

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

Owner of the Declaration	KONE Corporation
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Turnstile 1000 KONE

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ECO PLATFORM

EPD
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1. General Information

<p>KONE</p> <p>Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-KON-20220210-IBA1-EN</p> <hr/> <p>This declaration is based on the product category rules: Electronic and physical Access Control Systems, 07.2019 (PCR checked and approved by the SVR)</p> <hr/> <p>Issue date 28.09.2022</p> <hr/> <p>Valid to 25.05.2025</p> <hr/> <p></p> <hr/> <p>Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)</p> <hr/> <p></p> <hr/> <p>Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)</p>	<p>Turnstile 1000</p> <hr/> <p>Owner of the declaration KONE Corporation Keilasatama 3 02150 Espoo Finland</p> <hr/> <p>Declared product / declared unit 1 turnstile 1000 (1 piece)</p> <hr/> <p>Scope: This EPD refers to a specific Turnstile manufactured by dormakaba. The production site is located in Bühl (Germany).</p> <p>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 <i>EN 15804+A1</i>. In the following, the standard will be simplified as <i>EN 15804</i>.</p> <hr/> <p>Verification</p> <p>The standard <i>EN 15804</i> serves as the core PCR</p> <p>Independent verification of the declaration and data according to <i>ISO 14025:2010</i></p> <p><input type="checkbox"/> internally <input checked="" type="checkbox"/> externally</p> <hr/> <p></p> <hr/> <p>Dr.-Ing. Wolfram Trinius (Independent verifier)</p>
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2. Product

2.1 Product description/Product definition

KONE Turnstile 1000 combines the options of a modern access system in the supervised entrance area in three models. From short basic versions to exquisite objects with sophisticated sensors, they offer a wide range of functions.

The Turnstile 1000 ensures fluid movements and creates openness and security. Passage widths and opening angles adapt to requirements, from material transport to complex body movement. The interlock always responds sensitively. It's practically barrier-free. This variety is expressed in the modular design elements: with a wide range of colours and materials for handrails, side and profile parts, as well as drives and door leaves, previously unimagined design possibilities are opened up. Versatile aluminium as the basic material shows the way here. The turnstile 1000 blends harmoniously into any reception room: as a modern addition to a concept, as a discreet functional unit or as a self-confident statement. User guidance by light and passage widths from 650 mm up to 915 mm provide comfortable accessibility. Taller door leaves – with or without taller drives units – offer higher security.

The Turnstile 1000 at a length of 1,650 mm achieve the maximum security level. The horizontal sensor strip is supplemented with a vertical sensor.

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

- *Machinery Directive 2006/42/EC*
- *2014/30/EU Electromagnetic Compatibility Directive*
- *2011/65/EU ROHS2 Directive*
- *DIN EN ISO 12100:2011-03 Safety of machinery*
- *DIN EN 16005: 2013-01 and Amendment 2015-10 Power operated pedestrian doorsets*
- *DIN EN ISO 13849- 1:2016-06 Safety of machinery*
- *DIN EN ISO 13849- 2:2013-02 Safety of machinery*
- *DIN EN 60335-2-103: 2016-05 Household and similar electrical appliances*
- *DIN EN 61000-3-2:2015-03 Electromagnetic compatibility (EMC)*

- *DIN EN 61000-6-2: 2005 and Amendment:2011 Electromagnetic Compatibility (EMC)*
- *DIN EN 61000-6-3:2007 and A1:2011 Electromagnetic Compatibility (EMC)*

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

2.2 Application

The Turnstile 1000 can be used for convenient entry into:

- Office and administrative buildings
- Ministries and government buildings
- Banks and financial institutions
- Industrial buildings
- Schools and universities

2.3 Technical Data

The Turnstile 1000 has following technical properties:

Turnstile 1000	
Interlock height	990 mm
Interlock length	1,650 mm
Passage width	650 mm
Total width	915 mm
Housing, base columns, guiding elements	Profile and inlay elements in the hand rail and in the front of the side panels are made of aluminium
Blocking elements	Two door leaves made of transparent plastic, upper edge 990 mm
Sensors	The sensor system is integrated in the guiding elements both horizontally and vertically
Power supply	100 - 240 VAC, 50/60 Hz, 300 VA
Standby power consumption	17 VA
Standard adjustment in case of power failure	Door leaves move freely

