ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	dormakaba International Holding GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DOR-20160281-ICA1-EN
Issue date	24.04.2017
Valid to	23.04.2023

Crane AL 1000/2000/3000 - Automatic Revolving Door

dormakaba

Institut Bauen und Umwelt e.V.

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

General Information

dormakaba

Programme holder
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Declaration number
EPD-DOR-20160281-ICA1-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
24.04.2017

Valid to
23.04.2023

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

Dr. Burkhart Lehmann
(Managing Director IBU)

Crane AL 1000/2000/3000 - Automatic Revolving Door

Owner of the Declaration
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Declared product / Declared unit
The declaration represents one automatic revolving door, consisting of four (4) door leaves and with a diameter of 10 ft. (3050 mm) and a height of 7.5 ft. (2290 mm).

Scope:
The declaration and background LCA report represent DORMA's Crane AL 1000 / 2000 / 3000 automatic revolving doors. Raw materials and components are provided by suppliers and shipped to DORMA's facility in Illinois, USA, where doors are manufactured and assembled before being shipped to job sites.

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)

Product

Product description / Product definition
Revolving doors represent an alternative entrance option that minimizes airflow between the outside and inside while allowing for continuous traffic flow. A revolving door can also create a sealed barrier at the building envelope, reducing the load on HVAC systems and saving energy in the process. The Crane AL 1000/2000/3000 automatic revolving doors add the further benefits of controlling pedestrian flow and creating barrier-free passage for users.

The Crane AL 1000/2000/3000 automatic revolving doors are designed with an integrated network of sensors that monitor the door itself and its occupants to ensure safe operation.

The Crane AL series uses an aluminum sub frame construction. The 1000 series utilizes bolted construction methods throughout. The 2000 series canopy and enclosure are formed and welded, and retain traditional clad constructions for door leaves. The 3000 series is the premium design, and utilizes fully formed and welded construction methods throughout.

The heavy-duty hardware used in all Crane revolving doors complies with all state and federal requirements for providing emergency egress.

All Crane revolving doors are furnished with factory-made seals, which provide a durable dynamic barrier between inside and outside environments.

Crane AL 1000/2000/3000 automatic revolving doors can be manufactured in a range of 2.43 m (8 ft) to 3.66 m (12 ft) outer diameter, and can accommodate virtually any attachment plan that the architect has in their vision for the building.

For the use and application of the product, the respective national provisions at the place of use apply. In the United States, for example, this would be the relevant building codes and the corresponding national specifications.

Application
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:

- Hotels
- Healthcare settings
- Airports and transportation facilities
- Commercial office buildings
- Institutional and educational buildings
- Retail stores

Technical Data
The technical features for the Crane AL 1000/2000/3000 automatic revolving door are as follows:

Name	Value	Unit
Power input "Standby"*	29	W
Power input "Operation"*	184	W
Height range 1000/2000	7-9	ft
Height range 3000	7+ with engineering approval	ft
Diameter range 1000	6ft-6in ID to 12ft OD	
Diameter range 2000/3000	6 ID to 12 OD	ft
Enclosure glass 1000/2000	7/16" clear or tinted laminated	
Enclosure glass 3000	9/16" clear or tinted laminate	
	d	
Door leaf glass	1/4" tempered	
Emergency egress control	Crane adjustable bookfold design	
Speed control	Crane mechanical design	

**excludes lighting

Base materials / Ancillary materials

The basic material composition of the door is given below. The door is primarily manufactured from aluminum and glass.

Name	Value	Unit
Glass	58	%
Aluminum	32	%
Electronics (e.g. motor)	5	%
Bronze	4	%
Other	1	%

Reference service life
The reference service lives of the revolving doors will ultimately depend on the traffic pattern and degree of usage of the doors. A reference service life of 20 years is assumed for calculation of the Use Stage impacts of the Crane AL 1000/2000/3000 automatic revolving door.

LCA: Calculation rules

Declared Unit
The declared unit for this analysis is one (1) revolving door system.

Declared unit

Name	Value	Unit
Declared unit for revolving door system*	6.97	m^2
Mass of the entire system	887	kg
Conversion factor to 1 kg	0.0011	-
Grammage of the components	127	kg/m^2
Dimensions for revolving door, width	3050	mm
Dimensions for revolving door, height	2290	mm

* Area represents the cross-sectional area of the door, which is designed to fit in an opening of 3050-mm wide by 2290-mm high (10 ft. by 7.5 ft.).

System boundary
Type of EPD: cradle-to-grave. The following modules were considered in this analysis:

Product stage
- Raw material supply (A1)
- Transport (A2)
- Manufacturing (A3)

Construction stage
- Transport to the building site (A4)
- Installation, including packaging disposal (A5)

Use stage
- Maintenance (B2)
- Operation energy use (B6)

End-of-life stage
- Transport to disposal (C2)
- Waste processing (C3)
- Disposal (C4)

Benefits and loads beyond the system boundary
- Reuse, recovery, and recycling potential (D)

Submodules that were not declared either do not apply and would therefore be zero, or are estimated to fall below the cut-off criteria.

