PRODUCT INFORMATION FOR THE BUILDING CERTIFICATION SCHEME BREEAM®

(Building Research Establishment's Environmental Assessment Method)

The intention of this document is to support the BREEAM certification process by providing building-specific information. This information is based on the BREEAM technical manual (2014) [1]

Armaflex

General Information

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Product information

Product description

This fact sheet covers six product brands of the product family Armaflex:
NH/Armaflex, SH/Armaflex, HT/Armaflex, Armaflex Ultima, AF/Armaflex, AF/Armaflex Class O

Armaflex products are the professional, highly flexible, closed-cell elastomeric foam insulation (FEF) for continuous energy-saving and condensation-control purposes. The combination of very low thermal conductivity and extremely high resistance to water vapour transmission prevents long-term energy losses and water vapour ingress and reduces the risk of corrosion under insulation.

Application

Armaflex is used to insulate pipes, air ducts and vessels including fittings and flanges of industrial installations and building equipment.

[1] BREEAM UK New construction non-domestic buildings technical manual 2014; Reference: SD5076 – Issue: 1.0; Date: 21/05/2014. www.breeam.org

Technical data

Product brand	Water vapour diffusion resistance	Thermal conductivity	Maximum service temperature	Minimum service temperature	Reaction to fire
Standard/Unit	**EN 12088 [-]**	**[W/mK]**	**EN 14706/7 [°C]**	**EN 14706/7 [°C]**	**EN 135001-1 [-]**
NH/Armaflex	≥ 2000	0.040 (0°C)	+110	-50	Tubes: D_L-s3, d0/ Sheets: E
SH/Armaflex		0.036/0.040 (40°C)	+110	-50	Tubes: B_L-s3, d0/ C_L-s3, d0 Sheets: C-s3, d0/ D-s3, d0
HT/Armaflex	≥ 4000 / ≥ 3000	0.042 / 0.045 (40°C)	+110	-50	Tubes: D_L-s3, d0/ Sheets: D-s3, d0
Armaflex Ultima	7000	0.040 (0°C)	+110	-50	Tubes: B_L-s1, d0/ Sheets: B-s2, d0
AF/Armaflex	≥ 10000 / ≥ 7000	0.033 / 0.036 (0°C)	+110	-50	Tubes: B_L-s3, d0/ Sheets: B-s3, d0
AF/Armaflex Class O	≥ 10000 / ≥ 7000	0.033 / 0.036 (0°C)	+110	-50	Tubes: B_L-s3, d0/ Sheets: B-s3, d0

Product declarations

Environmental product declaration

Number	NH/Armaflex - EPD-ARM-20150106-IBB1-DE SH/Armaflex – EPD-ARM-20150107-IBB1-DE HT/Armaflex – EPD-ARM-20150108-IBB1-DE Armaflex Ultima – EPD-ARM-20150109-IBB1-DE AF/Armaflex – EPD-ARM-20150060-IBB1-DE AF/Armaflex Class O – EPD-ARM-2015-0110-IBB1-DE
Programme operator	Institut Bauen und Umwelt e.V. (IBU), Berlin, Germany
Author of the LCA	PE INTERNATIONAL AG, Leinfelden-Echterdingen, Germany

Management

Summary

This category encourages the adoption of sustainable management practices in connection with design, construction, commissioning, handover and aftercare activities to ensure that robust sustainability objectives are set and followed through into the operation of the building. Issues in this section focus on embedding sustainability activities through the key stages of design, procurement and initial occupation from the initial project brief stage to the appropriate provision of aftercare.

Category summary table for this BREEAM issue:

Issue ID	Issue name
Man 01	Project brief and design
Man 02	Life cycle cost and service life planning
Man 03	Responsible construction practices
Man 04	Commissioning and handover
Man 05	Aftercare

Man 02 Life cycle cost and service life planning

Aim of this issue
To deliver whole-life value from investment and promote economic sustainability by recognising and encouraging the use and sharing of life cycle costing and service life planning to improve design, specification and through-life maintenance and operation.

Product information for the declared product within this issue:

Specific information	Evidence (quality)
Reference service life RSL	Armaflex products are long-lasting products. Findings show that when used and installed properly they can have a service life of more than 50 years. It is practically only restricted by the service life of the equipment or whole building. The insulation performance is almost completely maintained over the entire service life. The insulation performance is only compromised by extraordinary impacts and damage during construction.
End-of-life stage	Through incineration with energy recovery, the waste treatment of the insulation material generates power and thermal energy.

