Statement of Verification

BREG EN EPD No.: 000471 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Keyfix

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

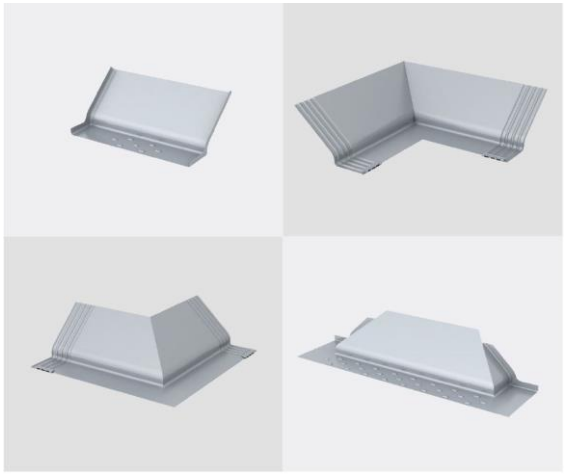
BRE Global Scheme Document SD207

This declaration is for:

1kg of Stainless-steel Non-combustible cavity tray

Company Address

Keyfix Cookstown
Ballyreagh Business Park,
Cookstown,
Tyrone,
BT80 9DG



Signed for BRE Global Ltd	Emma Baker Operator	21 December 2022 Date of this Issue
21 December 2022 Date of First Issue		20 December 2027 Expiry Date

Environmental Product Declaration

EPD Number: 000471

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Keyfix Cookstown Ballyreagh Business Park, Cookstown, Tyrone, BT80 9DG	LCA consultant: Bala Subramanian, BRE Tool: BRE LINA v2.0
Declared Unit	**Applicability/Coverage**
1kg of Stainless-steel Non-combustible cavity tray	Product Specific.
EPD Type	**Background database**
Cradle to Gate with options	ecoinvent v3.2

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: Nigel Jones
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+A1:2013. 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+A1:2013 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)

KG3 Ballyreagh Industrial Estate,
Sandholes Road,
Cookstown,
Co. Tyrone,
BT80 9DG

Construction Product

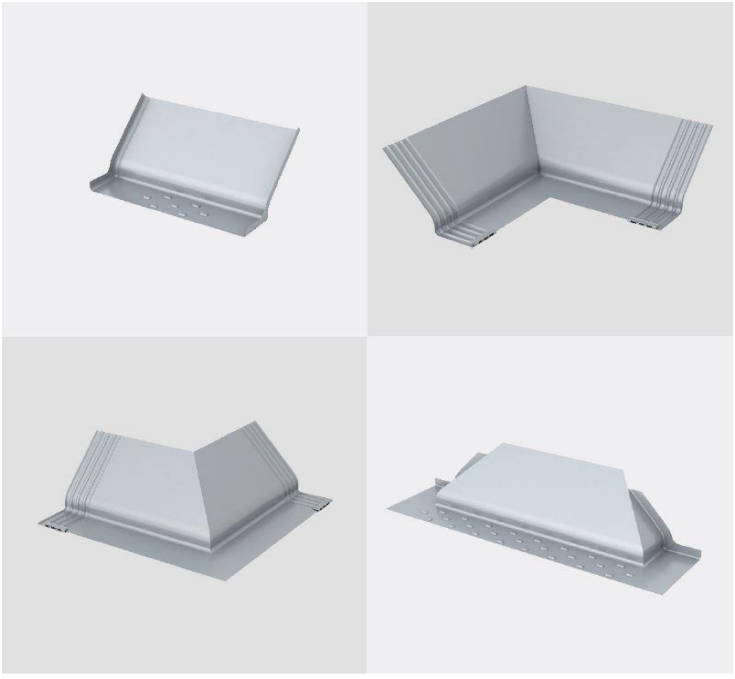
Product Description

Non-combustible Cavity Tray (NCCT) is a damp-proof course (DPC) that crosses the cavity of a cavity wall to prevent dampness from penetrating the internal skin of the wall. It is manufactured using class A1 non-combustible austenitic stainless steel grade 304 & grade 316 if required. Building regulations require cavity trays to prevent moisture that is travelling downward from being carried to the inner leaf, whereas damp-proof courses tend to be used to prevent rising damp. To accomplish this, the NCCT are designed to be self-supporting across the cavity and do not require support from the internal structure, thereby eliminating clashes with other components. Moreover, the NCCT incorporates integral stop ends on each tray to ensure water is trapped and channelled outwards via the Keyfix NCW (Non-combustible Weep). If necessary, the integral Stop Ends allow for perpendicular joint width adjustment of +/-3mm between 7 and 13mm.

