extensive design flexibility in terms of planning and technical requirements.
- Visually, technically and economically the ideal application.
- Optimization of the building energy balance.
- Efficient noise protection.
- Tailored integrated application combining industrial engineering precision and assured quality.

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

- 20111765/EU ROHS3 Directive

as well as the harmonized norms based on these provisions:

- DIN EN ISO 13849-1: Safety of machinery -Safety-related parts of control systems - Part 1: General principles for design.
- DIN EN ISO 12100: Safety of machinery -Basic concepts - Risk assessment and risk reduction.
- DIN EN 16005: Power operated pedestriandoorsets - Safety in use - Requirements and test methods.
- DIN EN 61000 - 6 - 2: Electromagnetic compatibility (EMC). Part 6-2: Generic standards: Interference resistance for industrial environments.
- DIN EN 61000 - 6 - 3: Electromagnetic compatibility (EMC). Part 6-3: Generic standards: Emission standard for residential, commercial and light-industrial environments.
- DIN EN 61000 - 3 - 2: Electromagnetic compatibility-3-2: Limits - Limits for harmoniccurrent emissions.
- DIN EN 61000 - 3 - 3: Electromagnetic compatibility-3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems.
- DIN EN 55022: Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
- DIN 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.

The CE-marking takes into account the proof of conformity with the respective harmonized norms based on the legal provisions above. For the application and use, the respective national provisions apply.

In addition to the harmonized standards, the following national standards have also been applied and complied with:

- 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.

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.

Typical applications include:

- Office
- Commercial buildings
- Airports
- Public buildings
- Hospitals
- Hotel

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

The Automatic Revolving Doors 30A have following technical properties:

Name	Value	Unit
3- or 4 design	optional	wing
Glazed drum	optional	walls
Metal	optional	paneling
Curved sliding doors in front of the entrance	optional	pieces

Performance data of the product according to the harmonized norms, based on the harmonization provisions. The following technical data excluding lighting also apply:

- Power Input Standby: 4,80 W
- Power Input Operation: 57,8 W

Base materials/Ancillary materials

For the main product components: One automatic revolving door, consisting of four (4) door leaves and with a diameter of 3000mm and a height of 2200mm, the product composition of the 30A is as follows:

Name	Value	Unit
Glass	46.6	%
Aluminum	32.3	%
Steel	12.9	%
Particle board	3.2	%
Electronics	1.7	%
Plastics	1.6	%
Zinc	1.5	%
Others	<0.3	%

The revolving door 30A includes partial articles which contain substances listed in the *Candidate List of REACH Regulation 1907/2006/EC* (date: 08.07.2021) exceeding 0.1 percentage by mass: yes

- Lead (Pb): 7439-92-1 (CAS-No.) is used in some of the alloys. The concentration of lead in each individual alloy

does not exceed 4.0% (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 automatic revolving door 30A is about 20 years, depending on the application and frequency of use. This is consistent with approximately 10 million cycles over the door's service life.

LCA: Calculation rules

Declared Unit

The declared unit is 1 piece of the product: 876,16 kg

Name	Value	Unit
Declared unit for revolving door system*	6.6	m^2
Mass of the entire system (excl. packaging)	876	kg
Grammage of the components	133	kg/m^2
Dimension for revolving door, diameter	3000	mm
Dimensions for revolving door, height	2200	mm

* 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: Bulgaria

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 of biogenic carbon

Information on describing the Biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	13.55	kg C
Biogenic carbon content in accompanying packaging	12.52	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

The following technical scenario information is required for the declared modules and optional for non-declared modules. Modules for which no information is declared can be deleted; additional information can also be listed if necessary.

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

A5 is not declared including the disposal of the packaging material on the construction site, the amounts of packaging materials included in the LCA calculations must be declared as technical scenario information for Module A5.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	100	km
Liters of fuel (per 1 kg)	0,00276	l/100km
Capacity utilization (including empty runs)	55	%

Transport distance is declared for a distance of 100 km 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)	35.7	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 dismantling is done manually without environmental burden.
C2: Transport to waste management is 50 km.

Name	Value	Unit
Collected separately waste type waste type	876	kg
Recycling	442	kg
Energy recovery	13.6	kg
Landfilling	420	kg
Transport to waste managment	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, glass/inert materials 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 %.

