

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	KONE Corporation
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-KON-20160134-IBA1-EN
Issue date	12/09/2016
Valid to	11/09/2021

KONE UniSwing Compact KONE Door Business

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



1. General Information

KONE Door Business

Programme holder

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

Declaration number

EPD-KON-20160134-IBA1-EN

This Declaration is based on the Product Category Rules:

Drive systems for automatic doors and gates, 07/2014
(PCR tested and approved by the SVR)

Issue date

12/09/2016

Valid to

11/09/2021



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



Dr. Burkhard Lehmann
(Managing Director IBU)

KONE UniSwing Compact

Owner of the Declaration

KONE Corporation
Keilasatama 3
02150 Espoo
Finland

Declared product / Declared unit

One KONE UniSwing Compact swing door operator, including:

- operator
- transmission arm
- packaging material

Scope:

This EPD lists the environmental impacts of the KONE UniSwing Compact, including packaging material.

The Components are sourced from approved international suppliers and the operator is manufactured in the Netherlands. 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 verifier appointed by SVR)

2. Product

2.1 Product description

KONE automatic swing door operators are designed for use in building environments that require high levels of security and accessibility. The KONE UniSwing Compact provides safety, security, and comfort and meets all relevant technical and safety standards, including /EN 16005/. The KONE UniSwing Compact consists of an extruded aluminum housing, electromechanical low-voltage motor, electric control board, and a transmission arm connected to the door leaf. It is designed for internal swing doors in buildings where space saving, energy efficiency, quiet operation, and aesthetics are important requirements.

2.2 Application

The KONE UniSwing Compact is intended for a wide range of applications, including:

- Hospitals and other healthcare-related buildings
- Buildings where hygiene is important, such as laboratories and other research facilities

- Residential buildings, including those housing senior citizens
- Commercial buildings such as offices, hotels, and retail centers

2.3 Technical Data

Name	Value	Unit
Height	75	mm
Installation depth	75	mm
Opening and closing force	<150	N
Opening speed (progressively adjustable)	<77	cm/s
Closing speed (progressively adjustable)	<65	cm/s
Hold open time	0 - 60	s
Supply voltage, frequency	50/60	Hz
Power input	71	W
Protection type	IP20	-

2.4 Application rules

This product complies with the following European directives:

2004/108/EC Electromagnetic Compatibility Directive (EMCD)

2006/42/EC Machinery Directive (MD)

1999/5/EC Radio equipment and telecommunications terminal equipment Directive (RTTE)

2006/95/EC Low Voltage Directive

This product complies with the following harmonized European standards:

EN 16005:2012 – Safety of power operated pedestrian door sets

EN 61000-6-2:2005 - Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments

EN 61000-6-3: 2007 – Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

EN ISO 13849-1/-2:2008 – Functional safety of machinery

EN 12978:2003+A1:2009 – Safety devices for power operated doors and gates

EN 60335-1:2002+A14:2010 – Safety of household and similar electrical appliances

EN 60335-2-103:2003+A11:2009/2012 – Safety of household and similar electrical appliances – particular requirements for drives for gates, doors, and windows

EN 60950-1: 2011+AC:2011+A2:2011 - Information technology equipment – Safety – Part 1: General requirements

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

DIN 18650-1/-2: 2010 – Safety of power operated pedestrian door sets

2.5 Delivery status

The swing door operator is delivered ready for installation in a cardboard box. The total package weight is approximately 9 kg.

2.6 Base materials / Ancillary materials

The composition of the product by percentage (%) of total mass per unit (excluding packaging) is as follows

Component	Percentage (%)
Steel	48.4%
Aluminum	26.1%
Copper/Brass	20.8%
Plastics	2.8%
Electronics	1.9%
Total	100%

2.7 Manufacture

Individual components such as the aluminum profiles and plastic components are manufactured mainly in China, and the electronics are mainly manufactured in the Netherlands. The geared motors are sourced from a third-party supplier. The final assembly of the swing door operator – including the cover and door arm – is

completed in the Netherlands. The manufacturing unit is /EN ISO 9001/ certified.

2.8 Environment and health during manufacturing

Manufacturing of the swing door operator does not require any specialized health and safety equipment.

2.9 Product processing/Installation

KONE products are supplied ready for installation. The operator is installed on-site by trained technicians.

2.10 Packaging

Packaging is provided to protect the door during transport. The operator including the door arm is packaged in a cardboard box. The total package weight is approximately 9 kg, and the package dimensions are 710 x 140 x 80 mm. All packaging materials are theoretically recyclable.

2.11 Condition of use

The operator must be installed, used, and maintained in accordance with the design specifications and instructions provided by KONE.

