

## ENVIRONMENTAL PRODUCT DECLARATION

# M9000 SERIES MORTISE LOCKS



*The M9000 is an ANSI Grade 1 Mortise Lock for heavy duty commercial applications requiring exceptional security, enhanced aesthetics, and rugged dependability.*



*Registered under the scope  
of mutual recognition between  
UL Environment and  
Institut Bauen und Umwelt e.V.*



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We are committed to sustainable development as one of our key business objectives. DORMA's aim is to ensure energy-saving and resource-conserving production, to maintain a high recycled content ratio and to provide products with a long service life. With expert advice, innovative products and international service coverage we are able to make significant contributions to energy efficiency and to drive cost savings derived from sustainable building concepts. Through our involvement in national organizations around the world, we at DORMA support the idea of the World Green Building Council.

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# ENVIRONMENTAL PRODUCT DECLARATION



DORMA Deutschland GmbH  
M9000 Series  
Mortise Locks

According to EN 15804 and ISO 14025  
Dual Recognition by UL Environment and Institut Bauen und Umwelt e.V.


This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. **Exclusions:** EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. **Accuracy of Results:** EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. **Comparability:** EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.



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DECLARATION HOLDER	DORMA Deutschland GmbH
ULE DECLARATION NUMBER	4786548204.106.1
IBU DECLARATION NUMBER	EPD-DOR-20140193-CBC1-EN
DECLARED PRODUCT	M9000 Series Mortise Locks
REFERENCE PCR	Product Category Rules Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 2013-04 Product Category Rules Part B: Locks and fittings, 2014-07

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CONTENTS OF THE DECLARATION	General information Product / Product description LCA calculation rules LCA scenarios and further technical information LCA results References	
The PCR review was conducted by:	IBU – Institut Bauen und Umwelt e.V.	
	PCR was approved by the Independent Expert Committee (IEC) of IBU	
The CEN Norm EN 15804 serves as the core PCR. This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Wade Stout	
	This life cycle assessment was independently verified in accordance with EN 15804 and the reference PCR by: IBU – Institut Bauen und Umwelt e.V.	



## Disclaimer

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## General Information

DORMA	M9000 Series Mortise Locks
<b>Programme holder</b> IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	<b>Owner of the Declaration</b> DORMA Deutschland GmbH DORMA Platz 1 58256 Ennepetal Germany
<b>Declaration number</b> EPD-DOR-20140193-CBC1-EN	<b>Declared product / Declared unit</b> The declaration represents one lock unit.
<b>This Declaration is based on the Product Category Rules:</b> Locks and fittings , 07.2014 (PCR tested and approved by the independent expert committee (IEC))	<b>Scope:</b> The declaration and the background LCA represent DORMA's M9000 Series mortise locks. Raw materials and components are provided by suppliers and shipped to DORMA, where the locks are assembled at DORMA's Reamstown, PA facility.
<b>Issue date</b> 28.10.2014	
<b>Valid to</b> 27.10.2019	
 Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	<b>Verification</b> The CEN Norm EN 15804 serves as the core PCR Independent verification of the declaration according to ISO 14025 <input type="checkbox"/> internally <input checked="" type="checkbox"/> externally
 Dr. Burkhardt Lehmann (Managing Director IBU)	 Dr.-Ing. Wolfram Trinius (Independent verifier appointed by IEC)

## Product

### Product description

DORMA's M9000 Series mortise locks are versatile, heavy-duty locksets that provide exceptional security, enhanced aesthetics, and rugged dependability. These locks are available in a range of lever and knob trim designs. The M9000 Series features more than 40 functions, including functions with optional deadbolt for security and single motion egress to meet code requirements.

### Application

The M9000 Series is suitable for a wide range of applications. It is best suited for high use commercial applications such as schools, government buildings, municipal buildings, offices, and more.

### Technical Data

The M9000 Series are non-handed locks that are suitable for door thicknesses from 1.75 to 2.25 inches.



A stainless steel deadbolt with hardened steel roller pins imparts strength, durability, and saw resistance, while a full length interlocking face plate supports both the latch and deadbolts against forced entry.

Certifications include /ANSI A156.13/ Series 1000, operational and security Grade 1; /ANSI A117.1/; and /UL 10C/.

