

# ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION



## EPD

*In accordance with NF EN 15804+A1 and its French National supplement NF EN 15804/CN*



### PLADUR® JN

► Issue date: August 2020

Version: 1.0



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## Warning

The information in this declaration has been furnished under the responsibility of PLADUR® GYPSUM, S.A.U., (EPD issuer), according to NF EN 15804+A1 and the French national supplement NF EN 15804/CN.

Any use, in part or in whole, of the information displayed in this document shall at the very least be accompanied by the full reference to the original FDES and to the issuer thereof who shall be able to provide a full copy.

## Reading guide

Details for enhanced reading the declaration or the data contained in the declaration.

The display inventory data meets the requirements of the NF EN 15804 + A1. In the following tables -9.0E-03 should be read as  $-9.0 \times 10^{-3}$  (scientific writing).

The units used are specified to each stream, and they are:

- Kilogram "kg"
- Litter "l"
- Kilowatt hour "kWh"
- Mega joules "MJ"
- Square metre "m<sup>2</sup>"
- Cubic metre "m<sup>3</sup>"
- Carbon dioxide equivalent "CO<sub>2</sub> eq"
- Functional Unit "FU"
- Chlorofluorocarbon "CFC"
- Sulphur dioxide "SO<sub>2</sub>"
- Phosphate "PO<sub>4</sub><sup>3-</sup>"
- Antimony "Sb"

Abbreviations:

- EPD: Environmental Product Declaration
- PCR: Product Category Rules
- FDES: Environmental and Health Declaration Form
- LCA: Life Cycle Assessment
- UF: Functional Unit
- MNA: Module not evaluated

## Precaution for use of EPD for product comparison

Construction product EPDs cannot be comparable if they do not comply with standard NF EN 15804+A1.

Standard NF EN 15804+A1 *defines in paragraph 5.3 Comparability of EPD for construction products*, the conditions whereby construction products may be compared, based on the information provided by the FDES:

*"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)."*

NOTE 1: The literal French translation of EPD (Environmental Product Declaration) is DEP (Déclaration Environnementale de Produit). However, in France, the term FDES (Environmental and Health Declaration Form) is commonly used and contains both the Environmental Declaration and Health information for the product covered by the FDES. The FDES is thus an "EPD" supplemented with health information.

## 1. General Information

**Manufacturer:** PLADUR® GYPSUM, S.A.U.  
Ctra. Andalucía Km. 30.200  
28343 VALDEMORO (Madrid) – Spain  
www.pladur.es  
Contact: David Sáenz de Villaverde  
Mail: david.saenz@pladur.com

**Production site:** Valdemoro – SPAIN

**Type of EPD:** Cradle to grave, Individual EPD

**Type of verification:** An independent verification has been performed according to EN ISO 14025: 2.010. This external verification has been carried out by a third part

**Name of the verifier:** Nicolas Béalu from EVEA

**Date of issue of the verification certificate:** 31/08/2020

**Publication date:** August 2020

**Valid to:** August 2025

**Programme name:** Programme INIES <http://www.inies.fr/>



**Programme operator:** Association HQE. Avenue du Recteur Poincaré numéro 4 - 75016 Paris.

**Product name:** This EPD covers PLADUR® JN powder compounds.

These powders are air-drying joint compounds used for hand or mechanical jointing of PLADUR® plasterboards used in combination with PLADUR® joint paper.

**Product Category Rules:** CEN standard EN 15804+A1 and the French national supplement NF EN 15804/CN provide the Product category definition rules (PCR).

**Scope:** This LCA is based on production data of the period November 2018 - October 2019 corresponding to the manufacturing site located in Spain and distributed in France.

**FDES destination:** B2B

The LCA calculations, LCA report and the FDES document has been carried out by Anthesis Lavola.

## 2. Description of the functional unit and the product

### Description of the functional unit

Considering the features of this product, the functional unit can be described as:

To treat completely all joints referred to 1 m<sup>2</sup> of plasterboard by means of an air-drying powder compound. The functional unit refers to a superficial density of 0.30 kg/m<sup>2</sup>, considering a life reference time of 50 years.

