



## ENVIRONMENTAL PRODUCT DECLARATION

*In accordance with UNE-EN ISO 14025:2010 y UNE-EN 15804:*

*EN 15804:2012 + A2:2019*

MDi

Programm:

The International EPD® System,  
[www.environdec.com](http://www.environdec.com)

Operator programm:

EPD International AB

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This EPD must provide current information and may be updated if conditions change. Therefore, the indicated validity is subject to further registration and publication in [www.environdec.com](http://www.environdec.com)

 INALCO

## Programme Information

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Product category rules (PCR):	<b>PCR 2019:14 Construction products version 1.2.5 (EN 15804+A2)</b>
<p>The PCR review was performed by: The Technical Committee of the International EPD® System. Full list of members available at <a href="http://www.environdec.com">www.environdec.com</a> (Members of the Committee were requested to state any potential conflict of interest with the PCR moderator or PCR committee and if so were excused from the review)</p> <p>Chair: Claudia A.Peña. Contact Via <a href="mailto:info@environdec.com">info@environdec.com</a></p>	
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<p>The procedure for tracking data during the validity of the EPD involves a third-party verifier:</p> <p><input checked="" type="checkbox"/> Yes   <input type="checkbox"/> No</p>	
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<p>Desarrollo de la EPD: <b>SGS TECNOS S.A.U</b></p> <div style="text-align: right;">  </div>	

The owner of the EPD presents the exclusive ownership and responsibility of the EPD. EPDs within the same product category, but from different programs may not be comparable. EPD construction products may not be comparable if they do not comply with the EN 15804 standard. For more information on comparability, see EN 15804 and ISO 14025.

## 1. OVERVIEW

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### 1.1 Company Overview

**INALCO** is a globalized company whose mission is to **provoke** change through global **leadership** in innovation, creating new solutions, technological and fashion trends to conquer the **future** generating the greatest differentiation and maximum **added value** by basing its business philosophy on five fundamental pillars: **Ethics, Innovation, Quality, Service-marketing and Sustainability.**



**ECOINALCO** is **INALCO's** public commitment to the environment and society and includes all human and technological resources aimed at preventing the environmental impact derived from its industrial activity, continuously reviewing the processes and investments necessary for sustainable development and consistent with its principles.

**INALCO** is aware of the importance of its contribution to the development of responsible practices that respect the environment and allow society to advance towards a better world. As a responsible company that grows from a sustainable perspective, INALCO considers environmental control a priority of its activity by providing all the technical, human and economic means at its disposal to prevent Environmental impact that its activity can generate and guarantee the safety of its workers and customers against the risks arising from their work and environmental.

This sustainable perspective is based on an efficient production system at all levels: energy, low emissions, low water consumption and promoting a business model that bets on the circular economy.

The identification and management of environmental risks is fundamental for INALCO, having, beyond legislative obligations, procedures for controlling environmental risks that allow a Eco-efficient control of production processes.

The adoption of measures aimed at mitigating the effects of climate change is facilitated by constant investments in new manufacturing technologies and the constant improvement of production processes that contribute to operational excellence, Key to achieving more efficient energy and resource consumption aimed at achieving carbon neutrality.

In this way, Inalco maintains an environmental policy based on four important basic pillars in which bases its strategy to achieve important sustainability achievements Recycling and optimization.

### Recycling and optimisation.



All waste generated is treated by authorized managers. **95%** of the waste generated in the production process is destined for recycling for the production of different products or their entry into the production chain as raw materials.

The consumption of natural water resources, raw materials and energy are optimized through the use of Best Available Techniques (BAT) Energy saving.

### Energy savings.



The use of natural gas energy in thermal processes means significant reductions in air pollutants, as it is the Less polluting energy source.

The constant investment in new and innovative technologies contributes to an important advance in productivity and reduction of energy consumption and natural resources in the manufacturing process of products.

### Emissions reduction.



Regular measurements and continuous monitoring of Co sub-processes contribute to a reduction in emissions in very high lower than the parameters established by current legislation.

Inalco uses **particulate filters** in all processes susceptible to particle emissions and **filtering systems** in the emitting sources of the furnaces, achieving a very important reduction of the gases responsible of the greenhouse effect (GHG) Innovation and technology.



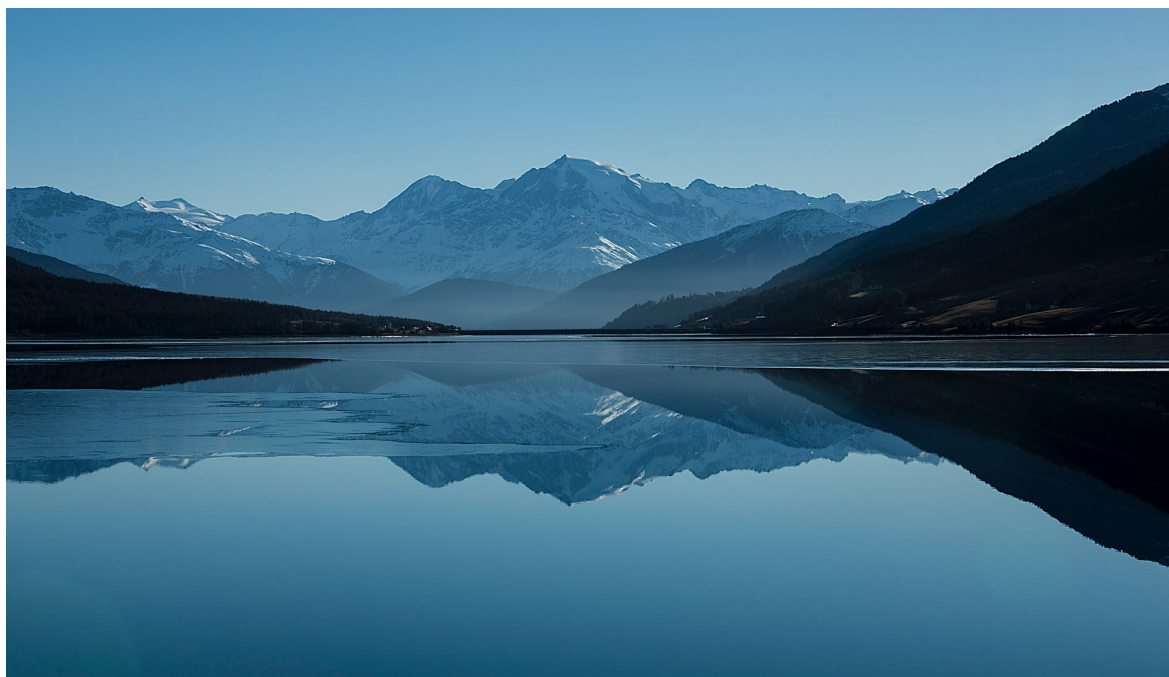
## Innovation and technology.



