



## Environmental Product Declaration

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

# Insulated Steel Panels manufactured by Ternium Mexico

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

EPD registered through  
the fully aligned regional  
programme/hub: EPD Latin America, [www.epd-latinamerica.com](http://www.epd-latinamerica.com)

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Revision date: 2019-06-27

Geographical scope: Mexico

# EPD Content

1. Ternium Mexico .....	3
2. General Information .....	4
3. Product Description .....	6
3.1 Ternium Multytecho .....	6
3.2 Ternium Multymuro .....	7
3.3 Ternium Econotecho .....	8
3.4 Ternium Economuro .....	9
3.5 Ternium Arkirib .....	10
3.6 Ternium Galvatecho .....	11
4. Content declaration .....	12
5. LCA Rules .....	13
5.1 Declared unit .....	13
5.2 System boundary .....	13
5.3 Description of the manufacturing process .....	15
5.4 Assumptions .....	16
5.5 Cut-off criteria .....	16
5.6 Allocation .....	16
5.7 Time representativeness .....	17
5.8 Data quality assessment .....	17
6. Environmental performance .....	19
6.1 Use of resources .....	19
6.2 Potential environmental impact .....	20
6.3 Waste production .....	21
6.4 Additional environmental information .....	22
7. Verification and registration .....	24
8. Contact information .....	25
9. References .....	26

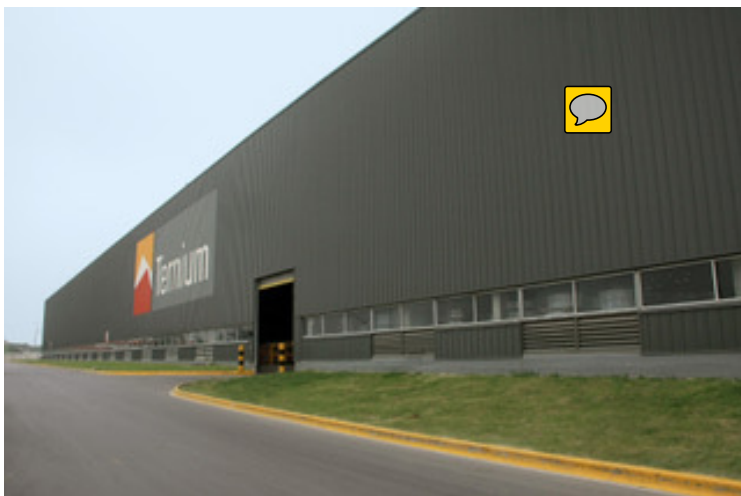
# 1. Ternium Mexico



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:	Insulated Steel Panels
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:	Insulating steel panels for prefabricated roofs and walls composed of a core of rigid polyurethane foam and - two faces of Ternium Pintro® steel. Ternium insulated – steel panels covered in this EPD are: Ternium Multytecho, Ternium Multymuro, Ternium Econotecho, Ternium Economuro, Ternium Arkirib y Ternium Galvatecho.
Declared Unit:	1 m2 of insulated steel panel manufactured by Ternium Mexico
Construction product identification:	Central Product Classification: CPC 4299 Other metal goods
Main product components:	78% in weight Ternium Pintro® steel, 22% in weight rigid polyurethane foam
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: <ul style="list-style-type: none"> <li>• Product definition and physical data.</li> <li>• Information about raw materials and origin.</li> <li>• Specifications on manufacturing the product.</li> <li>• Notes on product processing.</li> <li>• LCA based on a declared unit, cradle-to-gate.</li> <li>• LCA results.</li> <li>• Evidence and verifications.</li> </ul>
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

Intended public:

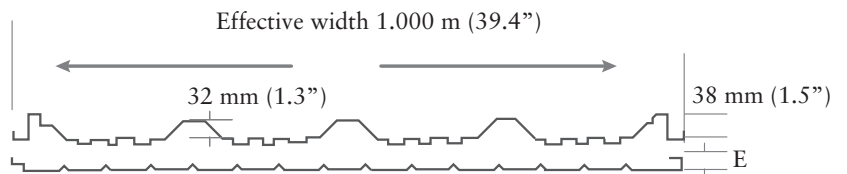
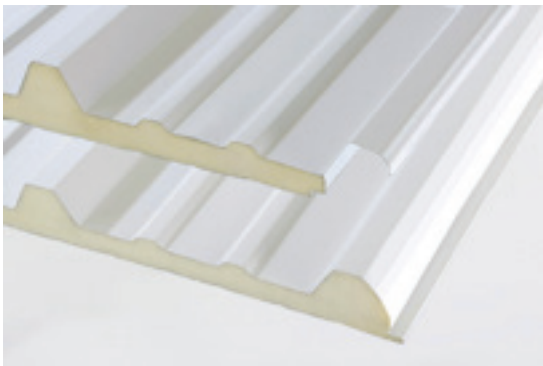
B2B (Business to Business)



# 3. Product Description

## 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 Mexico. 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.



### Product characteristics

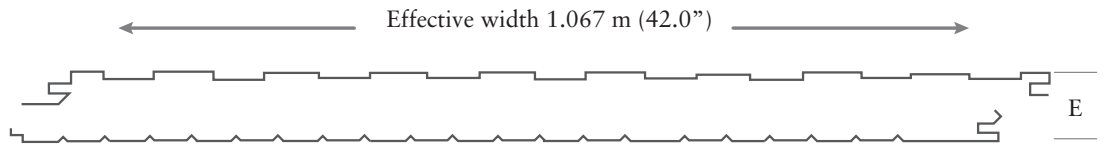
Product	Thickness mm (inch)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Multytecho	25.4, 38.1, 50.8, 63.5, 76.2, 101.6, 127.0, 152.0 (1", 1.5", 2", 2.5", 3", 4", 5" and 6")	26	Smooth or embossed	26 28	Smooth or embossed Embossed

### Product Properties

Thickness mm (inch.)	Heat transfer coefficient		Weight (aprox.) kg/m2 Caliber 26/26	Weight (aprox.) kg/m2 Caliber 26/26
	R, m2K/W (hrFT2 °F/BTU)	U, W/m2K (BTU/hrFT2°F)		
25.4 (1.0")	1.18 (6.67)	0.85 (0.15)	10.02	9.38
38.1 (1.5")	1.75 (10)	0.57 (0.1)	10.52	9.88
50.8 (2.0")	2.33 (13.33)	0.43 (0.075)	10.91	10.27
63.5 (2.5")	2.94 (16.67)	0.34 (0.06)	11.39	-
76.2 (3.0")	3.57 (20)	0.28 (0.05)	11.88	-
101.6 (4.0")	4.55 (26.67)	0.22 (0.038)	12.84	-
127 (5.0")	5.88 (33.33)	0.17 (0.03)	13.80	-
152.4 (6.0")	7.14 (40)	0.14 (0.025)	14.85	-

## 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



### Product characteristics

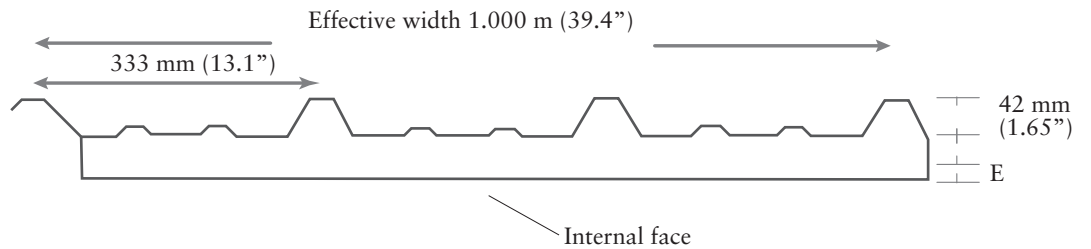
Product	Thickness mm (inch)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Multymuro	38.1, 50.8, 63.5,	26	Smooth or embossed	26	Smooth or embossed
Micro V	76.2, 101.6, 127.0,				
Ternium Myltymuro	152.0 (1.5", 2", 2.5",	26	Smooth or embossed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

