ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Stainless Steel Screw
ITW Construction Products

EPD HUB, HUB-4689
Published on 18.12.2025, last updated on 18.12.2025, valid until 18.12.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	ITW Construction Products
Address	Gl. Banegaardsvej 25, 5500 Middelfart, Denmark
Contact details	post@itwbyg.dk
Website	https://www.itwbyg.dk/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Anders Nissen
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Stainless Steel Screw
Additional labels	-
Product reference	https://www.itwbyg.dk/
Place(s) of raw material origin	China
Place of production	China Hangzhou, China Zhejiang and Denmark Middlefart
Place(s) of installation and use	DK, NO, SE, FI, DE, PL, FR
Period for data	01/01/2023-31/12/2023
Averaging in EPD	Multiple factories
Variation in GWP-fossil for A1-A3 (%)	0 / -15%
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	39,5

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of stainless steel screws
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	9,55
GWP-total, A1-A3 ($kgCO_2e$)	9,46
Secondary material, inputs (%)	58,8
Secondary material, outputs (%)	85
Total energy use, A1-A3 (kWh)	36,2
Net freshwater use, A1-A3 (m^3)	0,06

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

ITW Construction Products UK/Nordics is a division of ITW (Illinois Tool Works Ltd), a multinational industrial business operating across multiple industries. Since ITW's founding more than 100 years ago, it has become one of the world's leading diversified manufacturers of specialized industrial equipment, consumables, and related service businesses. The foundation of our company is the ITW Business Model, a unique and differentiated set of core capabilities and business practices that comprises three key elements: ITW's 80/20 Front to Back Process, customer-back innovation and a decentralized entrepreneurial culture. At ITW Construction Products UK/Nordics we are suppliers of innovative, engineered fastening systems and related consumables and software. These products are uniquely specified for a variety of materials, including wood, concrete and steel.

PRODUCT DESCRIPTION

Product Overview Stainless steel woodscrews are engineered for precision and durability, making them the ideal choice for wood-on-wood connections in decking, facade installations, and other similar applications. These screws combine superior holding power with corrosion resistance, ensuring long-lasting performance in both indoor and outdoor environments. Main Features manufactured from high-quality stainless steel, these woodscrews are designed to withstand harsh environmental conditions, providing excellent resistance to rust and corrosion. The countersunk and panhead options offer versatile solutions, delivering a flush finish or added support where needed. Use Cases Perfect for wood decking, facade installations, and other structural wood-on-wood connections, these screws excel in applications where stability and aesthetics are equally important. Whether securing wooden planks for outdoor decking or fixing facade elements, their robust design ensures a firm and reliable hold. Technical Details Material: Premium stainless steel with enhanced corrosion resistance. Head Types: Countersunk head for a flush, smooth finish; panhead for greater surface coverage and holding power. Benefits: Optimal strength and durability for long-term use. Excellent resistance to rust, ideal for outdoor applications. Versatile head types to suit specific project requirements. Applications: Suitable for decking, facades, and general wood-on-wood construction in residential, commercial, and industrial settings. Compliance: Designed to meet construction standards, ensuring safety, reliability, and performance. This EPD covers stainless steel woodscrews manufactured at three sites: Hangzhou (China), Zhejiang (China), and Middelfart (Denmark). All screws share the same material composition and similar production processes. The results are based on averaged data from these sites, with a worst-case factory used as the reference to ensure a conservative and representative assessment of the product group's environmental impacts.

Further information can be found at:
https://www.itwbyg.dk/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	100%	China
Minerals	-	-
Fossil materials	-	-
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0,0027
Biogenic carbon content in packaging, kg C	0,027

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of stainless steel screws
Mass per declared unit	1 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = ND. Modules not relevant = MNR

MANUFACTURING AND PACKAGING (A1-A3)

The product stage includes the manufacturing of raw materials, packaging materials, and ancillary inputs used in production, as well as energy consumption at the factories and the handling and treatment of production waste.

The manufacturing process begins with stainless steel wire, which is processed through wire drawing, cold forming, thread rolling, and surface finishing to produce the final screw. No heat treatment is applied.

Packaging: Finished products are packaged using a mix of materials, primarily cardboard boxes, but also plastic buckets with metal handles and plastic bags, depending on the product type and delivery format. Most packaging takes place at the Chinese manufacturing sites, while a portion of the products is

packed in Middelfart, Denmark, before distribution to customers. Packaging ensures safe transport and minimizes product damage during handling.

