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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:	Troldtekt A/S
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD00295E
ECO Platform reference number:	00000149
Issue date:	19.12.2014
Valid to:	19.12.2019

Troldtekt acoustic panels

Wood wool-cement panels

Troldtekt A/S

www.epd-norge.no

General information

Product
Troldtekt acoustic panels

Owner of the declaration
Troldtekt A/S
Contact person: Tina Kristensen
Phone: +45 87 47 81 24
e-mail: tkr@troldtekt.dk

Program holder
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo
Phone: +47 23 08 82 92
e-mail: post@epd-norge.no

Manufacturer
Troldtekt A/S

Declaration number:
NEPD00295E

Place of production:
Troldhede, 6920 Videbæk, Denmark

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serve as core PCR
together with the NPCR 010: Building boards.

Management system:

Declared unit:
1 ton of grey or white acoustic wood wool cement panels

Org. No:
CVR: 45810011

Declared unit with option:

Issue date
19.12.2014

Functional unit:
No functional unit has been declared

Valid to
19.12.2019

The EPD has been worked out by:

Maria R. Rasch

TEKNOLOGISK INSTITUT

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

Year of study:
2014

Verification:
Independent verification of data, other environmental information and EPD has been carried out in accordance with ISO14025, 8.1.3 and 8.1.4

externally ☑ internally ☐

Kari Sørnes, SINTEF
(Independent verifier approved by EPD Norway)

Approved

Dagfinn Malnes
Managing Director of EPD-Norway

Declared unit:
1 ton of grey or white acoustic wood wool cement panels

		grey panels	*white panels*	
Key environmental indicators	Unit	Cradle to gate A1 - A3	Cradle to gate A1 - A3	Transport *****
Global warming	kg CO_2 -eqv	208	434	10
Energy use	MJ	7643	8707	140
Dangerous substances	*	-	-	-
Use of secondary materials	kg	222	32	-

* The product contains no substances from the REACH Candidate list or the Norwegian priority list
***** Transport from production site to central warehouse in Norway

Product

Product description:
Troldtekt acoustic panels are intended for use on indoor ceilings and walls.

Product specification
Troldtekt acoustic panels are made with either grey or white cement. The panels are cut in different sizes with varying thicknesses.

Materials	kg	%
Wood	470	47,0
Cement	503	50,3
Water glass	13	1,3
Water based paint	14	1,4

Technical data:

Thickness (mm):	25 / 35 / 50
Width (mm):	600
Length (mm):	600 / 1200 / 2000 / 2400
Weight (kg/m^2)	9,7 / 12,0 / 15,0

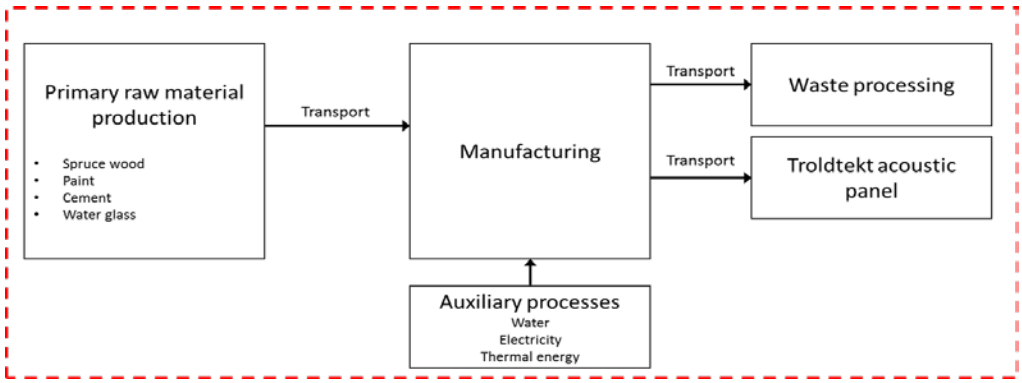
Troldtekt acoustic panels are CE-labelled in accordance with two European standards: EN 13168 for wood wool panels and EN 13964 for suspended ceilings.

