# ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012 + A2:2019 for:

## STAINLESS STEEL HOLLOW SECTIONS AND PROFILES GRADE EN 1.4301/1.4307

## Stalatube Oy

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|---|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
| EPD registration number: | S-P- 09672 |
| Publication date: | 2023-11-09 |
| Valid until: | 2028-11-09 |

# 1. General information

## Company information

### Owner of the EPD
Stalatube Oy
Taivalkatu 7,
15170 Lahti
Finland

### Description of the organization
Stalatube is known worldwide as the manufacturer of diverse and highly-developed stainless steel hollow sections, profiles, and components. It has the world's largest product range for square and rectangular hollow sections. Stalatube has been in business for over 50 years and has a global distribution network that reaches 50 countries across all continents.

### Additional information
+358 3 882 190
stalatube@stalatube.com
https://stalatube.com/

## Product information

### Product name
Stainless steel hollow sections and profiles Grade EN 1.4301/1.4307

### Place of production
Lahti, Finland

## Programme information

### Program operator, publisher
The International EPD® System, www.environdec.com

### Program information
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

### Standards and Product Category Rules
The declaration has been prepared in accordance with standards ISO 14025 and EN 15804:2012+A2:2019 and the additional requirements stated in the PCR for Construction products (version 1.3.1 dated 2023-07-08).

### Author of the life cycle assessment and declaration
Ramboll Finland Oy, Itsehallintokuja 3, 02601 Espoo, Finland.
Practitioner environmental consultant:
Nea Ferin

### Date of publication and validity
Declaration issue date 2023-11-09. The declaration is valid 5 years, 2023-11-09 - 2028-11-09.

## Verification

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| Product category rules (PCR): *Construction products. Version 1.3.1 dated 2023-07-08., UN CPC code 4153.* |
| PCR review was conducted by: The Technical Committee of the International EPD® System.<br>Chair: Claudia A. Peña.<br>Contact via info@environdec.com |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006:<br><br>☐ EPD process certification ☒ EPD verification |
| Third party verifier: Pär Lindman (Miljogiraff)<br>E-mail: par@miljogiraff.se<br>External independent verification<br>Signature of the third-party verifier:<br><br>Approved by: The International EPD® System |
| Procedure for follow-up of data during EPD validity involves third party verifier:<br><br>☐ Yes ☒ No |

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

## 2. Product information

### Products included in the EPD

This EPD concerns Stalatube's stainless steel hollow sections and profiles manufactured from Grade EN 1.4301/1.4307. More information on the products is available at https://stalatube.com/products/.

### Description of product and its use

Stalatube's Stainless steel hollow sections and profiles steel grade 1.4301/1.4307 are used in many different applications, e.g. transport and energy sectors, building and construction, and process industries. They are typically often used in, but not limited to, load bearing structures and frames in applications where corrosion resistance or visual quality is a high consideration.

### Certifications and labels

The Management System of Stalatube Oy follows standards ISO 14001:2015, ISO 45001:2018 and ISO 9001:2015. Stalatube Oy has also ISO 3834-2 certification for their welding quality management.

### UN CPC code

In the UN CPC system, the product is classified as 41288 *Tubes and pipes, of non-circular cross-section, welded, of steel*

## 3. Content declaration

### Raw materials of the product

The main material of the products is steel (100 weight-%).

### Information about recycled materials

The recycled material content for steel varies depending on the supplier. Stalatube has various steel supplier, whose steel's recycled material content is between 70 and 94 %. The secondary material content was included in the assessment accordingly.

### Information about packaging

The product is wrapped in plastic and placed on wooden pallet. Also, cardboard and timber are used as packaging materials.

### List of EU Chemicals Agency (ECHA) REACH SVHC substances contained in the product

The products do not contain substances which exceed the limits for registration with the European Chemicals Agency regarding the "Candidate List of Substances of Very High Concern for Authorisation".

## 4. LCA information

### Declared unit

The declared unit is set to 1 tonne (1000 kg) of finished steel product.

