Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Architectural precast concrete cladding panels (grey concrete)

Sector EPD

Mineral Products Association (MPA)

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	Sector EPD (based on an average product)
EPD registration number:	EPD-IES-0026577:001
Version date:	2026-03-04
Validity date:	2031-03-04
	An EPD may be updated or de-published if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *PCR 2019:14 Construction products, version 2.0.1 Published on 2025.06.05, UN CPC code 3755.*
PCR review was conducted by: The Technical Committee of the International EPD System, chaired by Rob Rouwette (Chair) and Noa Meron (co-Chair). A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com.
c-PCR, if applicable: *c-PCR 003, v1.0.0 Concrete and concrete elements (EN16757:2022).*

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: *Chris Foster, Eugeos* Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Mineral Products Association (MPA)

Address: 1st Floor, 297 Euston Road, London NW1 3AD

Contact: hafiz.elhag@mineralproducts.org.

LCA practitioner: Dr. Hafiz Elhag, MPA (hafiz.elhag@mineralproducts.org).

Description of the organisation: The Mineral Products Association (MPA) is the UK industry trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries. MPA covers 100% of UK cement and lime production, 90% of GB aggregates production, 70% of ready mixed and precast concrete production, and >90% of architectural precast concrete cladding production in the UK.

Product-related or management system-related certifications: MPA is a trade association. The data has been provided by MPA members: 100% of MPA Precast members' cladding production sites are certified to both ISO 9001 and ISO 14001. >94% of MPA Precast members' cladding production sites are certified to BES 6001.

PRODUCT INFORMATION

Product name: Architectural precast concrete cladding panels (grey concrete).

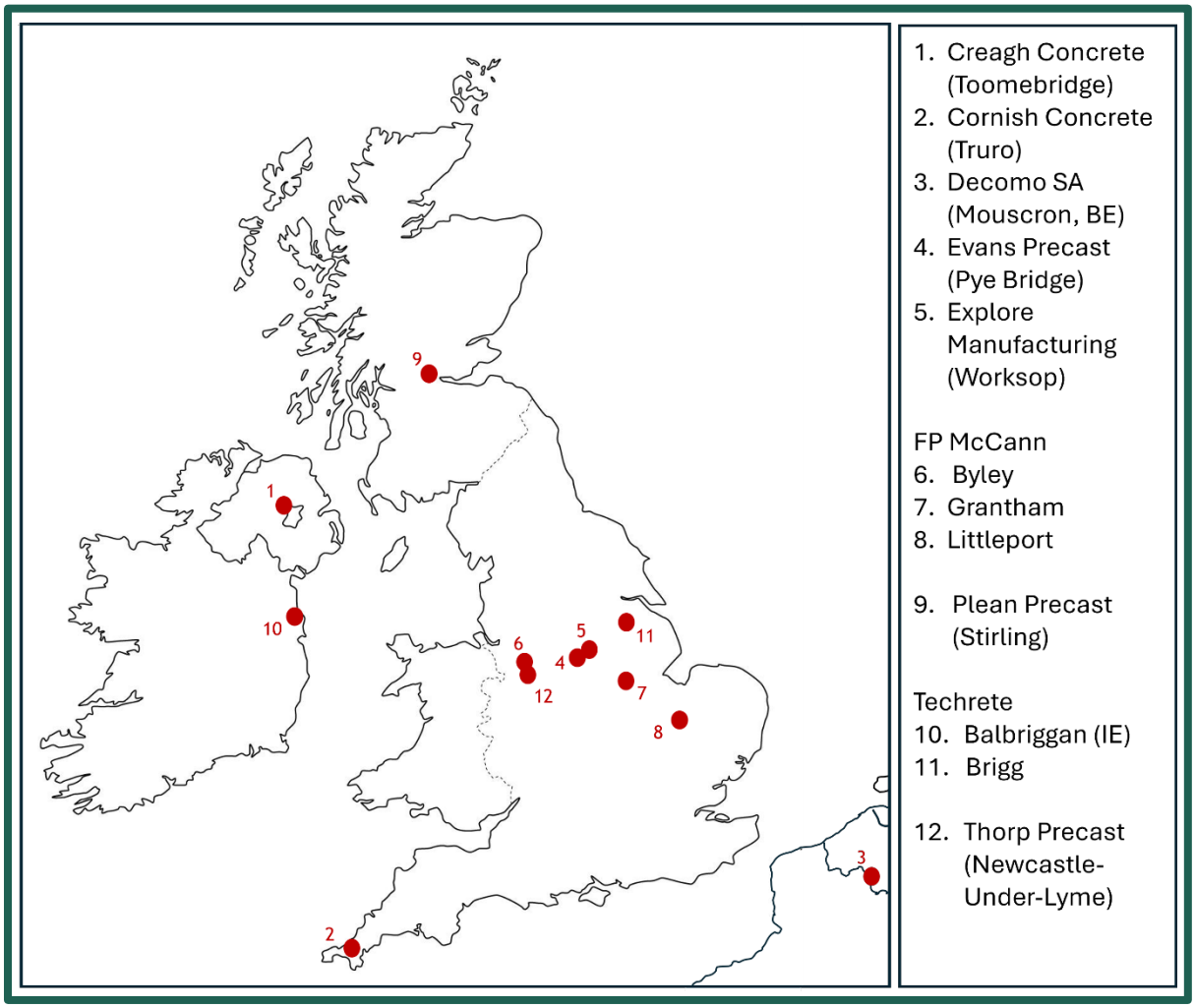
Product identification: Panels manufactured to BS 8297:2017 *Design, manufacture and installation of architectural precast concrete cladding – Code of practice*.