**The inclusion** of the latest technologies in the production process allows significant energy savings and the manufacture of high materials esthetic value and optimal environmental performance.

**H<sub>2</sub>O FULL DIGITAL** technology introduces water to replace solvents as the basis for decoration with inks and enamels.

This results in products with the highest definition without generating polluting emissions and reduces the water consumption in the production process.



## SUSTAINABLE MANUFACTURING PROCESS

Inalco's high commitment to the sustainable development of its activity is reflected in each and every one of the activities of its production process, distribution and marketing of its products introducing techniques and technologies aimed at significantly reducing environmental impact.



Due to the activities carried out by the company, one of the factors that is especially important is defined by the achievement as a "zero waste" objective. To this end, strategies have been implemented aimed at the reincorporation of waste materials both raw and cooked that allow their inclusion, after treatment, again in the production chain.



Both internal and external facilities are properly paved to avoid the generation of any type of dust in road traffic or DD) transfer of raw materials. The unloading hoppers of trucks with raw materials are properly tunneled and have a curtain closure to prevent the exit of powdery material.



The thermal subprocesses are optimized through the application of the most modern technologies and the residual heat streams of the cooking process are reoriented for use in the drying subprocesses so that obtains significant energy savings while reducing emissions of CO<sub>2</sub>, associated with the aforementioned thermal processes.



The electrification of the systems of movement of materials and circulation inside the production facilities and logistics center, contribute to a reduction of fossil fuel consumption and its impact on CO<sub>2</sub> emissions.



Inalco's MDi materials base their composition on mineral products of high purity and inorganic nature, exposing themselves to high temperature heat treatments. (1195-12002C) obtaining as final product totally inert materials that do not emit no emissions or volatile organic compounds (VOCs).



The enamels and pigments used in its elaboration are free of heavy metals such as cadmium or lead and after the cooking process are totally suitable for contact with food.



Inalco introduces H2O FULL DIGITAL technology in its production process as the first company in the world to use this technology. H2O FULL DIGITAL uses water as a base for the decoration of enamels and inks by means of digital systems. This results in products with maximum definition, a significant reduction in pollutant emissions and a reduction in water resources.

## 2. PRODUCT

### 2.1 Product identification

Starting from nature as a source of inspiration, **MDi** surfaces are composed of a selection of the best minerals that, thanks to an innovative production process, accelerates the natural lithological cycle, obtaining a product with innovative Aesthetic, technical and totally sustainable characteristics.

The surfaces included in this study belong to the absorption group Bla classification based on the standard UNE-EN 14411:2016 equivalente a la norma ISO 13006:2018 con absorción de agua inferior a 0.5%.

The product does not contain resins or organic additives, so no polymerization reactions are used to obtain it from a chemical composition based on totally inorganic minerals.

The product is classified with the code **CPC 376**

The versatility and customization of the various uses of the product prevent the standardization of format, thickness and type of surface finish. However, in the elaboration of this EPD, the different thicknesses, diversity of format and characteristics of the different raw materials used in the elaboration of the product have been taken into account, thus covering the different possibilities. architectural of the product. Thus, this Environmental Product Declaration (EPD) describes the environmental impacts corresponding to the product "MDi sintered stone surface" under different marketed finishes and 4 thickness references: 4mm, 6 mm, 12 mm y 20 mm.



**Figure 1: MDi surface.**

## **2.2 Use of product**

**MDi** is an innovative surface for countertops, benches, furniture covering, flooring and cladding where large format, high design and state-of-the-art materials converge that provide high technical and functional characteristics.

The product can be manufactured with fiberglass mesh reinforcement for safety reasons and reinforce the structure of the product.

**MDi** surfaces are marketed in thicknesses of: 4 mm (9.5 Kg/m<sup>2</sup>), 6 mm (14.2 Kg/m<sup>2</sup>), 12 mm (28,4 Kg/m<sup>2</sup>) y 20 mm (47.3 Kg/m<sup>2</sup>) with the same production process.

**MDi | ANTIBACTERIAL**, is a totally revolutionary innovation that increases the hygienic characteristics of MDi surfaces. With this new technology, surfaces not only prevent the appearance of bacteria, fungi, viruses and protozoa, but also destroy them and prevent their proliferation. Unlike other chemical disinfectant products, the activity of antibacterial is continuous and long-lasting, with no possibility of being eliminated through cleaning.

