ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	ETEX BUILDING PERFORMANCE INTERNATIONAL
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ETX-20180172-ICA1-EN
Issue date	26/04/2019
Valid to	25/04/2024

LaDura Plus BA13
LaDura Light BA13
LaDura Plus BA15
LaDura A1 BA13
LaDura A1 BA15
Solidtex BA13

ETEX BUILDING PERFORMANCE SpA

Institut Bauen und Umwelt e.V.

www.ibu-epd.com / https://epd-online.com

siniat

1. General Information

ETEX BUILDING PERFORMANCE SpA

Programme holder
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-ETX-20180172-ICA1-EN

This declaration is based on the product category rules:
Plasterboard, 07.2014
(PCR checked and approved by the SVR)

Issue date
26/04/2019

Valid to
25/04/2024

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Head of Board IBU)

SINIAT High Strength plasterboards

Owner of the declaration
ETEX BUILDING PERFORMANCE INTERNATIONAL
ZONE DU POLE TECHNOLOGIQUE AGROPARC
500 RUE MARCEL DEMONQUE
84140 AVIGNON
France

Declared product / declared unit
Ladura Plus BA13
1 m²

Scope:
The EPD applies for :
LaDura Plus BA13; LaDura Light BA13; LaDura Plus BA15; LaDura A1 BA13; LaDura A1 BA15; Solidtex BA13.
The EPD presents environmental impacts valid for LaDura Plus BA13. The environmental impacts for other covered products can be obtained by multiplying the presented results by the corresponding conversion factor presented in the table in 2.1 of this EPD.
This EPD was developed from data collected at the Siniat Italy's plasterboard factory located in Corfinio, producing 100 % of the total production of these products sold in the Italian market. The EPD is a cradle-to-gate with options EPD and covers Siniat plasterboards sold on the Italian market.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The standard /EN 15804/ serves as the core PCR
Independent verification of the declaration and data according to /ISO 14025:2010/
☐ internally ☒ externally

Christina Bocher
(Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

Siniat High Strength plasterboards covered by this EPD are used in interior construction as a dry system where high mechanical performances are required as well as other high technical characteristics (type DEFH1IR).

This EPD refers to 1 m² of Ladura Plus BA13 plasterboard. The following table presents the thickness and weight of the products covered by this EPD:

Product	Thickness (mm)	Weight (kg/m²)
LaDura Plus BA13	12.5	Approx 12.8
LaDura Light BA13	12.5	Approx. 12.2
LaDura Plus BA15	15	Approx. 15.3
LaDura A1 BA13	12.5	Approx. 12.8
LaDura A1 BA15	15	Approx. 15.3
Solidtex BA13	12.5	Approx. 15.3

For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration /EN 520:2009/ Gypsum plasterboards - Definitions, requirements and test methods, and the CE-marking.For the application and use the respective national provisions apply.

2.2 Application

Siniat High Strength plasterboards covered by this EPD are used in all construction types (residential, non-residential, new or refurbished), ranging from complex high-tech systems to easy to install products, assuring in any case high level of mechanical performances. They can be used for partitions and the lining of walls, ceilings.

They are suitable for any type of coating (wallpaper, paint, tiles).

2.3 Technical Data

Detailed technical information is available in the specific product data sheets at www.siniat.it.

The reference product LaDura Plus BA13 is compliant with type DEFH1IR of /EN520/ and is covered by /ETA 14/0221/.

