

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025:2006 AND EN 15804:2012+A2:2019/AC:2021

SmartEPD-2025-076-0549-01

Leviat Structural Steel Clamp & Spacer

Leviat
A CRH COMPANY

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Date of Issue:	Expiration:	Last updated:
Jun 20, 2025	Jun 20, 2030	Jul 18, 2025

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information



General Information

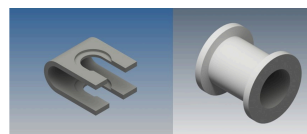
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Product Name:	Leviat Structural Steel Clamp & Spacer
Declared Unit:	1 kg of structural steel product
Declaration Number:	SmartEPD-2025-076-0549-01
Date of Issue:	June 20, 2025
Expiration:	June 20, 2030
Last updated:	July 18, 2025
EPD Scope:	Cradle to gate with other options A1 - A3, A4, A5, C1 - C4, D
Market(s) of Applicability:	China, Europe, Middle East (Western Asia), North America, Brazil, South East Asia, India

General Organization Information

Leviat is a global leader for engineered solutions and innovative products that enable safer, faster, stronger, more sustainable construction. Formed in 2020 as a single organization - Leviat brings together the expertise, resources and heritage of market-leading businesses including Ancon, Halfen, Meadow Burke and Plaka.

Limitations, Liability and Ownership

This EPD applies only to the specified product system and is not intended for direct comparisons unless conducted per relevant PCR requirements. The manufacturer is responsible for the accuracy of the data, while the program operator and verifier assume no liability for its use or interpretation. This document is the property of the manufacturer and may not be reproduced or modified without permission. It remains valid until its expiration date unless significant product or process changes occur.

This LCA and associated EPD report only on environmental aspects that are based on verified data and reflect actual processes, impacts, and conditions relevant to the product system. No claims are made regarding potential future environmental benefits or speculative outcomes unless such outcomes are supported by documented evidence and are reasonably expected to be realized under normal operating conditions.

This LCA and associated EPD do not include standalone sustainability claims. Where sustainability-related statements are made, they are explicitly linked to established sustainability programs that conform to the requirements of ISO 14020 Clause 6, or are referenced from publicly available documents that have been developed through consensus with the involvement of relevant interested parties. No general or unsubstantiated sustainability claims are included.

A manufacturer shall not make claims based on an industry-average EPD which leads the market to believe the industry-average is representative of manufacturer-specific or product-specific.

Reference Standards

Standard(s):	ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
Core PCR:	EPD International PCR for Construction Products 2019:14 (EN 15804:A2:2019/AC:2021) v1.3.4 Date of issue: April 30, 2024 Valid until: June 20, 2025
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

LCA Author/Creator:	Brian Bunte Brian Bunte sustainability@nextgenesg.co	
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Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: Sarah Curpen curpen1996@gmail.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s): Sarah Curpen curpen1996@gmail.com	External External

Product Information

Declared Unit:	1 kg of structural steel product
Mass:	1 kg
Product Specificity:	✓ Product Average ✗ Product Specific
Variation in GWP Result (Products):	-7.5% to 0%

Product Description

The steel clamp and steel spacer covered in this report are structural steel products intended for use in outdoor environments. These components are designed to provide mechanical support and structural integrity in a variety of assemblies. They are typically used in conjunction with other structural steel

products such as steel brackets and mounting frames. The products are fabricated to meet the durability and strength requirements of outdoor structural applications. Product diagrams for the clamp and spacer are provided below:

Product Specifications

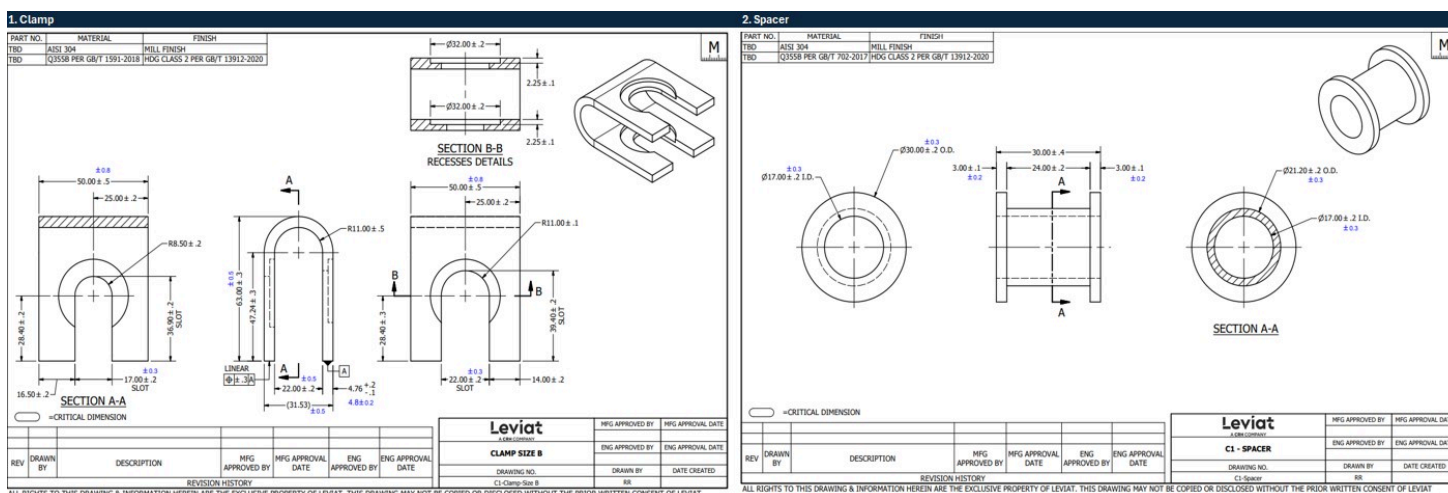
Product Classification Codes:

Masterformat - 05 12 13

Masterformat - 05 12 16

Masterformat - 05 12 23

Product Composition Diagram



Material Composition

Material/Component Category	Origin	% Mass
AISI 304 Steel	China	49.1
Q355B Steel	China	49.1
Zinc	Global	1.7

Packaging Material	Origin	kg Mass
Corrugate Box	China	.057
Shrink Wrap	China	.006

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in product	0

Biogenic Carbon Content	kg C per kg
Biogenic carbon content in accompanying packaging	0.0123

Hazardous Materials
0

EPD Data Specificity

- Primary Data Year:2024
- Manufacturing Specificity:

✗ Industry Average

✗ Manufacturer Average

✓ Facility Specific

Averaging:
This is a product-average LCA & EPD developed for two galvanized steel products manufactured at the same production facility. The results presented in this LCA and associated EPD reflect the most conservative set of results on a GWP basis, and all products are within +/- 10% A1-A3 GWP of this value. Results reflect a single manufacturing facility and therefore are not allocated or averaged across different manufacturing sites or suppliers.

System Boundary

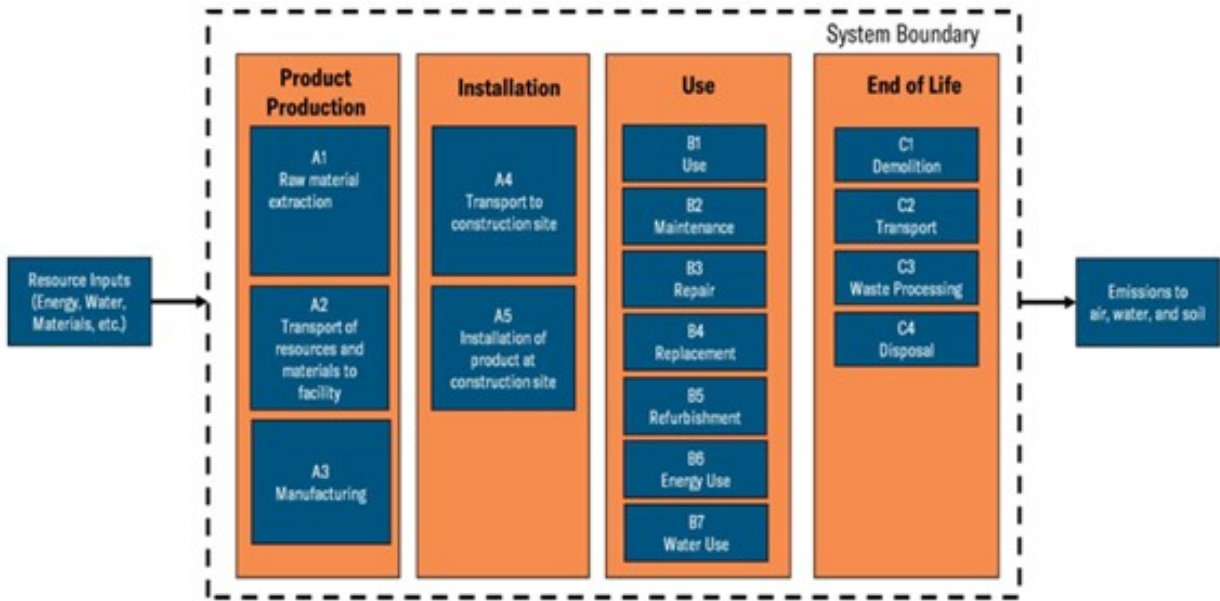
Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND

End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Note:

