GERDAU CORSA

LATIN AMERICA EPD®

Environmental Product Declaration
Steel rebar manufactured from steel scrap.

Environmental Product Declaration
In accordance with ISO 14025:2006 and EN 15804:2012

Program:	**The International EPD® System** **EPD registered through the fully aligned regional programme/hub:** **EPD Latin America**
Program operator:	**EPD International AB**
Regional Hub:	**EPD Latin America**
EPD registration number:	**S-P-01661**
Issue date:	**2020/07/27**
Validity date:	**2025/03/22** **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**
Revision date:	**2020/03/23**
Geographical scope:	**Mexico**

Content

1. GERDAU

Gerdau is a major producer of long steel in the Americas, and one of the world's largest suppliers of special steel. We operate in 10 countries and employ 30,000 individuals.

The trajectory of GERDAU began in 1901 with a factory in Porto Alegre, Brazil. Today, GERDAU products are present in the daily lives of millions of people.

We are also one of the largest recyclers in the world. Each year, we transform millions of tons of scrap into steel that is used to shape the future. Gerdau is a publicly traded company listed on the New York, São Paulo and Madrid stock exchanges.

Gerdau Arrived in Mexico in 2007 with the acquisition of a rebar plant, in 2008 Gerdau and Aceros Corsa create a joint venture with Aceros Corsa's merchant bar plant, and in 2012, Gerdau and Aceros Corsa unify the brand in Mexico under Gerdau Corsa name.
In 2015, Gerdau Corsa starts production in the new structural shapes plant located in Sahagun city, Hidalgo, Mexico.

GERDAU CORSA provides quality products and offers value-added services such as custom length cuts for optimized building structure fabrication.

Our network of steel mills covers the United States, Venezuela, Colombia, Argentina, Perú, Uruguay, Brasil, Republica Dominicana, Canada, and Mexico. We offer made to order Steel grades and lengths.

We believe in the strength of Steel transformation, and from the beginning of our history, the Main goal has always been to transform the lives of the people around us.

Steel can turn projects into reality and boost the development of a better society and a better place to live.

Our Purpose is to: Empower people who build the future

The men and women in the steel industry make a transformative impact on society. They create and build with steel. They connect the world through bridges and cars, move people on elevators and across railroads, construct homes that protect families, and erect structures that revitalize landscapes. At Gerdau Corsa, we empower people who build the future.

This Environmental Product Declaration (EPD) is in accordance with ISO 14025, for structural beams hot-rolled manufactured from steel scrap.

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPD of construction products may not be comparable if they do not comply with EN 15804 Sustainability of Construction Works – Environmental Product Declarations – Core rules for Central Product Classification: UN CPC 4124 Bars and rods, hot rolled, of iron or steel; Environmental product declarations within the same product category but from different programs may not be comparable.

