# ENVIRONMENTAL PRODUCT DECLARATION

***In accordance with ISO 14025 and EN 15804+A2:2019 for***

## Webertec RIPARA 60


**Version 1**
**2022-11-17**
**Validity: 5 years**
**Valid until: 2027-11-16**
**Scope of the EPD®: Italy**

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

**Registration number**
**The International EPD® System:**
**S-P-06658**

Production plants:
**Aquino**
Contrada San Marco, 1, 03031 Aquino (FR) (Italy)

# We care about people and their environment

At Weber, we believe that what matters most in the construction industry is to care about people and their environment. Weber develops, produces and sells solutions based an industrial mortars and constructions chemicals for building construction and renovation. Weber is made up of 10,000 people in 64 countries supported by almost 200 production units. Weber's services and solutions aim to help customers save time, feel confident and comfortable, be successful in their work and grow their business.

**Our brand promises:**

- **Well-being:** We care for the safety and benefit of all. Making lives easier, more convenient and more comfortable.
- **Empathy:** We care about people. Listening to what matters to people and taking into account theirs needs. Helping everyone to grow. Responding to the multiplicity of challenges in today's world, and adapting to the diversity of the lives that populate it.
- **Long-lasting:** We care about today. But also for the future. Taking responsibility to lead the change and build a tomorrow that is in harmony with its environment.

**Weber, a Saint-Gobain brand**

Saint-Gobain designs, manufactures and distributes materials and solutions for the construction, mobility, healthcare and other industrial application markets. Developed through a continuous innovation process, they can be found everywhere in our living places and daily life, providing wellbeing, performance and safety, while addressing the challenges of sustainable construction, resource efficiency and the fight against climate change.

This strategy of responsible growth is guided by the Saint-Gobain purpose, “MAKING THE WORLD A BETTER HOME”, which responds to the shared ambition of all the women and men in the Group to act every day to make the world a more beautiful and sustainable place to live in.

**Saint-Gobain Italy S.p.A. represents three brands**

ISOVER SAINT-GOBAIN
Solutions in mineral wool for thermal and acoustic insulation and fire protection solutions.

gyproc SAINT-GOBAIN
Products and solutions in plaster for new buildings or rehabilitation.

weber SAINT-GOBAIN
Reference in mortars for different application in construction.

**Company certifications**

**ISO 9001** - Quality management systems
**ISO 14001** - Environment management systems
**ISO 45001** - Occupational health and safety management systems

**TOP EMPLOYER -** Human Resource Management Best

# General information

**Manufacturer:** Saint-Gobain Italia, S.p.A
Via Giovanni Bensi 8, 20152 Milano, (Italy)
Tel. (+39) 02 611151/ mail: sg.ppc@legalmail.it / web: https://www.saint-gobain.it/

**Production plant: Aquino:** Contrada San Marco, 1, 03031 Aquino (FR) (Italy)

**CPC code:** 37510 Non-refractory mortars and concretes

**Geographical scope:** Italy

**Program used:** The International EPD® System. More information at www.environdec.com
**PCR identification:** The International EPD System PCR 2019:14 version 1.11 Construction products
**Prepared by:** IVL Swedish Environmental Research Institute, EPD International Secretariat

**Owner of the declaration:** Saint-Gobain Italia, S.p.A

**Product / product family name and manufacturer represented:** This EPD describes the environmental impacts of 1 $m^2$ of a mixture of **webertec RIPARA60** delivered in powder form.

**As their environmental impact differs less than 10%, this EPD covers the following product:**

**Webertec RIPARA 60+**


**EPD® prepared by:** Michela, Vecchione (Saint-Gobain Italia, S.p.A)
Fiorenza, Rubini (Saint-Gobain Italia, S.p.A)
Patricia Jimenez Diaz (Saint-Gobain LCA central team)

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**EPD registration number/declaration number:** S-P-06658

**Declaration issued:** 2022-11-17, **valid until:** 2027-11-16

**Demonstration of verification:** an independent verification of the declaration was made, according to EN ISO 14025:2010. This verification was external and conducted by a third party, based on the PCR mentioned above (see information below).

| | |
|---|---|
| **Programme** | The international EPD© System |
| **Adress:** | EPD© International AB Box 210 60 SE-100 31 Stockholm Sweden |
| **Website:** | www.environdec.com |
| **E-mail:** | info@environdec.com |
| CEN standard UNE-EN 15804 serves as the Core Product Category Rules (PCR) | |
| Product category rules (PCR): PCR 2019:14 Construction Products, version 1.1 | |
| PCR review was conducted by: El Comité Técnico del Sistema Internacional EPD©<br>President: Claudia A. Peña. Contact via info@environdec.com | |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006:<br>☐ EPD process certification ☒ EPD verification | |
| Third party verifier: Andrew Norton<br>Renuables http://renuables.co.uk<br>In case of recognized individual verifiers: Approved by: The International EPD© System | |
| Procedure for follow-up of data during EPD validity involves third part verifier:<br>☒ Yes ☐ No | |

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of

construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO EN 14025.