ND = Module not declared

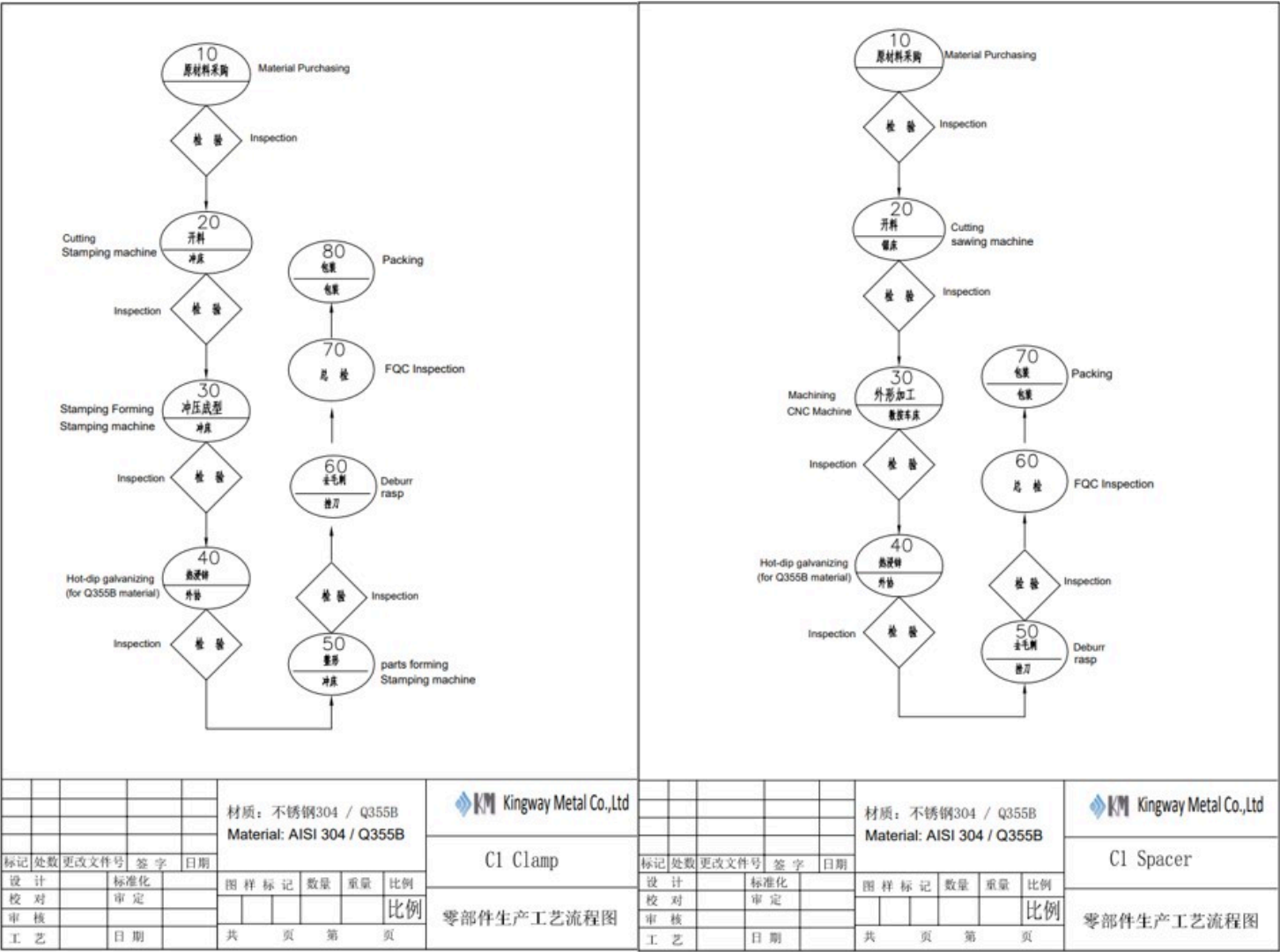
Product Composition Diagram



Plants

- Kingway Metal Co.,Ltd 7 Yongheng Road, Dongguan, Guangdong Province, China
- Kingway Metal Co.,Ltd 7 Yongheng Road, Dongguan, Guangdong Province, China

Product Flow Diagram



Software And Database

- LCA Software: ☑ SimaPro v. 9.6
- LCI Foreground Database(s): ☑ Ecoinvent v. 3.10 | 📍 CN-CSG | 📄 cut-off
- LCI Background Database(s): ☑ Ecoinvent v. 3.10 | 📍 RoW, GLO | 📄 cut-off | ☑ DATASmart LCI Package v. 2021 | 📍 RAS | 📄 cut-off

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

The data quality assessment for this EPD follows the framework established by Weidema et al. (2013), using the pedigree matrix approach to evaluate key aspects of data reliability, completeness, and representativeness. The pedigree matrix assesses data quality based on five key criteria: reliability, completeness, temporal correlation, geographical correlation, and technological correlation.