### Product Properties

Thickness mm (inch.)	Heat transfer coefficient		Weight (aprox.) kg/m2 Caliber 26/26
	R, m2K/W (hrFT2 °F/BTU)	U, W/m2K (BTU/hrFT2°F)	
38.1 (1.5")	1.75 (9.89)	0.57 (0.101)	10.09
50.8 (2.0")	2.33 (13.33)	0.43 (0.075)	10.77
63.5 (2.5")	2.94 (16.78)	0.34 (0.06)	11.25
76.2 (3.0")	3.57 (20.13)	0.28 (0.05)	11.73
101.6 (4.0")	4.76 (26.85)	0.21 (0.037)	12.7
127 (5.0")	6.67 (37.31)	0.15 (0.027)	13.66
152.4 (6.0")	8.33 (44.78)	0.12 (0.022)	14.63

# 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.



## Product characteristics

Product	Thickness mm (inch)	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

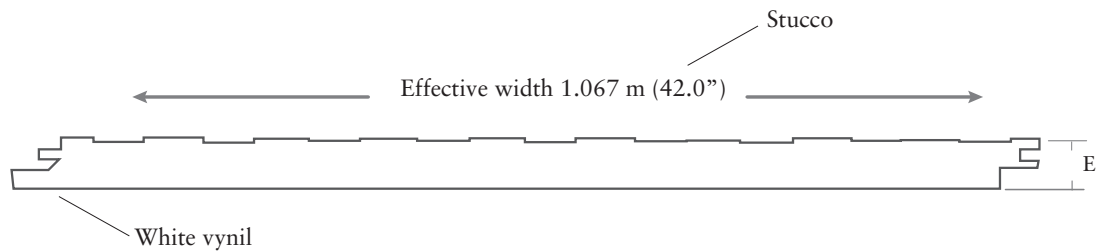
## Product Properties

Thickness mm (inch.)	Heat transfer coefficient		Weight (aprox.) kg/m2 Caliber 26/26
	R, m2K/W (hrFT2 °F/BTU)	U, W/m2K (BTU/hrFT2°F)	
25.4 (1.0")	1.18 (6.67)	0.85 (0.15)	6.10
38.1 (1.5")	1.75 (10)	0.57 (0.1)	6.61
50.8 (2.0")	2.33 (13.33)	0.43 (0.075)	7.00



# 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.



## Product characteristics

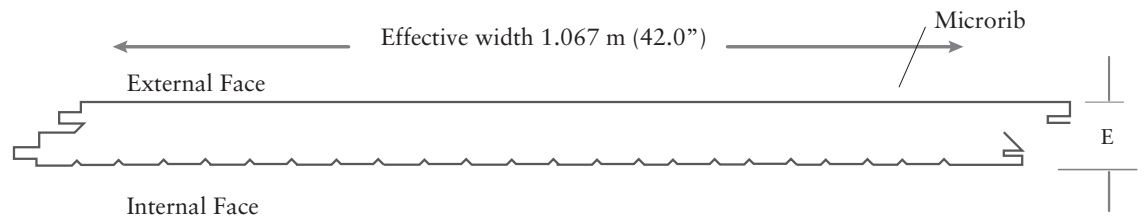
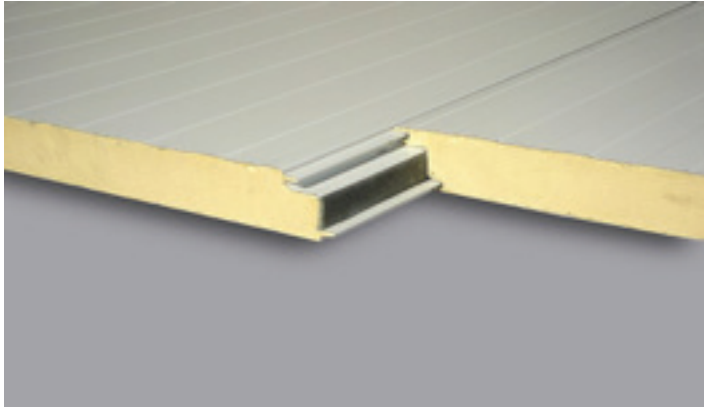
Product	Thickness mm (inch)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Economuro	38.1, 50.8 (1.5" and 2")	26	Embossed Stucco	Vinyl	Smooth