2.12 Environment and health during use

No personal injury or damage to health or environment is expected if the door is used in accordance with the instructions provided by KONE.

2.13 Reference service life

The product has a technical service life of 1,000,000 cycles. A reference service life of 15 years was used as the basis for this EPD.

2.14 Extraordinary effects

Fire

Not applicable.

Water

Unforeseen contact with water may result in malfunction of the electrical components. No impact on the environment is expected from contact with water.

Mechanical destruction

No impact on the environment is expected in the event of mechanical destruction.

2.15 Re-use phase

The majority (by weight) of the components are steel, aluminum, and copper, which can all be recycled. The plastic components can be used for energy recovery within a waste incineration process.

2.16 Disposal

Waste codes according to the /European Waste Catalogue/

Manufacturing

EWC 12 01 01 Ferrous metal filings and turnings

EWC 12 01 03 Non-ferrous metal filings and turnings

EWC 12 01 05 Plastics shavings and turnings

Packaging

EWC 15 01 01 Paper and cardboard packaging

EWC 15 01 02 Plastic packaging

End of Life

EWC 16 02 14 Used devices, with the exception of those outlined in 16 02 09 to 16 02 13
 EWC 16 02 16 Components removed from used devices, with the exception of those outlined in 16 02 15
 EWC 17 02 03 Plastics
 EWC 17 04 01 Copper, bronze, brass
 EWC 17 04 02 Aluminium
 EWC 17 04 05 Iron and steel
 EWC 17 04 11 Cables, with the exception of those outlined in 17 04 10

Disposal of the door is subject to the /WEEE Directive/, /Directive 2012/19/EU/.

2.17 Further information

KONE Industrial Ltd
 Hissikatu 3
 FI-05801 Hyvinkää Finland
 Tel: +358 20 4751

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the declared unit of 1 piece of KONE UniSwing Compact including packaging, as specified in Part B requirements on the EPD for doors, windows, shutters, and related products /IBU PCR Part B/.

Declared unit

Name	Value	Unit
Declared unit	1	Piece
Mass (total system incl. packaging)	8.75	kg
Conversion factor to 1 kg	0.114	Piece / kg

3.2 System boundary

Type of the EPD: cradle to gate - with options

The following life cycle phases were considered:

A1-A3 Production phase:

- A1 – Raw material extraction and processing
- A2 – Transport to the manufacturer and
- A3 – Manufacturing.

A4-A5 Construction phase:

- A4 – Transport from the gate to the site
- A5 – Packaging waste processing

The use phase:

- B6 – Occupational energy use

End-of-life phase:

- C2 – Transport to waste processing
- C3 – Waste processing
- C4 – Disposal (landfill)

These information modules include provision and transport of all materials, products, as well as energy and water provisions, waste processing up to the end-of-waste status or disposal of final residues.

Module D:

Declaration of all benefits or recycling potential from EOL and A5

3.3 Estimates and assumptions

Transport:

For all raw materials including product transportation before and after use road transport over an average distance of 600km has been considered.

Use phase:

For the use phase, it is assumed that the door is used in the European Union, thus an European electricity grid mix is considered within this phase. Please see chapter 4 for a detailed parameter list of the use scenario assumptions.

EOL:

In the End-of-life phase a recycling scenario with 100% collection rate was assumed.

3.4 Cut-off criteria

In the assessment, all available data from production process were considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1% of mass or energy (if available).

3.5 Background data

For life cycle modeling of the considered products, the GaBi ts Software System for Life Cycle Engineering, developed by thinkstep AG, is used /GaBi ts 2016/. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation /GaBi ts 2016D/. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

3.6 Data quality

The requirements for data quality and background data correspond to the specifications of the /IBU PCR PART A/.

thinkstep AG performed a variety of tests and checks during the entire project to ensure high quality of the completed project. This obviously includes an extensive review of project-specific LCA models as well as the background data used.

The technological background of the collected data reflects the physical reality of the declared products. The datasets are complete and conform to the system boundaries and the criteria for the exclusion of inputs and outputs.

All relevant background datasets are taken from the GaBi ts software database. The last revision of the used background data has taken place not longer than 10 years ago.

3.7 Period under review

The period under review is 2014 (12 month average).

3.8 Allocation

Regarding incineration, the software model for the waste incineration plant is adapted according to the material composition and heating value of the material. Following specific life cycle inventories for the waste incineration plant are considered:

- Waste incineration of plastic from packaging
- Waste incineration of paper from packaging
- Thermal treatment of plastic parts
- Waste incineration of particle board
- Waste incineration of electronic scraps (printed wiring boards)

Regarding the recycling material of metals, the metal parts in the EOL are declared as end-of-waste status. Thus, these materials are considered in module D. Specific information on allocation within each background dataset used is available in the GaBi dataset documentation.