#### Base materials / Ancillary materials

Name	Value	Unit
Steel	61	%
Brass	38	%
Zinc	1	%

#### Reference service life

No use stage modules are reported; as such, declaration of the reference service life (RSL) is voluntary. The RSL is not reported for the M9000 Series locks.

## LCA: Calculation rules

#### Declared Unit

The declared unit of this analysis is one mortise lock.

#### Declared unit

Name	Value	Unit
Declared unit (1 lock)	1	1 piece/product
Mass of system (without packaging)	2.4	kg
Conversion factor to 1 kg	0.42	-

#### System boundary

Type of EPD: cradle-to-gate - with options. The following modules were considered in the analysis:

#### Product stage:

- Raw material supply (A1)
- Inbound transport (A2)
- Manufacturing (A3)

#### Construction process stage:

- Distribution (A4)
- Installation (A5)

#### End-of-life stage:

- Disposal (C4)

#### Beyond system boundaries:

- Reuse, recovery, recycling potential (D)

#### 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.

## LCA: Scenarios and additional technical information

Additional information is provided for declared modules, including A4, A5, C4, and D. In order to represent DORMA's global distribution network, a sales-weighted average is used to model transport to the building site. The table for Module A4 shows both weighted average transportation distance (given regional mortise lock sales), which is used in the analysis, along with the variation in that distance. Additionally, estimated global average recycling rates are used to represent product disposal.

#### Transport to the building site (A4)

Name	Value	Unit
Litres of fuel (truck)	31	l/100km
Fuel economy (truck)	7.6	mpg
Transport distance (SI)	2400 - 22800	km
Average transport distance (SI)	6,000	km
Transport distance (imperial)	1,500 - 14,200	mi
Average transport distance (imperial)	3,750	mi
Capacity utilisation (including empty runs)	85	%

#### Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging)	0.32	kg

#### End of life (C1-C4)

Name	Value	Unit
Recycling	1.8	kg
Landfilling	0.64	kg

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

Name	Value	Unit
Recycling rate, brass	52	%
Recycling rate, paper	90	%
Recycling rate, steel	88	%
Recycling rate, zinc	52	%

## LCA: Results

The table below summarizes which modules are declared (as indicated by an "X"), and which are not declared (as indicated with "MND"). Environmental performance results are shown for one (1) mortise lock.

### 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 lock (2.4kg)\*

CML-IA version 4.2, released april 2013						
Parameter	Unit	A1 - A3	A4	A5	C4	D
Global warming potential	[kg CO <sub>2</sub> -Eq.]	9.305E+0	3.580E-1	6.670E-2	2.870E-2	-1.710E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.051E-8	2.020E-12	3.910E-14	5.990E-13	2.290E-8
Acidification potential of land and water	[kg SO <sub>2</sub> -Eq.]	4.902E-2	5.560E-3	7.690E-5	1.300E-4	8.130E-4
Eutrophication potential	[kg (PO <sub>4</sub> ) <sup>3-</sup> -Eq.]	3.817E-3	6.820E-4	3.440E-5	1.520E-5	-6.930E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	2.946E-3	-2.680E-5	2.310E-5	1.270E-5	-7.270E-4
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	1.201E-3	1.270E-8	7.330E-10	1.120E-8	6.460E-4
Abiotic depletion potential for fossil resources	[MJ]	1.178E+2	4.660E+0	2.860E-2	4.390E-1	-2.050E+1

TRACI 2.1						
Parameter	Unit	A1 - A3	A4	A5	C4	D
Global warming potential	[kg CO <sub>2</sub> -Eq.]	9.31E+00	3.58E-01	6.67E-02	2.87E-02	-1.71E+00
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.32E-08	2.15E-12	4.15E-14	6.37E-13	2.49E-08
Acidification potential of land and water	[kg SO <sub>2</sub> -Eq.]	4.87E-02	6.09E-03	1.23E-04	1.39E-04	-1.15E-03
Eutrophication potential	[kg N-Eq.]	6.21E-03	2.47E-04	2.89E-05	1.93E-05	-2.55E-04
Ground-level smog formation potential	[kg O <sub>3</sub> -Eq.]	2.38E-01	1.14E-01	4.85E-04	2.62E-03	-1.37E-01

