ALFA ACCIAI

Production Plant
Via San Paolo 152, 25134,
Brescia - (IT)

ENVIRONMENTAL PRODUCT DECLARATION

Alfa Sinstone®
industrial aggregate

Based on:
PCR ICMQ-001/15 v3
EN:15804:2012+A2:2019
UNI EN ISO 14025:2010

Certification N°:
EPDITALY0715

Product CPC code:
37

Date of issue:
2024/09/11

Valid until:
2029/09/11

Declaration number:
AA_EPD_009

General information

EPD REFERENCES

EPD OWNER: Alfa Acciai, via San Polo 152, 25134, Brescia – ITALY; Manufacturing plant is located in the same site

PROGRAM OPERATOR: EPDItaly, Via Gaetano De Castillia 10, 20124 Milano - ITALY

INDEPENDENT VERIFICATION

This declaration has been developed referring to the EPDItaly, following the last version of "Regolamento di EPDItaly"; further information and the document itself are available at: www.epditaly.it. EPD document valid within the following geographical area: Italy and other countries worldwide according to sales market conditions.

CEN standard EN 15804 served as the core PCR (PCR ICMQ-001/15 v3)
PCR review conducted by Daniele Pace, contact via info@epditaly.it

Independent verification of the declaration and data, according to EN ISO 14025 : 2010

Third party verifier: ICMQ SpA, via De Castillia, 10 20124 Milano (www.icmq.it)

☐ EPD process certification (Internal) ☑ EPD verification (External)

Accredited by: Accredia
Procedure for follow-up during EPD validity involves third party verifier:

☑ YES ☐ NO

Environmental declarations published within the same product category, though originating from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804.

The EPD Owner exempts EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for supporting information and evidence. EPDItaly disclaims all liability for the information, data and results provided by the EPD Owner for life cycle assessment.

CONTACTS

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ALFA ACCIAI

Technical support to Feralpi Group was provided by Life Cycle Engineering, Italy. (info@lcengineering.eu, www.lcengineering.eu).

LCE

Alfa Acciai Group

The Alfa Acciai Group has been among Europe's main manufacturers of reinforced steel and wire rod for 70 years, with over 1,200 employees and a total production capacity of 2.5 million tons per year and is a benchmark in terms of cutting-edge technology, mindful of the employees and with environmental awareness throughout the entire steel supply chain.

The Group has always been renowned for its industrial flexibility, utmost operational efficiency upstream and downstream of the melting process, and great financial and equity strength. It is focused on ethical corporate social responsibility principles, routine maintenance on installations and operations, caring and listening to stakeholders' requirements.

ALFA ACCIAI

The Brescia-based parent company is one of the largest electric-arc steelmaking plants in Italy and one of the top national wire rod producers, as well as being ranked among the leaders in the production of reinforcing steel for concrete in Europe.
The steel-making plant comprises two EAFs (electric arc furnaces) and 2 LFs (ladle furnaces), 2 five-strand continuous casting machines (10 lines) and a shredder for proler production. The hot rolling division is equipped with two bars and spool mills and a wire rod mill.

The production cycle is completed by cold rolling mills that produce high-ductility welded mesh for reinforced concrete and recoiled wire.

Acciaierie di Sicilia

Located in the industrial district of Catania, has been part of the Alfa Acciai Group since 1998 and is the only steel mill in the heart of the Mediterranean It is one of the main industrial centers of the Region and is characterized by a strong export vocation thanks to its proximity to significant port infrastructures. The company stands out for its constant technological innovation and steel know-how, factors that guarantee increasingly high-quality standards, respecting the environment and the health and safety of its employees. The production process includes an EAF (electric arc furnace), a continuous casting machine (4 lines) and a hot rolling mill using a hot-charge system to produce reinforcing steel in bars and coils.

FERROBERICA

Has belonged to the Group for over 30 years and has 5 operational sites located in: Vicenza, Montirone (BS), Sedegliano (UD) and 2 in Catania.
The company is the leading operator in Italy and the second in Europe in the cutting and bending, including the assembling of reinforcing steel for use in structural work. Thanks to its expertise, reliable supplies and market competitiveness, today Ferroberica is a production facility with a total annual capacity of 400,000 tonnes boasting the world's most high-tech plant in Montirone.