Visual representation of the product:

UN CPC code: 3755 - *Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone.*

Product description: Architectural concrete cladding panels consist mainly of concrete with steel reinforcement cage and steel fixings. Cladding panels are manufactured with varying heights and widths with a depth of around 150mm on average. Grey architectural precast cladding is mainly used in high-rise multistorey construction, including offices, commercial, cultural buildings and prisons. Average density is around 2,578 kg/m^3 and compressive strengths after manufacture range between 40 to 50 MPa. Constituents include CEM I, blended CEM II A-L, GGBS, limestone fines/ Betocarb, fine and coarse aggregates, water, admixtures, steel reinforcement and caging and metal fixings. The concrete is then cast over reinforcement caging in mechanical, metallic or wooden moulds. The cladding is then given time to cure and harden, stocked at the factory site for a number of weeks prior to being transported to construction sites for installation. The surface is acid-etched to remove laitance and expose its concrete texture and colour. Precast concrete cladding units are usually expected to last throughout the life of a building (60 to 100 years).

Name and location of production site(s):



Manufacturers included in the assessment:

- Creagh Concrete, 38 Blackpark Rd, Toomebridge, Antrim, BT41 3SL (https://www.creaghconcrete.com/);
- Cornish Concrete Products, Point Mills, Bissoe, Truro, TR4 8QZ (https://cornishconcrete.co.uk/);
- Decomo SA, Bd Industriel 96, 7700 Mouscron, Belgium (https://www.decomo.co.uk/);

- Evans Concrete Products Ltd, Pye Bridge Industrial Estate, Main Road Pye Bridge, Near Alfreton, Derbyshire, DE55 4NX (https://evansconcrete.co.uk/);
- Explore (Laing O'Rourke), Explore Way, Worksop, S80 3FD (https://www.laingorourke.com/company/our-businesses/explore-manufacturing/);
- FP McCann, Byley Road, Middlewich, Cheshire, CW10 9RJ (https://fpmccann.co.uk/);
- FP McCann, Alma Park Rd, Grantham, NG31 9SP (https://fpmccann.co.uk/);
- FP McCann, Wisbech Rd, Littleport, Ely, CB6 1RA (https://fpmccann.co.uk/);
- Plean Precast, President Kennedy Dr, Stirling, FK7 8AX (https://www.plean-precast.co.uk/);
- Techrete, Stephenstown Industrial Park, Stephenstown, Balbriggan, Co. Dublin, K32 W665, Ireland (https://techrete.com/);
- Techrete, Station Rd, Scawby, Hibaldstow, Brigg, DN20 9DT (https://techrete.com/);
- Thorp Precast, Apedale Rd, Newcastle, ST5 6BN (https://www.thorpprecast.co.uk/).

CONTENT DECLARATION

The mass (weight) of one unit of a product per declared unit: ~0.387 tonne.

Content of the product in the form of a list of materials and substances, and their mass:

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Portland cement (CEM I, CEM II A-L, etc)	61.3	0%	0%	0
GGBS	6.1	0%	0%	0
Limestone fines (binder)	15.8	0%	0%	0
Reinforcing steel	12.0	100%	0%	0
Fine and coarse aggregates	247.4	0%	0%	0
Crushed concrete aggregates	8.7	100%	0%	0
Water	27.8	0%	0%	0
Admixtures	0.7	0%	0%	0
Metal fixings	7.0	100%	0%	0
Etching acid	0.2	0%	0%	0
TOTAL	**386.7**	**7.16%**	**0%**	**0**

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
LDPE film covering	0.2	0.05%	0
TOTAL		**0.05%**	**0**

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Neither the cladding, nor its packaging, contain any biogenic carbon.

