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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Mapei AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-406-273-EN
ECO Platform reference number:	00000280
Issue date:	26.01.2016
Valid to:	26.01.2021

Zinkbolt

MAPEI
ADHESIVES · SEALANTS · CHEMICAL PRODUCTS FOR BUILDING

General information

Product:
ZinkBolt, mortar

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Declaration number:
NEPD-406-273-EN

Place of production:
Sagstua (Norway)

ECO Platform reference number:
00000280

Management system:
ISO 9001:2008 (N° 94-OSL-AQ-6236)
ISO 14001:2004 (N° 2002-OSL-SYMI-8147)
EMAS (N° NO - 000015)

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR

Organisation no:
911103079

Statement of liability:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Issue date:
26.01.2016

Valid to:
26.01.2021

Declared unit:
1 kg of ZinkBolt

Year of study:
2014

Declared unit with option:
1 kg of ZinkBolt

Comparability:
EPD of construction products may not be comparable if they do not comply with EN 15804 and are seen in a building context.

Functional unit:
-

The EPD has been worked out by:
Roberto Leoni

Verification:
The CEN Norm EN 15804 serves as the core PCR. Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

Third party verifier:

Gian Luca Baldo Ph.D.
(Independent verifier approved by EPD Norway)

Approved

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Zinkbolt is specially developed for anchoring hot galvanized bolts. Zinkbolt can be used for grouting fully cast-in bolts, not prestressed or combination bolts.

Zinkbolt is a thixotropic, cement based, non-shrinking dry mortar which expands 1 – 3% before setting.

The mortar requires only the addition of water.

The expanding component makes the mixture expand 1 – 3% while fresh: this ensures that Zinkbolt completely fills the cavity where it is placed, and fits closely around the bolts.

The mixture must be placed within 40 minutes of mixing in order to ensure maximum expansion.

The consumption of the product is approximately 1,6 kg of powder for 1m2.

Product specification:

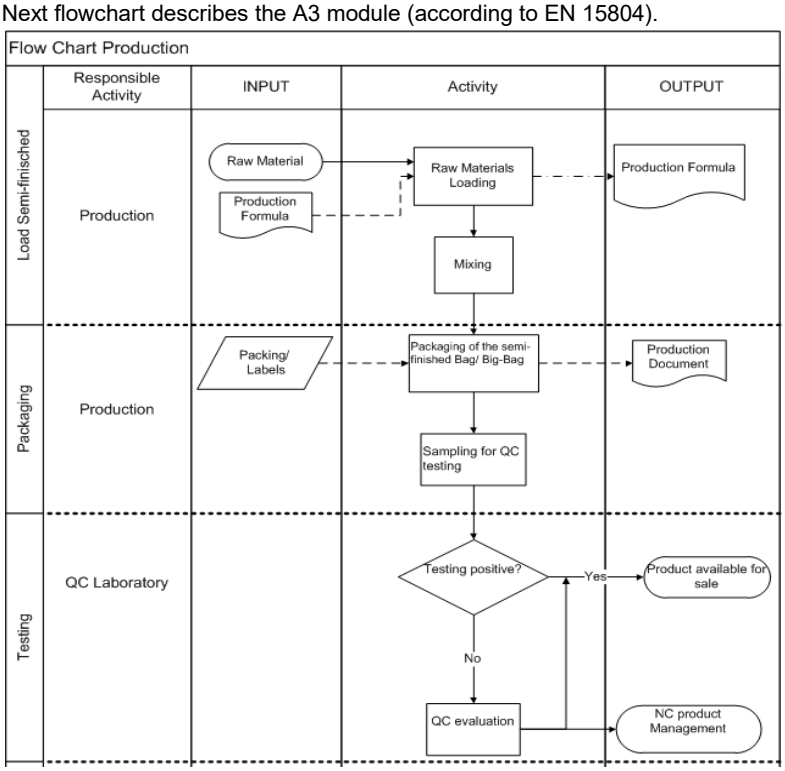
The composition of the product (included packaging - multiplybags with 25kg product, wrapping and pallet) is described in the following table:

Materials	Percent (%)	mass (Kg)
Cement	45,85	0,4585
Fillers (carbonate, sand, ….)	51,2	0,5120
Additives	0,51	0,0051
Packaging	2,44	0,0244

Production process:

All components, stored inside specific silos, are then weighted inside production scales; powder is then mechanically mixed for 5 minutes and packed (bags with 25kg of powder). Following flowchart describes production process from raw materials supply to final finished product packaging and QC testing.

