GRACCO
SURFACES

# Environmental Product Declaration

EPD VERIFIED

# INTRODUCTION AND OBJECTIVES

This document presents the EPD for the panels of GRACCO SURFACES on behalf of Cerámicas Cuatro Palomas, in accordance with international and national standards regarding environmental product declarations.

This document is aimed at construction professionals seeking to understand the environmental characteristics of materials and their contribution to sustainability in the building sector.

The results reflect the analysis of the production, transport, installation, use, and end-of-life phases. Other objectives of this study include implementing a systematic process of continuous improvement throughout all phases of this cycle and obtaining baseline results to publish an Environmental Product Declaration (EPD).

This study has been conducted in accordance with the following regulations:

- UNE-EN 15804: 2012+A2: 2020/AC: 2021. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
- UNE-EN 16757: 2023. Sustainability of construction works. Environmental product declarations. Product Category Rules for concrete and concrete elements

## Lecture Guide

Details for improved reading of the declaration or the data contained within.

The inventory display data complies with NR requirements. The units used are specified for each flow and include:

- Kilogram "kg"
- Gram "g"
- Liter "l"
- Kilowatt hour "kWh"
- Megajoules “MJ”
- Square meter "$m^2$"
- Cubic meter "$m^3$"
- Carbon dioxide equivalent “$Co_2$”
- Functional Unit "FU"
- Chlorofluorocarbon "CFC"
- Sulfur dioxide "SO2"
- Phosphate "PO_3" "
- Antimony "Sb"

Abreviaturas:
- EPD: Environmental Product
- Declaration
- NR: Reference Standard
- PCR: Product Category Rules
- FDES: Environmental and Health
- Declaration Form
- LCA: Life Cycle Assessment
- DVR: Lifetime Reference
- FU: Functional Unit

## Precaution for the Use of EPDs for Product Comparison

Construction product EPDs may not be comparable if they do not comply with NR. The NR defines the conditions under which construction products can be compared based on information provided by the EPD:

"The comparison of the environmental performance of construction products using EPD information shall be based on the product's use and its impacts on the building, considering the complete life cycle (all information modules)."

# COMPANY OVERVIEW

Cerámicas Cuatro Palomas S.A.
A5 km, 22.800, 28935 Móstoles (Madrid)
www.gracco.es
info@gracco.es

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

**Product Category Rules Identification:** UNE EN 15804+A2 NR, providing the rules for product category definition (PCR).

**Production Location:** A5 km, 22.800, 28935 Móstoles (Madrid)

GRACCO SURFACES is a leading company in the sector of materials for coatings and surfaces, with a long-standing track record in developing innovative and high-quality products. Specializing in solutions that combine durability and aesthetics, GRACCO SURFACES is recognized for its commitment to excellence and innovation in every product.

With a vision focused on environmental respect, the company has implemented policies to minimize the ecological impact of its operations.

The Environmental Management System of Cerámicas Cuatro Palomas S.A. is the ultimate guarantee of its commitment to the environment. It strives to adapt to the demands of a challenging nvironment with a spirit of continuous improvement, aiming to exceed current legislative requirements.

Cerámicas Cuatro Palomas S.A. bases its development on international expansion, an innovative research and development program, respect for the environment and sustainability, and its ongoing corporate commitment to society and local communities, including training, equality, and workplace safety.

## Technical Characteristics Not Included in the Functional Unit

The following table shows the main characteristics of GRACCO SURFACES panels common to the nine references covered by this EPD:

