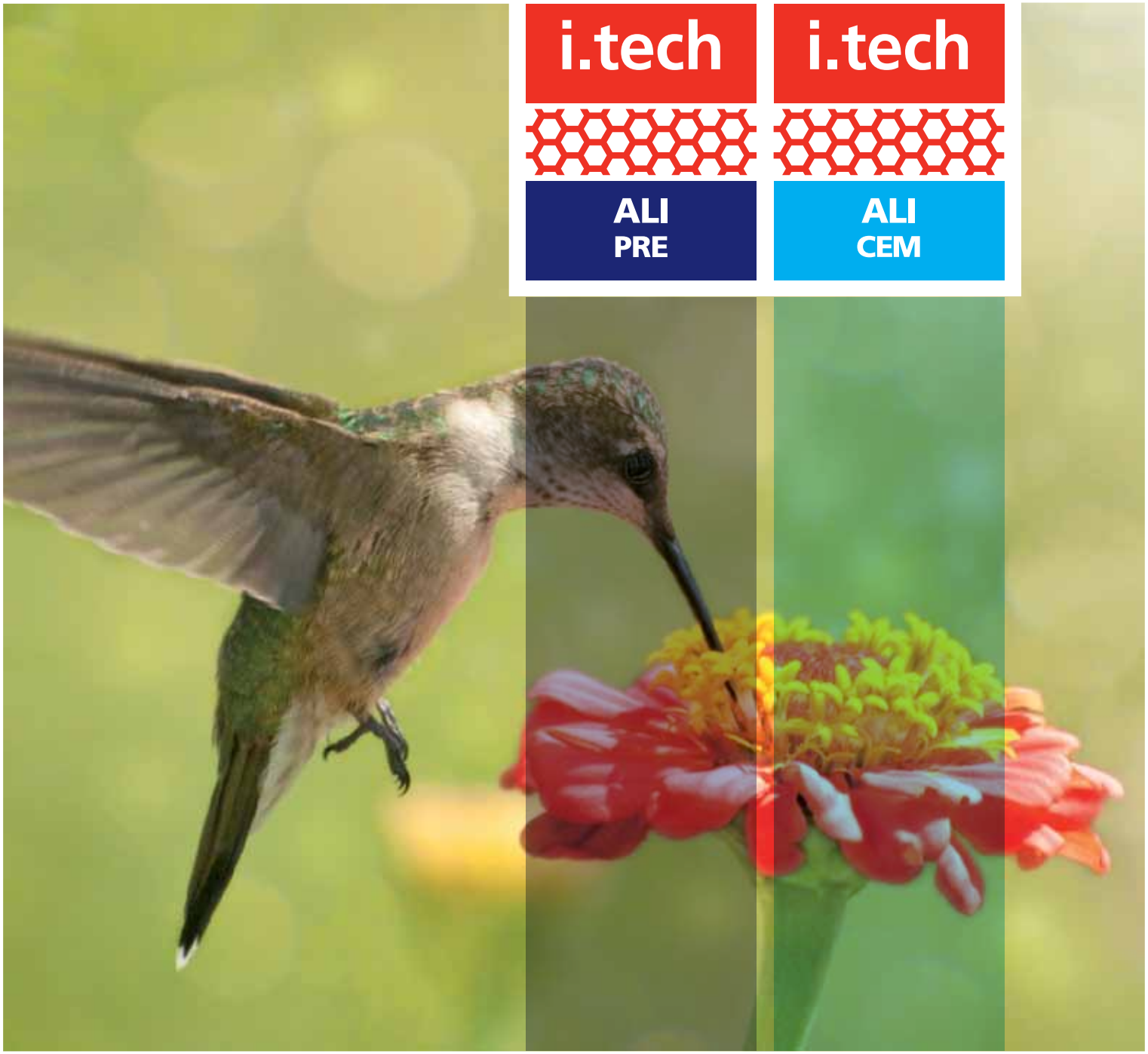
ITALCEMENTI

EPD - Environmental Product Declaration

i.tech ALI PRE

i.tech ALI CEM



i.tech ALI PRE

Global warming potential	**738 kg CO_2 eq/ton**
Use of recycled materials	**603 kg/ton**

i.tech ALI CEM

Global warming potential	**665 kg CO_2 eq/ton**
Use of recycled materials	**506 kg/ton**