Ancillary materials: Ancillary materials include water, lubricating oils, and replacement tools used for cooling, lubrication, and maintenance of forming and threading equipment. These inputs are consumed in small quantities relative to total production output but are included to ensure completeness of the life cycle model.

Energy use: Electricity consumption during forming, finishing, and packaging includes both grid electricity and on-site photovoltaic generation from factory-installed solar panels.
Production losses: Minor material losses occur during forming and threading. Generated steel scrap is collected and sent for recycling, while packaging residues and maintenance waste are handled by waste operators.

Waste management and transport: Waste from manufacturing is transported an average of 50 km by lorry (16–32 t, EURO 6) to external recycling or treatment facilities, modelled according to *Ecoinvent 3.10* transport assumptions.

TRANSPORT AND INSTALLATION (A4-A5)

A4 – Transport to construction site: Transportation impacts include direct fuel combustion emissions, upstream fuel production, and related infrastructure. Finished products are distributed to various locations across the Nordic countries, with average transport distances of **28.7 km/kg by sea** and **52.6 km/kg by truck**. A **50 % vehicle load factor** is assumed to reflect mixed shipments, consistent with *Ecoinvent 3.10* dataset **"Transport, freight, lorry 16–32 t, EURO6 (Europe)"**. Actual load factors may vary, but transportation emissions are considered a minor contribution to total impacts. Shipments are typically consolidated with other goods and share freight capacity rather than using dedicated transport, reducing emissions per unit. Empty return trips are not included, assuming the transport provider uses backhauls for other clients. Proper packaging ensures products arrive intact without losses.

A5 – Installation: Installation includes energy use, packaging waste treatment, and potential material losses.

- **Energy use:** 20.7 Wh/kg of product, modelled with *Ecoinvent 3.10* dataset **"Electricity, low voltage, Europe"**.
- **Material losses:** 0 % (negligible). Installation is assumed to use cordless, pneumatic, gas, or manual fastening methods.
- **Packaging waste:** Treatment follows *One Click LCA* datasets based on *Ecoinvent 3.10* and *EUROSTAT* data for EU-average scenarios:
  - **Plastic packaging:** *A5 x EoL Plastic packaging EU scenario (EI 3.10)*
  - **Steel packaging:** *A5 x EoL Steel packaging EU scenario (EI 3.10)*
  - **Cardboard packaging:** *A5 x EoL Cardboard packaging EU scenario (EI 3.10)*
  - **Wood packaging:** *A5 x EoL Wood packaging EU scenario (EI 3.10)*
    These datasets reflect typical EU recycling and incineration rates.
- **Transport of waste:** Average **50 km by lorry (16–32 t, EURO6)** to treatment facilities, modelled with *Ecoinvent 3.10*.

Overall, A5 includes electricity use during installation, packaging waste management, and waste transport.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

C1 – Deconstruction / Demolition: Deconstruction is assumed to consume **0.01 kWh/kg of product**, corresponding to *Ecoinvent 3.10* dataset **"Market for diesel, burned in building machine (Global)"**. It is assumed that **100 % of the waste** is collected and transported to the waste treatment facility.

C2 – Transport: End-of-life transport is modelled as **50 km average distance by lorry > 32 t, EURO 6 (Europe)** (*Ecoinvent 3.10*).

C3 – Waste Processing: Steel scrap is treated using *Ecoinvent 3.10* dataset **"Treatment of metal scrap, mixed, for recycling, unsorted, sorting"**, representing sorting and preparation of ferrous scrap for recycling. It is assumed that **85 % of the steel** is recycled and **15 %** is landfilled.

- **Recycling:** *Ecoinvent 3.10* dataset "Treatment of metal scrap, mixed, for recycling…"
- **Landfill:** *Ecoinvent 3.10* dataset "Treatment of scrap steel, inert material landfill"

