# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

## Unitec Bolted Coupler

Dextra Manufacturing Co., Ltd.

**EPD HUB, HUB-5884**

Published on 10.04.2026, last updated on 10.04.2026, valid until 09.04.2031

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

Dextra

# GENERAL INFORMATION

## MANUFACTURER

| | |
|---|---|
| Manufacturer | Dextra Manufacturing CO., Ltd. |
| Address | 191 Chalermprakiet Rama 9 Alley, 48 Alley, Dokmai Sub-District, Prawet District, Bangkok |
| Contact details | thailand@dextragroup.com |
| Website | www.dextragroup.com |

## 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 | Donthicha Chuepoodee |
| EPD verification | Independent verification of this EPD and data, according to ISO 14025:<br>o Internal verification þ External verification |
| EPD verifier | Yazan Badour as an authorized verifier for EPD Hub |

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 | Unitec Bolted Coupler |
| Additional labels | - |
| Product reference | - |
| Place(s) of raw material origin | China |
| Place of production | Thailand |
| Place(s) of installation and use | Worldwide |
| Period for data | September 2024 - August 2025 |
| Averaging in EPD | No averaging |
| Variation in GWP-fossil for A1-A3 (%) | - |
| GTIN (Global Trade Item Number) | - |
| NOBB (Norwegian Building Product Database) | - |
| A1-A3 Specific data (%) | 9,11 |

## ENVIRONMENTAL DATA SUMMARY

| | |
|---|---|
| **Declared unit** | 1 ton |
| **Declared unit mass** | 1,000 kg |
| **Mass of packaging** | 167.6 kg |
| **GWP-fossil, A1-A3 ($kgCO_2e$)** | 4,130 |
| **GWP-total, A1-A3 ($kgCO_2e$)** | 3,910 |
| **Secondary material, inputs (%)** | 37.7 |
| **Secondary material, outputs (%)** | 85 |
| **Total energy use, A1-A3 (kWh)** | 15,100 |
| **Net freshwater use, A1-A3 ($m^3$)** | 27.2 |

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

Dextra specializes in the design, manufacturing, and distribution of engineered construction solutions.
Dextra business lines include:

- Products for the reinforcement concrete, for both civil and nuclear applications,
- Engineered bar systems (tie bars, tension rods, post-tensioning bars)
- Rock and soil anchors used in various applications such as geotechnical works.

Overall, Dextra provides a complete solution, encompassing engineering, manufacturing, and product delivery, including specialized equipment like bar-end preparation machines.

## PRODUCT DESCRIPTION

Unitec is a bolted splicing system designed for the connection of two rebars which haven't been previously prepared (no thread). Each Unitec coupler features a long hollow body which will bond with rebar. Several screws will lock both bar ends and complete the connection. Unitec is designed to be operated with a standard impact/pneumatic wrench.

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass % | Material origin |
|---|---|---|
| Metals | 100% | China, Thailand |
| 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 | 39.55 |
| Biogenic carbon content in packaging, kg C | 98.45 |

## FUNCTIONAL UNIT AND SERVICE LIFE

| | |
|---|---|
| Declared unit | 1 ton |
| Mass per declared unit | 1000 kg |
| Functional unit | N/A |
| Reference service life | N/A |

## 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 | MND | MND | MND | MND | MND | MND | MND | 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 = MND. Modules not relevant = MNR*

## MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Unitec consists of several steel components such as tubes, studs, screws and pins. The raw materials are produced in China and delivered to the manufacturers site in Thailand, where they are cut and machined to form the final shapes and sizes. The manufacturing process requires electricity to power the production equipment. The product is then packed and placed in wooden boxes equipped with steel belt. During the manufacturing processes (cutting, machining, and welding) approximately 7% of the steel materials are lost. Additionally, there is also waste from ancillary materials, including its packaging such as oil drums and buckets. All steel waste is transferred to a recycling company, and hazardous liquid waste from ancillary materials are sent for incineration for proper disposal.

## TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The average distance of transportation from the production plant to the customers' sites is calculated to be 12,065.33 km and the transportation method is assumed to be lorry. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study, implemented through an average load factor in the Ecoinvent transport datapoints. Additionally, transportation does not result in losses as the product is properly packaged.

At the project site, a manual wrench is assumed to be the equipment used for the installation of the product. The installation time for one assembly is estimated to be 8 hours.