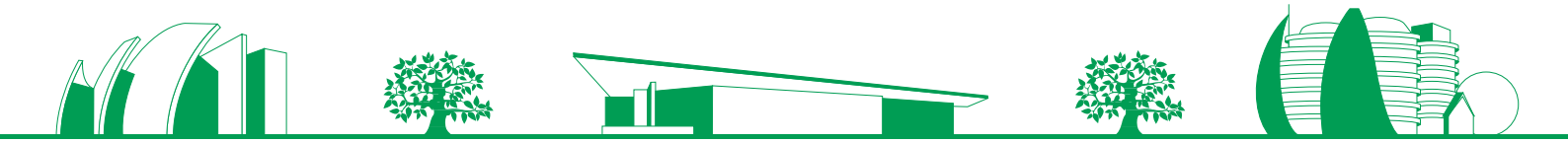
Company: Italcementi Group

Website: www.italcementigroup.com

Certification No.: S-P-00404

Validity: 26/12/2015

LCA coverage: cradle-to-gate



Declaration of general information

Manufacturer information

Italcementi Group is the fifth largest cement producer in the world. The Parent Company, Italcementi S.p.A., is one of Italy's 10 largest industrial companies and is listed on the Italian Stock Exchange. The Group companies combine the expertise, know-how and cultures of 21 countries in 4 Continents, boasting an industrial network of 51 cement plants, 10 grinding centres, 7 terminals, 449 concrete batching units and with an overall staff of about 19,000 people. In 2012 Italcementi Group had sales amounting to about 4.5 billion Euro.
Further information on Italcementi Group and contact details can be accessed at its official website **www.italcementigroup.com/ENG**.

Product description

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

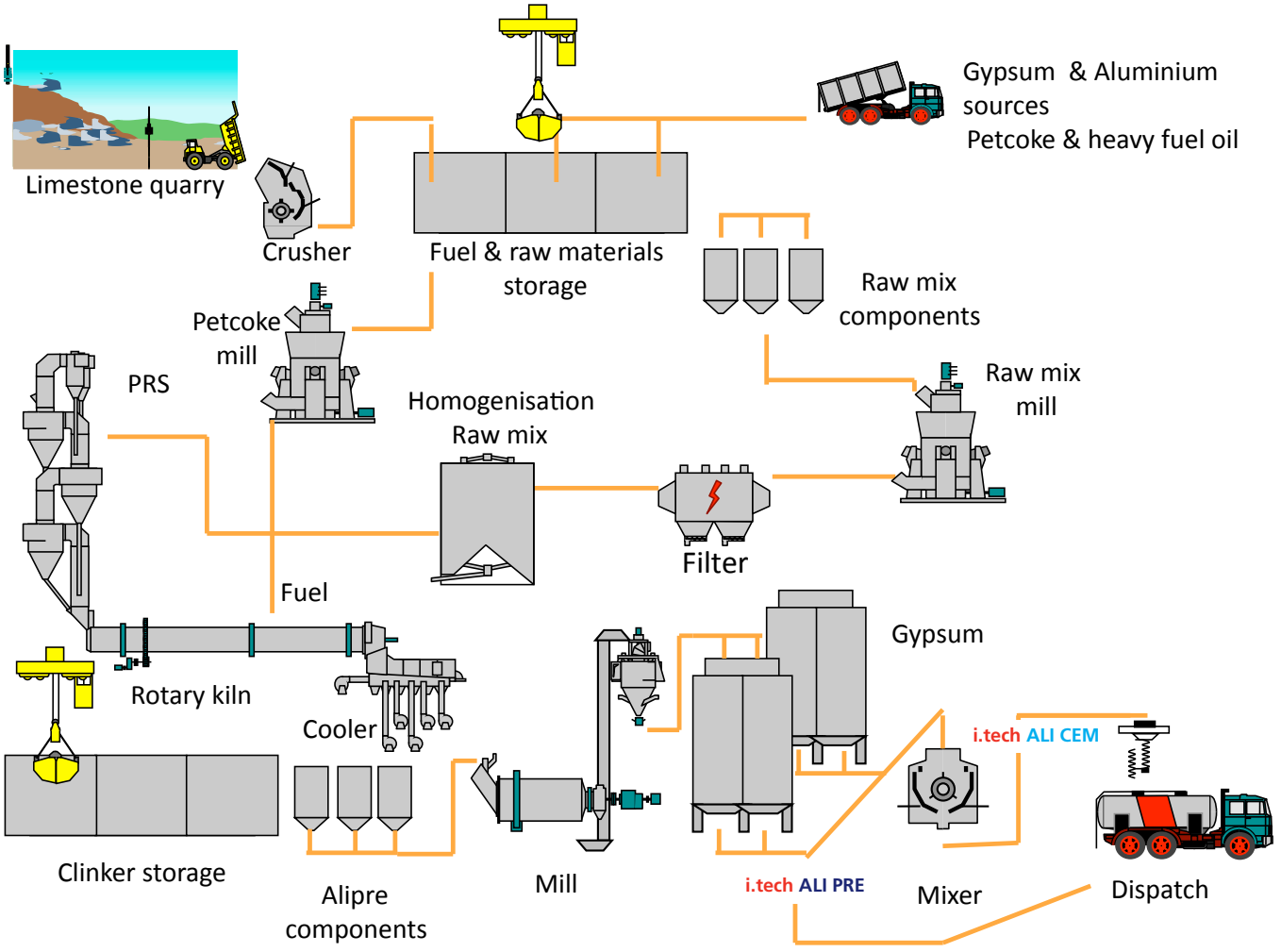
i.tech ALI CEM is an effective solution for a wide variety of applications:

