Deutsches Institut für Bautechnik

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Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment

ETA-17/0247 of 21 June 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	"Baustroh"
Product family to which the construction product belongs	Thermal insulation made of straw bales
Manufacturer	BauStroh GmbH Artilleriestraße 6 27283 Verden DEUTSCHLAND
Manufacturing plant	BauStroh GmbH Artilleriestraße 6 27283 Verden DEUTSCHLAND
This European Technical Assessment contains	7 pages including 2 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 040146-00-1201

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Specific part

1 Technical description of the product

This European Technical Assessment applies to the insulation product "Baustroh" made from pressed straw to bales with all blades of straw oriented in one direction.

The insulation product is initially manufactured as raw bales through baling on the field during harvesting of the crop; then the raw bales are processed on site through trained experts.

No additives are added to the insulation product in the manufacturing process.

The European Technical Assessment has been issued for the products on the basis of agreed data/information deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed. The European Technical Assessment applies only to products corresponding to this agreed data/information.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The insulation product is incorporated in a load-bearing or a non-load-bearing exterior wall structure or between rafters with a support spacing of less than one metre inside clear width.

The insulation product is not resistant to compressive loads and does not contribute to the structural stability of construction works or parts thereof.

The performance according to section 3 only applies if the insulation product is installed according to the manufacture's installation instructions and according to annex A and if it is protected from precipitation, wetting or weathering in built-in state and during transport, storage and installation.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the insulation product of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

For sampling, conditioning and testing the provisions of the EAD No 040146-00-1201 "thermal insulation for buildings made of straw bales" apply.

3.1 Mechanical resistance and stability (BWR 1)

Not applicable.

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire test acc. to EN ISO 11925-2:2010	Class E acc. to EN 13501-1:2007 + A1:2009

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Resistance to fungal growth test acc. to EAD, Annex A	No performance assessed.

3.4 Safety and accessibility (BWR 4)

Not applicable.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity test acc. to EN 12667:2001 (see EAD Annex B) 90° to stalk orientation (direction of thickness corresponding to alignment of stalks during installation) Declared value of thermal conductivity (see EAD Annex B) mass-related moisture content (at 23 °C / 80% relative humidity) mass-related moisture conversion coefficient moisture conversion factor (mass-related)	$\lambda_{10,dry,90/90}$ = 0.043 W/(m·K) [a)] $\lambda_{D\ (23/50)}$ = 0.048 W/(m·K) [b)] u = 11.8% $f_{u\ (dry-23/80)}$ = 0.823 $F_{m\ (dry-23/80)}$ = 1.10
Water vapour diffusion resistance factor test acc. to EN 12086:2013, climate conditions A	μ = 2.0
Specific airflow resistivity (per unit length)	No performance assessed.
Hygroscopic sorption properties test acc. to EN ISO 12571:2013 - Sorption curve - Desorption curve	Moisture absorption ≤ 18% (by mass) at 23 °C / 80% relative humidity - No performance assessed. - No performance assessed.
Water absorption (short-term by partial immersion)	No performance assessed.
Nominal length test in line with EN 822:2013	500 to 3000 mm
Nominal width test in line with EN 822:2013	300 to 900 mm
Nominal thickness (90° to stalk longitudinal axis) test in line with EN 823:2013 (with a load of 1000 Pa) dimensional deviation	200 to 700 mm ± 20 mm

Essential characteristic	Performance
Density test acc. to EN 1602:2013 (after conditioning / storage under normal climate conditions 23 °C / 50%)	100 kg/m³ ± 15 kg/m³
Dimensional stability	No performance assessed.
Tensile strength of the cording	No performance assessed.

a) Thermal conductivity of the insulation product at a reference temperature of 10 °C (dry), representative of at least 90% of the production with a 90% confidence level.
b) Declared value of thermal conductivity for a moisture content of the insulation product at 23 °C/50% relative humidity, representative of at least 90% of production with a 90% confidence level.

3.7 Sustainable use of natural resources (BWR 7)

Not applicable.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document No 040146-00-1201 "thermal insulation for buildings made of straw bales" the legal basis is: Commission Decision 1999/91/EC.

The system to be applied is: system 3.

In addition, the European legal basis for reaction to fire for products covered by this EAD is: Commission Decision 2001/596/EC.