# Product description

**Product description and description of use:**

The product family observed within the scope of this study is cement based. The webertec family composed by high-strength cementitious binders, selected aggregates, synthetic microfibers and special additives. It is used to reconstruction or repair of deteriorated structural masonry structural elements as footings or foundation of a building, concrete beams or pillars and deteriorated reinforced concrete. Restoration of areas subject to abrasion or sulphate aggression. It is also used for the repair of prefabricated structures.

This EPD applies for one specific product manufactured by Saint-Gobain Italia, S.p.A. in the plants located in Aquino.

All technical characteristics and properties for any product could be find on the website:

https://www.it.weber/malte-il-ripristino-del-cls-il-consolidamento-e-il-rinforzo-delle-strutture/protezione-ripristino-e-decorazione-cls/malte-il-ripristino-del-calcestruzzo/webertec-ripara60

| Technical data/physical characteristics | | |
|---|---|---|
| **Reaction to fire** | A1 | |
| **Compressive strength @28days (MPa)** | 60 | EN1504-3 |
| **Flexural strength @28 days (MPa)** | 9 | |
| **Adhesion @28 days (MPa)** | >2 | |
| **Thickness (mm)** | 10 - 100 | |
| **Mass of declared unit (kg/m$^2$)** | 104,5 | |

**Description of the main product components and/or materials:**

All raw materials contributing more than 5% to any environmental impact are listed in the following table.

| Product components | Weight (%) | Post-consumer material weight (%) | Renewable material weight (%) |
|---|---|---|---|
| **Standard product** | **100%** | **0%** | **0%** |
| **Cement** | **20% – 50%** | **0%** | **0%** |
| **Silica sand** | **5%– 45%** | **0%** | **0%** |
| **Limestone** | **10% – 30%** | **0%** | **0%** |
| **Water for installation** | **19%– 21 %** | **0%** | **0%** |

| Packaging materials | Weight (%) (versus the product) |
|---|---|
| **Polyethylene low density** | **1,0% – 4,0%** |
| **Paper + PE bag** | **2,0% – 4,0%** |
| **Pallet** | **0,3% – 0,8%** |
| **Paper label** | **0,1% – 0,8%** |

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0.1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

# LCA calculation information

| | |
|---|---|
| **EPD TYPE** | Cradle to grave and module D |
| **DECLARED UNIT** | 1 $m^2$ of cement based Concrete Repair Mortars, with a mass of 104.5 kg/$m^2$ per 5.5 mm of thickness |
| **SYSTEM BOUNDARIES** | Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and D |
| **REFERENCE SERVICE LIFE (RSL)** | 50 years |
| **CUT-OFF RULES** | Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included.<br>Flows related to human activities such as employee transport are excluded.<br>Transportation in-site is excluded<br>The construction of plants, production of machines and transportation systems are excluded |
| **ALLOCATIONS** | Allocation has been avoided when possible. For those cases, when recycled material has been used, a physical allocation based on mass is used.<br>The polluter pays and modularity principles have been followed |
| **GEOGRAPHICAL COVERAGE AND TIME PERIOD** | Data included is collected from 1 production site in Italy<br>Production year from 2021<br>Background data: Ecoinvent v3.6 and GaBi ts 2020 |
| **UN CPC CODE** | 37510 Non-refractory mortars and concretes |

EPD of construction products may not be comparable if they do not comply with EN 15804. Environmental product declarations within the same product category from different programs may not be comparable.

**Data quality assessment**

The data quality level is evaluated following as criteria the: Temporal relevance (TR), Geographical relevance (GR), and Technological relevance (TeR).

Geographical relevance - The data collected is based as close as possible to manufacturing site. All data was taken from sources from Portugal (e.g. Electricity production model), however if this was not possible then European sources were used.

Technological relevance - All the technological data gathered is current and for most materials it is generally industry averages.

Temporal relevance - Our data sets are updated as often as possible to ensure they are at least within the last 10 years for generic data and within the last 5 years for producer specific data. The databases, Gabi or Ecoinvent, listed in appendix II may be outside of the 10-year limit for generic data, however

The data is provided by Saint-Gobain Italia, S.p.A. through the data collection file. The data is checked against available annual environment reports for the site by Saint-Gobain LCA Central Team before the LCA project begins.

