



MACCAFERRI

Environmental Product Declaration (EPD)
MACDRAIN M



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PROGRAMME RELATED INFORMATION

This EPD is developed under The International EPD ® System Programme Operator, in compliance with the General Program Instruction version 2.5. for the EPD development and the Product Category Rules PCR CPC 54 “Construction products and Construction services” 2012:01 version 2.2. More information about the International EPD ® System is available on the website <https://www.environdec.com/>

Founded in 1879, Officine Maccaferri is specialised in the development of engineering solutions for the civil and environmental construction industry. Its continued growth is based upon long-held values of innovation, integrity, excellent service and respect for the environment.

Our vision is to become a leading international provider of advanced solutions to the civil, geotechnical and environmental construction markets. We deliver solutions from retaining walls to hydraulic works and from rockfall mitigation systems to soil reinforcement.

By implementing a strategy of vertical integration, we research, manufacture materials, design, supply and build solutions within these fields. Our differentiating factor is our people and their knowledge capital, which we share with our clients to overcome their engineering challenges.



MacDrain M

MacDrain M* family includes products referenced as MacDrain M, MacGrass M* and Terradrain M*. All references are hereafter called MacDrain M products.

MacDrain M is a geocomposite for planar drainage (GCD) with a draining core in extruded monofilaments having a biconical cusped shape.

MacDrain M can be realized by alternatively thermobonding the drainage core with two filtering nonwoven geotextiles that may be working as separation or protection layers one filtering nonwoven geotextiles one filtering nonwoven geotextiles and one polymeric reinforced membrane.

The external layers of MacDrain M are chosen according to the specific application requirements.

MacDrain M is used for drainage purposes in hydraulic works, landfills, planar and vertical drainage of structures. MacDrain drainage geocomposites replace traditional granular drainage stone with reliable, lab-tested hydraulic performance. MacDrain reduces:

- the cost of the drainage system
- the quantity of quarried materials
- the polluting truck movements needed to deliver the gravels

MacDrain geocomposite offer reliable and long-term drainage capacity unlike gravel drains which can become clogged by fines in suspension within water.

The products covered by the present EPD are produced in Officine Maccaferri plant in Slovakia.

The process of analysis has been performed on a sample of products variants selected against the production mass criteria and representing 70% of total production.

(*) MacGrass M was not produced in the reference year (2016-2017) as the production restarted in 2018. TerraDrain M has been produced continuously, as MacDrain M.



2.1 THE PRODUCTION PROCESS

The production process (Figure 4) of MacDrain M is the implementation of the core (geomat), through an extrusion process of the polymer.

The whole set of products under analysis are made of a geomat. Additional elements may be thermo-bonded to improve the performance of the product, e.g. a geotextile.

Technical Characteristics of the MACDRAIN M range products are listed and detailed in the technical data sheet available on Maccaferri website. According to Construction Product Regulation CEE 305/2011 the essential technical characteristics, as per Harmonized Document EN 13252:2016, are reported in the Declaration of Performances (DOP).

This EPD describes the impacts of the MacDrain M products, produced in Slovakia, using a reference product which is the most produced product variant in the plant for the reference year. The results reported in this EPD are representative of the production of the MacDrain M product family.