According to ETA 14/0221

Essential characteristic	Declared performance
Bending strength for mechanical actions perpendicular to the gypsum plasterboard	$f_{m,90,k}$ = 3.1 MPa $f_{m,0,k}$ = 6.6 MPa $E_{m,90,mean}$ = 3 800 MPa $E_{m,0,mean}$ = 4 600 MPa
Bending strength for mechanical actions in plane of the gypsum plasterboard	$f_{m,90,k}$ = 2.9 MPa $f_{m,0,k}$ = 4.8 MPa $E_{m,90,mean}$ = 2 100 MPa $E_{m,0,mean}$ = 2 300 MPa
Shear strength for mechanical actions in plane of the gypsum plasterboard	$f_{v,90,k}$ = $f_{v,0,k}$ = 2.4 MPa $G_{v,90,mean}$ = $G_{v,0,mean}$ = 1 750 MPa
Compression strength for mechanical actions perpendicular to the gypsum plasterboard	$f_{c,k}$ = 7 MPa $E_{c,mean}$ = 400 MPa
Compression strength for mechanical actions in plane of the gypsum plasterboard	$f_{c,90,k}$ = $f_{c,0,k}$ = 7 MPa $E_{c,90,mean}$ = $E_{c,0,mean}$ = 3 900 MPa
Tensile strength for mechanical actions in plane of the gypsum plasterboard	$f_{t,90,k}$ = 0.9 MPa $f_{t,0,k}$ = 2.1 MPa $E_{t,90,mean}$ = 4 900 MPa $E_{t,0,mean}$ = 3 900 MPa
Structure and cohesion of the core at high temperatures	Pass
Dimensions	t: ± 0.5 mm b: +0/-4 mm l: +0/-5 mm squareness: ≤ 2.5 mm/m
Dimensional stability	per 1 % variation in rel. humidity: 0.003 to 0.006 mm/m
Density	ρ = 1 050 ± 50 kg/m³
Surface hardness	Pass
Reaction to fire	A2-s1, d0
Content and/or release of dangerous substances	No dangerous substances
Water vapour permeability – Water vapour transmission	μ_{dry} = 10 μ_{wet} = 4
Water absorption	Surface: ≤ 180 g/m² Total: ≤ 5 %
Hard body impact	$IR_{t\geq 12.5}$ = 23.2 mm/mm
Thermal conductivity	λ = 0,25 W/(m · K)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to /ETA 14/0221/ of 18/07/2014, "Gypsum Plasterboard for load-bearing applications".
Visit www.siniat.it for detailed technical documentation.

2.4 Delivery status

The products covered by this EPD are delivered in variable dimensions, specified by their respective data sheets available at www.siniat.it.

Usual dimensions are 1200 mm width and lengths > 2000 mm. The selling unit is a pallet composed of a defined number of boards as specified in the Catalog list.

2.5 Base materials / Ancillary materials

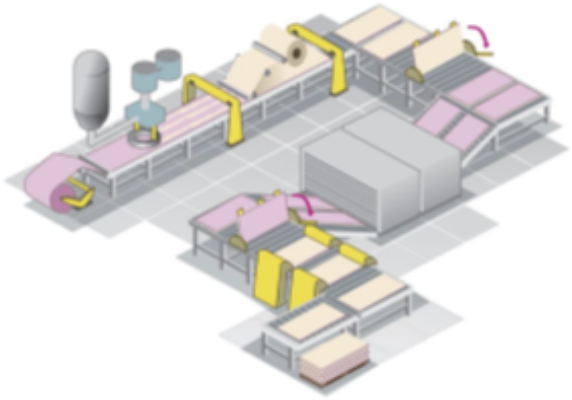
Plasterboards covered by this EPD are made from:
- gypsum natural and recycled gypsum: up to 94%
- cardboard: up to 3%
- additives (including starch, glass fibers and foaming agent, hydrophobic agent): less than 4%

Plasterboards covered by this EPD do not contain any substance listed in the candidate list /(https://echa.europa.eu/it/candidate-list-table - date: 27.06.2018)/ exceeding 0.1 percentage by mass.

Plasterboards covered by this EPD do not contain any other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass.

2.6 Manufacture

The manufacturing process is illustrated in the figure below.



A preliminary stage consists in calcining the gypsum (natural gypsum + recycled gypsum) in a kiln to obtain the stucco, which is a calcium sulphate hemi hydrate. Plasterboards are then manufactured in a continuous automated production process by pouring from a mixer a slurry of stucco, water and additives, in-between two layers of a liner, composed of paper, 100% recycled. The continuous laminated board is calibrated into a forming plate and transported on a conveyor belt to the knife, while the setting of the slurry occurs and the mechanical bond forms at the gypsum-paper interface. After cutting, the boards are introduced in a multilayer drier to remove the excess of water and increase strength. At the drier out-feed the boards are trimmed to the nominal length, piled up on stacking units.
The quality characteristics of the boards are controlled before storing pallets in the warehouse.
The management system operated by the site is in compliance with the /UNI EN ISO 9001:2015/.

