ENVIRONMENTAL PRODUCT DECLARATION OF CARBON STEEL PIPING

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

Programme:	**The International EPD® System** **EPD registered through the fully aligned regional programme/hub:** **EPD Latin America**
Programme operator:	**EPD International AB** **Regional Hub: EPD Latin America**
EPD registration number:	**S-P-02008**
Issue date:	**2022-02-14**
Validity date:	**2027-02-13** **An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com**
Revision date:	**2022-02-14**
Geographical scope:	**Mexico**

Content

1. FORZA STEEL

1.1. FORZA STEEL

LORZA STEEL is a company with more than 20 years in the steel market.

They are specialists in the manufacture of carbon steel pipes. The facilities are located on an area of 60 hectares in total, with an area of approximately 106,000 square meters; in addition, to have a railway line with a capacity for 33 railway cars.

The plants (Salinas and Juarez) is in the municipality of Salinas Victoria, Nuevo León, with a presence in Mexico and the United States.
Specialized in the manufacture of pipe with longitudinal seam (ERW - HFW) and pipe with helical seam.

Both the round pipe (ERW) as well as the square pipe (HSS), are manufactured with longitudinal seams under a continuous forming process with electric resistance welding.
Straight seam round tubing is ideal for fluid conduction, structural use, as well as excellent aesthetic appearance; while square tubing (HSS) requires less steel in its structure, which allows it to be strong, safe and at the same time lighter than other components.

Helical tubing is manufactured under an interior and exterior submerged arc welding (DSAWH) process, which ensures 100% penetration of the tube weld. The helical or spiral pipe manufacturing process is the most efficient in large diameters, ensuring the quality and competitiveness of your projects.

This Environmental Product Declaration (EPD) is in accordance with ISO 14025, for carbon steel piping.

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

2. GENERAL INFORMATION

PRODUCT	CARBON STEEL PIPING
Declaration owner:	Forza Steel, S.A. de C.V. Carr. A Salinas Victoria 2, 65500 Salinas Victoria Nuevo León CP 65500, México Contact person: Hugo Sanchez hsanchez@forzasteel.com Contact: +52 81 8280 4415, +52 81 1600 3498, +52 81 1660 0619 Marketing y relaciones publicas
Description of the construction product:	Structural square and rectangular section tubing (HSS), square and rectangular tubular profile (PTR), circular section pipeline (ERW) with and without finishing and helical tubing (DSAWH), manufactured by FORZA STEEL from steel carbon.
Declared Unit:	1 metric ton of square and rectangular section structural tubing (HSS), square and rectangular tubular profile (PTR), finished and unfinished circular section pipeline (ERW) and helical tubing (DSAWH), manufactured from carbon steel, by FORZA STEEL at the Salinas and Juárez plants, located in Nuevo León, Mexico.
Main product components:	The steel pipes consists of 99% carbon steel.
Life cycle stages not considered:	Downstream (A4, A5, B1, B2, B3, B4, B5, B6, B7, C1, C2, C3, C4), other environmental information (D), and inclusion of reference service life (RSL).
Content of the declaration:	This EPD is based on information modules that do not cover the aspects of use and end of life of the product. It contains in detail, for Upstream processes and Core processes (Module A1, A2 and A3): • Product definition and physical data. • Information about raw materials and origin. • Specifications on manufacturing the product. • Notes on product processing. • LCA based on a declared unit, cradle-to-gate. • LCA results. • Evidence and verifications.
For more information consult:	https://forzasteel.com
Site for which this EPD is representative:	**Manufacturing Plant** Carr. A Salinas Victoria 2, 65500 Salinas Victoria Nuevo León CP 65500, México
Intended Public:	B2B (Business to Business)

3. PRODUCT DESCRIPTION

1. SQUARE AND RECTANGULAR SECTION STRUCTURAL TUBING (HSS)

Square piping (HSS) is frequently used in construction projects due to its dual structural and aesthetic function, additionally facilitating maintenance and cleaning.
It is manufactured with top quality raw material, under a continuous cold forming process with electrical resistance welding with longitudinal seam.
Square tubing (HSS) requires less steel in its structure, allowing it to be strong, secure, and once lighter than any other component.
It resists fire, weathering, humidity, does not contract, kinks, cracks, swells or deforms and its interior can even be filled with any material.

Availability of the product
- They are manufactured in a standard length of 12.20 meters (40 feet).
- It can be requested at 6.10 meters.
- Some sizes and thicknesses are only made to order in high volume.
- If you are looking for a product that is not on the list, you can request a quote.
- It is handled in A500 grade B and C quality.

Product Information
HSS structural profiles are produced in square and rectangular shapes in a wide range of sizes and gauges. HSS structural steel tube has many benefits, including, aesthetic appeal, high strength-to-weight ratio, uniform strength, cost-effectiveness, and recyclability, as they are cold-formed and this gives them better torsional behavior, ease of painting. and pierce.
(FORZA STEEL, 2021)

