



THE INTERNATIONAL EPD® SYSTEM



LATIN AMERICA

Ternium Coating Steel Products

(Galvanized and Painted)

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Programme: The International EPD® System
EPD registered through the fully aligned regional programme / hub: Latin American Hub,
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Programme operator: EPD® Latin America
EPD International AB

Regional Hub:
Latin American Hub of the International EPD® System

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Geographical scope: Mexico

This EPD is of the type "EPD of multiple products, based on the average results of the product group"

This EPD covers the following products: families of galvanized and painted steel, in their presentation in roll, coil, sheet and die rolling steel (rectangular and corrugated).



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

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This EPD was prepared in conformity with the international standard ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works; Coating Steel Products (Galvanized and Painted).

The EPD owner has the sole ownership, liability, and responsibility for the EPD. The EPD of construction products may not be comparable if they do not comply with the Product Category Rules (PCR) "Construction Product" and the EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works – Environmental Product Declarations - Core rules for Central Product Classification: UN CPC 4123 Flat-rolled products of steel, further worked than hot-rolled or cold-rolled, Coating Steel Products (Galvanized and Painted).

For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 and ISO 14025:2006.

1. Ternium Mexico

Ternium is a leading company in Latin America that manufactures and processes a broad range of steel products using the most advanced technology. The company provides customers that operate in such diverse and essential steel consuming industries, such as construction, automotive and energy, as well as manufacturers of heavy and agricultural machinery, household appliances and packaging, among others.

Ternium and its subsidiaries have 17 productive centers in Argentina, Brazil, Colombia, Guatemala, Mexico, and the United States. It is also part of the controlling group of Usiminas, a leading steelmaker of the Brazilian market.

Ternium's supplies with high quality steel all the main regional markets and it also promotes the development of its customers from the metallurgical industry. The company's distinctive position is a result of its highly integrated production procedure. Its facilities feature the whole manufacturing process of steelmaking, from the mining of iron ore to the production of high value-added products. With a yearly achievable production capacity of 12.3 million tons, Ternium's shares are listed and traded on the New York Stock Exchange.



2. General information

Product:	Coating steel products include: Galvanized and painted steel
Declaration owner:	Ternium México S.A. de C.V. Avenida Universidad 992 Colonia Cuauhtémoc, C.P. 66450 San Nicolás de Los Garza. Nuevo León, México. mx.ternium.com Contact person: Lucia Betanzos: lbetanzo@ternium.com.mx Víctor Bernal: vbernalh@ternium.com.mx
Description of the construction product:	Coated steel for use in multiple industrial sectors. The coating can be: a) galvanized or b) galvanized and painted The final presentation can be: a) coil, b) sheet or c) die rolling sheets
Declared Unit:	1000 kg Coating steel products (Galvanized and Painted steel)
Construction product identification:	Central Product Classification: CPC 4123 Flat-rolled products of steel, further worked than hot-rolled or cold-rolled, Coating Steel Products (Galvanized and Painted).
Main product components:	Galvanized steel: Steel 97.3%, zinc 2.7% Painted steel: Steel 96.5%, zinc 2.7%, paint 0.8%
Life cycle stages not considered:	The modules: A4, A5, B1, B2, B3, B4, B5, B6, B7.
Statement content:	This environmental product declaration is based on information modules that do not cover aspects of construction stage and use. It contains detailed information on the stage of input materials used for the generation of raw material and central process, modules A1, A2, A3, approximations of scenarios C1, C2, C3, C4 and D based on national statistics. <ul style="list-style-type: none"> • Definition of the product. • Content declaration. • Declared unit. • System boundary. • Environmental performance. • Evidence and verifications.
Comparability of EPD of construction products:	a. EPD of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019/AC:2021 b. Environmental product declarations within the same product category from different programs may not be comparable.
For more information consult:	mx.ternium.com
Site for which this EPD is representative:	Manufacturing Plants <ul style="list-style-type: none"> • Industrial Center: Ave. Guerrero Nte. 151 Colonia Cuauhtémoc, San Nicolás de los Garza (66450) Nuevo León (+52) 81 8865-2828 • Industrial Center: Ave. Churubusco 1000 Colonia Santa Fe Monterrey (64540) Nuevo León (+52) 81 83295000 • Industrial Center: Carretera Pesquería-Los Ramones Km 13, Santa María La Floreña, Pesquería (66601)

2. General information

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- Industrial Center: Ave. Universidad 992 Nte. Colonia Cuauhtémoc, San Nicolás de los Garza (66450) Nuevo León (52) 81 8865-2828.
- Industrial Center: Boulevard Harold R. Pape 1349 Fraccionamiento Elizondo, Monclova, Coahuila.
- Industrial Center: Calle Blvd. Carlos Salinas de Gortari km. 11.5 Colonia Centro, Ciudad Apodaca (66600), Nuevo León. (+52) 81 88652828.
- Industrial Center: Calle Ave. G #520 Parque Industrial Almacentro, Ciudad Apodaca (66600), Nuevo León. (+52) 81 88652828.
- Industrial Center: Calle eje 134 #255, Colonia Zona Industrial, San Luis Potosí (78395), San Luis Potosí. (+52) 22 22233545.

Intended Public: B2B (Business to Business)

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804:2012+A2:2019/AC:2021 serve as the core Product Category Rules (PCR)

Product category rules (PCR): 2019:14 Construction products. Version 1.3.4 published April 30th, 2024.

PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com 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.

LIFE CYCLE ASSESSMENT (LCA)

LCA accountability: Dulce Zaragoza and Mireya González, Center for Life Cycle Assessment and Sustainable Design – CADIS.