Control system and power supply integrated in the unit

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

- *Machinery Directive 2006/42/EC*
- *2014/30/EU Electromagnetic Compatibility Directive*
- *2011/65/EU ROHS2 Directive*
- *DIN EN ISO 12100:2011-03 Safety of machinery*
- *DIN EN 16005: 2013-01 and Amendment 2015-10 Power operated pedestrian doorsets*
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- *DIN EN 60335-2-103: 2016-05 Household and similar electrical appliances*
- *DIN EN 61000-3-2:2015-03 Electromagnetic compatibility (EMC)*
- *DIN EN 61000-6-2: 2005 and Amendment:2011 Electromagnetic Compatibility (EMC)*
- *DIN EN 61000-6-3:2007 and A1:2011 Electromagnetic Compatibility (EMC)*

2.4 Delivery status

Each unit is packed in a card-box. Packaged sensor barrier dimensions:

- 196 cm x 132 cm x 83 cm

2.5 Base materials/Ancillary materials

The composition of the turnstile 1000 (117 kg/piece) is composed as follows:

- Aluminium: 66%
- Stainless steel: 11%
- Plastics: 9%
- Electronics: 4%
- Electromechanics: 4%
- Glass: 3%
- Steel: 2%
- Brass: <1%
- Others: 1%

The product includes partial articles which contain substances listed in the Candidate List of REACH Regulation 1907/2006/EC (date: 19.01.2021) exceeding 0.1 percentage by mass: yes

- Lead (Pb): 7439-92-1 (CAS-No.) is included in some of the alloys used. 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>.

2.6 Manufacture

The Turnstile 1000 is manufactured and assembled at the production facility at Bühl in Germany. The aluminium profiles are supplied by an external partner. During assembly the individual parts are assembled into the framework. The assembled units are then packaged with the installation accessories and installation manual for shipment.

The plant in Bühl, Germany, is certified to the quality management system *ISO 9001*, which ensures consistent quality of the products.

2.7 Environment and health during manufacturing

The manufacturing plant has an internal environmental, health and safety engineer as well as an integrated system according to national regulations and good European practices. The system ensures

healthful and safe workplaces and good working conditions for each employee.

2.8 Product processing/Installation

KONE deploys its own, specially-trained assembly teams for installation.

2.9 Packaging

The Turnstile 1000 is packed in cardboard boxes and are fixated in the single package box together with installation accessories and installation instructions. Packaging materials shall be collected separately for recycling.

2.10 Condition of use

There is no need for preventive replacement of wear parts. A visual inspection of all screws and mechanical components as well as a function test of the complete unit is recommended once a year.

2.11 Environment and health during use

No impacts on human health or the environment are expected during product use.

2.12 Reference service life

The reference service life amounts to 20 years (see table of Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)).

2.13 Extraordinary effects

Fire

Due to the predominant use of non-flammable and flame-retardant materials as well as materials which do not burn dripping, no influence on the environment in case of fire is to be expected.

Water

No substances are used which have a negative impact on the ecological water quality upon contact by the device with water.

Mechanical destruction

No impacts on the environment are foreseeable in the case of an unforeseeable mechanical destruction.

2.14 Re-use phase

The mechanical parts of the Turnstile 1000 may be updated to changing norms or technical standards in the future if upgrade kits are offered. The unit may be relocated during its reference service life. The components made of aluminium, steel and glass are

recyclable. Components made of plastic may be used for thermal recovery.

2.15 Disposal

All packaging materials used are environmentally friendly, recyclable and separated by type. Packaging materials must be disposed of in an environmentally friendly manner. Please consult with local waste management companies. The cardboard can be fully recycled and the foil is not intended as waste, but as a protective cover, until commissioning or in times, where units are out of service. At the end-of-life the foil can also be fully recycled.

Following codes in accordance with the *European Waste Catalogue* apply:

Packaging

- EWC 15 01 01 Paper and cardboard packaging
- EWC 15 01 02 Plastic packaging

All materials are directed to an energy recovery or metallurgical recycling process.

Following codes in accordance with the *European Waste Catalogue* apply:

EoL

- EWC 17 04 02 Aluminum
- EWC 17 04 01 Copper, bronze, brass
- EWC 17 02 03 Plastic
- EWC 17 04 05 Iron and steel/
- EWC 17 02 02 Glass
- EWC 16 02 14 Used devices with the exception of those included in 16 02 09 to 16 02 13/
- EWC 16 02 16 Components removed from used devices with the exception of those included in 16 02 15

2.16 Further information

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3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 piece of Turnstile 1000.

Declared unit

Name	Value	Unit
Declared unit	1	pce.
Mass of declared sensor barrier (Turnstile 1000)	117	kg
Conversion factor to 1 kg	0.0085470 1	-

3.2 System boundary

Type of EPD: cradle to gate - with options.

The Environmental Product Declaration refers to the production stage (A1-A3), the use stage (B6), the end of life stage (C3) and indicates the recycling potential which is declared in the module "benefits and loads beyond the product system boundary" (D).