Architectural precast cladding does not contain any substances that can be included in "Candidate List of Substances of Very High Concern for Authorization" and raw materials used are not part of the EU REACH regulation.

LCA INFORMATION

Declared unit: 1m^2 of 150mm grey architectural precast concrete cladding panel.

Conversion factor to mass if mass is not used as functional/declared unit (not applicable for services): ~0.387 tonne

Reference service life: No RSL is declared as this EPD is based on a Declared Unit only, but a product lifespan of 100 years was assumed for carbonation at B1 & Module C.

Time representativeness: 2023 (12 months)

Geographical scope: The United Kingdom, Republic of Ireland, and Belgium (Modules A1-A4). The United Kingdom (Modules A5, C1-C4, D).

Database(s) and LCA software used: Ecoinvent 3.10.1, One Click LCA database and software.

EPD/LCA Tool used: One Click LCA EF3.1

Description of system boundaries:
Cradle-to-gate with options, modules C1-C4, module D and optional modules, A4, A5, and B1.

Modules A1-A3: Boundaries for this stage include all raw materials data and sources, based on primary data collected by MPA for all 12 sites. Input flows include raw materials, fuels, electricity and other consumables (e.g. release agents). Output flows include production, material losses, waste and other outputs (e.g. co-products).

Module A4: A4 stage accounts for JIT transport of the cladding to construction sites, using Ecoinvent and IStructE's "*How to Calculate Embodied Carbon*" factors. Transport distance and utilisation capacity data was collected from the manufacturers for 2023.

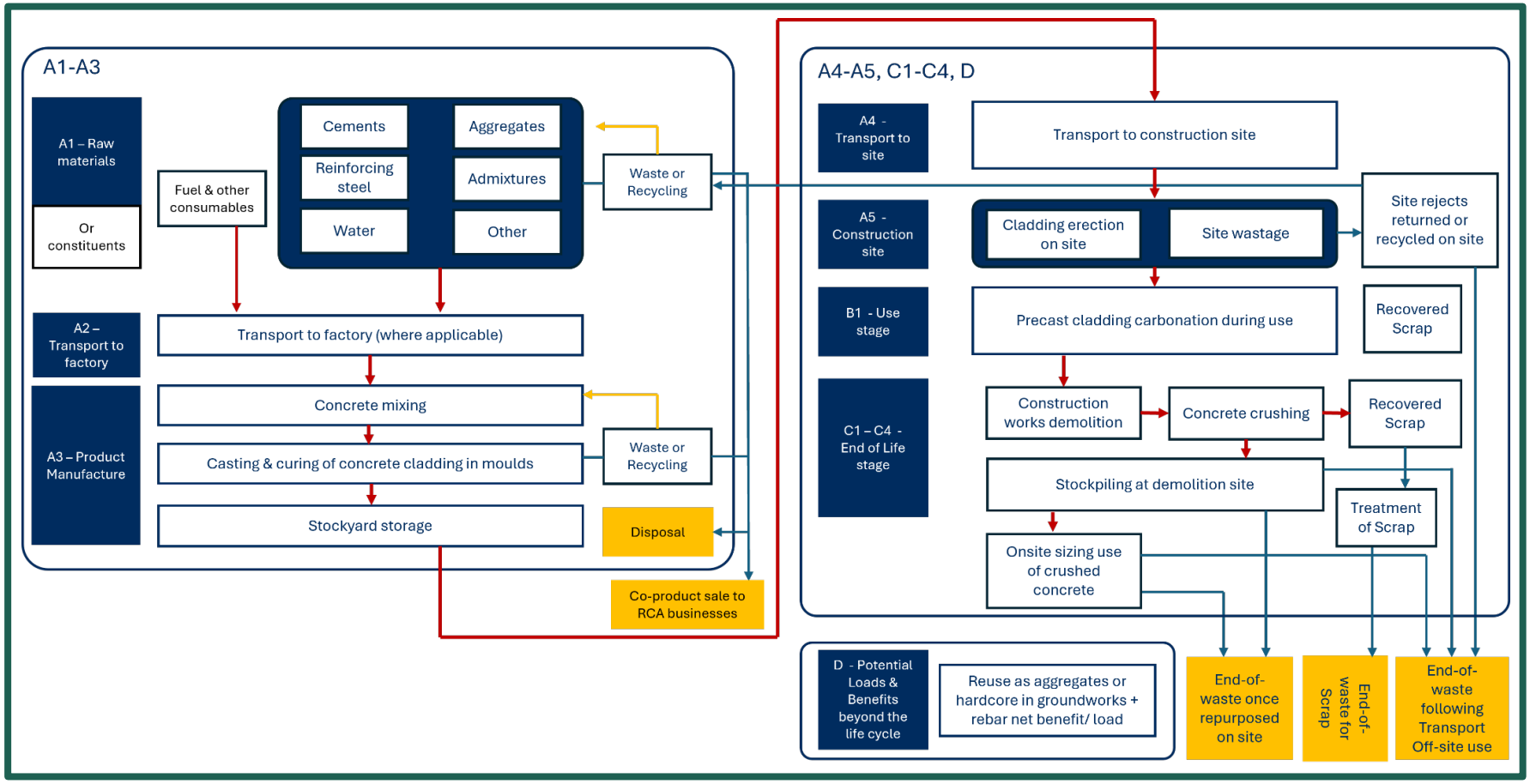
Modules A5: The scenario adopted for modules A5 is based on the methods described in EN 15804, EN 15941 and EN 16757, addressing the impacts related only to cladding panels, including wastage and emissions associated with the erection of cladding units (e.g. cranage). Impacts associated with any seals, additional metal fixings/ structures, or windows fitted into or between the panels are excluded. Internal insulation and plasterboard fitted behind the cladding panels are also excluded.

