

Owner: Siniat B.V.
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Valid to: 28-11-2021

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804

Owner of declaration

Siniat B.V.
Postbus 45
9930 AA Delfzijl,
The Netherlands
NL002851908B01



Issued:
28-11-2016

Valid to:
28-11-2021

Basis of calculation

This EPD is developed in accordance with the European standard EN 15804.

Comparability

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type

- Cradle-to-gate
- Cradle-to-gate with options
- Cradle-to-grave

Programme operator

Danish Technological Institute
www.dti.dk



Programme

EPD Danmark
www.epddanmark.dk



Declared products

- 1 m² Siniat Gypsum board, GKB Scan, 12,5mm;
- 1 m² Siniat Gypsum board, GKB Scan heavy, 12,5mm;
- 1 m² Siniat Gypsum board, GKF Scan, 15,5mm

Production site

Siniat B.V.
Delfzijl, The Netherlands

Products use

Gypsum boards are applied as ceilings or as part of a drywall (light-weight and non-structural inner wall). The boards consists out of a gypsum core on which on both sides a layer of thin cardboard has been applied.

Declared unit

1 m²

CEN standard EN 15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025
<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier: Susanne Vedel Hjuler

Mathias Hoeg
 EPD Danmark

Life cycle stages and modules (MND = module not declared)																	
Product			Construction process		Use								End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and 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	

Product information

Product description

The main product components, in the finished products, are shown in the table below as average fractions for all three declared gypsum boards. The maximum theoretical deviation from these fractions is <1 %. Due to rounding, the total weight-% is not exactly 100%.

Material	Weight-% of declared product
Flue gas desulphurization gypsum (FGD)	67,8%
Water (fresh + surface)	21,0%
Recycled gypsum	7,5%
Paper	3,1%
Additives	0,7%

Packaging material	GKB Scan 12,5 mm	GKB Scan Heavy 12,5 mm	GKF Scan 15,5 mm
Wooden pallets (kg per declared unit)	6,45E-02	7,93E-02	9,70E-02

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of the following gypsum boards for construction purposes:

- GKB Scan, 12,5mm;
- GKB Scan heavy, 12,5mm;
- GKF Scan, 15,5mm

These gypsum boards are produced by Siniat B.V. at their manufacturing facility in Delfzijl, the Netherlands. Adding to this it should be noted that the GKB Scan 12,5 gypsum board is also available as the 'GKB Scan 4AK 12,5'. The GKB Scan 12,5 has tapered edges only along its long side. The GKB Scan 4AK 12,5 also has tapered edges on its short side number. This declaration is representative for both.

Data originates from annual accounts, product specifications, calculations and measurements. The data supplied by Siniat B.V. has been validated by LBP|SIGHT and checked for consistency and completeness. As such the data quality has been warranted. One-year average data has been collected for the year 2012. Because the manufacturing process has not changed, the data is still representative for the current practice at the manufacturing facility of Siniat in Delfzijl, the Netherlands. The environmental profile of specifically the flue gas desulphurization gypsum has been derived from a representative and published MRPI-Certificate (Dutch, third party verified, EPD format). Generic data has been utilized to model all other background data. The main source of this generic data is the EcoInvent database (version 2.2) with the exception of one specific process where the Dutch environmental database (NMD, version 1.7) was used. The generic data that is used is less than 10 years old.

Dangerous substances

It is stated by Siniat B.V. that the declared gypsum boards do not contain any substances listed in the "Candidate List of Substances of Very High Concern for authorisation". (<http://echa.europa.eu/candidate-list-table>)

Essential characteristics (CE)

Gypsum boards are produced in compliance with the DIN 18180, the EN520:2004+A1:2009 and the EN14190:2014. A declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

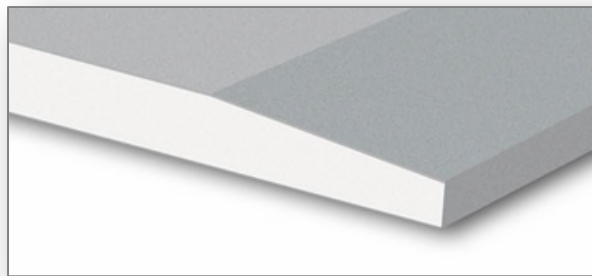
Further technical information can be obtained by contacting the manufacturer or on the manufacturers website: www.siniat.nu/da

Reference Service Life (RSL)

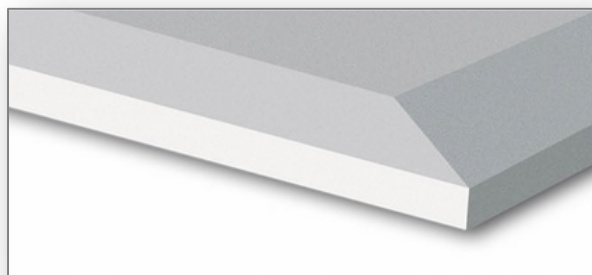
In compliance with the EN15804, a specific reference service life (RSL) cannot be determined for gypsum boards within the scope of this life cycle assessment as it concerns a cradle-to-gate type EPD.

