



THE INTERNATIONAL EPD® SYSTEM



Insulated Steel Panels

Ternium Multytecho, Ternium Multymuro, Ternium Econotecho, Ternium Economuro, Ternium Arkirib and Ternium Galvatecho

Environmental Product Declaration

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

“EPD of multiple products, based on the average results of the product group”

Programme: The International EPD® System
EPD registered through the fully aligned regional programme/ hub:
Latin American Hub, www.epd-latinamerica.com
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Programme operator: EPD® Latin America
EPD International AB

Regional Hub:
Latin American Hub of the International
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Geographical scope: México



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.

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 the product category of construction products. The Central Product Classification is CPC 4299 Other metal goods.

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 México

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 20 productive centers in Argentina, Brazil, Colombia, Guatemala, México, 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 15.4 million tons, Ternium's shares are listed and traded on the New York Stock Exchange.



2. General information

Product:	Ternium Panel
Declaration owner:	<p>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</p>
Description of the construction product:	<p>Insulating steel panels for prefabricated roofs and walls composed of a core of rigid polyurethane foam and two faces of Ternium steel. Ternium insulated – steel panels covered in this EPD are: Ternium Multytecho, Ternium Multymuro, Ternium Econotecho, Ternium Economuro, Ternium Arkirib y Ternium Galvatecho.</p>
Declared Unit:	<p>1 m² of insulated steel panel manufactured by Ternium México.</p>
Construction product identification:	<p>Central Product Classification: CPC 4299 Other metal goods.</p>
Main product components:	<p>75% in weight steel, 25% in weight rigid polyurethane foam.</p>
Life cycle stages not considered:	<p>The modules: A4, A5, B1, B2, B3, B4, B5, B6, B7.</p>
Statement content:	<p>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.</p> <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:	<p>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.</p>
For more information consult:	<p>mx.ternium.com</p>
Site for which this EPD is representative:	<p>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, Santa María La Floreña, Pesquería (66601) Nuevo León (+52) 81 88652828 Industrial Center: Ave. Universidad 992 Nte. Colonia Cuauhtémoc, San Nicolás de los Garza (66450) 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.</p>
Intended Public:	<p>B2B (Business to Business)</p>

2. General information

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 30, 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: Elena Rosa Domínguez, Andrea Solano 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 description

The results within this EPD reflect the average results of all investigated products, thus this EPD is valid for multiple products.

3.1 Ternium Multytecho

Insulating panel for prefabricated roofs consisting of a core of rigid polyurethane foam and two faces of painted steel sheet manufactured by Ternium México.

Ternium Multytecho is designed for roofs of a wide variety of applications. It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi, thousands of pounds per square inch).

The available colors are Standard Polyester White and Duraplus or Standard Polyester Sand and Duraplus.

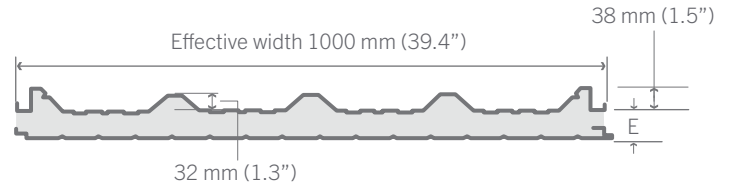
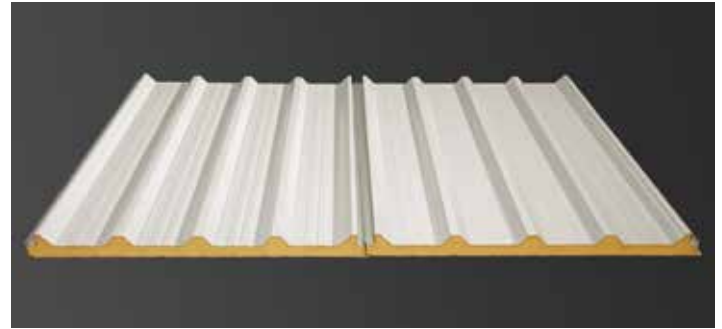


Table 1. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Multytecho	25.4, 38.1, 50.8, 63.5, 76.2, 101.6, 127.0, 152.0 (1", 1.5", 2", 2.5", 3", 4", 5" and 6")	26	Smooth or embossed	26	Smooth or embossed
				28	Embossed

Table 2. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26	Weight (aprox.) kg/m ² Caliber 26/28
	R hrFT ² °F/BTU	U BTU/hrFT ² °F		
25.4 (1.0")	6.67	0.150	10.02	9.38
38.1 (1.5")	10	0.100	10.52	9.88
50.8 (2.0")	13.33	0.075	10.91	10.27
63.5 (2.5")	16.67	0.060	11.39	-
76.2 (3.0")	20.00	0.050	11.88	-
101.6 (4.0")	26.67	0.038	12.84	-
127 (5.0")	33.33	0.03	13.80	-
152.4 (6.0")	40.00	0.025	14.85	-

3. The product description

3.2 Ternium Multymuro

Insulating panel to meet the most demanding specifications for its lateral connection that provides excellent tightness. It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi). The available colors are Standard Polyester White and Duraplus or Standard Polyester Sand and Duraplus.

