Ternium

LATIN AMERICA EPD®

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012

Steel Building Structure Products manufactured by Ternium Mexico

Programme:	The International EPD® System www.environdec.com
EPD registered through the fully aligned regional programme/hub:	EPD Latin America, www.epd-latinamerica.com
Programme operator:	EPD International AB
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Revision date:	2019-06-27
Geographical scope:	Mexico

EPD Content

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 production 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 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.

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

2. General information

Product:	Steel Building Structure Products
Declaration owner:	Ternium Mexico S.A. de C.V. Avenida Universidad 992 Colonia Cuauhtemoc, C.P. 66 450 San Nicolas De Los Garza. Nuevo León, México. Contact person: Luis Rechy lrechy@ternium.com.mx
Description of the construction product:	Steel Building Structure Products with an integral solution for metallic buildings. That includes columns, beams and frames (main structure), Wide Bay (secondary structure for wide buildings), Studs and girders (secondary structure) and Panel RIB (roofs and facades), SSR cover, moldings or gutters (accessories).
Declared Unit:	1 ton of columns and beams 1 ton of Wide Bay 1 ton of Studs and girders 1 ton of Panel RIB, SSR cover, moldings or gutters
Construction product identification:	Central Product Classification: CPC 38702 Prefabricated buildings, of metal.
Main product components:	Columns and beams: 98.3% steel, 0.9% paint, 0.8% welding material. Wide Bay: 97.6% steel, 1.6% paint, 0.8% welding material. Studs and girders: 99.3% steel, 0.6% zinc, 0.1% paint. Panel RIB, SSR cover, moldings or gutters: 97.6% steel, 2.2% zinc, 0.2% paint
Life cycle stages not considered:	Distribution, use, end of life.
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:	mx.ternium.com

Site for which this EPD is representative:	**Manufacturing Plants** 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. 15 Ejido La Victoria Pesquería (66650) Nuevo León (+52) 81 8865-2828 Industrial Center: Ave. Juventud 340 Colonia Cuauhtémoc San Nicolás de los Garza (66450) Nuevo León (+52) 81 8865-2828 Industrial Center: Ave. Universidad 992 Nte. Colonia Cuauhtémoc, San Nicolás de los Garza (66450) Nuevo León (52) 81 8865-2828 Industrial Center: Carretera a Laredo Km. 22.5 Ciénega de Flores (65550) Nuevo León
Intended public:	B2B (Business to Business)

3. Product Description

3.1 Columns and beams: Main structure

Columns and beams are formed of three welded steel plates of constant or variable section, designed and manufactured for easy assembly with screws.

Main structures made from hot rolled steel welded by submerged arc and Metal inert Gas (MIG) type, painted on all sides. It is manufactured with Structural Steel Grade A50, HSLA class 1 with an elastic limit (Fy) equal to 340 MPa (Fy=50 KSI, thousands of pounds per square inch).

Used in civil construction industry and building (frames, trusses, girders, beams, columns, and frames) infrastructure and bodywork.

3.2 Wide Bay

The elements of the secondary structure serve to receive the facade and roof systems, transferring their loads to the main structure.

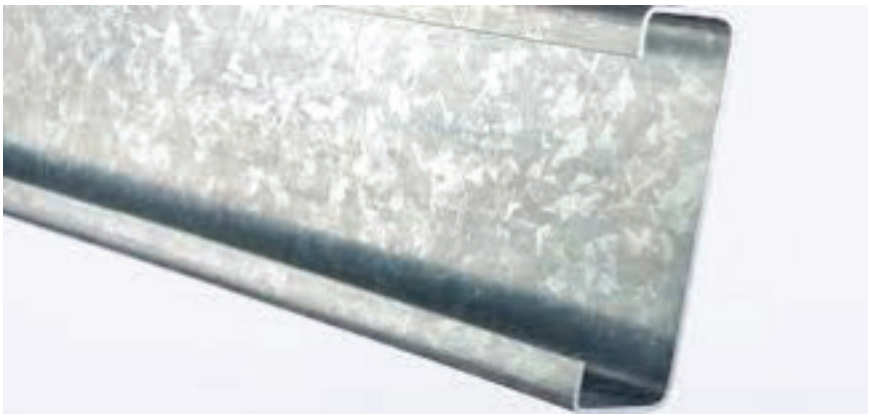
Element formed by two cold rolled chords joined together by a lattice-based square profile of 38.1 mm (1 ½”). It is the ideal solution for separations between frames greater than 12 meters and can be manufactured up to 18.3 m in length.

The chord is manufactured with Structural Steel Grade A55, HSLA class 1 with an elastic limit equal to 380 MPa (Fy=55 KSI) and the square profile is manufactured with Structural Steel Grade A46, with elastic limit equal to 317 MPa (Fy=46 KSI).

3.3 Studs

The studs are cold formed steel members, which are offered in section "C" or "Z", the latter being the most used for their design that allows to overlap them to achieve continuous support, optimizing their structural strength and minimizing their deflections.

It is manufactured with Structural Steel Grade A55, HSLA class 1 with an elastic limit equal to 380 MPa (Fy=55 KSI). Cant of 165 mm (6 1/2”), 26 mm (8 1/2 “) y 292 mm (11 1/2”) and thicknesses from 1.5 mm (.059”) to 2.7mm (.105”).



3.4 Panel RIB, SSR cover, moldings or gutters.

The elements of lamination allow covering the buildings protecting the interior of the inclemency by means of a joint system in the SSR Cover and a profile grooved (Panel RIB) to the base of painted steel. SSR fixation system to the structure is hidden, clips are used that allow the expansion and contraction of the covers, besides having a tongue and groove that allows a double joint. Its large hydraulic channel, cant and applied sealant allows it to ensure tightness. It has a covering power of 610 mm (24”) and a cant of 76 mm (3”).

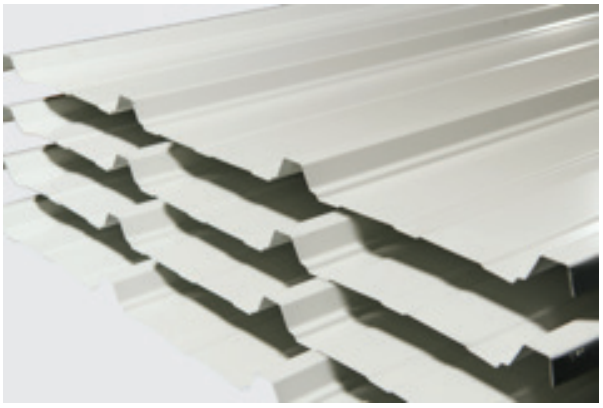
The facade system Panel RIB is a channeled profile with an effective cover power of 914 mm (36”) and a cant of 31.75 mm (1 ¼”) manufactured from Ternium Pintro steel. The profile RIB Panel provides beauty and durability at an economical cost.

There are different colors and finishes like Standard Polyester, Duraplus and Flurocarbonate.

The Panel RIB has structural characteristics to support and distribute loads on the roof of buildings.

In the case of the SSR Cover, the molding and the gutters are the elements that allow the closure and conduction of the water, avoiding infiltrations of elements of the external environment that could lead to the deterioration of the entire structure, which is why they are necessary to meet the function of the whole group of structural products.

