

Environmental Product Declaration

Under the general rules of the Environmental Footprint Institute

Product Group Classification: UN CPC 41532

In accordance with ISO 14025 and EN 15804 for:

Aluminium Wire Rod



Program:

Environmental Footprint Institute
Calle Circle 49A
CP 28022, Spain

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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued verification and registration at www.environmentalfootprintinstitute.org

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1.0 DOCUMENT INFORMATION

Program	The Environmental Footprint Institute
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Geographical Scope	Global



2.0 INTRODUCTION

This report contains the environmental performance of the manufacturing process of EC Grade Aluminium Wire Rod manufactured by Trans Gulf Aluminium Industries Co. L.L.C. This Environmental Product Declaration (EPD) has been developed using the Life Cycle Assessment (LCA) methodology. The environmental impact values calculated are expressed to One-Ton of Aluminium Wire Rod.

The assessed life cycle includes all phases in the manufacturing process of Aluminium Wire Rod in a “cradle to gate with options” scope. This LCA covers transportation of Raw materials, production, distribution of final product to the customer and end of life stages.

This EPD has been conducted according to the Environmental Footprint Institute regulations and it has been certified and registered in The Environmental Footprint Institute. The EPD regulation is a system for the international use of Type III Environmental Declarations, according to ISO 14025:2006. Not only the system, but also its applications, is described in the Programmer’s General Instructions (PGI). This report has been made following the specifications given in the European standard EN 15804:2012+A2:2019.



3.0 GENERAL INFORMATION

Trans Gulf Aluminium Industries Co. L.L.C was formed in 1998 for the manufacture of EC Grade Aluminium Wire Rods & Aluminium Alloy Ingots & other allied products.

Situated in Jebel Ali Industrial Area, next to one of the largest ports in world, it has a strategic advantage of proximity to major port and also to major Aluminium Smelters like Emirates Global Aluminium PJSC (Dubai Aluminium and Emirates Aluminium) and Sohar Aluminium LLC.

We produce continuous cast Aluminium wire rods used for Electrical purposes conforming to ASTM B 233-97. The wire rod is the base material for drawn wire products used mainly in the electrical Industry. Our Aluminium wire rods in various tempers (H11, H12, H13, H14, H16, etc.) to meet the growing demand for electrical power transmission and industrial wiring.

Trans Gulf has a CCR line that adopts a Properzi-continuous casting machine and the technology of continuous casting and rolling, to produce an Aluminium rod with a diameter of 9.5 & 12 mm, the alloy grade includes the 1000 series of the conductive round Aluminium rod (1080,1350,1370, etc.). The technology of the line can meet the standard of European (BS EN) and American (ASTM).

3.1 Analyzed Product

The assessed system in this Environmental Product Declaration (EPD) comprises the full life cycle of **EC Grade Aluminium Wire Rods – 9.5mm & 12.0mm diameter** by Trans Gulf Aluminium Industries Co. L.L.C in its factory in Plot No. 599-341, Jebel Ali Industrial Area-1, Dubai, UAE. The assessment has been done using the production data from January – December 2022.

3.2 Applications

Aluminium wire rods are made of pure Aluminium and different alloys that add properties to the wires. The produced EC rods are 99.70% minimum, and the production complies with stringent requirement of ASTM B233-97 and BS EN 1715-2. The rod's application fields are virtually unlimited. They include insulated cables for low and medium voltage distribution networks, conductors for overhead lines, flexible cables for robotics, welding and railway engineering, cables using nickel-plated wire for aeronautical engineering, magnetic wire (enameled wire) for windings, etc.

3.3 Declared Unit

The Declared Unit of the Life Cycle Assessments is One-Ton of Aluminium Wire Rod. All direct and indirect environmental impacts, as well as the use of resources, are reported referred to this unit. This EPD presents the environmental impacts associated to the LCA of Aluminium Wire Rod.

3.4 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.

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/ Oman	UAE/ Oman	UAE	GLO	-	-	-	-	-	-	-	-	GLO	GL O	GL O	GL O	GLO
Specific data	GWP > 90%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	Nil				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	Manufactured in one site				-	-	-	-	-	-	-	-	-	-	-	-	-

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







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

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. Aluminium Wire Rod production starts with receipt of raw materials, charging in the furnace, degassing & drossing, casting, hot rolling, quenching, coiling and packaging & wrapping. Electricity and Diesel are consumed in the production process. Aluminium Wire Rods are distributed to customer's places.

