

# Environmental Product Declaration

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

## Electric Resistance Welded Black and Galvanized Steel tubes and pipes.



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### Program:

The International EPD System

**Registration Number: S-P-10367**

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## 1.0 PROGRAM INFORMATION

<b>Program and Address</b>	The International EPD® System EPD International AB Box 210 60, SE-100 31 Stockholm, Sweden <a href="mailto:info@environdec.com">info@environdec.com</a>
<b>Accountabilities for PCR, LCA and independent, third-party verification</b>	
<b>Product Category Rules (PCR)</b>	
<p>PCR 2019:14 Construction products (EN 15804:A2) Version 1.2.5 dated 01.11.2022          CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</p> <p>PCR Review Conducted by: The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat <a href="http://www.environdec.com/contact">www.environdec.com/contact</a></p>	
<b>Life Cycle Assessment (LCA)</b>	
<p>LCA accountability: GCAS Quality Certifications          S.B.Rajan -BS (Engg.&amp; Tech), M.Sc (GE &amp; Climate Finance), Green Finance Specialist          Alan Beski Christopher -Sustainability Consultant          P.O.Box 65561, Dubai, United Arab Emirates. <a href="http://www.gcasquality.com">www.gcasquality.com</a></p>	
<b>Third-party verification</b>	
<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006 via;</p> <p><input checked="" type="checkbox"/> EPD Verification by accredited certification body</p>	
<p>Third party verification: EUROCERT S.A. is an approved certification body accountable for the third-party verification.          EUROCERT S.A: 89 Chlois St. &amp; Likovriseos Metamorphosi GR 14452, Athens, GREECE  <a href="mailto:info@eurocert.gr">info@eurocert.gr</a> <a href="http://www.eurocert.gr">www.eurocert.gr</a>          EUROCERT S.A. is an approved certification body accountable for third-party verification          The certification body is accredited by: Hellenic Accreditation System SA (E.S.Y.D), Accreditation No. 21-8</p>	
<p>Procedure for follow-up of data during EPD validity involves third party verifier</p> <p><input checked="" type="checkbox"/> Yes   <input type="checkbox"/> No</p>	
<p>The EPD owner has the sole ownership, liability, and responsibility for the EPD.</p> <p>EPDs within the same product category but registered in different EPD programmes may not be comparable. 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.</p>	

## 2.0 COMPANY INFORMATION

TSI Metal Industries (TSI) is the leading ERW steel tubes and pipes manufacturer based in the United Arab Emirates. Our manufacturing plants are located in Dubai and Abu Dhabi and are equipped to produce high quality tubes and pipes, which are compliant with global standards. Our products are distributed across GCC countries and exported to USA, Canada, European Union, United Kingdom and Australia through select channel partners.

TSI specializes in the manufacture of ERW Black and Galvanized steel tubes and pipes. We offer wide range of products in circular, square and rectangular tubular for construction and electro-mechanical purposes. All our tubes are categorized 'non-alloy'.

Product related and Management System Certifications;

- ISO 9001:2015 Quality Management System
- ISO 14001:2015 Environmental Management System
- ISO 45001:2018 Occupational Health & Safety Management System

Owner of the EPD	TSI Metal Industries LLC
Contact	Mr. Narendra Kumar – <a href="mailto:narendra.kumar@tsim-industries.com">narendra.kumar@tsim-industries.com</a>
Name and Location of production site covered	TSI Metal Industries LLC, PO Box 31165, ICAD II, Abu Dhabi, UAE
Head Office	TSI Metal Industries LLC, PO Box 3208, Al Qusais Industrial Area 1, Dubai, UAE



## 3.0 PRODUCT INFORMATION

### 3.1 Analyzed Product

The product covered in this EPD is ERW Black and Galvanized steel tubes and pipes according to ASTM A53, ASTM A135, ASTM A795, ASTM A500, ASTM A501, EN 10219, EN 10210, EN 10255, EN 10217-1, EN 39, AS/NZS 1163 and AS 1074 standards. It is one product and offered in circular, square and rectangular tubular for construction and electro-mechanical purposes as detailed below. All our tubes are categorized 'non-alloy'.

