Statement of Verification

BREG EN EPD No.: 000593 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

CCL Stressing International Ltd

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1 kg of Sheartrack (R) assemblies

Company Address

CCL Stressing International
Unit 8,
Millennium Drive,
Leeds,
LS11 5BP

DPatel	Deep Patel	23 August 2024
Signed for BRE Global Ltd	Operator	Date of this Issue
23 August 2024		22 August 2029
Date of First Issue		Expiry Date

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Environmental Product Declaration

EPD Number: **000593**

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.1
Commissioner of LCA study	**LCA consultant/Tool**
CCL Stressing International Unit 8, Millennium Drive, Leeds, LS11 5BP	LCA Consultant: Bala Subramanian LCA Tool: BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1 kg of Sheartrack (R) assemblies	Other (please specify). Product Specific
EPD Type	**Background database**
Cradle to Gate with Module C and D	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Pat Hermon
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

CCL USA,
8296 Sherwick Ct,
Jessup,
MD USA

Construction Product:

Product Description

CCL Sheartrack (R) assemblies are headed shear stud reinforcement consisting of individual headed studs or groups of headed studs, welded to a flat steel rail. They are mainly used in flat slabs, drop panels, column capitals, or foundations to increase punching shear capacity of the surrounding concrete element. They are typically installed around the columns, in place of shear reinforcement stirrups, links or hooks. The assemblies must comply with the building code requirements and be placed on site at a specified location as required by design.

Technical Information

CCL Sheartrack (R) assemblies are certified headed shear stud reinforcement meeting ASTM 1044 requirements (or equivalent for non-US usage). The certificate is renewed yearly and can be found on CCL website. Headed Studs are produced from ASTM A29 Grade 1010 through Grade 1020. Rails are produced from ASTM A36/A529 steel plate. Both studs and rails must comply with ASTM A1044 material properties as follows:

Headed Studs: The studs conform to the following physical and mechanical requirements in accordance with the prescribed values.

Property	Value, Unit
Tensile strength, min, psi (MPa)	65,000 (450)
Yield Strength, min, psi (MPa)	51,000 (350)
Elongation in 2 in. (50mm), min, %	20
Reduction of area, min, %	50

The studs may have a galvanised coating conforming to ASTM A123 and ASTM A153. Galvanisation to Sheartrack (R) assembly is applied after welding has been completed.

Flat Rails: The Flat rails are produced from ASTM A36/ASTM A529 steel plates and must conform to the following physical and mechanical requirements in accordance with the prescribed values.

Property	Value, Unit
Tensile strength, min, psi (MPa)	65,000 (450)
Yield Strength, min, psi (MPa)	44,000 (300)
Elongation in 8 in. (200mm), min, %	20