Product illustrations

GKB Scan, 12,5 mm / GKB Scan heavy, 12,5 mm



GKB Scan, 4AK, 12,5 mm



GKF Scan, 15,5 mm



LCA background

Declared unit

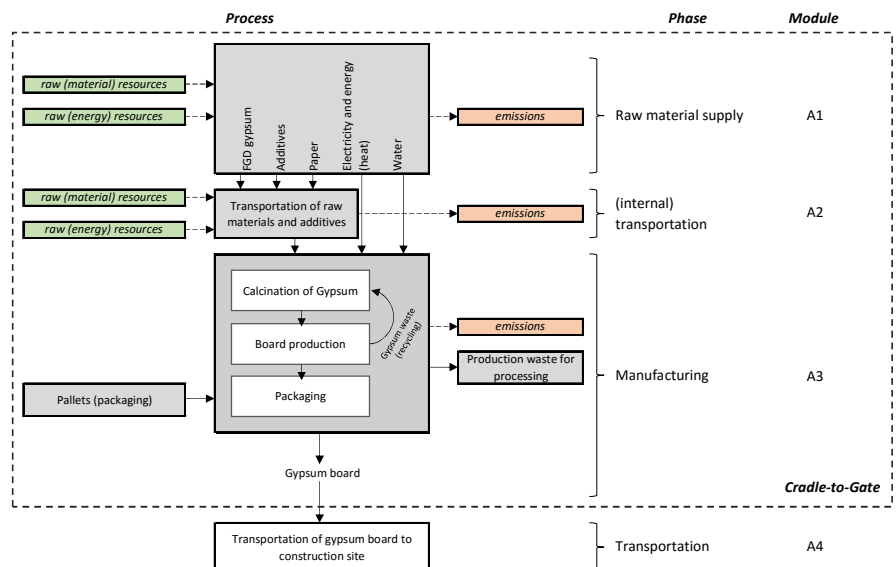
The LCI and LCIA results in this EPD relates to 1 m² Siniat Gypsum board GKB Scan 12,5 mm, GKB Scan Heavy 12,5 mm and GKF Scan 15,5 mm.

Name	Value			Unit
	GKB Scan 12,5 mm	GKB Scan Heavy 12,5 mm	GKF Scan 15,5 mm	
Declared unit	1	1	1	m ²
Density	ca. 730	ca. 900	ca. 880	kg/m ³
Specific weight	9,1	11,2	13,7	kg/m ²
Conversion factor to 1 kg	0,1099	0,0893	0,0730	-

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804.

Flow diagram



System boundaries

This EPD is based on a cradle-to-gate LCA, in which > 99 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

- A1 – Extraction and processing of raw materials
- A2 – Transport to the production site and internal transport
- A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, internal transportation, manufacturing, packaging and waste processing up to the “end-of-waste” state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The main material applied in the gypsum boards is flue gas desulphurization gypsum (FGD gypsum), a by-product of coal fired power plants. It should be noted that no environmental impacts are allocated to the production profile of FGD gypsum (source: MRPI certificate “Gypsum” – a Dutch EPD format).

The availability of the FGD gypsum as by-product is sufficient to cover the total demands for gypsum in the manufacturing process. As a consequence natural (primary) gypsum is not required and utilized. Gypsum waste that is generated during the manufacturing process is directly reused within the manufacturing process (closed-loop recycling).

In the manufacturing process both electricity and heat are required. Electricity is provided both by the grid through the Dutch production mix as well as through the combustion of natural gas in an on-site gas turbine.

The raw materials are transported from their suppliers and to the manufacturing site of Siniat, in Delfzijl the Netherlands, by road through the use of lorries and water by use of barges.

Internal transport of materials and (pre-)products is done with transport belts (electric) and forklifts.

The FGD gypsum is calcinated and under the influence of a high temperature chemical reaction the water is removed from the mixture. Additives are added in order to enhance the processing of the gypsum mixture during the manufacturing process.

Using a conveyor belt, the gypsum mixture is spread on, and covered by, a layer of recycled paper/cardboard, through a continuous process. Once the gypsum core has sufficiently set the boards are cut to standardized dimensions.

The finished gypsum boards are then stacked on pallets for further transportation.

Paper waste that is generated in the manufacturing process and which requires further treatment is also considered within this module.

