ENVIRONMENTAL PRODUCT DECLARATION

COLD-ROLLED REINFORCING STEEL AND ELECTROWELDED MESH

ALFA ACCIAI

Gruppo ALFA ACCIAI

EPD ITALY

Based on:	Certification N°:	Date of issue:	Valid until:
PCR ICMQ-001/15 v3 EN:15804:2012+A2:2019 UNI EN ISO 14025:2010	EPDITALY0015	2017/03/31	2025/12/09
	Product CPC code: 41	**Revision date:** v1 - 2021/08/03	

GENERAL INFORMATION

EPD REFERENCES

EPD OWNER: ALFA ACCIAI, VIA SAN POLO 152, 25134, BRESCIA – ITALY; MANUFACTURING PLANT IS LCOATED 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 UNI 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

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.

CONTACTS

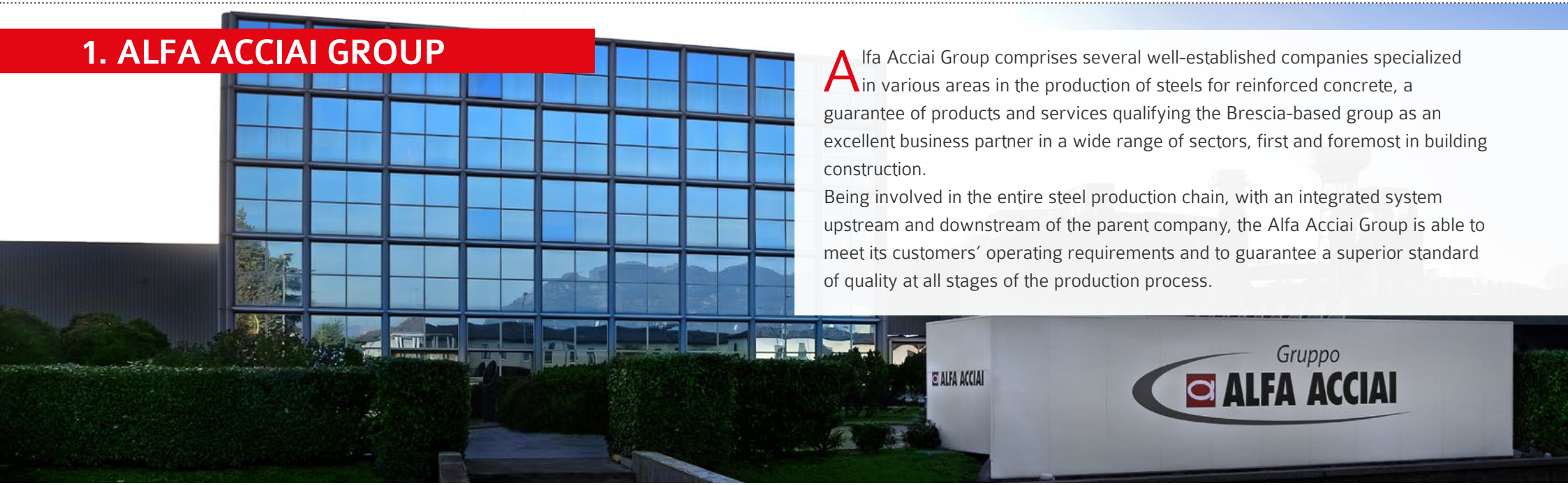
Alessandro Giovannelli (a.giovannelli@alfaacciai.it)
Phone: (+39) 030 23911

ALFA ACCIAI

Technical support to Alfa Acciai was provided by Life Cycle Engineering, Italy.
(info@studiolce.it, www.lcengineering.eu)

LCE

1. ALFA ACCIAI GROUP



Alfa Acciai Group comprises several well-established companies specialized in various areas in the production of steels for reinforced concrete, a guarantee of products and services qualifying the Brescia-based group as an excellent business partner in a wide range of sectors, first and foremost in building construction.

Being involved in the entire steel production chain, with an integrated system upstream and downstream of the parent company, the Alfa Acciai Group is able to meet its customers' operating requirements and to guarantee a superior standard of quality at all stages of the production process.

