

# Certificate

„recommended for healthy housing“



The Magazine of Healthy Housing Environment and Construction Hygiene, organ of the Society of Healthy Housing Environment, Construction Hygiene and Indoor Toxicology, awards the certificate "recommended for healthy housing", according to the terms (Healthy Housing Environment 40 [2002] Issue 4 in the version of 01.03.2015, [www.wohnmedizin.eu](http://www.wohnmedizin.eu)) to

**Thermalife Handelsgesellschaft mbH**

for

**Thermalife Interior**

Jena, 17.08.2017

Dr. Mario Blei, Editor in Chief

Zertifizierte Produkte  
Certified products  
Produits certifiés

**Thermalife Interior**

Probenart  
Kind of sample  
Type d'échantillon

**Innenraumfarbe**

Hersteller / Vertrieb  
Manufacturer / Distributor  
Fabricant / Service commercial

**Thermalife Handelsgesellschaft mbH Am  
Grarock 3  
33153 Salzkotten**

Zertifizierungsnummer  
Number of certificate  
Numéro de certificat

**ID 0514 - 33310 - 001**

Prüfberichtsnummer  
Number of test report  
N° du rapport de contrôle

**50640-001 II**

Prüfumfang  
Test program  
Programme du contrôle

Laborprüfung auf gesundheitlich bedenkliche Emissionen  
und Inhaltsstoffe.

Tested on hazardous emissions and components.

Contrôle en laboratoire des émissions et composants critiques  
pour la santé.

Prüfergebnis  
Test result  
Résultat du contrôle

Die untersuchten Produkte erfüllen die Anforderungen des  
eco-INSTITUT.

Einzelheiten siehe zugehöriges Gutachten.

The products fulfill the eco-INSTITUT-Label test criteria.  
For further details see the respective report.

Les produits respectent les exigences en vigueur du eco-INSTITUT.  
Pour les détails, cf. expertise du produit.

Gültigkeit des Zertifikats  
Validity of the certificate  
Validité du certificat

**05 / 2017**



Dr. Frank Kuebart



Alexandra Kühn



# CERTIFICATE

We hereby confirm the energy saving  
possibility  
of  
the **Thermalife Energy Saving Paint**.

The evaluation is based on:

DIN 18599  
EnEV 2009 Paragraph Opaque Building Elements  
EN 15026 Thermal and Hygro Technical  
Behaviour of Building Elements  
WTA Data Sheet 6-1-01/D  
Guide for Hygrothermal Simulation Evaluations  
WTA Data Sheet 6-2-01/D  
Simulation of Thermal and Hygro Technical Processes  
Numerical Simulation Procedure WUFI 1.4, 1.5  
Fraunhofer University for Construction Physics

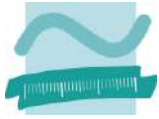
Dipl.-Chem. Engineer Burkhard Brandt

Concrete Engineer Wolfgang Bonder

Thermalife Handelsgesellschaft mbH  
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Berlin, 19 May 2006

## **Report on Comparative Measurements of Indoor Climate in Two Test Chambers Coated with Different Paints**

**Measurements were performed in the building of Fulda  
University of Applied Sciences, at Institute for Environment  
and Health  
36037 Fulda, Petersgasse 27**

Date: Saturday, 6 May 2006 and Sunday, 7 May 2006  
Measurements were conducted with the indoor climate analyzer of Type MS01A.

Description of chambers: Both test chambers are identical in construction and equipped with a 45° roof window (1.1qm). They are both situated on the top floor facing the same side of the building (south side), 8 meters apart, having the same floor plan. They are furnished with PVC floor and with ceiling sound insulation panels made of plastic.

**Chamber A:** The walls are painted with a special white paint. Measuring location of the climate sensor: writing desk.

**Chamber C:** The walls are painted with a conventional white paint. Measuring location of the climate sensor: writing desk.

Both rooms have approximately 45% of free wall surfaces that have an impact on the climate.

Distance between Chamber A and Chamber C is about 8 meters.

12 indoor climate analyzers were implemented in both rooms.

Climate data are recorded in nomograms A1 – A7 and C1 – C5.

Measured values are compiled in chart A and chart C.

### **7 measurements (Nomogram A1- A7) are related to Chamber A**

Measurement A1: Actual measurement

Measurement A2: After 30 minutes of heating through a 2 kW fan heater with window closed

Measurement A3: After 40 minutes of airing

Measurement A4: First measurement after the night

Measurement A5: After 30 minutes of heating with a 2 kW fan heater

Measurement A6: After 40 minutes of airing

Measurement A7: After 40 minutes of heating with a 2 kW fan heater

### **5 Measurements (Nomogram C1- C5) are related to Chamber C**

Measurement C1: Actual measurement

Measurement C2: First measurement after the night

Measurement C3: After 30 minutes of heating through a 2 kW fan heater with window closed

Measurement C4: After 40 minutes of thorough airing (with window wide open)

Measurement C5: After 40 minutes of heating with a 2 kW fan heater

## Findings:

**Evaluation 1 Cooling of Rooms** (Simulation: heating mode 'temperature drop at night')

The following chart serves to compare measured deviations before and after the nocturnal cooling of both test chambers for over 14 hours.

PROCEDURE: Prior to the nocturnal cooling period, the rooms were aired for 40 minutes with window fully open before room climate was measured (measurement A3 and C1). Room climate was measured again on the next morning (Measurement A4 and C2).

**Result:**        **Chamber C was clearly more cooled off, delta te = -3.6°C**  
**Chamber A: delta te = -1.2°C.**

**Evaluation 2 Heating of Test Chambers after Temperature Drop at Night**

The following chart records the metrological deviations which are detected with the room climate analyzer and nomogram at the beginning and after 40 minutes of heating the test chambers. With the deviations, the energy need can be determined by way of calculating the re-heating of the rooms to daily temperature.

PROCEDURE: Before measuring, both rooms were aired for 40 minutes with window fully open. The windows were then closed and the room climate was measured (Measurement A6 and C4). Afterwards, the test chambers, with window closed, were warmed up with a 2 kW fan heater for 40 minutes and the room climate was measured again (Measurement A7 and C5).

**Result: Chamber A requires less time and energy to raise temperature than Chamber C.**

**Chamber A: delta te= + 4.65°C**  
**Chamber C: delta te = + 3.3°C**

## Summary Evaluation:

Note:

My contract includes climate analysis, evaluation by nomogram and confirmation of the accuracy of measured values. **Interpretation and assessment of the measured values rest with the contracting authority.** In my opinion, the measurements allow the following qualitative evaluation:

## Evaluation:

Measurement of Chamber A with the **Thermalife Energy Saving Paint** indicates qualitatively obvious energy saving effect while at the same time having a positive impact on

thermal room climate parameters compared to Chamber C which is painted with normal interior paint.

1 The comparison between Chamber A with **Thermalife Energy Saving Paint** and Chamber C with conventional paint shows that Chamber A cools off at a slower pace over night, which means less loss of heat. On the next day, it requires accordingly less heating energy to raise the temperature in the room.