Primary data were collected directly from the manufacturer's facility in Dongguan, China. This data included product and packaging material and mass data as well as manufacturing energy and material transportation distances, etc. Allocation of inputs and outputs follows the principles outlined in EN 15804+A2 and Smart EPD Part A. Where primary data were not available, data from ecoinvent v3.10 were leveraged to represent upstream material production.

Data quality was assessed using the Weidema et al. (2013) pedigree matrix methodology, considering the following:

- *Temporal Correlation* – Product and packaging bills of material reflect data from 2025. All manufacturing energy and material primary input data reflect production from 2023. Secondary data are from the most recent available LCI sources.
- *Geographical Correlation* – Datasets reflective of sourcing or production geography were used where available; global or regional datasets were selected when country-specific data were not available.
- *Technological Correlation* – Selected datasets align with current manufacturing technologies for steel production and forming.
- *Reliability* – All data used are considered reliable, as primary data were sourced directly from manufacturing operations, while secondary data were selected from reputable databases and verified EPDs.
- *Completeness* – This analysis was conducted in alignment with the methodologies prescribed by EN 15804+A2, NPCR Part A, and NPCR Part B. The datasets used represent all major material and energy flows, and no flows were deliberately excluded.

A single pedigree matrix is presented to represent data quality for both clamp and spacer data. This is possible as the data used to model each product are from the same sources.

Table 4: Pedigree matrix representing data quality indicators for Leviat Clamp and Spacer using criteria from Weidema et al. 2013

Input Data	Reliability	Completeness	Temporal	Geographical	Technological
Product Raw Material Quantities	2	1	1	1	2
Product Raw Material Transportation Distance	2	3	2	2	2
Packaging Raw Material Quantities	2	1	1	1	3
Packaging Raw Material Transportation Distance	2	3	2	2	2
Manufacturing Energy and Water Inputs	2	1	1	1	1
Downstream Transportation Distances	3	3	3	3	3
Downstream Transportation Modes	2	3	2	2	2
Product End-of-life fate	2	2	2	3	2
End-of-Life Transportation Distances	3	3	3	2	2
Secondary data used to represent product raw materials	2	3	2	2	2
Secondary data used to represent packaging raw materials	3	3	3	3	3
Secondary data used to represent upstream inputs to energy	3	3	3	2	3
Secondary data used to represent upstream and downstream transportation	3	3	3	3	2
Secondary data used to represent end-of-life treatment of products and packaging	3	3	3	3	2

Overall, the data quality is considered medium-high due to the use of primary data from the manufacturer and high-quality secondary data from World Steel.

Life Cycle Module Description

A1 – Resource Extraction

This module includes the extraction and upstream processes associated with the production of input materials. This includes hot rolled steel, procured in coil or rod form, zinc, used in galvanizing, and packaging elements including cardboard and packaging film (PE). The LCI of steel coil and steel rod production are modeled using World Steel data from 2017 sourced from the LCI database Industry 2.0. Both steel datasets report approximately 2% post-consumer recycled content from external scrap. These steel production process includes alloying and forming steps up to the delivery of the steel coils/rods to the manufacturer. The manufacturer reports a 14% scrap rate in which scrap is cycled back into the same product system on-site in a closed loop and therefore is captured in aggregated material and energy data.

A2 – Inbound Transportation

The A2 module includes the transportation of resources and materials used in the production of steel Clamp and Spacer products. Both AISI 304 steel and Q355B steel is provided by the same supplier and is transported 160 km by road via truck transport. Corrugate boxes and shrink wrap are transported 185 km and 164 km by road, respectively. No transportation distance or mode was provided for the zinc used in HDG processes and therefore the transportation was assumed to be 160 km by road via truck, the same transport data reported inbound steel. Due to similarities in material composition and suppliers, transportation distances are identical across materials used in the Clamp and Spacer product systems.

