

ITALCEMENTI

S-P-00404 **EPD**[®]

THE INTERNATIONAL EPD[®] SYSTEM

Environmental Product Declaration



i.tech

i.tech



**ALI PRE
GREEN**

**ALI CEM
GREEN**



i.tech ALI PRE GREEN

Global warming potential	753 kg CO ₂ eq/ton
Use of recycled materials	612 kg/ton
Recycled materials content (ISO 14021 compliant)	56%

i.tech ALI CEM GREEN

Global warming potential	631 kg CO ₂ eq/ton
Use of recycled materials	490 kg/ton
Recycled materials content (ISO 14021 compliant)	45%

Company: Italcementi spa**Website:** www.italcementi.it**Registration No:** S-P-00404**Validity:** 20/12/2022**LCA coverage:** Cradle-to-gate

Declaration of general information

This Environmental Product Declaration (EPD) covers the **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN**, two products belonging to the Green Labelling Scheme of Italcementi. The Green Label is conferred to products with low CO₂ emissions (<562 kgCO₂ for A3 stage) and high recycled material content (>30% for products of European plants). The recycled material content is determined following guidelines in ISO 14021 whereas the CO₂ emissions threshold is derived from the third party verified country or regional specific database of the World Business Council for Sustainable Development- Cement Sustainability Initiative (WBCSD-CSI).

Manufacturer information

The history of Italcementi is the history of the cement industry in Italy. The company was founded over 150 years ago in Bergamo, when the first cement was ground in a watermill in 1864. Italcementi has since become a leader in Italy, both from the industrial and market perspective. In July 2016, Italcementi became part of the German cement producer HeidelbergCement. The current Italcementi industrial structure for cement production in Italy consists of six full-cycle cement plants, a site for special products and eight grinding centers. The overall industrial network boasts also a relevant presence in the concrete sector, through 124 ready-mixed concrete plants and 17 quarries for aggregates. Italcementi is a market leader in Italy, both in the cement and ready-mixed concrete business. The company has actively participated in the development of the Country, by contributing to important infrastructures. With a strong vocation for innovation, Italcementi has been a partner of great engineers and architects for major works. A special relationship connects Italcementi to the world of Universal Expositions. The first experience dates back to 1867, when the Company was awarded with the silver medal at the Universal Exposition in Paris. More recently, Italcementi played an active role in Expo 2010 Shanghai, by developing i.light, the transparent cement used for the Italian Pavilion, a masterpiece among 2010's best inventions, kept as a permanent structure. Last but not least, the company was engaged in the development of a new and truly innovative material - i.active BIODYNAMIC -, allowing for the creation of the extremely complex shapes of Palazzo Italia, the iconic place of Expo 2015 Milano. Among the most recent achievements, i.lab deserves a special mention. Located at the Kilometro Rosso scientific and technologic park in Bergamo, the building hosts the Product Innovation Centre of HeidelbergCement Group, as well as the Italian Headquarter of Italcementi. It is the synthesis of the Company's commitment towards innovative and sustainable technologies and materials. Italcementi is strongly engaged in anticipating market trends and requirements, promoting the concept of sustainable construction. In this perspective, the Company approaches the market with i.nova, the innovative market approach aiming at offering its leadership in innovation to the building community.

Product description

i.tech ALI CEM GREEN is manufactured by Italcementi in its cement plant situated at Guardiaregia in the South of Italy. The main component of **i.tech ALI CEM GREEN** is **i.tech ALI PRE GREEN**, a Calcium Sulfoaluminate clinker (CSA). **i.tech ALI CEM GREEN** and **i.tech ALI PRE GREEN** are part of the Italcementi i.tech Family, highly technological products able to guarantee ultra-high performance in terms of strength and safety. This EPD refers to both **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN** used for rapid setting, high early strength development and shrinkage compensation.



i.tech ALI CEM GREEN is an effective solution for a wide variety of applications:

- Adhesives
- Rapid sealants and mortars
- Precasts
- Floor screeds
- Shotcrete
- Waste inertization.