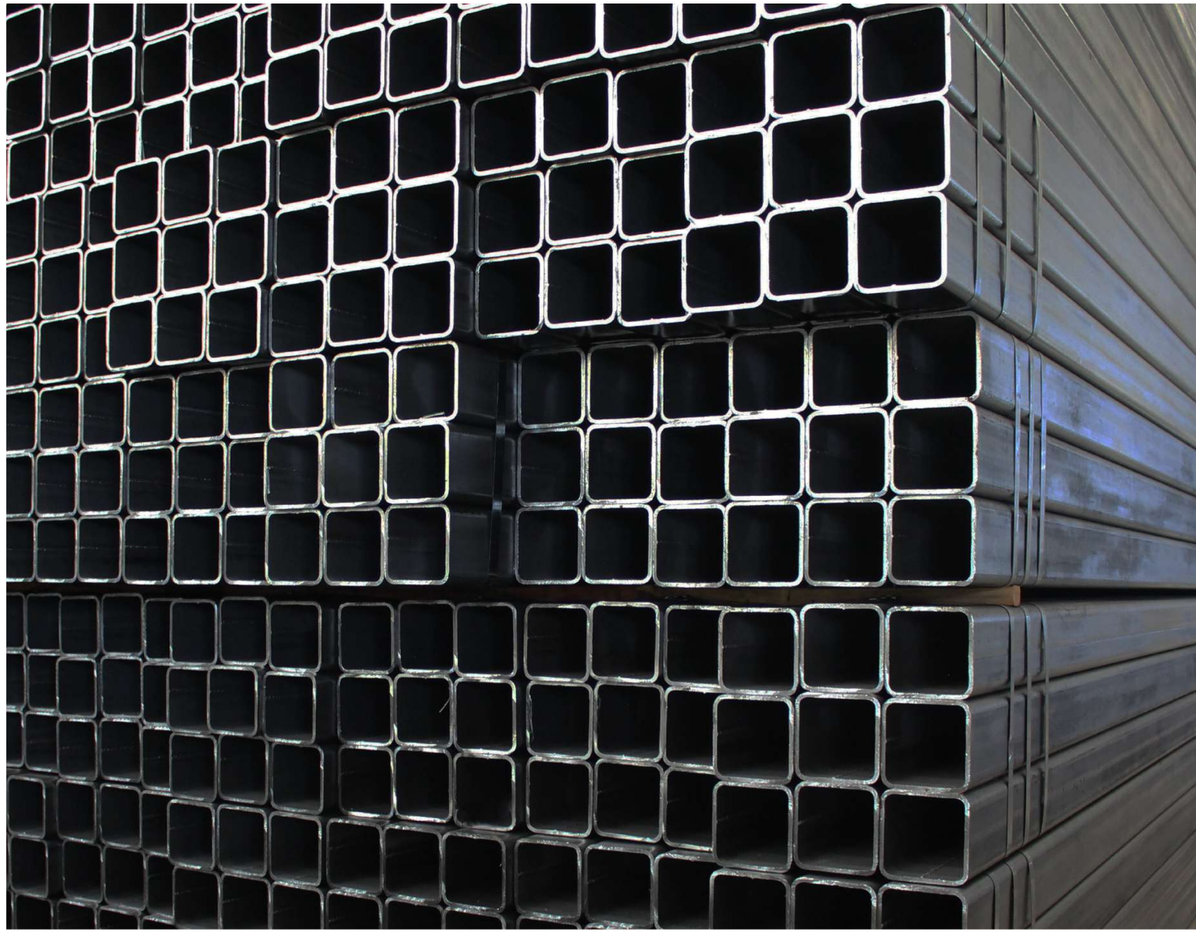


FIGURE 1. PIPES (HSS)

2. SQUARE AND RECTANGULAR TUBULAR PROFILE (PTR)

At Forza Steel manufactures cold formed carbon steel product with electric resistance welding for general and structural uses.

Sections or profile, square and / or rectangular, it is manufactured in quality ASTM A500 Gr. B

FIGURE 2. PIPES (PTR)

3. CIRCULAR SECTION PIPELINE (ERW)

Straight seam tubing offers excellent service in fluid conduction, as well as in structural use, with excellent aesthetic appearance. Provides accurate dimensional tolerance, including roundness, straightness, and thickness.

The products are manufactured with first quality raw material, under a continuous format process with electric resistance welding (ERW) with longitudinal seam.

Ranks
Diameter from 4 ″ to 20 ″ / Thickness 3/16 ″ to 5/8 ″

FIGURE 3. PIPES (ERW)

4. HELICAL TUBING (DSAWH)

Our pipe is manufactured with first quality raw material, under the internal and external submerged arc welding process which ensures 100% penetration of the tube.

The helical or spiral pipe manufacturing process is the most efficient for large diameters, ensuring the competitiveness of your projects, as well as offering an excellent distribution of the weld, giving greater resistance to any type of point stress or uniform distributed pressure.

If information on the technical specification tables is required, please consult the official FORZA STEEL web source https://forzasteel.com/productos/.
Where you can download the technical specifications and contact of the company.

FIGURE 4. PIPES (DSAW

4. CONTENT DECLARATION

CARBON STEEL PIPING MANUFACTURED BY FORZA STEEL HAS THE FOLLOWING COMPOSITION (TABLE 1).

TABLE 1. CONTENT CARBON STEEL PIPING

HOMOGENEOUS MATERIAL OR CHEMICAL SUBSTANCES	CHEMICAL SUBSTANCES	WEIGHT (%)	CAS NUMBER	FUNCTION OF CHEMICAL	HEALTH CLASS[1]
Carbon steel	Not applicable	99 %	Not applicable	Carbon Steel	Not listed
Rust preventative (PREVENTOX 2010M2)	Not applicable	<1 %	Not applicable	Antioxidants not specified in the data sheet by the supplier	Not listed
Refrigerant for mills and formed (ERAMIL 4916)	Not applicable	<1 %	Not applicable	Refrigerant not specified in the data sheet by the supplier	*
Welding	Not applicable	<1 %	Not applicable	Welding	Not listed
Flux	Aluminium	<1 %	85305-04-0	Flux	Not listed
Anti-corrosive alkyd paint (Paint used for pipe (ERW) with finish)	Not applicable	<1 %	Not applicable	Anti-corrosive	Not listed

* For refrigerants, regulatory obligations may exist for this substance under the legislations under ECHA's remit or for which ECHA has delegated tasks (i.e. REACH, CLP, BPR, PIC, CAD / CMD, WFD and POPs).
But by not reporting the chemical substances that make up the product by the manufacturer in its technical datasheet, it is not possible to establish legislations under ECHA's.

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

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

1 metric ton of square and rectangular section structural tubing (HSS), square and rectangular tubular profile (PTR), finished and unfinished circular section pipeline (ERW) and helical tubing (DSAWH), manufactured from carbon steel, by FORZA STEEL at the Salinas and Juárez plants, located in Nuevo León, Mexico.

5.2 SYSTEM BOUNDARY

The potential environmental impacts were calculated through Life Cycle Assessment (LCA) methodology of carbon steel piping to ISO 14040:2006 and ISO 14044:2006. This study went through a critical review process in accordance with ISO / TS 14071: 2014. For a “cradle-to-gate” EPD is be based on information upstream processes and core processes, modules A1 to A3. **(see table 2)**.

TABLE 2. SYSTEM BOUNDARY CARBON STEEL PIPING

LIFE CYCLE INFORMATION OF THE CARBON STEEL PIPING			EPD TYPE	
Life cycle stages in the international EPD- System	Asset life cycle stages (EN 15804)	Asset life cycle stages (EN 15804)	Declared unit: Cradle-Gate Cradle-Gate with options	Functional unit: Cradle-Grave
Upstream	A1) Raw material supply	A1-A3) Product stage	Mandatory	Mandatory
Core	A2) Transport			
	A3) Manufacturing			
Downstream	A4) Transport	A4-A5) Construction process stage	Optional for a product and mandatory for a service	Mandatory
	A5) Construction installation			
	B1) Use	B1-B5) Use stage	Optional	Mandatory
	B2) Maintenance			
	B3) Repair			
	B4) Replacement			
	B5) Refurbishment			
	B6) Operational energy use	----	----	----
	B7) Operational water use	----	----	----
	C1) Deconstruction, demolition	C1-C4) End of life stage	Optional	Mandatory
	C2) Transport			
	C3) Waste processing			
	C4) Disposal			
Other environmental information	D) Future, reuse, recycling or energy recovery potentials	D) Recovery stage	Optional	Optional
Inclusion of reference service life (RSL)	----	----	Mandatory if any module in Bis included	Mandatory

Description of information modules is included in Table 3

TABLE 3. DESCRIPTION OF INFORMATION MODULES INCLUDED IN THIS EPD.

A1) RAW MATERIALS SUPPLY

Production of raw materials: steel, flux, antioxidants, refrigerants, welding and paint.
• Production of packaging materials for raw materials.
• Generation and distribution of the electricity consumed in manufacturing.
• Generation and distribution of the diesel consumed in manufacturing.

A2) TRANSPORTATION

Transportation of carbon steel.
• Transportation of other raw materials.
• Transportation of auxiliary materials.
• Internal transportation requirements.

A3) MANUFACTURING

Consumption of fresh water.
• Production and consumption of auxiliary materials.
• Waste generation and waste management processes.
• Emissions to air.
• Transport of waste to the treatment and final disposal site.