Next flowchart describes the A3 module (according to EN 15804).



Market:

Norway

Technical data (typical values):

PRODUCT DETAILS	
Type:	CC
Appearance:	powder
Colour:	grey
Maximum aggregate size (mm):	0.5
Bulk density (kg/m³)	1,200
Dry solids content (%):	100
Chloride ions content – minimum requirements ≤ 0,05 % - according to EN 1015-17 (%):	≤ 0.05

APPLICATION DATA OF PRODUCT	
Colour of mix:	Grey
Mixing ratio:	100 parts of **Zinkbolt** with 23-25 parts water (approx. 5.7-6.3 l per 25 kg bag)
Consistency of mix:	tixotropic Fluid
Density of mix (kg/m³):	2,040
pH of mix:	>12
Application temperature range:	from +5°C to +35°C
Expansion according to EN 445 (%):	1 - 3
Bleeding according to EN 445 (%):	≤ 0.5
Pot life of mix:	approx. 40 min.

FINAL PERFORMANCE (25 % BLENDING WATER)				
Performance characteristics for product	Test methods	Requirements according to EN EN 1504-6	Product performance	
			22°C	5°C
Compressive strength (MPa):	EN 12190	> 80% of the value declared by the manufacturer	20 (after 1 day) 30 (after 2 days) 35 (after 7 days) 45 (after 28 days)	3 (after 1 day) 15 (after 2 days) 30 (after 7 days) 45 (after 28 days)
Flexural strength (MPa):	EN 196-1	None	3 (after 1 day) 5 (after 2 days) 7 (after 7 days) 8 (after 28 days)	1 (after 1 day) 2 (after 2 days) 5 (after 7 days) 6 (after 28 days)
Pull-out (mm)	EN 1881	Displacement ≤ 0.6 mm at load of 75 KN	< 0.1	
Reaction to fire:	Euroclass	Value declared by manufacturer	A1	

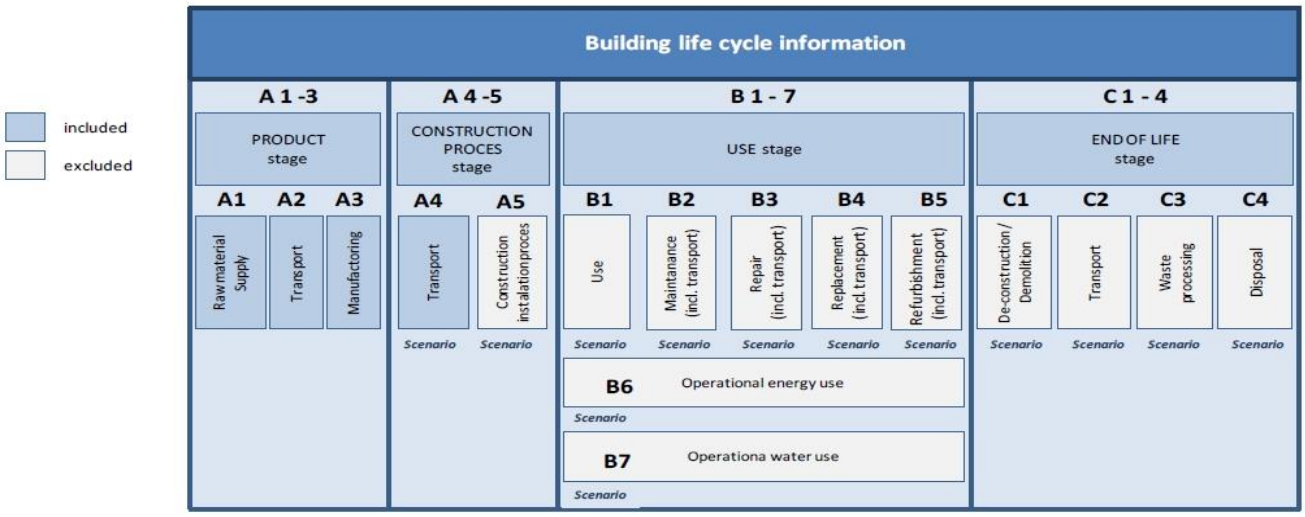
Reference service life, product:
as for the construction