2 The room climate analysis also clearly shows that thermal comfort in the cooling period (temperature drop at night) in Chamber A lasts longer. This tends to show that the special paint has the above-mentioned energy saving effect.

3 The above-mentioned Evaluation 2, which is claimed by the contracting authority to have a 41% reduction in heating requirement, indicates only a tendency:

$$((4.65^{\circ}\text{C} - 3.3^{\circ}\text{C}) / 3.3^{\circ}\text{C}) * 100 = 40.91 \%$$

Climate analyses are space-specific snapshots without taking the possibility, thermal inertia and moisture absorption of inventory and building construction, etc. into account. Constant temperature and humidity compensation makes it difficult to calculate energy savings of building materials like the special paint, because as a general rule, conditions of living areas are always dynamic and never static. In practice, therefore, energy consumption of individual property can only be accurately determined by reading the dial meter.

**Prof. Dr. P. Marx**  
**Expert in Measurement Engineering**

Fire Resistance Performance of Building Products  
Dipl.-Ing. Andreas Hoch (University of Applied Science)  
Testing, Monitoring and Certification Body accredited by  
Construction Supervision Authority.

## Test Certificate

**PZ – Hoch – 131357**

**For the proof of fire behaviour according to DIN 4102, Part 1**

|                              |                                                                                                                                                                                                                                                            |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant                    | Thermalife Handelsgesellschaft mbH<br>Am Garock 3<br>D-33154 Salzkotten                                                                                                                                                                                    |
| Type of test material        | white, solvent-free silicone resin exterior paint, applied on<br>plaster board                                                                                                                                                                             |
| Product Name                 | 'Thermalife' – white                                                                                                                                                                                                                                       |
| Sample provided by           | the applicant                                                                                                                                                                                                                                              |
| Purpose of test              | proof of <b>non-combustibility</b> for the classification of building<br>materials into Class A2 in accordance with DIN 4102, Part 1                                                                                                                       |
| Validity of test certificate | 30.09.2018                                                                                                                                                                                                                                                 |
| Result                       | the tested product, which is spread on mineral substrates with a<br>maximum application quantity of 400 g/m <sup>2</sup> , meets the<br>requirements of Building Material Class A2 for not flammable<br>materials in line with DIN 4102, part 1 (May 1998) |

The test certificate consists of 7 pages and 3 appendices.

Remarks: A general building supervisory test report is not required if the above-mentioned building material is not applied as product in accordance with MBO § 2, Paragraph 9, Class 1. This test certificate is not valid if the examined building material is used as product within the context of State Construction Code (MBO § 17, Paragraph 3).

This test certificate does not replace a necessary proof of usability concerning building supervisory laws according to State Construction Code. This has to be verified by:

- a general building approval or
- a general building inspectorate certificate or
- an individual-based approval

This test certificate may serve as a basis in a building supervisory procedure:

- for regulated building products which require proof of conformity
- for non-regulated building products which require proof of usability.

This test certificate may be published or duplicated only within the period of validity and only in its unaltered form and content without prior approval from the certification authority.

1. Description of test material in as-received condition  
PN 17977: 'Thermalife'  
White solvent-free silicon resin exterior paint / 1 pail, 5 Litre packaging  
Further information on the composition of the examined material is not presented to the certification authority. Samples are stored.
2. Preparation and pretreatment of sample  
The exterior paint was applied wet in two stages, each with approximately 200/m<sup>2</sup> (total application quantity approximately 400 g/m<sup>2</sup>), onto a 12.5 mm thick plasterboard according to EN 520.  
Working instructions were observed.  
The sample was kept in a climate chamber at 23/50 °C until constant weight was reached.
3. Testing methods according to DIN 4102 Part 1, Part 15 and Part 16
4. Test date calendar week 41 to 43, 2013
5. Test results Determination of heat value and heat development  
For the calculation of plasterboard construction plate according to DIN 4102 Part 1 Paragraph 5.2.4.5 (EN 520), the following values have been fixed:
  - thickness of the plasterboard construction plate: 12.5 mm
  - surface weight of the plasterboard construction plate: 9 kg/m<sup>2</sup>
  - surface weight of the upper cardboard layer: 300g/m<sup>2</sup>
  - calorific value H<sub>o</sub> of the cardboard: 15,120 kJ/kg
  - calorific value H<sub>o</sub> of the plaster core: 0 kJ/kg = 0 kJ/m<sup>2</sup>

Result: for the cardboard (2x): 4,536 kJ/m<sup>2</sup> x 2 = 9,072 kJ/m<sup>2</sup>  
for plasterboard plate: 9,072 kJ/m<sup>2</sup> / 9kg/m<sup>2</sup> = 1,008 kJ/kg

Average value from 3 measurements of the calorific value of the coating  
PN 17977 'Thermalife' 5.709 kJ/kg

| PN 17977: 'Thermalife' |                                         | 1                 | 2       | 3     | 4                            |
|------------------------|-----------------------------------------|-------------------|---------|-------|------------------------------|
|                        |                                         | Dimension         | Coating | GKB   | Total<br>Column 2 * column 3 |
| 1                      | Calorific value H <sub>o</sub>          | kJ/kg             | 5,709   | 1,008 | --                           |
| 2                      | Surface weight                          | Kg/m <sup>2</sup> | 0.255   | 4.5   | Σ1 = 4.76                    |
| 3                      | Amount of heat released line 1 * line 2 | kJ/m <sup>2</sup> | 1,456   | 4,536 | Σ2 = 5,992                   |
| 4                      | Calorific value of the composite Σ2/Σ1  | kJ/kg             | --      | --    | 1,259                        |

According to the above calculations, the calorific value of the product is 1,259 kJ/kg  
The amount of heat released is 5,992 kJ/m

## Preparation and pretreatment of samples

The calorific value tests were carried out with bomb calorimeter according to DIN 51900-2 procedures.

Three tests with the PN17977 were performed.

## 5.2 Fire shaft test

Sample arrangement:

#4656: 'Thermalife' applied on plasterboard plate

#4697: 'Thermalife' applied on plasterboard plate

#4698: 'Thermalife' applied on plasterboard plate

Table 2: Fire shaft test

| Line no. | Measurement value type                                                                             | Measurement value of sample |          |          |          |          |          | Dimension |
|----------|----------------------------------------------------------------------------------------------------|-----------------------------|----------|----------|----------|----------|----------|-----------|
|          | Test no.                                                                                           | #4656                       | #4697    | #4698    | -        | -        | -        |           |
| 1        | <u>Number of specimen arrangement</u><br>Acc. to DIN 4102/T15, Table 1                             | 7                           | 7        | 7        | -        | -        | -        |           |
| 2        | <u>Maximum flame height</u><br>above bottom edge                                                   | 60                          | 60       | 60       | -        | -        | -        | cm        |
| 3        | Time 1)                                                                                            | 1:10                        | 1:18     | 1:55     | ./.      | ./.      | ./.      | min:s     |
| 4        | <u>Melting/burning</u><br>Time 1)                                                                  | ./.                         | ./.      | ./.      | ./.      | ./.      | ./.      | min:s     |
| 5        | <u>Observations on the reverse side of the sample</u><br>Flames/glowing<br>Time 1)<br>Discolouring | -<br>./.                    | -<br>./. | -<br>./. | -<br>./. | -<br>./. | -<br>./. | min:s     |
| 6        | Time 1)                                                                                            | ./.                         | ./.      | ./.      | ./.      | ./.      | ./.      | min:s     |
| 7        | <u>Burning droplets</u><br>Begin 1)                                                                | ./.                         | ./.      | ./.      | ./.      | ./.      | ./.      | min:s     |
| 8        | <u>Range</u><br>Sporadic dripping of burning droplets 2)                                           | -                           | -        | -        | -        | -        | -        |           |
| 9        | Continues dripping of burning droplets 2)                                                          | -                           | -        | -        | -        | -        | -        |           |