Environmental impacts stemming from the installation of products into the building include the generation of waste packaging materials (A5) and the release of biogenic carbon dioxide from wooden pallets and boxes.

The waste from packaging materials consists of plastic, steel, and wooden waste. Treatment of plastic waste at the project site is assumed to be 50% landfill, 19% recycling, 9% incineration, and 22% mismanagement, according to OECD guidelines 2022. For steel waste, it is assumed to be 85% recycling and 15% landfill, as per World Steel Association LCI 2021. Regarding wooden waste, 15% is assumed

for recycling, 85% for landfill, based on Wood Recycling Facts and Statistics 2024 by Business Waste. The transportation distances to the waste treatment plant are assumed to be 25 km for mismanagement, 50 km for landfill, 100 km for incineration, and 150 km for recycling plants.

## PRODUCT USE AND MAINTENANCE (B1-B7)

The use phase is not included in the assessment as it is not relevant for the product. Air, soil, and water impacts during the use phase have not been studied

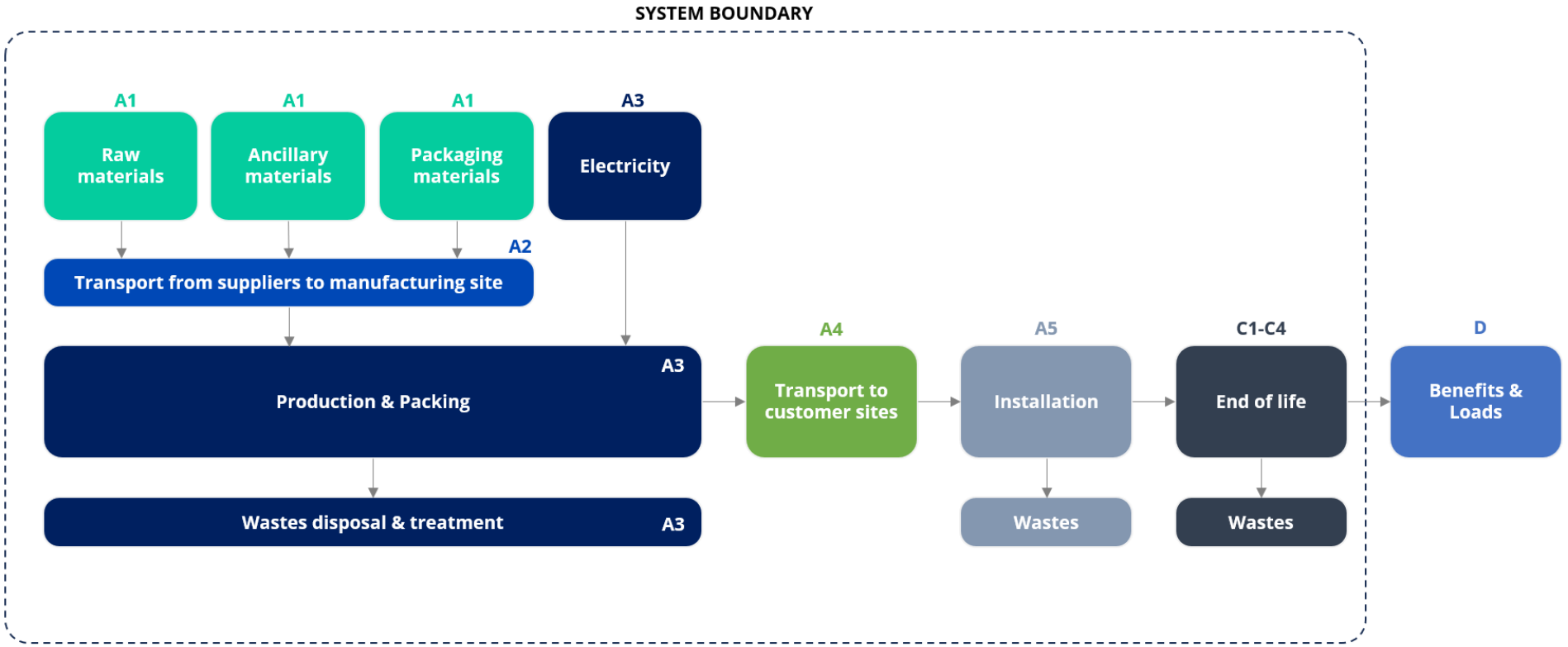
## PRODUCT END OF LIFE (C1-C4, D)

For the end-of-life stage, no dedicated energy is required for dismantling, as the product is removed as part of the overall building demolition process (Module C1).