This unprecedented development is totally ecological and non-polluting, as well as being harmless to other life beings. Through this application, the product **MDi** can be used in any type of space where the hygiene is paramount: not only kitchens, but also laboratories, hospitals, universities, public spaces, shopping areas...

### 2.3 Technical data and physical characteristics:

The following table shows the main technical characteristics of **MDi** surfaces:

PHYSICAL CHARACTERISTICS				
Water absorption	EN-ISO 10545-3	E ≤ 0,5%		E ≤ 0,1%
Bending strength (N/mm²)	EN-ISO 10545-4	> 35 N / mm²		Surpasses required value
Breaking strength (N)	EN-ISO 10545-4	12 mm / 20 mm	> 1.300 N	Surpasses required value
		6 mm	> 700 N	
Impacto péndulo	UNE-EN 12600	4mm		Resistant
Linear thermal expansion	EN-ISO 10545-8	Method available		≤ 9x10 <sup>-6</sup> K <sup>-1</sup>
Thermal shock resistance	EN-ISO 10545-9	Method available		Resistant
Frost resistance	EN-ISO 10545-12	Required		Resistant
Crazing resistance	EN-ISO 10545-11	Required		Resistant
Resistencia a los rayos UV	DIN 51094	-----		Sin alteraciones

CHEMICAL CHARACTERISTICS				
Resistance to low concentrations of acids and alkalis	EN-ISO 10545-13	As indicated by manufacturer	Polished finishing	Resistant (LB - LA)
			Remaining finishing	Resistant (LA)
Resistance to household cleaning products and swimming pool additives	EN-ISO 10545-13	Min. B		Resistant (A)
Resistance to staining	EN-ISO 10545-14	Min. Class 3		Class 5

DIMENSIONAL CHARACTERISTICS: PERMISSIBLE DEVIATION FROM WORK SIZE **			
Length and width	EN-ISO 10545-2	±0,3% / ±1,0 mm	±0,3% / ±1,0 mm
Thickness	EN-ISO 10545-2	±5% / ±0,5 mm	±5% / ±0,5 mm
Straightness of sides	EN-ISO 10545-2	±0,3% / ±0,8 mm	±0,3% / ±0,8 mm
Squareness	EN-ISO 10545-2	±0,3% / ±1,5 mm	±0,3% / ±1,5 mm
Surface flatness	EN-ISO 10545-2	±0,4% / ±1,8 mm	±0,4% / ±1,8 mm
Surface appearance	EN-ISO 10545-2	Min. 95% of slabs without defects	Min. 95% of slabs without defects

\* Results obtained on the samples tested.



## 2.3 Description of system components

**MDi** surfaces are manufactured from studied compositions of high purity minerals with a variable composition range, sintered at high temperature and based mainly on the components outlined in the attached table:

**Table 1: Table composition of the MDi system.**

RAW MATERIAL	PERCENTAGE %	RECYCLED MATERIAL , WEIGHT %	RENEWABLE , MATERIAL WEIGHT%
CLAYS	30-40%	0 %	0 %
FELDESPARS	25-30%	0 %	0 %
BLEACHING RAW MATERIALS	5-10%	0 %	0 %
FLUXES RAW MATERIALS	15-30%	0 %	0 %
INORGANIC PIGMENTS	3-4%	0 %	0 %
OTROS ADITIVOS	4-10%	0 %	0 %
PACKAGING	% PESO SOBRE EL PRODUCTO		
IRON	0,7%		
CARTON	0,1%		
PLASTIC	0,0%		
WOOD	1,8%		

The packaging materials are 100% recycled film, wooden drawers of different sizes, metal structures and cardboard protections. The amount of packaging materials varies according to the format to be packed.

During the life cycle of the product, no hazardous substance included in the "Candidate List for Authorization (SVHC)" has been used in a percentage greater than 0.1% of the weight of the product. All quantities specified in the component description table of the **MDi** system additive together, unifying all stages of the life cycle.



**Table 2: Amount of biogenic carbon in the product.**

RESULTS BY FUNCTIONAL UNIT		
AMOUNT OF BIOGENIC CARBON	UNIT	AMOUNT
Biogenic content in the product	Kg C	0
Biogenic content in packaging	Kg C	7,07E-02

This EPD refers to the **MDi** product (in terms of composition, more details in Information about content).

### 3. INFORMATION OF LCA

DECLARED UNIT	1 kg of MDi product.
SYSTEM LIMITS	From "Cradle to grave + module D" (A + B + C + D)
REFERENCE SERVICE LIFE (RSL)	50 years
CUT-OFF RULES	At least 99% energy consumption is considered for manufacturing facilities. It is considered 99% of the raw material in mass. The following processes have been excluded: - Manufacture of equipment used in production, buildings or any other equipment - Transport of personnel to the plant - Transportation of personnel within the plant - Research and development activities - Long-term emissions.
ALLOCATION	Wherever possible, assignments have been avoided. For cases where it has not been possible, a physical assignment based on mass is made. The data referring to the composition of the system have been obtained directly and have been analyzed following the principles of modularity and polluter pays.
GEOGRAPHICAL SCOPE	Global
PERIOD	2022
SOFTWARE FOR LCA CALCULATIONS	Ecoinvent 3.8 (allocation, cut-off by classification) with Simapro database 9.3.0.2 used for LCS calculations. The LCA methods used are in accordance with Standard UNE-EN 15804: EN 15804:2012 + A2:2019

### 3.1 Data quality

The data collected regarding components and energy correspond to the year 2022 and includes data on raw materials consumed and energy consumption. The plausibility and consistency of the collected data has been verified. It can therefore be considered a good quality of data.