Figure 1 Panel RIB



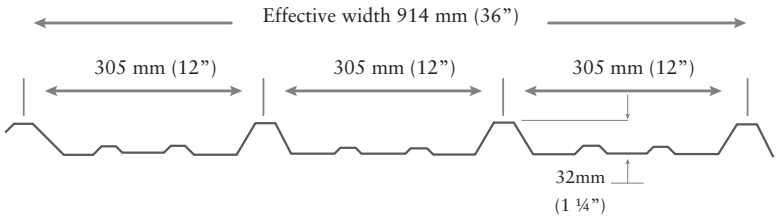


Figure 2 SSR Cover

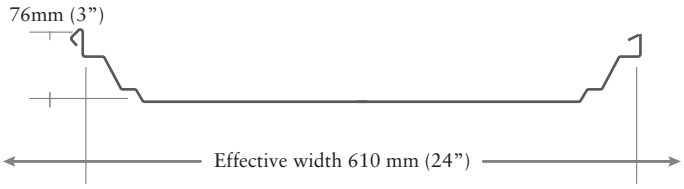


Table 1. Substrates and coatings of Steel building structure products manufactured by Ternium Mexico

Product		Thickness	External face caliber	Category	Standard
Main structure based on plate (Columns and beams)		Steel plate and hot rolled steel	Standard of 5 mm (3/16") to 25 mm (1") Special of 32 mm (1 ¼") to 76 mm (3")	SS Grade 50 HSLA class 1 Grade 50 Fy= 340 MPa (50 KSI)	ASTM A-529 A-572, A-1011
Secondary structure (studs)		Hot rolled steel (plate) and galvanized steel	1.90 mm (0.075") and 2.67 mm (0.105")	SS Grade 55 HSLA class 1 Grade 55 Fy= 380 MPa (55 KSI)	ASTM A-1011 A-653 (galvanized)
Steel for SSR Cover		Ternium Zintro Alum y Ternium Zintro	Standard 24, Special 22	SS Grade 50 HSLA class 2 Grade 50 Fy= 340 MPa (50 KSI)	ASTM A-792
Facade steel Panel RIB		Ternium Pintro	Standard 26, Special 24	SS Grade 50 HSLA class 2 Grade 50 Fy= 340 MPa (50 KSI)	CONST001
Wide Bay	Chord	Hot rolled steel (non-pickled)	1.85 mm (0.073") to 2.67 mm (0.105")	Fy= 380 MPa (55 KSI)	ASTM A-1011
	Brace (Lattice)	Structural square pipe 38.1 mm x 38.1 mm (1.5" x 1.5")	1.65 mm (0.065") to 3.05 mm (0.120")	Fy= 317 MPa (46 KSI)	ASTM A-500

4. Content declaration

Table 2. Typical content in Columns and beams: Main structure					
Homogeneous Material or Chemical Substance	**Chemical Substances**	**Weight (%)**	**CAS Number**	**Function of Chemical Substance**	**Health class[1]**
Steel	Not applicable	98.32%	Not applicable	Structural	Not listed
Paint	Commercial formulation	0.87%	Not applicable	Aesthetic performance	Not listed
Welding material	Welding material	0.81%	Not applicable	Welding material	Not listed

Table 3. Typical content in Wide Bay					
Homogeneous Material or Chemical Substance	**Chemical Substances**	**Weight (%)**	**CAS Number**	**Function of Chemical Substance**	**Health class**
Steel	Not applicable	97.6%	Not applicable	Structural	Not listed
Paint	Commercial formulation	1.6%	Not applicable	Aesthetic performance	Not listed
Welding material	Welding material	0.8%	Not applicable	Welding material	Not listed

Table 4. Typical content in Studs					
Homogeneous Material or Chemical Substance	**Chemical Substances**	**Weight (%)**	**CAS Number**	**Function of Chemical Substance**	**Health class**
Steel	Not applicable	99.3%	Not applicable	Structural	Not listed
Zinc	Zinc	0.6%	7440-66-6	Coating agent	Not listed
Paint	Commercial formulation	0.1%	Not applicable	Aesthetic performance	Data lacking

Table 5. Typical content in Panel RIB, SSR cover, moldings or gutters					
Homogeneous Material or Chemical Substance	**Chemical Substances**	**Weight (%)**	**CAS Number**	**Function of Chemical Substance**	**Health class**
Steel	Not applicable	97.6%	Not applicable	Structural	Not listed
Zinc	Zinc	2.2%	7440-66-6	Coating agent	Not listed
Paint	Commercial formulation	0.2%	Not applicable	Aesthetic performance	Data lacking

1 European Chemical Agency (ECHA):
a) Candidate List:
https://echa.europa.eu/es/candidate-list-table?p_p_id=disslists_WAR_disslistsportlet&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&_disslists_WAR_disslistsportlet_javax.portlet.action=searchDissLists
b) Authorisation list
https://echa.europa.eu/es/authorisation-list?p_p_id=disslists_WAR_disslistsportlet&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&_disslists_WAR_disslistsportlet_javax.portlet.action=searchDissLists
c) Restriction list
https://echa.europa.eu/es/substances-restricted-under-reach?p_p_id=disslists_WAR_disslistsportlet&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&_disslists_WAR_disslistsportlet_javax.portlet.action=searchDissLists

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 verification 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 columns and beams. One metric ton of Wide Bay. One metric ton of studs. One metric ton of Panel RIB, SSR cover, moldings or gutters

5.2 System boundary

The declared EPD is a "Cradle-to gate EPD" in line with ISO 14025:2006. Description of the system boundary is in Table 6.

Table 6. Steel Building Structure Products manufactured by Ternium Mexico

Life cycle environmental information of Steel Building Structure Products																Other environmental information
A1 - A3			A4 - A5		B1 - B7							C1 - C4				D
Product stage			Construction process stage		Use stage							End of life stage				Reuse recovery stage
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials acquisition	Transport	Manufacturing	Distribution	Construction and installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction, demolition	Transport	Waste processing	Disposal	Reuse – recovery – recycling potential
X	X	X	MND	MND	MND							MND				MND
Cradle-to-gate Declared unit: one metric ton of each Steel Building Structure Product																

(X = included in LCA; MND = Module Not Declared).

Table 7. Description of information modules included in this EPD.

A1) Raw materials supply

•Pre-processing of steel scrap

• Production of raw materials: ferroalloys, lime, carbon, graphite electrodes

• 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

• Production of steel slab by external provider

• Production of zinc, paint and welding material

A2) Transportation

• Transportation of steel scrap

• Transportation of iron pellet

• Transportation of other raw materials

• Transportation of ancillary materials

• Internal transportation requirements

• Transport of steel slab from external provider facilities

• Transport of zinc, paint and welding material

A3) Manufacturing

• Fresh water consumption

• Production and consumption of ancillary materials: oxygen, nitrogen, textiles for cleaning and maintenance, lubricating oils and grease

• Waste generation and waste management processes

• Emissions to air

• Transport of waste to treatment and final disposal sites

5.3 Description of the manufacturing process

Ternium Mexico manufactures Steel Building Structure Products in a general process, which will be described below, and the specific treatments by category of structure will be pointed out.

Hot Rolled Steel

The iron ore pellets used as main raw material are transformed to metallic iron through a direct reduction process to later pass to the stage of melting in the Electric Arc Furnace. Afterwards, secondary metallurgy, continuous casting and hot rolling processes are applied.

Beams and columns

The cutting and welding of structural steel parts for each element of the structure is carried out, then a thin layer of water base paint is applied.

Wide Bay

The hot rolled steel is cutting and welding . Then, the steel is cut into pairs simultaneously (top and bottom) for the string of different thickness are produced. Later the Lattice, is cutting and bending to the profiles that form the central part of the wide bay structure.

Subsequently, the strings and lattice are preassembled, and the welding and placement of accessories is applied. Finally, in the painting area, a layer of primer water base is applied through an immersion process.

Studs and girders

The hot rolled steel passes through the pickling process. Then the thickness of the steel is reduced in the cold mill. Afterwards, the steel is cut to form narrow steel strips. The steel pieces are shaped and painted.

