Environmental Product Declaration

BREG EN EPD No.: 000062 Issue: 01

ECO EPD Ref. No.: 000184

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

Knauf Insulation (Northern Europe)

Is in accordance with the requirements of:

EN 15804:2012+A1:2013

This declaration is for:

Glass Mineral Wool Insulation with ECOSE® Technology (0.032 – 0.033 W/mK)

Company Address

Stafford Road
St. Helens
Merseyside
WA10 3NS

Signed for BRE Global Ltd	Derek Hughes Operator	21 May 2015 Date of this Issue
21 May 2015 Date of First Issue		20 May 2020 Expiry Date

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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 ☐ Internal ☑ External
Third party verifier[b]: **Victoria Blake**
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

LCA Consultant	Verifier
Chris Foster EuGeos Limited Park Lane Macclesfield SK11 8JR www.eugeos.ltd.uk	Victoria Blake BRE Global Bucknalls Lane Watford WD25 9XX www.bre.co.uk

General Information

Summary

This environmental product declaration is for 1 cubic metre of Glass Mineral Wool Insulation with ECOSE® Technology (0.032 – 0.033 W/mK) produced by Knauf Insulation (Northern Europe) at the following manufacturing facilities:

Knauf Insulation (Northern Europe)
Stafford Road
St. Helens
Merseyside
WA10 3NS
UK

Knauf Insulation (Northern Europe)
Cwmbran

Torfaen
NP44 2YQ
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	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X		MND

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

Product comes as slabs, rolls or boards with the names: Earthwool DriTherm Cavity Slab 32 Ultimate; Earthwool Rafter Roll (75 & 100mm); Earthwool FrameTherm Slab 32; Earthwool FrameTherm Roll 32; Earthwool FactoryClad Roll 32; Kalzip Plus 32; Space Slab 033; EcoBlanket 033; Klima Duct Roll; Duct Roll 033; EcoBatt 033; EcoBatt 032.

Technical Information

Property	Value	Unit
Thermal conductivity (EN12667)	0.032 - 0.033	W/mK
Gross dry density (EN 1602)	26 - 32	kgm^{-3}
Water vapour diffusion resistance factor (EN 13162)	1	n/a
Water absorption Wp (EN 1609)	<1	kgm^{-2}
Fire Classification (in accordance with BS EN 13501-1 :2002)	Euroclass A1	n/a