Technical Information

Property	Value, Unit
Material	Austenitic Stainless Steel. Grade 1.4301 (AISI 304) Stainless Steel, as standard. Grade 1.4401 (AISI 316) Stainless Steel, if required.
Material Thickness	Non – Welded Components = 0.5mm Thick. Welded Components = 0.9mm Thick.
Product Dimensions	Designed to suit 102.5mm wall type as standard. Keyfix NCCT can be manufactured to suit bespoke brickwork dimensions.
Cavity Widths Accommodated	50mm and above.

Property	Value, Unit
Lateral Adjustment	Keyfix NCCT Stop Ends facilitate perp joint width adjustability of +/- 3mm between 7-13mm if required.
Component Length	200mm – 2500mm.
Component Weight	Up to Maximum of 2.5kg/m
Product Durability	Under normal service conditions, lifespan is 125+ years
Shear Strength	BBA Test Method. Test Report: T164377 Tested in accordance with BS EN 1052-4:2000
Flexural Bond Strength	BBA Test Method. Test Report: T164377 Tested in accordance with DD 86-1:1983
Effectiveness of Water Discharge	BBA Test Method. Test Report: T164436. Keyfix NCCT including external and internal Corner Units sustained a flow of 0.45L per minute per linear meter for a period of one hour without leaking
Behaviour in relation to fire	Keyfix NCCT manufactured from Stainless Steel have an A1 fire classification defined by Commission Decision 96/603/EC. No test required
Behaviour under load	Keyfix NCCT will not adversely affect ability of the wall to sustain and transmit compressive load.
Behaviour in mortar	Keyfix NCCT is finished with patented indents which help key into mortar during install. Indented surface also ensures no risk in rising damp as associated to perforated cavity tray systems. Stainless Steel does not react to alkaline in cement/water, unlike Aluminium and Zinc, so zero threat of corrosion.
Product Handling	Follow safe lifting and manual handling procedure when using product. Wear Cut Level 5 Safety Gloves when handling product to avoid cuts or abrasions.