### RESULTS OF THE LCA - RESOURCE USE: 1 lock (2.4kg)\*

Parameter	Unit	A1 - A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	8.406E+0	1.160E-1	1.360E-3	2.090E-2	2.030E+0
Renewable primary energy resources as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of renewable primary energy resources	[MJ]	8.406E+0	1.160E-1	1.360E-3	2.090E-2	2.030E+0
Non renewable primary energy as energy carrier	[MJ]	1.339E+2	5.020E+0	3.190E-2	4.890E-1	-2.020E+1
Non renewable primary energy as material utilization	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Total use of non renewable primary energy resources	[MJ]	1.339E+2	5.020E+0	3.190E-2	4.890E-1	-2.020E+1
Use of secondary material	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Use of renewable secondary fuels	[MJ]	-6.166E-3	3.230E-5	3.260E-5	5.000E-4	4.780E-4
Use of non renewable secondary fuels	[MJ]	-6.671E-2	3.390E-4	7.440E-5	1.140E-3	3.560E-3
Use of net fresh water	[m <sup>3</sup> ]	2.254E+1	9.650E-2	-8.640E-2	-1.390E+0	1.920E+1

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 lock (2.4kg)\*

Parameter	Unit	A1 - A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	3.875E-3	1.030E-5	7.360E-7	1.130E-5	-6.890E-5
Non hazardous waste disposed	[kg]	6.480E-1	3.660E-4	3.100E-2	6.340E-1	5.290E-1
Radioactive waste disposed	[kg]	2.906E-3	7.930E-6	3.670E-7	5.620E-6	4.040E-4
Components for re-use	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for recycling	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Materials for energy recovery	[kg]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported electrical energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0
Exported thermal energy	[MJ]	0.000E+0	0.000E+0	0.000E+0	0.000E+0	0.000E+0

\* 1kg = 2.204 lbs.

Mortise lock environmental impacts are dominated by the product stage (A1-A3) for all impact categories. The production of raw materials such as steel and brass, in particular, are key drivers of environmental performance. One exception, however, is ozone depletion potential, for which Module D accounts for a significant portion of environmental impact. This is due to differences in primary versus secondary steel production routes, the latter typically leading to higher ozone-depleting emissions from electricity use in electric arc furnaces.

Distribution also accounts for a relevant contribution in a few impact categories. Compared to the product stage, however, distribution is a smaller fraction of mortise lock environmental impact. Distribution is modeled assuming a sales-weighted average based on the countries and regions in which locks are sold. Finished products are



shipped from DORMA's facility in Reamstown, PA to various locations in Eurasia and the Americas. While the results represent DORMA's specific situation as of 2013, they can be reevaluated for a specific country or region.

At the end-of-life, DORMA's locks are modeled as being recycled. A portion of each material type is recovered and the remainder landfilled. In this case, proxy data are used as often, global average or even regional specific data are not available. Waste disposal (Module C4) is consistently a minor contributor to environmental impact so dataset choice is not anticipated to affect conclusions.

## References

### 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

### ANSI A117.1

ANSI A117.1 - 2009, Accessible and usable buildings and facilities

### ANSI A156.13

ANSI/BHMA A156.13 - 2012, Mortise locks

### GaBi 6

PE INTERNATIONAL; GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Echterdingen, 1992-2013.

### GaBi 6 Documentation

GaBi 6: Documentation of GaBi 6: Software-System and Database for Life Cycle Engineering. Copyright,

TM. Stuttgart, Echterdingen, 1992-2013.  
<http://documentation.gabi-software.com/>

### ISO 14040

EN ISO 14040:2006, Environmental management — Life cycle assessment — Principles and framework

### ISO 14044

EN ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines

### PCR Part A

Institut Bauen und Umwelt e.V. (Ed.): PCR Guidance-Texts for Building-Related Products and Services. Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. 2013. [www.bau-umwelt.com](http://www.bau-umwelt.com)

### PCR Part B

Institut Bauen und Umwelt e.V. (Ed.): PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Locks and fittings. 07-2014. [www.bau-umwelt.com](http://www.bau-umwelt.com)

### UL 10C

UL 10C, Positive pressure fire tests of door assemblies



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