The following data was the source of primary and secondary data used.

The data used in this EPD is representative of the production process and the product itself.

Table 1 - Specific data quality assessment

| | Year | Location country | Data record, source, year of collection, representativeness |
|---|---|---|---|
| **A1-A3 Product** | 2021 | Italy | Collected at plants in 2022 |
| **A4-A5 Construction process** | 2021 | Italy | Transport data supplied by logistics team at sites in 2022. Installation materials data supplied by Weber SG Italy. |
| **B1-B5 Use** | 2021 | Italy | No data required. |
| **C1-C4 End-of-life** | 2021 | Italy | Data supplied by sites in 2022 |

# Life cycle stages

*Flow diagram of the Life Cycle*

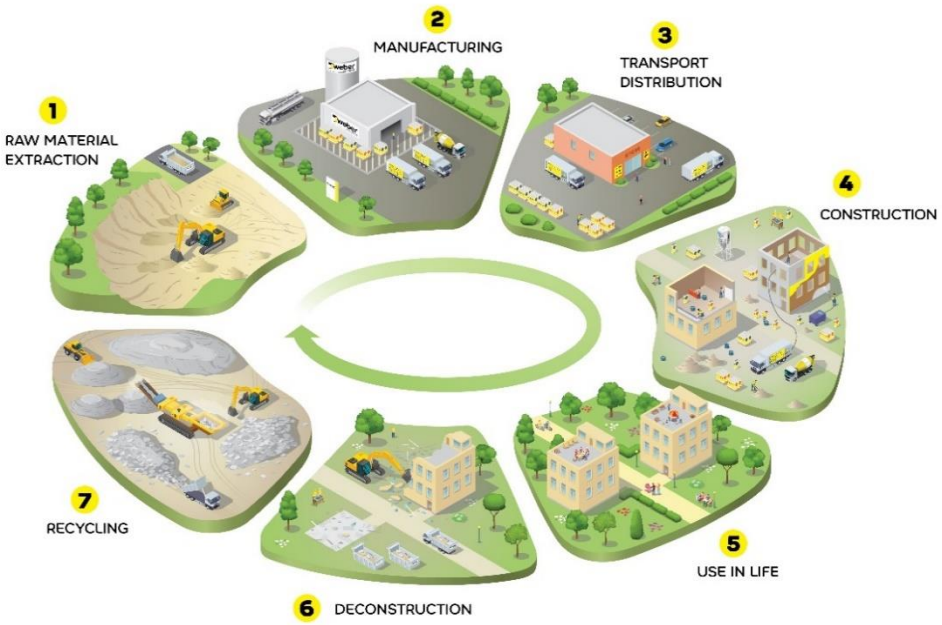



Figure 1: Life Cycle illustration of a product for construction

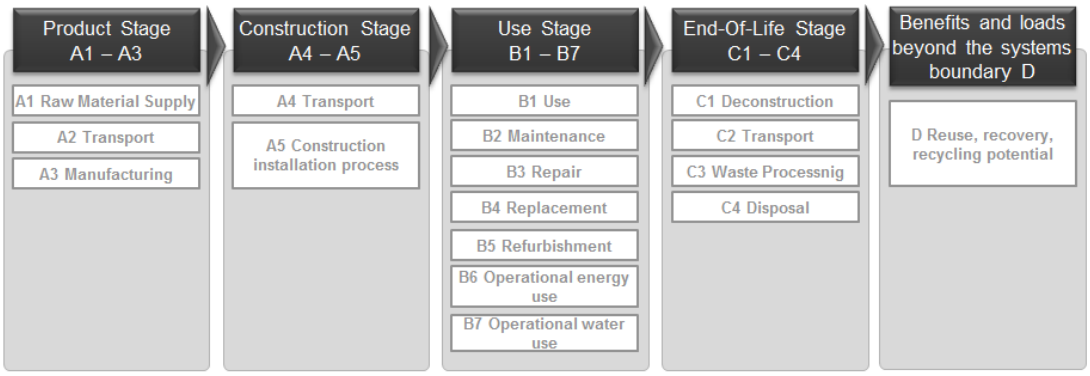



Figure 2: Cradle to grave analysis taking into account all stages of the Life Cycle product

[1] **Included Transport**

## Product stage, A1 - A3

**Description of the stage:**

The product stage of the Weber products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport” and “manufacturing”.

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

**A1, Raw material and energy supply**

This part takes into account the extraction and processing of all raw materials and energy which occurs upstream to the studied manufacturing process.

Specifically, the raw material supply covers sourcing (quarry) and production of all binder components and additives (e.g. sand, cement, rheology agent and others).