The information provided within the EPD can also be used within life cycle costing / planning.

Health and Wellbeing

Summary
This category encourages the increased comfort, health and safety of building occupants, visitors and others within the vicinity. Issues in this section aim to enhance the quality of life in buildings by recognising those that encourage a healthy and safe internal and external environment for occupants.

Category summary table for this BREEAM issue

Issue ID	Issue name
Hea 01	Visual comfort
Hea 02	Indoor air quality
Hea 03	Safe containment in laboratories
Hea 04	Thermal comfort
Hea 05	Acoustic performance
Hea 06	Safety and security

Hea 02 Indoor air quality

Aim of this issue
To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.

Product information for the declared product within this issue:

Part: Minimising sources of air pollution

Item	Value
Test institute / organization (Name)	Eurofins Product Testing A/S
Test method applied	ISO 16000-3/6/9/11 – loading factor 0.5 m²/m³
Applicable regulation/Criteria	AgBB
Regulation requirements met	yes

Hea 04 Thermal comfort

Aim of this issue
To ensure that appropriate thermal comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.

Product information for the declared product within this issue:

Specific information	Value and evidence (quality)					
	NH/Armaflex	SH/Armaflex	HT/Armaflex	Armaflex Ultima	AF/Armaflex	AF/Armaflex Class O
Thermal conductivity (W/mK)	0.040 (0 °C)	0.040 (40 °C)	0.045 (40 °C)	0.040 (0 °C)	0.033 (0 °C)	0.033 (0 °C)

Hea 05 Acoustic performance

Aim of this issue
To ensure the building's acoustic performance including sound insulation meet the appropriate standards for its purpose.

Product information for the declared product within this issue:

Specific information	Value and evidence (quality)	
	Test Standard	AF/Armaflex
Structure-borne sound transmission	ISO 3822-1	≤ 28 dB (A)
Weighted sound absorption coefficient	ISO 11654	≤ 0.45

Energy

Summary
This category encourages the specification and design of energy efficient building solutions, systems and equipment that support the sustainable use of energy in the building and sustainable management in the building's operation. Issues in this section assess measures to improve the inherent energy efficiency of the building, encourage the reduction of carbon emissions and support efficient management throughout the operational phase of the building's life.

Category summary table for this BREEAM issue

Issue ID	Issue name
Ene 01	Reduction of energy use and carbon emissions
Ene 02	Energy monitoring
Ene 03	External lighting
Ene 04	Low carbon design
Ene 05	Energy efficient cold storage
Ene 06	Energy efficient transportation systems
Ene 07	Energy efficient laboratory systems
Ene 08	Energy efficient equipment

Ene 01 Reduction of energy use and carbon emissions

Aim of this issue
To recognise and encourage buildings designed to minimise operational energy demand, primary energy consumption and CO_2 emissions.

Product information for the declared product within this issue:
See information provided in section Hea 04.

Ene 05 Energy efficient cold storage

Aim of this issue
To recognise and encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use.

Product information for the declared product within this issue:
See information provided in section Hea 04.

Materials

Summary
This category encourages steps taken to reduce the impact of construction materials through design, construction, maintenance and repair. Issues in this section focus on the procurement of materials that are sourced in a responsible way and have a low embodied impact over their life including extraction, processing and manufacture and recycling.

Category summary table for this BREEAM issue

Issue ID	Issue name
Mat 01	Life cycle impacts
Mat 02	Hard landscaping and boundary protection
Mat 03	Responsible sourcing of materials
Mat 04	Insulation
Mat 05	Designing for durability and resilience
Mat 06	Material efficiency

Mat 01 Life cycle impacts

Aim of this issue
To recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building.

Product information for the declared product within this issue:

Description	Value
"Product specific" environmental profile certification available?	yes
EPD Program Operator	Institut Bauen und Umwelt e.V. (IBU), Berlin, Germany
EPD Number	NH/Armaflex - EPD-ARM-20150106-IBB1-DE
	SH/Armaflex – EPD-ARM-20150107-IBB1-DE
	HT/Armaflex – EPD-ARM-20150108-IBB1-DE
	Armaflex Ultima – EPD-ARM-20150109-IBB1-DE
	AF/Armaflex – EPD-ARM-20150060-IBB1-DE
	AF/Armaflex Class O – EPD-ARM-2015-0110-IBB1-DE
System boundaries	Cradle-to-gate plus installation and EoL
Declared unit	1 m³
PCR	Insulating materials made of foam plastics, 10-2012