ALFA ACCIAI, the Brescia-based parent company, is one of the largest EAF steel mills in Italy. There is a steel shop department with 2 EAF (electric arc furnaces), 2 LF (ladle furnaces) and 2 continuous casting machines (10 lines). The hot rolling department is equipped with 3 rolling mills for rebars, coils and wired rod; the cold rolling department has 12 cold rolling mills and 5 welded mesh machines. This EPD is specifically about steel bars and coils for concrete produced in Brescia plant.

ACCIAIERIA DI SICILIA is the only steel mill operating in Sicily. High production capacity, state-of-the-art technology and a wide range of products have earned the company a good position in the European steel making industry and help it make good use of its strategic location for serving south Mediterranean markets.

ALFA MONTIRONE, which was set up in June 2016, has recently took over the Montirone-based steel-making line of business of the Stefana Group. The steel mill, which has been decommissioned for some time, is located in the province of Brescia. The site will be reclaimed and renovated in the coming years for its new intended use. The acquisition entailed for Alfa Acciai the taking on of all the existing 70 workers.

TECNOFIL, acquired by Alfa Acciai in September 2016 is one of Italy's leading wire drawing mills specialising in galvanized, copper-coated, annealed and plastic-coated wire and wire band for use in building construction, household appliances, automotive and numerous other everyday life applications. Over the years, TECNOFIL has developed its vocation to innovation of its production processes and constant search for tailored solutions for its national and international customers.

FERROBERICA is the largest company in Italy involved in the pre-shaping and laying of reinforcing steel for all kinds of structural work, for roads, railway, and maritime infrastructures, as well as public, industrial and civil buildings. The company handles the final stage of the group's production chain and guarantees a high standard of quality for the end users, i.e. leading building contractors.

SCOPE AND 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 from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De- construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

SOFTWARE: SimaPro ver. 9.1.1.1

MAIN DATABASE: Ecoinvent 3.6

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

GEOGRAPHICAL SCOPE OF THE EPD: World according to sales market conditions

TYPE OF EPD: specific for cold rolled steel products

2. THE PRODUCT

COLD-ROLLED REINFORCING STEEL ELECTROWELDED MESH

This EPD refers to construction products, cold rolled structural steel recoiled wires and electrowelded meshes, produced at Alfa Acciai plants placed in Brescia (Italy) and Montirone (Italy), with electric arc furnace route, starting from post and pre consumer steel scraps. The homogeneous and repeatable mechanical features of steel guarantee excellent performance in any type of construction and geographical area, since they have high ductility.

EPD reference products have a chemical composition in compliance with national regulation of destination countries where they are sent. In general, the main materials of the final product are: *iron > 96%*; *alloy elements* (e.g. manganese, silicon, carbon) *2% c.a.; other elements* (e.g.. copper, nickel, chromium), *complementary to 100%.*

DECLARED UNIT

According to EN:15804, the declared unit is **1 ton of cold rolled product**

INFORMATION	DESCRIPTION
Product identification	Cold rolled reinforcing steel and electrowelded mesh
Product features	Coils: Diameters from 6 mm to 16 mm Weight: from 2 100 kg to 5 000 kg Electrowelded mesh: Diameters from 4.5 to 12 mm Length: from 2.00 to 2.40 m Width: from 3 to 6 m Weight: from 9.24 to 177.70 kg
Product properties (under EN10080:2005)	Steel coming from post and pre consumer steel scraps produced in electric arc furnace route (EAF) and further hot and cold rolling processes
	Adherence and surface geometry f_R or f_P : - for 5 ≤ Ø ≤ 6 mm f_R or f_P 0.035; - for 6 < Ø ≤ 12 mm f_R or f_P 0.040; - for Ø >12 mm f_R or f_P 0.056.
	Weldability: C_{eq} < 0.52
	Typical yield stress: 400 MPa ≤ Cv ≤ 600 MPa
	Elongation: Agt > 5%
	Successful in bend and rebend test
	Successful in strength test and oligocyclic strength test
Plant features	Total production of EPD covered products, year 2020: 283 289 t
	Total production, for selling purpose, year 2020: 283 289 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.