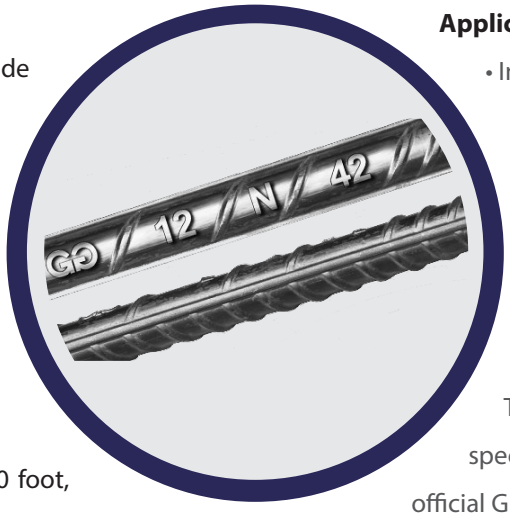
2. General information

Product:	Steel rebar manufactured from steel scrap
Declaration owner:	SIDERTUL S.A de C.V., Calle 3, s/n., Col. Independencia, Tultitlán, Estado de México C.P. 54900 / Contact person: Itzia Nallely Santillán Fierro Itzia.santillan@gerdau.com Cel: 5515039744 Tel: 52627335 Marketing y relaciones publicas
Description of the construction product:	Gerdau produces steel rebar manufactured from steel scrap, providing an unrivalled range of straight bars and dowel products. With our rebar, which is rolled from continuous cast billets, customers can choose products including dowel bars, mine anchor bolts and straight rebar.
Declared Unit:	One metric ton of steel rebar manufactured from steel scrap by GERDAU CORSA at the Tultitlan plant in Mexico of State.
Main product components:	100% Steel manufactured using scrap steel as source of iron.
Life cycle stages not considered:	Downstream (A4, A5, B1, B2, B3, B4, B5, B6, B7, C1, C2, C3, C4), other environmental information (D), and inclusion of reference service life (RSL).
Content of the declaration:	This EPD is based on information modules that do not cover the aspects of use and end of life of the product. It contains in detail, for Module A1, A2 and A3: • Product definition and physical data. • Information about raw materials and origin. • Specifications on manufacturing the product. • Notes on product processing. • LCA based on a declared unit, cradle-to-gate. • LCA results. • Evidence and verifications.
For more information consult:	https://www.gerdaucorsa.com.mx/
Site for which this EPD is representative:	Manufacturing Plant Calle 3, s/n., Col. Independencia, Tultitlán, Estado de México. C.P. 54900
Intended Public:	B2B (Business to Business)

3. Product description

3.1 Steel rebar

Gerdau Steel Rebar is used in a wide range of construction projects as the framework for reinforced concrete. Gerdau rebar is produced across our network of North American mills, allowing for fast and efficient service.



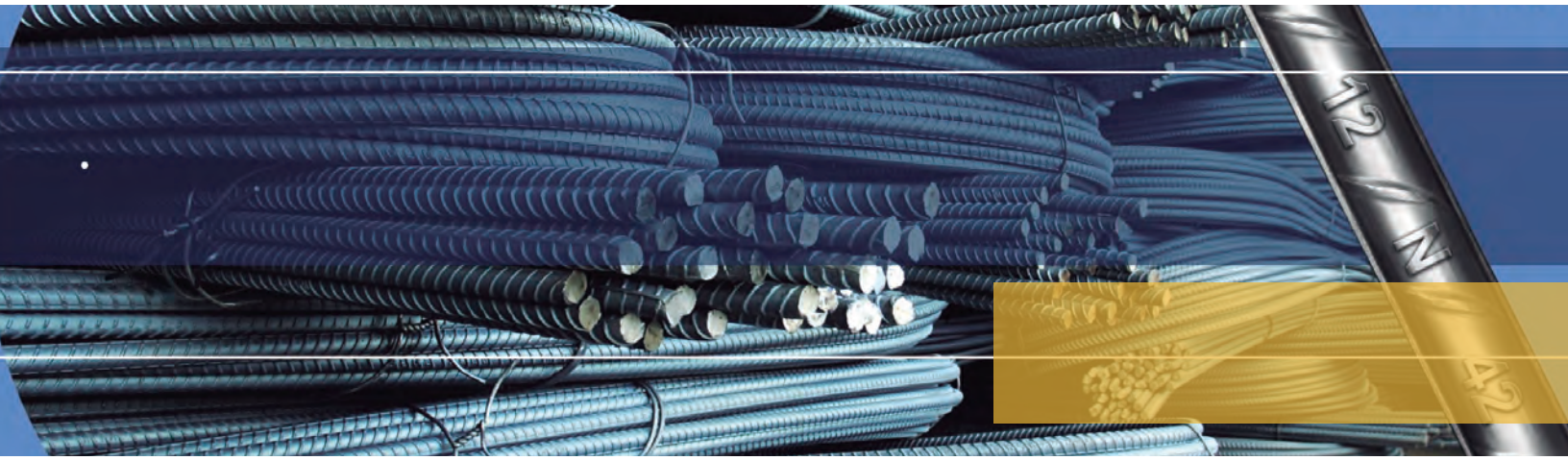
Technical characteristics

- Typical lengths are 20, 30, 40 and 60 foot, but custom lengths are available.
- ASTM A615 is produced in grades 40, 60, 75, 80, 100.
- ASTM A706 is produced in grades 60, 80.
- CSA 30.18-09 is produced in grades 400R, 400W, 500R, 500W.

Application

- In robust and resistant metal structures
- Racks
- Blacksmithing
- Secondary elements on decks
- Construction projects as the framework for reinforced concrete

The information on the tables of technical specifications is required, please consult the official GERDAU CORSA website. https://www.gerdaucorsa.com.mx. Where you can download the Profiles Manual, you can also contact Facebook / Instagram / and Linkedin.



