ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

StiFlex Steel Stiffener System

DYNTEK PTE LTD

EPD HUB, HUB-3534

Published on 29.06.2025, last updated on 09.07.2025, valid until 28.06.2030

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	DYNTEK PTE LTD
Address	100 Pasir Panjang, Singapore 118518
Contact details	mail.sg@stiflex.com
Website	https://stiflex.com/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025 /ISO 21930
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	Yap Ee Gin, Climate Asia Pte Ltd
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Sarah Curpen, 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	StiFlex Steel Stiffener System
Additional labels	StiFlex Stiffener/lintel
Product reference	StiFlex Steel Stiffener System
Place(s) of raw material origin	Malaysia
Place of production	Malaysia
Place(s) of installation and use	Singapore
Period for data	JAN 2024 - DEC 2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	0
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	4,38

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg StiFlex Stiffener Modular System
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	2,49E+00
GWP-total, A1-A3 ($kgCO_2e$)	2,48E+00
Secondary material, inputs (%)	9,11
Secondary material, outputs (%)	99
Total energy use, A1-A3 (kWh)	14,7
Net freshwater use, A1-A3 (m^3)	0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Established in Singapore since 1998, Dyntek Pte Ltd is a leading designer and manufacturer of StiFlex™ steel stiffeners, lintels and plaster lath for wall constructions. With a strong reputation built on continued innovation and technical excellence, we are committed in delivering superior quality products.

StiFlex™ products are manufactured and supplied just-in-time, under tight quality-controlled production management that provides our clientele the peace of mind and confidence needed in every project. StiFlex™ production certifications include ISO 9001, ISO 14001 and CIDB(MY)IBS.

PRODUCT DESCRIPTION

Manufactured from galvanized steel or powder coated steel, StiFlex™ replaces less efficient traditional construction methods such as casting of reinforced concrete stiffeners/lintels and conventional on-site cut, weld & paint steel stiffeners/lintels. Its modular convenience and size adaptability enables fast installation, saving both time and manpower, resulting in enhanced productivity by at least 5 folds.

With relentless product research and development, StiFlex™ remains relevant, dependable and are continually certified/assessed/tested for its purposed design to fully comply with current codes, standards or requirements, such as:

- For design of steel structures, EN 1993 Parts 1, 2 & 8:2005 and EN 1993 Parts 3 & 5:2006
- For design of masonry structures, EN1996 Part 1: 2005, Part 2: 2006 & Part 3: 2006.
- For design of structures for earthquake resistance, EN 1998-1:2004
- For loadbearing elements, EN845-2: 2013, specification for ancillary components for masonry – Lintels
- For environmental performance, SGBC Green Building Product; HKGBC Eco Product Listing
- For fire resistance,
    a) BS EN 1363-1:2012 and BS EN 1365-1:2012, loadbearing elements, up to 240 minutes
    b) BS EN 1364-1:2015 (replaces BS 476 Part 22), non-loadbearing elements, up to 240 minutes
    c) BS 476 Part 6: 1989 + A1: 2009 & Part 7: 1997, fire propagation and classification of the surface spread of flame, certified as Class 0 material

Further information can be found at:
https://stiflex.com/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	88,40	Malaysia
Minerals	10,96	Malaysia
Fossil materials	0,64	Malaysia
Bio-based materials	0	NA

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,002782

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg StiFlex Stiffener Modular System
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	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.

A market-based approach is used in modelling the electricity mix utilized in the factory.

This stage considers the extraction, processing and energy consumptions produce stiffener modular system from raw steel sheets. The raw materials are obtained within Malaysia and are transported to the factory. In this case, the analysis includes road transportation of each raw material. This stage also includes the manufacture of products and packaging, which includes metal cables, plastic films, brown paper and wood pallets. It also considers the energy consumption and waste generated at the production plant. Production losses is considered in this stage.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

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.

