

# ENVIRONMENTAL PRODUCT DECLARATION

## MERCHANT BARS MANUFACTURED IN GERLAFINGEN

**Based on PCR**

PCR 2019:14  
Construction products  
v 1.11, 2021-02-05

EN:15804:2012+A2:2019

ISO 14025

**Certification N°**

S-P-04507

**CPC Code**

41

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**Programme:**

The International  
EPD System  
[www.environdec.com](http://www.environdec.com)

**Valid until**

2027-01-17

**Programme operator:**

EPD International AB

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)

# GENERAL INFORMATION

## EPD REFERENCES

**EPD OWNER:** STAHL GERLAFINGEN AG - AFV BELTRAME GROUP, BAHNHOFSTRASSE, 2-3 4563 - GERLAFINGEN (CH)

**PROGRAM OPERATOR:** EPD INTERNATIONAL AB, BOX 21060, SE-100 31 STOCKHOLM, SWEDEN; INFO@ENVIRONDEC.COM

## INDEPENDENT VERIFICATION

This declaration has been developed referring to the International EPD System, following the General Programme Instructions v 4.0; further information and the document itself are available at: [www.environdec.com](http://www.environdec.com). EPD document valid within the following geographical area: Switzerland and other countries worldwide according to sales market conditions.

ISO standard ISO 21930 and CEN standard EN 15804 served as the core PCR  
 PCR 2019:14 Construction products, Version 1.11, 2021-02-05  
 PCR review was conducted by: The Technical Committee of the International EPD® System. See [www.environdec.com/TC](http://www.environdec.com/TC) for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat [www.environdec.com/contact](http://www.environdec.com/contact).

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

**Third party verifier:** ICMQ SpA, via De Castilia, 10 20124 Milano ([www.icmq.it](http://www.icmq.it))  EPD process certification (Internal)  EPD verification (External)

Accredited by: Accredia  YES  NO  
 Procedure for follow-up during EPD validity involves third party verifier

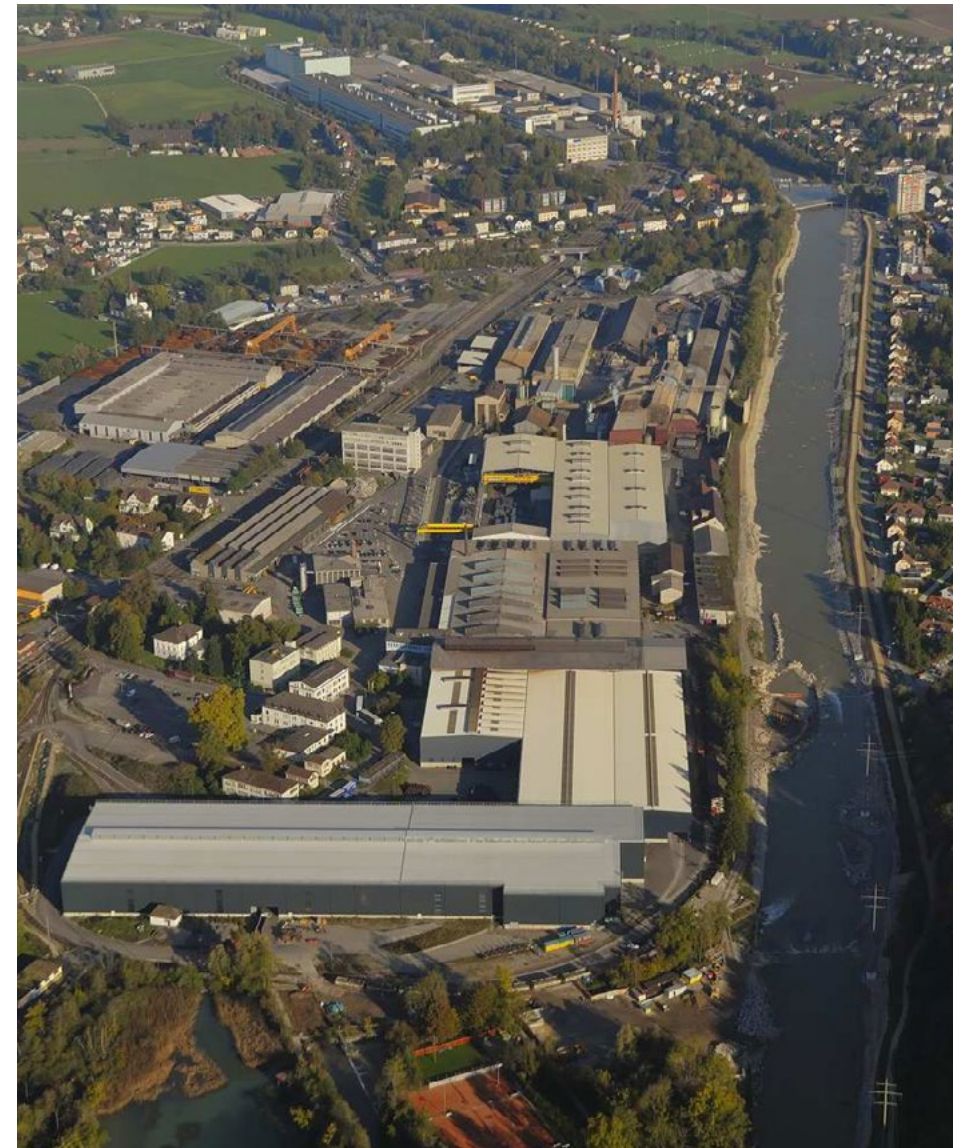
Environmental declarations published within the same product category, but from different programmes may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804. EPD owner has the sole ownership, liability and responsibility of the EPD.

