Environmental Product Declaration ISO 14025

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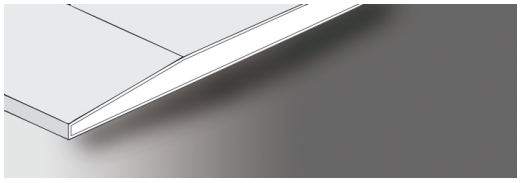
The Norwegian EPD Foundation

Norgips Rehab 6, Type A (RHB)



NEPD no: 112E

Approved according to ISO 14025:2006, 8.1.4

Approved: 06.05.09 Verification leader

Valid until: 06.05.14 Sveinn Fossdal

Verification of data: Externally X Internally

Verification of data and other environmental information has been carried out by Senior reseracher Guri Krigsvoll, HiO according to ISO 14025, 8.1.3.

Guri Krigsvoll

The declaration has been worked out by:

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NS-EN-ISO 14001:1994 Sertifikat nr. 801001 NCS

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About the EPD:

EPDs from other program operatios than Næringslisvets Stiftelse for Miljødeklarasjoner will not necessary be comparable.

PCR:

Product category rules (PCR) for "Building boards"

Environmental indicators	*Cradle to gate*	*Cradle to gate with opti.*	*Cradle to grave*
Global warming	1,7 kg CO2 eqv/DU	2,4 kg CO2 eqv/DU	2,4 kg CO2-eqv/FU
Total energy consumption	28,3 MJ/DU	38,9 MJ/DU	39,1 MJ/FU
Indoor impact	M1	M1	M1
Use of chemicals	See page 2	See page 2	See page 2
Resirculated materials	99 %	99 %	99 %

Scope and marked

Functionel unis:	m² installed plasterboard with expected service life of 60 years
Declared unit (DU):	m² manufactured plasterboard
Cradle to gate with option:	m² manufactured and installed plasterboard
Expected service life:	60 years
Scope:	See page 4
Year of study:	2008
Year of data:	2008
Marked area:	Norway/Sweden

Product description

Gypsum plasterboard consisting of a glass fiber reinforced gypsum core to achieve rigidity, strength and toughness during handling. The glass fiber reinforced core makes Norgips Rehab suitable for bending and, when laminated in multiple layers, be mounted directly on the joists.

Product specification

		Part %	Quantity (kg/FU)
Gypsum		92,0 %	4,89
Cardboard		7,1 %	0,38
Processing aid		0,9 %	0,05
SUM		100 %	5,32

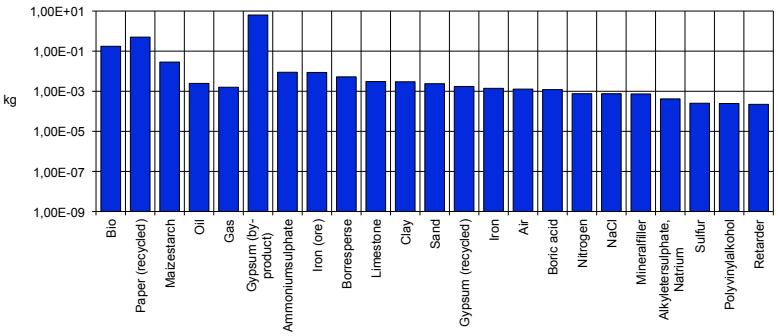
Use of resources

Material resources

All figures refer to functional unit (FU)