THIRD-PARTY VERIFICATION

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: Ruben Carnerero, IK Ingeniería SL.

Approved by: The International EPD System

Procedure for follow-up of data during EPD validity involves third-party verifier

Yes

No

3. The Product

Ternium Coating Steel products has two big families (Galvanized and Painted) according to the coating material that is required for each use.

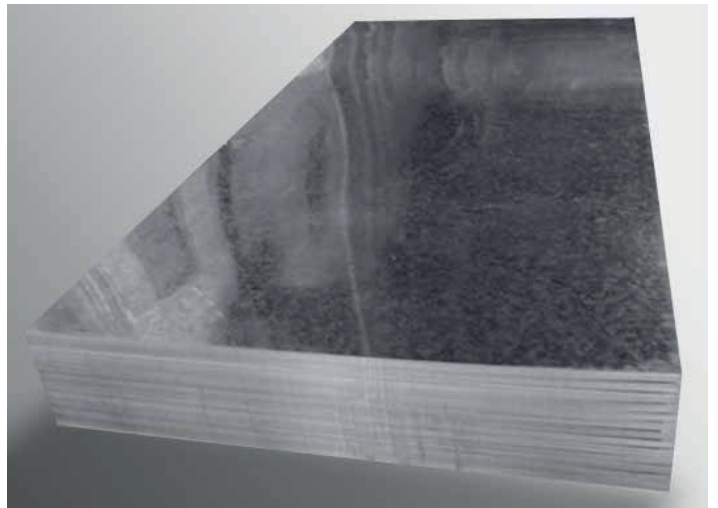
3.1 Galvanized steel coil and sheet (Ternium Zintro)

Galvanized steel (coil and sheet) covered with zinc or Zinc-Aluminum, offers more corrosion resistance and better appearance. The treatment during the coating of the sheets gives some characteristics that favor its use in the industry in weathering or humidity conditions. Also, it is useful in the installation of walls, roofs and fences in the construction industry.



3.2 Galvanized die rolling steel (corrugated and rectangular).

From Ternium Zintro die rolling (rectangular or corrugated) steel is made. It can be used as an exposed fixing cover. Galvanized corrugated or rectangular steel manufactured by Ternium Mexico is corrosion resistant, heat reflective and ideal for humidity conditions.



Galvanized steel:

Steel 97.3%, zinc 2.7%

Painted steel:

Steel 96.5%, zinc 2.7%, paint 0.8%

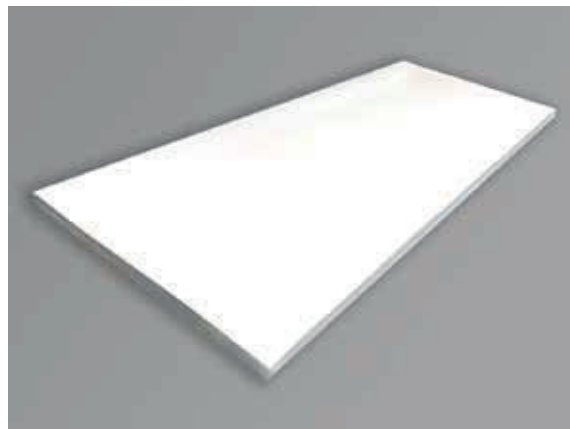
3. The Product

3.3 Painted steel coil and sheet (Ternium Pintro)

It is designed to be used as an exposed fixing cover. Ideal for walls, roofs and skirts of buildings in general. The steel has excellent relationship between economy, structural capacity and drainage capacity.

3.4 Painted die rolling steel (corrugated and rectangular)

This product offers an excellent appearance and great resistance to different environments. It is also a product of easy installation and handling, which does not suffer deformations or cracks over time. Ternium Galvateja is one example of this group of products which is made of galvanized and painted steel sheet, similar in appearance to the traditional tile with the durability of the coated steel. Ideal for commercial and residential use.



3. The Product



Table 1. Products Family characteristics.

Product	Thickness	Effective width (cm)	Cant (mm)	Coating*	Nominal thickness (mm)inch	Weight (kg/m ²)
TR-72	22, 24, 26, 28,30,32	72	25	Z, ZA, P	0.0097 (0.2464) - 0.0359 (0.9119)	2.81-9.00
TR-101	20, 22, 24, 26, 28, 30	100.8	25	Z, ZA, P	0.0097 (0.2464) - 0.0359 (0.9119)	2.81-9.00
TRN-100/35	22,24,26,28	100	35	Z, ZA, P	0.0179 (0.4547)- 0.0299 (0.7595)	4.69-7.61
TR-90	24, 26	90	120	Z, ZA, P	0.0179 (0.4547)- 0.0209 (0.5309)	5.21-6.02
T0-100	22, 24, 26,28	103.2 Wall 95.3 Cover	19	Z, ZA, P	0.0149 (0.3785)- 0.0299 (0.7595)	3.83 Wall 4.15 Cover 7.37 Wall 7.99 Cover
T0-725	26, 28, 30	71.5	19	Z, ZA, P	0.0149 (0.3785)- 0.0299 (0.7595)	3.83 Wall 4.15 Cover
T0-30	28,32	77.8	15	Z, ZA, ZC	0.0097 (0.2464)- 0.0149 (0.3785)	2.60-3.81
Galvalock	22,24	61	76	ZA, P	0.0239 (0.6071)- 0.0299 (0.7595)	6.40-7.92
Galvateja	26	100	42	P	-	--

* Ternium Pintro, ZA= Ternium Zintro Allum, Z=Ternium Zintro, ZC = Zintro Color

4. Content declaration

The materials with the most representative percentage that make up galvanized and painted steel families are presented in Table 2 and 3, respectively.