5.3 DESCRIPTION OF THE MANUFACTURING PROCESS

The manufacturing process is described in Figure 1:

FIGURE. 1. FLOW DIAGRAM OF CARBON STEEL PIPING

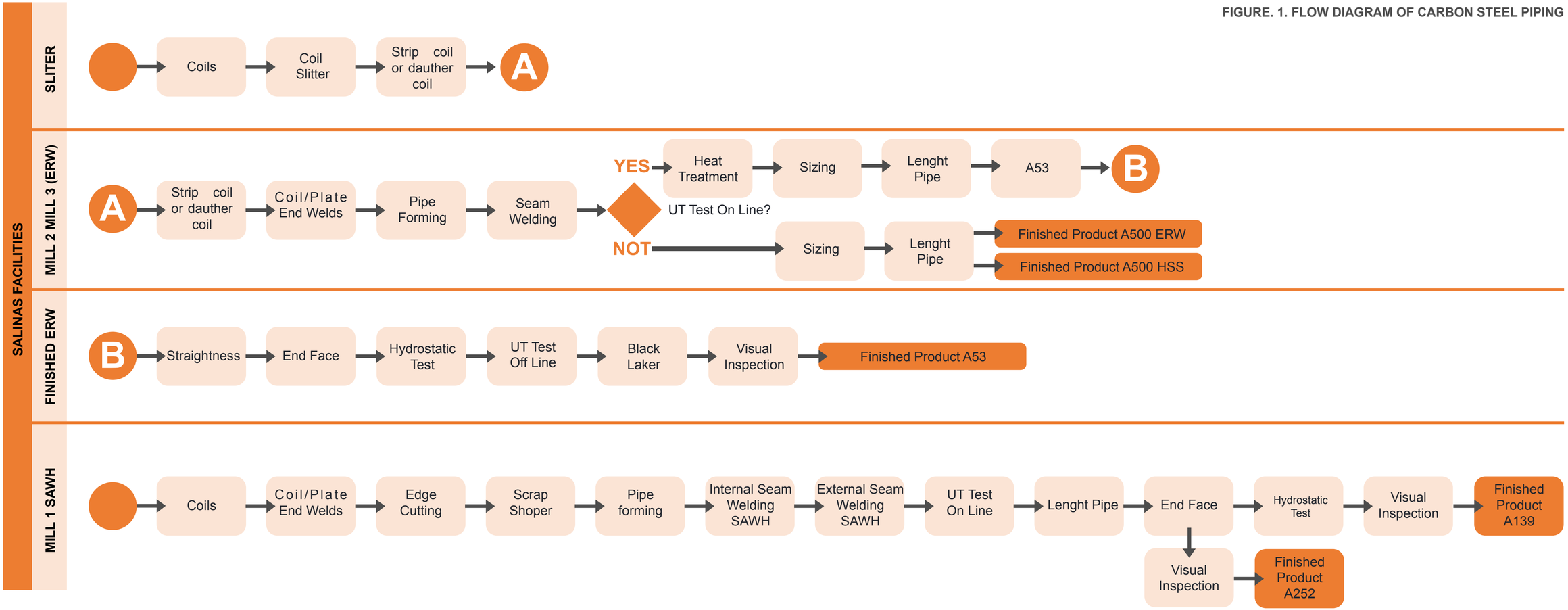
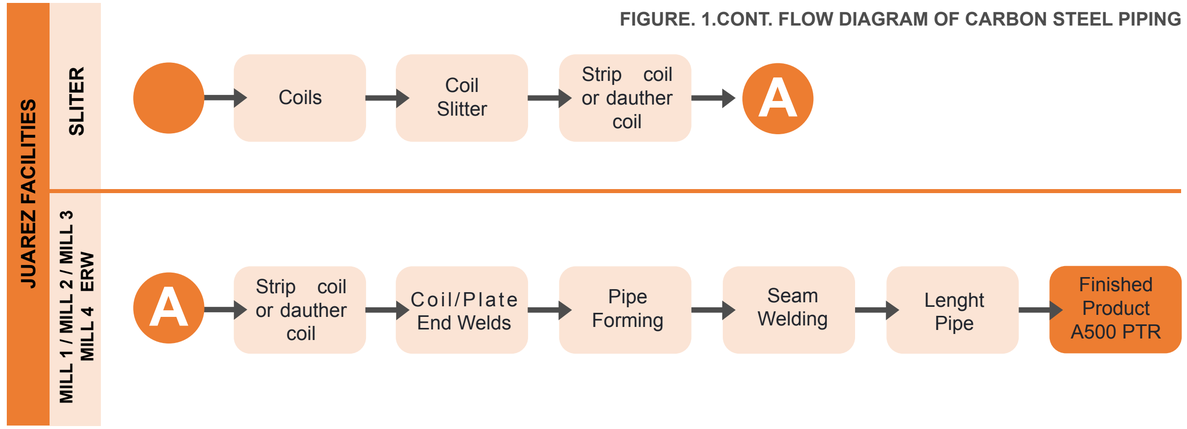


FIGURE. 1.CONT. FLOW DIAGRAM OF CARBON STEEL PIPING



5.4 ASSUMPTIONS

The following are the assumptions related to the industrialization process fabrication of carbon steel piping:

1. It was assumed that 20% of the butane gas reported by the company is used in the kitchen areas, the remaining 80% is used for the cutting area.

2. The bars that the company buys for the packaging of the tubes were taken as a single-use since they do not return to FORZA STEEL.

3. All the distances associated with the transport of the waste generated in Forza Steel were assumed, establishing them in a local range.

5.5 CUT-OFF CRITERIA

All flows of fuel, energy, materials and supplies necessary for the production of the Structural shapes have considered; materials that could use 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, belonging to the piping manufacturing process.

5.6 ALLOCATION

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

In the present study, allocation processes were applied for the co-products generated in the plants, such as scrap and second-hand products, during 2020.

In table 4, 5 and 6, shows the coproducts generated during the processing of manufacture.

TABLE 4. COPRODUCT GENERATED THE PROCESSING OF MANUFACTURE PLANT SALINAS.

PLANT SALINAS	
PRODUCT AND CO-PRODUCT	ASSIGNMENT (%)
A53/API ERW	16%
ERW	8%
HSS	66%
A500 PTR	0%
A252 DSAWH	6%
Scrap (Co-product)	0%
Second quality product ERW (co-product)	1%
Second quality product HSS (co-product)	3%
TOTAL	100%

TABLE 5. COPRODUCT GENERATED THE PROCESSING OF MANUFACTURE PLANT JUAREZ.

PLANT JUAREZ	
PRODUCT AND CO-PRODUCT	ASSIGNMENT (%)
A500PTR	97%
Scrap (Co-product)	1%
Second quality product PTR (co-product)	2%
TOTAL	100%

TABLE 6. COPRODUCT GENERATED THE PROCESSING OF MANUFACTURE PLANT SALINAS (SLITTER).

PLANT SALINAS ALLOCATION SLITER	
PRODUCT AND CO-PRODUCT	ASSIGNMENT (%)
A53/API ERW	18%
ERW	9%
HSS	75%
Scrap (Co-product)	3%
TOTAL	100%

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 carbon steel piping, 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.
For generic data Mexicaniuh and Ecoinvent 3.7
(Allocation - Recycled Content version) databases were used.

5.7 TIME REPRESENTATIVENESS

Direct data obtained from FORZA STEEL is representative for 2020.

5.8 DATA QUALITY ASSESSMENT

Data quality assessment per information module is provided in tables 7 and 8.

