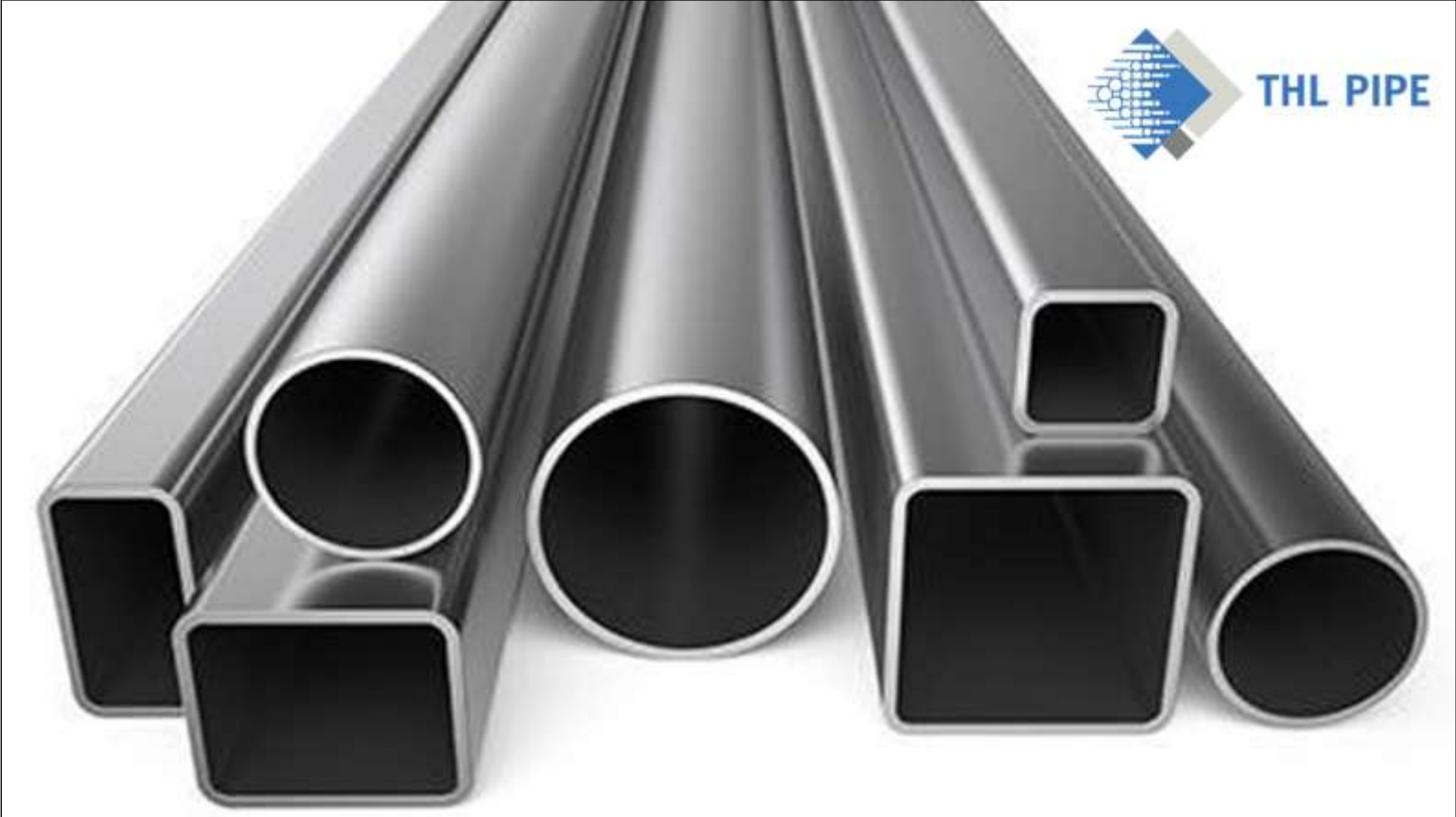


THL PIPE

Environmental Product Declaration

Programme :	The International EPD® System, www.environdec.com
Programme Operator :	EPD International AB
EPD registration number :	S-P-05200
Publication Date :	2021-11-26
Valid Untill :	2026-11-25
	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

In accordance with ISO 14025 and EN 15804 for :

High Frequency Welded Round Pipes, Square Tubes, Rectangular Tubes and Specialized Pipes

(MS Pipe & Tube, Line Pipe, Casing Pipe, Galvanized Pipe, Black Enamel Painted Pipe & Grooved Pipe)