- ERW Carbon Steel Tubes in Round, Square and Rectangular shapes. Size Range: CHS: Size 21.3-219.1 mm & Thickness 2.00-8.20 mm, SHS: Size 16X16-200X200 mm; RHS: Size 30X15-200X100 mm & Thickness 1.00-8.50 mm.
- Black and Hot-dipped Galvanized Hot Processed Welded Carbon Steel in Round, Square and Rectangular shapes. Size Range: CHS: Size 21.3-219.1 mm & Thickness 2.00-8.20 mm, SHS: Size 16X16-200X200 mm; RHS: Size 30X15-200X100 mm & Thickness 1.00-8.50 mm
- Cold-formed Welded Structural Hollow Sections of Non-Alloy and Fine Grain Steels of Circular, Square or Rectangular forms and applies to Structural Hollow Sections formed cold without subsequent heat treatment. CHS: Size 21.3-219.1 mm & Thickness 2.00-8.20 mm, SHS: Size 16X16-200X200 mm; RHS: Size 30X15-200X100 mm & Thickness 1.00-8.50 mm
- Hot-Finished Welded Structural Hollow Sections of Non-Alloy and Fine Grain Steel. Size Range: CHS: Size 21.3-219.1 mm & Thickness 2.00-8.20 mm, SHS: Size 16X16-150X150 mm; RHS: Size 30X20-200X100 mm & Thickness 1.00-8.50 mm
- Non-alloy ERW Steel Tubes for use with EN 74 couplers in the construction of falsework and working scaffolds. Tube sizes ranging 27mm, 38mm, 42mm, 63 mm are also manufactured for application in scaffoldings.
- Electric Resistance Welded, Steel Hollow Sections used for structural purposes. Size Range: CHS: Size 21.3-219.1 mm & Thickness 2.00-8.20 mm, SHS: Size 16X16-200X200 mm; RHS: Size 30X15-200X100 mm & Thickness 1.00-8.50 mm.

### 3.2 Product Specifications

<b>Physical Properties</b>	
Yield Strength : 230 to 460 Mpa min	Elongation: 25 -17% min
Tensile Strength: 310 to 720 Mpa min	-
Note: The above values are ranges of the all products. Refer to our below Technical data sheet for each product technical specifications;	

ASTM A500/500M:

<https://tsim-industries.com/pdf/technical/Technical%20Data%20ASTM%20A500%20&%20A500M.pdf>

ASTM A501/A501M:

<https://tsim-industries.com/pdf/technical/Technical%20Data%20ASTM%20A501%20&%20%20A501M.pdf>

EN 10219-1&2

<https://tsim-industries.com/pdf/technical/TEchnical%20Data%20Non%20Alloy%20EN10219.pdf>

EN 10210-1&2

<https://tsim-industries.com/pdf/technical/Technical%20Data%20%20EN10210%20.pdf>

EN 39: <https://tsim-industries.com/pdf/technical/Technical%20Data%20%20EN%2039.pdf>

AS/NZS 1163:

<https://tsim-industries.com/pdf/technical/Technical%20Data%20%20AS%20NZS%201163.pdf>

### 3.3 Product Application



**Construction**



**General Engineering**



**Fire Sprinklers & HVAC**



**Agriculture**



**Fencing**



**Value Added Solutions**

### 3.4 Product Classification & Geographical Scope

Product Group Classification	UN CPC 41288
Geographical Scope	Manufactured in Abu Dhabi, UAE and are distributed Globally.

## 4.0 LCA INFORMATION

### 4.1 Declared Unit

The Declared Unit of the Life Cycle Assessments is One-Ton of ERW Steel tubes.

### 4.2 Time representativeness

Manufacturing facility specific data from TSI Metal Industries are based on 1 year average for process data (Reference year January to December 2022). The following rules for time scope of data were applied - < 10 years for background data and < 2 years for manufacturer's data.

### 4.3 LCA Software and Database

Version 3.14.0.15 of software Air.e LCA™ with Ecoinvent™ 3.9 database has been used for LCA modeling and impacts calculations.

### 4.4 System Boundaries

This EPD covers all product stages from “cradle to gate with options”, i.e this LCA covers Production stage A1-A3, Transportation A4, End of life stages C1-C4 and Resource recovery stage D according to EN 15804 + A2/AC:2021.

The procedures that are not controlled by the company, but are included in this environmental study, are:

- The extraction and production of fuels.
- The production of electricity.
- The production of the machinery, buildings, and vehicles.

All related direct and indirect environmental impacts related to these elements have been calculated and were included in the LCAs in this EPD.

**Upstream Processes** (A1: Raw Material Supply): Production of the product starts with mainly raw material production and transportation from different parts of the world and some locally sourced. 'Raw material supply' includes raw material extraction before production.