These stages include transportation from the production gate in Malaysia to the construction site in Singapore, where the product will be installed. Fuel consumption during installation is not included, as the data is not available. Installation waste from packaging—such as metal straps for bundling the stiffeners/lintels, stretch film for wrapping, brown paper for product segregation, and wooden pallets used as product bases—is considered in Stage A5

PRODUCT USE AND MAINTENANCE (B1-B7)

Not declared.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

C1: This stage includes product deconstruction, dismantling, and demolition. An average energy consumption of 0.01 kWh per kg of product has been considered for demolition activities, based on literature values for building deconstruction energy (Bozdağ & Seçer, 2007). The electricity source is modelled using the dataset Market for electricity, medium voltage (Singapore) from Ecoinvent 3.10.1, which represents the country-specific electricity consumption mix at medium voltage level, including transmission losses. The associated Global Warming Potential for this electricity dataset is 0.53 kg CO_2e per kWh (Modules A1-A3).

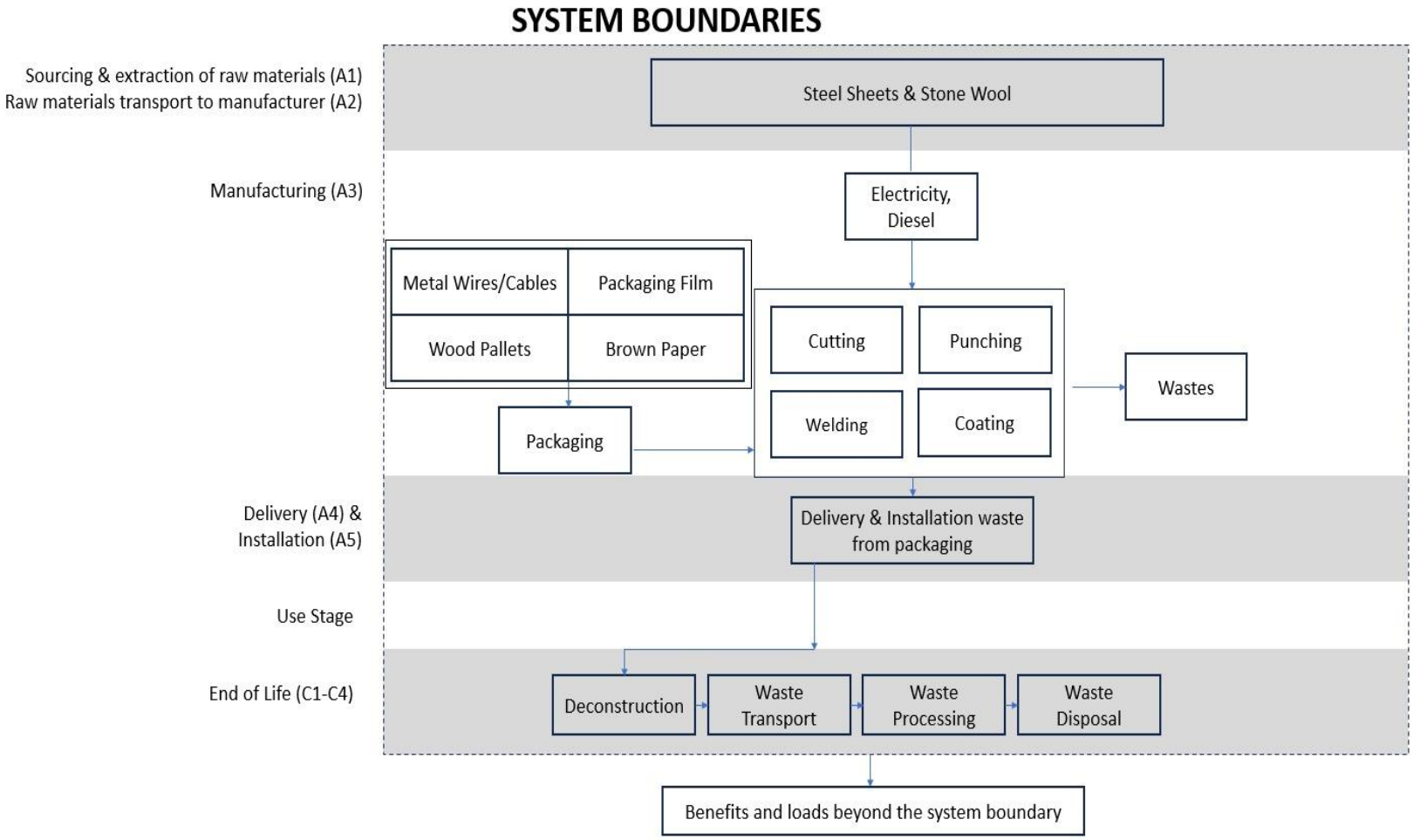
C2: Transport of the discarded product to the processing site. It is estimated that there is no mass loss during the use of the product, therefore, the end-of-life product is assumed that it has the same weight as the declared product. All the end-of-life product is assumed to be sent to the closest facilities, such as recycling. Transportation distance to the closest disposal area is estimated as 40 km and the transportation method is lorry which is the most common.