Panel Rib, Cover SSR and molding

The hot rolled steel is galvanized, and then painted, rolled, bends and die cutting. The manufacturing process is the same for Panel RIB, SSR cover, molding or gutters.

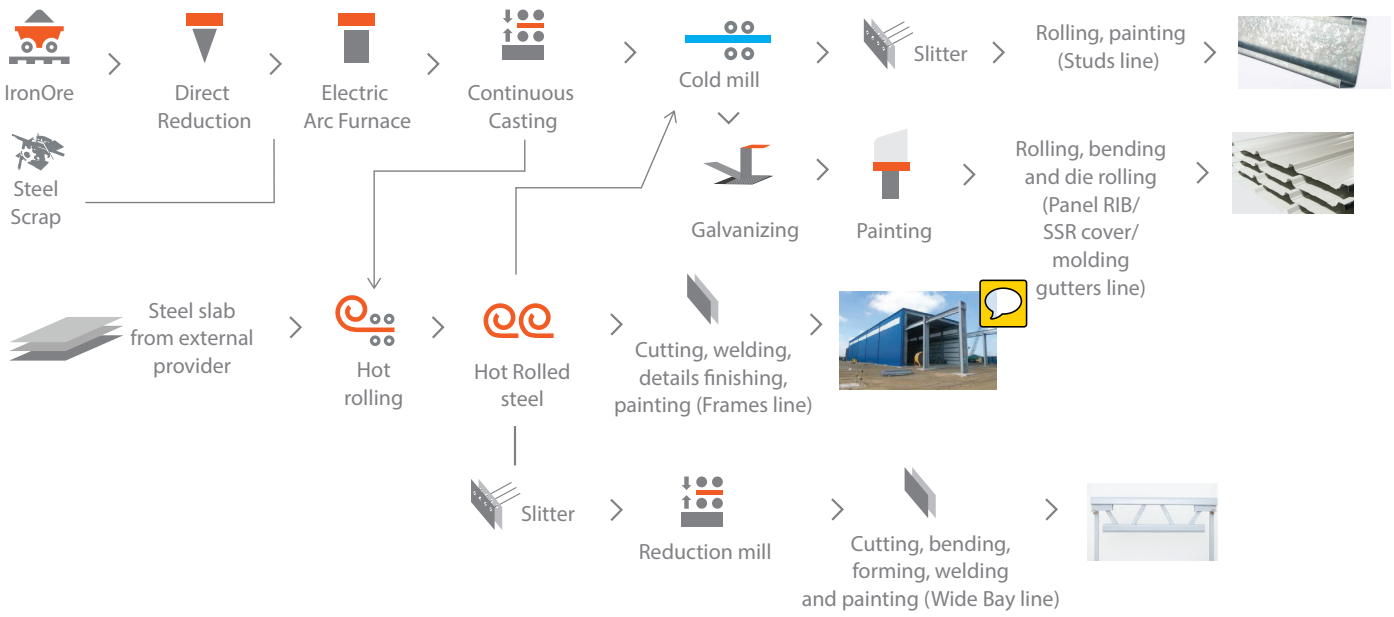


Figure 3. Flow diagram of Steel Building Structure Products manufactured by Ternium Mexico.

5.4 Assumptions

Assumptions regarding Ternium operation:

- The metal drums and buckets are sent for recycling by a third party at the end of their useful life.
- Used oil from the pickling and cold rolling process in the Guerrero plant are sent to the same supplier as those generated in the steel mill.
- Process additives have a density of 1 kg/liter and are inorganic chemicals.
- Tow and textiles for maintenance can absorb 55% of their weight.
- Acid cleaning residues are impregnated textiles.
- When the company did not report the origin, it was assumed that oil, tow, grease, textiles and mechanical components were sourced in the same municipality.
- When the generation of soil with hydrocarbons has been declared, it was assumed that the soil will absorb 72% of its weight.
- When the generation of contaminated industrial waste was reported, tow and rags were added to supplement the material balance, under the assumption that 50% by weight are tow and 50% are rags from reused garments (recycling).
- Tow and rags leave the system in the form of contaminated industrial waste or impregnated textiles and they have the capacity to absorb 55% of their weight.
- In spent emulsions, an oil content of 2% is assumed.

• The distance traveled by the transport of the steel in the processes of the same plant is 400 meters and the internal transport is in trailers of 16 to 32 tons.
• A generic inorganic chemical model for process additive was used since 99% (mass) of chemical products for this purpose are of this nature.
• Steel scrap generated by Ternium was considered a by-product for allocation purposes since it represents an economic input for the company.
• The supplier of acid from the Guerrero plant is the same as the one from the Churubusco plant
• Liquids were generated mainly in water.
• The solvents consumed in the Juventud plant are the same and in the same proportion as in the University plant in the painting areas.
• Acetylene gas and gas mix 7 m3 fuel comes in cylinders of 241.3 x 1 192 mm, empty weight of 56.4 kg and full weight of 63.2 kg with a useful life of 20 years.
• The packaging of raw materials and supplies come from the same place of origin.
• 100% of the hot-rolled steel used in Pickling 1 Churubusco comes from the same plant and the internal distance it covers is 400 meters.
• Fine iron waste with HC is 100% oil. The entrance is oil.
• The vanishing oil is the same supplier as the oil from the Pesquería plant that comes from Monterrey, N.L.
• The information of Pickling 3 line in Guerrero Plant is similar to Pickling 2 line in Guerrero Plant.
• The electric power consumption of MF4 Guerrero per ton is similar to MF3 Guerrero.
• Emulsion contains 2% oil and 98% water in a mass basis.
• Oil, tow and rags are manufactured in the municipality.
• The Fuel 7 mixture is a mixture of carbon dioxide (50%) and argon (50%) gases.
• The composition of the plasma water (96.78% distilled water + 3.22% glycol) was assumed to be the amount of Glycol input.
• The absorbent impregnated with hydrocarbons is a textile that absorbs 55% of its weight in hydrocarbons.
• The natural gas consumed in the Ternium Mexico plants comes from the Burgos plant of PEMEX.

Natural gas transport	Distance (km)
Burgos - Guerrero	228
Burgos - Universidad	228
Burgos - Pesquería	212
Burgos - Churubusco	225
Burgos - Juventud	226
Burgos – Edificios Metálicos (Ciénega)	219

5.5. Cut-off criteria

A minimum of 95% of the total flows (matter and energy) in modules A1 and A3 were included. Company infrastructure, employee's transportation and administrative were kept out of the scope of this study.

5.6 Allocation

Allocation of inputs and outputs between product and byproducts was based on a mass relation, considering the quantity produced per year of each product and byproduct at the level of unit process.

Table 8 shows the byproducts generated during hot rolled steel manufacturing.

