EPD

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for

Product name: CEM IV/B (P) 32,5 R- LH/SR

EPD owner: Colacem S.p.A.

product recently on the market – Results of this EPD shall be used with care as the LCI data is not yet based on 1 year of production which may result in increased uncertainty.

Programme	The International EPD® System, www. environdec.com
Programme operator	EPD International AB
Registration number	EPD-IES-0019845
Type of EPD	EPD of a product recently on the market
Version date	2025-07-16
Validity date	2030-07-15

An EPD may be updated or de-published if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

GENERAL INFORMATION

PROGRAMME INFORMATION	
Programme:	The International EPD® System
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

PRODUCT CATEGORY RULES (PCR)

CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14 - Construction products, ver. 2.0.1,

UN CPC code: 3744

c-PCR-001 - Cement and building limes - (EN 16908:2022)

PCR Review was conducted by: The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. The review panel may be contacted via e-mail (support@environdec.com)

VERIFICATION

☒ EPD process certification* with a pre-verified LCA/EPD tool

Third-party verifier:

RINA Services S.p.A. www.rina.org Via Corsica 12, 16128, Genova (GE), Tel +3901053851; Fax +39 0105351000, info@rina.org.

Accredited by: ACCREDIA, accreditation number: 00005VV

Pre-verified LCA tool: GCCA Tool, version 5.2

Third-party verifier, accountable for the tool verification:

Studio Fieschi & soci SrL

Approved by: International EPD System

EPD Process Certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.envrondec.com. International EPD System.

Procedure for follow-up of data during EPD validity involves third-party verifier:

☐ Yes √ No

OWNERSHIP

The EPD owner has the sole ownership, liability, and responsibility, for the EPD.

LIMITATIONS ON USE OF EPD

EPDs within the same product category but published in different EPD Programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same version number up to the first two digits) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterization factors); and be valid at the time of comparison.

INFORMATION ABOUT EPD OWNER

Figure 1 – Headquarters of Colacem S.p.A. - Gubbio (PG)

EPD owner: Colacem S.p.A

Address: Via della Vittorina, 60 - 06024 - Gubbio (PG)

Contact information: Fabio Santinelli, f.santinelli@financo.it

Description of the organization of the EPD owner: Colacem S.p.A is an Italian firm operating in the cement production sector. The company, which was founded by the Colaiacovo family in 1966, has continued to grow over the years thanks to its modern and innovative business culture, and is currently the third leading cement producer in Italian soil[1]. The company's vision is based on sustainability, as a result of its outstanding organizational and technological know-how, which has led to the granting of ISO 9001 certification. Colacem's way of doing business is focused on all those values that place the person at the center; for this very reason, economic growth and production activities have always gone hand in hand with both environmental and surrounding communities respect, thanks to natural resources proper management, impacts mitigation as well as active and responsible relationships with local communities. The company boasts widespread presence throughout Italy with various full-cycle plants, terminals, depots and area depts. Its headquarters are based in **Gubbio (PG)**. Production sites in Tunis, Sabana Grande de Palenque (Dominican Republic), Lafito (Haiti), Balldre (Albania), along with terminals in Alicante, Cartagena (Spain) and Kingston (Jamaica) represent the Group's international standing. Colacem employs about 900 staff in Italy.

Related certifications: UNI EN ISO 9001; UNI EN ISO 14001

1 - Source AITEC - Associazione Italiana Tecnico Economica del Cemento.

PRODUCT INFORMATION

Name: EN 197-1 CEM IV/B (P) 32,5 R- LH/SR

Standard: UNI EN 197-1

Figure 2 - Bulk cement

UN CPC code: 3744

Product description: for this Environmental Product Declaration purposes, cement **CEM IV/B (P) 32,5 R-LH/SR** produced at the Colacem plant of **Gubbio (PG)** in the reference year 2024, marketed in this form in the quantity of **0 ton**, was analyzed. The cement composition (mass percentage) has been detailed according to the UNI EN 197-1 standard "Cement-Part 1: Composition, specifications and conformity criteria for common cements", shown in subsequent Table 2.