|    |                                                                                                         |                      |                      |                      |                  |                  |                  |                      |
|----|---------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|------------------|------------------|------------------|----------------------|
| 10 | <u>Falling of burning parts</u><br>Begin<br>Range                                                       | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 11 | Sporadic falling of burning parts                                                                       | -                    | -                    | -                    | -                | -                | -                |                      |
| 12 | Continues falling of burning parts                                                                      | -                    | -                    | -                    | -                | -                | -                |                      |
| 13 | <u>Afterflame time at the bottom of the sieve (max.)</u>                                                | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 14 | <u>Impairment of the burner flames by dripping or falling material</u><br>Time                          | -                    | -                    | -                    | -                | -                | -                | min:s                |
| 15 | <u>Premature end of test</u><br>Final occurrence of burning                                             | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 16 | at the specimen 1)<br>Time of termination of test if necessary 1)                                       | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 17 | <u>Afterflame after end of test</u><br>Duration 1)                                                      | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 18 | Number of specimen                                                                                      | -                    | -                    | -                    | -                | -                | -                |                      |
| 19 | Front side of specimen 2)                                                                               | -                    | -                    | -                    | -                | -                | -                |                      |
| 20 | Back side of specimen 2)                                                                                | -                    | -                    | -                    | -                | -                | -                |                      |
| 21 | Flame length                                                                                            | -                    | -                    | -                    | -                | -                | -                | cm                   |
| 22 | <u>Afterglow after end of test</u><br>Duration 1)                                                       | ./.                  | ./.                  | ./.                  | ./.              | ./.              | ./.              | min:s                |
| 23 | Number of specimen                                                                                      | -                    | -                    | -                    | -                | -                | -                |                      |
| 24 | <u>Place of occurrence</u><br>Lower half of specimen 2)                                                 | -                    | -                    | -                    | -                | -                | -                |                      |
| 25 | Upper half of specimen 2)                                                                               | -                    | -                    | -                    | -                | -                | -                |                      |
| 26 | Front side of specimen 2)                                                                               | -                    | -                    | -                    | -                | -                | -                |                      |
| 27 | Back side of specimen 2)                                                                                | -                    | -                    | -                    | -                | -                | -                |                      |
| 28 | <u>Smoke density</u><br>≤ 400% * min                                                                    | 4                    | 3                    | 3                    | -                | -                | -                | %*min                |
| 29 | > 400% * min 4)                                                                                         | -                    | -                    | -                    | -                | -                | -                | %*min                |
| 30 | Diagram in fig. no.                                                                                     | 1                    | 2                    | 3                    | -                | -                | -                |                      |
| 31 | <u>Residual length: individual values</u><br>3)<br>Specimen 1<br>Specimen 2<br>Specimen 3<br>Specimen 4 | 48<br>42<br>46<br>47 | 42<br>45<br>43<br>41 | 46<br>45<br>42<br>42 | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | cm<br>cm<br>cm<br>cm |
| 32 | Average value 3)                                                                                        | 46                   | 43                   | 44                   | -                | -                | -                | cm                   |
| 33 | Photo of test specimen fig. no.                                                                         | 1                    | 2                    | 3                    | -                | -                | -                |                      |
| 34 | <u>Flue gas temperature</u><br>Maximum of average value                                                 | 112                  | 106                  | 106                  | -                | -                | -                | °C                   |
| 35 | Time 1)                                                                                                 | 08:40                | 09:26                | 09:36                | -                | -                | -                | min:s                |
| 36 | Diagram fig. no.                                                                                        | 1                    | 2                    | 3                    | -                | -                | -                |                      |
| 37 | Remarks: no                                                                                             |                      |                      |                      |                  |                  |                  |                      |
| 38 | Explanation for implementation of test: no                                                              |                      |                      |                      |                  |                  |                  |                      |

1) Indication of time: from start of testing procedure

2) Tick where applicable

- 3) Separate information on carrier plate/foam layer concerning fire retardants
- 4) Very strong smoke development

### 5.3 Smoke generation test on building materials – Decomposition under carbonisation conditions (DIN 4102, Part 1, Appendix A)

Preparation and pretreatment of samples:

Specimens of 270 mm \*5mm\* thickness according to DIN 4102-1 were cut out from the delivered material and tested.

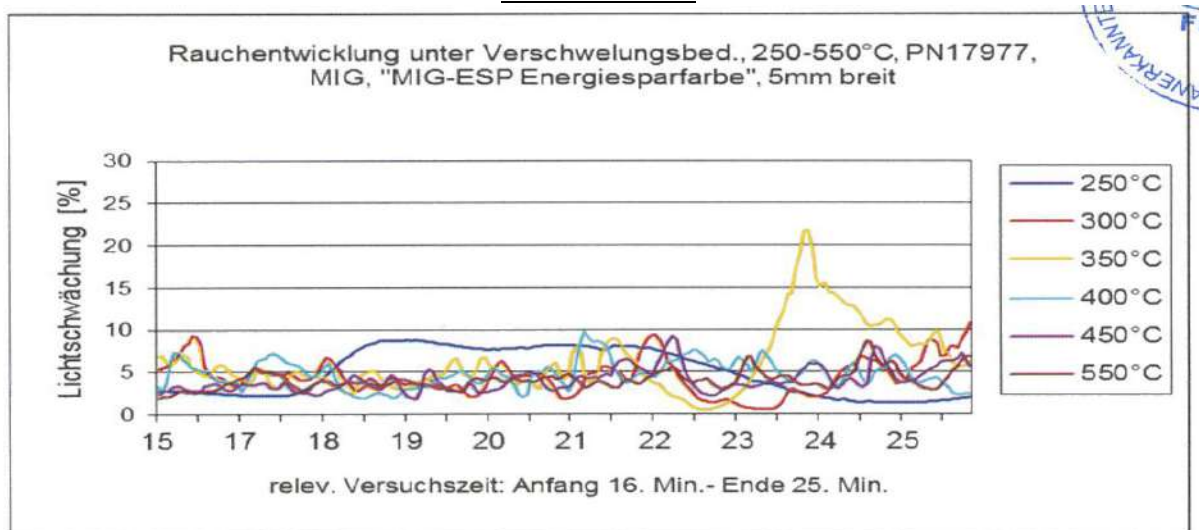
Table 3: Smoke generation test on building materials – decomposition under carbonisation conditions (DIN 4102, Part 1, Appendix A)

