

# Environmental Product Declaration

as per ISO 14025 and EN 15804

Owner of the declaration: Officine Maccaferri S.p.A.

Publisher: Kiwa-Ecobility Experts

Programme operator: Kiwa-Ecobility Experts

Registration number: EPD-Kiwa-EE-000381-EN

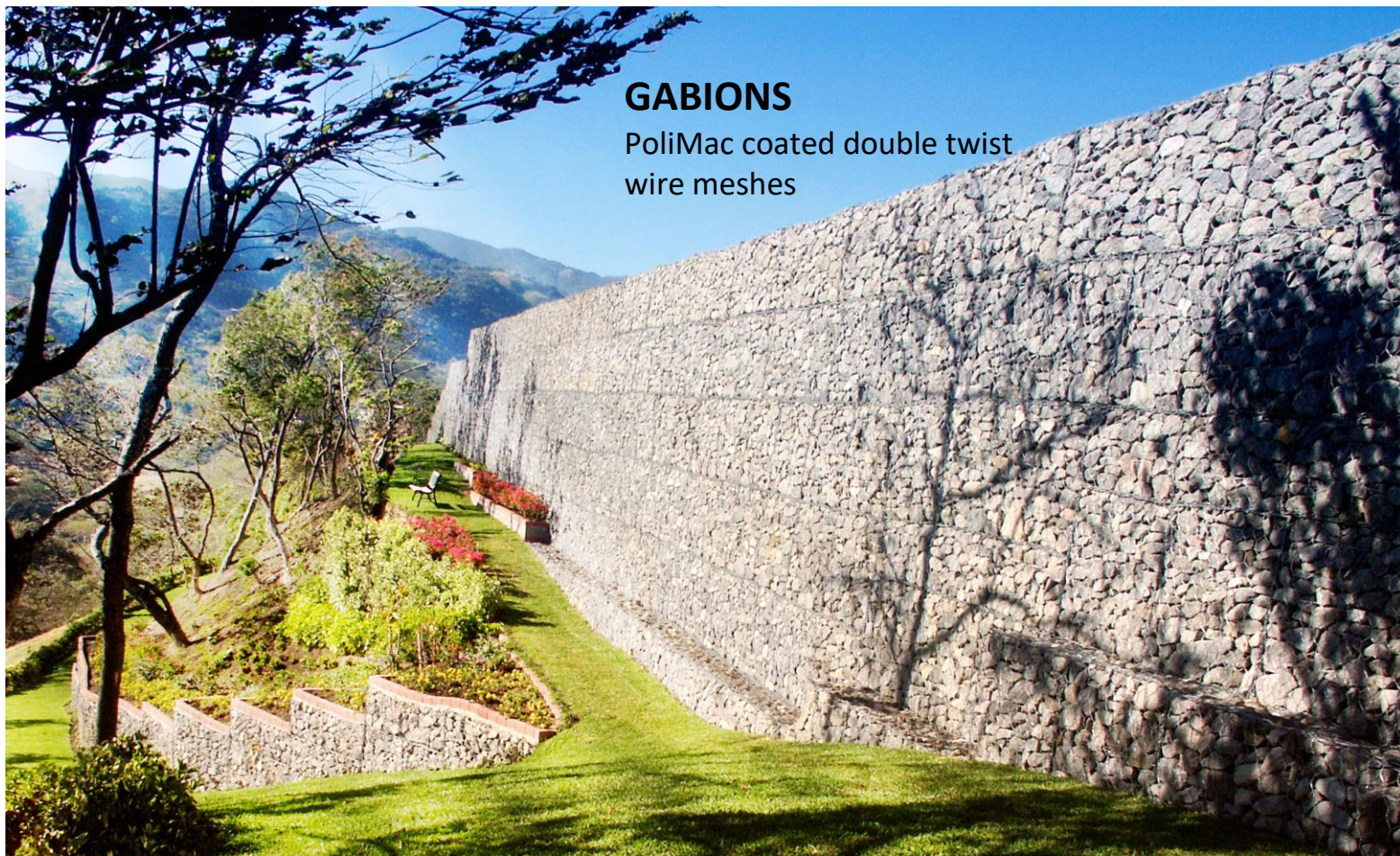
Issue date: 22.05.2024

Valid to: 22.05.2029



## GABIONS

PoliMac coated double twist wire meshes



**1. General information**

**Officine Maccaferri S.p.A.**

**Programme operator:**

Kiwa-Ecobility Experts  
 Kiwa GmbH, Ecobility Experts  
 Wattstraße 11-13  
 13355 Berlin  
 Germany