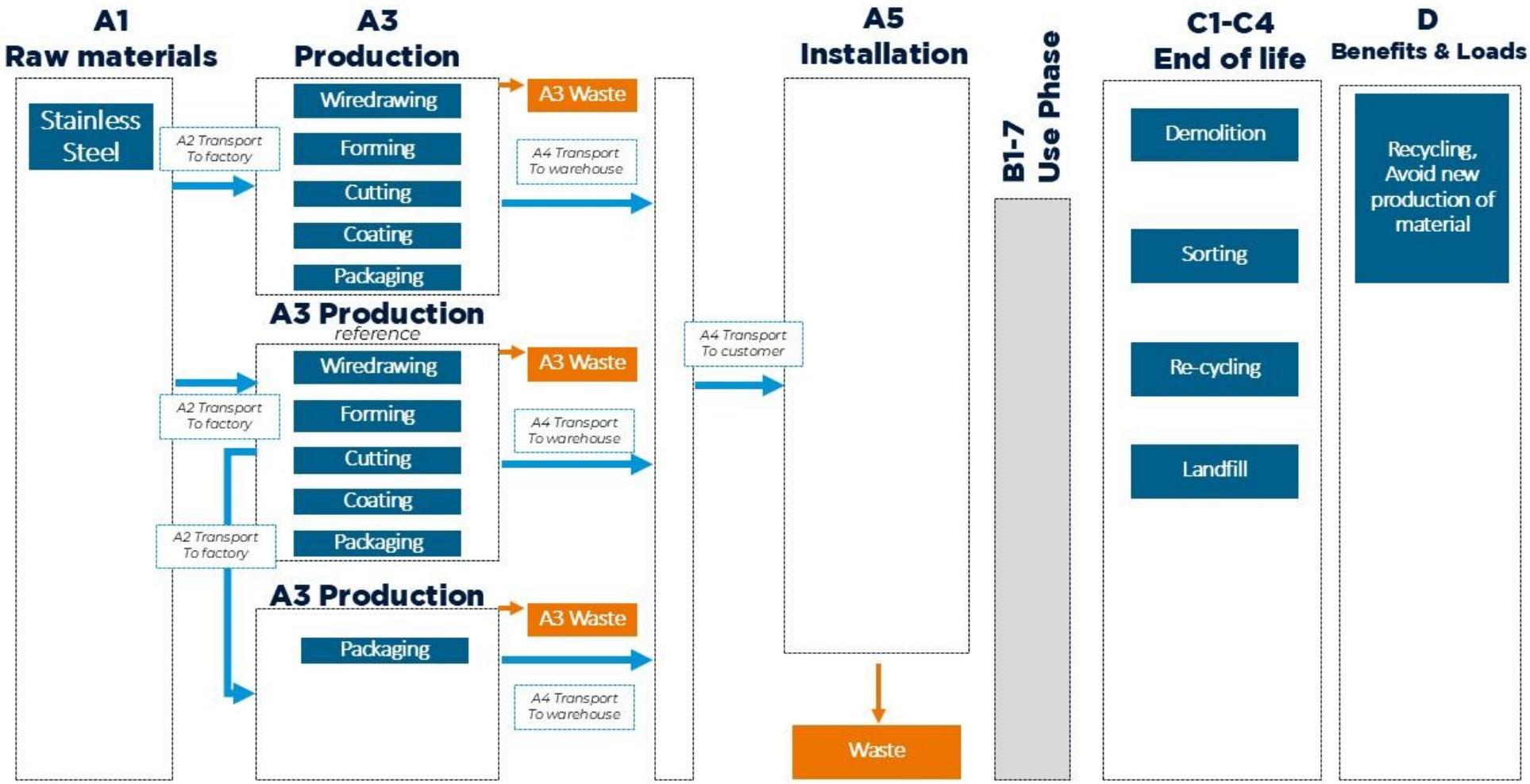
C4 – Disposal: The remaining 15 % of steel, coatings, and non-recyclable residues are assumed to go to inert landfill, based on *Ecoinvent 3.10*.

MODULE D – Reuse, Recovery, and Recycling Potential: End-of-life scenarios include the environmental benefits and burdens associated with resource recovery and substitution processes. The modelling follows *Ecoinvent 3.10* and *One Click LCA* EU-average scenarios for packaging waste treatment.

