

# ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2 

**Tarmac Holdings Limited – C35/45 RAFT:L71:L2LF:F:RS\_RAFT:F5:340:0.**



## Owner of the declaration

Tarmac Holdings Limited  
Ground Floor, T3 Trinity Park, Bickenhill  
Lane  
B37 7ES Birmingham  
United Kingdom

## Product

C35/45  
RAFT:L71:L2LF:F:RS\_RAFT:F5:340:0.

## Declared product / Declared unit

1 m<sup>3</sup> of C35/45  
RAFT:L71:L2LF:F:RS\_RAFT:F5:340:0.

## This declaration is based on Product Category Rules

EN 15804:2012 + A2:2019,  
NPCR 020 PART B for concrete and  
concrete elements (v3.0)

## Program operator:

EPD Norge  
Majorstuen P.O. Box 5250  
N 0303 Oslo  
Norway

## Declaration number

NEPD-8861-8516

## Registration number

NEPD-8861-8516

## Issue date

30.01.2025

## Valid to

30.01.2030

## EPD Software

Emidat EPDToolV1.0.0

## General Information

### Product

C35/45 RAFT:L71:L2LF:F:RS\_RAFT:F5:340:0.

### Program Operator

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### Declaration Number

NEPD-8861-8516

### This declaration is based on Product Category Rules

EN 15804:2012 + A2:2019,  
NPCR 020 PART B for concrete and concrete elements  
(v3.0)

### Statements

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

### Declared unit

1 m<sup>3</sup> of C35/45 RAFT:L71:L2LF:F:RS\_RAFT:F5:340:0.

### General information on verification of EPD from EPD tools

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPDNorway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

### Verification of EPD tool

Charlotte Merlin, FORCE Technology  
(no signature required)

### Owner of the declaration

Tarmac Holdings Limited

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### Manufacturer

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Ground Floor, T3 Trinity Park, Bickenhill Lane  
B37 7ES Birmingham, United Kingdom

### Place of production

London, United Kingdom

### Management system

ISO 9001, ISO 14001, ISO 45001, ISO 50001, BES 6001

### Issue date

30.01.2025

### Valid to

30.01.2030

### Year of study

2023

### Comparability

EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database (including primary and secondary data).

### Development and verification of EPD

The declaration was created using the Emidat EPD tool v1.0, developed by Emidat GmbH. The EPD tool has been approved by EPD Norway.

Developer of EPD: Rob Owen

Reviewer of company-specific input data and EPD: Amal Saleh

### Approved

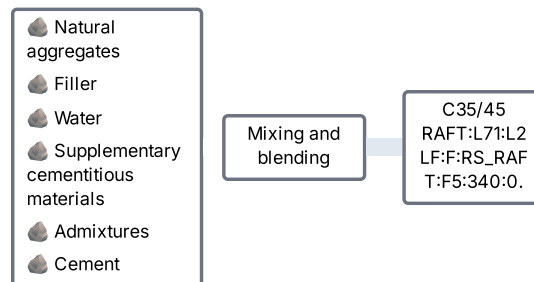


Håkon Hauan, CEO EPD-Norge

## Product

### Product description

Concrete is a building material made up of several components, including cement, water, sand, gravel, and air. Ready-mix concrete is manufactured in a batch plant in a controlled environment, using precise mix designs (with the addition of other cementitious materials or chemical admixtures that improve the properties of the concrete), ensuring consistency in quality, strength, and composition. This consistency leads to predictable performance in construction projects. Ready-mix concrete is then delivered to the construction site in an unhardened state, ready to use, eliminating the need for on-site mixing. This saves time in labour, equipment setup, and material handling, speeding up the construction process. The product is produced according to BS 8500. Testing was conducted according to EN 12350 and EN 12390. Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).



The most common man-made substance in the world is concrete. Regardless of the magnitude of the construction, it is a necessary component of roads, buildings, bridges, dams, pavements, pipelines, sewers, and other structures. It is made up of naturally occurring aggregates with varying granulometries (sand, fine gravel, and gravel) joined by hydrated cement paste. To improve particular qualities of the fresh or hardened concrete, such as workability, durability, or early and final strength, chemical admixtures can also be used. After manufacture, concrete is workable enough to be transported, poured, pumped, put in place, and compacted at the project site, where it gradually solidifies and gains strength.