2.7 Environment and health during manufacturing

Relating to health protection during the manufacturing process, the plant follows and respects the specific Italian Regulation. The manufacturing process is certified according to Occupational Health and Safety Assessment Series /(OHSAS) 18001:2007/.
Plasterboards are manufactured in a plant permitted by emission law and by external waste recovery in accordance with the Italian regulation. The management system operated by the site is in compliance with the standard /UNI EN ISO 14001:2015/.
Production waste is internally recycled.

Gypsum waste from the flue-gas desulphurization plants of coal-fired power stations is used in additional to natural gypsum as well as plasterboard waste coming from external job-site.

2.8 Product processing/Installation

Store in closed rooms, in dry conditions, on firm level ground.
Minimize and control dust when cutting, sawing or sanding plasterboards in confined spaces. During these operations, the occupational exposure limit value for gypsum products of 10mg/m3 (ref. association advancing occupational and environmental health (ACGIH) - calcium sulphate -Total inhalable threshold limit value (TLV)-time-waited-average (TWA)) must be observed.
The glass fibers used in some plasterboards are so-called continuous filament glass fibers which are manufactured with a defined diameter. Fibres with a diameter of more than 3 micrometers are not respirable according to world health organisation (WHO). Only such fibres are used in the manufacturing plasterboard process; they do not splice even when subjected to further processing with the result that no "fibre dust" arises.
When manually handling plasterboards, use correct manual handling techniques according to size, thickness and density.

2.9 Packaging

Siniat plasterboards are prepared on pallets using wooden bearers, without extra packaging.
Special packaging available on request according to the services offered in the Catalog list.

2.10 Condition of use

Siniat plasterboards are suitable for any type of coating (wallpaper, paint, tiles). No maintenance or repair is required over their service life. The material composition of the product does not change during its use phase.

2.11 Environment and health during use

Plasterboards covered by this EPD are tested by CATAS Laboratory according to /UNI EN 16000-9/ to assess volatile organic compound (VOC) emissions. The test results indicate that during the use phase, no hazardous substances are emitted, reporting values far below the limit values of DM 11/10/2017.

2.12 Reference service life

In accordance with the /BBSR “Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach dem Bewertungssystem Nachhaltiges Bauen (BNB)” (Useful lives of components for LCAs in accordance with the Sustainable Building assessment system) table/, last revised 03.11.2011, a service life of 50 years can be considered for gypsum plasterboards. This service life is not a Reference Service Life according to ISO 15686

There are no influences on ageing when the recognised rules of technology are applied.

2.13 Extraordinary effects

Fire

Name	Value
Building material class	A2
Burning droplets	d0
Smoke gas development	s1

Water

Plasterboards covered by this EPD must be protected from permanent humidity.

Mechanical destruction

Mechanical damage can be repaired using jointing compound, due to the easy repair associated with the plasterboards and without any adverse effects on function. Plasterboards can be easily replaced with new boards in the event of more extensive damage. Besides the need for repair, the destruction will not have any significant environmental impact.

2.14 Re-use phase

Re-use

Once plasterboards are installed, they cannot be re-used for the same application without undergoing some change. For easier recycling or disposals, prior to collection, plasterboards should be separated from other used building materials and pruned of foreign matter, e.g. metals from the structure.

Further use

Plasterboards which are as good as new (e.g. cuttings) can be used after crushing and possibly separating the cardboard and coatings in agreement with the customer as recultivation material in mining areas, for recovery on landfills, as soil conditioner, fertiliser components or acceleration agents for cement. However, this procedure requires agreement with the purchaser and consideration of national regulations.

Recycling

After treatment in special recycling plants for gypsum waste (as the one installed in Siniat site) that remove remaining metallic component by a magnetic separator and peel the adherent board liner from the gypsum core, the recycled gypsum can be added to the manufacturing process for new boards.
Alternatively, the recycled gypsum can be used in the areas outlined for further use.