| Test Temperature | Average smoke density in % |            |            |               |        |        |               |
|------------------|----------------------------|------------|------------|---------------|--------|--------|---------------|
|                  | Test 1 5mm                 | Test 2 5mm | Test 3 5mm | Average value | Test 1 | Test 2 | Average value |
| 250 °C           | 4.9                        | ---        | ---        | 4.9           | ---    | ---    | ---           |
| 300 °C           | 4.3                        | 3.2        | ---        | 3.75          | ---    | ---    | ---           |
| 350 °C           | 6.1                        | 5.8        | 4.9        | 5.6           | ---    | ---    | ---           |
| 400 °C           | 4.8                        | 4.0        | ---        | 4.4           | ---    | ---    | ---           |
| 450 °C           | 3.9                        | ---        | ---        | 3.9           | ---    | ---    | ---           |
| 550 °C           | 4.0                        | ---        | ---        | 4.0           | ---    | ---    | ---           |
| 600 °C           | ---                        | ---        | ---        | 4.9           | ---    | ---    | ---           |

Remarks and explanations on implementation of test: no

Summary of test results:  
Maximum average light attenuation 5.6%  
at a reference temperature of 350 °C

### Measured Data



#### 5.4 Smoke generation test on building materials – burning upon exposure to flames (DIN 4102, Part 1, Appendix B)

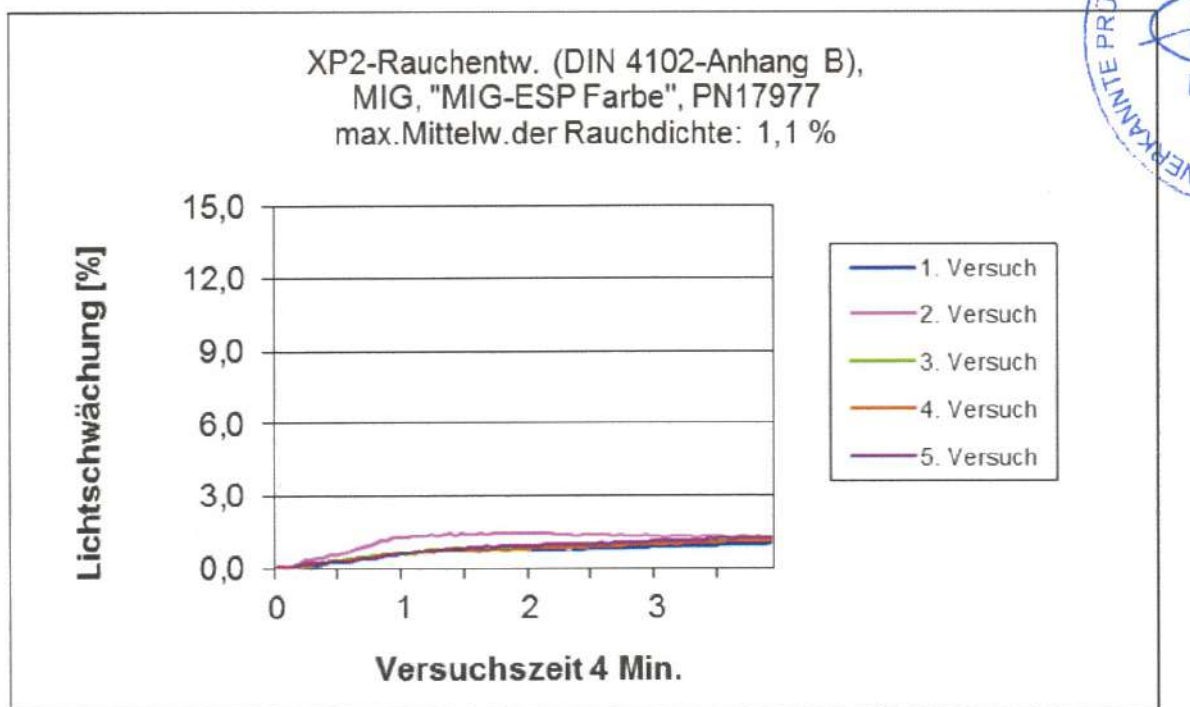
Preparation and pretreatment of samples:

Specimens were cut out from the delivered material (specimen size 30 mm \* 30 mm according to DIN 4102-1) to perform smoke generation tests for burning upon exposure to flames. Flame impinged on the painted side.

Table 4: Smoke generation test on building materials – burning upon exposure to flames (DIN 4102, Part 1, Appendix B)

|                                                        |      |      |      |      |      |      |      |      |      |      |
|--------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Time (min : sec)                                       | 0:12 | 0:24 | 0:36 | 0:48 | 1:00 | 1:12 | 1:24 | 1:36 | 1:48 | 2:00 |
| Average smoke density (%)                              | 0.1  | 0.2  | 0.4  | 0.6  | 0.7  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  |
| Time (min : sec)                                       | 2:12 | 2:24 | 2:36 | 2:48 | 3:00 | 3:12 | 3:24 | 3:36 | 3:48 | 4:00 |
| Average smoke density (%)                              | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.1  | 1.1  | 1.1  |
| Average residual absorption after test ends: 0.7%      |      |      |      |      |      |      |      |      |      |      |
| Remarks and explanations on implementation of test: no |      |      |      |      |      |      |      |      |      |      |
| Summary of test results:                               |      |      |      |      |      |      |      |      |      |      |
| Maximum smoke density (%): 1.1%                        |      |      |      |      |      |      |      |      |      |      |
| Time of occurrence (min): 3:36 minutes                 |      |      |      |      |      |      |      |      |      |      |

#### Measured Data



6. Explanations: no

7. Summary of test result

| Serial No. | Test type                                                           | result                                                                 |                             | Limit value                |
|------------|---------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------|----------------------------|
| 1          | Specific calorific value                                            | Mass-related                                                           | 1,259 kJ/kg                 | 4,200 kJ/kg                |
|            | Releasable amount of heat                                           | Area-related                                                           | 5,992kJ/m <sup>2</sup>      | 16,800kJ/m <sup>2</sup>    |
| 2          | Fire shaft test # 4656<br>Test 1                                    | Residual length:<br>Max. smoke temperature:<br>Smoke density -integral | 46 cm<br>112 °C<br>4% * min | > 35 cm<br>< 125 °C<br>--- |
|            | Fire shaft test # 4697<br>Test 2                                    | Residual length:<br>Max. smoke temperature:<br>Smoke density-integral  | 43 cm<br>106 °C<br>3% * min | >35 cm<br><125 °C<br>---   |
|            | Fire shaft test # 4698<br>Test 3                                    | Residual length:<br>Max. smoke temperature:<br>Smoke density-integral: | 44cm<br>106 °C<br>3% * min  | >35 cm<br><125 °C<br>---   |
| 3          | Fire generation during decomposition under carbonisation conditions | Average smoke density<br>Reference temperature                         | 5.6%<br>350 °C              | 30%<br>---                 |
| 4          | Smoke generation during burning upon exposure to flames             | Max. smoke density<br>Average residual absorption                      | 1.1%<br>0.7%                | 15%                        |
| 5          | Toxicity                                                            | Not detected                                                           |                             |                            |

8. Summarised result

- a. Spread onto massive mineral substrates with a maximum application quantity of 400 g/m<sup>2</sup>, this tested product meets the requirements of the building material class A2 for non-combustible building materials according to DIN 4102, Part 1, Issue (Mai 1998).
- b. An inhalation toxicity test on the material has not been conducted.