TECNOFIL

Located in Gottolengo (BS), has been part of the Alfa Acciai Group since September 2016.
Tecnofil is currently the major drawing mill with a galvanizing plant in Europe. It produces steel wire, galvanized wire, alu-zinc wire, bright wire, annealed wire, redrawn wire and skinpassed wire for use in construction, household appliances, automotive, agricoltural and numerous other applications of everyday life. Over the years the company has significantly expanded its overall production capacity (currently over 100,000 tons / year) and the range of products to be offered on the market.

Scope & type of EPD®

The approach used in this EPD is "Cradle to gate with options" one

TABLE OF MODULES

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw material supply	Transport	Manufacturing	Transport to the gate to the site	Asseambly	Use	Mainteinance	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	✓	✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	MND	✓	✓	✓	✓	✓
geography	IT	IT	IT	IT	-	-	-	-	-	-	-	-	WLD	WLD	WLD	WLD	WLD
specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - products	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - sites	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-

SOFTWARE: SimaPro ver. 9.5

MAIN DATABASE: Ecoinvent 3.9.1

REPORT LCA: Life Cycle Assessment (LCA) for hot and cold rolled structural steel and for recycled aggregates produced by Alfa Acciai for EPD® purposes - Final Report

GEOGRAPHICAL SCOPE OF THE EPD: Italy

TYPE OF EPD: specific for recycled industrial aggregates

The Product

Sinstone industrial aggregate

This EPD refers to Sinstone industrial aggregate, produced at Alfa Acciai plant placed in Brescia (Italy).
Production residue arising from the Electric Arc Furnace process represent the core material of the aggregate. Once produced and transformed, the black slag becomes Sinstone. The aggregate is sold to external companies to be used in road pavements, cement aggregates and bituminous conglomerates. The adoption of the Sinstone aggregate allows to avoid the depletion of inert natural materials such as gravel, with savings in terms of land use.

Declared Unit according to EN:15804, the declared unit is 1 ton of Sinstone aggregate

INFORMATION	DESCRIPTION
Product identification	Sinstone industrial aggregate
Product features	CE mark using 2+ scheme according to the following standards SINSTONE 0-20: UNI EN 13242 SINSTONE 0-63: UNI EN 13242 SINSTONE 0-90: UNI EN 13242 Volumic mass [t/m3] SINSTONE 0-90: 3,8 Water absorption [%] SINSTONE: ≤ 2%
Plant features	Total production of EPD covered products, year 2023: 18 704 t
	Total production, for selling purpose, year 2023: 18 704 t
	On-site air emission control system
	On-site waste water control system
	On-site system to recycle water used in process
	In/out materials/products and melting process monitored to prevent nuclear radiation
	Plant air emissions accounted under ETS (Emission Trading System)

Environmental performance

The detailed environmental performance (in terms of use of resources, pollutant emissions and waste generation) is presented for the three phases, Upstream, Core and Downstream and related sub-phases (A1-A2-A3-A4-C1-C2-C3-C4-D). The numbers reported in the following tables are the outcome of rounding.

For this reason total results could slightly differ from the sum of contributions of the different phases. The energy sources behind the electricity grid used in manufacturing is the italian residual mix 0,457 kg CO_2 eq./kWh (AIB report May 2023) to which LCE adds emissions related to network losses and transformation.

