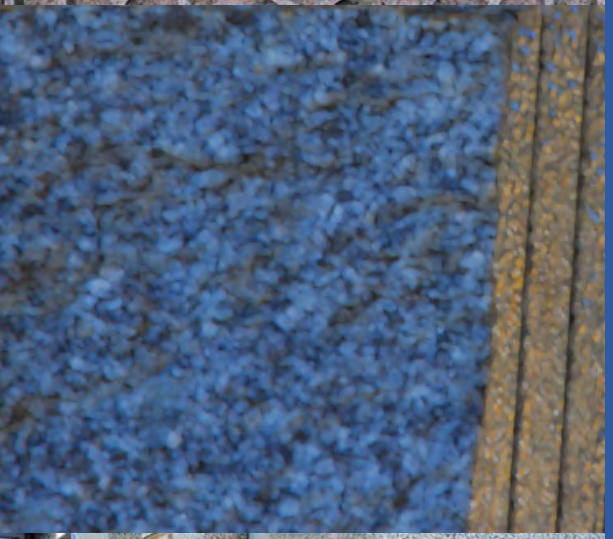

PLACE
OF PRODUCTION
**PIETRASANTA (LU),**
**ITALY**

# SAVEMA

## GRANITE MANUFACTURED PRODUCTS
## for ARCHITECTURAL/CONSTRUCTION WORKS

ENVIRONMENTAL PRODUCT DECLARATION
in accordance with ISO 14025:2006
and EN 15804 + A1: 2013

*PUBLISHED BY*
The International EPD® System
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S-P-04698

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2021 - 09 - 30

*APPROVAL DATE*
2021 - 04 - 26

*VALID UNTIL*
2026 - 04 - 25

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# S A V E M A - **GRANITE MANUFACTURED PRODUCTS *for* ARCHITECTURAL/CONSTRUCTION WORKS**

| | |
|---|---|
| Holder of the declaration | SAVEMA S. p. A. |
| Published by | INTERNATIONAL EPD SYSTEM |
| Declaration number | S-P-04698 |
| Publication date | 2021 - 09 - 30 |
| Approval date | 2021 - 04 - 26 |
| Valid until | 2026 - 04 - 25 |

## CEN STANDARD EN 15804 SERVED AS THE CORE PCR

### PCR 2012:01 CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES, VERSION 2.33

**PCR REVIEW was conducted by**

THE TECHNICAL COMMITTEE of the INTERNATIONAL EPD® System
- Chair: *Massimo Marino*
- Contact via **info@environdec.com**

**INDEPENDENT VERIFICATION of the DECLARATION and DATA, ACCORDING to ISO 14025**

EPD VERIFICATION (External)

**THIRD PART VERIFIER**

DNVGL BUSINESS ASSURANCE **www.dnvgl.it**

**ACCREDITED by**

ACCREDIA

SAVEMA

Savema has been founded in 1975 by initiative of two families, Piacentini and Volterrani, since many years in the stone business. Thanks to the founders' market talent and their long-term experience, in less than a decade Savema has established itself as one of the leading global players for the supply of architectural stone works for projects of high quality and large scale. At the same time, Savema started the processing and sales of marble, granite and other stone in slabs / semi-finished products, becoming one of the best-known producers for many marble workshops, importers and distributors worldwide.

PIETRA NATURALE

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# S A V E M A - **GENERAL INFORMATIONS**

## PRODUCT
Manufactured granite in various processes,
of 1 cm to 6 cm thick
and massive pieces/mouldings
(average thickness of 14 cm),
for buildings and construction works.

