

Centerline Steel LLC

EPD Steel Bracket Products

ISO 14020; ISO 14025; ISO 14040; ISO 14044; ISO 21930:
Edition 1; Revision 1: January 2024

1. PROGRAMME INFORMATION

EPD Program and program operator name, address, logo, and website	Program Operator Provided
General program instructions and version	Program Operator Provided
Manufacturer name and address	Centerline Steel LLC, 208 W. Davis Industrial Drive, St. Augustine, FL 32084-8413
Declaration number	Program Operator Provided
Declared product and declared unit	1 Tonne of steel bracket products
Reference PCR and version number	ISO 21930:2017 UL Part A: Product Category Rules for Building Related Products and Services, UL 10010, v2, 2017 UL Part B: Designated Steel Construction Product EPD Requirements, UL 10010– 34, v2, 2020
Description of product's intended application and use	Steel brackets for countertop support
Markets of applicability	United States
Date of issue	Program Operator Provided
Period of validity	Program Operator Provided



EPD type	Product Specific
Dataset variability	Industry-average LCI database
EPD scope	Cradle to gate with Options (modules C1-C4, D)
Year(s) of reported primary data	2020 - 2021
LCA software and version number	SimaPro v 9.1
LCI database and version number	Ecoinvent v 3.8
LCIA methodology and version number	TRACI v2.1
The sub-category PCR review was conducted by:	Program Operator Provided
	Program Operator Provided
	Program Operator Provided
	Program Operator Provided
This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017) <input type="checkbox"/> INTERNAL <input type="checkbox"/> EXTERNAL	Program Operator Provided
This lifecycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Program Operator Provided
This lifecycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Program Operator Provided
LIMITATIONS The environmental impact results of steel products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the steel product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted. See Section 3.10 for additional EPD comparability guidelines. Environmental declarations from different programs (ISO 14025) may not be comparable.	

2. COMPANY INFORMATION

Centerline Steel LLC (hereinafter referred to as Centerline) is a leading manufacturer and distributor of steel bracket products in North America. This cradle-to gate with end-of-life environmental product declaration is for 1 metric ton of steel bracket products from the location fully owned and operated by Centerline, as follows:

Centerline Steel Plant

208 W. Davis Industrial Drive, St. Augustine, FL 32084-8413

Centerline Steel LLC is the study commissioner and EPD owner.

Centerline produce a range of steel bracket products. Further information is publicly available on <http://www.countertopbracket.com/>

3. PRODUCT INFORMATION

This EPD provides information concerning steel bracket products produced by Centerline in the United States as detailed in Table 1.

All Centerline Steel support brackets are made from steel that is recycled by U.S. foundries with a commitment to American sourcing. Proprietary manufacturing technologies enable highest strength to support a wide range of materials used for countertops, cooking islands, shelving and more. Additionally, Centerline's brackets are installed to be partly or fully hidden, which enhances overall aesthetic and safety.

The following support brackets are covered by this EPD:

- Standard Bracket

This general-purpose support bracket is both strong and easy-to-install. Designed to mount on the top of a pony or knee wall its sleek design keeps it hidden from view.



- Standard Plus Bracket

Like its sister product the standard plus bracket is installed on the top of a pony or knee wall. The rear flange on the back provides an additional contact point for securing the bracket.



- Forward L Bracket

For commercial environments or when supporting an overhang greater than 18" this bracket provides extra mounting points allowing the rear flange to attach to not only the cap of knee or pony wall, but also, the vertical stud.



- Island Bracket

This bracket is designed for an application where no knee wall exists, and the countertop extends directly off the base cabinets. The key to its strength lies in the cantilever action that uses the weight of the countertop material to ensure solid support.



- Island Support System

This unique system supports an overhang on more than one side of a kitchen island or peninsula. Lap joints are used to create a custom bracket specific to each kitchen's design.



- Front Mounting Bracket

Designed to mount directly to a stud this support bracket can be used in either an existing or new installation. If used with a backing plate it can also be installed inside a cabinet to keep it hidden from view.



- Front Mounting Plus Bracket

This bracket provides maximum support for high-traffic or load applications such as commercial environments, shower benches or free-floating desks. The addition of a low-profile gusset substantially increases the load rating on the bracket.



- Floating Wall Mount Bracket

Cleverly hidden behind the drywall, this versatile bracket is designed to affix to the side of a stud in a floor-to-ceiling wall allowing for the ability to float vanities, countertop, benches, or shelves directly off the wall.