Results of the LCA – ENVIRONMENTAL IMPACTS:

NH/Armaflex 1 m³ / 62.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	307.494	4.628	57.503	0.286	159.851	-49.310
ODP [kg CFC11-Äq.]	9.137E-09	1.904E-11	1.807E-10	1.177E-12	1.319E-09	-1.689E-08
AP [kg SO2-Äq.]	5.928E-01	1.189E-02	1.060E-02	7.349E-04	2.171E-01	-1.314E-01
EP [kg PO43-- Äq.]	1.192E-01	2.935E-03	1.721E-03	1.814E-04	7.541E-03	-8.901E-03
POCP [kg Ethen Äq.]	1.379E-01	-3.219E-03	1.608E-03	-1.989E-04	4.860E-03	-1.078E-02
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

SH/Armaflex 1 m³ / 47.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	213.538	3.019	34.844	0.217	121.486	-36.722
ODP [kg CFC11-Äq.]	1.025E-08	1.242E-11	1.630E-10	8.942E-13	1.002E-09	-1.258E-08
AP [kg SO2-Äq.]	9.711E-01	7.755E-03	1.306E-02	5.585E-04	1.650E-01	-9.786E-02
EP [kg PO43-- Äq.]	9.684E-02	1.915E-03	1.326E-03	1.379E-04	5.731E-03	-6.629E-03
POCP [kg Ethen Äq.]	4.388E-01	-2.099E-03	4.579E-03	-1.512E-04	3.693E-03	-8.027E-03
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

HT/Armaflex 1 m³ / 75 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	309.211	5.113	58.448	0.343	191.821	-57.798
ODP [kg CFC11-Äq.]	1.267E-08	2.103E-11	2.199E-10	1.412E-12	1.582E-09	-1.980E-08
AP [kg SO2-Äq.]	2.354E+00	1.314E-02	2.887E-02	8.819E-04	2.605E-01	-1.540E-01
EP [kg PO43-- Äq.]	1.455E-01	3.243E-03	2.010E-03	2.177E-04	9.049E-03	-1.043E-02
POCP [kg Ethen Äq.]	2.741E-01	-3.555E-03	2.992E-03	-2.387E-04	5.832E-03	-1.263E-02
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

Armaflex Ultima 1 m³ / 57.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	232.710	3.792	41.888	0.263	147.063	-43.915
ODP [kg CFC11-Äq.]	7.966E-09	1.560E-11	1.468E-10	1.082E-12	1.213E-09	-1.504E-08
AP [kg SO2-Äq.]	5.688E-01	9.743E-03	9.518E-03	6.761E-04	1.997E-01	-1.170E-01
EP [kg PO43-- Äq.]	9.816E-02	2.405E-03	1.382E-03	1.669E-04	6.937E-03	-7.927E-03
POCP [kg Ethen Äq.]	1.528E-01	-2.637E-03	1.705E-03	-1.830E-04	4.471E-03	-9.599E-03
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

AF/Armaflex 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	264.092	3.661	43.639	0.240	134.274	-40.853
ODP [kg CFC11-Äq.]	1.061E-08	1.506E-11	1.727E-10	9.883E-13	1.108E-09	-1.400E-08
AP [kg SO2-Äq.]	1.307E+00	9.405E-03	1.702E-02	6.173E-04	1.823E-01	-1.089E-01
EP [kg PO43-- Äq.]	1.165E-01	2.322E-03	1.548E-03	1.524E-04	6.334E-03	-7.374E-03
POCP [kg Ethen Äq.]	2.481E-01	-2.546E-03	2.673E-03	-1.671E-04	4.082E-03	-8.930E-03
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

AF/Armaflex Class O 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard EN 15804)	A1-A3	A4	A5	C2	C4	D
GWP [kg CO_2-Äquiv.]	230.364	1.057	36.981	0.240	134.274	-41.176
ODP [kg CFC11-Äq.]	1.007E-08	4.349E-12	1.688E-10	9.883E-13	1.108E-09	-1.411E-08
AP [kg SO2-Äq.]	1.275E+00	2.716E-03	1.678E-02	6.173E-04	1.823E-01	-1.097E-01
EP [kg PO43-- Äq.]	1.082E-01	6.706E-04	1.457E-03	1.524E-04	6.334E-03	-7.433E-03
POCP [kg Ethen Äq.]	1.313E+00	-7.352E-04	1.345E-02	-1.671E-04	4.082E-03	-9.001E-03
Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources					