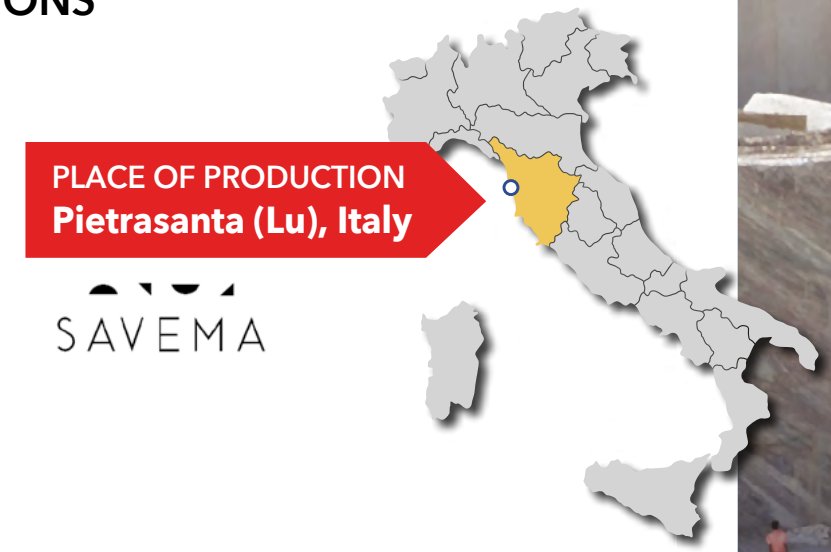
## DECLARATION BASED on PRODUCT CATEGORY RULES
CONSTRUCTION PRODUCTS
AND CONSTRUCTION SERVICES
2012:01 VERSION 2.33

## CPC CODE
151 – MONUMENTAL
AND BUILDING STONES

## COMPARABILITY
EPD of construction materials may
not be comparable except in accordance
with EN 15804 + A1: 2013

## PROGRAM HOLDER
International EPD ® System

## YEAR OF THE ANALYSIS
The data used refers to the year 2019.
Analysis carried out in the year 2020.

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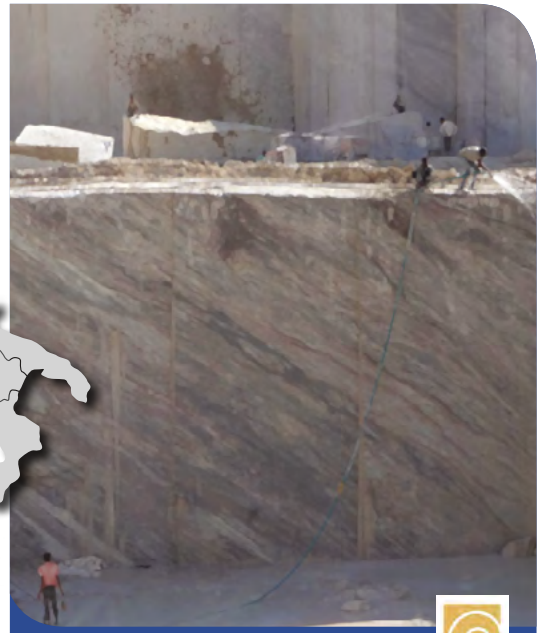
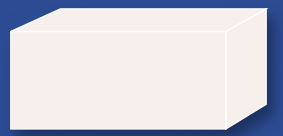


## DECLARED UNIT

1 m² of manufactured granite
in thickness from 1 cm to 6 cm
and massive pieces/mouldings
(average thickness 14 cm).

from 1 cm
to 6 cm



massive
pieces/mouldings
(average thickness
14 cm)

SAVEMA

International leader for the supply of marble, granite and other ornamental stones specialized in:

- **Architectural stonework** for exteriors or interiors for worldwide primary projects, including artistic and ornamental works.
- **Marble, granite, onyxes, travertine and limestone in slabs**, directed to international wholesalers and dealers.
- **Marble blocks**, quarried in Carrara area and other Italian and foreign quarries.

PIETRA NATURALE

## S A V E M A - **COMPANY DESCRIPTION**

SAVEMA S.p.A. is a working company in the natural stone business since 1975, located in Pietrasanta (LU), and in these forty years of activity has acquired a position of international leading company as far as production activity is concerned , workmanship and marketing of marbles, granites and other ornamental stones.

SAVEMA S.p.A. has currently an organic of around 100 employees among executives, employees and workers and has its own establishment in Pietrasanta (Lucca), legal and administrative headquarter of the company.