**Core Processes** (A2: Transportation, A3: Manufacturing and A4: Transport): Transport is relevant for delivery of raw materials to the plant and the transport of materials within the plant. Electricity and Diesel are consumed in the production process. Steel Tubes are distributed to customer's places. To create a scenario of the A4 phase, all the tubes sold from January – December 2022 has been analyzed as representative of the international transport. The transport means are international cargo ships and heavy trucks, Euro 6.

Scenario Details	Description
Vehicle used for transport	Long distance truck >32t truck
Vehicle capacity	25 tons
Fuel type and consumption	Diesel, 0.38 liters per km
Capacity utilization (including empty drums)	50% as assumed in Ecoinvent
Bulk transportation	Mass of the transported product.
Ship- Transoceanic cargo ship	Capacity 50,000 Kg(dw). 0.24 Litres of heavy fuel oil per km

### C1 - Demolition and Deconstruction

95% of the steel is removed during demolition with diesel consumption of machineries: (60.8 liters/hour; capacity approx. 15 m<sup>3</sup>/h) and 40% is dismantled with hydraulic excavator and tongs (diesel consumption of excavator: 36.1 liters/hour; capacity approx. 20 m<sup>3</sup>/h). The ratio of steel to concrete content is 4.8 %, corresponding to 120 kg reinforcing steel per m<sup>3</sup> reinforced concrete (Source: German Environment Agency). Calculated diesel consumption for the demolition of 1 kg steel is 0.0013 liters.

### C2 - Transportation of demolished items

With a collection rate of 100%, the transports are carried out by truck over 50 km and with a capacity utilization of 50%. Since the product is poured into concrete, it is collected as mixed construction waste.

### C3 - Waste Processing

Steel must be mechanically separated from the concrete or any other material surrounding them prior to recycling so that the steel can be made available to a downstream product system as secondary material. This is considered in module C3. The impact level is negligible.

### C4 - Disposal

Landfilling of the remaining 5% which is not collected for recycling is considered in module C4.

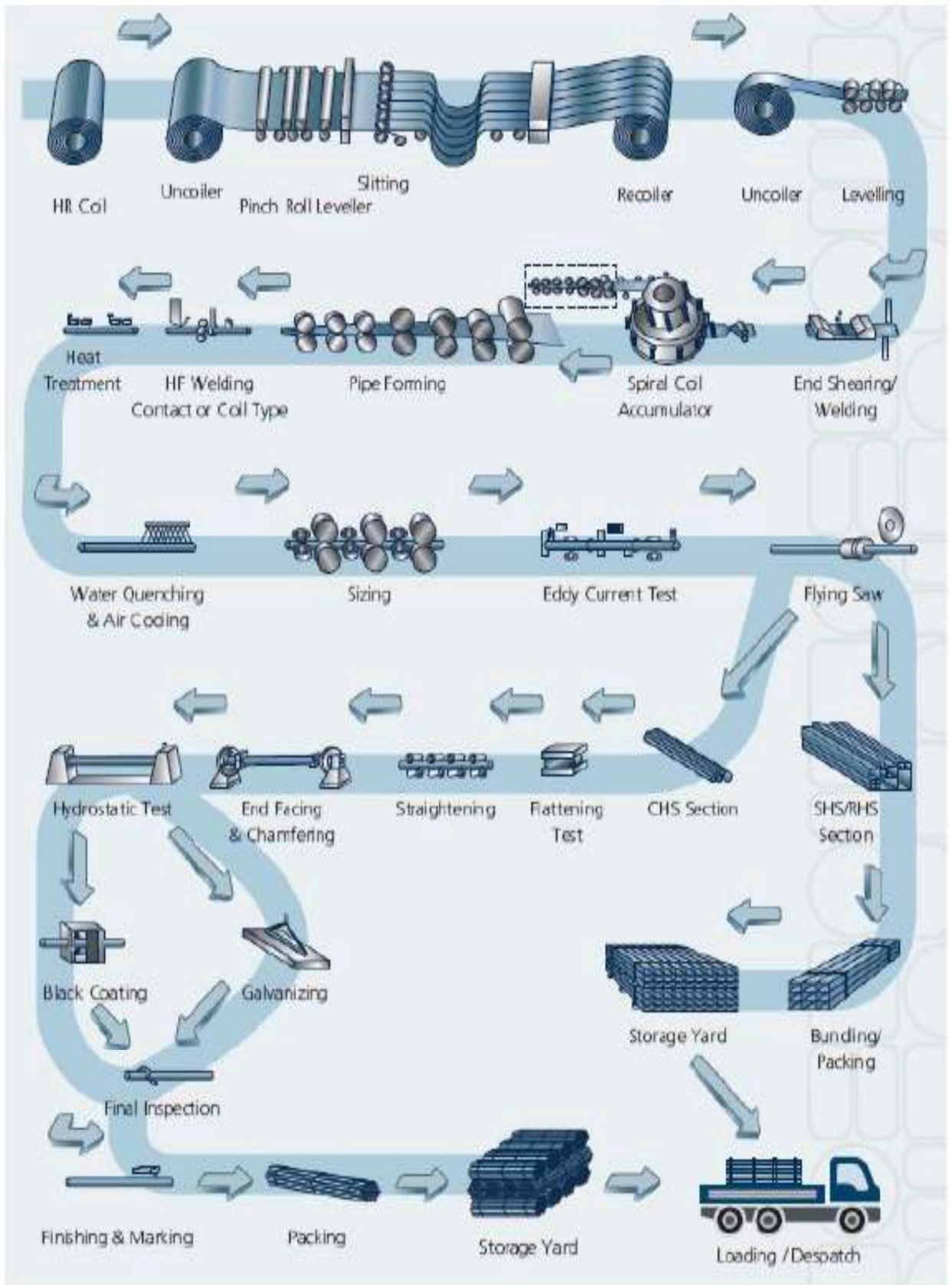
Scenario Details	Description
Collection Process by type	1 ton of collected product mixed with construction waste
Recovery	95% steel. 0.95 tons of steel for recycling & 0.5 tons of steel to landfill.