**Registration number:**

EPD-Kiwa-EE-000381-EN

**This declaration is based on the Product**

**Category Rules:**

PCR B – Product Category Rules for steel construction products, Requirements on the Environmental Product Declarations for steel construction products; Version 2020-03-13  
 PCR A: EPD program Version 2.1, 2022-02-14

**Issue date**

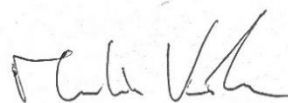
22.05.2024

**Valid to**

22.05.2029



Raoul Mancke  
 (Head of programme operations, Kiwa-Ecobility Experts)



Martin Koehrer  
 (Verification body, Kiwa-Ecobility Experts)

**GABIONS**

**Owner of the declaration:**

Officine Maccaferri S.p.A.  
 Via del Faggiolo, 1/12  
 40132 Bologna (BO)  
 Italia

**Declared product / declared unit:**

1 kg GABIONS PoliMac coated double twist wire meshes including distribution packaging.

**Scope:**

The EPD is based on the composition product GABION 8x10 2,7 PMC. The LCA results are also representative of the others Gabion products applying the scaling function reported in section 7.

Kiwa-Ecobility Experts assumes no liability for manufacturer's information, LCA data and evidence.

**Verification**

The European standard EN 15804+A2:2019 serves as the core PCR.

Independent verification of the declaration and data according to ISO 14025: 2010.

internal

external



Dr.-Ing. Morteza Nikravan  
 (External verifier of Kiwa GmbH)

## 2. Product

### 2.1 Product description

GABIONS are engineered steel wire baskets manufactured from hexagonal double twisted wire mesh, galvanised (zinc-aluminium alloy in accordance with EN 10244-2 and ISO 7989-2 - Class A) and with an additional polymer (PoliMac) coating.

Delivered flat-packed, gabions are assembled and then filled with stones at the project site. The following products name are covered by the present EPD.

- Jumbo Gabions are multiple cell gabions whose lid is made from a separate sheet of mesh, used on large scale civil engineering projects where large volumes of gabions are to be constructed.
- Cubiroc, Cubimac, ReadyMac are gabion units designed to be pre-filled with stones and ready to be installed on the project site.
- Maccaferri Green Gabions are modular gabion units used for streambank stabilization, restoration and erosion protection solutions.
- MacSoil is a prismatic (or trapezoidal) gabion element engineered from double twisted hexagonal woven steel wire mesh. It is used to form low-height retaining structures or revetment protection works and it has the final appearance of a vegetated natural slope.
- Sack gabions are cylindrical double twisted steel wire mesh units with a lateral opening to allow the stone filling on project site. The tubular units are then laced tightly shut. This modular unit is used to provide erosion protection for riverbanks, scour protection of bridge piers, or any situation that requires immediate defence from the erosion effects of water.
- Strong Face gabions are used when a gabion wall requires a stronger facing unit due to either heavy loadings or to abrasion forces acting onto the facia.

GABIONS comply with EN 10223-3:2013.



**2.2 Application (Intended Use of the product)**

There are several uses for these modular units and they are typically used to form flexible, permeable and monolithic structures such as retaining walls, channel linings, hydraulic control structures and erosion protection. They are increasingly being used in architectural applications as well.

The wide range of GABIONS are designed to suit specific project needs, from prefilled gabions to gabions specifically designed for use with soil bioengineering techniques.

GABIONS PoliMac coated are CE marked in compliance with Regulation (EU) 305/2011, according to EAD 200039 and EAD 200019.



**2.3 Reference Service Life (RSL)**

The typical service life is up to 120 years, according to related Declaration of Performance. Durability of the products are defined as per EN 10223-3 and tested accordingly.

**2.4 Technical data**

Characteristics (*)	Unit	Value
Tensile Strength (EN 10223-3:2013) MD	≥ 37	kN/m
Production route (EAF or BOF)	%	75.39 EAF – 24.61 BOF
Durability (EN 10223-3:2013)		120 years in environmental conditions C2, C3, C4 and C5 as per Annex A of EN 10223-3:2013

(\*) Further Performances are detailed in Declaration of Performance according to Regulation (EU) 305/2011.

**2.5 Substances of very high concern**

GABIONS PoliMac do not contain substances listed on the candidate list of Substances of Very High Concern, as published on the ECHA website, in concentrations exceeding 0,1 percentage by mass

**2.6 Base materials / Ancillary materials**

The composition of the reference products is reported in Table below. The products are implemented with galvanized steel wire (diameter 2.7 mm for the mesh and 3.4 for the edges), PoliMac coated (coating thickness 0.5 mm).