## S A V E M A - **PRODUCT DESCRIPTION**

The analyzed product is 1 $m^2$ of manufactured granite of varying thickness (from 1 to 6 cm and massive pieces/mouldings, of average thickness 14 cm).

| CHEMICAL COMPOSITION | % OF TOTAL | CHEMICAL COMPOSITION | % OF TOTAL |
|---|---|---|---|
| Silica ($SiO_2$) | 72% | Iron oxide ($Fe_2O_3$) | 1,20 % |
| Alluminium oxide ($Al_2O_3$) | 14,40 % | Magnesium oxide (MgO) | < 1 % |
| Potassium oxide ($K_2O$) | 4,10 % | Titanium dioxide ($TiO_2$) | < 0,50 % |
| Sodium oxide ($Na_2O$) | 3,70 % | Manganous oxide (MnO) | < 0,50 % |
| Calcium oxide (CaO) | 1,80 % | Phosphorus pentoxide ($P_2O_5$) | < 0,50 % |
| Iron oxide (FeO) | 1,70 % | | |

The final product may turn out in slabs of various sizes *(width and length)* processed on surface according to clients request *(polished, honed, flamed, etc.)*.

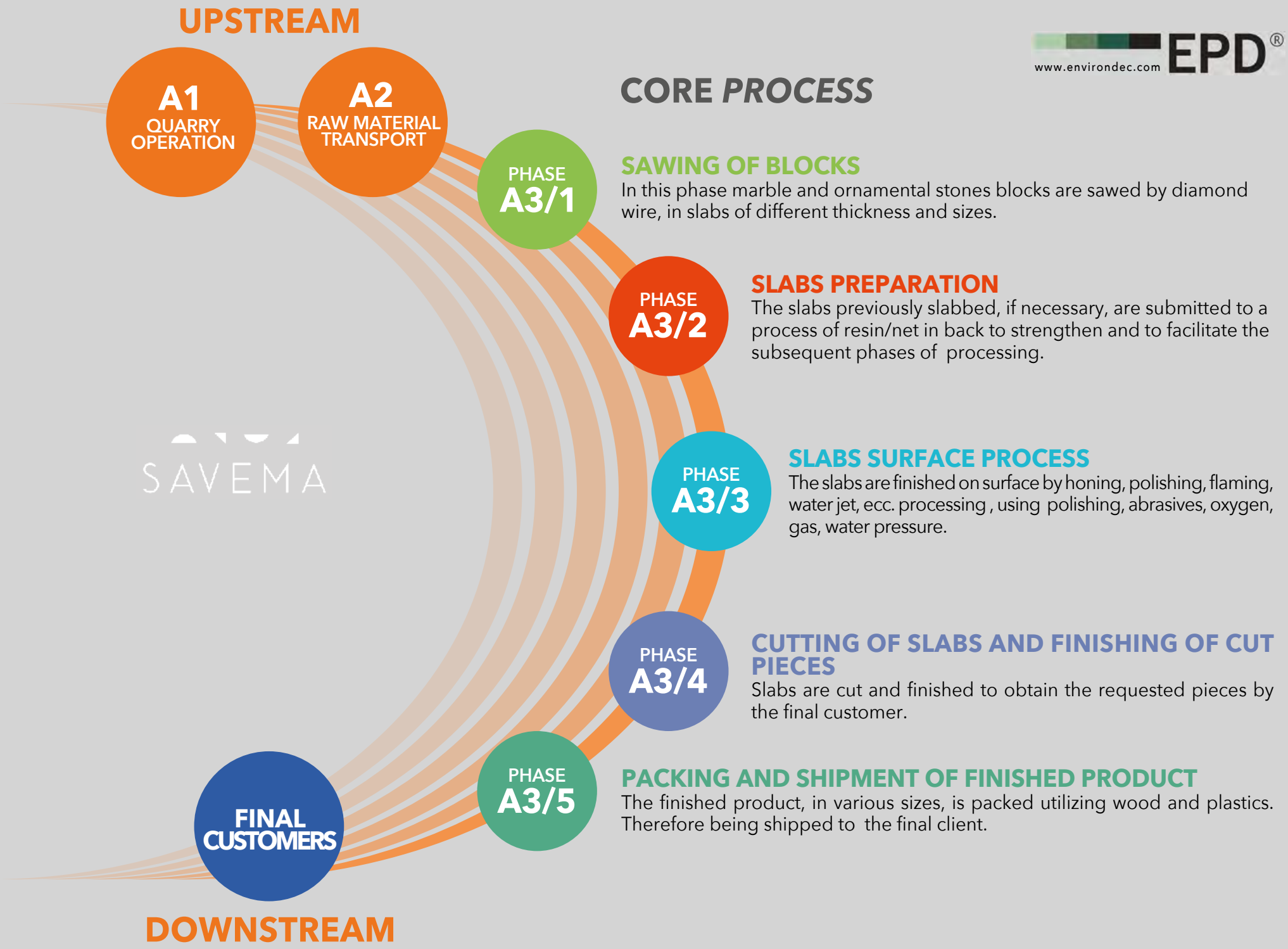
# S A V E M A - **SISTEMA SCOPE**

Here below is the process flow. The phase of extraction happens in quarries in Italy, Africa, Europe, Asia, South and North America.