The disassembly of the product is assumed to be conducted using a manual wrench over a period of 8 hours. It is assumed that different waste materials will be collected separately and transported to a waste treatment facility. Treatment of steel waste is assumed to undergo 85% recycling and 15% landfill, as per Life cycle inventory (LCI) study 2021. Transportation distances to waste treatment plants are assumed to be 50 km for landfill, 150 km for recycling plants, with transportation conducted by lorry (C2). Module C3 encompasses energy and resource inputs for sorting and treating materials for recycling, while landfilled materials are addressed in Module C4.

The product's material recovery potential, as well as that of its packaging, contributes to the avoidance of virgin material production. Moreover, energy recovered from incineration substitutes electricity and heat from primary sources. Module D encompasses the benefits and burdens from incineration and recycling.

# 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 infra-structure, 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 | No allocation |
| 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 | No averaging |
| Grouping method | Not applicable |
| Variation in GWP-fossil for A1-A3, % | - % |

This EPD is product and factory specific.

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD System Verification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

# 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 $CO_2$e | 3,56E+03 | 1,31E+02 | 2,25E+02 | 3,91E+03 | 1,27E+02 | 3,66E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,33E+01 | 2,31E+01 | 9,39E-01 | -5,65E+02 |
| GWP – fossil | kg $CO_2$e | 3,41E+03 | 1,31E+02 | 5,85E+02 | 4,13E+03 | 1,27E+02 | 4,86E+00 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,33E+01 | 2,31E+01 | 9,38E-01 | -5,65E+02 |
| GWP – biogenic | kg $CO_2$e | 1,45E+02 | 2,62E-02 | -3,61E+02 | -2,16E+02 | 1,99E-02 | 3,61E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,46E-03 | -6,90E-02 | 4,21E-04 | 0,00E+00 |
| GWP – LULUC | kg $CO_2$e | 2,51E+00 | 6,36E-02 | 7,36E-01 | 3,31E+00 | 6,82E-02 | 5,31E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,43E-02 | 2,72E-02 | 5,38E-04 | 1,08E-02 |
| Ozone depletion pot. | kg CFC-$_{11}$e | 2,40E-05 | 1,85E-06 | 2,53E-05 | 5,12E-05 | 1,82E-06 | 8,30E-08 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,53E-07 | 2,48E-07 | 2,61E-08 | -1,20E-06 |
| Acidification potential | mol $H^+$e | 1,50E+01 | 1,81E+00 | 2,67E+00 | 1,94E+01 | 3,64E+00 | 2,38E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,08E-01 | 2,47E-01 | 6,57E-03 | -2,31E+00 |
| EP-freshwater[2)] | kg Pe | 1,72E+00 | 7,99E-03 | 1,07E-01 | 1,83E+00 | 4,11E-03 | 1,63E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,57E-03 | 1,25E-02 | 8,21E-05 | -4,84E-01 |
| EP-marine | kg Ne | 3,33E+00 | 4,71E-01 | 7,88E-01 | 4,59E+00 | 9,07E-01 | 5,60E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,43E-02 | 5,49E-02 | 2,52E-03 | -3,29E-01 |
| EP-terrestrial | mol Ne | 3,34E+01 | 5,21E+00 | 8,62E+00 | 4,72E+01 | 1,01E+01 | 9,01E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,73E-01 | 6,19E-01 | 2,76E-02 | -5,71E+00 |
| POCP ("smog")[3)] | kg NMVOCe | 1,12E+01 | 1,53E+00 | 2,53E+00 | 1,53E+01 | 2,73E+00 | 3,44E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,48E-01 | 1,82E-01 | 9,95E-03 | -1,68E+00 |
| ADP-minerals & metals[4)] | kg Sbe | 2,23E-02 | 3,29E-04 | 1,02E-03 | 2,37E-02 | 1,30E-04 | 1,44E-05 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,08E-04 | 1,36E-03 | 1,40E-06 | -1,04E-02 |
| ADP-fossil resources | MJ | 3,74E+04 | 1,74E+03 | 7,16E+03 | 4,63E+04 | 1,55E+03 | 7,76E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,59E+02 | 2,73E+02 | 2,30E+01 | -5,05E+03 |
| Water use[5)] | $m^3$e depr. | 1,35E+03 | 7,00E+00 | 2,83E+03 | 4,19E+03 | 4,41E+00 | 6,40E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,04E+00 | 4,31E+00 | 1,01E+00 | 3,23E+01 |