### Product specification

Name of ingredient	Share of total weight	Country of origin
Admixtures	0 - 2 %	United Kingdom
Cement	2 - 10 %	United Kingdom
Filler	2 - 10 %	United Kingdom
Natural aggregates	50 - 80 %	United Kingdom
Supplementary cementitious materials	10 - 25 %	United Kingdom
Water	2 - 10 %	United Kingdom

### Technical data

	Unit	Value
Compressive Strength (Cylinder)	N / mm <sup>2</sup>	35.0
Compressive Strength (Cube)	N / mm <sup>2</sup>	45.0
Gross Density	kg / m <sup>3</sup>	2385.4

### Market

United Kingdom

**Reference service life**

50 years

## LCA: Calculation rules

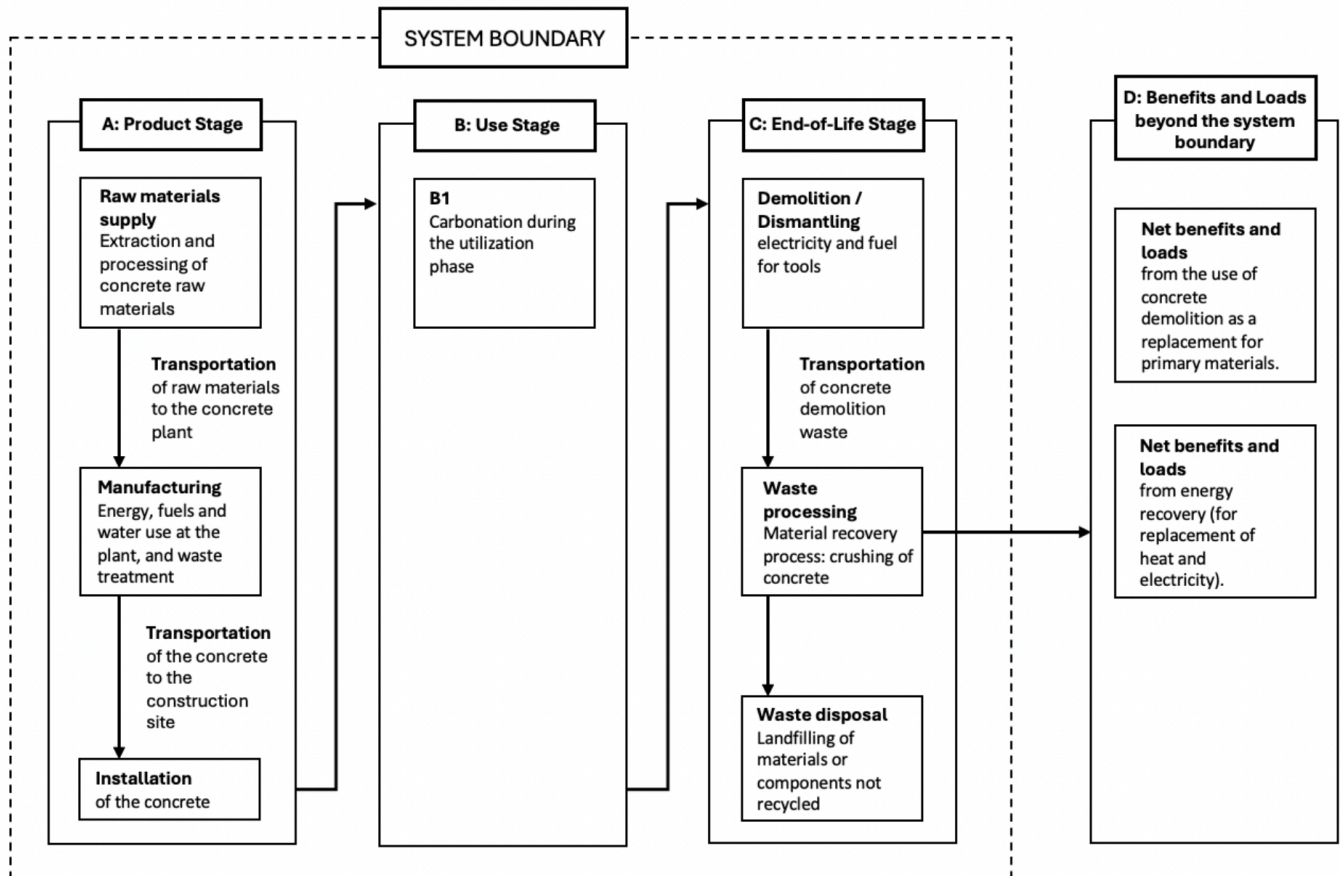
### Declared unit

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### Reference service life

50 years

### System boundary



### Data quality

The Emidat EPD Tool v1.0.0 was used for LCA modeling and calculation. Background data was used from ecoinvent database v3.10.

**System boundaries (X=included, MND=module not declared)**

	Production			Installation		Use stage							End-of-Life				Next product system
	Raw material supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and loads beyond the system boundary
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	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography			GB	GB	GB	GB	MND	MND	MND	MND	MND	MND	GB	GB	GB	GB	GB

For the geographies modeled in A1 and A2, refer to *Product specification*.

Type of EPD: cradle to gate with options, modules C1-C4 and module D (A1-A3, C, D, additional modules A4, A5, and B1)

**Stage of Material Production and Construction**

Module A1: Extraction and processing of raw materials

Module A2: Transportation of raw materials to the plant

Module A3: Concrete production at the plant and waste treatment

Module A4: Transportation to the construction site

Module A5: Includes processes associated with concrete installation (e.g., pumping on the construction site), as well as the production, transportation, and treatment of unused concrete

**Use Stage**

Module B1: Carbonation during the utilization phase

**Disposal Stage**

Module C1: Demolition/Dismantling

Module C2: Transportation of concrete demolition waste for processing

Module C3: Sorting of waste components and recycling of concrete

Module C4: Disposal of concrete