A3 – Manufacturing

The manufacturing of Clamp and Spacers takes place in a single manufacturing facility operated by Kingway Metal Co., Ltd. located at No.7, Yongheng Road Xialingbei, Liaobu Town, Dongguan City, Guangdong Province, China. The manufacturer receives steel coils and steel rods which undergo machining (cutting, shaping, and forming) followed by hot-dip galvanizing (HDG) to apply a protective zinc coating. Manufacturing energy includes electricity only, with electricity modeled using the regional electricity mix representative of the Dongguan region, the region in China where the manufacturer is located. The characterization factor for this electricity is 0.677 kg CO_{2e}/kWh. This value is from the ecoinvent 3.10 process *Electricity, medium voltage {CN-CSG}| market for electricity, medium voltage | Cut-off, U* which references data year 2021 and data sources National Bureau of Statistics Database Year 2021 and 2021 electricity and other energy statistics, translated from chinaenergyportal.org. Full process documentation can be found in Documentation section for this process in the ecoinvent database. Note that the manufacturer's electricity is considered within the A3 stage of this EPD (not A1). The manufacturer provided electricity data already allocated on a metric ton-basis. The manufacturer allocates 200 kWh of electricity per metric ton of processed products. This value is identical for both clamp and spacer products. This electricity consumption value is then further allocated to a per kg basis as it better represents the scale of the clamp and spacer products (as they are both far lighter than a metric ton). In addition, no market-based instruments, renewable electricity, CO₂ certificates, or "green power" are considered in this LCA or associated EPD. The manufacturer reports a 14% internal scrap rate, which is recycled internally in a closed-loop system. This internal recycling is accounted for within the manufacturing energy and material balance of this study. No additional materials or ancillary inputs are included unless referenced in background datasets from Industry data 2.0 or ecoinvent, and no significant co-products are generated during manufacturing.

A4 – Downstream Transportation

The A4 module includes transportation of the final product to customers (building site). This LCA averages downstream transportation distances and modes for three key distribution routes to North America, Europe, and Asia. One third of products are assumed to be shipped to each of these geographies, and therefore the simple average of these transport distances is used. Shipments throughout Asia are assumed to be done via road transport and shipments to Europe and the Americas is assumed to be done through a combination of road and oceanic transport. Transportation distances were estimated using Ecotransit shipping distance calculator.

A5 – Installation

Module A5 accounts for impacts associated with the installation of the product. For these products, no significant impact arises from installation activities other than the disposal of packaging materials. Installation impacts are therefore limited to the transport and end-of-life treatment of packaging. The end-of-life treatment of both packaging film and corrugate boxes are conservatively assumed to be incinerated without energy recovery. Packaging elements are assumed to be transported 100 km via truck transport to end-of-life treatment facility. The dataset used to represent this transportation is identical to the datasets used to represent road transportation above, Transport, freight, lorry, unspecified {RoW}| market for transport, freight, lorry, unspecified | Cut-off, U.

B1 – B7 – Use

The use phase of a product includes seven information modules, B1-B7. Modules B1 through B7 are considered null for this EPD as the Clamp and Spacer are structural steel components and do not require maintenance, repair, replacement, refurbishment, operational energy, or operational water use during

their use phase. The Clamp and Spacer are passive structural elements with no operational energy or water requirements and do not typically require maintenance, repair, or replacement under normal conditions.

There are no known releases of dangerous substances to indoor air, soil, or water during the use stage of the product. These structural steel products are inert in use and do not emit volatile organic compounds (VOCs) or other harmful emissions under normal conditions.

C1 – C4 – End-of-Life

The end-of-life of a product consists of four information modules, C1-C4. At end-of-life, the Clamp and Spacer products are intended to be 100% recycled. However, realistic recycle rates typically do not exceed 85 – 90%. Therefore, 85% of product mass is assumed to be recycled and the remainder deposited in a sanitary landfill. C1 (deconstruction, demolition) energy is estimated using secondary data fromecoinvent. Module C2 accounts for transportation of the waste to recycling facilities and landfills with an assumed transport distance of 100 km by truck using the dataset *Transport, freight, lorry, unspecified {RoW}* | market for transport, freight, lorry, unspecified | Cut-off, U. Module C3, waste processing, is considered null since no additional processing is needed after deconstruction before end-of-life treatment. Module C4 includes the impacts associated with recycling processes, in alignment with the polluter-pays principle.

D – Potential Benefits Outside of the System Boundary (recycling)

Module D provides supplementary information about the potential net benefits associated with the recycling and recovery of materials beyond the system boundary of a product's life cycle. For the Clamp and Spacer products, Module D reflects the net environmental benefit of recycling steel at end-of-life. The modeling approach follows a closed-loop recycling allocation in line with EN 15804 and utilizes the Industry Data 2.0 process: *Value of Scrap {GLO} | blast furnace route and electric arc furnace route | production mix, at plant | LCI result*. This process by WorldSteel represents the average avoided burden associated with recycled steel. To avoid double-counting benefits, Module D credits are calculated based only on the net scrap, or total end-of-life scrap minus the 2% of external scrap that was already input in the upstream production phase. In addition, the realistic recycling rate of structural steel (%) is applied. The equation and section below illustrate how net scrap is considered in Module D:

Equation 1: Net scrap equation used in module D

$$\text{Net Scrap (kg)} = \text{EoL Scrap (kg)} - \text{Scrap in Product (kg)} * \text{Recycle Rate (\%)}$$

Where:

- **Net Scrap (kg)** = Quantity of steel scrap considered in Module D for benefits
- **EoL Scrap (kg)** = Quantity of scrap collected at end-of-life for recycling
- **Scrap in Product (kg)** = Quantity of External Scrap Already Included in Product
- **Recycle Rate (%)** = The share of material recycled at end-of-life

As indicated in A1 section, external scrap in steel coils and steel rods are reported to be “approximately 2%” (WorldSteel, 2017) and therefore 2% is used as the Scrap in Product value meaning that the remaining 98% is available for consideration in Module D benefits.