- **Steel (low-alloyed):** 79 % recycled / 21 % lost to processing and landfill. Benefits modelled using *Steel production, converter, low-alloyed (EI 3.10)* assuming 6 % recycled content in primary steel. Loads modelled using *Steel production, electric, low-alloyed (EI 3.10)*.
- **Stainless steel (18/8 chromium):** 79 % recycled / 21 % lost. Benefits modelled using *Steel production, chromium steel 18/8, hot rolled (EI 3.10)*.
- **Ferrous metal scrap:** 85 % recycled / 15 % landfilled, based on *Treatment of metal scrap, mixed for recycling* and *Treatment of scrap steel, inert material landfill (EI 3.10)*.
- **Cardboard packaging:** 83 % recycled / 17 % incinerated, EU average from *D Cardboard packaging EU scenario, One Click LCA – EI 3.10*.
- **Wood packaging (pallets):** Predominantly reused (multiple cycles); remaining fractions treated according to *D Wood packaging EU scenario, One Click LCA – EI 3.10* (≈ 35 % recycled, 60 % incinerated, 5 % landfilled).
- **Plastic packaging:** 42 % recycled / 56 % incinerated / 2 % landfilled, based on *D Plastic packaging EU scenario, One Click LCA – EI 3.10*.

The **system boundary** for Module D begins when sorted recyclable materials leave the waste-treatment process. Recycled steel is assumed to substitute the production of **primary low-alloyed and stainless steel**. **Credits for energy recovery** from incinerated packaging are included according to EU-average energy substitution. All burdens up to the point of recycling and waste treatment are included in Modules C1–C4; **avoided impacts** are reported as benefits in Module D.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.
The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Allocated by mass or volume
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple factories
Grouping method	Based on worst-case results
Variation in GWP-fossil for A1-A3, %	0 / -15%

This EPD covers a group of stainless steel wood screws used for fastening in general construction and woodworking applications. All products share the same raw materials, functions, and production processes, differing only in size and length within the same product family. The screws are manufactured at two production sites in China (Hangzhou and Zhejiang provinces). Both factories perform wire drawing, cold forming, thread rolling, and surface finishing using stainless steel wire of the same alloy types. No heat treatment is applied. A portion of the products is packed directly at the Chinese sites prior to export, while others are supplied in bulk and packaged in Middelfart, Denmark. The Danish site performs packaging only and has no manufacturing operations. The EPD represents the product group based on the worst-case result per kilogram of screw, ensuring that all included products have equal or lower impacts for the declared modules.

AVERAGES AND VARIABILITY

The averaging applied in this EPD complies with the requirements for allowed averaging and aggregation set out in the General Programme Instructions (GPI) for EPDs. Three sites are included in this EPD: Hangzhou, China; Zhejiang, China; and Middelfart, Denmark. The Danish site is responsible for packaging operations only and represents a minor share of total impacts. Differences between sites, including the Danish electricity mix, are captured in the **variation in GWP-fossil for A1–A3 (0 / –12 %)**. The declared results are based on the **worst-case Chinese manufacturing site**, ensuring conservative representativeness for the product group.

- **Averaging approach:** Results are based on the worst-case scenario among the included manufacturing sites and products. All input data, processes, and datasets are harmonised and representative of current production.
- **Restrictions to use:** No restrictions apply, as the declared results represent or exceed the environmental impacts of all products included in the group.
- **Representativeness:** The declared results are representative of stainless steel wood screws manufactured at the included Chinese sites and packaged either in China or Denmark.
- **Geographical coverage:** The EPD is representative for products sold in **Denmark, Norway, Sweden, Finland, Germany, Poland, and France**. It should not be used to represent products manufactured or distributed outside this defined region or supply chain.
- **Variation range:** The variation in GWP-fossil for A1–A3 between the included sites is **0 % / –12 %**, which is within the acceptable range for grouped EPDs.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

BIBLIOGRAPHY AND REFERENCES USED IN MODELLING

Standards and Methodological References

•EN 15804:2012 + A2:2019/AC:2021 – *Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products*

• ISO 14025:2010 – *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*

• ISO 14040:2006 and ISO 14044:2006 – *Life cycle assessment – Principles, framework, requirements, and guidelines*

• EPD Hub General Programme Instructions (GPI), current version

Industry and Statistical Data Sources

• World Steel Association (2020). *Life Cycle Inventory Study for Steel Products* – Recycling and End-of-Life data.

• EUROSTAT (2021). *Packaging Waste Statistics* – EU-average recycling and incineration rates.

• PEFCR Thermal Insulation Products (2018) – Reference for conservative End-of-Life modelling assumptions.

Other References and Site Data

• Manufacturer-specific production, energy, and waste data for 01.01.2023 – 31.12.2023..

• Supplier documentation on renewable electricity generation (on-site photovoltaic systems and power purchase agreements).