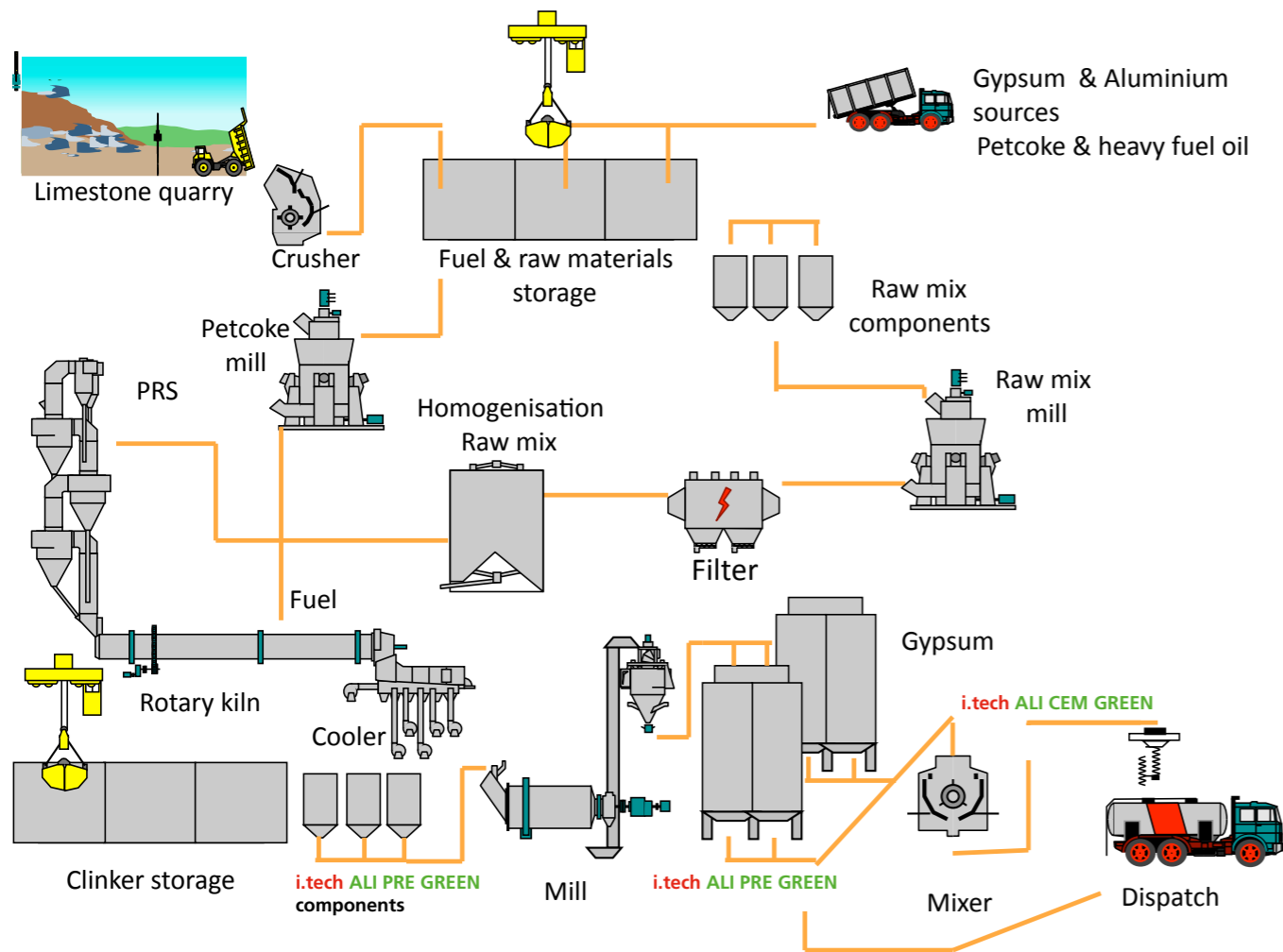
In addition **i.tech ALI CEM GREEN** is appropriate for products that are exposed to aggressive environments such as acid-resistant coatings.