R = Recycled materials * = Feedstock	Type	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
Renewable materials									
Bio	*	kg		1,75E-01					1,75E-01
Paper (recycled)	R	kg	5,02E-01						5,02E-01
Maizestarch		kg	2,86E-02						2,86E-02
Non-renewable materials									
Oil	*	kg		2,47E-03					2,47E-03
Gas	*	kg		1,58E-03					1,58E-03
Gypsum (by-product)	R	kg	6,36E+00						6,36E+00
Ammoniumsulphate		kg	8,84E-03						8,84E-03
Iron (ore)		kg	8,67E-03						8,67E-03
Borresperse		kg	5,20E-03						5,20E-03
Limestone		kg	3,06E-03						3,06E-03
Clay		kg	2,97E-03						2,97E-03
Sand		kg	2,37E-03						2,37E-03
Gypsum (recycled)	R	kg	1,73E-03						1,73E-03
Iron		kg	1,39E-03						1,39E-03
Air		kg	1,28E-03						1,28E-03
Boric acid		kg	1,20E-03						1,20E-03
Nitrogen		kg	7,51E-04						7,51E-04
NaCl		kg	7,51E-04						7,51E-04
Mineralfiller		kg	7,31E-04						7,31E-04
Alkyletersulphate, Natrium		kg	4,16E-04						4,16E-04
Sulfur		kg	2,52E-04						2,52E-04
Polyvinylalkohol		kg	2,44E-04						2,44E-04
Retarder		kg	2,22E-04						2,22E-04
Feedstock Renewable		MJ							3,82E+00
Feedstock Non-renewable		MJ							2,39E-01

Material resources total



Renewable materials 7 %, Non-renewable materials 93 %, Recycled materials 99 %

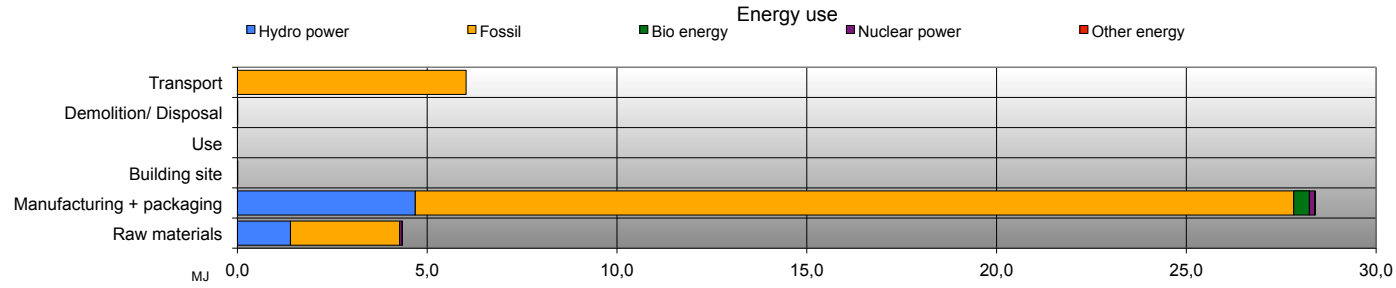
The product does not contain tropical wood.

Consumption of chemicals on the Norwegian observation list

CAS-number	Risk phrases	Quantity	Unit
CAS-55965-84-9	Xi; R36/38-43	4,88E-02	g
CAS-10043-35-3	Xn, Rep3, R62, R63	4,88E-02	g
CAS-7758-98-7	Xi R22-36/38-50/53	3,58E-13	g
			g
			g
			g
Total		9,75E-02	g

Energy resources

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Transport	Total
Renewable energy								
Hydro power	MJ	1,40E+00	4,69E+00	1,48E-03		1,48E-03		6,09E+00
Bio energy	MJ		4,10E-01					4,10E-01
Non-renewable energy								
Oil	MJ	2,67E+00	5,16E-01	3,86E-06		3,86E-06	6,03E+00	9,21E+00
Gas	MJ	1,28E-01	2,27E+01	1,27E-05		1,27E-05		2,28E+01
Coal	MJ	8,00E-02	2,50E-01	1,64E-05		1,64E-05		3,30E-01
Nuclear power	MJ	6,82E-02	1,64E-01	3,61E-05		3,61E-05		2,32E-01
Other energy	MJ	9,85E-03	1,89E-02	8,28E-06		8,28E-06		2,88E-02
							Total	3,91E+01