Table 8. Main Byproduct generated during Steel Building Structure manufacturing

Product	Plant	Process	Byproduct
Hot rolled steel	Guerrero	Direct Reduction	CO2
			Iron dust
			Direct reduction sludge
		Steelmaking	Slag
			Mixrock (steel dust)
			Hematite
		Hot Rolling Mill 1	Steel scale
		Hot Rolling Mill 2	Steel scale
	Churubusco	Hot Rolling Mill 3	Steel scrap
			Slab cutting slag
Beams and columns	Churubusco	Frames	Steel scrap
Wide Bay	CSI Nogalar	Slitter	Steel scrap
	TPG	Slitter	Steel scrap
	TPG	Mill	Steel scrap
	Edificios Metalicos	Wide Bay line	Steel scrap
Stud	Guerrero	Pickling 2	Steel scrap
	Churubusco	Pickling 3	Steel scrap
	Universidad	Pickling	Steel scrap
	Churubusco	Pickling 1	Steel scrap
		Pickling 2	Steel scrap
	Guerrero	Pickling 3	Steel scrap
	Churubusco	Cold Rolling	Steel scrap
	Universidad	Cold Rolling 2	Steel scrap
		Cold Rolling 3	Steel scrap
	Pesquería	Pickling	Steel scrap
	Guerrero	Cold Rolling 4	Steel scrap

Table 8. Main Byproduct generated during Steel Building Structure manufacturing			
Product	Plant	Process	Byproduct
Panel RIB/SSR Cover/moldings/gutters	Guerrero	Pickling 2	Steel scrap
	Churubusco	Pickling 3	Steel scrap
	Universidad	Pickling	Steel scrap
	Churubusco	Cold Rolling	Steel scrap
	Universidad	Cold Rolling 2	Steel scrap
		Cold Rolling 3	Steel scrap
	Universidad	Galvanizing 3	Steel scrap
			Zinc Dross
	Juventud	Galvanizing 3	Zinc Dross
			Steel scrap
	Universidad	Painting 1	Steel scrap
		Painting 2	Steel scrap
	Edificios Metálicos	Line PRIB/SSR/moldings/gutters	Steel scrap

The polluter pays principle was applied for the allocation procedure during recycling. In this way, in each case when there was an input of secondary material to the steel building structure product system, recycling process and transportation to the site were included in life cycle inventory (for example, steel scrap). In those cases, in which output of material to recycling were presented, material transportation to recycling plant was included. This principle was applied to plastic and metal containers recycled by a third party as well as waste used as energy source by third parties.

For generic data Mexicaniuh and Ecoinvent 3.3 (Allocation - Recycled Content version) databases were used.

5.7 Time representativeness

Direct data obtained from Ternium Mexico is representative of 2017.

5.8 Data quality assessment

Data quality assessment per information module is provided in Tables 9, 10 and 11.

Table 9. Raw material supply module data quality assessment

Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Raw materials and energy consumption, waste generation and emissions for iron or extraction	1999 - 2016	Europe adapted to Mexico	Modern	Ecoinvent 3	M&E
Raw materials and energy consumption, waste generation and emissions for iron pellet manufacturing	2017	Mexico	Modern	Ternium Mexico	M
Energy consumption for scrap steel pre-processing	2018	Europe	Modern	Scrap steel processing equipment provider	E
Raw materials consumption for steel building structure products manufacturing.	2017	Mexico	Modern	Ternium Mexico	M
Energy consumption for steel building structure products manufacturing.	2017	Mexico	Modern	Ternium Mexico	M
Consumption of fuels and emissions related to electricity production in Mexico at country level	2017	Mexico	Modern Mexican energy mix	Mexicaniuh	M&E
Consumption of fuels and emissions related to electricity production by independent providers	2000 - 2016	Mexico	Modern Natural gas Combined cycle	Ecoinvent 3.3 adapted	M&E
Energy and materials consumption and emissions related to natural gas production in Mexico	2017	Mexico	Modern	Mexicaniuh	M&E
Energy and materials consumption and emissions related to the production of other raw materials for steelmaking	1990-2016	Europe	Modern	Ecoinvent 3.3	M&E
Consumption of electricity, fuels and water for production of steel slab by independent provider	2016	Mexico	Modern	Independent provider	M
Consumption of other inputs, waste treatment, process efficiency and byproducts during production of steel slab by independent provider	2017	Mexico	Modern	Ternium Mexico	E

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

Table 10. Transportation module data quality assessment					
Data	**Time related coverage**	**Geographic coverage**	**Technological coverage**	**Data source**	**Measured or estimated**
Transport distance of scrap and other raw materials	2017	Mexico	N/A	Ternium Mexico	M
Transport distance of ancillary supplies	2017	Mexico	N/A	Ternium Mexico	M
Consumption of materials and energy and emissions related to the transport requirements of raw materials and auxiliary inputs.	1992-2014	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E

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

Table 11. Manufacture module data quality assessment					
Data	**Time related coverage**	**Geographic coverage**	**Technological coverage**	**Data source**	**Measured or estimated**
Production yield and generation of by-products.	2017	Mexico	Modern	Ternium Mexico	M
Consumption of auxiliary materials during manufacturing.	2017	Mexico	Modern	Ternium Mexico	M
Consumption of energy and materials for the manufacture of ancillary materials.	1990 - 2017	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E
Waste generation during manufacture	2017	Mexico	Modern	Ternium Mexico	M
Consumptions of materials and related energy during waste treatment.	1990 - 2017	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E
Emissions to air during the manufacturing process	2017	Mexico	Modern	Ternium Mexico EPA AP42	M
Waste transport distance	2017	Mexico	Modern	Ternium Mexico and Google Maps	M
Consumption of materials and energy and emissions related to waste transport requirements	1992-2014	Worldwide average based on Europe	Worldwide average based on Europe	Ecoinvent 3.3	M&E

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

6. Environmental performance

SimaPro 8.4.0 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 obtained from life cycle inventory (direct consumption) and with Recipe 2016 Midpoint (H) version 1.00 (indirect consumption) (Huijbregts et al. 2017). The detailed description of the use of resources of Columns and Beams, Wide Bay, Studs and Panel RIB/ cover SSR/molding or gutters are provided in Table 12, Table 13, Table 14 and Table 15.

Table 12. Resource Indicators per metric ton of Columns and Beams

Impact Category	Unit	A1) Raw materials supply	A2) Transportation	A3) Manufacturing		Total A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ %	1 615 90.5%	27 1.5%	0 0.0%	142 7.9%	1 783 100.0%
Use of renewable primary energy as raw materials	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total use of renewable primary energy resources	MJ %	1 615 90.5%	27 1.5%	0 0.0%	142 7.9%	1 783 100.0%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ %	19 463 85.0%	1 690 7.4%	0 0.0%	1 745 7.6%	22 898 100.0%
Use of non-renewable primary energy used as raw materials	MJ %	4 636 68.9%	0 0.0%	2 090 31.1%	0 0.0%	6 726 100.0%
Total use of non-renewable primary energy resources	MJ %	24 100 81.4%	1 690 5.7%	2 090 7.1%	1 745 5.9%	29 625 100.0%
Use of secondary material	kg %	72 34.3%	0 0.0%	137 65.7%	0 0.0%	209 100.0%
Use of renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of non-renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of net fresh water	m3 %	7.2 67.0%	0.4 3.4%	0.8 7.0%	2.4 22.6%	10.8 100.0%

**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 13. Resource Indicators per metric ton of Wide Bay						
Impact Category	**Unit**	**A1) Raw materials supply**	**A2) Transportation**	**A3) Manufacturing**		**Total A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ %	1 816 94.9%	26 1.3%	0 0.0%	73 3.8%	1 915 100.0%
Use of renewable primary energy as raw materials	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total use of renewable primary energy resources	MJ %	1 816 94.9%	26 1.3%	0 0.0%	73 3.8%	1 915 100.0%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ %	21 015 82.6%	1 611 6.3%	0 0.0%	2 826 11.1%	25 453 100.0%
Use of non-renewable primary energy used as raw materials	MJ %	4 526 68.9%	0 0.0%	2 041 31.1%	0 0.0%	6 567 100.0%
Total use of non-renewable primary energy resources	MJ %	25 541 79.8%	1 611 5.0%	2 041 6.4%	2 826 8.8%	32 020 100.0%
Use of secondary material	kg %	70 34.3%	0 0.0%	134 65.7%	0 0.0%	204 100.0%
Use of renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of non-renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of net fresh water	m3 %	7.8 70.4%	0.3 3.1%	0.7 6.7%	2.2 19.8%	11.1 100.0%

