



ENVIRONMENTAL PRODUCT DECLARATION

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

**T-WALL
REINFORCED EARTH COMPANY LTD**

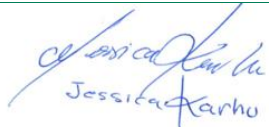
GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Reinforced Earth Company Ltd
Address	Innovation House, Euston Way, Telford TF3 4LT
Contact details	info@reinforcedearth.co.uk
Website	www.reinforcedearth.co.uk

PRODUCT IDENTIFICATION

Product name	T-Wall
Additional label(s)	
Product number / reference	A12 to A48
Place(s) of production	United Kingdom



Jessica Karhu
RTS EPD Committee secretary



Laura Ajilo
Managing Director

The Building Information Foundation RTS sr

EPDs within the same product category but from different programmes may not be comparable.

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	Rakennustietosäätiö RTS sr Rakennustieto Oy Malminkatu 16 A, PL 1004, 00101 Helsinki rts@rakennustieto.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version 26.8.2020) is used.
EPD author	David Carson, Reinforced Earth Company Ltd
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
Verification date	8.8.2021
EPD verifier	Anni Oviir, Rangi Maja OÜ www.lcasupport.com
EPD number	RTS_141_21
ECO Platform nr.	-
Publishing date	16.08.2021
EPD valid until	16.08.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

T-Wall modular, stackable precast retaining structure consisting of concrete and reinforcement. T-Wall is a concrete facing panel with a perpendicular concrete stem, forming the shape of a “T”. Since the production of T-Wall in the UK was not yet started at the time this EPD was created, the EPD has been calculated based on its sibling product consisting of the facing panel only, which has been in production in the UK for over forty years. The production impacts of T-Wall can be considered as identical with that of the facing panel.

PRODUCT APPLICATION

Retaining walls, bridge abutments and other structures for use on road, rail, housing, industrial, ports, harbours etc

TECHNICAL SPECIFICATIONS

The strength of the class is C40/50

PRODUCT STANDARDS

BSEN15258:2008 Precast concrete products. Retaining wall elements

BSEN 13369:2004 Common rules for precast concrete products

More information can be seen on our website

PHYSICAL PROPERTIES OF THE PRODUCT

C40/C50 CEMIIIA Concrete and reinforcement bars

The outer facing panel is a fixed size of 1580mm x 1500mm

The stem length cast into the facing panel varies in length from 1200mm up to 4800mm in 600mm steps

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.reinforcedearth.co.uk.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Cement	122-124	0	0	UK
Fine aggregates	366-370	0	0	UK
Coarse aggregates	338-342	0	0	UK
GGBS	71-72	100	0	UK
Water	69-70	0	0	UK
Admixture	1.3	0	0	UK
Reinforced steel	21-33	97	0	UK

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	2	UK
Minerals	98	UK
Fossil materials	0	
Bio-based materials	0	

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

MANUFACTURING AND PACKAGING (A1-A3)

Once the correct concrete mixture has taken place, this is carried to be poured into moulds. The concrete is standard to all our products. The moulds are adjustable for the stem length. The moulds use similar moulds to our standard produced products, but include the additional stem. The moulds have the reinforced steel bars already placed into them and in the geometry required for optimum strength when completed. The concrete is poured into the mould and vibro-sticks used to ensure the concrete covers the whole surface areas and without any air inclusions. The mould and concrete are left to cure for at least 24 hours. Once cured, the mould is split open and then carried out of the manufacturing floor to the stored outside for future transportation to client locations.

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 transportation distance is defined according to RTS PCR. Average distance of transportation from production plant to building site is assumed as 67km by ferry to the mainland UK and 300 km by road and the transportation method is assumed to be lorry. Transportation does not cause losses as product are packaged properly.