| TEST | UD | VALEU |
|---|---|---|
| Width | mm | 100 - 1.200 |
| Length | mm | 100 - 3.920 |
| Thickness | mm | 15 - 40 |
| Flatness Tolerances | mm | ≤ 0,3 |
| Straight Angles | L<600mm | ± 0,9 |
| | ≥600 mm & ≤1.000 mm | ± 1,2 |
| | >1.000 mm & ≤3.500 mm | ± 3,0 |
| Density | kg/m³ | 2.301 |
| Flexural Strength | MPa | ≥ 9,3 |
| Fire Reaction | Class | A1 |
| Wind Load Resistance | Pa | 3.600 |
| Impact Resistance | | e=20 mm \| Cat. IV |
| | | e=30 mm \| Cat. III |
| Flexural strength of the cladding element | MPa | e=20 mm \| 9,3 Mpa |
| | | e=30 mm \| 9,3 Mpa |
| Mechanical strength of the grooved cladding element | | Valor medio 2.151 N |
| | | Valor característico 1.821 N |
| Linear thermal expansion coefficient of the cladding element | (µm/m°C) | ≤ 6,1 |
| Frost-thaw resistance of the cladding element | | 1,1 |
| Thermal shock resistance of the cladding element | | 1,0 |

## GRACCO'S COMMITMENT TO THE ENVIRONMENT

At GRACCO, we take environmental respect and sustainability very seriously, striving to ensure that our environmental impact is minimal. The company recognizes the importance of reducing its carbon footprint and promotes energy efficiency and responsible resourse use across all its operations.

Our production process is based on the Fourth Industrial Revolution, Industry 4.0, which greatly facilitates our path toward sustainability through process automation.

We recycle our own waste, reintegrating it back into the production process.

Our tiles and panels are replaceable and reusable, which reduces the Product Environmental Footprint (PEF) and ecological footprint based on Life Cycle Assessment (LCA).

However, in this case, we have gone a step further. We are not only committed to ensuring that our activity does not compromise future generations but also actively reverse current pollution problems with our material, thanks to the photocatalytic properties of GRACCO SURFACES.

## Organization carbon footprint self-declaration Facades and light coverings

The organization's carbon footprint evaluates the emissions and removals of greenhouse gases, direct and indirect, that occur as a consequence of the organization's activity, expressed as tons of CO2 equivalent.

The following table shows the organization's carbon footprint corresponding to the year 2023, for scopes 1, 2 and 3 of the GHG Protocol, and broken down by categories and subcategories according to the UNE-EN ISO 14064-1:2019 standard.

**CLIMATE DECLARATION**

Table 1. Organization Carbon Footprint Calculation. Methodology: GHG Protocol

| Emission sources | Totales emission (ton CO2 eq) |
|---|---|
| PERE (MJ) | 1,50E+0 |
| PERM (MJ) | 0,00E+0 |
| PERT (MJ) | 1,50E+0 |
| PENRE (MJ) | 1,19E-4 |

Table 2. Organization Carbon Footprint Calculation. Methodology: UNE-EN ISO 14064-1:2019 Standard

| Categories | Subcategories | Totales emission (ton Co2 eq) |
|---|---|---|
| Direct emissions | Direct emissions from mobile combustion | 2,58 |
| | Direct emissions from stationary combustion | 17,39 |
| Indirect GHG emissions from products used | Indirect emissions from the upstream phase of the products purchased | 401,99 |
| | Indirect emissions from the disposal of solid and liquid waste | 1,38 |
| Indirect GHG emissions from use of the organization's products | Indirect emissions from the use of the product during its useful life | 0,01 |
| Indirect GHG emissions from imported energy | Indirect emissions from imported electricity | 85,57 |
| Indirect GHG emissions from transportation of people and estate | Indirect emissions from transportation and distribution of estate upstream | 68,14 |
| **Total emissions** | | **577,07** |

**REFERENCES**


- UNE-EN ISO 14064-1:2019 Standard
- Methodologies: GHG Protocol

## Policies and actions in favor of sustainability and environmental prevention

Among the main actions of GRACCO SURFACES in favor of sustainability are:

- Implementation of environmental management systems based on international standards such as ISO 14001.
- Use of responsible raw materials and cleaner production processes.
- Optimization of waste generated during manufacturing, promoting recycling and reuse.
- Constant innovation in the development of products with lower environmental impact.