- Center Levered Bracket

This specialty support is designed for use when you have countertops that extend on both sides of a knee or pony wall. The steel flanges provide additional stability to the bracket making it an ideal solution for commercial locations such as a bar.



- Spanning Bracket

Just as the name implies the spanning bracket is used when support is needed for a span of countertop where there's support on both ends, but nothing in between. It can also be used where you have overhangs on opposite sides of a support cabinet.



- Commercial Standard Bracket

The bracket serves as a sleek, modern support for any overhang. They are designed to be a lower cost alternative for Professional Granite Installers and Tradesmen.



3.1 TECHNICAL SPECIFICATION OF PRODUCT

Table 1: technical specification and usage

Aspect	Details
Usage	Centerline is a premier supplier of support brackets to both commercial and residential constructors and designers in North America and worldwide. In addition to its portfolio of countertop supports meeting the greatest number of conventional needs, Centerline's full-service shop also manufactures custom products.
Identification	Made exclusively of domestically sourced steel—98% of which is reclaimed and recycled—the company's brackets are manufactured in a state-of-the-art facility. A broad selection of powder-coat options helps ensure that overall color-scheme and décor-design objectives are achieved.
Technical and Functional Characteristics	<p>Standard Bracket:</p> <ul style="list-style-type: none"> • 2½" wide x ½" thick steel • Length is 7" – 18", determined by customer • 4 mounting holes, ¼", countersunk offset pattern • Load rating: 395 – 2153 lbf, dependent on bracket size and position <p>Standard Plus Bracket:</p> <ul style="list-style-type: none"> • Horizontal support is 2 ½" wide x ½" thick steel • Length is 8" – 21", determined by customer • 4 mounting holes, ¼", countersunk, off-set pattern • The flange is 2 ½" wide x 1 ½" tall x ¼" thick steel • 1 mounting hole, ¼", countersunk • Load rating: 452 – 2497 lbf, dependent on bracket size and position <p>Forward L Bracket:</p> <ul style="list-style-type: none"> • Horizontal support is 2 ½" wide x ½" thick steel • Length is 9" – 22", determined by customer • 4 mounting holes, ¼", countersunk, off-set pattern • The flange is 2 ½" wide x 4" tall x ¼" thick steel • 2 mounting holes, ¼", countersunk • Load rating: 659.8 – 1672.8 lbf, dependent on bracket size and position <p>Island Bracket:</p> <ul style="list-style-type: none"> • Horizontal support is 2 ½" wide x ½" thick steel • Length is 16" – 44", determined by customer • The flange is 4" wide x ½" tall x ¼" thick steel • 2 mounting holes, ¼" • Load rating: 980 – 1307 lbf, dependent on bracket size and position
Technical and Functional Characteristics	<p>Island support system:</p> <ul style="list-style-type: none"> • Horizontal support is 2 ½" wide x ½" thick steel • Length 16" – 44", determined by customer • The flange is 4" wide x ½" tall x ¼" thick steel

Aspect	Details
	<ul style="list-style-type: none">• 2 mounting holes, ¼"• Load rating: 626 - 969 lbf, dependent on bracket size and position
	Front Mounting Bracket <ul style="list-style-type: none">• Brackets are 2½" wide x ⅜" thick steel• 3 mounting ¼" holes in the vertical plate, ¼", countersunk• Stock sizes are: 6" x 6" 8" x 6" 10" x 8" 12" x 10" 14" x 10"• Load rating: 459 – 1221 lbf, dependent on bracket size and position
	Front Mounting Plus Bracket <ul style="list-style-type: none">• Brackets are 2½" wide x ⅜" thick steel• Gussets are ¼" thick, length determined by bracket size• 4 mounting holes, ¼", countersunk• Stock sizes are 8" x 6" 10" x 8" 12" x 10" 14" x 10" 16" x 12" 18" x 12" 20" x 14" 22" x 14" 24" x 16"• Load rating: 325 – 1002 lbf, dependent on bracket size and position
	Floating Wall Mount Bracket <ul style="list-style-type: none">• Horizontal support is 2½" wide x ½" thick steel• Length is 7" – 22", determined by customer• The vertical flange is 2½" wide x 8" long x ⅜" thick steel• 6 mounting holes, sized for ¼" lag screws
	Center Levered Bracket <ul style="list-style-type: none">• Horizontal support is 2½" wide x ½" thick steel• Length is 14" – 44", determined by customer• 5 mounting holes, ¼", countersunk• The vertical flanges are 2½" wide x 4" tall x ¼" thick steel• 2 mounting holes, ¼", countersunk• Load rating: 1053 – 2705 lbf, dependent on bracket size and position
	Spanning support bracket <ul style="list-style-type: none">• Horizontal support is 2½" wide x ½" thick steel• Length is 24" – 60", determined by customer• Load rating: dependent on bracket size and position
	Commercial Standard Bracket <ul style="list-style-type: none">• 3½" wide x ¼" thick steel• Stock lengths are 8" 10" 12" 14"• 4 mounting holes, ¼", countersunk, off-set pattern• Load rating: 875 – 1743 lbf, dependent on bracket size and position