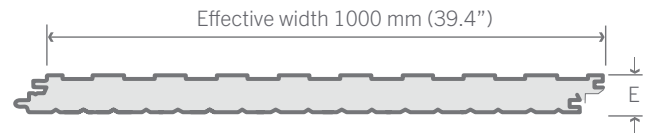


Table 3. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Multymuro Micro V	38.1, 50.8, 63.5,	26	Smooth or embossed	26	Smooth or embossed
Ternium Myltymuro Mesa	76.2, 101.6, 127.0,	26	Smooth or embossed	26	
Ternium Multymuro Stuko	152.0 (1.5", 2", 2.5", 3", 4", 5" and 6")	26	Stucco	26	

Table 4. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26
	R hrFT ² °F/BTU	U BTU/hrFT ² °F	
38.1 (1.5")	9.89	0.101	10.09
50.8 (2.0")	13.33	0.075	10.77
63.5 (2.5")	16.78	0.060	11.25
76.2 (3.0")	20.13	0.050	11.73
101.6 (4.0")	26.85	0.037	12.7
127 (5.0")	37.31	0.027	13.66
152.4 (6.0")	44.78	0.022	14.63
38.1 (1.5")	9.89	0.101	10.09

3. The product description

3.3 Ternium Econotecho

Insulating panel for roofs with low internal appearance requirements and lower structural strength, manufactured with the external face of steel and the inner face of vinyl. It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi). The available colors are Standard Polyester White and Duraplus or Standard Polyester Sand and Duraplus.

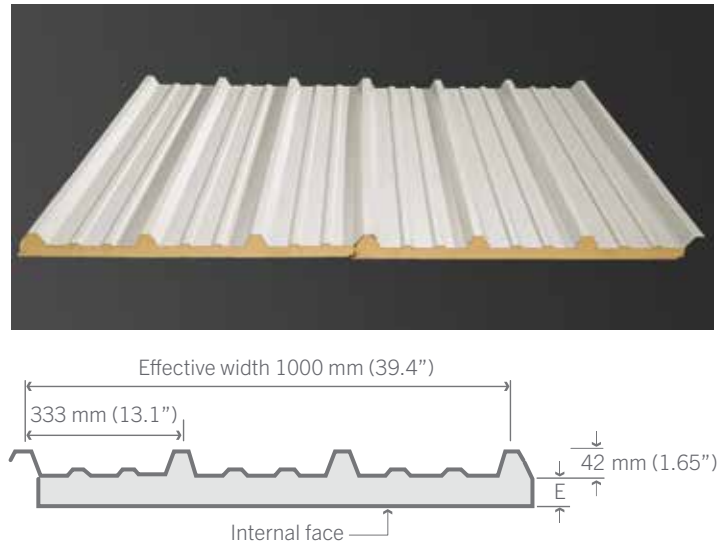


Table 5. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face presentation
Ternium Econotecho	25.4, 38.1, 50.8 (1\", 1.5\" and 2\")	26	Smooth or embossed	White vinyl

Table 6. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26
	R hrFT ² °F/BTU	U BTU/hrFT ² °F	
25.4 (1.0\")	6.67	0.150	6.10
38.1 (1.5\")	10.00	0.100	6.61
50.8 (2.0\")	13.33	0.075	7.00

3. The product description

3.4 Ternium Economuro

Insulating panel for prefabricated walls, which is produced in a continuous process. It is composed of a core of rigid polyurethane foam, an outer face of Ternium Pintro steel and a white interior lamination core of white vinyl with reinforcement mesh. This product is designed for walls of low specification constructions. It is used in liners and industrial warehouses that do not require structural capacity.

It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi). The available colors are Standard Polyester White and Duraplus or Standard Polyester Sand and Duraplus.

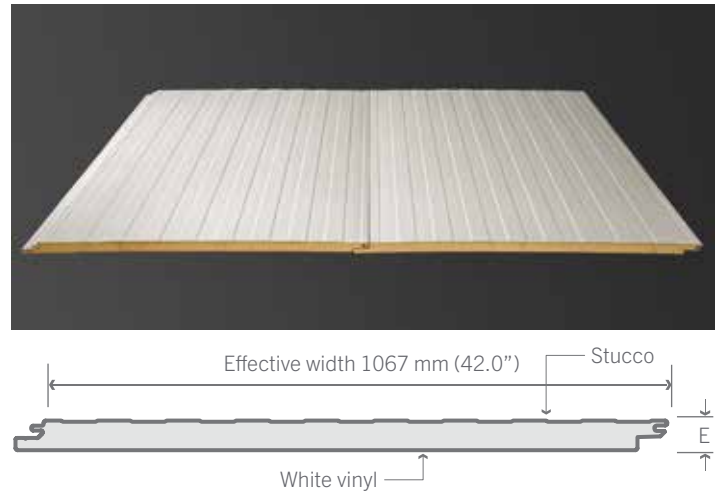


Table 7. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Economuro	38.1, 50.8 (1.5" and 2")	26	Embossed Stucco	Vinyl	Smooth

Table 8. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26
	R hrFT ² °F/BTU	U BTU/hrFT ² °F	
38.1 (1.5")	10.00	0.100	6.64
50.8 (2.0")	13.33	0.075	7.14

3. The product description

3.5 Ternium Arkirib

Insulating panels for architectural applications due to its appearance and finish. It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi).