4. Content declaration

Steel rebar manufactured from steel scrap is produced in electric arc furnace with 96% of recycled material. The typical composition is in Table 1.

Homogeneous Material or Chemical Substances	Chemical Substances	Weight (%)	CAS Number	Function of Chemical Substance	Health class[1]
Steel scrap	Not applicable	96 %	Not applicable	Iron content in steel	Not listed
Anthracite	Anthracite	<1 %	8029-10-5	Carbon content in steel	Not listed
Anthracite M6-20	Anthracite	1 %	8029-10-5	Carbon content in steel	Not listed
Lime	Calcium carbonate	<1 %	471-34-1	Iron ore sintering agent steel foundry	Not listed
Lime	Calcium carbonate	1 %	471-34-1	Iron ore sintering agent steel foundry	Not listed
Hard Coal	Anthracite	<1 %	8029-10-5	Carbon content in steel	Not listed
Lime	Calcium carbonate	<1 %	471-34-1	Iron ore sintering agent steel foundry	Not listed
Dolomite	Calcium carbonate magnesium	<1 %	16389-88-1	Iron ore sintering agent steel foundry	Not listed

1 According to EN15804 declaration of material content of the product shall List of Substances of Very High Concern (SVHC) that are listed by European Chemicals Agency.

Table 1. Content commercial long steel hot-rolled manufactured from steel scrap

5. LCA Rules

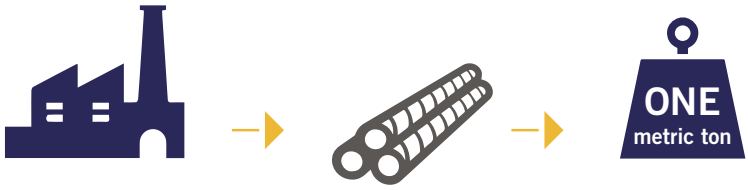
Environmental potential impacts were calculated according to EN 15804:2012 and PCR 2012:01 Construction products and construction services Version 2.3 (2018-11-15). This EPD is in accordance with ISO 14025:2006.

Environmental potential impacts were calculated through Life Cycle Assessment (LCA) methodology according to ISO 14040:2006 and ISO 14044:2006.

An external third-party veri¬fication process of the EPD was conducted according to General Programme Instructions for the International EPD® System Version 3.0. Verification includes a documental review and a validation of both the underlying LCA study and documents describing additional environmental information that justify data provided in the EPD.

5.1. Declared unit

One metric ton of steel rebar manufactured from steel scrap by GERDAU CORSA at the Tultitlan plant in Mexico of State.



5.2. System boundary

The potential environmental impacts were calculated through Life Cycle Assessment (LCA) methodology of steel rebar manufactured from steel scrap according to ISO 14040:2006 and ISO 14044:2006.

This study went through a critical review process in accordance with ISO / TS 14071: 2014. For a "cradle-to-gate" EPD is be based on information modules A1 to A3. (see table 2).

Table 2. Steel rebar manufactured from steel scrap

Life cycle information of steel rebar manufactured by GERDAU CORSA, from steel scrap			EPD type	
Life cycle stages in the international EPD- System	Asset life cycle stages (EN 15804)	Information modulo (EN 15804)	Declared unit: Cradle-Gate Cradle-Gate with options	Function of Chemical Substance
Upstream	A1) Raw material supply	A1-A3) Product stage	Mandatory	Mandatory
Core	A2) Transport A3) Manufacturing			
Downstream	A4) Transport A5) Construction installation	A4-A5) Construction process stage	Optional for a product, mandatory for a service	Mandatory
	B1) Use B2) Maintenance B3) Repair B4) Replacement B5) Refurbishment	B1-B5) Use stage	Optional	Mandatory
	B6) Operational energy use B7) Operational water use	---------- ----------	---------- ----------	---------- ----------
	C1) Deconstruction, demolition C2) Transport C3) Waste processing C4) Disposal	C1-C4) End of life stage	Optional	Mandatory
Other environmental information	D) Future, reuse, recycling or energy recovery potentials	D) Recovery stage	Optional	Optional
Inclusion of reference service life (RSL)	----------	----------	Mandatory if any module in Bis included	Mandatory

Description of information modules is included in Table 3.