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

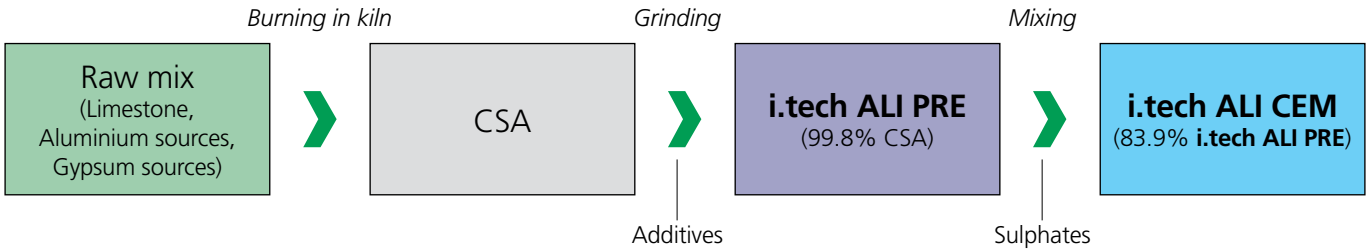
In addition **i.tech ALI CEM** is appropriate to manufacture products that withstand aggressive environments such as acid-resistant coatings.

Chemically, **i.tech ALI CEM** 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 (higher than common CEM I 52.5 R).
The production process of **i.tech ALI CEM** is similar to the general cement production process. Raw materials are burned in a kiln producing clinker. In the case of **i.tech ALI CEM**, CSA is produced at a lower kiln temperature (<1300°C vs 1450°C of portland clinker) due to the lower temperature needed for the clinkerisation reaction. CSA is ground together with selected additives to produce **i.tech ALI PRE**. The final production step involves the mixing of **i.tech ALI PRE** with gypsum to produce **i.tech ALI CEM**.