Market:
Norway and Northern Europe

Reference service life:
The expected lifetime of the panels is 50 years

LCA: Calculation rules

System boundary:



The system boundary include the recovery and transport of raw materials to the production site and the production processes.

Declared unit:
1 ton of grey or white acoustic wood wool cement panels

Data quality:
Production data for Troldtekt acoustic panels is based on a yearly average of 2013. For background data the GaBi 6.3 databases have been used and all data is <10 years old. Data for the production of cement is provided as EPDs from Aalborg Portland A/S, 2013, compliant with EN 15804.

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

Allocation:
The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house production is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

LCA: Scenarios and additional technical information

Additional technical information
Troldtekt acoustic wood wool cement panels all hold the Danish *Indeklimamærket* and the fulfils the M1 criteria of the Finish *Emission Class for Building Materials,* both concerning indoor environment. The panels have no emission of gasses, including TVOC, formaldehyde, ammonia, any carcinogenic compounds or particles in the use phase.

All wood used at Troldtekt A/S holds the FSC® or PEFC® label which ensures sustainable forestry.

LCA: Results

The following information describe the scenarios of the modules in the EPD.
The central warehouse in Norway is located in Oslo. The transport distance from the warehouse to the final place of use is estimated to be 50 km.

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

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

Environmental impact		*Grey panels*				*White panels*			
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A1**	**A2**	**A3**	**A1-A3**
GWP	kg CO_2 -eqv	6,97E+01	1,09E+01	1,27E+02	2,08E+02	2,96E+02	1,09E+01	1,27E+02	4,34E+02
ODP	kg CFC11-eqv	9,35E-08	8,43E-11	7,72E-10	9,43E-08	1,84E-07	8,43E-11	7,72E-10	1,84E-07
AP	kg SO_2 -eqv	8,87E-01	3,20E-02	2,77E-01	1,20E+00	2,00E+00	3,20E-02	2,77E-01	2,31E+00
EP	kg PO_4^{3-}-eqv	1,33E-01	7,07E-03	2,46E-01	3,85E-01	2,25E-01	7,07E-03	2,46E-01	4,78E-01
POCP	kg C_2H_4 - eqv	8,83E-02	-3,16E-03	4,78E-02	1,33E-01	1,56E-01	-3,16E-03	4,78E-02	2,01E-01
ADPM	kg Sb-eqv	4,47E-04	7,52E-07	3,95E-06	4,51E-04	9,16E-04	7,52E-07	3,95E-06	9,20E-04
ADPE	MJ	3,78E+03	2,73E+02	2,53E+02	4,30E+03	5,66E+03	2,73E+02	2,53E+02	6,18E+03

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 photochemical oxidants; **ADPM** Abiotic depletion potential for non fossil resources; **ADPE** Abiotic depletion potential for fossil resources

Resource use		*Grey panels*				*White panels*			
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A1**	**A2**	**A3**	**A1-A3**
RPEE	MJ	1,40E+03	1,30E+01	5,90E+02	2,01E+03	1,45E+03	1,30E+01	5,90E+02	2,06E+03
RPEM	MJ	6,54E+03	-	1,80E+02	6,72E+03	6,54E+03	-	1,80E+02	6,72E+03
TPE	MJ	7,95E+03	1,30E+01	7,70E+02	8,73E+03	8,00E+03	1,30E+01	7,70E+02	8,78E+03
NRPE	MJ	4,39E+03	2,74E+02	2,53E+02	4,92E+03	5,85E+03	2,74E+02	2,53E+02	6,38E+03
NRPM	MJ	-	-	1,28E+01	1,28E+01	-	-	1,28E+01	1,28E+01
TRPE	MJ	4,39E+03	2,74E+02	2,66E+02	4,93E+03	5,85E+03	2,74E+02	2,66E+02	6,39E+03
SM	kg	2,22E+02	-	-	2,22E+02	3,19E+01	-	-	3,19E+01
RSF	MJ	2,82E+02	-	-	2,82E+02	2,70E+02	-	-	2,70E+02
NRSF	MJ	4,32E+02	-	-	4,32E+02	-	-	-	-
W	m^3	9,12E-01	2,29E-02	1,46E-01	1,08E+00	9,12E-01	2,29E-02	1,46E-01	1,08E+00