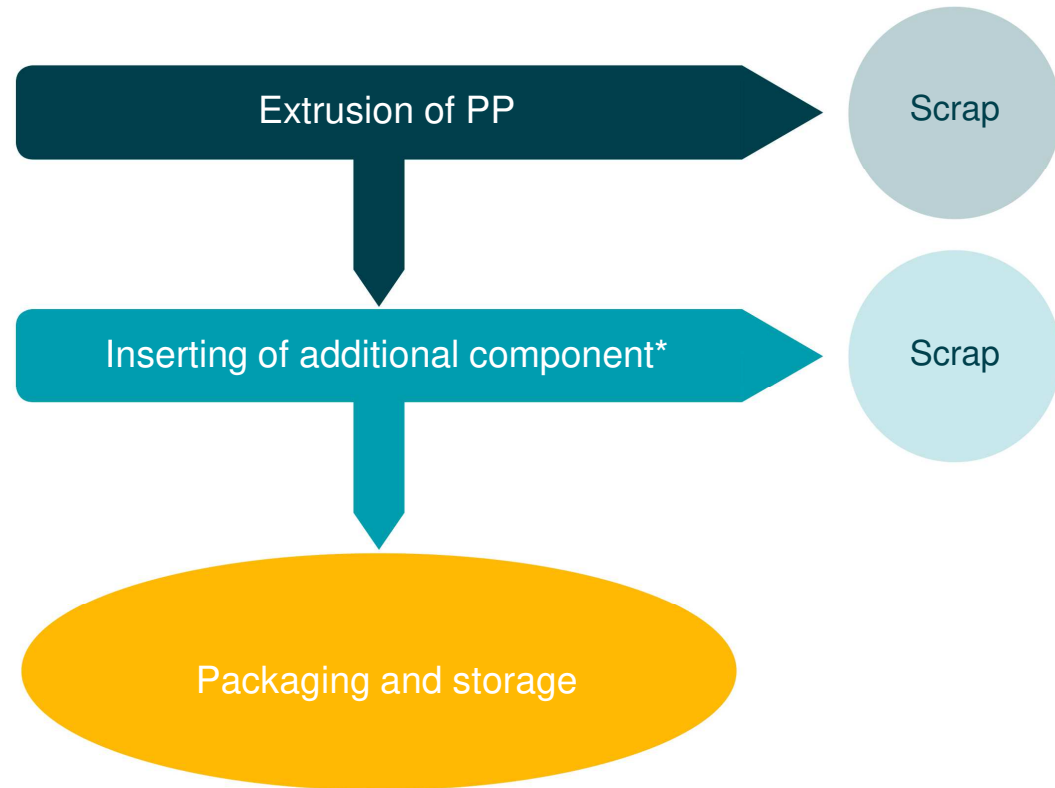


Figure 4: Production process of the MacDrain M

2.2 PRODUCT COMPOSITION

The composition of the reference products is reported in Table 1.

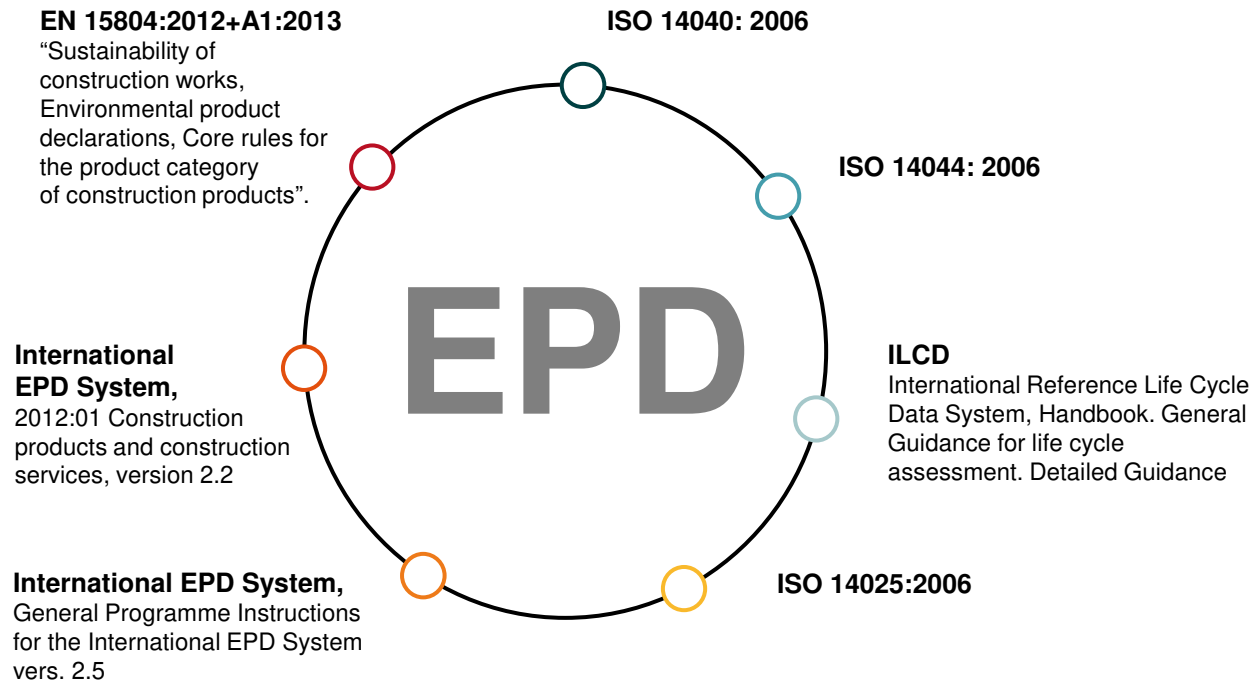
The content of SVHC does not exceed 0.1 % of the total weight.