Results of the LCA – RESOURCE USE:

NH/Armaflex 1 m³ / 62.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	7388.568	67.607	83.720	4.178	350.416	-928.036
PERE [MJ]	1627.093	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	1627.093	3.574	17.270	0.221	36.469	-85.211
PENRE [MJ]	4736.475	-	-	-	-	-
PENRM [MJ]	1025.000	-	-	-	-	-
PENRT [MJ]	5761.475	64.033	66.450	3.957	313.947	-842.826
SM [kg]	45.026	0	0.455	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1654.506	6.273	67.878	0.388	330.871	-172.017
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

SH/Armaflex 1 m³ / 47.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	5199.792	44.093	58.847	3.175	266.316	-691.107
PERE [MJ]	1016.805	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	1016.805	2.331	10.856	0.168	27.717	-63.449
PENRE [MJ]	3313.737	-	-	-	-	-
PENRM [MJ]	869.250	-	-	-	-	-
PENRT [MJ]	4182.987	41.762	47.991	3.008	238.599	-627.658
SM [kg]	25.188	0	0.254	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1746.481	4.091	51.614	0.295	251.462	-128.086
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

HT/Armaflex 1 m³ / 75 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	7643.700	74.682	87.126	5.014	420.499	-1087.772
PERE [MJ]	1628.272	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	1628.272	3.948	17.364	0.265	43.763	-99.864
PENRE [MJ]	4650.428	-	-	-	-	-
PENRM [MJ]	1365.000	-	-	-	-	-
PENRT [MJ]	6015.428	70.734	69.762	4.749	376.736	-987.907
SM [kg]	45.541	0	0.460	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1945.354	6.929	72.030	0.465	397.045	-201.599
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

Armaflex Ultima 1 m³ / 57.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	5316.377	55.392	61.018	3.844	322.383	-826.477
PERE [MJ]	1228.254	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	1228.254	2.928	13.085	0.203	33.552	-75.872
PENRE [MJ]	2236.623	-	-	-	-	-
PENRM [MJ]	1851.500	-	-	-	-	-
PENRT [MJ]	4088.123	52.464	47.933	3.641	288.831	-750.605
SM [kg]	32.459	0	0.328	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1859.118	5.140	56.330	0.357	304.401	-153.165
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

AF/Armaflex 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	6186.695	53.475	68.476	3.510	294.349	-768.861
PERE [MJ]	1268.847	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	1268.847	2.827	13.380	0.186	30.634	-70.590
PENRE [MJ]	4020.098	-	-	-	-	-
PENRM [MJ]	897.750	-	-	-	-	-
PENRT [MJ]	4917.848	50.648	55.096	3.324	263.715	-698.271
SM [kg]	33.613	0	0.340	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1959.900	4.962	58.482	0.326	277.932	-142.502
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

AF/Armaflex Class O 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
PE total [MJ]	5616.149	15.444	62.675	3.510	294.349	-774.953
PERE [MJ]	975.119	-	-	-	-	-
PERM [MJ]	0	-	-	-	-	-
PERT [MJ]	975.119	0.816	10.428	0.186	30.634	-71.157
PENRE [MJ]	3743.281	-	-	-	-	-
PENRM [MJ]	897.750	-	-	-	-	-
PENRT [MJ]	4641.031	14.627	52.247	3.324	263.715	-703.796
SM [kg]	24.423	0	0.247	0	0	0
RSF [MJ]	-	-	-	-	-	-
NRSF [MJ]	-	-	-	-	-	-
FW [kg]	1772.929	1.433	57.712	0.326	277.932	-143.645
Caption	PE total = Total use of primary energy resources (=PERT+PENRT); 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 = Use of net fresh water					

Results of the LCA – OUTPUT FLOWS AND WASTE CATEGORIES:

NH/Armaflex 1 m³ / 62.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	1.741E-03	3.038E-05	2.057E-05	1.878E-06	1.371E-04	-2.429E-04
NHWD [kg]	3.391E+01	9.116E-03	1.426E+00	5.634E-04	9.887E+01	-2.520E-01
RWD [kg]	1.432E-01	8.749E-05	1.867E-03	5.407E-06	1.340E-02	-6.058E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	1.689	0	53.815	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	26.389	0	141.550	-
EET [MJ]	0	0	61.429	0	333.925	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