The performance for a Q2 quality level has been chosen as superficial density for the reference flow.

### Description of the product and use of the product

Air-Drying powder product based on inorganic fillers with special additives that allow mixing the product with water to obtain a compound for application on PLADUR® plasterboard systems. The resulting compound hardens through a chemical reaction and by air drying.

PLADUR® JN compounds are indicated for the complete treatment (jointing and finishing) of plasterboard joints and coating screw heads in PLADUR® plasterboard systems, obtaining a flat surface, ready to perform decoration works. These types of products are indicated for indoor use only.

### Other technical characteristics not included in the functional unit

The compounds are manufactured according to the specification EN-13963.

Parameter	Value		
Classification under EN-13963	3A		
Reaction to fire	A2-s1, d0		
Performance for the required quality level	Q1	Q2	Q3
	0.25 kg/m <sup>2</sup>	0.30 kg/m <sup>2</sup>	0.33 kg/m <sup>2</sup>

Jointing in accordance with Quality Level 1 (Q1) includes the filling of the joints between the plasterboards and the covering of the visible parts of the fixing.

Jointing and finishing according to Quality level 2 (Q2) fulfils the basic requirements for wall and ceiling surfaces, and includes:

- Basic filling (Q1)
- Finishing in order to achieve a continuous transition to the board surface, including sanding the jointed areas if necessary.

Jointing and finishing according to Quality level 3 (Q3) includes:

- Jointing and finishing to Q2, plus
- Wider finishing of the joint and a tight coat of joint compounds to the entire plasterboard surface, filling the pores.

### Description of the main components and/or materials of the product

The compounds are composed of calcium carbonate and additives in minor quantities.

The compounds are packaged with bags that are transported in wood pallets wrapped with plastic film and a PE top.

Packaging description considered per Functional Unit:

Packaging description	Value (kg/FU)
Bag	3.80E-03
Plastic film	5.73E-05
Polyethylene top	3.42E-05
Pallet	4.95E-03

During the life cycle of the product, no substances listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” as hazardous substances have been used.

### Description of the reference service life

The reference service life of the compounds has been estimated to be at least 50 years according to Standard ISO 15686, when the indicated conditions for packaging, transport, storage, installation, use, maintenance, and repair are met.

Moreover, as compounds will be used on buildings, it coincides with the Building Reference Service Life, estimated as 50 years.

Parameter	Value
Reference service life	50 years
Declared product properties (at the gate) and finishes, etc.	The declared product has the properties determined by the specification EN-13963 and it is CE certified.
Design application parameters (if instructed by the manufacturer), including references to any appropriate practices	The product shall be applied in accordance with the manufacturer's instructions.
Assumed quality of work, when installed in accordance with the manufacturer's instructions	The quality of the work is presumed to comply with the EN-13963.
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV, and wind exposure, building orientation, shading, temperature	Not applicable
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	The product is subject to sanitary labelling on indoor air quality.
In-use conditions, e.g. frequency of use, mechanical exposure	The product shall be used under conditions that comply with the manufacturer's instructions and the standards mentioned above.
Maintenance e.g. required frequency, type and quality and replacement of components	No maintenance is necessary when using the product.

### 3. Life cycle stages

#### Life cycle diagram



#### Product stage, A1-A3

##### Description of the stage

The product stage includes raw materials extraction, transport from the quarry or the additive manufacturer to the processing plant and manufacturing process.

##### **A1 Raw materials supply**

This module considers the supply and treatment of all raw materials and energy that occur upstream of the manufacturing process. It covers the supply of calcium carbonate and additives.