Production process



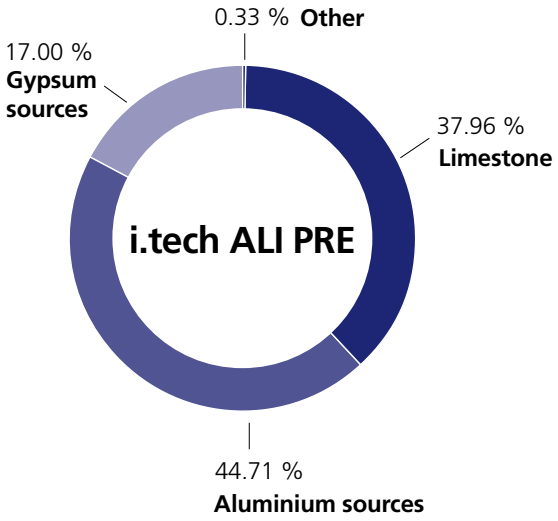
Main pre-products

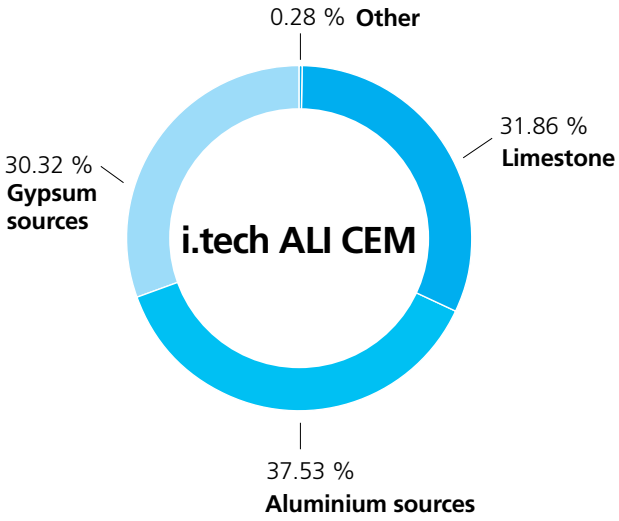


CSA: Calcium Sulfo Aluminate clinker

The overall composition of products under study and the energy input by energy source is provided below. **i.tech ALI PRE** and **i.tech ALI CEM** contain a high percentage of recycled materials used as aluminium sources. This particularity implies savings in natural resources and energy which would have been consumed.

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





Energy input (process)

	Thermal Energy (MJ)	Electrical Energy (kWh)
i.tech ALI PRE	2,336	189
i.tech ALI CEM	1,965	183

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. The EPD is subject to the International EPD Consortium (IEC) 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 3744 relative to cement (PCR 2010:09, Version 1.0 dated 2010-09-15). The General Programme Instructions (version 1.0 dated 2008-02-29) of the IEC have been implemented.
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 refers to the production of **i.tech ALI PRE** and **i.tech ALI CEM** during the year 2012 and applies 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 EN15804 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	1,000 kg (1 tonne) **i.tech ALI PRE**
Declared unit	1,000 kg (1 tonne) **i.tech ALI CEM**
Temporary boundary	2012 production
System boundary	From cradle to gate **Upstream processes** - Raw material and fuel acquisition, Electricity generation & distribution, transportation to plant. **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.

Parameters describing environmental impacts

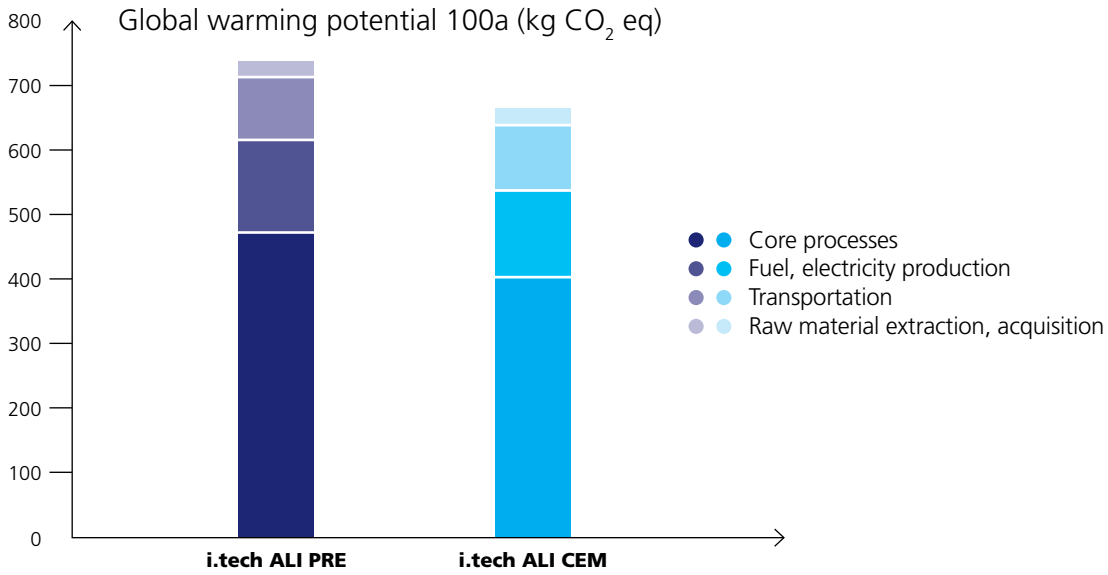
The following information on environmental impacts is expressed with the impact category parameters of LCIA using characterisation factors.