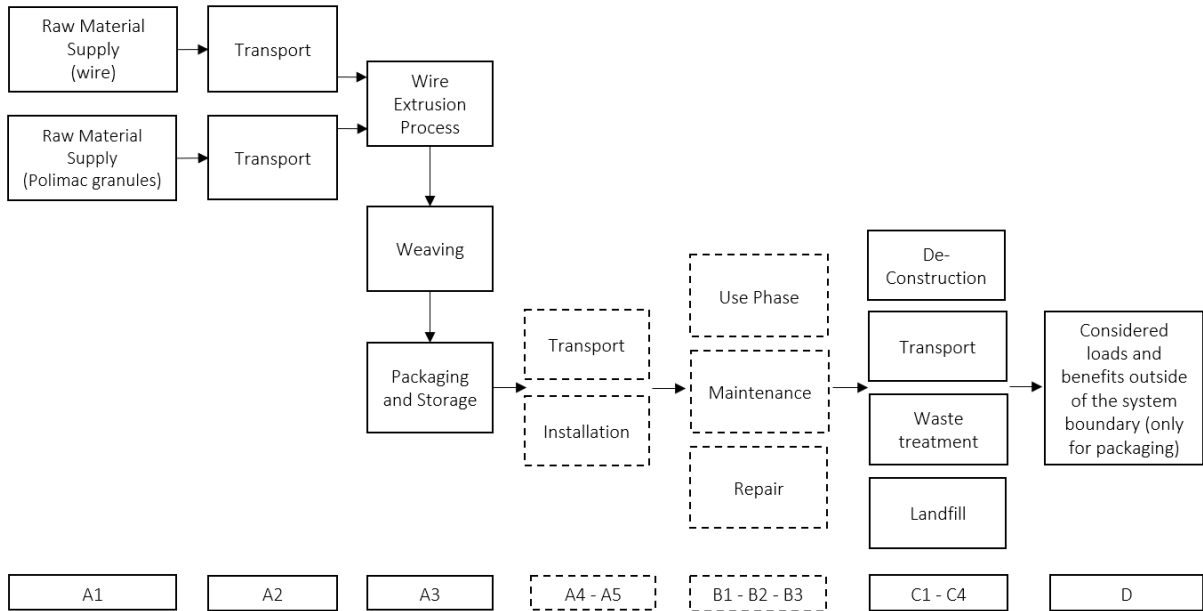
PoliMac is a high abrasion and UV resistant polymer extruded on the metallic wire specifically developed by Maccaferri.

Raw material	Unit	Value
PoliMac	kg	0.090
Steel (galvanized steel)	kg	0.938

The reference CPC code is 412 “Products of iron or steel”.

**2.7 Manufacturing**

The manufacturing is managed in Senica plant (Slovakia) by Maccaferri Manufacturing Europe s.r.o., in Shijak plant (Albania) by Maccaferri Balkans Sh.p.k., both subsidiaries of Officine Maccaferri S.p.A. The production process includes the weaving of the double twist wire mesh, starting from steel wire, onto which the PoliMac coating can be applied at the plant through the extrusion process.



**2.8 Other Information**

Further technical characteristics and information of the GABIONS are detailed and available on the Maccaferri website (<https://www.maccaferri.com/>).

According to Construction Product Regulation (EU) 305/2011 the essential technical characteristics, as per Harmonized Documents EAD 200039 and EAD 200019, are reported in the Declaration of Performances (DOP).

**3. LCA: Calculation rules**

**3.1 Declared unit**

In accordance with the PCR B, 1 kg of GABION PoliMac coated double twist wire meshes is chosen as the declared unit.

Product	Unit weight (kg)
GABION 2x1x1 8X10 D27 PMC	1

**3.2 Scope of declaration and system boundaries**

This a cradle to gate EPD with modules C1-C4 and module D. More precisely, the following processes were accounted for each module:

A1 - Production of raw materials used in the products, as well as the production of energy carriers used in the production process.

A2 - Transport of raw materials to the manufacturing site and internal handling

A3 - Manufacturing of the Officine Maccaferri GABIONS which includes the manufacturing steps reported in section 2.7 as well as the production of the distribution packaging and of the ancillary material. In addition, the treatment of waste generated from the distribution packaging are accounted for.

C1 - Disassembly of the packaging was considered to be insignificant and equal to zero.

C2 - Transport from collection point to waste processing and disposal site.

C3 - Shredding and sorting of fractions for recycling.

C4 - Landfill of material fractions not recycled.

D - Benefit and load beyond the product system.

Description of the system boundary																
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from manufacturer to place of use	Construction-in-stallation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction / demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

X=Module declared | MND=Module not declared

### 3.3 Geographical reference area

All process-specific data was collected for the operating year 2022-2023. Geographical reference area is global.