Table 2. Typical content in Ternium Galvanized steel.

Homogeneous Material or Chemical Substance	Weight (kg)	Weight (%)	Chemical Substances	CAS Number	Function of Chemical Substance	Health class ¹	Post-consumer recycled material (%)	Biogenic content (kg)	Biogenic content (kg C/product)
Steel	973	97.3%	Not applicable	Not applicable	Structural	Not listed	33	0	0
Zinc	27	2.7%	Zinc	7440-66-6	Coating agent	Not listed	0	0	0

NOTE: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂

Table 3. Typical content in Ternium Painted steel.

Homogeneous Material or Chemical Substance	Weight (kg)	Weight (%)	Chemical Substances	CAS Number	Function of Chemical Substance	Health class ¹	Post-consumer recycled material (%)	Biogenic content (kg)	Biogenic content (kg C/product)
Steel	965	96.5%	Not applicable	Not applicable	Structural	Not listed	33	0	0
Zinc	27	2.7%	Zinc	7440-66-6	Coating agent	Not listed	0	0	0
Paint	8	0.8%	Commercial formulation	-	Aesthetic performance	Data lacking	0	0	0

NOTE: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂

5. Distribution packaging

The product is sent to the customers with packaging according with the client requirements and product characteristics.

¹ European Chemical Agency (ECHA):

a) Candidate List: https://echa.europa.eu/es/candidate-list-table?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=2&p_p_col_count=3&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists
 b) Authorisation list: https://echa.europa.eu/es/authorisation-list?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=2&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists
 c) Restriction list: https://echa.europa.eu/es/substances-restricted-under-reach?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=2&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists

² European Chemical Agency (ECHA):

d) Candidate List: https://echa.europa.eu/es/candidate-list-table?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=2&p_p_col_count=3&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists
 e) Authorisation list: https://echa.europa.eu/es/authorisation-list?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=2&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists
 f) Restriction list: https://echa.europa.eu/es/substances-restricted-under-reach?p_p_id=dislists_WAR_dislistsportlet&p_p_lifecycle=1&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_pos=1&p_p_col_count=2&dislists_WAR_dislistsportlet_javax.portlet.action=searchDisLists

6. Biogenic Carbon Content Information

The Coating steel products doesn't have biogenic carbon content. Biogenic carbon from packaging and products was excluded from the system, since by mass it represents less than 5% ("2019:14 Construction products, Version 1.3.4").

7. LCA Rules

Environmental potential impacts were calculated in accordance with EN 15804:2012+A2:2019/AC:2021 sustainability of construction works and PCR 2019:14 Construction products Version 1.3.4. This EPD is in accordance with ISO 14025:2006.

Environmental potential impacts were calculated through Life Cycle Assessment (LCA) methodology conformity to ISO 14040:2006 and ISO 14044:2006. An external third-party verification process of the EPD was conducted according to General Programme Instructions from the International EPD® System Version 4.0. 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.

7.1 Declared unit.

1000 kg of Coating Steel (Galvanized and Painted) manufactured in 2022 by Ternium Mexico.

7.2 System boundary

The potential environmental impacts were calculated through Life Cycle Assessment (LCA) methodology for Coating Steel (galvanized and painted) to ISO 14040:2006 and ISO 14044:2006. This study went through a critical review process in accordance with ISO / TS 14071: 2014.

According to EN 15804:2012+A2:2019/AC:2021 section 5.2 the following type of EPD is "cradle to gate with modules C1-C4 and module D (A1-A3 +C+D)". This EPD is based on information upstream processes and core processes, modules A1 to A3, and approximations of scenarios C1, C2, C3, C4, and D based on construction sector statistics in Mexico (see Table 4). Does not include A4-A5 Construction stage and B Usage stage.

7. LCA Rules

Table 4. System boundary of Coating steel products (Galvanized and Painted).

Life cycle stage	Information about the modules contained in the stages	EPD			
		Cradle-to-gate with modules C1-C4 and module D	Cradle-to-gate with modules C1-C4, module D and optional modules	From cradle to grave and module D	EPD construction services: Cradle to door with modules A1-A5 and optional modules
A1-A3 products stage	A1) Raw material procurement	Mandatory	Mandatory	Mandatory	Mandatory
	A2) Transport				
	A3) Manufacture				
A4-A5 Construction stage	A4) Transport	-	Optional for goods Required for services	Mandatory	Mandatory
	A5) Construction / installation				
B Usage stage	B1) Use	-	Optional	Mandatory	Mandatory
	B2) Maintenance				
	B3) Reparation				
	B4) Replacement				
	B5) Remodeling				
	B6) Operational energy use				
	B7) Operational water use				
C End of life stage	C1) Deconstruction, demolition	Mandatory	Mandatory	Mandatory	Optional
	C2) Transport				
	C3) Waste processing				
	C4) Final disposition				
D Benefits and charges beyond the system limit	D) Reuse, recycling or energy recovery potential.	Mandatory	Mandatory	Mandatory	-

7.3 Description of information modules

Table 5. Description of the modules included in this EPD.