## Product Properties

Thickness mm (inch)	Heat transfer coefficient		Weight (aprox.) kg/m <sup>2</sup> Caliber 26/26
	R, m <sup>2</sup> K/W (hrFT <sup>2</sup> °F/BTU)	U, W/m <sup>2</sup> K (BTU/hrFT <sup>2</sup> °F)	
38.1 (1.5")	1.75 (10)	0.57 (0.1)	6.64
50.8 (2.0")	2.33 (13.33)	0.43 (0.075)	7.14

# 3.5 Ternium Arkirib

Insulating panel 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 are Standard White Polyester, Duraplus and Flurocarbon, Standard Polyester Sand - Duraplus and Flurocarbon and Standard Poly-Polyester.



## Product characteristics

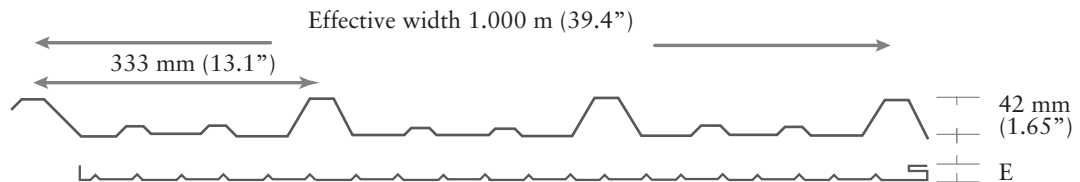
Product	Thickness mm (inch)	External face caliber	External face presentation	Internal face caliber	Internal face presentation
Ternium Arkirib	50.8 (2")	24	Smooth or embossed	26	Smooth or embossed

## Product Properties

Thickness mm (inch.)	Heat transfer coefficient		Weight (aprox.) kg/m <sup>2</sup> Caliber 26/26
	R, m <sup>2</sup> K/W (hrFT <sup>2</sup> °F/BTU)	U, W/m <sup>2</sup> K (BTU/hrFT <sup>2</sup> °F)	
50.8 (2.0")	2.63 (14.93)	0.38 (0.067)	11.89

# 3.6 Ternium Galvatecho

Insulating panel 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 are Standard Polyester White and Duraplus or Standard Polyester Sand and Duraplus.



## Product characteristics

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

## Product Properties

Thickness mm (inch.)	Heat transfer coefficient		Weight (aprox.) kg/m2 Caliber 26/26	Weight (aprox.) kg/m2 Caliber 26/26
	R, m2K/W (hrFT2 °F/BTU)	U, W/m2K (BTU/hrFT2°F)		
25.4 (1.0")	1.18 (6.67)	0.85 (0.15)	9.87	9.45
38.1 (1.5")	1.75 (10)	0.57 (0.1)	10.38	9.96
50.8 (2.0")	2.33 (13.33)	0.43 (0.075)	10.88	10.35
63.5 (2.5")	2.94 (16.78)	0.34 (0.06)	11.39	10.83
76.2 (3.0")	3.57 (20.13)	0.28 (0.05)	11.9	11.31
101.6 (4.0")	4.76 (26.85)	0.21 (0.037)	12.92	12.28