PRODUCT USE AND MAINTENANCE (B1-B7)

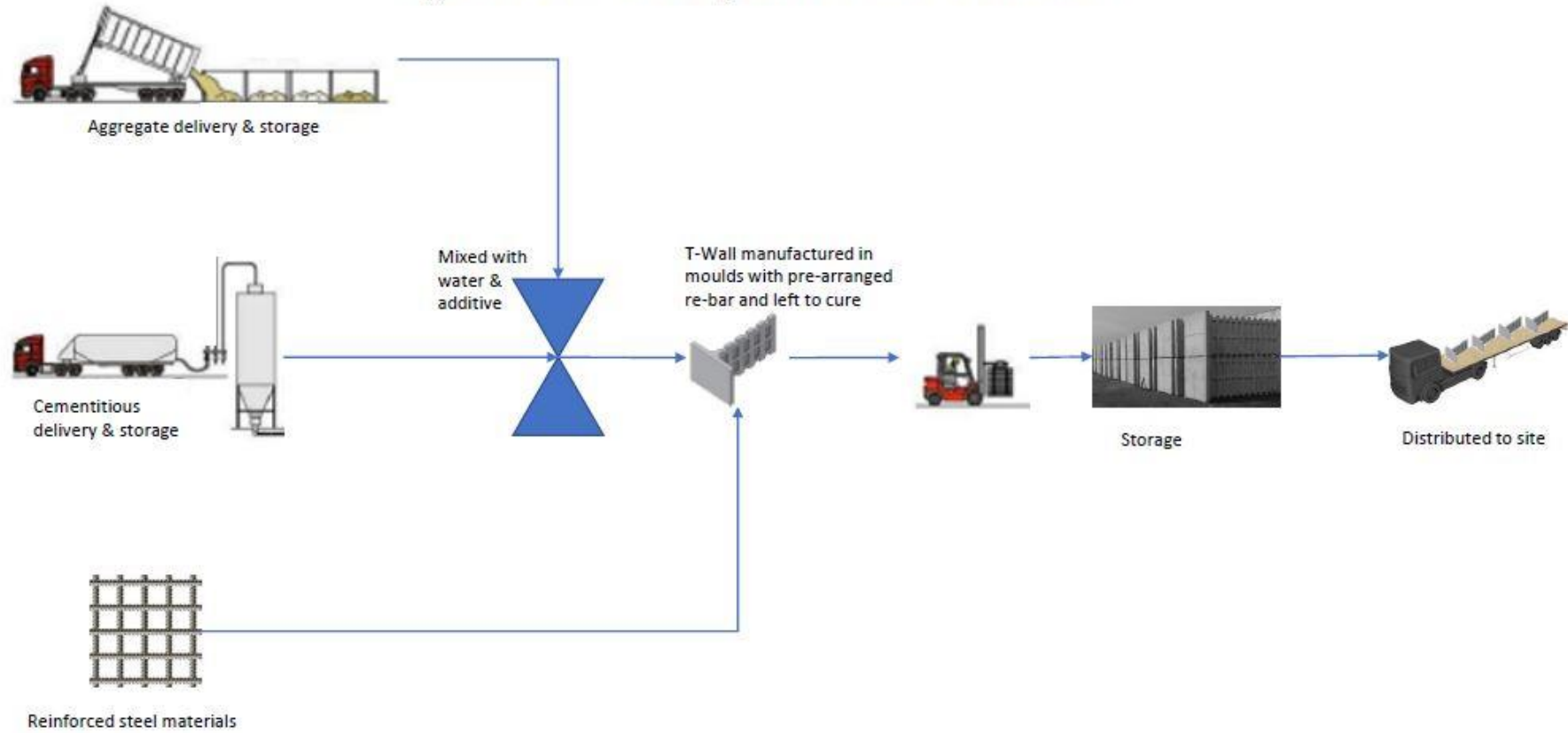
This EPD does not cover the use phase. Air, soil and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 91% of the concrete waste and 91% of the reinforced steel is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines (C1). The product is delivered to the nearest construction waste treatment plant (C2), usually on site so that the waste can be re-used on the construction site. At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use (C3). Small quantities are disposed of in a landfill (C4). Due to the recycling potential of reinforcement steel and concrete, they can be used as secondary raw material. This avoids the use of virgin raw materials (D).

MANUFACTURING PROCESS

Typical Process Flow Diagram For Precast T-Wall Panels



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020
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DECLARED UNIT

Declared unit	1 Tonne
Mass per declared unit	1000

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	4.17

SYSTEM BOUNDARY

This EPD covers the *cradle to gate* with modules A4-A5, C1-C4 and module D; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

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	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	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.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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 study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and RTS 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 which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected

input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages.