The process of phases A3 is done in SAVEMA S.p.a factory in Pietrasanta, or external companies, however located in Italy.

The phase of packing and shipment is also done in Savema S.p.a. factory located in Pietrasanta.
The productive process calls for the fabrication of a co-product, identified with the term *«rough»* slabs, that is sold prior to phase A3/4 *"Cutting of slabs and finishing of cut pieces"*.

All impacts associated to the co-products were not considered in the impact's assessment of the final product.
All impacts associated with water treatment and disposal of waste produced have been considered. The impacts of the distribution of the product to the end customer were not considered.

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## CORE *PROCESS*

PHASE A3/1

### SAWING OF BLOCKS

In this phase marble and ornamental stones blocks are sawed by diamond wire, in slabs of different thickness and sizes.

PHASE A3/2

### SLABS PREPARATION

The slabs previously slabbed, if necessary, are submitted to a process of resin/net in back to strengthen and to facilitate the subsequent phases of processing.

PHASE A3/3

### SLABS SURFACE PROCESS

The slabs are finished on surface by honing, polishing, flaming, water jet, ecc. processing , using polishing, abrasives, oxygen, gas, water pressure.

PHASE A3/4

### CUTTING OF SLABS AND FINISHING OF CUT PIECES

Slabs are cut and finished to obtain the requested pieces by the final customer.

PHASE A3/5

### PACKING AND SHIPMENT OF FINISHED PRODUCT

The finished product, in various sizes, is packed utilizing wood and plastics. Therefore being shipped to the final client.

# S A V E M A - **THE ANALYSIS**
## SYSTEM SCOPE

| Product Stage | | | Construction Process Stage | | | Use Stage | | | | | | End Of Life Stage | | | | Resource Recovery Stage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw Materials | Transport | Manufacturing | Transport | Construction Installation | Use | Manteinance | 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 | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA | MNA |

X = Included in the analysis

MNA = Module not assessed

## ALLOCATION RULES

The allocation rules used, in accordance with the provisions of EN 15804 + A1: 2013, are specific for each material and the criteria used is that which is identified as the most relevant to the type of work performed. Allocation has been made even for the co-product, using the same criteria as that used for the finished product.
The allocation criteria used were:

- Time required to perform the processing *(elettricity, water)*;
- Criterion of allocation for mass *(oil, wood, plastics)*;
- Criterion of allocation for worked surface *(LPG, oxygen)*.

## QUALITY DATA

The data used for the environmental impact assessment of the A2 ed A3 phases are:

- Specific data collected at SAVEMA S.p.A site and referred to the year 2019 for the core activities *(consumption, distances etc)*;
- Selected generic data for almost all Ecoinvent processes used for the LCA model;
- Proxy data contribute to the final impacts is less than 5%.

## CUT-OFF CRITERIA

As raw material has been considered marble and ornamental stones, all energy consumption are included with the exception of the energy used for the processing of resin in the respect of the cut-off rule provided by the reference PCR.
Not included are materials of which the total weight does not exceed 5% of the total of the items input weight.
Some accessory materials were considered as significant during the various processing stages.
The total of the considered materials exceeds 99% of the materials used in the manufacturing process.

