MASAVEU ● INDUSTRIA

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

ECO PLATFORM EPD VERIFIED

AENOR

CEMENTOS TUDELA VEGUÍN

ENVIRONMENTAL PRODUCT DECLARATION

CEM I 52.5 N (ma)

ABOÑO FACTORY

Independent verification of the declaration and data, according to:

EN ISO 14025:2010
EN 15804:2012+A2:2019
EN 16908:2019+A1:2022

Issue date: 13 November 2023
Renewal date: 13 November 2028
Expiration date: 13 November 2028
The declared validity is subject to registration and publication on **www.aenor.com**

Registration code: GlobalEPD EN 16908-011

The owner of the EPD shall be liable for the underlying life cycle assessment data and evidences.

Cementos Tudela Veguín

EPD owner
Cementos Tudela Veguín, S.A.
Fábrica de Aboño

C/Argüelles, 25. 33003 - Oviedo (Asturias)
ctv@sc.masaveu.com
www.cementostudelaveguin.com

Centro de Investigación Elías Masaveu s.a.

LCA author
Centro de Investigación Elías Masaveu, S.A.

C/Argüelles, 25, 33033 - Oviedo (Asturias)
www.ciemsa.es

AENOR

Programmer operator
AENOR Internacional S.A.U.

C/ Génova, 6, 28009 - Madrid (España)
Tel.: (+34) 902 102 201
aenordap@aenor.com
www.aenor.com

AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes.

Product Category Rule:

The European Standard EN 15804:2012+A2:2019 serves as the basis for CPRs.

Independent verification of the declaration and data, in accordance with the Standard UNE EN ISO 14025:2010

☐ Internal ☒ External

Third Party verified:

AENOR

The Certification Body is accredited by ENAC 1/C-PR468

CEMENTOS TUDELA VEGUÍN

Calle Argüelles, 25. 33003 - Oviedo (Asturias)
T. 985 98 11 00
www.cementostudelaveguin.com

COMMITTED TO THE ENVIRONMENT · SINCE 1898
MASAVEU ● INDUSTRIA

CONTENTS

1. GENERAL INFORMATION

1.1. The organization

Cementos Tudela Veguín S.A. is one of the companies of Masaveu Industria, which has four production centers, which are located in Narón, Tudela Veguín, Aboño and La Robla.

The Aboño factory, which provides the framework for this EPD, has the following production capacities in tons/year:

- Gray clinker: 750,000
- Gray cement: 1,500,000
- Ground granulated blast furnace slag: 1,000,000

1.2. Scope of the Environmental Product Declaration

The EPD covers all product stages from 'cradle to gate' (A1-A3) throughout 2022. The selected system boundaries comprise of cement CEM I 52.5 N (ma) include raw material extraction up to the finished product at the factory gate.

1.3. Lifecycle and compliance

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010 and EN 15804:2012+A2:2020 Standards and the following Product Category Rule:

PRODUCT CATEGORY RULES INFORMATION	
Descriptive title	UNE-EN 16908:2019 Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804.

This Environmental Product Declaration includes the following life cycle stages:

SYSTEM BOUNDARIES. LIFE CYCLE STAGES

PRODUCT STAGE	A1	Raw materials supply	X
	A2	Transport	X
	A3	Manufacturing	X
CONSTRUCTION	A4	Transport	MNA
	A5	Construction installation process	MNA
STAGE OF USE	B1	Use	MNA
	B2	Maintenance	MNA
	B3	Repair	MNA
	B4	Replacement	MNA
	B5	Refurbishment	MNA
	B6	Operation energy use	MNA
	B7	Operational water use	MNA
END OF SERVICE LIFE	C1	De-construction/demolition	MNA
	C2	Transport	MNA
	C3	Waste processing	MNA
	C4	Disposal	MNA
	D	Reuse - Recovery - Recycling potential	MNA

X = Module included in the LCA; NR = Module not relevant; MNA = Module not assessed

This EPD may not be comparable with those developed in other programmes or in accordance with different reference documents, specifically it may not be comparable with EPDs not prepared according to the EN 15804+A2 Standard.