Available colors

- Standard White Polyester
- Duraplus and Flurocarbon
- Standard Polyester Sand - Duraplus
- Flurocarbon
- Standard Poly-Polyester.

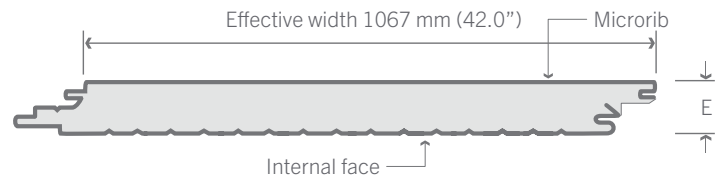
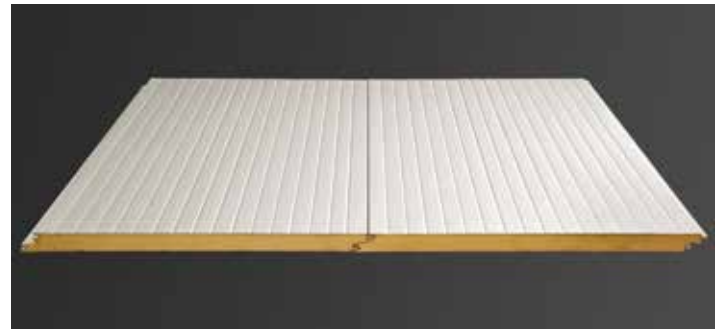


Table 9. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Arkirib	2"	24	Smooth or embossed	26	Smooth

Table 10. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26
	R hrFT ² °F/BTU	U BTU/hrFT ² °F	
50.8 (2.0")	14.93	0.067	11.89

3. The product description

3.6 Ternium Galvatecho

Insulating panels for roofs of all types of construction. Its overlap panel-panel union makes it efficient in construction times in general. It is manufactured with the Ternium Pintro product with a structural steel grade SS37 with elastic limit (Fy) equal to 255 MPa (37 ksi).

Available colors

- Standard Polyester White and Duraplus
- Standard Polyester Sand and Duraplus.

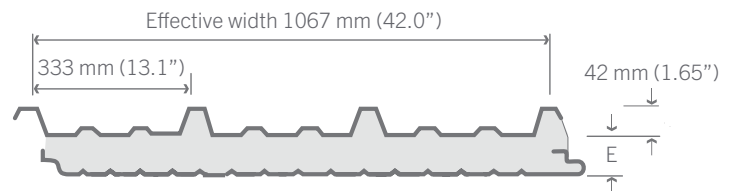
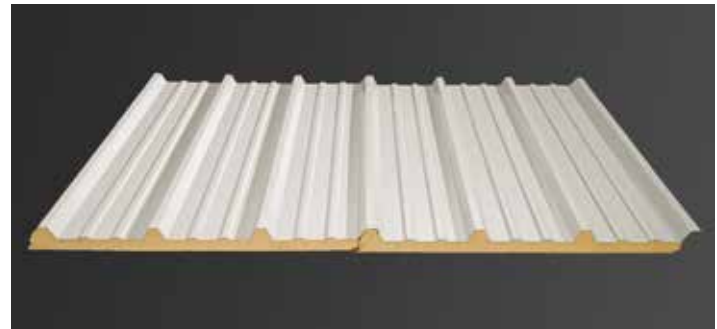


Table 11. Product characteristics.

Product	Thickness mm (in.)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Galvatecho	25.4, 38.1, 50.8, 63.5, 76.2, 101.6 (1", 1.5", 2", 2.5", 3" and 4")	26	Smooth or embossed	26 28	Smooth or embossed Embossed

Table 12. Product properties.

Thickness mm (in.)	Heat transfer coefficient		Weight (aprox.) kg/m ² Caliber 26/26	Weight (aprox.) kg/m ² Caliber 26/28
	R hrFT ² °F/BTU	U BTU/hrFT ² °F		
25.4 (1.0")	6.67	0.150	9.87	9.45
38.1 (1.5")	10.00	0.100	10.38	9.96
50.8 (2.0")	13.33	0.075	10.88	10.35
63.5 (2.5")	16.78	0.060	11.39	10.83
76.2 (3.0")	20.13	0.050	11.9	11.31
101.6 (4.0")	26.85	0.037	12.92	12.28

4. Content declaration

Table 13 presents the product content declaration of Insulated Steel Panels, including the biogenic carbon content, the properties of hazardous substances according to the Candidate List of Substances of High Concern according to the European Chemicals Agency (ECHA) and the recycled material content for Insulated Steel Panels by Ternium México during 2022.

It should be noted that the packaging is not reported because the products are delivered according to customer requirements, which is different for each customer, which is why they were not considered for the LCI.

Table 13. Composition of Insulated Steel Panels manufactured by Ternium México.