PRODUCT COMPOSITION OF THE MACDRAIN M (REFERENCE PRODUCT)	
MACDRAIN M 1181	
BoM - contribution (% in weight) of materials to the declared unit – 1 kg of product	
Polypropylene	99.19
Master Batch Polypropylene	0.081
Stretch Foil (Packaging)	0.004

Table 1: BoM of the reference product for the MacDrain M

3.1 METHODOLOGY

The study behind the present EPD has been performed according to the state of art of the LCA methodology, with specific reference to the construction sector, in accordance to the following standard and guide lines:



The goal of the study is the evaluation of the potential environmental impacts of MacDrain M.

The EPD is mainly addressed to the business-to-business communication. The data elaboration has been performed with the Gabi software, version 8.0.6.0.20. The database used are the most updated ones implemented in Gabi software. More in detail, main database used is thinkstep. The LCIA method used is CML 2001 version 4.2 (April 2013).






3. ENVIRONMENTAL PRODUCT DECLARATION

3.2 DECLARED UNIT

The declared unit is 1 kg of MacDrain M, plus its packaging.

3.3 SYSTEM BOUNDARY

The EPD only covers the Cradle to Gate stage (as represented in Table 4 and in showed in Figure 4) because other stages are very dependent on particular scenarios and are better developed for specific construction works.

 PRODUCT STAGE	A1	Raw Material Supply	X
	A2	Transport	X
	A3	Manufacturing	X
 CONSTRUCTION PROCESS STAGE	A4 to A5	Transport from the gate to the installation site, Construction/ Installation	Mnd*
 USE STAGE	B1 to B7	Use, Maintenance, Repair, Replacement, Refurbishment, Operational energy use, Operational water use	Mnd*
 END-OF-LIFE STAGE	C1 to C4	Deconstruction/Demolition, Transport, Waste processing, Disposal	Mnd*
 BENEFITS and LOADS BEYOND SYSTEM BOUNDARY	D	Reuse, Recycling potential	Mnd*

* Module Not Declared

Table 2: Life cycle stages included in the study for Officine Maccaferri MacDrain M

3. ENVIRONMENTAL PRODUCT DECLARATION

The following stages are included in the study:

Raw Materials supply (A1). Production of raw materials used in the products, of as well as the production of energy carriers used in the production process.

Transport of raw materials to the factory (A2).

Manufacturing of the Officine Maccaferri MacDrain M (A3).
It includes the following production phases:

- Extrusion of the polymer
- Inserting of additional elements, if any
- Final check on finished product and packaging.

Moreover, in module A3, the production of primary packaging and of the ancillary materials and the treatment of waste generated from the manufacturing processes are accounted for.

The electricity used in the manufacturing processes is from the national grid..