SH/Armaflex 1 m³ / 47.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	1.115E-02	1.981E-05	1.147E-04	1.427E-06	1.042E-04	-1.809E-04
NHWD [kg]	1.599E+01	5.945E-03	9.721E-01	4.282E-04	7.514E+01	-1.877E-01
RWD [kg]	1.136E-01	5.706E-05	1.438E-03	4.109E-06	1.018E-02	-4.511E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	0.659	0	30.102	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	17.471	0	107.578	-
EET [MJ]	0	0	40.674	0	253.783	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

HT/Armaflex 1 m³ / 75 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	2.969E-02	3.356E-05	3.032E-04	2.253E-06	1.646E-04	-2.847E-04
NHWD [kg]	2.945E+01	1.007E-02	1.580E+00	6.761E-04	1.186E+02	-2.954E-01
RWD [kg]	1.447E-01	9.665E-05	1.912E-03	6.489E-06	1.608E-02	-7.100E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	1.314	0	54.426	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	26.958	0	169.859	-
EET [MJ]	0	0	62.760	0	400.710	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

Armaflex Ultima 1 m³ / 57.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	1.321E-03	2.489E-05	1.580E-05	1.727E-06	1.262E-04	-2.163E-04
NHWD [kg]	2.917E+01	7.469E-03	1.272E+00	5.183E-04	9.096E+01	-2.244E-01
RWD [kg]	1.209E-01	7.168E-05	1.551E-03	4.975E-06	1.233E-02	-5.394E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	0.000	0	38.783	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	19.306	0	130.226	-
EET [MJ]	0	0	44.949	0	307.211	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

AF/Armaflex 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	1.822E-02	2.403E-05	1.902E-04	1.577E-06	1.152E-04	-2.012E-04
NHWD [kg]	2.456E+01	7.210E-03	1.154E+00	4.732E-04	8.305E+01	-2.088E-01
RWD [kg]	1.342E-01	6.920E-05	1.651E-03	4.542E-06	1.126E-02	-5.018E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	0.892	0	40.171	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	20.221	0	118.902	-
EET [MJ]	0	0	47.073	0	280.497	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

AF/Armaflex Class O 1 m³ / 52.5 kg/m³

Life cycle stages	A 1-A3	A 4-5		C1-4		D
	Product stage	Construction process stage		End-of-life stage		Benefits and loads beyond the system boundary
Declared life cycle stages (standard DIN EN 15804)	A1-A3	A4	A5	C2	C4	D
HWD [kg]	1.702E-02	6.940E-06	1.778E-04	1.577E-06	1.152E-04	-2.028E-04
NHWD [kg]	1.182E+01	2.082E-03	1.100E+00	4.732E-04	8.305E+01	-2.105E-01
RWD [kg]	1.378E-01	1.999E-05	1.700E-03	4.542E-06	1.126E-02	-5.059E-02
CRU [kg]	-	-	-	-	-	-
MFR [kg]	2.768	0	29.210	0	0	-
MER [kg]	-	-	-	-	-	-
EEE [MJ]	0	0	21.339	0	118.902	-
EET [MJ]	0	0	49.632	0	280.497	-
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per energy carrier					

Mat 03 Responsible sourcing of materials

Aim of this issue
To recognise and encourage the specification and procurement of responsibly sourced materials for key building elements.

Product information for the declared product within this issue:

Responsible Sourcing Certification Scheme	Certification level / scope
EN ISO 14001	Certificates available on request

Detailed information Mat 03 Responsible sourcing of materials at http://www.breeam.org/page.jsp?id=617

Mat 04 Insulation

Aim of this issue
To recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties.

Product information for the declared product within this issue:

Specific information	Value and evidence (quality)					
	NH/Armaflex	SH/Armaflex	HT/Armaflex	Armaflex Ultima	AF/Armaflex	Armaflex Class O
Thermal conductivity (W/mK)	0.040 (0 °C)	0.040 (40 °C)	0.045 (40 °C)	0.040 (0 °C)	0.033 (0 °C)	0.033 (0 °C)
EPD available?	yes					
EPD No.	EPD-ARM-20150106-IBB1-DE	EPD-ARM-20150107-IBB1-DE	EPD-ARM-20150108-IBB1-DE	EPD-ARM-20150109-IBB1-DE	EPD-ARM-20150060-IBB1-DE	EPD-ARM-2015-0110-IBB1-DE
Programme operator	Institut Bauen und Umwelt e.V. (IBU), Berlin, Germany					

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