### D - Reuse, Recycling, and Recovering Potential

Module D contains credits from the recycling of steel in module C3. Corresponding potentials and avoided loads are assigned to module D. As a result of the recycling process the production of steel is avoided.



## 4.5 Manufacturing Flow and System Diagram

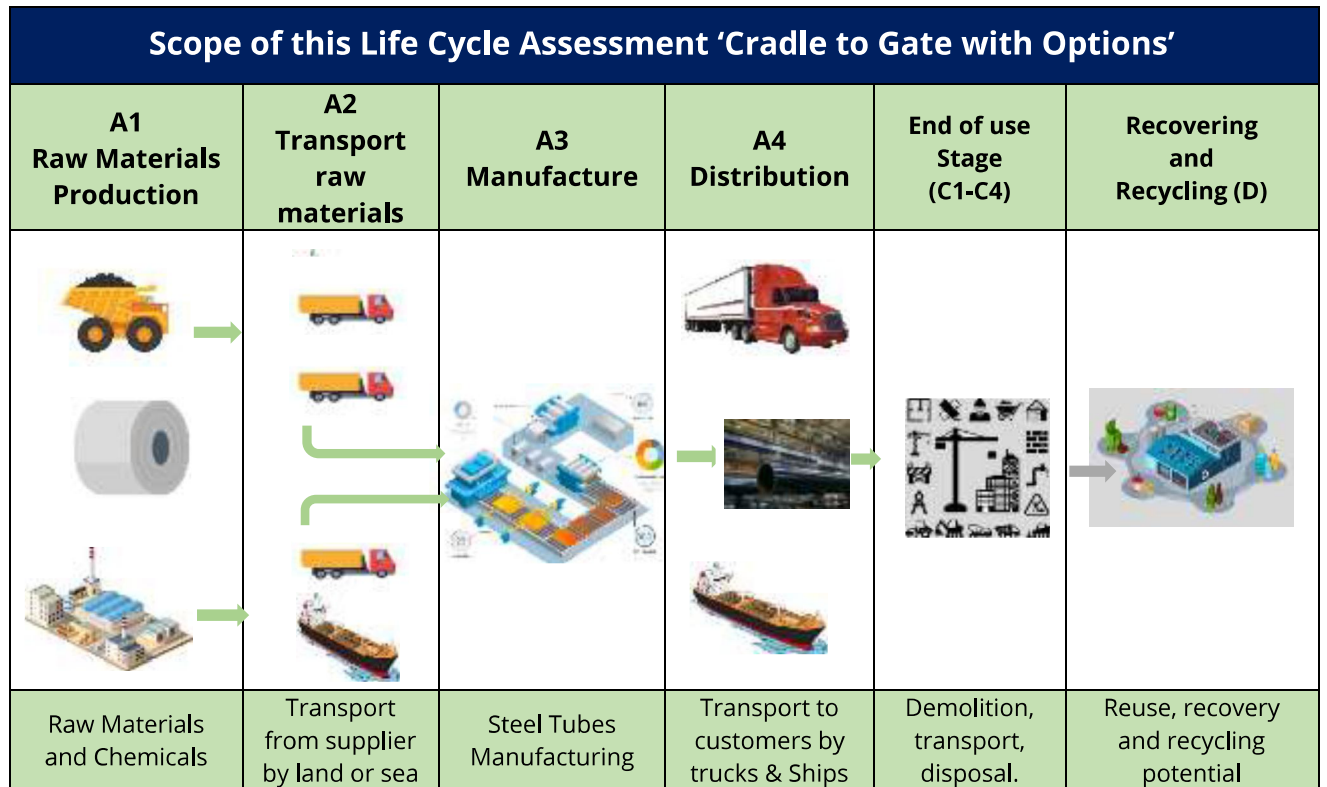


**The scope of this EPD is "cradle to gate with options".**

Possible scopes of the LCA defined in the European standard EN 15804:2012+A2:2019/ AC:2021 are:

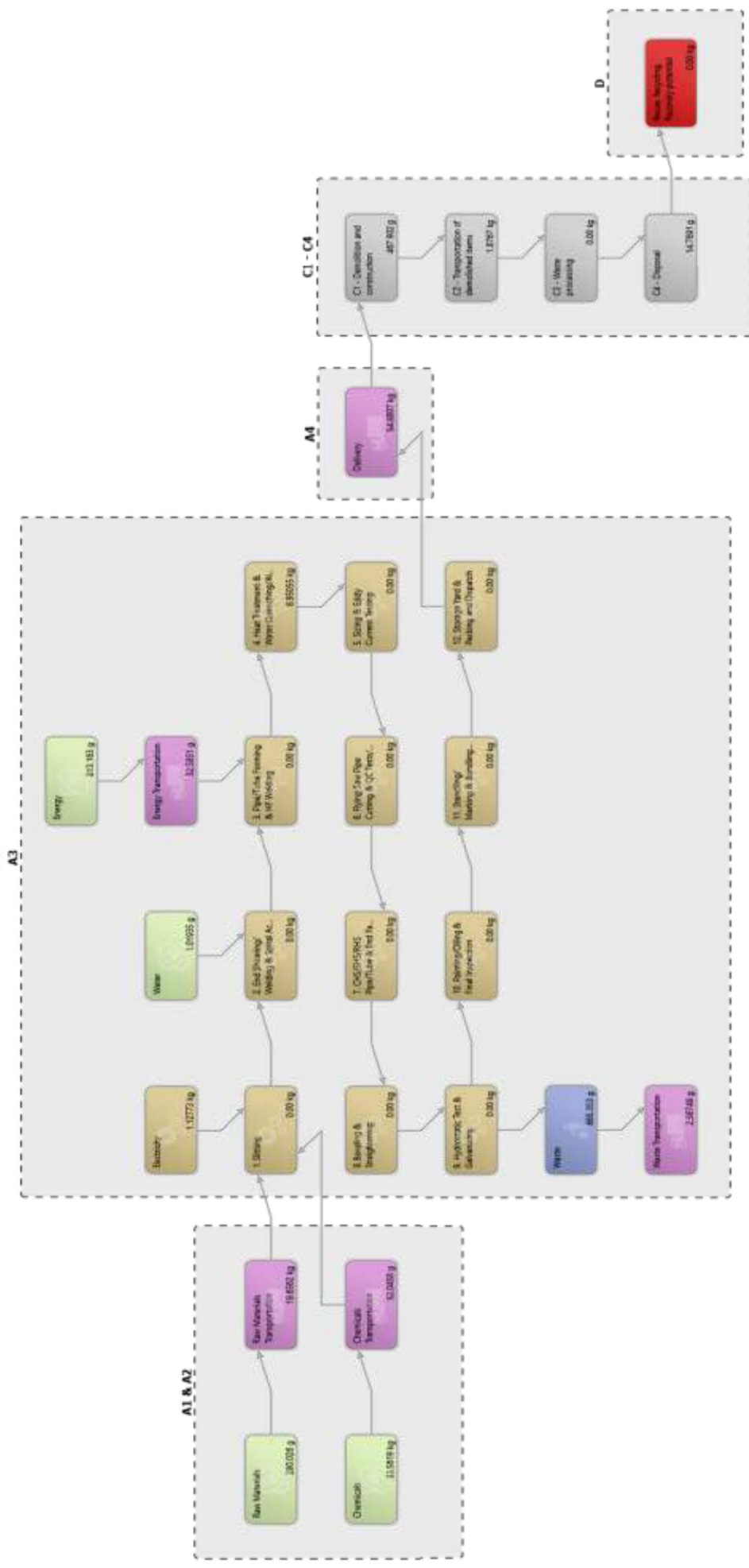
	Production Stage			Construction Process Stage		Use Stage							End of Life Stage				Resource Recovery Stage
	Raw Materials	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction Demolition	Transport	Waste Processing	Disposal	Reuse Recovery Recycling Potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	UAE/ GLO	UAE/ GLO	UAE	-	-	-	-	-	-	-	-	-	GLO	GL O	GL O	GL O	GLO
Specific data	GWP > 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	One Product			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	One Manufacturing Site			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X = Included, ND=Module not declared, NR= Module not relevant