## CONTACTS

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Technical support to Beltrame Group was provided by Life Cycle Engineering, Italy.  
 ([info@studiolce.it](mailto:info@studiolce.it), [www.lceengineering.eu](http://www.lceengineering.eu)).



# THE COMPANY

The AFV Beltrame Group has operated in the steel industry for over a century, producing rolled sections for use in construction, shipyards, and excavators.

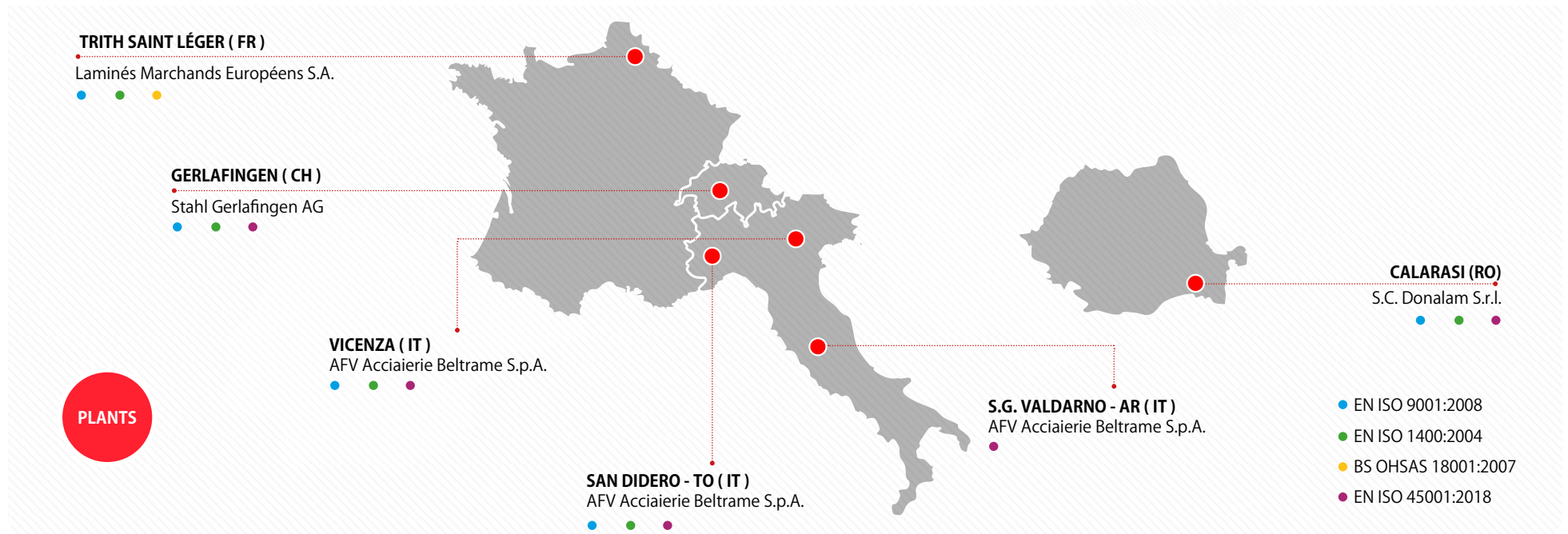
The facilities, which have a production capacity of approximately **3,2 million tons**, include three electric furnaces and ten rolling mills. These are scattered in six plants located in **Italy, France, Switzerland, and Romania.**