Main Product Contents

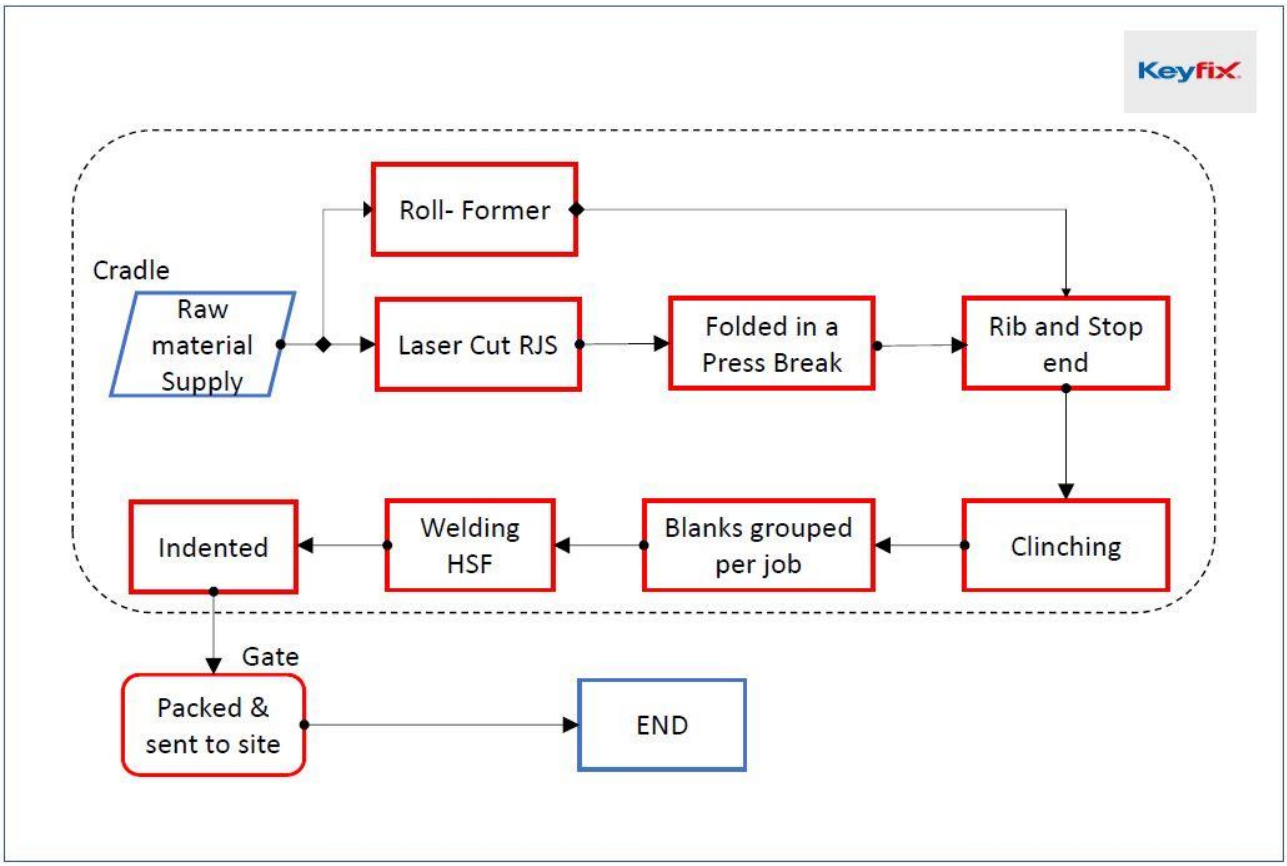
Cavity trays are made from 100% stainless steel. No other materials are mixed during the manufacturing process.

Material/Chemical Input	%
Stainless Steel	100

Manufacturing Process

Cavity trays are manufactured either using a roll former or by laser cutting and folding. The stainless-steel sheets will go through a ribbed phase before being clinched to remove any significant blockages in the folded sheet while still protecting sharp edges. This technique has the advantage of being able to be cut on both faces and edges. Thus, after the ribbing process, the sheets will undergo a bulk-sheet metal-forming method called "clinching." It uses specialised tools to plastically interlock two or more thin metal sheets together in order to link them together without the need for any other components. Production of cavity trays will be based on the customer's requirements for the different projects, so that folded sheets can be blanked and then cut to the necessary size through the blanking process, which will be followed by the welding process. In the final phase, an indented line will be framed through the bending process. Therefore, the finished cavity trays will be transported to the construction site.

Process flow diagram



Construction Installation

Cavity trays should be installed as close as possible to the item being protected or within a maximum of 225 mm. Place a NCCT in 1/2 bed of mortar below the corner tray and the first brick tray, beginning at the corner. Non-combustible stainless-steel weep should be placed 225mm from the outside of the buttered up stop end. Weeps should be installed within 450mm from the inside of overlapping brick trays' stop ends and thereafter at 450mm centres. Make certain that the perineal joint is filled on top of the weep. During the installation process, no additional fixings, sealants, or fabrication are required, so installation of the trays will not impede the speed of brick laying when compared to any traditional DPC.

Use Information

The NCCT will be used as an integral component of the building. In line with that, the design is based on the "fix and forget" principle, so after the NCCT is installed in the buildings, they do not require any maintenance, repair, or replacement until the end of their life cycle.