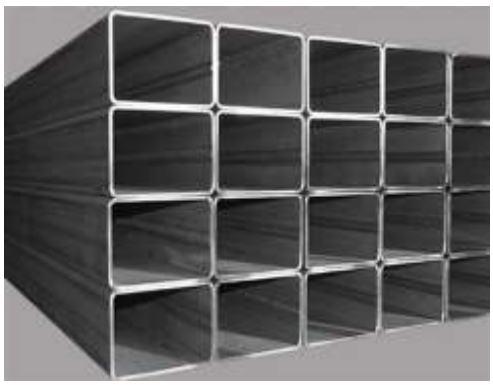
ECO PLATFORM EPD EN 15804 VERIFIED

EPD® THE INTERNATIONAL EPD® SYSTEM

TABLE OF CONTENTS

1.0 DOCUMENT INFORMATION

Program	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Product Category Rules (PCR)	PCR 2019:14 PCR 2019:14 Construction products (EN 15804:A2) (1.11)
Product Group Classification	UN CPC 41288
PCR Review Conducted by	IVL Swedish Environmental Research Institute Secretariat of the International EPD® System
Independent third-party verification of the declaration and data, according to ISO 14025:2006	☐ EPD Process Certification ☒ EPD Verification
Third party verifier	Professor Vladimír Kocí Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier	☐ Yes ☒ No
Geographical Scope	United Arab Emirates and Global



2.0 INTRODUCTION

This report contains the environmental performance of the high frequency welded Steel Pipes and Tubes by THL Tube & Pipe Industries LLC. This Environmental Product Declaration (EPD) has been developed using the Life Cycle Assessment (LCA) methodology. The environmental impact values calculated are expressed to 1 metric ton (MT) of Steel Pipe.

The assessed life cycle includes all phases in the manufacturing process of high frequency welded Steel Pipes and Tubes in a “Cradle to Gate with options” scope. This LCA covers from the supply of raw material (HR coil) and all other processes up to the distribution of final product to the customer. For pipe finishing, and under customer requirement, THL do black painting or galvanizing.

This EPD has been conducted according to the program operator regulations and it has been verified and registered in The International EPD System. The EPD regulation is a system for the international use of Type III Environmental Declarations, according to ISO 14025:2010. Not only the system, but also its applications, is described in the Programmer’s Product Category Rules (PCR). This report has been made following the specifications given in the European standard EN 15804:2012+A2:2019.

The direct and indirect emissions and the corresponding environmental impacts calculated in the life cycle assessments and reported in this EPD include, amongst other, the calculation of the environmental impacts to air, land and water, according to the selected Product Category Rules.

3.0 GENERAL INFORMATION

THL Tube & Pipe Industries LLC

P.O.Box 49695, Dubai Investment Park 2
Dubai
United Arab Emirates
Tel.: +971 4 8848221
Fax: +971 4 8848229
www.thlpipe.com

THL Tube & Pipe Industries LLC is a fully owned subsidiary of TAURANI HOLDINGS LTD. THL Tube & Pipe Industries LLC is one of the leading manufacturers, stockist and distributors of high frequency welded steel pipes and tubes in the United Arab Emirates. Spread over 25,000 square meters, the company is well positioned to cater to a diverse clientele across many sectors from Oil & Gas to Onshore Exploration, Water Treatment and Desalination to Petrochemical & Refinery, Agriculture and Water Irrigation to Scaffolding and Handrail Equipment.

The mill's manufacturing size range consists of Round pipes from sizes 4" to 12", Square tubes from size 40 x 40 to 250 x 250 and Rectangular tubes from size 60 x 40 to 300 x 200 in thicknesses from 1.5 mm to 12.7mm, using material Grades S235JR, S275J0, S275J2, S355J0, S355J2 and as per client/ customer requirements. One of the production lines is especially dedicated for manufacturing structural tubing in standards as per ASTM A500, AS/ NZS 1163 and EN10219.

THL's growth trajectory is well piloted by its able management and intricately supported by its dedicated human capital. With its manufacturing facilities in Dubai Investment Park and an amicable sales and stocking/ distribution network across GCC, Europe, Australia, Canada and North America, the company is well positioned to efficiently service its vast customer base across five continents.

Under the aegis of its gifted leadership and committed work force, the company has and will continue upgrading its services and keeps on enhancing its already vast product portfolio to match its every customer's requirement and is well poised to broaden its spectrum across many other emerging markets.

3.1 Analyzed Product

The assessed system in this Environmental Product Declaration (EPD) comprises the full life cycle of high frequency welded Steel Pipes and Tubes by THL Tube & Pipe Industries LLC in its factory in Dubai. The assessment has been done using the production data from August 2020 – July 2021.

THL produces steel pipes in a wide range of sizes and finishes. This EPD comprises the general environmental assessment of the following types of steel tubes and pipes:

- Electric Resistance Welded Steel Pipes: ERW pipes are manufactured from HR coils;
- Black and Galvanized Rolled Grooved Pipes: To preserve steel for a long time, galvanized pipes are produced from the unpainted pipes by coating them with zinc;
- Water based Blue Painted pipes are produced from ERW unpainted pipes.

The above types of tubes and pipes have the same process flow, from raw material (HR coil) extraction to unpainted pipes (raw pipes) production. For pipe finishing, and under customer requirement, THL do black painting or water based blue painting or galvanizing.

