Statement of Verification

BREG EN EPD No.: 000245 Issue 1

This is to verify that the

Environmental Product Declaration

provided by:

Hanson UK

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

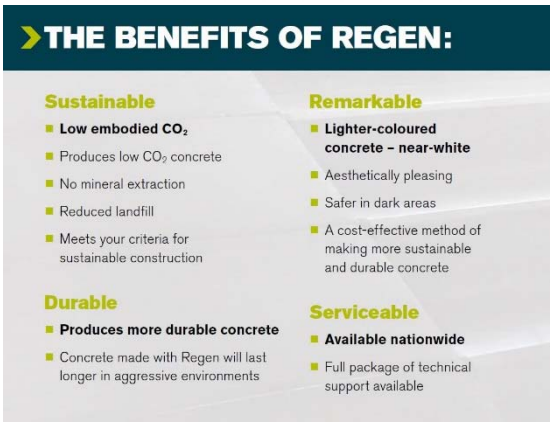
BRE Global Scheme Document SD207

This declaration is for:

Hanson Regen

Company Address

14 Castle Hill
Maidenhead
Berkshire
SL6 4JJ
United Kigdom



Hanson HEIDELBERGCEMENT Group

Signed for BRE Global Ltd	Laura Critien Operator	30 May 2019 Date of this Issue
30 May 2019 Date of First Issue		29 May 2024 Expiry Date

BRE Global Verified EPD

BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

Environmental Product Declaration

EPD Number: 000245

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**
Hanson UK Maidenhead 14 Castle Hill Maidenhead Berkshire SL6 4JJ United Kingdom	BRE LINA v 2.0.8
Declared/Functional Unit	**Applicability/Coverage**
1 Tonne of Regen	Product Average.
EPD Type	**Background database**
Cradle to Gate	ecoinvent

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)

Hanson Regen results represented in this EPD are the weighted average results based on production data from the three Hanson sites below:

Purfleet Works, London Road, Grays, RM20 3NL	Port Talbot Works, Rio Tinto Wharf, Port Talbot Docks, Port Talbot, SA13 1RA
Teesside Works, Tees Dock Road, Middlesbrough, North Yorkshire, TS6 6UF	

Construction Product:

Product Description

Regen is produced from granulated blast furnace slag(GBS) by drying and grinding it to a fine powder. It is used as a cementitious addition to concrete and in blended cements within the BS EN197-1 cement standard. The Regen production covered by this declaration meet 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’.

Technical Information

Property	Value, Unit
Dry bulk density	1400-1600 kg/m^3

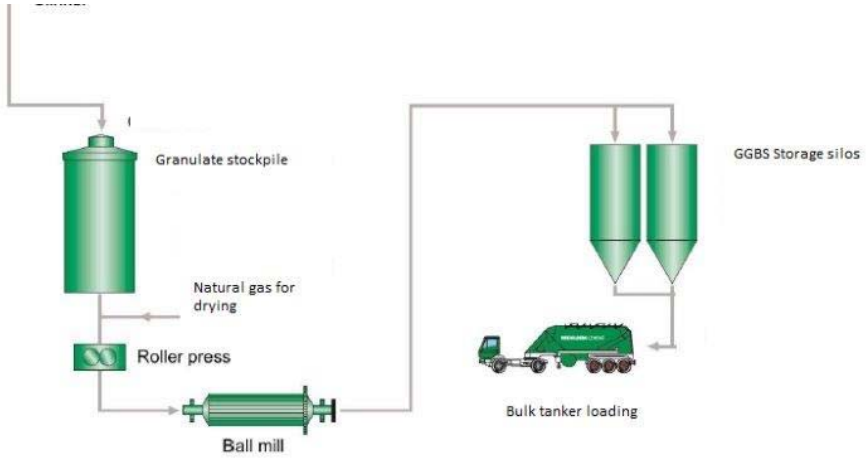
Main Product Contents

Material/Chemical Input	%
Granulated Blast furnace Slag	100

Manufacturing Process

Granulated blast furnace slag is delivered to site from the granulator located at the blast furnace. GBS is sourced from blast furnaces located in the UK and overseas. The granulate is either dried in a dryer or in the mill using heat from a natural gas burner. The granulate is milled to a fine powder to produce ground granulated blast furnace slag (GGBS) and transferred to storage silos. It is dispatched in road tankers for use at concrete plants where it is added with cement to produce concrete. GGBS is also used to produce blended cements in combination with Cem I cements.

Process flow diagram



Schematic Regen production process,

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 Tonne of REGEN (ground granulated blast furnace slag (GGBS))

System boundary

This is a cradle to gate EPD with modules A1-A3 declared. Granulated blast furnace slag (GBS) is a low revenue co-product. The impacts for the production of GBS are allocated to the ironmaking process with the exception of the electrical energy used in the granulation process which is included in this EPD.

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

Data sources, quality and allocation

This LCA study was carried out using BRE LINA. The tool has been pre-verified to confirm to the modelling requirements of EN 15804+A1. Manufacturer specific data for three individual Hanson UK manufacturing sites for the period of the 12 months of 2017 was modelled to create a weighted average results dataset that represents Regen made across the three sites.

Secondary data for upstream and downstream processes are as provided in the BRE LINA tool. The background LCI datasets are based on ecoinvent database v3.2.

The allocation of electricity at the granulation stage is on a mass basis i.e. all the power consumed by the granulator for the GBS production is within the scope of this EPD irrespective of location or conventions applied in different countries. For example GBS produced in France has been assigned the French electricity data set and GBS import from the Netherlands has been assigned the Dutch electricity data set even though the convention is to assign all impacts of GBS to the blast furnace in this case. The energy consumed for granulation has been taken to be the same at all granulate production sites based on data provided by Hanson's UK granulate supplier. This is considered a reasonable assumption as it represents less than 2% of the total production power consumption.

Cut-off criteria

No inputs or outputs have been excluded. All raw materials, including the delivery of raw materials to site, the delivery and use of fuel to plant including the fuel used by the mobile plant, the water used and waste produced are included. Calculated emission to air and water related to the production process are calculated from continuous emissions monitors or using technical estimations.

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	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	7.96e+1	9.52e-6	8.87e-1	1.22e-1	6.17e-2	5.46e-5	1.22e+3
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
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	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND	MND

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	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	5.93e+1	9.89e-5	5.93e+1	1.39e+3	0.00e+0	1.39e+3
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
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	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00e+0	0.00e+0	0.00e+0	3.18e-1
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
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	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

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	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	3.03e-1	2.02e+0	7.32e-3
Construction process stage	Transport	A4	MND	MND	MND
	Construction	A5	MND	MND	MND
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	MND	MND	MND
	Disposal	C4	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00e+0	2.07e-2	0.00e+0	0.00e+0
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
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	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Sustainability at Hanson UK – Our vision

Our vision is to be the clear and sustainable market leader, focused on exceeding customer expectations through an engaged team that is responsible, reliable and safe.

Our approach is built around six topics which underpin our sustainability policy and performance indicators:

- **Enabling sustainable construction** – partnership and product development
- **People and communities** – zero harm in the workplace; creating sustainable communities and working with our stakeholders
- **Carbon and energy** – climate change and energy use
- **Waste and raw materials** – sustainable consumption and production
- **Water and biodiversity** – water conservation and enhancing the natural environment
- **Quality processes and systems** – management systems for continual improvement.

We have clear targets within these topics and report annually on progress and performance.

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.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

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

BSI. Ground granulated blast furnace slag for use in concrete, mortar and grout - Definitions, specifications and conformity criteria. BS EN 15167-1:2006. London, BSI, 2006