3.2 CONTENT DECLARATION

All steel bracket products are made from the same composition of materials, as per **Table 2**. They differ only by form and size.

Table 2: product composition of steel brackets

Material	Contribution (%)
Cold formed low carbon steel, flat, sq and hex, channel	<0.1%
Hot rolled steel, flat, plate and sheet	98%
Hot rolled steel, GA wall tubing	<0.1%
6061 cold finished aluminum, sheet, pipe, bar, tubing	<0.1%
6063 cold finished aluminum tubing	<0.1%
Cold drawn seamless / drawn-over-mandrel steel	<0.1%
Powder coat, silver, black, silver vein, bronze, white	1%
Steel screws	1%

The product composition for the products is provided in **Table 2**. The steel bracket products do not meet the criteria for PBT (Persistent, Bio-accumulative and Toxic) or vPvB (very Persistent and very Bio-accumulative) in accordance with Annex XIII of Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). Furthermore, the steel bracket products are articles, and exempted from REACH registration.

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

3.3 MANUFACTURING PROCESS

The main steps in the steel bracket manufacturing process are as follows:

- Raw material reception and preparation
- Raw material fabrication
- Shaping, bending, welding and cutting
- Finishing and packaging



Figure 1: Manufacturing flow

Raw material supply, storage and preparation

Raw materials are supplied, received, and stored in dedicated storage facilities.

Cutting

Sheet metal or flat bar is cut to size using a plasma cutter.

Bending

Once cut to size the steel is bent and shaped according to the final product shape.

Finishing

The steel bracket products are powder coated using a spray gun and cured in an oven.

Packaging

Steel bracket products are packaged using cardboard, kraft paper and plastic wrapping.

