

# ENVIRONMENTAL PRODUCT DECLARATION

## HOT-ROLLED REINFORCING STEEL FOR CONCRETE IN BARS AND COILS



### Based on:

PCR ICMQ-001/15 v3

EN:15804:2012+A2:2019

UNI EN ISO 14025:2010

### Certification N°:

EPDITALY0003

### Product CPC code:

41

### Date of issue:

2016/04/12

### Update:

2023/07/31

### Valid until:

2025/11/16

### Declaration number:

ADS\_EPD\_001

## GENERAL INFORMATION

### EPD REFERENCES

EPD OWNER: ACCIAIERIE DI SICILIA, STRADA PASSO CAVALIERE 1, 95121, CATANIA – ITALY; MANUFACTURING PLANT: CATANIA, ITALY

PROGRAM OPERATOR: EPDITALY, VIA GAETANO DE CASTILLIA 10, 20124 MILANO - ITALY

### INDEPENDENT VERIFICATION

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

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

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Technical support to Acciaierie di Sicilia was provided by Life Cycle Engineering, Italy.  
([info@lceengineering.eu](mailto:info@lceengineering.eu), [www.lceengineering.eu](http://www.lceengineering.eu)).



## 1. ALFA ACCIAI GROUP



For almost 70 years, the Alfa Acciai Group has been one of the leading Italian and European producers of reinforced concrete steel and wire rod, with 1,200 employees and with a total production capacity of 2.5 million tons per year and today represents a technologically advanced reality, attentive to the environment and present throughout the steel supply chain.

The Group is characterized by a marked industrial flexibility and maximum operational efficiency upstream and downstream of the smelting process, responds successfully to the continuous changes in the national and foreign steel market and to the growing attention of citizens towards environmental issues and always maintains high attention to its collaborators and customers.

### ALFA ACCIAI

**ALFA ACCIAI**, the Brescia-based parent company, is one of the leader and major producer of steel for reinforced concrete and wire rod in Italy and Europe. The production process in the EAF (electric arc furnace) steel mill sites involves two EAF (electric arc furnaces) followed by 2 LF (ladle furnaces), 2 continuous casting machines (10 lines) and a shredder for proler production. Hot rolling is equipped with two bars and spool mills and a wire rod mill. The production cycle is completed by cold rolling mills that produce welded wire mesh and recoiled wire.

### ACCIAIERIE DI SICILIA

**ACCIAIERIA DI SICILIA** located in the industrial area of Catania, has been part of the Alfa Acciai Group since 1998, is the only steel mill in Sicily and is located 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 to produce bars and spool.

### Tecnofil

**TECNOFIL**, located in Gottolengo (BS), has been part of the Alfa Acciai Group since September 2016. The company is a drawing mill that has the largest galvanizing plant in Italy and among the largest in Europe and completes the production chain of wire rod downstream. It produces galvanized wires and tapes, aluzinc and bright wire fzinc aluminum and polished wires for use in construction, household appliances, automotive 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.

### FERROBERICA

**FERRO BERICA** has been part of the Alfa Acciai Group since September 2016 and has 4 operational sites located in: Vicenza, Montirone (BS), Catania and Sedegliano (UD). The company is the largest Italian player (second in Europe) in the pre-shaping and assembly of reinforced concrete bars destinates to the main construction companies for use in structural works. Ferroberica thanks to the know-how acquired, reliability in supplies, competitiveness on the market and attention to quality and customer care, represents a cutting-edge production reality, equipped with latest generation machinery and with an annual production capacity of more than 300,000 tons.