Module C and Information Module D: Module C (end-of-life), and module D (potential loads & benefits), are based on typical UK practice for demolition and recovery up to the point of End-of-Waste, accounting for the crushing and recycling of concrete, and recycling of rebar, as the only 100% scenario as identified in NFDC statistics for end-of-life concrete.

Carbonation was accounted for in modules B1, C3 and in secondary use beyond system boundaries (see pages 9 and 10). All carbonation calculations were carried out in accordance with Annex G of EN 16757 using statistical data from NFDC.

Process flow diagram:

Figure 2. Architectural precast concrete cladding product system's flow diagram.



More information:

Data Quality Assessment (DQA) and declaration

DQA was carried out in accordance with EN 15941 and the PCR/ GPI requirements. Data contributing to over 80% of the results for all core environmental impact indicators have been assessed in terms of time, geographic and technology representativeness and was found to be mostly **very good** and appropriate for use. The data was also found to be relevant, complete (all relevant flows included) and consistent across the system boundary. Use of proxy data was highlighted in the DQA and justified in the LCA Report. Its effect is believed to be minimal. It should also be noted that uncertainty for some indicators is high due to use of different versions of Ecoinvent (3.4 and 3.10) for some raw materials' datasets.

Cut-off criteria

Cut-off rules employed are in accordance with EN 15804 where a cut-off criteria of 1% (for renewable and non-renewable primary energy usage and total mass input) was maintained. The total of neglected input flows per module do not exceed 5% of energy usage or mass.

Capital Goods and Equipment

Capital goods impacts associated with renewable electricity infrastructure (solar panels and a wind turbine) where included in accordance with the EPD International PCR (4.3.6).

Modules A1-A3:

Allocation:

A1-A2: Upstream co-product allocation for GGBS is based on economic allocation. Upstream allocation associated with the pre-consumer scrap in rebar and other metallic fixings also complies with the requirements of section 4.5.3 of PCR 2019:14 Construction products, version 2.0.1.

A3: Co-product allocation with other precast concrete products manufactured on sites was based on no allocation (physical partitioning) and physical allocation. No impacts are allocated to crushed concrete aggregates generated and exported/ sold from the sites.

GWP intensity of recycled content:

The combined GWP-GHG intensity associated with input recycled content in the product (mainly rebar, metallic fixings, and recycled concrete aggregates) is **384.74 kg CO_2 eq./ tonne of input**.

Share of primary data:

Total share of primary data contributing to the declared GWP-GHG (A1-A3) is ~83% (see table in page 11 below).

Electricity Mix

Some of the electricity used by MPA members for the manufacture of precast cladding is either generated (and used) on-site or backed by European Guarantees of Origin or Ofgem's REGOs. These also include transmission and distribution losses:

Electricity	Renewable (REGOs & European GO's)	Renewable (generated & used on-site)	Residual mix	Total
kWh/m²	5.86	0.53	2.86	9.26

The grid mix for REGO and other renewable generation is based on statistics published by the UK government Department for Energy Security and Net Zero (DESNZ) for 2023 and companies' own certificates.