9. Special remarks – no –

10. Period of validity

This test result is valid until the time indicated on page 1, in the event the test provisions and basis for evaluation following the state of the art do not change ahead of time.

Fladungen, 31 October 2013

Person in charge:



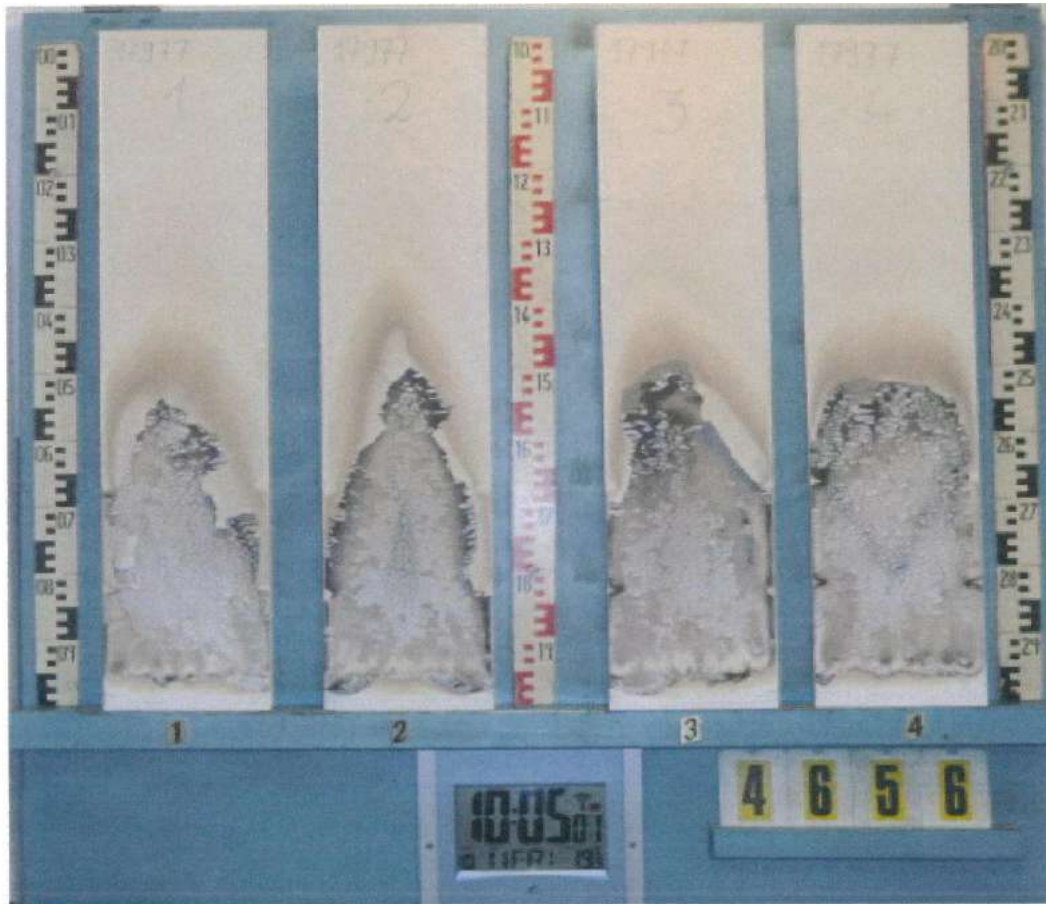
(State certified MBA Jens Rieger)

Head of the testing laboratory:



(Dipl.-Ing., University of Applied Science)  
Andreas Hoch

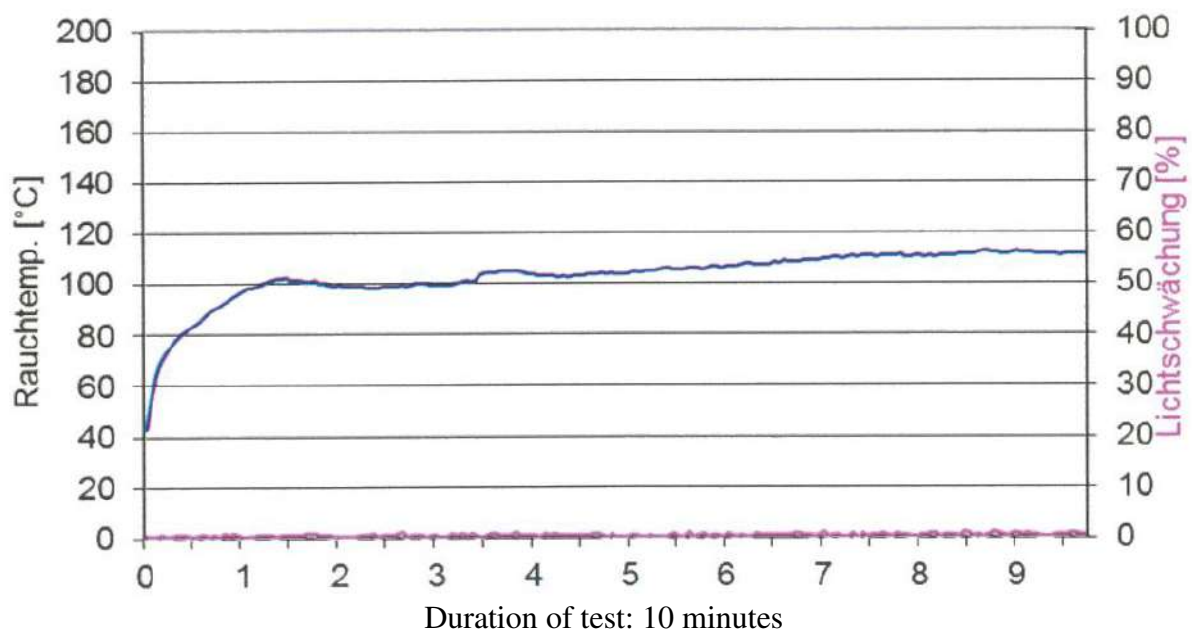
Fire shaft test #4656



Measured Data

#4656, Thermalife on plasterboard plate, PN17977

Residual length: 46cm, max. smoke temperature: 112°C, smoke-int: 4% min



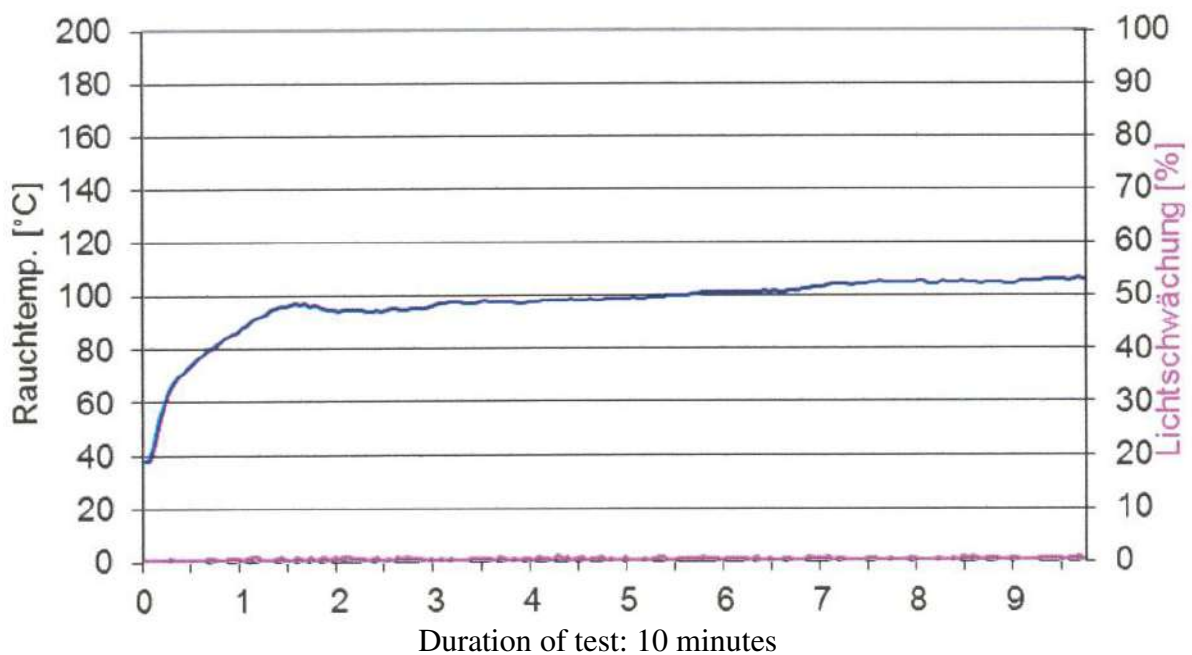
Fire shaft test #4697



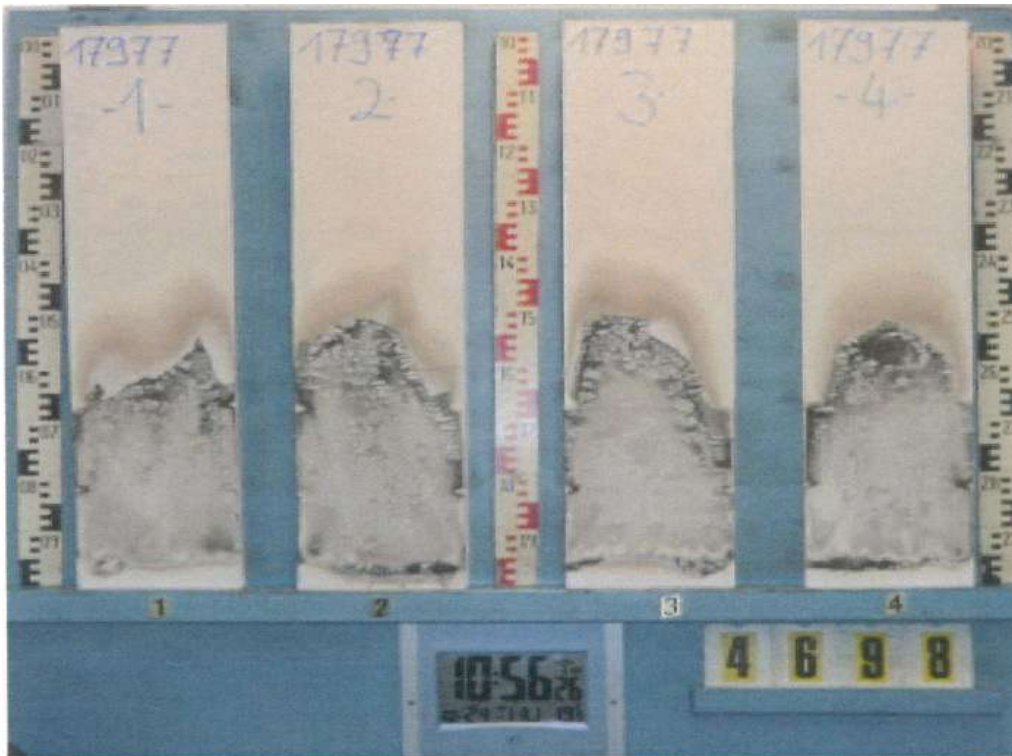
Measured Data

#4697, Thermalife on plasterboard plate, PN17977

Residual length: 43cm, max. smoke temperature: 106°C, smoke-int: 3%/min



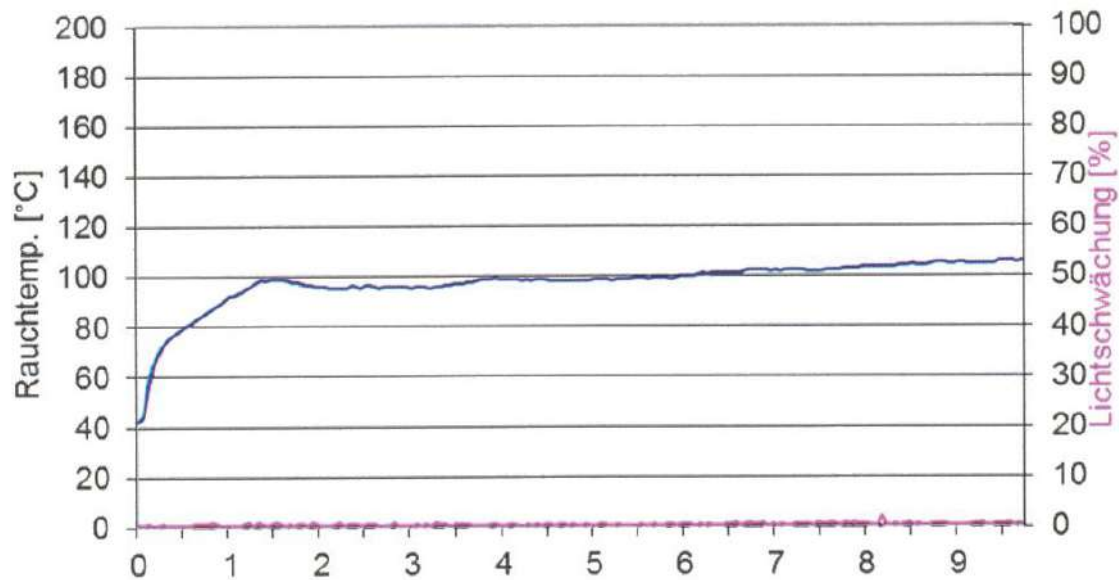
Fire shaft test #4698



Measured Data

#4698, Thermalife on plasterboard plate, PN17977

Residual length: 44cm, max. smoke temperature: 106°C, smoke-int: 3%/min



Duration of test: 10 minutes

Von-Eichendorff-Str. 46a  
33106 Paderborn  
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E-mail: ICTBrandt@aol.com