### 3.4 Cut-off Criteria

The cut-off applied are related to the packaging of chemicals products and lubricating oil used in the production process.

### 3.5 Allocation

A mass allocation based on the weight of the production volumes has been applied.

### 3.6 Data collection and reference time period

Specific data were collected at Senica plant (Slovakia) and at Shijak plant (Albania) considering an annual average referred to 2022-2023, whereas the most updated selected generic datasets available in the LCI databases were used for the other modules. Thus, in line with PCR A requirements, manufacturer-specific data is not older than 5 years and generic data is not older than 10 years.

### 3.7 Estimates and assumptions

The main assumptions are related to distances of inbound and background transportations. It was also assumed that liquid and gas auxiliaries are unpacked and supplied in tanker trucks.

### 3.8 Comparability

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. A comparability needs to be

evaluated. For further guidance see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

#### 4. LCA: Scenarios and additional technical information

As these products are used as structural components for retaining walls, channel linings, embankment protection, hydraulic control structures, erosion protection, drapery systems that control and prevent rock fall and the flow of loose debris, soil nailing systems and earth retaining structures: they are therefore intended to be embedded in a permanent manner in the engineering work in which they are used. For this reason, an end of life equal to zero was assumed.

Regarding the end of life of packaging components, the following scenarios were applied:

- The end-of-life plastic component was, conservatively, incinerated.
- The end of life of the wooden pallet was taken from the PEF Guidance.
- The end-of-life steel component was recycled.

Processes	Unit (expressed per FU or DU of components, products or materials and by type of material)	GABION 2x1x1 8X10 D27 PMC
Collection process specified by type	Kg collected separately	Polymer: 5.14E-04 kg
		Wood: 3.29E-03 kg
		Steel: 6.17E-04 kg
Recovery system specified by type	Kg for reuse	Wood: 9.87E-04 kg
	Kg for recycling	Steel: 6.17E-04 kg
	Kg for energy recovery	Wood: 1.04E-03 kg
Polymer: 5.14E-04 kg		
Disposal specified by type	Kg product or material for final deposition	Landfill (Wood): 1.23E-03 kg

#### 5. LCA: Results

The following tables show the results of the impact assessment indicators, resource use, waste and other output streams. The results presented here refer to the declared average product.

LCA results - Indicators describing environmental impacts based on the impact assessment (LCIA): 1 kg GABION 2x1x1 8X10 D27 PMC (EN 15804+A2)							
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
<b>Core environmental impact indicators (EN 15804+A2)</b>							
GWP-total	kg CO2 eqv.	1.59E+00	0.00E+00	3.71E-05	1.68E-03	3.66E-03	-1.22E-03
GWP-f	kg CO2 eqv.	1.58E+00	0.00E+00	3.73E-05	2.85E-05	1.37E-03	-1.22E-03
GWP-b	kg CO2 eqv.	5.31E-03	0.00E+00	-5.51E-07	1.65E-03	2.29E-03	-3.95E-06
GWP-luc	kg CO2 eqv.	1.24E-03	0.00E+00	3.45E-07	6.55E-09	9.11E-08	-1.68E-07
ODP	kg CFC 11 eqv.	9.95E-12	0.00E+00	3.26E-18	1.67E-16	3.94E-16	-6.67E-15
AP	mol H+ eqv.	5.08E-03	0.00E+00	1.96E-07	2.76E-07	6.95E-07	-1.77E-06
EPfr	kg P eqv.	3.46E-06	0.00E+00	1.36E-10	4.72E-11	3.79E-09	-1.55E-09
EPmar	kg N eqv.	1.57E-03	0.00E+00	9.46E-08	7.93E-08	8.58E-07	-4.89E-07
EPter	mol N eqv.	1.70E-02	0.00E+00	1.05E-06	1.14E-06	2.84E-06	-5.25E-06
POCP	kg NMVOC eqv.	4.86E-03	0.00E+00	1.85E-07	2.18E-07	1.47E-06	-1.44E-06
ADP-e	kg Sb-eqv.	3.73E-05	0.00E+00	2.42E-12	1.56E-12	4.47E-12	-7.06E-11
ADP-f	MJ	2.58E+01	0.00E+00	5.06E-04	4.22E-04	1.84E-03	-1.97E-02
WU	m3 world eqv.	1.48E-01	0.00E+00	4.29E-07	1.85E-04	1.32E-04	-9.29E-05
<b>Additional environmental impact indicators (EN 15804+A2)</b>							
PM	disease incidence	7.63E-08	0.00E+00	9.15E-13	1.85E-12	7.07E-12	-1.85E-11
IR	kBq U235 eqv.	1.29E-01	0.00E+00	9.47E-08	3.83E-06	5.04E-06	-2.19E-04
ETP-fw	CTUe	9.34E+00	0.00E+00	3.57E-04	1.74E-04	2.91E-03	-2.72E-03
HTP-c	CTUh	1.06E-09	0.00E+00	7.20E-15	1.79E-14	7.53E-14	-5.89E-13
HTP-nc	CTUh	1.90E-08	0.00E+00	3.18E-13	9.87E-13	9.01E-12	-4.55E-12
SQP	Pt	1.30E+01	0.00E+00	2.11E-04	1.29E-04	2.46E-04	-3.15E-03
<p><b>ADP-e</b>= Abiotic depletion potential for non-fossil resources   <b>ADP-f</b>=Abiotic depletion for fossil resources potential   <b>AP</b>= Acidification potential, Accumulated Exceedance   <b>EPfr</b> = Eutrophication potential, fraction of nutrients reaching freshwater end compartment   <b>EPmar</b>= Eutrophication potential, fraction of nutrients reaching marine end compartment  <b>EPter</b>= Eutrophication potential, Accumulated Exceedance  <b>GWP-b</b>=Global Warming Potential biogenic   <b>GWP-f</b>=Global Warming Potential fossil fuels   <b>GWP-luc</b>=Global Warming Potential land use and land use change  <b>GWP-total</b>=Global Warming Potential total  <b>ODP</b>=Depletion potential of the stratospheric ozone layer  <b>POCP</b>=Formation potential of tropospheric ozone   <b>WU</b>=Water (user) deprivation potential, deprivation- weighted water consumption   <b>ETP-fw</b>=Potential Comparative Toxic Unit for ecosystems   <b>HTP-c</b>=Potential Toxic Unit for Humans toxicity, cancer   <b>HTP-nc</b>= Potential Toxic Unit for humans, non-cancer   <b>IRP</b>=Potential Human exposure efficiency relative to U235, human health   <b>PM</b>=Potential incidence of disease due to Particulate Matter emissions   <b>SQP</b>=Potential soil quality index</p>							