3.9 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.

4. LCA: Scenarios and additional technical information

Transport from the gate to the site (A4)

Name	Value	Unit
Litres of fuel	0.01	l/100km
Transport distance	600	km
Capacity utilisation (including empty runs)	85	%

Assembly (A5)

Name	Value	Unit
Packaging waste (Paper/Cardboard, Plastics, Pallets) to be treated	0.42	kg

Reference service life

Name	Value	Unit
Reference service life	15	a

Operational energy use (B6)

The energy consumption of the door is defined in two use modes:

1. The non-active mode: door is ready to be used, but door leaves are not actively moving
2. The active mode: door is executing an opening - closing cycle

The total energy consumed during the whole product life was calculated using following formula:

$$(E_{non-active} + E_{active}) * days_year * life_span * 3600/10^6$$

With:

$$E_{non-active} = E_{standby} + E_{idle} = P_{non-active} * T_{non-active}$$

$$E_{active} = P_{active} * T_{active} = P_{active} * (N_{cycle} * T_{cycle}/3600)$$

Where:

$E_{stand-by}$ = Energy consumption due to stand-by mode per day

E_{idle} = Energy consumption due to idle mode per day

$P_{non-active}$ = The required power [W] to keep the control system energized, including the required accessories to switch to the active mode. Covers stand-by and idle mode

$T_{non-active}$ = Operation time in non-active mode in hours per day (= 24 hours – T_{active}). Covers stand-by

and idle mode

E_{active} = Energy consumption due to active mode per day

P_{active} = Average power during the time of the whole cycle

T_{active} = Average operation time per day

N_{cycle} = Average number of opening/closing cycles per day

T_{cycle} = Average Time [s] of one opening/closing cycle

$days_year$ = Operation days per year [d]

$Life_span$ = Reference service life of product [a]

$3600/10^6$ = Conversion factor from Wh to MJ

Name	Value	Unit
Electricity consumption	2752.21	kWh
Days per year in use	365	d/a
Hours per day in non-active mode	23.4	h/d
Power in non-active mode	17.4	W
Power in active mode	23.29	W
Operating time for one opening/closing cycle	13	s
Numbers of opening/closing cycles per day	180	
Weight of door leaves to be moved	55	kg

**Energy measurements are performed with reference equipment under reference conditions. The actual energy consumption of a specific installation can vary due to the conditions, exact door configuration, and usage rates.*

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	8.33	kg
Recycling	7.96	kg
Energy recovery	0.33	kg
Landfilling	0.04	kg

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

Name	Value	Unit
Collected separately waste (incl. packaging)	8.75	kg
Recycling (metals, glass)	96	%
Energy recovery (Plastics, Paper/Wood)	4	%
Landfill (inert material)	1	%

5. LCA: Results

The table below shows the LCA results for the declared unit - 1 Piece of KONE UniSwing Compact

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 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	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: One piece of UniSwingCompact

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
GWP	[kg CO ₂ -Eq.]	5.10E+1	2.40E-1	4.96E-1	1.28E+3	2.28E-1	1.45E-2	6.24E-1	-2.27E+1
ODP	[kg CFC11-Eq.]	9.75E-9	1.10E-12	0.00E+0	9.07E-7	1.05E-12	1.03E-11	2.64E-12	8.96E-9
AP	[kg SO ₂ -Eq.]	2.63E-1	5.91E-4	0.00E+0	3.56E+0	5.63E-4	4.03E-5	5.42E-4	-1.10E-1
EP	[kg (PO ₄) ³ -Eq.]	1.91E-2	1.37E-4	0.00E+0	3.18E-1	1.30E-4	3.61E-6	5.71E-5	-6.70E-3
POCP	[kg ethene-Eq.]	1.93E-2	-1.66E-4	0.00E+0	2.45E-1	-1.58E-4	2.78E-6	1.98E-5	-8.46E-3
ADPE	[kg Sb-Eq.]	4.33E-3	1.60E-8	0.00E+0	4.17E-4	1.52E-8	4.73E-9	1.45E-7	4.05E-4
ADPF	[MJ]	6.01E+2	3.30E+0	0.00E+0	1.38E+4	3.14E+0	1.57E-1	6.06E-1	-2.31E+2