### Time representativeness

The data used to model product manufacturing corresponds to year 2022. The data from generic databases are from 2014 – 2021, apart from one dataset for plastic packaging from 2013. The used EPDs are from 2022-2023.

### Geographical scope

This EPD is site specific (products produced only in Lahti, Finland).

### Database(s) and LCA software used

The LCA was modelled using the LCA software GaBi 10 Professional and the life cycle inventory datasets provided by Sphera.

### Cut-off criteria

Waste, other than steel scrap, generated from production and their treatment are excluded from this assessment as they present less than 5 % of input flows of energy usage and mass per module.

### Allocation

Steel raw materials come from several suppliers. Thus, the steel raw material was allocated based on the supplier shares during the studied period. Electricity, district heat, fuel and water consumptions, and production wastes were known in plant level and thus, allocation was needed in phase A3, too. Allocation was based on plant's total utility consumption and total production volumes (varies depending on the product). The products are transported to several countries (A4), and the weight of product transported was allocated based on market shares. In addition, steel scrap from the production phase is allocated as co-product using mass allocation.

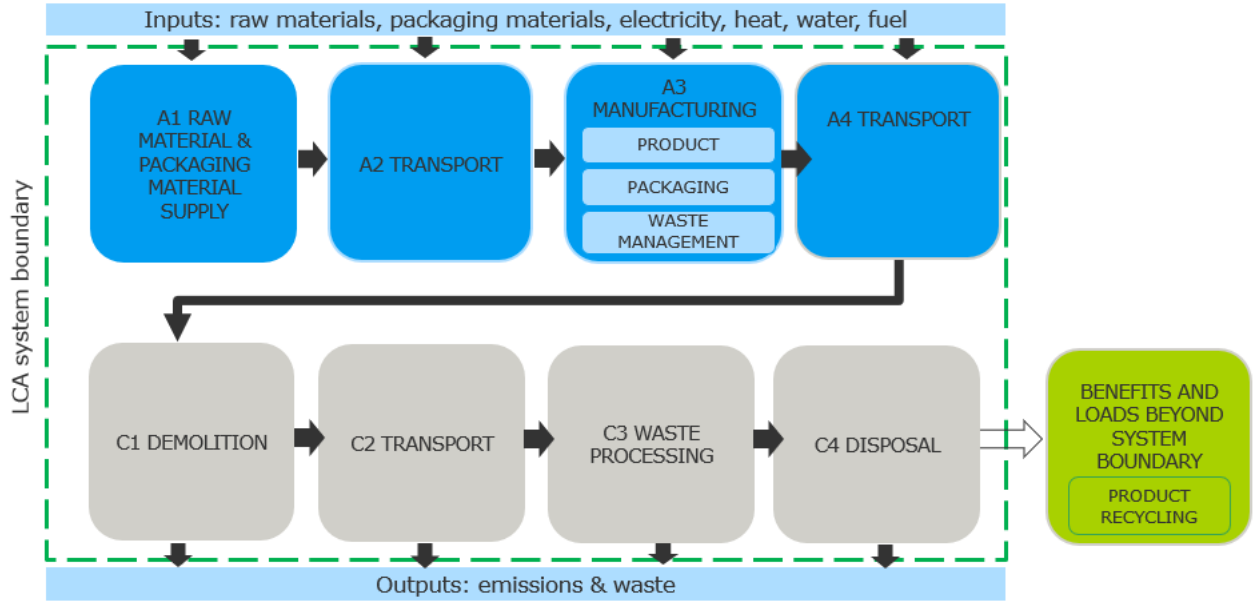
No other allocations were made in this assessment.

## Data quality

Site-specific production data have been collected for 2022 from the production site. The upstream and downstream processes have been modelled based on environmental data from supplier specific EPDs and generic database (Sphera). The collected data were reviewed in terms of consistency, and it is estimated as good quality.

## System diagram

The product system to be studied consists of the whole life cycle of the steel product. The assessment covers the product stage (A1-A3), transport to the building site of the construction process stage (A4), the end-of-life stage (C1-C4) and benefits and loads beyond the system boundary (D). Modules B1-B7 are considered not relevant. Machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.