Use of electricity, fuels and auxiliary materials in the production is taken into account too. The environmental profile of these energy carriers is modeled for local conditions.

**A2, Transport to manufacturer**

The raw materials are transported to the manufacturing site. In this case, the modelling includes road and boat transportations (average values) of each raw material.

**A3, Manufacturing**

This module includes manufacturing of products but also besides on-site activities such as grinding, drying, storing, mixing, packing and internal transportation.

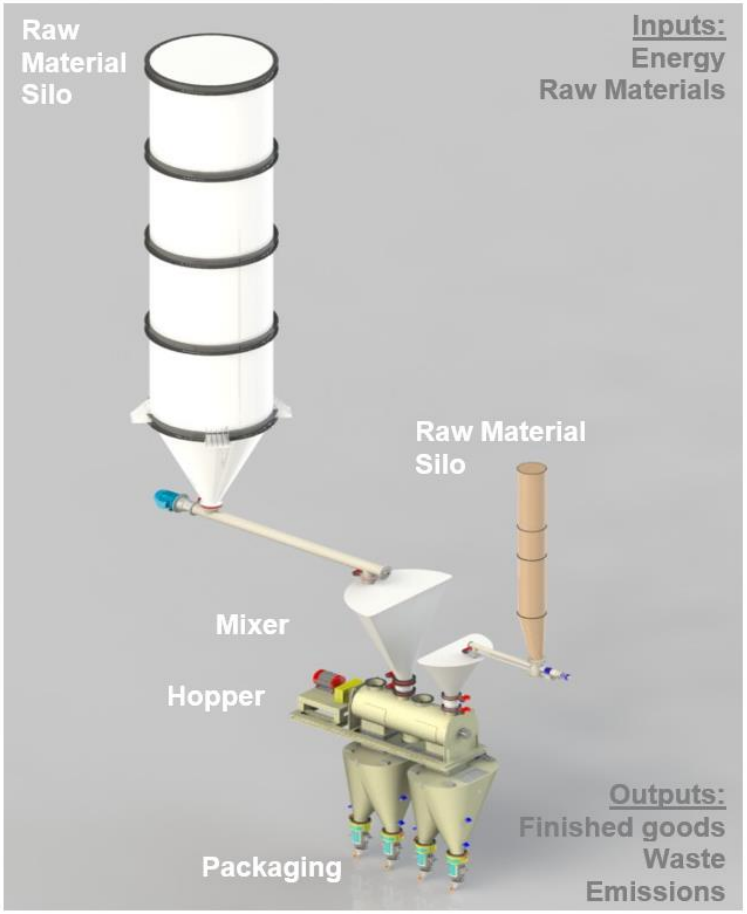
The manufacturing process also collect data on the combustion of refinery products, such as diesel and gasoline, related to the production process.

Packaging-related flows in the production process and all up-stream packaging are included in the manufacturing module, i.e. wooden pallets, paper sack and LDPE film.

Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. They are reported and allocated to the module where the packaging is applied. Data on packaging waste created during this step are then generated.

It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected and either recycled or incinerated with energy recovery.

*Manufacturing process flow diagram: Basic scheme of a Mortar Production line*




## Construction process stage, A4 - A5

**Description of the stage:**

The construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building

### A4, Transport to the building site

This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described in the following table.

| PARAMETER | VALUE (expressed per declared unit) |
|---|---|
| **Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.** | Average truck trailer 30 t payload, diesel consumption 38 liters for 100 km |
| **Distance** | 400 km |
| **Capacity utilisation (including empty returns)** | 83 % for lorries<br>30% of empty returns |
| **Bulk density of transported products** | 1750 kg/m$^3$ |
| **Volume capacity utilisation factor** | 1 (by default) |

**A5, Installation into the building.**

For the implementation of the product, mixer pump equipment is generally used for high volume purposes. Smaller volumes are mixed and applied according to local circumstances. A pump is generally used. The energy to run different equipment has been accounted for in relation to the product type and different uses.

Packaging materials are considered as landfilled in module A5.

| PARAMETER | VALUE (expressed per declared unit) |
|---|---|
| **secondary materials for installation (specified by materials)** | none |
| **Water use** | Webertec RIPARA 60 20,9 l/m$^2$ |
| **Other resource use** | none |
| **Quantitative description of energy type (regional mix) and consumption during the installation process** | 0,7524 MJ/m$^2$ |
| **Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)** | 5% losses during installation |
| **Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)** | Paper label: 0,5225 kg/m$^2$ to landfill<br>Paper+PE bag: 3,344 kg/m$^2$ to landfill<br>Polyethylene film: 3,605 kg/m$^2$ to landfill<br>Wooden pallet: 0,491 kg/m$^2$ to landfill |
| **Direct emissions to ambient air, soil and water** | none |

## Use stage (excluding potential savings), B1 - B7

**Description of the stage:**

The use stage is divided into the following modules: **Use – B1, Maintenance – B2, Repair – B3, Replacement – B4, Refurbishment – B5, Operational energy and water use – B6 and B7**

Once installation is complete, no actions or technical operations are required during the use stages until the end of life stage. The product does not require any energy, water or material input to keep it in working order. Furthermore, it is not exposed to the indoor atmosphere of the building, nor is it in contact with the circulating water or the ground.