Module	Product stage			Construction process phase		Usage stage						End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction facility	Use	Maintenance	Repair	Restoration	Operational energy use	Operational use of water	Demolition/Deconstruction	Transport	Waste processing	Disposal	Reuse Recovery Recycling potential
Module	A1	A2	A3	A4	A5	B1	B2	B4	B5	B6	B7	C1	C2	C3	C4	D
Declared modules	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	MX	MX	MX	ND	ND	ND	ND	ND	ND	ND	ND	MX	MX	MX	MX	MX
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-
Product variation*	15%			-	-	-	-	-	-	-	-	-	-	-	-	-
Sit variaton**	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-

X = Declared module; ND = No declared module; MX= México

*This product variation corresponds to the maximum difference of all weighted products.

**This site variation corresponds to equal products and processes, unweighted.

Table 6. Description of information modules included in this EPD.



7.4 Description of the manufacturing process

Product stage (modules A1, A2, A3). In this life cycle stage are included raw materials acquisition, transport and manufacturing process. It includes production of galvanized and painted sheets, zinc and paint, generation of electrical energy and fuel production for manufacturing process; also, transportation of raw materials to manufacturing sites; related to manufacturing process is included production of ancillary materials, freshwater consumption, waste and emissions generated.

End of life stage (modules C1, C2, C3, C4). In this life cycle stage includes deconstruction, machinery for deconstruction, hours of demolition and fuel consumption for demolition. Waste transportation to recycling and sanitary landfill. Waste processing of deconstruction waste 98% per 1000 kg of coating steel for recycling and waste disposal of 2% in sanitary landfill.

Resource recovery stage (module D). Avoided loads and benefits of stopping the production of mineral for steel are evaluated and produce sheets with scrap steel.

The manufacturing process of Coating Steel for families of galvanized and painted is shown in Figure 1 and is described below:

Steelmaking and hot rolling of steel

The iron pellets are prepared for steelmaking through a direct reduction process. Later, steelmaking is conducted in an Electric Arc Furnace using direct reduced iron and steel scrap as raw material.

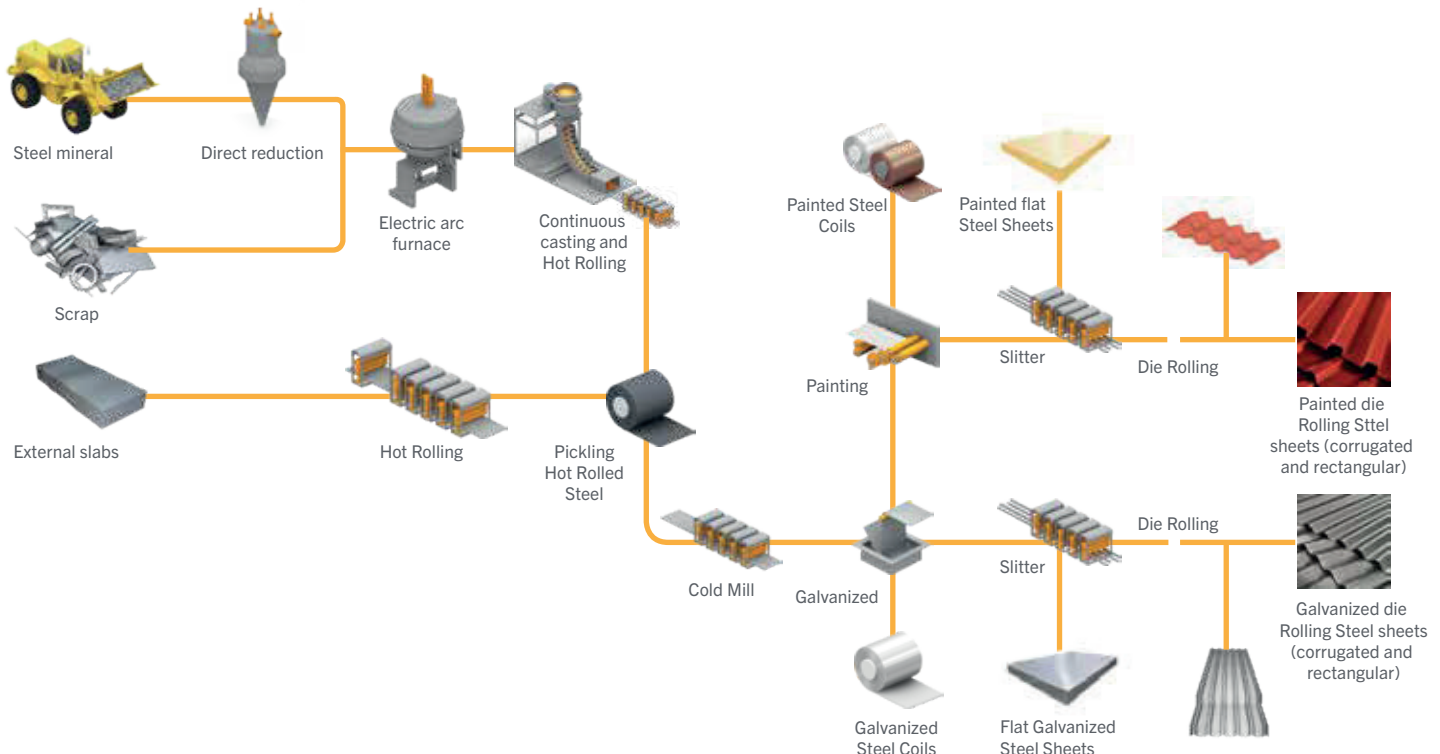
Steel pass to the stage of secondary metallurgy and finally to hot rolling process to obtain coils.

Ternium Mexico also acquired slab from external providers following a BF-BFO steelmaking process, and in this case, the Ternium process starts in the Hot Rolling Process directly.