Chemically, **i.tech ALI CEM GREEN** is mainly composed of tetracalcium aluminate sulphate and its composition is optimized to confer it the ability to achieve not only high early strength, but also a progressive strength development up to very high values (i.e 60 MPa at 28 days).

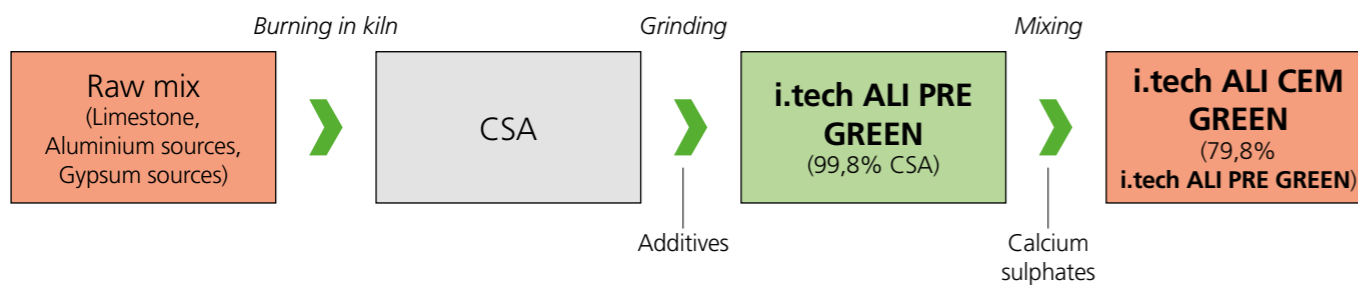
The production process of **i.tech ALI CEM GREEN** is similar to the general cement production process. Raw materials are combusted in a kiln producing clinker. In the case of **i.tech ALI CEM GREEN**, CSA is produced at reduced kiln temperatures (<1300°C vs 1450°C of portland clinker) due to lower required temperatures for the clinkerisation reaction. CSA is ground together with selected additives to produce **i.tech ALI PRE GREEN**. The final production step involves the mixing of **i.tech ALI PRE GREEN** with gypsum to produce **i.tech ALI CEM GREEN**.