**Credits and burdens outside the system boundaries**

Module D: Credits and burdens from the use of demolished concrete as a replacement for primary materials

**Cut-off criteria**

Environmental impacts of the following processes are considered to be negligible: Production and use of formwork and falsework for the installation of concrete, Materials used for the curing of concrete (e.g. plastics, aluminum) .

**Allocation**

Elementary flows (energy and fuels, ancillary materials and waste) data was collected on production-process-level. Using the total output of the production process in 2023, elementary flows are assigned to 1 declared unit based on volume.

## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport to the building site (A4)	Value	Unit
Transported mass	2385.40	kg
Fuel consumption	5.33	L / 100 km
Average distance from manufacturer to construction site	1.60	km
Transport mode	truck	
Gross density of products transported	2385.40	kg / m <sup>3</sup>

Installation into the building (A5)	Value	Unit
Formwork	-	kg
Falsework	-	kg
Concrete waste (installation losses, typical wastage rate on site)	1.50	%
Distance to waste landfill facility (for installation losses)	50	km
Amount of electricity to pour 1 m <sup>3</sup> of concrete	3	kWh
Amount of diesel to pour 1 m <sup>3</sup> of concrete	60	MJ
Water	0.29	m <sup>3</sup>
Wastewater treatment	0.29	m <sup>3</sup>

Formwork and Falsework each contribute less than 1% of the total product CO<sub>2</sub> emissions, and are therefore neglected under cut-off rules. (Kaethner, Burrige, 2012). Other sources: Concrete waste: Adams & Hobbs (2023). Electricity, Diesel: Ecoinvent benchmark average.

Use of the installed product (B1)	Value	Unit
Reference use period	50	years
Application	Building, in the ground	
Degree of carbonation (Dc)	0.85	-
Cement absorption factor	0.49	kg CO <sub>2</sub> / kg Cement
k-factor	0.80	mm / √year
Correction factor	1.00	-
Surface area of concrete	5	m <sup>2</sup>

Calculation of carbonization according to EN 16757. k-factor results from the concrete's compressive strength and its application. The cement absorption factor (maximum theoretical CO<sub>2</sub> uptake) depends on the average clinker content in cement. The correction factor results from cement substitutes in the recipe.