Their geographical distribution is very advantageous given the areas where the products are consumed and those where raw materials are purchased.

The AFV Beltrame Group is commercially present in all European markets as well as in the Mediterranean region through shares in local companies, agents, or the internal sales force. All employees, amounting to approximately **2,000 people**, are strongly committed

and motivated to satisfy the customers' needs through constant improvements in production, organization and level of service.

In order to support the principles in the code of ethics and the policy regarding **Quality, Health and Safety**, and the **Environment** (QHSE), all production plants have adopted an Integrated Management System.



# 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	CH	CH	CH	WLD	-	-	-	-	-	-	-	-	WLD	WLD	WLD	WLD	WLD
Specific data used	> 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	< 10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-

**TYPE OF EPD® :** Product EPD®

**REPORT LCA:** Life Cycle Assessment (LCA) applied to Merchant bars (WP)

**REFERENCE PERIOD:** 2020

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

**AVERAGING:** Not applied.

**SOFTWARE:** SimaPro ver. 9.2.0.1 (www.pre.nl)

**MAIN DATABASE:** Ecoinvent 3.6

Environmental declarations published within the same product category, though originating from different programs, may not be comparable.

# DETAILED PRODUCT DESCRIPTION

This EPD refers to Merchant bars (WP), produced at **Gerlafingen (Switzerland)** plant via electric arc furnace route and rolling mill, starting from post and pre consumer steel scraps, varying steel grades, e.g. S235, S275, S355 etc.. The total amount of products covered by this EPD, year 2020: 78 090 t.

## CONTENT DECLARATION

MATERIAL	MASS SHARE
IRON	96 %
ALLOY ELEMENTS	2 %
OTHER ELEMENTS	2 %

No packaging is required for functional unit delivery and distribution, and no renewable material is contained in functional unit.

## PRODUCT DIMENSIONS AND SPECIFIC STANDARDS:

- » SIA 262
- » NFA 35-080-1
- » DIN 488-2
- » NEN 6008



PRODUCT	STANDARD	DIMENSIONS (mm)		THICKNESS (mm)	
		from	to	from	to
WIDE FLATES	DIN 59200:2001	150	400	6	40
H PROFILES	DIN 1025:1994	100	180	5	14
I PROFILES	EN 10034:1993	180	240	5	10
ANGLES	EN 10056:1998	150	200	10	16

# ENVIRONMENTAL PERFORMANCE

The detailed environmental performance (in terms of potential environmental impacts, use of resources 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). Construction installation (A5) and use phase (B1 - B7) are modules not declared (MND).

**DECLARED UNIT (D.U.)** The declared unit is 1 tonne (1 000 kg) of Merchant bars



# GERLAFINGEN - AFV BELTRAME GROUP - MERCHANT BARS

**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  
**GWP,ghg** Global warming potential, excluding biogenic uptake, emission and storage