Production process



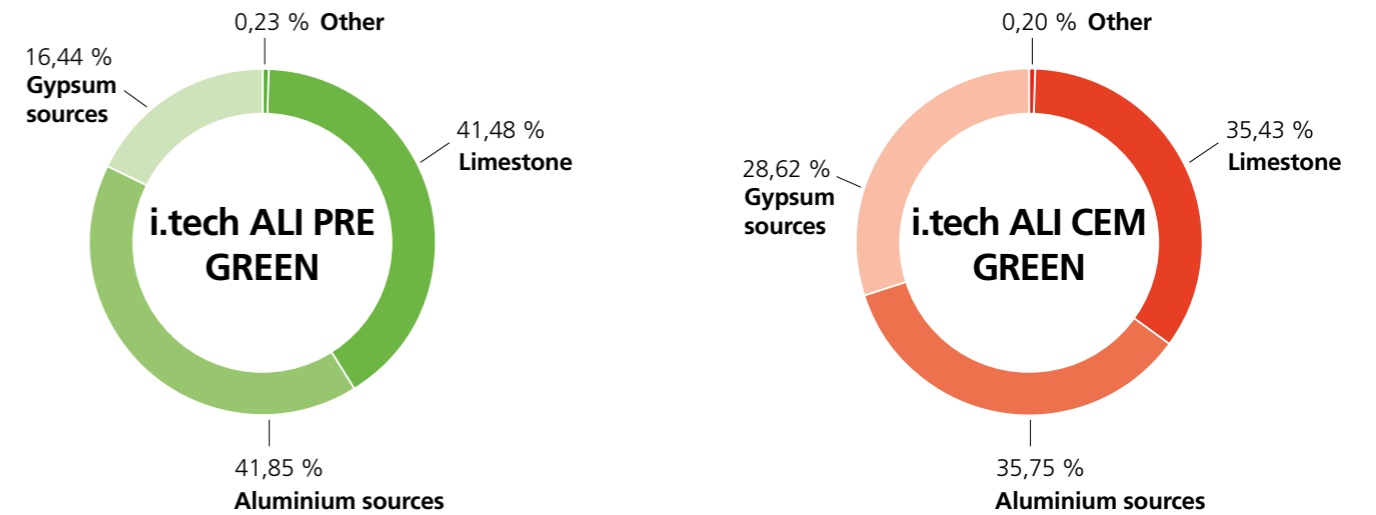
Main pre-products



CSA: Calcium Sulfo Aluminate clinker

The overall composition of the products under study and the energy input involved are provided below. This shows relative percentages of materials and energy sources used in producing **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN**, without considering loss in mass during combustion.

Product composition: i.tech ALI PRE and i.tech ALI CEM



Energy input (process)

	Thermal Energy (MJ)	Electrical Energy (kWh)
i.tech ALI PRE GREEN	2,499	245
i.tech ALI CEM GREEN	1,999	183

i.tech ALI PRE GREEN and **i.tech ALI CEM GREEN** contain a high percentage of recycled materials used as aluminum sources. This particularity implies savings in natural resources and energy which would otherwise have been consumed. The aluminum based recycled materials result from the production of secondary aluminum and as such are classified as pre-consumer recycled materials according to the standard ISO 14021. Following rules set in this standard, the recycled material content of **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN** is at 56% and 45% respectively.

EPD type and programme operator

This is an Environmental Product Declaration (EPD) compliant to a Type III environmental declaration as defined by ISO 14025:2006. **i.tech ALI CEM GREEN** and **i.tech ALI PRE GREEN** are construction products therefore this EPD is compliant to EN 15804:2012+A1:2013. The EPD is subject to the International EPD System (IES) which acts as the Programme Operator and is aligned to the Product Category Rules (PCR) for the assessment of the environmental performance of UN CPC 374 relative to cement (PCR 2012:01 v2.2 SUB-PCR-H). The General Programme Instructions (version 3.0 dated 2017-12-11) of the IES have been implemented.. Further information on IES is available on the official website www.environdec.com.

The EPD refers to a cradle-to-gate boundary so as to meet the following goals:

- › Establish third party verified environmental information
- › Provide information and data for business-to-business communication

This EPD applies to the production of **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN** in Italy during the year 2017. It results from the life cycle assessment study carried out following the principles contained in the ISO 14040 series of standards.

EPDs within the same product category but from different EPD Programmes shall not be comparable. Moreover as stated in EN 15804:2012+A1:2013 the comparison of products on the basis of their EPD is defined by the contribution they make to the environmental performance of the building. Consequently, comparison of the environmental performance of construction products using this EPD information shall be based on the product's use in and its impacts on the building, and shall consider the complete life cycle of the product within the building or construction works.

Declaration of environmental parameters derived from LCA

Scope

Declared unit	1000 kg (1 tonne) i.tech ALI PRE GREEN
Declared unit	1000 kg (1 tonne) i.tech ALI CEM GREEN
Temporary boundary	Year 2017 production
System boundary	From cradle to gate A1-3 A1 (Upstream processes) - Raw material and fuel acquisition, Electricity generation & distribution A2 (Upstream processes) - Transportation to plant. A3 (Core processes) - Manufacturing processes in plant, treatment waste from manufacturing processes.

The results in terms of environmental impacts, resource use and other environmental information are based on the declared unit.

The LCA model includes a representative inventory of the product system in line with cut-off requirements of the reference PCR. Input materials and energy input to the product system do not contain biogenic carbon, consequently there is no Greenhouse Gas emission from biogenic sources.

The EPD Tool for Cement and Concrete (EPD Tool), pre-verified against requirements of the reference cement PCR, was used in computing Life cycle impacts of **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN**. The Tool applies specific datasets of the cement production process together with representative datasets in Ecoinvent version 3.3 to compute environmental parameters of the product under study.