Additionally, a notable feature of GRACCO is the use of photocatalytic materials, developed to improve air quality by breaking down pollutants such as nitrogen oxides (NOx) and volatile organic compounds (VOCs) when exposed to light. This technology contributes to sustainability by purifying the air in environments near buildings and enhancing quality of life.

## Environmental management

As a provider of architectural concrete solutions for ventilated facades, we follow the principles of **UNE-EN 16757:2023**, which establishes guidelines for the sustainability of our products.

This standard regulates the requirements for evaluating the environmental impact at all stages of the life cycle of the products offered by Gracco Surfaces.

These are developed with a focus on resource efficiency, wate minimization, and the integration of advanced technologies to optimize their ecological footprint.

## Sustainable innovation and integration

The use of photocatalytic materials in GRACCO SURFACES products aligns with the goals of **UNE-EN 15804**, as these materials are not only sustainable in their production but also improve air quality by breaking down pollutants present in the environment.

Therefore, these products not only have a low environmental footprint but also actively contribute to improving the enviroment through the air purification system.

## Economy and waste prevention

One of the main objectives of the company is to implement **Industry 4.0** in its products and the manufacturing process.

Industry 4.0 refers to the transformation of industrial processes through the integration of advanced digital technologies and automation.

By combining these advances with the use of renewable energies, the aim is to create more sustainable and efficient production environments that are less dependent on fossil fuel energy sources, thereby contributing to the reduction of the industry's carbon footprint.

Additionally, it optimizes operational costs and improves productivity, offering a more profitable economic model.

## 3. Information about EPD

The Environmental Product Declaration (EPD) is a verified document that provides detailed and transparent information about the environmental impact of a product throughout its life cycle. It is a key tool in the field of sustainable construction and allows for the quantitative and standardized assessment of the environmental performance of materials and products

## Standards and Methodologies

EPDs are prepared following international standards, such as **ISO 14025** and **EN 15804** in the case of construction products. These standards ensure that the information is consistent, verifiable, and comparable among similar products.

They use the Life Cycle Assessment (LCA) methodology to evaluate impacts from the extraction of raw materials, manufacturing, use, and finally, disposal or recycling.

## Evaluated Impact Categories

EPDs provide information on different impact categories, such as:

CO2 emissions and other greenhouse gases (carbon footprint).
Energy consumption (renewable and non-renewable primary energy).
Water use and other natural resources.
Waste generation and recycling potential.

## Advantages of EPDs

They facilitate the comparison between products from different manufacturers, promoting competition in terms of sustainability.

They are essential for obtaining sustainability certifications such as LEED, BREEAM, or WELL, as they provide the necessary documentation to meet the requirements of these environmental assessment systems.

They promote the circular economy by encouraging the design of products that are more sustainable, recyclable, and have a lower environmental impact.

## PRODUCT

The GRACCO SURFACES panels are made from micro-mortar cement which gives it a structure that combines high-strength elements with aesthetic finishes, making it an ideal choice for large-scale architectural projects. It is developed for applications such as:

- Facade cladding
- High-Traffic Pavements
- Interior and exterior wall cladding

The company offers panels in various sizes, thicknesses, colors, and textures, aiming to adapt to the aesthetic and technical needs of each architectural project.

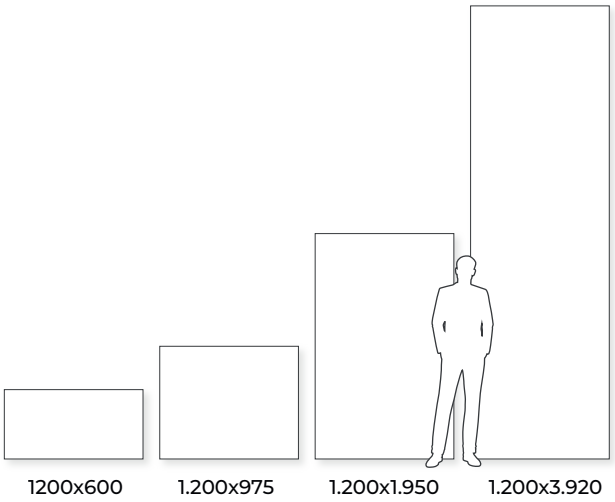
The GRACCO SURFACES panel has the European Technical Assessment (ETA 20/0316).