## 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
MODULE	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	IT	IT	IT	WLD	-	-	-	-	-	-	-	-	WLD	WLD	WLD	WLD	WLD
Specific data used	> 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-

**SOFTWARE:** SimaPro ver. 9.5.

**MAIN DATABASE:** Ecoinvent 3.9.1

**REPORT LCA:** Life Cycle Assessment (LCA) for hot rolled reinforcing steel for concrete produced by Acciaierie di Sicilia for EPD® purposes - Final Report

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

**TYPE OF EPD:** specific for hot rolled steel products

## 2. THE PRODUCT



### HOT-ROLLED REINFORCING STEEL FOR CONCRETE IN BARS AND COILS

This EPD refers to construction products hot rolled structural steel bars and coils produced at Acciaierie di Sicilia plant placed in Catania (Italy), with electric arc furnace technology 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 > 97%*; *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 hot rolled product**

INFORMATION	DESCRIPTION
<b>Product identification</b>	Hot-rolled reinforcing steel for concrete in bars and coils
<b>Product features</b>	Bars: Diameters from 6 mm to 32 mm Length up to 18 m Weight: up to 2 300 kg Coils: Diameters from 6 to 16 mm Weight from 1450 to 3 000 kg  Steel coming from post and pre consumer steel scraps produced in electric arc furnace route (EAF) and further hot rolling process.
<b>Product properties (under EN10080:2005)</b>	Adherence and surface geometry $f_R$ or $f_p$ : - for $5 \leq \emptyset \leq 6$ mm $f_R$ or $f_p$ 0.035; - for $6 < \emptyset \leq 12$ mm $f_R$ or $f_p$ 0.040; - for $\emptyset > 12$ mm $f_R$ or $f_p$ 0.056.  Weldability: $C_{eq} < 0.52$  Typical yield stress: $400 \text{ MPa} \leq C_v \leq 600 \text{ MPa}$  Elongation: $A_{gt} > 5\%$  Successful in bend and rebend test  Content of recycled materials $\geq 99\%$ (Certified by ICMQ SpA following UNI/PdR 88:2020)  Successful in strength test and oligocyclic strength test  Total production of EPD covered products, year 2022: 268 905 t  Total production, for selling purpose, year 2022: 268 905 t
<b>Plant features</b>	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<sub>2</sub> eq./kWh (AIB report May 2023) to which LCE adds emissions related to network losses and transformation.

ENVIRONMENTAL IMPACTS											
 TABLE OF MODULES POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM		CORE PROCESS		DOWNSTREAM					
		A1 	A2 	A3 	A1:A3	A4 	C1 	C2 	C3 	C4 	D 
<b>GWP</b>	kg CO <sub>2</sub> eq	5,61E+02	6,45E+00	1,21E+02	<b>6,88E+02</b>	3,32E+01	5,38E+01	1,82E+01	2,36E+00	2,78E-01	1,54E+02
<b>GWP,f</b>	kg CO <sub>2</sub> eq	5,61E+02	6,45E+00	1,20E+02	<b>6,87E+02</b>	3,32E+01	5,38E+01	1,82E+01	2,35E+00	2,78E-01	1,54E+02
<b>GWP,b</b>	kg CO <sub>2</sub> eq	2,53E-01	4,73E-04	1,85E-01	<b>4,38E-01</b>	2,37E-03	3,94E-03	1,34E-03	7,09E-03	3,59E-05	1,44E-02
<b>GWP,luluc</b>	kg CO <sub>2</sub> eq	1,48E-01	1,26E-04	6,86E-02	<b>2,17E-01</b>	7,12E-04	2,16E-03	3,52E-04	5,79E-03	1,36E-05	1,41E-02
<b>GWP,ghg</b>	kg CO <sub>2</sub> eq	5,61E+02	6,45E+00	1,21E+02	<b>6,88E+02</b>	3,32E+01	5,38E+01	1,82E+01	2,36E+00	2,78E-01	1,54E+02
<b>ODP</b>	kg CFC11 eq	1,34E-05	1,37E-07	5,87E-07	<b>1,41E-05</b>	6,75E-07	8,29E-07	3,88E-07	1,44E-08	4,02E-09	2,77E-06
<b>AP</b>	mol H+ eq	1,88E+00	1,50E-02	3,60E-01	<b>2,26E+00</b>	2,13E-01	5,04E-01	3,59E-02	1,12E-02	2,51E-03	5,73E-01
<b>EP,f</b>	kg P eq	1,04E-02	4,99E-06	2,73E-03	<b>1,32E-02</b>	2,54E-05	4,50E-05	1,41E-05	1,16E-04	9,54E-07	6,48E-03
<b>EP,m</b>	kg N eq	3,64E-01	5,02E-03	5,31E-02	<b>4,23E-01</b>	5,89E-02	2,37E-01	1,26E-02	2,16E-03	1,14E-03	1,13E-01
<b>EP,t</b>	mol N eq	4,06E+00	5,26E-02	5,80E-01	<b>4,70E+00</b>	6,39E-01	2,57E+00	1,31E-01	2,38E-02	1,24E-02	1,31E+00
<b>POCP</b>	kg NMVOC eq	1,76E+00	2,30E-02	1,86E-01	<b>1,97E+00</b>	2,09E-01	7,57E-01	6,06E-02	7,15E-03	3,71E-03	7,00E-01
<b>ADPE*</b>	kg Sb eq	2,28E-04	2,17E-07	2,41E-06	<b>2,31E-04</b>	1,01E-06	2,21E-06	6,18E-07	6,57E-08	1,07E-08	1,30E-03
<b>ADPF*</b>	MJ	9,47E+03	8,30E+01	8,33E+02	<b>1,04E+04</b>	4,23E+02	6,80E+02	2,35E+02	3,96E+01	3,48E+00	1,88E+03
<b>WDP*</b>	m <sup>3</sup>	3,49E+01	7,77E-02	9,36E+01	<b>1,29E+02</b>	3,94E-01	8,92E-01	2,20E-01	4,19E-01	4,82E-03	1,80E+01