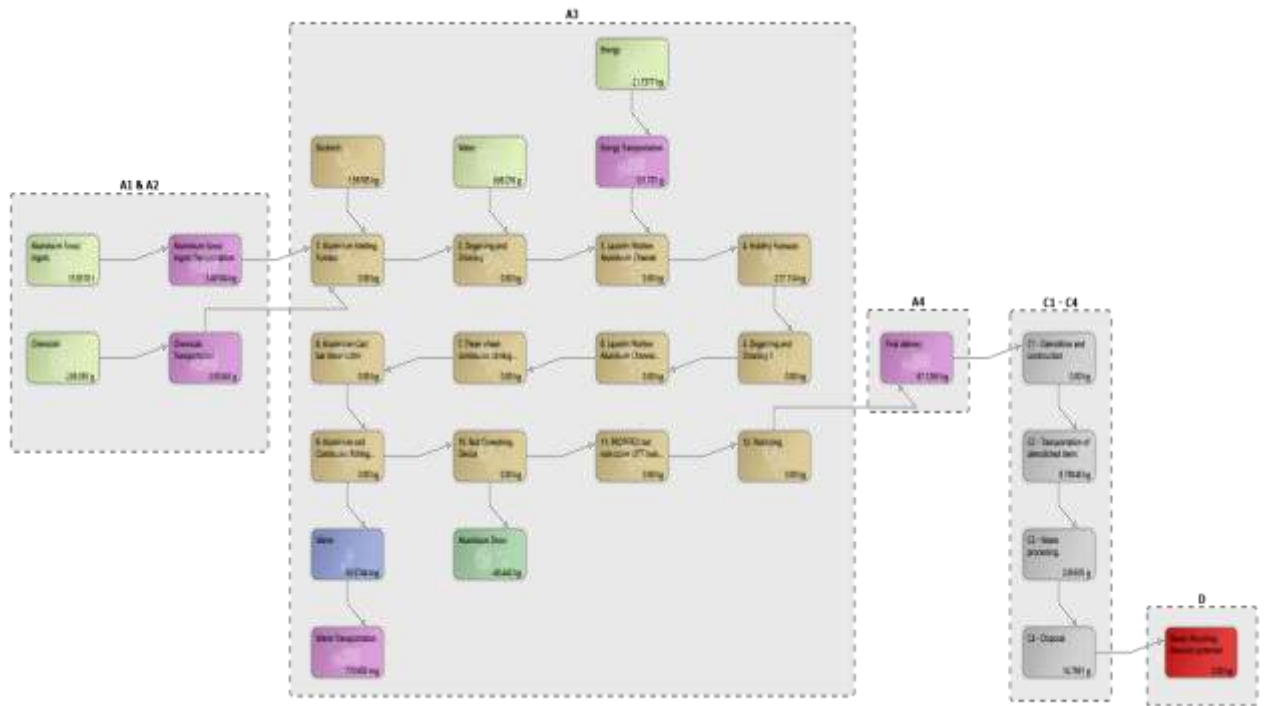
3.5 Product Stages

A simplified model of the manufacturing and distribution 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 (A1-A4). The first phase in the LCA is the production of Aluminium Wire Rods.

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 land or sea	Aluminium melting, Rod quenching	Transport to customers by trucks & Ships	Deconstruction/ demolition, transport, disposal.	Reuse, recovery and recycling potential

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

Life Cycle Assessment Modeling



3.6 Content Declaration

Materials	Percentage
Aluminium	99.70% minimum
Others (alloying elements & fluxes)	0.3%