3.2 Product Applications


Oil & Gas

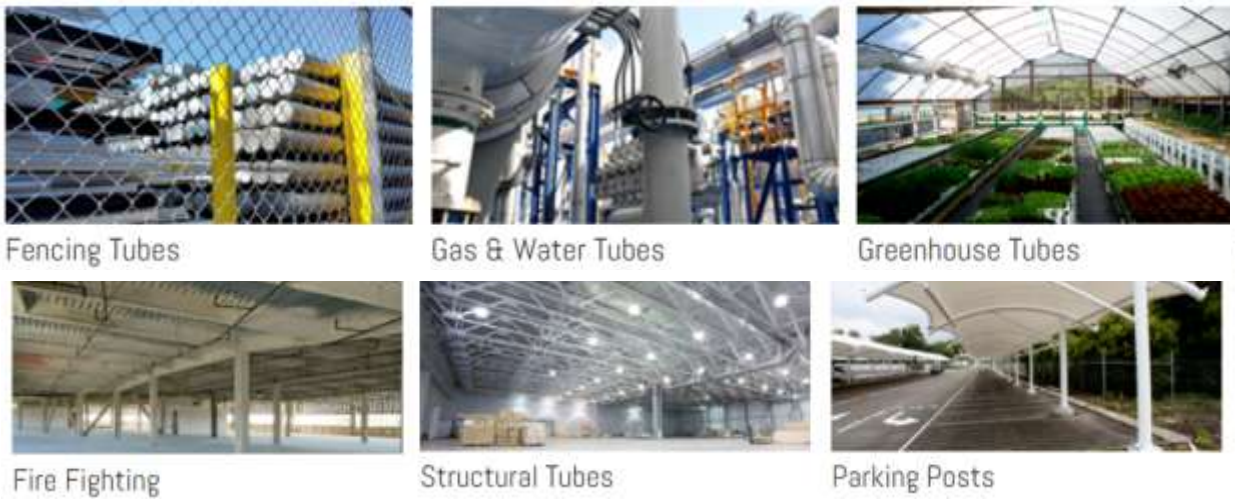

Water Desalination


Agriculture


Petrochemical


Sprinkler System


Lighting Poles



3.3 Declared Unit

The Declared Unit of the Life Cycle Assessments is 1 metric ton (MT) of Steel Pipe at the gate of the customer.

All direct and indirect environmental impacts, as well as the use of resources, are reported referred to this unit. This EPD presents separately the environmental impacts associated to the LCA of all the high frequency welded Steel Pipes and Tubes analyzed in this EPD.

3.4 System Boundaries

This EPD covers all product stages from "Cradle to Gate with options", this means that process in the life cycle from raw materials extraction, production and transport to final customers are included. In addition to this the end of use and final recovery stages are included in this LCA.

THL Tube & Pipe Industries LLC buys the raw materials HR Coils from external suppliers. From this point, THL Tube & Pipe Industries LLC controls all the production process: slitting, uncoiling, forming, welding, cooling, ultrasonic testing, hydrostatic testing, end facing, straightening, marking and Packing.

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.

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 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	UAE/ GLO	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data	GWP > 90%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not Applicable				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not Applicable				-	-	-	-	-	-	-	-	-	-	-	-	-

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

Modules from A5 to B7 are not included (X refers to considered stage; N refers to not relevant stage and ND to not declared stage).

Upstream Processes (A1: Raw Material Supply): Production for each product starts with mainly transported from GCC Countries and some locally sourced. 'Raw material supply' includes raw material extraction and pre-treatment processes before coating.

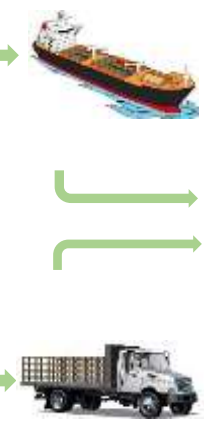
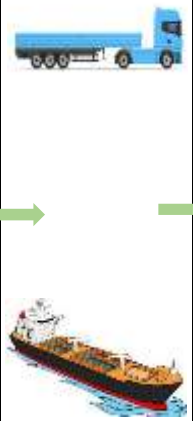
Core Processes (A2: Transportation, A3: Manufacturing and A4: Transport): Transport is relevant for delivery of raw materials to the plant. All high frequency welded Steel Pipes and Tubes products are distributed to customer's sites.

3.5 Product Stages

A simplified model of the manufacturing process is described in the following diagrams, enumerating the main activities included in the system boundaries. The process and facilities are also linked to the phases of the product life cycle. The first phase in the LCA is the high frequency welded steel pipes and tubes. THL buys the HR Coils & Paints, etc. from different suppliers and from different parts of the world (A1-A2). Slitting, uncoiling, forming, welding,