ENVIRONMENTAL IMPACTS

POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM	CORE PROCESS		DOWNSTREAM					TOTAL	
		A1	A2	A3	A4	C1	C2	C3	C4		D
GWP	kg CO_2 eq	5,92E+02	4,01E+01	1,53E+02	5,00E+01	3,81E+01	2,44E+01	2,01E+00	7,31E-01	**9,00E+02**	4,41E+02
GWP,f	kg CO_2 eq	5,92E+02	4,01E+01	1,53E+02	5,00E+01	3,81E+01	2,44E+01	2,00E+00	7,30E-01	**9,00E+02**	4,41E+02
GWP,b	kg CO_2 eq	2,21E-01	2,53E-03	2,09E-01	6,13E-03	2,68E-03	1,54E-03	6,09E-03	1,01E-04	**4,48E-01**	6,15E-02
GWP,luluc	kg CO_2 eq	5,34E-02	3,23E-04	7,30E-02	1,45E-03	5,53E-04	1,95E-04	4,06E-03	1,79E-05	**1,33E-01**	4,38E-02
ODP	kg CFC11 eq	9,56E-05	9,39E-06	3,76E-06	1,16E-05	8,60E-06	5,72E-06	9,06E-08	1,53E-07	**1,35E-04**	1,32E-05
AP	mol H+ eq	2,18E+00	2,34E-01	3,62E-01	2,91E-01	4,12E-01	1,41E-01	1,01E-02	7,55E-03	**3,64E+00**	2,12E+00
EP,f	kg P eq	1,29E-02	2,41E-05	3,44E-03	7,82E-05	2,99E-05	1,47E-05	1,07E-04	2,67E-06	**1,66E-02**	2,64E-02
EP,m	kg N eq	4,11E-01	9,42E-02	1,26E-01	1,16E-01	1,85E-01	5,69E-02	1,84E-03	3,28E-03	**9,94E-01**	4,09E-01
EP,t	mol N eq	4,61E+00	1,03E+00	1,32E+00	1,28E+00	2,03E+00	6,25E-01	2,05E-02	3,59E-02	**1,09E+01**	4,62E+00
POCP	kg NMVOC eq	1,36E+00	2,69E-01	3,59E-01	3,32E-01	5,54E-01	1,62E-01	5,50E-03	1,00E-02	**3,05E+00**	2,26E+00
ADPE	kg Sb eq	2,16E-04	2,49E-06	6,24E-05	3,48E-06	1,70E-05	1,45E-06	1,23E-06	3,03E-07	**3,05E-04**	7,96E-03
ADPF	MJ	1,02E+04	5,74E+02	7,31E+02	7,17E+02	5,29E+02	3,49E+02	2,59E+01	9,75E+00	**1,31E+04**	3,56E+03
WDP	m^3	2,63E+03	-1,25E-01	2,18E+02	-5,60E-02	1,02E-01	-7,69E-02	3,00E-01	3,35E-03	**2,85E+03**	3,94E+01

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

RESOURCE USE PER DECLARED UNIT

USE OF RENEWABLE MATERIAL RESOURCES	UNITS / D.U.	UPSTREAM	CORE PROCESS		DOWNSTREAM					TOTAL	D
		A1	A2	A3	A4	C1	C2	C3	C4		
PERE	[MJ]	5,36E+02	8,03E-01	1,12E+02	2,56E+00	8,03E-01	4,89E-01	2,98E+00	3,68E-02	**6,55E+02**	3,28E+02
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]	5,36E+02	8,03E-01	1,12E+02	2,56E+00	8,03E-01	4,89E-01	2,98E+00	3,68E-02	**6,55E+02**	3,28E+02
PENRE	[MJ]	1,20E+04	5,60E+02	4,92E+02	7,02E+02	5,17E+02	3,41E+02	3,38E+01	9,73E+00	**1,46E+04**	5,29E+03
PENRM	[MJ]	0,00E+00	0,00E+00	3,71E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**3,71E+02**	0,00E+00
PENRT	[MJ]	1,20E+04	5,60E+02	8,63E+02	7,02E+02	5,17E+02	3,41E+02	3,38E+01	9,73E+00	**1,50E+04**	5,29E+03
SM	[kg]	1,21E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,21E+03**	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	[m³]	6,17E+01	1,14E-02	5,47E+00	2,18E-02	1,36E-02	6,92E-03	1,45E-02	2,92E-04	**6,72E+01**	8,26E-01