In line with the PCR, A5 is declared to ensure the export of biogenic CO₂ from renewable packaging materials.

Modules A1 to A3 include the provision and processing of raw materials as well as the processing of input

materials, the transport to manufacturer and production site. Module B6 includes the operational energy consumption of the sensor barrier during its use. Module C3 includes the incineration of plastics for energy recovery. Module D comprises the recycling of metals and gives the recycling potentials as well as potential benefits from energy substitution. A5 is declared to ensure the export of biogenic CO₂ that is incorporated in the used packaging materials (wood, paper). Potential benefits from the incineration of packaging materials are also declared in module D.

3.3 Estimates and assumptions

For the end of life, it is assumed that the product is disassembled into different material fractions in order to be recycled. The metal and electronic parts are recycled, and plastics are incinerated with energy recuperation. The end of life is declared in C3, minor proportions of waste to landfill (e.g. 1% glass) are considered as residues from the recycling process and are also modelled in C3.

Losses within metal recycling are assumed to be 5%. For the packaging material of the product (wood and paper) the biogenic CO₂ uptake within A3 is considered and exported from the product system in A5.

For the energy consumption in the use stage (B6) the European electricity grid mix is used for a service life of 20 years.

3.4 Cut-off criteria

No cut-off criteria are applied in this study. All reported data were incorporated and modelled using best available Life Cycle Inventory (LCI) data. Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment. Transport processes of pre-products, raw materials and packaging material to the manufacturing facility are considered.

3.5 Background data

All background data used are taken from the /GaBi ts software/ data bases. The consistent data sets contained in the GaBi data base are documented in the online GaBi ts documentation. The last update of the database was in 2019.

In order to guarantee comparability of the results, the consistent background data from the GaBi data base exclusively is used in the LCA (e.g. data sets on energy, transport, auxiliaries and consumables).

3.6 Data quality

Primary data was collected by dormakaba International Holding AG using a specific questionnaire for the sensor barrier. The foreground data collected by the manufacturer are based on a specific bill of material, yearly production amounts and extrapolations of measurements on specific machines and plants. The production data refer to an average of the year 2018. The data quality of the primary data is very high.

3.7 Period under review

The data in this LCA is based on data records from 2018. The period under review was 12 months.

3.8 Allocation

The production process does not deliver any co-products. The applied software model does not contain any allocation.

Environmental burden of the incineration of combustible materials (plastics and packaging material) in their end of life are assigned to the system (A5 and C3). The credits for thermal and electrical energy, resulting from energy substitution in the incineration process, are declared in module D and calculated with European average data.

The amount of secondary material in the different metals is considered in the study within A1. Only the net amount is declared in Module D, i.e. the part of the secondary material capable of fully substituting the input is a component of the product system examined and is not allocated to Module D.

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.

The GaBi ts software and databases are used

4. LCA: Scenarios and additional technical information

The following technical scenario describes the declared modules.

Operational energy use (B6) and Operational water use (B7)

The energy consumption in this EPD is declared for a use time of 20 years. The LCA is calculated with LCI of the European grid mix 2016.

Name	Value	Unit
Power consumption in 20 years	3404	kWh
Days per year in use	365	days
On mode per day (approx. 2000 cycles per day, each 2 seconds)	1.1	hours
Idle mode per day	22.9	hours
On mode power	70.0	W
Idle mode power	17.0	W

End of life (C1-C4)

Name	Value	Unit
Collected separately	117	kg
Recycling	93	kg
Energy recovery	10	kg
Landfilling	5	kg

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%).

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

Collection rate is 100%.

5. LCA: Results

The results for the use stage (B6) are declared for a time period of **20 years**.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE 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	MND	X	MND	MND	MNR	MNR	MNR	X	MND	MND	MND	X	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 piece Turnstile 1000

Parameter	Unit	A1-A3	A5	B6	C3	D
Global warming potential	[kg CO ₂ -Eq.]	8.70E+2	5.19E+1	1.60E+4	6.63E+1	-7.14E+2
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.43E-8	1.00E-14	4.48E-10	9.40E-12	-8.10E-9
Acidification potential of land and water	[kg SO ₂ -Eq.]	4.34E+0	6.94E-3	4.54E+1	7.57E-2	-3.56E+0
Eutrophication potential	[kg (PO ₄) ³ -Eq.]	2.98E-1	1.30E-3	4.25E+0	6.47E-3	-2.29E-1
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	2.42E-1	4.93E-4	2.88E+0	6.94E-3	-1.93E-1
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.68E-2	7.68E-7	5.09E-3	5.22E-5	-1.64E-2
Abiotic depletion potential for fossil resources	[MJ]	1.05E+4	1.13E+1	1.72E+5	5.69E+2	-7.78E-3