In the calculation of the LCA of the system, the flows related to the construction of the production plants, the application machines or the transport of the employees have not been considered.

### 3.2 Other information

This LCA has been carried out by **SGS TECNOS S.A.U.** Material and energy bills have been collected and checked. The study covers at least 95% of the materials and energy per module and at least 99% of the total material and energy use of each unit process.

### 3.3 Life cycle and compliance:

This EPD includes the steps shown in Table 3. This statement is of the cradle-to-grave type.

This statement may not be comparable with those developed in other programmes or under different reference documents; in particular, it may not be comparable with Declarations not prepared in accordance with Standard UNE-EN 15804: EN 15804: 2012 + A2: 2019. Similarly, environmental declarations may not be comparable if the source of the data is different, the same information modules are not included, or they are not based on the same scenarios.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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	ES	ES	ES	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	>90% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	1 product to analyze					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	1 manufacturer center					-	-	-	-	-	-	-	-	-	-	-	-

Table 3 : System limits. X: Module declared; GLO: Global; EN: Spain

## 4. LIFE CYCLE STAGES

Description of system limits: **Cradle to grave + module D**

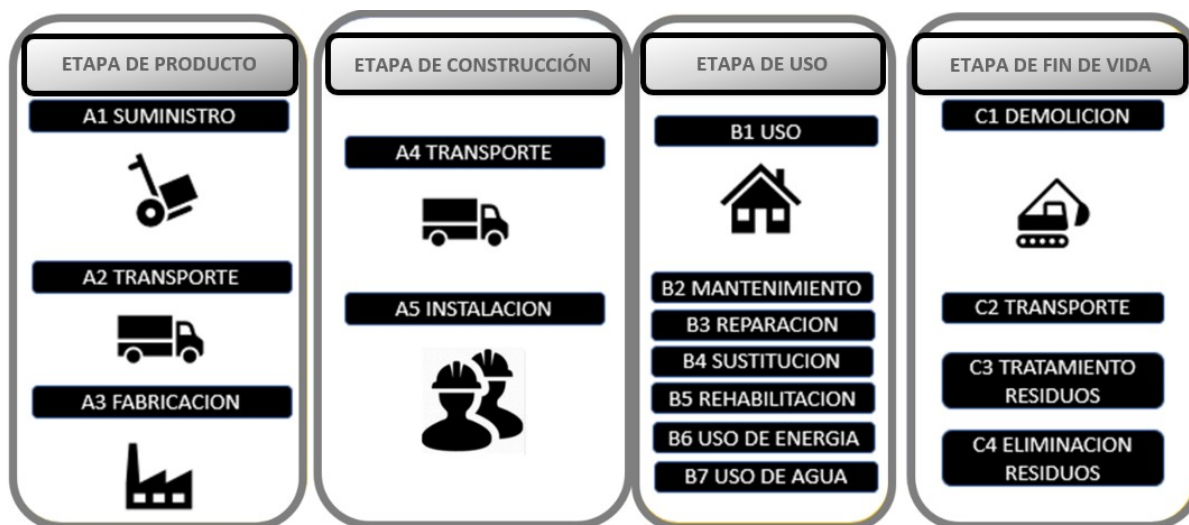


Figure 2: Stages of the life cycle of a product according to the "cradle to grave" analysis.

### 4.1 Product Stage A1 - A3

#### Description of the stage:

The product stage of the MDi system is subdivided into modules A1 raw material supply, A2 transport to manufacturer and A3 manufacturing. The grouping of these three modules is a possibility contemplated by the UNE-EN15804 standard: EN 15804: 2012 + A2: 2019 that is applies in this EPD.

#### A1 Supply of Raw Materials

This module deals with the extraction and pre-processing of raw materials and sources of energy used in the manufacture of the products that make up the system.

#### A2 Transport

This module includes the transport of raw materials to the manufacturing plant.

#### A3 Manufacturing

This module mainly contemplates the energy consumption during the manufacture of the product, as well as the manufacture of the product. The A3 stage, corresponding to the manufacture, although keeping a faithful similarity with the traditional processes of ceramic manufacture, presents great differences marked by the use of raw materials of



great purity and studied composition, as well as the use in the production process of innovative technologies which give the finished materials exceptional technical characteristics.



**Figure 3: Simplified flow scheme of the production process of MDi surfaces**

## PREPARATION OF RAW MATERIALS

INALCO, uses for its process of forming the MDi support, clay raw materials of great purity through studied composition of mixture of fluxing and refractory elements that together with clays of high quartz content give rise to compositions that allow a great chromatic rendering of the support. These studied compositions allow later during the process of sintering or firing the obtaining materials of high densification and mechanical resistance.

## DDD DECORATION AND FORMING

The DDD dry digital decoration system allows the obtaining of various natural effects, through digital systems of deposition of colored MDi powder, flakes or granules of glazed composition, deposited on the clay band and prior to the compaction process. These natural effects are perfectly integrated after the process of continuous compaction of the support. The introduction of Continuo+ technology, allows compaction or forming that is carried out by means of opposing pressure belts and rollers allowing high levels of compaction without limits of perimeter format. This

system gives MDi sheets great technical advantages by releasing the internal stresses of the formed material, stresses that occur in the systems of traditional compacting by molds and unidirectional pressure on the formed piece. In the same way it transmits, through the upper band appreciated reliefs natural that give the substrate high decorative characteristics.