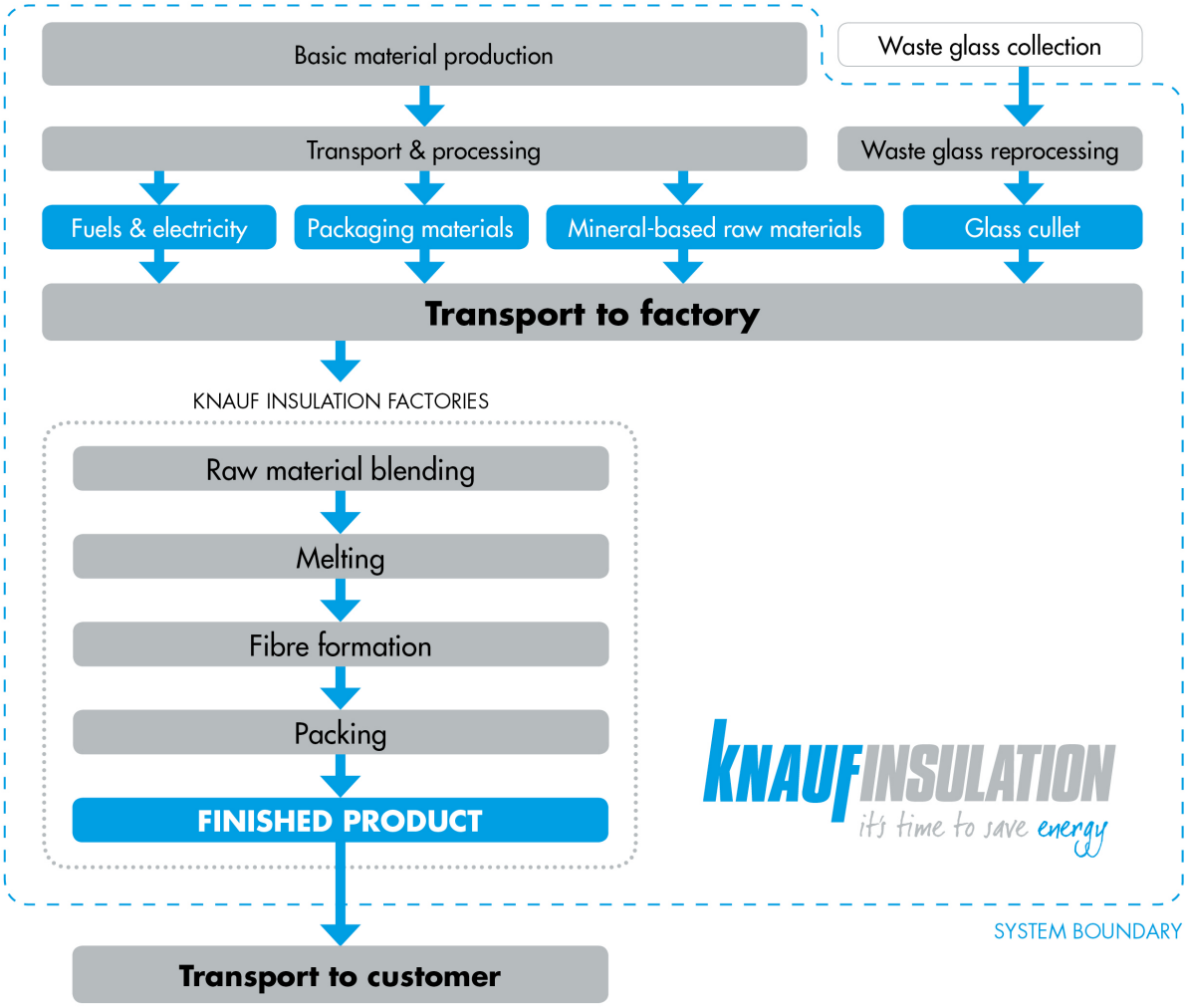
Product Contents

Material/Chemical Input	%
Recovered waste glass	50 - 80
Sand	8 - 19
Dolomite	2 - 9
Soda ash	3 - 9
Other minerals	3 - 9
Plant-based resin	4 - 7

Manufacturing Process

The product is approximately 95% glass; the remaining 5% comprises a bio-based resin that serves as a binder and small quantities of additives that aid performance. In the manufacturing process, recovered waste glass is melted together with other raw materials needed to achieve the target composition. As molten glass leaves the furnace, it is cooled and formed into glass fibres. Binder is then applied prior to forming and curing of the glass mineral wool product. All glass mineral wool products are compressed when packed to optimise their transport to customers.

The process flow diagram is shown below:



Construction Installation

Glass mineral wool insulation is intended for thermal and acoustic insulation, as well as for fire prevention in buildings and industry. Methods of installation vary according to the type of application.

Use Information

Glass mineral wool insulation is designed for installation into both new and existing buildings. It is used in cavity walls, party walls, open attics and lofts, timber frame walls and in pitched roofs.

End of Life

The product is classified as non-hazardous. The International Agency for Research on Cancer (IARC) classifies mineral wool fibres in group 3: "not classified as to their carcinogenicity to humans". These fibres are exempt from carcinogenic classification under European Regulation 1272/2008, having bio-persistence below the values defined in its note "Q". This exemption is certified by the European Certification Board (www.euceb.org). The product may be disposed of as a non-hazardous material.

Life Cycle Assessment Calculation Rules

Declared / Functional unit

1 m³ of glass mineral wool insulation with ECOSE® Technology with the product names provided in the Product Description. The density used for the calculation of the LCA is 29 kg/m³.