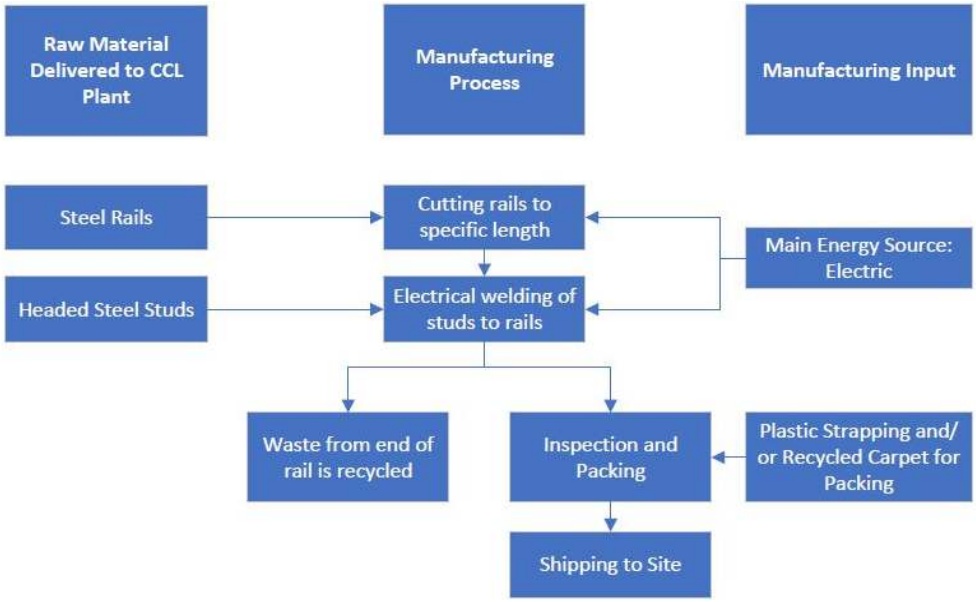
Main Product Contents

Material/Chemical Input	%
Hot Roll - Merchant Bar Quality	35%
Grade C-1015 Steel	65%

Manufacturing Process

CCL Sheartrack (R) assemblies are factory-welded to the flat steel rail using certified welding equipment in accordance with procedures recommended by AWS. All welding is done at CCL facility and complies with AWS D1.1/D1.1M requirements.

Process flow diagram



End of Life

The end-of-life stage starts when the construction product is replaced, dismantled, or deconstructed from the building or construction work and does not provide any further function. Deconstruction will happen for the entire building by using power tools, so while comparing the energy used to deconstruct the building and the quantity used to remove the Sheartrack Assemblies, which is very small, it is negligible. The recovered steel is transported for recycling, while a small portion is assumed to be unrecoverable and remains in the rubble, which is sent to landfills (BRE PCR 3.1).

Life Cycle Assessment Calculation Rules

Declared / Functional unit description.

1 kg of Sheartrack (R) assemblies

System boundary

This is a cradle-to-gate with modules C and D LCA, reporting all production life cycle stages of modules A1 to A3 and end of life stages C1-C4, and D in accordance with EN 15804:2012+A2:2019 and BRE 2023 Product Category Rules (PN 514 Rev 3.1).

Data sources, quality and allocation

The datasets are derived from Ecoinvent v3.8, and the LCA tool used was BRE LINA A2. In this EPD, Sheartrack (R) assemblies product have been calculated for 1kg. The quantity used in the data collection for this EPD is therefore a total production data of Sheartrack (R) Assemblies produced during the data collection period (01/01/22-31/12/22) manufactured at CCL USA. Sheartrack (R) assemblies are manufactured from single headed studs that are mechanically welded to a steel base rail. The stud's diameter typically ranges from 3/8"

(9.5mm) to 3/4" (19.1mm) and are manufactured to a given height. A number of studs are then welded to the rail based on a specified spacing between each stud to form the Sheartrack (R) assembly. So, in this EPD, the total quantity of rail and stud used for the Sheartrack (R) assemblies have been used for the LCA modelling.

CCL USA manufactures other products along with the Sheartrack (R) assemblies therefore allocation of fuel consumption, water consumption & discharge, and waste emissions was required, and this has been done according to the provisions of the BRE PCR PN514 and EN 15804.The original data collection form has been used while doing an LCA analysis, there was a no uplift in the given data. Electricity consumption was determined by measuring the consumption on the manufacturing site for all production lines and weighted proportionally by production of the assemblies. The consumption of water is calculated based on the factual consumption. The manufacturer has confirmed that there is a packaging material has been used during the data collection period and it is negligible.

ISO14044 guidance. **Quality Level**	**Geographical representativeness**	**Technical representativeness**	**Time representativeness**
Very Good	Data from area under study.	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e., identical technology).	n/a
Very Good	n/a	n/a	There is approximately 1-2 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

The original data collection form has been used while doing an LCA analysis, there was a no uplift in the given data. Specific European datasets have been selected from the ecoinvent LCI for this LCA. Manufacturer uses the national grid electricity and natural gas for production, so therefore the most recent US consumption mix has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of electricity, US kWh is 0.1417 in kgCO2e/kWh and the GWP of 1kWh of Natural gas, at industrial furnace is 0.2564 kgCO2e/kWh. The quality level of time representativeness is also Very Good as the background LCI datasets are based on ecoinvent v3.8 which was compiled in 2021. Therefore, there is less than 5 years between the ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