The reference year of the study is from November 2016 to October 2017.

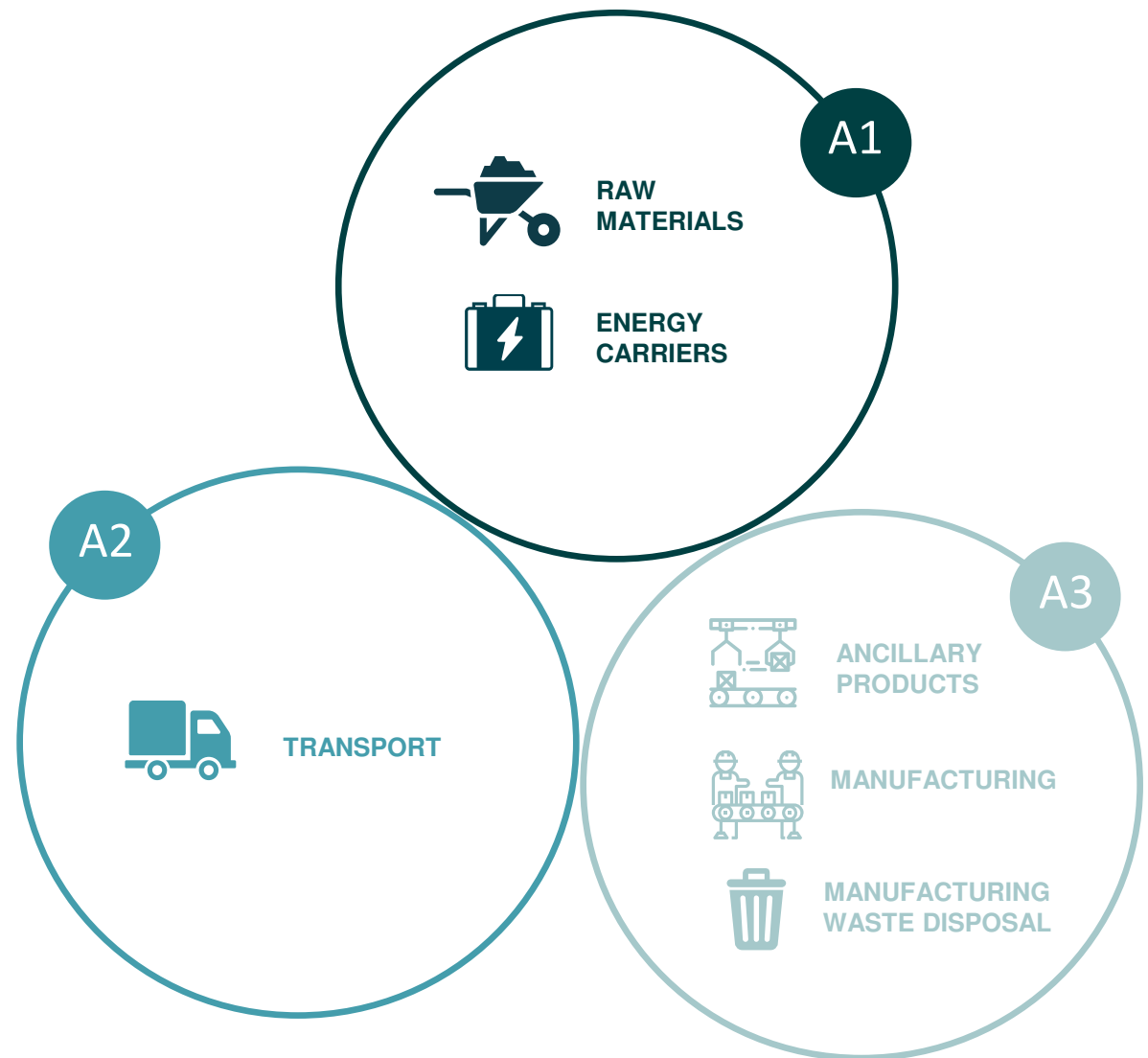


Figure 5: System boundaries for the Officine Maccaferri MacDrain M

3.4 MAIN ASSUMPTIONS, CUT OFFS AND BACKGROUND DATA INFORMATION

Regarding the exclusion of product life cycle stages and processes, the capital goods have not been accounted for, as well as the use and the end of life phases.