TABLE 7.RAW MATERIAL SUPPLY UPSTREAM PROCESSES DATA QUALITY ASSESSMEN

DATA	TIME RELATED COVERAGE	GEOGRAPHIC COVERAGE	TECHNOLOGICAL COVERAGE	DATA SOURCE	MEASURED OF ESTIMATED
Consumption of raw materials for the manufacture of tubes	2020	Mexico	Modern	FORZA STEEL	M
Consumption of raw material packaging materials	2020	Mexico	Modern Technology	FORZA STEEL	M
Consumption of raw materials for the manufacture of packaging	2020	Mexico	Modern Technology	FORZA STEEL	M
Consumption of energy, emissions, waste and materials for the manufacture of raw materials	1980-2020	Promedio mundial basado en Europa	Promedio mundial basado en Europa	Ecoinvent 3.7	M&E
Consumption of fuels and emissions related to electricity production in Mexico at country level	2020	Mexico	Technological mix Mexico	Mexicaniuh	M&E
Energy and materials consumption and emissions related to diesel production in Mexico	2020	Mexico	Technological mix Mexico	Mexicaniuh	M&E

TABLE 8. CORE PROCESSES DATA QUALITY ASSESSMENT

DATA	TIME RELATED COVERAGE	GEOGRAPHIC COVERAGE	TECHNOLOGICAL COVERAGE	DATA SOURCE	MEASURED OF ESTIMATED
Raw material transportation distance	2020	Mexico & other countries	Modern Technology	FORZA STEEL	M
Transport distance of packa-ging materials from raw materials and supplies	2020	Mexico & other countries	Modern Technology	FORZA STEEL	M
Distance of transportation of packaging materials from the finished product	2020	Mexico & other countries	European production	FORZA STEEL	M
Consumption of materials and energy, emissions related to the transport requirements of raw materials and inputs for the manufacture and packaging of the finished product.	1992-2020	European mix	European mix	Ecoinvent 3.7	M&E

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

6. ENVIRONMENTAL PERFORMANCE

SimaPro 9.2.1 was used for Life Cycle Impact Assessment

6.1 USE OF RESOURCES

Parameters describing resource use were evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht et al. 2007) except for the indicator of use of net fresh water that was evaluated with Recipe 2016 Midpoint (H) version 1.00 (Huijbregts et al. 2017). The detailed description of the use of resources is provided in table 9, 10, 11, 12 and 13.

TABLE 9. RESOURCE INDICATORS PER METRIC TON OF PIPES (ERW)

PARAMETER	UNIT	TOTAL	A1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	20743.53	20685.65	24.98	32.89
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	20743.53	20685.65	24.98	32.89
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	34066.86	30237.04	3134.01	695.79
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	34066.86	30237.04	3134.01	695.79
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m3	18.47	18.28	0.186	0.001

TABLE 10. RESOURCE INDICATORS PER METRIC TON OF PIPES (HSS)

PARAMETER	UNIT	TOTAL	A1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	12358.46	12300.58	24.98	32.89
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	12358.46	12300.58	24.98	32.89
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	33607.75	29777.94	3134.01	695.79
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	33607.75	29777.94	3134.01	695.79
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m3	18.47	18.28	0.186	0.001

TABLE 11. RESOURCE INDICATORS PER METRIC TON OF PIPES (ERW WITH FINISH)

PARAMETER	UNIT	TOTAL	A1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	22347.13	22280.44	26.02	40.66
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	22347.13	22280.44	26.02	40.66
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	35879.13	31756.90	3264.15	858.07
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	35879.13	31756.90	3264.15	858.07
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m3	19.52	19.31	0.19	0.013

TABLE 12. RESOURCE INDICATORS PER METRIC TON OF PIPES (PTR)

PARAMETER	UNIT	TOTAL	A1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	81768.86	81654.22	58.68	55.94
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	81768.86	81654.22	58.68	55.94
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	42748.37	35391.01	6339.61	1017.74
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	42748.37	35391.01	6339.61	1017.74
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m3	4.65	0.35	4.30	0.00004

TABLE 13. RESOURCE INDICATORS PER METRIC TON OF PIPES (DSAWH)

PARAMETER	UNIT	TOTAL	A1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	22336.65	22270.71	28.99	36.94
Use of renewable primary energy as raw materials	MJ	0	0	0	0
Total use of renewable primary energy resources	MJ	22336.65	22270.71	28.99	36.94
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	35884.48	31707.97	3445.30	731.19
Use of non-renewable primary energy used as raw materials	MJ	0	0	0	0
Total use of non-renewable primary energy resources	MJ	35884.48	31707.97	3445.30	731.19
Use of secondary material	kg	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0
Use of net fresh water	m3	19.52	19.27	0.25	0.0008

6.2 POTENTIAL ENVIRONMENTAL IMPACT

All information modules are reported and valued separately. However, in the present EPD presents itself the total impact across all stage.
Parameters describing environmental potential impacts were calculated using CML-IA method version 3.04 (Guinee et al. 2001; Huijbregts et al. 2003; Wegener et al. 2008) as implemented in SimaPro 9.2.1. Water scarcity potential was calculated using AWARE method (Boulay et al. 2018).

TABLE 14. POTENTIAL ENVIRONMENTAL IMPACT INDICATORS PER METRIC TON OF PIPES (HSS)

POTENTIAL ENVIRONMENTAL IMPACT					
IMPACT CATEGORY	**UNIT**	**A1 RAW MATERIALS**	**A2 TRANSPORT**	**A3 MANUFACTURE**	**TOTAL**
Abiotic depletion	kg Sb eq	9.5E-03	2.8E-04	1.2E-05	9.8E-03
	%	97%	3%	0%	100%
Abiotic depletion (fossil fuels)	MJ	1.8E+04	2.2E+02	4.5E+02	2.1E+04
	%	87%	11%	2%	100%
Global warming (GWP100a)	kg CO2 eq	1.4E+03	1.6E+01	2.9E+01	1.6E+03
	%	88%	10%	2%	100%
Ozone layer depletion (ODP)	kg CFC-11 eq	1.1E-04	2.7E-05	2.6E-06	1.4E-04
	%	78%	20%	2%	100%
Photochemical oxidation	kg C2H4 eq	5.5E-01	7.2E-02	5.2E-03	6.3E-01
	%	88%	11%	1%	100%
Acidification	kg SO2 eq	6.3E+00	2.7E-00	1.3E+01	9.2E+00
	%	69%	30%	1%	100%
Eutrophication	kg PO43 eq	2.9E+00	3.4E-01	4.0E-02	3.2E+00
	%	88%	10%	1%	100%
Water scarcity potential	m3	2.62E+01	4.62E-00	1.94E+01	3.10E+01
	%	84%	15%	1%	100%

FIGURE. 2 POTENTIAL ENVIRONMENTAL IMPACT CONTRIBUTION PER METRIC TON PIPES (HSS)