## Characteristics

### *Varied sizes and formats*

The panels can reach large dimensions, with sizes up to 3,920x1,200 mm, making them among the largest on the market, which allows for more impressive facade designs with fewer visible joints.

The available thicknesses range from 15 mm to 40 mm, providing options of 5 mm between models, thus adapting to the structural and aesthetic needs of each project.




### *Strength and Durability*

Gracco Surfaces panels are designed to be highly resistant, even under low-impact conditions, providing a robust appearance and minimizing the risk of breakage.

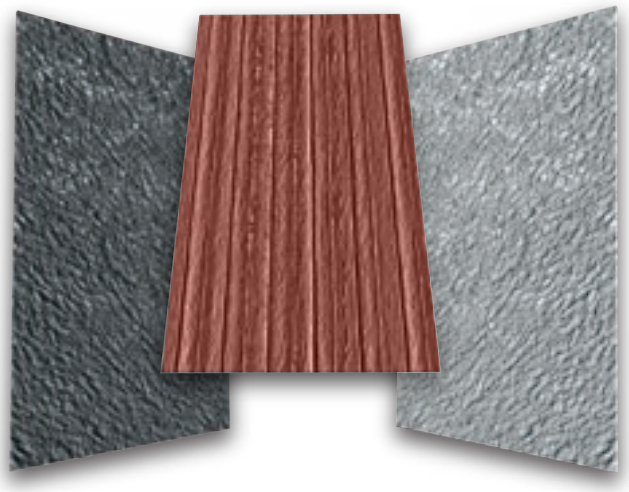
### *Photocatalytic Technology*

A notable feature of Gracco products is the integration of photocatalytic materials that help purify the air. These materials react with light to break down pollutants such as nitrogen oxides (NOx), improving air quality in the surrounding environments and contributing to sustainability.

### *Variety of Textures and Colors*

Gracco Surfaces offers multiple options for finishes and colors, ranging from light grays to darker tones, adapting to different architectural styles and design preferences.

The surfaces can be smooth or textured, providing flexibility to create unique and customized facades.



# LIFE CYCLE

This EPD was drafted and verified in accordance with the NR.
This EPD includes the life cycle stages listed in Table 1.

This declaration cannot be compared as a draft in other programs or according to different reference documents. This EPD is not comparable to other EPDs not developed according to standard EN 15804. Similarly, environmental declarations cannot be subject to comparison if the source of the data is different (for example, the datasets), if not all relevant information modules are included, or if they are not based on the same scenarios.

The comparison of construction products
will be based in the same manner, using the same functional unit at the building level (or architecture, or civil engineering work), that is, including the product's performance during the life cycle.

| | | | |
|---|---|---|---|
| Stage of product | A1 | Supply of raw materials | X |
| | A2 | Transport | X |
| | A3 | Manufacturing | X |
| Cons-truction | A4 | Transportation to construction site | X |
| | A5 | Installation in the building | X |
| Stage of product | B1 | Use | MNR |
| | B2 | Maintenance | MNR |
| | B3 | Repair | MNR |
| | B4 | Substitution | MNR |
| | B5 | Renewal | MNR |
| | B6 | Use of energy in service | NA |
| | B7 | Use of water in service | NA |
| Final del vida | C1 | Deconstruction or demolition | X |
| | C2 | Transport | X |
| | C3 | Waste treatment | X |
| | C4 | Elimination | X |
| | D | Reuse potential, recovery and/or recycling | X |

X= Module included in the ACV; MNR = Module no relevant; MNE = Module not evaluated

# A1-A3 PRODUCTION

The product stage includes the extraction of raw materials, production of additives, transportation from the supplier to the processing plant, and the manufacturing process.