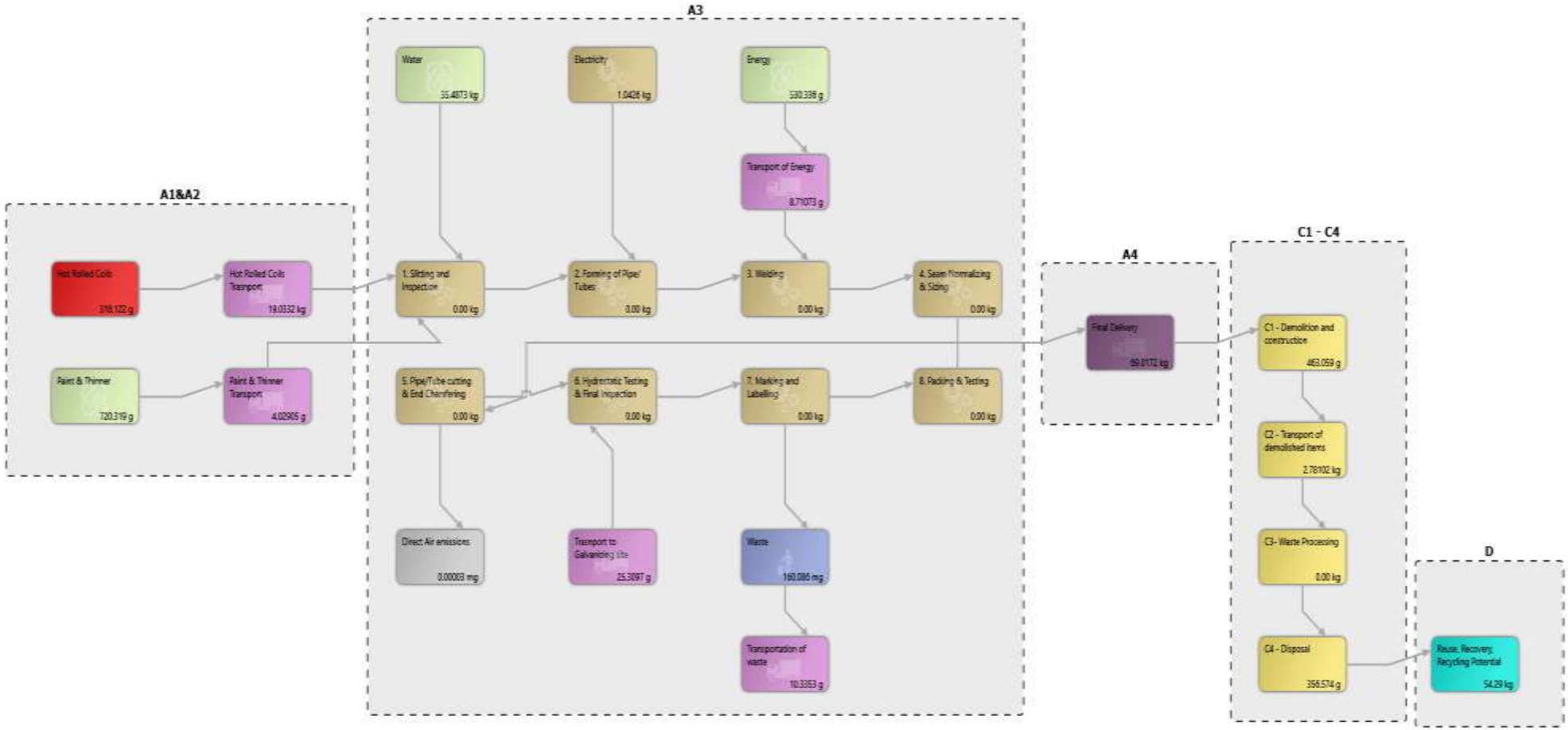
cooling, ultrasonic testing, hydrostatic testing, end facing, straightening, marking and Packing (A3).

Tube and Pipes are distributed to customers around the world (A4). Deconstruction/ demolition, transport, disposal considered in C1-C4 stage and Reuse, recovery and recycling potential considered in D stage. In this EPD environmental impacts are reported by high frequency welded steel pipes and tubes type of product.

Scope of this Life Cycle Assessment 'Cradle to Gate with Options'					
A1 Raw Materials Production	**A2 Transport raw materials**	**A3 Manufacture**	**A4 Distribution**	**End of use Stage (C1-C4)**	**Recovering and Recycling (D)**
					
Raw Materials and Chemicals	Transport from supplier by Road & Sea	Loading, forming, welding, inspection, unloading, packing etc	Transport to customers by Road & Sea	Deconstruction/ demolition, transport, disposal.	Reuse, recovery and recycling potential