Global warming potential

This refers to the Global warming impact of greenhouse gases such as Carbon Dioxide (CO_2), measured using the equivalent CO_2 emission over a 100 year time horizon. The definition and characterisation factors are those of the International Panel for Climate Change 4th Assessment Report, 2007.

	Global warming 100a (kg CO_2 eq)				
	Cradle to gate	**Core processes**	**Fuel, electricity production**	**Transportation**	**Raw material extraction, acquistion**
i.tech ALI PRE	737.59	474.09	143.61	95.37	24.52
i.tech ALI CEM	664.60	400.65	134.58	103.28	25.89

Graphical illustration of GWP of life cycle stages



Other environmental impacts

Per ton of i.tech ALI PRE

Impact category Per ton i.tech ALI PRE	Unit	Cradle to gate	Core processes	Uptream processes
Ozone layer depletion 20a	kg CFC-11 eq	3.39E-05	0.00E+00	3.39E-05
Acidification	kg SO2 eq	2.31	0.63	1.68
Eutrophication	kg PO4---eq	0.45	0.14	0.31
Photochemical oxidation	kg C2H4 eq	0.12	0.04	0.09
Abiotic depletion	kg Sb eq	3.20	0.00	3.20

Per ton of i.tech ALI CEM

Impact category Per ton i.tech ALI CEM	Unit	Cradle to gate	Core processes	Uptream processes
Ozone layer depletion 20a	kg CFC-11 eq	3.41E-05	4.84E-07	3.36E-05
Acidification	kg SO2 eq	2.17	0.55	1.62
Eutrophication	kg PO4---eq	0.43	0.13	0.30
Photochemical oxidation	kg C2H4 eq	0.11	0.03	0.08
Abiotic depletion	kg Sb eq	3.03	0.03	3.00

Parameters describing resource use

The following environmental parameters apply data based on the 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.

Per ton of i.tech ALI PRE

Per ton of i.tech ALI PRE†	Unit	Cradle to gate	Core processes‡
Non renewable energy resources	MJ	7,185	0.00
Fossil	MJ	6,861.10	0.00
Renewable energy resources	MJ	199	0.24
Water	MJ	181.69	0.24
Biomass	MJ	10.97	0.00
Non renewable material resources	kg	1,440.29	0.00
Alluminium	kg	602.90	0.00
Calcite	kg	515.15	0.00
Gypsum	kg	231.67	0.00
Gravel	kg	85.82	0.00
Renewable material resources	kg	0.00	0.00
Water use	m^3	5.02	0.23
Net fresh water	m^3	4.81	0.017
Electricity during manufacturing	kWh	-	189.41

† Breakdown for energy and material resources covers atleast 95% of total
‡ Results for Upstream processes is the difference between Cradle-to-gate and Core processes

Per ton of i.tech ALI CEM

Per ton of i.tech ALI CEM†	Unit	Cradle to gate	Core processes‡
Non renewable energy resources	MJ	6,799.01	0.00
Fossil	MJ	6,469.05	0.00
Renewable energy resources	MJ	192.77	0.25
Water	MJ	175.09	0.00
Biomass	MJ	10.77	0.25
Non renewable material resources	kg	1,341.35	0.00
Alluminium	kg	506.04	0.00
Calcite	kg	433.23	0.00
Gypsum	kg	194.45	0.00
Gravel	kg	111.91	0.00
Sulphate	kg	53.56	0.00
Renewable material resources	kg	0.00	0.00
Water use	m^3	5.98	0.27
Net fresh water	m^3	5.73	0.02
Electricity during manufacturing	kWh	-	183.17