The main assumptions applied in the study are reported below.

- For the majority of the raw materials as well as for the packaging for the finished products an European production is assumed.
- A default mean a transportation (truck Euro 4 > 32 t) with an utilisation ratio of 0,61 has been assumed when primary data on transport size were not available.
- For the energy consumption and the ancillary consumption in the manufacturing process, a mass-based allocation has been applied.

The construction of the manufacturing site (capital goods) is not included in the LCA study.

Background data used in the study are from LCI database and are not older than 5 years.

3.5 PARAMETERS DESCRIBING THE ENVIRONMENTAL IMPACTS

The variability of impacts among products in the family of MacDrain M is lower than -10%. More in detail, it runs from -1.74% in ADP elements to -0.33% in ADP fossil.

IMPACT CATEGORY	MacDrain M– Modules A1-A3
	MacDrain M 1181
Abiotic Depletion (ADP fossil) [MJ]	7,54E+01
Abiotic Depletion (ADP elements)[kg Sb-Equiv.]	5,42E-07
Acidification Potential (AP) [kgSO2-Equiv.]	4,67E-03
Eutrophication Potential (EP_ [kgPhosphate-Equiv.]	5,15E-04
Global Warming Potential (GWP 100 years) [kgCO2-Equiv.]	2,30E+00
Ozone Layer Depletion Potential(ODP, steady state) [kg R11-Equiv.]	1,86E-11
Photochem. Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	5,23E-04

Table 3: Environmental profile for Officine Maccaferri MacDrain M

3. ENVIRONMENTAL PRODUCT DECLARATION

3.6 INDICATORS OF RESOURCES USE

INDICATOR OF RESOURCES	MacDrain M Modules A1-A3
	MacDrain M 1181
Use of renewable primary energy excluding renewable primary resources used as raw materials [MJ, net calorific value]	4,29E+00
Use of renewable primary energy resources used as raw materials [MJ, net calorific value]	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) [MJ, net calorific value]	4,29E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ, net calorific value]	3,42E+01
Use of non-renewable primary energy resources used as raw materials [MJ, net calorific value]	4,74E+01
Total use of non-renewable primary energy resources(primary energy and primary energy resources used as raw materials) [MJ, net calorific value]	8,16E+01
Use of secondary material [kg]	0,00E+00
Use of non renewable secondary fuels [MJ, net calorific value]	4,01E-22
Use of renewable secondary fuels [MJ, net calorific value]	3,41E-23
Use of net fresh water [m^3]	2,64E-02

Table 4: Indicators of resources use for Officine Maccaferri MacDrain M

3. ENVIRONMENTAL PRODUCT DECLARATION

3.7 INDICATORS OF WASTE AND OUTPUT FLOWS

INDICATOR OF WASTE	MacDrain M – Modules A1-A3
	MACDRAIN M 1181
Hazardous waste disposed [kg]	6,85E-08
Non-hazardous waste disposed [kg]	2,51E-02
Radioactive waste disposed [kg]	2,45E-03

Table 5: Indicators of waste for Officine Maccaferri MacDrain M

INDICATOR OF OUTPUT FLOWS	MacDrain M – Modules A1-A3
	MACDRAIN M 1181
Materials for energy recovery [kg]	1,02E-02
Materials for recycling [kg]	1,23E-02

Table 6: Indicators of output flows for Officine Maccaferri MacDrain M

EC-JRC, 2010. International reference Life Cycle data System Handbook. General Guidance for life cycle assessment. Detailed Guidance

Ecoinnovazione, 2018. Technical report: LCA study of Geosynthetic product for civil engineering works