ENVIRONMENTAL IMPACTS

INDICATORS	UNITS / D.U.	UPSTREAM	CORE PROCESS		A1:A3	DOWNSTREAM					
		A1	A2	A3		A4	C1	C2	C3	C4	D
GWP	kg CO_2 eq	6.79E-01	3.15E-02	1.48E+00	2.19E+00	1.55E+00	5.85E+01	7.61E+00	0.00E+00	2.70E+00	0.00E+00
GWP,f	kg CO_2 eq	6.78E-01	3.15E-02	1.48E+00	2.19E+00	1.55E+00	5.84E+01	7.61E+00	0.00E+00	2.70E+00	0.00E+00
GWP,b	kg CO_2 eq	2.52E-04	1.90E-06	2.25E-04	4.79E-04	9.24E-05	3.48E-03	4.53E-04	0.00E+00	2.85E-04	0.00E+00
GWP,luluc	kg CO_2 eq	1.89E-04	6.30E-07	6.80E-05	2.58E-04	3.06E-05	2.40E-03	1.50E-04	0.00E+00	1.36E-04	0.00E+00
GWP,ghg	kg CO_2 eq	6.79E-01	3.15E-02	1.48E+00	2.19E+00	1.55E+00	5.85E+01	7.61E+00	0.00E+00	2.70E+00	0.00E+00
ODP	kg CFC11 eq	3.36E-08	6.95E-10	1.15E-09	3.54E-08	3.38E-08	9.22E-07	1.65E-07	0.00E+00	4.02E-08	0.00E+00
AP	mol H+ eq	3.12E-03	5.44E-05	1.48E-02	1.80E-02	3.12E-03	5.60E-01	3.32E-02	0.00E+00	2.51E-02	0.00E+00
EP,f	kg P eq	7.99E-05	2.19E-07	2.66E-05	1.07E-04	1.07E-05	4.41E-04	5.22E-05	0.00E+00	8.07E-05	0.00E+00
EP,m	kg N eq	6.23E-04	1.72E-05	7.42E-03	8.06E-03	1.10E-03	2.63E-01	1.48E-02	0.00E+00	1.14E-02	0.00E+00
EP,t	mol N eq	6.03E-03	1.76E-04	8.13E-02	8.75E-02	1.14E-02	2.86E+00	1.59E-01	0.00E+00	1.24E-01	0.00E+00
POCP	kg NMVOC eq	4.43E-03	9.44E-05	1.94E-02	2.39E-02	5.27E-03	8.41E-01	5.11E-02	0.00E+00	3.71E-02	0.00E+00
ADPE*	kg Sb eq	1.23E-07	1.10E-09	7.53E-08	2.00E-07	5.37E-08	2.46E-06	2.63E-07	0.00E+00	1.07E-07	0.00E+00
ADPF*	MJ	2.74E+01	4.28E-01	1.01E+00	2.88E+01	2.08E+01	7.69E+02	1.02E+02	0.00E+00	3.47E+01	0.00E+00
WDP*	m^3	4.96E-02	3.91E-04	1.27E-01	1.77E-01	1.90E-02	9.85E-01	9.32E-02	0.00E+00	4.78E-02	0.00E+00

GWP Global warming potential, total

GWP,f Global warming potential, fossil

GWP,b Global warming potential, biogenic

GWP,luluc Global warming potential, land use & land use change

ODP Ozone depletion potential

AP Acidification Potential

EP,f Eutrophication potential, freshwater

EP,m Eutrophication potential, marine

EP,t Eutrophication potential, terrestrial

POCP Photochemical ozone creation potential

ADPE Abiotic depletion potential minerals & metals

ADPF Abiotic depletion potential fossil fuels

WDP Water use deprivation potential

Additional environmental impact indicators are computed in the LCA report but not reported in the EPD.
*The results of this enviromental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

RESOURCES USE

INDICATORS	UNITS / D.U.	UPSTREAM	CORE PROCESS		A1:A3	DOWNSTREAM					
		A1	A2	A3		A4	C1	C2	C3	C4	D
PERE	[MJ]	3.88E-01	1.12E-03	1.24E-01	5.13E-01	5.46E-02	1.50E+00	2.68E-01	0.00E+00	1.55E-01	0.00E+00
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.88E-01	1.12E-03	1.24E-01	5.13E-01	5.46E-02	1.50E+00	2.68E-01	0.00E+00	1.55E-01	0.00E+00
PENRE	[MJ]	2.86E+01	4.32E-01	1.16E+00	3.02E+01	2.10E+01	7.78E+02	1.03E+02	0.00E+00	3.57E+01	0.00E+00
PENRM	[MJ]	0.00E+00	0.00E+00	1.21E-02	1.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	2.86E+01	4.32E-01	1.17E+00	3.02E+01	2.10E+01	7.78E+02	1.03E+02	0.00E+00	3.57E+01	0.00E+00
SM	[kg]	1.00E+03	0.00E+00	0.00E+00	1.00E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.93E-03	1.79E-05	3.22E-03	5.17E-03	8.69E-04	3.82E-02	4.26E-03	0.00E+00	1.82E-03	0.00E+00