A complete list of LCI tables representing the modules listed above are available in the accompanying LCA report.

LCA Discussion

Allocation Procedure

Allocation follows the principles set forth in EN 15804 + A2 and ISO 14040/14044, ensuring a transparent and consistent distribution of inputs and outputs across the life cycle stages of the product's life cycle. The allocation methods used in this analysis were selected to best align with the physical relationships in the production systems. The following allocation approach is used:

- *Per kilogram (kg)* - System inputs and outputs such as raw materials and energy are allocated on a per kilogram basis.

Cut-off Procedure

The LCA Tool and analysis done within it align with the Cut-off Rules described in EN 15804 + A2, ensuring that all relevant mass, energy, and environmental impact contributions are accounted for in the LCA. Specifically:

- Individual flows representing less than 1% of the total mass, energy, or environmental impact may be excluded, provided that their cumulative exclusion does not exceed 5% of the total impact for any environmental indicator.
- All known primary materials, production processes, and energy flow are included.
- Infrastructure, capital equipment, and personnel-related impacts are excluded from the system boundaries unless captured in background datasets
- Excluded flows are documented, and sensitivity analyses confirm that their omission does not significantly affect results.

Renewable Electricity

Energy Attribute Certificates (EACs) such as
Renewable Energy Certificates (RECs) or Power
Purchase Agreements (PPAs) are included in the
baseline reported results: ✗ No

Results

Environmental Impact Assessment Results

EF3.1

per 1 kg of product of structural steel product.

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

Spacer LCIA Results (per kg)

Impact Category	Unit	Method	A1 - A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO2 eq	EF3.1	2.71e+0	4.31e-1	1.02e-1	5.34e-2	1.11e-2	3.20e-2	0	-1.39e+0
GWP- fossil	kg CO2 eq	EF3.1	2.75e+0	4.30e-1	1.87e-2	5.34e-2	1.11e-2	3.26e-2	0	-1.39e+0
GWP-biogenic	kg CO2 eq	EF3.1	-3.45e-2	-5.13e-5	8.36e-2	8.90e-5	5.15e-7	-6.85e-4	0	2.10e-2
GWP-luluc	kg CO2 eq	EF3.1	1.08e-3	2.01e-4	3.04e-7	4.65e-6	4.62e-6	3.70e-5	0	-2.98e-5
ODP	kg CFC11 eq	EF3.1	4.37e-9	6.57e-9	1.39e-11	8.16e-10	1.78e-10	3.92e-10	0	-3.15e-15
AP	mol H+ eq	EF3.1	8.55e-3	6.42e-3	1.17e-5	4.81e-4	2.81e-5	3.28e-4	0	-3.10e-3
PM	disease incidence	EF3.1	9.52e-8	2.85e-8	1.23e-10	1.37e-8	1.08e-9	4.70e-9	0	-5.20e-8
IRP	kBq U235 eq	EF3.1	1.18e+1	4.17e-3	1.23e-5	3.12e-4	1.47e-4	1.27e-3	0	3.25e+1
POCP	kg NMVOC eq	EF3.1	5.56e-3	5.26e-3	1.51e-5	7.29e-4	4.26e-5	2.58e-4	0	-2.21e-3
EP-fw	kg P eq	EF3.1	1.21e-4	2.50e-5	4.16e-7	1.56e-6	8.95e-7	1.78e-5	0	-2.62e-7
EP-marine	kg N eq	EF3.1	1.70e-3	1.60e-3	6.05e-6	2.23e-4	7.14e-6	7.65e-5	0	-5.45e-4
EP-terrestrial	mol N eq	EF3.1	1.65e-2	1.77e-2	5.92e-5	2.44e-3	7.73e-5	8.56e-4	0	-4.78e-3
SQI	dimensionless	EF3.1	6.43e+0	3.68e+0	4.13e-3	4.90e-2	1.67e-1	7.32e-1	0	2.18e-1
WDP	m3 world eq deprived	EF3.1	-6.79e+0	2.34e-2	4.80e-4	1.51e-3	8.49e-4	-1.91e-2	0	-1.73e+1
ADP-fossil	MJ, net calorific value	EF3.1	2.94e+1	5.84e+0	1.08e-2	6.92e-1	1.64e-1	3.90e-1	0	-1.38e+1
ADP-minerals&metals	kg Sb eq	EF3.1	2.91e-5	8.44e-7	2.17e-9	1.90e-8	3.12e-8	1.61e-6	0	-3.59e-6

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

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

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Resource Use Indicator

per 1 kg of product of structural steel product.

