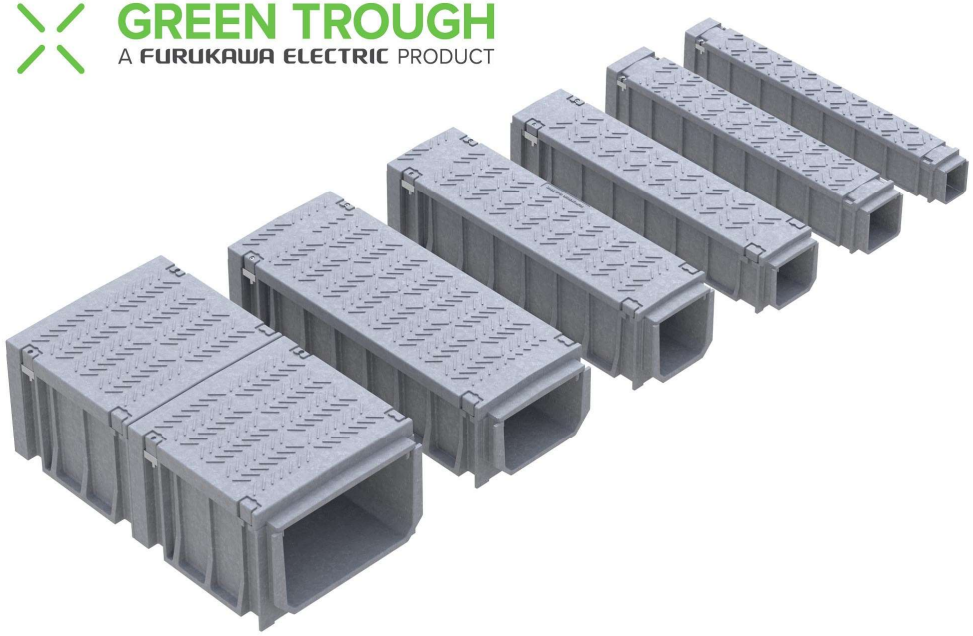
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Furukawa Green Trough
Furukawa Electric Co., Ltd

GREEN TROUGH
A FURUKAWA ELECTRIC PRODUCT



EPD HUB, EPD number XXXXX
Publishing XXX date, last updated XXX date, valid until XXX date

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Furukawa Electric Co., Ltd
Address	Head Office. 2-6-4, Otemachi, Chiyodaku, Tokyo 100-8322, Japan
Contact details	ben.street@furukawa.co.uk
Website	https://www.furukawa.co.jp/en

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Furukawa Electric Europe Ltd
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	#VERIFIER#

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	Furukawa Green Trough
Additional labels	-
Product reference	Polymer Cable Trough
Place of production	**Chiba Factory** 6, Yawata-Kaigandori, Ichihara-city, Chiba, Japan. **Hiratsuka Factory** 5-1-9, Higashi-Yawata, Hiratsuka, Kanagawa, Japan. **Mie Factory** 16-13, Nobono, Kameyama, Mie, Japan. **Akita Factory** 11-1, Ogida-Ogibuchi, Noshiro, Akita, Japan. End of life assumed to be Europe.
Period for data	Fiscal Year 1st April 2019 – 31st March 2020
Averaging in EPD	Multiple factories
Variation in GWP-fossil for A1-A3	-16% ~ 48% %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	9,56E-01
GWP-total, A1-A3 (kgCO2e)	9,56E-01
Secondary material, inputs (%)	70.0
Secondary material, outputs (%)	63.8
Total energy use, A1-A3 (kWh)	2.74
Total water use, A1-A3 (m3e)	7,31E-03

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Furukawa Electric Co., Ltd. is a Japan-based manufacturing company founded in 1884. The Company has six business divisions. The Information and Communication division offers optical fibers and cables, and affiliated products and engineering services, related optical products, as well as network equipment. The Energy and Industrial Machinery division provides bare wires, aluminum wires, coated wires, electric cables, plastic products and thermoelectric products, among others. The Metal division provides processed copper products such as extended copper products, electrolytic copper foils and memory metals, among others. The Light Metal division provides aluminum sheets, aluminum extrusion and molds, among others. The Electronics divisions products include batteries, automobile parts and wires, heat sheets, aluminum boards for memory discs and electronic parts, among others. The Service division provides real estate, logistics, information and other services.

PRODUCT DESCRIPTION

Green Trough is the world's most versatile cable trough system.

Furukawa Green Trough cable management system offers the most innovative, environmentally friendly and state-of-the-art solution to cable route management. Green Trough polymer cable trough is simple and fast to install thanks to its low weight and intuitive joining mechanism and can be modified on site using basic hand tools.