Product components	Weight (kg)	Weight (%)	Chemical substances	CAS number	Function of the substance	Health class ¹	Post-consumer recycled material (%)	Biogenic material (kg)	Biogenic material (kg C/product)
Galvanized painted steel	8.09E+00	74.91%	Steel, Zinc, paint	Not applicable	Structural	Data lacking	33%	0	0
Adhesive	7.11E-03	0.07%	Adhesive	Not applicable	Adherent	Not listed	0	0	0
Isocyanate	2.09E-03	0.02%	Polymethylene polyphenyl polyisocyanate	9016-87-9	Rigid polyurethane foam component	Not listed	0	0	0
Polyol	1.57E+00	14.55%	Polyol	154397-82-7	Rigid polyurethane foam component	Not listed	0	0	0
Resin	2.27E-01	2.10%	Tris (1-chloro-2-propyl) phosphate	13674-84-5	Rigid polyurethane foam component	Not listed	0	0	0
Blowing Agent	8.95E-01	8.29%	1,1,1,2-Tetra uoroethane	811-97-2	Blowing Agent	Not listed	0	0	0

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

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. Distribution packaging

Table 14. Packaging material used for 1m² of one square meter of Ternium Panel.

Packaging	Material	Weight (%)	Function
Cardboard	Cardboard	77%	Support
Adhesive tape	Polypropylene	0.3%	Fastening
Plastic strap	Thermoforming of plastic	0.1%	Fastening
Fibreboard	Fibreboard	4%	Support
Plastic film	Low density polyethylene	18%	Steel protection
Containerboard	Cardboard	0.1%	Fastening

6. Biogenic Carbon Content Information

The Insulated Steel Panels don'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. The EPD considers multiple products, so a report based on weighted average results by production quantity was chosen as the option chosen to declare multiple products, within the framework of PCR 2019:14 Construction products. Version 1.3.4.

7.1 Declared unit.

**1 m² of Insulated Steel Panels
manufactured in 2022 by
Ternium México.**

7.2 System boundary

The potential environmental impacts were calculated through Life Cycle Assessment (LCA) methodology of Insulated Steel Panels 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 México (see Table 15).

Does not include A4-A5 Construction stage and B Usage stage.

7. LCA Rules

Table 15. System boundary of Insulated Steel Panels.

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				
	A2) Transport	Mandatory	Mandatory	Mandatory	Mandatory
	A3) Manufacture				
A4-A5 Construction stage	A4) Transport		Optional for goods		
	A5) Construction / installation	-	Required for services	Mandatory	Mandatory
B Usage stage	B1) Use				
	B2) Maintenance				
	B3) Reparation				
	B4) Replacement	-	Optional	Mandatory	Mandatory
	B5) Remodeling				
	B6) Operational energy use				
	B7) Operational water use				
C End of life stage	C1) Deconstruction, demolition				
	C2) Transport	Mandatory	Mandatory	Mandatory	Optional
	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. LCA Rules

Table 16. 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		61%		-	-	-	-	-	-	-	-	-	-	-	-	-
Site variation**		<10%		-	-	-	-	-	-	-	-	-	-	-	-	-

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

* The consumption of slabs comes only from Ternium.

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

Table 17. Variation of the main indicators in A-C.






Basic category impacts	Unit	Variation
Climate change-GWP	kg CO ₂ eq	61.45%
Climate change- Total	kg CO ₂ eq	61.22%
Climate change- Fossil	kg CO ₂ eq	61.52%
Climate change- Biogenic	kg CO ₂ eq	65.17%
Climate change - Land use and LU change	kg CO ₂ eq	58.44%
Ozone depletion	kg CFC11 eq	68.16%
Acidification	mol H ⁺ eq	58.61%
Photochemical ozone formation	kg NMVOC eq	58.13%
Eutrophication, freshwater	kg P eq	54.88%
Eutrophication, marine	kg N eq	56.74%
Eutrophication, terrestrial	mol N eq	57.61%
Resource use, fossils	MJ	64.22%
Resource use, minerals and metals	kg Sb eq	56.86%
Water use	m ³ depriv.	67.79%

7. LCA Rules

7.3 Description of information modules

In Table 18 the description of information modules is included.

Table 18. Description of information modules included in this EPD.

				
A1) RAW MATERIALS	A2) TRANSPORTATION	A3) MANUFACTURING	C) END OF LIFE	D) BENEFITS AND CHARGES BEYOND THE SYSTEM BOUNDARIES
<ul style="list-style-type: none"> • Raw materials production and consumption. • Electricity generation and consumption. • Generation and distribution of the natural gas consumed in manufacturing. 	<ul style="list-style-type: none"> • Transportation of raw materials from the production site to each of the Ternium México Plants involved in the production process of Insulated Steel Panels, including the transportation of scrap from local, national and imported suppliers. • Fuels consumption related to Internal transportation. 	<ul style="list-style-type: none"> • Water consumption. • Production of auxiliary inputs. • Emissions to air. • Emissions to water. • Generation and treatment of waste. • Transportation of waste to final disposal sites or recycling sites. 	<ul style="list-style-type: none"> • Demolition • Transport final destination. • What can be recycled. • What goes to landfill what is wasted and not recycled. 	<ul style="list-style-type: none"> • The avoided loads, benefits of stopping producing Steel with virgin material.

7. LCA Rules

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, 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).