Despite there are no relevant changes in the production process and in the mix of fuels and raw materials used, some variations of environmental parameters occurred between the years 2016 and 2017; these variations are due to updates of the Ecoinvent database over the years and to the increase in the plant power consumption.

Parameters describing environmental impacts

The following information on environmental impacts are expressed in terms of impact category parameters using characterization factors.

Potential environmental impacts per ton of i.tech ALI PRE GREEN

IMPACT CATEGORY PER TON I.TECH ALI PRE GREEN	UNIT	CRADLE TO GATE A1-3
Global warming potential, GWP (100 years)	kg CO ₂ -eq	7,53E2
Ozone depletion potential	kg CFC 11-eq	4,95E-5
Acidification potential	kg SO ₂ -eq	3,08E0
Eutrophication potential	kg PO ₄ ³⁻ -eq	1,3E0
Photochemical ozone creation potential	kg C ₂ H ₄ -eq	1,22E-1
Depletion of abiotic resources (elements)	kg Sb -eq	1,16E-3
Depletion of abiotic resources (fossil)	MJ, net calorific value	4,47E3

Potential environmental impacts per ton of i.tech ALI CEM GREEN

IMPACT CATEGORY PER TON I.TECH ALI CEM GREEN	UNIT	CRADLE TO GATE 1-3
Global warming potential, GWP (100 years)	kg CO ₂ -eq	6,32E2
Ozone depletion potential	kg CFC 11-eq	4,33E-5
Acidification potential	kg SO ₂ -eq	2,84E0
Eutrophication potential	kg PO ₄ ³⁻ -eq	1,29E0
Photochemical ozone creation potential	kg C ₂ H ₄ -eq	1,05E-1
Depletion of abiotic resources (elements)	kg Sb -eq	1,14E-3
Depletion of abiotic resources (fossil)	MJ, net calorific value	3,94E3

Parameters describing resource use

The following environmental parameters apply data based on LCI. They describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy, water use and electricity use during manufacturing.



Resource use per ton of i.tech ALI PRE GREEN

I.TECH ALI PRE GREEN	UNIT	CRADLE TO GATE A1-3
Use of non-renewable primary Energy excluding non-renewable primary Energy used as raw materials	MJ	5,7E3
Use of non-renewable primary Energy resources used as raw materials	MJ	0,00
Total use of non-renewable primary Energy resources (primary energy and primary Energy resources used as raw materials)	MJ	5,7E3
Use of renewable primary Energy excluding renewable primary Energy used as raw materials	MJ	2,31E3
Use of renewable primary Energy resources used as raw materials	MJ	0,00
Total use of renewable primary Energy resources (primary energy and primary Energy resources used as raw materials)	MJ	2,31E3
Use of secondary materials	kg	6,12E2
Net fresh water	m ³	2,37E1
Electricity during manufacturing (A3 only)	kWh	2,45E2

Resource use per ton of i.tech ALI CEM GREEN

I.TECH ALI CEM GREEN	UNIT	CRADLE TO GATE A1-3
Use of non-renewable primary Energy excluding non-renewable primary Energy used as raw materials	MJ	4,93E3
Use of non-renewable primary Energy resources used as raw materials	MJ	0,00
Total use of non-renewable primary Energy resources (primary energy and primary Energy resources used as raw materials)	MJ	4,93E3
Use of renewable primary Energy excluding renewable primary Energy used as raw materials	MJ	2,31E3
Use of renewable primary Energy resources used as raw materials	MJ	0,00
Total use of renewable primary Energy resources (primary energy and primary Energy resources used as raw materials)	MJ	2,31E3
Use of secondary materials	kg	4,89E2
Net fresh water	m ³	2,11E1
Electricity during manufacturing (A3 only)	kWh	1,83E2

Use of renewable secondary fuels and use of nonrenewable secondary fuels are zero for both **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN**.

Other environmental indicators

The following parameters describe waste categories and other flows derived from LCI.