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

RESULTS OF THE LCA - RESOURCE USE: One piece of UniSwingCompact

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
PERE	[MJ]	1.53E+2	IND	IND	IND	IND	IND	IND	IND
PERM	[MJ]	0.00E+0	IND	IND	IND	IND	IND	IND	IND
PERT	[MJ]	1.53E+2	1.88E-1	0.00E+0	6.24E+3	1.79E-1	7.07E-2	1.01E-1	-9.29E+1
PENRE	[MJ]	6.76E+2	IND	IND	IND	IND	IND	IND	IND
PENRM	[MJ]	5.43E+0	IND	IND	IND	IND	IND	IND	IND
PENRT	[MJ]	6.81E+2	3.32E+0	0.00E+0	2.23E+4	3.16E+0	2.52E-1	6.74E-1	-2.65E+2
SM	[kg]	2.27E+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
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
FW	[m ³]	4.51E-1	4.70E-4	0.00E+0	9.62E+0	4.48E-4	1.09E-4	1.57E-3	-2.55E-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 – OUTPUT FLOWS AND WASTE CATEGORIES: One piece of UniSwingCompact

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
HWD	[kg]	5.28E-5	2.51E-7	0.00E+0	1.41E-5	2.39E-7	1.60E-10	1.07E-8	5.42E-7
NHWD	[kg]	6.55E+0	2.79E-4	0.00E+0	1.34E+1	2.65E-4	1.52E-4	1.87E-1	-5.05E+0
RWD	[kg]	3.14E-2	4.74E-6	0.00E+0	3.36E+0	4.51E-6	3.81E-5	2.67E-5	-1.31E-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
MFR	[kg]	0.00E+0	0.00E+0	4.20E-1	0.00E+0	0.00E+0	7.96E+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	3.28E-1	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.67E-1	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.55E+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

6. LCA: Interpretation

It can be stated that the result of almost every environmental indicator in scope is clearly dominated by the use phase of the products caused by its electricity consumption. Only the indicator **ADP** (Abiotic Depletion Potential) elements is almost only influenced by the production of the raw materials as the production of energy is not affected by the

extraction and consumption of abiotic elements. The given credits for metal recycling and produced energy through the incineration of contained plastics are displayed as negative environmental burden. Transports (modules A2, A4, C2) as well as the product installation (A5) play an insignificant role.

7. Requisite evidence

Not applicable in this EPD.

8. References

Institut Bauen und Umwelt

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

General principles

for the EPD range of Institut Bauen und Umwelt e.V.
(IBU), 2013/04
www.bau-umwelt.de

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

EN ISO 9001:2008

Quality management systems – Requirements

WEEE

Directive 2012/19/EU of the European Parliament and
of the Council of 4 July 2012 on waste electrical and
electronic equipment (WEEE)

EWC

European Waste Catalogue and Hazardous Waste List
- Valid from 1 January 2002, Environmental Protection
Agency

GaBi ts

GaBi ts dataset documentation for the software-system
and databases, LBP, University of Stuttgart and
thinkstep, Leinfelden-Echterdingen, 2016
(<http://documentation.gabi-software.com/>)

IBU PCR Part A

Institut Bauen und Umwelt e.V., Berlin (pub.):
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. April 2013
www.bau-umwelt.de

IBU 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 drives systems of
automatic doors and gates, 2014.
www.bau-umwelt.com

2004/108/EC

Electromagnetic Compatibility Directive (EMCD)

2006/42/EC

Machinery Directive (MD)

1999/5/EC

Radio equipment and telecommunications terminal
equipment Directive (RTTE)

2006/95/EC

Low Voltage Directive

EN 16005:2012

Safety of power operated pedestrian door sets

EN 61000-6-2:2005

Electromagnetic compatibility (EMC). Generic
standards. Immunity for industrial environments

EN 61000-6-3: 2007

Electromagnetic compatibility (EMC). Generic
standards. Emission standard for residential,
commercial and light-industrial environments

EN ISO 13849-1/-2:2008

Functional safety of machinery

EN 12978:2003+A1:2009

Safety devices for power operated doors and gates

EN 60335-1:2002+A14:2010

Safety of household and similar electrical appliances

EN 60335-2-103:2003+A11:2009/2012

Safety of household and similar electrical appliances –
particular requirements for drives for gates, doors, and
windows

EN 60950-1: 2011+AC:2011+A2:2011

Information technology equipment – Safety – Part 1:
General requirements

DIN 18650-1/-2: 2010

Safety of power operated pedestrian door sets

**Publisher**

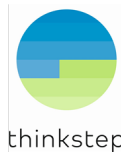
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

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**

thinkstep AG
Hauptstraße 111
70771 Leinfelden-Echterdingen
Germany

Tel +49 711 341817-0
Fax +49 711 341817-25
Mail info@thinkstep.com
Web www.thinkstep.com

**Owner of the Declaration**

KONE Corporation
Keilasatama 3
02150 ESPOO
Finland

Tel +358(0)204 75 1
Fax +358(0)204 75 4496
Mail contact@kone.com
Web www.kone.com