ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Heidelberg Materials UK
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HEI-20240153-CAD1-EN
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Valid to	18/07/2029

Heidelberg Materials Portland Cement (CEM I 52.5N)

Heidelberg Materials UK

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General Information

Heidelberg Materials UK

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-HEI-20240153-CAD1-EN

This declaration is based on the product category rules:

Cement, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

19/07/2024

Valid to

18/07/2029

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Heidelberg Materials Portland Cement (CEM I 52.5N)

Owner of the declaration

Heidelberg Materials UK
Arena Court, Crown Lane Second Floor
SL6 8QZ Maidenhead
United Kingdom

Declared product / declared unit

1 tonne of Portland Cement (CEM I 52.5N)

Scope:

Heidelberg Materials Portland Cement (CEM I 52.5N) results represented in this EPD are the weighted average results based on production data from the three Heidelberg Materials UK cement production sites; Ketton Works in Lincolnshire, Ribblesdale Works in Lancashire and Padeswood Works in Flintshire.

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

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR			
Independent verification of the declaration and data according to ISO 14025:2011			
☐	internally	☒	externally

Angela Schindler,
(Independent verifier)

Product

Product description/Product definition

Heidelberg Materials Portland Cement (CEM I 52.5N) is a BS EN 197 cement made from cement clinker, gypsum (both natural and recycled), and up to 5% minor additional constituents, mainly limestone.

It is used for general construction needs, from concretes and mortars to renders, screed and grouts, and is compatible with all concrete admixtures and lime.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN 197-1 and the CE-marking.

For the placing on the market of the product in the UK, UK Statutory Instrument 2019 No 465 Construction Products (Amendment etc.) (EU Exit) Regulations, applies. The product needs a declaration of performance taking into consideration BS EN 197-1 and UKCA marking.

For the application and use the respective national provisions apply.

Application

Portand Cement is often used for general construction purposes, including infrastructure and residential buildings. It is one of the most versatile types of cement and can be used in the manufacture of precast elements, ready-mixed concrete, and more.

Technical Data

The declared cement corresponds to the 52.5 standard compressive strength class with ordinary early strength development (N) in accordance with BS EN 197-1.

Constructional data

Name	Value	Unit
Strength class acc. to BS EN 197-1	52.5	N/mm^2

Performance data of the product are in accordance with the declaration of performance with respect to its essential characteristics according to EN 197-1:2011, Cement – Part 1: Composition, specifications and conformity criteria for common cements.

Base materials/Ancillary materials

Name	Value	Unit
Clinker	89.5	%
Gypsum	5.8	%
Limestone	4.7	%
Ferrous sulphate	0.2	%
Grinding aid	0.01	%

This product contains substances listed in the candidate list exceeding 0.1 percentage by mass: no

Reference service life

This EPD covers the production stage information (from A1-A3) of the product. As no use stage is declared, the reference service life is not stated.

LCA: Calculation rules

Declared Unit

The declared unit is 1 metric tonne of Portland cement (CEM I 52.5N).

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	t
Conversion factor to 1 kg	0.001	-
Gross density	1200	kg/m^3

System boundary

Type of the EPD: cradle to gate, A1-A3

The applied system boundaries cover the production of the cement including extraction of raw materials up to the finished product at the factory gate.

The product stage includes:
Module A1:Extraction and processing of raw materials. The raw materials are predominantly limestone, sand and clay for clinker production and additionally limestone, gypsum and ferrous sulphate for cement production.
Module A2:Transport of raw materials to the factory gate
Module A3:Clinker and cement production.

In clinker production raw materials are mixed in the required quanitites and ground together to form a raw meal. This raw meal is heated to around 900°C in a preheater/calciner and then fed in to a rotary kiln. A range of fossil and waste-derived fuels are used to heat the clinker to around 1450°C. The clinker is then cooled.
In cement production the required quantities of clinker, limestone, gypsum and ferrous sulphate are milled to a fine powder to produce the declared cement.

One site has on-site electricity generation from a solar farm. This solar energy represents 4% of the total electricity demand in the production of the declared cement. The remaining electricity is supplied via a contract backed by nuclear generation.

For the modelling of cement, both specific production data from Heidelberg Materials and background data (especially for upstream processes) have been used. For life cycle modelling of the considered product, the verified Global Cement and Concrete Association GCCA Industry EPD Tool for Cement and Concrete, version 4.2, LCA Model, International version, was used.

The GCCA tool uses the ecoinvent database version 3.5 together with GCCA custom emission factors for processes not included in the ecoinvent database.