### A1 Supply of raw materials

This module takes into account the supply and treatment of all raw materials that occur before the manufacturing process. In particular, it covers the supply of mortar components and reinforcement components

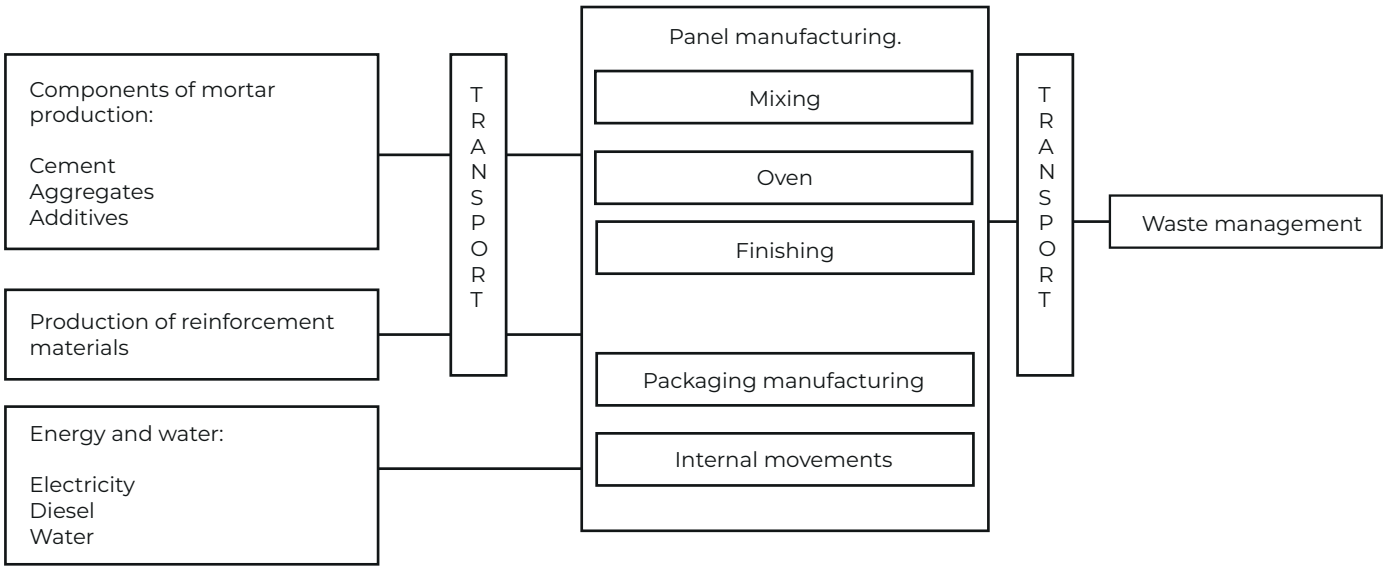
### A2 Transport

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

### A3 Manufacturing

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

The raw materials are mixed homogeneously to form the mortar. Then, the panel is placed in an oven, and finally, operations are carried out to complete the process.



## A4-A5
## CONSTRUCTION PHASE

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

**A4 Transportation to construction site**

This module includes transportation from the manufacturing factory to the site construction.

**A5 Installation in the building**

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

## B1-B7
## STATES OF USE

The use phase is divided into seven modules:

- **B1:** Use or application of the product installed
- **B2:** Maintenance
- **B3:** Repair
- **B4:** Substitution
- **B5:** Renewal
- **B6/B7:** Energy and water use

During the life cycle of the panel GRACCO SURFACES, B2 and B4.

## C1-C4
## END OF LIFE

This step includes the following modules:

- **C1:** Deconstruction or demolition
- **C2:** Transport to the plant waste treatment
- **C3:** Waste treatment for reuse, recovery and/or recycling
- **C4:** Waste disposal.

# CONCLUSION AND RESULTS

The life cycle analysis, data intro duction and environmental impact calculations have been carried out using the A-DAP software, version 24.04, certified by TECNALIA CERTIFICATION, no. EPD06901.