Likewise, this EPD may not be comparable if the data source is different (for example, databases), not all relevant information modules are included, or they are not based on the same scenarios.

The comparison of construction products must be made on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), i.e. including the behaviour of the product throughout its life cycle, as well as the specifications of section 6.7.2 of UNE-EN ISO 14025.

2. PRODUCT INFORMATION

2.1. Product identification

Cement is a hydraulic binder, that is a finely ground inorganic material which, when mixed with water, forms a paste which sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water.

The cement under study is named under the UNE-EN 197-1 standard as follows: **CEM I 52.5 N (ma).**

The CPC code of the product is 37440.

Santiago-Orense high-speed line

2.2. Technical characteristics

Conformity is ensured through compliance with the quality standards included in the CE marking. The aforementioned marking requires that the product present a series of characteristics:

	FEATURE	PERIOD	TYPICAL VALUE	LIMITS
Physical	Setting	Initial	225 min.	≥ 45 min.
		Final	290 min.	< 720 min.
Mechanical	Compressive strength	2 days	36.0 MPa	≥ 20.0 MPa
		28 days	61.5 MPa	≥ 52.5 MPa

Indicated for reinforced and prestressed concrete that requires high mechanical properties, as well as stripping and removing formwork at very early ages.

Likewise, its use is recommended for high-resistance precast, concret and shotcrete.

A remarkable characteristic is the Na-equivalent content, because it acquires its moderate alkalis status ranging between 0.60 and 0.75%, which makes it an ideal cement for its use with aggregates with moderate reactivity.

2.3. Product composition

The composition of CEM I 52.5 N (ma) according to the UNE-EN 197-1 standard is the following:

	Main constituents (%)	Clinker (K)	95-100
	Minor additional constituents (%)		0-5

The composition calculation basis does not include other compounds present in the cement such as: setting regulators, grinding aid additives or Cr (VI) reducing agents.

Also, none of the components of the final product are included in the 'Candidate List of Substances of Very High Concern for Authorization'.

3. LCA INFORMATION

3.1. Life cycle analysis

The LCA has a boundary 'from cradle to gate' covering the modules A1 to A3 (product stage) in reference to the year 2022. The life cycle analysis is described in the LCA report of CEM I 52.5 N (ma) cement.

It is complemented by a series of annexes where particularities corresponding to the production process are described.

3.2. Declared unit

The declared unit is 1 ton (1,000 kg) of cement CEM I 52.5 N (ma).

3.3. Reference service life (RSL)

The cement loses its physical identity and is not recognizable or separable on site. Therefore, its reference service life is linked to the service life of the structural elements in which it is integrated.

3.4. Allocation criteria

When it has not been possible to avoid allocation, mass allocations have been made. It has been applied in the case of energy consumption, waste and emissions to water.

In the case of waste, the 'Polluter pays' principle has been applied, therefore, as established in Annex D of Standard UNE-EN 16908:2019, whoever generates the waste 'declares the use of the waste and the impact environmental of the use of the waste in the module where it is used'.

3.5. Cut-off rules

More than 99% of the materials and energy consumption have been included.

3.6. Representativeness, quality and selection of data

The LCA is limited to the production of CEM I 52.5 N (ma) cement at the Aboño Factory in the time horizon of 2022.

The database used in this inventory is Ecoinvent v3.8, which incorporates data related to materials, energy, transportation, processing, use, waste scenario or waste treatment. These data comply with the system of quality indicators set forth in UNE-EN ISO 14041, which evaluates their suitability by granting them a score based on temporal, geographical, and technological criteria.

In the modeling of the process, in the absence of specific data, data at the national level have been selected, whenever possible. If not, European or global data have been used in that same order of priority.

For modeling, generation of inventories and calculation of environmental impact, the SimaPro 9.4.0.2 tool has been used.

3.7. Other calculation rules and assumptions

3.7.1. Biogenic carbon content

The declaration of biogenic carbon content is omitted because due to the nature of the product its proportion is well below the limit of 5% with respect to the total mass, according to what is indicated in the EN 15804:2012+A2:2019 standard.