2.15 Disposal

Disposal in accordance with the waste code: 17 08 02 Gypsum-based construction materials other than those mentioned in 17 08 01.
National disposal guidelines have to be observed.
Gypsum-based construction materials adhere to the disposal conditions from landfill.

2.16 Further information

www.siniat.it

3. LCA: Calculation rules

3.1 Declared Unit

The LCA results presented in this EPD are related to 1 m² of LaDura Plus BA13 installed in the building, which is 12.5 mm thick and weights 12.8 kg approximately.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Conversion factor to 1 kg	0.08	-

The LCA results for other covered products can be obtained by multiplying the presented results by the corresponding conversion factor as included in the following table:

Product	Conversion factor
LaDura Plus BA13	1,00
LaDura Light BA13	1,21
LaDura Plus BA15	1,00
LaDura A1 BA13	1,20
LaDura A1 BA15	0,95
Solidtex BA13	1,00

3.2 System boundary

This EPD is a cradle-to-gate with options EPD, covering the following life cycle stages:

- plasterboards manufacturing (modules A1-A3), including the production of components, their transport to the manufacturing site, as well as impacts due to energy consumption, air and water emissions, as well as waste treatment and packaging material production,
- transport of the plasterboards from manufacturing to building site (module A4),
- installation (module A5), including the production of auxiliaries (screw, joint tape and coating). Due to the many possible applications of plasterboards, frames or suspended-ceiling systems are excluded from the system boundary,
- emissions during the use phase (modules B1). No emissions occur during Siniat plasterboards use phase,
- end-of-life (modules C1-C4), including impacts from manual deconstruction, transport of waste to treatment facility, and waste processing and waste disposal. Two scenarios were considered : For scenario 1 (100% landfill), the system boundaries include transport to the treatment facility (C2), sorting of screws (C3) and landfill (C4). For scenario 2 (100% recovery), the system boundaries include transport to the treatment facility (C2), sorting of gypsum, cardboard and other waste (C3), and landfill of other auxiliaries (joint tape, sealant).
- benefits and loads beyond the system boundaries (D). This module is included only for end-of-life scenario 2.

3.3 Estimates and assumptions

Assumptions regarding transport distances were made by the manufacturer and are viewed as representative of the average distances for Siniat plasterboards sold on the Italian market.

3.4 Cut-off criteria

A cut-off criteria of 1% in mass was applied for this LCA. The main additives, representing less than 1% of the total product mass were included despite this cut-off criteria, so that all neglected processes contribute to less than 5 % of the total mass or less than 5 % of the total energy consumption.

3.5 Background data

The life cycle model supporting this EPD was developed in /SimaPro 8.5/, using background data from /ecoinvent 3.4/, with the cutoff system model. When background data representative of the Italian market was not available in the ecoinvent database, European average data("Europe without Switzerland" or "RER") or Swiss data ("CH") was used instead.

3.6 Data quality

Background data is from the ecoinvent 3.4 database. Some of these background datasets have been collected more than 10 years ago but are still representative of current technology. Primary data provided by Siniat is representative of the annual production for the year 2017.

3.7 Period under review

The data used for this study complies with the current level of knowledge at the time of modelling the LCA in 2018.

3.8 Allocation

Allocations were used in the background data for modelling some upstream products (e.g. provision of electricity). Allocations were avoided in the modelling.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

Comparison of the environmental performance of construction products using the EPD information shall be based on the product's use in and its impacts on the building, and shall consider the complete life cycle (all information modules)

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4. LCA: Scenarios and additional technical information

Transport to the building site (A4)

Name	Value	Unit
Transport distance	400	km
Capacity utilisation (including empty runs)	80	%
Gross density of products transported	≥700	kg/m^3

Installation into the building (A5)

Name	Value	Unit
Auxiliary	0.39	kg
Water consumption	0.00018	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	0.43	kg
Output substances following waste treatment on site	0.66	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	50	a
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	/UNI11424 / compliant	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	/UNI11424 / compliant	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	/UNI11424 / compliant	-

End of life (C1-C4)

Two different end-of-life scenarios are declared. The results are indicated separately in module C.
Each scenario is calculated as a 100% scenario.
Scenario 1: 100 % landfill disposal
Scenario 2: 100 % recycled

A transport distance of 250 km between the deconstruction site and the treatment facility has been considered for both scenarios.