Versatile: Straights, bends, gradients and T-junctions all available in 6 sizes including an innovative walkway system, together with accessories and an elevated system to meet any requirement. .
Sustainable: Green Trough is made from 100% recycled polymer.
Extremely durable: 50+ year UV resistance. Suitable for use in -40°C to +80°C temperature range. Resistant to salt damage. Excellent impact resistance. Will not crumble like concrete.
Simple installation: Weighs 75% less than traditional concrete trough alternatives. All Green Trough items are a one-man lift.
Secure: Interlocking units: Each trough has a male and a female end, together with Lockable lids. Straight units have up to 5 degrees vertical and horizontal flexibility.
Cost saving: Significantly reduces labour time and possession costs.
Compliant: Approved by Network Rail, Deutsche Bahn, New South Wales, Banedanmark and Japan Railways. Installed on major infrastructure projects since 2005.
Flame resistant: K1 according to DIN 53438. Self extinguishes in under 30 seconds.
Strong: Can withstand 10kN vertical load.
Suitable for high voltage cables.
Anti-static.

Further information can be found at https://www.furukawa.co.jp/en.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	-
Minerals	37	Japan
Fossil materials	63	Japan
Bio-based materials	0	-

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

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1kg
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	Deconstr./demol.	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.

Green Trough is a cable trough system consisting of a body and lid manufactured from recycled HDPE. G90, G135, 150B, 200B and Walkway products are manufactured in metre length units. 430C, the largest size, is manufactured in 0.5m lengths. Green Trough is manufactured at 4 different factories, all based in Japan.

Raw material is supplied by various municipalities in Japan, coming from recycled household plastic containers and packaging.

The products are packed on recycled plastic pallets, wrapped in plastic film and strapped with polyester straps.

Electricity is from the grid in Japan and medium voltage between 1kV and 24kV.

Manufacturing waste is typically 3%. At Mie and Chiba factories this waste is re-used in the manufacturing of new Green Trough units. Manufacturing waste at Hiratsuka and Akita factories is sent to a third party for recycling, transported via truck. The average distance from the factories to the third party recycling facility is 125km.

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.

Transportation impacts from delivering the products from the factories to the installation site, covering direct fuel exhaust emissions, environmental impacts of fuel
production, as well as related infrastructure emissions.

No specialist / powered machinery is needed during installation of the Green Trough product, installation teams will use simple hand tools such as shovels. No Co2e emitting machines are required at point of

installation. Green Trough is lightweight and suitable for a one-person lift, meaning it can be carried and placed by hand.

Local site teams can opt to prepare a site with a layer of sand for example, but this is not essential, therefore no additional resources are needed.

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)

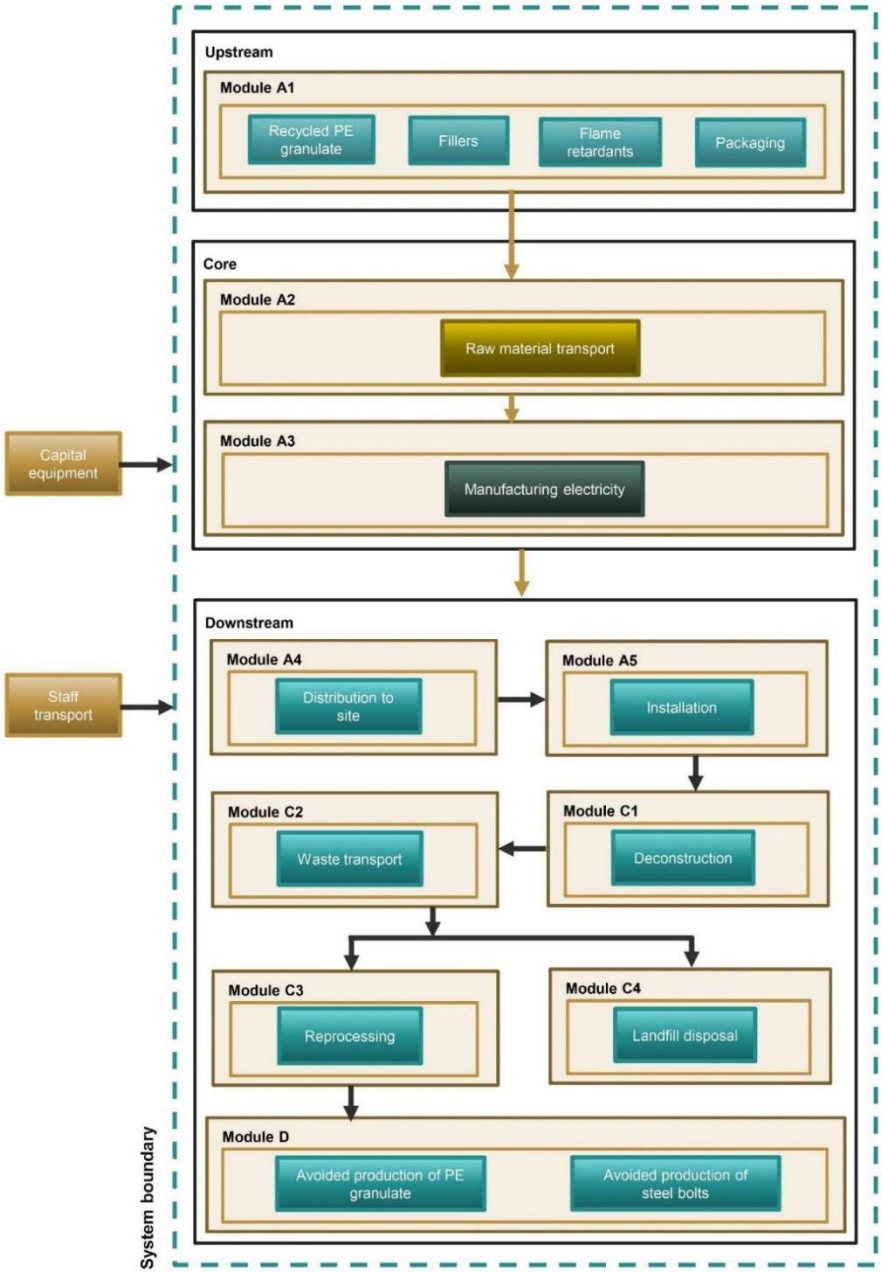
It is possible to recycle used Green Trough into new Green Trough units, and this process is already in place for factory waste. However, this is not accounted for in this EPD.