The following diagram designed using Air.e LCA software shows system boundaries and example of the materials, fuels consumption, energy consumption, transports and other elements included in the assessments.

### Life Cycle Assessment Modeling



#### 4.6 More information

**Cut-off rules:** more than 99% of the materials and energy consumption have been included. The Polluter Pays Principle and the Modularity Principle have been followed.

**Allocations:** All production of TSI Metal Industries represents ERW steel tubes of different weight and length. The allocation of common inputs and outputs is based on the general allocation rule what represents the proportion of production of every specific product in overall production expressed in a ton. Generic process data for production of input materials were used.

**Electricity:** A specific dataset with the Life Cycle Inventory (LCI) corresponding to the electricity mix in United Arab Emirates, has been used for this LCA.

**Calculation Rules:** Datasets from Ecoinvent 3.9.0 with emission factors for raw materials and generic chemicals have been characterized to adjust them to the characteristics of manufacturing of TSI Metal Industries L.L.C suppliers or counties where suppliers are located. Specific datasets with the emissions factors corresponding to the fuel combustion of production plant and machinery have been developed for these LCAs. Indirect emissions due to diesel production and transportation are also included in the environmental impact.

Minor components are not directly related to the product, with less than 1% impact, such as office supplies, has been excluded from the assessment.

All transports of components have been included in the LCA considering real distances travelled by materials used from January – December 2022. Transport of raw materials needed to produce steel tubes is estimated in a global scale according to Ecoinvent™ criteria. Main means of transport have been included for materials purchases. As exact port locations are not known in detail, transport distances have been calculated from a one of the ports in the country of origin to the factory. Operation in port has also been excluded. Road distances calculated using Google Maps. Maritime distances calculated using Marine Traffic Voyage Planner.

**By Products Assignment** There are no By Products in this Environmental Product Declaration. Hence, no allocation had to be applied.

#### 4.7 Content Declaration

Product Components	Weight Kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	990	0	0
Zinc	10	0	0
<b>Total</b>	<b>1000</b>	<b>0</b>	<b>0</b>

Packaging Materials			
Packaging Materials	Weight Kg	Weight % (Versus the Product)	Weight biogenic carbon, kg C/kg
Wooden Pallet	2.83	0.0283	0*
LDPE	27.83	0.2783	0
Metal Straps	0.237	0.00237	0
Total	30.897	0.30897	0

\*Biogenic carbon content is not presents since the packaging weights less than a 5% over the product's weight.

#### 4.8 Substances listed in the “Candidate List of SVHC”

The following list includes all the substances used to manufacture the product that are included in the Candidate List of Substances of very high concern by European Chemicals Agency and their content exceeds 0,1% of the weight of the product.

For black and unpainted steel pipes, TSI Metal Industries LLC does not use any chemicals stated in the SVHC candidate list. During pipe galvanizing process zinc ingots is used, which contains lead in a percentage less than 0.001 %.

Substance	EC number	CAS number
Lead	231-100-4	7439-92-1

## 5.0 ENVIRONMENTAL PERFORMANCE

### 5.1 Potential Environment Impacts

In the following tables, the environmental performance of the declared units “One-Ton of ERW Tubes” is presented for the TSI Metal Industries L.L.C product totalized and for every sub-phase of the life cycles. During the assessment it was not evident to distinguish the differences in the consumption of electricity, water, diesel, raw material and chemicals during the manufacturing process of the steel tubes. Hence, the calculation is based on total production vs total consumption against production of the product. *This EPD values are applicable to specifically ERW tubes.*

Environmental impacts are calculated using the EF-3.0, (ILCD).