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,41E+00	2,40E+00	1,66E+00	9,46E+00	3,14E-03	1,33E-01	ND	ND	ND	ND	ND	ND	ND	3,61E-03	5,17E-03	1,73E-02	9,37E-04	-3,80E+00
GWP – fossil	kg CO_2e	5,40E+00	2,40E+00	1,76E+00	9,55E+00	3,13E-03	3,21E-02	ND	ND	ND	ND	ND	ND	ND	3,60E-03	5,17E-03	1,74E-02	9,36E-04	-3,78E+00
GWP – biogenic	kg CO_2e	6,77E-03	5,43E-04	-1,00E-01	-9,29E-02	6,77E-07	1,01E-01	ND	ND	ND	ND	ND	ND	ND	3,68E-07	1,13E-06	-1,77E-04	-2,98E-07	-1,87E-02
GWP – LULUC	kg CO_2e	5,42E-03	1,07E-03	2,29E-03	8,78E-03	1,24E-06	3,13E-05	ND	ND	ND	ND	ND	ND	ND	3,69E-07	2,01E-06	1,98E-05	5,35E-07	-3,65E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}e$	3,71E-08	3,54E-08	1,09E-08	8,34E-08	6,46E-11	2,08E-10	ND	ND	ND	ND	ND	ND	ND	5,52E-11	1,08E-10	1,01E-10	2,71E-11	-2,61E-08
Acidification potential	mol H^+e	2,95E-02	8,18E-03	9,08E-03	4,67E-02	1,06E-05	7,00E-05	ND	ND	ND	ND	ND	ND	ND	3,25E-05	1,22E-05	1,12E-04	6,64E-06	-2,11E-02
EP-freshwater[2)]	kg Pe	1,72E-03	1,87E-04	3,91E-04	2,29E-03	2,14E-07	9,50E-06	ND	ND	ND	ND	ND	ND	ND	1,04E-07	3,61E-07	7,58E-06	7,70E-08	-1,13E-03
EP-marine	kg Ne	5,34E-03	2,69E-03	2,08E-03	1,01E-02	2,72E-06	2,68E-05	ND	ND	ND	ND	ND	ND	ND	1,51E-05	3,20E-06	5,34E-05	2,53E-06	-3,79E-03
EP-terrestrial	mol Ne	5,69E-02	2,92E-02	2,16E-02	1,08E-01	2,97E-05	1,29E-04	ND	ND	ND	ND	ND	ND	ND	1,65E-04	3,46E-05	3,29E-04	2,76E-05	-4,04E-02
POCP ("smog")[3)]	kg NMVOCe	1,81E-02	1,21E-02	6,41E-03	3,65E-02	1,50E-05	4,32E-05	ND	ND	ND	ND	ND	ND	ND	4,93E-05	2,12E-05	1,08E-04	9,90E-06	-1,30E-02
ADP-minerals & metals[4)]	kg Sbe	1,29E-04	6,69E-06	8,30E-06	1,44E-04	8,74E-09	1,47E-07	ND	ND	ND	ND	ND	ND	ND	1,29E-09	1,48E-08	3,32E-07	1,49E-09	-9,82E-05
ADP-fossil resources	MJ	5,94E+01	3,48E+01	2,03E+01	1,14E+02	4,67E-02	2,51E-01	ND	ND	ND	ND	ND	ND	ND	4,72E-02	7,77E-02	1,44E-01	2,30E-02	-4,11E+01
Water use[5)]	m^3e depr.	1,59E+00	1,72E-01	3,46E-01	2,11E+00	2,36E-04	7,20E-03	ND	ND	ND	ND	ND	ND	ND	1,18E-04	3,98E-04	3,12E-03	6,63E-05	-1,09E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,42E-07	2,40E-07	1,40E-07	8,22E-07	2,98E-10	3,86E-10	ND	ND	ND	ND	ND	ND	ND	9,25E-10	5,04E-10	1,17E-08	1,51E-10	-3,01E-07
Ionizing radiation[6]	kBq U235e	3,12E-01	3,03E-02	1,53E-01	4,96E-01	5,52E-05	6,27E-03	ND	ND	ND	ND	ND	ND	ND	2,09E-05	9,36E-05	7,73E-04	1,44E-05	-1,61E-01
Ecotoxicity (freshwater)	CTUe	1,57E+01	4,92E+00	5,87E+00	2,64E+01	5,44E-03	1,12E-01	ND	ND	ND	ND	ND	ND	ND	2,60E-03	9,15E-03	5,41E-01	1,93E-03	-1,07E+01
Human toxicity, cancer	CTUh	7,06E-09	3,96E-10	5,51E-10	8,00E-09	5,27E-13	5,92E-12	ND	ND	ND	ND	ND	ND	ND	3,71E-13	8,61E-13	1,03E-10	1,73E-13	-3,40E-09
Human tox. non-cancer	CTUh	1,06E-07	2,25E-08	1,61E-08	1,44E-07	2,96E-11	2,93E-10	ND	ND	ND	ND	ND	ND	ND	5,87E-12	5,02E-11	9,22E-10	3,97E-12	-7,53E-08
SQP[7]	-	2,67E+01	3,50E+01	1,05E+01	7,22E+01	4,57E-02	7,57E-02	ND	ND	ND	ND	ND	ND	ND	3,30E-03	7,82E-02	7,31E-01	4,52E-02	-1,92E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	1,37E+01	4,77E-01	2,24E+00	1,65E+01	7,48E-04	-9,35E-01	ND	ND	ND	ND	ND	ND	ND	2,99E-04	1,26E-03	2,03E-02	2,22E-04	-9,64E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	8,03E-01	8,03E-01	0,00E+00	-8,03E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,67E-01
Total use of renew. PER	MJ	1,37E+01	4,77E-01	3,04E+00	1,73E+01	7,48E-04	-1,74E+00	ND	ND	ND	ND	ND	ND	ND	2,99E-04	1,26E-03	2,03E-02	2,22E-04	-9,48E+00
Non-re. PER as energy	MJ	5,94E+01	3,48E+01	1,95E+01	1,14E+02	4,67E-02	-4,05E-01	ND	ND	ND	ND	ND	ND	ND	4,72E-02	7,77E-02	1,44E-01	2,30E-02	-4,11E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	8,93E-03	8,93E-03	0,00E+00	-8,93E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,91E-01
Total use of non-re. PER	MJ	5,94E+01	3,48E+01	1,96E+01	1,14E+02	4,67E-02	-4,14E-01	ND	ND	ND	ND	ND	ND	ND	4,72E-02	7,77E-02	1,44E-01	2,30E-02	-4,09E+01
Secondary materials	kg	5,88E-01	1,48E-02	6,67E-02	6,70E-01	2,03E-05	9,58E-05	ND	ND	ND	ND	ND	ND	ND	1,96E-05	3,36E-05	2,59E-04	5,78E-06	4,48E-01
Renew. secondary fuels	MJ	1,46E-03	1,88E-04	9,95E-03	1,16E-02	2,49E-07	7,00E-07	ND	ND	ND	ND	ND	ND	ND	5,12E-08	4,24E-07	2,05E-05	1,20E-07	-1,03E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,95E-02	5,14E-03	7,72E-03	6,23E-02	6,78E-06	1,67E-04	ND	ND	ND	ND	ND	ND	ND	3,12E-06	1,15E-05	7,34E-05	2,39E-05	-3,31E-02