The tool was developed by Quantis and is owned by the Global Cement and Concrete Association. The LCA model and database have been implemented in accordance with the requirements of EN 15804:2012+A2:2019 and the latest cement PCR, c-PCR-001 Cement and building limes (EN 16908) registered as a complementary PCR of PCR 2019:14 Construction products (EN 15804+A2).

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: United Kingdom

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Information on describing the biogenic carbon content at factory gate

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

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 tonne Portland Cement CEM I 52.5N

Parameter	Unit	A1-A3
Global Warming Potential total (GWP-total)	kg CO_2 eq	6.93E+02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	6.92E+02
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	1.74E-01
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	2.91E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.82E-05
Acidification potential of land and water (AP)	mol H^+ eq	1.46E+00
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	5.85E-02
Eutrophication potential aquatic marine (EP-marine)	kg N eq	5.32E-03
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	5.87E+00
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.44E+00
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.49E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.45E+03
Water use (WDP)	m^3 world eq deprived	8.04E+01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 tonne Portland Cement CEM I 52.5N

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier (PERE)	MJ	5.14E+01
Renewable primary energy resources as material utilization (PERM)	MJ	0
Total use of renewable primary energy resources (PERT)	MJ	5.14E+01
Non renewable primary energy as energy carrier (PENRE)	MJ	3.45E+03
Non renewable primary energy as material utilization (PENRM)	MJ	0
Total use of non renewable primary energy resources (PENRT)	MJ	3.45E+03
Use of secondary material (SM)	kg	7.93E+01
Use of renewable secondary fuels (RSF)	MJ	5.43E+02
Use of non renewable secondary fuels (NRSF)	MJ	9.31E+02
Use of net fresh water (FW)	m^3	2.06E+00

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 tonne Portland Cement CEM I 52.5N

Parameter	Unit	A1-A3
Hazardous waste disposed (HWD)	kg	0
Non hazardous waste disposed (NHWD)	kg	4.3E-01
Radioactive waste disposed (RWD)	kg	ND
Components for re-use (CRU)	kg	0
Materials for recycling (MFR)	kg	1.87E+00
Materials for energy recovery (MER)	kg	0
Exported electrical energy (EEE)	MJ	0
Exported thermal energy (EET)	MJ	ND

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 tonne Portland Cement CEM I 52.5N

Parameter	Unit	A1-A3
Incidence of disease due to PM emissions (PM)	Disease incidence	1.09E-05
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	1.17E+02
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	4.67E+01
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	1.13E-06
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	2.79E-05

Soil quality index (SQP)	SQP	6.93E+02

Remark to Global warming potential: For all GWP indicators in A1 – A3 net values are reported. The waste status of all (waste--based) fuels has been proven. Gross emissions (i.e. including CO2 from combustion of proven wastes) are 804.3 kg CO2-Eq. / t (GWP--total), 804.0 kg CO2-Eq. / t (GWP--fossil), 0.3278 kg CO2-Eq. / t (GWP--biogenic).

Remark to Waste categories: The waste indicators account for wastes from clinker and cement manufacturing only.

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.
This EPD was created using a software tool.

References

Standards

BS EN 197-1:2011 Cement - Part 1: Composition, specifications and conformity criteria for common cements

CPR
Regulation (EU) No. 305/2011:Construction Products Regulation (CPR)

UK Statutory Instrument 2019 No 465, Construction Products (Amendment etc.) (EU Exit) Regulations 2019

UKCA
United Kingdom Conformity Assessed

GCCA software tool
Global Cement and Concrete Association GCCA Industry EPD Tool for Cement and Concrete, version 4.2, LCA Model, International version
Concrete EPD Tool (https://concrete-epd-tool.org)

The GCCA tool uses the ecoinvent database version 3.5 together with GCCA custom emission factors for processes not included in the ecoinvent database.

Product Category Rules for Building-Related Products and Services
Institut Bauen und Umwelt e.V. (IBU)
Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019

PCR Guidance-Texts for Building-Related Products and ServicesFrom the range of Environmental Product Declarations of Institute Construction and Environment e.V.
(IBU) Part B: Requirements on the EPD for Cement

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

BS EN 16908:2017+A1:2022 Cement and building lime. Environmental product declarations. Product category rules complementary to EN 15804

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

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Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021
www.ibu-epd.com

Publisher

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Heidelberg Materials UK
Second Floor, Arena Court, Crown Lane
SL6 8QZ Maidenhead
United Kingdom

0162 877 4100
epd@uk.heidelbergmaterials.com
www.heidelbergmaterials.co.uk/en

Owner of the Declaration

Heidelberg Materials UK
Arena Court, Crown Lane Second Floor
SL6 8QZ Maidenhead
United Kingdom

0162 877 4100
epd@uk.heidelbergmaterials.com
https://www.heidelbergmaterials.co.uk/en