4. SYSTEM BOUNDARIES, SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

This EPD includes only modules A1-A3, product stage, according to the modular scheme of the EN 15804+A2 standard, and presents the results in an aggregated form.

In the cement manufacturing process, the following stages have been included in the life cycle analysis.

A1. Raw material supply

The main raw materials are limestone and shale obtained from our own quarries. External and alternative natural raw materials are also incorporated.

A2. Transport

External raw materials and fuels arrive by truck or ship and are incorporated into the production process.

A3. Manufacturing

PREHOMOGENIZATION

The flow of raw materials, after a crushing process, is stored in the prehomogenization warehouse, where it is positioned in uniform layers ensuring that the mixture has an adequate composition and its variability is reduced.

GRINDING OF RAW MATERIALS

The raw materials are ground to obtain a product of uniform composition and to reduce its size in order to facilitate calcination in the kiln. This grinding is carried out using a ball mill.

CALCINATION

The kiln is fed through a cyclone preheater, which heats the ground raw material with exhaust gases from the klin and with a contribution of fossil and/or alternative fuels.

CLINKERIZATION

The ground raw material advances through the rotary kiln, where temperatures, above 1,400 ºC are reached, giving rise to the clinker sintering process. To reach these temperatures, it is necessary, as in calcination, to consume fuels that, again, can be fossil and/or alternative.

COOLING

Upon leaving the kiln, the clinker is introduced into the cooler, which injects cold air to reduce its temperature and set the desired mineralogical composition.