Other indicators per ton of i.tech ALI PRE GREEN

PER TON I.TECH ALI PRE GREEN	UNIT	CRADLE TO GATE A1-3
Hazardous waste	kg	2,7E-2
Non-hazardous waste	kg	1,09E0
Dust	kg	1,00E-2

Other indicators per ton of i.tech ALI CEM GREEN

PER TON I.TECH ALI CEM GREEN	UNIT	CRADLE TO GATE
Hazardous waste	kg	2,7E-2
Non-hazardous waste	kg	1,09E0
Dust	kg	1,00E-2

Components for re-use, Materials for recycling, Materials for energy recovery, Exported energy and Radioactive waste disposed are zero for both **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN**.

Additional environmental information

Guardiaregia plant, certified according to ISO 14001:2015 and ISO 9001:2015, covers a total surface area of 96700 m² and has been in operation for 60 years. The quarry supplying limestone for production activities is at 4 km from the plant and has a surface area of 425.730 m². Safety data sheets of **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN** provide information on proper handling of these products. They are intended for use by professionals and enable them to take necessary measures as regards health, safety and environment at work-sites. Safety data sheets and other technical documents of **i.tech ALI CEM GREEN** and **i.tech ALI PRE GREEN** can be consulted on the Italcementi website www.italcementi.it.



Additional information

Product innovation is one of the strategic pillars of Italcementi and the parent Company, HeidelbergCement. Consequently, the production of **i.tech ALI PRE GREEN** and **i.tech ALI CEM GREEN** is in line with Group Sustainability Commitments 2030 advocating product design suitable for energy efficiency in buildings, sustainable construction and optimizing the use of recycled materials. Moreover, new clinker, cements or binders alternative to Ordinary Portland Cement are under development. In particular, research focuses on the use of renewable and reusable raw materials and the development of specialty admixtures and special additions for concrete, also through investigations and experiments based on nano and biotechnologies applied to the construction materials sector. In addition, unconventional products in the Company's portfolio, such as TX Active®, i.light® and the EXPO Milan 2015 i.active BIODYNAMIC, are able to provide added technological and functional value to traditional products. More information on Sustainability can be accessed at the official website.

<https://www.heidelbergcement.com/en/responsibility>.

References

ISO 14025:2006	Environmental labels and declarations - Type III environmental declarations
ISO 14040:2006	Environmental management - Life cycle assessment - Principles and Framework
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and Guidelines
ISO 14021:2012	Environmental labels and declarations – Self-declared environmental claims (Type II Environmental labelling)
GPI	General Programme Instructions of IES www.environdec.com (version 3.0 dated 2017-12-11)
EN 15804:2013	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
PCR for cement	www.environdec.com - PRODUCT CATEGORY RULES (PCR) for Product Group "Cement", CPC 3744. (version 2.2 2017-05-30)

Demonstration of verification

The CEN standard EN 15804 served as the core PCR.
 The PCR 2012:01, Construction products and construction services, Version 2.2 was reviewed by the Technical Committee of the International EPD® System (IES).
 Chair: Massimo Marino. Contact via info@environdec.com

Independent verification of the declaration and data, according to ISO 14025:2006

EPD Process Certification (Internal) EPD Verification (External)

Registration No.: S-P-00404

Date of Certification: 2013/02/22

Renewal: 2018/09/20

Validity: 2022/12/20

Independent Verifier: Certiquality Srl (Number of accreditation: 003H rev.14)

Accredited by: Accredia

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Glossary

Ozone layer depletion 20a	Destructive effects on the stratospheric ozone layer over a time horizon of 20 years.
Acidification	Increase of soil and water acidity.
Eutrophication	Excessive levels of macronutrients in the environment caused by emissions of nutrients to air, water and soil.
Photochemical oxidation	Oxidizing of volatile compounds in the presence of nitrogen oxides (NOx) which frees ozone in the low atmosphere.
Abiotic depletion	Extraction of minerals and fossil fuels due to inputs in the system.







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