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.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

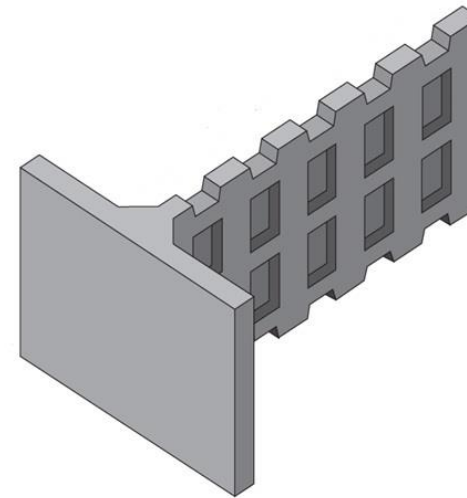
The production plant manufacturers many pre-cast products and therefore an annual average of energy consumption per tonne of materials has been used. The concrete and reinforced steel used for T-Wall is a standard requirement for Reinforced Earth across all its products

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This

methodology is in line with the requirements of the EN 15804 - standard.

AVERAGES AND VARIABILITY

Products in this range are within the 10% GWP indicator. Where averages have been used the variability is within 1% across the range of products



T-Wall typical 3D representation



T-Wall bridge abutment



T-Wall hydraulic application



T-Wall rail embankment back to back walls



T-Wall typical road ramp wall

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

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	kg CO2e	1,41E2	7,07E0	-1,7E0	1,47E2	5,75E1	4,73E1	MND	MND	MND	MND	MND	MND	MND	3,1E1	2,98E-1	4,05E0	4,75E-1	-5,41E0
GWP – fossil	kg CO2e	1,39E2	7,06E0	4,04E0	1,5E2	5,79E1	4,36E1	MND	MND	MND	MND	MND	MND	MND	3,1E1	2,98E-1	4,07E0	4,74E-1	-5,3E0
GWP – biogenic	kg CO2e	2,07E0	5,13E-3	-5,75E0	-3,68E0	2,53E-2	3,68E0	MND	MND	MND	MND	MND	MND	MND	8,54E-3	2,16E-4	-2,86E-2	9,39E-4	-9,41E-2
GWP – LULUC	kg CO2e	6,37E-2	2,13E-3	6,58E-3	7,24E-2	2,25E-2	3,81E-2	MND	MND	MND	MND	MND	MND	MND	2,59E-3	8,96E-5	8,86E-4	1,41E-4	-8,8E-3
Ozone depletion pot.	kg CFC11e	6,95E-6	1,66E-6	2,64E-7	8,88E-6	1,3E-5	5,72E-6	MND	MND	MND	MND	MND	MND	MND	6,63E-6	7E-8	8,42E-7	1,95E-7	-5,74E-7
Acidification potential	mol H+e	4,34E-1	2,97E-2	2,01E-2	4,84E-1	4,5E-1	3,52E-1	MND	MND	MND	MND	MND	MND	MND	1,37E-1	1,25E-3	4,35E-2	4,5E-3	-3,86E-2
EP-freshwater ²⁾	kg Pe	2,84E-3	5,75E-5	1,59E-4	3,06E-3	4,54E-4	1,25E-3	MND	MND	MND	MND	MND	MND	MND	1,24E-4	2,42E-6	5E-5	5,72E-6	-3,75E-4
EP-marine	kg Ne	9,78E-2	8,94E-3	3,78E-3	1,11E-1	1,22E-1	1,2E-1	MND	MND	MND	MND	MND	MND	MND	5,03E-2	3,77E-4	1,78E-2	1,55E-3	-8,21E-3
EP-terrestrial	mol Ne	1,15E0	9,88E-2	4,58E-2	1,3E0	1,35E0	1,35E0	MND	MND	MND	MND	MND	MND	MND	5,53E-1	4,16E-3	1,96E-1	1,71E-2	-1,11E-1
POCP (“smog”)	kg NMVOCe	3,18E-1	3,18E-2	1,2E-2	3,62E-1	3,82E-1	3,73E-1	MND	MND	MND	MND	MND	MND	MND	1,59E-1	1,34E-3	5,39E-2	4,95E-3	-2,34E-2
ADP-minerals & metals	kg Sbe	1,31E-3	1,21E-4	2,24E-5	1,46E-3	1,42E-3	1,6E-3	MND	MND	MND	MND	MND	MND	MND	4,69E-5	5,08E-6	3,4E-5	4,33E-6	-7,44E-4
ADP-fossil resources	MJ	9,06E2	1,1E2	5,4E1	1,07E3	8,57E2	5,59E2	MND	MND	MND	MND	MND	MND	MND	4,22E2	4,63E0	5,61E1	1,32E1	-8,61E1
Water use ¹⁾	m3e depr.	5,05E1	4,09E-1	8,22E-1	5,17E1	2,63E0	4,7E2	MND	MND	MND	MND	MND	MND	MND	7,88E-1	1,72E-2	1,93E-1	6,12E-1	-1,19E1

