

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2 

Heidelberg Materials UK – UK Average Regen GGBS



Owner of the declaration

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

Product

UK Average Regen GGBS

Declared product / Declared unit

1 t of UK Average Regen GGBS

This declaration is based on Product Category Rules

EN 15804:2012 + A2:2019,
NPCR018 for natural stone products,
aggregates and fillers.

Program operator:

EPD Norge

Majorstuen P.O. Box 5250
N 0303 Oslo
Norway

Declaration number

NEPD-8767-8422-2

Registration number

NEPD-8767-8422-2

Issue

20.01.2025

date

20.01.2030

Valid to

EPD Software

EmidatEPD ToolV1.0.0

General Information

Product

UK Average Regen GGBS

Program Operator

EPD-Norge

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NPCR018 for natural stone products, aggregates and
fillers.

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 t of UK Average Regen GGBS

Verification

Independent verification of the declaration and data,
according to ISO14025:2010

Internally Externally

Charlotte B. Merlin
(Independent verifier approved by EPD Norway)

Owner of the declaration

Heidelberg Materials UK

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Manufacturer

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Second Floor, Arena Court
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Place of production

Port Talbot, Purfleet, Teesside - United Kingdom

Management system

ISO 9001, ISO 14001, ISO 45003, BES 6001, ISO 50001

Issue date

20.01.2025

Valid to

20.01.2030

Year of study

2022

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 of EPD

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

Approved



Håkon Hauan, CEO EPD-Norge

Product

Product description

Regen GGBS is produced from granulated blast furnace slag (GBS) by drying and grinding it to a fine powder. The raw material is granulated blast furnace slag (GBS), sourced from the UK and overseas. The GBS is dried and then milled to a fine powder to produce ground, granulated blast furnace slag (GGBS) and transferred to storage silos. GGBS is added at the concrete plants with cement to produce concrete. GGBS is also used to produce blended cements in combination with CEM I cements, CEM II/A-LL and other supplementary cementitious materials (SCMs).

Regen GGBS can replace Portland cement in concrete at varying levels, typically ranging from 30% to 85%, with common usage falling between 40% to 50%. This material is known for its durability benefits, offering protection against sulfate and chloride attacks in concrete structures. Additionally, Regen GGBS helps reduce the heat of hydration in concrete, leading to improved long-term durability and reduced risk of cracking. Appearance-wise, Regen GGBS produces a lighter-colored concrete finish compared to Portland cement, enhancing aesthetics and surface.

Under normal use, GGBS is not hazardous to the environment. Dust of granulated slag can act as an irritant and cause mechanical irritation to the eyes and respiration system.

The GGBS covered by this declaration meets the standard BS EN 15167-1. Performance data for the product is in accordance with the Declaration of Performance with respect to its essential characteristics according to BS EN 15167-1 'Ground granulated blast furnace slag for use in concrete, mortar and grout – Part 1: Definitions, specifications and conformity criteria'.

GGBS minimum technical specifications have to answer the criteria listed in EN 197-1:

- $\text{CaO} + \text{SiO}_2 + \text{MgO} > 66 \%$
- $(\text{CaO} + \text{MgO}) / \text{SiO}_2 > 1$
- Glass ratio $> 66 \%$



Product specification

Name of ingredient	Share of total weight	Country of origin
Blast furnace slag	100 %	various

Technical data

	Unit	Value
Dry bulk density	kg / m ³	1100.0

Market

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 15167-1 and UKCA marking. For the application and use the respective national provisions apply.

Reference service life

This study does not cover the use stage. Thus, the reference service life is irrelevant.

LCA: Calculation rules

Declared unit

1 t of UK Average Regen GGBS

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography			GB	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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

Type of EPD: cradle to gate (A1-A3)

Stage of Material Production and Construction

Module A1: Molten iron blast furnace slag by-product from pig iron production

Module A2: Transportation to the GGBS plant

Module A3: GGBS production at the plant and waste treatment

Cut-off criteria

Environmental impacts of the following processes are considered to be negligible: electricity for quenching, which is a minor part of the energy profile relative to more significant processes (e.g., furnace operations, transportation, or grinding of slag).