*Disclaimer: “According to the EN 15804:2012+A2:2019 standard, the LCIA results are relative expressions translating impacts into environmental themes such as climate change, ozone depletion, etc. (midpoint impact categories). Thus, the LCIA results do not predict impacts on category endpoints such as impact on the extinction of species or human health. In addition, the results do not provide information about the exceeding of thresholds, safety margins or risks”.*

## ERW Tubes

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

### Core Environmental Impact Indicators

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change (GWP) – fossil	kg CO2e	6.53E+01	5.49E+01	ND	ND	4.67E-01	1.88E+00	0.00E+00	1.45E-02	-2.17E+00
Climate change (GWP) – biogenic	kg CO2e	1.60E+00	5.56E-03	ND	ND	3.12E-04	0.00E+00	0.00E+00	1.37E-04	-5.84E-04
Climate change (GWP) – LULUC	kg CO2e	-6.24E-03	3.06E-05	ND	ND	-1.68E-05	0.00E+00	0.00E+00	-3.12E-06	-5.66E-05
Climate change (GWP) – total	kg CO2e	6.52E+01	5.49E+01	ND	ND	4.68E-01	1.88E+00	0.00E+00	1.48E-02	-2.17E+00
Ozone depletion	kg CFC11e	5.41E-06	5.21E-06	ND	ND	7.86E-07	0.00E+00	0.00E+00	1.66E-09	-7.52E-07
Acidification	mol H+e	4.72E-01	8.64E-01	ND	ND	5.73E-03	6.60E-04	0.00E+00	1.00E-04	-5.84E-04
Eutrophication, aquatic freshwater	kg PO4e	3.10E-02	2.52E-03	ND	ND	1.07E-04	0.00E+00	0.00E+0	2.23E-05	-1.61E-03
Eutrophication, aquatic freshwater	Kg P eq	1.01E-02	8.21E-04	ND	ND	3.48E-05	0.00E+00	0.00E+00	7.26E-06	-5.23E-04
Eutrophication, aquatic marine	kg Ne	1.32E-01	2.15E-01	ND	ND	7.27E-04	3.27E-04	0.00E+00	1.90E-05	-1.61E-02
Eutrophication, terrestrial	mol Ne	1.39E+00	2.39E+00	ND	ND	7.97E-03	3.69E-03	0.00E+00	1.70E-04	-1.77E-01
Photochemical ozone formation	kg NMVOCe	3.78E-01	6.19E-01	ND	ND	3.22E-03	9.74E-04	0.00E+00	4.64E-05	-4.61E-02
Abiotic depletion, minerals & metals	kg Sbe	6.76E-04	3.60E-05	ND	ND	5.93E-07	0.00E+00	0.00E+00	1.78E-06	-1.49E-06
Abiotic depletion of fossil resources	MJ	7.02E+02	3.55E+02	ND	ND	5.03E+01	0.00E+00	0.00E+00	1.80E-01	-4.13E+01
Water use	m3e depr.	5.50E+01	8.00E-01	ND	ND	1.75E-02	0.00E+00	0.00E+00	1.60E-02	-2.76E-01

EN 15804+ A2 disclaimers for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

## Additional Environmental Impact Indicators

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2.61E-06	8.55E-07	ND	ND	2.90E-08	3.48E-09	0.00E+00	7.83E-10	-4.67E-06
Ionizing radiation, human health	kBq U235e	2.45E+00	1.52E+00	ND	ND	2.10E-01	0.00E+00	0.00E+00	1.75E-03	-1.97E-01
Eco-toxicity (freshwater)	CTUe	2.10E+03	2.07E+02	ND	ND	2.54E+01	4.99E-03	0.00E+00	1.30E+00	-1.25E+01
Human toxicity, cancer effects	CTUh	4.26E-08	1.56E-08	ND	ND	1.86E-10	6.44E-11	0.00E+00	2.34E-11	-6.49E-09
Human toxicity, non-cancer effects	CTUh	1.26E-06	1.80E-07	ND	ND	5.66E-09	3.19E-09	0.00E+00	9.09E-10	-1.12E-08
Land use related impacts/soil quality	-	9.74E+01	4.43E+01	ND	ND	5.92E+00	0.00E+00	0.00E+00	1.38E-01	-2.45E+00

EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

## Environmental impacts – GWP-GHG

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG	kg CO2e	6.36E+01	5.49E+01	ND	ND	4.68E-01	1.88E+00	0.00E+00	1.46E-02	-2.17E+00