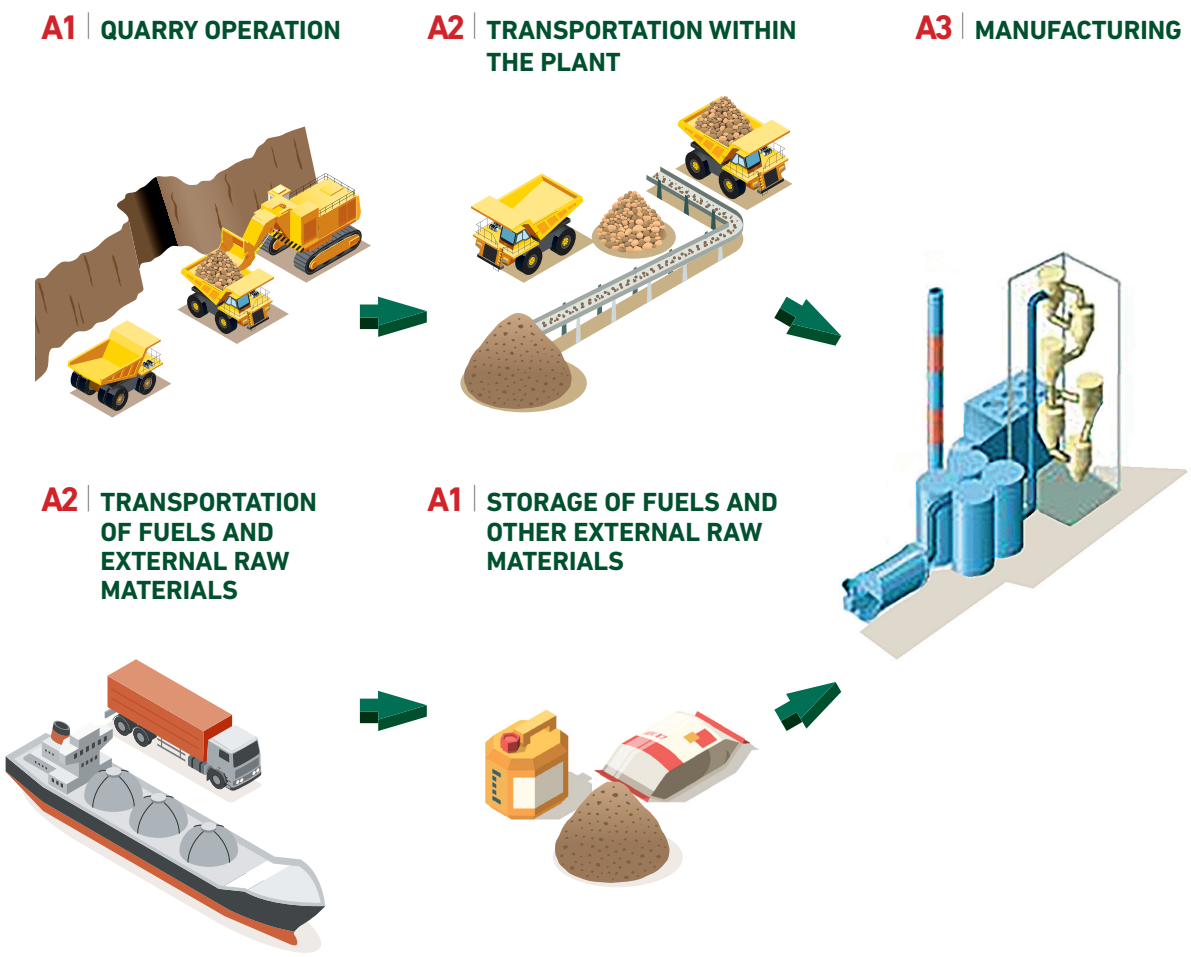
GRINDING

The joint mixture of the clinker produced with gypsum is ground in a ball mill until obtaining the composition and particle size distribution that give rise to CEM I 52.5 N (ma).

PRODUCT STORAGE

Cement is stored in silos for future shipment.