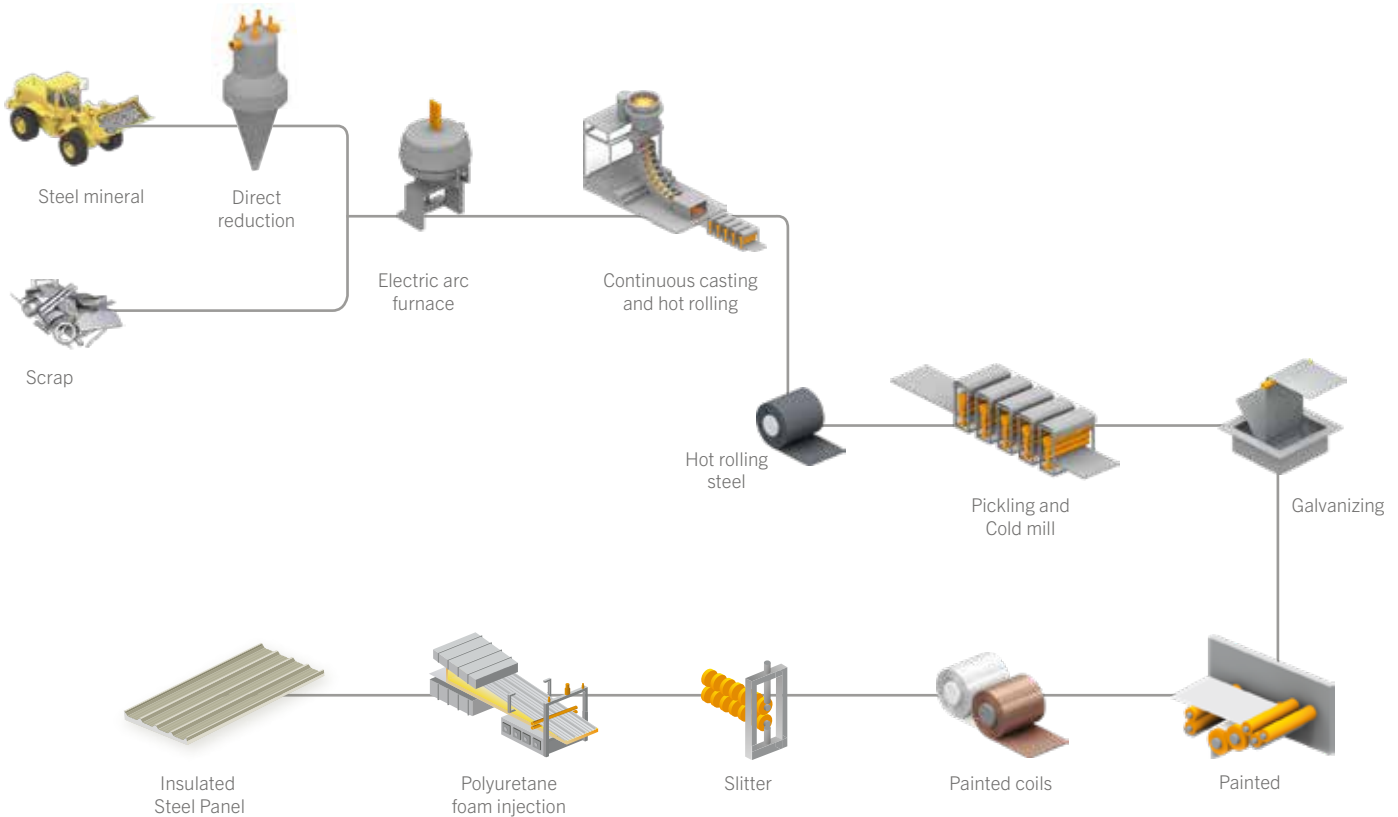
In this life cycle stage includes fuel consumption for deconstruction. Waste transportation to recycling and sanitary landfill. Waste processing of deconstruction 98% per 10.80 kg of coating steel for recycling and waste disposal of 2% coating steel and 100% of polyurethane in sanitary landfill.

Resource recovery stage (module D).

The avoided loads and benefits of stopping the production of steel with virgin material are evaluated and compared with producing steel with recycled material.

The manufacturing process of Insulated Steel Panels is shown in Figure 1 and is described below: The Insulated Steel Panels is manufactured in the Panel lines 1 and 2 of the Juventud Plant, located in the municipality of San Nicolás de los Garza, state of Nuevo León. The production process, considered in this EPD as the core process, is identical in the two Panel lines.

Figure 1. Flow diagram of Insulated Steel Panels manufacturing process.



7. LCA Rules

Unrolling steel

The pre-painted steel is unrolled and a polymer protective film is applied, then it passes through rollers or forming dies to produce the rolled sheet.

Foam injection

The rolled sheet is preheated before the application of the mixture of chemical products, which are pumped from storage tanks to day tanks, where they are mixed in a mixing head by means of dosing pumps, the mixture is added between the 2 sheet leaves. The thickness of the rigid polyurethane foam layer depends on the type of application to be made, wall ceiling or for cold rooms, the dimensions being from 2 to 8 inches thick.

Pressing and curing of foam

The sheets of foil with rigid polyurethane foam are transferred to an oven where the foam is cured and pressed, giving rise to the product called “Panel”.

Cutting dimensioning and packaging

Subsequently the panel goes to cut size and packaging.

7.5 Assumptions

The assumption related to the Insulated Steel Panels manufacturing process is 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 México 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 refers to inventories related to the manufacturing of raw materials. Generic data is also used for the manufacture of packaging materials, means of transportation, and waste treatment.