Spacer Resource Use Results (per kg)

Indicator	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.76e+0	6.13e-2	2.43e-4	4.16e-3	2.10e-3	4.57e-2	0	8.35e-1
PERM	MJ	6.43e+0	0	0	0	0	0	0	0
PERT	MJ	8.19e+0	6.13e-2	2.43e-4	4.16e-3	2.10e-3	4.57e-2	0	8.35e-1
PENRE	MJ	3.05e+1	5.91e+0	1.10e-2	6.97e-1	1.66e-1	4.10e-1	0	-1.33e+1
PENRM	MJ	2.20e+0	0	0	0	0	0	0	0
PENRT	MJ	3.27e+1	5.91e+0	1.10e-2	6.97e-1	1.66e-1	4.10e-1	0	-1.33e+1
ADP-fossil	MJ	2.94e+1	5.84e+0	1.08e-2	6.92e-1	1.64e-1	3.90e-1	0	-1.38e+1
SM	kg	1.72e-1	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	3.67e-2	6.53e-4	1.50e-5	4.45e-5	2.34e-5	-4.10e-4	0	-8.59e-3

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

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

Waste and Output Flow Indicators

per 1 kg of product of structural steel product.

Spacer Output Flows and Waste Results (per kg)

Indicator	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	0	0	0	0	0	0	0	0
NHWD	kg	0	0	5.50e-1	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	8.75e+0	0	0
MER	kg	0	0	0	0	0	0	0	0
MNER	kg	ND	ND	ND	ND	ND	ND	ND	ND
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Interpretation

A1 – A3 Cradle-to-Gate Results

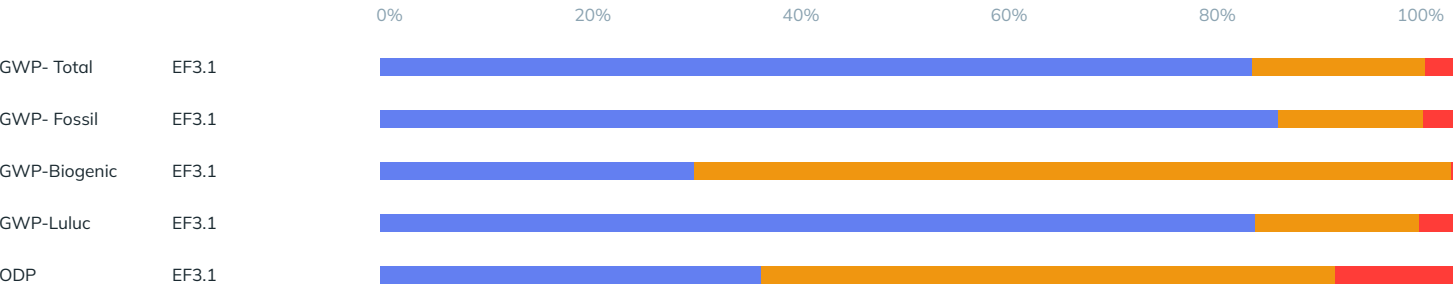
This section discusses the cradle-to-gate results for the declared units, 1 kg of Leviat Clamp product and 1 kg of Leviat spacer product. Although this discussion is focused on the LCIA results, calculated using the EN 15804 + A2 (adapted) LCIA method, the section also includes A1-A3 results for Primary Resource Use, Indicators Describing Waste and Output Flows, and Additional Environmental Information. Results for biogenic carbon in packaging are reported in this section due to use of corrugate boxes as packaging (A1). LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

