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Zertifizierter Sachverständiger
nach DIN EN ISO/IEC 17024:2012,
Zertif.-Nr : ZN – 20120928-0262
für Schäden an Gebäuden,
Innenraumschadstoffen,
Bauphysik, Fenstermontagen,
energetische Bewertung von
Gebäuden und Energieeffizienz

Bonn, den 28.08.2013

Straw Bale House

Dear Mr. Bjorn Kierulf,

The calculations with WUFI have been done under the following conditions:

- **climate data: Miami, cold year**
- humidity of the materials: straw < 17%
- indoor climate: high humidity loads (bathrooms or similar as maximal humidity)
- exterior wall: southeast (main wheater side)

1) Wall construction with 4mm plaster

Construction from inside to outside:

clay plaster 25mm
straw 400mm
roofing membrane SD: 0.2 m
wood fibre insulation board 040 60mm
exterior plaster 4mm

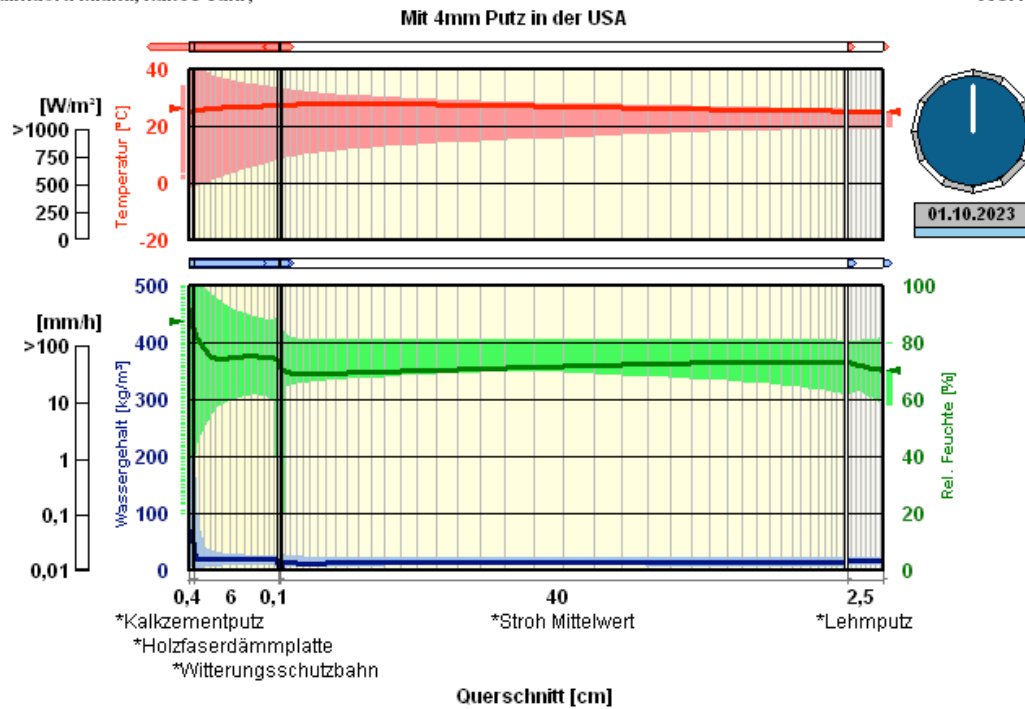
The exterior plaster with a w-value (coefficient of water absorption) of <math><0.1 \text{ kg/m}^2 \cdot \text{h}</math>.

Under these conditions, the calculations for the relevant components have revealed the following:

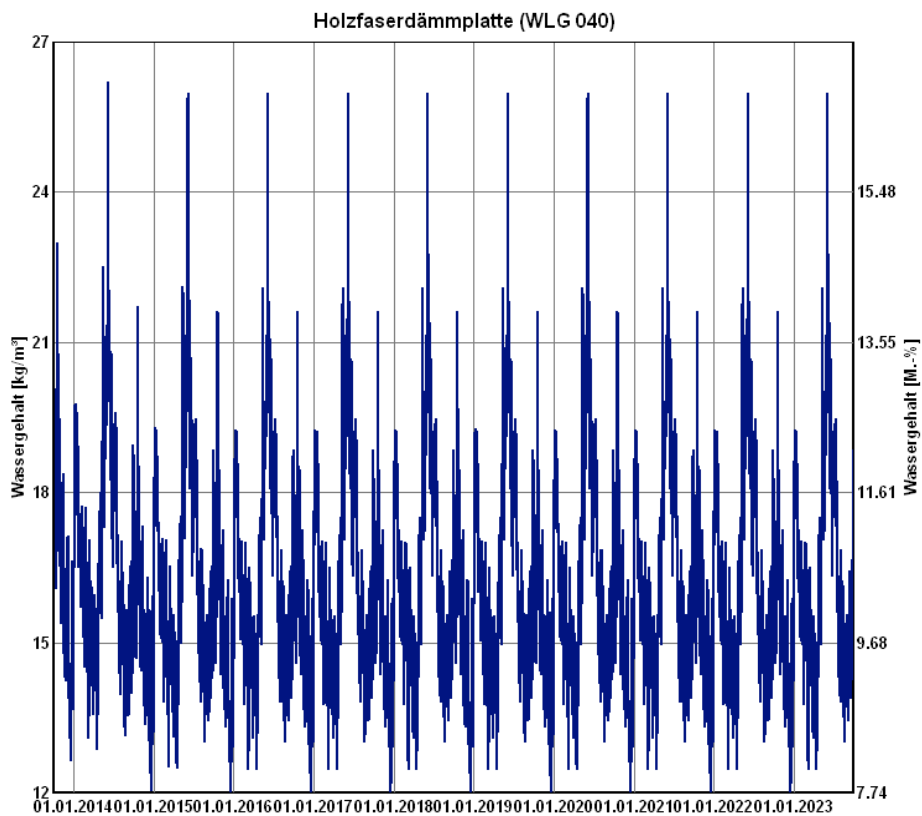
Whole construction:

Klimaort: Miami; kaltes Jahr;

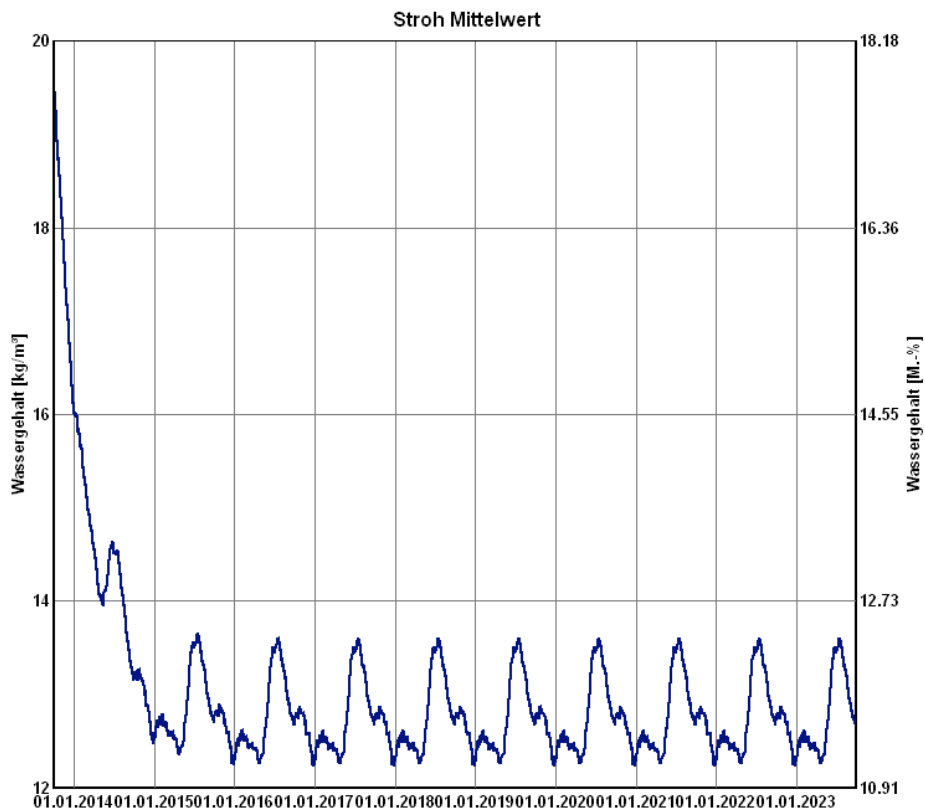
WUFI®



Wood fibre insulation board:



Straw bale:



This construction can be realised under the following conditions:

- The exterior plaster must have permanently a w-value of $< 0.1 \text{ kg/m}^2 \cdot \text{h}$.
- The w-value must be frequently controlled. If the value increases over $0.15 \text{ kg/m}^2 \cdot \text{h}$ the construction is not longer realisable.