Water

Potable water 9,1E-04 m³

Land

Land used 0,00 m²

Emissions and environmental impacts

Environmental impacts

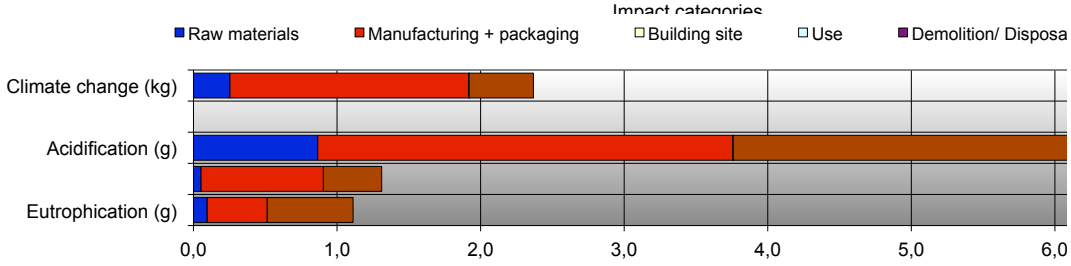
	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal
Climate change	kg CO_2 - equiv.	2,54E-01	1,67E+00	3,54E-06		3,54E-06
Ozone depletion	kg ODP - equiv.	3,48E-14	2,80E-12	2,41E-17		2,41E-17
Acidification	kg SO_2 - equiv.	8,66E-04	2,89E-03	4,88E-09		4,88E-09
Formation of photochemical oxidants	kg POCP- equiv.	5,26E-05	8,53E-04	5,52E-10		5,52E-10
Eutrophication	kg PO_4 - equiv.	9,52E-05	4,20E-04	5,23E-10		5,23E-10

Emissions to air

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal
CO_2	g	2,34E+02	1,65E+03	2,97E-03		2,97E-03
CO	g	1,59E-03	1,74E+00	1,18E-06		1,18E-06
SO_2	g	3,79E-01	6,48E-01	2,28E-06		2,28E-06
NO_x	g	6,91E-01	3,21E+00	3,59E-06		3,59E-06
NMVOC	g	2,99E-02	1,64E+00	4,41E-07		4,41E-07
Particles	g	7,21E-02	2,33E-01	6,00E-07		6,00E-07
CH_4	g	3,44E-01	1,94E-01	2,10E-05		2,10E-05
N_2O	g	4,08E-02	1,08E-02	2,82E-07		2,82E-07
NH_3	g	8,26E-05	3,15E-04	5,48E-08		5,48E-08
Pb	g	1,59E-04	2,99E-07	9,71E-11		9,71E-11
Hg	g	1,08E-06	2,99E-07	9,71E-11		9,71E-11
HF	g	8,06E-04	1,26E-06	1,42E-11		1,42E-11
HCl	g	1,18E-03	2,33E-04	8,94E-11		8,94E-11
Benzene	g	2,93E-05	7,44E-08	2,41E-11		2,41E-11
HCFC-22	g	1,02E-09	8,24E-08	7,10E-13		7,10E-13
Sb	g	2,24E-07				
As	g	1,34E-07				
Ca	g	4,48E-08				

Emissions to water

Substance/fibre	g		3,82E-04			
COD	g		2,12E-02	1,75E-10		1,75E-10
BOD	g		4,97E-03	9,71E-11		9,71E-11
Phosphorus P	g		8,09E-06	9,71E-11		9,71E-11
Nitrogen N	g		3,84E-04	1,42E-10		1,42E-10



Indoor environment

TVOC	<10	µg/m²h Measured after 3 days
Formaldehyde	<10	µg/m²h Measured after 3 days
Ammonia	22,0	µg/m²h Measured after 3 days
Carcinogenic compounds	<2	µg/m²h Measured after 3 days
Classified as category	M1	Classification according to EN 15251:2007

Noise	No information	dB(A)

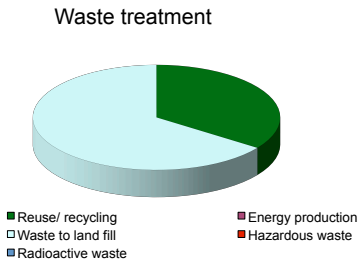
Emissions are measured for Norgips Plasterboard 13 Type A (STD), report from SP 23.01.2009.