EN 15804:2012+A1:2013 “Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”

International EPD® System, 2017. General Programme Instructions for the International EPD System, vers. 2.5

International EPD® System, 2012. PCR 2012:01 Construction products and construction services, version 2.2

International Organisation for Standardization (ISO), 2006a Environmental management – Life Cycle assessment – Principles and framework. ISO 14040:2006, Geneva

International Organisation for Standardization (ISO), 2006b Environmental management – Life Cycle assessment – Requirements and guidelines. ISO 14044:2006, Geneva

International Organisation for Standardization (ISO), 2006c Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures. ISO 14025:2006, Geneva

ENVIRONMENTAL IMPACT: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects [ISO 14001:2004].

ENVIRONMENTAL DECLARATION: Claim which indicates the environmental aspects of a product or service. An environmental label or declaration may take the form of a statement, symbol or graphic on a product or package label, in product literature, in technical bulletins, in advertising or in publicity, amongst other things. [ISO 14020:2000].

HAZARDOUS WASTE: Hazardous waste is waste that poses substantial or potential threats to public health or the environment [EPD, General Programme Instructions 2.5].

IMPACT CATEGORY: Class representing environmental issues of concern to which life cycle inventory analysis results may be assigned [ISO 14040:2006]

LIFE CYCLE ASSESSMENT (LCA): Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle [ISO 14040:2006]

PRODUCT CATEGORY RULES (PCR): Set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more product categories [ISO 14025:2006].

RAW MATERIAL: Primary or secondary material that is used to produce a product. Secondary material includes recycled material. [ISO 14040:2006]

RECOVERED MATERIAL (SECONDARY MATERIAL): Material that would have otherwise been disposed of as waste or used for energy recovery, but has instead been collected and recovered as a material input, in lieu of new primary material, for a recycling or a manufacturing process. [ISO 14021:1999].

SYSTEM BOUNDARY: Set of criteria specifying which unit processes are part of a product system [ISO 14040:2006].

SVHC: Substances that may have serious and often irreversible effects on human health and the environment can be identified as substances of very high concern (SVHCs). If a substance is identified as an SVHC, it will be added to the Candidate List for eventual inclusion in the Authorization List of the REACH Regulation). The inclusion in this list implicates legal duties for manufacturers, importers or companies, which use those substances as such, in formulation or in their products.

6.1 ADDITIONAL INFORMATION CONCERNING THE PROGRAMME AND THE EPD

EPDs within the same product category but from different programme may not be comparable.

EPDs 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. This EPD and the PCR CPC 54 “Construction products and Construction services” are available on the website of The International EPD System (www.environdec.com).

The verifier and the Programme Operator do not make any claim nor have any responsibility of the legality of the products included in the present EPD.

The LCA study and the present EPD have been issued with the technical scientific support of Ecoinnovazione S.r.l., spin-off ENEA (<http://ecoinnovazione.it/?lang=en>).

6.2 ADDITIONAL INFORMATION ON THE PRODUCTS AND ON THE COMPANY

MacDrain M units covered by the present EPD are produced in Slovakia (Senica) plant. The management and production system of the plant is certified in compliance to ISO 9001.

For further information on product characteristics, typical applications, technical datasheet and case histories, please visit our website (maccaferri.com) or contact us info@maccaferri.com


6.3 DIFFERENCES VS PREVIOUS VERSION

Editorial changes occurred:

- respect the 1st version in order to delete the reference to Maccaferri Industrial Group in paragraph 1;
- respect the 2nd version in order to add the name of TerraDrain and MACGRASS M in paragraph 2.

7. VERIFICATION AND REGISTRATION

CEN standard EN 15804 served as core PCR

EPD Programme:	The International EPD® System. For more information - www.environdec.com
PCR:	PCR 2012:01 Construction products and construction services version 2.2
PCR review was conducted by:	The Technical Committee of the International EPD® System. Contact via info@environdec.com
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