Manufacturing processes: The main raw materials and constituents used in the plant are marl, limestone and gypsum, which are extracted from quarries and mines. In order to reduce natural raw materials consumption, as set forth in the sector Best Available Techniques (BAT), "secondary raw materials" deriving from other production activities and recovered to replace the aforementioned materials are also used, see Figure 3 below.

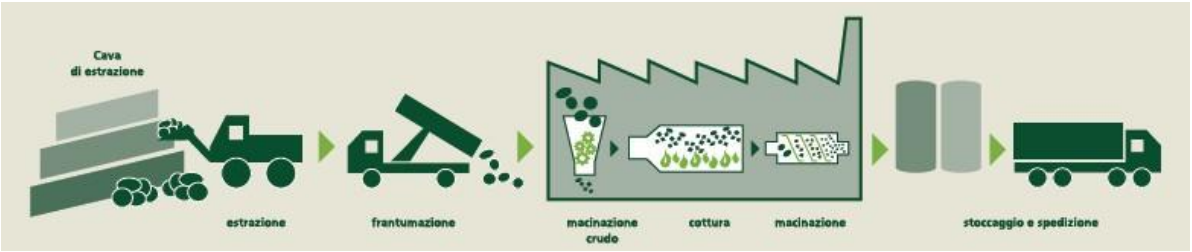

Figure 3 - Cement production process

Materials obtained in quarries are not suitable for use in the state in which they are extracted. They are thus carefully crushed to obtain a homogenous product. The crushed material, subjected to quality control, is then dried, finely ground in a mill and processed into a very fine powder, called meal. Meal is stored in special silos, where it homogenizes further. It passes through a preheating tower at around 900 °C and is then fed into a kiln where it reaches a temperature of 1450 °C and is transformed into clinker. Clinker undergoes a cooling process and is then stored in a large silo. Clinker is finely ground, with gypsum and any other constituents (such as limestone, pozzolan, fly ash, slag, etc.) to obtain cements suitable for various uses, which are stored in special silos. Individual cements, taken from the silos, are ready to be distributed in bulk or bagged. The most common uses of this product are listed in Table 3.

Location of the production site: Via degli Artigiani, 69, Loc. Ghigiano - 06024 Gubbio (PG)

For more information: www.colacem.it

Some particularly representative indicators of the product are summarized in Table 1.

Table 1 - Relevant environmental information

CEM IV/B (P) 32,5 R- LH/SR	
GWP - total, kg CO_2 eq.	5,65E+02
GWP - GHG, kg CO_2 eq.	5,65E+02
Sum of recycled, recovered and by-product material content (%)	7,36

CONTENT DECLARATION

Declared unit: 1.000 Kg

Table 2: List of materials

CEM IV/B (P) 32,5 R- LH/SR				
Materials	**%**	**% of post-consumer recycled content**	**BIOGENIC MATERIAL Mass-% of product**	**BIOGENIC MATERIAL (kgC/product)**
Clinker	60	0,58	0	0
Pozzolana	35	0	0	0
Chemical gypsum	4,9	0	0	0
Chromium reducing additive	0,05	0	0	0
Grinding additives	0,05	0	0	0
TOTAL	100	0,35	0	0

Table 3 - Most common uses of cement

USE	CEM IV/B (P) 32,5 R- LH/SR
Precast	√
Premixed mortars	√

Packaging composition is not provided, as the product is sold in bulk, i.e., without packaging. The content of hazardous substances from the candidate list of SVHCs for authorization is not provided, as concrete is naturally free of them.