The product covered by this EPD does not require any maintenance as it is aimed for pavements regularization. In addition, due to the product durability; maintenance, repair, replacement or restoration are irrelevant in the specified applications. Declared product performances therefore assume a working life that equals the building's lifetime. For this reason, no environmental loads are attributed to any of the modules between B1 and B5.

## End-of-life stage C1 - C4

**Description of the stage:**

Landfill is considered to be the worst scenario.

The end-of-life stage is divided into the following modules:

### C1, Deconstruction

The de-construction and/or dismantling of the product take part of the demolition of the entire building. In our case, a small amount of energy is considered 0.05 MJ/m²

### C2, Transport to waste processing

The model use for the transportation is applied.

### C3, Waste processing

The product is considered to be landfilled without reuse, recovery or recycling. No environmental loads are attributed to this stage.

### C4, Disposal

The product is considered to be landfilled

**Description of the scenarios and additional technical information for the end-of-life:**

| PARAMETER | VALUE (expressed per declared unit) / DESCRIPTION |
|---|---|
| **Collection process specified by type** | 1 $m^2$ collected with mixed construction waste. |
| **Recovery system specified by type** | 0% of waste |
| **Disposal specified by type** | 100% (1 $m^2$) product to municipal landfill |
| **Assumptions for scenario development (e.g. transportation)** | Average truck trailer with 30t payload, diesel consumption 38L/100km ; 100km distance to landfill |

Carbonation occurs during the end of life of mortar the CO2 uptake from air however it has not been calculated in compliance with FprEN 16757:2016.

## Reuse/recovery/recycling potential, D

100% of wastes are landfilled, so not recycling, recovery or reuse has been considered

# LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors from EC-JRC..Specific data has been supplied by the plant, and generic data come from GABI and Ecoinvent databases.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

All emissions to air, water, and soil, and all materials and energy used have been included.

LCA data results are detailed on the following tables and they refer to a declared unit of 1 $m^2$ of cement based Concrete Repair Mortars.

Description of the system boundary, X = Included in LCA, MND = Module Not Declared

| | PRODUCT STAGE | | | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction-Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-recovery |
| **Module** | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| **Modules declared** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **Geography** | IT | IT | IT | IT | IT | - | - | - | - | - | - | - | IT | IT | IT | IT | - |
| **Specific data used** | >90% GWP- GHG | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| **Variation products** | < 10% | | | | | - | - | - | - | - | - | - | - | - | - | - | - |
| **Variation sites** | Not relevant | | | | | - | - | - | - | - | - | - | - | - | - | - | - |