2) Construction with ventilated facade:

The construction with the ventilated facade, without rainfall on the wood fibre insulation board, has the following results:

Construction from inside to outside:

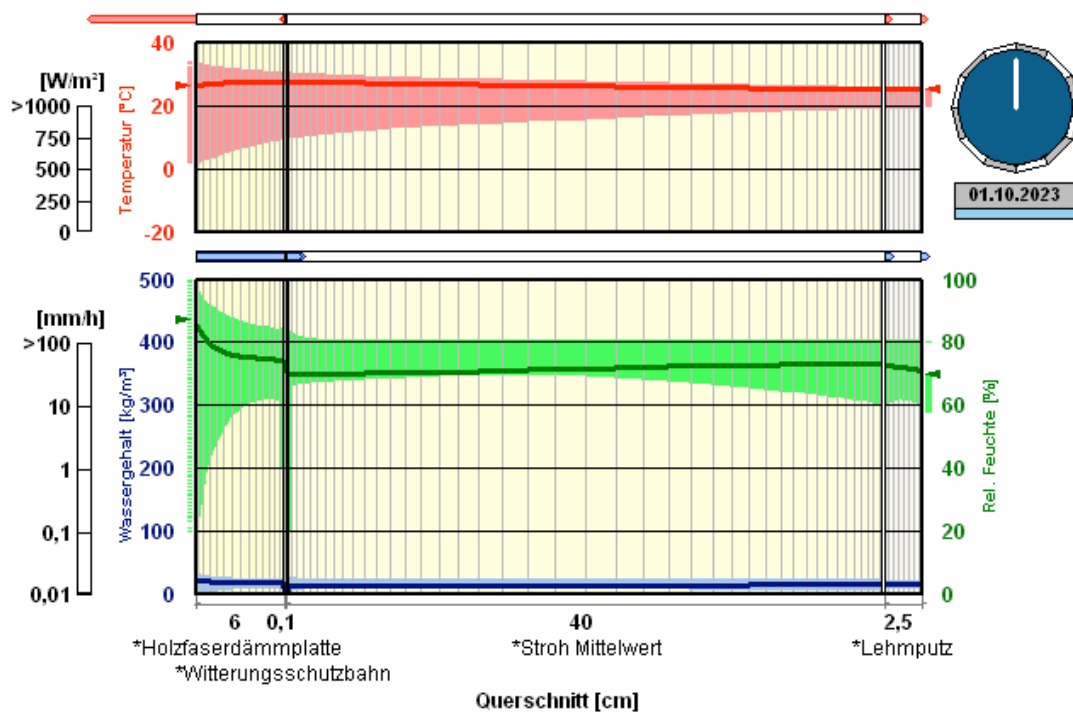
clay plaster 25mm
straw 400mm
roofing Membrane SD: 0.2 m
wood fibre insulation board 040 60mm
ventilated facade

Whole construction:

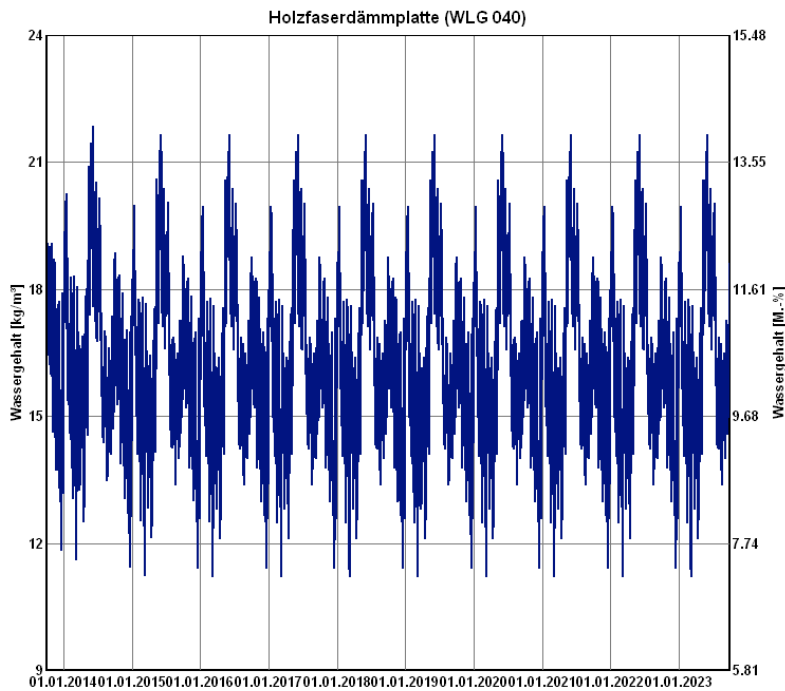
Klimaort: Miami; kaltes Jahr;

Hinterlüftung USA

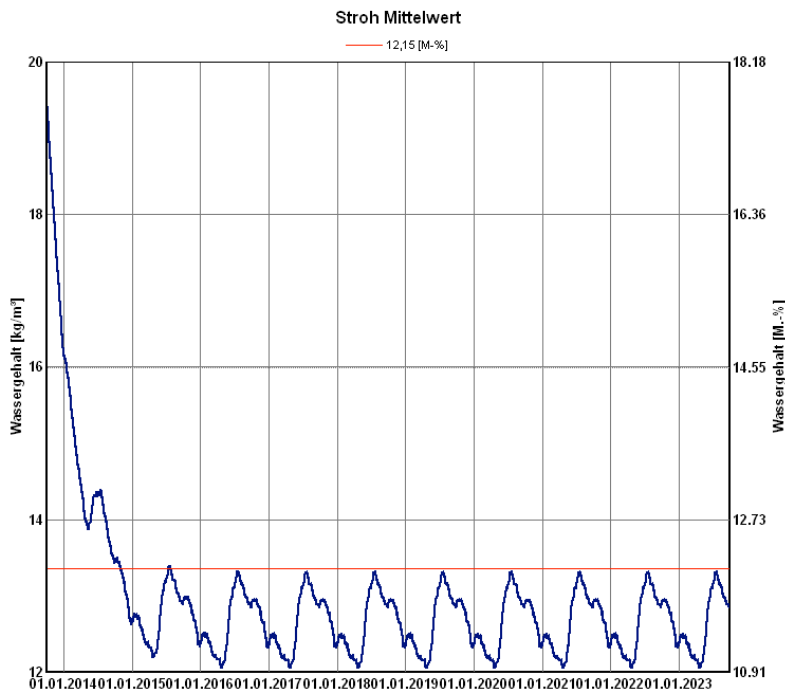
WUFI®



Wood fibre insulation board:



Straw bale:



The construction can be realised.

The same construction could also be realised without the roofing membrane, if the vapor tightness is ensured on the inside.

Kind regards

Michael Brandhorst

Annotation:

The values for the straw bale are average values, of all existent analysis. The following values has been used for he calculations:

raw density	100,0	kg/m ³
porosity	0,9	m ³ /m ³
thermal Capacity	2000	J/kgK
thermal Conductivity	0,045	W/mK
diffusion resistance coefficient	1,3	-

Due to their inhomogeneity, exacte values for straw bales are not definable. The above-mentioned calculations present only referrence values.

Terms and conditions for building physical calculations

- 1) The calculations are only for the named object and part constructions, and can not be transferred, even if the construction is the same or similar.
- 2) The calculations shall be allowed only if the defined and specified conditions are met.
- 3) For the accuracy of the calculation, a precise manufacturing of the structures is required.
- 4) The Contractor is responsible for the coherence of the data.
- 5) If an extra is calculated, this is only a planning proposal and not a planning. Therefore, the Büro Brandhorst assumes no liability.
- 6) The calculations of the software WUFI and Delphin are simulations using predefined weather data. Exact simulations for the specific building location can only be performed, if appropriate weather data are provided.
- 7) Air tightness and eventually air tightness checks are preconditions.
- 8) The indicated values for timber and material humidity may not be exceeded.

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