For the manufacture of the Coating Steel (galvanized steel family) the coils are first pickled to eliminate impurities before cold rolling where the desired steel thickness is obtained. Subsequently, the steel is galvanized with zinc through a hot dip process. Finally, galvanized steel may be commercialized in coil or sheets after a cutting process or in galvanized steel dies (corrugated or rectangular), passing it through an additional rolling process and cutting to the required length.

For the Coating Steel (painted steel family) the painting process is applied to the previously manufactured galvanized steel coils and the painted steel may be commercialized in coils or sheets after a cutting process, or in Painted steel dies (corrugated or rectangular) by passing it through an additional process of lamination and cutting to the required length.

Figure 1. Flow diagram of Coating Steel (galvanized and painting) manufacturing process.



7.5 Assumptions

The assumption related to the Coating Steel manufacturing process are presented below.

- For secondary data and when it was not possible to acquire direct information from the company, the Ecoinvent 3.9.1 life cycle databases, in their Cut-off version, were used.

The characteristics of the generic data used in this study from the Ecoinvent 3.9.1 database are presented below.

- They are representatives of the world average, excluding Europe (RoW).
- They represent technological equivalence to those used by Ternium Mexico suppliers.
- Achieves limitations regarding nature.
- The datasets used represent cradle-to-gate systems, thus respecting the technological limits of the complete system under study.

This LCA study and the derived EPD were calculated using specific data for those processes on which Ternium México has influence, and generic data were used for those processes on which it does not. Generic data refer to inventories related to the manufacturing of raw materials, such as iron ores, zinc, and paints. Generic data are also used for the manufacture of packaging materials, means of transportation, and type of waste treatment.

7.6 Cut off criteria

All flows of fuel, energy, materials and supplies necessary to produce the Coating Steel have been considered; materials that could be used in preventive or corrective maintenance of

machinery and equipment were disregarded, as well as the use of uniforms and personal protective equipment or other auxiliary materials, leaving out textile impregnated with oils or plastics and the final disposal of these as hazardous waste.

7.7 Allocation

In this study, the first preferred allocation procedure was applied, mentioned in the PCR (PCR, 2023), which constitutes the partition of the inputs and outputs of the system, reflecting the physical relationships between the product and each by-product. The partition of inputs and outputs was based on a mass relationship, considering the quantity produced per year of each product or byproduct at the unit process level.

This procedure constitutes a conservative approach, because the products represent the largest proportion when analyzing the outputs (based on the mass produced) in each unit process evaluated. This procedure was used in the same way for material flows as for energy flows throughout the evaluated modules.

Also, the performances of each plant and process involved in the manufacture of Galvanized, painted and die rolling steel were used in the assignment of the input and output flows of the LCI.

7.8 Time representativeness

Direct data obtained from Ternium Mexico is representative for 2022.

8. Environmental performance

SimaPro 9.5 and Ecoinvent 3.9.1 were used for Life Cycle Impact Assessment.

8.1 Potential environmental impact

In accordance with section 2.2.2.1. EPD of multiple products of the PCR “2019:14 Construction Products, Version 1.3.4”, of the International System of Environmental Product Declarations, The International EPD® System: “Several sets of results, reflecting different products, are not allowed to be declared in the same EPD. However, similar products from a single or several manufacturing sites covered by the same PCR and manufactured by the same company with the same major steps in the core processes may be grouped and thereby included in the same EPD.” In this sense, the products of this EPD (galvanized and painted sheets) share the main processes for their production, then the first option was chosen: “For each indicator, declare the average results of the included products. This average shall be weighted according to the production volumes of the included products, if relevant.

In this option, the average content shall be declared in the content declaration”. Therefore, Table 10 and Graph 1, present the weighted results of the EICV of 1000 kg of Coating Steel products (galvanized and painted) manufactured by Ternium in 2022 according to their production, considering the product stages A1-A3 and the basic impact categories.

Electricity impact

The electricity generation data in Mexico comes from the Ecoinvent 3.9 database and information from the National Center for Energy Control (CENACE), which is a decentralized public body whose purpose is to manage the Operational Control of the National Electric System in México. With both references a dataset was created, named “Electricity, high voltage, 2023 {MX}| market for electricity, high voltage | Cut-off, U”, this dataset represents the most recent electricity Mexican grid by type of technology. But adjusts was required to reflect that Ternium México in year 2022 also use Electricity from Independent Producers and this one has at least for GWP lower emission factors.

Table 7. Mexican electricity grid

Type of technology	Total
Deep geothermal	1%
Hard coal	4%
Hydro, run-of-river	6%
Natural gas, combined cycle power plant	59%
Natural gas, conventional power plant	9%
Nuclear, boiling water reactor	3%
Wind, 1-3MW turbine, onshore	5%
Photovoltaic, 570kWp open ground installation, multi-Si	5%
Ethanol production from sweet sorghum	<0%
Oil	2%
Natural gas, burned in gas turbine, for compressor station	6%
TOTAL	100%

8. Environmental performance

As part of the requirements of the PCR, the climate impact as kg CO₂ eq/kWh of the electricity used in the manufacturing process of coating steel (galvanized and painted), is reported in the Table 8. This impact was calculated using the GWP-GHG indicator.

Table 8. Electricity Global Warming Potential (kg CO₂ eq/kWh).

Electricity	Quantity
Weighted total of electrical power sources	4.00E-01

Global warming potential (GWP-GHG) of Scrap use

Another specific topic in accordance with the new requirements of the PCR is the report of the Global warming potential of the scrap inputs per 1000 kg of coating steel (galvanized and painted); this impact was calculated using the GWP-GHG indicator and it is reported in Table 9.