A1) Raw material supply

- Pre-processing of steel scrap.
- Production of raw materials: ferroalloys, lime, carbon, graphite electrodes, etc.
- Production of packaging materials for raw materials.
- Generation and distribution of the electricity consumed in manufacturing.
- Generation and distribution of the natural gas consumed in manufacturing

A2) Transportation

- Transportation of scrap steel.
- Transportation of other raw materials.
- Transportation of packaging materials for raw materials.
- Transportation of packaging materials for commercial long steel.

A3) Manufacturing

- Consumption of fresh water.
- Production and consumption of auxiliary materials: oxygen, nitrogen, chemicals for water treatment.
- Waste generation and waste management processes.
- Emissions to air.
- Transport of waste to the treatment and final disposal site.

Table 3. Description of information modules included in this EPD.

5.3. Description of the manufacturing process

The manufacturing process is described in Figure 1:

Figure. 1. Flow diagram of steel rebar manufactured from steel scrap

5.4. Assumptions

1. It assumed that the patio of the State of Mexico (the kings) collects and treats the scrap metal from the State of Mexico and Queretaro.

2. In the Veracruz scrap collection center, it is not a constant supplier of material for Tultitlan since it only took steel scrap six times during the year, although they did take into account.

3. Guadalajara scrap collection center and treats the material of Jalisco.

4. Mexico City collection center and processes about the city plus what comes from states like Morelos.

5. Only specific monthly data did provide on the amount of scrap supplied to the yards until month 8, for the month 9,10,11 and 12, the missing amount reported in the totals that went into production during the year did distribute. Tultitlan plant and was assigned according to the proportion of arrival of material as identified reported in the internal logbooks.

6. All the transports were taken into account since there is an internal transport that collects the scrap metal, which arrives from the different courtyards and mobilizes it to the Tultitlan plant, this distance did assume by an average.

7. All weights of packaging materials were assumed according to the technical data sheets of suppliers.

8. It did believe that the shipment of waste was at a local distance since that distance was not available.

9. Air emissions were calculated by means of emission factors by company personnel.

10. The wooden cylinder where the steel strip used for the packaging of the finished product is not taken into account.

11. Assumptions did make of some distances such as those corresponding to imports from Austria, leaving the cargo from Vienna by train, to the port of Rotterdam and Rotterdam travelling by boat to the port of Veracruz, and from the port to Tultitlan.

12. The distances of Veracruz Tamos, Puebla and Progreso, Hgo were assumed.

13. For the transportation of diesel, the premises did take as distance.

14. The graphite PE cover was not taken into account as it was not representative.

5.5. Cut-off criteria

The flows like fuel, oil, energy and raw materials necessary to produce the steel rebar considered.

The materials that could use in preventive or corrective maintenance of machinery were disregarded, as well as the use of uniforms and personal protective equipment or another consumer of area administrative.

5.6. Allocation

In this study, allocation procedures were applied for products because, in the year 2018 in which data did collect, the Tultitlan plant manufactured other products besides the corrugated rod.

The percentage of production of other products is not significant since only 6% of the total produced corresponds to elements such as angle, square, round OS and TE profile, which did evaluate in the commercial long steel Life Cycle Assesment to GERDAU CORSA.

The life cycle inventory of the corrugated rod did form for a functional unit of 94% since the remaining 6% of transport and material consumption belongs to the production of other commercial elements of GERDAU CORSA.

The allocation percentages appear below:

Table 4. Product generated the processing of Tultitlan plant.

Product	Quantity	Unit	Assignment
Angles	16,079	Ton	5%
Square	2,035	Ton	<1%
Round OS	2,300	Ton	1%
Beams TE	1,657	Ton	<1%
Steel rebar	326,780	Ton	94%
Total produced in the year	348,851	Ton	100%

The assignment amount of resource of the life cycle inventory is for 85.65% steel billet manufactured from steel scrap, and the 14.35% to waste of usable ferrous material, called slag. Below are the assignments related to the manufacturing process of the steel rebar manufactured from steel scrap.

Table 5. Coproduct generated in the manufacturing steel rebar

Co-product	Quantity	Unit	Assignment
Steel slag and dust of Steel	167.48	kg	14.3%
Steel billet	1000	kg	85.6%
Steel billet, Steel slag and dust	1167	kg	100%
Steel Shell	9.08	kg	<1%
Steel rebar	1000	kg	99%
Steel rebar and Steel shell	1009	ton	100%

5.7. Time representativeness

Direct data obtained from GERDAU CORSA is representative for 2018.

