

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-20160132-IBA1-EN
Issue date	12/09/2016
Valid to	11/09/2021

KONE Sliding Door 80 KONE Door Business

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



Picture may not represent the exact door configuration described in this EPD.

1. General Information

KONE Door Business

Programme holder

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

Declaration number

EPD-KON-20160132-IBA1-EN

This Declaration is based on the Product Category Rules:

Automatic doors, automatic gates, and revolving door systems, 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 Sliding Door 80

Owner of the Declaration

KONE Corporation
Keilasatama 3
02150 Espoo
Finland

Declared product / Declared unit

One KONE Sliding Door 80 fire-rated automatic building door, including:

- KONE UniDrive operator
- two fire-rated sliding panels
- two fire-rated fixed side panels
- opening and safety devices
- packaging material

Scope:

This EPD lists the environmental impacts of the fire-rated KONE Sliding Door 80, including packaging material. For this declaration, a double sliding door set with two side panels was considered.

The components are sourced from approved international suppliers and the door is manufactured at the KONE premises in Veenendaal, 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 sliding doors are designed for use in building environments that require high levels of security and accessibility. The KONE Sliding Door 80 is driven by KONE UniDrive operator, which provides safety, security, and comfort while meeting all relevant technical and safety standards, including /EN 16005/. The KONE Sliding Door 80 is certified for a fire rating of 30 minutes (EI30). The panels are constructed from glass with a durable steel frame that includes fire-insulating material tested according to /EN 1634-1/ and /EN 13501-1/ standards.

2.2 Application

KONE automatic sliding doors are designed and engineered for a wide range of applications, including:

- Office buildings
- Hotels
- Hospitals

- Airports and other transportation hubs
- Educational facilities such as schools and universities
- Retail centers

2.3 Technical Data

Name	Value	Unit
Power input "Standby"	18.49	W
Power input "Operation"	44.96	W
Rated Power	80	W
Max. door opening width	2000	mm
Max. door opening height	2300	mm
Max. opening speed	1.44	m/s
Max. closing speed	1.44	m/s
Mains power supply	230 VAC +10/-15%, 50/60 Hz	

Ambient temperature	-15°C to +50°C. IP20. No condensation allowed; only for dry rooms
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**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.*

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 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 16005:2012 – Safety of power operated pedestrian door sets

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

EN13501-2:2007+A1:2009 – Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services

EN1634-1:2008 – Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

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 door set is delivered ready for installation including the operator, door panel, and frame. The total weight depends on the dimensions of the door panel.

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	46.7%
Stainless steel	0.8%
Aluminum	5.8%
Glass	44.7%
Plastics	0.3%
Sealants/Rubber	0.1%
Electronics	1.7%
Total	100%

2.7 Manufacture

The door components are sourced mainly from Europe and Asia. Prior to assembly, the metal components are surface treated, either anodized or powder coated, by a third-party. The final assembly of the door – including the operator, cover, and rail – is completed in the Netherlands. The manufacturing unit is /EN ISO 9001/ certified.

2.8 Environment and health during manufacturing

The manufacturing unit is /EN ISO 14001/ certified. Offcuts and scraps are directed to a recycling unit. Waste is sent for disposal. Preparation and manufacturing conditions do not require any special health and safety measures.

2.9 Product processing/Installation

KONE products are supplied ready for installation. The frame and door leaves are assembled at the manufacturing unit and installed on-site by trained technicians.

2.10 Packaging

Packaging, including polystyrene, is provided to protect the door during transport. The door set is wrapped in plastic for delivery and the operator is packaged in a cardboard box. The door is packaged on a wooden pallet. All packaging materials are theoretically recyclable.

2.11 Condition of use

The door 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

All substances have been tested for fire performance and behavior. The performance level is defined according to the respective European standards /EN 13501-2/ and /EN 1634-1/. The door construction is classified as: EI₂ 15, EI₂ 20, EI₂ 30, EW 20, EW 30.

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 aluminum, steel, and glass components can 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

EWC 15 01 03 Wooden 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 02 Glass
EWC 17 02 03 Plastics
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

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3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the declared unit of 1 piece of KONE Sliding Door 80 (W x H (outer frame of door panels)= 790 x 2240 mm / (W x H (side panels)= 750 x 2250 mm) 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)	539.50	kg
Conversion to 1kg	0.002	Piece / kg
Area	6.91	m ²
Ratio to reference door	2.58	Measuring 1.23 m x 2.18 m = 2.68 sqm/pc (reference door based on /EN1435 1-1/)

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 to the building site (A4)

Name	Value	Unit
Litres of fuel	0.84	l/100km
Transport distance	600	km
Capacity utilisation (including empty runs)	85	%

Installation into the building (A5)

Name	Value	Unit
Packaging waste (Paper/Cardboard, Plastics, Pallets) to be treated	24.66	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 leaf(s) 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:

Estand-by = Energy consumption due to stand-by mode per day

Eidle = Energy consumption due to idle mode per day

Pnon-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

Tnon-active = Operation time in non-active mode in hours per day (= 24 hours – *Tactive*). Covers stand-by and idle mode