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 AND WASTE CATEGORIES

WASTE GENERATION AND TREATMENT	UNITS / D.U.	UPSTREAM	CORE PROCESS		DOWNSTREAM					TOTAL	D
		A1	A2	A3	A4	C1	C2	C3	C4		
HWD	[kg]	0,00E+00	0,00E+00	2,17E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**2,17E-01**	0,00E+00
NHWD	[kg]	0,00E+00	0,00E+00	5,06E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**5,06E+01**	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	1,74E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	**1,74E+02**	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

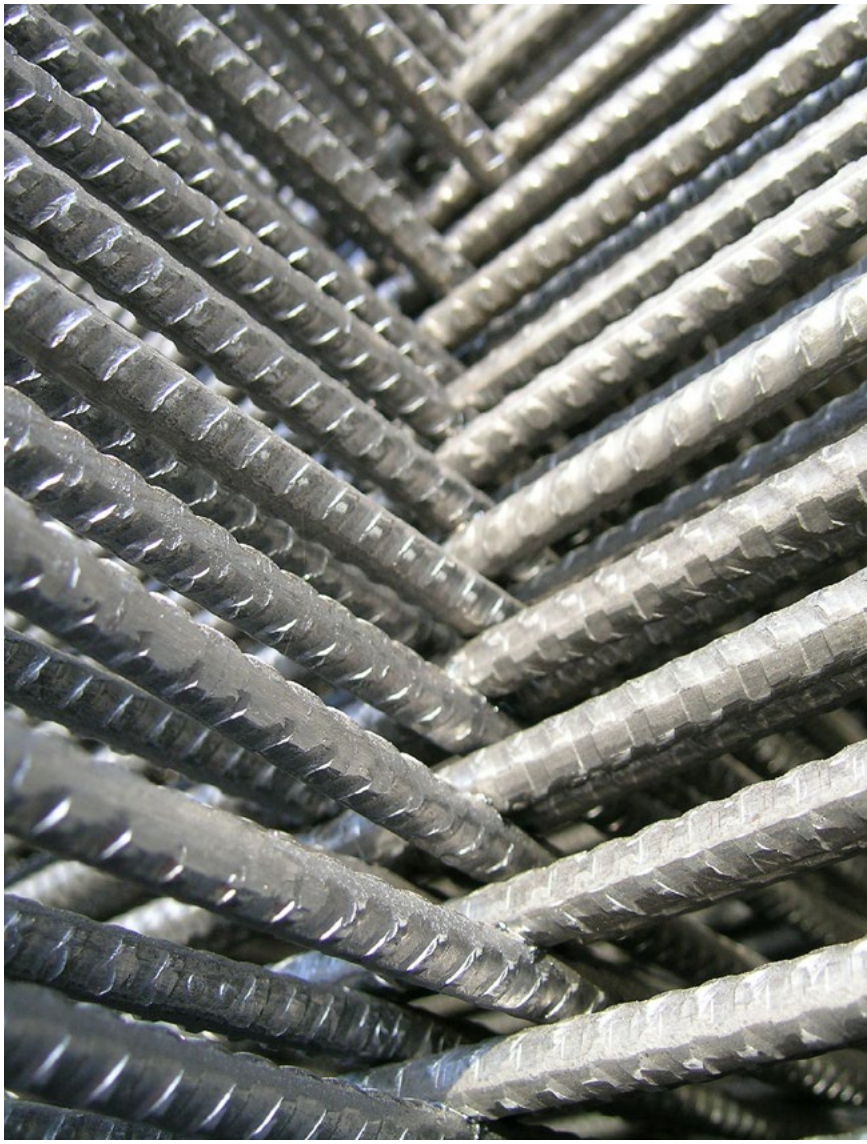
3. CALCULATION RULES

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.
Cold rolled steel products at plant level were described by using specific data from manufacturing facilities placed in Brescia (Italy) and Montirone (Italy) for year 2020.
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 phases (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.