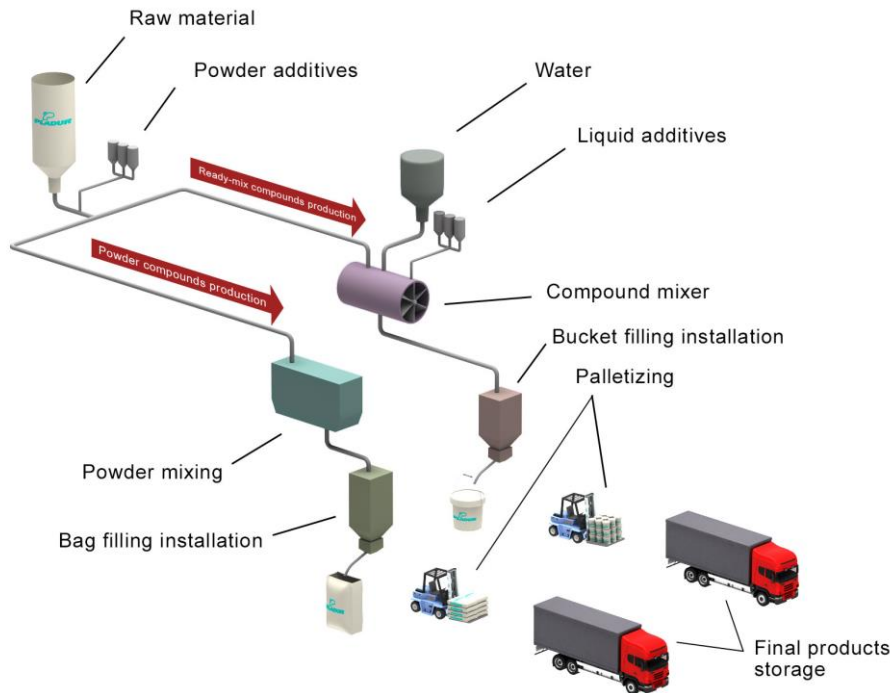
##### **A2 Transportation**

Raw materials are transported from the quarry and suppliers to the manufacturing site. The model comprises transport by road for each raw material.

##### **A3 Manufacturing**

This module includes electricity consumption in the manufacturing process, as well as management of waste resulting from the process and packaging production.

## Manufacturing process diagram



Raw materials are received in the manufacturing plant, where they are weighted and mixed according to the formulation. Once raw materials are mixed, the product is packaged in bags for its storage in pallets until the product is distributed.

## Construction stage, A4-A5

### Description of the stage

The construction stage is divided into two modules: A4, transportation to the construction site and A5, installation in the building.

#### **A4 Transport to the construction site**

This module includes transportation from the manufacturing factory to the construction site. The product distribution is mainly done to Spain, France, and Portugal, but as FDES's geographical scope is France, a 100% French market scenario is considered.

Transportation is calculated on a scenario including the following parameters:

Parameter	Value
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat etc.	Lorry of 16-32 tones capacity EURO VI
Distance to the construction site	PLADUR® JN compounds are manufactured in Spain (manufacturing site located in Valdemoro, Madrid). The product is mainly distributed in Spain, France and Portugal, but considering the French market, the reference distance is 700 km.
Capacity utilization (including empty returns)	38% of the volume capacity 100% empty returns
Bulk density of transported product	900 kg/m <sup>3</sup>



### A5 Installation in the building

This module includes materials that are necessary for the installation of the product in the building.

Parameter	Value
Installation instructions	<p>Joint compound must be mixed with clean water in the recommended amount in a clean container and be stirred with a mechanical beater. It is recommended to leave the obtained dough stand between 5 and 10 minutes before application.</p> <p>Apply a thin layer of joint compound over the gypsum board and stick the paper joint tape. Flatten with a spatula and remove excess of joint compound avoiding leaving lumps, bumps, and air bubbles under the tape. Let it dry completely. Joint compound must also be applied to the screw heads.</p> <p>Successive joint compound coats must be applied according to the required finishing (one, two or three hands) and it is necessary to respect the drying time between coats.</p>
Ancillary materials for installation (specified by material)	There is no need of ancillary materials
Water use	0.14 liters/m <sup>2</sup>
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	Electricity: 0.0004 kWh/m <sup>2</sup>
Waste produced on the building site before waste processing, generated by the product's installation (specified by type)	2% of the compound: 0.006 kg/m <sup>2</sup> of compound Packaging wastes per m <sup>2</sup> : 5.73E-05 kg of plastic film 3.42E-05 kg of Polyethylene top 3.80E-03 kg of Bag 4.95E-03 kg of Pallet
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	Wasted compound: Landfill Packaging waste: Landfill Pallet waste: recycled
Direct emissions to ambient air, soil, and water	No direct emissions are emitted to air, soil, or water