The table below summarizes the results for the functional unit:

**DECLARED UNIT:** 1,000 kg (1 ton) of precast concrete elements for facades and light coverings, with an average reference useful life of 50 years

Table 1. Parameters that describe environmental impacts.

| IMPACT CATEGORY | LIFE CYCLE STAGE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Parameter (unit) | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
| GWP-total (kg $CO_2$ eq) | 3,10E+2 | 4,34E+1 | 9,03E-1 | 3,54E+2 | 4,08E+0 | 7,47E+0 | 3,03E-1 | 1,13E+0 | -9,89E-1 |
| GWP - fosil (kg $CO_2$eq) | 3,06E+2 | 4,34E+1 | 9,03E-1 | 3,51E+2 | 4,08E+0 | 7,46E+0 | 2,96E-1 | 1,13E+0 | -9,90E-1 |
| GWP - biogEnic (kg $CO_2$ eq) | 8,65E-1 | 2,56E-3 | 1,49E-4 | 8,68E-1 | 2,43E-4 | 4,42E-4 | 7,20E-3 | 1,74E-4 | 1,19E-3 |
| GWP - luluc (kg $CO_2$ eq) | 7,05E-1 | 8,83E-4 | 5,69E-5 | 7,06E-1 | 1,67E-4 | 1,46E-4 | 9,08E-5 | 4,56E-5 | -1,24E-4 |
| ODP (kg CFC-11 eq) | 2,75E-5 | 9,28E-7 | 1,79E-8 | 2,84E-5 | 6,43E-8 | 1,61E-7 | 6,54E-9 | 2,14E-8 | -1,47E-8 |
| AP (mol H+ eq) | 7,06E-1 | 6,77E-2 | 3,04E-3 | 7,77E-1 | 3,91E-2 | 9,39E-3 | 2,45E-3 | 7,51E-3 | -8,72E-3 |
| EP - freshwater (kg P- eq) | 1,10E-2 | 3,42E-5 | 3,72E-6 | 1,10E-2 | 3,49E-6 | 5,87E-6 | 2,85E-6 | 1,11E-6 | -2,88E-6 |
| EP - saltwater (kg N-eq) | 2,14E-1 | 2,01E-2 | 1,37E-3 | 2,36E-1 | 1,83E-2 | 2,33E-3 | 1,09E-3 | 3,45E-3 | -4,03E-3 |
| EP - terrestrial (mol N- eq) | 1,57E+0 | 2,04E-1 | 1,48E-2 | 1,79E+0 | 2,00E-1 | 2,27E-2 | 1,21E-2 | 3,74E-2 | -4,37E-2 |
| POCP (kg NMVOC eq) | 6,77E-1 | 1,21E-1 | 6,87E-3 | 8,05E-1 | 5,87E-2 | 1,76E-2 | 3,54E-3 | 1,14E-2 | -1,31E-2 |
| ADPE (kg Sb eq) | 6,54E-4 | 1,51E-6 | 7,19E-8 | 6,55E-4 | 1,72E-7 | 2,58E-7 | 5,99E-8 | 4,32E-8 | -1,80E-7 |
| ADPF (MJ eq) | 3,12E+3 | 5,73E+2 | 8,63E+0 | 3,70E+3 | 5,35E+1 | 9,87E+1 | 3,71E+0 | 1,49E+1 | -1,30E+1 |
| WDP ($m^3$) | 6,69E+1 | 5,31E-1 | 3,26E-2 | 6,75E+1 | 6,88E-2 | 9,01E-2 | 5,74E-2 | 1,70E-2 | -1,09E+0 |
| particulate matter emissions (inc. enferm.) | 2,49E-1 | 2,94E-6 | 7,54E-8 | 2,49E-1 | 4,82E-6 | 4,50E-7 | 3,04E-6 | 1,93E-7 | 2,71E-6 |
| ionizing radiation (kBq U-235 eq) | 3,86E+1 | 9,09E-2 | 3,27E-3 | 3,86E+1 | 6,32E-3 | 1,58E-2 | 2,43E-1 | 3,85E-3 | 6,28E-2 |
| Ecotoxicity - freshwater (CTUe) | 1,89E+3 | 2,57E+2 | 4,85E+0 | 2,15E+3 | 2,57E+1 | 4,41E+1 | 1,44E+0 | 6,88E+0 | -6,38E+0 |
| Human Toxicity - carcinogenic effects (CTUh) | 1,04E-7 | 2,75E-9 | 1,01E-10 | 1,06E-7 | 2,29E-10 | 4,75E-10 | 2,30E-11 | 1,40E-10 | -2,37E-10 |
| Human Toxicity - non-carcinogenic effects (CTUh) | 5,67E-6 | 2,99E-7 | 1,85E-9 | 5,98E-6 | 5,72E-9 | 5,31E-8 | 7,49E-10 | 6,14E-9 | -2,29E-9 |
| use / pavement quality (Pt) | 4,64E+2 | 1,10E+0 | 1,34E+0 | 4,66E+2 | 1,02E-1 | 1,89E-1 | 5,55E-1 | 8,49E+0 | -2,32E+1 |