## GEOGRAPHICAL AND TEMPORAL BOUNDARIES

GEOGRAPHICAL BOUNDARIES UPSTREAM PROCESS ▶ Europe, Africa, Asia, South America, North America
GEOGRAPHICAL BOUNDARIES CORE PROCESS ▶ Province of Lucca, Italy
TEMPORAL BOUNDARIES ▶ Production data in the calendar year 2019

# S A V E M A - **ENVIRONMENTAL *PERFORMANCES***

| IMPACT CATEGORY | Reference Unit | 1 cm | 2 cm | 3 cm | 4 cm | 5 cm | 6 cm | 14 cm |
|---|---|---|---|---|---|---|---|---|
| ADP (fossil) | MJ | 1.06E+03 | 1.69E+03 | 1.81E+03 | 2.02E+03 | 2.46E+03 | 2.20E+03 | 6.06E+03 |
| ADP (el) | kg Sb eq | 3.20E-05 | 6.45E-05 | 9.63E-05 | 8.49E-05 | 1.10E-04 | 1.10E-04 | 3.60E-04 |
| AP | kg $SO_2$ eq | 4.36E-01 | 8.28E-01 | 1.12E+00 | 9.45E-01 | 1.19E+00 | 1.13E+00 | 3.89E+00 |
| EP | kg $PO_{4---}$ eq | 7.75E-02 | 1.36E-01 | 1.64E-01 | 1.61E-01 | 2.00E-01 | 1.84E-01 | 5.71E-01 |
| GWP | kg $CO_2$ eq | 7.73E+01 | 1.23E+02 | 1.30E+02 | 1.46E+02 | 1.78E+02 | 1.57E+02 | 4.32E+02 |
| GWP (w/out biogenic) | kg $CO_2$ eq | 7.70E+01 | 1.22E+02 | 1.29E+02 | 1.45E+02 | 1.77E+02 | 1.56E+02 | 4.29E+02 |
| GWP (biogenic) | kg $CO_2$ eq | 2.97E-01 | 6.04E-01 | 9.16E-01 | 7.95E-01 | 1.00E+00 | 1.07E+00 | 3.44E+00 |
| ODP | kg CFC-11 eq | 1.17E-05 | 1.84E-05 | 2.00E-05 | 2.22E-05 | 2.71E-05 | 2.43E-05 | 6.75E-05 |
| POCP | kg $C_2H_4$ eq | 1.72E-02 | 3.12E-02 | 4.04E-02 | 3.58E-02 | 4.48E-02 | 4.18E-02 | 1.39E-01 |

Since the data of impact among the different thicknesses differ for more than 10%,
the results are introduced for every average product in separate columns for each analyzed thickness
*(1 cm., 2 cm., 3 cm., 4 cm., 5 cm., 6 cm., massive pieces/mouldings).*

# S A V E M A - **ENVIRONMENTAL *PERFORMANCES***

| IMPACT CATEGORY | Reference Unit | 1 cm | 2 cm | 3 cm | 4 cm | 5 cm | 6 cm | Masselli (14 cm) |
|---|---|---|---|---|---|---|---|---|
| PERT | MJ | 4.36E+01 | 7.12E+01 | 7.87E+01 | 1.01E+02 | 1.24E+02 | 1.23E+02 | 3.01E+02 |
| PERM | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PERE | MJ | 4.36E+01 | 7.12E+01 | 7.87E+01 | 1.01E+02 | 1.24E+02 | 1.23E+02 | 3.01E+02 |
| PENRT | MJ | 7.55E+02 | 1.25E+03 | 1.47E+03 | 1.49E+03 | 1.83E+03 | 1.70E+03 | 4.96E+03 |
| PENRM | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRE | MJ | 7.55E+02 | 1.25E+03 | 1.47E+03 | 1.49E+03 | 1.83E+03 | 1.70E+03 | 4.96E+03 |
| SM | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FWT | $m^3$ | 5.03E+00 | 7.43E+00 | 6.33E+00 | 9.03E+00 | 1.08E+01 | 8.83E+00 | 2.09E+01 |

The impacts are aggregated for the A1-A3 phases, as required by the reference PCR.