5.8. Data quality assessment

Data quality assessment per information module is provided in Tables 6, 7 and 8.

Table 6. Raw material supply module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverag	Data source	Measured or estimated
Consumption steel scrap	2018	Mexico	Modern	GERDAU CORSA	M
Transport distance of Steel scrap to pre-processing plants	2018	Mexico	Modern	GERDAU CORSA	M
Energy and materials consumption, coproduct and emissions generation from pre-processing steel scrap	2018	Mexico	Modern	GERDAU CORSA	M
Raw material consumption for steel billet manufactured from steel scrap	2018	Mexico	Modern	GERDAU CORSA	M
Production of raw materials packaging	2018	Mexico	Modern	GERDAU CORSA	M
Raw material consumption for steel rebar manufactured from steel scrap	2018	Mexico	Modern	GERDAU CORSA	M
Consumption of energy, emissions, waste and materials for the manufacture of steelmaking raw materials	1980-2016	Mix european	European production	Ecoinvent 3.3	M&E
Consumption of fuels and emissions related to electricity production in Mexico at country level	2017	Mexico	Mix technological Mexico	Mexicaniuh	M&E
Energy and materials consumption and emissions related to natural gas production in Mexico	2017	Mexico	Mix technological Mexico	Mexicaniuh	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 7. Transportation module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverag	Data source	Measured or estimated
Transport distance of scrap and other raw materials	2018	Mexico	N/A	GERDAU CORSA	M
Transport distance of auxiliary supplies	2018	Mexico	N/A	GERDAU CORSA	M
Transport distance of materials packaging (commercial long steel)	2018	Mexico	N/A	GERDAU CORSA	M
Consumption of materials and energy and emissions related to the transport requirements of raw materials and auxiliary inputs.	1992-2014	Mix european	European production	Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

Table 8. Manufacture module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverag	Data source	Measured or estimated
Water consumption	2017	Mexico	Modern	GERDAU CORSA	M
Consumption of auxiliary materials during manufacturing	1990 - 2016	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E
Consumption of energy and materials for the manufacture of auxiliary materials.	1990 - 2016	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E
Consumption of energy and materials for the manufacture of the packaging of auxiliary materials used during manufacturing	2018	Mexico	Modern	GERDAU CORSA	M
Emissions to air and water during the manufacturing process	2018	Mexico	Modern	GERDAU CORSA	M
Emissions to waste during the manufacturing process	2018	Mexico	Modern	GERDAU CORSA	M
Waste treatment processes	1992- 2014	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E
Distance and consumption of materials, energy and emissions related to waste transport requirements	2018/ 1992- 2014	Mexico/ Worldwide average based on Europe	Mexico/ Worldwide average based on Europe	GUERDAU CORSA/ Ecoinvent 3.3	M&E

M&E: Measured and Estimated, M: Measured, E: Estimated

6. Environmental performance

SimaPro 8.4 was used for Life Cycle Impact Assessment

6.1. Use of resources

Parameters describing resource use were evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht et al. 2007) except for the indicator of use of net fresh water that was evaluated with Recipe 2016 Midpoint (H) version 1.00 (Huijbregts et al. 2017). The detailed description of the use of resources is provided in Table 9.

Table 9. Resource Indicators per metric ton of steel rebar

Parameter	Unit	Total	A1) Raw materials supply	A2) Transportation	A3) Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	5.87E+02	3.20E+02	2.67E+00	2.64E+02
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	5.87E+02	3.20E+02	2.67E+00	2.64E+02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	9.98E+03	7.42E+03	2.51E+02	2.32E+03
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	9.98E+03	7.42E+03	2.51E+02	2.32E+03
Use of secondary material	kg	9.22E+02	9.22E+02	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m^3	4.65E+00	3.50E-01	4.30E-05	4.30E+00