**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 14. Resource Indicators per metric ton of Studs						
Impact Category	**Unit**	**A1) Raw materials supply**	**A2) Transportation**	**A3) Manufacturing**		**Total A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ %	1 214 90.9%	26 1.9%	0 0.0%	95 7.1%	1 335 100.0%
Use of renewable primary energy as raw materials	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total use of renewable primary energy resources	MJ %	1 214 90.9%	26 1.9%	0 0.0%	95 7.1%	1 335 100.0%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ %	17 949 85.8%	1 621 7.7%	0 0.0%	1 346 6.4%	20 916 100.0%
Use of non-renewable primary energy used as raw materials	MJ %	4 436 68.9%	0 0.0%	2 000 31.1%	0 0.0%	6 436 100.0%
Total use of non-renewable primary energy resources	MJ %	22 385 81.8%	1 621 5.9%	2 000 7.3%	1 346 4.9%	27 352 100.0%
Use of secondary material	kg %	68 34.3%	0 0.0%	131 65.7%	0 0.0%	200 100.0%
Use of renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of non-renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of net fresh water	m3 %	5.9 63.4%	0.3 3.8%	1.0 10.4%	2.1 22.4%	9.3 100.0%

**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 15. Resource Indicators per metric ton of Panel RIB, SSR cover, moldings or gutters						
Impact Category	**Unit**	**A1) Raw materials supply**	**A2) Transportation**	**A3) Manufacturing**		**Total A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ %	1 424 90.8%	29 1.8%	0 0.0%	116 7.4%	1 569 100.0%
Use of renewable primary energy as raw materials	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Total use of renewable primary energy resources	MJ %	1 424 90.8%	29 1.8%	0 0.0%	116 7.4%	1 569 100.0%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ %	22 401 83.4%	1 781 6.6%	0 0.0%	2 688 10.0%	26 871 100.0%
Use of non-renewable primary energy used as raw materials	MJ %	4 533 68.9%	0 0.0%	2 044 31.1%	0 0.0%	6 577 100.0%
Total use of non-renewable primary energy resources	MJ %	26 935 80.5%	1 781 5.3%	2 044 6.1%	2 688 8.0%	33 448 100.0%
Use of secondary material	kg %	70 34.3%	0 0.0%	134 65.7%	0 0.0%	204 100.0%
Use of renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of non-renewable secondary fuels	MJ %	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Use of net fresh water	m3 %	7.2 63.5%	0.4 3.3%	1.6 14.0%	2.2 19.2%	11.4 100.0%

**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

6.2 Potential environmental impact

All information modules are reported separately. However, the total impact across all stages is also presented.

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 8.4.0 Water scarcity potential was calculated using AWARE method (Boulay et al. 2018).

Table 16. Potential environmental impact indicators per metric ton of Columns and Beams

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 %	4.07E-02 99.1%	1.88E-04 0.5%	1.87E-04 0.5%	4.11E-02 100.0%	Modules not declared
Abiotic depletion (fossil fuels)	MJ %	23 296 81.4%	1 661 5.8%	3 669 12.8%	28 627 100.0%	
Global warming (GWP100a)	kg CO2 eq %	1 085 73.2%	105 7.1%	292 19.7%	1 483 100.0%	
Ozone layer depletion (ODP)	kg CFC-11 eq %	1.73E-04 80.1%	1.87E-05 8.7%	2.44E-05 11.3%	2.16E-04 100.0%	
Photochemical oxidation	kg C2H4 eq %	0.85 92.6%	0.02 2.4%	0.05 5.0%	0.91 100.0%	
Acidification	kg SO2 eq %	10.9 88.2%	0.5 4.2%	0.9 7.6%	12.4 100.0%	
Eutrophication	kgPO4^{3-}eq %	2.5 88.1%	0.1 4.2%	0.2 7.7%	2.9 100.0%	
Water scarcity potential	m3eq %	178 36.0%	7 1.5%	310 62.5%	496 100.0%	

* Note: AWARE method sets the maximal characterization factor (i.e. 100) for the geographical location of Ternium Works involved in manufacturing. However, AWARE factor is linked to Ecosystem Water Requirement (EWR) which is calculated at global scale and does not account for specific local aspects due to limited data access. EWR is the most uncertain variable of the method (Boulay et al. 2018).

Figure. 4 Potential environmental impact contribution per metric ton Columns and Beams

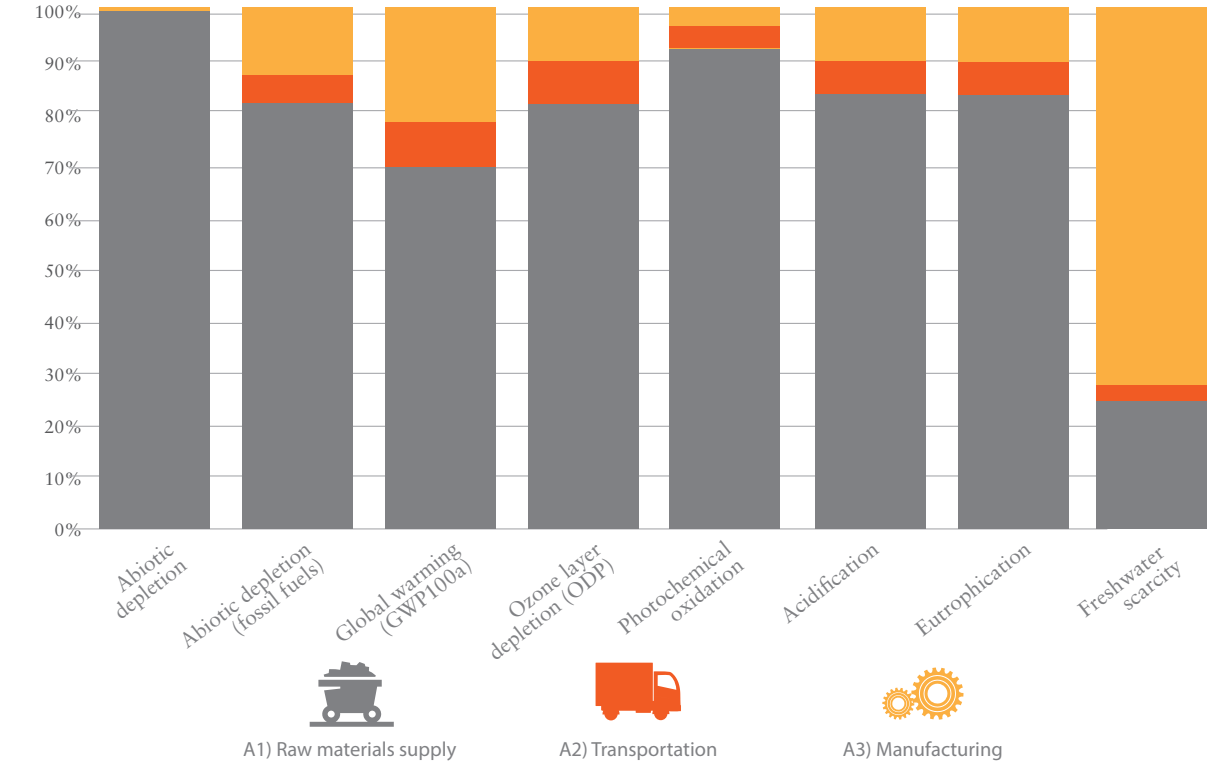


Table 17. Potential environmental impact indicators per metric ton of Wide Bay						
Impact Category	**Unit**	**A1) Raw materials supply**	**A2) Transportation**	**A3) Manufacture**	**Total A1 - A3**	**A4 - A5, B1-B7, C1-C4, D**
Abiotic depletion	kg Sb eq %	4.08E-02 99.5%	1.80E-04 0.4%	4.28E-05 0.1%	4.10E-02 100.0%	
Abiotic depletion (fossil fuels)	MJ %	24 596 79.5%	1 584 5.1%	4 750 15.4%	30 930 100.0%	
Global warming (GWP100a)	kg CO2 eq %	1 179 75.7%	101 6.5%	278 17.9%	1 558 100.0%	
Ozone layer depletion (ODP)	kg CFC-11 eq %	1.82E-04 82.4%	1.78E-05 8.1%	2.11E-05 9.5%	2.21E-04 100.0%	Modules not declared
Photochemical oxidation	kg C2H4 eq %	0.98 94.3%	0.02 2.0%	0.04 3.6%	1.03 100.0%	
Acidification	kg SO2 eq %	11.8 90.3%	0.5 3.8%	0.8 5.9%	13.1 100.0%	
Eutrophication	kgPO4^{3-}eq %	2.6 91.7%	0.1 4.0%	0.1 4.3%	2.9 100.0%	
Water scarcity potential	m3eq %	238 44.9%	7 1.3%	284 53.7%	529 100.0%	