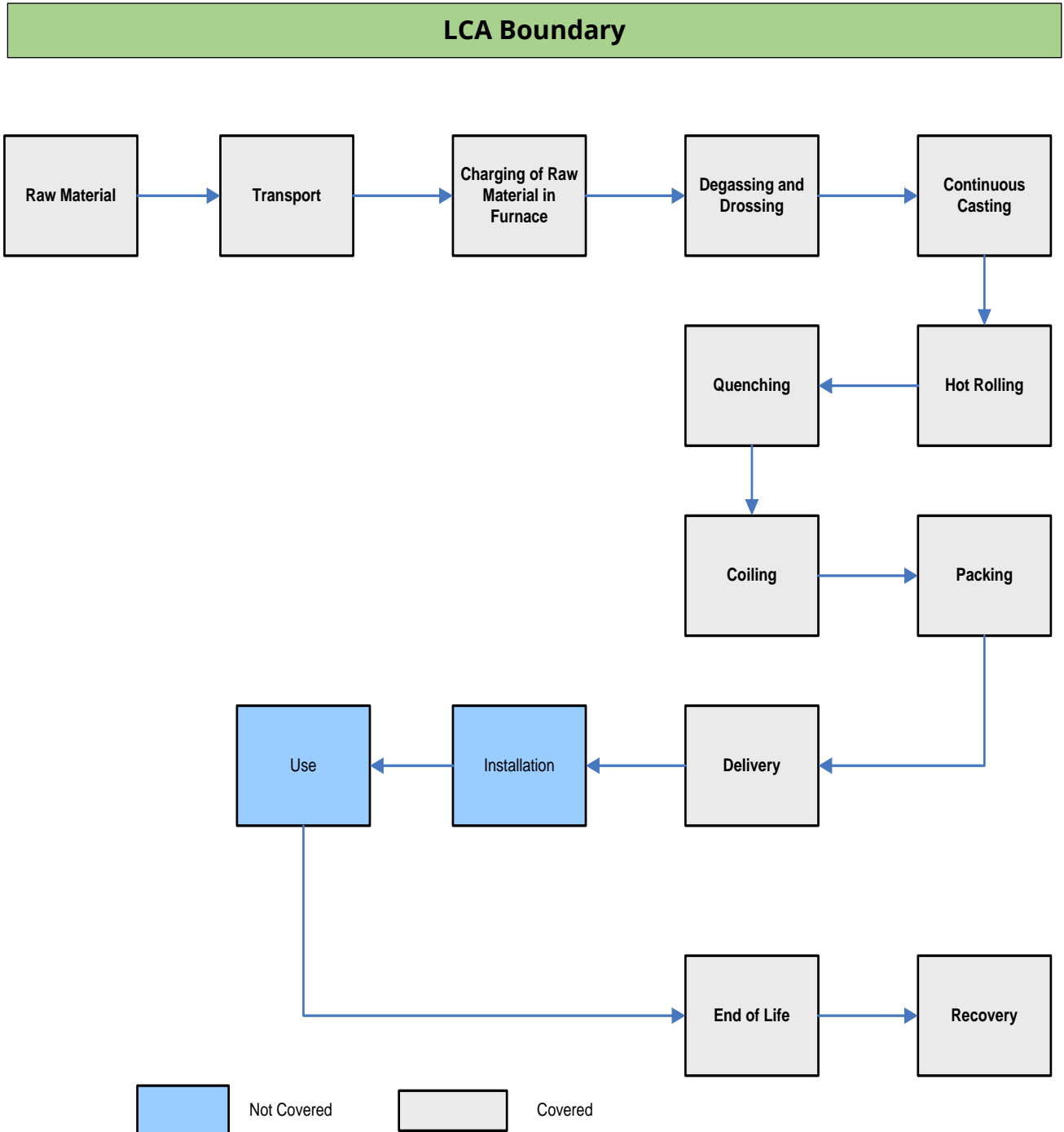
Materials		
Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg	Renewable material, weight-%
0	0	0

Packaging Materials			
Packaging Materials	Weight Kg	Weight % (Versus the Product)	Weight biogenic carbon, kg C/kg
Wooden Pallet	222816	0.69	0
Bags LDPE	13926	0.043	0
Metal Straps	31333.50	0.096	0
Corrugated Sheet	11140.80	0.034	0

3.7 Substances listed in the “Candidate List of SVHC”

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0.1% of the weight of the product.

The following diagram is a more detailed description LCA boundary;



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, as Product Category Rules.