M&E: Measured and Estimated, M: Measured, E: Estimated

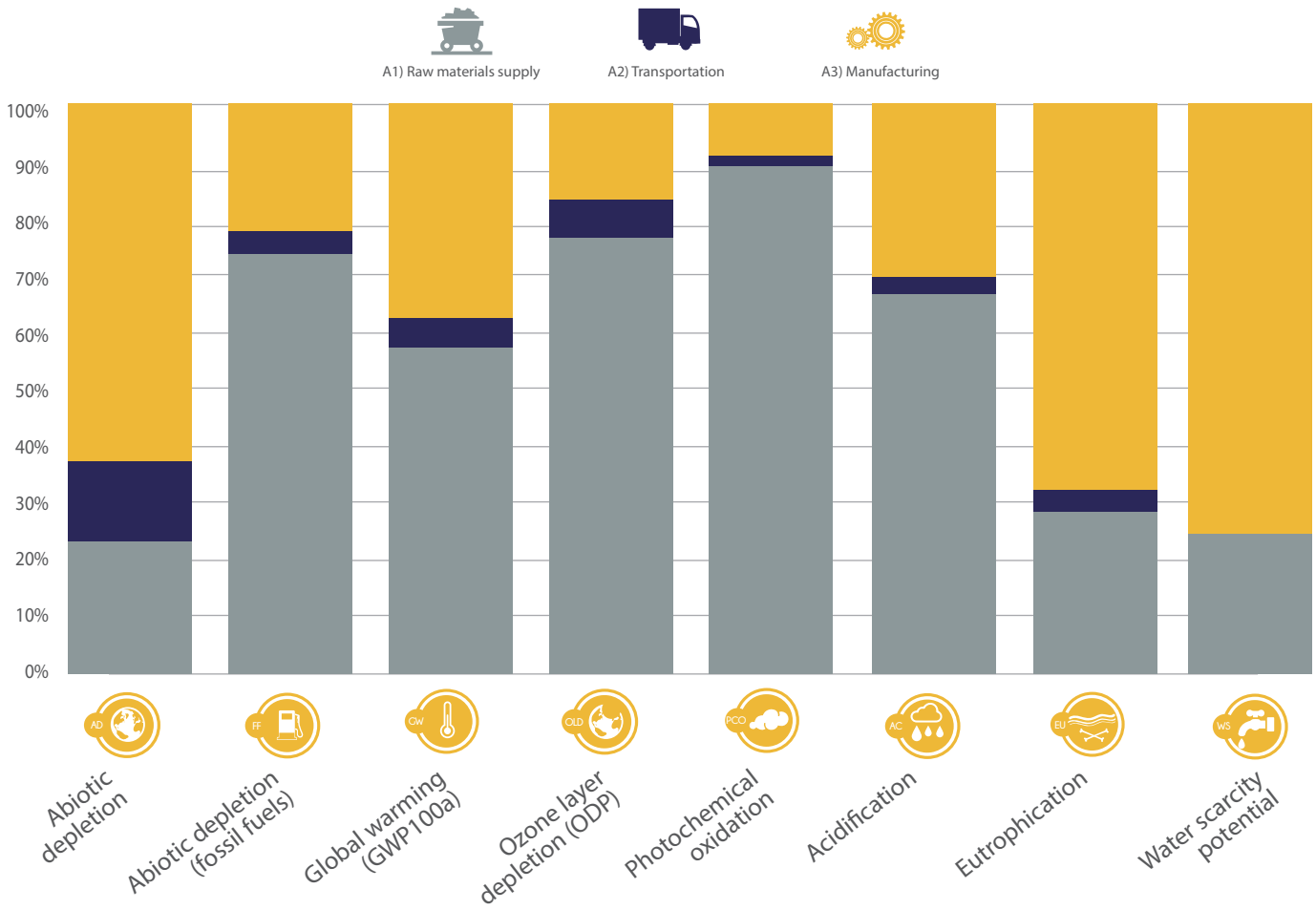
6.2. Potential environmental impact

All information modules are reported and value separately. However, in the present EPD presents itself the total impact across all stage. Parameters describing environmental potential impacts were calculated using CML-IA method version 3.04 (Guinee et al. 2001; Huijbregts et al. 2003; Wegener et al. 2008) as implemented in SimaPro 8.4. Water scarcity potential was calculated using AWARE method (Boulay et al. 2018).