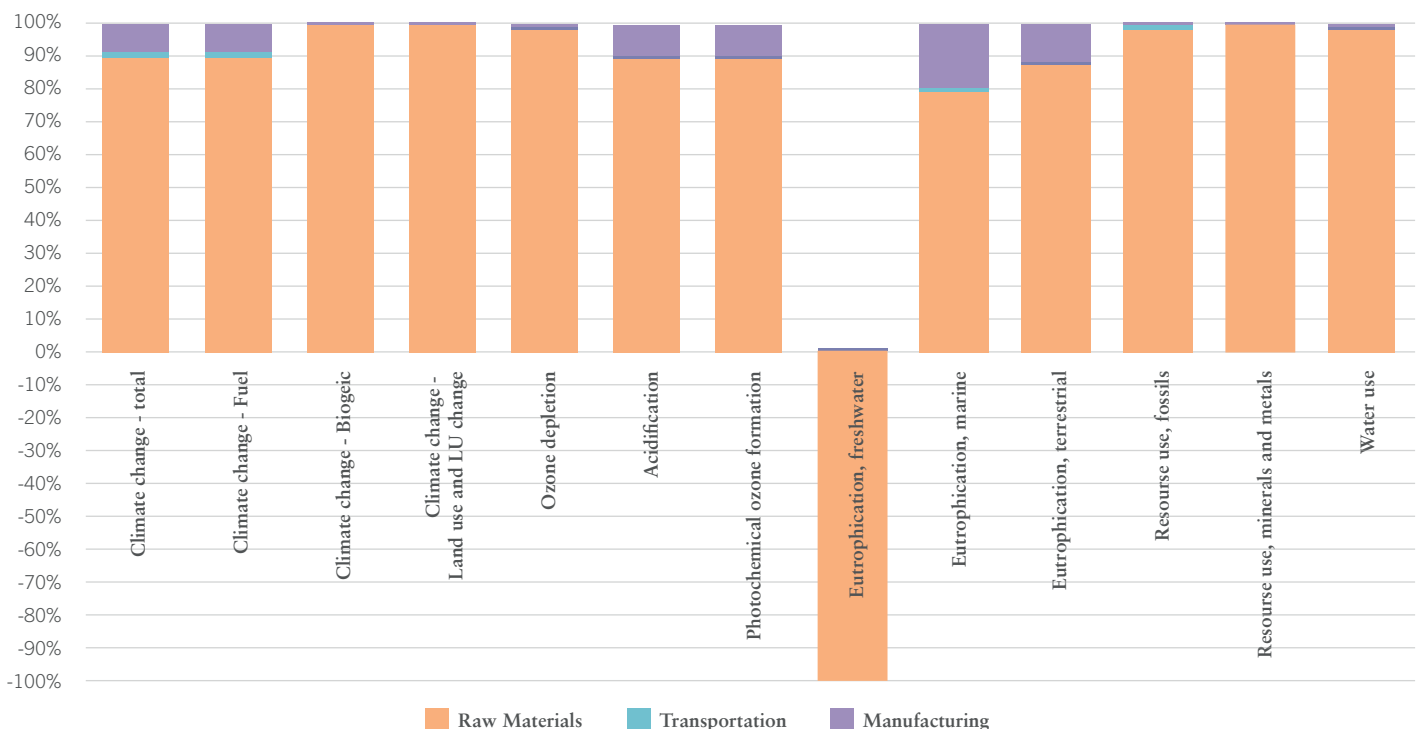
Table 9. Scrap use, Global warming potential

Impact Basic Category	Unit	Quantity
Global warming potential (GWP-GHG) of scrap use	kg CO ₂ eq.	0.02186

All information modules are reported separately. However, the total impact across all stages is also presented. Parameters describing environmental potential impacts were calculated using EN 15804+A2 Adapted version 1 (https://eplca.jrc.ec.europa.eu/permalink/EN_15804.zip) as implemented in SimaPro 9.5.

Module A1, obtaining raw materials, has the highest contribution in all the potential environmental impact categories assessed. Module A2 does not present significant impacts in any impact category, since its contribution is less than 1%. In the case of module A3, manufacturing, six impact categories present significant contributions of 8 to 20%.

Graph 1. A1-A3. Basic impact categories results of Coating Steel products (galvanized and painted).



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Table 10. A1-A3. Basic impact categories results of Coating Steel products (Galvanized and Painted).

Basic impact categories	Unit	A1) Raw materials	A2) Transportation	A3) Manufacturing	Total
Climate change- total	kg CO ₂ eq	1.85E+03	1.88E+01	1.81E+02	2.05E+03
Climate change- Fossil	kg CO ₂ eq	1.84E+03	1.88E+01	1.81E+02	2.04E+03
Climate change- Biogenic	kg CO ₂ eq	1.50E+00	1.17E-03	3.79E-03	1.50E+00
Climate change - Land use and LU change	kg CO ₂ eq	8.28E+00	6.89E-04	1.84E-03	8.28E+00
Ozone depletion	kg CFC11 eq	5.29E-05	2.96E-07	7.96E-07	5.40E-05
Acidification	mol H+ eq	3.46E+01	6.96E-02	4.07E+00	3.88E+01
Photochemical ozone formation	kg NMVOC eq	2.99E+01	9.58E-02	3.65E+00	3.37E+01
Eutrophication, freshwater	kg P eq	-5.55E-01	4.76E-05	2.72E-04	-5.55E-01
Eutrophication, marine	kg N eq	5.30E+00	2.76E-02	1.36E+00	6.69E+00
Eutrophication, terrestrial	mol N eq	1.09E+02	2.96E-01	1.49E+01	1.24E+02
Resource use, fossils	MJ	1.91E+04	2.54E+02	8.34E+01	1.94E+04
Resource use, minerals and metals ¹	kg Sb eq	4.83E-02	1.04E-06	6.04E-06	4.83E-02
Water use	m ³ depriv.	2.13E+02	4.04E-01	3.08E+00	2.17E+02

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

Disclaimer discouraging the use of the results of modules A1-A3 without considering the results of module C.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

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The results of C1-C4 and D modules are presented in Table 11.