## ICT – Product Declaration LEED® 2009 New Construction and Major Renovations NC & CS

**Manufacturer:** Thermalife Handelsgesellschaft mbH

**Product Name:** Thermalife® (Thermalife - Energy Saving Paint®)

**Product Rating:**

- The product fulfills the requirements for paints and coatings and contribute to achieve one LEED credit within IEQ Credit 4.2.
- The product contains 14.4 % recycled materials and contribute to achieve LEED credits within MR Credit 4.
- Depending on the building project location the product fulfills the requirements for regional extracted and manufactured materials (see locations). The product might contribute to achieve LEED credits within MR Credit 5.

### Indoor Environmental Quality (IEQ) - LEED Category

|                 |                         |                                       |         |                                     |
|-----------------|-------------------------|---------------------------------------|---------|-------------------------------------|
| IEQ Credit 4.1: | Low Emitting Materials: | Adhesives and Sealants                | 1 Point | <input type="checkbox"/>            |
| IEQ Credit 4.2: | Low Emitting Materials: | Paints and Coatings                   | 1 Point | <input checked="" type="checkbox"/> |
| IEQ Credit 4.3: | Low Emitting Materials: | Flooring Systems                      | 1 Point | <input type="checkbox"/>            |
| IEQ Credit 4.4: | Low Emitting Materials: | Composite Wood and Agrifiber Products | 1 Point | <input type="checkbox"/>            |

### Materials and Resources (MR) - LEED Category

|              |                             |              |                                                  |
|--------------|-----------------------------|--------------|--------------------------------------------------|
| MR Credit 4: | Recycled Content            | 1 - 2 Points | 14.4 % <input checked="" type="checkbox"/>       |
| MR Credit 5: | Regional Materials          | 1 - 2 Points | See location <input checked="" type="checkbox"/> |
| MR Credit 6: | Rapidly Renewable Materials | 1 Point      | <input type="checkbox"/>                         |
| MR Credit 7: | Certified Wood              | 1 Point      | <input type="checkbox"/>                         |

### Product Characteristics

#### Thermalife - Energy Saving Paint® for Interior Walls

Inhaber: Dipl.-Chem. Ing. Burkhard Brandt Volksbank Bad Lippspringe BLZ: 47260121 Konto: 922 8040 800  
USt-IdNr.: DE221682869 StNr. 35 I/5025/1248 Finanzamt Gütersloh

## About LEED & Products - [www.usgbc.org](http://www.usgbc.org)

This declaration helps to assess products easily according the certification system LEED® 2009 New Construction and Major Renovations NC & CS (excluded SCHOOLS). Products are not reviewed or certified by LEED. LEED credit requirements cover the performance of materials in aggregate, not the performance of individual products or brands. For more information about LEED visit [www.usgbc.org/leed](http://www.usgbc.org/leed). The project team or the manufacturer is responsible to declare the compliance with the project requirements to achieve LEED points.

### IEQ Credit 4.1: Low Emitting Materials: Adhesives and Sealants (1 Point)

#### Intent

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants caused by adhesives and sealants applied on site.

#### Requirement

All adhesive, sealants and sealant primers used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) must comply / shall comply with the VOC content limits of the following:

- SCAQMD Rule #1168 (effective date of July 1, 2005 and rule amendment date of January 7, 2005),
- Aerosol Adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

### IEQ Credit 4.2: Low Emitting Materials: Paints and Coatings (1 Point)

#### Intent

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants caused by paints and coatings applied on site.

#### Requirement

Paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) must comply with the VOC content limits of the following:

- Green Seal Standard GS-11, Paints Edition, May 20, 1993,
- Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997, and
- South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

### Detailed Rating

| No | Product Name         | Manufacturer                        | Related Credit | Product Type                                    | VOC-Content |         | Contribution of Product                                      |                                     |
|----|----------------------|-------------------------------------|----------------|-------------------------------------------------|-------------|---------|--------------------------------------------------------------|-------------------------------------|
|    |                      |                                     |                |                                                 | Allowable   | Product |                                                              |                                     |
| A1 | Energy Saving Paint® | Thermalife Handels-gesellschaft mbH | IEQ Credit 4.2 | Flat Low-VOC Paints (Green Seal Standard GS-11) | 50 g/l      | <1 g/l  | The product fulfills the requirements for paints & coatings. | <input checked="" type="checkbox"/> |

### MR Credit 4: Recycled Content (1-2 Points)

Inhaber: Dipl.-Chem. Ing. Burkhard Brandt Volksbank Bad Lippspringe BLZ: 47260121 Konto: 922 8040 800  
USt-IdNr.: DE221682869 StNr. 351/5025/1248 Finanzamt Gültersloh

### Intent

To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

### Requirement

Use materials with recycled content\* such that the sum of post-consumer\*\* recycled content plus one-half of the pre-consumer\*\*\* content constitutes at least 10%/20% (based on cost) of the total value of the materials in the project.

The minimum percentage materials recycled for each point threshold is as follows:

- 10% Recycled Content -> 1 Point
- 20% Recycled Content -> 2 Points.

\* Recycled content is defined in accordance with the International Organization of Standards document, ISO 14021 — Environmental labels and declarations — Self-declared environmental claims (Type II environmental labeling).

\*\* Postconsumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.

\*\*\* Preconsumer material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (i.e., rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.

### Detailed Rating

| No | Product Name         | Manufacturer                       | Related Credit | Product Type                                    | Recycled Content |              | Contribution of Product                                 |                                     |
|----|----------------------|------------------------------------|----------------|-------------------------------------------------|------------------|--------------|---------------------------------------------------------|-------------------------------------|
|    |                      |                                    |                |                                                 | Post-Consumer    | Pre-Consumer |                                                         |                                     |
| A2 | Energy Saving Paint® | Thermalife Handelsgesellschaft mbH | MR Credit 4    | Flat Low-VOC Paints (Green Seal Standard GS-11) | 7%               | 7.4%         | Accountable recycled content according to LEED is 14.4% | <input checked="" type="checkbox"/> |

### MR Credit 5: Regional Materials (1-2 Points)

#### Intent

To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

#### Requirement

Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) must contribute to the regional value. The minimum percentage regional materials for each point threshold is as follows:

- 10% Regional Materials -> 1 Point

### Detailed Rating

| No | Product Name         | Manufacturer                       | Related Credit | Product Type                                    | Location Harvesting/ Extraction | Location Manufacturing |                                     |
|----|----------------------|------------------------------------|----------------|-------------------------------------------------|---------------------------------|------------------------|-------------------------------------|
| A3 | Energy Saving Paint® | Thermalife Handelsgesellschaft mbH | MR Credit 5    | Flat Low-VOC Paints (Green Seal Standard GS-11) | not specified                   | Germany / Salzkotten   | <input checked="" type="checkbox"/> |

Notice: This declaration is a product of ICT. The distribution by third parties is prohibited. This declaration is no official certificate in terms of LEED. The contents are based on manufacturer specifications. In spite of a diligent treatment of all information ICT cannot guarantee the actuality or correctness of the published data. The interpretation of the LEED criteria requirements can differ and depend on the project and the scope of application. In spite of a diligent treatment of all information ICT cannot guarantee the correctness of evaluation in terms of the LEED requirements. The user of this declaration, the consumer of the product and the consultant/planner, who is advising this product in any construction projects, is responsible by himself to proof all data published in this document and to verify the permissibility for the designated application.