## 4. Content declaration

Table 1. Typical content in one square meter of Ternium Panel

Homogeneous Material or Chemical Substance	Chemical Substances	Weight (%)	CAS Number	Function of Chemical Substance	Health class <sup>1</sup>
Refrigerant R-134a	1,1,1,2-Tetrafluoroethane	1.7%	811-97-2	Blowing agent	Not listed
Isocyanate	Polymethylene polyphenyl polyisocyanate	11.4%	9016-87-9	Rigid polyurethane foam component	Not listed
Polyol	Polyol	0.6%	154397-82-7	Rigid polyurethane foam component	Not listed
Fe 680 Resin	Tris(1-chloro-2-propyl) phosphate	8.0%	13674-84-5	Rigid polyurethane foam component	Not listed
Galvanized painted steel	Steel, Zinc, paint	78.3%	Not applicable	Structural	Data lacking

Table 2. Packaging materials used for one square meter of Ternium Panel

Packaging	Material	Weight (%)	Function
Cardboard	Cardboard (80% post consumer recycled content)	<0.01%	Support
Expanded polystyrene	Expanded Polystyrene	89.70%	Support
Plastic film	Polypropylene	1.20%	Steel protection
Plastic strap	Polypropylene	0.20%	Fastening
Plastic wrap	Polypropylene	8.90%	Fastening

## 5. LCA Rules

Environmental potential impacts were calculated according to EN 15804:2012 and PCR 2015:04 Fabricated products made out of metal composite material (MCM) Version 1.0. 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.

<sup>1</sup> 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](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](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](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)

# 5.1 Declared unit

One square meter of Ternium Panel.




# 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 3.

Table 3. Insulated Steel Panel manufactured by Ternium Mexico product system																Other environmental information
Life cycle environmental information of Insulated Steel Panel manufactured by Ternium Mexico															D	
A1 - A3			A4 - A5		B1 - B7							C1 - C4				Reuse recovery stage
Product stage			Construction process stage		Use stage							End of life 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 square meter of Insulated Steel Panel																

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

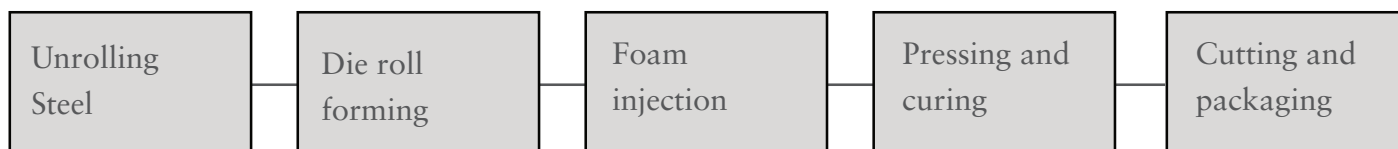
Table 4. Description of information modules included in this EPD.

		
A1) Raw materials supply	A2) Transportation	A3) Manufacturing
<ul style="list-style-type: none"> <li>• Ternium Pintro Steel</li> <li>• Isocyanate</li> <li>• Polyol</li> <li>• Blowing agents</li> <li>• Adhesives</li> <li>• Production of packaging materials for raw materials</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation of raw materials</li> <li>• Transportation of ancillary materials</li> <li>• Internal transportation requirements</li> <li>• Transport of waste to treatment or recycling</li> </ul>	<ul style="list-style-type: none"> <li>• Production of packaging materials</li> <li>• Generation and distribution of electricity consumed in manufacturing</li> <li>• Generation and distribution of natural gas consumed in manufacturing</li> <li>• Fresh water consumption</li> <li>• Production and consumption of ancillary materials: textiles for cleaning and maintenance, lubricating oils and grease</li> <li>• Waste generation and waste management processes</li> <li>• Emissions to air</li> </ul>

## 5.3 Description of the manufacturing process

Ternium Mexico manufactures Panel Ternium 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 and is described in the diagram shown in Figure 1.