Goal of the study:
This EPD is the result of a Life Cycle Assessment study (ref. LCA Study Report rev. n°03 20151218) on Zinkbolt manufactured in Mapei AS (Sagstua, Norway), according to EN 15804:2014.
Target audiences of the study are customers and other parties with an interest in the environmental impacts of Zinkbolt.

LCA: Calculation rules

Declared unit:
1 kg ZinkBolt, mortar

System boundary:
Cradle to gate with option.All processes from raw material extraction to product from the factory gate are included in the analysis (A1-A3). In addition, transportation to customers in accordance with guidelines issued by the EPD Norway (A4) is included.



Data quality:

Dataset	Data quality	Data source	Age of data
A1			
Silica sand	ThinkStep Database	DE Sand grain 0-2mm (dried)	2013
Calcium carbonate	ThinkStep Database	DE Limestone Flour (0,5mm)	2013
Silica Fume	Ecoinvent 3.1 Database	GLO Market for Silica Fume	2015
PTL Cement	EPD Norcem – 23N rev.1 (EPD Norge - *CEM I Industri og Standard*)	Specific data from producer	2013
Additives	EPD EFCA – 20150091-IAG1 (IBU)	Worst-case scenario	2015
A2-A4 (Transport)			
Truck transport	ThinkStep Database	GLO Truck trailer euro 4	2012
Rail transport	ThinkStep Database	GLO rail transport cargo	2013
Electricity mix	ThinkStep Database	EU27 Electricity grid mix	2011
Diesel for transp.	ThinkStep Database	EU27 Diesel mix at refinery	2011
A3 (production)			
Electricity mix	ThinkStep Database	NO Electricity grid mix	2011
Waste	ThinkStep Database	EU27 data approx. (small q.)	2005-2013
Packaging	ThinkStep Database – PlasticEurope	EU27 data approx.	2005-2013

When possible, specific data from supplier are preferred (i.e. those regarding cement production, the most relevant contribute for all environmental categories included in this study).
Transport datasets have a global or European representativeness.
All dataset are not more than 10 years old (according to EN 15804 § 6.3.7 “data quality requirements”)

Allocation:
The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house are allocated equally among all products through mass allocation.

Cut-off criteria:
All major raw materials and all the essential energy are included. The production process for raw materials and energy flows that are included with very small amounts (< 0,1%) might not be reported and therefore not included. This cut-off rule does not apply to hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD. The choosen distance covers the whole Norwegian market.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	85%	Truck 27 tons	500	0,016 l/tKm	8
Railway					
Boat					
<Other Transportation>					

LCA: Results

The declared unit is 1 kg of ZinkBolt, A1-A3 Cradle to Gate + A4 Transport (generic scenario with average distance of 500 Km)

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assemby stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impact			
Parameter	**Unit**	**A1- A3**	**A4**
GWP	kg CO2 -eqv	3,91E-01	2,36E-02
ODP	kg CFC11-eqv	1,72E-09	9,61E-14
POCP	kg C2H4 -eqv	6,09E-05	-3,47E-05
AP	kg SO2 -eqv	8,18E-04	1,04E-04
EP	kg PO43--eqv	1,98E-04	2,63E-05
ADPM	kg Sb-eqv	1,17E-07	9,18E-10
ADPE	MJ	2,10E+00	3,22E-01

The value in A4 module for POCP category, is due to CML methodology applied (v. 4.2) which considers a negative emission factor for NO.