Waste treatment

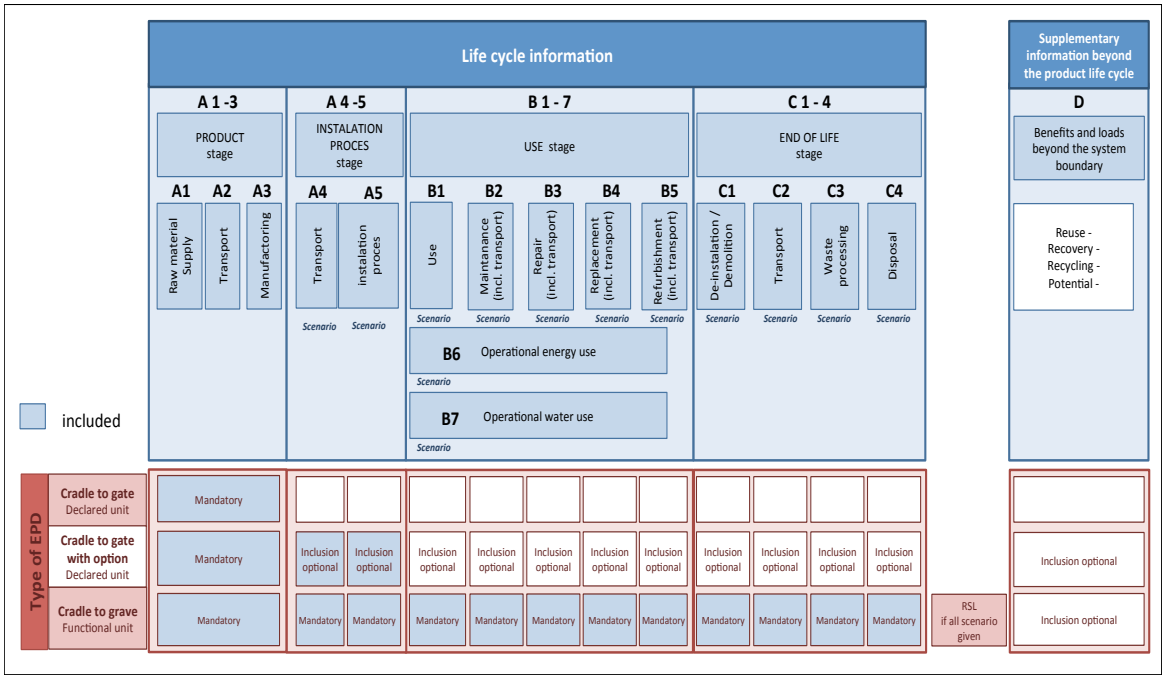
All figures refer to functional unit (FU)

	Unit	Raw materials	Manufacturing + packaging	Building site	Use	Demolition/ Disposal	Total
Reuse/ recycling	kg	9,48E-04	1,59E-02	7,98E-01		1,33E+00	2,15E+00
Energy production	kg	8,05E-04	1,81E-04				9,87E-04
Waste to land fill	kg	6,98E-03	1,80E-02			3,99E+00	4,02E+00
Hazardous waste	kg	9,96E-05	1,28E-04				2,27E-04
Radioactive waste	g	1,88E-05	1,63E-03			4,27E-07	1,65E-03

By the end of life 25 % of plasterboards will be recycled, the rest will be waste to landfill.



System boundaries



Uncertainty	±	11 %
Scope of data (average)		99 %
Materials with product specific data		100 %
Cut-off		0,32 %

References: Sintef Byggforsk Report 21800

Cut-off only includes data for production of rawmaterials and for some chemicals/helping aids. All materials are assessed regarding content of hazardous and toxic materials and all transport are included.