Additional environmental impact indicators are computed in the LCA report but not reported in the EPD.

\*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

**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				
		A1 	A2 	A3 	A1:A3	A4 	C1 	C2 	C3 	C4 	D 
<b>PERE</b>	[MJ]	4,81E+02	2,21E-01	1,24E+02	<b>6,04E+02</b>	1,07E+00	1,35E+00	6,28E-01	4,34E+00	1,55E-02	1,06E+02
<b>PERM</b>	[MJ]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>PERT</b>	[MJ]	4,81E+02	2,21E-01	1,24E+02	<b>6,04E+02</b>	1,07E+00	1,35E+00	6,28E-01	4,34E+00	1,55E-02	1,06E+02
<b>PENRE</b>	[MJ]	9,52E+03	8,54E+01	7,17E+02	<b>1,03E+04</b>	4,35E+02	7,00E+02	2,42E+02	4,01E+01	3,57E+00	1,89E+03
<b>PENRM</b>	[MJ]	0,00E+00	0,00E+00	1,29E+02	<b>1,29E+02</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>PENRT</b>	[MJ]	9,52E+03	8,54E+01	8,45E+02	<b>1,05E+04</b>	4,35E+02	7,00E+02	2,42E+02	4,01E+01	3,57E+00	1,89E+03
<b>SM</b>	[kg]	1,38E+03	0,00E+00	0,00E+00	<b>1,38E+03</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>RSF</b>	[MJ]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>NRSF</b>	[MJ]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>FW</b>	[m <sup>3</sup> ]	1,15E+00	3,53E-03	2,49E+00	<b>3,65E+00</b>	1,78E-02	3,44E-02	1,00E-02	1,76E-02	1,82E-04	3,60E-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

 <b>WASTE GENERATION AND TREATMENT</b>	UNITS / D.U.	UPSTREAM		CORE PROCESS		DOWNSTREAM					
		A1 	A2 	A3 	A1:A3	A4 	C1 	C2 	C3 	C4 	D 
<b>HWD</b>	[kg]	0,00E+00	0,00E+00	1,52E-02	<b>1,52E-02</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>NHWD</b>	[kg]	0,00E+00	0,00E+00	1,10E+02	<b>1,10E+02</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E+02	0,00E+00
<b>RWD</b>	[kg]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>CRU</b>	[kg]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>MFR</b>	[kg]	0,00E+00	0,00E+00	1,27E+02	<b>1,27E+02</b>	0,00E+00	0,00E+00	0,00E+00	9,00E+02	0,00E+00	0,00E+00
<b>MER</b>	[kg]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<b>EE</b>	[MJ]	0,00E+00	0,00E+00	0,00E+00	<b>0,00E+00</b>	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 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 (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 (Catania, Italy) for year 2022.

Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system (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 manufacturing up to end of life.

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 included. 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.

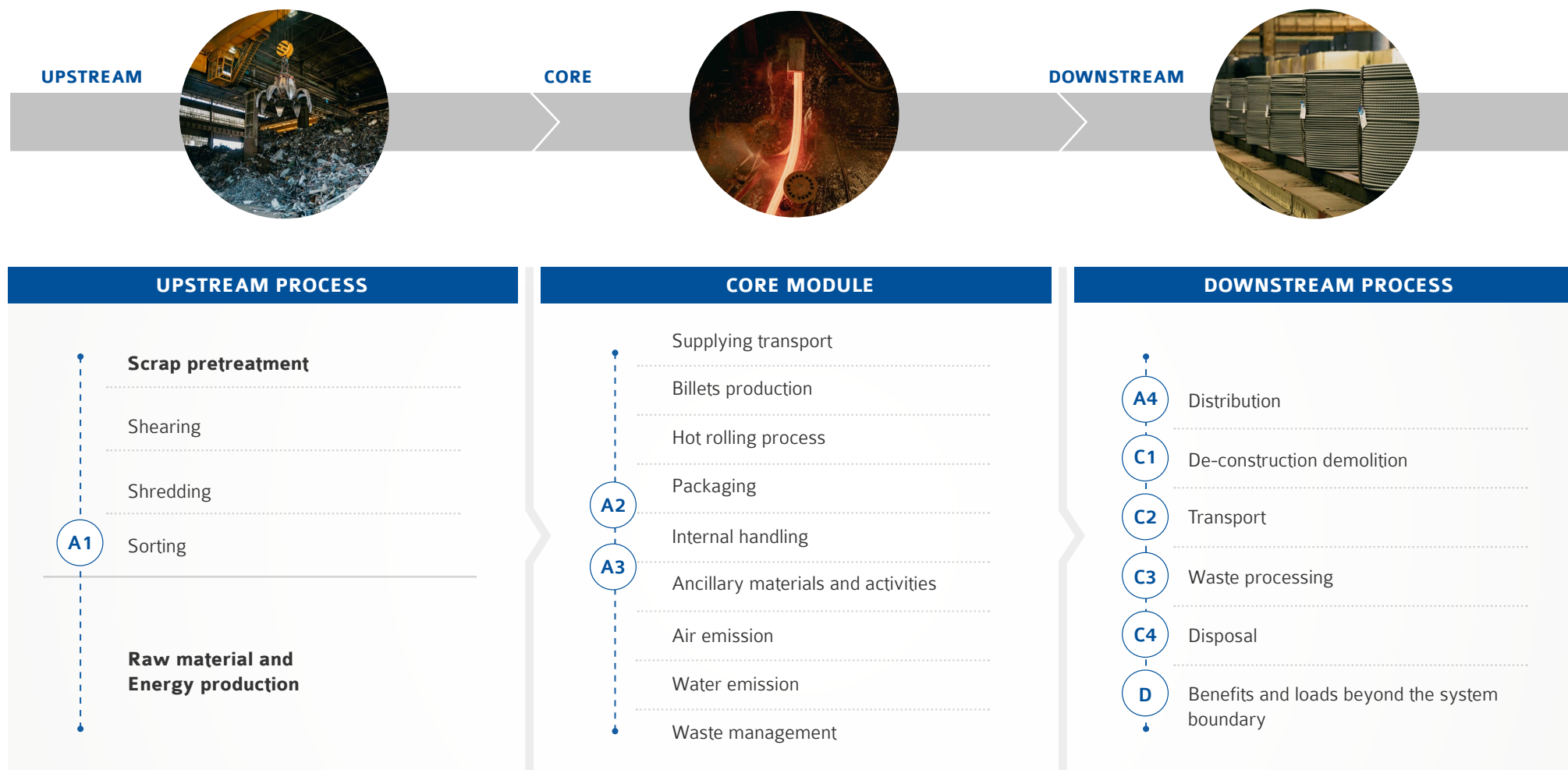
According to EN:15804 the applied cut-off criterion for mass and energy flows is 1%.