4.2 Emission Factors

Emission factors and environmental impacts of elements in life cycles that are not directly controlled by Trans Gulf Aluminium Industries Co. L.L.C (Raw materials, Chemicals, Electricity, Fuels Production, etc.) 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 criteria applied in the calculation of the environmental performance of this type of elements in the LCA.

Raw Materials and Chemicals

Datasets from Ecoinvent 3.8.0 with emission factors for raw materials has been characterized to adjust them to the characteristics of manufacturing of Trans Gulf Aluminium Industries Co. L.L.C suppliers or counties where suppliers are located.

Datasets from Ecoinvent 3.8.0 with emission factors for generic chemicals have been characterized to adjust them to the characteristics of the products manufactured by Trans Gulf Aluminium Industries Co. L.L.C suppliers.

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.

Fuels Production and Consumption

Specific datasets with the emissions factors corresponding to the fuel combustion in Trans Gulf Aluminium Industries Co. L.L.C plant and machinery have been developed for these LCAs. Indirect emissions due to diesel production and transportation are also included in the environmental impact values calculation reported in this report. In the calculation was estimated a diesel calorific value of 43 kg/l and a density of 0,85 kg/l for diesel.

Transport to the construction site Stage – A4

The Aluminium Wire Rods are provided to customers all over the world. To create a scenario of the A4 phase, all the coils sold from January – December 2022 has been analyzed as representative of the international transport. The transport means are international cargo ships and 3.5-7.5t & >32t trucks, Euro 6.

4.3 Calculation Rules

Version 3.14.0.15 of software Air.e LCA™ with Ecoinvent™ 3.9 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 January – November 2022. Transport of raw materials needed to produce Aluminium Wire Rod 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

Economic allocation was applied and the allocation was performed according to the PCR. Economic allocation was based on the income of each product. There is no List of by-Products used in this EPD.

4.5 Additional Environmental Information

Module C1: Demolition and construction - Demolition of this product is part of the demolition of the building itself. Therefore, it is assumed that the energy used for the demolition of building products has minor significance and the environmental impact of this module is set to be zero.

Module C2: This module assumes that only 97% of the Aluminium rod is transported an average of 75 kilometers by a Euro 6 truck to a nearby recycling center. This is a conservative approach. 2-3% of the Aluminium rod is assumed to be lost as dust during transportation.

Module C3: The packaging of Aluminium rod is considered to be incinerated in this module.

Module C4 Disposal - This module represents 5% of the construction waste which is to be disposed of in a landfill.

Module D Reuse, Recycling & Recovery Potential - 95% of the Aluminium rod is considered to be recycled, hence module D calculates the environmental impacts of the recycling potential of the Aluminium rod. This module contains credits from module C4.

5.0 ENVIRONMENTAL PERFORMANCE

5.1 Potential Environment Impacts

In the following tables, the environmental performance of the declared units “One-Ton Aluminium Wire Rods” are presented for the Trans Gulf Aluminium Industries Co. 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 Aluminium wire rod. 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).