End of Life

NCCT are an integral component of a building greater than 18m tall. Therefore, deconstruction will take place along with the entire building. Cavity Tray components can then be salvaged, sorted, and recycled accordingly. At the end of life, the collected cavity trays will be recycled through the recycling processor, which feeds the scrap into a large shredder to break it into smaller pieces. It is chemically analysed and stored by type. This process may include ‘blending’ the scrap into chrome steels, nickel alloys, and other types of stainless steel. Scrap and the other raw materials are melted in an electric furnace. After melting, impurities are removed to refine the molten metal, and the chemistry is again analysed to make any final adjustments necessary for the specific type of stainless steel being produced. The molten stainless steel is formed into slabs before being production of plate, sheet, coil, wire, and other forms in preparation for use by manufacturers.

The module D, which presents the results of the environmental loads or benefits that have been calculated according to end-of-life scenario.

Life Cycle Assessment Calculation Rules

Declared unit description

Declared unit: 1 kg of Non-Combustible Cavity Trays.

System boundary

This is a cradle-to-gate with options LCA study that follows the modular design defined in EN 15804:2012+A1:2013.

Data sources, quality and allocation

Datasets are derived from ecoinvent v3.2 (2015) and the LCA tool used was BRE LINA v2.0. The LCA work which uses the manufacturer-specific data from Keyfix Ltd., covers a period of one year (01/01/21 – 31/12/21). The LCA models and reports the production stage modules, A1 to A3, A4, A5, C4 and D modules. No inputs or outputs have been excluded and all raw materials, packaging and transport, energy, water use and wastes, are included. The only exceptions are the direct emissions to air, water, and soil, which are not measured.

Keyfix are manufacture other products in addition to Non-combustible cavity tray (NCCT), therefore an allocation of fuel consumption, water consumption & discharge, and waste emissions was required. So, the allocation has made based on the total production output of NCCT. The quantity used in the data collection for this EPD is therefore an average value, based on the total quantity of NCCT manufactured during the data collection period (01/01/21 - 31/12/21). The original data collection form has been used while doing an LCA analysis, there was a no uplift in the given data.

Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e., raw material production) from the Ecoinvent 3.2 database. All Ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804.

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
Fair	n/a	n/a	There is approximately 5-6 years between the Ecoinvent LCI reference year, and the time period for which the LCA was undertaken.

Specific European and UK datasets have been selected from the Ecoinvent LCI for this LCA. The quality level of geographical and technical representativeness is therefore Very Good. The quality level of time representativeness is Fair as the background LCI datasets are based on Ecoinvent v3.2 which was compiled in 2015. Therefore, there is approximately 5-6 years between the Ecoinvent LCI reference year and the time period for which the LCA was undertaken.

Cut-off criteria

All the raw materials, ancillary materials, process energy, general energy, water use/discharge and production waste have been included. Direct emissions to air, water, and soil are not measured**.**

LCA Results

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

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	5.20E+00	2.68E-07	3.20E-02	9.51E-03	3.47E-03	1.60E-04	6.80E+01
	Transport	A2	5.23E-02	9.84E-09	1.99E-04	5.08E-05	3.94E-05	9.59E-08	8.10E-01
	Manufacturing	A3	1.63E-02	1.62E-09	1.85E-04	6.73E-05	4.70E-05	1.01E-07	1.10E+00
	Total (of product stage)	A1-3	5.27E+00	2.79E-07	3.24E-02	9.63E-03	3.55E-03	1.61E-04	6.99E+01
Construction process stage	Transport	A4	3.61E-01	6.29E-08	1.20E-03	3.27E-04	1.97E-04	1.71E-06	5.35E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND	MND
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.34E-03	3.54E-10	9.41E-06	3.09E-06	1.57E-06	1.91E-09	3.30E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.44E+00	-1.26E-07	-1.50E-02	-4.47E-03	-1.63E-03	-7.52E-05	-3.20E+01