Based on the latest Eurostat data for High Density Polyethylene, the recycling rate for this material is 64%. Therefore, we have considered that 64% of the product will be recycled at end of life, with 36% being sent to landfill. This represents the latest statistics on European plastic waste recycling, and not necessarily the recyclability of the product material.

It is assumed that there is no energy consumption during demolition, as Green Trough is deconstructed manually, using the same method as during installation but in reverse.

It is conservatively assumed that the distance to the nearest waste processing facility is 50km maximum.

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.

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 materials	Allocated by mass or volume
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	Multiple factories
Averaging method	Representative product
Variation in GWP-fossil for A1-A3	-16% ~ 48% %

This EPD uses data from the most representative factory of four factories manufacturing the Green Trough product. All factories fall within the +/- 50% permissible variation range for average 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. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

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	6,87E-01	2,50E-02	2,45E-01	9,56E-01	2,44E-01	5,01E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,68E-03	1,07E-01	5,32E-02	-3,48E-01
GWP – fossil	kg CO_2e	6,85E-01	2,50E-02	2,46E-01	9,56E-01	2,44E-01	5,00E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,68E-03	1,07E-01	5,32E-02	-3,48E-01
GWP – biogenic	kg CO_2e	1,12E-03	0,00E+00	-1,12E-03	-2,58E-18	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
GWP – LULUC	kg CO_2e	7,36E-04	9,21E-06	1,12E-04	8,57E-04	1,64E-04	2,17E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,73E-06	6,50E-05	4,02E-06	6,11E-05
Ozone depletion pot.	kg $CFC_{-11}e$	2,46E-08	5,74E-09	1,36E-08	4,40E-08	5,00E-08	1,35E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,08E-09	2,18E-09	1,15E-09	-5,14E-09
Acidification potential	mol H^+e	4,14E-03	1,06E-04	1,21E-03	5,46E-03	6,73E-03	6,95E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,98E-05	1,75E-04	3,28E-05	-1,04E-03
EP-freshwater[2)]	kg Pe	2,06E-05	2,04E-07	7,04E-06	2,78E-05	1,07E-06	4,55E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,83E-08	1,38E-06	6,32E-08	-2,64E-06
EP-marine	kg Ne	6,14E-04	3,14E-05	1,88E-04	8,33E-04	1,65E-03	2,37E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,89E-06	5,08E-05	2,02E-05	-1,61E-04
EP-terrestrial	mol Ne	6,11E-03	3,47E-04	2,06E-03	8,52E-03	1,84E-02	2,20E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,49E-05	5,32E-04	1,21E-04	-1,92E-03
POCP ("smog")[3)]	kg NMVOCe	1,75E-03	1,11E-04	6,17E-04	2,48E-03	4,80E-03	7,02E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,08E-05	1,62E-04	4,65E-05	-1,21E-03
ADP-minerals & metals[4)]	kg Sbe	8,81E-06	5,85E-08	4,62E-07	9,33E-06	3,81E-07	1,98E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,10E-08	6,24E-07	1,31E-08	-2,52E-06
ADP-fossil resources	MJ	5,43E+00	3,75E-01	3,25E+00	9,05E+00	3,19E+00	1,46E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,03E-02	3,17E-01	8,84E-02	-1,49E+01
Water use[5)]	m^3e depr.	2,54E-01	1,68E-03	4,30E-02	2,99E-01	1,04E-02	4,48E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,14E-04	1,38E-02	5,32E-04	-1,95E-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.