#### **CUTTING ON THE FLY**

The process of cutting on the fly after the pressing subprocess allows obtaining different formats made from the large format plates. This crude cutting system after the pressing or forming process performs the functions of cutting in continuous movement of the plates guaranteeing values in the cutting measurements with negligible perimeter differences of the materials subjected to the process. The system provides great flexibility in the introduction of various formats in the production chain without time delays allowing enormous flexibility and productivity in the process.

#### **DRYING BY HORIZONTAL DRYER**

The 7-plane horizontal drying system facilitates a strong increase in the mechanical strength of the raw material necessary for subsequent enameling and decoration applications prior to the firing process. The state-of-the-art dryers used in the process allow the MDi material to dry in raw with fast cycles and significant energy savings that contribute to a reduction in CO<sub>2</sub> emissions. These dryers, equipped with reducer-regulator combustion burners, facilitate a homogeneous distribution of heat that translates into negligible differences in T<sup>a</sup> throughout the charge it.

#### **ENAMELLED AND DECORATED "FULL DIGITAL BASE H20"**

INALCO, as the first company in the installation of the technology of enameling and decoration "Full Digital Base H20", uses digital techniques for the deposition of the different layers of enamel and the decoration of images of great naturalness and chromatic richness that allows, through the use of water-based inks and enamels, a great reduction in water consumption and atmospheric emissions associated with its production process. This technology facilitates the production of large sheets with innovative designs and enormous chromatic richness through the use throughout its process of digital techniques that facilitate decoration in low reliefs or selective zones of the MDi surface.

#### **COOKING SUBPROCESS BY EKO OVEN**

The firing sub-process is carried out by EKO ovens that combine the incorporation of self-recovering burners and thermal cells that configure temperature gradients across the channel below 32C and significant energy savings and reduced emissions. The firing process at high temperatures (12002C) of MDi materials facilitates the physicochemical transformations of the raw materials incorporated in the sheets to obtain MDi plates of great mechanical resistance, vitrified surfaces and important technical characteristics associated with reduced water absorption (AA < 0.1%).

#### **MECHANICAL TREATMENTS**

The mechanical grinding and/or polishing treatments carried out as a final part of the production process incorporate important natural textures to the touch and varying levels of gloss to the MDi surfaces. The treatment of the perimeter grinding of the plates gives them negligible differences between sides of less than 0.3 mm. that ensure a uniform system of placement on the different surfaces of use. On the other hand, INALCO has developed high gloss materials (>80 GU) and low gloss surfaces (>80 GU) and low gloss surfaces (<20 GU) through important developments in the polishing system that guarantee innovative and natural MDi surfaces of high design and added value with important technical characteristics of resistance to stains and acids that they guarantee the different conditions of use.

#### **SELECTION AND PACKAGING**

As a final part of the process, a total visualization and classification of the MDi plates is carried out using artificial vision systems that guarantee the total quality of the product. These systems initially based on high resolution lenses and rapid transmission of the image compare each of the pieces viewed with reference to the established pattern with a very high degree of accuracy, guaranteeing the quality of the material viewing. After the viewing process, and in constant communication of the systems, perimeter and planarity measurements are made through automatic continuous measurement systems that guarantee maximum errors of 0.1 mm. in the measurements thus providing a detailed quality assurance as an added value to the materials inspected.

## 4.2 Construction process stage A4 - A5

### Description of the stage:

The MDi product construction process stage is subdivided into A4 modules. Transport to the construction site and A5 installation.

#### A4 Transport to construction site

This module covers the transport of system components from the production site to the application site, including the possibility of intermediate storage. An average distance of transport is estimated depending on the destination of the product.

Transport is calculated based on an average scenario whose parameters characteristics are described in the following table.

PARAMETER	VALUE (expressed by Declared unit)
Fuel consumption of the vehicle or means of transport used	Truck with an average load 16-32 t (euro 6) for land transport, y buque carguero de carga media para transporte marítimo
Total distance	2.936 km
Bulk density of transported product	2410 kg/m3
Load capacity utilization (in volume, including assumed in the Ecoinvent database return of transport without load)	% Assumed in Ecoinvent data base
Factor de utilización de la capacidad de carga, en volumen	1 (default)

Figura 4: Etapa A4.

#### A5 Installation

This module covers the application of the product on site, and includes:

- There are no residues derived from the application of the product, the waste produced correspond to the packaging of the product.
- The most representative application scenario associated with the MDi product does not require use of water or energy as it is a manual installation.
- Regarding packaging, it is considered that 100% of the packaging used during the Installation is sent to landfill.
- Auxiliary materials are not taken into account for the installation therefore the installation vertically is excluded from the scope of this EPD.



PARAMETER	VALUE (expressed by Declared unit)
Secondary materials used on installation	None
Water use	0 liters
Other resource uses (electricity)	0 kWh
Electricity consumed while installation	0 kWh
Waste material while installation process	1% of components
Site waste (collection for recycling, energy recovery (recovery) or landfill (specify by way))	Product packaging waste is landfilled. Conservative methodology: product waste deposited in landfill.
Residuos de packaging (with landfill final disposal)	0,03 kg
Emisiones directas al aire, suelo o agua	They are not generated.

Figure 5: Stage A5.

The statement does not address the impact related to the optional use of products or accessories not specified in the technical data sheet of the system used.

#### 4.3 Stage of Use (excluding possible savings) B1 - B7

##### Description of the stage:

This stage refers to the operation of the building including any emission into the environment caused by the use of the product (module B1) or by subsequent technical operations: maintenance (B2), repair (B3), replacement (B4) or rehabilitation (B5).