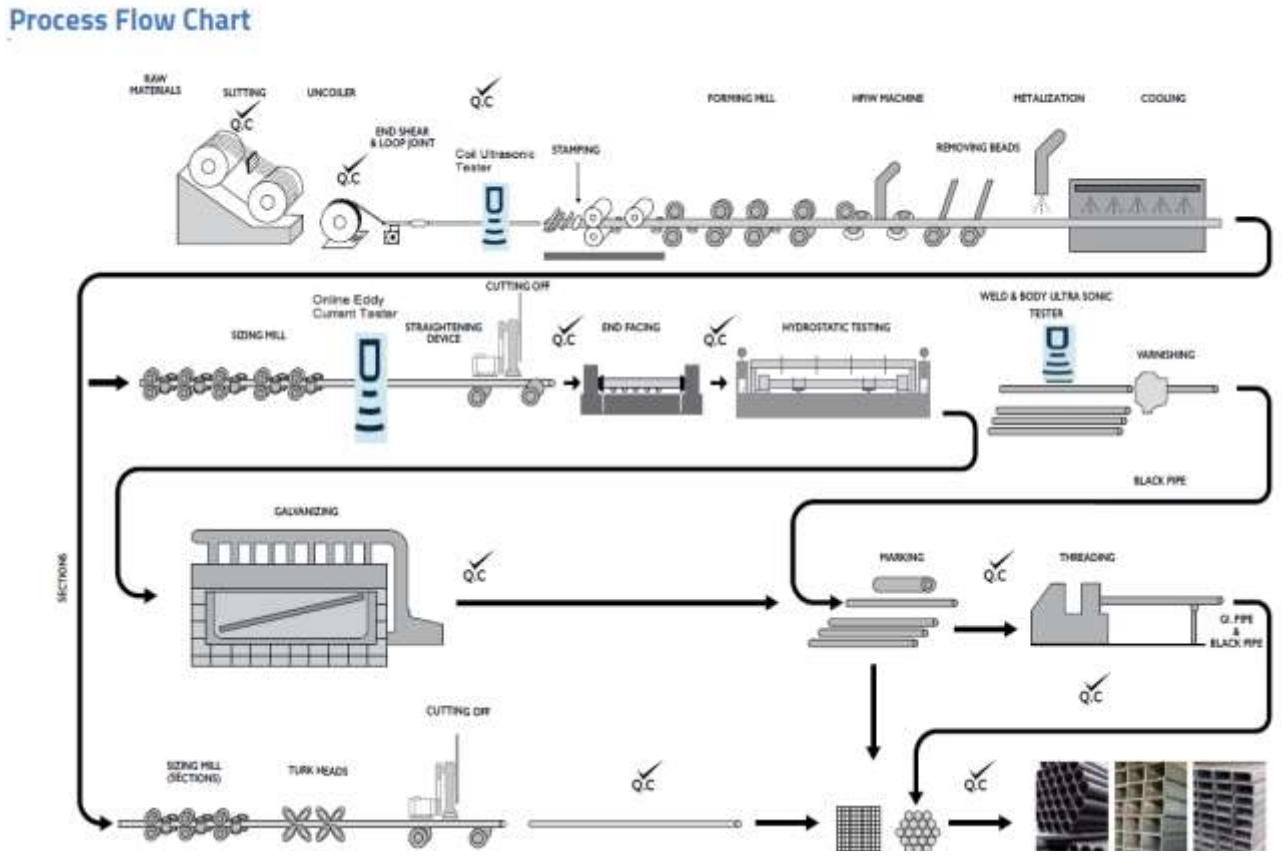
The following diagram designed using Air.e LCA software shows and example of the materials, fuels consumption, energy consumption, transports and other elements and procedures included in the assessments.

Life Cycle Assessment



The following diagram is a more detailed description of the A3 phase.

Manufacturing Process



- **HR Coils** - HR Coils for production of pipes will be procured from approved vender. The steel shall be of fully killed, with grain size ASTM 7 or finer as per ASTM E 112. Mechanical properties of HR Coil material shall confirm to TDC of raw material / applicable standard.

- **Forming** - Slit is passed through horizontal and vertical forming rolls to receive a defined diameter open edge round pipe suitable for welding. At the final stage of forming, rolls are provided with guide fins to have a proper proportionate gap & correct entry in welding roll.

- **Welding** - The performed shape of pipe is finally passed through welding heads 'V' edges controlled by the seam guide. The welding process is ERW with high frequency induction welder. The fusion takes place through five roll assembly set at the Mill which ensures proper welding. Bead scarfing shall be done as per applicable standard & Client specification. Welding parameters, like-current, voltage, welding speed and heat treatment temperature shall be monitored. The welding temperature shall be adequate to form weld. By controlling various controlling parameters, desired welding quality is achieved.

- **Seam normalizing** is carried out on weld and HAZ after the welding. The normalizing equipment is based on medium frequency. Seam normalizing temperature is monitored by the non-contact temperature indicator.
- **Sizing** - The water cooled pipe is passed through a set of sizing roll which controls the ovality and required dimensions stipulated in respective specification. This is finally verified by measuring gauge.
- **Cutting** - The pipes are cut to length by cut of carriage (COC) as per client requirement.
- **End Chamfering** - Cut cleanly and nominally square with the axis of the pipe and free from burrs.
- **Bevelling** - Each pipe is transferred to end preparation stand where both ends of the pipe are bevelled at an angle 30,-0/+5 degree with root face 0.063" ± 0.031" (1.60mm, ±0.80mm).
- **Hydrostatic Testing** - Pipes are taken from mill as per plan. Clean the internal diameter of pipe properly to avoid any chips and ID bead. The requirements (test pressure & holding time) are verified as per applicable standards. Pipes are checked for any leakage during testing.
- **Final Inspection** - Dimension of pipe shall be measured by calibrated gauges and acceptance as per the applicable standard.
- **Marking/Labeling** - The relevant marking stipulated in applicable standard / specification shall be Paint / Inkjet stenciled on each length of the pipe. Additionally, the pipes shall be bundled as per Client requirement and each bundle tagged with permanent & legible label at both end.
- **Packing and Handling** - Sufficient care should be exercised while storing, packing and handling of products. While storing and transporting them, adequate ventilation should be provided. It is necessary to store galvanized pipes with space in between them.
- **Testing** - Materials testing like Flattening Test, Tensile Test, Impact Test, Metallographic Test & Chemical analysis are carried out as per work instruction / applicable standard.