† Breakdown for energy and material resources covers atleast 95% of total
‡ Results for Upstream processes is the difference between Cradle-to-gate and Core processes

Other indicators

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

Per ton of i.tech ALI PRE

Per ton i.tech ALI PRE†	Unit	Cradle to gate	Core processes‡
Use of recycled materials (Aluminium sources)	kg	602.83	602.83
Use of secondary fuels	MJ	0.00	0.00
Non hazardous waste	kg	158.00	139.00
Hazardous waste	kg	0.12	0.11
Dust	g	625	3.79
Land use	PDF*m2yr	2.71	0.00

† Breakdown for energy and material resources covers atleast 95% of total
‡ Results for Upstream processes is the difference between Cradle-to-gate and Core processes

Per ton of i.tech ALI CEM

Per ton i.tech ALI CEM†	Unit	Cradle to gate	Core processes‡
Use of recycled materials (Aluminium sources)	kg	505.97	505.97
Use of secondary fuels	MJ	0.00	0.00
Non hazardous waste	kg	188.00	166.00
Hazardous waste	kg	0.14	0.13
Dust	g	617	22.7
Land use	PDF*m2yr	2.68	0.00

† Breakdown for energy and material resources covers atleast 95% of total
‡ Results for Upstream processes is the difference between Cradle-to-gate and Core processes

Additional environmental information

Guardiaregia plant covers a total surface area of 96,700 m^2 and has been in operation for 56 years. The quarry supplying limestone for production activities is at 4 km from the plant and has a surface area of 425,730 m^2.

Micro-pollutants (Polychlorodibenzodioxins (PCDD), Polychlorodibenzofurans (PCDF) and Polycyclic Aromatic Hydrocarbons (IPA)) are not relevant for the **i.tech ALI CEM** product system as values are three orders of magnitude less than emissions limits imposed by Italian law - D.Lgs 133/05. Safety data sheets of **i.tech ALI PRE** and **i.tech ALI CEM** provide information concerning use at the place of work. These are intended for use by professional users and enable them to make the necessary measures as regards the protection of health, safety and environment at the place of work. Safety data sheets of **i.tech ALI CEM** and **i.tech ALI PRE** can be consulted in Italian on the Italcementi Group website **www.italcementi.it/ITA/Prodotti+servizi+e+qualita/**.

Additional information

As already mentioned **i.tech ALI PRE** and **i.tech ALI CEM** are innovative products of Italcementi Group. Product innovation is one of the strategic axis of the Group. The production of **i.tech ALI PRE** and **i.tech ALI CEM** is in line with our Sustainability Policies which advocate designing products suitable for energy efficiency in buildings and sustainable construction and optimizing the content 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 Group's portfolio, such as TX Active®, i.light® and others, are able to provide added technological and functional value to traditional products. More information on Sustainable development at Italcementi Group, Sustainability Policies and related activities can be accessed at the official website **www.italcementigroup.com/ENG/Sustainable+Development/**.

Guardiaregia plant in line with Group sustainability policies and strategy is certified according to ISO 14001:2004 and ISO 9001:2008.

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
GPI	General Programme Instructions of IEC www.environdec.com (version 1.0 dated 2008-02-29)
PCR for cement	www.environdec.com - PRODUCT CATEGORY RULES (PCR) for Product Group "Cement", CPC 3744. (version 1.0 2010-09-15)
Verification Report	Environmental Product Declaration Verification Report for **i.tech ALI PRE** and **i.tech ALI CEM**, Italcementi Group (date: November 2012)

Demonstration of verification

The cement PCR 2010:09, Version 1.0 dated 2010-09-15 was conducted by the the Technical Committee of the International EPD® Consortium (IEC). **PCR Moderator**: Carlo Strazza, CE.Si.S.P., carlo.strazza@cesisp.unige.it
Independent verification of the declaration, according to ISO 14025:2006 ☐ Internal ☒ External
Certification No.: S-P-00404
Date of Certification: 27/12/2012
Validity: 26/12/2015
Independent Verifier: Certiquality Srl
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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