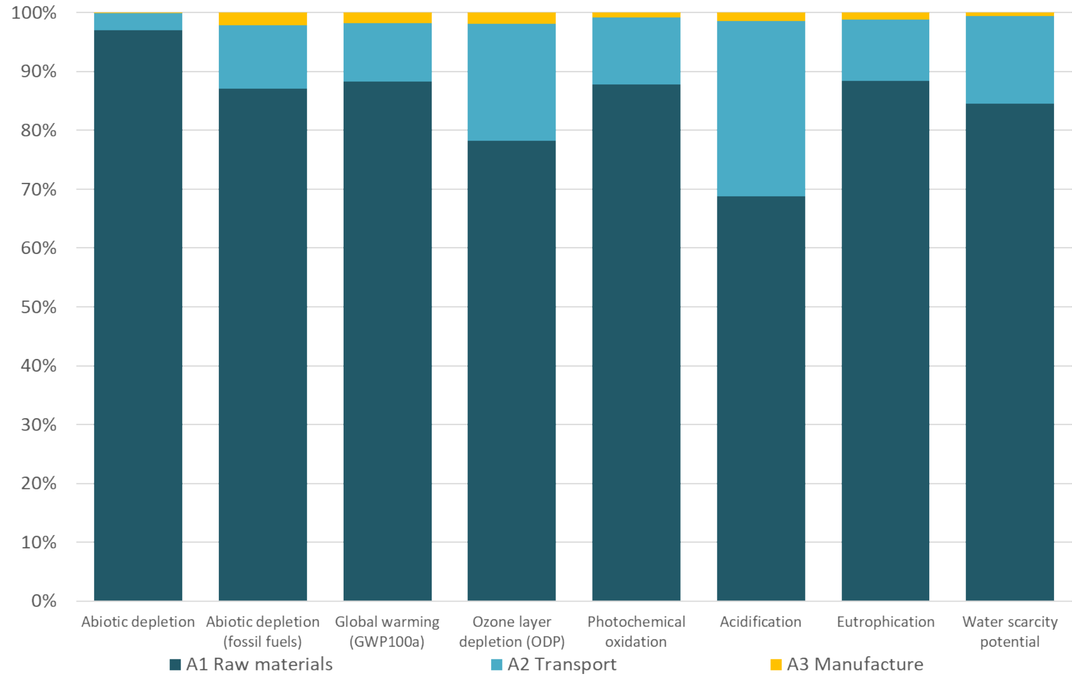


TABLE 15. POTENTIAL ENVIRONMENTAL IMPACT INDICATORS PER METRIC TON OF PIPES (ERW)

POTENTIAL ENVIRONMENTAL IMPACT					
IMPACT CATEGORY	**UNIT**	**A1 RAW MATERIALS**	**A2 TRANSPORT**	**A3 MANUFACTURE**	**TOTAL**
Abiotic depletion	kg Sb eq	9.5E-03	2.8E-04	1.2E-05	9.8E-03
	%	97%	3%	0%	100%
Abiotic depletion (fossil fuels)	MJ	1.8E+04	2.2E+03	4.5E+02	2.1E+04
	%	87%	11%	2%	100%
Global warming (GWP100a)	kg CO2 eq	1.4E+03	1.6E+02	2.9E+01	1.6E+03
	%	88%	10%	2%	100%
Ozone layer depletion (ODP)	kg CFC-11 eq	1.1E-04	2.7E-05	2.6E-06	1.4E-04
	%	78%	20%	2%	100%
Photochemical oxidation	kg C2H4 eq	5.5E-01	2.7E-02	5.2E-03	6.3E-01
	%	88%	11%	1%	100%
Acidification	kg SO2 eq	6.3E+00	2.7E-00	1.3E+01	9.2E+00
	%	69%	30%	1%	100%
Eutrophication	kg PO43 eq	2.9E+00	3.4E-01	4.0E-02	3.2E+00
	%	88%	10%	1%	100%
Water scarcity potential	m3	2.68E+01	4.62E-00	1.94E+01	3.16E+01
	%	85%	15%	1%	100%

FIGURE. 3 POTENTIAL ENVIRONMENTAL IMPACT CONTRIBUTION PER METRIC TON PIPES (ERW)

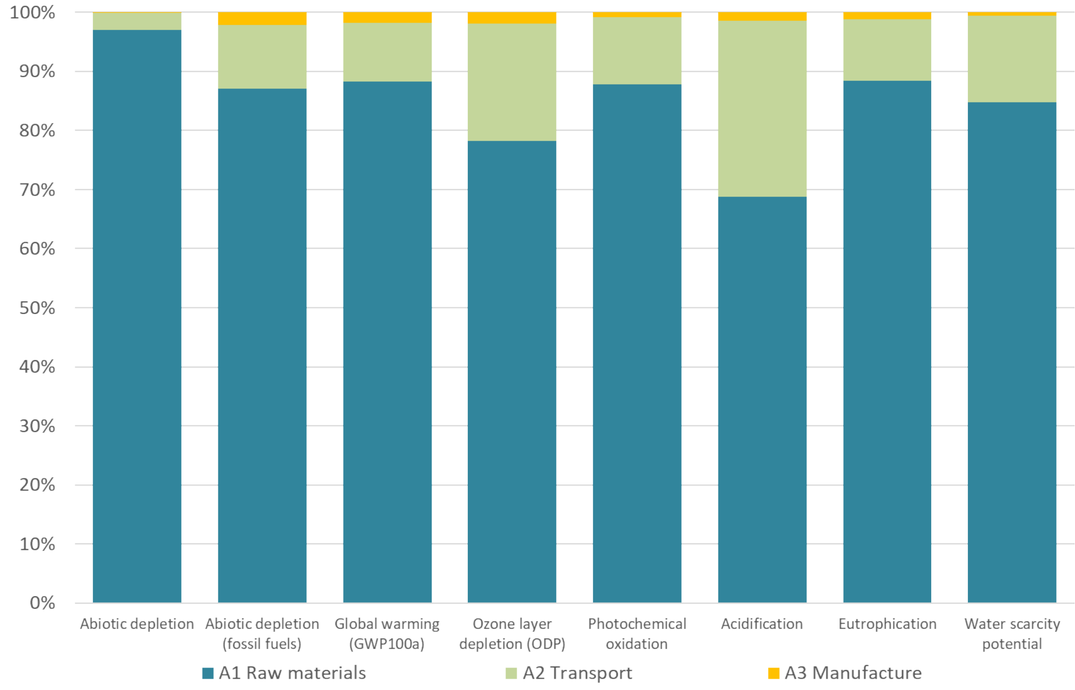


TABLE 16. POTENTIAL ENVIRONMENTAL IMPACT INDICATORS PER METRIC TON OF PIPES (ERW WITH FINISH)

POTENTIAL ENVIRONMENTAL IMPACT					
IMPACT CATEGORY	**UNIT**	**A1 RAW MATERIALS**	**A2 TRANSPORT**	**A3 MANUFACTURE**	**TOTAL**
Abiotic depletion	kg Sb eq	9.6E-03	2.8E-04	2.1E-05	9.9E-03
	%	97%	3%	0%	100%
Abiotic depletion (fossil fuels)	MJ	1.8E+04	2.2E+03	5.6E+02	2.1E+04
	%	87%	11%	3%	100%
Global warming (GWP100a)	kg CO2 eq	1.4E+03	1.6E+02	3.8E+01	1.6E+03
	%	88%	10%	2%	100%
Ozone layer depletion (ODP)	kg CFC-11 eq	1.1E-04	2.7E-05	3.5E-06	1.4E-04
	%	78%	20%	3%	100%
Photochemical oxidation	kg C2H4 eq	5.6E-01	7.2E-02	6.4E-03	6.3E-01
	%	88%	11%	1%	100%
Acidification	kg SO2 eq	6.3E+00	2.7E-00	1.6E+01	9.2E+00
	%	69%	30%	2%	100%
Eutrophication	kg PO43 eq	2.9E+00	3.4E-01	5.2E-02	3.3E+00
	%	88%	10%	2%	100%
Water scarcity potential	m3	2.73E+01	4.63E-00	1.31E+00	3.32E+01
	%	82%	14%	4%	100%

