Brucha
Product sustainability fact sheet

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 provided building specific information. The basis of this information is the BREEAM technical manual (2014) [1]

Brucha panels for walls - Polyurethane

General Information

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Date of this document:	28.08.2015

Product information

Product description

Sandwich wall panels – BRUCHAPaneel PU wall panels – WP consist of a supporting core made of polyurethane rigid foam (PUR) connected to colour-coated metal covers in a resistant manner. The metal face sheets are protected against corrosion by means of zinc plating and organic coating. These panels are pre-fabricated double skin steel faced sandwich panels used for load-bearing, self-supporting and non-supporting application in wall structures.

Application

To be used as construction element in wall structures for mainly static loads. The sandwich panel assumes building-physics related tasks in the wall structure. The panel ensures protection against noise, heat and humidity and simultaneously assumes the air-tightness function of the building envelope.

Technical data

The thickness of element can vary between 40 and 220 mm. The thickness of the steel sheets is always the same, but the thickness of the polyurethane insulation layer varies. The elements are manufactured with an overall width of up to 1,100 mm. Both even and profiled steel sheets are used as faces.

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

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Description	Value	Unit
Density of insulation layer (WP 40)	43	kg/m³
Density of insulation layer (WP 220)	39	kg/m³
Thickness of elements	40 - 220	mm
Thickness of inner sheet cover	0.6	mm
Thickness of outer sheet cover	0.5	mm
Thermal conductivity of insulating material	0.022	W/(mK)
Thermal transmission coefficient according to DIN EN 14509 (WP 40)	0.542	W/(m²K)
Thermal transmission coefficient according to DIN EN 14509 (WP 220)	0.102	W/(m²K)
Sound reduction index according to EN ISO 140-3	25	dB
Sound absorption coefficient test according to EN ISO 354	0.15	%

Product declarations

Environmental product declaration

Number	EPD-BRU-20130193-IBC1-DE
Program operator	Institute Construction and Environment (IBU - Institut Bauen und Umwelt e.V.), Berlin, Germany
Author of the LCA	thinkstep AG formerly PE International

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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 actions 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	Comment
Construction process stage	-
Reference service life (RSL)	According to service life of the building or 40 – 45 years, if the product is installed and used in accordance with the manufacturer's instructions.
Use stage	Under normal conditions, no maintenance is required and therefore no costs are arising.
End of life stage	Scenario that is also calculated in EPD: Metal is recycled and polyurethane is sent for thermal energy recovery.

	Value	Unit
Recycling	9.8	Kg
Energy recovery	4.81	Kg
Landfill	0	Kg

Man 04 Commissioning and handover

Aim of this issue
To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.

Product information for the declared product within this issue:

Product specific information for the Building User Guide (BUG)	
Installation instruction:	Please follow the installation instructions: http://www.brucha.at/opmodule/user/brucha-neu/?kat=5&dok_id=18578&lang=en
Maintenance instruction:	Please follow the maintenance instruction: http://www.brucha.at/opmodule/user/brucha-neu/dokumente/en_Oberflaechen.pdf

Building User Guide (BUG):
Dedicated building/site specific guidance for the non-technical building user. The purpose of the guide is to help building users access, understand and operate the building efficiently and in a manner in keeping with the original design intent. A Building User Guide will provide easily accessible and understandable information relevant to the following stakeholders:

- The building's staff (or where relevant residents)
- The non-technical facilities management team/building manager
- Other building users, e.g. visitors/community users

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

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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)
Thermal conductivity (W/mK) acc. EN 12667	0.0221
U-value (W/m²K) acc. DIN EN 14509 (WP 40) incl. connection loss	0.542
U-value (W/m²K) according DIN EN 14509 (WP 220) incl. connection loss	0.102

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)
Sound insulation Rw(C;Ctr) according EN ISO 140-3 (dB)	25
Sound absorption coefficient according EN ISO 354 (%)	0.15

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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:

Specific information	evidence (quality)
See section Hea 04 for relevant technical information.	

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

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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. The following LCA results refer to a sandwich panel with a representative thickness of 130 mm and a weight of 15.6 kg.