C3: Waste processing for reuse, recovery and/or recycling. Based on Singapore's NEA average 99% of steel are transformed into secondary material in a recycling plant without any quality loss.

C4: Discharge (disposal). It is assumed that rest 1% of steel is landfilled.

D: Corresponding benefits and avoided loads are assigned 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	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	0%

This EPD is product and factory specific.

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'.

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

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	2,36E+00	7,50E-02	4,24E-02	2,48E+00	3,25E-03	1,05E-02	MND	MND	MND	MND	MND	MND	MND	5,32E-03	4,31E-03	2,69E-02	6,25E-05	-9,65E-01
GWP – fossil	kg CO_2e	2,36E+00	7,50E-02	5,25E-02	2,49E+00	3,25E-03	2,74E-04	MND	MND	MND	MND	MND	MND	MND	5,32E-03	4,31E-03	2,69E-02	6,24E-05	-9,65E-01
GWP – biogenic	kg CO_2e	0,00E+00	0,00E+00	-1,02E-02	-1,02E-02	0,00E+00	1,02E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	2,50E-03	3,35E-05	2,41E-05	2,56E-03	1,45E-06	1,40E-07	MND	MND	MND	MND	MND	MND	MND	3,47E-07	1,93E-06	3,16E-05	3,57E-08	5,67E-05
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	2,26E-08	1,11E-09	1,59E-09	2,53E-08	4,80E-11	2,57E-12	MND	MND	MND	MND	MND	MND	MND	1,24E-10	6,36E-11	2,89E-10	1,81E-12	-1,62E-09
Acidification potential	mol H^+e	1,06E-02	2,56E-04	6,47E-04	1,15E-02	1,11E-05	1,21E-06	MND	MND	MND	MND	MND	MND	MND	6,06E-06	1,47E-05	2,88E-04	4,43E-07	-3,39E-03
EP-freshwater[2)]	kg Pe	7,82E-04	5,84E-06	8,18E-05	8,70E-04	2,53E-07	4,41E-08	MND	MND	MND	MND	MND	MND	MND	1,49E-07	3,35E-07	1,46E-05	5,13E-09	-3,02E-04
EP-marine	kg Ne	2,22E-03	8,40E-05	6,58E-05	2,37E-03	3,64E-06	4,67E-06	MND	MND	MND	MND	MND	MND	MND	1,69E-06	4,82E-06	6,39E-05	1,69E-07	-5,07E-04
EP-terrestrial	mol Ne	2,27E-02	9,14E-04	7,65E-04	2,44E-02	3,96E-05	4,80E-06	MND	MND	MND	MND	MND	MND	MND	1,80E-05	5,25E-05	7,21E-04	1,84E-06	-8,98E-03
POCP ("smog")[3)]	kg NMVOCe	7,34E-03	3,77E-04	2,43E-04	7,96E-03	1,63E-05	1,73E-06	MND	MND	MND	MND	MND	MND	MND	1,34E-05	2,16E-05	2,12E-04	6,60E-07	-2,65E-03
ADP-minerals & metals[4)]	kg Sbe	1,13E-05	2,09E-07	4,69E-06	1,62E-05	9,07E-09	3,25E-10	MND	MND	MND	MND	MND	MND	MND	6,14E-09	1,20E-08	1,59E-06	9,92E-11	-1,48E-05
ADP-fossil resources	MJ	2,77E+01	1,09E+00	7,12E-01	2,95E+01	4,72E-02	2,62E-03	MND	MND	MND	MND	MND	MND	MND	8,40E-02	6,25E-02	3,18E-01	1,53E-03	-7,87E+00
Water use[5)]	m^3e depr.	6,69E-01	5,38E-03	1,98E-02	6,94E-01	2,33E-04	2,12E-05	MND	MND	MND	MND	MND	MND	MND	3,98E-04	3,09E-04	5,03E-03	4,42E-06	1,43E-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