### Life stage in use (excluding potential savings), B1-B7

#### Description of the stage

The use phase is divided into seven modules:

- B1: Use or application of the installed product
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6/B7: Use of energy and water

No technical operations are required during the use phase. Thus, compounds have no environmental impacts during this stage.

JN powder compounds are classified as A+ according to the French VOC label.

## End-of-life stage, C1 - C4

### Description of the stage

This step includes the following different modules: C1, deconstruction or demolition; C2, transport to the waste treatment plant; C3, waste treatment for reuse, recovery and/or recycling; C4 waste disposal.

Parameter	Value
Demolition	It is assumed that energy consumption and particle emissions to air due to the compounds and plaster compounds demolition are negligible
Collection process specified by type	0.30 kg/m <sup>2</sup> collected with mixed construction waste:
Recovery system specified by type	0% for reuse, recycling, or energy recovery
Disposal specified by type	0.30 kg to landfill (100%)
Assumptions for scenario development, e.g. transportation	Waste is transported 50 km by lorry 16-32 tones EURO VI.

### Recycling/reuse/recovery potential,D

Module D, of benefits and loads beyond the system boundaries, has not been evaluated.

## 4. Information for the life cycle analysis calculation

PCR used	CEN standard EN 15804+A1 and the French national supplement NF EN 15804/CN provide the Product category definition rules (PCR)
System boundaries	From cradle to grave Stages: A1-3, A4-5, B1-7, C1-4 Module D not evaluated
Allocations	Allocation criteria are based on mass
Geographic representativity and time-related representativity of primary data	The representativity is: <ul style="list-style-type: none"> <li>- Geographic: manufactured in Spain for the French market</li> <li>- Temporal: manufactured during the period November 2018 - October 2019</li> </ul> Primary data obtained from the company (2018 and 2019) and generic data from Ecoinvent 3.5 (cut-off) Software used: Simapro (v9.0)

## 5. Results of the life cycle analysis

In tables below, results for the functional unit are summarized.

ENVIRONMENTAL IMPACTS																			
Environmental impacts	Production Stage	Construction Stage			Use Stage								End-of-life stage				Total Life Cycle	D Benefits and loads beyond the system boundary	
	Total A1 - A3 production	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Use of energy	B7 Use of water	Total B1-B7	C1 Deconstruction / Demolition	C2 Transport	C3 Waste processing	C4 Landfill disposal			Total C1-C4
Global Warming kg CO <sub>2</sub> eq/FU	5.66E-02	3.48E-02	4.03E-03	3.88E-02	0	0	0	0	0	0	0	0	0	2.42E-03	0	3.13E-03	5.55E-03	1.01E-01	MNA
Ozone Depletion kg CFC 11 eq/FU	8.98E-09	6.44E-09	4.04E-10	6.84E-09	0	0	0	0	0	0	0	0	0	4.47E-10	0	8.59E-10	1.31E-09	1.71E-08	MNA
Acidification of soil and water kg SO <sub>2</sub> eq/FU	2.23E-04	8.32E-05	7.85E-06	9.11E-05	0	0	0	0	0	0	0	0	0	5.78E-06	0	2.14E-05	2.71E-05	3.41E-04	MNA
Eutrophication kg (PO <sub>4</sub> ) <sup>3-</sup> eq/FU	6.97E-05	1.12E-05	4.09E-06	1.53E-05	0	0	0	0	0	0	0	0	0	7.75E-07	0	3.67E-06	4.45E-06	8.94E-05	MNA
Photochemical ozone creation Ethene eq/FU	2.28E-05	5.30E-06	1.16E-06	6.46E-06	0	0	0	0	0	0	0	0	0	3.68E-07	0	1.00E-06	1.37E-06	3.06E-05	MNA
Depletion of abiotic resources (elements) kg Sb eq/FU	1.80E-07	1.07E-07	6.62E-09	1.13E-07	0	0	0	0	0	0	0	0	0	7.40E-09	0	4.15E-09	1.15E-08	3.04E-07	MNA
Depletion of abiotic resources (fossil) MJ/FU	1.11E+00	5.32E-01	3.83E-02	5.70E-01	0	0	0	0	0	0	0	0	0	3.69E-02	0	8.00E-02	1.17E-01	1.79E+00	MNA
Water pollution - m <sup>3</sup> /FU	2.69E-02	1.18E-02	1.21E-03	1.30E-02	0	0	0	0	0	0	0	0	0	8.16E-04	0	1.58E-03	2.39E-03	4.23E-02	MNA
Air Pollution - m <sup>3</sup> /FU	8.37E+00	3.46E+00	2.90E-01	3.75E+00	0	0	0	0	0	0	0	0	0	2.40E-01	0	4.54E-01	6.94E-01	1.28E+01	MNA