Figure. 5 Potential environmental impact contribution per metric ton Wide Bay

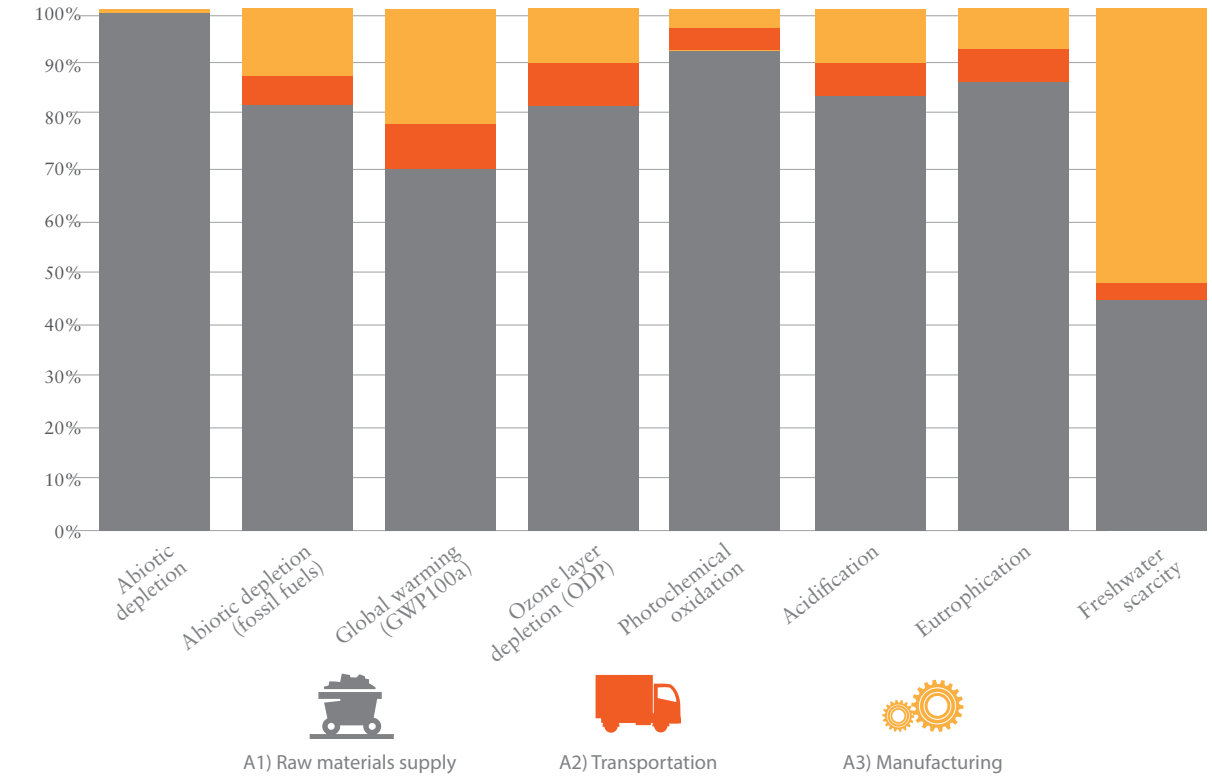


Table 18. Potential environmental impact indicators per metric ton of Studs						
Impact Category	**Unit**	**A1) Raw materials supply**	**A2) Transportation**	**A3) Manufacture**	**Total A1 - A3**	**A4 - A5, B1-B7, C1-C4, D**
Abiotic depletion	kg Sb eq %	5.54E-02 99.4%	1.85E-04 0.3%	1.22E-04 0.2%	5.58E-02 100.0%	
Abiotic depletion (fossil fuels)	MJ %	21 831 81.8%	1 594 6.0%	3 257 12.2%	26 682 100.0%	
Global warming (GWP100a)	kg CO2 eq %	955 71.1%	101 7.6%	286 21.3%	1 342 100.0%	
Ozone layer depletion (ODP)	kg CFC-11 eq %	1.64E-04 77.7%	1.79E-05 8.5%	2.93E-05 13.9%	2.12E-04 100.0%	Modules not declared
Photochemical oxidation	kg C2H4 eq %	0.55 87.0%	0.02 3.4%	0.06 9.6%	0.64 100.0%	
Acidification	kg SO2 eq %	7.2 85.1%	0.5 5.9%	0.8 9.0%	8.5 100.0%	
Eutrophication	kgPO4^{3-}eq %	0.7 73.4%	0.1 11.5%	0.2 15.1%	1.0 100.0%	
Water scarcity potential	m3eq %	27 8.3%	7 2.2%	289 89.5%	323 100.0%	