3.6 Sustainable Practices

THL operations are certified in accordance with industry and international standards to meet regulations and environmental requirements. These are some of the sustainable practices throughout their manufacturing operations:

- ISO 9001:2015 Certification;
- ISO 14001:2015 Certification;
- ISO 45001:2018 Certification;

- API 5L Grade A25 to X70 PSL1;
- API 5L Grade B to X 80 PSL2;
- API 5CT Grade H40, J55 & K55;
- CE marking for manufacture as per EN 10255 & EN 10219 standards;
- Factory production control for manufacture as per EN 10219 & AS/ NZS 1163.

3.7 Content Declaration

Materials	Percentage
Steel	98%
Zinc	1%
Paint and Thinner	1%

3.8 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, THL Tube & Pipe 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

4.0 TECHNICAL INFORMATION

4.1 Calculation Methodology

This EPD represents a Type III Environmental Declarations according to ISO 14025:2006. The Life Cycle Assessment (LCA) has been developed following the ISO 14040 International Standard. The environmental impacts calculation method reported in this EPD follow the EF-3.0, (ILCD). The report has been done following the specifications given in the European standard EN 15804:2012+A2:2019.

4.2 Emission Factors

Emission factors and environmental impacts of elements in life cycles that are not directly controlled by THL Tube & Pipe Industries LLC have been analyzed using external studies and external emissions factors databases like Ecoinvent due to the lack of direct data. The next paragraphs describe the calculation rules and criterial applied in the calculation of the environmental performance of this type of elements in the LCA.

Raw Materials and Chemicals

Datasets from Ecoinvent 3.7.1 with emission factors raw materials for High Frequency welded Pipes & Tubes has been characterized to adjust them to the characteristics of manufacturing of THL Tube & Pipe Industries LLC suppliers or countries where suppliers are located.

Datasets from Ecoinvent 3.7.1 with emission factors for generic chemicals have been characterized to adjust them to the characteristics of the products manufactured by THL Tube & Pipe Industries LLC suppliers.

Electricity

A specific dataset with the Life Cycle Inventory (LCI) corresponding to the electricity mix in Dubai in 2021 has been used for this LCA.

Transport to the construction site stage – A4

The High Frequency welded Pipes & Tubes is provided to customers all over the world. To create a scenario of the A4 phase, all the plasters sold from August 2020 – July 2021 has been analyzed as representative of the international transport. The transport means are international cargo ships and 3.5-7.5t & >32t trucks, as described in the following table.

Scenario	Parameter	Units	Value Per functional unit
A4 – Cargo Ship	Vehicle type used for transport	Transoceanic cargo ship	n/a
	Vehicle load capacity	Kg (dw)	50,000
	Fuel type and consumption	Litres of heavy fuel oil per km	0.24
	Distance to construction site	Km	See detailed table
	Capacity utilization	%	See detailed table
	Bulk density of transported products	Kg/m3	n/a
	Volume capacity utilization factor	n/a	1
A4 - Truck	Vehicle type used for transport	>32t truck	n/a
	Vehicle load capacity	Tons	25
	Fuel type and consumption	Litres of diesel per km	0.38
	Distance to construction site	Km	See detailed table
	Capacity utilization	%	See detailed table
	Bulk density of transported products	Kg/m^3	n/a
	Volume capacity utilization factor	n/a	1

For every destination, the total amount of products delivered to customers has been taken to account according to the following detailed table:

Means of Transport	Destination	Distance	% FU
A4-Truck	DSS - Dubai	42 kms	69.23
	Hamriyah Port	53.40 kms	8.60
	Technopark - Dubai	21 kms	15.01
	Valmont - Dubai	20 kms	0.85
	ASU - Dubai	36 kms	0.0089
	Thamood – Al Ain	154 kms	0.55
	UTP - Dubai	16 kms	0.70
	DBMT – Dubai (Delivered to Port)	100 kms	0.65
	Abu Dhabi	154 kms	0.69
	Kuwait	1189 kms	0.07
A4-Ship	Australia	7936 nmi	14.74
	UK	6936 nmi	15.22
	Germany	7306 nmi	2.89
	USA	14300 nmi	1.63
	Singapore	3971 nmi	5.66
	Hong Kong	5766 nmi	0.21

4.3 Calculation Rules

Version 3.12.0.5 of software Air.e LCA™ with Ecoinvent™ 3.7.1 database has been used for LCA modeling and impacts calculations. 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 August 2020 – July 2021. Transport of raw materials needed to produce high frequency welded Steel Pipes and 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.

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.

4.4 By Products Assignment

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

4.5 Additional Environmental Information

End-of-Life Scenario

Establishing accurate reuse and recycling rates for construction materials is difficult. (Recycling or reuse rate is defined as the proportion of material arising, from demolition, refurbishment, etc, that is recycled or reused).

Waste occurs during the construction and refurbishment of buildings and when they are ultimately demolished or deconstructed and therefore material becomes available for recycling at each of these stages. As prefabricated products and systems, waste from the manufacture of steel construction products is easily collected and segregated for recycling in the factory or fabrication workshop and, on the construction site, steel products generate very little or zero waste.