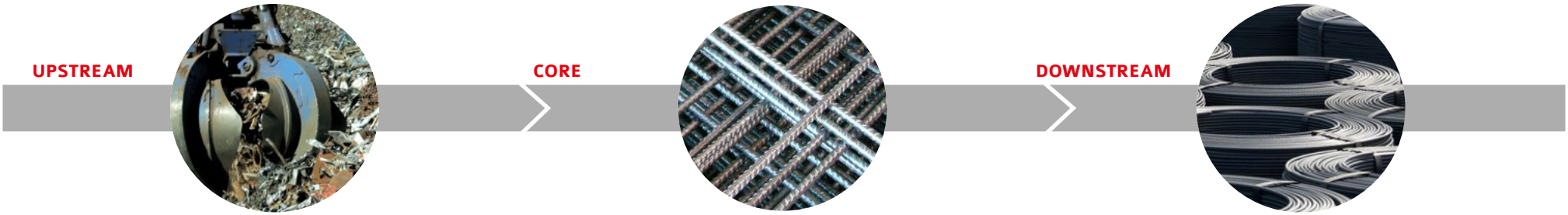
Data quality has been assessed and validated during data collection process.

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.

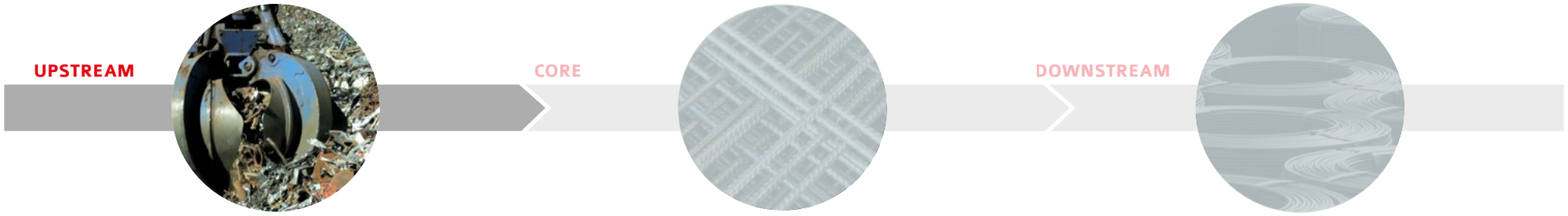
4. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION



UPSTREAM PROCESS	CORE MODULE	DOWNSTREAM PROCESS
Scrap pretreatment	Supplying transport	A4 Distribution
Shearing	Billets production	C1 De-construction demolition
Shredding	Cold rolling process	C2 Transport
A1 Sorting	A2 Packaging	C3 Waste processing
Raw material and Energy production	Internal handling	C4 Disposal
	A3 Ancillary materials and activities	D Reuse - Recovery - Recycling potential
	Air emission	
	Water emission	
	Waste management	

*Broad scheme of hot-rolled reinforcing steel for concrete production, in which the main activities included in the system boundaries, are listed and divided in the three subsystems: **UPSTREAM** Process, **CORE** Module and **DOWNSTREAM** Process.*

UPSTREAM PROCESS



Scheme of the considered system boundaries (upstream processes).

Steel scrap collection (shredded both in external and internal plants) and other raw materials production

