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Braunschweig, March 24, 2014

## Test report QA - 2014 - 307

**Client:** Fermacell GmbH  
Kalkwerk Winterberg  
37539 Bad Grund

**Object of the testing:** Determination of the water vapor adsorption of Fermacell gypsum fiberboards,  
based on DIN 18947:2013-08

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The test report comprises 5 pages including the attachments. A publication of this report in excerpts is subject to the written consent of Fraunhofer-Institute for Wood Research, Wilhelm-Klauditz-Institute (WKI), Bienroder Weg 54 E, 38108 Braunschweig.

The results of this test report relate to the objects tested, only.



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für Soziales, Frauen, Familie,  
Gesundheit und Integration**

Anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle NDS08

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- 1 Task** The company Fermacell GmbH, Bad Grund, authorized Fraunhofer-Institute for Wood Research, Wilhelm-Klauditz-Institut (WKI), with the determination of the performance of gypsum fiberboards concerning the adsorption of water vapor, based on DIN 18947:2013.
- 2 Relevant Standards** DIN 18947:2013-08
- 3 Material to be tested and date of receipt** With the order confirmation from October 31, 2013 the company Fermacell GmbH, Bad Grund, authorized Fraunhofer WKI with the determination of the water vapor adsorption based on DIN 18947 of gypsum fiberboards "Fermacell", with a nominal thickness of 15 mm.  
The samples were selected by the client and delivered to WKI.
- The samples were delivered at WKI on February 7, 2014. The following sample boards were delivered:  
- 15 boards gypsum fiberboards "Fermacell" (FC), 15 mm
- The boards were marked by WKI with numbers from 1 to 15.  
The nominal dimensions of the boards were length x width 500 mm x 200 mm.
- The material was disposed by WKI after completion of the determinations.
- 4 Testing methods** The standard DIN 18947 describes terms and definitions, requirements and test methods of earth plasters.  
Gypsum cardboards or gypsum fiberboards are not covered by this standard.  
The execution of the determination of the water vapor adsorption (annex A.2) was performed according to DIN 18947:2013, annex A.2.2.
- Sample preparation** The samples were delivered by the producer,  
The bottom side and the edge faces were covered with a diffusion resistant self-adhesive aluminum foil / tape.  
Prior to testing all samples were stored until constant mass at constant climate conditions of  $(23\pm 2)$  °C and  $(50\pm 5)$  % relative humidity.  
To improve the adhesion of the self-adhesive tape it was bonded around the upper edge for 2 mm in average. The loss of 0,0028 m<sup>2</sup> testing area was taken in consideration for the analysis of the determination.
- Execution** Immediately before starting the determination the initial mass of the samples was determined at constant climate conditions of  $(23\pm 2)$  °C and  $(50\pm 5)$  % relative humidity.

Subsequently, the samples were covered and stored in a closed plastic container. The plastic container was then carried to a 2-chamber climate room where the testing conditions of  $(23\pm 2)$  °C and  $(80\pm 5)$  % relative humidity were preset.

In order not to manipulate the measurements subsequent to the short conditioning intervals at the beginning of the determination (initial weighing, 0,5 h, 1 h), the required climate was preset in both chambers of the 2-chamber climate room. In one chamber the samples were stored, the other chamber was reserved for the balance.

For the duration of the weighing the fans at the balance-side were disabled, in order to let the balance level-off.

At the stipulated time of weighing each sample was passed through a small port from sample-side to balance-side of the chamber. It was balanced and immediately returned to the sample-side of the chamber.

This procedure was repeated at every stipulated time of weighing.

One cycle of testing took about 3 minutes for an amount of 15 samples.

## 5 results

The requirements of DIN 18947:2013-08 are given in table 1.