LCA INFORMATION

PRODUCTION STEP				CONSTRUCTION PHASE		USE PHASE							END-OF-LIFE					RESOURCE RECOVERY
	Raw materials, electricity, fuels	Transport	Production step	Transport to construction site	Installation	Use	Maintenance	Repairs	Replacement	Restructuring	Energy consumption during use phase	Water consumption during use phase	Disposal, demolition	Waste transport	Waste treatment	Waste disposal		Reuse - recovery – recycling potential
MODULES	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
DECLARED MODULES	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND
GEOGRAPHIC SCOPE	w	w	IT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND
SPECIFIC DATA USED	89,8%			-		-	-	-	-	-	-	-	-	-	-	-		-

Figure 4. - Declared modules and geographical scope. Include modules (X), not declared (ND) modules; World (W, world), Italy (IT).

Declaration of sources and share of primary data: The share of primary data is calculated in accordance with the pre-verified tool. The quality data assessment has been conducted in conformity with the requirements of the applicable PCR and has been developed in an external calculation file that is available upon request; the assessment covers at least 80% of the results.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Manufacturing of product	Collected data	EPD owner	2024	Primary data	83%
Manufacturing of product	Database	Ecoinvent v3.10	2024	Primary data	6,8%
Other processes	Databases	Ecoinvent v3.10	2024	Secondary data	0%
Total share of primary data, of GWP-GHG results for A1-A3					89,8%

Declared unit: **1.000 kg of cement**

Name and version of LCA software: GCCA EPD Tool, ver. 5.2 - https://www.concrete-epd-tool.org/intl. Global Cement and Concrete Association (GCCA), https://gccassociation.org/, Paddington Central, 6th Floor, 2 Kingdom Street, London, W2 6JP - United Kingdom, Tel.+44 (0)20 3580 4286, info@gccassociation.org.

LCA Model. (GreenDelta), International version ver 5.2, 2025-06-23.

Database: ver. 5.2, Ecoinvent ver. 3.10

Referance year: **2024**

System boundary: cradle to gate, see Figure 5 below.

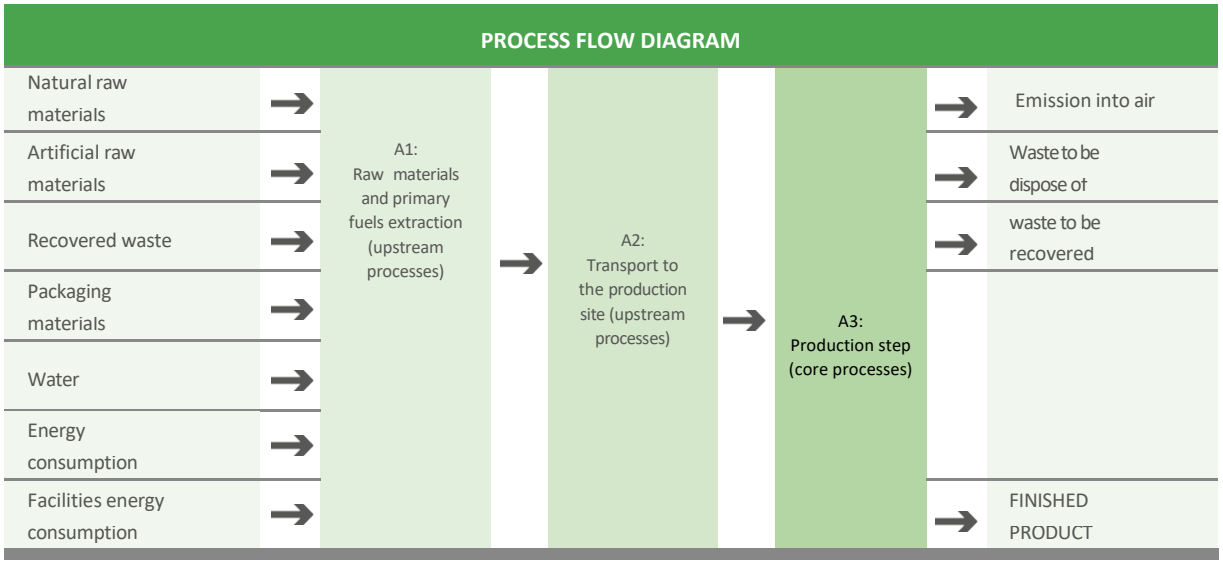

Figure 5 - System Boundary.