**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\*

\*: The results of these 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

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









## ENVIRONMENTAL IMPACTS PER DECLARED UNIT

POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM	CORE			DOWNSTREAM				TOTAL*	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 		
GWP	kg CO <sub>2</sub> eq	2,15E+02	1,89E+01	3,01E+02	3,59E+01	5,11E+01	2,60E+01	2,64E+00	1,26E-01	<b>6,51E+02</b>	-1,20E+02
GWP,f	kg CO <sub>2</sub> eq	2,15E+02	1,89E+01	3,01E+02	3,59E+01	5,11E+01	2,60E+01	2,63E+00	1,26E-01	<b>6,50E+02</b>	-1,20E+02
GWP,b	kg CO <sub>2</sub> eq	2,09E-01	1,05E-02	2,83E-01	1,88E-03	3,44E-03	1,41E-03	7,89E-03	1,67E-05	<b>5,17E-01</b>	-2,57E-02
GWP,luluc	kg CO <sub>2</sub> eq	5,92E-02	2,09E-04	1,14E-01	2,68E-04	7,48E-04	1,99E-04	5,44E-03	3,11E-06	<b>1,81E-01</b>	-1,23E-02
GWP,ghg	kg CO <sub>2</sub> eq	2,15E+02	1,89E+01	3,01E+02	3,59E+01	5,11E+01	2,60E+01	2,64E+00	1,26E-01	<b>6,50E+02</b>	-1,20E+02
ODP	kg CFC11 eq	5,62E-05	4,27E-06	5,23E-06	8,20E-06	1,15E-05	6,08E-06	9,70E-08	2,63E-08	<b>9,16E-05</b>	-3,72E-06
AP	mol H+ eq	1,03E+00	1,44E-01	5,95E-01	2,22E-01	5,52E-01	1,21E-01	1,32E-02	1,30E-03	<b>2,68E+00</b>	-4,53E-01
EP,f	kg P eq	6,55E-03	2,81E-05	4,62E-03	1,86E-05	3,82E-05	1,43E-05	1,38E-04	4,55E-07	<b>1,14E-02</b>	-5,10E-03
EP,m	kg N eq	2,56E-01	5,50E-02	1,85E-01	8,48E-02	2,47E-01	4,52E-02	2,41E-03	5,65E-04	<b>8,77E-01</b>	-9,23E-02
EP,t	mol N eq	2,82E+00	6,05E-01	2,05E+00	9,32E-01	2,71E+00	4,96E-01	2,67E-02	6,20E-03	<b>9,65E+00</b>	-1,01E+00
POCP	kg NMVOC eq	8,80E-01	1,58E-01	5,26E-01	2,43E-01	7,42E-01	1,29E-01	7,23E-03	1,73E-03	<b>2,69E+00</b>	-5,37E-01
ADPE	kg Sb eq	8,61E-05	6,42E-07	1,84E-04	1,31E-06	2,54E-06	1,11E-06	5,01E-08	5,83E-09	<b>2,76E-04</b>	-1,88E-03
ADPF	MJ	1,07E+04	2,66E+02	1,19E+03	5,01E+02	7,07E+02	3,71E+02	3,41E+01	1,68E+00	<b>1,38E+04</b>	-9,89E+02
WDP	m <sup>3</sup>	1,02E+04	3,25E-01	1,37E+02	-1,09E-01	1,44E-01	-7,92E-02	3,83E-01	5,89E-04	<b>1,04E+04</b>	-1,06E+01

# GERLAFINGEN AFV BELTRAME GROUP MERCHANT BARS

- 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

## RESOURCE USE PER DECLARED UNIT

USE OF RESOURCES	UNITS / D.U.	UPSTREAM	CORE			DOWNSTREAM				TOTAL*	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 		
PERE	MJ	7,14E+02	2,69E+00	1,47E+02	7,84E-01	1,12E+00	5,46E-01	4,04E+00	6,99E-03	<b>8,71E+02</b>	-8,74E+01
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	<b>0,00E+00</b>	0,00E+00
PERT	MJ	7,14E+02	2,69E+00	1,47E+02	7,84E-01	1,12E+00	5,46E-01	4,04E+00	6,99E-03	<b>8,71E+02</b>	-8,74E+01
PENRE	MJ	1,18E+04	2,62E+02	1,43E+03	4,89E+02	6,92E+02	3,63E+02	4,45E+01	1,68E+00	<b>1,51E+04</b>	-1,48E+03
PENRM	MJ	0,00E+00	0,00E+00	4,38E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>4,38E+00</b>	0,00E+00
PENRT	MJ	1,18E+04	2,62E+02	1,43E+03	4,89E+02	6,92E+02	3,63E+02	4,45E+01	1,68E+00	<b>1,51E+04</b>	-1,48E+03
SM	kg	1,15E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>1,15E+03</b>	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	<b>0,00E+00</b>	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	<b>0,00E+00</b>	0,00E+00
FW	m <sup>3</sup>	2,41E+02	1,87E-02	3,61E+00	1,54E-02	1,78E-02	7,36E-03	1,44E-02	4,81E-05	<b>2,45E+02</b>	-1,60E-01

\*Totals may not correspond to the sum of the individual contributes due to approximations.