7.6 Cut off criteria

All flows of fuel, energy, materials and supplies necessary to produce Insulated Steel Panels 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. LCA Rules

7.7 Allocation

In this study, the first preferred allocation procedure was applied, mentioned in the PCR (PCR, 2024), 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 Insulated Steel Panels were used in the assignment of the input and output flows of the LCI. The quantity corresponding to 1 m² of Insulated Steel Panels is 10.80 kg, where 6.11 kg are produced on the Panel 1 line and 4.68 kg on the Panel 2 line.

7.8 Time representativeness

Direct data obtained from Ternium México is representative for 2022, and it was collected during 2023 and 2024.

8. Environmental performance

SimaPro 9.5 and Ecoinvent 3.9.1 were used for Life Cycle Impact Assessment. Potential impacts were calculated using the EN15804+A2 (adapted) V1.0 / EF 3.1 normalization and weighting set method (PRé-Sustainability, 2021).

8.1 Potential environmental impact

The results of the LCIA for the basic categories of 1 m² of Ternium Insulated Steel Panels are presented in Figure 2 and Table 22. The LCIA is shown with the reference substance corresponding to each impact category and the percentage contribution. All information modules are reported and valued separately. However, this EPD presents the full impact at all stages.

Electricity impact

The electricity generation data in México comes from the Ecoinvent 3.9.1 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 adjustments were required to reflect that Ternium México in 2022 also use Electricity from Independent Producers and this one has at least GWP lower emission factors.

Table 19. 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%

As part of the requirements of the PCR, the climate impact as kg CO₂ eq of the electricity used in the manufacturing process of Insulated Steel Panels is reported in Table 20. This impact was calculated using the GWP-GHG indicator.

8. Environmental performance

Table 20. Electricity Global Warming Potential (kg CO₂ eq/kWh).

Type of electricity	Unit	Quantity
Weighted total of electrical energy sources	kg CO ₂ eq	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 1 m² of Insulated Steel Panels. This impact was calculated using the GWP-GHG indicator.

Table 21. Scrap use, Global warming potential.

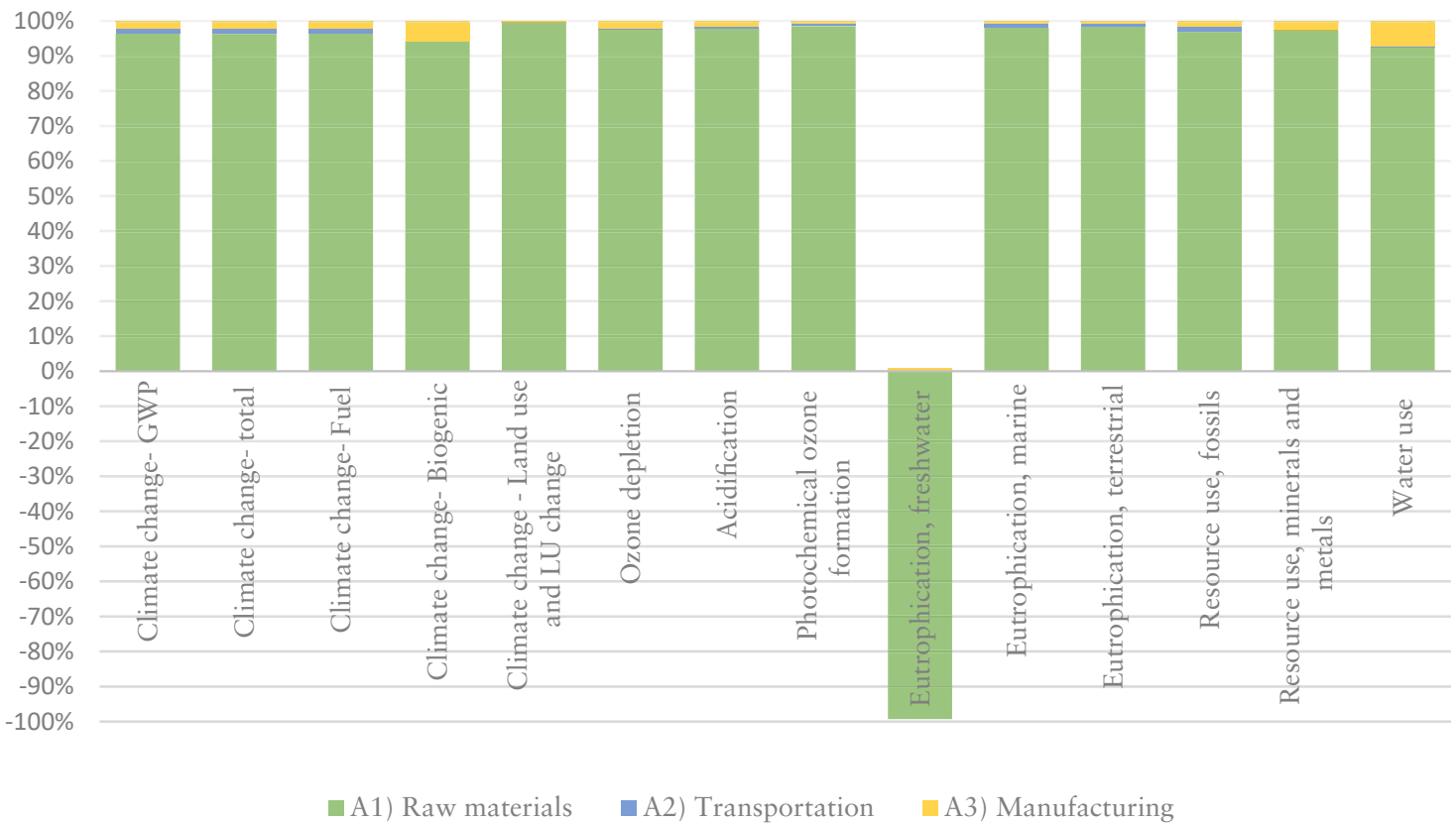
Impact Basic Category	Unit	Quantity
Global warming potential (GWP-GHG) of scrap use	kg CO ₂ eq	2.19E-02