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) 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 experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e.

ADDITIONAL (OPTIONAL) 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
Particulate matter	Incidence	3,74E-6	6,39E-7	3,51E-7	4,73E-6	3,74E-6	7,19E-6	MND	MND	MND	MND	MND	MND	MND	2,42E-6	2,69E-8	4,59E-6	8,74E-8	-4,13E-7
Ionizing radiation ³⁾	kBq U235e	4,21E0	4,8E-1	2,21E-1	4,91E0	3,74E0	2,3E0	MND	MND	MND	MND	MND	MND	MND	1,81E0	2,02E-2	2,45E-1	5,43E-2	-6,31E-1
Ecotoxicity (freshwater)	CTUe	1,48E3	8,4E1	5,55E1	1,61E3	6,46E2	7,19E2	MND	MND	MND	MND	MND	MND	MND	2,48E2	3,54E0	5,91E1	8,36E0	-7,05E1
Human toxicity, cancer	CTUh	2,5E-7	2,15E-9	2,79E-9	2,55E-7	2,1E-8	2,71E-8	MND	MND	MND	MND	MND	MND	MND	2,11E-8	9,06E-11	1,78E-9	1,98E-10	-5,72E-9
Human tox. non-cancer	CTUh	7,93E-6	9,95E-8	5,06E-8	8,08E-6	7,12E-7	7,54E-7	MND	MND	MND	MND	MND	MND	MND	2,24E-7	4,2E-9	6,1E-8	6,11E-9	-3,87E-7
SQP	-	1,86E2	1,66E2	5,17E0	3,57E2	6,37E2	5,79E2	MND	MND	MND	MND	MND	MND	MND	1,08E1	6,99E0	3,04E0	2,25E1	-6,44E1

4) SQP = Land use related impacts/soil quality.5) 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.

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	MJ	6,99E1	1,38E0	1,3E1	8,42E1	1,13E1	2,85E1	MND	MND	MND	MND	MND	MND	MND	2,29E0	5,83E-2	1,39E0	1,07E-1	-8,4E0
Renew. PER as material	MJ	0E0	0E0	7,44E1	7,44E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	6,99E1	1,38E0	8,73E1	1,59E2	1,13E1	2,85E1	MND	MND	MND	MND	MND	MND	MND	2,29E0	5,83E-2	1,39E0	1,07E-1	-8,4E0
Non-re. PER as energy	MJ	8,91E2	1,1E2	5,4E1	1,05E3	8,57E2	5,59E2	MND	MND	MND	MND	MND	MND	MND	4,22E2	4,63E0	5,61E1	1,32E1	-8,61E1
Non-re. PER as material	MJ	1,52E1	0E0	0E0	1,52E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	9,06E2	1,1E2	5,4E1	1,07E3	8,57E2	5,59E2	MND	MND	MND	MND	MND	MND	MND	4,22E2	4,63E0	5,61E1	1,32E1	-8,61E1
Secondary materials	kg	2,01E1	0E0	0E0	2,01E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-6,75E-1
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	1,87E0	2,29E-2	1,56E-2	1,91E0	1,39E-1	1,08E1	MND	MND	MND	MND	MND	MND	MND	3,73E-2	9,64E-4	7,24E-3	1,45E-2	-9,54E-1