# GERLAFINGEN

## AFV BELTRAME GROUP

### MERCHANT BARS

**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

**OUTPUT FLOWS AND WASTE CATEGORIES PER DECLARED UNIT**

WASTE GENERATION AND TREATMENT	UNITS / D.U.	UPSTREAM	CORE			DOWNSTREAM				TOTAL*	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 		
HWD	kg	0,00E+00	0,00E+00	8,64E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>8,64E-01</b>	0,00E+00
NHWD	kg	2,71E-02	0,00E+00	2,99E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>2,99E+01</b>	0,00E+00
RWD	kg	3,16E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>3,16E-04</b>	0,00E+00
CRU	kg	5,59E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>5,59E-02</b>	0,00E+00
MFR	kg	0,00E+00	0,00E+00	3,59E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>3,59E+02</b>	0,00E+00
MER	kg	0,00E+00	0,00E+00	6,71E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	<b>6,71E-01</b>	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	<b>0,00E+00</b>	0,00E+00

\*Totals may not correspond to the sum of the individual contributes due to approximations.

# CALCULATION RULES

## METHODOLOGY

The environmental burden of the product has been calculated according to the GPI v.3.01 issued by the International EPD System<sup>1</sup> (Cradle to gate with options). This declaration is based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system.

Merchant bars at plant level, was described by using specific data from manufacturing facility (Gerlafingen) for year 2020.

Customized LCA<sup>2</sup> questionnaires were used to gather in-depth information about all aspects of the production system (for example, raw materials specifications, pre treatments, process efficiencies, air emissions, waste management), ultimately providing 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 PCR, while transport to final destination (A4) and end-of-life phases (C1-C2-C3-C4-D) were considered. A distance of 200 km from operation plant and dismantling site was adopted. According to PEF<sup>3</sup> a collection rate of 0,95 was adopted. Therefore, in nominal installation and operating conditions, no emissions to air nor to water shall occur.

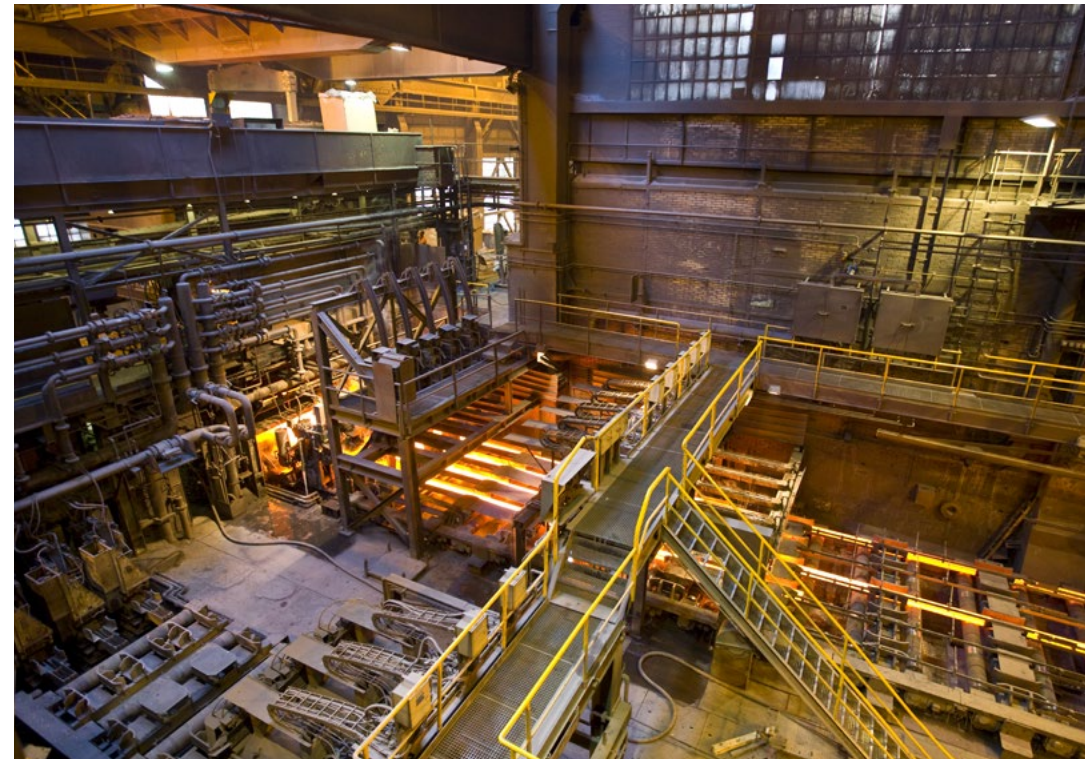
Data quality has been assessed and validated during data collection process. According to EN:15804 the applied cut-off criterion for mass and energy flows is 1%.