All information modules are reported separately. However, the total impact across all stages is also presented. Parameters describing environmental potential impacts were calculated using EN15804+2 Adapted version 1 (https://eplca.jrc.ec.europa.eu/permalink/EN_15804.zip) as implemented in SimaPro 9.5.

8. Environmental performance

The EICV results for 1 m² of Ternium Insulated Steel Panels are presented in Figure 2 and Table 22 shows the EICV by module and the environmental impact contribution analysis for 1 m² of Ternium Insulated Steel Panels. Module A1 has the highest contribution in all impact categories.

Figure 2. A1-A3 Basic impact categories result of Insulated Steel Panels.



8. Environmental performance

Table 22. A1-A3 Basic impact categories result of Insulated Steel Panels.

Basic Impact categories	Unit	A1) Raw Materials	A2) Transportation	A3) Manufacturing	Total
Climate change- GWP	kg CO ₂ eq	3.56E+019	5.04E-01	8.52E-01	3.69E+01
	%	96.33%	1.37%	2.31%	100%
Climate change- Total	kg CO ₂ eq	3.56E+019	5.04E-01	8.52E-01	3.69E+01
	%	96.33%	1.37%	2.31%	100%
Climate change- Fossil	kg CO ₂ eq	3.54E+019	5.04E-01	8.48E-01	3.67E+01
	%	96.32%	1.37%	2.31%	100%
Climate change - Biogenic	kg CO ₂ eq	5.55E-029	3.17E-05	3.42E-03	5.90E-02
	%	94.14%	0.05%	5.81%	100%
Climate change - Land use and LU change	kg CO ₂ eq	1.42E-019	1.93E-05	8.26E-04	1.43E-01
	%	99.41%	0.01%	0.58%	100%
Ozone depletion	kg CFC11 eq	2.70E-06	7.46E-09	6.22E-08	2.77E-06
	%	97.48%	0.27%	2.25%	100%
Acidification	mol H ⁺ eq	4.10E-01	2.00E-03	6.84E-03	4.19E-01
	%	97.89%	0.48%	1.63%	100%
Photochemical ozone formation	kg NMVOC eq	3.52E-01	2.78E-03	2.55E-03	3.58E-01
	%	98.51%	0.78%	0.71%	100%
Eutrophication, freshwater	kg P eq	-4.21E-03	1.18E-06	2.90E-05	-4.18E-03
	%	100.72%	-0.03%	-0.70%	100%
Eutrophication, marine	kg N eq	7.95E-02	8.17E-04	7.43E-04	8.11E-02
	%	98.08%	1.01%	0.92%	100%
Eutrophication, terrestrial	mol N eq	1.23E+00	8.78E-03	1.03E-02	1.25E+00
	%	98.47%	0.70%	0.83%	100%
Resource use, fossils	MJ	4.69E+02	6.77E+00	8.30E+00	4.84E+02
	%	96.89%	1.40%	1.71%	100%
Resource use, minerals and metals	kg Sb eq	4.29E-04	3.00E-08	1.18E-05	4.41E-04
	%	97.32%	0.01%	2.67%	100%
Water use	m ³ H ₂ O eq	1.08E+01	9.41E-03	8.58E-01	1.17E+01
	%	92.59%	0.08%	7.33%	100%

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.

8. Environmental performance

The results of stages C1-C4 are presented next as well as stage D.

Table 23. Impact assessment of end-of-life scenario.

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- GWP GHG	kg CO ₂ eq	3.70E-01	2.06E-01	0.00E+00	3.56E-01	-1.35E+00
Climate change- Fossil	kg CO ₂ eq	3.70E-01	2.06E-01	0.00E+00	3.55E-01	-1.35E+00
Climate change- Biogenic	kg CO ₂ eq	2.43E-05	1.33E-05	0.00E+00	2.76E-04	1.21E-02
Climate change - Land use and LU change	kg CO ₂ eq	1.51E-05	8.11E-06	0.00E+00	5.43E-05	4.56E-03
Ozone depletion	kg CFC11 eq	5.83E-09	3.12E-09	0.00E+00	4.90E-10	-1.24E-07
Acidification	mol H ⁺ eq	3.54E-03	3.34E-04	0.00E+00	4.18E-04	2.89E-04
Eutrophication, freshwater	kg P eq	3.16E-07	4.94E-07	0.00E+00	1.59E-06	5.23E-04
Eutrophication, marine	kg N eq	1.66E-03	7.74E-05	0.00E+00	3.67E-03	9.53E-04
Eutrophication, terrestrial	mol N eq	1.81E-02	7.74E-04	0.00E+00	1.57E-03	-7.82E-03
Photochemical ozone formation	kg NMVOC eq	5.32E-03	4.77E-04	0.00E+00	5.03E-04	-1.62E-02
Resource use, fossils	MJ	4.87E+00	2.84E+00	0.00E+00	6.69E-01	-9.02E+00
Resource use, minerals and metals	kg Sb eq	1.55E-08	1.26E-08	0.00E+00	8.34E-08	8.06E-06
Water use	m ³ depriv.	6.23E-03	3.95E-03	0.00E+00	5.73E-03	-5.40E+00

