

Environmental Product Declaration

BREG EN EPD No.: 000001

Issue: 05

ECO EPD Ref. No.: 000091

This is to certify that this verified Environmental Product Declaration provided by:

Forterra Building Products Ltd

Is in accordance with the requirements of:

EN 15804:2012+A1:2013

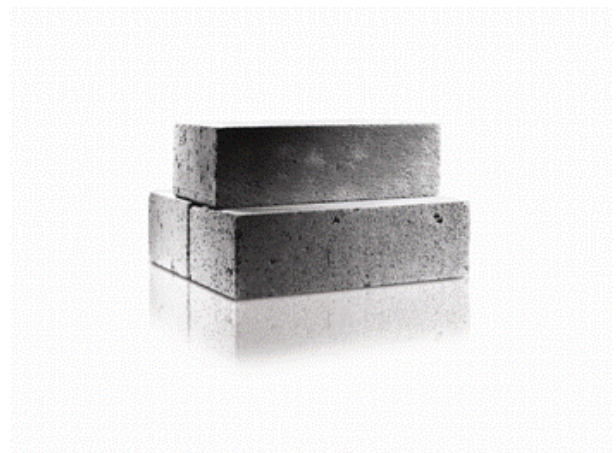
This declaration is for:

Thermalite Autoclaved Aerated Concrete Block (470-770 kg/m³)



Company Address

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Signed for BRE Global Ltd

Laura Critien
Operator

08 April 2016
Date of this Issue

24 February 2014
Date of First Issue

23 February 2019
Expiry Date



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To check the validity of this EPD please visit www.greenbooklive.com/check or contact us.
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EPD verification and LCA details

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	
<input type="checkbox"/> Internal	<input checked="" type="checkbox"/> External
Third party verifier ^b : Dr Owen Abbe	
<small>a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)</small>	

LCA Consultant	Verifier
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General Information

Summary

This environmental product declaration is for 1 tonne of Thermalite Autoclaved Aerated Concrete Block (470-770 kg/m³) produced by Forterra Building Products Ltd at the following manufacturing facilities:

Hams Hall Distribution Park	Newbury
Canton Lane	Enterprise Way
Coleshill	Thatcham
Birmingham	Berkshire
B46 1AQ	RG19 4AN
UK	UK

This is a Cradle to gate with options EPD. The life cycle stages included are as shown below (X = included, MND = module not declared):

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	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X

Programme Operator

BRE Global, Watford, Herts, WD25 9XX, United Kingdom.

This declaration is based on the BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013.

Comparability

Environmental declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the product category rules used and the source of the data, e.g. the database. See EN 15804:2012+A1:2013 for further guidance.

Construction Product

Product Description

Forterra Thermalite blocks are Autoclaved Aerated concrete (AAC / Aircrete) masonry units with structural, fire protection, sound and thermal insulating properties for which the main intended uses are different types of load bearing and non-loadbearing applications, both internal and external, above and below ground level, in the construction of domestic and non-domestic buildings.

The product content in the table below represents an average composition for 1 tonne of Thermalite block.

Technical Information

Property	Value	Unit
Width	100 - 300	mm
Mean dry density	470 - 730	kg/m ³
Mean compressive strength	2.9 - 7.3	N/mm ²
Thermal conductivity design value	0.11 - 0.18	W/(m.K)
Face dimensions	440 x 215	mm

Product Contents

Material/Chemical Input	%
PFA	67 - 81
Cement	8 - 24
Quicklime	5 - 11
Other (Sand, Hardcore, Anhydrite, etc.)	0 - 8

Manufacturing Process

The products are manufactured by the mixing of the input materials into slurry in the mixing plant and then transferring to moulds. Additives in the mix cause the aeration reaction and the slurry rises and sets. After de-moulding, the resulting 'cake' is then cut into the required block sizes and autoclaved to cure the blocks.

The finished Thermalite blocks are then packaged and made ready for transport.

Data sources, quality and allocation

Specific foreground data derived from Forterra production processes is used in the production LCA for modules A1 – A3. Generic data is used for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production, and end-of-life).

Modelling of the life cycle of Thermalite block was performed using SimaPro 8 LCA software from PRé. All relevant background LCI datasets are taken from the ecoinvent database v2.2.

In accordance with the requirements of EN 15804, the most current available data was used to calculate the study. The manufacturer-specific data from Forterra covered a production period of 1 year (01/01/2011 to 31/12/2011).

All allocation procedures in the background datasets were according to EN 15804 and based on the ISO 14044 guidance.

The Hams Hall site manufactures Trenchblock, Trenchblock T & G, Hi-Strength Trenchblock and Bricks in addition to the products covered by this study. The Newbury site also manufactures Trenchblock, Trenchblock T & G and Hi-Strength Trenchblock in addition to those products covered by this study. Therefore, some calculations were performed to allocate energy use, water use, waste and emissions to the average Thermalite Block.

Cut-off criteria

All raw materials, packaging materials and consumable item inputs, and associated transport to the plant, process energy and water use, direct production waste and emissions to air and water are included.