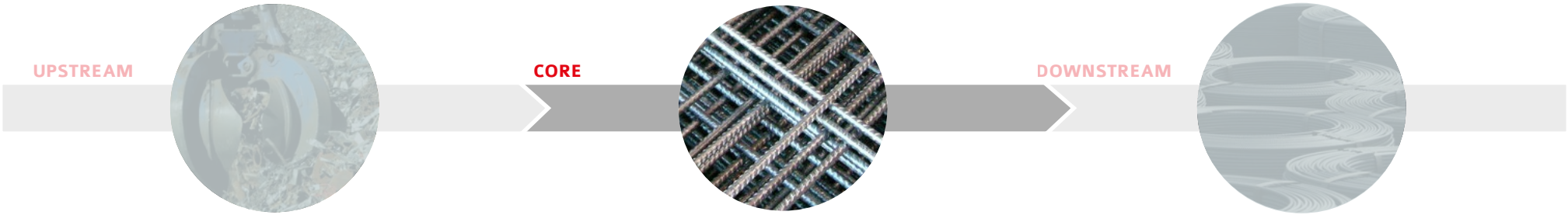
Production of alloy elements

Specific secondary materials pre-treatments, where appropriate

Generation of electricity and other fuels from primary and from secondary energy resources (excluding waste treatments)

A1 - Raw Materials Supply

CORE PROCESS



A2 - Transportation

Raw materials transportation from production or collection facilities to the production plant and internal transportation

A3 - Manufacturing

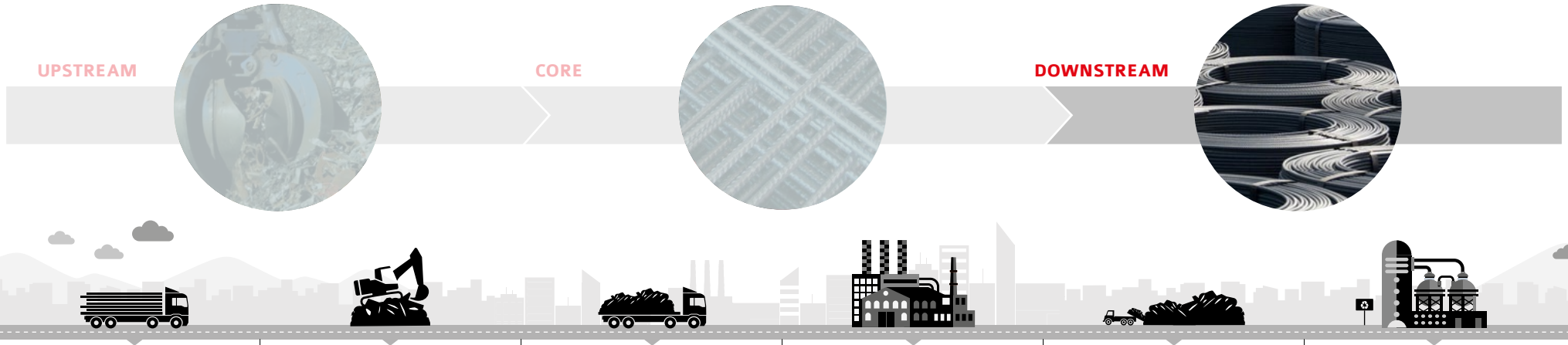
Rolling mill, production, including utilities

Packaging materials

Steel mill production, including utilities

Treatment of waste generated from the manufacturing processes

DOWNSTREAM PROCESS



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 are delivered to many national (69% of the total sold product) and international areas such as Germany (around 9%), France and Austria, mentioning the main countries.

The means of transport used to deliver steel bars and coils are truck and freight ship. On average, finished product is transported for 457 km by road and 547 km by ship.