# SAVEMA - **ENVIRONMENTAL *PERFORMANCES***

| IMPACT CATEGORY | Reference Unit | 1 cm | 2 cm | 3 cm | 4 cm | 5 cm | 6 cm | 14 cm |
|---|---|---|---|---|---|---|---|---|
| HWD | kg | 7.85E+01 | 1.27E+02 | 1.70E+02 | 1.45E+02 | 1.76E+02 | 1.76E+02 | 5.35E+02 |
| NHWD | kg | 4.34E-03 | 7.35E-03 | 9.22E-03 | 8.76E-03 | 1.08E-02 | 1.03E-02 | 3.15E-02 |
| RWD | kg | 3.42E-02 | 3.48E-02 | 3.47E-02 | 3.52E-02 | 3.57E-02 | 3.53E-02 | 3.89E-02 |

## ACRONYMS

| ENVIRONMENTAL IMPACTS | |
|---|---|
| **AP** | Acidification Potential |
| **$ADP_{el}$** | Abiotic Depletion Potential (elements) |
| **EP** | Eutrophication Potential |
| **ODP** | Ozone Depletion Potential |
| **GWP** | Global Warming Potential |
| **POCP** | Photochemical Ozone Creation Potential |
| **$ADP_f$** | Abiotic Depletion Potential (fossil) |

| RESOURCE CONSUMPTION | |
|---|---|
| **PERT** | Total use of renewable primary energy resources |
| **PERM** | Use of renewable primary energy resources used as raw materials |
| **PERE** | Use of renewable primary energy excluding renewable primary energy resources used as raw materials |
| **PENRT** | Total use of non-renewable primary energy resources |
| **PENRM** | Use of non-renewable primary energy resources used as raw materials |
| **PENRE** | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials |
| **SM** | Use of secondary material |
| **RSF** | Use of renewable secondary fuels |
| **NRSF** | Use of non-renewable secondary fuels |
| **FWT** | Total use of net fresh water |

| WASTE PRODUCTION | |
|---|---|
| **HWD** | Hazardous waste disposed |
| **NHWD** | Non-hazardous waste disposed |
| **RWD** | Radioactive waste disposed |

# S A V E M A - **DIFFERENCES *of* ENVIRONMENTAL *PERFORMANCES***

The updating of specific data of the production process and of some generic database processes have led to *significant changes in the environmental performance*.
In many cases results have undergone a variation (positive or negative) of more than 10%, so as expected in the GPI it was necessary to update the published environmental declaration.

The **variations in environmental performance** obtained are mainly due to **the following causes:**

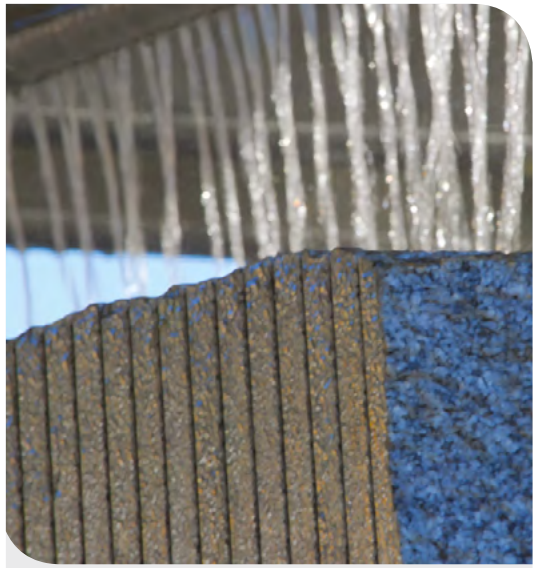
**VARIATIONS CAUSES ≥ 10%**

**Update** of the production model of the electricity consumed *(italian residual mix 2019)*

Running into full operation of **new production processes** *(p.e. bleaching)*

**Variations in the mix of processed materials**, and consequently in the supply distance of raw materials and processes performed, according to the changing market demands

**Processing of natural products** of which hundreds of varieties are present in nature with very different chemical-physical characteristics, which determine the ease of processing the material (given primarily by the different degree of hardness).



## CONCLUSIONS

To conclude, the variability of the mix of processed materials and of the of the production processes *(parameters linked both to the trend in demand)* every year are the basis of the variation of environmental performance of the various classes of materials and above all are the cause of the lack of correlation *(direct or reverse)* between thickness and environmental performance.

## DOCUMENTARY REFERENCES

- ISO 14025:2006
- EN 15804 + A1: 2013
- PCR 2012:01 Construction products and Construction services, Version 2.33
- General Programme Instructions 2.5

For data processing we have been used:
- Software: Open LCA 1.9
- Main Database: Ecoinvent 3.3
- Geographical scope EPD: Globale

*Environmental statements on construction products, recorded with different programs or constructed not in accordance with EN 15804 + A1: 2013, may not be comparable.*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