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		Grey panels				White panels			
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A1**	**A2**	**A3**	**A1-A3**
HW	kg	1,46E-02	1,13E-04	1,47E-03	1,62E-02	1,46E-02	1,13E-04	1,47E-03	1,62E-02
NHW	kg	2,20E+01	3,80E-02	1,46E+02	1,68E+02	2,20E+01	3,80E-02	1,46E+02	1,68E+02
RW	kg	4,81E-02	3,80E-04	4,31E-03	5,28E-02	4,81E-02	3,80E-04	4,31E-03	5,28E-02

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

End of life - Output flow		Grey panels				White panels			
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A1**	**A2**	**A3**	**A1-A3**
CR	kg	-	-	-	-	-	-	-	-
MR	kg	9,26E-01	-	-	9,26E-01	7,05E-01	-	-	7,05E-01
MER	kg	5,52E-02	-	-	5,52E-02	5,52E-02	-	-	5,52E-02
EEE	MJ	6,93E-01	-	-	6,93E-01	6,93E-01	-	-	6,93E-01
ETE	MJ	2,45E-02	-	-	2,45E-02	2,45E-02	-	-	2,45E-02

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

Reading example: 9,0 E-03 = $9,0*10^{-3}$ = 0,009

Additional Norwegian requirements

Electricity
Electricity used in the manufacturing processes has been accounted for using the process Danish grid mix at consumer (1-60 kV) and a Danish mix of electricity from windpower from GaBi v. 6.3

Greenhouse gas emissions:	0,132	kg CO_2 - eqv/MJ	Danish grid mix (1-60 kV)
Greenhouse gas emissions:	0,0023	kg CO_2 - eqv/MJ	Danish mix (wind power)

Dangerous substances
None of the following substances have been added to the product: Substances on the REACH Candidate list of substances of very high concern or substances on the Norwegian Priority list (of 18.12.2014) or substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations.

Transport
Transport from production site to central warehouse in Norway is: 302 km

Transportation to a central warehouse is done by truck and by ship from Denmark to Norway. The truck is based on a Euro 5, 20-26 t (17,3 t payload) and the ship is based on a container ship including consumption of heavy fuel oil.

Indoor environment
The product meets the requirements for low emissions (M1) according to EN15251: 2007 Appendix E.

Bibliography

ISO 14025:2006	*Environmental labels and declarations - Type III environmental declarations - Principles and procedures*
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012	*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*
Rasch M. (2014)	LCA of Troldtekt wood wool-cement acoustic panels, Project Report, Danish Technological Institute, 2014
PCR 2014	NPCR 010 rev1. *Building Boards* , www.epd-norge.no, 2013

epd-norge.no The Norwegian EPD Foundation	**Program holder and publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo Norway	Phone: e-mail: web	+47 23 08 82 92 post@epd-norge.no www.epd-norge.no
Troldtekt® Natural acoustic solutions	**Owner of the declaration** Troldtekt A/S Østergade 37, 6920 Videbæk Denmark	Phone: Fax e-mail: web	+45 87 47 81 00 +45 87 47 81 11 info@troldtekt.dk www.troldtekt.dk
TEKNOLOGISK INSTITUT	**Author of the Life Cycle Assessment** Maria R. Rasch Teknologisk Institut Aarhus, Denmark	Phone: e-mail: web	+45 72 20 16 66 mror@teknologisk.dk www.teknologisk.dk