# Environmental Impacts

| | Environmental indicators | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, Recovery Recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  | Climate Change [kg CO2 eq.] | 5,23E+01 | 1,97E+00 | 9,94E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,70E-01 | 5,10E-01 | 0 | 1,46E+00 | 0 |
| | Climate Change (fossil) [kg CO2 eq.] | 5,81E+01 | 1,92E+00 | 3,81E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,70E-01 | 5,00E-01 | 0 | 1,59E+00 | 0 |
| | Climate Change (biogenic) [kg CO2 eq.] | -5,78E+00 | 5,00E-02 | 6,13E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,16E-04 | -8,48E-04 | 0 | -1,30E-01 | 0 |
| | Climate Change (land use change) [kg CO2 eq.] | 1,01E-02 | 1,12E-04 | 1,51E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,03E-05 | 4,09E-03 | 0 | 4,56E-03 | 0 |
|  | Ozone depletion [kg CFC-11 eq.] | 1,34E-06 | 2,83E-16 | 7,49E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,96E-17 | 9,27E-17 | 0 | 5,88E-15 | 0 |
|  | Acidification terrestrial and freshwater [Mole of H+ eq.] | 7,45E-02 | 3,17E-03 | 6,94E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,37E-03 | 2,93E-03 | 0 | 1,00E-02 | 0 |
|  | Eutrophication freshwater [kg P eq.] | 2,92E-03 | 3,69E-07 | 3,68E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,03E-07 | 1,54E-06 | 0 | 2,72E-06 | 0 |
| | Eutrophication freshwater [kg (PO4)3 eq.] | 8,97E-03 | 1,13E-06 | 1,13E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,16E-07 | 4,73E-06 | 0 | 8,35E-06 | 0 |
| | Eutrophication marine [kg N eq.] | 4,19E-02 | 1,32E-03 | 3,49E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,56E-04 | 1,41E-03 | 0 | 2,93E-03 | 0 |
| | Eutrophication terrestrial [Mole of N eq.] | 1,60E-01 | 1,00E-02 | 2,00E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,80E-03 | 2,00E-02 | 0 | 3,00E-02 | 0 |
|  | Photochemical ozone formation - human health [kg NMVOC eq.] | 1,34E-01 | 2,84E-03 | 9,17E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8,03E-04 | 2,67E-03 | 0 | 8,86E-03 | 0 |
|  | Resource use, mineral and metals [kg Sb eq.] | 7,16E-05 | 2,30E-08 | 4,24E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,22E-08 | 4,09E-08 | 0 | 1,42E-07 | 0 |
| | Resource use, energy carriers [MJ] | 5,43E+02 | 2,65E+01 | 3,68E+01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,70E+00 | 6,74E+00 | 0 | 2,08E+01 | 0 |
|  | Water scarcity [m³ world equiv.] | 8,35E+00 | 1,87E-03 | 5,00E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,68E-04 | 4,93E-03 | 0 | 1,70E-01 | 0 |

# Resources Use

| | Resources Use indicators | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| | Use of renewable primary energy (PERE) [MJ] | 1,45E+02 | 6,40E-01 | 7,26E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,00E-02 | 3,90E-01 | 0 | 2,72E+00 | 0 |
| | Primary energy resources used as raw materials (PERM) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total use of renewable primary energy resources (PERT) [MJ] | 1,45E+02 | 6,40E-01 | 7,26E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,00E-02 | 3,90E-01 | 0 | 2,72E+00 | 0 |
| | Use of non-renewable primary energy (PENRE) [MJ] | 6,66E+02 | 2,66E+01 | 4,30E+01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,71E+00 | 6,77E+00 | 0 | 2,08E+01 | 0 |
| | Non-renewable primary energy resources used as raw materials (PENRM) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total use of non-renewable primary energy resources (PENRT) [MJ] | 6,66E+02 | 2,66E+01 | 4,30E+01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,71E+00 | 6,77E+00 | 0 | 2,08E+01 | 0 |
| | Input of secondary material (SM) [kg] | 2,66 | 0 | 0,13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of renewable secondary fuels (RSF) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of non-renewable secondary fuels (NRSF) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Use of net fresh water (FW) [m3] | 2,50E-01 | 1,17E-04 | 1,00E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,54E-05 | 4,54E-04 | 0 | 5,25E-03 | 0 |

# Waste Category & Output flows

| | Waste Category & Output Flows | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  | Hazardous waste disposed (HWD) [kg] | 5,05E-04 | 1,71E-09 | 2,53E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,79E-10 | 3,13E-07 | 0 | 3,17E-07 | 0 |
|  | Non-hazardous waste disposed (NHWD) [kg] | 1,12E+00 | 5,38E-04 | 1,21E+01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,41E-03 | 1,07E-03 | 0 | 1,05E+02 | 0 |
|  | Radioactive waste disposed (RWD) [kg] | 1,72E-03 | 3,01E-05 | -1,68E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,55E-06 | 1,25E-05 | 0 | 2,37E-04 | 0 |
|  | Components for re-use (CRU) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Materials for Recycling (MFR) [kg] | 1,30E-01 | 0 | 6,37E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Material for Energy Recovery (MER) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Exported electrical energy (EEE) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Exported thermal energy (EET) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

| | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | D Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| GWP-GHG (kg CO2 eq.) | 5,72E+01 | 1,90E+00 | 3,73E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,60E-01 | 5,00E-01 | 0 | 1,55E+00 | 0 |