End of life (C1-C4)	Value	Unit
Diesel for deconstruction	-	kg

The product remains in the ground at its end-of-life.

## LCA: Results

### Core environmental impact indicators

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> -eq.	1.49e+02 (1.43e+02)*	3.96e-01	9.71e+00	-1.41e+00	0	0	0	0	0
GWP-fossil	kg CO <sub>2</sub> -eq.	1.48e+02 (1.43e+02)*	3.95e-01	9.57e+00	-1.41e+00	0	0	0	0	0
GWP-biogenic	kg CO <sub>2</sub> -eq.	5.44e-01 (5.33e-01)*	1.98e-04	1.35e-01	0	0	0	0	0	0
GWP-luluc	kg CO <sub>2</sub> -eq.	6.89e-02	1.40e-04	2.93e-03	0	0	0	0	0	0
ODP	kg CFC-11-Eq	2.31e-06	8.24e-09	1.78e-07	0	0	0	0	0	0
AP	mol H <sup>+</sup> -Eq	6.24e-01	9.33e-04	6.86e-02	0	0	0	0	0	0
EP-freshwater	kg P-Eq	1.33e-02	2.78e-05	9.05e-04	0	0	0	0	0	0
EP-marine	kg N-Eq	9.08e-02	2.45e-04	3.31e-02	0	0	0	0	0	0
EP-terrestrial	mol N-Eq	1.73e+00	2.65e-03	3.18e-01	0	0	0	0	0	0
POCP	kg NMVOC-Eq	4.70e-01	1.62e-03	9.47e-02	0	0	0	0	0	0
ADPE	kg Sb-Eq	2.32e-04	1.13e-06	9.75e-06	0	0	0	0	0	0
ADPF	MJ, net calorific value	1.07e+03	5.93e+00	1.27e+02	0	0	0	0	0	0
WDP	m <sup>3</sup> world Eq deprived	1.65e+01	2.98e-02	7.32e-01	0	0	0	0	0	0

**GWP-total:** Global Warming Potential - total **GWP-fossil:** Global warming potential - fossil **GWP-biogenic:** Global Warming Potential - biogenic **GWP-luluc:** Global Warming Potential - luluc **ODP:** Depletion potential of the stratospheric ozone layer **AP:** Acidification potential, Accumulated Exceedance **EP-freshwater:** Eutrophication potential - freshwater **EP-marine:** Eutrophication potential - marine **EP-terrestrial:** Eutrophication potential - terrestrial **POCP:** Photochemical Ozone Creation Potential **ADPE:** Abiotic depletion potential - non-fossil resources **ADPF:** Abiotic depletion potential - fossil resources **WDP:** Water (user) deprivation potential

\* The first value is the gross value, it includes the impacts from all manufacturing activities. Gross values are more commonly used in Northern Europe. The value in brackets is the net value, it excludes the impact from the incineration of waste-derived fuels, and is more common in Central Europe and Germany.

### Additional indicators

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
PM	disease incidence	ND	3.85e-08	ND	0	0	0	0	0	0
IRP	kBq U235-Eq	ND	7.21e-03	ND	0	0	0	0	0	0
ETP-fw	CTUe	ND	1.41e+00	ND	0	0	0	0	0	0
HTP-c	CTUh	ND	2.53e-09	ND	0	0	0	0	0	0
HTP-nc	CTUh	ND	3.91e-09	ND	0	0	0	0	0	0
SQP	dimensionless	ND	5.97e+00	ND	0	0	0	0	0	0

**PM:** Potential incidence of disease due to PM emissions **IRP:** Potential Human exposure efficiency relative to U235 **ETP-fw:** Potential Comparative Toxic Unit for ecosystems **HTP-c:** Potential Comparative Toxic Unit for humans - cancer effects **HTP-nc:** Potential Comparative Toxic Unit for humans - non-cancer effects **SQP:** Potential Soil quality index