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	1,74E-07	7,51E-09	2,47E-09	1,84E-07	3,26E-10	2,96E-11	MND	MND	MND	MND	MND	MND	MND	2,70E-11	4,31E-10	4,02E-09	1,01E-11	-6,68E-08
Ionizing radiation[6)]	kBq U235e	1,25E-01	9,48E-04	1,11E-03	1,27E-01	4,11E-05	6,32E-06	MND	MND	MND	MND	MND	MND	MND	9,16E-06	5,44E-05	1,14E-03	9,63E-07	1,16E-02
Ecotoxicity (freshwater)	CTUe	1,25E+01	1,54E-01	7,42E-01	1,34E+01	6,68E-03	5,95E-03	MND	MND	MND	MND	MND	MND	MND	4,82E-03	8,84E-03	1,84E-01	1,29E-04	6,12E+00
Human toxicity, cancer	CTUh	1,69E-09	1,24E-11	6,09E-11	1,76E-09	5,37E-13	6,70E-14	MND	MND	MND	MND	MND	MND	MND	4,08E-13	7,11E-13	2,15E-11	1,15E-14	4,71E-10
Human tox. non-cancer	CTUh	2,55E-08	7,05E-10	3,98E-09	3,02E-08	3,06E-11	4,59E-12	MND	MND	MND	MND	MND	MND	MND	1,11E-11	4,05E-11	1,38E-09	2,64E-13	7,40E-08
SQP[7)]	-	1,12E+01	1,10E+00	1,53E+00	1,38E+01	4,75E-02	2,49E-03	MND	MND	MND	MND	MND	MND	MND	5,76E-03	6,29E-02	6,01E-01	3,02E-03	-3,83E+00

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	2,16E+00	1,49E-02	1,46E-01	2,33E+00	6,47E-04	-3,33E-02	MND	MND	MND	MND	MND	MND	MND	1,06E-03	8,56E-04	4,93E-02	1,48E-05	-1,19E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	9,92E-02	9,92E-02	0,00E+00	-9,92E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,16E+00	1,49E-02	2,46E-01	2,43E+00	6,47E-04	-1,32E-01	MND	MND	MND	MND	MND	MND	MND	1,06E-03	8,56E-04	4,93E-02	1,48E-05	-1,19E+00
Non-re. PER as energy	MJ	4,90E+01	1,09E+00	5,58E-01	5,07E+01	4,72E-02	-2,84E-02	MND	MND	MND	MND	MND	MND	MND	8,40E-02	6,25E-02	3,18E-01	1,53E-03	-7,87E+00
Non-re. PER as material	MJ	0,00E+00	0,00E+00	6,33E-02	6,33E-02	0,00E+00	-6,33E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	4,90E+01	1,09E+00	6,21E-01	5,07E+01	4,72E-02	-9,18E-02	MND	MND	MND	MND	MND	MND	MND	8,40E-02	6,25E-02	3,18E-01	1,53E-03	-7,87E+00
Secondary materials	kg	9,11E-02	4,63E-04	5,58E-04	9,21E-02	2,01E-05	1,33E-06	MND	MND	MND	MND	MND	MND	MND	1,84E-05	2,66E-05	3,68E-04	3,85E-07	6,45E-01
Renew. secondary fuels	MJ	9,84E-04	5,88E-06	2,40E-03	3,39E-03	2,55E-07	1,12E-08	MND	MND	MND	MND	MND	MND	MND	1,79E-08	3,38E-07	1,67E-05	7,97E-09	-1,42E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,23E-02	1,61E-04	3,15E-04	1,28E-02	6,98E-06	-1,11E-05	MND	MND	MND	MND	MND	MND	MND	9,52E-06	9,24E-06	1,39E-04	1,59E-06	-3,12E-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	3,20E-01	1,84E-03	3,58E-03	3,26E-01	7,99E-05	8,60E-06	MND	MND	MND	MND	MND	MND	MND	6,49E-05	1,06E-04	2,48E-03	1,69E-06	-5,71E-01
Non-hazardous waste	kg	1,02E+01	3,41E-02	2,03E-01	1,04E+01	1,48E-03	1,56E-02	MND	MND	MND	MND	MND	MND	MND	9,83E-04	1,96E-03	6,97E-02	3,87E-05	1,42E+01
Radioactive waste	kg	3,06E-05	2,32E-07	3,58E-07	3,12E-05	1,01E-08	1,54E-09	MND	MND	MND	MND	MND	MND	MND	2,07E-09	1,33E-08	2,81E-07	2,35E-10	2,67E-06