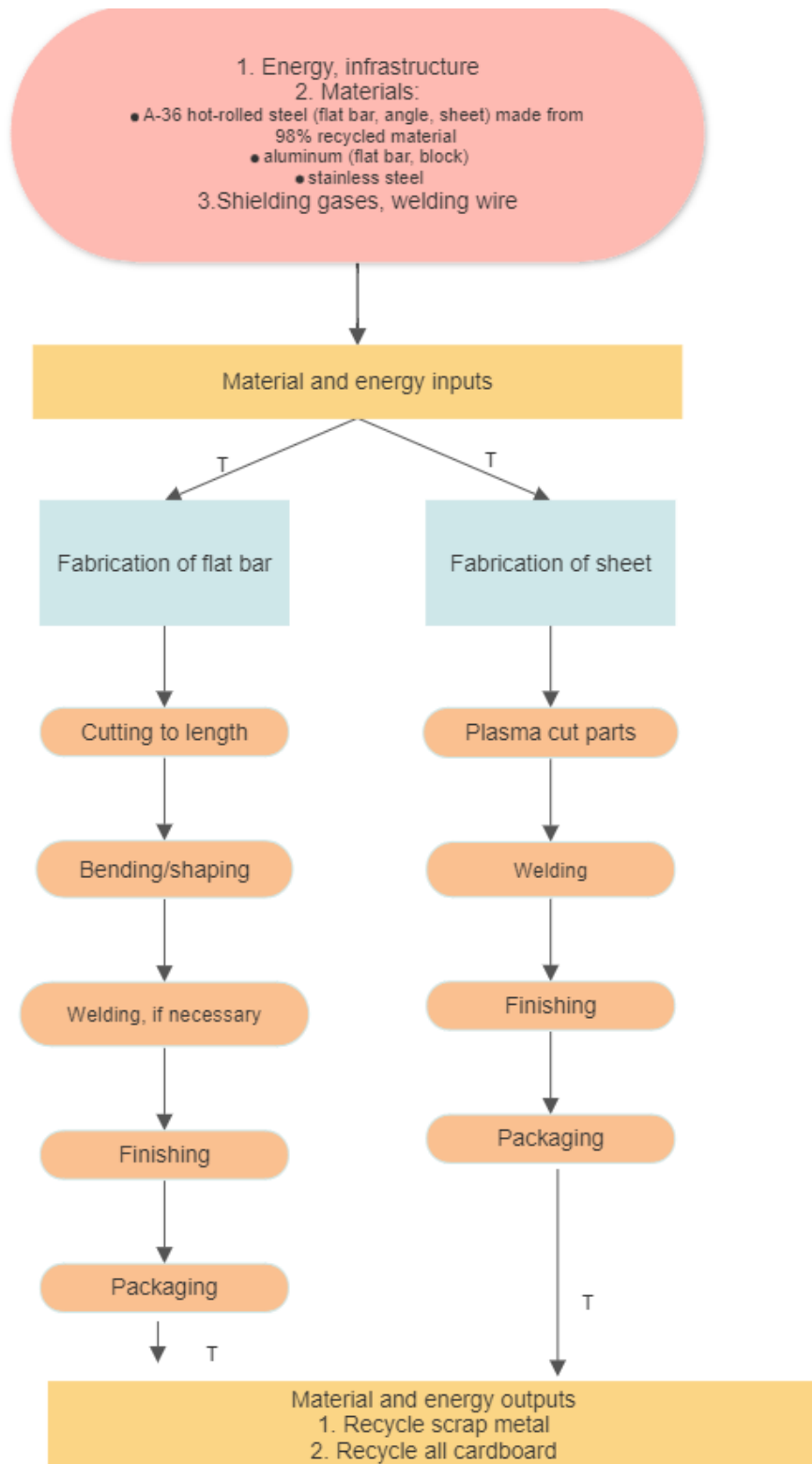


Figure 2: Process flow diagram

4. LCA INFORMATION

4.1 GOAL OF STUDY

The goal of this study was to generate an environmental profile of steel bracket products produced and delivered from the locations fully owned and operated by Centerline, to better understand the associated lifecycle environmental impacts and to allow a Type III EPD to be generated and made public via the NSF EPD System.

4.2 DECLARED UNIT

The **declared unit** for the study is defined as:

- 1 metric ton of steel bracket products

4.3 SYSTEM BOUNDARY

System boundaries determine the unit processes to be included in the LCA study and which data as “input” and/or “output” to/from the system can be omitted.

This EPD covers the cradle to gate stage (A1 to A3) plus end-of-life (C1-C4) and benefits and loads beyond the system boundary (D), because other life cycle stages are dependent on scenarios and are better developed for specific building or construction works.

System boundaries are according to the modular approach and the cradle to gate stage is divided into the upstream (A1), core (A2 and A3) and end-of-life phases, as outlined in Figure 2. Life cycle stage that are not covered by the EPD are indicated as MND (Module Not Declared).

Production			Construction		Use							End of Life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport to site	Assembly / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Figure 2: Modules included in the steel bracket products LCA

The modularity principles (as illustrated in the above system diagram, **Figure 2**) have been followed.

A1: Raw material supply

The A1 module includes the upstream extraction and production of the raw materials used in the manufacture of the steel bracket products. The A1 module does not include the manufacture of lubricants and other processing aids or packaging (this is included under the scope of module A3).

A2: Transport of raw materials

The A2 module includes the transport of raw materials from extraction site or source to the steel bracket products manufacturing site.

A3: Manufacturing

The A3 module includes the manufacture of the steel bracket products, including the upstream impact of lubricants and other processing aids, generation of all fuels needed in steel bracket product manufacturing, packaging and their associated transportation to the manufacturing site, transportation, and treatment of waste.

C1: De-construction, demolition

The system boundary of this module covers the deconstruction of steel bracket products from a building.

C2: Transport to waste processing

The boundary of this module covers transportation of waste materials to the waste processing plants, including internal transport. Energy used for personal transportation (staff commuting) are not included within the study.