**IRP:** 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.

**ETP-fw, HTP-c, HTP-nc and SQP:** 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 these indicators.



### Use of resources

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
PERE	MJ	1.27e+02	9.41e-02	9.11e+00	0	0	0	0	0	0
PERM	MJ	3.94e-01	0	5.91e-03	0	0	0	0	0	0
PERT	MJ	1.28e+02	9.41e-02	9.11e+00	0	0	0	0	0	0
PENRE	MJ	1.05e+03	5.93e+00	1.26e+02	0	0	0	0	0	0
PENRM	MJ	1.67e+01	0	2.51e-01	0	0	0	0	0	0
PENRT	MJ	1.07e+03	5.93e+00	1.27e+02	0	0	0	0	0	0
SM	kg	2.80e+02	0	4.20e+00	0	0	0	0	0	0
RSF	MJ	4.74e+01	0	7.11e-01	0	0	0	0	0	0
NRSF	MJ	5.29e+01	0	7.94e-01	0	0	0	0	0	0
FW	m <sup>3</sup>	2.07e+00	8.63e-04	4.79e-02	0	0	0	0	0	0

**PERE:** Primary energy resources - renewable: use as energy carrier **PERM:** Primary energy resources - renewable: used as raw materials **PERT:** Primary energy resources - renewable: total **PENRE:** Primary energy resources - non-renewable: use as energy carrier **PENRM:** Primary energy resources - non-renewable: used as raw materials **PENRT:** Primary energy resources - non-renewable: total **SM:** Use of secondary material **RSF:** Renewable secondary fuels **NRSF:** Non-renewable secondary fuels **FW:** Net use of fresh water

### Waste flows

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
HWD	kg	2.89e+00	8.62e-03	1.83e-01	0	0	0	0	0	0
NHWD	kg	1.04e+02	1.73e-01	3.31e+02	0	0	0	0	0	0
RWD	kg	3.14e-03	1.78e-06	2.35e-04	0	0	0	0	0	0

**HWD:** Hazardous waste disposed **NHWD:** Non hazardous waste disposed **RWD:** Radioactive waste disposed

### Output flows

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0

**CRU:** Components for re-use **MFR:** Materials for recycling **MER:** Materials for energy recovery **EEE:** Exported electrical energy **EET:** Exported thermal energy

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

## Additional requirements

### Greenhouse gas emissions from the use of electricity in the manufacturing phase

Electricity consumption in the manufacturing phase is composed from the sources below certified by Guarantee of Origin. Electricity is represented by data in ecoinvent 3.10 regionalised for United Kingdom.

Electricity	Unit	Value
Solar	kg CO <sub>2</sub> -eq. / kWh	0.08
Wind	kg CO <sub>2</sub> -eq. / kWh	0.02
Hydro	kg CO <sub>2</sub> -eq. / kWh	0.41

### Dangerous substances

The product contains no substances given by the REACH candidate list.

## Additional environmental information

### Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-3	A4	A5	B1	C1	C2	C3	C4	D
GWP-IOBC	kg CO <sub>2</sub> -eq.	ND	3.95e-01	ND	-1.41e+00	0	0	0	0	0

**GWP-IOBC:** Global Warming Potential - Instantaneous oxidation of biogenic carbon

## Bibliography

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DIN EN ISO 14040:2021-02	Environmental management - Life cycle assessment - Principles and framework
DIN EN ISO 14044:2021-02	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
DIN CENTR 15941:2010-11	Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data
DIN EN 15942:2022-04	Sustainability of construction works - Environmental product declarations - Communication format business-to-business
ISO 21930:2017-07	Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
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Dos Santos Gervasio, H. and Dimova, S.	Environmental benchmarks for buildings , EUR 29145 EN, Publications Office of the European Union, 2018, ISBN 978-92-79-80969-9 (print),978-92-79-80970-5 (pdf), doi:10.2760/073513 (online),10.2760/90028 (print), JRC110085.  Basic principles and recommendations for describing the dismantling, post use, and disposal stage of construction products: <a href="https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020-07-06_texte_130-2020_guidance-document-construction-industry.pdf">https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020-07-06_texte_130-2020_guidance-document-construction-industry.pdf</a>  ILCD Handbook: <a href="https://epca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf">https://epca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf</a>

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