According to a study from 2016 by the Italian association "Fondazione per lo Sviluppo sostenibile", 20% of gypsum-based products are recycled in Italy. The average end-of-life impacts in Italy can be calculated by using the following formula :
= 80 % impact (scenario 1)
+ 20 % impact (scenario 2)

Name	Value	Unit
Scenario 1: Collected as mixed construction waste	13.1	kg
Scenario 1: Landfilling	13.1	kg
Scenario 2: Collected separately	13.1	kg
Scenario 2: Recycling	12.7	kg
Scenario 2: Landfilling	0.38	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D takes into account loads and benefits beyond the system boundaries, related to the use and production of recycled material. This net production is calculated by adding all the material and energy flows leaving the system, and by subtracting all the secondary material flows entering the system. Gypsum and cardboard are concerned.

Name	Value	Unit
Scenario 1: Net production of secondary gypsum	-4.70	kg
Scenario 1: Net production of secondary cardboard	-0.32	kg
Scenario 2: Net production of secondary gypsum	6.41	kg
Scenario 2: Net production of secondary cardboard	0.03	kg

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	X	X	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² LaDura Plus BA13

Parameter	Unit	A1-A3	A4	A5	B1	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/2
GWP	[kg CO_2-Eq.]	3.00E+0	3.91E-1	2.57E-1	0.00E+0	0.00E+0	2.14E-1	2.14E-1	4.76E-5	4.84E-2	6.93E-2	2.00E-3	-5.65E-2
ODP	[kg CFC11-Eq.]	3.81E-7	6.86E-8	2.92E-8	0.00E+0	0.00E+0	3.79E-8	3.79E-8	1.94E-11	1.97E-8	2.31E-8	6.66E-10	-9.63E-9
AP	[kg SO_2-Eq.]	6.22E-3	1.61E-3	7.74E-4	0.00E+0	0.00E+0	8.81E-4	8.81E-4	3.49E-7	3.55E-4	5.16E-4	1.49E-5	-3.85E-4
EP	[kg $(PO_4)^{3-}$-Eq.]	1.54E-3	4.18E-4	1.50E-4	0.00E+0	0.00E+0	2.27E-4	2.27E-4	7.34E-8	7.46E-5	8.90E-5	2.57E-6	-8.24E-5
POCP	[kg ethene-Eq.]	9.55E-4	2.12E-4	9.62E-5	0.00E+0	0.00E+0	1.16E-4	1.16E-4	3.70E-8	3.77E-5	6.43E-5	1.85E-6	-3.35E-5
ADPE	[kg Sb-Eq.]	2.71E-5	4.72E-6	1.80E-6	0.00E+0	0.00E+0	2.49E-6	2.49E-6	8.99E-11	9.15E-8	8.75E-8	2.52E-9	-2.45E-7
ADPF	[MJ]	5.14E+1	6.05E+0	4.06E+0	0.00E+0	0.00E+0	3.32E+0	3.32E+0	6.87E-4	6.99E-1	1.98E+0	5.71E-2	-8.07E-1

Caption	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 ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 m² LaDura Plus BA13

Parameter	Unit	A1-A3	A4	A5	B1	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/2
PERE	[MJ]	3.86E+0	1.41E-1	7.01E-1	0.00E+0	0.00E+0	7.60E-2	7.60E-2	9.70E-5	9.86E-2	5.10E-2	1.47E-3	1.27E+0
PERM	[MJ]	6.39	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	[MJ]	1.02E+1	1.41E-1	1.02E+0	0.00E+0	0.00E+0	7.60E-2	7.60E-2	9.70E-5	9.86E-2	5.10E-2	1.47E-3	1.27E+0
PENRE	[MJ]	5.36E+1	6.26E+0	4.34E+0	0.00E+0	0.00E+0	3.44E+0	3.44E+0	2.25E-3	2.28E+0	2.01E+0	5.79E-2	-7.05E-1
PENRM	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	[MJ]	5.36E+1	6.26E+0	4.34E+0	0.00E+0	0.00E+0	3.44E+0	3.44E+0	2.25E-3	2.28E+0	2.01E+0	5.79E-2	-7.05E-1
SM	[kg]	4.88	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.36
RSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	[m^3]	1.31E-2	1.52E-3	2.10E-3	0.00E+0	0.00E+0	8.28E-4	8.28E-4	5.27E-7	5.36E-4	2.21E-3	6.36E-5	2.08E-4