REGO electricity source (%)	Onshore wind	Offshore wind	Solar	Hydro	Bioenergy & waste
	31.6%	31.0%	9.8%	8.1%	19.5%

The corresponding climate impact, GWP-GHG, associated with the overall electricity mix at A3 is **~0.181 kg CO_2e/ kWh**.

Module A4: Transport to construction site

Ecoinvent 3.10 transport emission factors were modified to reflect factors used in the UK's (from IStructE HTCEC guide). No return journey included to enable project-specific scenarios in accordance with EN 15978. Distance to site data is based on companies' own KPI data for 2023.

Scenario parameter (A4)	Quantity	Unit
Specific transport CO_2e emission factor	0.08997	Kg CO_2e/ tkm
Distance to site	157	km
Capacity Utilisation*	100	%

*Capacity Utilisation of 50% can be used in case of empty return journeys.

Additional haulage distance (by road and by sea) added for the two factories located outside the UK to account for products' shipping to the country.

Module A5: Construction process

An average site wastage rate of 0.5% was used. Cranage energy was accounted for using data from a similar precast concrete product EPD. Sealants and any additional supporting fixing structures are omitted as these vary widely based on a building specification. An assessor of a building's environmental performance (to EN 15978) may add these aspects as part of their wider building assessment.

Scenario parameter (A5)	Quantity	Unit
Wastage rate	0.5	%
Cranage (lifting of units per DU)	1.60	kWh

Module B1 Use stage

The outer surface of the precast concrete architectural cladding would be expected to carbonate at a 85% Degree of carbonation (D_c) as "outdoor/ exposed". The internal surface is treated as "indoor/ covered" with no B1 carbonation.

Scenario parameter (B1)	Quantity	Unit
Cladding CO_2 uptake (carbonation)	- 0.30	Kg CO_2/ m^2

Module C1-C4 End-of-Life

End-of-Life scenarios are based on statistics from the National Federation of Demolition Contractors (see Figure 3). It is assumed that all concrete and rebar (100%) is recycled. Around 95% is processed

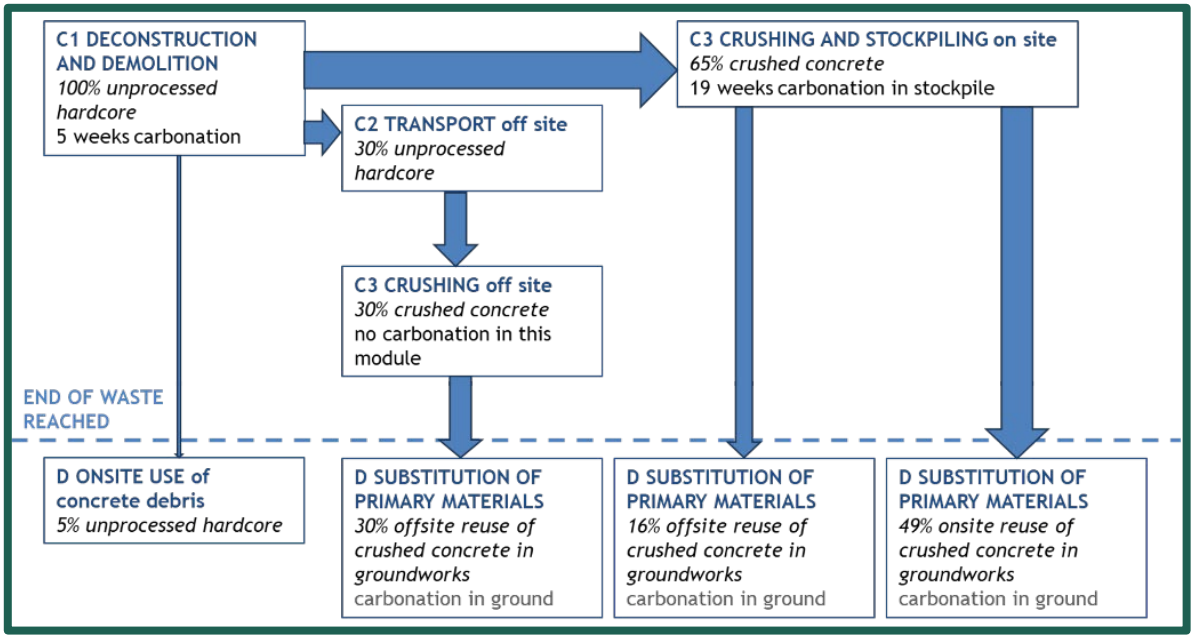
post-demolition and then crushed to a 6F2 specification. The unprocessed material first remains on site for 5 weeks:

- Around 65% of the concrete is then crushed and recycled on-site, remaining at the demolished structure site for an average period of 19 weeks prior to being used on-site as hardcore for site reinstatement.
- Around 30% of the crushed concrete is transported for further treatment and processing.
- Around 5% is left unprocessed at the demolition site and is directly used as hardcore.