System boundary

The system boundary of the EPD is defined using the modular approach set out in EN 15804. This cradle-to-gate with options EPD includes the product stage (A1-A3); transport to the construction site (A4); transport to waste processing (C2); and disposal at end-of-life (C4).

Data sources, quality and allocation

Specific foreground data derived from Knauf Insulation production information is used in the product-stage 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, vehicle operation, end-of-life).
Where possible all relevant background LCI datasets were taken from the ecoinvent database v3.1. Where the creation of specific background datasets was necessary, these were created using processes within the ecoinvent database v3.1 wherever possible.
In accordance with the requirements of EN 15804, the most current available data was used to calculate the EPD.
Manufacturer-specific data from Knauf Insulation covers a production period of 1 year (01/01/2012 to 31/12/2012).
All allocation procedures in the background datasets are in accordance with EN 15804 and are based on the ISO 14044.
Materials, energy flows and associated emissions are allocated to the product by physical property.

Cut-off criteria

All data related to raw material, packaging material and consumable items, with the associated transport to the manufacturing site; 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	A4	A5	B1	B2	B3
		Raw materials supply	Transport to factory	Manufacturing	Aggregateted	Transport to site	Construction - installation	Use	Maintenance	Repair
Environmental impacts per declared/functional unit										
GWP	kg CO_2 eq.	AGG	AGG	AGG	35.9	0.503	INA	INA	INA	INA
ODP	kg CFC 11 eq.	AGG	AGG	AGG	3.45E-06	9.22E-08	INA	INA	INA	INA
AP	kg SO_2 eq.	AGG	AGG	AGG	0.181	0.00262	INA	INA	INA	INA
EP	kg $(PO_4)^{3-}$ eq.	AGG	AGG	AGG	0.0312	0.000497	INA	INA	INA	INA
POCP	kg C_2H_4 eq.	AGG	AGG	AGG	0.00673	9.58E-05	INA	INA	INA	INA
ADPE	kg Sb eq.	AGG	AGG	AGG	0.00137	1.64E-06	INA	INA	INA	INA
ADPF	MJ eq.	AGG	AGG	AGG	618	7.64	INA	INA	INA	INA
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	112	0.0951	INA	INA	INA	INA
PERM	MJ	AGG	AGG	AGG	INA	0.00	INA	INA	INA	INA
PERT	MJ	AGG	AGG	AGG	112	0.0951	INA	INA	INA	INA
PENRE	MJ	AGG	AGG	AGG	631	8.17	INA	INA	INA	INA
PENRM	MJ	AGG	AGG	AGG	INA	0.00	INA	INA	INA	INA
PENRT	MJ	AGG	AGG	AGG	631	8.17	INA	INA	INA	INA
SM	kg	AGG	AGG	AGG	21.2	0.00243	INA	INA	INA	INA
RSF	MJ	AGG	AGG	AGG	INA	INA	INA	INA	INA	INA
NRSF	MJ	AGG	AGG	AGG	INA	INA	INA	INA	INA	INA
FW	m^3	AGG	AGG	AGG	0.423	0.00146	INA	INA	INA	INA
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	0.154	0.00331	INA	INA	INA	INA
NHWD	kg	AGG	AGG	AGG	3.39	0.375	INA	INA	INA	INA
TRWD	kg	AGG	AGG	AGG	0.00224	5.28E-05	INA	INA	INA	INA
RWDHL	kg	AGG	AGG	AGG	0.00021	4.83E-07	INA	INA	INA	INA
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	INA	INA	INA	INA	INA	INA
MFR	kg	AGG	AGG	AGG	INA	INA	INA	INA	INA	INA
MER	kg	AGG	AGG	AGG	INA	INA	INA	INA	INA	INA
EE	MJ	AGG	AGG	AGG	INA	INA	INA	INA	INA	INA
CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Export energy										

LCA Results (continued)