<sup>1</sup>International EPD System is managed by EPD International AB ([www.environdec.com](http://www.environdec.com)).

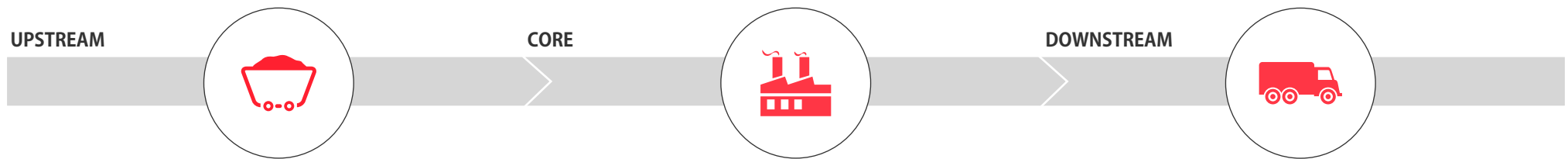
<sup>2</sup>The LCA methodology is standardized at international level by ISO 14040 and ISO 14044.

## DECLARED UNIT

Bars are usually traded in mass so that the declared unit is **1 ton of Merchant bars.**



# CALCULATION RULES

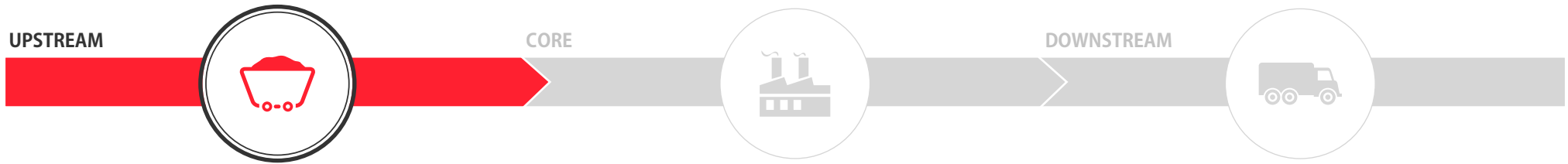


According to the PCR 2019:14 v. 1.11 the main activities are listed and divided in three subsystems: **UPSTREAM Process**, **CORE Module**, **DOWNSTREAM Process**

UPSTREAM PROCESS	CORE MODULE	DOWNSTREAM PROCESS
<p><b>Scrap pretreatment</b></p> <p>Demolition</p> <p>Shearing</p> <p><b>A1</b> Crushing</p> <hr/> <p><b>Material and energy ware production</b></p> <p>Other raw materials</p> <p>Energy</p>	<p>Supplying transport</p> <p>Steel mill process</p> <p>Rolling mill process</p> <p>Packaging</p> <p><b>A2+A3</b> Internal handing</p> <p>Ancillary activities</p> <p>Air emission</p> <p>Water emission</p> <p>Wastes</p>	<p><b>A4</b> Distribution</p> <hr/> <p><b>C1</b> De-construction demolition</p> <hr/> <p><b>C2</b> Transport</p> <hr/> <p><b>C3</b> Waste processing</p> <hr/> <p><b>C4</b> Disposal</p> <hr/> <p><b>D</b> Reuse - Recovery - Recycling potential</p>

Figure 1. Scheme of the considered system boundaries (including upstream, core and downstream main processes).