Figure. 6 Potential environmental impact contribution per metric ton Studs

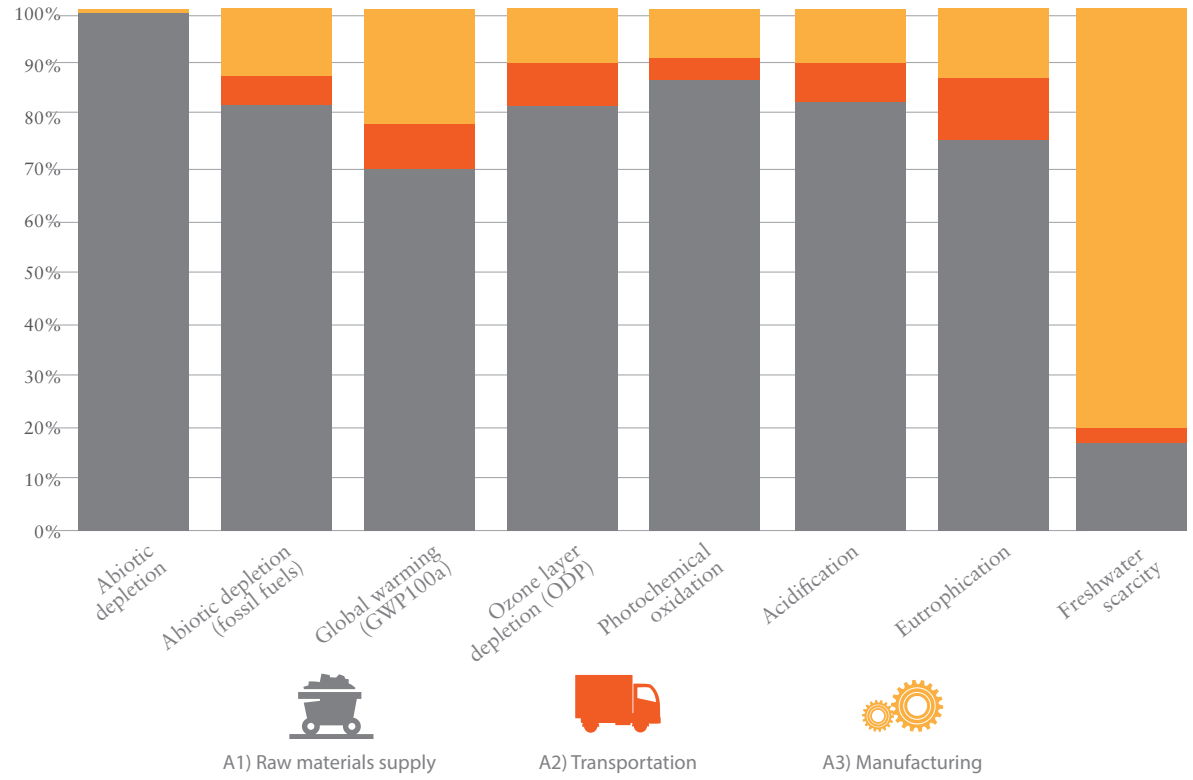
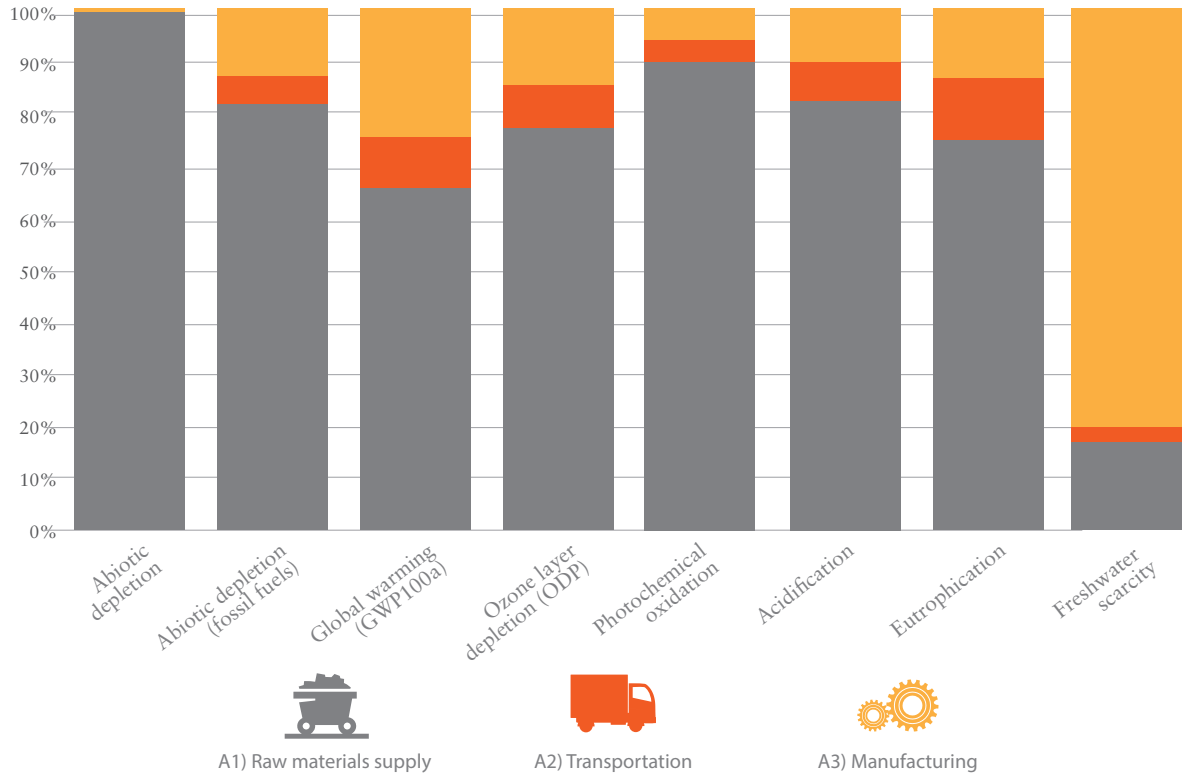


Table 19. Potential environmental impact indicators per metric ton of Panel RIB, SSR cover, moldings or gutters

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	1.99E-01	2.26E-04	1.80E-04	2.00E-01	
	%	99.8%	0.1%	0.1%	100.0%	
Abiotic depletion (fossil fuels)	MJ	26 271	1 751	4 618	32 640	
	%	80.5%	5.4%	14.1%	100.0%	
Global warming (GWP100a)	kg CO2 eq	1 168	112	409	1 689	
	%	69.2%	6.6%	24.2%	100.0%	
Ozone layer depletion (ODP)	kg CFC-11 eq	1.95E-04	1.97E-05	4.43E-05	2.59E-04	Modules not declared
	%	75.3%	7.6%	17.1%	100.0%	
Photochemical oxidation	kg C2H4 eq	0.67	0.02	0.05	0.74	
	%	90.5%	3.2%	6.3%	100.0%	
Acidification	kg SO2 eq	9.1	0.5	1.0	10.7	
	%	85.5%	5.1%	9.4%	100.0%	
Eutrophication	$kgPO4^{3-}eq$	1.2	0.1	0.2	1.5	
	%	78.5%	8.2%	13.3%	100.0%	
Water scarcity potential	m3eq	48	8	347	403	
	%	12.0%	1.9%	86.1%	100.0%	

Figure. 7 Potential environmental impact contribution per metric ton Panel RIB, SSR cover, moldings or gutters



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). The detailed description of the use of resources of Columns and Beams, Wide Bay, Studs and Panel RIB/ cover SSR/molding/gutters are provided in Table 20, Table 21, Table 22 and Table 23.

Table 20. Waste and other outputs per metric ton of Columns and Beams

Parameter	Unit	Total A1-A3	1) Raw materials supply	A2) Transportation	A3) Manufacturing (direct)**	A3) Manufacturing (Indirect)**
Hazardous waste	kg	25.2	6.2	1.01E-03	18.9	7.16E-03
	%	100.0%	24.7%	0.0%	75.2%	0.0%
Non hazardous waste	kg	180	66	108	0.00E+00	6
	%	100.0%	36.9%	60.0%	0.0%	3.2%
Radioactive waste*	kg	0.04	2.35E-02	1.05E-02	0	3.75E-03
	%	100.0%	62.2%	27.8%	0.0%	9.9%
Components for reuse	kg	0.00	0	0	0	0
	%	0%	0%	0%	0%	0%
Materials for recycling	kg	71.7	70.1	0.0	1.6	0.0
	%	100.0%	97.8%	0.0%	2.2%	0.0%
Materials for energy recovery	kg	0.73	0.04	0.00	0.68	0.00
	%	100.0%	5.9%	0.0%	94.1%	0.0%
Exported energy	kg	0	0	0	0	0
	%	0%	0%	0%	0%	0%

*No radioactive waste is produced during Ternium Mexico operation.
**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 21. Waste and other outputs per metric ton of Wide Bay

Parameter	Unit	Total A1-A3	1) Raw materials supply	A2) Transportation	A3) Manufacturing (direct)**	A3) Manufacturing (Indirect)**
Hazardous waste	kg	10.3	6.1	9.67E-04	4.2	0.0
	%	100.0%	59.0%	0.0%	41.0%	0.0%
Non hazardous waste	kg	185	81	102	0.00E+00	2
	%	100.0%	43.7%	55.1%	0.0%	1.2%
Radioactive waste*	kg	0.04	2.61E-02	1.00E-02	0	1.91E-03
	%	100.0%	68.6%	26.4%	0.0%	5.0%
Components for reuse	kg	0.00	0	0	0	0
	%	0%	0%	0%	0%	0%
Materials for recycling	kg	68.5	68.5	0.0	0.0	0.0
	%	100.0%	99.9%	0.0%	0.1%	0.0%
Materials for energy recovery	kg	0.64	0.04	0.00	0.59	0.00
	%	100.0%	6.6%	0.0%	93.4%	0.0%
Exported energy	kg	0	0	0	0	0
	%	0%	0%	0%	0%	0%