C3: Waste processing for reuse, recovery and/or recycling

The boundary of this module covers sorting, collection, processing of waste steel brackets for the different routes (reuse, recycling, energy recovery, final disposal) at a waste processing facility. For this LCA, an assumption for recycling rate of 82% has been made as per the American Iron and Steel institutes technical report on the Determination of Steel Recycling Rates in the United States.

C4: Disposal

The boundary of this module covers final disposal at disposal site, including any required pre-treatment and the management of the disposal facility. For this LCA, any waste that is not recycled was assumed to be landfilled.

Module D: Reuse, recovery and/or recycling potentials, expressed as net impacts and benefits

Module D covers the potential benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials resulting from the lifecycle of the product.

The considered scenario for this LCA is to reuse the recyclable steel in future production. As a result, this stage depicts the difference between the impacts of recycling steel until it reaches end-of-waste state and the impacts of using primary material. A recycling rate of 82% has been assumed as per the American Steel and Iron institute.

4.4 DATA SCORES AND QUALITY

The geographical system boundary of the LCA is North American. All processes are valid for the production site in the United States.

All material flows of the processes are based on company and site-specific data gathered for one year of operation, for the period 01/10/2020 – 30/09/2021.

Modelling of the life cycle of the Centerline steel bracket products were performed using SimaPro v.9.1 LCA software from PRé.

All relevant background LCI datasets are taken from the ecoinvent database v3.8 (cut-off) released in 2021.

The foreground data have been collected on site and validated based on mass balances. The background data are based on reviewed datasets from life cycle inventories. As all datasets are validated, the data quality for the entire study can be judged as good.

4.5 ALLOCATION

All allocation was performed according to the basic rules from Part A: Product Category Rules for Building Related Products and Services, UL 10010. As no co-products are produced, the flow of materials and energy and the associated release of substances and energy into the environment is therefore related exclusively to the steel bracket products produced.

In terms of generic data, the ecoinvent v3.8 (cut-off) database was used which defaults to an economic allocation for most processes. However, in some cases, where there is a direct physical relationship, mass-based allocation was used. The allocation approach of specific ecoinvent modules is documented on their website and method reports (www.ecoinvent.org).

In the case of end-of-life allocation of generic data, the ecoinvent v3.8 with a cut-off by classification end-of-life allocation method was used. In this approach, environmental burdens and benefits of recycled/reused materials are given to the product system consuming them, rather than the system providing them, and are quantified based on the recycled content of the material under investigation. This is a common approach in LCA for materials where there is a loss in inherent properties during recycling, the supply of recycled material exceeds demand and recycled content of the product is independent of whether it is recycled downstream. This approach is aligned with the ISO standards on LCA.

4.6 CUT-OFF CRITERIA AND ASSUMPTIONS

In the process of building an LCI it is typical to exclude items considered to have a negligible contribution to results. To do this in a consistent and robust manner there must be confidence that the exclusion is fair and reasonable. To this end, cut-off criteria were defined in this study, which allow items to be neglected if they meet the criteria. In accordance with Part A: Product Category Rules for Building Related Products and Services, UL 10010, exclusions could be made if they were expected to be within the below criteria and the total neglected input flows per module did not exceed 5% of energy usage and mass:

- **Mass:** when using mass as a cut-off criterion, it is appropriate to require the inclusion in the study of all inputs that cumulatively contribute more than a defined percentage to the mass input of the product system being modelled. In this case, a cut off of < 1% was considered.
- **Energy:** similarly, an appropriate decision, when using energy as a criterion, is to require the inclusion in the study of those inputs that cumulatively contribute more than a defined percentage of the product system's energy inputs. In this case, a cut off of < 1% was considered.
- **Environmental significance:** decisions on cut-off criteria should be made to include inputs that contribute more than an additional defined amount of the estimated quantity of individual data of the product system that are specially selected because of environmental relevance. In this case, a cut off of < 1% was considered.

In addition to exclusions based on cut-off criteria, the following general exclusions from the scope of the study were made as permissible by the PCR:

- Capital goods and infrastructure flows;
- Human activity and personnel-related activity such as travel furniture, office supplies, etc.; and
- Environmental impacts associated with support functions (e.g., R&D, marketing, finance, management etc.)

No known flows are deliberately excluded from this EPD.

4.7 COMPARABILITY

Comparison of the environmental performance of [Product category] using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR.

Full conformance with the PCR for Designated Steel Construction products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible.

4.8 IMPACT CATEGORIES

Life Cycle Impact Assessment (LCIA) was conducted according to the TRACI v2.1 methodology. The impact categories shown in the table below were assessed.