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	MND	MND	MND	MND	MND	MND	MND	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	4,47E-02	4,47E-02	0,00E+00	3,91E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,90E-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	MND	MND	MND	MND	MND	MND	MND	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	MND	MND	MND	MND	MND	MND	MND	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	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	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	4,52E+00	7,46E-02	5,34E-02	4,65E+00	3,23E-03	8,62E-04	MND	MND	MND	MND	MND	MND	MND	5,28E-03	4,28E-03	2,68E-02	6,19E-05	-9,55E-01
Ozone depletion Pot.	kg $CFC_{-11}e$	1,96E-08	8,83E-10	1,25E-09	2,17E-08	3,83E-11	2,07E-12	MND	MND	MND	MND	MND	MND	MND	9,89E-11	5,07E-11	2,40E-10	1,44E-12	-1,83E-09
Acidification	kg SO_2e	1,02E-02	1,95E-04	5,60E-04	1,10E-02	8,47E-06	9,00E-07	MND	MND	MND	MND	MND	MND	MND	4,78E-06	1,12E-05	2,32E-04	3,28E-07	-2,70E-03
Eutrophication	kg PO_4^3e	6,03E-03	4,76E-05	1,99E-04	6,28E-03	2,06E-06	1,08E-06	MND	MND	MND	MND	MND	MND	MND	8,75E-07	2,73E-06	3,30E-05	1,04E-07	5,66E-04
POCP (“smog”)	kg C_2H_4e	7,19E-04	1,74E-05	2,64E-05	7,63E-04	7,55E-07	2,10E-07	MND	MND	MND	MND	MND	MND	MND	5,85E-07	9,99E-07	1,37E-05	3,10E-08	-6,19E-04
ADP-elements	kg Sbe	1,10E-05	2,04E-07	4,68E-06	1,59E-05	8,85E-09	3,18E-10	MND	MND	MND	MND	MND	MND	MND	5,90E-09	1,17E-08	1,58E-06	9,72E-11	-1,48E-05
ADP-fossil	MJ	2,58E+01	1,07E+00	6,96E-01	2,75E+01	4,65E-02	2,52E-03	MND	MND	MND	MND	MND	MND	MND	8,39E-02	6,16E-02	3,00E-01	1,52E-03	-8,05E+00

ENVIRONMENTAL IMPACTS – 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	2,36E+00	7,50E-02	5,26E-02	2,49E+00	3,25E-03	2,74E-04	MND	MND	MND	MND	MND	MND	MND	5,32E-03	4,31E-03	2,69E-02	6,25E-05	-9,65E-01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, Malaysia, 2021 (One Click LCA)
Electricity CO2e / kWh	0,9
District heating data source and quality	NA
District heating CO2e / kWh	0

Transport scenario documentation A4

Scenario parameter	Value
Fuel and vehicle type. Eg, electric truck, diesel powered truck	0,11
Average transport distance, km	40
Capacity utilization (including empty return) %	50
Bulk density of transported products	-
Volume capacity utilization factor	1

Installation scenario documentation A5

Scenario information	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	0
Water use / m^3	0
Other resource use / kg	0
Quantitative description of energy type (regional mix) and consumption during the installation process / kWh or MJ	0
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	Paper (total), 0.000707 kg Plastic (total), 0.001351 kg Reinforcement steel, 0.000925 kg Wood (total), 0.004037 kg
Output materials (specified by type) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (specified by route) / kg	Recycled, ~0.003844 kg Landfilled, ~0.003176 kg
Direct emissions to ambient air, soil and water / kg	0

End of life scenario documentation

Scenario information	Value
Collection process – kg collected separately	-
Collection process – kg collected with mixed waste	1
Recovery process – kg for re-use	-
Recovery process – kg for recycling	0,99
Recovery process – kg for energy recovery	-
Disposal (total) – kg for final deposition	0,01
Scenario assumptions e.g. transportation	Transport, freight, lorry >32 metric ton, EURO5

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 15802+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

Sarah Curpen, as an authorized verifier acting for EPD Hub Limited.

29.06.2025