*No radioactive waste is produced during Ternium Mexico operation.
**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 22. Waste and other outputs per metric ton of Studs						
Parameter	Unit	Total A1-A3	1) Raw materials supply	A2) Transportation	A3) Manufacturing (direct)**	A3) Manufacturing (Indirect)**
Hazardous waste	kg	11.1	6.0	9.73E-04	5.1	2.03E-02
	%	100.0%	53.9%	0.0%	45.9%	0.2%
Non hazardous waste	kg	141	36	102	1.45E-01	3
	%	100.0%	25.7%	72.0%	0.1%	2.2%
Radioactive waste*	kg	0.03	1.84E-02	1.01E-02	0	4.25E-03
	%	100.0%	56.2%	30.8%	0.0%	13.0%
Components for reuse	kg	0.00	0	0	0	0
	%	0%	0%	0%	0%	0%
Materials for recycling	kg	80.2	67.1	0.0	13.1	0.0
	%	100.0%	83.7%	0.0%	16.3%	0.0%
Materials for energy recovery	kg	1.74	0.04	0.00	1.70	0.00
	%	100.0%	2.4%	0.0%	97.6%	0.0%
Exported energy	kg	0	0	0	0	0
	%	0%	0%	0%	0%	0%

*No radioactive waste is produced during Ternium Mexico operation.
**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

Table 23. Waste and other outputs per metric ton of Panel RIB, Roof (cover) SSR, moldings and gutters						
Parameter	Unit	Total A1-A3	1) Raw materials supply	A2) Transportation	A3) Manufacturing (direct)**	A3) Manufacturing (Indirect)**
Hazardous waste	kg	12.8	6.2	1.08E-03	6.7	3.09E-03
	%	100.0%	48.0%	0.0%	52.0%	0.0%
Non hazardous waste	kg	156	44	107	2.17E-02	4
	%	100.0%	28.4%	68.9%	0.0%	2.7%
Radioactive waste*	kg	0.05	2.16E-02	1.10E-02	0	1.25E-02
	%	100.0%	47.9%	24.4%	0.0%	27.7%
Components for reuse	kg	0.00	0	0	0	0
	%	0%	0%	0%	0%	0%
Materials for recycling	kg	127	69	0	59	0
	%	100.0%	54.0%	0.0%	46.0%	0.0%
Materials for energy recovery	kg	2.87	0.04	0.00	2.83	0.00
	%	100.0%	1.5%	0.0%	98.5%	0.0%
Exported energy	kg	0	0	0	0	0
	%	0%	0%	0%	0%	0%

*No radioactive waste is produced during Ternium Mexico operation.
**The column "A3) Manufacturing (direct) refers to direct data from Ternium operations. The column "A3) Manufacturing (indirect) refers to background data regarding production of ancillary materials and other processes outside Ternium's facilities".

6.4 Additional environmental information

All the Industrial centers of Ternium Mexico related to the manufacturing process are certified with ISO 14001:2015 and most of them also have the Clean Industry Governmental Award.
Also, an environmental policy is kept in practice in all industrial centers of the company in Mexico.
All the industrial centers of Ternium Mexico related to the manufacturing process send a portion of hazardous waste to energy recovery.

Facility	Fraction of waste to energy recovery
Churubusco	4%
Guerrero	40%
Juventud	69%
Pesquería	4%
Universidad	20%

Ternium's Certifications

Environment
Ternium plants in Mexico participate in the National Voluntary Environmental Audit Program of the PROFEPA (Federal Attorney for Environmental Protection), thereby ensuring that during the manufacturing processes, compliance with the provisions of current environmental regulations is met.
Likewise, the Environmental Management System of the Ternium Plants that participate in the manufacture are certified under standard ISO 14001:2015

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 specifies records for the proper operation, maintenance and control of facilities, as well as for the handling of substances.

Quality

In order 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 or ISO/TS 16949:2009 quality standards, 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 physical integrity and occupational health of all the personnel, Ternium Plants that participate in the manufacture have a Health & Safety Management System certified under the OHSAS 18001 standard.

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. Also, 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).

In 2018 Ternium won the Sustainability Champions Award. This recognition was granted for its work in favor of sustainability.

7. Verification and registration

Programme:	International EPD® System www.environdec.com EPD registered through the fully aligned regional programme/hub: EPD Latin America www.epd-americalatina.com
Programme 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-01429
Date of publication (issue):	2019-07-01
Date of validity:	2024-06-26
Date of revision:	2019-06-27
Reference year of data:	2017
Geographical scope:	Mexico
Product group classification:	Central Product Classification: CPC 38702 Prefabricated buildings, of metal.
PCR:	2012:01 Construction products and construction services Version 2.3
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: Approved by:	Rubén Carnerero Acosta 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. Contact information

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LCA study: Análisis de ciclo de vida de productos estructurales para edificios metálicos fabricados por Ternium México.

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9. References

Boulay AM, Bare J, BeniniL, Berger M, Lathuillière MJ, Manzardo A, Margni M, Motoshita M, Núñez M, Valerie-Pastor A, Ridoutt B, Oki T, Worbe S, P¬ster S (2018) The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE). The International Journal of Life Cycle Assessment. Volume 23, Issue 2, pp 368–378. https://doi.org/10.1007/s11367-017-1333-8.

EN 15804:2012+A1:2013 (Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products).

EPD International (2018) Construction products and construction services. 2012:01 Version 2.3 2018-11-15. www.environdec.com.

EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com.

Frischknecht R, Jungbluth N, Althaus HJ, Bauer C, Doka G, Dones R, Hischier R, Hellweg S, Humbert S, Köllner T, Loerincik Y, Margni M, Nemecek T (2007) Implementation of Life Cycle Impact Assessment Methods Data v2.0. ecoinvent report No. 3. Swiss Centre for Life Cycle Inventories, Dübendorf.

Guinee JB, Marieke G, Heijungs R, Huppes G, Kleijn R, van Oers L, Wegener S, Suh S,Udo de Haes HA, de Bruijn H, van Duin R, Huijbregts MAJ (2001). Handbook on Life Cycle Assessment, Operational guide to the ISO standards Volume 1, 2a, 2b and 3. Springer Netherlands. DOI 10.1007/0-306-48055-7. Series ISSN 1389-6970

Hauschild M, Potting J (2005) Spatial differentiation in Life Cycle impact assessment - The EDIP2003 methodology. Institute for Product Development Technical University of Denmark.

Huijbregts MAJ, Steinmann ZJN, Elshout PMF, Stam G, Verones F, Vieira M, Zijp M, Hollander A, van Zelm R. ReCiPe2016: a harmonised life cycle impact assessment method at midpoint and endpoint level. International Journal on Life Cycle Assessment Volume 22 Issue 2. pp 138-147. https://-doi.org/10.1007/s11367-016-1246-y

Martínez A, Chargoy JP, González M, Luque C, Vulling M, Hernández M, Guerrero MR, Rechy L (2019) Análisis de ciclo de vida de productos estructurales para edificios metálicos fabricados por Ternium México. Centro de Análisis de Ciclo de Vida y Diseño Sustentable (CADIS). México.

UN (2015) Central Product Classification (CPC) Version 2.1. Department of Economic and Social Affairs. Statistics Division. United Nations, New York.

Wegener AS, van Oers L, Guinée JB, Struijs J, Huijbregts MAJ (2008) Normalisation in product life cycle assessment: An LCA of the global and European economic systems in the year 2000. Science of The Total Environment. Volume 390, Issue 1. Pages 227-240. ISSN 0048-9697. https://doi.org/10.1016/j.scitotenv.2007.09.040.

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