**GWP-total:** Global warming potential **GWP - fossil:** Global warming potential of fossil fuels **GWP - biogenic:** Global warming potential biogenic **GWP - luluc:** Global warming potential of land use and land use change **ODP:** Stratospheric ozone layer depletion potential **AP:** Potential of acidification, accumulated surplus **EP - freshwater:** Eutrophication potential, fraction of nutrients that reach the final freshwater compartment **EP - seawater:** Eutrophication potential, fraction of nutrients that reach the final marine water compartment **EP - terrestrial:** Eutrophication potential, accumulated surplus **POCP:** Tropospheric ozone formation potential **ADPE:** Abiotic resource depletion potential for non-fossil resources **ADPF:** Abiotic resource depletion potential for fossil resources **WDP:** Water deprivation potential (user), weighted water deprivation consumption **Particulate matter emissions:** Incidence potential diseases due to emissions of particulate matter Ionizing radiation: Human potential exposure efficiency relative to U235 **Ecotoxicity - fresh water:** Comparative potential of toxic unit for ecosystems - fresh water Human toxicity - carcinogenic effects: Comparative potential of toxic unit for ecosystems - carcinogenic effects **Human toxicity - non-carcinogenic effects:** Comparative potential of toxic unit for ecosystems - non-carcinogenic effects Use / quality of soil: Soil quality potential index

**A1:** Supply of raw materials **A2:** Transportation **A3:** Manufacturing **C1:** Demolition/Deconstruction **C2:** Transportation to treatment **C3:** Preparation for reuse or recycling **C4:** Treatment by incineration or landfill **D:** Off-system environmental benefits

Table 2. Parameters describing resource usage

| IMPACT CATEGORY | LIFE CYCLE STAGE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Parameter (unit) | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
| PERE (MJ) | 8,47E+2 | 1,50E+0 | 1,00E-1 | 8,49E+2 | 1,05E-1 | 2,61E-1 | 9,50E+0 | 4,21E-1 | 1,72E+0 |
| PERM (MJ) | 6,26E-1 | 0,00E+0 | 0,00E+0 | 6,26E-1 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| PERT (MJ) | 8,48E+2 | 1,50E+0 | 1,00E-1 | 8,50E+2 | 1,05E-1 | 2,61E-1 | 9,50E+0 | 4,21E-1 | 1,72E+0 |
| PENRE (MJ) | 3,16E+2 | 1,19E-4 | 3,06E-5 | 3,16E+2 | 1,51E-4 | 1,08E-5 | 2,42E-5 | 3,10E-5 | -1,36E-4 |
| PENRM (MJ) | 5,66E+3 | 5,76E+2 | 8,79E+0 | 6,25E+3 | 5,37E+1 | 9,93E+1 | 1,25E+1 | 1,50E+1 | -1,07E+1 |
| PENRT (MJ) | 5,98E+3 | 5,76E+2 | 8,79E+0 | 6,56E+3 | 5,37E+1 | 9,93E+1 | 1,25E+1 | 1,50E+1 | -1,07E+1 |
| SM (kg) | 5,90E+2 | 0,00E+0 | 0,00E+0 | 5,90E+2 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| RSF (MJ) | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| NRSF (MJ) | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| FW ($m^3$) | 1,70E+1 | 2,44E-2 | -2,24E-4 | 1,70E+1 | 2,68E-3 | 4,17E-3 | 3,14E-2 | 1,51E-3 | -1,10E+0 |