PERE Use of renewable primary energy excluding renewable primary energy resources used as raw materials

PERM Use of renewable primary energy resources used as raw materials

PERT Total use of renewable primary energy resources

PENRE Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials

PENRM Use of non-renewable primary energy resources used as raw materials

PENRT Total use of non-renewable primary energy resources

SM Use of secondary raw materials

RSF Use of renewable secondary fuels

NRSF Use of non-renewable secondary fuels

FW Use of net fresh water

OUTPUT FLOWS

INDICATORS	UNITS / D.U.	UPSTREAM	CORE PROCESS		A1:A3	DOWNSTREAM					
		A1	A2	A3		A4	C1	C2	C3	C4	D
HWD	[kg]	0.00E+00	0.00E+00	2.68E-03	2.68E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	[kg]	0.00E+00	0.00E+00	5.97E-02	5.97E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+03	0.00E+00
RWD	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	2.99E-01	2.99E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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

EE Exported energy

Calculation Rules

The environmental burden of the product has been calculated according to EN 15804:2012+A2:2019[1] and PCR ICMQ-001/15 v3.This declaration is a cradle to gate with options EPD type, based on the application of Life Cycle Assessment[2] (LCA) methodology to the whole life-cycle system.
In the whole LCA model, infrastructures and production equipments are not taken into account.
Hot rolled steel products at plant level, were described by using specific data from manufacturing facility (Brescia, Italy) for year 2023.
Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system (for example, raw materials contents and specifications, pre treatments, process efficiencies, air and water emissions, waste management), in order to provide a complete picture of the environmental burden of the system from raw materials supply (A1) to Transport (A2) and Manufacturing (A3).

The use phase was not considered according to EN:15804 and PCR ICMQ-001/15 v3, while transport to final destination (A4) and end of life (C1-C2-C3-C4-D) were considered. The product is designed for being incorporated into concrete structures. Therefore, in nominal installation and operating conditions, no emissions to air nor to water shall occur.

According to ISO 14040 and 14044, allocation is avoided whenever possible by dividing the system into sub-systems. When allocation cannot be avoided physical properties are used to drive flow analysis.

Data quality has been assessed and validated during data collection process.

According to EN:15804 the applied cut-off criterion for mass and energy flows is 1%.

[1]EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations
Core rules for the product category of construction products.
[2]The LCA methodology is standardized at international level by ISO 14040 and ISO 14044.

System boundaries

Broad scheme of Alfa Sinstone aggregate production, in which the main activities included in the system boundaries, are listed and divided in the three subsystems:

UPSTREAM process

A1

- **Scrap pretreatment**
  Shearing / Shredding / Sorting
- **Raw material and Energy production**

CORE module

A2/A3

- **Supplying transport**
- **Billets production**
- **Sinstone treatment**
- **Internal handling**
- **Ancillary materials and activities**
- **Air emission**
- **Water emission**
- **Waste management**

DOWNSTREAM process

A4/C1/C2/C3/C4/D

- **Distribution**
- **De-construction demolition**
- **Transport**
- **Waste processing**
- **Disposal**
- **Reuse - Recovery - Recycling potential**

Upstream process

A1

A1 RAW MATERIALS SUPPLY	Steel scrap collection (shredded both in external and internal plants) and other raw materials production
	Specific secondary materials pre-treatments, where appropriate
	Production of alloy elements
	Generation of electricity and other fuels from primary and from secondary energy resources (excluding waste treatments)

Core module

A2 / A3

A2 TRANSPORTATION + **A3** MANUFACTURING	Raw materials transportation from production or collection facilities to the production plant and internal transportation
	Steel mill production, including utilities
	Sinstone aggregate production, including utilities
	Treatment of waste generated from the manufacturing processes