Disclaimer on ADP-e, ADP-f, WU, ETP-fr, HTP-c, HTP-nc, SQP: The results of these environmental impact indicators must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

Disclaimer on IR: This impact category mainly addresses the potential effect of low dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposures, nor does it consider radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator.



**LCA results - Indicators describing resource use and environmental information derived from life cycle inventory (LCI): 1 kg GABION 2x1x1 8X10 D27 PMC (EN 15804+A2)**

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	6.82E+00	0.00E+00	3.58E-05	1.05E-04	2.52E-04	-4.75E-03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.82E+00	0.00E+00	3.58E-05	1.05E-04	2.52E-04	-4.75E-03
PENRE	MJ	2.58E+01	0.00E+00	5.08E-04	4.23E-04	1.84E-03	-1.97E-02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.58E+01	0.00E+00	5.08E-04	4.23E-04	1.84E-03	-1.97E-02
SM	Kg	7.49E-01	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M3	6.70E-03	0.00E+00	3.95E-08	4.35E-06	3.17E-06	-4.26E-06
HWD	Kg	4.74E-07	0.00E+00	1.88E-15	9.55E-15	1.11E-13	-9.99E-13
NHWD	Kg	7.74E-02	0.00E+00	7.32E-08	3.31E-05	8.48E-04	-1.25E-05
RWD	Kg	1.17E-03	0.00E+00	6.56E-10	2.39E-08	3.55E-08	-1.31E-06
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	Kg	4.80E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.17E-04
MER	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-03
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-03

PERE=Use of renewable primary energy excluding renewable primary energy resources used as raw materials | PERM= Use of renewable primary energy resources used as raw materials | PERT=Total use of renewable primary energy resources | PENRE= Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | PENRM= Use of non-renewable primary energy resources used as raw materials | PENRT= Total use of non-renewable primary energy resources | SM=Use of secondary material | RSF=Use of renewable secondary fuels | NRSF=Use of non-renewable secondary fuels | FW=Use of fresh water | HWD=Hazardous waste disposed | NHWD=Non-hazardous waste disposed | RWD=Radioactive waste disposed | CRU=Components for re-use | MFR=Materials for recycling | MER=Materials for energy recovery | EET=Exported energy, thermal | EE=Exported energy, electrical

