

ENVIRONMENTAL PRODUCT DECLARATION



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The Norwegian EPD Foundation

In accordance with ISO 14025 ISO 21930 EN 15804

Owner of the declaration	Norgips Norge AS
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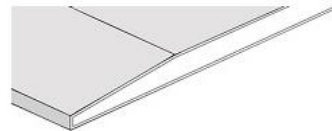
Norgips Rehab type A (RHB)

Product

NORGIPS

Norgips Norge AS

Owner of the declaration



General information

Product

Norgips Rehab type A (RHB)

Owner of the declaration

Norgips Norge AS
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Manufacturer

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Declaration number:

NEPDP-112-177-EN, updated

Place of production:

Norgips Norge AS, Svelvik

This declaration is based on Product Category Rules:

EN 15804:2012+A1:2013 serve as core PCR
 NPCR 10:2013 rev 1, PCR for Building boards

Management system:

Declared unit:

Org. No:

NO 986034757 MVA

Declared unit with option:

Issue date

FI .€I .2€FI

Functional unit:

1 m² of installed plasterboard used for walls, during 60 years

Valid to

FI .€I .2€€

The EPD has been worked out by:

Mie Vold



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

Approved

sign

Independent verifier approved by EPD Norway

Dagfinn Malnes
 Managing Director of EPD-Norway

Functional unit

1 m² of installed plasterboard used for walls, during 60 years

Key environmental indicators	Unit	Cradle to gate A1-A3	Transport A4	Module D
Global warming	kg CO ₂ -eq.	1,4	0,22	MND
Energy use	MJ	27,7	3,4	
Dangerous substances	*	*		
Recycled raw materials	kg	5,4		
	%	98,9		

* The product contains no substances from the REACH Candidate list or the Norwegian priority list

Product

Product description:

Gypsum plasterboard composed of a plaster core encased in and firmly bonded to paper liners. The front and back paper liners are overlapped and glued together on the backside of the board. The board is suitable for bending and, when laminated in multiple layers, it can be mounted directly on the joists for direct bonding on existing substrates.

Technical data:

The product is in compliance with EN 520

Weight: 5,5 kg/m² ± 2 %,

Thickness: 6,5 mm ± 0,5 mm

For more information from the product data sheet, see www.norgips.no / www.norgips.se

Market:

Norway and Sweden

Reference service life:

60 years

Product specification

Materials (excl water)	kg	%
Gypsum (REA)	5,1	93,2
Cardboard	0,3	5,8
Glass fibre reinforcement	0,005	0,1
Div additives (total)	0,05	1,0
Total	5,5	100

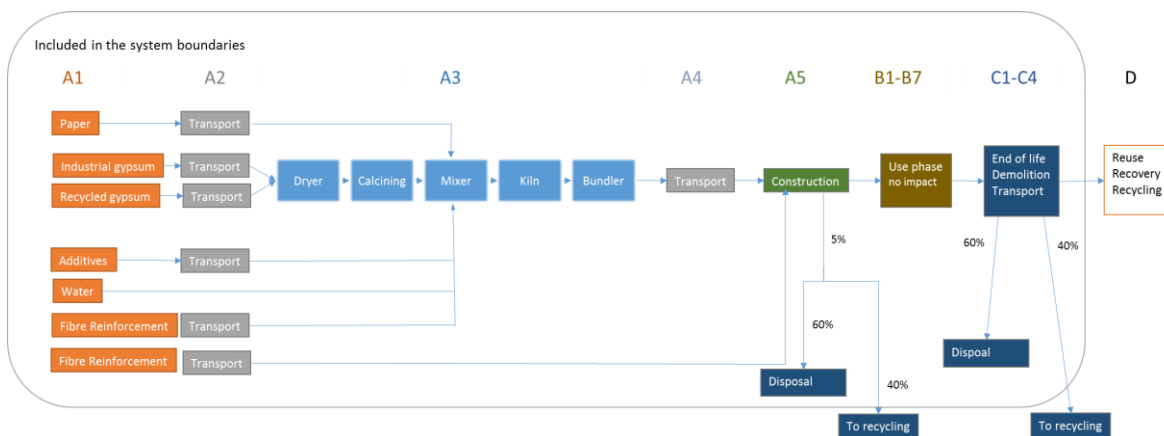
LCA: Calculation rules

Functional unit:

1 m² of installed plasterboard used for walls, during 60 years

System boundary:

Industrial gypsum and recycled gypsum are mixed and dried before the mixture is calcined. The calcined gypsum is transferred to the mixer where water and additives are added. The slurry is distributed to a plasterboard liner where the edges are folded and a new layer of plasterboard liner is glued on to form a sandwich. The board line is continuous transferred along the production line, cut to suitable lengths and dried in a kiln. The dried boards are cut to the correct lengths and stacked in pallets.



Scenarios for user phase (B1-B7) and end of life (C1-C4) are described in scenarios below

Data quality:

Specific data for products and mass flows are from 2013. Data sources: Ecoinvent 2.2/SimaPro software (generic). Ecoinvent 2.2 processes are created 2003-2007. Upstream data for raw materials are significant for the LCA results in this study; these are modelled using Ecoinvent processes. EcoInvent 2.2 is used since EcoInvent 3 had important data gaps when the assessment was completed. Impact assessment methods are in accordance with EN 15804:2012 + A1:2013

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.

Cut-off criteria:

All major raw materials and all the essential energy is included. Also production processes for raw materials and energy flows that are included with very small amounts (<1%) are included.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)

Transport of building products from manufacturer to building site (distance estimated to 360 km)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	Average European capacity utilisation	Lorry > 32 metric ton	360	0,02 l/tkm	7,6
Railway				kWh/tkm	
Boat				l/tkm	

Installation in the building (A5)

Data on energy consumption on the building site is based on lifting the board into the building information given by Norgips Norge AS. An average energy consumption value of 0,00121 MJ/m² (3*10⁻⁴ kWh/m²) shall be applied. It is assumed 5% loss in implementation.