Table 11. Impact assessment of C1-C4 and D modules.

Basic impact categories	Unit	C1) Deconstruction	C2) Waste transport	C3) Waste treatment	C4) Waste disposal	D) Benefits and charges beyond the system boundary
Climate change- total	kg CO ₂ eq	2,68E+00	1,91E+01	0,00E+00	6,69E+00	-2.33E+02
Climate change- Fossil	kg CO ₂ eq	2,68E+00	1,91E+01	0,00E+00	6,68E+00	-2.35E+02
Climate change- Biogenic	kg CO ₂ eq	1,76E-04	1,23E-03	0,00E+00	6,28E-03	1.34E+00
Climate change - Land use and LU change	kg CO ₂ eq	1,10E-04	7,52E-04	0,00E+00	1,92E-03	3.55E-01
Ozone depletion	kg CFC11 eq	4,23E-08	2,89E-07	0,00E+00	2,26E-08	-1.44E-05
Acidification	mol H ⁺ eq	2,57E-02	3,09E-02	0,00E+00	2,02E-02	-2.93E-01
Photochemical ozone formation	kg NMVOC eq	3,86E-02	4,42E-02	0,00E+00	1,86E-02	6.67E-02
Eutrophication, freshwater	kg P eq	2,29E-06	4,58E-05	0,00E+00	8,03E-05	2.08E-02
Eutrophication, marine	kg N eq	1,20E-02	7,18E-03	0,00E+00	5,97E-03	-2.03E+00
Eutrophication, terrestrial	mol N eq	1,31E-01	7,18E-02	0,00E+00	6,76E-02	-2.16E+00
Resource use, fossils	MJ	3,53E+01	2,64E+02	0,00E+00	3,24E+01	-1.51E+03
Resource use, minerals and metals	kg Sb eq	1,13E-07	1,17E-06	0,00E+00	1,05E-05	1.03E-03
Water use	m ³ depriv.	4,52E-02	3,66E-01	0,00E+00	3,15E-01	-8.08E+02

Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

8. Environmental performance

8.1.1 Global Warming Potential (GWP-GHG)

Table 12 shows the results of the Global warming potential of 1000 kg of Coating steel products evaluated with the IPCC GWP100 method for modules A1-A3 and Table 13 for modules C1-C4 and D.

Table 12. A1-A3. Climate Impact (GWP-GHG) of Coating Steel products (Galvanized and Painted).

Impact category	Unit	A1) Raw materials	A2) Transportation	A3) Manufacturing	Total
Climate change- GWP	kg CO ₂ eq	1.85E+03	1.88E+01	1.81E+02	2.05E+03

This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Table 13. C1-C4 and D. Climate Impact (GWP-GHG) of Coating Steel products (galvanized and painted).

Impact category	Unit	C1) Deconstruction	C2) Waste transport	C3) Waste treatment	C4) Waste disposal	D) Benefits and charges beyond the system boundary
Climate change- GWP	kg CO ₂ eq	2.68E+00	1.91E+01	0.00E+00	6.69E+00	-2.33E+02

This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

8. Environmental performance

8.2. Use of resources

Parameters describing resource use were evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht et al. 2007) and adjusted with option B of Annex 3 of the PCR 2019:14 Construction products. Version 1.3.4, 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.

Table 14. Use of resources parameters of 1000 kg of Coating Steel products (Galvanized and Painted).

Use of resources parameters	Unit	A1-A3	C1) Deconstruction	C2) Waste transport	C3) Waste treatment	C4) Waste disposal	D) Benefits and charges beyond the system boundary
Use of renewable primary energy excluding renewable primary energy resources used as feedstock (PERE)	MJ	5.62E+02	6.87E-02	3.89E-01	-7.01E+01	1.31E+00	3.39E+02
Use of renewable primary energy as raw material (PERM)	MJ	7.15E+01	0.00E+00	0.00E+00	-7.01E+01	0.00E+00	0.00E+00
Total use of renewable primary energy (primary energy and primary energy resources used as feedstock) (PERT)	MJ	6.33E+02	6.87E-02	3.89E-01	-1.40E+02	1.31E+00	3.39E+02
Non-renewable primary energy use excluding renewable primary energy resources used as feedstock (PENRE)	MJ	1.89E+04	3.75E+01	2.80E+02	2.36E+03	0.00E+00	-1.54E+03
Use of non-renewable primary energy as raw material (PENRM)	MJ	2.41E+03	0.00E+00	0.00E+00	-2.36E+03	0.00E+00	0.00E+00
Total use of non-renewable primary energy (primary energy and primary energy resources used as raw materials) (PENRT)	MJ	2.13E+04	3.75E+01	2.80E+02	0.00E+00	0.00E+00	-1.54E+03
Use of secondary materials (SM)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of secondary renewable fuels (RSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of secondary non-renewable fuels (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of fresh water (FW)	m ³	6.15E+00	1.75E-03	1.45E-02	0.00E+00	9.41E-03	-1.60E+01

These energy parameters are evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht Rolf, 2007) and adjusted with option B of Annex 3 of the PCR 2019:14 Construction products. Version 1.3.4 published on April 30, 2024 (PCR, 2024). Water use was evaluated with ReCiPe 2016 Midpoint (H) version 1.08 (Huijbregts, et al., 2017).