## Information on biogenic carbon content

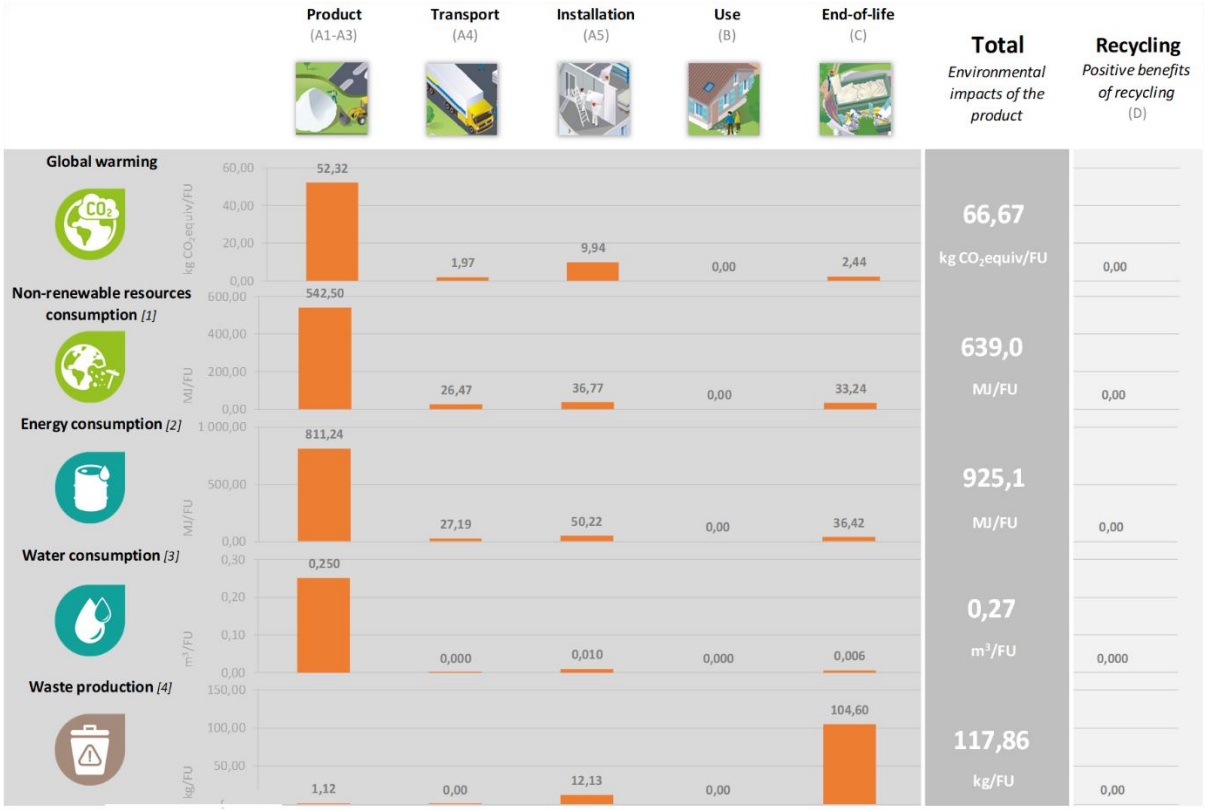
| | | Product stage |
|---|---|---|
| | **Biogenic Carbon Content** | **A1 / A2 / A3** |
| | Biogenic carbon content in product [kg] | **2,00E-02** |
| | Biogenic carbon content in packaging [kg] | **1,53E+00** |

*Note: 1 kg biogenic carbon is equivalent to 44/12 kg $CO_2$.*

The product contains a small quantity of biogenic carbon due to the additives used. Regarding packaging, wooden pallets and paper bag production is accounted for.

# LCA results interpretation

The following figure refers to a declared unit of 1m² cement based Concrete Repair Mortars




*[1] This indicator corresponds to the abiotic depletion potential of fossil resources.*
*[2] This indicator corresponds to the total use of primary energy.*
*[3] This indicator corresponds to the use of net fresh water.*
*[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.*

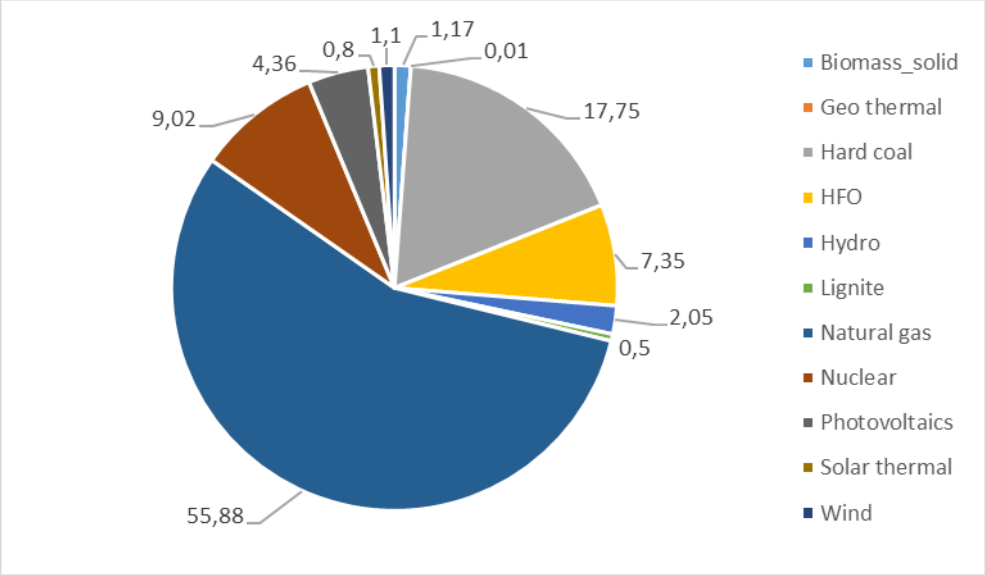
With the graphic views above, it is possible to assess which steps of the LCA are the most impacting for the chosen indicators