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	5,86E-01	4,22E-03	2,71E-01	8,62E-01	2,48E-02	1,23E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,92E-04	3,78E-02	1,65E-03	-1,36E-01
Renew. PER as material	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
Total use of renew. PER	MJ	5,86E-01	4,22E-03	2,71E-01	8,62E-01	2,48E-02	1,23E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,92E-04	3,78E-02	1,65E-03	-1,36E-01
Non-re. PER as energy	MJ	5,43E+00	3,75E-01	3,18E+00	8,98E+00	3,19E+00	1,46E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,03E-02	3,17E-01	8,84E-02	-5,08E+00
Non-re. PER as material	MJ	2,78E+01	0,00E+00	3,91E-01	2,82E+01	0,00E+00	-1,28E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,72E+01	-9,68E+00	6,21E+00
Total use of non-re. PER	MJ	3,32E+01	3,75E-01	3,57E+00	3,71E+01	3,19E+00	-1,27E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,03E-02	-1,69E+01	-9,59E+00	1,14E+00
Secondary materials	kg	7,00E-01	1,04E-04	3,08E-02	7,31E-01	1,34E-03	6,61E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,95E-05	2,11E-03	3,15E-05	2,44E-01

Renew. secondary fuels	MJ	1,19E-04	1,05E-06	3,82E-04	5,03E-04	4,92E-06	5,70E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,97E-07	1,72E-05	1,21E-06	3,81E-07
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	6,19E-03	4,86E-05	1,07E-03	7,31E-03	2,46E-04	1,36E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,10E-06	3,42E-04	9,46E-05	-5,05E-03

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	6,11E-02	4,97E-04	1,50E-02	7,66E-02	4,33E-03	2,13E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,32E-05	6,88E-03	0,00E+00	-9,60E-04
Non-hazardous waste	kg	9,97E-01	8,17E-03	2,86E-01	1,29E+00	4,23E-02	1,41E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,53E-03	9,94E-02	3,59E-01	-1,14E-01
Radioactive waste	kg	9,56E-06	2,51E-06	7,51E-06	1,96E-05	2,24E-05	5,87E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,70E-07	1,45E-06	0,00E+00	-7,95E-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	6,60E-02	6,60E-02	0,00E+00	1,95E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	6,38E-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

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

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	6,97E-01	2,47E-02	2,41E-01	9,63E-01	2,42E-01	4,66E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-03	1,05E-01	4,32E-02	-3,18E-01
Ozone depletion Pot.	kg CFC-11e	2,12E-08	4,55E-09	1,04E-08	3,62E-08	3,96E-08	1,12E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,52E-10	1,88E-09	9,14E-10	-4,59E-09
Acidification	kg SO_2e	3,52E-03	8,21E-05	1,02E-03	4,62E-03	5,38E-03	5,40E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,54E-05	1,36E-04	2,49E-05	-8,69E-04
Eutrophication	kg PO_4^3e	9,47E-04	1,87E-05	2,67E-04	1,23E-03	6,11E-04	7,22E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,51E-06	3,58E-04	2,00E-03	-1,34E-04
POCP (“smog”)	kg C_2H_4e	1,75E-04	3,21E-06	4,72E-05	2,25E-04	1,41E-04	5,93E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,01E-07	1,09E-05	7,84E-06	-1,17E-04
ADP-elements	kg Sbe	8,75E-06	5,67E-08	4,59E-07	9,26E-06	3,73E-07	1,97E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,06E-08	6,19E-07	1,26E-08	-2,52E-06
ADP-fossil	MJ	5,43E+00	3,75E-01	3,25E+00	9,05E+00	3,19E+00	1,45E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,03E-02	3,17E-01	8,84E-02	-1,49E+01

DELIVERY DESTINATION

This EPD is based on sales data from the 2019/2020 financial year and transport to the UK only.

If this EPD was to be based on data from the most recent 12-month period, using a weighted average for transport to all customer destinations in Europe, the result for A4 Transport GWP - fossil kg CO_2e would be 2,407E-01.

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

#SIGNATURE#