FIGURE. 4 POTENTIAL ENVIRONMENTAL IMPACT CONTRIBUTION PER METRIC TON PIPES (ERW WITH FINISH)

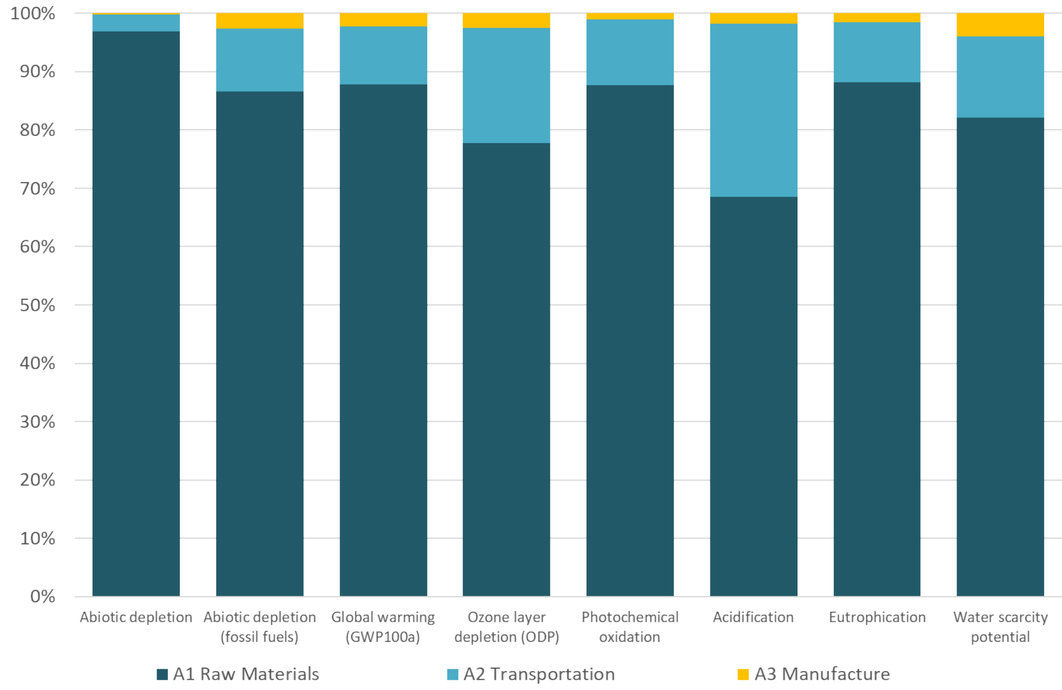


TABLE 17. POTENTIAL ENVIRONMENTAL IMPACT INDICATORS PER METRIC TON OF PIPES (DSAWH)

POTENTIAL ENVIRONMENTAL IMPACT					
IMPACT CATEGORY	**UNIT**	**A1 RAW MATERIALS**	**A2 TRANSPORT**	**A3 MANUFACTURE**	**TOTAL**
Abiotic depletion	kg Sb eq	9.5E-03	3.7E-04	2.0E-05	9.9E-03
	%	96%	4%	0%	100%
Abiotic depletion (fossil fuels)	MJ	1.8E+04	2.4E+03	4.7E+02	2.1E+04
	%	86%	12%	2%	100%
Global warming (GWP100a)	kg CO2 eq	1.4E+03	1.8E+02	3.5E+01	1.6E+03
	%	87%	11%	2%	100%
Ozone layer depletion (ODP)	kg CFC-11 eq	1.1E-04	3.0E-05	2.9E-06	1.4E-04
	%	77%	21%	2%	100%
Photochemical oxidation	kg C2H4 eq	5.5E-01	7.4E-02	5.8E-03	6.3E-01
	%	87%	12%	1%	100%
Acidification	kg SO2 eq	6.3E+00	2.8E-00	1.5E+01	9.2E+00
	%	68%	30%	2%	100%
Eutrophication	kg PO43 eq	2.9E+00	3.5E-01	4.8E-02	3.3E+00
	%	88%	11%	1%	100%
Water scarcity potential	m3	2.63E+01	7.52E-00	8.42E+02	3.39E+01
	%	78%	22%	0%	100%

FIGURE. 5 POTENTIAL ENVIRONMENTAL IMPACT CONTRIBUTION PER METRIC TON PIPES (DSAWH)

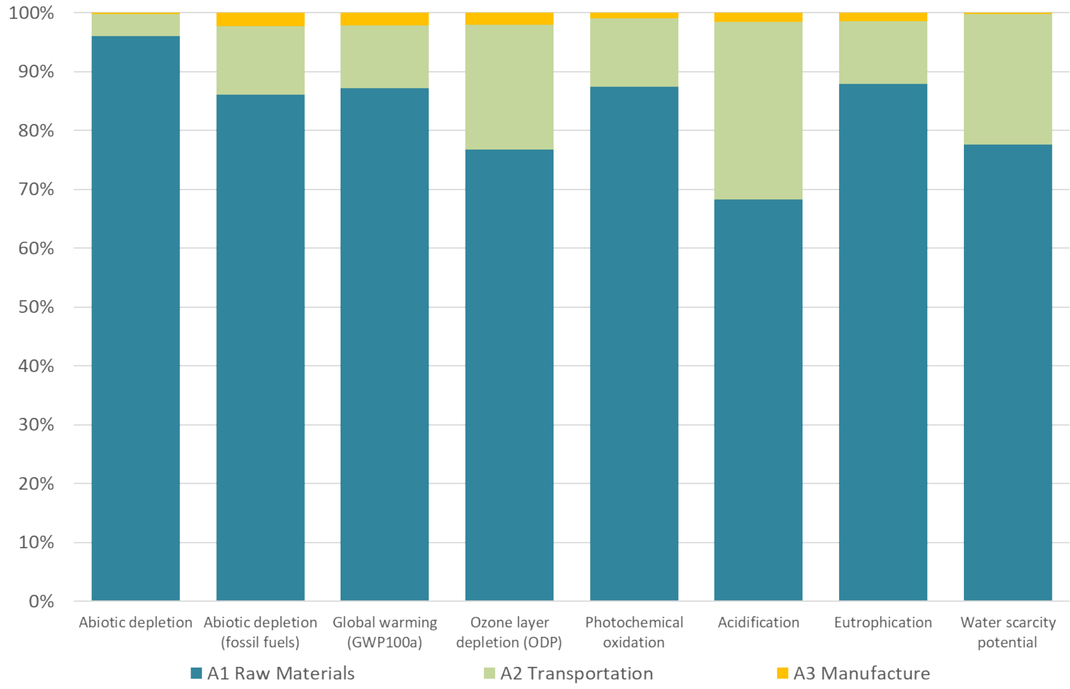
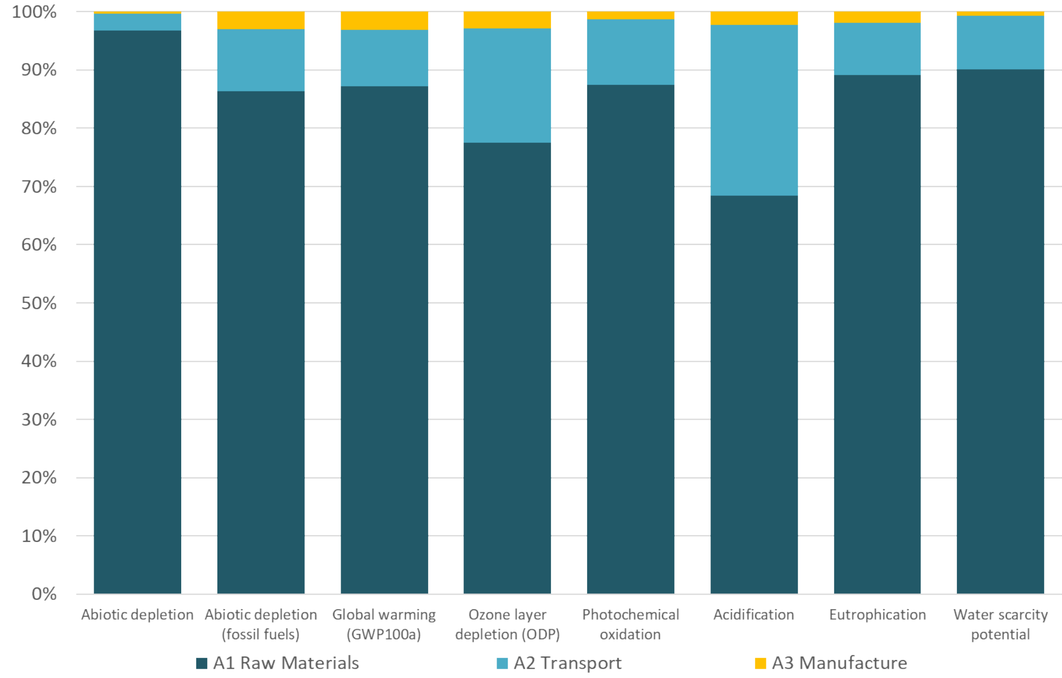