Figure. 1. Flow diagram of Insulated Steel Panel manufacturing (core) process



### 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 profile 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.

## 5.4 Assumptions

- 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 that they have the capacity to absorb 55% of their weight.
- Rags and tow used for cleaning, as well as the grease for maintenance are sourced in the same municipality.

## 5.5. Cut-off criteria

A minimum of 99% of the total flows (matter and energy) in modules A1 and A3 modules were included. Company infrastructure, employee's transportation and administrative were kept out of the scope of this study.

## 5.6 Allocation

No allocation procedures were applied since no by-products are obtained during production process of Insulated Steel Panel manufactured by Ternium Mexico.

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 Insulated Steel Panel 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 Mexicanaiah and Ecoinvent 3.3 (Allocation - Recycled Content version) databases were used.



## 5.7 Time representativeness

Direct data obtained from Ternium Mexico is representative for 2017.

## 5.8 Data quality assessment

Data quality assessment per information module is provided in Tables 5, 6 and 7.

Table 5. Raw material supply module data quality assessment					
Data	Time related coverage	Geographic coverage	Technological coverage	Data source	Measured or estimated
Raw materials consumption for Insulated Steel Panel manufacturing.	2017	Mexico	Modern	Ternium Mexico	M
Consumption of raw materials and energy, emissions and transports related to production process of steel used for panel manufacturing	2017	Mexico	Modern	Ternium Mexico	M
Energy and materials consumption and emissions related to the production of other raw materials	1990-2016	Europe	Modern	Ecoinvent 3.3	M&E

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

Table 6. Transport 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
Waste transport distance	2017	Mexico	Modern	Ternium Mexico and Google Maps	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
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

Table 7. 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
Energy consumption for Insulated Steel Panel 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	Mexicanuih	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	Mexicanuih	M&E
Consumption of auxiliary materials and packaging materials during manufacturing.	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
Waste generation during manufacture	2017	Mexico	Modern	Ternium Mexico	M
Consumption of materials and energy and emissions related to waste transport requirements	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

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 is provided in Table 8.

Table 8. Resource Indicators per square meter of Insulated Steel Panel

Parameter	Unit	A1) Raw materials supply	A2) Transportation	A3) Manufacturing		Total A1-A3
				Direct**	Indirect**	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ %	18.7 97.0%	2.39E-02 0.1%	0.0 0.0%	0.5 2.8%	19.3 100.0%
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 %	18.7 97.0%	2.39E-02 0.1%	0.0 0.0%	0.5 2.8%	19.3 100.0%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ %	494.7 93.8%	2.0 0.4%	3.9 0.7%	26.9 5.1%	527.4 100.0%
Use of non-renewable primary energy used as raw materials	MJ %	54.2 100.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	54.2 100.0%
Total use of non-renewable primary energy resources	MJ %	549.0 94.4%	2.0 0.3%	3.9 0.7%	26.9 4.6%	581.7 100.0%
Use of secondary material	kg %	1.90 100.0%	0.00 0.0%	0.00 0.0%	0.00 0.0%	1.90 100.0%
Use of renewable secondary fuels	MJ %	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%
Use of non-renewable secondary fuels	MJ %	0.00 0.0%	0.00 0.0%	0.00 0.0%	0.00 0.0%	0.00 0.0%
Use of net fresh water	m <sup>3</sup> %	0.43 92.4%	3.79E-04 0.1%	0.00E+00 0.0%	0.04 7.5%	0.5 100.0%

\*\*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.