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	5,20E+00	5,90E-02	2,23E-01	5,49E+00	6,74E-05	1,13E-03	ND	ND	ND	ND	ND	ND	ND	5,25E-05	1,12E-04	1,47E-03	2,54E-05	-3,69E+00
Non-hazardous waste	kg	1,10E+01	1,09E+00	3,42E+00	1,55E+01	1,34E-03	1,16E-01	ND	ND	ND	ND	ND	ND	ND	7,15E-04	2,25E-03	5,82E-02	5,80E-04	-7,78E+00
Radioactive waste	kg	7,77E-05	7,42E-06	3,75E-05	1,23E-04	1,37E-08	1,61E-06	ND	ND	ND	ND	ND	ND	ND	5,12E-09	2,32E-08	1,89E-07	3,52E-09	-3,97E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,71E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	8,50E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,27E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,31E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy –	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,37E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	5,37E+00	2,39E+00	1,75E+00	9,51E+00	3,11E-03	3,81E-02	ND	ND	ND	ND	ND	ND	ND	3,59E-03	5,14E-03	4,33E-02	9,28E-04	-3,76E+00
Ozone depletion Pot.	kg $CFC_{-11}e$	3,12E-08	2,83E-08	1,07E-08	7,02E-08	5,14E-11	1,74E-10	ND	ND	ND	ND	ND	ND	ND	4,37E-11	8,58E-11	8,49E-11	2,15E-11	-2,20E-08
Acidification	kg SO_2e	2,45E-02	6,24E-03	7,31E-03	3,80E-02	8,39E-06	5,83E-05	ND	ND	ND	ND	ND	ND	ND	2,29E-05	9,68E-06	8,81E-05	4,91E-06	-1,76E-02
Eutrophication	kg PO_4^3e	3,36E-03	1,52E-03	2,49E-03	7,37E-03	1,71E-06	1,73E-05	ND	ND	ND	ND	ND	ND	ND	5,34E-06	2,42E-06	4,92E-05	1,56E-06	-2,42E-03
POCP (“smog”)	kg C_2H_4e	1,50E-03	5,57E-04	5,03E-04	2,56E-03	7,12E-07	4,95E-06	ND	ND	ND	ND	ND	ND	ND	1,71E-06	9,87E-07	2,24E-05	4,65E-07	-1,07E-03
ADP-elements	kg Sbe	1,29E-04	6,52E-06	8,24E-06	1,44E-04	8,54E-09	1,47E-07	ND	ND	ND	ND	ND	ND	ND	1,26E-09	1,44E-08	3,30E-07	1,46E-09	-9,80E-05
ADP-fossil	MJ	5,45E+01	3,43E+01	1,76E+01	1,06E+02	4,58E-02	1,40E-01	ND	ND	ND	ND	ND	ND	ND	4,68E-02	7,61E-02	1,32E-01	2,28E-02	-3,87E+01