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

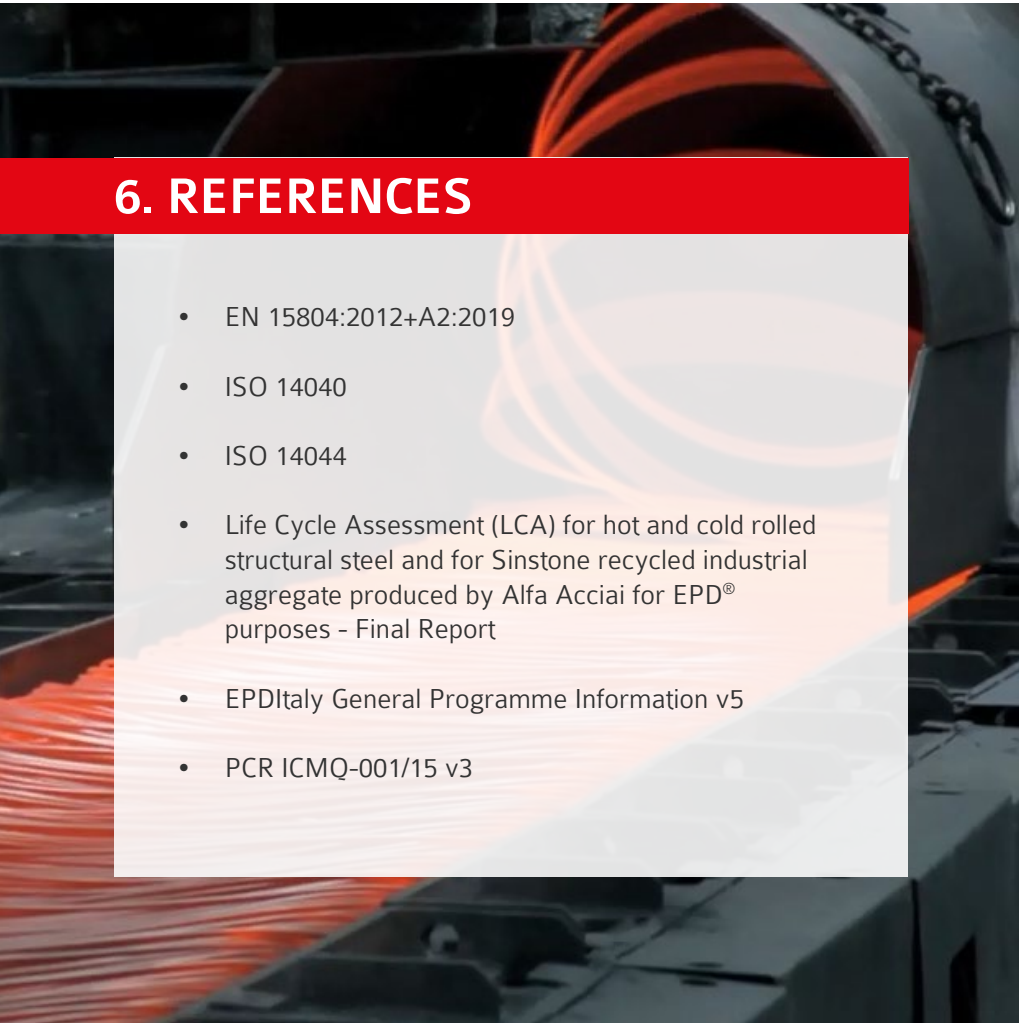
Waste disposal including physical pre-treatment and management of the disposal site.

D
Reuse - Recovery - Recycling potential

Environmental impacts associated to waste use after the investigated system (including recycling).

In this module impacts arising from steel recycling are accounted, including avoided impacts associated to primary steel production. The result is expressed as net value between direct impact (i.e. recycling steel in EAF furnace) and avoided impact (i.e. producing steel from iron ore in BOF furnace).

5. OTHER OPTIONAL ADDITIONAL ENVIRONMENTAL INFORMATION



6. REFERENCES

- EN 15804:2012+A2:2019
- ISO 14040
- ISO 14044
- 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 v5
- PCR ICMQ-001/15 v3

OTHER ENVIRONMENTAL CHARACTERISTICS OF ALFA ACCIAI PLANT

The recoiling/stretching process uses latest-generation high-productivity equipment that ensure increased mechanical properties of the processed wire, while maintaining the high-ductility properties for class C. It is worth noting the importance of recoiling by winding up the turns with high precision and accuracy which facilitate customers in unwinding and processing the coil. The product is packaged on automatic strapping machines.

The production of electrowelded mesh involves recoiling on independent processing lines equipped with unwinding stations, untangling benches, gear blocks, straightening benches and spoolers, followed by assembling on fully automated lines, each consisting of a series of lengthwise and crosswise wire uncoiling and gearing devices, a multiple electrowelding bench, and downstream equipment for packaging, strapping and storage of the packs of finished panels.

ALFA ACCIAI has been striving for the "high-ductility" project for electrowelded mesh, product which is traditionally made from cold-rolled wire only**.**