Carbonation takes place at stage C3 when the crushed concrete is further processed and managed until it is no longer waste or until demolition and site reinstatement works are complete. All carbonation calculations were carried out in accordance with the methodology introduced in EN 16757. Transport for waste concrete and rebar treatment is assumed to be for 50 km (IStructE, 2025). Crushing energy consumption is based on Table 4 of PCR 2019:14.V 2.0.1.

Scenario parameter (C1-C4)	Quantity	Unit
Diesel use for crushing and processing operations (up to End-of-waste)	3.87	kWh/m^2
CO_2 uptake (carbonation) at C3	- 4.18	Kg CO_2/ m^2

Figure 3. Typical flows of end-of-life concrete during modules C and D and relevant carbonation (NFDC, 2023).



Module D Loads & Benefits beyond the System Boundary

Substitution of virgin materials (aggregates) by the crushed concrete from the demolished building is based on 100% of the total mass of concrete. Substitution of the virgin steel content from the reinforcement was also accounted for (resulting in a positive value as rebar is made of recycled steel).

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	UK/ IR/ BE	UK/ IR/ BE	UK/ IR/ BE	UK	UK	-	-	-	-	-	-	-	UK	UK	UK	UK	UK
Share of primary data	83%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	NA			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	+39.2%(1)/-15.6%			0%	0%	-	-	-	-	-	-	-	-	-	-	-	-

x= declared, ND = not declared

Share of primary data

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Production of Portland cements and reinforcing steel	EPD, Database	Confidential	2022, 2023, 2022, 2023	Primary data, secondary data	71%
Other raw materials	Database, EPD	Ecoinvent v3.10, One Click LCA	2021, 2023, 2024, 2025	Secondary data	0%
Transport of raw materials to manufacturing sites	Database Data collection	Ecoinvent v3.10 EPD Owner	2024	Primary data, secondary data	3%
Manufacture of product	Collected data	EPD owner	2023	Primary data	9%
Generation of electricity used in manufacturing of product	Database	Ecoinvent v3.10	2024	Primary data, secondary data	3% (already part of manufacture of product)
Other processes	Databases	Ecoinvent v3.10, One Click LCA	2019–2024	Secondary data	0%
Total share of primary data, of GWP-GHG results for A1-A3					83%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories. The reported share of primary data is associated with uncertainty, as an EPD [or: several EPDs] used as data source lack information on the share of primary data.

(1) Production sites with the higher A1-to-A3 GWP-GHG limit collectively make up ≤3.4% of the overall production covered in the LCI (by volume and mass). Variations are mainly due to products' concrete mix and fuels used in A3