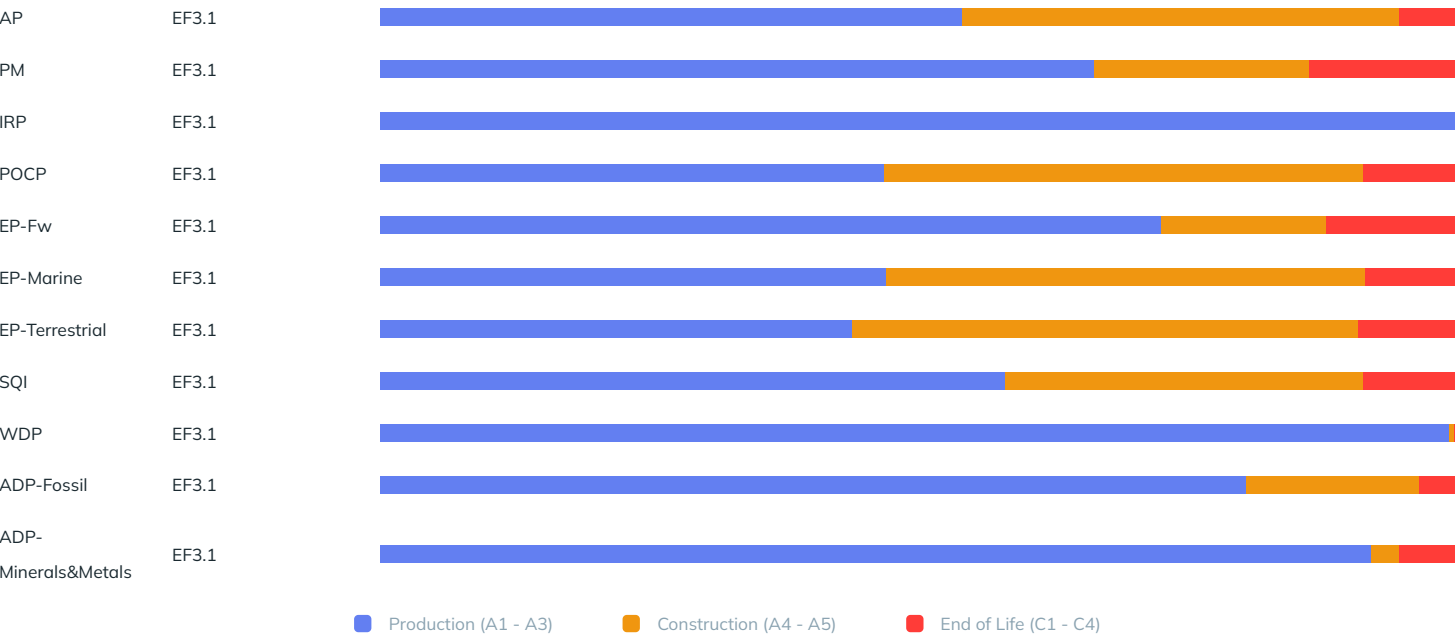
Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building or construction works has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase only when product or construction works performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparisons can be inaccurate and could lead to erroneous selection of materials or products that are higher-impact, at least in some impact categories.

Stage A1 is the dominant contributor across all mandatory indicators, with contributions ranging from approximately 65% to 95% for the spacer. A3 has minor to moderate contributions to impacts, contributing roughly 20% to total A1-A3 ODP and EP-fw impacts. A2 has insignificant to minor contributions to impacts across categories, contributing from roughly 0% up to almost 10% in the ODP indicator. These results highlight the significance of the upstream production processes associated with the steel procured by the manufacturer. Due to significant similarities in material composition, energy intensity, and supplier attributes, this interpretation serves for both the clamp and spacer products.

A1 – C4 Cradle-to-Grave

The LCIA results for A1-C4 demonstrate that the A1-A3 stages have the most significant contributions across indicators, ranging from 30% to over 99% of the total life cycle impacts and roughly 70% of indicators on average. This reinforces the significance of raw material extraction and upstream processing, transportation, and manufacturer-controlled processes in determining the overall environmental performance of the product. Beyond A1-A3, the A4 stage has moderate contributions, reaching up to 56% in select indicators such as ODP and contributing to roughly 23% to indicators on average. A5 contributes less than 3% across all impact categories. B1-B7 (Use Stage) are considered null in this assessment, as the clamp and spacer products do not require energy, water, or routine maintenance throughout their use phase. End-of-life impacts (C1-C4) are also relatively low in comparison with A1-A3. Modules C1 and C4 have similar contributions to impacts across indicators, contributing 4% to indicators on average and contributing up to 12% in some categories. Module C2 has an insignificant contribution to impacts, roughly 1% on average across categories. Module C3 includes the collection of the product to recycling, with no additional pre-treatment processes required. Environmental impacts are considered negligible. Due to significant similarities in material composition, energy intensity, and supplier attributes, this interpretation serves for both the clamp and spacer products. Results on a per kilogram (kg) basis are provided in the results tables.





Further Information

Product Total Masses

Product	Mass (kg)
Spacer	8.75
Clamp	36.63

Leveraging Reported Results to Quantify Results on a Product basis (per unit clamp or spacer)

The results tables presented in the Results section of this EPD represent worst-case results, from the spacer product, on a per kg basis. Results for full clamp and spacer products can be calculated by multiplying the results tables by the total product masses displayed in the table above.

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