Eactive = Energy consumption due to active mode per day

Pactive = Average power during the time of the whole cycle

Tactive = Average operation time per day

Ncycle = Average number of opening/closing cycles per day

Tcycle = 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	2506.39	kWh
Days per year in use	365	d/a
Hours per day in non-active mode	23.5	h/d
Power in non-active mode	18.49	W
Power in active mode	44.96	W
Operating time for one opening/closing cycle	10.6	s
Numbers of opening/closing cycles per day	180	

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	514.84	kg
Recycling	510	kg
Energy recovery	3.49	kg
Landfilling	1.35	kg

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

Name	Value	Unit
Collected separately waste (incl packaging)	539.50	kg
Recycling (metals, glass)	98	%
Energy recovery (Plastics, Paper/Wood)	2	%
Landfill (inert material)	0	%

5. LCA: Results

The table below shows the LCA results for the declared unit - 1 Piece of Sliding Door 80

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 KONE Sliding Door 80

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
GWP	[kg CO ₂ -Eq.]	1.37E+3	1.48E+1	1.20E+1	1.16E+3	1.41E+1	4.61E-2	8.18E+0	-6.17E+2
ODP	[kg CFC11-Eq.]	3.12E-7	6.79E-11	3.24E-11	8.26E-7	6.48E-11	3.27E-11	2.38E-11	1.27E-7
AP	[kg SO ₂ -Eq.]	6.02E+0	3.64E-2	9.83E-4	3.24E+0	3.48E-2	1.28E-4	5.57E-3	-2.74E+0
EP	[kg (PO ₄) ³⁻ -Eq.]	6.07E-1	8.44E-3	1.98E-4	2.90E-1	8.06E-3	1.15E-5	7.48E-4	-1.84E-1
POCP	[kg ethene-Eq.]	5.68E-1	-1.02E-2	8.87E-5	2.23E-1	-9.76E-3	8.84E-6	2.54E-4	-2.85E-1
ADPE	[kg Sb-Eq.]	2.96E-2	9.84E-7	8.93E-8	3.80E-4	9.39E-7	1.50E-8	1.34E-6	-4.60E-3
ADPF	[MJ]	1.58E+4	2.04E+2	1.68E+0	1.26E+4	1.94E+2	4.99E-1	5.93E+0	-6.06E+3

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 KONE Sliding Door 80

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
PERE	[MJ]	2.40E+3	IND	IND	IND	IND	IND	IND	IND
PERM	[MJ]	0.00E+0	IND	IND	IND	IND	IND	IND	IND
PERT	[MJ]	2.40E+3	1.16E+1	2.54E-1	5.68E+3	1.10E+1	2.25E-1	9.86E-1	-1.19E+3
PENRE	[MJ]	1.68E+4	IND	IND	IND	IND	IND	IND	IND
PENRM	[MJ]	6.07E+1	IND	IND	IND	IND	IND	IND	IND
PENRT	[MJ]	1.69E+4	2.04E+2	2.00E+0	2.03E+4	1.95E+2	8.03E-1	6.56E+0	-6.42E+3
SM	[kg]	3.40E+1	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]	8.38E+0	2.90E-2	2.19E-2	8.76E+0	2.77E-2	3.47E-4	1.94E-2	-3.90E+0

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 KONE Sliding Door 80

Parameter	Unit	A1-A3	A4	A5	B6	C2	C3	C4	D
HWD	[kg]	1.52E-3	1.55E-5	2.29E-9	1.29E-5	1.47E-5	5.10E-10	7.23E-8	-5.42E-6
NHWD	[kg]	1.13E+2	1.72E-2	4.06E-2	1.22E+1	1.64E-2	4.85E-4	3.79E+0	-7.54E+1
RWD	[kg]	4.45E-1	2.92E-4	1.26E-4	3.06E+0	2.79E-4	1.21E-4	2.50E-4	-1.43E-1
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	2.03E+1	0.00E+0	0.00E+0	5.10E+2	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	5.00E+0	0.00E+0	0.00E+0	0.00E+0	3.49E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	9.98E+0	0.00E+0	0.00E+0	0.00E+0	6.77E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	2.32E+1	0.00E+0	0.00E+0	0.00E+0	1.57E+1	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 influenced by the production and supply of the raw materials as well as the use phase of the door consuming electric energy. To a much lesser degree the manufacturing of the products play a role. **GWP** (Global Warming Potential) additionally is also notable affected by the

(biogenic) emissions resulting from waste treatment (incineration of the wooden door parts). 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

EN ISO 14001:2004

Environmental management systems - Requirements with guidance for use

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., Königswinter (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 Automatic doors, automatic gates, and revolving door systems, 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 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 16005:2012

Safety of power operated pedestrian door sets

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

EN13501-2:2007+A1:2009

Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services

EN1634-1:2008

Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

DIN 18650-1/-2: 2010

Safety of power operated pedestrian door sets

**Publisher**

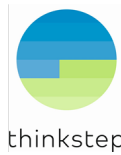
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