All inputs or outputs have been included and all raw materials, transport, energy, water use and wastes, are included, except packaging and direct emissions to air, water and soil, which are not measured. Upstream extraction and/or processing of inputs are included within the use of the background datasets within LINA.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	2.07E+00	2.07E+00	4.03E-04	8.74E-04	9.01E-08	8.33E-03	9.97E-04
	Transport	A2	6.29E-02	6.28E-02	5.35E-05	2.47E-05	1.45E-08	2.55E-04	4.04E-06
	Manufacturing	A3	1.21E-01	1.20E-01	8.90E-04	5.26E-05	7.16E-09	3.97E-04	8.81E-05
	Total (Consumption grid)	A1-3	2.25E+00	2.25E+00	1.35E-03	9.51E-04	1.12E-07	8.99E-03	1.09E-03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% Recycled & 5% Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	8.32E-03	8.31E-03	7.08E-06	3.26E-06	1.92E-09	3.37E-05	5.35E-07
	Waste processing	C3	5.47E-02	5.47E-02	1.93E-05	5.46E-06	1.17E-08	5.68E-04	1.69E-06
	Disposal	C4	2.64E-04	2.63E-04	2.61E-07	2.49E-07	1.07E-10	2.48E-06	2.41E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.74E+00	-1.75E+00	3.98E-03	-1.10E-03	-7.95E-08	-6.71E-03	-7.71E-04

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral &metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	1.85E-03	1.97E-02	9.31E-03	2.36E-05	2.08E+01	4.80E-01	1.49E-07
	Transport	A2	7.68E-05	8.39E-04	2.57E-04	2.18E-07	9.49E-01	4.27E-03	5.42E-09
	Manufacturing	A3	1.05E-04	6.87E-04	2.00E-04	2.07E-07	2.00E+00	-9.33E-03	2.60E-09
	Total (Consumption grid)	A1-3	2.03E-03	2.12E-02	9.77E-03	2.40E-05	2.38E+01	4.75E-01	1.57E-07
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
95% Recycled & 5% Landfill									
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.02E-05	1.11E-04	3.40E-05	2.89E-08	1.26E-01	5.65E-04	7.17E-10
	Waste processing	C3	2.52E-04	2.76E-03	7.58E-04	2.81E-08	7.50E-01	1.73E-03	1.52E-08
	Disposal	C4	8.61E-07	9.42E-06	2.74E-06	6.01E-10	7.35E-03	3.37E-04	4.99E-11
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.61E-03	-1.69E-02	-8.29E-03	-2.38E-06	-1.70E+01	-4.18E-01	-1.33E-07

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	8.38E-02	6.14E+01	1.29E-08	4.75E-08	6.42E+00
	Transport	A2	4.88E-03	7.41E-01	2.40E-11	7.77E-10	6.52E-01
	Manufacturing	A3	4.22E-02	2.16E+00	3.57E-11	8.82E-10	3.21E-01
	Total (Consumption grid)	A1-3	1.31E-01	6.43E+01	1.29E-08	4.92E-08	7.39E+00
Construction process stage	Transport	A4	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
95% Recycled & 5% Landfill							
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.46E-04	9.81E-02	3.18E-12	1.03E-10	8.63E-02
	Waste processing	C3	3.38E-03	4.39E-01	1.70E-11	3.18E-10	9.55E-02
	Disposal	C4	3.27E-05	4.64E-03	1.18E-13	3.05E-12	1.54E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.30E-02	-4.88E+01	-1.02E-08	-3.63E-08	-4.69E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.73E+00	0.00E+00	1.73E+00	2.06E+01	0.00E+00	2.06E+01
	Transport	A2	1.34E-02	0.00E+00	1.34E-02	9.32E-01	0.00E+00	9.32E-01
	Manufacturing	A3	5.41E-03	0.00E+00	5.41E-03	4.82E-02	1.27E-03	4.94E-02
	Total (Consumption grid)	A1-3	1.75E+00	0.00E+00	1.75E+00	2.16E+01	1.27E-03	2.16E+01
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% Recycled & 5% Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.77E-03	0.00E+00	1.77E-03	1.23E-01	0.00E+00	1.23E-01
	Waste processing	C3	4.20E-03	0.00E+00	4.20E-03	7.36E-01	0.00E+00	7.36E-01
	Disposal	C4	6.27E-05	0.00E+00	6.27E-05	7.22E-03	0.00E+00	7.22E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.37E-01	0.00E+00	-5.37E-01	-1.67E+01	0.00E+00	-1.67E+01