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: Automatic Revolving Door 30A

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	4.08E+03	7.97E+00	5.25E+01	1.43E+03	0	3.81E+00	8.63E+01	6.42E+00	-2.06E+03
GWP-fossil	kg CO_2 eq	4.17E+03	7.62E+00	5.53E+00	1.43E+03	0	3.64E+00	3.54E+01	6.38E+00	-2.05E+03
GWP-biogenic	kg CO_2 eq	-9.68E+01	3.52E-01	4.7E+01	4.75E+00	0	1.68E-01	5.09E+01	2.18E-02	-4.76E+00
GWP-luluc	kg CO_2 eq	2.33E+00	1.81E-04	1.04E-03	2.07E+00	0	8.67E-05	2.45E-03	1.84E-02	-7.08E-01
ODP	kg CFC11 eq	7.29E-09	8.05E-16	1.09E-14	3.14E-11	0	3.85E-16	2.37E-14	2.37E-14	-1.39E-08
AP	mol H^+ eq	2.23E+01	7.63E-03	1.43E-02	3.15E+00	0	3.65E-03	1.36E-02	4.58E-02	-7.87E+00
EP-freshwater	kg P eq	4.26E-03	1.63E-06	2.05E-06	4E-03	0	7.8E-07	3.72E-06	1.1E-05	-1.23E-03
EP-marine	kg N eq	3.55E+00	2.43E-03	5.05E-03	6.99E-01	0	1.16E-03	3.8E-03	1.18E-02	-1.06E+00
EP-terrestrial	mol N eq	3.93E+01	2.7E-02	6.43E-02	7.34E+00	0	1.29E-02	6.3E-02	1.29E-01	-1.15E+01
POCP	kg NMVOC eq	9.75E+00	6.86E-03	1.34E-02	1.92E+00	0	3.28E-03	1.04E-02	3.57E-02	-3.36E+00
ADPE	kg Sb eq	7.73E-02	2.29E-07	1.67E-07	4.13E-04	0	1.09E-07	3.39E-07	5.73E-07	-2.69E-02
ADPF	MJ	5.37E+04	1.08E+02	1.72E+01	2.51E+04	0	5.17E+01	2.71E+01	8.37E+01	-2.86E+04
WDP	m^3 world eq deprived	1.3E+03	1.49E-02	6.42E+00	3.11E+02	0	7.14E-03	8.87E+00	6.69E-01	-1.77E+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: Automatic Revolving Door 30A

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE	MJ	1.88E+04	3.41E-01	4.11E+02	1.11E+04	0	1.63E-01	5.17E+02	1.1E+01	-1.25E+04
PERM	MJ	9.19E+02	0	-4.08E+02	0	0	0	-5.11E+02	0	0
PERT	MJ	1.97E+04	3.41E-01	3.29E+00	1.11E+04	0	1.63E-01	6.24E+00	1.1E+01	-1.25E+04
PENRE	MJ	5.32E+04	1.08E+02	9.03E+01	2.51E+04	0	5.17E+01	5.34E+02	8.37E+01	-2.87E+04
PENRM	MJ	5.8E+02	0	-7.31E+01	0	0	0	-5.07E+02	0	0
PENRT	MJ	5.37E+04	1.08E+02	1.72E+01	2.51E+04	0	5.17E+01	2.71E+01	8.37E+01	-2.87E+04
SM	kg	3.69E+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	5.92E+01	6.11E-04	1.51E-01	1.28E+01	0	2.92E-04	2.1E-01	2.11E-02	-2.44E+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: Automatic Revolving Door 30A

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD	kg	1.07E-04	1.05E-08	3.01E-08	1.04E-05	0	5.02E-09	6.89E-08	1.28E-06	-1.31E-04
NHWD	kg	8.44E+02	1.11E-02	1.96E+00	1.78E+01	0	5.29E-03	3.96E+00	4.21E+02	-4.74E+02
RWD	kg	2.52E+00	1.16E-04	8.74E-04	3.8E+00	0	5.55E-05	1.23E-03	9.53E-04	-2.88E+00
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	4.09E+02	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	5.15E+00	0	8.09E+01	0	0	0	0	0	0
EET	MJ	9.34E+00	0	1.51E+02	0	0	0	0	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: Automatic Revolving Door 30A

Parameter	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM	Disease incidence	2.24E-04	4.01E-08	8.46E-08	1.39E-05	0	1.92E-08	1.16E-07	5.66E-07	-1.3E-04
IR	kBq U235 eq	4.7E+02	1.66E-02	1.3E-01	3.28E+02	0	7.93E-03	1.54E-01	9.8E-02	-5.77E+02
ETP-fw	CTUe	3.11E+04	7.66E+01	7.98E+00	5.64E+03	0	3.66E+01	1.09E+01	4.78E+01	-1.1E+04
HTP-c	CTUh	7.35E-05	1.44E-09	4.47E-10	1.56E-07	0	6.89E-10	8.42E-10	7.09E-09	-6.96E-07
HTP-nc	CTUh	5.58E-05	6.16E-08	2.31E-08	5.74E-06	0	2.95E-08	6.4E-08	7.81E-07	4.97E-06
SQP	SQP	1.62E+04	2.78E-01	4.64E+00	4.2E+03	0	1.33E-01	7.89E+00	1.74E+01	-1.15E+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 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. This EPD was created using a software tool.

References

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 door sets - 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, Authorization 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 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 (doors)

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 Automatic doors, automatic gates, and revolving door systems, 08/2021, Institut Bauen und Umwelt e.V., www.ibu-epd.com.

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