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

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² LaDura Plus BA13

Parameter	Unit	A1-A3	A4	A5	B1	C1	C2/1	C2/2	C3/1	C3/2	C4/1	C4/2	D/2
HWD	[kg]	4.12E-2	7.08E-3	3.75E-3	0.00E+0	0.00E+0	3.77E-3	3.77E-3	5.63E-7	5.73E-4	1.01E-3	2.92E-5	-1.32E-4
NHWD	[kg]	4.41E-1	4.12E-1	7.22E-1	0.00E+0	0.00E+0	2.27E-1	2.27E-1	7.62E-6	7.75E-3	1.31E+1	3.77E-1	3.24E-3
RWD	[kg]	8.44E-5	3.89E-5	1.05E-5	0.00E+0	0.00E+0	2.15E-5	2.15E-5	2.63E-8	2.67E-5	1.30E-5	3.75E-7	-3.52E-6
CRU	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	[kg]	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.01	11.44	0.00	0.00	0.00
MER	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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; EEE = Exported thermal energy

6. LCA: Interpretation

Product stage (modules A1-A3) is responsible for the biggest share of the impact for most indicators. About 80% of the impacts of Siniat plasterboards on the Global Warming Potential is due to its production. Energy consumption for gypsum calcination is the main contributor to this indicator. For most other indicators, modules A1-A3 are responsible for 60% to 95% of the sum of the impacts of all modules. Using secondary gypsum for manufacturing Siniat plasterboards reduces the need to produce natural gypsum, and therefore reduce the associated environmental impacts.

Most of the “non-hazardous waste” and “materials for recycling” are produced at the end-of-life of Siniat plasterboards. Therefore, module C is the most contributing module to both of these indicators.

7. Requisite evidence

7.1 Leaching (sulphate + heavy metals)

Plasterboards covered by this EPD show a leaching behaviour typical for gypsum based building products. Proper disposal in accordance with the parameters which can depend on use, sorting depth during deconstruction, collection (separately or together with other construction waste) and treatment, and must be determined by the waste producer's responsibility.

7.2 Radioactivity

Gypsum is a material whose natural radioactivity is the lowest between the mineral construction materials. Therefore the radioactivity of plasterboards is negligible compared to the environmental radioactivity.

7.3 VOC emissions

Plasterboards covered by this EPD are tested by CATAS Laboratory according to /UNI EN 16000-9/:

		CONCENTRATION µg/m³	
VOC	CAS NR	72hrs	28days
Formaldeide*	50-00-0	n.d.	<2
Acetaldeide*	75-07-0	n.d.	5
Toluene	108-88-3	<2	<2
Tetracloroetilene	127-18-4	<2	<2
Xilieni isomeri	1330-20-7	4	<2
1,2,4 Trimetilbenzene	95-63-6	<2	<2
1,4 Dichlorobenzene	106-46-7	<2	<2
Etilbenzene	100-41-4	<2	<2
2 Butossietanolo	111-76-2	139	25
Stirene	100-42-5	<2	<2
Metilisobutilchetone	108-10-1	3	<2
i Butile acetato	110-19-0	3	<2
n Butile acetato	123-86-4	27	5
Metossipropanolo acetato	108-65-6	9	<2
1 Metossi 2 propanolo	107-98-2	8	<2
n Pentanolo	71-41-0	3	<2
Benzene	71-43-2	<1	<1
Trielina	79-01-6	<1	<1
Esanale §	66-25-1	13	<2
Di (butil) ftalato	84-74-2	<1	<1
Di (2-etilesil) ftalato	117-81-7	<1	<1
Nonanale §	124-19-6	14	5
Acido acetico	64-19-7	94	23
TVOC		317	58

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