6) 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	6,62E0	1,07E-1	2,76E-1	7E0	8,76E-1	2,41E0	MND	MND	MND	MND	MND	MND	MND	4,55E-1	4,5E-3	0E0	1,24E-2	-3,31E-1
Non-hazardous waste	Kg	1,28E2	1,18E1	4,91E0	1,45E2	5,44E1	6,69E1	MND	MND	MND	MND	MND	MND	MND	4,86E0	4,98E-1	0E0	9E1	-1,87E1
Radioactive waste	Kg	4,16E-3	7,54E-4	2,82E-4	5,19E-3	5,89E-3	2,82E-3	MND	MND	MND	MND	MND	MND	MND	2,96E-3	3,18E-5	0E0	8,76E-5	-4,54E-4

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	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	5,73E0	5,73E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,1E2	0E0	0E0
Materials for energy rec	Kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO2e	1,41E-1	7,07E-3	-1,7E-3	1,47E-1	5,8E-2	4,73E-2	MND	MND	MND	MND	MND	MND	MND	3,1E-2	2,98E-4	4,05E-3	4,75E-4	-5,41E-3
ADP-minerals & metals	kg Sbe	1,31E-6	1,21E-7	2,24E-8	1,46E-6	1,42E-6	1,6E-6	MND	MND	MND	MND	MND	MND	MND	4,69E-8	5,08E-9	3,4E-8	4,33E-9	-7,44E-7
ADP-fossil	MJ	9,06E-1	1,1E-1	5,4E-2	1,07E0	8,57E-1	5,59E-1	MND	MND	MND	MND	MND	MND	MND	4,22E-1	4,63E-3	5,61E-2	1,32E-2	-8,61E-2
Water use	m3e depr.	5,05E-2	4,09E-4	8,22E-4	5,17E-2	2,63E-3	4,7E-1	MND	MND	MND	MND	MND	MND	MND	7,88E-4	1,72E-5	1,93E-4	6,12E-4	-1,19E-2
Secondary materials	kg	2,01E-2	0E0	0E0	2,01E-2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-6,75E-4
Biog. C in product	kg C	0E0	0E0	0E0	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	0E0	0E0	4,17E-3	4,17E-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7) Biog. C in product = Biogenic carbon content in product

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Market for electricity, medium voltage (Reference product: electricity, medium voltage)
Electricity CO2e / kWh	0.5
District heating data source and quality	-
District heating CO2e / kWh	-

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO2e emissions, kg CO2e / tkm	0.11
Average transport distance, km	67
Capacity utilization (including empty return) %	100
Bulk density of transported products	2448
Volume capacity utilization factor	<1

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1000
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	910kg average for

Scenario parameter	Value
Recovery process – kg for energy recovery	-
Disposal (total) – kg for final deposition	90
Scenario assumptions e.g. transportation	End of life product

BIBLIOGRAPHY

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

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Ecoinvent database v3.6 (2019) and One Click LCA database.

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

RTS PCR (English version 26.8.2020)

T-Wall LCA background report 06.07.2021

Recovery rate from non-hazardous construction and demolition (C&D) waste, Defra Waste Statistics (2020)

ABOUT THE MANUFACTURER

Reinforced Earth is a design and supply company providing structural soil engineered retaining solutions. Part of the Soletanche Freyssinet group of companies. Reinforced Earth/Terre Armee were the pioneers of reinforced soil solutions in the early 1960's. As the global market leader, Reinforced Earth is established as an innovative and sustainable technology organisation that has been used globally on over 100,000 projects and installed over 60million m². Our retaining walls, steep slopes, bridge abutments, pre-cast arches, geosynthetics and noise barrier solutions offer value engineered, quick installation, low-carbon sustainable solutions, durable and safe installations that have been used in roads, rail, housing, industry, mining, defence, coastal, river, dam and avalanche barriers.

Reinforced Earth Company outsource concrete manufacturing to a Northern Irish supplier, who have been our preferred supplier for over 10 years.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Reinforced Earth Company Ltd
EPD author	David Carson, Reinforced Earth Company Ltd
EPD verifier	Anni Oviir, Rangi Maja OÜ www.lcasupport.com
EPD program operator	Rakennustietosäätiö RTS sr Rakennustieto Oy Malminkatu 16 A, PL 1004, 00101 Helsinki rts@rakennustieto.fi
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Cementious Products

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 EN 15804, 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 background report (project report) for this EPD

Why does verification transparency matter? [Read more online.](#)

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Anni Oviir, Rangi Maja OÜ
EPD verification started on	3.8.2021
EPD verification completed on	8.8.2021
Approver of the EPD verifier	The Building Information Foundation RTS sr

Author & tool verification	Answer
EPD author	David Carson, Reinforced Earth
EPD author training completion	30.9.2020
EPD Generator module	Cementious Products
Independent software verifier	Anni Oviir, Rangi Maja OÜ
Software verification date	27.6.2020

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 EN 15804:2012+A2:2019.