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<sup>1</sup>EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations  
Core rules for the product category of construction products.



## 4. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION



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.

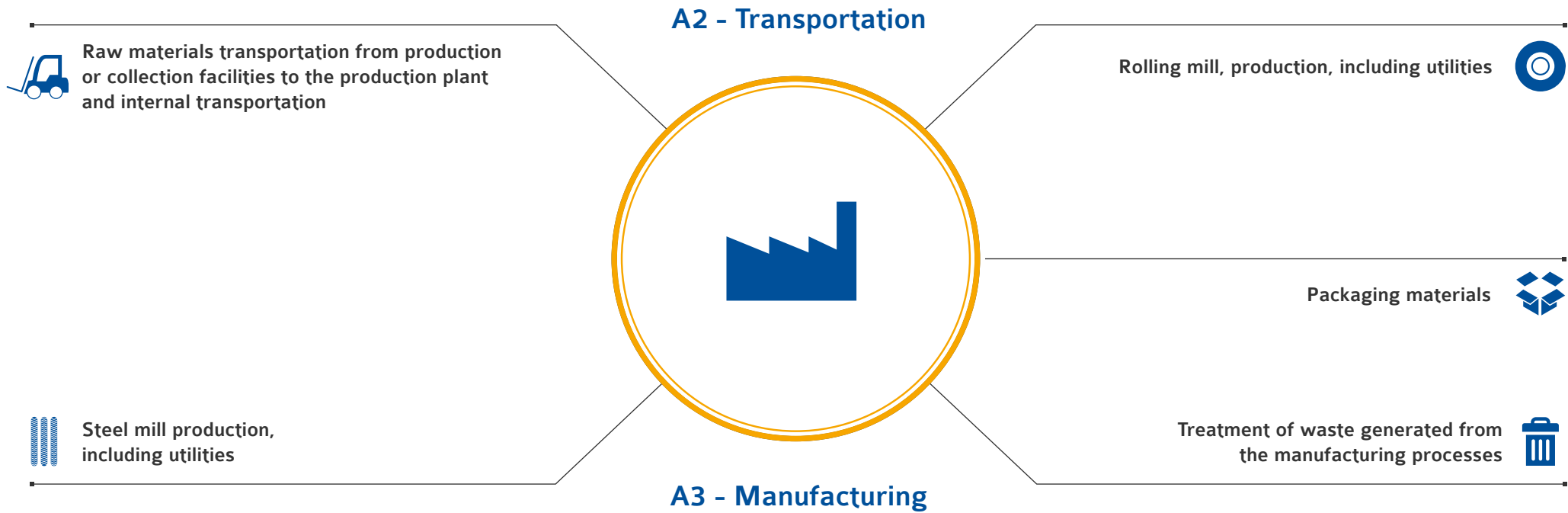
# UPSTREAM PROCESS



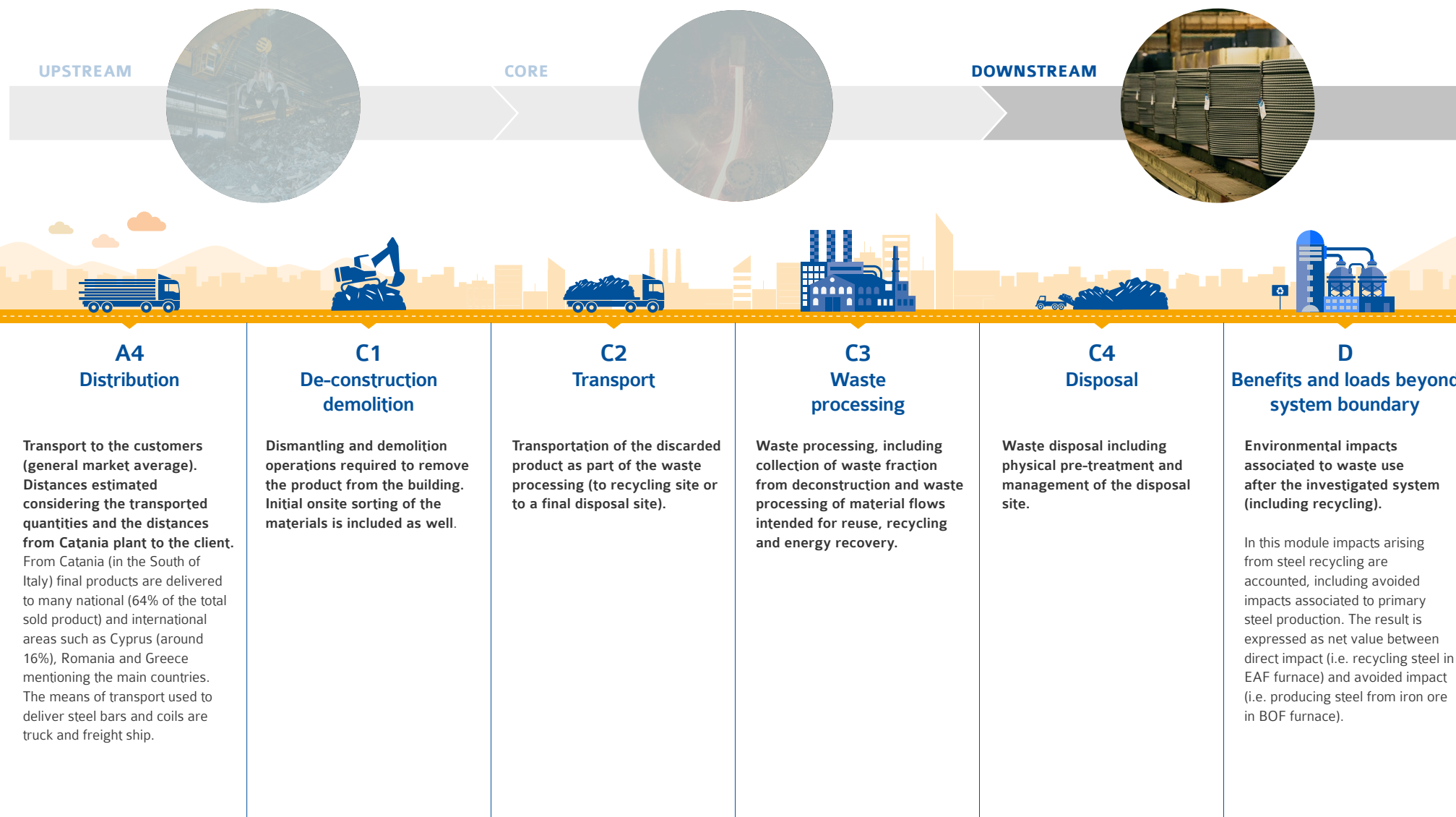
*Scheme of the considered system boundaries (upstream processes).*



# CORE PROCESS



# DOWNSTREAM PROCESS



## 5. OTHER OPTIONAL ADDITIONAL ENVIRONMENTAL INFORMATION

### 6. REFERENCES

- EN 15804:2012+A2:2019
- ISO 14040:2021
- ISO 14044:2021
- Life Cycle Assessment (LCA) for hot rolled reinforcing steel for concrete produced by Acciaierie di Sicilia for EPD® purposes - Final Report
- EPDItaly General Programme Information v5.2
- PCR ICMQ-001/15 v3

#### Other environmental characteristics of Acciaierie di Sicilia plant are:

1. Acciaierie di Sicilia reinforcing steel in bars and coils production capacity is around 500,000 t per year. The main peculiarity is that ferrous scrap is mainly collected from Sicily (about 90%).
2. Acciaierie di Sicilia features the best available technologies in term off-gas filtering system with activated carbon injection, innovative pulse-jet cleaning system to guarantee enhanced environmental performance.
3. Acciaierie di Sicilia is equipped with radiometric monitoring instruments to prevent radioactive-contaminated in the incoming raw materials and throughout the entire production process.

**Content of recycled materials  $\geq$  99%**  
(Certified by ICMQ following UNI/PdR 88:2020)