RESOURCE USE																			
Resource Use	Production Stage	Construction Stage			Use Stage								End-of-life stage				Total Life Cycle	D Benefits and loads beyond the system boundary	
	A1 - A3 production	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Use of energy	B7 Use of water	Total B1-B7	C1 Deconstruction / Demolition	C2 Transport	C3 Waste processing	C4 Landfill disposal			Total C1-C4
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - MJ/FU	1.87E-01	5.72E-03	4.42E-03	1.01E-02	0	0	0	0	0	0	0	0	0	3.97E-04	0	1.25E-03	1.65E-03	1.99E-01	MNA
Use of renewable primary energy resources used as raw materials- MJ/FU	4.84E-02	0.00E+00	9.68E-04	9.68E-04	0	0	0	0	0	0	0	0	0	0.00E+00	0	0.00E+00	0.00E+00	4.94E-02	MNA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)- MJ/FU	2.36E-01	5.72E-03	5.39E-03	1.11E-02	0	0	0	0	0	0	0	0	0	3.97E-04	0	1.25E-03	1.65E-03	2.48E-01	MNA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials- MJ/FU	1.19E+00	5.71E-01	4.64E-02	6.17E-01	0	0	0	0	0	0	0	0	0	3.96E-02	0	8.58E-02	1.25E-01	1.93E+00	MNA
Use of non-renewable primary energy resources used as raw materials- MJ/FU	4.22E-02	0.00E+00	8.44E-04	8.44E-04	0	0	0	0	0	0	0	0	0	0.00E+00	0	0.00E+00	0.00E+00	4.30E-02	MNA
Total use of non-renew primary energy resources (primary energy and primary energy resources used as raw materials)- MJ/FU	1.23E+00	5.71E-01	4.73E-02	6.18E-01	0	0	0	0	0	0	0	0	0	3.96E-02	0	8.58E-02	1.25E-01	1.98E+00	MNA
Use of secondary material- kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	MNA
Use of renewable secondary fuels - MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	MNA
Use of non-renewable secondary fuels - MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	MNA
Net use of fresh water - m3/FU	7.46E-04	8.77E-05	1.33E-04	2.21E-04	0	0	0	0	0	0	0	0	0	6.09E-06	0	8.12E-05	8.73E-05	1.05E-03	MNA