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

Mandatory impact category indicators according to EN 15804

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	7.18E+01	5.88E+00	1.21E+00	−3.00E−01	ND	ND	ND	ND	ND	ND	1.40E+00	6.89E-01	-2.04E+00	1.15E-01	2.33E+01
GWP-fossil[2]	kg CO_2 eq.	7.18E+01	5.88E+00	1.21E+00	−3.00E−01	ND	ND	ND	ND	ND	ND	1.40E+00	6.89E-01	-2.04E+00	1.15E-01	2.33E+01
GWP-biogenic	kg CO_2 eq.	7.65E-04	0.00E+00	−6.81E−04	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.14E-02	2.30E−03	1.86E−04	0.00E+00	ND	ND	ND	ND	ND	ND	1.43E-04	3.03E-04	2.19E-04	6.56E-05	-3.42E-03
ODP	kg CFC 11 eq.	1.12E-06	1.22E−07	1.55E−08	0.00E+00	ND	ND	ND	ND	ND	ND	2.14E-08	1.07E-08	3.28E-08	3.33E-09	-1.25E-08
AP	mol H^+ eq.	2.19E-01	1.58E−02	6.60E−03	0.00E+00	ND	ND	ND	ND	ND	ND	1.26E-02	2.25E-03	1.93E-02	8.14E-04	-7.00E-02
EP-freshwater	kg P eq.	5.69E-02	4.08E−04	3.05E−04	0.00E+00	ND	ND	ND	ND	ND	ND	4.03E-05	5.29E-05	6.18E-05	9.44E-06	1.03E-02
EP-marine	kg N eq.	2.83E-02	4.12E-03	2.90E-03	0.00E+00	ND	ND	ND	ND	ND	ND	5.84E-03	7.24E-04	8.96E-03	3.10E-04	1.73E-02
EP-terrestrial	mol N eq.	6.87E-01	4.47E−02	3.12E-02	0.00E+00	ND	ND	ND	ND	ND	ND	6.40E-02	7.87E-03	9.81E-02	3.39E-03	1.90E-01
POCP	kg NMVOC eq.	1.94E-01	2.54E-02	9.31E-03	0.00E+00	ND	ND	ND	ND	ND	ND	1.91E-02	3.37E-03	2.93E-02	1.21E-03	6.92E-02
ADP-minerals &metals*	kg Sb eq.	5.35E-05	1.67E−05	6.41E-07	0.00E+00	ND	ND	ND	ND	ND	ND	5.00E-07	1.93E-06	7.68E-07	1.82E-07	-2.08E-06
ADP-fossil*	MJ	5.08E+02	8.81E+01	1.09E+01	0.00E+00	ND	ND	ND	ND	ND	ND	1.82E+01	1.00E+01	2.80E+01	2.82E+00	1.96E+02
WDP*	m^3	7.50E+00	4.49E−01	7.37E-02	0.00E+00	ND	ND	ND	ND	ND	ND	4.56E-02	4.99E-02	7.00E-02	8.13E-03	3.21E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

[2] The indicated Global Warming Potential fossil fuels (GWP-fossil) value includes GHG emissions from combustion of both fossil and waste-derived fuels during cement manufacture. The A1-A3 'net' (or cut-off-by-Classification) value of GWP-fossil, excluding combustion of waste-derived fuel, is **66.6 kg CO_2e/ m^2** (172.2 kg CO_2e/ tonne).

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Additional mandatory and voluntary impact category indicators

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[3]	kg CO_2 eq.	7.18E+01	5.88E+00	1.21E+00	−3.00E−01	ND	ND	ND	ND	ND	ND	1.40E+00	6.89E-01	-2.04E+00	1.15E-01	2.33E+01

Additional voluntary environmental impact indicators (EN 15804, Table 4) are not declared.

Resource use indicators

Results per declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.11E+02	1.43E+00	6.16E-01	0.00E+00	ND	ND	ND	ND	ND	ND	1.16E-01	1.41E-01	1.77E-01	2.72E-02	-1.02E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.11E+02	1.43E+00	6.16E-01	0.00E+00	ND	ND	ND	ND	ND	ND	1.16E-01	1.41E-01	1.77E-01	2.72E-02	-1.02E+01
PENRE	MJ	4.81E+02	8.81E+01	3.82E+00	0.00E+00	ND	ND	ND	ND	ND	ND	1.82E+01	1.00E+01	2.80E+01	2.82E+00	1.96E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	4.90E+02	8.81E+01	-4.67E+00	0.00E+00	ND	ND	ND	ND	ND	ND	1.82E+01	1.00E+01	2.80E+01	2.82E+00	1.96E+02
SM	kg	2.57E+01	3.81E-02	1.32E-01	0.00E+00	ND	ND	ND	ND	ND	ND	7.58E-03	4.29E-03	1.16E-02	7.08E-04	-1.68E+01
RSF	MJ	2.53E+01	4.77E-04	1.27E-01	0.00E+00	ND	ND	ND	ND	ND	ND	1.98E-05	5.44E-05	3.04E-05	1.47E-05	8.36E-04
NRSF	MJ	4.66E+01	0.00E+00	2.33E-01	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.83E-01	1.29E-02	3.56E-03	0.00E+00	ND	ND	ND	ND	ND	ND	1.21E-03	1.48E-03	1.85E-03	2.93E-03	1.17E-02
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

[3] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.26E+00	1.27E−01	1.94E-02	0.00E+00	ND	ND	ND	ND	ND	ND	2.03E-02	1.67E-02	3.12E-02	3.11E-03	-1.02E+00
Non-hazardous waste disposed	kg	3.76E+01	2.54E+00	7.40E-01	0.00E+00	ND	ND	ND	ND	ND	ND	2.77E-01	3.11E-01	4.25E-01	7.11E-02	6.23E+01
Radioactive waste disposed	kg	5.93E-03	2.61E−05	3.07E−05	0.00E+00	ND	ND	ND	ND	ND	ND	1.98E-06	2.26E-06	3.04E-06	4.32E-07	-4.23E-04