LCA results

ENVIRONMENTAL IMPACTS PER [1 m ²]				
Parameter	Unit	Gypsum boards, GKB Scan 12,5 (A1-A3)	Gypsum boards, GKB Scan Heavy 12,5 (A1-A3)	Gypsum boards, GKF Scan 15,5 (A1-A3)
GWP	[kg CO ₂ -eq.]	2,40E+00	2,95E+00	3,61E+00
ODP	[kg CFC11-eq.]	1,57E-07	1,93E-07	2,36E-07
AP	[kg SO ₂ -eq.]	5,01E-03	6,15E-03	7,52E-03
EP	[kg PO ₄ ³⁻ -eq.]	1,23E-03	1,51E-03	1,85E-03
POCP	[kg ethene-eq.]	2,64E-04	3,24E-04	3,96E-04
ADPE	[kg Sb-eq.]	1,41E-06	1,74E-06	2,12E-06
ADPF	[MJ]	4,06E+01	4,99E+01	6,10E+01
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources			

RESOURCE USE PER [1 m ²]				
Parameter	Unit	Gypsum boards, GKB Scan 12,5 (A1-A3)	Gypsum boards, GKB Scan Heavy 12,5 (A1-A3)	Gypsum boards, GKF Scan 15,5 (A1-A3)
PERE	[MJ]	8,40E+00	1,03E+01	1,26E+01
PERM	[MJ]	-	-	-
PERT	[MJ]	8,40E+00	1,03E+01	1,26E+01
PENRE	[MJ]	4,37E+01	5,37E+01	6,57E+01
PENRM	[MJ]	-	-	-
PENRT	[MJ]	4,37E+01	5,37E+01	6,57E+01
SM	[kg]	7,62E+00	8,44E+00	1,03E+01
RSF	[MJ]	-	-	-
NRSF	[MJ]	-	-	-
FW	[m ³]	2,07E+00	2,54E+00	3,11E+00
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water			

WASTE CATEGORIES AND OUTPUT FLOWS PER [1 m ²]				
Parameter	Unit	Gypsum boards, GKB Scan 12,5 (A1-A3)	Gypsum boards, GKB Scan Heavy 12,5 (A1-A3)	Gypsum boards, GKF Scan 15,5 (A1-A3)
HWD	[kg]	8,43E-01	1,04E+00	1,27E+00
NHWD	[kg]	4,20E-01	5,17E-01	6,32E-01
RWD	[kg]	5,60E-03	6,88E-03	8,42E-03

CRU	[kg]	-	-	-
MFR	[kg]	-	-	-
MER	[kg]	-	-	-
EEE	[MJ]	-	-	-
EET	[MJ]	-	-	-
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy			

Additional information


Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

References

Publisher	 http://www.epddanmark.dk
Programme operator	Danish Technological Institute Sustainable Construction Kongsvang Allé 29 DK-8000 Aarhus C http://www.teknologisk.dk
LCA-practitioner	ing. Jeannette Levels ir. René Kraaijenbrink LBP SIGHT  Kelvinbaan 40 3439 MT Nieuwegein The Netherlands www.lbpsight.nl info@lbpsight.nl
LCA software /background data	SimaPro 8 / EcoInvent 2.2 (2010)
3rd party verifier	Susanne Vedel Jørgensen – COWI A/S

General programme instructions

Version 1.7

www.epddanmark.dk

Standards

EN 15804

DS/EN 15804 + A1:2013 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

ISO 14044

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"

DIN 18180

DIN 18180 "Gypsum plasterboards - Types and requirements"

EN 520

EN520:2004+A1:2009 "Gypsum plasterboards - Definitions, requirements and test methods"

EN 14190

EN14190:2014 "Gypsum board products from reprocessing - Definitions, requirements and test methods"

Data sources**MRPI-Certificate "Gypsum"**

MRPI code: 20.1.00029.005

Verified by IVAM UvA. The LCA on which the EPD is based, is executed by EcoReview. The data on the MRPI-certificate are based on the EN15804:2012, on the Dutch national guidelines from the SBK protocol (November 2011) and on the MRPI-review protocol. The verification meets the standard of the ECO platform verification. (http://www.vliegasunie.nl/downloads_nl/MRPI%20gips.pdf)

NMD, version 1.7

Dutch Environmental database (NMD), release 1.7, June 2015, as administrated by SBK.

EcoInvent 2.2

The ecoinvent Association. EcoInvent 2.2 database (published 2010).

EPA, AP-42

Emission factors by Environmental Protection Agency's and published in the AP-42 'Compilation of emission factors' (2008).

Calculation methods**CML-IA baseline**

Institute of Environmental Sciences (CML) impact assessment method. Version 4.2, released April 2013.

Dutch SBK Bepalingsmethode

Dutch Foundation for Building Quality (SBK) impact assessment method. Version 2.07, released September 2013.

VLCA, 2015

Excel file for calculating waste indicator: www.vlca.nl/wp-content/uploads/2015/10/SBK-Bepalingsmethode-indicator-afval-inclusief-milieuprofielen-2015.xlsm, released 2015.