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 2022, elementary flows are assigned to 1 declared unit based on mass. Granulated blast furnace slag (GBS) is a low revenue co-product of the blast furnace iron making process. Economic allocation was used to allocate impacts from the blast furnace process to the GBS, based on the market values of pig iron and GBS in 2022. In addition, the impact of the electrical energy and water used in the granulation process are included in this EPD.

All the manufacturing and transport stages from the granulator (at the steelworks) to the factory gate are within the system boundary. This includes all energy, water and emissions from the GBS stockpile, raw material drying and GGBS grinding plant, GGBS storage, loading and dispatch.

LCA: Results

Core environmental impact indicators

Indicator	Unit	A1-3
GWP-total	kg CO ₂ -eq.	1.55e+02
GWP-fossil	kg CO ₂ -eq.	1.55e+02
GWP-biogenic	kg CO ₂ -eq.	-2.71e-01
GWP-luluc	kg CO ₂ -eq.	5.36e-02
ODP	kg CFC-11-Eq	2.69e-06
AP	mol H ⁺ -Eq	1.83e+00
EP-freshwater	kg P-Eq	2.88e-02
EP-marine	kg N-Eq	4.29e-01
EP-terrestrial	mol N-Eq	4.73e+00
POCP	kg NMVOC-Eq	1.36e+00
ADPE	kg Sb-Eq	1.24e-04
ADPF	MJ, net calorific value	2.41e+03
WDP	m ³ world Eq deprived	1.32e+01

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

Additional indicators

Indicator	Unit	A1-3
PM	disease incidence	7.08e-06
IRP	kBq U235-Eq	3.04e+01
ETP-fw	CTUe	5.43e+03
HTP-c	CTUh	2.00e-05
HTP-nc	CTUh	9.07e-07
SQP	dimensionless	2.18e+02

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
PERE	MJ	3.30e+01
PERM	MJ	0
PERT	MJ	3.30e+01
PENRE	MJ	2.41e+03
PENRM	MJ	0
PENRT	MJ	2.41e+03
SM	kg	1.00e+03
RSF	MJ	0
NRSF	MJ	0
FW	m ³	1.37e+00

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
HWD	kg	7.94e+00
NHWD	kg	1.77e+02
RWD	kg	7.24e-03

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

Output flows

Indicator	Unit	A1-3
CRU	kg	0
MFR	kg	0
MER	kg	0
EEE	MJ	0
EET	MJ	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 source	Foreground/ core [kWh]	GWP-total [kg CO2e/ kWh]	SUM [kg CO2e]
Amount of guarantee of origin electricity used in the foreground	37.76	7.03e-03	2.7e-01
Amount of residual mix electricity used in the foreground	14.26	4.48e-1	6.39e+00

Dangerous substances

Regen GGBS is produced by grinding of granulated blast furnace slag produced as a by-product in the production of pig iron.

GGBS is registered in UK REACH under the following references:

- EINECS No.: 266-002-0
- CAS name: Slags, ferrous metal, blast furnace
- CAS No.: 65996-69-2
- REACH Registration No.: UK-01-8706475375-6-0005

No substances listed on the 'Candidate List of Substances of Very High Concern for Authorisation' by the European Chemicals Agency EC 1907-2006 are contained in the GGBS in declarable quantities. This product contains substances listed in the candidate list (date: 08.07.2021) exceeding 0.1 percentage by mass: no

Additional environmental information

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

Indicator	Unit	A1-3
GWP-IOBC	kg CO ₂ -eq.	1.55e+02

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

Bibliography

DIN EN ISO 14025:2011-10	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
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
Ecoinvent v3.10	ecoinvent, Zurich, Switzerland, database version 3.10
PCR	NPCR018 for natural stone products, aggregates and fillers. Basic principles and recommendations for describing the dismantling, post use, and disposal stage of construction products: https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020-07-06_texte_130-2020_guidance-document-construction-industry.pdf ILCD Handbook: https://epca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf

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