Product information for the declared product within this issue:

Description	Value
"Product specific" environmental profile certification available?	yes
EPD Program Operator	Institute Construction and Environment (IBU - Institut Bauen und Umwelt e.V.), Berlin
EPD Number	EPD-BRU-20130193-IBC1-DE
System boundaries	A1-A3, C4, D (cradle-to-gate with options)
Declared unit	1 m²
PCR	Double skin metal faced sandwich panels (version 07.2013)
Green guide rating	Example Generic Green Guide rating for Industrial Buildings: Externals Walls: Insulated Cladding: Coated steel composite profiled panel with pentane blown PUR/PIR insulation and steel liner on steel support, structural steel frame with no internal finish. Element Number: 806600001, **Summary Rating: A+**

Results of the LCA – ENVIRONMENTAL IMPACTS:

Declared life cycle stages (standard DIN EN 15804)	PRODUCT STAGE	END OF LIFE STAGE	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
	A1-A3	C4	D
GWP [kg CO_2-eq.]	4.21E+01	1.06E+01	-2.18E+01
ODP [kg CFC11-eq.]	2.32E-05	1.06E-10	-7.00E-10
AP [kg SO2-eq.]	1.25E-01	4.39E-03	-7.65E-02
EP [kg PO43-- eq.]	1.25E-02	1.09E-03	-6.20E-03
POCP [kg Ethene eq.]	1.84E-02	2.93E-04	-1.06E-02
ADPE [kg Sb eq.]	2.24E-03	7.41E-08	-8.57E-07
ADPF [MJ]	6.67E+02	2.62E+00	-2.29E+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		

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Results of the LCA – RESOURCE USE:

Declared life cycle stages (standard DIN EN 15804)	PRODUCT STAGE	END OF LIFE STAGE	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
	A1-A3	C4	D
PE total [MJ]	7.22E+02	3.20E+00	-2.37E+02
PERE [MJ]	2.53E+01	-	-
PERM [MJ]	0.00E+00	-	-
PERT [MJ]	2.53E+01	2.00E-01	-3.80E+00
PENRE [MJ]	5.65E+02	-	-
PENRM [MJ]	1.32E+02	-	-
PENRT [MJ]	6.97E+02	3.00E+00	-2.33E+02
SM [kg]	0.00E+00	-	-
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00
FW [m³]	-	-	-
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:

Declared life cycle stages (standard DIN EN 15804)	PRODUCT STAGE	END OF LIFE STAGE	BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
	A1-A3	C4	D
HWD [kg]	-	-	-
NHWD [kg]	-	-	-
RWD [kg]	-	-	-
CRU [kg]	0	-	0
MFR [kg]	0	-	9.8
MER [kg]	0	-	4.8
EEE [MJ]	0	15.7	
EET [MJ]	0	43.2	
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: EEE = Exported energy, electric energy, EET = Exported energy, thermal energy		

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	The management system of Brucha GmbH has been certified to ISO 14001 by LRQA (Certificate No. VNA0005184/E). The certificates are downloadable: http://www.brucha.at/opmodule/user/brucha-neu/dokumente/de_ISO_90014_ems_qms.pdf. Additionally, the main suppliers of steel and of polyurethane are certified to ISO 14001. Evidence of supplier certification can be provided for BREEAM Assessments on request from m.pfiel@brucha.at.

Responsible sourcing certification scheme point scores
A graded scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding credits in the BREEAM issue Mat 03. Refer to Guidance Note (TBC) available in the Resources section of the BREEAM website for an up-to-date table of responsible sourcing certification schemes recognised by BRE Global Ltd for the purposes of a BREEAM assessment.

Detailed information Mat 03 Responsible sourcing of materials and 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:

Description		Value	Test Standard / Link
Thermal conductivity (W/mK)		0.022	EN 12667
Generic Green Guide rating	Equivalent product: Rigid urethane (pentane blown) with gas-tight facers, density 32 kg/m³ and k-value 0.023 W/mK)	Summary Rating: A+	Element No: 1415320205
EPD available?		no	
EPD No.			
Program operator			

Waste

Summary
This category encourages the sustainable management (and reuse where feasible) of construction, operational waste and waste through future maintenance and repairs associated with the building structure. By encouraging good design and construction practices, issues in this section aim to reduce the waste arising from the construction and operation of the building, encouraging its diversion from landfill. It includes recognition of measures to reduce future waste as a result of the need to alter the building in the light of future changes to climate.

Category summary table for this BREEAM issue

Issue ID	Issue name
Wst 01	Construction waste management
Wst 02	Recycled aggregates
Wst 03	Operational waste
Wst 04	Speculative floor and ceiling finishes
Wst 05	Adaptation to climate change
Wst 06	Functional adaptability

Wst 01 Construction waste management

Aim of this issue
To promote resource efficiency via the effective management and reduction of construction waste.

Product information for the declared product within this issue:

Specific information	evidence (quality)
Very little offcut, because the panels are exclusively made to order	
Contract with ARA (Altstoff Recycling Austria) for the collection of packaging waste	Concession agreement No. 13099

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Wst 06 Functional adaptability

Aim of this issue
To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.

Product information for the declared product within this issue:

Specific information	evidence (quality)
If panel buildings are reconstructed, the panels can easily be reused	

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