This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

## Use of Natural Resources

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	2.77E+01	2.24E+00	ND	ND	1.17E-01	0.00E+00	0.00E+00	2.39E-02	-8.42E-11
Renewable PER used as materials	MJ	1.27E-01	9.90E-03	ND	ND	5.73E-04	0.00E+00	0.00E+00	4.60E-05	-3.85E-03
Total use of renewable PER	MJ	2.78E+01	2.25E+00	ND	ND	1.18E-01	0.00E+00	0.00E+00	2.39E-02	-3.85E-03

Non-renew. PER used as energy	MJ	7.02E+02	3.55E+02	ND	ND	5.03E+01	0.00E+00	0.00E+00	1.80E-01	-6.92E+01
Non-renew. PER used as materials	MJ	7.73E-05	5.92E-06	ND	ND	2.74E-07	0.00E+00	0.00E+00	5.27E-08	-5.98E-06
Total use of non-renewable PER	MJ	7.02E+02	3.55E+02	ND	ND	5.03E+01	0.00E+00	0.00E+00	1.80E-01	-6.92E+01
Use of secondary materials	Kg	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renew. secondary fuels	MJ	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	2.52E+04	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PER abbreviation stands for primary energy a resource

## End of Life - Waste

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste	Kg	1.45E+05	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste	Kg	4.17E+03	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste	Kg	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## End of Life - Outflows

Impact Category	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for reuse	Kg	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E+08
Materials for recycling	Kg	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	Kg	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	7.58E+06	0.00E+00
Exported energy - electricity	MJ	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	MJ	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



## Biogenic Carbon Content

Details	Unit	A1-A3
Biogenic carbon content in product	Kg C	0
Biogenic carbon content in packaging	Kg C	0

### 5.2 Interpretation of LCA Study Results

In general terms, as it is shown in the table of core environmental impact indicators, A1-A3 modules have the higher impact, representing above 80% of the whole impact. A4 module has a less impact. C2 and C4 module has little impact too, representing at most 0.16% and 0.01% respectively of the whole impact. Finally, Module D represents savings between 0.1% and 20% of the total impact.

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## 6.0 ADDITIONAL INFORMATION

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### 6.1 Action against Erosion, Environmental Restoration, and Landscaping of the work.

Application of measures to prevent erosion, restore the environment, and landscape the job includes restoring all elements immediately connected to it. The restoration of other related items indirectly is also suggested, including work roads, auxiliary facilities, and loan and landfill lands.

Quality assurance is an integral part of all aspects of the process flow, governing daily work to an extent far beyond the requirements of applicable standards.

In the areas of air protection, TSI Metal Industries makes an effort to stop pollution and lessen its damaging effects on the environment management of both waste and water. The foundation of quality and environmental policy is a long-term growth plan built on recognized and global trends that have been expertly evaluated in relation to the development of potential clients' needs.

The following strategic actions ensure the aforementioned expected worldwide trends:

- Increasing product quality and value without raising production's energy intensity or environmental burdens through ongoing technical advancements and equipment replacement.
- Ensuring that the requirements of the customer for production of tubes for a particular use are met.
- Constantly discovering consumer needs, routinely and methodically analyzing them, and responding to them in production.
- Preventing pollution while adhering to the integrated permit's stringent legal and other criteria. Encouraging staff and increasing their understanding of environmental preservation.

### 6.2 Information related to Sector EPD

This is not a sector EPD.

### 6.3 Differences versus previous versions

This is the first version of the EPD.

## 7.0 REFERENCES

LCA Report: Life Cycle Inventory of ERW Tubes of TSI Metal Industries LLC.

Software: Air.e LCA Version 3.14.0.15 [www.solidforest.com](http://www.solidforest.com)

Main database: Ecoinvent 3.9 [www.ecoinvent.org](http://www.ecoinvent.org)

Geographical scope of the EPD: Global

ISO 14040:2006 "Environmental management -- life cycle assessment -- principles and framework";

ISO 14044:2006 "Environmental management -- life cycle assessment -- requirements and guidelines";

ISO 14020:2000 "Environmental Labels and declarations - General Principles

ISO 14025:2006 "Environmental labels and declarations -- type III environmental declarations -- principles and procedures".

EN 15804+A2:2019/AC:2021 European Committee for Standardization: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

General Programme Instructions of the International EPD® System. Version 4.0

Product Category Rules PCR 2019:14. Construction Products. Version 1.2.5 dated 01-11-2022