The recycling rate of steel products is assumed to be 95% based on Annex C of the Product Environmental Footprint Guidance of European Commission. Therefore, 5% of recovered steel is considered to become landfill scrap.

The recycling rate is considered to account for all material losses throughout the lifecycle, from the collection and recycling (or reuse) process to the point of final replacement.

Dismantling/demolition (module C1)

95% of the steel is removed during demolition with diesel consumption of machineries: 60.8 liters/hour; capacity approx. 15 m³/h) and 40% is dismantled with hydraulic excavator and tongs (diesel consumption of excavator: 36.1 liters/hour; capacity approx. 20 m³/h). The ratio of steel to concrete content is 4.8 %, corresponding to 120 kg reinforcing steel per m³ reinforced concrete (Source: German Environment Agency). Calculated diesel consumption for the demolition of 1 kg steel is 0.0013 liters.

Type	Share	Steel concrete/hour	Diesel/hour	Steel in concrete
Diesel consumption machineries	60 %	15 m3	60.81	4.8% =120kg
Hydraulic excavator and tongs	40%	20 m3	36.11	4.8% =120kg

Transport (module C2)

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.

Type	Capacity utilization	Type of vehicle	Average distance
Truck	50%	Euro 6 >32t	50 km

Waste processing (modules C3 and C4)

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 is considered negligible.

Corresponding potentials and avoided loads are assigned to module D. The landfilling of remaining 5 % which are not collected for recycling is considered in module C4.

Waste	kg for re-use	kg for recycling	kg for energy recovery	kg to landfill
Steel Scrap	-	0.95	-	0.05

Recyclability potentials (module D)

Module D contains credits from the recycling of steel in module C3.

5.0 ENVIRONMENTAL PERFORMANCE

5.1 Potential Environment Impacts

In the following tables, the environmental performance of the declared units "1 metric ton (MT) of Steel Pipe" are presented for the THL Tube & Pipe Industries LLC 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 different types of high frequency welded Steel Pipes and Tubes. Hence, the calculation is based on total production vs total consumption against production of the product.

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

Core Environmental Impact Indicators

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total
Climate change (GWP) – fossil	kg CO2e	2.00E+01	3.70E+01	6.90E+01	ND	ND	4.63E-01	2.78E+00	0	3.55E-01	-5.43E+01	7.52E+01
Climate change (GWP) – biogenic	kg CO2e	4.30E-03	8.49E-02	9.70E-03	ND	ND	3.12E-04	0.00E+00	0	6.26E-04	-8.93E-03	9.09E-02
Climate change (GWP) – LULUC	kg CO2e	2.27E-03	-1.26E-02	2.13E-04	ND	ND	-1.04E-05	0.00E+00	0	-2.11E-05	-4.83E-04	-9.64E-03
Climate change (GWP) – total	kg CO2e	2.01E+01	3.71E+01	6.90E+01	ND	ND	4.63E-01	2.78E+00	0	3.57E-01	-5.43E+01	7.55E+01
Ozone depletion	kg CFC11e	2.58E-06	1.61E-05	8.67E-06	ND	ND	7.68E-07	0.00E+00	0	1.12E-07	-1.17E-05	1.66E-05
Acidification	mol H+e	3.95E-01	1.76E-01	1.42E+00	ND	ND	5.65E-03	9.70E-04	0	2.78E-03	-5.65E-01	1.43E+00
Eutrophication, aquatic freshwater	kg PO4e	7.48E-04	2.71E-01	1.60E-03	ND	ND	3.57E-05	0.00E+00	0	4.15E-05	-1.61E-03	2.71E-01
Eutrophication, aquatic marine	kg Ne	9.75E-02	1.55E-01	3.50E-01	ND	ND	7.22E-04	4.87E-04	0	9.87E-04	-2.51E-01	3.54E-01
Eutrophication, terrestrial	mol Ne	1.08E+00	3.50E-01	3.89E+00	ND	ND	7.90E-03	5.44E-03	0	1.05E-02	-2.75E+00	2.60E+00
Photochemical ozone formation	kg NMVOCe	2.81E-01	9.87E-02	1.01E+00	ND	ND	3.21E-03	1.44E-03	0	3.01E-03	-7.54E-01	6.41E-01
Abiotic depletion, minerals & metals	kg Sbe	9.74E-05	8.85E-05	3.33E-04	ND	ND	5.54E-07	0.00E+00	0	1.09E-06	-2.47E-05	4.96E-04
Abiotic depletion of fossil resources	MJ	1.71E+02	5.75E+02	5.48E+02	ND	ND	4.66E+01	0.00E+00	0	7.76E+00	-7.39E+02	6.09E+02
Water use	m3e depr.	1.37E+00	4.96E+02	2.00E+00	ND	ND	5.61E-02	0.00E+00	0	3.77E-01	-2.50E+00	4.97E+02