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.



Anni Oviir, Rangi Maja OÜ www.lcasupport.com

ANNEX 1 : 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 CO2e	1,38E2	7E0	3,98E0	1,49E2	5,75E1	4,31E1	MND	MND	MND	MND	MND	MND	MND	3,08E1	2,95E-1	4,04E0	4,65E-1	-5,23E0
Ozone depletion Pot.	kg CFC11e	6,15E-6	1,32E-6	2,16E-7	7,69E-6	1,03E-5	4,67E-6	MND	MND	MND	MND	MND	MND	MND	5,25E-6	5,57E-8	6,71E-7	1,55E-7	-5,24E-7
Acidification	kg SO2e	3,61E-1	1,44E-2	1,61E-2	3,91E-1	2,96E-1	1,33E-1	MND	MND	MND	MND	MND	MND	MND	4,53E-2	6,06E-4	9,14E-3	1,87E-3	-2,28E-2
Eutrophication	kg PO4 3e	1,16E-1	2,9E-3	4,53E-3	1,23E-1	4,27E-2	7,24E-2	MND	MND	MND	MND	MND	MND	MND	7,98E-3	1,22E-4	2,51E-3	3,63E-4	-1,22E-2
POCP ("smog")	kg C2H4e	1,69E-2	9,11E-4	7,51E-4	1,86E-2	1,17E-2	1,28E-2	MND	MND	MND	MND	MND	MND	MND	5,41E-3	3,84E-5	7,23E-4	1,37E-4	-1,09E-3
ADP-elements	kg Sbe	1,31E-3	1,21E-4	2,24E-5	1,46E-3	1,42E-3	1,6E-3	MND	MND	MND	MND	MND	MND	MND	4,69E-5	5,08E-6	3,4E-5	4,33E-6	-7,44E-4
ADP-fossil	MJ	9,06E2	1,1E2	5,4E1	1,07E3	8,57E2	5,59E2	MND	MND	MND	MND	MND	MND	MND	4,22E2	4,63E0	5,61E1	1,32E1	-8,61E1

ANNEX 2 : ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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 CO2e	1,37E2	6,99E0	3,99E0	1,48E2	5,74E1	4,29E1	MND	MND	MND	MND	MND	MND	MND	3,07E1	2,95E-1	4,02E0	4,62E-1	-5,23E0
Ozone Depletion	kg CFC11e	7,93E-6	1,76E-6	2,89E-7	9,98E-6	1,37E-5	6,25E-6	MND	MND	MND	MND	MND	MND	MND	7E-6	7,42E-8	8,93E-7	2,06E-7	-6,9E-7
Acidification	kg SO2e	4,03E-1	2,59E-2	1,69E-2	4,46E-1	3,86E-1	3,13E-1	MND	MND	MND	MND	MND	MND	MND	1,22E-1	1,09E-3	3,94E-2	3,99E-3	-3,26E-2
Eutrophication	kg Ne	3,96E-2	3,63E-3	1,78E-3	4,5E-2	3,45E-2	3,08E-2	MND	MND	MND	MND	MND	MND	MND	1,55E-2	1,53E-4	3,52E-3	4,78E-4	-4,27E-3
POCP ("smog")	kg O3e	6,15E0	5,67E-1	2,36E-1	6,95E0	7,75E0	7,58E0	MND	MND	MND	MND	MND	MND	MND	3,21E0	2,39E-2	1,13E0	9,85E-2	-5,14E-1
ADP-fossil	MJ	7,85E1	1,57E1	6,07E0	1E2	1,23E2	5,98E1	MND	MND	MND	MND	MND	MND	MND	6,25E1	6,64E-1	7,98E0	1,92E0	-7,16E0