

# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025 AND ISO 21930:2017

SmartEPD-2023-001-0005-01

## Carbon Steel Pipe (Bare)



**Date of Issue:**  
May 04, 2023

**Expiration:**  
May 04, 2028

**Last updated:**  
Aug 30, 2024

|                                             |    |
|---------------------------------------------|----|
| General Information .....                   | 3  |
| Reference Standards .....                   | 3  |
| Verification Information .....              | 3  |
| Limitations, Liability, and Ownership ..... | 4  |
| Organization Information .....              | 4  |
| Product Information .....                   | 4  |
| Plants .....                                | 5  |
| Product Specifications .....                | 5  |
| Material Composition .....                  | 5  |
| Software and LCI Data Sources .....         | 6  |
| EPD Data Specificity .....                  | 6  |
| Renewable Electricity .....                 | 6  |
| System Boundary .....                       | 7  |
| Product Flow Diagram .....                  | 8  |
| Life Cycle Module Descriptions .....        | 9  |
| LCA Discussion .....                        | 9  |
| Results .....                               | 10 |
| Environmental Impact Assessment .....       | 10 |
| Resource Use Indicators .....               | 10 |
| Waste and output Flow Indicators .....      | 11 |
| Interpretation .....                        | 12 |
| References .....                            | 12 |

## General Information

### JSW Steel USA

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|                             |                           |
|-----------------------------|---------------------------|
| Product Name:               | Carbon Steel Pipe (Bare)  |
| Declared Unit:              | 1 metric ton              |
| Declaration Number:         | SmartEPD-2023-001-0005-01 |
| Date of Issue:              | May 04, 2023              |
| Expiration:                 | May 04, 2028              |
| Last updated:               | August 30, 2024           |
| EPD Scope:                  | Cradle to gate<br>A1 – A3 |
| Market(s) of Applicability: | North America             |

## Reference Standards

|                                |                                                                                                                             |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Standard(s):                   | ISO 14025 and ISO 21930:2017                                                                                                |
| Core PCR:                      | UL PCR for Building-Related Products and Services Part A v.3.2<br>Date of issue: December 12, 2018                          |
| Sub-category PCR:              | UL Part B: Designated Steel Construction Products v.2<br>Date of issue: December 31, 2020<br>Valid until: December 31, 2025 |
| Sub-category PCR review panel: | 📄 Contact Smart EPD for more information.                                                                                   |
| General Program Instructions:  | 📄 Smart EPD General Program Instructions v.1.0, November 2022                                                               |

## Verification Information

|                       |                                                                                                                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LCA Author/Creator:   | 🌐 Jana Fogarty   📄 TrueNorth Collective   ✉ <a href="mailto:info@truenorthcollective.net">info@truenorthcollective.net</a>                                                                         |
| EPD Program Operator: | 📄 Smart EPD   ✉ <a href="mailto:info@smartepd.com">info@smartepd.com</a>   🌐 <a href="http://www.smartepd.com">www.smartepd.com</a>  <br>📍 585 Grove St., Ste. 145 PMB 966, Herndon, VA 20170, USA |

**Verification:**

Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071 :

External

🌐 Anna Lasso | ✉ [anna.lasso@smartepd.com](mailto:anna.lasso@smartepd.com)

Independent external verification of EPD, according to ISO 14025 and reference PCR(s) :

External

🌐 Anna Lasso | ✉ [anna.lasso@smartepd.com](mailto:anna.lasso@smartepd.com)

## Limitations, Liability, and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The environmental impact results of steel products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the steel product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted. The EPD owner has sole ownership, liability, and responsibility for the EPD.

## Organization Information

JSW USA is part of the diversified US \$22 billion JSW Group. As affiliates of JSW Group, with more than 18 million tons of installed capacity worldwide, JSW Steel USA benefits from having access to team members with world-class expertise and product knowledge.

JSW Steel USA has two strategic locations in the United States; Mingo Junction, Ohio and Baytown, Texas. We are committed to creating a better today, stronger tomorrow.

JSW Steel USA is home to both the largest and most modern Consteel™ EAF technology in North America as well as one of the widest plate mills. By using the Consteel™ EAF method of melted and manufactured steel, JSW produces some of the cleanest steel products possible in the world. JSW services shipyards, oilfield fabricators, heavy equipment producers, machinery makers, global energy and petrochemicals industry, and many other end users and distributors who need high quality steel.

Further information can be found at: <https://jswsteel.us/>

## Product Description

This EPD represents double submerged arc welded (DSAW) carbon steel pipe produced UOE technology from carbon steel plate.

JSW Steel USA is committed to creating safe sustainable steel. Steel pipe is produced to order. Company procedures conform to all PED, ASTM, EN, ASME, API, DIN, and JIS Standards. The most demanding customer requirements are met with tightly controlled and documented Quality Assurance and Preventative Maintenance programs.

Products are used in a wide range of applications, including high pressure oil and gas transmission lines, power plants, L&G terminals, steel casing, piling and other heavy infrastructure applications

Further information can be found at: <https://jswsteel.us/carbon-steel-plate/>

## Product Information

Declared Unit: 1 metric ton

Mass: 1000 kg

Product Specificity:

✗ Product Average

✓ Product Specific

Averaging:

Averaging was not conducted for this EPD. Data utilized for this EPD is based on production records for the calendar year 2021.

## Plants



JSW Baytown  
5200 E Mc Kinney Rd, Baytown, TX 77523, USA

## Product Specifications

|                               |                                    |
|-------------------------------|------------------------------------|
| Product SKU(s):               | Carbon Steel Pipe (Bare)           |
| Product Classification Codes: | UNSPSC - 40171601                  |
| Form Factor:                  | Steel >> Structural Steel >> Plate |
| Steel Type:                   | Alloy                              |
| Yield Tensile Strength:       | 235-634 MPa                        |

## Material Composition

| Material/Component Category | Origin | % Mass |
|-----------------------------|--------|--------|
| Purchased Slab              | None   | 100    |

| Packaging Material | Origin | kg Mass   |
|--------------------|--------|-----------|
| Dunnage            | None   | 1.26E+000 |
| Cribbing           | None   | 0.00E+000 |

| Hazardous Materials                                                          |
|------------------------------------------------------------------------------|
| No regulated hazardous or dangerous substances are included in this product. |

EPD Data Specificity

|                            |                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Primary Data Year:         | 2021                                                                                                                         |
| Manufacturing Specificity: | <div><div>✗</div>Industry Average</div> <div><div>✓</div>Manufacturer Average</div> <div><div>✓</div>Facility Specific</div> |

Software and LCI Data Sources

|                             |                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------|
| LCA Software:               | <div><div></div>SimaPro v. 9.4.0</div>                                                   |
| LCI Foreground Database(s): | <div><div></div>Ecoinvent v. 3.8</div>   <div><div></div>Cut-Off by Classification</div> |
| LCI Background Database(s): | <div><div></div>Ecoinvent v. 3.8</div>                                                   |

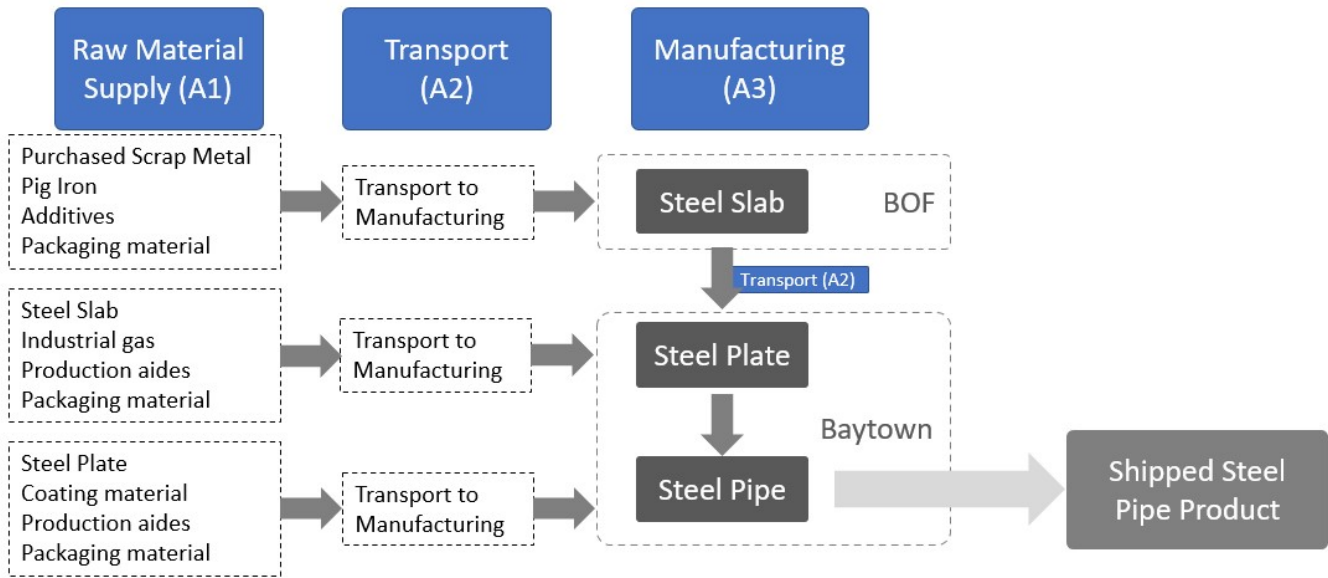
Renewable Electricity

|                                |    |
|--------------------------------|----|
| Renewable electricity is used: | No |
|--------------------------------|----|

## System Boundary

|                                         |    |                                     |    |
|-----------------------------------------|----|-------------------------------------|----|
| Production                              | A1 | Raw material supply                 | ✓  |
|                                         | A2 | Transport                           | ✓  |
|                                         | A3 | Manufacturing                       | ✓  |
| Construction                            | A4 | Transport to site                   | ND |
|                                         | A5 | Assembly / Install                  | ND |
| Use                                     | B1 | Use                                 | ND |
|                                         | B2 | Maintenance                         | ND |
|                                         | B3 | Repair                              | ND |
|                                         | B4 | Replacement                         | ND |
|                                         | B5 | Refurbishment                       | ND |
|                                         | B6 | Operational Energy Use              | ND |
|                                         | B7 | Operational Water Use               | ND |
| End of Life                             | C1 | Deconstruction                      | ND |
|                                         | C2 | Transport                           | ND |
|                                         | C3 | Waste Processing                    | ND |
|                                         | C4 | Disposal                            | ND |
| Benefits & Loads Beyond System Boundary | D  | Recycling, Reuse Recovery Potential | ND |

Product Flow Diagram



## Life Cycle Module Descriptions

### Raw Material Supply (A1)

For this JSW USA study, primary data was collected through customizable templates and reviewed internally to ensure completeness and credibility. Common practices such as mass balance, energy balance and stoichiometry were considered. Final model inputs were reviewed by the client to verify key assumptions.

### Packaging (A1)

Steel slab packaging from Mingo Junction consists of wooden cribbing and steel plate packaging from Baytown uses wooden dunnage.

### Transportation to Factory (A2)

Materials used in the production of steel products can be sourced from multiple suppliers. While material type is the same, transportation distance may differ drastically. In this study, a weighted average distance was estimated for each transportation mode and each material set based on primary data. The average distance per transportation mode was used for all supplied materials. Shipping distances and transportation modes between referenced JSW USA facilities were obtained from JSW USA. Weighted average shipping distances were calculated and used for all 2021 amounts within this study. Upstream transportation was modeled based on primary data using an average distance for incoming supplied ferrous scrap and pig iron. Ferrous scrap and pig iron consist of >84% of the total mass of supplied materials. The average distance is 147 km by truck and 2690 km of transport by sea. An average distance of 100km was used for transportation of manufacturing waste via truck.

### Manufacturing (A3)

The information module manufacturing includes:

- A3, production of ancillary materials or pre-products
- A3, generation of electricity, steam and heat from primary energy resources used in manufacturing including their extraction, refining and transport
- A3, emissions from the combustion of secondary fuels and waste used in the manufacturing process
- A3, manufacturing of products and co-products, including their extraction, manufacturing and transport
- A3, manufacturing of packaging, including their extraction, manufacturing and transport
- A3, waste management from manufacturing packaging and manufacturing wastages transport up to the recycler or disposal

## LCA Discussion

### Allocation Procedure

#### Cut-Off Criteria

All known mass and energy flows are included; no known flows are deliberately excluded. All upstream and downstream activities are included using a combination of primary and secondary data. While the majority of inventory data are sourced from primary resources, representative proxies are used to close gaps in the absence of primary data.

**Allocation & Recycling** While conducting an LCA, if the life cycles of more than one product are connected, allocation of the process inputs should be avoided by using the system boundary expansion approach. In accordance with the PCR, mass should be used as the primary basis for co-product allocation.

The allocations of relevance for calculation (appropriation of impacts across various products) shall be indicated, at least:

- Allocation in the use of recycled and/or secondary raw materials.
- Allocation of energy, ancillary and operating materials used for individual products in a factory.

No multi-output allocation was necessary in the foreground of the study. Allocation of secondary data taken from ecoinvent v3.8 cut-off by classification has allocation applied to it. Since the EPD does not include end-of-life of the product, end-of-life allocation is outside the scope of the study. For the cradle-to-gate boundaries, this study uses the cut-off approach method for recycling. According to this approach, the first life of a material bears the environmental burdens of its production (e.g., raw material extraction and processing) and the second life (e.g., scrap input) bears the burdens of refurbishment (e.g., collection and refining of scrap).

The burdens from waste treatment are taken by the life after which they occur. The results of the study are only applicable to the defined scenarios. Any adjustment of the study boundaries or processes may change the results. Environmental declarations from different programs may not be comparable (ISO 14025, 2006). Even when the same PCR is followed, different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared. EPD's produced under this PCR do not include the operational impacts of the whole building or end of life impacts. In most applications, steel products have little to no maintenance or replacement and do not result in emissions to air or water.

## Results

### Environmental Impact Assessment Results

IPCC AR5 GWP, TRACI 2.1

per 1 metric ton of product.

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

| Impact Category | Method       | Unit         | A1      | A2      | A3      | A1A2A3  |
|-----------------|--------------|--------------|---------|---------|---------|---------|
| GWP-total       | IPCC AR5 GWP | kg CO2 eq    | 2.85e+3 | 1.38e+2 | 5.72e+2 | 3.56e+3 |
| ODP             | TRACI 2.1    | kg CFC-11 eq | 1.60e-4 | 2.90e-5 | 7.18e-5 | 2.61e-4 |
| AP              | TRACI 2.1    | kg SO2 eq    | 1.08e+1 | 3.81e+0 | 8.07e-1 | 1.54e+1 |
| EP              | TRACI 2.1    | kg N eq      | 1.10e+1 | 2.01e-1 | 1.49e+0 | 1.27e+1 |
| POCP            | TRACI 2.1    | kg O3 eq     | 1.58e+2 | 7.02e+1 | 8.05e+0 | 2.36e+2 |
| ADPF            | TRACI 2.1    | MJ           | 1.48e+3 | 2.61e+2 | 1.25e+3 | 2.99e+3 |

#### Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. 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.

### Resource Use Indicators

per 1 metric ton of product.

| Indicator | Unit | A1      | A2      | A3      | A1A2A3  |
|-----------|------|---------|---------|---------|---------|
| RPRE      | MJ   | 2.96e+3 | 1.20e+1 | 2.81e+2 | 3.25e+3 |
| RPRM      | MJ   | 0       | 0       | 0       | 0       |
| NRPRE     | MJ   | 2.96e+4 | 1.77e+3 | 8.73e+3 | 4.01e+4 |
| NRPRM     | MJ   | 0       | 0       | 0       | 0       |
| SM        | kg   | 0       | 0       | 0       | 0       |
| RSF       | MJ   | 0       | 0       | 0       | 0       |
| NRSF      | MJ   | 0       | 0       | 0       | 0       |
| RE        | MJ   | 0       | 0       | 0       | 0       |
| FW        | m3   | 0       | 0       | 1.12e+0 | 1.12e+0 |

#### Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRM or PENRM = Total non-renewable primary resources with energy content, SM: Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Waste and Output Flow Indicators  
per 1 metric ton of product.

| Indicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Unit | A1 | A2 | A3      | A1A2A3  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|----|---------|---------|
| HWD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | kg   | 0  | 0  | 0       | 0       |
| NHWD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | kg   | 0  | 0  | 5.62e+0 | 5.62e+0 |
| HLRW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | kg   | 0  | 0  | 0       | 0       |
| ILLRW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | kg   | 0  | 0  | 0       | 0       |
| CRU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | kg   | 0  | 0  | 0       | 0       |
| MR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | kg   | 0  | 0  | 3.22e+2 | 3.22e+2 |
| MER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | kg   | 0  | 0  | 0       | 0       |
| EE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MJ   | 0  | 0  | 0       | 0       |
| <p>Abbreviations:</p> <p>HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.</p> |      |    |    |         |         |

## Interpretation

Interpretation is the last phase of an LCA, although it is typically done iteratively to inform and refine the goal and scope. In this section, the results are examined based on the data quality and consistency. Key assumptions are reviewed to ensure that conclusions and recommendations are consistent with the goal and scope. It should be noted that LCA results are based on a relative approach and indicate potential environmental effects therefore do not predict actual impacts on category impacts. Based on the results and study assumptions, methods and data, the cradle-to-gate impacts for the steel plate product using slabs produced via Basic Oxygen Furnace are split between A1, raw material supply (49% - 87%) and A3, manufacturing (3% - 42%), with the remainder coming from A2, transportation to factory (2% - 30%).

## Environmental Activities and Certifications

| Certification |
|---------------|
| ISO 14001     |
| ISO 9001      |

## References

- Bare, J., Gloria, T., & Norris, G. (2006). Development of the Method and U.S. Normalization Database for Life Cycle Impact Assessment and Sustainability Metrics. Environmental Science & Technology.
- Bare, J., Norris, G., Pennington, D., & McKone, T. (2003). TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Journal of Industrial Ecology.
- ecoinvent center. (2019). Allocation cut-off by classification. Zurich, Switzerland: ecoinvent center. Retrieved 2019, from <https://www.ecoinvent.org/database/system-models-in-ecoinvent-3/cut-off-system-model/allocation-cut-off-by-classification.html>
- IPCC. (2013). IPCC Fifth Assessment report. The Physical Science Basis. Retrieved from <http://www.ipcc.ch/report/ar5/wg1/>. ISO 14025. (2006).
- ISO 14025:2006: Environmental labels and declarations — Type III environmental declarations — Principles and procedures. International Organization for Standardization.
- ISO 14040. (2006). ISO14040:2006/Amd 1:2020 -- Environmental management -- Life cycle assessment -- Principles and framework. International Organization for Standardization.
- ISO 14044. (2006). ISO 14044:2006/Amd 1:2017/Amd 2:2020 -- Environmental management - Life cycle assessment – Requirements and guidelines. International organization for Standardization (ISO).
- ISO 21930. (2017). Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services.
- UL. (2018). Product Category Rules for Building Related Products and Services, Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL 10010, v3.2. UL.
- UL. (2020). Product Category Rule (PCR) Guidance for Building-Related Products and Services Part B: Designated Steel Construction Product EPD Requirements, UL 10010–34, v. 2. UL.
- SmartEPD (2022) General Program Instructions, Version 1.0. November.
- Wernet, G. B.-R. (2016). The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, 1218–1230.