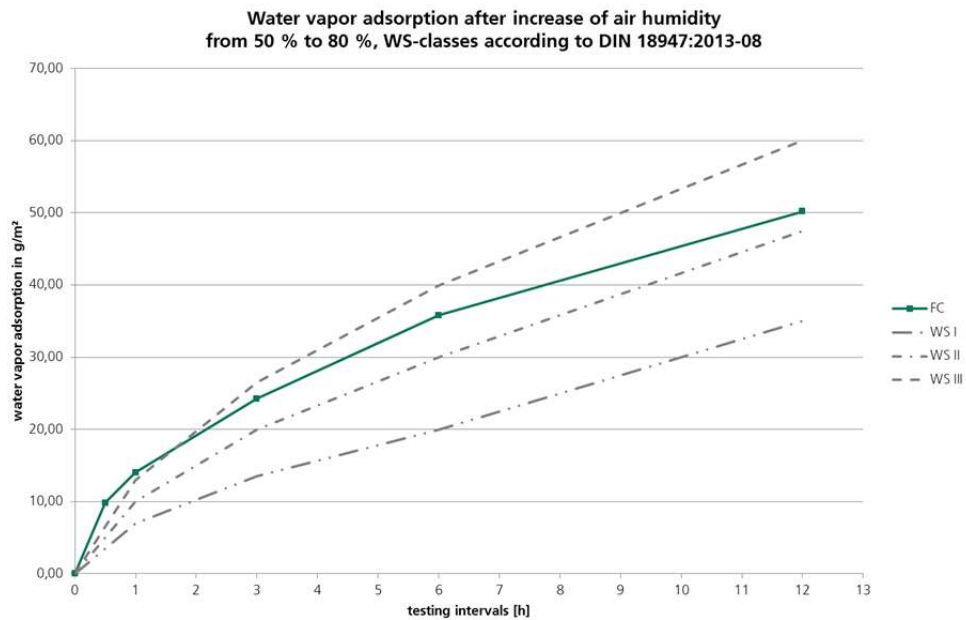
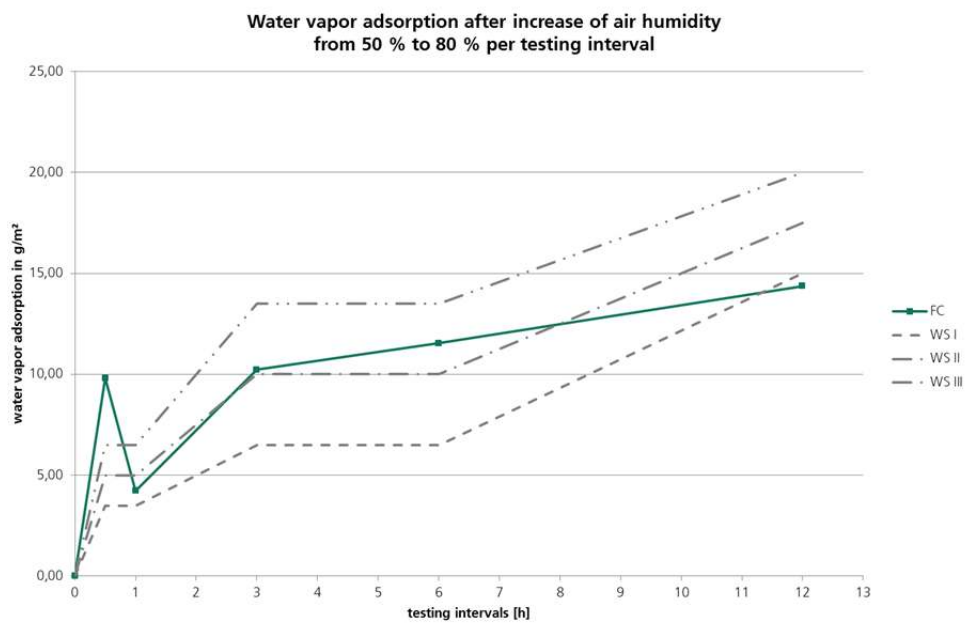
The results of the determination are outlined in table 2 and presented in pictures 1 and 2.

**table 1 – requirements according to DIN 18947:2013-08, table A.2**

Class of water vapor adsorption	Water vapor adsorption according to A.2.2					
	Start g/m <sup>2</sup>	0,5 hours g/m <sup>2</sup>	1 hour g/m <sup>2</sup>	3 hours g/m <sup>2</sup>	6 hours g/m <sup>2</sup>	12 hours g/m <sup>2</sup>
WS I	0	3,5	7	13,5	20	35
WS II	0	5	10	20	30	47,5
WS III	0	6,5	13	26,5	40	60

**table 2 – Results of the determination of the water vapor adsorption**

Material	Water vapor adsorption according to A.2.2 (accumulated)					
	Start g/m <sup>2</sup>	0,5 hours g/m <sup>2</sup>	1 hour g/m <sup>2</sup>	3 hours g/m <sup>2</sup>	6 hours g/m <sup>2</sup>	12 hours g/m <sup>2</sup>
Fermacell (FC)	0,00	9,81	14,04	24,27	35,82	50,19

**picture 1 – results chart**

**picture 2 – Water vapor adsorption per interval**


**6 abstract**

Based on the results of this determination the gypsum fiberboards of the company Fermacell GmbH, Bad Grund, reach class WS II of DIN 18947:2013-08, A.2.

After exposure of 30 minutes and one hour to the climate ( $23\pm 2$ ) °C and ( $80\pm 5$ ) % relative humidity the adsorption capability is good enough to reach the requirements of class WS III. This indicates a short reaction time of the material concerning a change of air humidity.

After 2 hours exposure the graph levels to a value that class WS II is reached.



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