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

Indicator	Unit	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse/ Recovery/ Recycling potential
Environmental impacts per declared/functional unit										
GWP	kg CO_2 eq.	INA	INA	INA	INA	INA	0.247	INA	0.159	INA
ODP	kg CFC 11 eq.	INA	INA	INA	INA	INA	4.52E-08	INA	5.22E-08	INA
AP	kg SO_2 eq.	INA	INA	INA	INA	INA	0.00129	INA	0.00122	INA
EP	kg $(PO_4)^{3-}$ eq.	INA	INA	INA	INA	INA	0.000244	INA	0.0002	INA
POCP	kg C_2H_4 eq.	INA	INA	INA	INA	INA	4.70E-05	INA	5.80E-05	INA
ADPE	kg Sb eq.	INA	INA	INA	INA	INA	8.06E-07	INA	2.09E-07	INA
ADPF	MJ eq.	INA	INA	INA	INA	INA	3.75	INA	4.44	INA
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	INA	INA	INA	INA	INA	0.0466	INA	0.105	INA
PERM	MJ	INA	INA	INA	INA	INA	0.00	INA	0.00	INA
PERT	MJ	INA	INA	INA	INA	INA	0.0466	INA	0.105	INA
PENRE	MJ	INA	INA	INA	INA	INA	4.00	INA	4.76	INA
PENRM	MJ	INA	INA	INA	INA	INA	0.00	INA	0.00	INA
PENRT	MJ	INA	INA	INA	INA	INA	4.00	INA	4.76	INA
SM	kg	INA	INA	INA	INA	INA	0.00119	INA	0.00116	INA
RSF	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
NRSF	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
FW	m^3	INA	INA	INA	INA	INA	0.000718	INA	0.00494	INA
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	INA	INA	INA	INA	INA	0.00162	INA	0.00196	INA
NHWD	kg	INA	INA	INA	INA	INA	0.184	INA	29.00	INA
TRWD	kg	INA	INA	INA	INA	INA	2.59E-05	INA	2.99E-05	INA
RWDHL	kg	INA	INA	INA	INA	INA	2.37E-07	INA	2.35E-07	INA
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	INA	INA	INA	INA	INA	INA	INA	INA	INA
MFR	kg	INA	INA	INA	INA	INA	INA	INA	INA	INA
MER	kg	INA	INA	INA	INA	INA	INA	INA	INA	INA
EE	MJ	INA	INA	INA	INA	INA	INA	INA	INA	INA
CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Export energy										

Scenarios and Additional Technical Information

Module A4 – Transport to the building site				
Vehicle Type	**Fuel Consumption (L/km)**	**Distance (km)**	**Capacity Utilisation (%)**	**Density Of Product (kg/m³)**
Lorry	0.3	100	36	29

End-of-life modules – C1, C3, and C4			
Parameter	**Description**	**Unit**	**Value**
Waste for final disposal	Quantity of waste to landfill	kg	29

Module C2 – Transport to waste processing				
Vehicle Type	**Fuel Consumption (L/km)**	**Distance (km)**	**Capacity Utilisation (%)**	**Density Of Product (kg/m³)**
Lorry	0.3	50	36	29

Interpretation

At all stages of the life cycle and for most impact categories, fossil fuel production and combustion make a dominant contribution to the environmental impact indicator results. One exception is the ADPE category: here the extraction of minerals contributes significantly to the overall indicator value.
Figure 1 shows environmental impact potential per module for each of the impact categories covered by the LCA. The product stage makes the most significant contribution to total indicator values.
LCIA results for the declared unit are related to product density. To illustrate how this affects environmental indicator values, Figure 2 shows LCIA results for the minimum and maximum density products in the product group.