TABLE 18. POTENTIAL ENVIRONMENTAL IMPACT INDICATORS PER METRIC TON OF PIPES (PTR)

POTENTIAL ENVIRONMENTAL IMPACT					
IMPACT CATEGORY	**UNIT**	**A1 RAW MATERIALS**	**A2 TRANSPORT**	**A3 MANUFACTURE**	**TOTAL**
Abiotic depletion	kg Sb eq	9.7E-03	2.9E-04	3.2E-05	1.0E-02
	%	97%	3%	0%	100%
Abiotic depletion (fossil fuels)	MJ	1.8E+04	2.3E+03	6.5E+02	2.1E+04
	%	86%	11%	3%	100%
Global warming (GWP100a)	kg CO2 eq	1.5E+03	1.6E+02	5.2E+01	1.7E+03
	%	87%	10%	3%	100%
Ozone layer depletion (ODP)	kg CFC-11 eq	1.1E-04	2.8E-05	4.1E-06	1.4E-04
	%	78%	20%	3%	100%
Photochemical oxidation	kg C2H4 eq	5.6E-01	7.2E-02	8.4E-03	6.4E-01
	%	87%	11%	1%	100%
Acidification	kg SO2 eq	6.4E+00	2.7E-00	2.1E+01	9.4E+00
	%	68%	29%	2%	100%
Eutrophication	kg PO43 eq	3.3E+00	3.4E-01	7.1E-02	3.7E+00
	%	89%	9%	2%	100%
Water scarcity potential	m3	4.71E+01	4.80E-00	3.68E+01	5.22E+01
	%	90%	9%	1%	100%

FIGURE. 6 POTENTIAL ENVIRONMENTAL IMPACT CONTRIBUTION PER METRIC TON PIPES (PTR)



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 19, 20, 21 and 22, shows waste and other outputs generated during each information module.

TABLE 19. WASTE AND OTHER OUTPUTS PER METRIC TON OF PIPES MANUFACTURED FROM CARBON STEEL (ERW AND HSS)

OUTPUT PARAMETER	UNIT	TOTAL	1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Hazardous waste	kg	2.24	2.20	0.004	0.03
Non hazardous waste	kg	1101.67	979.69	121.50	0.47
Radioactive waste*	kg	0.09	0.07	0.020	0.001
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	0	0	0	0
Materials for energy recovery	kg	0	0	0	0
Exported electricity	MJ	0	0	0	0
Exported heat	MJ	0	0	0	0

*No radioactive waste is produced during FORZA STEEL operation.

TABLE 20. WASTE AND OTHER OUTPUTS PER METRIC TON OF PIPES MANUFACTURED FROM CARBON STEEL (ERW WITH FINISH)

OUTPUT PARAMETER	UNIT	TOTAL	1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Hazardous waste	kg	2.77	2.46	0.004	0.300
Non hazardous waste	kg	1143.6	1015.88	126.59	1.132
Radioactive waste*	kg	0.09	0.07	0.020	0.001
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	0	0	0	0
Materials for energy recovery	kg	0	0	0	0
Exported electricity	MJ	0	0	0	0
Exported heat	MJ	0	0	0	0

*No radioactive waste is produced during FORZA STEEL operation.

TABLE 21. WASTE AND OTHER OUTPUTS PER METRIC TON OF PIPES MANUFACTURED FROM CARBON STEEL (DSAWH)

OUTPUT PARAMETER	UNIT	TOTAL	1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Hazardous waste	kg	2.48	2.46	0.005	0.01
Non hazardous waste	kg	1144.6	1014.55	129.57	0.52
Radioactive waste*	kg	0.09	0.07	0.020	0.001
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	0	0	0	0
Materials for energy recovery	kg	0	0	0	0
Exported electricity	MJ	0	0	0	0
Exported heat	MJ	0	0	0	0

*No radioactive waste is produced during FORZA STEEL operation.

TABLE 22. WASTE AND OTHER OUTPUTS PER METRIC TON OF PIPES MANUFACTURED FROM CARBON STEEL (PTR)

OUTPUT PARAMETER	UNIT	TOTAL	1) RAW MATERIALS SUPPLY	A2) TRANSPORTATION	A3) MANUFACTURING
Hazardous waste	kg	2.48	2.48	0.012	3.04
Non hazardous waste	kg	1144.6	1102.96	397.73	0.91
Radioactive waste*	kg	0.09	0.09	0.040	0.001
Components for reuse	kg	0	0	0	0
Materials for recycling	kg	0	0	0	0
Materials for energy recovery	kg	0	0	0	0
Exported electricity	MJ	0	0	0	0
Exported heat	MJ	0	0	0	0

*No radioactive waste is produced during FORZA STEEL operation.

6.4 ADDITIONAL ENVIRONMENTAL INFORMATION

FTOP00115
Ed.: 07

Certificación Mexicana, S.C.

