ENVIRONMENTAL PRODUCT DECLARATION

GALVANIZED WELDED CARBON STEEL TUBE

STRUCTURAL STEEL

MARUICHI STEEL TUBE LTD.

Maruichi Steel Tube manufactures steel tubes used in things that are indispensable in our daily lives, such as buildings and automobiles. Through our extensive sales network, covering Japan and overseas, we deliver our products to customers around the world.

As a leading company in the steel tube industry, we have established a unique production and sales system and currently hold the No. 1 market share in the domestic welded steel tube industry. With consolidated subsidiaries in five overseas countries—United States (five locations), Mexico, Vietnam (two locations), India (three locations), and the Philippines—we provide high quality products to customers worldwide.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

MARUICHI STEEL TUBE LTD.

CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025
ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Solutions www.ul.com 333 Pfingsten Rd, Northbrook, IL, 60062 www.spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION	Program Operator Rules v 2.7 2022
MANUFACTURER NAME AND ADDRESS	MARUICHI STEEL TUBE LTD. Namba SkyO 29th floor, 5-1-60 Namba, Chuo-ku, Osaka, Osaka Prefecture 542-0076 Japan
DECLARATION NUMBER	4791650548.102.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	GALVANIZED WELDED CARBON STEEL TUBE Structural Steel, 1 metric ton
REFERENCE PCR AND VERSION NUMBER	ISO 21930:2017 serves as the core PCR SMART EPD® Part A Product Category Rules for Building and Construction Products and Services Standard 1000, version 1.2, March 14, 2025 SMART EPD® Part B Product Category Rules for Designated Steel Construction Products, Standard 1000-008, version 3, April 3, 2025
DESCRIPTION OF PRODUCT APPLICATION/USE	The main applications of the products are machine structure, agricultural use, piping, electrical conduit, etc. Steel tubes for machine structure are used as automobile parts, steel furniture, etc.
PRODUCT RSL DESCRIPTION (IF APPL.)	Building/Structural Use (Indoor): Approximately 50+ years Piping Use (Underground/Indoor): Approximately 20–40 years Piping Use (Plated) (Outdoor Exposure): Approximately 15–30 years
MARKETS OF APPLICABILITY	Japan
DATE OF ISSUE	December 22nd, 2025
PERIOD OF VALIDITY	5 Years
EPD TYPE	Manufacturer Average
EPD SCOPE	Cradle to gate
YEAR(S) OF REPORTED PRIMARY DATA	April 2022 and March 2023
LCA SOFTWARE & VERSION NUMBER	Microsoft Excel calculation tool with IDEA database
LCI DATABASE(S) & VERSION NUMBER	IDEA v3.5（2025）
LCIA METHODOLOGY & VERSION NUMBER	LIME2

Independent verification of the declaration and data, according to EN ISO 14025:2010 (ISO 14025:2006)

This declaration was independently verified in accordance with ISO 14025: 2006.

☐ INTERNAL ☒ EXTERNAL

Third Party Verifier

Cooper McCollum, UL Solutions

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: comparison of the environmental performance of construction works and construction products using EPD information shall be based on the product's use and impacts at the construction works level. In general, EPDs may not be used for comparability purposes when not considered in a construction works context.

ENVIRONMENTAL PRODUCT DECLARATION

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

Product information

Product description

The product is a welded carbon steel tube manufactured by high-frequency welding using galvanized steel strip (coil) as the raw material. The shape of the product is not only round but also angular (square, rectangular).

The product is mainly provided for Japan market and complies with JIS G 3444, JIS G 3466, JIS G 3445, JIS G 3452, JIS G 3454, etc.

Application

The main applications of the products are machine structure, agricultural use, piping, electrical conduit, etc. Steel tubes for machine structure are used as automobile parts, steel furniture, etc.

Technical data

Name	Value	Unit
Density	7,850	kg/m^3
Modulus of elasticity	2.1×10^5	N/mm^2
Coefficient of thermal expansion	12.6	$10^{-6}K^{-1}$
Thermal conductivity	60.3	W/(mK)
Melting point	1,370	°C

Delivery status

The delivery conditions and dimension may vary according to the intended application.

Base materials / Ancillary materials

The products are made of carbon steel with a small percentage of alloy elements.

The basic raw material for the production is hot-rolled steel coil. In addition auxiliary raw materials are added such as forming oil to increase production efficiency.

Any hazardous substances defined in Basel Convention and/or regulated by Japanese laws are not included in raw materials.

Manufacture

Plating process is handled at Takuma Plant.

After plating is performed at Takuma Plant, all seven factories carry out the pipe manufacturing process.

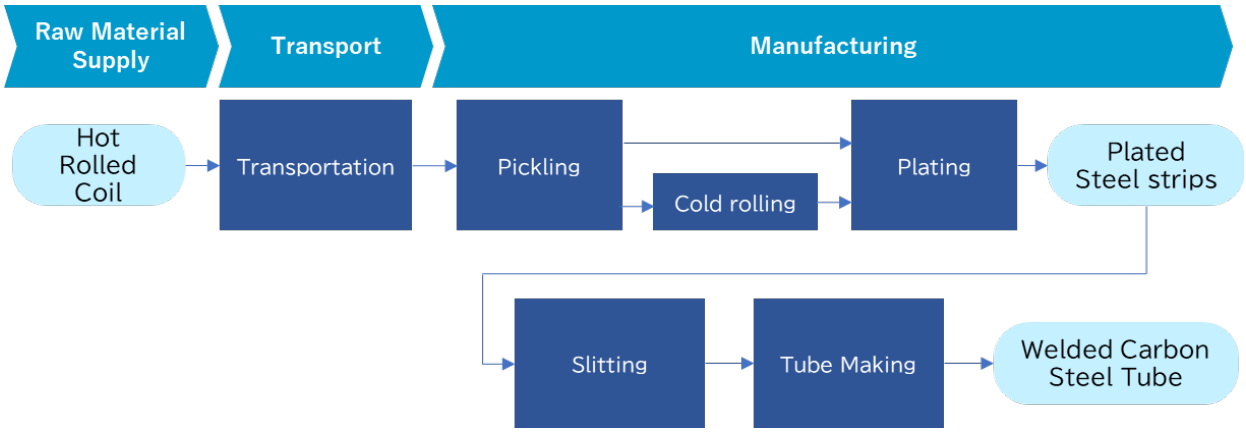
MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

Company	Factory	Address
Maruichi Steel Tube Ltd.	Sakai Plant	16, Ishizu-nishimachi, Nishi-ku, Sakai, Osaka 592-8332, Japan
	Tokyo Plant	11, 1-Chome, Shiohama, Ichikawa, Chiba 272-0127, Japan
	Nagoya Plant	14, Kanaoka, Tobishima-mura, Ama-gun, Aichi 490-1445, Japan
	Takuma Plant	6883, Takuma, Takuma-cho, Mitoyo, Kagawa 769-1101, Japan
Hokkaido Maruichi Steel Tube Ltd.	Tomakomai Factory	134-110, Aza Numanohata, Tomakomai, Hokkaido 059-1364, Japan
Kyushu Maruichi Steel Tube Ltd.	Kyushu Factory	12, Meishihama, Nagasu-cho, Tamana-gun, Kumamoto 869-0111, Japan
Shikoku Maruichi Steel Tube Ltd.	Shikoku Factory	2112-48, Takuma, Takuma-cho, Mitoyo, Kagawa 769-1101, Japan
	Tachibana Factory	12, 2-Cho, Ishihara-cho, Higashi-ku, Sakai, Osaka 599-8102, Japan

Manufacturing process flow



Quality Management System

All eight factories (Sakai Plant/Tokyo Plant/Nagoya Plant/ Takuma Plant /Tomakomai Factory/Kyushu Factory/Shikoku Factory/Tachibana Factory) covered by this LCA are certified according to ISO9001 Quality Management System.

Environmental Management System

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

All eight factories (Sakai Plant/Tokyo Plant/Nagoya Plant/ Takuma Plant /Tomakomai Factory/Kyushu Factory/Shikoku Factory/Tachibana Factory) covered by this LCA are certi-fied according to ISO14001 Enviromental Management System.

Packaging

The packaging materials are steel strapping for bunding. they are included in this study.

Mandatory environmental information

No substances required to be reported as hazardous are associated with the production of this product.

Reference service life

Reference service life (guideline) under typical usage conditions is as follows:

Building/Structural Use (Indoor): Approximately 50+ years

Piping Use (Underground/Indoor): Approximately 20–40 years

Piping Use (Plated) (Outdoor Exposure): Approximately 15–30 years

Reuse and recycle

Although not included in the scope of this study, the product can be reused after recovery and can be reused or recycled without being disposed of as scrap steel. The recycling rate of iron products in Japan is 93.7%.

ENVIRONMENTAL PRODUCT DECLARATION

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

LCA Rules

Declared unit

Name	Value	Unit
Declared unit	1	metric ton
Density	7,850	kg/m^3
Conversion factor to 1kg	0.001	-
Thickness	0.8 – 4.5	mm

System boundary

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

This is an EPD based on a cradle-to-gate life cycle assessment. The selected system boundaries of this study encompass the following steps:
A1: Raw material supply
A2: Transport
A3: Manufaturing

No known flows are deliberately excluded from this EPD except for strapping bands which were demonstrated to be below the cut-off threshold.
Capital goods and infrastructure flows are excluded from the product system boundary.

Estimates and Assumptions

A1: Raw material supply

The raw materials data is specific to each company and shows the actual production status of Maruichi Steel Tube Co., Ltd. The main raw material, coils, are made from blast furnace materials, and the amount of raw materials used per product ton is calculated by taking the weighted average of the annual production volume and annual raw material input volume of the target products at seven factories (Sakai, Tokyo, Nagoya, Tomakomai, Shikoku, Tachibana, and Kyushu) after plating at the Takuma Factory.

The calculation of raw materials is based on PCR, using information from raw material suppliers when available and Worldsteel's dataset when not. For blast furnace materials, a dataset has been obtained from Worldsteel and reflected in the parameters. However, with regard to the impact assessment method used in the Environmental Impact Indicators, the dataset from Worldsteel does not provide details of the results for resource use, so the input data for the three types of raw materials (blast furnace hot rolled material, blast furnace pickling material, and blast furnace cold rolled material) provided by Worldsteel is used as the input amount. Calculations were made to meet the requirements using indicators in accordance with ISO 21930 in IDEA

A2：Transport

For the procurement and transportation of raw materials, emissions related to the procurement of raw materials for coils before galvanizing at the Takuma Plant and the procurement and transportation of raw materials after galvanizing at the other seven sites (Sakai, Tokyo, Nagoya, Tomakomai, Shikoku, Tachibana, and Kyushu) are calculated as weighted average values of procurement and production volumes, respectively.

For the transportation method, container ship transportation, bulk carrier transportation, and 10t truck transportation are selected as emission factors.

A3：Manufacturing

For the production plants for this product, the Takuma Plant performs galvanizing of raw materials, and after galvanizing,the same steel pipes are produced from raw materials at seven sites (Sakai, Tokyo, Nagoya, Tomakomai, Shikoku, Tachibana, and Kyushu), and the amount of energy used and the amount of raw materials input in this LCA are weighted averages according to the production volume of each site.

The emission factor of the grid electricity used in this LCA is the factor obtained by adding "Electricity, Japan Japan average, FY2021, GHG Protocol compliant Scope 2, JPN" to "Electricity, average, FY2021, GHG Protocol compliant Scope 3, JPN" in IDEA_Ver3.5, and some renewable energy is also used.

Cut-off rules

The cut-off criteria are 1 % of renewable primary resource (energy), 1 % nonrenewable primary resource (energy) usage, 1 % of the total mass input of that unit process and 1 % of environmental impacts. The total of neglected input flows per module are a maximum of 5 % of energy usage, mass and environmental impacts. These cut-off criteria align with ISO 21930.

All information from the data collection process has been considered, covering all used and registered materials, thermal energy, electrical energy, and diesel consumption.

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

Data quality

Foreground data: Collected from production data of 8 sites (Sakai, Tokyo, Nagoya, Tomakomai, Shikoku, Tachibana, Kyushu, Takuma)

Background data: IDEA v3.5 (2025), LCI DATA FOR STEEL PRODUCTS (Worldsteel.2021)

Time coverage: Foreground data was collected at 8 sites between April 2022 and March 2023. Background data comes from IDEA v3.5 (2025) and LCI DATA FOR STEEL PRODUCTS (Worldsteel.2021). The data referenced year varies.

Geographical coverage:This product is produced and provided in Japan. Foreground was collected in Japan and Background data referred Japan, Asia and Global Average data in IDEA v3.5 (2025) and LCI DATA FOR STEEL PRODUCTS (Worldsteel.2021)

Technology coverage: State-of-the-art at the time when the data was developed.

Allocation

No by-products are produced in the manufacturing process.

All environmental impacts are allocated to the steel product (i.e., they are not allocated to any of by-products and wastes).

Electricity, fuel, water, and waste are aggregated on a plant-by-plant basis, so allocations were made according to the weight ratio of the subject products.

The seven plants other than the Takuma plant have their inventory data weighted according to production volume.

The Takuma plant does not have its inventory data weighted. Because plating is performed only at the Takuma plant.

The weighted ratio is below.

Sakai	Tokyo	Nagoya	Tomakomai	Shikoku	Tachibana	Kyushu
13%	32%	11%	18%	11%	1%	14%

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to ISO 21930 and the building context, respectively the product-specific characteristics of performance, are taken into account.

ENVIRONMENTAL PRODUCT DECLARATION

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

Life Cycle Assessment Results

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Environment Impact					
Impact Category	Units	Total	A1	A2	A3
Global warming (GWP)	kg-CO_2eq	2.62E+03	2.39E+03	1.16E+01	2.24E+02
Acidification (AP)	kg-SO_2eq	6.03E+00	5.86E+00	3.67E-03	1.66E-01
Eutrophication (EP)	Kg-PO_4^3-eq	5.48E-01	5.48E-01	4.10E-08	1.27E-04
Ozone depletion (ODP)	kg-CFC11eq	2.04E-06	1.30E-06	7.43E-11	7.32E-07
Photo Chemical Ozone Creation (POCP)	kg-C_2H_4eq	1.03E+00	1.03E+00	2.23E-05	1.86E-03

Since this LCA study is based on the EPD certification “HOT ROLED COIL/CHECKERED COIL (DECLARATION NUMBER: 4791119520.101.1)” from Tokyo Steel Corporation, which was conducted with the UL PCRs “Product Category Rules for Building-Related Products and Services (in Brazil, Japan, China, Korea, Europe, North America, India, South East Asia) Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL Environment, Standard 10010, Version 4.0, March 28, 2022” and “Product Category Rule (PCR) Guidance for Building-Related Products and Services Part B: Designated Steel Construction Product LCA Requirements, UL 10010-34, Second Edition, Au-gust 26, 2020” and the EPD does not have the data for GWP-fossil, GWP-biogenic, GPW-luluc, this LCA shows only the total GWP data.

Comparability: Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

Any comparison of EPDs shall be subject to the requirements of ISO 21930. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Carbon dioxide emissions and removals from biogenic sources, carbonation, and combustion of waste are not relevant to this product system and were not included in the calculation of GWP.

Resource Use					
Parameter	Units	Total	A1	A2	A3
Renewable primary resources used as energy carrier	MJ	1.73E+03	2.99E+02	2.06E-02	1.43E+03

Renewable primary resources with energy content used as material	MJ	8.58E-01	6.63E-01	9.24E-05	1.95E-01
Non-renewable primary resources used as an energy carrier	MJ	3.21E+04	2.70E+04	1.25E+02	5.01E+03
Non-renewable primary resources with energy content used as material	MJ	1.05E+02	9.66E+01	2.38E-04	7.94E+00
Secondary materials	kg	7.88E-01	5.89E-01	3.61E-05	1.99E-01
Renewable secondary fuels	MJ	5.23E-01	4.82E-01	1.27E-05	4.17E-02
Non-renewable secondary fuels	MJ	3.24E-01	2.49E-01	4.50E-05	7.50E-02
Recovered energy	MJ	1.44E+01	5.36E-01	7.39E-05	1.38E+01
Use of net fresh water resources	m^3	1.40E+02	1.40E+02	0.00E+00	1.03E-01
Abiotic depletion potential for fossil resources	MJ	3.12E+04	2.70E+04	1.25E+02	5.01E+03

Output Flows and Waste Categories					
Parameter	Units	Total	A1	A2	A3
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nonhazardous waste disposed	kg	7.72E+00	4.40E-01	4.19E-03	7.28E+00
High-level radioactive waste, conditioned, to final repository (*)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Intermediate- and low-level radioactive waste, conditioned, to final repository (*)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	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	0.00E+00
Recovered energy exported from the product system	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

(*) Radioactive waste data is not available in IDEA database.

Carbon Emissions					
Parameter	Units	Total	A1	A2	A3
Calcination Carbon Emissions	kg-CO_2	8.29E+01	8.29E+01	0.00E+00	0.00E-00

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

Interpretation

Completeness

All relevant production processes are included in the LCA calculation.

Sensitivity

This LCA conducted a sensitivity analysis on GWP when all electricity—the largest energy source in production—is replaced with renewable energy. The result indicated a 5% sensitivity. While replacing electricity with renewable energy within our company is considered effective, A1 has the largest GWP. Therefore, reducing raw material procurement (especially coils) is still presumed to be effective for reducing environmental impact. We intend to analyze this further in the future, including through replacing primary data.

Consistency

All foreground data was collected at a consistent per-unit granularity, and appropriate regional data was used for background data.

Representativeness

All production bases are at 8 factories in Japan, and the foreground data collected is from April 2022 ~ March 2023 for all 8 factories in the target. Background data is also used for Japan and Asia.

When analyzing the difference with the weighted average of the seven factories other than the Takuma Factory, A2 is 74% and A3 is 10%. As only the Takuma Factory is included in the cal-culation for A1, there is no variation. When analyzing the difference from the weighted average of A2 to A3 without taking A1 into account, the deviation is large at 15%, but if the figure for Takuma Factory is provisionally included in A1, the figure becomes 1%, so the deviation in representa-tiveness is not large.

Limitation

Since this LCA uses two different environmental impact assessment methods, mainly LIME2 and CML/EF only for Hot-rolled steel coil, the results will differ when a single environmental impact assessment method is used.

Since IDEA is for the domestic market and World Steel's dataset is for the Asian market, there are limitations when used in other countries.

IDEA does not cover radioactive waste data related to electricity from nuclear power plants, and some data are not available.

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

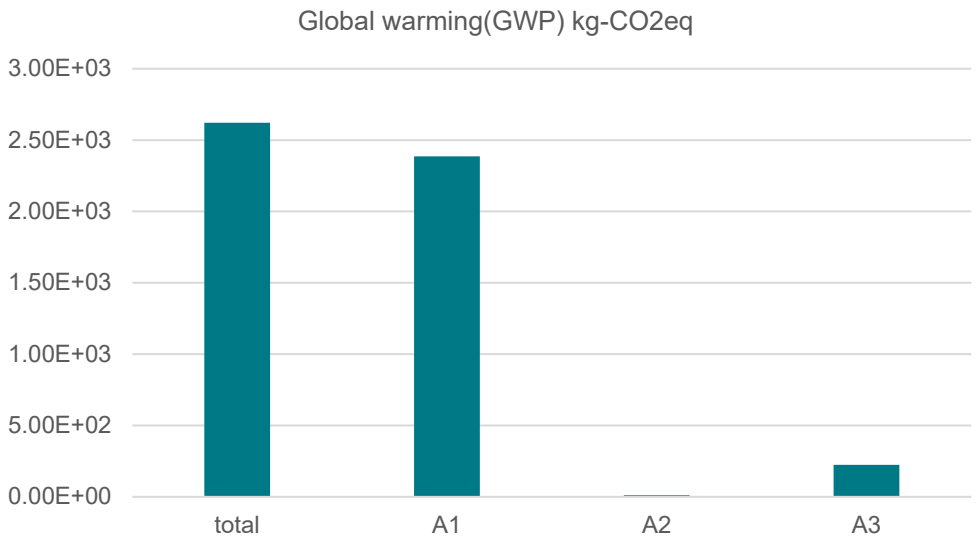
According to ISO 14025/ISO 21930:2017

Conclusion

The results of the impact assessment for each process with reference to the GWP items show that A1 is the largest contributor, and A1 accounts for most of the GWP for the entire process.

The environmental impact of this product from raw material procurement to production varies greatly depending on the raw material procurement stage.

The next largest impact is A3. Among them, the largest impact is electricity, which can be influenced under the company's control, so the sensitivity analysis when replacing it with renewable electricity is as shown.



References

IDEA v3.5:2025

ISO 21930: 2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

ISO 9001:2015 Quality management systems – Requirements

ISO 14001:2015 Environmental management systems -- Requirements with guidance for use

ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14040: 2006 Environmental management – Life cycle assessment – Principles and framework

ISO 14044: 2006 Environmental management – Life cycle assessment – Requirements and guidelines

JIS G 3444:2025 Carbon steel tubes for general structure

ENVIRONMENTAL PRODUCT DECLARATION

MARUICHI STEEL TUBE LTD.

GALVANIZED WELDED CARBON STEEL TUBE
Structural Steel

According to ISO 14025/ISO 21930:2017

JIS G 3466:2025 Carbon steel square and rectangular tubes for general structure

JIS G 3445:2025 Carbon steel tubes for machine structure

JIS G 3452:2019 Carbon steel pipes for ordinary piping

JIS G 3454:2017 Carbon steel pipes for pressure service

SMART EPD® Part A Product Category Rules for Building and Construction Products and Services Standard 1000, version 1.2, March 14, 2025

SMART EPD® Part B Product Category Rules for Designated Steel Construction Products, Standard 1000-008, version 3, April 3, 2025

Environment