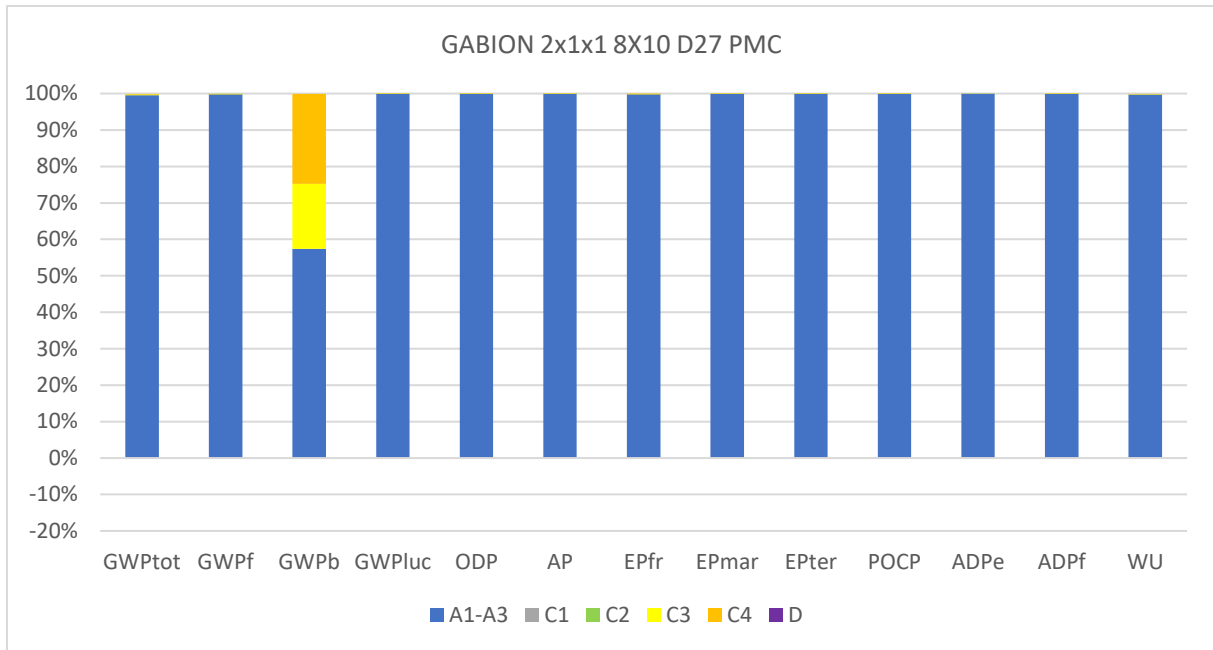
**LCA results - information on biogenic carbon content at the factory gate: 1 kg GABION 2x1x1 8X10 D27 PMC (EN 15804+A2)**

Parameter	Unit	Value
biogenic carbon content in product	kg C	0
biogenic carbon content in accompanying packaging	kg C	1.31E-03

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg CO2

**6. LCA: Interpretation**

The analysis of the contribution of each module to the impacts of GABION 2x1x1 8X10 D27 PMC is shown in the graph below. It can be observed that the impacts are driven by modules A1-A3, while the contribution of the other modules is about 1% for all impact categories analyzed, except for biogenic GWP, whose impacts are driven by the disposal of wood waste of distribution packaging. The contribution of module D is negligible (<1%) compared to modules A1-A3.



## 7. Scaling

The environmental impacts for the production phase (Module A1-A3) of specific **GABION** (product dimension/mesh dimension/wire diameter) products, defined by diameter of the weaving coated galvanized steel wire, are shown in the following tables. For other GABION the scaling function in the last column can be used, where 'x' represents the diameter of the weaving coated galvanized steel wire in mm/unit.