PRODUCT STAGE



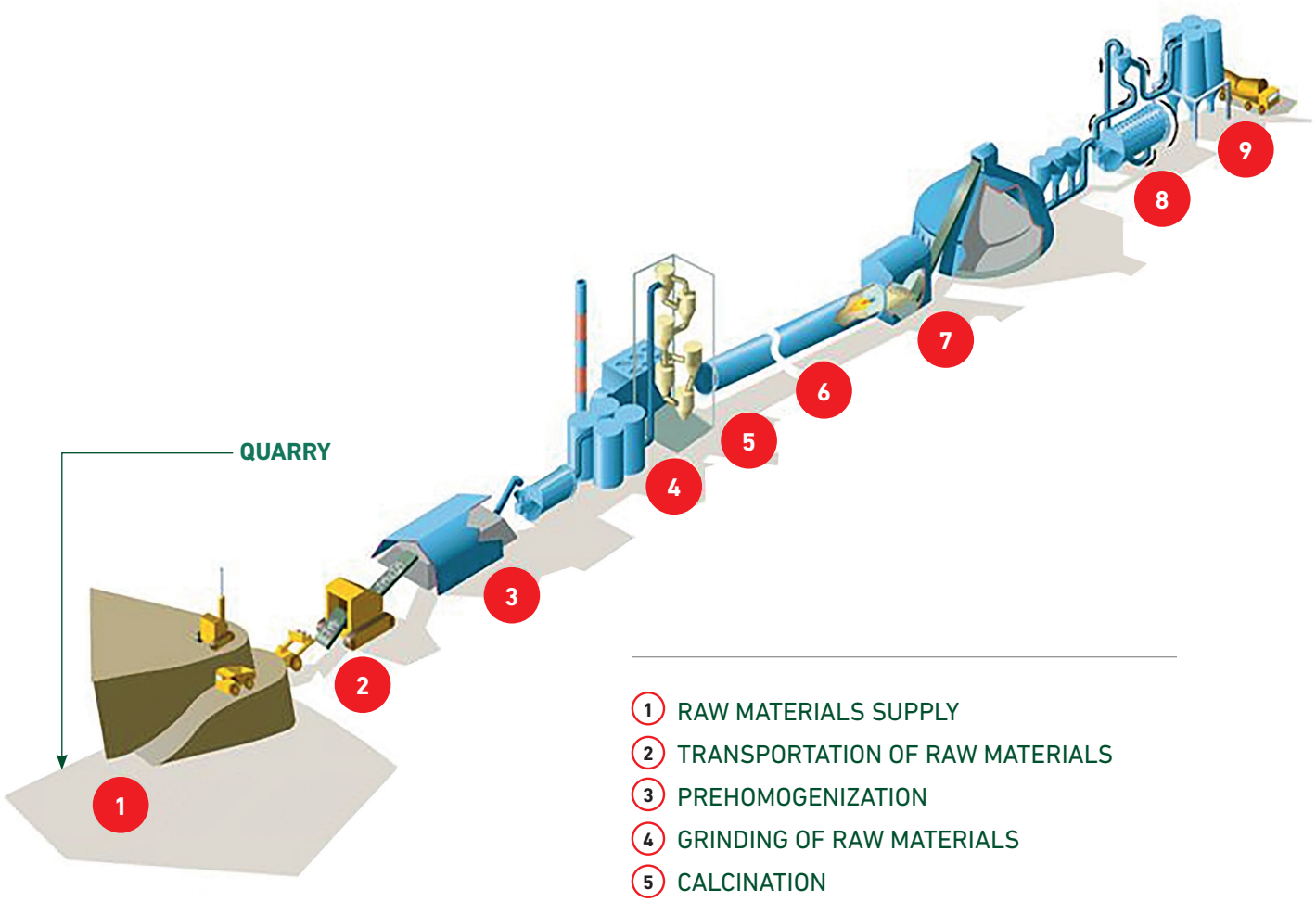
A1 RAW MATERIAL SUPPLY
A2 TRANSPORT
A3 MANUFACTURING

CEMENTOS TUDELA VEGUÍN

Calle Argüelles, 25. 33003 - Oviedo (Asturias)
T. 985 98 11 00
www.cementostudelaveguin.com

COMMITTED TO THE ENVIRONMENT · SINCE 1898
MASAVEU ● INDUSTRIA

A3 | STEPS IN CEMENT MANUFACTURING



1. RAW MATERIALS SUPPLY
2. TRANSPORTATION OF RAW MATERIALS
3. PREHOMOGENIZATION
4. GRINDING OF RAW MATERIALS
5. CALCINATION
6. CLINKERIZATION
7. COOLING
8. GRINDING
9. STORAGE

5. DECLARATION OF ENVIRONMENTAL LCA AND LCI PARAMETERS

ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNITS	A1-A3
GWP- total	kg $CO_{2\text{-equivalent}}$	7.36E+02
GWP- fossil	kg $CO_{2\text{-equivalent}}$	7.35E+02
GWP- biogenic	kg $CO_{2\text{-equivalent}}$	2.48E-01
GWP- lu&luc	kg $CO_{2\text{-equivalent}}$	8.01E-03
ODP	kg $CFC_{11\text{-equivalent}}$	4.55E-05
AP	mol $H^{+}_{\text{equivalent}}$	5.14E-01
EP- freshwater	kg $P_{\text{equivalent}}$	9.51E-04
EP- marine	kg $N_{\text{equivalent}}$	3.35E-01
EP- terrestrial	mol $N_{\text{equivalent}}$	1.54E+00
POCP	kg $NMVOC_{\text{equivalent}}$	9.39E-01
ADP - minerals & metals (1)	kg $Sb_{\text{equivalent}}$	2.09E-05
ADP - fossil (1)	MJ	3.78E+03
WDP (1)	m^3	2.08E+01

GWP - total: Global warming potential total
GWP - fossil: Global warming potential fossil
GWP - biogenic: Global warming potential biogenic
GWP - lu&luc: Global warming potential of land use and land use change
ODP: Depletion potential of the stratospheric ozone layer
AP: Acidification potential, accumulated exceedance
EP - freshwater: Eutrophication potential, fraction of nutrients reaching freshwater end com-partment
EP - marine: Eutrophication potential, fraction of nutrients reaching marine end compart-ment
EP - terrestrial: Eutrophication potential, accumulated exceedance
POCP: Formation potential of tropospheric ozone
ADP - minerals & metals: Abiotic depletion potential for non-fossil resources
APD - fossil: Abiotic depletion potential for fossil resources
WDP: Water (user) deprivation potential, deprivation weighted water consumption

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

(1) The results of this environmental impact indicator shall be used with caution, since the uncertainties of the results are high and there is limited experience with the indicator.