- B1: The emissions of volatile organic compounds into the environment of the applied product are considered irrelevant.

- B2-B5: The performance of the product under consideration allows it to be concluded that its service life equals or exceeds the useful life of the building. Once applied, the system components do not require technical actions or operations until the end-of-life stage, so it is considered that the product does not generate environmental loads at this stage.

The use stage also includes the use of energy in service (module B6) and the use of water in service (module B7).

- B6, B7: The product does not use electricity during its useful life. However, there is a water consumption associated with B7 for cleaning, but they are operational that depend on the user and, therefore, has not been considered.

#### 4.4 End-of-life stage, C1 - C4

##### Description of the stage:

This phase consists of the end-of-life related modules, C1 to C4, detailed below:

- C1 Deconstruction, demolition: As the demolition and / or dismantling of the product is part of the demolition of the building itself, it is assumed that the environmental impact is extremely low and therefore can be neglected.
- C2 Transport: Includes the transfer of construction waste from the construction site to the waste treatment point.
- C3 Waste treatment: Includes the reuse, recovery and/or recycling of waste. Law 7/2022 establishes that construction and demolition waste must be destined to reuse, recycling or other forms of minimum recovery by 70% and therefore it is considered that the product is sent a recovery after the demolition of the building together with the concrete material extracted by 70%.
- C4 Waste disposal: It is assumed that 30% of waste is disposed of in a landfill and an average distance of 50 km is considered.

PARÁMETRO	VALOR (expresado por unidad funcional)
Collection process (mixed with the rest of the CDW)	MDi
Recovery system	Valorization (70%)
Disposal (landfill)	MDi 30%
Transport assumptions for development scenario	Truck average load 16-32 t (euro 6)
Distance to landfill	50 km

Figure 6: Stages C1-C4

#### 4.5 Reuse/recovery/recycling potential, D

Module D declares the environmental benefits resulting from the reuse and recycling of products, as well as energy recovery.

This EPD considers the avoided environmental burdens resulting from recycling carried out throughout the life cycle of the product, considering that 70% of the product is taken to recycling and 30% of the product is taken to landfill so it has been considered benefit environmental.

In this module, a 70% saving has not been computed as a result of recycling carried out throughout the life cycle. The profit derived from this module is realized on the net balance of virgin materials.



## 5. ENVIRONMENTAL IMPACTS OF THE MDI PRODUCT

The LCA results are detailed in the tables on the following pages together with the interpretation of the global impacts produced per functional unit (1 kg of MDi product). Estimated impact results are only relative statements that do not indicate impact category endpoints, threshold exceedances, safety margins or risks.

Simapro 9.3.0.2 software was used to perform the LCA, together with the Ecoinvent 3.8 database.

As impact models have been used:

- CML-IA baseline V3.07/ EU25.
- ReCiPe 2016 Midpoint (H) V1.06 / World (2010) H.
- EDIP 2003 V1.07 / Default.
- Cumulative Energy Demand V1.11
- EF 3.0 Method (adapted) V1.02 / EF 3.0 normalization and weighting set.
- IPCC.2022

### CORE ENVIRONMENTAL IMPACT INDICATORS OF MDi

Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Potential - fossil fuels (GWP-fossil)	kg CO <sub>2</sub> eq.	1,02E+00	3,59E-01	1,40E-02	0	0	0	0	0	0	0	0	6,74E-03	0	7,57E-04	-2,72E-03
Global Warming Potential - biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq.	-6,95E-02	3,06E-04	-6,92E-04	0	0	0	0	0	0	0	0	2,15E-06	0	3,91E-07	-3,97E-06
Global Warming Potential - land use and land use change (GWP-luluc)	kg CO <sub>2</sub> eq.	2,54E-03	1,41E-04	2,69E-05	0	0	0	0	0	0	0	0	5,46E-08	0	2,58E-08	-2,79E-06
Global Warming Potential - total (GWP-total)	kg CO <sub>2</sub> eq.	9,56E-01	3,60E-01	1,33E-02	0	0	0	0	0	0	0	0	6,75E-03	0	7,58E-04	-2,73E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	7,26E-08	8,31E-08	1,59E-09	0	0	0	0	0	0	0	0	1,60E-09	0	1,57E-10	-2,68E-10
Acidification potential, Accumulated Exceedance (AP)	mol H <sup>+</sup> eq.	4,16E-03	1,23E-03	5,48E-05	0	0	0	0	0	0	0	0	1,34E-05	0	7,80E-06	-1,98E-05
Eutrophication potential - freshwater (EP-freshwater)	kg PO <sub>4</sub> <sup>3-</sup> eq.	5,56E-05	7,73E-06	6,34E-07	0	0	0	0	0	0	0	0	1,06E-08	0	-2,40E-07	-2,40E-07
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	1,81E-05	2,52E-06	2,06E-07	0	0	0	0	0	0	0	0	3,46E-09	0	2,69E-09	-7,80E-08
Eutrophication potential - marine (EP-marine)	kg N eq.	5,78E-04	2,56E-04	8,70E-06	0	0	0	0	0	0	0	0	2,23E-06	0	3,39E-06	-5,90E-06
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	6,45E-03	2,86E-03	9,70E-05	0	0	0	0	0	0	0	0	2,48E-05	0	3,72E-05	-6,83E-05
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	2,09E-03	1,01E-03	3,22E-05	0	0	0	0	0	0	0	0	8,73E-06	0	1,04E-05	-1,89E-05
Abiotic depletion potential - non-fossil resources (ADPE)	kg Sb eq.	1,93E-06	1,25E-06	3,18E-08	0	0	0	0	0	0	0	0	2,93E-10	0	3,65E-11	-2,31E-08
Abiotic depletion potential - fossil resources (ADPF)	MJ	1,29E+01	5,43E+00	1,85E-01	0	0	0	0	0	0	0	0	9,57E-02	0	1,01E-02	-3,22E-02

Disclaimer-(1)- This impact category refers mainly to the eventual impact of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities. The potential radiation from soil, radon and some building materials is also not measured by this indicator.