Product grade	Unit	GAB PMCGL 8X10 D30 2X1X1	GAB PMCGL 8X10 D27 2X1X1	GAB PMCGL 6x8 D27 2X1X1	GAB PMCGL 6X8 D22 2X1X1	Scaling Function
Unit diameter	mm/unit	3	2.7	2.7	2.2	x
<b>Core environmental impact indicators (EN 15804+A2)</b>						
GWP-total	kg CO <sub>2</sub> eqv.	1.56E+00	1.59E+00	1.59E+00	1.63E+00	-8.49E-02x+1.82E+00
GWP-f	kg CO <sub>2</sub> eqv.	1.56E+00	1.58E+00	1.58E+00	1.62E+00	-8.44E-02x+1.81E+00
GWP-b	kg CO <sub>2</sub> eqv.	5.19E-03	5.31E-03	5.32E-03	5.57E-03	-4.82E-04x+1.06E-02
GWP-luc	kg CO <sub>2</sub> eqv.	1.24E-03	1.24E-03	1.24E-03	1.24E-03	-4.17E-07x+1.24E-03
ODP	kg CFC 11 eqv.	9.99E-12	9.95E-12	9.95E-12	9.87E-12	1.51E-13x+9.54E-12
AP	mol H+ eqv.	5.06E-03	5.08E-03	5.08E-03	5.11E-03	-6.82E-05x+5.26E-03
EP-fr	kg P eqv.	3.44E-06	3.46E-06	3.46E-06	3.50E-06	-7.54E-08x+3.66E-06
EP-mar	kg N eqv.	1.56E-03	1.57E-03	1.57E-03	1.59E-03	-3.36E-05x+1.66E-03
EP-ter	mol N eqv.	1.69E-02	1.70E-02	1.70E-02	1.72E-02	-3.41E-04x+1.79E-02
POCP	kg NMVOC eqv.	4.82E-03	4.86E-03	4.87E-03	4.95E-03	-1.57E-04x+5.29E-03
ADP-e	kg Sb-eqv.	3.77E-05	3.73E-05	3.73E-05	3.65E-05	1.55E-06x+3.31E-05
ADP-f	MJ	2.50E+01	2.58E+01	2.58E+01	2.74E+01	-3.00E+00x+3.39E+01
WU	m <sup>3</sup> world eqv.	1.48E-01	1.48E-01	1.48E-01	1.48E-01	7.18E-06x+1.49E-01
<b>Additional environmental impact indicators (EN 15804+A2)</b>						
PM	disease incidence	7.64E-08	7.63E-08	7.63E-08	7.61E-08	4.03E-10x+7.52E-08
IR	kBq U235 eqv.	1.29E-01	1.29E-01	1.29E-01	1.28E-01	7.69E-04x+1.27E-01
ETP-fw	CTUe	8.94E+00	9.34E+00	9.37E+00	1.02E+01	-1.56E+00x+1.36E+01
HTP-c	CTUh	1.06E-09	1.06E-09	1.06E-09	1.06E-09	-5.45E-12x+1.07E-09
HTP-nc	CTUh	1.88E-08	1.90E-08	1.90E-08	1.95E-08	-9.50E-10x+2.16E-08
SQP	Pt	1.31E+01	1.30E+01	1.30E+01	1.28E+01	3.68E-01x+1.20E+01

Product grade	Unit	GAB PMCGL 8X10 D30 2X1X1	GAB PMCGL 8X10 D27 2X1X1	GAB PMCGL 6x8 D27 2X1X1	GAB PMCGL 6X8 D22 2X1X1	Scaling Function
Unit diameter	mm/unit	3	2.7	2.7	2.2	X
<b>Core environmental impact indicators (EN 15804+A2)</b>						
PERE	MJ	6.85E+00	6.82E+00	6.82E+00	6.75E+00	1.29E-01x+6.47E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
PERT	MJ	6.85E+00	6.82E+00	6.82E+00	6.75E+00	1.29E-01x+6.47E+00
PENRE	MJ	2.50E+01	2.58E+01	2.59E+01	2.74E+01	-3.01E+00x+3.40E+01
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+2.02E+01
PENRT	MJ	2.50E+01	2.58E+01	2.59E+01	2.74E+01	-3.01E+00x+3.40E+01
SM	Kg	7.57E-01	7.49E-01	7.49E-01	7.32E-01	3.12E-02x+6.64E-01
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
FW	M3	6.64E-03	6.70E-03	6.70E-03	6.81E-03	-2.12E-04x+7.27E-03
HWD	Kg	4.79E-07	4.74E-07	4.74E-07	4.64E-07	1.95E-08x+4.21E-07
NHWD	Kg	7.79E-02	7.74E-02	7.74E-02	7.65E-02	1.84E-03x+7.24E-02
RWD	Kg	1.18E-03	1.17E-03	1.17E-03	1.17E-03	1.23E-05x+1.14E-03
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
MFR	Kg	4.83E-02	4.80E-02	4.79E-02	4.73E-02	1.21E-03x+4.47E-02
MER	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00

The environmental impacts for the end-of-life phase (Module C1-C4) of specific **GABION** (product dimension/mesh dimension/wire diameter) products, defined by diameter of the weaving coated galvanized steel wire, are shown in the following tables. The end-of-life phase refers to packaging per kg of product only. For other GABION, therefore, the scaling function in the last column, where 'x' represents the diameter of the galvanized coated steel wire in mm/unit, remains constant.