*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 | 3,44E-04 | 7,85E-06 | 4,09E-05 | 3,93E-04 | 3,89E-06 | 4,94E-07 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,31E-06 | 3,45E-06 | 1,51E-07 | -4,73E-05 |
| Ionizing radiation[6)] | kBq U235e | 1,39E+02 | 1,24E+00 | 1,80E+01 | 1,58E+02 | 7,14E-01 | 1,31E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,77E-01 | 9,79E-01 | 1,38E-02 | 4,35E+00 |
| Ecotoxicity (freshwater) | CTUe | 2,51E+05 | 2,21E+02 | 2,13E+03 | 2,53E+05 | 1,18E+02 | 6,90E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,93E+01 | 1,58E+02 | 1,54E+01 | 5,03E+01 |
| Human toxicity, cancer | CTUh | 3,85E-06 | 2,90E-08 | 1,34E-06 | 5,22E-06 | 2,67E-08 | 1,23E-09 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 5,32E-09 | 1,85E-08 | 1,70E-10 | 2,80E-07 |
| Human tox. non-cancer | CTUh | 4,87E-05 | 8,41E-07 | 3,62E-06 | 5,32E-05 | 3,94E-07 | 6,55E-08 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,70E-07 | 1,18E-06 | 3,83E-09 | 4,58E-05 |
| SQP[7)] | - | 1,61E+04 | 6,98E+02 | 3,95E+04 | 5,62E+04 | 1,42E+02 | 1,07E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,37E+02 | 5,16E+02 | 4,52E+01 | -2,66E+03 |

*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 | 3,91E+03 | 2,08E+01 | 5,88E+03 | 9,81E+03 | 1,21E+01 | -2,63E+03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,62E+00 | 4,24E+01 | 2,15E-01 | -8,92E+02 |
| Renew. PER as material | MJ | 0,00E+00 | 0,00E+00 | 2,95E+03 | 2,95E+03 | 0,00E+00 | -2,95E+03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of renew. PER | MJ | 3,91E+03 | 2,08E+01 | 8,83E+03 | 1,28E+04 | 1,21E+01 | -5,59E+03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 6,62E+00 | 4,24E+01 | 2,15E-01 | -8,92E+02 |
| Non-re. PER as energy | MJ | 3,74E+04 | 1,74E+03 | 5,37E+03 | 4,45E+04 | 1,55E+03 | 6,12E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,59E+02 | 2,73E+02 | 2,30E+01 | -5,05E+03 |
| Non-re. PER as material | MJ | 0,00E+00 | 0,00E+00 | 7,22E+02 | 7,22E+02 | 0,00E+00 | -7,22E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of non-re. PER | MJ | 3,74E+04 | 1,74E+03 | 6,09E+03 | 4,53E+04 | 1,55E+03 | -6,60E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,59E+02 | 2,73E+02 | 2,30E+01 | -5,05E+03 |
| Secondary materials | kg | 3,77E+02 | 8,05E-01 | 1,35E+00 | 3,80E+02 | 7,40E-01 | 3,40E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,96E-01 | 3,16E-01 | 5,72E-03 | 4,05E+02 |
| Renew. secondary fuels | MJ | 1,24E+00 | 6,86E-03 | 4,05E-02 | 1,29E+00 | 1,81E-03 | 5,31E-04 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 2,35E-03 | 1,43E-02 | 1,19E-04 | -8,16E-02 |
| 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 | $m^3$ | 2,01E+01 | 1,92E-01 | 6,95E+00 | 2,72E+01 | 1,08E-01 | -5,10E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 5,82E-02 | 1,19E-01 | 2,38E-02 | -2,07E+01 |

*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 | 1,05E+03 | 2,81E+00 | 2,29E+01 | 1,08E+03 | 2,08E+00 | 2,09E-01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,87E-01 | 2,13E+00 | 2,62E-02 | -3,57E+02 |
| Non-hazardous waste | kg | 1,80E+04 | 4,86E+01 | 4,34E+02 | 1,85E+04 | 2,84E+01 | 7,04E+02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,52E+01 | 5,98E+01 | 6,05E-01 | 7,53E+03 |
| Radioactive waste | kg | 3,46E-02 | 3,04E-04 | 4,08E-03 | 3,89E-02 | 1,74E-04 | 3,24E-05 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 9,24E-05 | 2,41E-04 | 3,35E-06 | 7,79E-04 |