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 piece Turnstile 1000

Parameter	Unit	A1-A3	A5	B6	C3	D
Renewable primary energy as energy carrier	[MJ]	4.89E+3	1.53E+1	1.16E+5	3.30E+1	-3.50E+3
Renewable primary energy resources as material utilization	[MJ]	1.30E+1	-1.30E+1	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	4.91E+3	2.33E+0	1.16E+5	3.30E+1	-3.52E+3
Non-renewable primary energy as energy carrier	[MJ]	1.22E+4	1.33E+1	2.89E+5	6.37E+2	-9.05E+3
Non-renewable primary energy as material utilization	[MJ]	1.40E+1	0.00E+0	0.00E+0	-1.40E+1	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.22E+4	1.33E+1	2.89E+5	6.23E+2	-9.05E+3
Use of secondary material	[kg]	1.03E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	1.06E+1	1.31E-1	1.37E+2	1.48E-1	-9.41E+0

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 piece Turnstile 1000

Parameter	Unit	A1-A3	A5	B6	C3	D
Hazardous waste disposed	[kg]	4.40E-5	1.91E-8	1.38E-4	1.20E-7	-1.12E-5
Non-hazardous waste disposed	[kg]	2.05E+2	8.85E-1	2.11E+2	1.85E+1	-1.84E+2
Radioactive waste disposed	[kg]	6.53E-1	7.98E-4	4.66E+1	2.23E-2	-4.97E-1
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	8.23E+1	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	7.53E+1	0.00E+0	5.40E+1	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	1.36E+2	0.00E+0	9.74E+1	0.00E+0

6. LCA: Interpretation

The energy consumption in the use phase (B6) is declared for a time period of 20 years and dominates all environmental impact categories over the life cycle of the product. The production stage (A1-A3) is in comparison to the use stage significantly lower and is mainly determined by the pre-chain of the raw materials (module A1).

Within A1 the product components made of aluminum are most important (>50%) within the environmental impact of the sensor barrier. This correlates with the

mass proportion of aluminium in the product (69%). Only for Abiotic depletion potential for non-fossil resources (ADPe) the electronic parts have a significant influence (>50%).

The influence of modules A2, A3, A5 and C3 are negligible over the product's life cycle for all impact categories.

7. Requisite evidence

This Environmental Product Declaration does not require any evidence relating to the material composition of the product and its area of applicability.

8. References

EN 15804

EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14025

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

IBU 2016

Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V. Version 1., Berlin: Institut Bauen und Umwelt e.V., 2016.
www.ibu-epd.com

PCR Part A

PCR – Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Project Report, version 1.7, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2018

PCR Part B

PCR – Part B: Requirements on the EPD for Electronic Access Control Systems, version 1.2, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2016

GaBi ts software

GaBi version 9, SP 39: software and database for life cycle assessment, 1992-2019, thinkstep AG, Leinfelden-Echterdingen, with recognition by LBP University of Stuttgart

GaBi ts documentation

GaBi ts dataset documentation for the software-system and databases, LBP, University of Stuttgart and thinkstep, Leinfelden-Echterdingen, 2019 (<http://www.gabi-software.com/international/support/gabi/gabi-database-2018-ici-documentation/>)

Machinery Directive

DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC

Electromagnetic Compatibility Directive

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

ROHS2 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

DIN EN ISO 12100

DIN EN ISO 12100:2011-03 Safety of machinery

DIN EN 16005

DIN EN 16005: 2013-01 and Amendment 2015-10 Power operated pedestrian doorsets

DIN EN ISO 13849- 1

DIN EN ISO 13849- 1:2016-06 Safety of machinery

DIN EN ISO 13849- 2

DIN EN ISO 13849- 2:2013-02 Safety of machinery

DIN EN 60335-2

DIN EN 60335-2-103: 2016-05 Household and similar electrical appliances

DIN EN 61000-3-2

DIN EN 61000-3-2:2015-03 Electromagnetic compatibility (EMC)

DIN EN 61000-6-2

DIN EN 61000-6-2: 2005 and Amendment:2011 Electromagnetic Compatibility (EMC)

DIN EN 61000-6-3

DIN EN 61000-6-3:2007 and A1:2011 Electromagnetic Compatibility (EMC)

REACH

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

ISO 9001

ISO 9001:2015-09 Quality management systems - Requirements

European Waste Catalogue (EWC)

COMMISSION DECISION of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

BBSR

Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen (BNB), 24.02.2017, www.nachhaltigesbauen.de

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