ADDITIONAL ENVIRONMENTAL IMPACTS

IMPACT CATEGORY	UNITS	A1-A3
PM	Disease incidence	3.98E-06
IRP (2)	kBq U235 equivalent	2.69E+01
ETP-fw (1)	CTUe	1.85E+03
HTP-c (1)	CTUh	1.39E-08
HTP-nc (1)	CTUh	5.08E-07
SQP (1)	Pt	2.37E+02

PM: Potential for disease incidence due to particulate matter emissions
IRP: Human potential exposure efficiency relative to U235
ETP-fw: Comparative potential toxic unit for humans - freshwater
HTP-c: Comparative potential toxic unit for humans - carcinogenic effects
HTP-nc: Comparative potential toxic unit for humans - non-carcinogenic effects
SQP: Soil quality potential index

PARAMETERS DESCRIBING RESOURCE USE

PARAMETER	UNITS	A1-A3
PERE	MJ	6.79E+01
PERM	MJ	0.00E+00
PERT	MJ	6.79E+01
PENRE	MJ	3.99E+03
PENRM	MJ	0.00E+00
PENRT	MJ	3.99E+03
SM	kg	1.24E+02
FW	m^3	5.29E-03

PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM: Use of renewable primary energy used as raw material
PERT: Total use of primary renewable energy
PENRE: Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials
PENRM: Use of non-renewable primary energy used as raw material
PENRT: Total use of primary non-renewable energy
SM: Use of secondary materials
FW: Net use of running water resources

(1) The results of this environmental impact indicator shall be used with caution, since the uncertainties of the results are high and there is limited experience with the indicator.

(2) This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health, from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some construction materials, is not measured in this parameter either.

WASTE CATEGORIES

PARAMETER	UNITS	A1-A3
HWD	kg	1.25E-03
NHWD	kg	1.57E+01
RWD	kg	2.74E-02

HWD: Hazardous waste disposed
NHWD: Non-hazardous waste disposed
RWD: Radioactive waste disposed

OUTPUT FLOWS

PARAMETER	UNITS	A1-A3
CRU	kg	0.00E+00
MFR	kg	2.45E-02
MER	kg	1.89E+00
EE	MJ	0.00E+00

CRU: Components for re-use
MFR: Materials for recycling
MER: Materials for energy recovery
EE: Exported energy

REFERENCES

- LCA Report CEM I 52.5 N (ma). Version V1.2. September 2023.
- General Rules of the GlobalEPD Program, 2nd revision. AENOR. February 2016.
- UNE-EN ISO 14025:2010 Environmental labels. Type III environmental declarations. Principles and procedures (ISO 14025:2006).
- EN 15804:2012+A2:2019 Sustainability in construction. Environmental product declarations. Basic product category rules for construction products.
- UNE-EN ISO 14040 Environmental Management. Life cycle analysis. Principles and frame of reference. 2006.
- UNE-EN ISO 14044 Environmental Management. Life cycle analysis. Requirements and guidelines. 2006.
- UNE-EN 197-1: 2011 Cement. Part 1.
- UNE-EN 15171:1:2006 Granulated ground blast furnace slag for use in concrete, mortars and pastes. Part 1: Definitions, specifications and conformance criteria.
- UNE-EN 16908:2019+A1:2022 Construction cements and limes. Environmental product declarations. Product category rules complementary to Standard EN 15804.
- Commission Delegated Regulation (EU) 2021/21 39 of 4 June 2021. Technical selection criteria to determine the conditions under which an economic activity is considered to contribute substantially to the mitigation of climate change or to adaptation to it.

MASAVEU ● INDUSTRIA

COMMITTED TO THE ENVIRONMENT · SINCE 1898

GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

ECO PLATFORM EPD VERIFIED

AENOR

CEMENTOS TUDELA VEGUÍN

Calle Argüelles, 25, 33003 Oviedo, Asturias
T. 985 98 11 00

www.cementostudelaveguin.com