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Resource use			
Parameter	**Unit**	**A1-A3**	**A4**
RPEE	MJ	1,45E+00	1,81E-02
RPEM	MJ	0,00E+00	0,00E+00
TPE	MJ	1,45E+00	1,81E-02
NRPE	MJ	2,14E+00	3,23E-01
NRPM	MJ	2,51E-02	0,00E+00
TRPE	MJ	2,17E+00	3,23E-01
SM	kg	8,46E-03	0,00E+00
RSF	MJ	0,00E+00	0,00E+00
NRSF	MJ	7,37E-01	0,00E+00
W	m3	5,96E-01	6,23E-04

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste			
Parameter	**Unit**	**A1- A3**	**A4**
HW	kg	5,78E-07	0,00E+00
NHW	kg	3,79E-02	0,00E+00
RW	kg	4,64E-06	0,00E+00

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow			
Parameter	**Unit**	**A1- A3**	**A4**
CR	kg	0,00E+00	0,00E+00
MR	kg	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

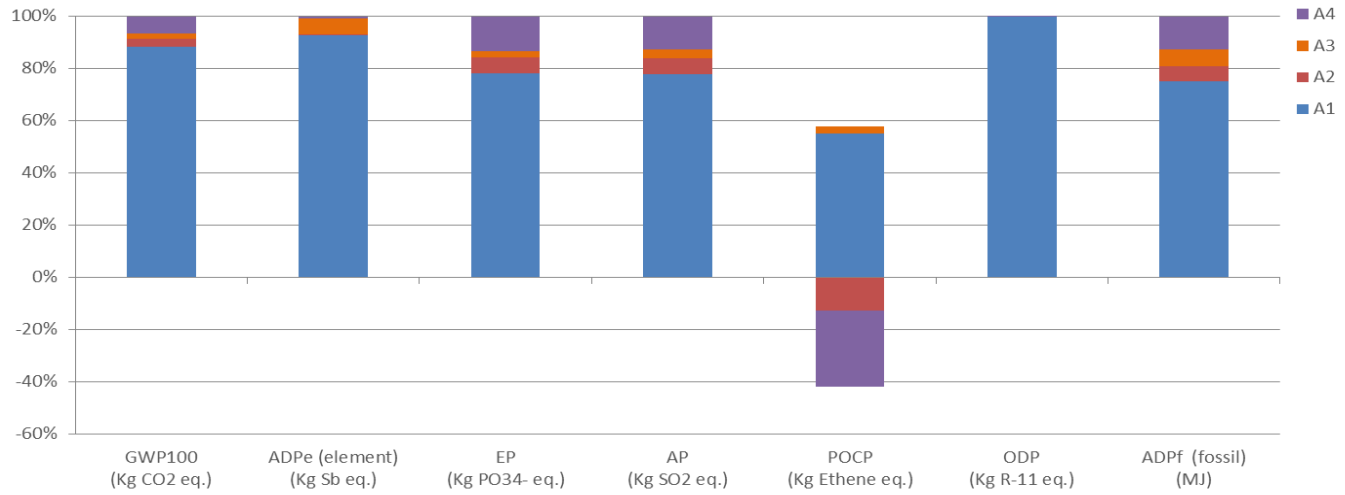


***Figure.1** : percentage contribution of modules considered for each environmental category*

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase
National production mix from import, low woltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess (A3).

Data source	Amount	Unit
GaBi (v6) database	0,0438	kg CO2-eqv/kWh

Dangerous substances

☑ The product contains no substances given by the REACH Candidate list (v. 17 Dec. 2015)

☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.

☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.

☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.

Name	CAS no.	Amount

Indoor environment
No tests have been carried out on the product concerning indoor air _ Not relevant

Carbon footprint
Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14044:2006	*Environmental management - Life cycle assessment - Requirements and guidelines*
EN 15804:2014+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
LCA Report	Revision 1

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