## Product life cycle

**Production (A1-A3)**

The product stage takes into account the manufacture of raw materials, their transport to the production plant and the stages of the product manufacturing process.

**A1:** The production of raw materials includes the environmental impacts arising from the procurement, processing, and manufacture of all raw materials used in the products. The ratio of steel suppliers represents the year 2022, which corresponds a typical average.

**A2:** Transportation of the raw materials to the production facility of Stalatube in Lahti, Finland. Specific transportation methods (truck or ferry) and actual distances are taken into account.

**A3:** Manufacturing and packaging of the steel products at the production site. The manufacturing process consists of the following phases: Cold roll forming, welding and cutting to length followed by optional surface treatments such as polishing or pickling and passivation. The assessment covers the electricity, heating, fuel and water use needed during the production process and the transport. The electricity and district heat are modelled based on the information provided by the supplier. Fuel and water use are modelled using allocation based on plant level consumption and production volumes.

**Transportation (A4)**

Transportation of the finished products from the production facility. Distances between Stalatube's production facility in Lahti, Finland and destination (country) capitals are used, excluding United States, where Chicago is providing more accurate estimation.

**End of life cycle (C1-C4)**

**C1:** Deconstruction of the product is assumed to be done by machine that consumes fuel. Actual machinery may vary depending on the steel application.

**C2:** Transportation of the dismantled product for processing was assessed based on average waste transportation distance in Finland.

**C3:** In the end-of-life scenario, it was assumed that steel will be recycled as material. Following the current recycling practices, the life cycle assessment has been made on the assumption that 100 % of steel will be recycled as material.

**C4:** No waste is assumed to end up in final deposition.

**Benefits and loads beyond the system boundary (D)**

Materials delivered for material recycling can be used to make secondary material, thus avoiding the use of virgin raw material. The life cycle assessment has been made on the assumption that 100 % of the products' material ends up in material recovery at the end of the life cycle.

## System boundaries

The system boundary was set at cradle to gate with options, including modules A1-A3, A4, module C1-C4 and module D. The life cycle stages included are described in the table below:

| | **Product stage** | | | **Construction stage** | | **Use stage** | | | | | | | **End-of-life stage** | | | | **Non-life cycle impacts** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | | |
| Modules declared | ☒ | ☒ | ☒ | ☒ | ND | ND | ND | ND | ND | ND | ND | ND | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ |
| Module | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement of | Extensive | Use of energy | Use of water | Demolition | Transport | Waste processing | Waste disposal | Reuse | Recovery | Recycling |
| Geography | Glo, EU | Glo, EU | FI, EU | Glo, EU | - | - | - | - | - | - | - | - | - | Glo, EU | EU | - | EU | | |
| Specific data used | >60 % * | | | | | | | | | | | | | | | | | | |
| Variation - products | Not relevant (results presented product-specifically, not averaged) | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation - sites | Not relevant (site-specific EPD) | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

X = Module declared ND = Not declared

| | |
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| | Compulsory modules in cradle to gate with options |
| | Optional modules by scenario |

* The percentage of specific data is assumed to be larger than 60%, but it cannot be proved since one or several EPDs that are used as data sources lack information on the percentage of specific data used.

## 5. Environmental and resource use indicators

In the following tables the potential environmental impacts are reported per the declared unit and per life cycle stage. The impact categories presented here are consistent with the reference PCR.

The results are presented in scientific form. Data interpretation example: $1.31E^{-2} = 1.31*10^{-2} = 0.0131$

According to the EN 15804 standard, environmental declarations for construction products may not be comparable if they have not been prepared in accordance with that standard or if a different notified unit has been used.