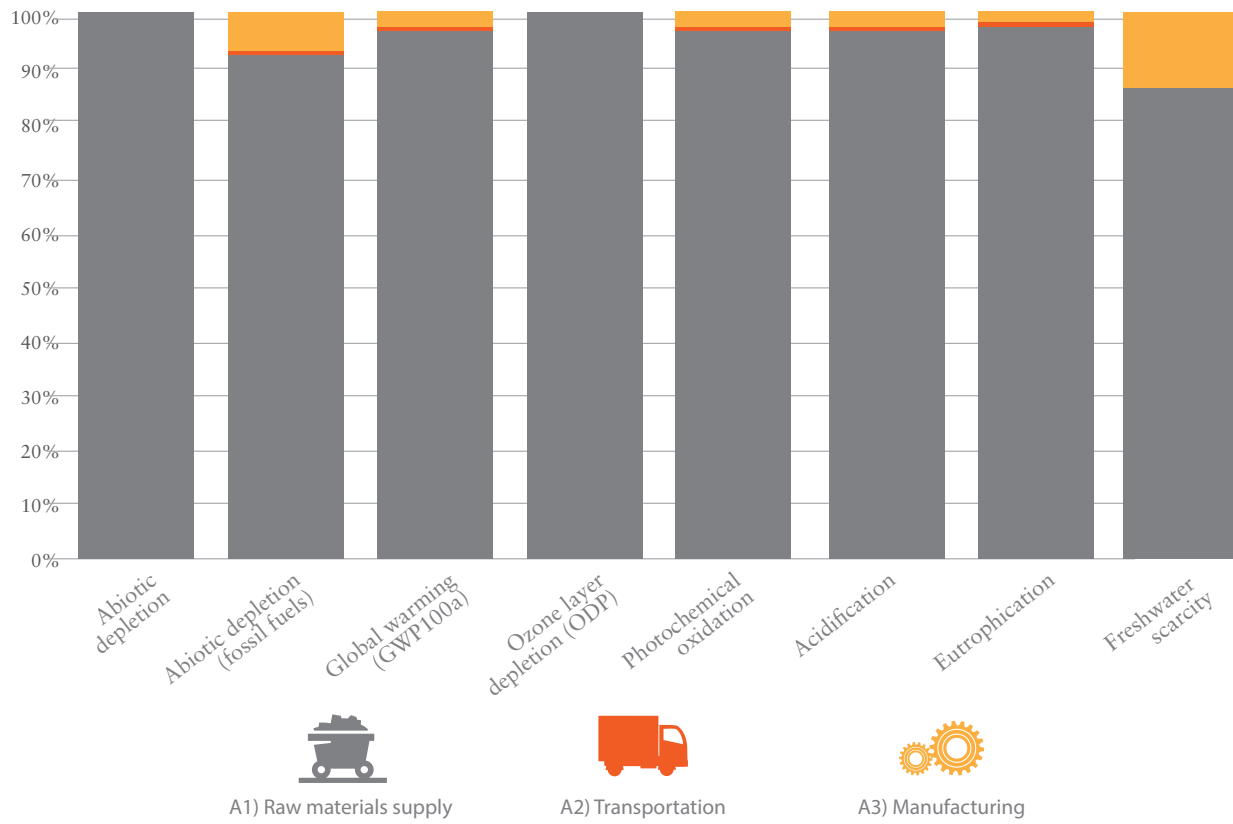
Parameters describing environmental potential impacts were calculated using CML-IA method version 3.04 (Guinee et al. 2001; Huijbregts et al. 2003; Wegener et al. 2008) as implemented in SimaPro 8.4.0 Water scarcity potential was calculated using AWARE method (Boulay et al. 2018).