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

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	1.43E+01	8.37E-06	1.43E+01	7.24E+01	0.00E+00	7.24E+01
	Transport	A2	1.31E-02	4.33E-08	1.31E-02	8.07E-01	0.00E+00	8.07E-01
	Manufacturing	A3	3.49E-01	9.74E-07	3.49E-01	1.19E+00	0.00E+00	1.19E+00
	Total (of product stage)	A1-3	1.46E+01	9.38E-06	1.46E+01	7.44E+01	0.00E+00	7.44E+01
Construction process stage	Transport	A4	8.39E-02	4.28E-07	8.39E-02	5.33E+00	0.00E+00	5.33E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	1.01E-03	2.76E-09	1.01E-03	3.32E-02	0.00E+00	3.32E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.72E+00	-3.93E-06	-6.72E+00	-3.40E+01	0.00E+00	-3.40E+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	0.00E+00	0.00E+00	0.00E+00	5.83E-02
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	1.93E-04
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	9.91E-04
	Total (of product stage)	A1-3	0.00E+00	0.00E+00	0.00E+00	5.94E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	1.30E-03
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	3.72E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-2.74E-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	4.69E+00	1.09E+00	1.57E-04
	Transport	A2	3.48E-04	6.36E-02	5.59E-06
	Manufacturing	A3	7.34E-04	3.30E-03	1.30E-06
	Total (of product stage)	A1-3	4.69E+00	1.16E+00	1.64E-04
Construction process stage	Transport	A4	3.22E-03	1.56E-01	3.55E-05
	Construction	A5	0.00E+00	0.00E+00	0.00E+00
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
End of life	Deconstruction, demolition	C1	MND	MND	MND
	Transport	C2	MND	MND	MND
	Waste processing	C3	0.00E+0	0.00E+0	0.00E+0
	Disposal	C4	2.49E-05	1.30E-01	2.04E-07
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.20E+00	-5.12E-01	-7.38E-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
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	1.26E-02	0.00E+00	0.00E+00
	Total (of product stage)	A1-3	0.00E+00	1.26E-02	0.00E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	2.07E+03	2.00E+03	0.00E+00	0.00E+00
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
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	0.00E+0	8.70E-01	0.00E+0	0.00E+0
	Disposal	C4	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+0	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
A4 – Transport to the building site	Once the NCCT's have been manufactured, they will be transported to the construction site for the installation.		
	Transport mode	**Transport type**	**Distance (km)**
	Road Transport	Lorry, 3.5 - 7.5 metric ton	700
	Water Transport	Ship, sea	72
	Capacity utilisation (incl. empty returns)	%	40
	Bulk density of transported products	kg/m3	8000
A5 – Installation in the building	During the installation, NCCT will be start installing from the corner, by placing NCCT on the ½ bed mortar below the corner tray and first brick tray and continue to install from left to right. Use jointing pieces to connect brick trays. No additional fixings, sealants or fabrication are required for installation of the trays. After installation, the cavity tray is "Fix and Forget" therefore no additional on-site work required.		
	Installation wastage rate	%	0
C1 to C4 End of life,	The end-of-life stage starts when the product is replaced, dismantled, and does not provide any further function. The recovered steel is transported for recycling while a small portion is assumed to be unrecoverable which is considered to send to landfill. 87% of the steel is assumed to be recycled and 13% is sent to landfill (Bowyer, et al., 2015). Once steel scrap is generated through the deconstruction activities on the demolition site it is considered to have reached the “end of waste” state. No further processing is required so there are no impacts associated with this module. Hence no impacts are reported in module C3.		
Module D	After building demolition, the collected cavity trays will be recycled through the recycling processor. The composition of the cavity tray includes 40% recycled content, so therefore, pre-processed cavity trays can be used in place of virgin materials. In line with this, 0.87 kg of scrap steel waste recovered from the building demolition sites can be used to offset the impacts of 0.60 kg of virgin material, and it is assumed that there is a 100% recycling yield from the recycling process.		

Interpretation

As the product is 100% stainless steel, most of the environmental impacts are attributed to the manufacturing phase, covered by information modules A1-A3 of EN15804:2012+A1:2013.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

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J. Bowyer, S. Bratkovich, K. Fernholz, M. Frank, H. Groot, J. Howe, E. Pepke, Understanding Steel Recovery and Recycling Rates and Limitations to Recycling, Dovetail Partners Inc., Minneapolis, MN, USA, 2015, pp. 1e12, 2015.