### 5.1 Stainless steel hollow sections and profiles Grade EN 1.4301/1.4307

| Environmental impact category | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Global warming potential (GWP) – fossil | kg $CO_2$ eq. | 1,61E+03 | 1,08E+02 | 1,12E+01 | 7,58E+00 | 2,59E+00 | 0,00E+00 | -1,83E+02 |
| Global warming potential (GWP) – biogenic | kg $CO_2$ eq. | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Global warming potential (GWP) – luluc | kg $CO_2$ eq. | 9,79E-01 | 2,26E-01 | 4,95E-01 | 4,22E-02 | 1,20E-02 | 0,00E+00 | -4,93E-02 |
| Global warming potential (GWP) – total | kg $CO_2$ eq. | 1,61E+03 | 1,08E+02 | 1,17E+01 | 7,62E+00 | 2,60E+00 | 0,00E+00 | -1,83E+02 |
| Ozone depletion (ODP) | kg CFC11 eq. | 5,47E-05 | 8,86E-12 | 7,21E-12 | 4,54E-13 | 3,85E-12 | 0,00E+00 | -1,04E-10 |
| Acidification (AP) | mol $H^+$ eq. | 1,04E+01 | 1,64E+00 | 5,45E-02 | 6,97E-03 | 1,34E-02 | 0,00E+00 | -4,90E-01 |
| Eutrophication (EP) – freshwater | kg P eq. | 5,81E-03 | 1,07E-04 | 2,62E-04 | 2,26E-05 | 7,43E-06 | 0,00E+00 | -1,34E-04 |
| Eutrophication (EP) – marine | kg N eq. | 1,38E+00 | 7,10E-01 | 1,25E-02 | 2,13E-03 | 6,11E-03 | 0,00E+00 | -1,06E-01 |
| Eutrophication (EP) – terrestrial | mol N eq. | 1,41E+01 | 7,78E+00 | 1,61E-01 | 2,57E-02 | 6,74E-02 | 0,00E+00 | -1,15E+00 |

| Environmental impact category | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Photochemical ozone formation (POCP) | kg NMVOC eq. | 4,66E+00 | 1,93E+00 | 4,24E-02 | 6,06E-03 | 1,66E-02 | 0,00E+00 | -3,64E-01 |
| Depletion of abiotic resources (ADP) – minerals & metals | kg Sb eq. | 1,21E-01 | 2,36E-06 | 7,41E-06 | 6,33E-07 | 2,87E-06 | 0,00E+00 | -9,42E-06 |
| Depletion of abiotic resources (ADP) – fossil fuels | MJ | 3,22E+04 | 1,36E+03 | 9,64E+02 | 1,01E+02 | 5,06E+01 | 0,00E+00 | -1,51E+03 |
| Water deprivation potential (WDP) | $m^3e$ depr. | -3,83E+02 | 4,31E-01 | 8,22E-01 | 6,79E-02 | 4,99E-01 | 0,00E+00 | 2,95E+00 |

## Additional environmental impact indicator

| Environmental impact indicator | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Global warming potential (GWP-GHG) | kg $CO_2$ eq. | 1,61E+03 | 1,08E+02 | 1,17E+01 | 7,63E+00 | 2,60E+00 | 0,00E+00 | -1,83E+02 |

## Resource use

| Resource use indicators | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) | MJ | 1,19E+04 | 2,85E+01 | 6,68E+01 | 5,75E+00 | 4,06E+00 | 0,00E+00 | -8,04E+01 |
| Use of renewable primary energy resources used as raw materials (PERM) | MJ | 1,60E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT) | MJ | 1,19E+04 | 2,85E+01 | 6,68E+01 | 5,75E+00 | 4,06E+00 | 0,00E+00 | -8,04E+01 |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE) | MJ | 7,02E+04 | 1,36E+03 | 9,68E+02 | 1,01E+02 | 5,07E+01 | 0,00E+00 | -1,52E+03 |
| Use of non-renewable primary energy resources used as raw materials (PENRM) | MJ | 1,64E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT) | MJ | 7,02E+04 | 1,36E+03 | 9,68E+02 | 1,01E+02 | 5,07E+01 | 0,00E+00 | -1,52E+03 |
| Use of secondary material (SM) | kg | 7,56E+02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of renewable secondary fuels (RSF) | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of non-renewable secondary fuels (NRSF) | MJ | 3,23E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Net use of fresh water (FW) | $m^3$ | 2,41E+01 | 3,22E-02 | 7,72E-02 | 6,51E-03 | 1,42E-02 | 0,00E+00 | -2,30E-01 |