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 24 shows the results of the Global warming potential of 1 m² of Insulated Steel Panels evaluated with the IPCC GWP100 method for modules A1-A3 and Table 25 for modules C1-C4 and D.

Table 24. A1-A3. Climate Impact (GWP-GHG) of Insulated Steel Panels.

Impact category	Unit	A1) Raw materials	A2) Transportation	A3) Manufacturing	Total
Climate change- GWP	kg CO ₂ eq	3.56E+01	5.04E-01	8.52E-01	3.69E+01

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 25. C1-C4 and D. Climate Impact (GWP-GHG) of of Insulated Steel Panels.

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	3.70E-01	2.06E-01	0.00E+00	3.56E-01	-1.35E+00

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) 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). A detailed description of the use of resources is provided in Table 26.

Table 26. Use of resources parameters of 1 m² of Insulated Steel Panels.

Use of resources parameters	Units	Total 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	2.75E+01	9.48E-03	4.19E-03	2.26E-02	4.23E-02	1.95E+03
Use of renewable primary energy as raw material (PERM)	MJ	4.36E-02	0.00E+00	0.00E+00	-2.26E-02	0.00E+00	0.00E+00
Total use of renewable primary energy (primary energy and primary energy resources used as feedstock) (PERT)	MJ	2.75E+01	9.48E-03	4.19E-03	0.00E+00	4.23E-02	1.95E+03
Non-renewable primary energy use excluding renewable primary energy resources used as feedstock (PENRE)	MJ	5.08E+02	5.17E+00	3.02E+00	8.17E+00	7.11E-01	-8.95E+00
Use of non-renewable primary energy as raw material (PENRM)	MJ	1.58E+01	0.00E+00	0.00E+00	-8.17E+00	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	5.24E+02	5.17E+00	3.02E+00	0.00E+00	7.11E-01	-8.95E+00
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	3.23E-01	2.42E-04	1.57E-04	0.00E+00	2.09E-04	-9.93E-02

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:

Table 27. Other indicators describe waste categories of Insulated Steel Panels.

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	2.02E-02	3.25E-05	1.91E-05	0.00E+00	2.24E-06	-6.77E-04
Non-hazardous waste**	kg	1.25E+00	3.61E-04	7.26E-04	0.00E+00	3.30E+00	2.29E+00
Radioactive waste***	kg	3.11E-04	2.37E-07	9.97E-08	0.00E+00	7.80E-07	7.12E-05

* Direct indicators from Ternium México process data

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

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

Table 28. Other indicators describe output flows categories of Insulated Steel Panels.

Output parameter	Unit	A1-A3	C1) Deconstruction	C2) Waste transport	C3) Waste treatment	C4) Waste disposal	D) Benefits and charges beyond the system boundary
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	1.54E-06	0.00E+00	0.00E+00	7.66E+00	0.00E+00	7.66E+00
Materials for energy recovery*	kg	2.34E-03	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 México process data

For more information about Insulated Steel Panels, contact the EPD owner who has LCA study of these products.



9. Differences between EPD versions

The previous version of this EPD named Insulated Steel Panels México was published on July 01, 2019, in accordance with PCR 2012:01 Construction products and construction services, Version 2.3 (2018-11-15).

This EPD was updated 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 Chile: Alonso de Ercilla 2996, Ñuñoa, Santiago Chile. México: Bosques de Bohemia 2 No. 9, Bosques del Lago. Cuautitlan Izcalli, Estado de México, México.</p>	
EPD registration number:	EPD-IES-0001426:001 (S-P-01426)	
Date of publication (issue):	2019-07-01	
Date of validity:	2029-12-18	
Date of revision:	2024-12-18	
Reference year of data:	2022	
Geographical scope:	México	
Product group classification:	<p>Central Product Classification: CPC 4219</p> <p>Other structures (except prefabricated buildings) and parts of structures, of iron, and steel; plates, rods, angles, shapes, sections, profiles, tubes and the like, prepared for use in structures, of iron and steel.</p>	
PCR:	PCR 2019:14 construction products, Version 1.3.4 (15804:2012+A2:2019/AC:2021)	
PCR review was conducted by:	<p>Claudia A. Peña, University of Concepción, Chile.</p> <p>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>Ruben 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 checked="" type="checkbox"/> Yes <input 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 ISO45001:2018.

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 México, 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 México (CAMIMEX) and the Environmental Protection Institute of Nuevo León (IPA-NL).

12. Contact information

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LCA Study:
Life Cycle Impact
Assessment Insulated
Steel Panels by
Ternium México
(Report 2024)

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