Downstream process

A4 / C1 / C2 / C3 / C4 / D

A4 DISTRIBUTION	Transport to the customers (general market average). Distances estimated considering the transported quantities and the distances from Brescia plant to the client. From Brescia (in the North of Italy) final products is mainly delivered within the district or regional boundaries. Sinstone aggregate is delivered by truck. A radius of 50 km has been assumed as a representative scenario for product delivery to end users. This is a cautelative assumption considering that product may pass regional borders in some cases.
C1 DE-CONSTRUCTION DEMOLITION	Dismantling and demolition operations required to remove the product from the building. Initial onsite sorting of the materials is included as well.
C2 TRANSPORT	Transportation of the discarded product as part of the waste processing (to recycling site or to a final disposal site).
C3 WASTE PROCESSING	Waste processing, including collection of waste fraction from deconstruction and waste processing of material flows intended for reuse, recycling and energy recovery.
C4 DISPOSAL	Waste disposal including physical pre-treatment and management of the disposal site.
D REUSE - RECOVERY - RECYCLING POTENTIAL	Environmental impacts associated to waste use after the investigated system (including recycling). In this module impacts arising from landfilling are accounted, there are no recycling scenario due to the by-product use in construction sector. avoided impact (i.e. producing steel from iron ore in BOF furnace.

Minimum content of recycled, recovered, by-product materials

TABLE OF MODULES

PRODUCT TYPE	PRODUCT NAME		RECYCLED MATERIAL			RECOVERED MATERIAL	BY-PRODUCT MATERIAL	TOTAL CONTENT OF RECYCLED, RECOVEREDBY-PRODUCT MATERIAL
			TOTAL	PRE - CONSUMER	POST - CONSUMER			
Industrial aggregate	Sinstone	≥	0%	0%	0%	0%	100%	100%

Content of recycled materials ≥ 99,0%
(Certified by ICMQ SpA following UNI/PdR 88:2020)

Certificate n. R0449, of 11/09/2024

Other optional additional environmental information

Other environmental characteristics of Alfa Acciai plant

The production process involves scrap melting in the two electric arc furnaces (EAFs) with a total annual production capacity of about 2,000,000 tonnes, liquid steel tapping and secondary metallurgical processing in the two ladle furnaces, and finally casting in the two 5-line continuous casting machines. Alfa Acciai plant is equipped with powerful off-gas filtering system for both furnaces with active carbons injection to prevent and reduce the organic micro pollutants in air emissions (PCDD /F and PCB).

Alfa Acciai in Brescia is a model of circular economy as through the rational consumption of materials and recycling strategies it minimizes the use of raw natural resources and enhances the residues produced. In recent years, environmental issues have assumed increasing importance worldwide, Alfa Acciai has shown itself to be sensitive to these aspects, undertaking actions aimed at reducing its impact.

Among the main projects the following stand out:

- SmartGrid Pilot Project recovers heat from the offgas plant cooling system serving the furnaces at the steel mill and through an highly energy-efficient heat exchange system connects the Alfa Acciai process and the A2A district heating network. Thanks to this plant more than 6,000 residential units should be heated and at the same time reduces heat loss into the atmosphere and make-up water consumption;
- Decarbonisation, achieved among other, through the partial replacement of the coal and its derivatives, in the EAF process, with recycled polymers reach in biomass carbon with the aim of reduce CO_2 emissions;
- Energy efficiency, through the implementation of initiatives geared towards optimising the use of energy resources and reducing consumption, e.g., through energy optimisation processes based on the recovery of heat generated by industrial facilities and increased use of energy from renewable sources.

REFERENCES

- EN 15804:2012+A2:2019
- ISO 14040:2021
- ISO 14044:2021
- Life Cycle Assessment (LCA) for hot and cold rolled structural steel and for Sinstone recycled industrial aggregate produced by Alfa Acciai for EPD® purposes - Final Report
- EPDItaly General Programme Information v6.0
- PCR ICMQ-001/15 v3

ALFA ACCIAI Group

All-round sustainability

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