# UPSTREAM PROCESS



Scheme of the considered system boundaries (upstream processes).

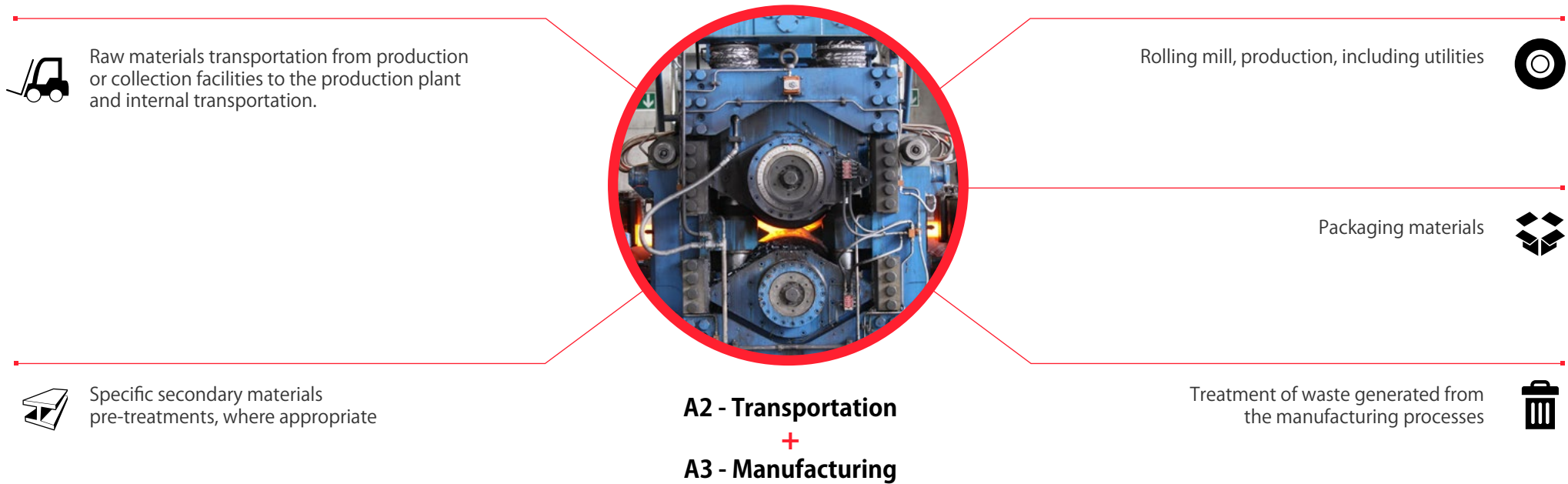


## A1 - Raw Materials Supply

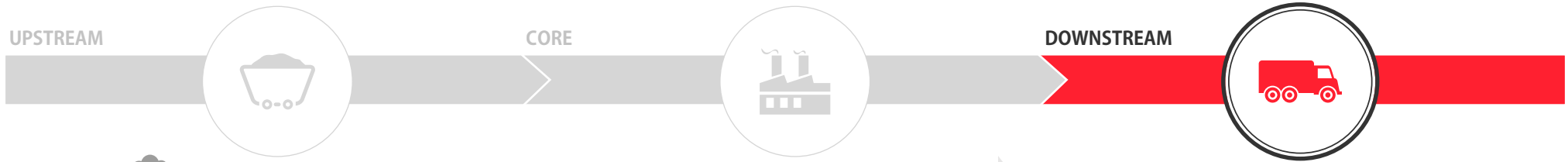
# CORE PROCESS



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



# DOWNSTREAM PROCESS



## A4 Distribution

Transport to the customers (general market average). Distances estimated considering the transported quantities and the distances average from Gerlafingen plant to the client. Final products are delivered to many national and international areas.