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	5,40E+00	2,40E+00	1,76E+00	9,56E+00	3,13E-03	3,21E-02	ND	ND	ND	ND	ND	ND	ND	3,61E-03	5,17E-03	1,75E-02	9,37E-04	-3,78E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION
DATA SOURCES

Manufacturing energy scenario documentation

1. Market for diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO2e/MJ
2. Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted, zhejiang, Ecoinvent, 0.0845 kgCO2e/kWh
3. Market for electricity, low voltage, eastChinaGrid, Ecoinvent, 0.88 kgCO2e/kWh

Electricity production, wind, 1–3 MW turbine, offshore, Ecoinvent 3.10.1 – used for variation analysis representing Danish packaging site. Heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical (heat, district or industrial, natural gas), Ecoinvent 3.10.1 – used for variation analysis representing Danish packaging site. Note: The Danish site in Middelfart performs packaging only. The above Danish energy datasets are included in the variation analysis (A1–A3: 0 / -15 %) but not in the declared worst-case scenario, which is based on Chinese production.

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry >32 metric ton, EURO6, 27.02 km

2. Transport, freight, sea, container ship, 10.58 km

Transport scenario documentation A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50
Bulk density of transported products	0,00E+00
Volume capacity utilization factor	1

Installation scenario documentation - A5 (Installation resources)

1. Market group for electricity, low voltage, Ecoinvent, 0.029 kWh

Installation scenario documentation - A5 (Installation waste)

1. Treatment of waste paperboard, unsorted, sorting, Ecoinvent, Materials for recycling, 0.049 kg
2. Treatment of waste packaging paper, municipal incineration, Ecoinvent, 0.0047 kg
3. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 0.0053 kg
4. Exported Energy: Electricity, Ecoinvent, 0.0094 MJ
5. Exported Energy: Electricity, Ecoinvent, 0.041 MJ
6. Exported Energy: Electricity, Ecoinvent, 0.0027 MJ
7. Exported Energy: Thermal, Ecoinvent, 0.014 MJ
8. Exported Energy: Thermal, Ecoinvent, 0.056 MJ
9. Exported Energy: Thermal, Ecoinvent, 0.0037 MJ
10. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.0065 kg
11. Treatment of waste polyethylene, municipal incineration, Ecoinvent, 0.006 kg
12. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.0037 kg
13. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 0.0013 kg
14. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, 0.0012 kg
15. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 0.0015 kg
16. Treatment of metal scrap, mixed, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 2.7E-4 kg
17. Treatment of scrap steel, inert material landfill, Ecoinvent, 6.3E-5 kg

End of Life scenario documentation - C1-C4 (Data source)

1. Treatment of metal scrap, mixed, for recycling, unsorted, sorting, Ecoinvent, 0.85 kg
2. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.15 kg
3. Market for diesel, burned in building machine, Ecoinvent, 0.01 kWh

Scenario information	Value
Scenario assumptions e.g. transportation	

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
18.12.2025