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-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total
Particulate matter	Incidence	4.40E-07	1.55E-06	1.38E-06	ND	ND	2.87E-08	4.99E-09	0	5.02E-08	-1.00E-05	-6.55E-06
Ionizing radiation, human health	kBq U235e	7.74E-01	3.93E+00	2.51E-08	ND	ND	2.12E-01	0.00E+00	0	3.89E-02	-3.40E+00	1.55E+00
Eco-toxicity (freshwater)	CTUe	2.52E+02	1.76E+03	7.18E+02	ND	ND	4.94E+01	1.40E-02	0	1.29E+01	-8.55E+02	1.94E+03
Human toxicity, cancer effects	CTUh	1.54E-08	7.04E-08	4.61E-08	ND	ND	4.20E-10	1.90E-10	0	3.98E-10	-3.92E-08	9.37E-08
Human toxicity, non-cancer effects	CTUh	2.18E-07	1.26E-06	6.45E-07	ND	ND	3.43E-08	9.10E-09	0	8.53E-09	-6.12E-07	1.56E-06
Land use related impacts/soil quality	-	1.37E+02	2.08E+05	2.91E+02	ND	ND	3.30E+01	0.00E+00	0	1.47E+01	-1.04E+02	2.09E+05

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.

Use of Natural Resources

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total
Renewable PER used as energy	J	3.01E+06	4.51E+07	3.87E+06	ND	ND	1.13E+05	0	0	1.36E+05	-3.94E+06	4.83E+07
Renewable PER used as materials	J	6.55E+20	2.23E+22	1.48E+21	ND	ND	4.71E+19	0	0	3.38E+19	-1.56E+21	2.29E+22
Total use of renewable PER	J	6.55E+20	2.23E+22	1.48E+21	ND	ND	4.71E+19	0	0	3.38E+19	-1.56E+21	2.30E+22
Non-renew. PER used as energy	J	1.71E+08	5.75E+08	5.48E+08	ND	ND	4.66E+07	0	0	7.76E+06	-7.39E+08	6.09E+08
Non-renew. PER used as materials	J	3.93E+17	8.67E+18	7.87E+17	ND	ND	2.31E+16	0	0	4.10E+17	-8.93E+17	9.39E+18
Total use of non-renewable PER	J	3.93E+17	8.67E+18	7.87E+17	ND	ND	2.31E+16	0	0	4.10E+17	-8.93E+17	9.39E+18
Use of secondary materials	Kg	0	0	0	ND	ND	0	0	0	0	0	0

Use of renewable secondary fuels	J	0	0	0	ND	ND	0	0	0	0	0	0
Use of non-renew. secondary fuels	J	0	0	0	ND	ND	0	0	0	0	0	0
Use of net fresh water	m3	9.14E+03			ND	ND	0	0	0	0	0	9.14E+03

PER abbreviation stands for primary energy a resource

End of Life - Waste

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total
Hazardous waste	Kg	0	4.06E+04	0	ND	ND	0	0	0	0	0	4.06E+04
Non-hazardous waste	Kg	0	7.39E+04	0	ND	ND	0	0	0	4.18E+03	0	7.81E+04
Radioactive waste	Kg	<0.01 - No nuclear energy used										

End of Life - Outflows

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total
Components for reuse	Kg	0	0	0	ND	ND	0	0	0	0	0	0
Materials for recycling	Kg	0	1.15E+05	0	ND	ND	0	0	0	0	-7.93E+04	3.57E+04
Materials for energy recovery	Kg	0	0	0	ND	ND	0	0	0	0	0	0
Exported energy - electricity	MJ	0	0	0	ND	ND	0	0	0	0	0	0
Exported energy - thermal	MJ	0	0	0	ND	ND	0	0	0	0	0	0

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, A3 module has the biggest impact, representing above 98% of the whole impact. A4 module has a little 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 24% of the total impact. The life cycle has an impact of 1.26E+02 kg of CO2 equivalent.

6.0 MANDATORY STATEMENTS

Explanatory material can be obtained from EPD owner and/or LCA author. Contact information can be found below. The verifier and The Program Operator do not make any claim or present any responsibility about the legality of the product.

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.

7.0 CONTACT INFORMATION

EPD Owner	Mr. Ghanshyam Chaudhary Quality Manager THL Tube & Pipe Industries LLC Dubai, UAE Tel: (+971) 4 8848221 Email: qc@thlpipe.com http://www.thlpipe.com/
LCA Author	Alan B. Christopher, LCA Consultant GCAS Quality Certifications P.O.Box 65561, Dubai, UAE www.gcasquality.com info.dubai@gcasquality.com

Verifier	Professor Vladimír Kocí LCA Studio Šárecká 5,16000 Prague 6 - Czech Republic www.lcastudio.cz

8.0 REFERENCES

LCA Report: Life Cycle Inventory of THL Tube & Pipe Industries LLC

Software: Air.e LCA rev. 3.12.0.5 www.solidforest.com

Main database: Ecoinvent 3.7.1 www.ecoinvent.org

Geographical scope of the EPD: Global

Normative: ISO 14040:2006 “Environmental management -- life cycle assessment -- principles and framework”; ISO 14044:2006 “Environmental management -- life cycle assessment -- requirements and guidelines”; ISO 14020 “Environmental Labelling: General Principles”; ISO 14025:2006 “Environmental labels and declarations -- type III environmental declarations -- principles and procedures” and EN 15804.