	Unit	Value
Auxiliary	kg	
Water consumption	m ³	
Electricity consumption	kWh	3E-04
Other energy carriers	MJ	
Material loss	kg	0,28
Output materials from waste treatment	kg	
Dust in the air	kg	

User phase B1-B7

All modules in user phase have been assessed, but the product will not need maintenance, repair or replacement during the user phase. Therefore the environmental impact for the user phase is zero.

	Unit	Value
Replacement cycle*		1
Electricity consumption	kWh	
Replacement of worn parts		

* Number or RSL (Reference Service Life)

End of Life (C1, C3, C4)

When the product is discarded and its original function is lost, it can be processed further in a waste management system. The flows of the recycled material will then become inputs into the production of the next product. For Norgips building boards it has been assumed that 40 % of all materials from demolition will be reused/recycled and the rest will be sent to disposal.

	Unit	Value
Hazardous waste disposed	kg	
Collected as mixed construction waste	kg	
Reuse	kg	
Recycling	kg	2,2
Energy recovery	kg	
To landfill	kg	3,3

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	Average European capacity utilisation	Lorry >32 metric ton	50	0,02 kg/tkm	1,2
Railway				kWh/tkm	
Boat				l/tkm	

LCA: Results

All modules from rawmaterial production to end of life are included. The modules in user phase have no impacts since nothing happens during user phase.

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	x	x	x	x	x	x	x	x	x	x	x	x	x	MND

Environmental impact

Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
GWP	kg CO ₂ -eq.	1,4	0,22	1,22E-05	0	1,22E-05	0,029	0	0,024
ODP	kg CFC11 -eq.	1,02E-07	3,61E-08	8,97E-13	0	8,97E-13	4,83E-09	0	7,02E-09
POCP	kg C ₂ H ₄ -eq.	1,79E-04	2,89E-05	1,76E-09	0	1,76E-09	3,85E-06	0	5,12E-06
AP	kg SO ₂ -eq.	1,32E-03	2,36E-04	1,63E-08	0	1,63E-08	2,52E-05	0	3,41E-05
EP	kg PO ₄ ³⁻ -eq.	3,08E-03	8,68E-04	3,71E-08	0	3,71E-08	9,20E-05	0	1,39E-04
ADPM	kg Sb-eq.	1,10E-06	6,61E-07	4,30E-11	0	4,30E-11	8,75E-08	0	2,52E-08
ADPE	MJ	25	3,3	1,33E-04	0	1,33E-04	0,44	0	0,58

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	A5	B1-B7	C1	C2	C3	C4
RPEE	MJ	2,0	0,047	1,2E-03	0	1,2E-03	6,2E-03	0	4,8E-03
RPEM	MJ	0,18	4,8E-03	3,9E-05	0	3,9E-05	6,4E-04	0	4,8E-04
TPE	MJ	2,2	0,052	1,3E-03	0	1,3E-03	6,9E-03	0	5,3E-03
NRPE	MJ	26	3,4	1,7E-04	0	1,7E-04	0,45	0	0,59
NRPM	MJ	0,15	0	0	0	0	0	0	0
TRPE	MJ	26	3,4	1,7E-04	0	1,7E-04	0,45	0	0,59
SM	kg	5,5	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	-4,0E-03	0	0	0	0	0	0	0
W	m ³	9,3E-03	7,0E-06	1,0E-03	0	0	1,9E-07	1,4E-04	0

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	A5	B1-B7	C1	C2	C3	C4
HW	kg	3,1E-05	3,9E-06	4,6E-10	0	4,60E-10	5,21E-07	2,40E-07	2,40E-07
NHW	kg	0,28	4,0E-02	1,5E-05	0	1,5E-05	5,3E-03	3,3	3,3
RW	kg	0	0	0	0	0	0	0	0

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

End of life - Output flow

Parameter	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4
CR	kg	0	0	0	0	0	0	0	0
MR	kg	0,11	0	0	0	0	0	2,2	0
MER	kg	9,10E-06	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
ETE	MJ	0	0	0	0	0	0	0	0

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

The following data from ecoinvent v2 for Norwegian production mix included import, Electricity, medium voltage, at grid/kWh/NO/s". import, production of transmission lines, in addition to direct emissions and loss in grid are included. Characterisation factors stated in EN 15804:2012+A1:2013 are used.

Greenhouse gas emissions: 36 g CO₂ - eq./kWh

Dangerous substances

None of the following substances have been added to the product: Substances on the REACH Candidate list (per 17.12.2014) of substances of very high concern or substances on the Norwegian Priority list (per 04.12.2014) 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 to building site is in accordance with scenario description A4 360 km

Indoor environment

TVOC	<10	µg/m ³ h	Measured after 3 days
Formaldehyde	<10	µg/m ³ h	
Ammonia	22	µg/m ³ h	
Carcinogenic compounds	<2	µg/m ³ h	
Classified as category	M1		Classification according to EN 15251:2007

Noise	No information	dB(A)
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* Emissions are measured for Norgips Plasterboard 13 Type A (STD), report from SP 23.01.2009

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2006	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012 + A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
PCR	<i>NPCR 10:2013 rev 1, PCR for Building boards, www.EPD-Norge.no</i>
Vold, M, 2014	<i>Livsløpsdata for Gipsplater fra Norgips, Bakgrunnsdata for miljødeklarasjon (EPD), Østfoldforskning, OR 27.14, Fredrikstad</i>

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