**PERE:** Use of primary renewable energy excluding primary renewable energy resources used as raw materials **PERM:** Use of primary renewable energy used as raw material **PERT:** Total use of primary renewable energy **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw material **PENRM:** Use of primary non-renewable energy used as raw material **PENRT:** Total use of primary non-renewable energy **SM:** Use of materials secondary **RSF:** Use of renewable secondary fuels **NRSF:** Use of non-renewable secondary fuels **FW:** Net use of tap water resources

**A1:** Supply of raw materials **A2:** Transportation **A3:** Manufacturing **C1:** Demolition/Deconstruction **C2:** Transportation to treatment **C3:** Preparation for reuse or recycling **C4:** Treatment by incineration or landfill **D:** Off-system environmental benefits

Table 3. Environmental information describing waste categories

| IMPACT CATEGORY | LIFE CYCLE STAGE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Parameter (unit) | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
| HWD (kg) | 2,18E-2 | 3,81E-3 | 4,26E-5 | 2,57E-2 | 3,59E-4 | 6,55E-4 | 2,29E-5 | 9,89E-5 | -8,63E-5 |
| NHWD (kg) | 1,11E+1 | 2,90E-2 | 3,00E+1 | 4,12E+1 | 3,99E-3 | 4,90E-3 | 3,24E-3 | 2,00E+2 | -9,68E-3 |
| RWD (kg) | 2,98E-2 | 4,87E-5 | 2,18E-6 | 2,99E-2 | 2,62E-6 | 8,51E-6 | 1,31E-4 | 2,54E-6 | 3,39E-5 |

**HWD:** Residuos peligrosos eliminados **NHWD:** Residuos no peligrosos eliminados **RWD:** Residuos radiactivos eliminados

**A1:** Supply of raw materials **A2:** Transportation **A3:** Manufacturing **C1:** Demolition/Deconstruction **C2:** Transportation to treatment **C3:** Preparation for reuse or recycling **C4:** Treatment by incineration or landfill **D:** Off-system environmental benefits

Table 4. Environmental information describing outflows

| IMPACT CATEGORY | LIFE CYCLE STAGE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Parámetro (unidad) | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
| CRU (kg) | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| MFR (kg) | 2,36E-2 | 0,00E+0 | 0,00E+0 | 2,36E-2 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| MER (kg) | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |
| EE (MJ) | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 | 0,00E+0 |

**CRU:** Componentes para su reutilización **MFR:** Materiales para el reciclaje **MER:** Materiales para valorización energética **EE:** Energía exportada

**A1:** Supply of raw materials **A2:** Transportation **A3:** Manufacturing **C1:** Demolition/Deconstruction **C2:** Transportation to treatment **C3:** Preparation for reuse or recycling **C4:** Treatment by incineration or landfill **D:** Off-system environmental benefits

**32.4%** electricity self-sufficiency; **32.4%** renewable energy used.

At the end of their useful life, precast concrete elements allow for 80% recycling as secondary raw material. Guidance values. Source: https://www.co2data.fi/

**REFERENCES**


- Standard UNE-EN 15804:2012+A1:2014. Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
- UNE-EN 16757:2018 Standard. Product Category Rules for obtaining environmental declarations for precast concrete products.
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info@gracco.es

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