Retorno 13 de Jesús Galindo y Villa No. 21, Col. Jardín Balbuena, Del. Venustiano Carranza, Ciudad de México, C. P. 15900

Otorga el presente

CERTIFICADO DE PRODUCTO
DE CONFORMIDAD CON LA NORMA OFICIAL MEXICANA

NOM-001-CONAGUA-2011

"Sistemas de agua potable, toma domiciliaria y alcantarillado sanitario – Hermeticidad –Especificaciones y métodos de prueba"

A la empresa:

Forza Steel, S.A. de C.V. MR

Fabricante con domicilio en:
Carretera Salinas Victoria km 2 S/N, Salinas Victoria, Nuevo León, C.P. 65500

CERTIFICADO DE PRODUCTO A:

Tubos de acero negro con costura empleados en sistemas de distribución de agua potable, en diámetros nominales de 100 mm (4 pulgadas) Tipo E Grado A y B Cedula 40, 60 y 80; 150 mm (6 pulgadas) Tipo E Grado A y B Cedula 40; 200 mm (8 pulgadas) Tipo E Grado A y B Cedula 20, 30 y 40; 250 mm (10 pulgadas) Tipo E Grado A y B Cedula 20, 30, 40 y 60; 300 mm (12 pulgadas) Tipo E Grado A y B Cedula 20, 30 y 40.

De acuerdo a lo indicado en el punto 1.1 de la NMX-B-177-1990, adicionalmente, el diámetro nominal 100 mm (4 pulgadas) puede fabricarse en espesores de 4.78, 5.56, 6.35 y 7.92 mm (0.188, 0.219, 0.250 y 0.312 pulgadas); el diámetro nominal 150 mm (6 pulgadas) puede fabricarse en espesores de 4.78, 5.56, 6.35, 7.92 y 8.74 mm (0.188, 0.219, 0.250, 0.312 y 0.344 pulgadas); el diámetro nominal 200 mm (8 pulgadas) puede fabricarse en espesores de 5.16, 5.56, 7.92, 8.74 y 9.52 mm (0.203, 0.219, 0.312, 0.344 y 0.375 pulgadas); el diámetro nominal 250 mm (10 pulgadas) puede fabricarse en espesores de 4.78, 5.16, 5.56, 7.09, 8.74 y 11.13 mm (0.188, 0.203, 0.219, 0.279, 0.344 y 0.438 pulgadas); y el diámetro nominal 300 mm (12 pulgadas) puede fabricarse en espesores de 5.56, 7.74, 7.92, 8.14, 9.52, 11.13 y 12.70 mm (0.219, 0.281, 0.312, 0.344, 0.375, 0.438 y 0.500 pulgadas).

Opción 4 (vigencia indefinida): muestreo y ensayos al producto más sistema de gestión de calidad
Visitas de vigilancia anuales*

Norma de referencia:

NMX-B-177-1990

"Tubos de acero con o sin costura, negros y galvanizados por inmersión caliente"

Vigente a partir del 30 de noviembre de 2017*
Actualización 21 de marzo de 2019
Ciudad de México a 21 de marzo de 2019

Ing. Roberto Vargas Soto
Director General

ema
ORGANISMO DE CERTIFICACIÓN
ACREDITADO 18/19

Clave de evaluación: CMX 17 C TAP 044
No. certificado: CMX-CP-2694-2019

Este certificado cancela y sustituye el certificado No. CMX-CP-2533-2017 emitido el día 30 de noviembre de 2017

El presente documento se complementa con la información indicada en el reverso, y carece de validez sin el dictamen correspondiente. Aclaraciones acerca de su alcance, aplicaciones o validez pueden solicitarse al titular o al Organismo emisor del mismo.
El uso indebido del presente Certificado dará como resultado la cancelación del mismo.
** En caso de no aceptar o no liberarse a cabo las visitas de vigilancia se cancelará este certificado*

Página 1 de 2

7. VERIFICATION AND REGISTRATION

CEN standard EN 15804 served as the core PCR	
Programme	International EPD® System www.environdec.com EPD registered through the fully aligned regional programme/hub: EPD Latin America www.epdlatinamerica.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-02008**
Date of publication (issue):	2022-02-14
Date of validity:	2027-02-13
Date of revision:	2022-02-14
Reference year of data:	2020
Geographical scope:	Mexico
Central product classification:	UN CPC 4124 Bars and rods, hot rolled, of iron or steel
PCR:	PCR 2012:01 construction products and construction services, Version 2.3 (2018-11-15)
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration data, according to ISO 14025:2006.	EPD process certification (Internal) X EPD verification (External)
Third-party verifier: Approved by:	Dr. Ruben Carnerero Acosta Approved EPD verifier r.carnerero@ik-ingenieria.com The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier:	Yes X No

8. CERTIFICATIONS

THE COMPANY HAS FOLLOWING CERTIFICATIONS:

QMS REGISTERED

Certificate of Registration

APIQR® REGISTRATION NUMBER
1370

This certifies that the quality management system of

FORZA STEEL
Carretera Salinas Victoria Km 2 S/N
Salinas Victoria, Nuevo Leon
Mexico

has been assessed by the American Petroleum Institute Quality Registrar (APIQR®) and found it to be in conformance with the following standard:

ISO 9001:2015

The scope of this registration and the approved quality management system applies to the

Manufacture of Structural, Water, Steam, Oil,
Gas and other Fluids Conduction Carbon Steel Pipes

APIQR® approves the organization's justification for excluding:

8.3 Design and Development of Products and Services

Effective Date: JUNE 13, 2020
Expiration Date: JUNE 13, 2023
Registered Since: JANUARY 2, 2019

Vice President of Global Industry Services

Accredited by Member of the International Accreditation Forum Multilateral Recognition Arrangement for Quality Management Systems

ANAB

IAF

This certificate is valid for the period specified herein. The registered organization must continually meet all requirements of APIQR's Registration Program and the requirements of the Registration Agreement. Registration is maintained and regularly monitored through annual full system audits. Further clarifications regarding the scope of this certificate and the applicability of ISO 9001 standard requirements may be obtained by consulting the registered organization. This certificate has been issued from APIQR offices located at 200 Massachusetts Avenue, NW Suite 1100, Washington, DC 20001-5571, U.S.A.. It is the property of APIQR, and must be returned upon request. To verify the authenticity of this certificate, go to www.api.org/compositelist.

QUALITY REGISTRAR

9. CONTACT INFORMATION

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Hugo Sanchez
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Marketing y relaciones publicas

LCA AUTOR

Center for Life Cycle Assessment and
Sustainable Design – CADIS
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Lago. Cuautitlan Izcalli, Estado de México,
México.
C.P. 54766
www.centroacv.mx

LCA Study: Life Cycle Assessment (LCA
methodology of structural beams hot-rolled manufactured from steel scrap.
LCA Authors: Luque Claudia, Chargoy Juan
Pablo.

Contact person:
Juan Pablo Chargoy
jpchargoy@centroacv.mx

PROGRAMME OPERATOR

THE INTERNATIONAL EPD®SYSTEM

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EPD registered through the fully aligned regional programme/hub:

EPD Latin America
www.epd-latinamerica.com

Chile:
Alonso de Ercilla 2996, Ñuñoa, Santiago Chile.

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de Baz, Estado de México, México, C.P. 54050

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ENVIRONMENTAL PRODUCT DECLARATION OF CARBON STEEL PIPING - FORZA STEEL