- The main environmental impacts of the product life cycle come from extraction and processing of raw materials (A1-A3). The Product stage is responsible for over 55% of the impact for following indicators: Climate Change, Ozone depletion, Acidification terrestrial and freshwater, Eutrophication freshwater, Eutrophication marine, Eutrophication terrestrial, Photochemical ozone formation - human health, Resource use, mineral and metals, Resource use, energy carriers and Water scarcity.

# Additional information

## Electricity description

| TYPE OF INFORMATION | DESCRIPTION |
|---|---|
| **Location** | Representative of Electricity purchased by Saint-Gobain Italy |
| **Geographical representativeness description** | Split of energy sources in Italy<br>– Biomass solid 1.17%<br>– Geo thermal 0.01 %<br>– Hard coal 17.75 %<br>– Fuel oil 7.35 %<br>– Hydro power 2.05 %<br>– Lignite 0.5 %<br>– Natural gas 55.88%<br>– Nuclear 9.02 %<br>– Photovoltaics 4.36 %<br>– Solar thermal 0.8%<br>– Wind power 1.1 % |
| **Reference year** | 2020 |
| **Type of data set** | Cradle to gate from Gabi database |
| **Source** | European Residual Mixes 2019. Association of Issuing Bodies 2020 |
| **Global warming potential (excluding biogenic Carbon)** | 0,592 kg of CO2 eq /kWh (based on Climate Change (fossil) indicator) |



## Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of 1m$^2$ cement based Concrete Repair Mortars to to use in the reconstruction or repair of deteriorated structural masonry structural elements according to EN 15804 +A1.

| | | Product stage | Construction stage | | Use stage | | | | | | | End of life stage | | | | Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| Environmental impacts | Global Warming Potential (GWP) [kg CO2eq.] | 5,72E+01 | 1,90E+00 | 3,73E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,60E-01 | 5,00E-01 | 0 | 1,55E+00 | 0 |
| | Ozone depletion (ODP) [kg CFC 11eq.] | 1,33E-06 | 3,78E-16 | 7,65E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6,62E-17 | 1,24E-16 | 0 | 7,84E-15 | 0 |
| | Acidification potential (AP) [kg SO2eq.] | 6,32E-02 | 2,29E-03 | 5,66E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,14E-03 | 2,01E-03 | 0 | 9,13E-03 | 0 |
| | Eutrophication potential (EP) [kg (PO4)3-eq.] | 1,09E-02 | 4,89E-04 | 4,71E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,10E-05 | 5,03E-04 | 0 | 1,03E-03 | 0 |
| | Photochemical ozone creation (POCP) - [kg Ethylene eq.] | 2,03E-02 | 1,58E-04 | 1,24E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8,38E-05 | 7,05E-05 | 0 | 7,36E-04 | 0 |
| | Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sbeq.] | 7,28E-05 | 2,40E-08 | 4,37E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,28E-08 | 4,57E-08 | 0 | 5,49E-07 | 0 |
| | Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ] | 5,00E+02 | 2,65E+01 | 3,44E+01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,69E+00 | 6,74E+00 | 0 | 2,02E+01 | 0 |

# References


1. EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0, dated 2021-03-29. www.environdec.com.
2. The International EPD System PCR 2019:14 version 1.11 Construction products
3. EN 15804:2012 + A2:2019 Sustainability of construction works ‑ Environmental product declarations ‑ Core rules for the product category of construction products
4. ISO 14 025: environmental labels and declarations – type III Environmental Declarations Principles and procedure (2009)
5. ISO 14 040: Environmental management – Life Cycle Assessment – Principles and framework (2006)
6. ISO 14 044: Environmental management – Life Cycle Assessment – Requirements and guidelines (2006)
7. ISO 14020:2000 Environmental labels and Declarations - General principles
8. EN 15978 Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method
9. FprEN 16757:2016 Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements