Environmental Product Declaration

In accordance with ISO 14025:2006 and
EN 15804:2012+A2:2019/AC:2021

NORTH AMERICA EPD

INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

NON-GALVANIZED METAL POST

Manufactured by Techno Pieux



This environmental product declaration (EPD) covers the non-galvanized metal post manufactured by Techno Pieux. The EPD was prepared by CT Consultant in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/ AC:2021, and verified by Marie Bellemare Consulting.

This EPD presents the results of the life cycle assessment (LCA) including the raw materials supply, manufacturing, transport, installation, use, end-of-life stages as well as the benefits and loads beyond the system boundary (i.e., cradle-to-gate with options, modules C1-C4, module D and optional modules (A4-A5 and B1-B7)).

For more information about Techno Pieux, please visit www.technometalpost.com

Program	The International EPD® System, www.environdec.com
Program operator	EPD International AB
Licensee	EPD North America
EPD registration number	EPD-IES-0028216:007
Version date	2026-10-28
Validity date	2031-02-13

An EPD may be updated or depublished if conditions change.

1 | GENERAL INFORMATION

Program information	
Program	The International EPD® System [1]
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
E-mail	support@environdec.com

Product Category Rules (PCR)	
CEN standard EN 15804:2021 [2] serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR)	International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1 [3]
UN CPC code	41287 Other tubes and pipes, of circular cross-section, welded, of steel
PCR review was conducted by	Technical Committee of the International EPD System A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com. Chair of the PCR review: Rob Rouwette (Star2See), chair Noa Meron (thinkstep-anz), co-chair

Third-party verification	
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via an individual EPD verification without a pre-verified LCA/EPD tool	
Third-party verifier	Marie Bellemare, Marie Bellemare Consulting
Approved by	International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier	☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programs, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 [2] and ISO 14025:2006 [4].

In this EPD, a dot is used as the decimal separator and a space as the thousands separator.

2 | INFORMATION ABOUT EPD OWNER

Owner of the EPD	Techno Pieux
Address	1700 Setlakwe Street Thetford Mines, Quebec Canada G6G 8B2 1 418 332-2139 www.technometalpost.com
Contact	Étienne St-Laurent, Eng. Director of Operations & Finance
Address and contact information of the LCA practitioner commissioned by the EPD owner	CT Consultant 266 Hickson Street Montreal, Quebec Canada H4G 2J6 www.ctconsultant.ca
Description of the organization	Techno Pieux is a company recognized as a world leader in the design, manufacturing and installation of metal posts for building foundations. Its head office is located in Thetford Mines, Canada, where more than 100 employees work in its manufacturing, R&D, distribution and management facilities. The company relies on a network of more than 175 distributors in North America and Europe. Since its founding, the company has completed more than 500 000 projects, involving a wide range of services, including engineering services, and it maintains a research centre dedicated exclusively to innovation.
Product-related and management system-related certifications	ISO 9001:2015 Quality management systems - requirements [5] EN 1090-1:2009+A1:2011 Execution of steel structures and aluminium structures [6]

3 | PRODUCT INFORMATION

Product name	P4-16 non-galvanized metal post
Product identification	The product is a non-galvanized metal P4-16 model post made of steel that complies with the ASTM A500 grade C, CAN/CSA-G40.21 and CSA W47 standards.
Product description	The non-galvanized metal post manufactured by Techno Pieux is a screwed metal post used to establish the necessary foundations for a given construction project. The structure to be supported may be residential (house, cottage, etc.), touristic (flagpoles, signposts, etc.), energy sector-related (solar panel structures), infrastructure projects (footbridge) or industrial and commercial (machinery, offices). The P4-16 metal post can achieve load-bearing capacities of 200 kN in compression, 100 kN in tension and 12 kN in lateral capacity [7]. A secondary function of the product is to contribute to the aesthetics of the structure to be supported. The non-galvanized metal post is made of steel to which a high-density polyethylene (HDPE) sheathing can be added to protect it from ground movement caused by freezing and thawing. A metal post consists of a steel tube with one or more steel helixes. Its length varies from 2 to 3 metres, and its diameter ranges from 48.3 mm to 168.3 mm [8]. The P4-16 non-galvanized metal post has a length of 2 meters and a diameter of 101.6 mm. Accessories (steel base plates and rings) are used to secure the metal post to the structure. When the depth required to achieve the desired load-bearing capacity is greater than the length of the metal post, one or more extensions can be used. An extension consists of a tube without a helix and an HDPE sheathing.



Photo 1. Non-galvanized post manufactured by Techno Pieux

3 | PRODUCT DESCRIPTION (CONTINUED)

Name and location of production sites	The non-galvanized metal posts are manufactured at four sites located in two countries: • **Canada** 1) The Setlakwe manufacturing plants located at 1700 Setlakwe Street and 1725 Setlakwe Street in Thetford Mines (Quebec, Canada) are dedicated to the production and assembly of metal posts; 2) The building at 1191 Huppé Street in Thetford Mines (Quebec, Canada) houses the administrative offices and manufactures the HDPE sheathing for the metal posts produced at the Setlakwe manufacturing plants; 3) The manufacturing plant at 4150 Nancy Street in Terrebonne (Quebec, Canada) is dedicated to assembling metal posts produced at Setlakwe manufacturing plants prior to being sold in the Greater Montreal area; • **France** 4) A manufacturing plant located on Chemin de la Hayette in Poix-de-Picardie (France) where metal posts are produced and assembled.
Product manufacturing	Steel in the form of tubes and plates is shipped by truck from steel mills in Ontario, Canada, to the Techno Pieux manufacturing plants in Thetford Mines to manufacture the tube and helix of the metal post (Figure 1). At their manufacturing plants, Techno Pieux assembles the tubes and helixes with solder to manufacture the posts. Some of the tubes and helixes from the Setlakwe manufacturing plants are sent to the Terrebonne manufacturing plant to be assembled into posts. In the case of the Poix-de-Picardie manufacturing plant, some of the steel tubes and steel plates come from the Setlakwe manufacturing plants, while the rest of the steel comes from European steel mills. The steel is produced either by oxygen converter (BOF or Linz-Donawitz process) or by electric arc furnace (EAF). The HDPE sheathing used for the metal posts is manufactured at the plant located at 1191 Huppé Street (Thetford Mines, Quebec). The HDPE used in its production comes from a Canadian manufacturer. Manufacturing waste (non-compliant metal posts, steel losses) is sent for recycling.
Product transport	The non-galvanized metal post is shipped to the construction sites by truck and by boat via distributors in Canada, the United States and Europe.
Product installation	During installation, the metal post is screwed into the ground using an installation machine. The extensions and accessories (steel base plate and ring) are welded to the metal post using an electrode welding machine.
Product use	Once installed, the metal post requires no maintenance, repair or replacement. This means that no resources or energy are consumed during the metal post's use. Furthermore, the product is considered to emit no emissions into the air, soil or water during its lifetime.
Product end of life	At the end of its life, the metal post is left in place (in the ground where it was installed).

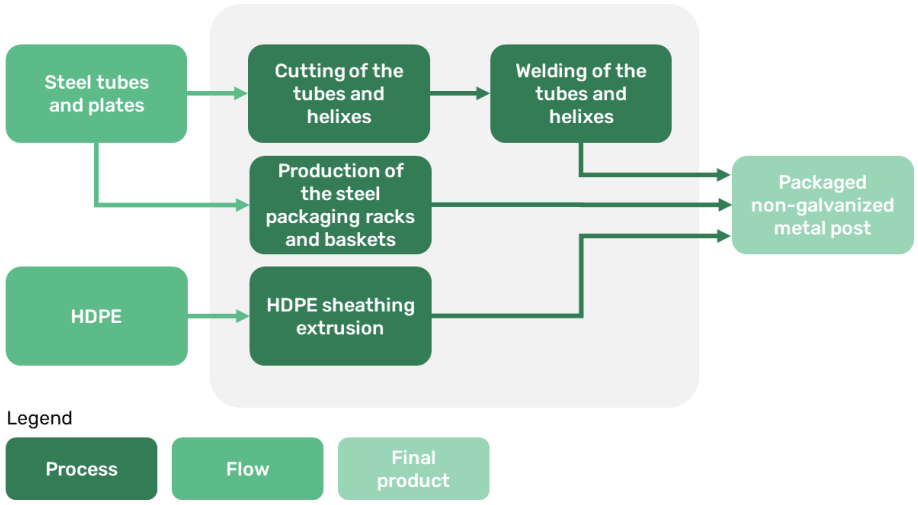


Figure 1: Manufacturing steps for the Techno Pieux non-galvanized metal post

4 | CONTENT DECLARATION

Table 1: Material composition of the P4-16 non-galvanized metal post

PRODUCT CONTENT	MASS (KG)	RECYCLED CONTENT (% OF MATERIAL)
Steel	39.92	36.7%
HDPE (sheathing)	0.40	0%
TOTAL	**40.32**	**36.3%**

The steel recycling content is a weighted average from different suppliers. The metal post is packaged in custom-made steel racks and baskets manufactured by Techno Pieux from the same type of steel purchased to produce the metal posts. The mass of the steel racks and baskets used for the packaging of the P4-16 non-galvanized steel post is 0.36 kg. The exact breakdown between pre and post consumer recycled content was not available for all inputs, so this distinction is not presented.

The product does not contain any substances on the REACH candidate list with a concentration greater than 0.1% by mass. The product and its packaging do not contain any biogenic carbon. The product and its packaging do not contain any substances on the candidate list of Substances of Very High Concern (SVHCs) that exceed the limits for registration with the European Chemicals Agency.

5 | LCA INFORMATION

5.1 | General LCA information

Declared unit	Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.
Conversion factor	This EPD represents a P4-16 non-galvanized metal post with a declared mass of 40.32 kg. For information purposes, Table 15 of Section 7 presents size variations of the same product. The impact results in Section 6 can be converted to 1 kg of metal post by multiplying them by the conversion factor of 0.0248 (1/40.32 kg). These results can then be used to derive environmental impacts of metal posts of identical material composition and manufacturing process by linear mass-based scaling.
Technical lifespan	The technical lifespan of a non-galvanized metal post is 90 years, based on the ICC-ES AC-358 evaluation criteria and a corrosion thickness of 1.5 mm (International council code).
Time representativeness	1 January 2023 to 31 December 2023
Geographical scope	• A1-A2: Global; • A3: Quebec (Canada) and France; • A4-A5, B1-B7 and C1-C4: Global.
Database used	Ecoinvent v3.11 database - EN 15804 add-on [9]
LCA software used	OpenLCA version 2.4.1 [10]
Impact assessment method	EF 3.1 impact assessment method [11]
Infrastructure / capital goods	The Ecoinvent database used for the background data of the LCA includes the infrastructure and capital goods by default.
System boundary	The system boundary is “cradle-to-gate with options, modules C1-C4, module D and optional modules (A4-A5 and B1-B7)” and includes the following life cycle stages and modules according to EN 15804:2012+A2:2019/AC:2021 [2] (Table 2, Figure 2): • Production (A1 - A3); • Construction (A4 - A5); • Use (B1 - B7); • End of life (C1 - C4); • Benefits and loads beyond the system boundary (D). As Techno Pieux declared an end-of-life scenario in which 100% of the metal post is left in place in the ground (not extracted for economic reasons), module D (benefits associated with recycling) is considered to be zero.

5.2 | Modules declared and geographical scope

Table 2: Modules declared and geographical scope

	PRODUCTION STAGE (A1-A3)			CONSTRUCTION STAGE (A4-A5)		USE STAGE (B1-B7)							END-OF-LIFE STAGE (C1-C4)				BEYOND THE SYSTEM BOUNDARY
	Production of raw materials	Transport of raw materials	Manufacturing	Transport to the construction site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Energy use	Water use	Deconstruction/demolition	Transport to the waste treatment site	Waste treatment for reuse, recovery and/or recycling	Disposal	Benefits associated with reuse/recycling/energy recovery
Module name	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Declared module	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	Global		CA, FR	Global													Global
Share of primary data	27.92%			-													-
Variation of GWP-GHG – products*	Not applicable			-													-
Variation of GWP-GHG – sites**	0.6 – 5.2%			-													-

Legend

X: Life cycle module included in the LCA

ND: Life cycle module not declared (excluded) from the LCA

*Not applicable: this EPD represents one product, meaning there is no variation between products. The table in Section 7 presents size variations of the same product (scaling by mass).

**According to the PCR, the variations in percentage between two numbers are calculated by dividing the absolute value of the difference between the numbers by the average of the numbers and then multiplying by 100. The variation between sites is mainly due to differences in steel sourcing (steel manufacturing process, recycled content) between the Canadian and French manufacturing plants.

5.3 | Process flow diagram

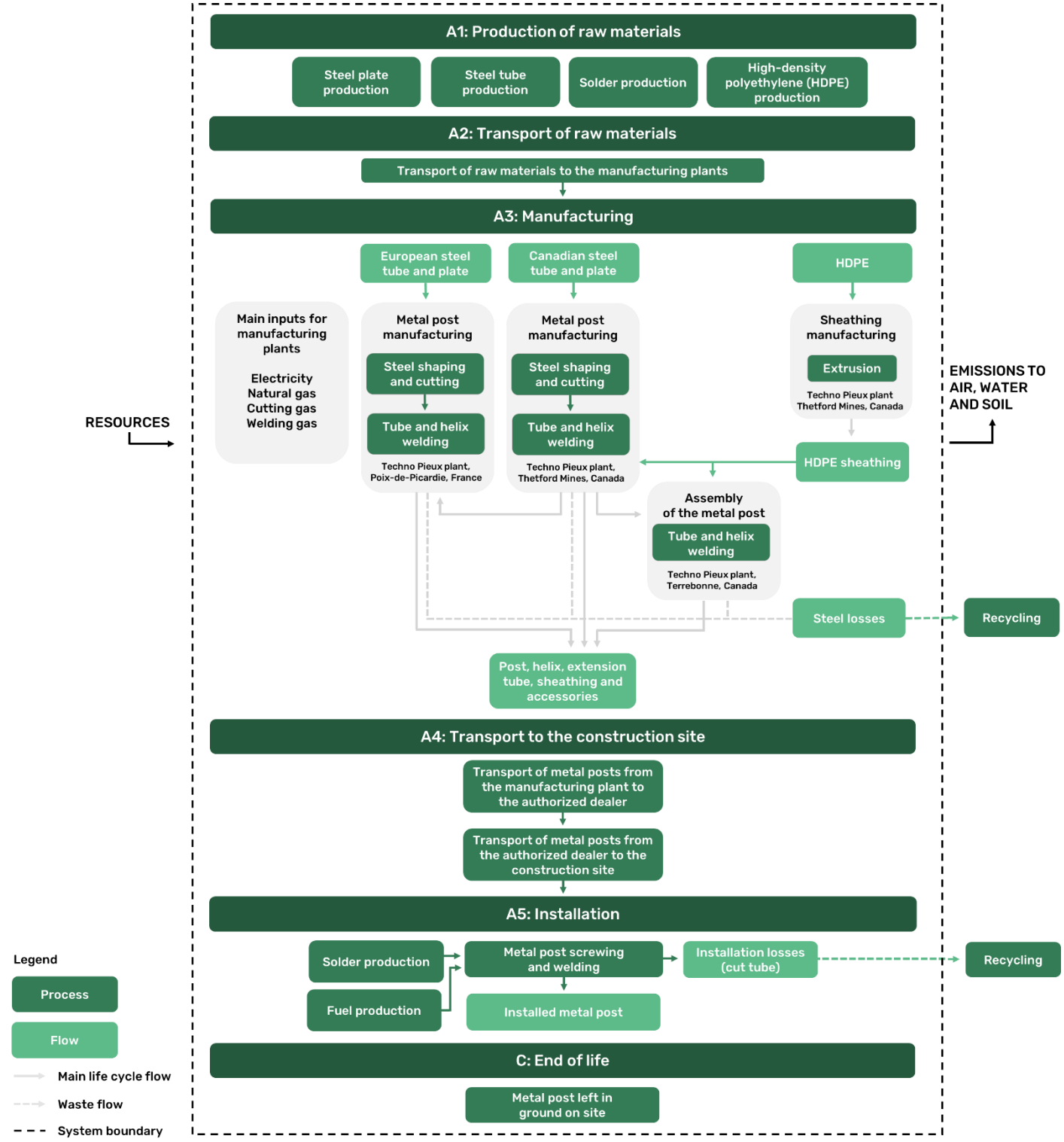


Figure 2: Process flow diagram – Non-galvanized metal post

5.4 | Cut-off criteria

The following cut-off criteria were applied according to the PCR [3]:

- **Mass and energy.** LCI data shall include a minimum of 99% of total inflows (mass and energy) per unit process and 95% of total inflows (mass and energy) per life cycle stages A1-A3, A4-A5 and C1-C4, aggregated modules B1-B5 and B6-B7, and module D.
- **Environmental impact.** At least 95% of the environmental impact per aggregated module shall be included.

Based on these cut-off criteria, the following activities were excluded: production of packaging for the raw materials, production of lubricant for manufacturing plant equipment, water consumption at the manufacturing plants and transport of the packaging for recycling.

5.5 | Allocation

When a process in a product's life cycle generates multiple outputs (multifunctional processes) or is linked to another system (life cycle of a product outside the boundary of the system under study), the environmental impact of the process must be allocated to the various products, co-products and systems. The allocation methods considered for this study are:

- **Allocation for end-of-life processes.** The cut-off approach specifies that the impacts associated with secondary materials entering the system are attributable to the system that generated them, and the benefits associated with recycling materials leaving the system are not included. In this study, this means that the secondary steel enters module A1 without impact, and no environmental impacts or benefits associated with recycling manufacturing or installation losses are included.
- **Allocation for multifunctional processes.** No foreground process in the metal post's life cycle generates co-products within the boundary of the system under study. Therefore there is no allocation of this type to consider in this study.
- **Allocation approach in the database inventory data.** The Ecoinvent datasets used (Ecoinvent v3.11 database - EN 15804 add-on) comply with the EN 15804:2021 standard, which attributes the impacts of secondary materials entering the system to those that generated them and excludes the benefits associated with material recycling, while including the impacts associated with the conditioning of materials prior to recycling.

5.6 | Scenarios used in the modelling of downstream stages

Table 3: Module A4 – Transport of the non-galvanized metal post to the construction site

PARAMETER	VALUE/SPECIFICATION	UNIT
Scenario 1 - Transport to the construction site via an authorized dealer located in Europe		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by truck		
Vehicle type	Trucks with load capacities of 3.5 to 7.5 tonnes and over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12 or 35	L/100 km
Distance travelled	420	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient (coefficient: =1 or <1 or ≥1 for compressed or nested products)	1	-
Transport stage 2a – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by boat (intra Europe scenario)		
Vehicle type	Boat	-
Fuel type	Diesel	-
Fuel consumption	0.003	kg/t*km
Distance travelled	302	km
Bulk density of transported products	1 271[1]	kg/m³

PARAMETER	VALUE/SPECIFICATION	UNIT
Volume capacity utilisation coefficient	1	-
Transport stage 2b – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by boat (transatlantic scenario)		
Vehicle type	Boat	-
Fuel type	Diesel	-
Fuel consumption	0.003	kg/t*km
Distance travelled	5 830	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 3 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Scenario 2 - Transport to the construction site via an authorized dealer located in Canada		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by truck		
Vehicle type	Trucks with load capacities of 3.5 to 7.5 tonnes and over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12 or 35	L/100 km
Distance travelled	1 521	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 2 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Scenario 3 - Transport to the construction site via an authorized dealer located in the United States		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to the authorized dealer by truck		
Vehicle type	Trucks with a load capacity of over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	35	L/100 km
Distance travelled	2 198	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 2 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-

[1] The density of a metal post is 1 271 kg/m^3 considering an average mass of 36 kg (for a length of 2 m), an external diameter of 101.6 mm and an internal diameter of 83.4 mm (the inside of the metal post is hollow).

A4 transport distances are weighted averages based on Techno Pieux's 2023 sales data and the average local delivery radius of authorized dealers.

Table 4: Module A5 - Installation of the non-galvanized metal post

PARAMETER		VALUE	UNIT
Solder		0.019	kg
Water usage		0	m^3
Electricity consumption for electrode welding		0.010	kWh
Diesel consumption for installation machine		99.90	MJ
Use of other resources		0	kg
Material waste at the construction site prior to treatment of waste generated by product installation	Installation losses (metal posts)	0.402	kg
Output materials produced by waste treatment at the construction site	Collection for recycling of installation losses	0.402	kg
Direct emissions to air, soil and water		0	kg

Table 5: Technical lifespan of the non-galvanized metal post

PARAMETER	VALUE/SPECIFICATION	UNIT
Technical lifespan	90	years
Declared product properties	ASTM A500 Grade C CAN/CSA-G40.21 CSA W47	-
Design application parameters	Design according to manufacturer's instructions	-
Presumed quality of work, when installation complies with the manufacturer's instructions	Installation in accordance with best practices and manufacturer's recommendations	-
Outdoor environment (for outdoor applications), e.g. weather conditions, pollutants, exposure to UV rays and wind, building orientation, shade, temperature	The metal post may be subject to soil contact, moisture exposure, freeze–thaw cycles, temperature fluctuations, and naturally occurring chemical agents in soil. Valid for soil conditions defined in ICC-ES AC-358. The polyethylene sleeve protects the pile from any ground movement (e.g., freeze/thaw cycle or swelling clay). The helix size of the metal post is adapted to the specific soil conditions to obtain the required structural support.	-
Indoor environment (for indoor applications), e.g. temperature, humidity, exposure to chemicals	Not applicable	-
Conditions of use, e.g. frequency of use, mechanical exposure	Once the metal post is planted in the soil, it does not require any maintenance during use. The technical lifespan is valid under the soil exposure conditions defined in ICC-ES AC-358 and may vary depending on environmental conditions. The metal posts are designed to resist axial, lateral, and bending moment loads in accordance with the specific project requirements. Once installed, the metal posts are immediately ready to support the structure.	-
Maintenance, e.g. required frequency, type and quality, and replacement of replaceable components	No maintenance required during the technical lifespan.	-

Table 6: Modules C1-C4 – End of life of the non-galvanized metal post

PARAMETER	VALUE/SPECIFICATION	UNIT
Left in place (on site)	40.32	kg
Assumptions for scenario development	The entire metal post is left onsite (in the ground where it was installed).	

5.7 | Modelling of electricity

The following table presents information on the electricity mix used to model the electricity consumed at the manufacturing plants in A3 and the electricity mix used for steel production in A1.

Table 7: Specific electricity mixes used

MODULE	USE OF ELECTRICITY	PROCESS	YEAR OF THE DATASET	GWP-GHG KG CO_2 EQ / KWH
A1	Electricity used for the production of steel in Ontario, Canada	market for electricity, medium voltage | electricity, medium voltage | EN15804GD, U - CA-ON	2020-2024	0.09115
A3	Electricity consumed at the plants situated in Quebec, Canada	electricity, low voltage residual mix with upstream electricity | electricity, low voltage | EN15804GD, U - CA-QC*	2020-2024	0.02666
A3	Electricity consumed at the plant located in France	electricity, low voltage, residual mix | electricity, low voltage | EN15804GD, U - FR	2020-2024	0.09184

* This process was created using data provided by Hydro-Québec representing the residual electricity mix for 2024 [12].

5.8 | Main assumptions

Carrying out an LCA involves making assumptions when data is incomplete or missing. The following assumptions were made in this LCA:

- **Transport of steel to the manufacturing plant (A2)**. The transport distance from the steel producer to the supplier of the Poix-de-Picardie manufacturing plant is unknown. Therefore, a 1 000 km transport by a semi-trailer truck was considered to account for its transport from to the supplier of Techno Pieux.
- **Transport of manufacturing losses (A3).** The transport of manufacturing losses to recycling is included in A3 as a conservative assumption. In the absence of primary data from Techno Pieux concerning the transport distance of manufacturing losses from the manufacturing plants to the recycling sites, a generic assumption of 50 km provided by EN 15804:2021 was used.
- **Transport of installation losses (A5).** The transport of installation losses to recycling is included in A5 as a conservative assumption. In the absence of primary data from Techno Pieux concerning the transport distance of installation losses from the construction site to the recycling sites, a generic assumption of 50 km provided by EN 15804:2021 was used.

5.9 | Data quality

This EPD is based on data selected according to the PCR requirements (Section 4.6.5). Specific data was provided by Techno Pieux for the reference period from 1 January 2023 to 31 December 2023. This data included the materials and energy consumed, the masses and transport distances, as well as the waste generated by each elementary process included within the system boundary. Generic data was taken from the Ecoinvent database (version 3.11 - EN 15804 [9] released in 2024), a transparent and internationally recognized life cycle inventory database. A data quality assessment was conducted in accordance with the UN Environment Global Guidance (Table E.1, Annex E of EN 15804:2021) as required by the PCR and covered the following criteria: temporal, geographical and technological coverage, as well as precision, plausibility, completeness and consistency. For each relevant data (i.e., contributing to at least 80% of the impact score of any environmental indicator) a score was assigned to each criterion (VG = Very good, G = Good, F = Fair, P = Poor, VP = Very poor).

The results of the data quality assessment indicate that the scores for each criterion are predominantly rated as “Very good” or “Good” for the majority of the relevant datasets. Some secondary data are rated as “Fair” with respect to geographical coverage, as they are representative of the “rest of the world” (RoW) region rather than the specific study geography (e.g. transport processes, HDPE production, and natural gas supply). A “Fair” score is also applied for the technological coverage of the cutting gas, for which a technological proxy is used. A “Poor” score is assigned to the dataset representing steel left on site due to limitations in technological and geographical coverage, as well as precision, since a proxy dataset is used to model this process. On average, the data quality is considered “Good” with respect to temporal, geographical, and technological coverage, as well as plausibility, completeness, and consistency, and the data is thus deemed adequate to meet the objectives of the study.

The total share of primary data contributing to the GWP-GHG results of modules A1-A3 is presented at Table 8 [1]. The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Table 8: Share of primary data contributing to the GWP-GHG results of modules A1-A3

MODULE	PROCESS	SOURCE TYPE	SOURCE	REFERENCE YEAR	DATA CATEGORY	SHARE OF PRIMARY DATA, OF GWP-GHG RESULTS FOR A1-A3
						NON-GALVANIZED METAL POST
A1	Production of steel	Database	Ecoinvent v3.11	2024	Representative generic data	0.00%
A1	Production of HDPE	Database	Ecoinvent v3.11	2024	Representative generic data	0.00%
A2	Transport of steel to the manufacturing site	Database with collected activity data	Ecoinvent v3.11	2023	Primary data	4.88%
A2	Transport of HDPE to the manufacturing site	Database with collected activity data	Ecoinvent v3.11	2023	Primary data	0.01%
A3	Energy consumption at the manufacturing plant electricity, natural gas and diesel)	Collected data	Techno Pieux	2023	Primary data	1.74%
A3	Manufacturing of the product (steel processing, HDPE moulding)	Collected data	Techno Pieux	2023	Primary data	21.30%
A3	Transport of manufacturing waste	Standard	EN 15804:2012+ A2:2019/AC:2021	2019	Representative generic data	0.00%
Total share of primary data, of GWP-GHG results for A1-A3						**27.92%**

6 | ENVIRONMENTAL PERFORMANCE

6.1 | Mandatory impact category indicators

Table 9: Mandatory impact category indicators according to EN 15804:2021 – Results per declared unit

Declared unit: Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq	9.70E+1	7.60E+0	1.12E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.37E-2	0.00E+0
GWP-fossil	kg CO_2 eq	9.65E+1	7.59E+0	1.12E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.37E-2	0.00E+0
GWP-biogenic	kg CO_2 eq	9.55E-2	2.06E-3	2.18E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
GWP-luluc	kg CO_2 eq	4.38E-1	3.75E-3	5.53E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ODP	kg CFC 11 eq	6.10E-7	1.04E-7	1.57E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
AP	mol H^+ eq	3.54E-1	3.99E-2	9.42E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.36E-7	0.00E+0
EP-freshwater	kg P eq	3.27E-3	9.45E-5	7.31E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EP-marine	kg N eq	8.11E-2	1.28E-2	4.28E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.76E-7	0.00E+0
EP-terrestrial	mol N eq	9.57E-1	1.41E-1	4.70E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.56E-9	0.00E+0
POCP	kg NMVOC eq	3.19E-1	4.84E-2	1.41E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.06E-6	0.00E+0
ADP-minerals& metals*	kg Sb eq	2.88E-4	2.62E-5	7.28E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ADP-fossil*	MJ	1.10E+3	1.06E+2	1.44E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
WDP*	m^3	6.43E+1	6.02E-1	1.03E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Acronyms	GWP = Global Warming Potential; GWP-total = Total Global Warming Potential; GWP-fossil = Global Warming Potential from fossil sources; GWP-biogenic = Global Warming Potential from biogenic sources; GWP-luluc = Global Warming Potential from land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential; EP = Eutrophication Potential; EP-freshwater = Freshwater eutrophication potential; EP-marine = Marine eutrophication potential; EP-terrestrial = Terrestrial eutrophication potential; POCP = Photochemical Ozone Creation Potential; ADP = Abiotic Depletion Potential; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water Deprivation Potential															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). The product and its packaging contain no biogenic carbon, thus biogenic CO_2 emissions and uptake were set to zero [3]. GWP-biogenic results arise exclusively from biogenic CH_4 emissions in background processes.

6.2 | Additional mandatory and voluntary impact category indicators

Table 10: Additional mandatory and voluntary impact category indicators – Results per declared unit

Declared unit: Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG*	kg CO_2 eq	9.70E+1	7.60E+0	1.12E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.37E-2	0.00E+0
Fine particulate matter emissions	Incidence of disease	8.46E-6	6.12E-7	2.67E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.02E-13	0.00E+0
Ionizing radiation - human health	kBq U-235 eq	1.06E+1	9.25E-2	1.70E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Freshwater ecotoxicity	CTUe	3.54E+2	1.97E+1	1.13E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.29E-1	0.00E+0
Human toxicity - cancer effects	CTUh	1.29E-7	1.31E-9	2.47E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.38E-10	0.00E+0
Human toxicity - non-cancer effects	CTUh	5.83E-7	6.49E-8	2.38E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	5.57E-11	0.00E+0
Impacts related to land use/soil quality	-	5.53E+2	7.62E+1	1.52E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.79E+1	0.00E+0

** GWP-GHG = Global Warming Potential for greenhouse gases. This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total.*

6.3 | Resource use indicators

Table 11: Resource use indicators – Results per declared unit

Declared unit: Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9.55E+1	1.60E+0	1.90E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	9.55E+1	1.60E+0	1.90E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRE	MJ	1.10E+3	1.06E+2	1.44E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRM	MJ	6.86E+0	0.00E+0	6.86E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	1.11E+3	1.06E+2	1.44E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
SM	kg	1.00E+1	0.00E+0	1.00E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	1.50E+0	1.40E-2	2.41E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

Option B of Annex 3 of the PCR was used to calculate the primary energy use indicators.

6.4 | Waste indicators

Table 12: Waste indicators – Results per declared unit

Declared unit: Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.66E+1	1.79E-1	3.01E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Non-hazardous waste disposed	kg	6.37E+1	1.06E+0	1.63E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.05E+1	0.00E+0
Radioactive waste disposed	kg	3.12E-3	2.27E-5	4.69E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

6.5 | Output flow indicators

Table 13: Output flow indicators – Results per declared unit

Declared unit: Using a non-galvanized P4-16 metal post with a non-galvanized extension (40.32 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 90 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Material for recycling	kg	3.99E+0	0.00E+0	4.41E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy, electricity	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy, thermal	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

7 | ADDITIONAL ENVIRONMENTAL INFORMATION

7.1 | Types, dimensions and masses of metal posts manufactured by Techno Pieux

Table 14 shows the diameters of the metal post types. Table 15 shows the masses of the metal post types for the different types of helixes. It should be noted that all metal post types have the same composition and manufacturing process.

Table 14: Diameters of different types of metal posts

TYPE OF METAL POSTS	DIAMETER (MM)
P1	48.3
P2	60.3
P3	88.9
P4	101.6

Table 15: Masses of non-galvanized metal posts for 2-metre sections according to metal post type and helix type

HELIX TYPE (DIAMETER IN MM)	TYPE OF METAL POST			
	P1	P2	P3	P4
	MASS (KG)			
152.4	9.8	12.7	N/A	N/A
203.2	10.9	13.8	26.6	31.2
254	12.2	15.1	28.4	33.1
304.8	13.8	16.7	30.6	35.2
406.4	18.0	20.9	36.1	40.8

8 | ABBREVIATIONS AND GLOSSARY

General abbreviations	
CEN	European Committee for Standardization
CFC	Chlorofluorocarbon
CFC-11	Trichlorofluoromethane
CH_4	Methane
CO_2	Carbon dioxide
EN	European Norm (Standard)
EF	Environmental Footprint
EPD	Environmental product declaration
eq	Equivalent
ISO	International Organization for Standardization
LCA	Life cycle assessment
LHV	Lower heating value
N	Nitrogen
N/A	Not applicable
ND	Not declared
NMVOC	Non-Methane Volatile Organic Compounds
O_3	Ozone
P	Phosphorus
PCR	Product category rules
Sb	Antimony
SO_2	Sulphur dioxide
SVH	Substances of Very High Concern
UN CPC code	United Nations Central Product Classification
Environmental impact indicators	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq)
GWP-total	Total Global Warming Potential (kg CO_2 eq)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq)
ODP	Ozone Depletion Potential (kg CFC-11 eq)
AP	Acidification Potential (mol H^+ eq)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq)
EP-marine	Marine eutrophication potential (kg N eq)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq)
ADP	Abiotic Depletion Potential
ADP-minerals & metals	Abiotic depletion potential for non-fossil resources (kg Sb eq)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)

Glossary	
Cut-off threshold	Criteria for excluding inputs and outputs based on their contribution (%) to the total mass and energy. If this contribution is lower than a certain threshold (cut-off), these flows can be ignored [2].
Ecoinvent	Life cycle inventory database for materials, chemicals, power generation systems, transport and waste treatment processes [13].
Environmental impact	Any negative or beneficial modification of the environment, resulting wholly or in part from environmental aspects [14], i.e., elements of the activities, products or services of an organization that can interact with the environment [2].
Environmental Product Declaration (EPD)	Environmental declaration providing quantified environmental data using predetermined parameters based on the ISO 14040:2006 and ISO 14044:2006 standards [15,16].
Declared unit	Quantified performance of a product system intended to be used as a reference unit in a life cycle assessment [15].
Life cycle assessment (LCA)	Compilation and evaluation of the inputs and outputs (inventory) as well as the assessment of potential environmental impacts of a product during its life cycle [15].
Product Category Rules (PCR)	A set of specific rules, requirements and guidelines for the development of EPDs. The PCR referenced in this EPD is "International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1 [3]".
Reference flow	Quantity of process outputs in a given product system required to fulfill the function as expressed by the declared unit [15].

9 | VERSION HISTORY

Version 1.0 (Original version of the EPD): 13 February 2026
Version 2.0 (Update of version date due to issue with verification date): 11 June 2026
Version 3.0 (Update of version number and minor editorial corrections): 14 October 2026
Version 4.0 (Product image update, alignment with declared unit terminology and conversion factor per PCR 2019:14 v2.0.1, and update of GWP-biogenic results per Annex 2): 21 October 2026
Version 5.0 (Minor editorial corrections): 28 October 2026

10 | REFERENCES

[1] International EPD System (2025) General program instructions International EPD System for the version 5.0.1. Available at:https://www.datocms-assets.com/37502/1744981993-gpi5-0-1_20250227.pdf.

[2] European Committee for Standardization (2021) EN 15804:2012+A2:2019/AC:2021 - Standards publication sustainability of construction works - environmental product declarations - core rules for the product category of construction products.

[3] International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1. Available at:https://www.environdec.com/pcr-library/pcr_6b99d07c-4b75-4763-4485-08dd775d2e49.

[4] International Organization for Standardization (2006) ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

[5] International Organization for Standardization (2015) ISO 9001:2015 Quality management systems - requirements.

[6] European committee for standardization (2011) EN 1090-1:2009+A1:2011 Execution of steel structures and aluminium structures.

[7] Techno Pieux (2025) Selection table. Available at:https://www.technopieux.com/wp-content/uploads/documents/EN-CA/PDF/Selection-Table-CA-EN.pdf.

[8] Techno Pieux (2018) Product manual.

[9] Ecoinvent (2024) Ecoinvent v3.11. Available at:https://ecoinvent.org/ecoinvent-v3-11/.

[10] GreenDelta (2025) openLCA 2.4.1. Available at:https://www.openlca.org/.

[11] European Commission (2022) Environmental Footprint reference packages. Available at:https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html.

[12] Hydro-Québec (2024) Residual electricity mix and greenhouse gas (GHG) emission rate. Available at:https://www.hydroquebec.com/data/developpement-durable/pdf/label-hq-main-power-grid-2024.pdf.

[13] Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E. and Weidema, B. (2016) The ecoinvent database version 3 (part I): overview and methodology. *The International Journal of Life Cycle Assessment* 21, 1218–1230. Available at:https://link.springer.com/article/10.1007/s11367-016-1087-8.

[14] International Organization for Standardization (2010) ISO 21931-1 Sustainability in building construction - framework for methods of assessment of the environmental performance of construction works - part 1: buildings.

[15] International Organization for Standardization (2006) ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework.

[16] International Organization for Standardization (2006) ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.

techno PIEUX

1700 Setlakwe Street
Thetford Mines, Quebec
Canada G6G 8B2
1 418 332-2139
www.technometalpost.com



Environmental Product Declaration

In accordance with ISO 14025:2006 and
EN 15804:2012+A2:2019/AC:2021

NORTH AMERICA EPD

INTERNATIONAL EPD SYSTEM

ECO PLATFORM EPD VERIFIED

GALVANIZED METAL POST

Manufactured by Techno Pieux



This environmental product declaration (EPD) covers the galvanized metal post manufactured by Techno Pieux. The EPD was prepared by CT Consultant in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/ AC:2021, and verified by Marie Bellemare Consulting.

This EPD presents the results of the life cycle assessment (LCA) including the raw materials supply, manufacturing, transport, installation, use, end-of-life stages as well as the benefits and loads beyond the system boundary (i.e., cradle-to-gate with options, modules C1-C4, module D and optional modules (A4-A5 and B1-B7)).

For more information about Techno Pieux, please visit www.technometalpost.com

Program	The International EPD® System, www.environdec.com
Program operator	EPD International AB
Licensee	EPD North America
EPD registration number	EPD-IES-0025862:007
Version date	2026-10-28
Validity date	2031-02-13

An EPD may be updated or depublished if conditions change.

1 | GENERAL INFORMATION

Program information	
Program	The International EPD® System [1]
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
E-mail	support@environdec.com

Product Category Rules (PCR)	
CEN standard EN 15804:2021 [2] serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR)	International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1 [3]
UN CPC code	41287 Other tubes and pipes, of circular cross-section, welded, of steel
PCR review was conducted by	Technical Committee of the International EPD System A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com. Chair of the PCR review: Rob Rouwette (Star2See), chair Noa Meron (thinkstep-anz), co-chair

Third-party verification	
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via an individual EPD verification without a pre-verified LCA/EPD tool	
Third-party verifier	Marie Bellemare, Marie Bellemare Consulting
Approved by	International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier	☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programs, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

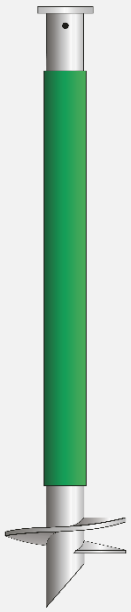
For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 [2] and ISO 14025:2006 [4].

In this EPD, a dot is used as the decimal separator and a space as the thousands separator.

2 | INFORMATION ABOUT EPD OWNER

Owner of the EPD	Techno Pieux
Address	1700 Setlakwe Street Thetford Mines, Quebec Canada G6G 8B2 1 418 332-2139 www.technometalpost.com
Contact	Étienne St-Laurent, Eng. Director of Operations & Finance
Address and contact information of the LCA practitioner commissioned by the EPD owner	CT Consultant 266 Hickson Street Montreal, Quebec Canada H4G 2J6 www.ctconsultant.ca
Description of the organization	Techno Pieux is a company recognized as a world leader in the design, manufacturing and installation of metal posts for building foundations. Its head office is located in Thetford Mines, Canada, where more than 100 employees work in its manufacturing, R&D, distribution and management facilities. The company relies on a network of more than 175 distributors in North America and Europe. Since its founding, the company has completed more than 500 000 projects, involving a wide range of services, including engineering services, and it maintains a research centre dedicated exclusively to innovation.
Product-related and management system-related certifications	ISO 9001:2015 Quality management systems - requirements [5] EN 1090-1:2009+A1:2011 Execution of steel structures and aluminium structures [6]

3 | PRODUCT INFORMATION

Product name	P4-16 galvanized metal post	
Product identification	The product is a galvanized metal P4-16 model post made of steel and zinc that complies with the ASTM A500 grade C, CAN/CSA-G40.21 and CSA W47 standards.	
Product description	The galvanized metal post manufactured by Techno Pieux is a screwed metal post used to establish the necessary foundations for a given construction project. The structure to be supported may be residential (house, cottage, etc.), touristic (flagpoles, signposts, etc.), energy sector-related (solar panel structures), infrastructure projects (footbridge) or industrial and commercial (machinery, offices). The P4-16 metal post can achieve load-bearing capacities of 200 kN in compression, 100 kN in tension and 12 kN in lateral capacity [7]. A secondary function of the product is to contribute to the aesthetics of the structure to be supported. The galvanized metal post is made of galvanized steel to which a high-density polyethylene (HDPE) sheathing can be added to protect it from ground movement caused by freezing and thawing. A metal post consists of a steel tube with one or more steel helixes. Its length varies from 2 to 3 metres, and its diameter ranges from 48.3 mm to 168.3 mm [8]. The P4-16 galvanized metal post has a length of 2 meters and a diameter of 101.6 mm. Accessories (steel base plates and rings) are used to secure the metal post to the structure. When the depth required to achieve the desired load-bearing capacity is greater than the length of the metal post, one or more extensions can be used. An extension consists of a tube without a helix and an HDPE sheathing.	 **Photo 1. Galvanized post manufactured by Techno Pieux**

3 | PRODUCT DESCRIPTION (CONTINUED)

Name and location of production sites	The galvanized metal posts are manufactured at four sites located in two countries: • **Canada** 1) The Setlakwe manufacturing plants located at 1700 Setlakwe Street and 1725 Setlakwe Street in Thetford Mines (Quebec, Canada) are dedicated to the production and assembly of metal posts; 2) The building at 1191 Huppé Street in Thetford Mines (Quebec, Canada) houses the administrative offices and manufactures the HDPE sheathing for the metal posts produced at the Setlakwe manufacturing plants; 3) The manufacturing plant at 4150 Nancy Street in Terrebonne (Quebec, Canada) is dedicated to assembling metal posts produced at Setlakwe manufacturing plants prior to being sold in the Greater Montreal area; • **France** 4) A manufacturing plant located on Chemin de la Hayette in Poix-de-Picardie (France) where metal posts are produced and assembled.
Product manufacturing	Steel in the form of tubes and plates is shipped by truck from steel mills in Ontario, Canada, to the Techno Pieux manufacturing plants in Thetford Mines to manufacture the tube and helix of the metal post (Figure 1). At their manufacturing plants, Techno Pieux assembles the tubes and helixes with solder to manufacture the posts. The metal posts are sent to a subcontractor for galvanization. Some of the tubes and helixes from the Setlakwe manufacturing plants are sent to the Terrebonne manufacturing plant to be assembled into posts. In the case of the Poix-de-Picardie manufacturing plant, some of the steel tubes and steel plates come from the Setlakwe manufacturing plants, while the rest of the steel comes from European steel mills. The steel is produced either by oxygen converter (BOF or Linz-Donawitz process) or by electric arc furnace (EAF). The HDPE sheathing used for the metal posts is manufactured at the plant located at 1191 Huppé Street (Thetford Mines, Quebec). The HDPE used in its production comes from a Canadian manufacturer. Manufacturing waste (non-compliant metal posts, steel losses) is sent for recycling.
Product transport	The galvanized metal post is shipped to the construction sites by truck and by boat via distributors in Canada, the United States and Europe.
Product installation	During installation, the metal post is screwed into the ground using an installation machine. The extensions and accessories (steel base plate and ring) are welded to the metal post using an electrode welding machine.
Product use	Once installed, the metal post requires no maintenance, repair or replacement. This means that no resources or energy are consumed during the metal post's use. Furthermore, the product is considered to emit no emissions into the air, soil or water during its lifetime.
Product end of life	At the end of its life, the metal post is left in place (in the ground where it was installed).

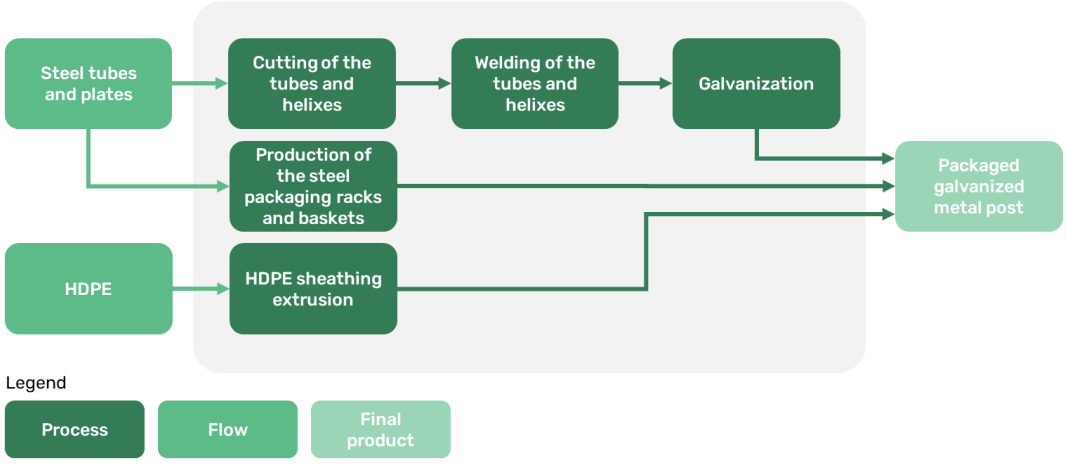


Figure 1: Manufacturing steps for the Techno Pieux galvanized metal post

4 | CONTENT DECLARATION

Table 1: Material composition of the P4-16 galvanized metal post

PRODUCT CONTENT	MASS (KG)	RECYCLED CONTENT (% OF MATERIAL)
Steel	39.87	32.7%
Zinc	4.48	0%
HDPE (sheathing)	0.45	0%
TOTAL	**44.80**	**29.1%**

The steel recycling content is a weighted average from different suppliers. The metal post is packaged in custom-made steel racks and baskets manufactured by Techno Pieux from the same type of steel purchased to produce the metal posts. The mass of the steel racks and baskets used for the packaging of the P4-16 galvanized steel post is 0.39 kg. The exact breakdown between pre- and post- consumer recycled content was not available for all inputs, so this distinction is not presented.

The product does not contain any substances on the REACH candidate list with a concentration greater than 0.1% by mass. The product and its packaging do not contain any biogenic carbon. The product and its packaging do not contain any substances on the candidate list of Substances of Very High Concern (SVHCs) that exceed the limits for registration with the European Chemicals Agency.

5 | LCA INFORMATION

5.1 | General LCA information

Declared unit	Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.
Conversion factor	This EPD represents a galvanized P4-16 metal post with a declared mass of 44.8 kg. For information purposes, Table 15 of Section 7 presents size variations of the same product. The impact results in Section 6 can be converted to 1 kg of metal post by multiplying them by the conversion factor of 0.0223 (1/44.8 kg). These results can then be used to derive environmental impacts of metal posts of identical material composition and manufacturing process by linear mass-based scaling.
Technical lifespan	The technical lifespan of a galvanized metal post is 100 years according to the ICC-ES AC-358 evaluation criteria with a corrosion thickness of 1.5 mm (International council code) and Techno Pieux [9].
Time representativeness	1 January 2023 to 31 December 2023
Geographical scope	• A1-A2: Global; • A3: Quebec (Canada) and France; • A4-A5, B1-B7 and C1-C4: Global.
Database used	Ecoinvent v3.11 database - EN 15804 add-on [10]
LCA software used	OpenLCA version 2.4.1 [11]
Impact assessment method	EF 3.1 impact assessment method [12]
Infrastructure / capital goods	The Ecoinvent database used for the background data of the LCA includes the infrastructure and capital goods by default.
System boundary	The system boundary is "cradle-to-gate with options, modules C1-C4, module D and optional modules (A4-A5 and B1-B7)" and includes the following life cycle stages and modules according to EN 15804:2012+A2:2019/AC:2021 [2] (Table 2, Figure 2): • Production (A1 - A3); • Construction (A4 - A5); • Use (B1 - B7); • End of life (C1 - C4); • Benefits and loads beyond the system boundary (D). As Techno Pieux declared an end-of-life scenario in which 100% of the metal post is left in place in the ground (not extracted for economic reasons), module D (benefits associated with recycling) is considered to be zero.

5.2 | Modules declared and geographical scope

Table 2: Modules declared and geographical scope

	PRODUCTION STAGE (A1-A3)			CONSTRUCTION STAGE (A4-A5)		USE STAGE (B1-B7)							END-OF-LIFE STAGE (C1-C4)				BEYOND THE SYSTEM BOUNDARY
	Production of raw materials	Transport of raw materials	Manufacturing	Transport to the construction site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Energy use	Water use	Deconstruction/demolition	Transport to the waste treatment site	Waste treatment for reuse, recovery and/or recycling	Disposal	Benefits associated with reuse/recycling/energy recovery
Module name	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Declared module	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	Global		CA, FR	Global													Global
Share of primary data	32.90%			-													-
Variation of GWP-GHG – products*	Not applicable			-													-
Variation of GWP-GHG – sites**	1.6 – 4.2%			-													-

Legend

X: Life cycle module included in the LCA

ND: Life cycle module not declared (excluded) from the LCA

*Not applicable: this EPD represents one product, meaning there is no variation between products. The table in Section 7 presents size variations of the same product (scaling by mass).

**According to the PCR, the variations in percentage between two numbers are calculated by dividing the absolute value of the difference between the numbers by the average of the numbers and then multiplying by 100. The variation between sites is mainly due to differences in steel sourcing (steel manufacturing process, recycled content) between the Canadian and French manufacturing plants.

5.3 | Process flow diagram

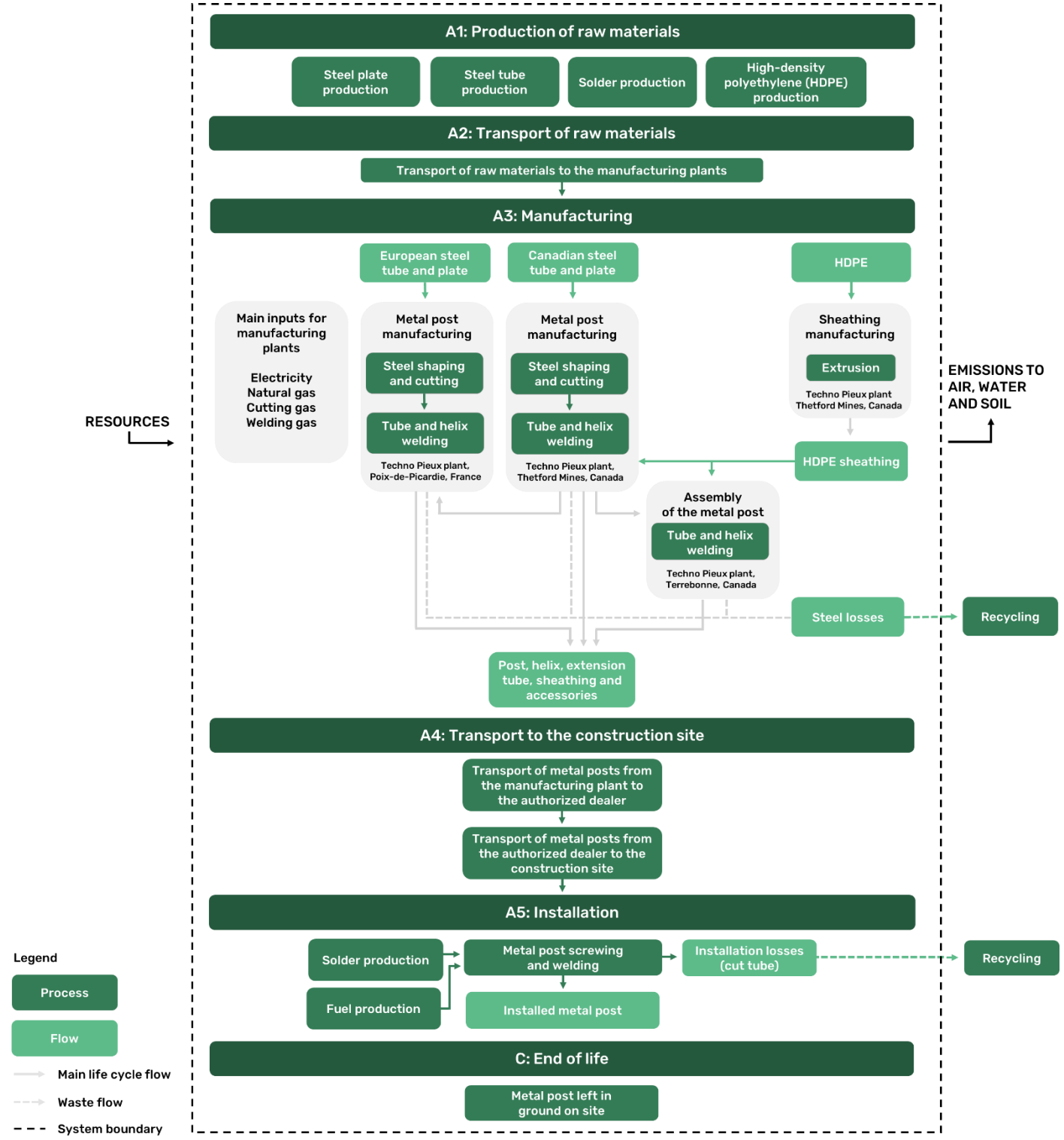


Figure 2: Process flow diagram – Galvanized metal post

5.4 | Cut-off criteria

The following cut-off criteria were applied according to the PCR [3]:

- **Mass and energy.** LCI data shall include a minimum of 99% of total inflows (mass and energy) per unit process and 95% of total inflows (mass and energy) per life cycle stages A1-A3, A4-A5 and C1-C4, aggregated modules B1-B5 and B6-B7, and module D.
- **Environmental impact.** At least 95% of the environmental impact per aggregated module shall be included.

Based on these cut-off criteria, the following activities were excluded: production of packaging for the raw materials, production of lubricant for manufacturing plant equipment, water consumption at the manufacturing plants and transport of the packaging for recycling.

5.5 | Allocation

When a process in a product's life cycle generates multiple outputs (multifunctional processes) or is linked to another system (life cycle of a product outside the boundary of the system under study), the environmental impact of the process must be allocated to the various products, co-products and systems. The allocation methods considered for this study are:

- **Allocation for end-of-life processes.** The cut-off approach specifies that the impacts associated with secondary materials entering the system are attributable to the system that generated them, and the benefits associated with recycling materials leaving the system are not included. In this study, this means that the secondary steel enters module A1 without impact, and no environmental impacts or benefits associated with recycling manufacturing or installation losses are included.
- **Allocation for multifunctional processes.** No foreground process in the metal post's life cycle generates co-products within the boundary of the system under study. Therefore there is no allocation of this type to consider in this study.
- **Allocation approach in the database inventory data.** The Ecoinvent datasets used (Ecoinvent v3.11 database - EN 15804 add-on) comply with the EN 15804:2021 standard, which attributes the impacts of secondary materials entering the system to those that generated them and excludes the benefits associated with material recycling, while including the impacts associated with the conditioning of materials prior to recycling.

5.6 | Scenarios used in the modelling of downstream stages

Table 3: Module A4 – Transport of the galvanized metal post to the construction site

PARAMETER	VALUE/SPECIFICATION	UNIT
Scenario 1 - Transport to the construction site via an authorized dealer located in Canada		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by truck		
Vehicle type	Trucks with load capacities of 3.5 to 7.5 tonnes and over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12 or 35	L/100 km
Distance travelled	454	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient (coefficient: =1 or <1 or ≥1 for compressed or nested products)	1	-
Transport stage 2 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-

PARAMETER	VALUE/SPECIFICATION	UNIT
Scenario 2 - Transport to the construction site via an authorized dealer located in the United States		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by truck		
Vehicle type	Trucks with a load capacity of over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	35	L/100 km
Distance travelled	2 161	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 2 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Scenario 3 - Transport to the construction site via an authorized dealer located in Europe		
Transport stage 1 – Transport from the manufacturing plants of Techno Pieux to the authorized dealer by truck		
Vehicle type	Trucks with load capacities of 3.5 to 7.5 tonnes and over 32 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12 or 36	L/100 km
Distance travelled	337	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 2a – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by boat (intra Europe scenario)		
Vehicle type	Boat	-
Fuel type	Diesel	-
Fuel consumption	0.003	kg/t*km
Distance travelled	2 110	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 2b – Transport from the manufacturing plants of Techno Pieux to an authorized dealer by boat (transatlantic scenario)		
Vehicle type	Boat	-
Fuel type	Diesel	-
Fuel consumption	0.003	kg/t*km
Distance travelled	6 102	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-
Transport stage 3 – Transport from an authorized dealer to the construction site		
Vehicle type	Truck with a load capacity of 3.5 to 7.5 tonnes	-
Fuel type	Diesel	-
Fuel consumption	12	L/100 km
Distance travelled	100	km
Bulk density of transported products	1 271[1]	kg/m³
Volume capacity utilisation coefficient	1	-

[1] The density of a metal post is 1 271 kg/m³ considering an average mass of 36 kg (for a length of 2 m), an external diameter of 101.6 mm and an internal diameter of 83.4 mm (the inside of the metal post is hollow).

A4 transport distances are weighted averages based on Techno Pieux's 2023 sales data and the average local delivery radius of authorized dealers.

Table 4: Module A5 - Installation of the galvanized metal post

PARAMETER		VALUE	UNIT
Solder		0.021	kg
Water usage		0	m^3
Electricity consumption for electrode welding		0.011	kWh
Diesel consumption for installation machine		110.14	MJ
Use of other resources		0	kg
Material waste at the construction site prior to treatment of waste generated by product installation	Installation losses (metal posts)	0.443	kg
Output materials produced by waste treatment at the construction site	Collection for recycling of installation losses	0.443	kg
Direct emissions to air, soil and water		0	kg

Table 5: Technical lifespan of the galvanized metal post

PARAMETER	VALUE/SPECIFICATION	UNIT
Technical lifespan	100	years
Declared product properties	ASTM A500 Grade C CAN/CSA-G40.21 CSA W47	-
Design application parameters	Design according to manufacturer's instructions	-
Presumed quality of work, when installation complies with the manufacturer's instructions	Installation in accordance with best practices and manufacturer's recommendations	-
Outdoor environment (for outdoor applications), e.g. weather conditions, pollutants, exposure to UV rays and wind, building orientation, shade, temperature	The metal post may be subject to soil contact, moisture exposure, freeze–thaw cycles, temperature fluctuations, and naturally occurring chemical agents in soil. Valid for soil conditions defined in ICC-ES AC-358. The polyethylene sleeve protects the pile from any ground movement (e.g., freeze/thaw cycle or swelling clay). The helix size of the metal post is adapted to the specific soil conditions to obtain the required structural support.	-
Indoor environment (for indoor applications), e.g. temperature, humidity, exposure to chemicals	Not applicable	-
Conditions of use, e.g. frequency of use, mechanical exposure	Once the metal post is planted in the soil, it does not require any maintenance during use. The technical lifespan is valid under the soil exposure conditions defined in ICC-ES AC-358 and may vary depending on environmental conditions. The metal posts are designed to resist axial, lateral, and bending moment loads in accordance with the specific project requirements. Once installed, the metal posts are immediately ready to support the structure.	-
Maintenance, e.g. required frequency, type and quality, and replacement of replaceable components	No maintenance required during the technical lifespan.	-

Table 6: Modules C1-C4 – End of life of the galvanized metal post

PARAMETER	VALUE/SPECIFICATION	UNIT
Left in place (on site)	44.8	kg
Assumptions for scenario development	The entire metal post is left onsite (in the ground where it was installed).	

5.7 | Modelling of electricity

The following table presents information on the electricity mix used to model the electricity consumed at the manufacturing plants in A3 and the electricity mix used for steel production in A1.

Table 7: Specific electricity mixes used

MODULE	USE OF ELECTRICITY	PROCESS	YEAR OF THE DATASET	GWP-GHG KG CO_2 EQ / KWH
A1	Electricity used for the production of steel in Ontario, Canada	market for electricity, medium voltage | electricity, medium voltage | EN15804GD, U - CA-ON	2020-2024	0.09115
A3	Electricity consumed at the plants situated in Quebec, Canada	electricity, low voltage residual mix with upstream electricity | electricity, low voltage | EN15804GD, U - CA-QC*	2020-2024	0.02666
A3	Electricity consumed at the plant located in France	electricity, low voltage, residual mix | electricity, low voltage | EN15804GD, U - FR	2020-2024	0.09184

* This process was created using data provided by Hydro-Québec representing the residual electricity mix for 2024 [13].

5.8 | Main assumptions

Carrying out an LCA involves making assumptions when data is incomplete or missing. The following assumptions were made in this LCA:

- **Transport of steel to the manufacturing plant (A2)**. The transport distance from the steel producer to the supplier of the Poix-de-Picardie manufacturing plant is unknown. Therefore, a 1 000 km transport by a semi-trailer truck was considered to account for its transport from to the supplier of Techno Pieux.
- **Transport of manufacturing losses (A3).** The transport of manufacturing losses to recycling is included in A3 as a conservative assumption. In the absence of primary data from Techno Pieux concerning the transport distance of manufacturing losses from the manufacturing plants to the recycling sites, a generic assumption of 50 km provided by EN 15804:2021 was used.
- **Transport of installation losses (A5).** The transport of installation losses to recycling is included in A5 as a conservative assumption. In the absence of primary data from Techno Pieux concerning the transport distance of installation losses from the construction site to the recycling sites, a generic assumption of 50 km provided by EN 15804:2021 was used.

5.9 | Data quality

This EPD is based on data selected according to the PCR requirements (Section 4.6.5). Specific data was provided by Techno Pieux for the reference period from 1 January 2023 to 31 December 2023. This data included the materials and energy consumed, the masses and transport distances, as well as the waste generated by each elementary process included within the system boundary. Generic data was taken from the Ecoinvent database (version 3.11 - EN 15804 [10] released in 2024), a transparent and internationally recognized life cycle inventory database. A data quality assessment was conducted in accordance with the UN Environment Global Guidance (Table E.1, Annex E of EN 15804:2021) as required by the PCR and covered the following criteria: temporal, geographical and technological coverage, as well as precision, plausibility, completeness and consistency. For each relevant data (i.e., contributing to at least 80% of the impact score of any environmental indicator) a score was assigned to each criterion (VG = Very good, G = Good, F = Fair, P = Poor, VP = Very poor).

The results of the data quality assessment indicate that the scores for each criterion are predominantly rated as “Very good” or “Good” for the majority of the relevant datasets. Some secondary data are rated as “Fair” with respect to geographical coverage, as they are representative of the “rest of the world” (RoW) region rather than the specific study geography (e.g. transport processes, HDPE production, and natural gas supply). A “Fair” score is also applied for the technological coverage of the cutting gas, for which a technological proxy is used. A “Poor” score is assigned to the dataset representing steel left on site due to limitations in technological and geographical coverage, as well as precision, since a proxy dataset is used to model this process. On average, the data quality is considered “Good” with respect to temporal, geographical, and technological coverage, as well as plausibility, completeness, and consistency, and the data is thus deemed adequate to meet the objectives of the study.

The total share of primary data contributing to the GWP-GHG results of modules A1-A3 is presented at Table 8 [1]. The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Table 8: Share of primary data contributing to the GWP-GHG results of modules A1-A3

MODULE	PROCESS	SOURCE TYPE	SOURCE	REFERENCE YEAR	DATA CATEGORY	SHARE OF PRIMARY DATA, OF GWP-GHG RESULTS FOR A1-A3
						GALVANIZED METAL POST
A1	Production of steel	Database	Ecoinvent v3.11	2024	Representative generic data	0.00%
A1	Production of HDPE	Database	Ecoinvent v3.11	2024	Representative generic data	0.00%
A2	Transport of steel to the manufacturing site	Database with collected activity data	Ecoinvent v3.11	2023	Primary data	4.22%
A2	Transport of HDPE to the manufacturing site	Database with collected activity data	Ecoinvent v3.11	2023	Primary data	0.02%
A3	Energy consumption at the manufacturing plant electricity, natural gas and diesel)	Collected data	Techno Pieux	2023	Primary data	2.78%
A3	Manufacturing of the product (steel processing, HDPE moulding)	Collected data	Techno Pieux	2023	Primary data	24.26%
A3	Galvanization of the metal post	Collected data	Techno Pieux	2023	Primary data	1.63%
A3	Transport of manufacturing waste	Standard	EN 15804:2012+ A2:2019/AC:2021	2019	Representative generic data	0.00%
Total share of primary data, of GWP-GHG results for A1-A3						**32.90%**

6 | ENVIRONMENTAL PERFORMANCE

6.1 | Mandatory impact category indicators

Table 9: Mandatory impact category indicators according to EN 15804:2021 – Results per declared unit

Declared unit: Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq	1.06E+2	9.31E+0	1.23E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.78E-2	0.00E+0
GWP-fossil	kg CO_2 eq	1.05E+2	9.31E+0	1.23E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.78E-2	0.00E+0
GWP-biogenic	kg CO_2 eq	1.27E-1	2.60E-3	2.62E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
GWP-luluc	kg CO_2 eq	5.58E-1	4.63E-3	6.86E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ODP	kg CFC 11 eq	6.52E-7	1.27E-7	1.73E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
AP	mol H^+ eq	4.00E-1	3.93E-2	1.04E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.47E-7	0.00E+0
EP-freshwater	kg P eq	3.15E-3	1.20E-4	7.63E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EP-marine	kg N eq	9.34E-2	1.34E-2	4.72E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.87E-6	0.00E+0
EP-terrestrial	mol N eq	1.10E+0	1.48E-1	5.18E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.15E-8	0.00E+0
POCP	kg NMVOC eq	3.66E-1	5.28E-2	1.56E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.31E-5	0.00E+0
ADP-minerals& metals*	kg Sb eq	9.04E-4	3.39E-5	1.39E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ADP-fossil*	MJ	1.23E+3	1.30E+2	1.59E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
WDP*	m^3	7.77E+1	7.56E-1	1.21E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Acronyms	GWP = Global Warming Potential; GWP-total = Total Global Warming Potential; GWP-fossil = Global Warming Potential from fossil sources; GWP-biogenic = Global Warming Potential from biogenic sources; GWP-luluc = Global Warming Potential from land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential; EP = Eutrophication Potential; EP-freshwater = Freshwater eutrophication potential; EP-marine = Marine eutrophication potential; EP-terrestrial = Terrestrial eutrophication potential; POCP = Photochemical Ozone Creation Potential; ADP = Abiotic Depletion Potential; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water Deprivation Potential															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). The product and its packaging contain no biogenic carbon, thus biogenic CO_2 emissions and uptake were set to zero [3]. GWP-biogenic results arise exclusively from biogenic CH_4 emissions in background processes.

6.2 | Additional mandatory and voluntary impact category indicators

Table 10: Additional mandatory and voluntary impact category indicators – Results per declared unit

Declared unit: Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG*	kg CO_2 eq	1.06E+2	9.31E+0	1.23E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.78E-2	0.00E+0
Fine particulate matter emissions	Incidence of disease	9.93E-6	7.55E-7	2.95E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.36E-13	0.00E+0
Ionizing radiation - human health	kBq U-235 eq	1.21E+1	1.17E-1	1.92E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Freshwater ecotoxicity	CTUe	5.50E+2	2.53E+1	1.41E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.81E-1	0.00E+0
Human toxicity - cancer effects	CTUh	1.33E-7	1.60E-9	2.63E-9	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.54E-10	0.00E+0
Human toxicity - non-cancer effects	CTUh	7.88E-7	8.14E-8	2.77E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.77E-10	0.00E+0
Impacts related to land use/soil quality	-	6.17E+2	9.47E+1	1.70E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.24E+1	0.00E+0

** GWP-GHG = Global Warming Potential for greenhouse gases. This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total.*

6.3 | Resource use indicators

Table 11: Resource use indicators – Results per declared unit

Declared unit: Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.24E+2	2.03E+0	2.28E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	1.24E+2	2.03E+0	2.28E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRE	MJ	1.23E+3	1.30E+2	1.59E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRM	MJ	2.23E+1	0.00E+0	2.23E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	MJ	1.25E+3	1.30E+2	1.59E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
SM	kg	1.52E+1	0.00E+0	1.52E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m^3	1.81E+0	1.76E-2	2.82E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

Option B of Annex 3 of the PCR was used to calculate the primary energy use indicators.

6.4 | Waste indicators

Table 12: Waste indicators – Results per declared unit

Declared unit: Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.73E+1	2.24E-1	3.21E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Non-hazardous waste disposed	kg	7.10E+1	1.34E+0	1.81E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.53E+1	0.00E+0
Radioactive waste disposed	kg	3.69E-3	2.87E-5	5.43E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

6.5 | Output flow indicators

Table 13: Output flow indicators – Results per declared unit

Declared unit: Using a galvanized P4-16 metal post with a galvanized extension (44.8 kg) to achieve a specific load-bearing capacity (compression, shear, flexion) for a technical lifespan of 100 years.																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Material for recycling	kg	6.50E+0	0.00E+0	5.08E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy, electricity	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy, thermal	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

7 | ADDITIONAL ENVIRONMENTAL INFORMATION

7.1 | Types, dimensions and masses of metal posts manufactured by Techno Pieux

Table 14 shows the diameters of the metal post types. Table 15 shows the masses of the metal post types for the different types of helixes. It should be noted that all metal post types have the same composition and manufacturing process.

Table 14: Diameters of different types of metal posts

TYPE OF METAL POSTS	DIAMETER (MM)
P1	48.3
P2	60.3
P3	88.9
P4	101.6

Table 15: Masses of galvanized metal posts for 2-metre sections according to metal post type and helix type

HELIX TYPE (DIAMETER IN MM)	TYPE OF METAL POST			
	P1	P2	P3	P4
	MASS (KG)			
152.4	10.0	12.7	N/A	N/A
203.2	10.9	15.1	29.3	34.4
254	11.8	16.6	31.2	36.4
304.8	13.6	18.4	33.6	38.8
406.4	15.9	23.0	39.7	44.8

8 | ABBREVIATIONS AND GLOSSARY

General abbreviations	
CEN	European Committee for Standardization
CFC	Chlorofluorocarbon
CFC-11	Trichlorofluoromethane
CH_4	Methane
CO_2	Carbon dioxide
EN	European Norm (Standard)
EF	Environmental Footprint
EPD	Environmental product declaration
eq	Equivalent
ISO	International Organization for Standardization
LCA	Life cycle assessment
LHV	Lower heating value
N	Nitrogen
N/A	Not applicable
ND	Not declared
NMVOC	Non-Methane Volatile Organic Compounds
O_3	Ozone
P	Phosphorus
PCR	Product category rules
Sb	Antimony
SO_2	Sulphur dioxide
SVH	Substances of Very High Concern
UN CPC code	United Nations Central Product Classification
Environmental impact indicators	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq)
GWP-total	Total Global Warming Potential (kg CO_2 eq)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq)
ODP	Ozone Depletion Potential (kg CFC-11 eq)
AP	Acidification Potential (mol H^+ eq)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq)
EP-marine	Marine eutrophication potential (kg N eq)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq)
ADP	Abiotic Depletion Potential
ADP-minerals & metals	Abiotic depletion potential for non-fossil resources (kg Sb eq)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)

Glossary	
Cut-off threshold	Criteria for excluding inputs and outputs based on their contribution (%) to the total mass and energy. If this contribution is lower than a certain threshold (cut-off), these flows can be ignored [2].
Ecoinvent	Life cycle inventory database for materials, chemicals, power generation systems, transport and waste treatment processes [14].
Environmental impact	Any negative or beneficial modification of the environment, resulting wholly or in part from environmental aspects [15], i.e., elements of the activities, products or services of an organization that can interact with the environment [2].
Environmental Product Declaration (EPD)	Environmental declaration providing quantified environmental data using predetermined parameters based on the ISO 14040:2006 and ISO 14044:2006 standards [16,17].
Declared unit	Quantified performance of a product system intended to be used as a reference unit in a life cycle assessment [16].
Life cycle assessment (LCA)	Compilation and evaluation of the inputs and outputs (inventory) as well as the assessment of potential environmental impacts of a product during its life cycle [16].
Product Category Rules (PCR)	A set of specific rules, requirements and guidelines for the development of EPDs. The PCR referenced in this EPD is "International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1 [3]".
Reference flow	Quantity of process outputs in a given product system required to fulfill the function as expressed by the declared unit [16].

9 | VERSION HISTORY

Version 1.0 (Original version of the EPD): 13 February 2026
Version 2.0 (Update of version date due to issue with verification date): 11 June 2026
Version 3.0 (Update of version number and minor editorial corrections): 14 October 2026
Version 4.0 (Product image update, alignment with declared unit terminology and conversion factor per PCR 2019:14 v2.0.1, and update of GWP-biogenic results per Annex 2): 21 October 2026
Version 5.0 (Minor editorial corrections): 28 October 2026

10 | REFERENCES

[1] International EPD System (2025) General program instructions International EPD System for the version 5.0.1. Available at:https://www.datocms-assets.com/37502/1744981993-gpi5-0-1_20250227.pdf.

[2] European Committee for Standardization (2021) EN 15804:2012+A2:2019/AC:2021 - Standards publication sustainability of construction works - environmental product declarations - core rules for the product category of construction products.

[3] International EPD System (2025) PCR 2019:14 Product category rules - Construction products (EN 15804+A2) version 2.0.1. Available at:https://www.environdec.com/pcr-library/pcr_6b99d07c-4b75-4763-4485-08dd775d2e49.

[4] International Organization for Standardization (2006) ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

[5] International Organization for Standardization (2015) ISO 9001:2015 Quality management systems - requirements.

[6] European committee for standardization (2011) EN 1090-1:2009+A1:2011 Execution of steel structures and aluminium structures.

[7] Techno Pieux (2025) Selection table. Available at:https://www.technopieux.com/wp-content/uploads/documents/EN-CA/PDF/Selection-Table-CA-EN.pdf.

[8] Techno Pieux (2018) Product manual.

[9] Techno Pieux (2019) Personal communication.

[10] Ecoinvent (2024) Ecoinvent v3.11. Available at:https://ecoinvent.org/ecoinvent-v3-11/.

[11] GreenDelta (2025) openLCA 2.4.1. Available at:https://www.openlca.org/.

[12] European Commission (2022) Environmental Footprint reference packages. Available at:https://eplca.jrc.ec.europa.eu/LCDN/developerEF.html.

[13] Hydro-Québec (2024) Residual electricity mix and greenhouse gas (GHG) emission rate. Available at:https://www.hydroquebec.com/data/developpement-durable/pdf/label-hq-main-power-grid-2024.pdf.

[14] Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E. and Weidema, B. (2016) The ecoinvent database version 3 (part I): overview and methodology. *The International Journal of Life Cycle Assessment* 21, 1218–1230. Available at:https://link.springer.com/article/10.1007/s11367-016-1087-8.

[15] International Organization for Standardization (2010) ISO 21931-1 Sustainability in building construction - framework for methods of assessment of the environmental performance of construction works - part 1: buildings.

[16] International Organization for Standardization (2006) ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework.

[17] International Organization for Standardization (2006) ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.


techno PIEUX
1700 Setlakwe Street
Thetford Mines, Quebec
Canada G6G 8B2
1 418 332-2139
www.technometalpost.com
EM2
techno Metal Post