LCA Results

(INA = Indicator not assessed, AGG = Aggregated, NA = Not Applicable)

Indicator	Unit	A1	A2	A3	A1-A3	C4	D
		Raw Material supply	Transport to factory	Manufacturing	Merged A1/A2/A3	Disposal	Reuse/ Recovery/ Recycling Potential
Environmental impacts per declared/functional unit							
GWP	kg CO ₂ eq.	AGG	AGG	AGG	280	0.245	-1.83
ODP	kg CFC 11 eq.	AGG	AGG	AGG	0.000144	6.00E-07	-3.28E-06
AP	kg SO ₂ eq.	AGG	AGG	AGG	0.612	0.00186	-0.0118
EP	kg (PO ₄) ³⁻ eq.	AGG	AGG	AGG	0.0834	0.000401	-0.00229
POCP	kg C ₂ H ₄ eq.	AGG	AGG	AGG	0.0785	0.000238	-0.00138
ADPE	kg Sb eq.	AGG	AGG	AGG	4.91E-07	1.09E-10	-6.62E-08
ADPF	MJ eq.	AGG	AGG	AGG	2540	3.33	-25.8
GWP = Global Warming Potential (Climate Change); ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels							
Resource use							
PERE	MJ	AGG	AGG	AGG	84.8	0.00746	-4.13
PERM	MJ	AGG	AGG	AGG	0.00	0.00	0.00
PERT	MJ	AGG	AGG	AGG	84.8	0.00746	-4.13
PENRE	MJ	AGG	AGG	AGG	2650	3.29	-50.6
PENRM	MJ	AGG	AGG	AGG	0.00	0.00	0.00
PENRT	MJ	AGG	AGG	AGG	2650	3.29	-50.6
SM	kg	AGG	AGG	AGG	211	0.00	0.00
RSF	MJ	AGG	AGG	AGG	0.00	0.00	0.00
NRSF	MJ	AGG	AGG	AGG	0.00	0.00	0.00
FW	m ³	AGG	AGG	AGG	1.66	0.000315	-1.38
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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water							
Waste to disposal							
HWD	kg	AGG	AGG	AGG	1.80	8.96E-05	-0.0154
NHWD	kg	AGG	AGG	AGG	0.0138	100	50.00
TRWD	kg	AGG	AGG	AGG	0.0237	7.34E-05	-0.00101
RWDHL	kg	AGG	AGG	AGG	0.00283	9.59E-06	-9.50E-05
HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; TRWD = Total Radioactive waste disposed; RWDHL = Radioactive waste disposed (high-level nuclear waste)							
Other output flows							
CRU	kg	AGG	AGG	AGG	101	400	0.00
MFR	kg	AGG	AGG	AGG	0.0604	500	0.00
MER	kg	AGG	AGG	AGG	0.00	0.00	0.00
EE	MJ	AGG	AGG	AGG	7.16	0.0399	-0.264
CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Export energy							

Scenarios and Additional Technical Information

End-of-life modules – C1, C3, and C4			
Parameter	Description	Unit	Value
Waste for recycling	Concrete block from demolition to recycling	%	90
Waste for final disposal	Concrete block from demolition to landfill	%	10

Module D – Reuse/Recovery/Recycling Potential

After demolition, concrete blocks are crushed on site and then used as a replacement for gravel as a virgin aggregate on site. Assuming 95% conversion efficiency, 1.05 tonnes of crushed concrete block are required to produce 1 tonne of recycled secondary aggregate with 50 kg needing to be disposed of in landfill. This can in turn replace 1 tonne of virgin gravel aggregate.

Interpretation

The major environmental impact arising from the manufacturing of aircrete blocks derives from the use of cement and quicklime. The manufacture of cement involves the use of energy to heat the cement kilns to 1500°C. During the production of quicklime a large amount of energy is used to heat the limestone to remove CO₂ from it. Forterra has reduced this impact by replacing cement in their concrete block with Pulverised Fuel Ash (PFA). PFA is a secondary input material arising from the production of electricity in coal fired power stations, so has comparatively lower impacts than cement.

Key sources of the Global Warming Potential (GWP) environmental indicator are the amount of CO₂ emitted during the manufacture of the raw materials used in the Thermalite block and during the burning of fuel consumed during the manufacture of the Thermalite block itself plus transport of the raw materials.

The Acidification Potential (AP) indicator is predominantly driven by the production of nitrogen oxides (NO_x) and sulphur oxides (SO_x) from the combustion of fossil fuels.

At disposal, at end-of-life (C4), the environmental impacts result only from the waste sent to landfill and associated depletion of fossil fuel resources from the use of diesel and light fuel oil in site machinery used at the landfill.

There is benefit in Module D associated with the recycling of concrete block as a secondary aggregate replacing virgin aggregate material in a new system.

Sources of additional information

BRE Global. BRE Environmental Profiles 2013: Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013. PN 514. Watford, BRE, 2014.

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.

Thermalite Technical Manual, available to download from <http://forterra.co.uk/>