Cement production is modelled using primary data collected at the plant for the reporting period. The analysis therefore aims at assessing the environmental impacts associated with the bulk cement produced in this cement plant. The environmental product declaration is based on a Life Cycle Assessment (LCA) performed in accordance with ISO 14040 and 14044 standards and in accordance with ISO 14025:2006 standard.

In addition, reference is made to:

- PCR 2019:14 “Construction products” (EN 15804 - A2) ver. 2.0.1;
- PCR complementary 001 “Cement and building limes” (EN 16908);
- EN 15804:2012+A2:2019/AC:2021 “Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products”;
- EN 16908:2022 “Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804”.

Production step, A1-A3:

Upstream processes in the secondary system are:

- Extraction of raw materials and primary fuels;
- Transport of raw materials to the production site;
- Production of finished product packaging (where applicable);
- In-house transport

Core processes in the analyzed primary system are:

- Production of the main semi-finished product (clinker);
- Production of finished products;
- Transport of waste generated during this production step (including waste from raw material packaging) from the plant to the waste disposal/recovery site;
- Treatment of waste generated during this production step (including waste from finished product packaging, where applicable).

Consumption of Electricity for production:

- The source of modelled electricity meets criterion No. 3 'Residual electricity mix of the electricity on the market' (PCR 2019:2014, ver. 2.0.1): national residual mix provided by AIB related to the reference year.
- Climate impact of electricity, source our "Self-declaration report", calculated from GWP-GHG: **8,08 E-01kg CO_2 eq/kWh.**

EN 15804:2012+A2:2019/AC:2021 standard requires the inclusion of modules A1-A3, C1-C4 and D for all construction products, except for products that do fulfil the following three conditions:

1. Products that are physically integrated with other products during the installation phase;
2. Products that are no longer identifiable at the end of their life-cycle;
3. Products that do not contain biogenic carbon.
4. The EPD is not intended for business-to-consumer communication.

The cement produced in this plant does meet all the aforementioned three criteria.

End of Life scenario: The end-of-life modules are excluded from the study because the product cement meets the above criteria and therefore only the modules A1-A3 are described. The scenario depends on the destination use either in pre-mixed concrete and precast. In both cases the most probable scenario is the 100% recycling. We assume the recycled materials are actually recycled and accounted for as recycled material. The potential credits in module D therefore apply to the recycling of concrete at the end of life, the recycling of reinforcing steel at the end of life and the incineration with energy recovery of (a fraction of) packaging and/or product waste. This methodological choice is consistent with the reality of the cement and concrete industry. No allocation is applied in the GCCA tool. For instance, no allocation of impacts will be applied to excess electricity or excess heat which may result from the production of concrete or precast. Such situations are considered to be marginal and negligible when they take place.

Additional relevant information: maintenance processes (which also entail replacement of mill balls and refractory materials) are not included, as they are considered negligible. Treatment processes of waste leaving the plant for recovery were also excluded from the analysis, while impacts related to waste disposal according to the Polluters Pays (PP) allocation principle, were taken into account. In general, cut-off criteria are set at 1% of mass and energy flows, in accordance with reference relevant standards. Furthermore, the treatment processes of secondary raw materials and secondary fuels entering the process (from waste to secondary raw materials) were considered to have "zero impact", as no information was available on the treatments undergone after the end of waste status, which were therefore considered as cut-offs. Previous impacts were also omitted, according to the Polluters Pays (PP) allocation principle. Post-manufacturing phases (construction, use phase and end-of-life) were excluded from the analysis as they are not within the scope of application.

The assessment of environmental impacts does not include construction of infrastructure and goods, as well as transport of personnel to and from work (PCR 2019:2014, ver. 2.0.1).