The systems to be applied are: system 1, 3 or 4.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

The technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 21 June 2017 by Deutsches Institut für Bautechnik

Prof. Gunter Hoppe
Head of Department

beglaubigt:
Getzlaff

ANNEX A

The given performances for the insulation product in clause 3 apply, if the following is taken into account regarding the installation and use:

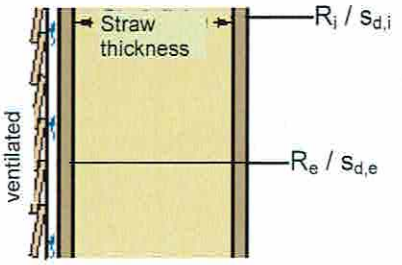
1. The insulation product is only installed in structures in which it is protected from precipitation, weathering and moisture.
2. The insulation product is installed in dry condition (moisture content $u \leq 18\%$ by mass).
3. The moisture content of the installed timber components does not exceed $u \leq 20\%$ by mass at the time when the room-facing side is closed.
4. The structure is designed in a way that the inner room-side cladding has permanently tight joints so that no flowing air can pass from the inside outwards into the structure.
5. The insulation product is installed such that the stalks are aligned at a right angle to the heat flow (90° to thickness direction).
6. All elements are planned and executed such that no mould growth can occur in the insulation.
7. The suitability of the structure for protecting from condensation and resisting mould growth is verified through simulation (e.g. based on EN 15026) for the concrete element configuration and the climate conditions at the location of installation. For the climate conditions in Germany, suitability can be assumed when the superstructure specifications in Annex B are adhered to.
8. The density of the installed thermal insulation layer is determined by the installer who issues a certificate confirming that it corresponds to the density specified in clause 3.
9. The thickness of the installed thermal insulation layer is determined by the installer who issues a certificate confirming that it at least corresponds to the required nominal thickness (planned thickness).

Annex B

Allowable moisture-dependent layer properties for structures with straw as thermal insulation in Germany

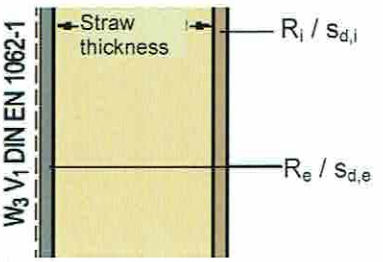
a) Exterior wall structures with back-ventilated external cladding for weather protection

Line	Straw thickness [m]	$s_{d,i}$ [m]	R_i [m²·K/W]	$s_{d,e}$ [m]	R_e [m²·K/W]
1	≤ 1.00	**≥ 0.10**	**≤ 0.35**	**≤ 0.50**	-
2	≤ 0.48	**≥ 0.76**	≤ 3.14	≤ 0.50	-
3	≤ 0.48	≥ 0.10	≤ 0.35	≤ 1.00	**≥ 1.00**
4	≤ 0.48	**≥ 2.00**	≤ 0.35	≤ 1.50	**≥ 0.70**
5	≤ 0.48	≥ 0.10	≤ 0.35	≤ 1.50	**≥ 1.43**
6	≤ 0.48	≥ 0.10	≤ 0.35	≤ 2.00	**≥ 1.90**



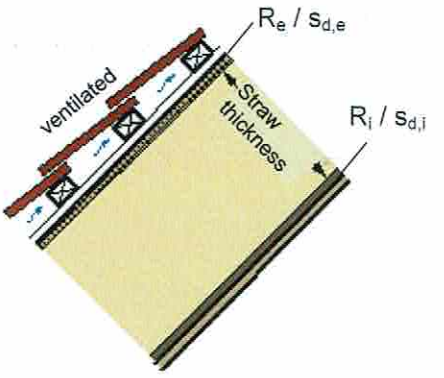
b) Plastered exterior wall structures with no weather protection
Plaster in accordance with EN 998-1 with water-repellent coating in accordance with EN 1062-1 in W_3 and V_1

Line	Straw thickness [m]	$s_{d,i}$ [m]	R_i [m²·K/W]	$s_{d,e}$ [m]	R_e [m²·K/W]
1	≤ 0.70	**≥ 0.10**	**≤ 0.35**	**≤ 0.50**	-
2	≤ 0.48	**≥ 0.76**	≤ 3.14	≤ 0.50	-
3	≤ 0.48	**≥ 3.00**	≤ 0.35	≤ 1.50	**≥ 0.30**



c) Roof structures with ventilated roofing

Line	Straw thickness [m]	$s_{d,i}$ [m]	R_i [m²·K/W]	$s_{d,e}$ [m]	R_e [m²·K/W]
1	≤ 0.48	**≥ 2.00**	**≤ 0.35**	**≤ 0.50**	**≥ 0.14**
2	**≤ 0.36**	**≥ $s_{d,e}$**	≤ 0.35	≤ 3.00	≥ 0.14



Note:
Line 1 characterises the allowable basic version.
Additional lines: possible versions with modified element characteristics (with grey background) which in turn require modified layer characteristics (values shown in bold).

Symbols, indices:
$s_{d,e}$ diffusion-equivalent air layer thickness for the external layers / cladding
$s_{d,i}$ diffusion-equivalent air layer thickness for the internal layers / cladding
R_i thermal resistance for the internal layers / cladding
R_e thermal resistance for the external layers / cladding
W_3 water permeability of coating classified acc. to EN 1062-1 and tested acc. to EN 1062-3: $W_{24} \leq 0.1$ kg/(m²·√h); Index 24 = test duration of 24 h
V_1 water vapour flux density of coating classified acc. to EN 1062-1 and tested acc. to EN 1062-3: $V_1 > 150$ g/(m²·d) with $s_d < 0.14$ m