WASTE CATEGORY																			
Waste Category	Production Stage	Construction Stage			Use Stage								End-of-life stage				Total Life Cycle	D Benefits and loads beyond the system boundary	
	A1 - A3 production	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Use of energy	B7 Use of water	Total B1-B7	C1 Deconstruction / Demolition	C2 Transport	C3 Waste processing	C4 Landfill disposal			Total C1-C4
Hazardous waste disposed -kg/FU	1.21E-03	3.37E-04	5.32E-05	3.90E-04	0	0	0	0	0	0	0	0	0	2.34E-05	0	8.29E-05	1.06E-04	1.70E-03	MNA
Non-hazardous waste disposed -kg/FU	3.18E-02	2.84E-02	1.19E-02	4.03E-02	0	0	0	0	0	0	0	0	0	1.97E-03	0	3.01E-01	3.03E-01	3.75E-01	MNA
Radioactive waste disposed - kg/FU	5.20E-06	3.63E-06	2.84E-07	3.92E-06	0	0	0	0	0	0	0	0	0	2.52E-07	0	4.90E-07	7.42E-07	9.86E-06	MNA

OUTPUT FLOWS																				
Output Flows	Production Stage	Construction Stage			Use Stage								End-of-life stage					Total Life Cycle	D Benefits and loads beyond the system boundary	
	A1 - A3 production	A4 Transport	A5 Installation	Total A4-A5	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Use of energy	B7 Use of water	Total B1-B7	C1 Deconstruction / Demolition	C2 Transport	C3 Waste processing	C4 Landfill disposal	Total C1-C4			
Components for re-use kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MNA
Materials for recycling kg/FU	1.78E-02	0.00E+00	3.56E-04	3.56E-04	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-02	MNA
Materials for energy recovery kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MNA
Exported Energy - Electricity - MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MNA
Exported Energy - Steam- MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MNA
Exported Energy - Process gases - MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MNA

## 6. Additional information on release of dangerous substances to indoor air, soil and water during the use stage

### Indoor air

#### VOCs and Formaldehyde

According to the French rule on sanitary labeling on indoor air quality (“qualité de l’air intérieur”), started in the “Décret n° 2011-321 du 23 mars 2011 (NOR: DEVL1101903D) et l’arrêté du 19 avril 2011 (NOR: devl1104875a)”, on the labeling of emissions of volatile organic compounds of construction products, wall or floor covering and paints and varnishes, PLADUR® JN compounds have been rated as class A+ product by an independent labeled laboratory: EUROFINS.

The limit values of the emissions' classes refer to the total of the VOC emissions and also to the evaluation of 10 single substances (in  $\mu\text{g}/\text{m}^3$ ). A+ rating is the highest level of certification.

The basis of testing is ISO 16000 and the certificate test number is 392-2013-00026801.



#### Absence of carcinogenic, mutagenic and toxic to reproduction (C.M.R.) substances

The test (n° 392-2013-00026801) has also evaluated accomplishment with the French regulation on 4 carcinogenic, mutagenic and toxic to reproduction substances (“4 substances C.M.R.”), stated in Rule of April the 30<sup>th</sup> 2009 (NOR: DEVP0908633A) and Rule of May the 28<sup>th</sup> 2009 (NOR: DEVP0910046A).

These four tested substances are:

- Trichloroethylene, CAS number: 79-01-6.
- Benzene, CAS number: 71-43-2.
- Bis(2-ethylhexyl) phthalate, CAS number: 117-81-7.
- Dibutyl phthalate, CAS number: 84-74-2.

#### Radioactive emissions

No test available.

#### Growth of microorganisms

Not applicable.

### Soil and water

Not applicable.

## 7. Contribution of product to quality of life inside buildings

### Characteristics of product involved in creating hygrothermal comfort conditions in the building

Not applicable.

### **Characteristics of product involved in creating acoustic comfort conditions in the building**

Not applicable.

### **Characteristics of product involved in creating visual comfort conditions in the building**

PLADUR® JN compounds have a positive impact over visual comfort in indoor areas, as they give continuity to surfaces, providing the required level of finish to indoor areas.

### **Characteristics of product involved in creating olfactory comfort conditions in the building**

The product is odorless, but it has not been measured according to any standard.

## **8. Additional information**

### **LCA interpretation**

Product stage (modules A1-3) is the most relevant life cycle stage for almost all impact categories, together with module A4, the transport of the compound from PLADUR® Gypsum S.A.U. manufacturing plant to the French market. In fact, both stages account for more than 90% of the impact for all impact categories.