In the tables reporting the outcome of the study, null values are indicated with number “0.00”, while data not available or not declared with “ND”. The hyphen “- “is used only where allowed, to indicate data, elements or aspects which were not applied or not applicable.

ENVIROMENTAL PERFORMANCE

Results refer to a declared measurement unit (1000 kg of cement) are calculated according to EN 15804.

The environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The description of the abbreviations is available in a designated section below.

Mandatory environmental impact category indicators:

Table 4 - Mandatory environmental impact category indicators according to EN 15804

INDICATORS	UNIT OF MEASUREMENT	A1-A3
GWP - fossil	kg CO_2 eq.	5,64E+02
GWP - biogenic	kg CO_2 eq	7,22E-02
GWP - luluc	kg CO_2 eq.	2,99E-02
GWP - total	kg CO_2 eq.	5,65E+02
ODP	kg CFC-11 eq.	3,20E-06
AP	mol di H^+ eq.	2,40E+00
EP - freshwater	kg P eq.	6,66E-03
EP - marine	kg N eq.	1,55E-01
EP - terrestrial	mol di N eq.	6,12E+00
POCP	kg NMVOC eq.	1,72E+00
ADPE– materials & metals	kg Sb eq.[2]	2,41E-04
ADPF - fossil	MJ [2]	2,93E+03
WDP	m^3 , [2]	2,14E+01

Please note that Total GWP means Net GWP (NET) as per EN 15804:2021, Appendix D, point D.3.2.

2 - Outcomes of this environmental impact indicator should be used with caution as the uncertainty of these results is high and experience in using this indicator is limited.

Additional mandatory environmental impact indicators:

Table 5 - Additional mandatory and voluntary environmental impact category indicators

INDICATORS	UNIT OF MEASUREMENT	A1-A3
GWP - GHG	kg CO_2 eq. [3]	5,65E+02

Additional voluntary environmental impact indicators:

Tables 6 - Additional voluntary environmental impact indicators

INDICATORS	UNIT OF MEASUREMENT	A1-A3
PM	Disease incidence	1,95E-05
IRP	kBq U235 eq. [4]	5,00E+00
ETP - fw	CTUe [2]	4,07E+02
HTP - c	CTUh [2]	8,57E-07
HTP - nc	CTUh [2]	3,31E-05
SQP	Adimensional [2]	4,76E+02

Indicators describing resource use:

Tables 7 - Resource use

INDICATORS	UNIT OF MEASUREMENT	A1-A3
PERE	MJ	6,30E+01
PERM	MJ	0,00E+00
PERT	MJ	6,30E+01
PENRE	MJ	2,94E+03
PENRM	MJ	0,00E+00
PENRT	MJ	2,94E+03
SM	kg	7,00E+01
RSF	MJ	1,44E+02
NRSF	MJ	3,02E+02
FW	m^3	6,34E-01

3 - The specific data used are declared in the designated section
4 - This impact category mainly concerns the possible impact of a low dose of ionising radiation on human health from nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or effects related to the disposal of radioactive waste in underground facilities. This indicator also does not consider potential ionising radiation from soil, Radon or certain building materials.

Environmental information describing waste categories:

Tables 8 - Waste produced

INDICATORS	UNIT OF MEASUREMENT	A1-A3
HWD	kg	2,06E-02
NHWD	kg	1,06E-02
RWD	kg	2,24E-01

Outflows:

Table 9 - Outflows

INDICATORS	UNIT OF MEASUREMENT	A1-A3
CRU	kg	0,00E+00
MFR	kg	1,29E+00
MER	kg	0,00E+00
EEE	MJ	0,00E+00
EET	MJ	0,00E+00

Additional environmental information:

The Table 10 below shows the following information:

- Recycled, recovered and by-product material content
- Recycled, recovered and by-product material total content

All calculated according to the AITEC guidelines ver. 5 May 2020 – "Quantification of the content of recovered, recycled or by-product material in cement production for self-declared environmental declarations or certification by a conformity assessment body".

Table 11 shows the origin of cement raw materials, calculated by internal method (Google Maps).