## 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 | 6,66E+01 | 6,66E+01 | 0,00E+00 | 2,60E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 0,00E+00 | 8,50E+02 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec | kg | 0,00E+00 | 0,00E+00 | 2,79E+01 | 2,79E+01 | 0,00E+00 | 6,92E-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 | 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 – Electricity | 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 |
| Exported energy – | 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 |

## 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 $CO_2$e | 3,51E+03 | 1,30E+02 | 5,84E+02 | 4,22E+03 | 1,26E+02 | 1,29E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,31E+01 | 2,30E+01 | 9,30E-01 | -5,62E+02 |
| Ozone depletion Pot. | kg $CFC_{-11}$e | 2,16E-05 | 1,47E-06 | 2,26E-05 | 4,57E-05 | 1,44E-06 | 6,66E-08 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,62E-07 | 2,06E-07 | 2,08E-08 | -1,32E-06 |
| Acidification | kg $SO_2$e | 1,22E+01 | 1,44E+00 | 2,07E+00 | 1,57E+01 | 2,91E+00 | 1,80E-02 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 8,30E-02 | 1,99E-01 | 4,86E-03 | -1,85E+00 |
| Eutrophication | kg $PO_4^3$e | 2,88E+00 | 1,86E-01 | 8,80E+00 | 1,19E+01 | 3,20E-01 | 8,74E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,93E-02 | 2,83E-02 | 1,61E-03 | 2,68E-01 |
| POCP (“smog”) | kg $C_2H_4$e | 1,32E+00 | 8,01E-02 | 1,99E-01 | 1,60E+00 | 1,44E-01 | 3,21E-03 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 7,33E-03 | 1,18E-02 | 4,62E-04 | -3,86E-01 |
| ADP-elements | kg Sbe | 2,20E-02 | 3,23E-04 | 1,01E-03 | 2,33E-02 | 1,29E-04 | 1,40E-05 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 1,05E-04 | 1,36E-03 | 1,37E-06 | -1,04E-02 |

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADP-fossil | MJ | 3,52E+04 | 1,72E+03 | 6,92E+03 | 4,38E+04 | 1,54E+03 | 7,55E+01 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 4,53E+02 | 2,57E+02 | 2,28E+01 | -5,13E+03 |

## 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 $CO_2e$ | 3,41E+03 | 1,31E+02 | 5,86E+02 | 4,13E+03 | 1,27E+02 | 4,86E+00 | ND | ND | ND | ND | ND | ND | ND | 0,00E+00 | 3,33E+01 | 2,31E+01 | 9,39E-01 | -5,65E+02 |

*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. Electricity, Thailand, 2023, Thailand, One Click LCA, 0.63 kgCO2e/kWh

**Transport scenario documentation - A4 (Transport resources)**

1. Transport, freight, lorry 16-32 metric ton, EURO5, 15.9 km
2. Transport, freight, sea, container ship, 12,065.33 km

**Installation scenario documentation - A5 (Installation waste)**

1. Treatment of waste polyvinylchloride, unsanitary landfill, dry infiltration class (100 mm), Ecoinvent, 0.17 kg
2. Treatment of waste polyvinylchloride, municipal incineration, Ecoinvent, Materials for energy recovery, 0.07 kg
3. Treatment of waste polyvinylchloride, sanitary landfill, Ecoinvent, 0.39 kg
4. Treatment of waste polyvinylchloride, recycling, Ecoinvent, Materials for recycling, 0.15 kg
5. Treatment of waste steel, inert material landfill, Ecoinvent, 0.17 kg
6. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.98 kg
7. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 140.83 kg
8. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 24.85 kg

**EOL scenario documentation - C1-C4 (Data source)**

1. Treatment of waste steel, inert material landfill, Ecoinvent, 150.00 kg
2. Sorting and pressing of iron scrap, Ecoinvent, 850.00 kg

| Scenario information | Value |
|---|---|
| Scenario assumptions e.g. transportation | 25 km for mismanagement, 50 km for landfill, 100 km for incineration, and 150 km for recycling plants. |

# 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

Yazan Badour as an authorized verifier for EPD Hub Limited 10.04.2026

VERIFIED ISO 14025