Product stage has a contribution that goes from 52% of the life cycle impact (Ozone depletion) to 78% (Eutrophication).

The product distribution has a significant impact, of at least 12% (Eutrophication) and a maximum contribution of 38% for Ozone depletion impact category.

The installation stage accounts with 5% of the impact for all analyzed categories, while end of life stage represents maximum 6% of the life cycle impact.

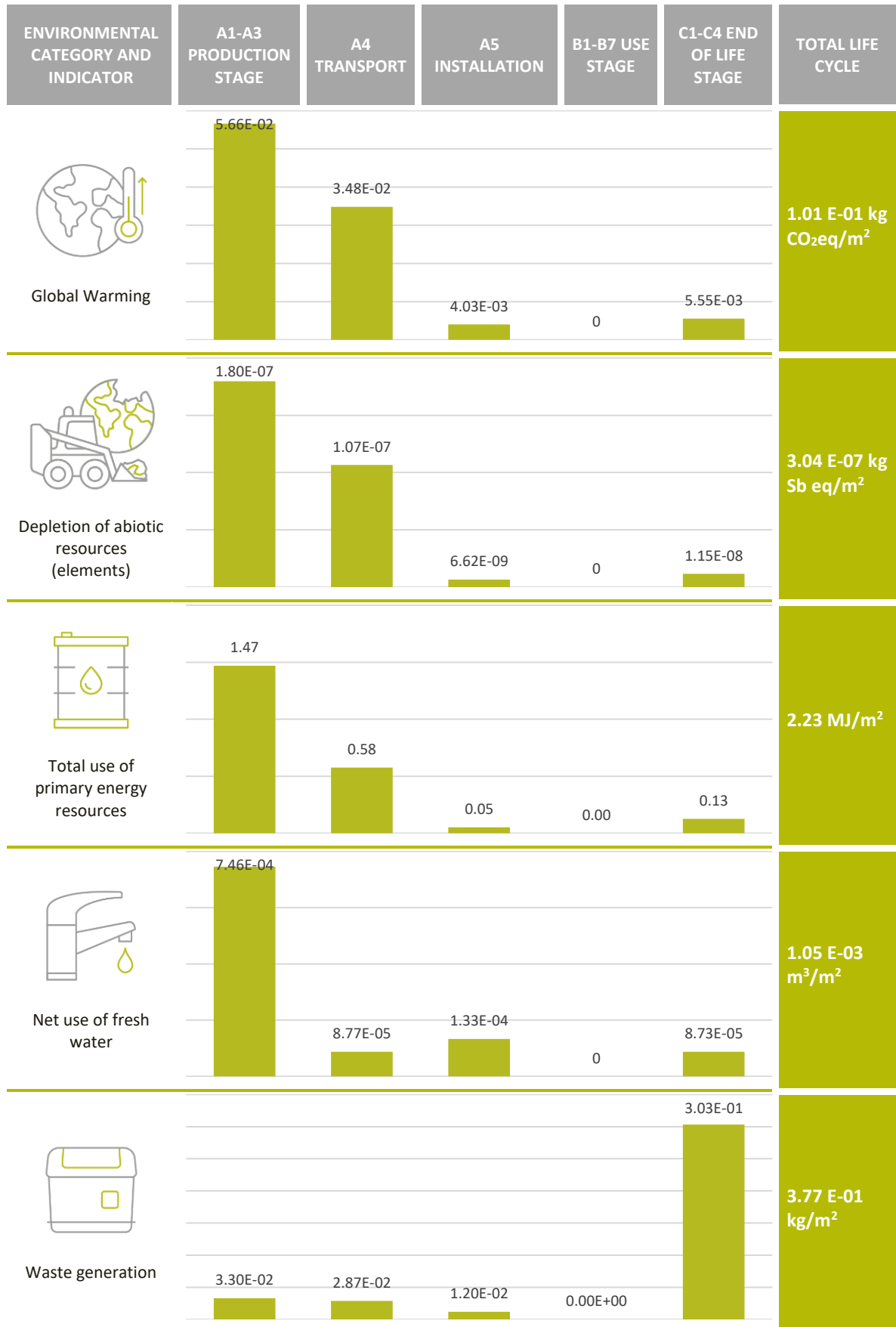
No technical operations are required during the use phase. Thus, compounds have no environmental impacts during this stage.