Table 3: Impact categories assessed

Impact Category	Unit
Global Warming (Climate Change)	kg CO ₂ eq.
Ozone Depletion	kg CO ₂ eq.
Acidification Potential	kg CO ₂ eq.
Eutrophication	kg CO ₂ eq.
Smog Potential (SP)	kg CFC 11 eq.
Abiotic Depletion Potential, fossil (ADP)	MJ

These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development, however the EPD users shall not use additional measures for comparative purposes.

5 ENVIRONMENTAL PERFORMANCE

The results for the assessed product are presented below per declared unit to three significant figures, and broken down into product life cycle stages (A1 – A3) and end of life lifecycle stages (C1-C4 plus module D). LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Parameters describing environmental impacts									
GWP: Global warming potential – total	kg CO ₂ eq	2510	15.1	238	0	3.95	0	2.67E-03	-1860
ODP: Ozone depletion Potential	kg CFC-11 eq	2.97E-06	2.17E-07	4.88E-06	0	5.69E-08	0	4.25E-11	1.68E-06
AP: Acidification potential	kg SO ₂ eq	5.72	0.0386	1.71	0	0.0101	0	2.31E-05	-3.40
EP: Eutrophication potential	kg N eq	0.234	3.63E-03	0.141	0	9.52E-04	0	1.62E-06	-8.64E-02
SFP: Smog formation potential	kg O ₃ eq	81.1	0.964	12.0	0	0.253	0	7.21E-04	-33.2
ADP: Abiotic depletion potential, fossil	MJ	29400	200	3360	0	52.5	0	34.7	-25300
Parameters describing use of resources									
PERE: Renewable primary energy used as energy carrier (fuel)	MJ	2030	0	334	0.293	1670	0	0.0770	0
PERM: Renewable primary resources with energy content used as material	MJ	1130	0	9.52	0.0213	1120	0	5.58E-03	0
PERT: Total renewable primary resources	MJ	344	0.315	2810	0	0.0826	0	0.206	-241
PENRE: Non-renewable primary resources used as an energy carrier (fuel)	MJ	29600	194	3780	0	50.9	0	34.0	-25400
PENRM: Non-renewable primary resources with energy content used as material	MJ	0	0	0	0	0	0	0	0
PENRT: Total non-renewable primary resources	MJ	29600	194	3780	0	50.9	0	34.0	-25400
SM: Secondary materials	kg	0	0	0	0	0	0	0	0
RSF: Renewable secondary fuels	MJ	0	0	0	0	0	0	0	0
NRSF: Non-renewable secondary fuels	MJ	0	0	0	0	0	0	0	0
RE: Recovered energy	MJ	0	0	0	0	0	0	0	0
FW: Use of net fresh water resources	m ³	367	9.64E-03	23.4	0	2.53E-03	0	1.63E-03	-346

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Parameters describing waste production									
HWD: Hazardous waste disposed	kg	2.29E-03	1.35E-03	7.23E-03	0	3.54E-04	0	2.26E-04	0.0105
NHWD: Non-hazardous waste disposed	kg	12.7	0.0526	4.99	0	0.0138	0	999	0.225
RWD: Radioactive waste disposal	kg	7.23E-04	7.17E-06	8.57E-04	0	1.88E-06	0	2.06E-06	1.68E-04
Parameters describing outputs flows									
CRU: Components for reuse	kg	0	0	0	0	0	0	0	0
MR: Material for recycling	kg	0	0	0	0	0	850	0	0
MER: Materials for energy recovery	kg	0	0	0	0	0	0	0	0
EEE: Exported energy, electrical	MJ	0	0	0	0	0	0	0	0
EET: Exported energy, thermal	MJ	0	0	0	0	0	0	0	0

The environmental impact results of steel products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the steel product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

The results presented in this EPD are limited by the scope, boundaries and reference period defined within this assessment (e.g., production (A1-A3) and end of life (C1-C4 plus module D) system boundary) in addition to the use of generic data to represent upstream processes.

Note, third party verified ISO 14040/44 secondary LCI data sets contribute more than 67% of total impact (either at the unit process level or in aggregate) to any of the required impact categories.

5.1 BIOGENIC CARBON

As per the PCR, the biogenic carbon content shall be separately declared for the product. However, this is only relevant for the packaging, which has been excluded from the scope of this assessment.

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