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.20E-01	0.00E+00	0.00E+00	1.25E-02
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	1.06E-04
	Manufacturing	A3	7.66E-06	0.00E+00	0.00E+00	-1.43E-04
	Total (Consumption grid)	A1-3	2.20E-01	0.00E+00	0.00E+00	1.25E-02
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
95% Recycled & 5% Landfill						
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	1.40E-05
	Waste processing	C3	2.88E-04	0.00E+00	0.00E+00	4.28E-05
	Disposal	C4	1.52E-06	0.00E+00	0.00E+00	7.88E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-1.00E-02

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	7.64E-01	3.83E+00	3.80E-05
	Transport	A2	1.05E-03	1.86E-02	6.42E-06
	Manufacturing	A3	1.43E-04	1.82E-03	2.32E-07
	Total (Consumption grid)	A1-3	7.65E-01	3.85E+00	4.47E-05
Construction process stage	Transport	A4	MND	MND	MND
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
95% Recycled & 5% Landfill					
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.39E-04	2.46E-03	8.50E-07
	Waste processing	C3	9.88E-04	6.92E-03	5.18E-06
	Disposal	C4	7.65E-06	1.08E-04	4.82E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.25E-01	-2.77E+00	-2.73E-05

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	4.47E-05	1.45E-07	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total (Consumption grid)	A1-3	0.00E+00	3.26E-02	1.45E-07	0.00E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
95% Recycled & 5% Landfill								
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	9.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 - Deconstruction	The end-of-life stage starts when the construction product is replaced, dismantled, or deconstructed from the building or construction work and does not provide any further function. Deconstruction will happen for the entire building by using power tools, so while comparing the energy used to deconstruct the building and the quantity used to remove the Sheartrack assemblies, which is very small, it is negligible. The recovered steel is transported for recycling, while a small portion is assumed to be unrecoverable and remains in the rubble, which is sent to landfills		
C2- Transportation	50km by road has been modelled for module C2 as a typical distance from the demolition site to the disposal unit. However, end-users of the EPD can use this information to calculate the impacts of a bespoke transport distance for module C2 if required.		
	Fuel type / Vehicle type	Road transport	16–32-ton lorry
	Deconstruction site to the disposal unit	km	50
C3 – Preprocessing	In this scenario, it is assumed as 95 % recycling rate for the steel product according to BRE PCR 3.1. The remaining 5 % is assumed to remain uncollected or to go to disposal e.g., landfill. The energy used for processing the recovered steel is not included in module C3, it is assumed to be very small and effectively negligible.		
	Recovered Sheartrack assemblies to recycling	kg	0.95
	5% is assumed as unrecoverable so they will be sent to landfill		
	Unrecovered Sheartrack assemblies to landfill	kg	0.05
Module D	“Benefits and loads beyond the system boundary” (module D) accounts for the environmental benefits and loads resulting from Iron and steel that is used as raw material in the EAF or BOF and that is collected for recycling at end of life. These benefits and loads are calculated by excluding the pre-existing recycled steel that is used in the primary process. In the pre-processing stage, 0.95 kg of recovered steel is recycled, initially which is a mix of scrap steel (34%) and virgin steel (66%). In order to calculate the benefits of the product at Module D, the pre-existing content of scrap steel in the recovered steel waste should be excluded from 0.95 kg, i.e., 0.323 kg of pre-existing content should be avoided and only 0.627 kg of virgin steel should be considered in Module D. In line with this, 0.627 kg of virgin steel recovered from the demolition sites can be used to offset the impacts of 0.627 kg of virgin steel material in A1, and it is assumed that there is a 100% recycling yield from the recycling process		

Interpretation of results:

The Sheartrack Assemblies are made up of 100% steel, so the bulk of the environmental impacts and primary energy demand are attributed to the upstream manufacturing process, covered by information modules A1-A3 of EN15804:2012+A2:2019.

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