EC Grade Aluminium Wire Rods

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-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total (A1 to C4)
Climate change (GWP) – fossil	kg CO2e	1.59E+04	2.01E+02	6.71E+01	ND	ND	0.00E+00	8.76E+00	2.85E-03	1.45E-02	-1.53E+04	1.62E+04
Climate change (GWP) – biogenic	kg CO2e	5.23E+00	7.44E-03	1.13E-02	ND	ND	0.00E+00	0.00E+00	5.01E-06	1.37E-04	-5.02E+00	5.25E+00
Climate change (GWP) – LULUC	kg CO2e	-2.17E-01	-7.57E-04	6.22E-05	ND	ND	0.00E+00	0.00E+00	-1.22E-07	-3.12E-06	-2.08E-01	-2.17E-01
Climate change (GWP) – total	kg CO2e	1.59E+04	2.01E+02	6.71E+01	ND	ND	0.00E+00	8.76E+00	2.86E-03	1.48E-02	-1.53E+04	1.62E+04
Ozone depletion	kg CFC11e	1.06E-03	4.68E-05	1.06E-05	ND	ND	0.00E+00	0.00E+00	1.70E-10	1.66E-09	-1.01E-03	1.11E-03
Acidification	mol H+e	6.94E+01	1.76E+00	1.74E+00	ND	ND	0.00E+00	3.07E-03	9.28E-06	1.00E-04	-6.67E+01	7.29E+01
Eutrophication, aquatic freshwater	kg PO4e	6.46E+00	9.83E-03	5.12E-03	ND	ND	0.00E+00	0.00E+00	4.91E-05	2.23E-05	-6.20E+00	6.48E+00
Eutrophication, aquatic freshwater	Kg P eq	2.11E+00	3.20E-03	1.67E-03	ND	ND	0.00E+00	0.00E+00	1.60E-05	7.26E-06	-2.02E+00	2.11E+00
Eutrophication, aquatic marine	kg Ne	1.04E+01	1.54E-01	4.29E-01	ND	ND	0.00E+00	1.53E-03	2.70E-06	1.90E-05	-9.97E+00	1.10E+01
Eutrophication, terrestrial	mol Ne	1.11E+02	1.66E+00	4.77E+00	ND	ND	0.00E+00	1.72E-02	3.00E-05	1.70E-04	-1.07E+02	1.18E+02
Photochemical ozone formation	kg NMVOCe	3.66E+01	5.40E-01	1.23E+00	ND	ND	0.00E+00	4.55E-03	7.80E-06	4.64E-05	-3.51E+01	3.84E+01
Abiotic depletion, minerals & metals	kg Sbe	2.37E-02	6.79E-06	7.32E-05	ND	ND	0.00E+00	0.00E+00	9.21E-09	1.78E-06	-2.27E-02	2.37E-02
Abiotic depletion of fossil resources	MJ	2.38E+05	2.57E+03	7.22E+02	ND	ND	0.00E+00	0.00E+00	1.85E-02	1.80E-01	-2.29E+05	2.41E+05
Water use	m3e depr.	1.19E+03	4.52E+00	1.63E+00	ND	ND	0.00E+00	0.00E+00	4.34E-04	1.60E-02	-1.15E+03	1.20E+03

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. "Reading example: 1.57E-03 = 1.57*10-3 = 0.00157"

Additional Environmental Impact Indicators

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total (A1 to C4)
Particulate matter	Incidence	7.20E-04	1.00E-05	1.66E-06	ND	ND	0.00E+00	1.63E-08	8.12E-11	7.83E-10	-6.85E-04	7.32E-04
Ionizing radiation, human health	kBq U235e	1.91E-01	1.26E+01	3.09E+00	ND	ND	0.00E+00	0.00E+00	8.53E+04	1.75E-03	-1.83E+02	8.53E+04
Eco-toxicity (freshwater)	CTUe	2.47E+05	9.43E+02	4.19E+02	ND	ND	0.00E+00	2.33E-02	2.28E-01	1.30E+00	-2.37E+05	2.48E+05
Human toxicity, cancer effects	CTUh	2.00E-05	2.40E-08	3.01E-08	ND	ND	0.00E+00	3.00E-10	1.22E-10	2.34E-11	-1.90E-05	2.01E-05
Human toxicity, non-cancer effects	CTUh	3.60E-04	3.33E-07	2.93E-07	ND	ND	0.00E+00	1.49E-08	6.57E-10	9.09E-10	-3.50E-04	3.61E-04
Land use related impacts/soil quality	-	2.36E+04	2.97E+02	9.00E+01	ND	ND	0.00E+00	0.00E+00	2.51E-02	1.38E-01	-2.27E+04	2.40E+04

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-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total (A1 to C4)
GWP-GHG	kg CO2e	1.59E+04	2.01E+02	6.71E+01	0.00E+00	0.00E+00	0.00E+00	8.76E+00	2.85E-03	1.46E-02	-1.53E+04	1.62E+04

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-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total (A1 to C4)
Renewable PER used as energy	J	2.19E+09	7.42E+06	4.55E+06	ND	ND	0.00E+00	0.00E+00	8.44E+02	2.39E+04	-2.11E+09	2.20E+09
Renewable PER used as materials	J	1.10E+07	3.75E+04	2.01E+04	ND	ND	0.00E+00	0.00E+00	3.36E+00	4.60E+01	-1.06E+07	1.11E+07
Total use of renewable PER	J	2.20E+09	7.46E+06	4.57E+06	ND	ND	0.00E+00	0.00E+00	8.47E+02	2.39E+04	-2.12E+09	2.21E+09
Non-renew. PER used as energy	J	2.38E+11	3.17E+09	7.22E+08	ND	ND	0.00E+00	0.00E+00	1.85E+04	1.80E+05	-2.29E+11	2.42E+11
Non-renew. PER used as materials	J	2.82E+04	1.64E+01	1.20E+01	ND	ND	0.00E+00	0.00E+00	1.07E-02	5.27E-02	-2.71E+04	2.82E+04
Total use of non-renewable PER	J	2.38E+11	3.17E+09	7.22E+08	ND	ND	0.00E+00	0.00E+00	1.85E+04	1.80E+05	-2.29E+11	2.42E+11
Use of secondary materials	Kg	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	J	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renew. secondary fuels	J	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	1.72E+04			ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E+04

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 (A1 to C4)
Hazardous waste	Kg	0.00E+00	6.00E+02	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	1.62E+06	0.00E+00	1.63E+06
Non-hazardous waste	Kg	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	2.79E+05	0.00E+00	0.00E+00	2.79E+05
Radioactive waste	Kg	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

End of Life - Outflows

Impact Category	Unit	A1-A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D	Total (A1 to C4)
Components for reuse	Kg	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.09E+07	0.00E+00
Materials for recycling	Kg	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00	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	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	MJ	0.00E+00	9.82E+06	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.82E+06
Exported energy - thermal	MJ	0.00E+00	8.31E+07	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.31E+07

Biogenic Carbon Content (for all products listed)

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-A2 and A4 module has the higher impact, representing above 90% of the whole impact. A3 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.

6.0 VERIFICATION

Diffusion Institution	The Environmental Footprint Institute Calle CIRCE 49A Madrid 28022 Spain www.environmentalfootprintinstitute.org
EPD Registration Number	230506EPD CR:P-15804
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Product Category Rules	P-1100: Construction products in general (EN-15804)
Product Group Classification	UN CPC 41532
Reference year for Data	January - December 2022
Geographical Scope	Global

Product category rules (PCR): P-1100: Construction products in general (EN-15804)
PCR review was conducted by: The Environmental Footprint Institute.
Independent verification of the declaration and data, according to ISO 14025:2006 and ISO 14040: <input type="checkbox"/> EPD Process Certification (internal) <input checked="" type="checkbox"/> EPD Verification (external)
Third party verifier: Mr. Iván Jiménez Accredited by: The Environmental Footprint Institute.


7.0 MANDATORY STATEMENTS

Explanatory material can be obtained from EPD owner and/or LCA author. Contact information can be found below. The owner of the declaration shall be liable for the underlying information and evidence. The LCA Author shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The verifier and The Environmental Footprint Institute do not make any claim or present any responsibility about the legality of the product.

EPDs within the same product category but from different programmes may not be comparable.

8.0 CONTACT INFORMATION

<p>EPD Owner</p>	<p>Trans Gulf Aluminium Industries Co. L.L.C Plot No. 599-341, Jebel Ali Industrial Area-1 PO Box 83059, Dubai – U.A.E Tel : +971 4 8801524 sickandar@tggroup.ae www.tggroup.ae</p> 
<p>LCA Author</p>	<p>Alan B.Christopher GCAS Quality Certifications P.O.Box 65561, Dubai, UAE www.gcasquality.com info.dubai@gcasquality.com +971-4-3437552 / +971-50-4568038</p> 
<p>Programme Operator</p>	<p>The Environmental Footprint Institute Calle Circe 49A Madrid, Spain www.environmentalfootprintinstitute.com info@environmentalfootprintinstitute.com</p> 

9.0 REFERENCES

This Environmental Footprint has been developed and diffused following the instructions of the Environmental Footprint Institute.

LCA Report: Life Cycle Inventory of Aluminium Wire Rod.

Software: Air.e LCA Version 3.14.0.15 www.solidforest.com

Main database: Ecoinvent 3.9 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.

Product Category Rules: P-1100: Construction products in general (EN-15804)