## 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).

# ADDITIONAL INFORMATION

Main environmental characteristics of the considered plants are:

- 1.** EAF primary and secondary dedusting achieve an efficient extraction of all emission sources by using direct off-gas extraction (shaft) and total building evacuation, with subsequent dedusting by means of a bag filter
- 2.** Prevention and reduction of (PCDD/F) and (PCB) emissions by using the combination of the following techniques,
  - appropriate rapid quenching of the EAF off-gas
  - injection of adsorption agents into the duct
  - final dedusting with a bag filter.
- 3.** Minimisation of water consumption by using a recirculating loop cooling system with purge recovery. Removal of solids by sedimentation or filtration, removal of oil with skimming devices.
- 4.** Prevention and reduction of waste generation by using the following techniques:
  - I.** appropriate collection and storage to facilitate specific treatments;
  - II.** on-site recovery and recycling of specific by-products from the different processes;
  - III.** external recovery of filter dusts in the non-ferrous metal industry (zinc, lead);
  - IV.** separation of scale in the water treatment process and external recovery in the cement and blast-furnace industry;
  - V.** recovery of EAF slag as a secondary raw material (inert aggregates) in the construction industry.


- 5.** Radiation monitoring of scraps and raw materials by means of detection equipment installed at the weighing post.

In accordance with general EPD requirements the LCA study used specific, generic and other generic data. This last data contributes to the environmental indicators less than 10%.



# ADDITIONAL INFORMATION - MERCHANT BARS

## ECOLOGICAL SCARCITY METHOD - UBP

POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM	CORE			DOWNSTREAM				TOTAL	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 		
Water resources	UBP	322	4	234	1	8	1	-10	0,0	<b>560</b>	24
Energy resources	UBP	39 261	987	4 455	1 857	2 621	1 377	128	6	<b>50 693</b>	-3 649
Mineral resources	UBP	30 138	3	2 644	6	12	5	1	0,0	<b>32 808</b>	-27 95
Land use	UBP	712	2	191	2	3	1	5	9	<b>925</b>	-828
Global warming	UBP	94 437	8 660	44 967	16 462	23 419	11 900	1 182	58	<b>201 085</b>	-53 421
Ozone layer depletion	UBP	256	24	27	46	64	34	1	0,1	<b>452</b>	-62
Main air pollutants and PM	UBP	77 827	7 752	36 281	12 648	35 976	6 806	943	83	<b>178 316</b>	-51 611
Carcinogenic substances into air	UBP	10 563	132	31 613	200	322	62	59	2	<b>42 952</b>	-16 771
Heavy metals into air	UBP	2 159	1 293	35 621	3 292	496	1 981	42	2	<b>44 886</b>	33 789
Water pollutants	UBP	19 713	933	1 221	1 826	2 767	1 349	14	6	<b>27 829</b>	-2 041
POP into water	UBP	929	586	481	1 149	1 602	848	10	4	<b>5608</b>	-267
Heavy metals into water	UBP	447 679	142	578 892	274	414	200	43	1	<b>1 027 645</b>	101 663
Pesticides into soil	UBP	9	0,0	5	0,0	0,1	0,0	0,4	0,0	<b>14</b>	-6
Heavy metals into soil	UBP	730	608	268	1 616	6	929	3	0,0	<b>4 161</b>	-252
Radioactive substances into air	UBP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	<b>0,0</b>	0,0
Radioactive substances into water	UBP	928	0,5	86	0,3	0,3	0,2	2	0,0	<b>1 017</b>	8
Noise	UBP	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	<b>0,0</b>	0,0
Non radioactive waste to deposit	UBP	212	16	3 219	31	50	26	0,3	0,1	<b>3 555</b>	-283
Radioactive waste to deposit	UBP	82 627	44	7 599	26	34	19	155	0,1	<b>90 505</b>	755



# REFERENCES

- EN 15804:2012+A2:2019
- ISO 14040 : 2021
- ISO 14044 : 2021
- Life Cycle Assessment (LCA) of Merchant bars (WP) and Rebars (WK)
- General Programme Instructions, v3.01 (2019-09-18)
- PCR 2019:14 - Construction products - v 1.11 (2021-02-05)