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited.



### ADDITIONAL MANDATORY ENVIRONMENTAL IMPACT INDICATORS OF MDi

Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Potential (GWP-GHG)	kg CO2 eq.	1,02E+00	3,58E-01	1,39E-02	0	0	0	0	0	0	0	0	6,73E-03	0	7,48E-04	-2,69E-03

Disclaimer-(1)- This impact category refers mainly to the eventual impact of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities. The potential radiation from soil, radon and some building materials is also not measured by this indicator.

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited.

### ADDITIONAL VOLUNTARY ENVIRONMENTAL IMPACT INDICATORS OF MDi

Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate Matter emissions (PM)	Disease incidence (NA)	6,37E-08	2,85E-08	9,47E-10	0	0	0	0	0	0	0	0	4,55E-10	0	2,09E-10	-3,71E-10
Ionizing radiation, human health (IRP)	kBq U235 eq. (1)	1,36E-02	2,36E-02	3,80E-04	0	0	0	0	0	0	0	0	4,16E-04	0	4,24E-05	-1,09E-04
Eco-toxicity - freshwater (ETP-fw)	CTUe (2)	1,77E+01	4,22E+00	2,20E-01	0	0	0	0	0	0	0	0	3,90E-02	0	5,11E-03	-5,36E-02
Human toxicity, cancer effect (HTP-c)	CTUh (2)	5,35E-10	1,36E-10	6,72E-12	0	0	0	0	0	0	0	0	5,04E-13	0	6,25E-14	-2,18E-12
Human toxicity, non-cancer effects (HTP-nc)	CTUh (2)	8,48E-09	4,26E-09	1,29E-10	0	0	0	0	0	0	0	0	6,00E-11	0	7,59E-12	-4,94E-11
Land use related impacts/Soil quality (SQP)	Pt (2)	1,08E+01	3,72E+00	1,46E-01	0	0	0	0	0	0	0	0	2,57E-04	0	1,24E-02	-4,65E-02

Disclaimer-(1)- This impact category refers mainly to the eventual impact of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities. The potential radiation from soil, radon and some building materials is also not measured by this indicator.

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INDICATORS DESCRIBING RESOURCE USE MDi																
Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Use of renewable primary energy as energy carrier (PERE)	MJ	3,05E+00	7,65E-02	3,13E-02	0	0	0	0	0	0	0	0	1,47E-04	0	4,22E-05	-1,87E-03
Use of renewable primary energy resources used as raw materials (PERM)	MJ	2,44E-02	0,00E+00	2,44E-04	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	0,00E+00
Total use of renewable primary energy (PERT)	MJ	3,08E+00	7,65E-02	3,16E-02	0	0	0	0	0	0	0	0	1,47E-04	0	4,22E-05	-1,87E-03
Use of non renewable primary energy as energy carrier (PENRE)	MJ	1,40E+01	5,77E+00	2,00E-01	0	0	0	0	0	0	0	0	1,02E-01	0	1,07E-02	-3,42E-02
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	1,10E-02	0,00E+00	1,10E-04	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	0,00E+00
Total use of non renewable primary energy resource (PENRT)	MJ	1,40E+01	5,77E+00	2,00E-01	0	0	0	0	0	0	0	0	1,02E-01	0	1,07E-02	-3,42E-02
Use of secondary material (SM)	kg	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	0,00E+00
Use of non renewable secondary fuels (NRSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0	0,00E+00	0,00E+00
Net use of fresh water (FW)	m3	3,36E-03	6,05E-04	3,97E-05	0	0	0	0	0	0	0	0	2,63E-07	0	2,16E-07	-9,84E-04

Disclaimer-(1)- This impact category refers mainly to the eventual impact of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not take into account the effects due to possible nuclear accidents, occupational exposure or underground radioactive waste disposal facilities. The potential radiation from soil, radon and some building materials is also not measured by this indicator.

Disclaimer-(2)- The results of this environmental impact indicator should be used with caution, as uncertainties about these results are high or experience with the indicator is limited.

### ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES OF MDi

Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	1,20E-05	1,40E-05	2,65E-07	0	0	0	0	0	0	0	0	2,52E-07	0	2,54E-08	-7,22E-08
Non hazardous waste disposed (NHWD)	kg	5,47E-02	2,80E-01	3,29E-02	0	0	0	0	0	0	0	0	4,63E-06	0	3,00E-01	-3,98E-04
Radioactive waste disposed (RWD)	kg	1,35E-02	2,62E-04	1,37E-04	0	0	0	0	0	0	0	0	1,08E-06	0	1,56E-06	-1,64E-05

### ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES OF MDi

Parameters	Unit (EN)	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use (CRU)	kg	0	0	0	0	0	0	0	0	0	0	0	0	7,00E-01	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials 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

6. INTERPRETATION OF THE LCA

The following graph allows us to determine which stages of the Life Cycle have the greatest impact on the selected environmental indicators.