Table 10 – Recycled, recovered and by-product material content

MATERIAL CONTENT	UNIT OF MEASUREMENT	CEM IV/B (P) 32,5 R- LH/SR
Recycled	%	0,40
Recycled material Pre-consumer	%	0,05
Recycled material post-consumer	%	0,35
Recovered	%	6,96
By-product	%	0,00
Recycled, recovered and by-product total content	**%**	**7,36**

Table 11 – Components supply distances

PRODUCT COMPONENTS	QUANTITY COMING FROM A DISTANCE LOWER THAN 150 KM (%)	QUANTITY COMING FROM A DISTANCE LOWER THAN 160 KM (%)
Clinker	100	100
Pozzolana	0	99,7
Chemical gypsum	0	0
Chromium reducing additive	0	0
Grinding additive	0	0
Total weighted average on the recipe, %	**60**	**94,9**

Version history:

Original version of the EPD, 2025-07-16

Abbreviations:

Tables 13. – Abbreviations, name and definition

NAME	DEFINITION
GWP	Global warming potential
GWP - biogenic	Global warming potential - biogenic
GWP - luluc	Global warming potential - land use and land use change
GWP - total	land use and land use change - total
ODP	Ozone depletion potential
AP	Acidification potential
EP - freshwater	Eutrophication potential - for freshwater compartment
EP - marine	Eutrophication potential - for marine compartment
EP - terrestrial	Eutrophication potential - for terrestrial compartment
POCP	Photochemical ozone creation potential
ADPE– materials & metals	Abiotic depletion potential
ADPF - fossil	Abiotic depletion potential - fossil
WDP	Water deprivation potential
GWP - GHG	Global warming potential- accounts for all greenhouse gases except biogenic CO_2 uptake and emissions and biogenic carbon stored in the product and/or the packaging.
PM	Particulate matter
IRP	Ionizing radiation potential
ETP - fw	Ecotoxicity potential- freshwater
HTP - c	Human toxicity potential- cancer
HTP - nc	Human toxicity potential- non cancer
SQP	Index of soil quality potential.
PERE	Use of primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw
PERT	Use of total use of renewable primary energy resources
PENRE	Use of non-renewable primary energy excluding non-renewable
PENRM	Use of non-renewable primary energy resources used as raw
PENRT	Use of total use of non-renewable primary energy resources

SM	Use of secondary materials
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of fresh water (net)
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
EEE	Exported energy - electrical
EET	Exported energy - thermal

NAME	DEFINITION
SVHC	Substances of Very High Concern
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared

References

1. EN 15804:2012+A2:2019/AC:2021 “Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products”.
2. EN 16908:2022 “Cement and building lime - Environmental product declarations - Product category rules complementary to EN 15804”.
3. PCR 2019:14 “Construction products” (EN 15804:A2) ver. 2.0.1
4. c-PCR-001, PCR complementary 001 “Cement and building limes” (EN 16908);
5. ISO 14040:2021 “Environmental management - Life cycle assessment - Principles and framework”.
6. ISO 14044:2018 “Environmental management - Life cycle assessment - Requirements and guidelines”.
7. ISO 14025:2010 “Environmental labels and declarations - Type III environmental declara- tions - Principles and procedures”.
8. ISO 14021:2021 “Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)”.
9. GPI “General Programme Instructions for the International EPD® System”, Version 5.0.1, 2025-02-27.
10. AITEC - Associazione Italiana Tecnico Economica del Cemento - Linee guida per la quantificazione del contenuto di materiale recuperato, riciclato o del sottoprodotto nella produzione di cemento ai fini delle asserzioni ambientali autodichiarate o ai fini di una certificazione da parte di un organismo di valutazione della conformità nella ver. 5 di Maggio 2020.
11. European Residual Mixes 2024, Association of Issuing Bodies, ‘Results of the calculation of Residual Mixes for the calendar year 2024’ version 1.0, 2025-05-30.

SMART
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