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.
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LCA: Scenarios and additional technical information

Additional information is provided for the declared modules, including A4, A5, B2, B6, C2, C4, and D. In order to represent DORMA's global distribution network, sales-weighted averages are used to model transport to the building sites and electricity consumption during product use.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	30	l/100km
Transport distance	2500	km
Capacity utilisation (including empty runs)	75	%

Installation into the building (A5)

Name	Value	Unit
Packaging waste for disposal (wood)	209	kg
Packaging waste for disposal (other)	19	kg

Maintenance (B2)

Name	Value	Unit
Maintenance cycle	1	Number/ RSL
Replacement components	22	kg

Reference service life

Name	Value	Unit
Reference service life	20	a

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

Name	Value	Unit
Electricity consumption	9800	kWh

End of life (C1-C4)

Name	Value	Unit
Collected separately	269	kg
Collected as mixed construction waste	618	kg
Recycling	269	kg
Landfilling	618	kg

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

Name	Value	Unit
Collection rate, aluminum	90	%
Collection rate, bronze	45	%
Collection rate, steel	81	%

LCA: Results

The table below summarizes which modules are declared and which are not declared. Environmental performance results are shown for one (1) piece of revolving door and represent the average of Crane AL 1000/2000/3000 automatic revolving doors produced at DORMA's facility.

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	X	MNR	MNR	MNR	X	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: one revolving door system

Parameter	Unit	A1-A3	A4	A5	B2	B6	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	5.79E+3	4.42E+2	2.62E+2	5.59E+2	6.02E+3	1.46E+1	0.00E+0	2.83E+1	-8.83E+2
ODP	[kg CFC11-Eq.]	3.19E-7	3.58E-9	2.26E-10	9.55E-8	2.21E-6	1.18E-10	0.00E+0	5.49E-10	-4.08E-8
AP	[kg SO_2-Eq.]	3.54E+1	1.28E+0	5.28E-1	2.60E+0	1.92E+1	4.07E-2	0.00E+0	1.24E-1	-6.07E+0
EP	[kg $(PO_4)^{3-}$-Eq.]	2.47E+0	3.22E-1	4.55E-1	2.03E-1	1.07E+0	1.05E-2	0.00E+0	1.58E-2	-2.54E-1
POCP	[kg ethene-Eq.]	2.07E+0	1.58E-1	1.47E-1	2.14E-1	1.16E+0	5.14E-3	0.00E+0	1.26E-2	-3.05E-1
ADPE	[kg Sb-Eq.]	1.06E-1	6.50E-5	4.46E-6	3.07E-2	1.12E-3	2.14E-6	0.00E+0	1.10E-5	2.79E-2
ADPF	[MJ]	6.80E+4	6.11E+3	2.06E+2	6.81E+3	6.93E+4	2.01E+2	0.00E+0	4.33E+2	-8.13E+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 revolving door system

Parameter	Unit	A1-A3	A4	A5	B2	B6	C2	C3	C4	D
PERE	[MJ]	2.08E+4	1.01E+2	1.09E+1	8.16E+2	9.92E+3	3.34E+0	0.00E+0	2.82E+1	-5.32E+3
PERM	[MJ]	7.16E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.09E+4	1.01E+2	1.09E+1	8.16E+2	9.92E+3	3.34E+0	0.00E+0	2.82E+1	-5.32E+3
PENRE	[MJ]	7.35E+4	6.14E+3	2.10E+2	7.31E+3	8.89E+4	2.02E+2	0.00E+0	4.45E+2	-8.36E+3
PENRM	[MJ]	1.37E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	7.36E+4	6.14E+3	2.10E+2	7.31E+3	8.89E+4	2.02E+2	0.00E+0	4.45E+2	-8.36E+3
SM	[kg]	2.04E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	2.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.92E-1
NRSF	[MJ]	2.51E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.40E+0
FW	[m^3]	5.16E+1	1.24E+0	6.46E-2	3.76E+0	3.70E+1	4.10E-2	0.00E+0	6.85E-2	-2.44E+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 revolving door system

Parameter	Unit	A1-A3	A4	A5	B2	B6	C2	C3	C4	D
HWD	[kg]	2.32E+0	7.79E-6	3.69E-7	3.57E-4	5.35E-5	2.57E-7	0.00E+0	8.52E-7	-8.53E-2
NHWD	[kg]	7.39E+2	2.15E-1	1.51E+2	2.80E+1	2.93E+1	7.11E-3	0.00E+0	6.42E+2	-2.73E+2
RWD	[kg]	2.26E+0	1.29E-2	1.72E-3	1.98E-1	7.69E+0	4.26E-4	0.00E+0	4.53E-3	-9.46E-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	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.04E+2	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	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	7.32E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	3.44E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+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

The revolving door environmental footprint is primarily dominated by materials production (Module A1) and by electricity consumption during door operation (Module B6). The extent to which operation electricity consumption dominates, however, will depend on the traffic pattern of the building in which the door is installed. In order to capture DORMA's global sales network, the LCA assumes a sales-weighted average grid mix based on the countries and regions where Crane doors are sold. Finished products are primarily shipped within North America, but around 1% are sent to South America.

Materials used during door maintenance also represent a non-negligible contribution to abiotic depletion potential

of elements. Module D is associated with a net positive abiotic depletion potential of elements (i.e., an environmental burden) because the amount of secondary material for bronze production in Module A1 is modeled as exceeding the amount of bronze recovered at end-of-life (Module C3).

At the end-of-life, the metal components of the revolving door are modeled as being recycled. A portion of the aluminum and bronze are recovered and the remainder landfilled. Glass, however, is assumed to be sent entirely to landfill as recycling this material from demolished buildings is not considered common practice.

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