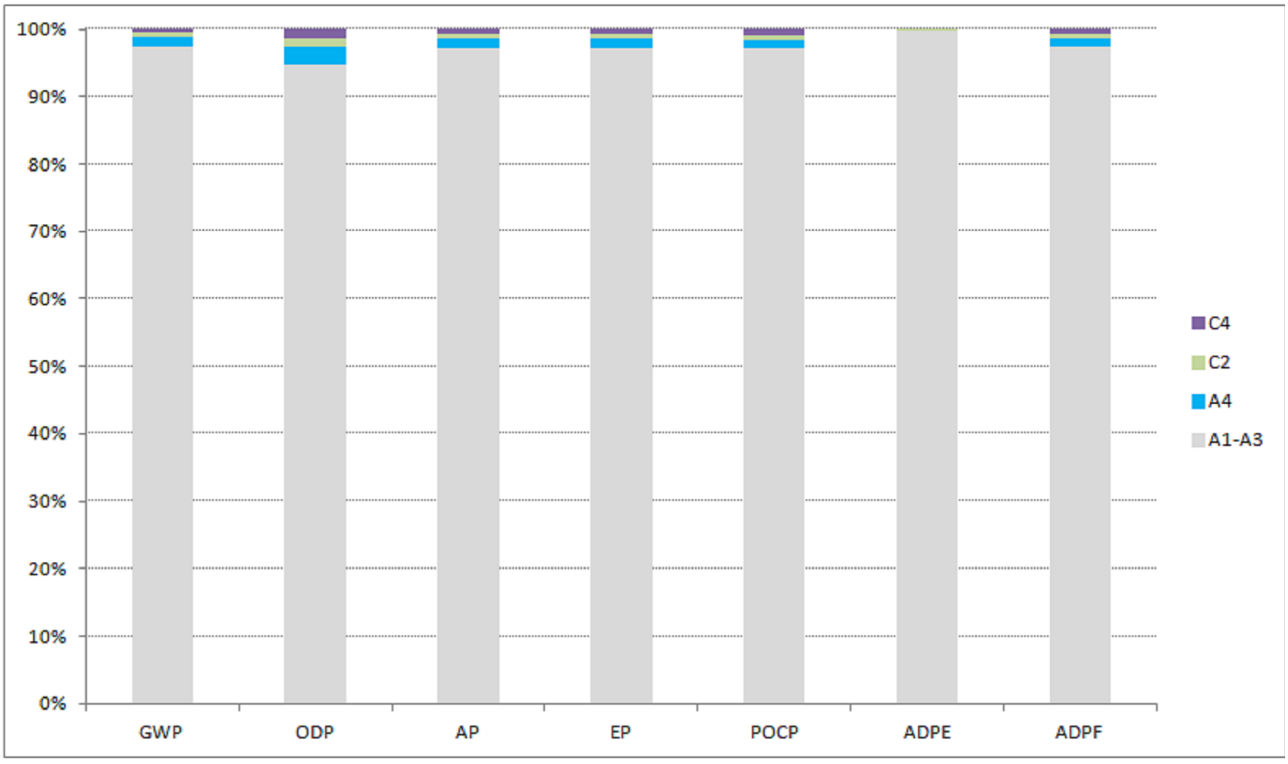


Figure 1

Module	Product density (kgm^{-3})	GWP	ODP	AP	EP	POCP	ADPE	ADPF
		kg CO_2 eq	kg CFC-11 eq	kg SO_2 eq	kg PO_4^{3-} eq	kg ethylene eq	kg Sb eq	MJ
A1 - A3	26	3.22E+01	3.10E-06	1.62E-01	2.79E-02	6.03E-03	1.23E-03	5.54E+02
	32	3.96E+01	3.81E-06	1.99E-01	3.44E-02	7.43E-03	1.51E-03	6.82E+02
A4	26	9.19E-03	1.69E-09	4.79E-05	9.06E-06	1.75E-06	3.01E-08	1.40E-01
	32	1.13E-02	2.07E-09	5.89E-05	1.12E-05	2.16E-06	3.70E-08	1.72E-01
C2	26	4.51E-03	8.26E-10	2.35E-05	4.44E-06	8.59E-07	1.47E-08	6.85E-02
	32	5.55E-03	1.02E-09	2.89E-05	5.47E-06	1.06E-06	1.81E-08	8.43E-02
C4	26	1.43E-01	4.68E-08	1.09E-03	1.79E-04	5.20E-05	1.88E-07	3.98E+00
	32	1.75E-01	5.75E-08	1.34E-03	2.20E-04	6.40E-05	2.31E-07	4.90E+00

Figure 2

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.