8. Environmental performance

8.3. Other indicators describing waste categories

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). Environmental parameters describing waste generation are provided below:

For more information about the Coating steel products (galvanized and painted), contact the EPD owner who has the complete LCA study of these products.

Table 15. Other indicators describing waste categories of Coating steel products (Galvanized and Painted).

Output parameter	Unit	A1-A3	C1) Deconstruction	C2) Waste transport	C3) Waste treatment	C4) Waste disposal	D) Benefits and charges beyond the system boundary
Hazardous waste**	kg	1.17E+00	2.36E-04	1.78E-03	0	9.53E-05	-7.11E-02
Non-hazardous waste**	kg	5.26E+01	2.62E-03	6.73E-02	0.00E+00	4.00E+01	1.52E+02
Radioactive waste***	kg	8.99E-03	1.72E-06	9.24E-06	0	1.55E-05	5.45E-03
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling*	kg	3.71E-01	0.00E+00	0.00E+00	3.64E-01	0.00E+00	3.64E-01
Materials for energy recovery*	kg	1.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*Direct indicators from Ternium Mexico process data

**Indirect indicators are not related to Ternium Mexico's operations but to the generation during the processes of obtaining auxiliary inputs.

***No radioactive waste is produced during Ternium Mexico operation.



9. Differences between EPD versions

The previous version of this EPD named Galvanized, painted and die rolling steel manufactured by Ternium Mexico was published on July 1, 2019, in accordance with PCR 2012:01 Construction products and construction services, Version 2.3 (2018-11-15).

This EPD was updating following EN 15804:2012+A2:2019/AC:2021 standard and Construction products PCR 2019:2014 V 1.3.4.

10. Verification and registration

CEN STANDARD EN 15804 SERVED AS THE CORE PCR

Programme:	<p>International EPD® System www.environdec.com</p> <p>EPD registered through the fully aligned regional programme/hub: EPD Latin America www.epd-americalatina.com</p>	 
Programme operator:	<p>EPD International AB Box 210 60, SE-100 31 Stockholm, Sweden E-mail: info@environdec.com EPD Latin America</p> <p>Chile: Alonso de Ercilla 2996, Ñuñoa, Santiago Chile. Mexico: Bosques De Bohemia 2 No. 9, Bosques del Lago. Cuautitlan Izcalli, Estado de México, México.</p>	
EPD registration number:	EPD-IES-0001428:001 (S-P-01428)	
Date of publication (issue):	2019-07-01	
Date of validity:	2029-10-28	
Date of revision:	2024-10-28 (Version 001)	
Reference year of data:	2022	
Geographical scope:	Mexico	
Product group classification:	CPC 4123 Flat-rolled products of steel, further worked than hot-rolled or cold-roller	
PCR:	PCR 2019:14 construction products, Version 1.3.2 (15804:2012+A2:2019/AC:2021)	
PCR review was conducted by:	<p>Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.</p>	
Independent verification of the declaration data, according to ISO 14025:2006.	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)	
External third-party verifier and critical reviewer of the LCA:	<p>Rubén Carnerero Approved EPD verifier r.carnerero@ik-ingenieria.com The International EPD® System</p>	
Accredited or approved by:	The International EPD® System	
Procedure for follow-up of data during EPD validity involves third-party verifier:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

11. Ternium's Certifications

Environment

The Environmental Management System of the Ternium Plants that participate in the manufacture are certified under standard ISO 14001:2015

Quality

To ensure the quality of the steel products that are produced in Ternium plants, the different manufacturing processes are certified with the ISO 9001:2015 quality standard, in its latest version. Additionally, the chemical and physical test labs are certified with ISO 17025:2017 standard, as well in its latest version.

Safety

To ensure the care of the physical integrity and occupational health of all the personnel, of the Ternium Plants that participate in the manufacture the Safety Management System is certified with the ISO 45001:2018.

Sustainability

Towards sustainability and environmental protection Ternium manufactures 100% recyclable products, with the highest quality and minimizing environmental impact. Recycling is an important part of the company's production process, as well as ensuring a long-term healthy link with the communities neighboring the production centers. Ternium is deeply committed to sustainable development, so

its actions are guided by an Environmental and Energy Policy that involves employees, shareholders, suppliers, customers, and communities. The company has a Management System that foresees procedures, reviews and specific records for the proper operation, maintenance and control of facilities, as well as for the handling of substances.

Active Participation

Ternium reports, since 2005, CO₂ emissions to the World Steel Association. This garnered the recognition of the "Climate Action Member" program. Additionally, Ternium subscribed to the report on sustainability indicators and reports on energy consumption and personnel training. In addition Ternium also garnered for 6 consecutive years the recognition of Sustainability Champion by the World Steel Association.

In addition, the company is part of different groups that are concerned about environmental issues, mainly the World Business Council for Sustainable Development (National Chapters), the Latin American Steel Association (Alacero), World Steel Association and various work committees in several industrial associations. In Mexico, it participates through the commissions related to environmental issues and energy saving of the National Chamber of Iron and Steel (CANACERO), the Mining Chamber of Mexico (CAMIMEX) and the Environmental Protection Institute of Nuevo León (IPA-NL).

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LCA Study: LCA of
coating steel products
(galvanized, painted and
die rolling steel - corrugat-
ed and rectangular)
manufactured by Ternium
Mexico (2024)

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