Output flow indicators

Results per declared unit																
Indicator	**Unit**	**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	ND	ND	ND	ND	ND	ND	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.92E+01	0.00E+00	2.03E+00	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	3.49E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	1.32E-03	0.00E+00	2.00E−01	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ADDITIONAL ENVIRONMENTAL INFORMATION

Further cladding carbonation beyond the system boundary

100% of the Declared Unit is recycled and reused in groundworks at the End-of-life, either within the demolished building site, or offsite, and either after demolition or after further sizing/ crushing. By assuming a 6F2 distribution for the further processed recycled concrete and a "buried in ground (above groundwater level) exposure condition, and by considering a Secondary Life extended over 100 years, the additional carbonation beyond the system boundary would be **-16.28 kg CO_2e/m^2**. This calculation was carried out in accordance with Annex G of EN 16757.

Overall CO_2 uptake in cladding (100 and 60 years lifespan)

LIFE CYCLE STAGE	CO_2 UPTAKE			
	100 years lifespan		*60 years lifespan*	
	Kg CO_2/ m^2	Kg CO_2/ tonne	Kg CO_2/ m^2	Kg CO_2/ tonne
Module B1	-0.30	-0.78	-0.23	-0.59
Module C3	-4.18	-10.81	-4.23	-10.94
Total (Modules A-C)	-4.48	-11.58	-4.46	-11.53
Secondary Use (beyond system boundary)	-11.8	-30.51	-11.8	-30.51
Total (all modules including secondary use)	**-16.28**	**-42.10**	**-16.28**	**-42.10**

INFORMATION RELATED TO SECTOR EPD

The production volume covered by data collection is 100% of the production represented by the EPD and 100% of the production/ sites of the manufacturing companies identified in the "Product Information" section in 2023. This Sector EPD covers only around 80% to 85% of the cladding market in the UK. The declared product is an average that is not available for purchase on the market.

Conversion

Where these EPD results are used for other shapes of grey precast concrete cladding, a tonne or m^3 conversion factor should be used using equivalent mass units. For example, 71.8 kg CO_2e/ m^2 (GWP-fossil for A1-A3) is converted to **185.6 kg CO_2e/ tonne**.

The GWP-fossil values reported in this EPD are based on 'gross' CO_2e emissions i.e., they include combustion emissions from both fossil and waste-derived fuels (also called 'alternative' or 'secondary' fuels) during the manufacture of cement. An equivalent 'Net' (*Cut-off by Classification*) GWP-fossil value, which excludes waste-derived fuel emissions in accordance with the Polluter Pays principle, is also reported as recommended in EN 16908 (**66.6 kg CO_2e/m^2** or **172.2 kg CO_2e/ tonne** for A1-A3). The 'Net' value is also more in line with other product assessments in accordance with EN 15804 (D.2.4), ensuring more consistency in assessments and optioneering to EN 15978.

The LCA indicators for grey precast cladding in this sector EPD are intended to provide the basis for the environmental assessment of buildings and other construction works in typical UK situations and in accordance with nationally recognized standards, such as the UK RICS WLCA standard. Such assessment should consider the whole life cycle: Modules A1-A3 should not be used alone without

considering results from Module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/ or risks. The declared product is an average that is not available for purchase on the market and the results are not representative for any specific manufacturer or its products.

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
6F2	Refers to a type of graded crushed recycled aggregate with 75mm – 0mm grading.
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
EF	Environmental Footprint
EN	European Norm (Standard)
D_c	Degree of Carbonation (see EN 16757)
DQA	Data Quality Assessment
GGBS	Ground Granulated Blast-furnace Slag
GHS	Globally harmonized system of classification and labelling of chemicals
GPI	General Programme Instructions
GRI	Global Reporting Initiative
HTCEC	“How to Calculate Embodied Carbon” guide
ISO	International Organization for Standardization
IStructE	Institute of Structural Engineers (UK)
MPA	Mineral Products Association
ND	Not Declared
NFDC	National Federation of Demolition Contractors (UK)
RCA	Recycled Concrete Aggregates
RICS	Royal Institute of Chartered Surveyors (UK)
SCM	Supplementary Cementitious Materials
SVHC	Substances of Very High Concern
WLCA	Whole Life Carbon Assessment

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VERSION HISTORY

Original Version of the EPD, 2026-03-04

Revision 1, 20YY-MM-DD,
Differences versus the previously published version: ...

Revision 2, 20YY-MM-DD
Differences versus the previously published version: ...
...

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