Table 10. Potential environmental impact indicators per metric ton of steel rebar manufactured from steel scrap

Impact Category	Unit	A1) Raw materials supply	A2) Transportation	A3) Manufacture	Total A1 - A3	A4 - A5, B1-B7 C1-C4, D
Abiotic depletion	kg Sb eq	4.3E-05	3.0E-05	1.2E-04	1.9E-04	Modules not declared
	%	22%	15%	63%	100%	
Abiotic depletion (fossil fuels)	MJ	7.0E+03	2.5E+02	2.0E+03	9.3E+03	
	%	75%	3%	22%	100%	
Global warming (GWP100a)	kg CO_2 eq	2.7E+02	1.4E+01	1.8E+02	4.7E+02	
	%	58%	3%	39%	100%	
Ozone layer depletion (ODP)	kg CFC-11 eq	4.7E-05	3.2E-06	9.1E-06	5.9E-05	
	%	79%	5%	15%	100%	
Photochemical oxidation	kg C_2H_4 eq	4.7E-01	3.3E-03	4.2E-02	5.2E-01	
	%	91%	1%	8%	100%	
Acidification	kg SO_2 eq	3.5E+00	8.4E-02	9.6E-01	4.6E+00	
	%	77%	2%	21%	100%	
Eutrophication	kg PO_4^{3-}--- eq	1.4E-01	1.8E-02	3.5E-01	5.1E-01	
	%	28%	3%	68%	100%	
Water scarcity potential	m^3	2.06E+01	2.22E-03	6.43E+01	8.49E+01	
	%	24%	0%	76%	100%	

Figure. 2 Potential environmental impact contribution per metric ton of steel rebar manufactured from steel scrap.



6.3. Waste production

Environmental indicators describing waste generation were obtained from LCI except for background information which has been calculated using EDIP 2003 method (Hauschild and Potting, 2005). Table 11 shows waste and other outputs generated during each information module.

Table 11. Waste and other outputs per metric ton of steel rebar manufactured from steel scrap

Output parameter	Unit	Total	1) Raw materials supply	A2) Transportation	A3) Manufacturing
Hazardous waste	kg	6.89E-03	3.63E-03	1.35E-04	3.13E-03
Non hazardous waste	kg	4.33E+01	7.39E+00	6.98E+00	2.90E+01
Radioactive waste*	kg	1.59E-02	8.19E-03	1.58E-03	6.11E-03
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	1.25E-01	7.75E-02	0	4.77E-02
Materials for energy recovery	kg	0	0	0	0
Exported electricity	MJ	0	0	0	0
Exported heat	MJ	0	0	0	0

**No radioactive waste is produced during GERDAU CORSA operation.*

6.4 Additional environmental information

Environment

Gerdau Corsa seeks to balance our economic, environmental, and social commitments. Each day, our team members make steel products almost entirely composed of recycled content. That's one way in which we reduce our environmental footprint.

Recycling

Steel is an endlessly recyclable material. Each year, Gerdau Corsa transforms about 1 million tons of recycled scrap into steel products. Most of the scrap comes from discarded materials.

Producing steel from scrap metal reduces the amount of material deposited in landfills.

The use of steel scrap as a raw material reduces energy consumption in our production process, and minimizes emissions of CO_2.

Culture of Sustainability

Gerdau Corsa integrates green practices into our operations. Through initiatives including waste reduction, sustainable purchasing, pollution prevention, energy efficiency, and alternative transportation, we strive to lessen our impact on the environment.

7. Verification and registration

CEN standard EN 15804 served as the core PCR	
Program:	International EPD® System www.environdec.com EPD registered through the fully aligned regional program/hub: EPD Latin America www.epdlatinamerica.com
Program operator:	EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden EPD Latin America Chile: Alonso de Ercilla 2996, Ñuñoa, Santiago Chile. Mexico: Av. Convento de Actopan 24 Int. 7A, Colonia Jardines de Santa Mónica, Tlalnepantla de Baz, Estado de México, México, C.P. 54050
EPD registration number:	S-P-01661
Issue date:	2020/07/27
Validity date:	2025/03/22
Revision date:	2020/03/23
Reference year of data:	2018
Geographical scope:	Mexico
Product group classification:	CPC Division 54 Construction services
PCR:	PCR 2012:01 construction products and construction services, Version 2.3 (2018-11-15)
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration data, according to ISO 14025:2006.	EPD process certification (Internal) ☐ EPD verification (External) ☑
Third-party verifier: Accredited or approved by:	Rubén Carnerero Acosta, approved EPD verifier r.carnerero@ik-ingenieria.com The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier:	Yes ☐ No ☑

8.Certifications

PLANTA ISO 45001 2018 CERTIFICADA
SEGURIDAD Y SALUD

PLANTA ISO 9001 2015 CERTIFICADA
CALIDAD

PLANTA ISO 14001 2015 CERTIFICADA
MEDIO AMBIENTE

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LCA study: Análisis de ciclo de vida de tableros de yeso.

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9. References

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