## Waste categories

| Waste category | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Hazardous waste disposed (HWD) | kg | 2,21E+02 | 4,14E-09 | 5,12E-09 | 4,86E-10 | 6,34E-10 | 0,00E+00 | 1,43E-08 |
| Non-hazardous waste disposed (NHWD) | kg | 4,23E+02 | 1,45E-01 | 1,58E-01 | 1,45E-02 | 1,34E-02 | 0,00E+00 | -2,20E+00 |
| Radioactive waste disposed (RWD) | kg | 1,60E+00 | 1,82E-03 | 1,80E-03 | 1,25E-04 | 6,68E-04 | 0,00E+00 | -8,37E-03 |

## Environmental information describing output flows

| Indicator | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Components for reuse (CRU) | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling (MFR) | kg | 9,42E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,00E+03 |
| Material for energy recovery (MER) | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity (EE) | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal (EET) | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

## Additional environmental indicators

| Indicator | Unit | A1-A3 total | A4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|
| Particulate matter | Disease incidences | 9,37E-05 | 4,00E-05 | 4,49E-07 | 4,26E-08 | 2,53E-07 | 0,00E+00 | -6,49E-06 |
| Ionising radiation, human health | kBq U235 eq. | 6,03E+01 | 2,64E-01 | 2,71E-01 | 1,83E-02 | 1,09E-01 | 0,00E+00 | -7,37E-01 |
| Ecotoxicity, freshwater | CTUe | 4,16E+03 | 9,52E+02 | 6,83E+02 | 7,02E+01 | 3,38E+01 | 0,00E+00 | -3,24E+02 |
| Human toxicity, cancer | CTUh | 3,27E-05 | 1,80E-08 | 1,41E-08 | 1,42E-09 | 7,26E-10 | 0,00E+00 | -2,47E-07 |
| Human toxicity, non-cancer | CTUh | 2,43E-05 | 8,60E-07 | 7,52E-07 | 7,33E-08 | 3,88E-08 | 0,00E+00 | -2,24E-06 |
| Land Use | Pt | 1,96E+03 | 1,41E+02 | 4,08E+02 | 3,48E+01 | 1,14E+01 | 0,00E+00 | -8,80E+01 |

## Biogenic carbon content

| Biogenic carbon content | Amount per declared unit |
|---|---|
| The amount of biogenic carbon in the product | 0 kg |
| Amount of biogenic carbon in packaging | 7.7 kg |

## 6. Scenarios and additional technical information

### Additional technical information, energy use in manufacturing (A3)

| Variable | Amount |
|---|---|
| Quality of electricity information | Assumptions based on supplier specific data |
| $CO_2$ emission factor for electricity | 0.125 kg $CO_2$ eq. /kWh |
| Quality of heating data | Assumptions based on supplier specific data |
| $CO_2$ emission factor for heating | 0.119 kg $CO_2$ eq. /kWh |

### Additional technical information, transport to the site (A4)

| Variable | Amount | Data quality |
|---|---|---|
| Fuel type and consumption of the vehicle used or type of vehicle, e.g. truck, ship, etc. dm3/km or vehicle type | diesel 0.0082 kg/tonne*km | Truck, Euro 6, 28 - 32t gross weight / 22t payload capacity |
| | light fuel oil 0.0164 kg/tonne*km | Ro-ro-ship, 1,200 to 10,000 dwt payload capacity |
| | heavy fuel oil 0.0028 kg/tonne*km | Container ship, 5.000 to 200.000 dwt payload capacity, deep sea |
| Transportation distance (declared average or exact data) | 68 673 km | total transport distance |
| Capacity utilization rate | Truck: 85 %<br>Ship: 70 % | |
| Bulk density of transported products | varies according to the product | |
| Volume capacity utilization factor (factor = 1 or <1 or ≥1 for compressed or nested packaged products) | not applicable | |

## 7. References

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

EPD International AB (2021) General programme instructions for the International EPD System. Version 3.1, 2019-09-18.

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Ramboll, 2023. Stalatube Stainless steel hollow sections and profiles - Life cycle assessment report.