Product grade	Unit	GAB PMCGL 8X10 D30 2X1X1	GAB PMCGL 8X10 D27 2X1X1	GAB PMCGL 6x8 D27 2X1X1	GAB PMCGL 6X8 D22 2X1X1	Scaling Function
Unit diameter	mm/unit	3	2.7	2.7	2.2	X
<b>Core environmental impact indicators (EN 15804+A2)</b>						
GWP-total	kg CO <sub>2</sub> eqv.	5.38E-03	5.38E-03	5.38E-03	5.38E-03	0.00E+00x+5.38E-03
GWP-f	kg CO <sub>2</sub> eqv.	1.43E-03	1.43E-03	1.43E-03	1.43E-03	0.00E+00x+1.43E-03
GWP-b	kg CO <sub>2</sub> eqv.	3.94E-03	3.94E-03	3.94E-03	3.94E-03	0.00E+00x+3.94E-03
GWP-luc	kg CO <sub>2</sub> eqv.	4.43E-07	4.43E-07	4.43E-07	4.43E-07	0.00E+00x+4.43E-07
ODP	kg CFC 11 eqv.	5.64E-16	5.64E-16	5.64E-16	5.64E-16	0.00E+00x+5.64E-16
AP	mol H+ eqv.	1.17E-06	1.17E-06	1.17E-06	1.17E-06	0.00E+00x+1.17E-06
EP-fr	kg P eqv.	3.98E-09	3.98E-09	3.98E-09	3.98E-09	0.00E+00x+3.98E-09
EP-mar	kg N eqv.	1.03E-06	1.03E-06	1.03E-06	1.03E-06	0.00E+00x+1.03E-06
EP-ter	mol N eqv.	5.03E-06	5.03E-06	5.03E-06	5.03E-06	0.00E+00x+5.03E-06
POCP	kg NMVOC eqv.	1.87E-06	1.87E-06	1.87E-06	1.87E-06	0.00E+00x+1.87E-06
ADP-e	kg Sb-eqv.	8.45E-12	8.45E-12	8.45E-12	8.45E-12	0.00E+00x+8.45E-12
ADP-f	MJ	2.77E-03	2.77E-03	2.77E-03	2.77E-03	0.00E+00x+2.77E-03
WU	m <sup>3</sup> world eqv.	3.17E-04	3.17E-04	3.17E-04	3.17E-04	0.00E+00x+3.17E-04
<b>Additional environmental impact indicators (EN 15804+A2)</b>						
PM	disease incidence	9.84E-12	9.84E-12	9.84E-12	9.84E-12	0.00E+00x+9.84E-12
IR	kBq U235 eqv.	8.96E-06	8.96E-06	8.96E-06	8.96E-06	0.00E+00x+8.96E-06
ETP-fw	CTUe	3.44E-03	3.44E-03	3.44E-03	3.44E-03	0.00E+00x+3.44E-03
HTP-c	CTUh	1.00E-13	1.00E-13	1.00E-13	1.00E-13	0.00E+00x+1.00E-13
HTP-nc	CTUh	1.03E-11	1.03E-11	1.03E-11	1.03E-11	0.00E+00x+1.03E-11
SQP	Pt	5.86E-04	5.86E-04	5.86E-04	5.86E-04	0.00E+00x+5.86E-04

Product grade	Unit	GAB PMCGL 8X10 D30 2X1X1	GAB PMCGL 8X10 D27 2X1X1	GAB PMCGL 6x8 D27 2X1X1	GAB PMCGL 6X8 D22 2X1X1	Scaling Function
Unit diameter	mm/unit	3	2.7	2.7	2.2	X
<b>Core environmental impact indicators (EN 15804+A2)</b>						
PERE	MJ	3.93E-04	3.93E-04	3.93E-04	3.93E-04	0.00E+00x+3.93E-04
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
PERT	MJ	3.93E-04	3.93E-04	3.93E-04	3.93E-04	0.00E+00x+3.93E-04
PENRE	MJ	2.77E-03	2.77E-03	2.77E-03	2.77E-03	0.00E+00x+2.77E-03
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
PENRT	MJ	2.77E-03	2.77E-03	2.77E-03	2.77E-03	0.00E+00x+2.77E-03
SM	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
FW	M3	7.57E-06	7.57E-06	7.57E-06	7.57E-06	0.00E+00x+7.57E-06
HWD	Kg	1.23E-13	1.23E-13	1.23E-13	1.23E-13	0.00E+00x+1.23E-13
NHWD	Kg	8.81E-04	8.81E-04	8.81E-04	8.81E-04	0.00E+00x+8.81E-04
RWD	Kg	6.01E-08	6.01E-08	6.01E-08	6.01E-08	0.00E+00x+6.01E-08
CRU	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
MFR	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
MER	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00x+0.00E+00

## 8. References

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