Table 9. Potential environmental impact indicators per square meter of Insulated Steel Panel

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 %	1.92E-03 100.0%	3.78E-07 0.0%	2.58E-07 0.0%	1.92E-03 100.0%	Modules not declared
Abiotic depletion (fossil fuels)	MJ %	515 94.2%	2 0.4%	30 5.4%	547 100.0%	
Global warming (GWP100a)	kg CO2 eq %	45.5 96.9%	0.1 0.3%	1.3 2.8%	47.0 100.0%	
Ozone layer depletion (ODP)	kg CFC-11 eq %	1.97E-03 100.0%	2.27E-08 0.0%	7.41E-08 0.0%	1.97E-03 100.0%	
Photochemical oxidation	kg C2H4 eq %	9.05E-03 97.2%	2.19E-05 0.2%	2.34E-04 2.5%	9.30E-03 100.0%	
Acidification	kg SO2 eq %	0.17 97.3%	5.04E-04 0.3%	4.10E-03 2.4%	0.17 100.0%	
Eutrophication	kgPO4 <sup>3-</sup> eq %	0.03 97.8%	1.13E-04 0.4%	4.69E-04 1.8%	0.03 100.0%	
Water scarcity potential*	m3eq %	24.2 87.4%	7.63E-03 0.0%	3.5 12.6%	27.7 100.0%	

\* Note: AWARE method sets the maximal characterization factor (i.e. 100) for the geographical location of Ternium Works involved in Ternium Insulated Steel Panel 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. 2 Potential environmental impact contribution per square meter of Insulated Steel Panel



## 6.3 Waste production

Environmental indicators describing waste generation were obtained from LCI except for background - information, which has been calculated using EDIP 2003 method (Hauschild and Potting, 2005). Table 10 shows waste and other outputs generated during each information module.

Table 10. Waste and other outputs per square meter of Insulated Steel Panel

Parameter	Unit	Total A1-A3	1) Raw materials supply	A2) Transportation	A3) Manufacturing (direct)**	A3) Manufacturing (Indirect)**
Hazardous waste	kg	0.11	0.11	1.17E-06	5.87E-03	4.66E-06
	%	100.0%	94.9%	0.0%	5.1%	0.0%
Non hazardous waste	kg	1.88	1.78	0.09	0.00E+00	0.01
	%	100.0%	94.7%	4.6%	0.0%	0.7%
Radioactive waste*	kg	3.98E-04	3.83E-04	1.28E-05	0.00E+00	2.18E-06
	%	100.0%	96.2%	3.2%	0.0%	0.5%
Components for reuse	kg	0.00	0	0	0	0
	%	0.0%	0.0%	0.0%	0.0%	0.0%
Materials for recycling	kg	1.56	1.24	0.00	0.32	0.00
	%	100.0%	79.3%	0.0%	20.7%	0.0%
Materials for energy recovery	kg	0.05	0.02	0.00E+00	0.03	0.00E+00
	%	100.0%	39.4%	0.0%	60.6%	0.0%
Exported energy	kg	0.00	0	0	0	0
	%	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	6%
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 from the World Steel Association. This recognition was granted for its work in favor of sustainability.

# 7. Verification and registration

Programme:	International EPD® System <a href="http://www.environdec.com">www.environdec.com</a>	
	EPD registered through the fully aligned regional programme/hub: EPD Latin America <a href="http://www.epd-americalatina.com">www.epd-americalatina.com</a>	
Programme operator:	EPD International AB / Box 210 60 / SE-100 31 Stockholm, Sweden	
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EPD registration number:	S-P-01426	
Date of publication (issue):	2019-07-01	
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Date of revision:	2019-06-27	
Reference year of data:	2017	
Geographical scope:	Mexico	
Product group classification:	Central Product Classification: CPC 4299 Other metal goods	
PCR:	2015:04 Fabricated products made out of metal composite material (MCM) Version 1.0	
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via <a href="mailto:info@environdec.com">info@environdec.com</a>	
Independent verification of the declaration data, according to ISO 14025:2006.	EPD process certification (Internal) <input type="checkbox"/> EPD verification (External) <input checked="" type="checkbox"/>	
Third-party verifier:	Rubén Carnerero Acosta <a href="mailto:r.carnerero@ik-ingenieria.com">r.carnerero@ik-ingenieria.com</a>	
Approved by:	The International EPD® System	
Procedure for follow-up of data during EPD validity involves third-party verifier::	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	



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