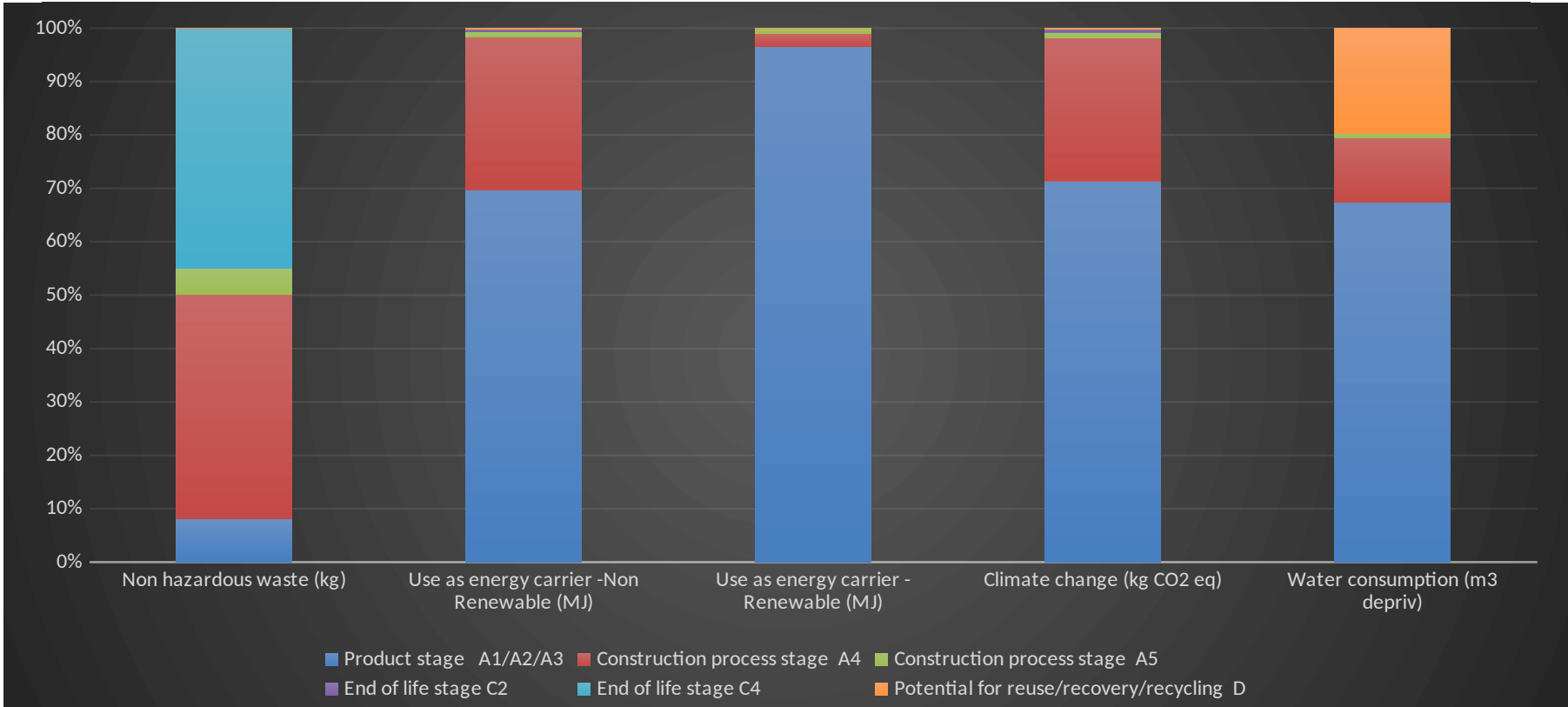


Figure 7: Environmental impacts of MDi



## 7. OTHER INFORMATION OF LCA

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Ver las fichas de datos de seguridad de los componentes del sistema.

<https://www.inalco.global/>

## 8. POSITIVE CONTRIBUTIONS TO THE ENVIRONMENT

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In INALCO, an organization dedicated to the design, development, production and marketing of MDi product systems, in addition to committing ourselves to comply with the policy of quality, environmental management and health and safety, linked to our system of management, shows a firm commitment to the environment and develops our products thinking about a sustainable and efficient future, betting on R + D + i, one of our hallmarks of identity.

The development of the MDi material allows, from a point of view committed to the environment, the alignment with Inalco's public commitment to the environment and society. From Inalco, the "Ecoinalco" initiative is launched, which includes all the human and technological resources aimed at preventing the impact of the activity, as well as the continuous review of the processes and investments necessary to procure A development sustainable and consistent with the general principles of the company.

## 9. INFORMATION RELATING TO THE EPD SECTOR

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This EDP is an MDi product declaration.

## 10. ORIGIN OF THE INFORMATION

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Scope: Spain

Period: 2022

The information has been obtained from Ecoinvent 3.8 databases and/or from raw materials.

Raw materials	Generic data bases and suppliers information or producer associations
Production	Own data
Transport	Generic or specific information
Application	Generic or specific information
Use	Generic information
End of life	Generic information
Energy	Specific information

## 11. REFERENCES

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- General Programme Instructions of the International EPD® System. Version 4.0.
- ISO 14020:2000: Environmental labels and declarations – General principles
- ISO 14025:2006, Etiquetas y declaraciones ambientales – Declaraciones ambientales tipo III – Principios y procedimientos (2010).
- ISO 14040, Gestión ambiental – Análisis del ciclo de vida – Principios y marco de referencia (2006).
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- PCR 2019:14 Construction products - version 1.2.5 - CEN (2019): EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for product category of construction products)
- UNE-EN 15804:2012+A2:2019/AC:2021 – Declaraciones ambientales de Producto – Reglas de categoría de productos básicas para productos de construcción (2021).
- ACV Inalco (2023).