Regarding resource use indicators, 89% of the primary energy use comes from non-renewable sources, while 11% comes from renewable sources. 95% of the renewable energy is consumed in the product stage, whereas this stage consumes 62% of the non-renewable primary energy. 29% of the non-renewable energy is used in A4 module for the product distribution.

71% of water consumed takes place in the product stage, while 8% is consumed in module A4, 13% is consumed in the installation module (A5) and 8% in disposal stage (C4). It has to be considered that the product is presented as powder and therefore water is needed in the installation in order to obtain the plaster.

Waste disposed (hazardous, non-hazardous, and radioactive waste) are generated in various life cycle stage: 9% in product stage, 8% in A4 module, 3% in A5 module and 80% in end of life stage, mainly in C4 module.





## Environmental commitment

PLADUR® compounds are manufactured in the company facilities in Valdemoro (Madrid), in compliance with the Directive laying down the obligations on integrated prevention and pollution control.

The facilities have the Integrated Environmental Authorisation, ACIC-MO-AAI-1007/14 10-AM-00076.4/06 record. This authorization was granted by the Ministry of Environment on September the 23rd 2009 and modified automatically by the same Ministry on February the 2<sup>nd</sup> 2015.

Data related to pollutant emissions to air, soil and water and waste transferred from the facility are annually reported, according to 166/2006 Regulation and 508/2007 Decree and PLADUR® installation has the greenhouse gases emission authorization, also granted by the Ministry of Environment (10-AGEI-M-002/2014).

The company has also made the necessary arrangements to comply with the REACH Regulation, on the registration, evaluation, authorization and restriction of substances and chemical preparations, obtaining the following registration number: 01-2119444918-26-0236.

Moreover, PLADUR® Gypsum S.A.U (PLADUR®) has implemented an Environmental Management System in accordance with UNE-EN-ISO 14001:2015, certified by AENOR, that covers the following activities: design and manufacture of plasterboards in different sizes and characteristics (standard, waterproof, vapor barrier, fire resistance, thermal and acoustic insulating, honeycomb sandwich and decorative panels), adhesive compounds and associated metal profiles. Certification number is GA-2011/0624.

The Quality Management System of PLADUR® Gypsum S.A.U. allows that the raw materials rejected during the production process can be recycled internally, reducing impacts derived from the extraction and processing of raw materials. Moreover, materials used for manufacturing PLADUR® products are characterized by having a low impact over their life cycle. PLADUR® Gypsum S.A.U. facilities are located near the main raw material quarries, reducing impacts related to transportation.

Water efficiency is also a priority for PLADUR® Gypsum S.A.U. Specifically, in Valdemoro there is a pond where rainwater and industrial wastewater are collected, to be entered again in the industrial processes after being treated.

The main objectives or the organization related to the environment are:

- Minimizing air emissions
- Reducing hazardous waste
- Valuing non-hazardous waste
- Optimizing water consumption
- Increasing energy efficiency
- Improving spills prevention system

Specifically, there is an organizational commitment to climate change, energy efficiency, natural resources preservation and atmospheric emissions reduction that is translated into:

- Regular monitoring on CO<sub>2</sub> emissions
- Periodic measurements on emission points to control emitted pollutant levels
- Natural gas is used as fuel for the manufacturing process
- Natural gas is also used as preferred fuel for the vehicle fleet (trucks)
- Good energy management practices are applied in a continuous improvement management system

Criteria on energy efficiency are implemented in all manufacturing activities in order to respect the environment, preserve natural resources, reduce atmospheric emissions and contribute to minimize climate change effects.



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