The content of this data sheet does not manifest any legal relationship. With the publication of a new edition, this declaration can no longer be considered to be valid. The latest version is available in the internet.

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**Title:** **Determination of S<sub>d</sub>- and W<sub>24</sub>-values.**

**Test Methods:** **S<sub>d</sub>-value according to DIN EN ISO 7783-2  
W<sub>24</sub>-value according to EN 1062-3**

**Test Material:** **Thermalife**

**Results:** **Thermalife:**  
Capillary water absorption W<sub>24</sub>: III (low)  
Water vapour permeability S<sub>d</sub>: I (high)

| Sample     | Liquid water transmission rate, w <sub>24</sub> -value in kg/m <sup>2</sup> h <sup>0,5</sup> | Water vapour permeability, wet-cup, s <sub>d</sub> -value in m |
|------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Thermalife | 0.04                                                                                         | 0.04                                                           |

Thermalife had an ideal W<sub>24</sub> and S<sub>d</sub> values (low capillary water absorption and high water vapour permeability).

## **Description of methods:**

### **Sample preparation:**

Thermalife was used as delivered by Thermalife. Samples were applied in two layers over two days. Thermalife was diluted with 5% water to gain optimal viscosity. W<sub>24</sub> and S<sub>d</sub> values were tested as described in detail below.

**Procedure for Water vapour permeability (gravimetric wet cup method following ISO 7783-2):**



1. PE frit coated with test formulation ( $400 \text{ g/m}^2$ ), conditioning: 14 d at 50% rel. humidity (r.h.),  $23^\circ\text{C}$
2. Cup: filled with 200 g  $\text{NH}_4\text{H}_2\text{PO}_4$  solution  $\Rightarrow$  constant rel. humidity of 93%
3. Specimen mounted on cup and sealed
4. Cup exposed to controlled atmosphere: 50% r.h.,  $23^\circ\text{C}$
5. Weight determination after 24, 48, 72 h  $\Rightarrow$  vapour diffusion rate  $V$  in  $\text{g/m}^2\text{d}$
6. Calculation:

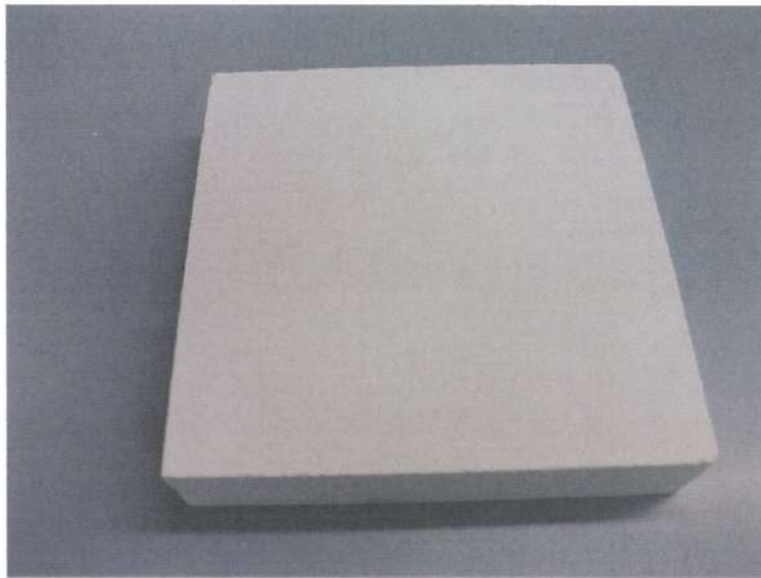
$$s_d = \frac{20.351 \text{ g/m}\cdot\text{d}}{V} - s_{d0}$$

$s_d$  = diffusion equivalent air layer thickness test formulation

20,351 g/md = wet cup factor for 93% r.h./ $23^\circ\text{C}$ , PE disc

$s_{d0}$  = diffusion equivalent air layer thickness uncoated PE frit (0.07m)

### Procedure for capillary water absorption according EN 1062-3:



1. lime sandstone (11.5 x 11.5 x 2.5 cm; uncoated:  $W > 5 \text{ kg/m}^2$ ) is coated with test formulation.
2. drying: 72 h ambient temperature + 72 h at 50°C.
3. conditioning: 72 h immersion into water bath (1 cm deep), and drying for 72 h at 50°C
4. test: coated conditioned lime sandstone is put on foam sponge, saturated with water;  
sponge is kept wet by putting it into a water bath => weight is determined after 1, 2, 3, 6 and 24 h.  
⇒ water absorption  $W$  in  $\text{kg/m}^2$

$$W = w \cdot \sqrt{t}$$

$W$  = water absorption [ $\text{kg/m}^2$ ]

$t$  = absorption time [h]

$w$  = water absorption coefficient [ $\text{kg/m}^2\text{h}^{0,5}$ ]

## Standardised classifications:

### Water vapour transmission rate:

$s_d$ : diffusion-equivalent air layer thickness [m]

$V$  (=WDD): water vapour transmission rate

| $s_d$ [m]  | Water vapour transmission rate $V$ [g/m <sup>2</sup> d] | ISO 7783-2  |
|------------|---------------------------------------------------------|-------------|
| < 0.14     | > 150                                                   | I (high)    |
| 0.14 - 1.4 | 15 - 150                                                | II (medium) |
| > 1.4      | < 15                                                    | III (low)   |

Low  $s_d$ -value = high water vapour permeability

### Liquid water transmission rate:

$W$ : water absorption [kg/m<sup>2</sup>]

$w$ : water absorption coefficient [kg/m<sup>2</sup>h<sup>0,5</sup>]

$t$ : absorption time [h]

| $w$ [kg/m <sup>2</sup> h <sup>0.5</sup> ] | EN 1062-3   |
|-------------------------------------------|-------------|
| > 0.5                                     | I (high)    |
| 0.1 - 0.5                                 | II (medium) |
| < 0.1                                     | III (low)   |

low  $w$ -value = low capillary water absorption

**Ideal:  $s_d < 0.14$  m,  $w < 0.1$  kg/m<sup>2</sup>h<sup>0.5</sup>**

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## Notices:

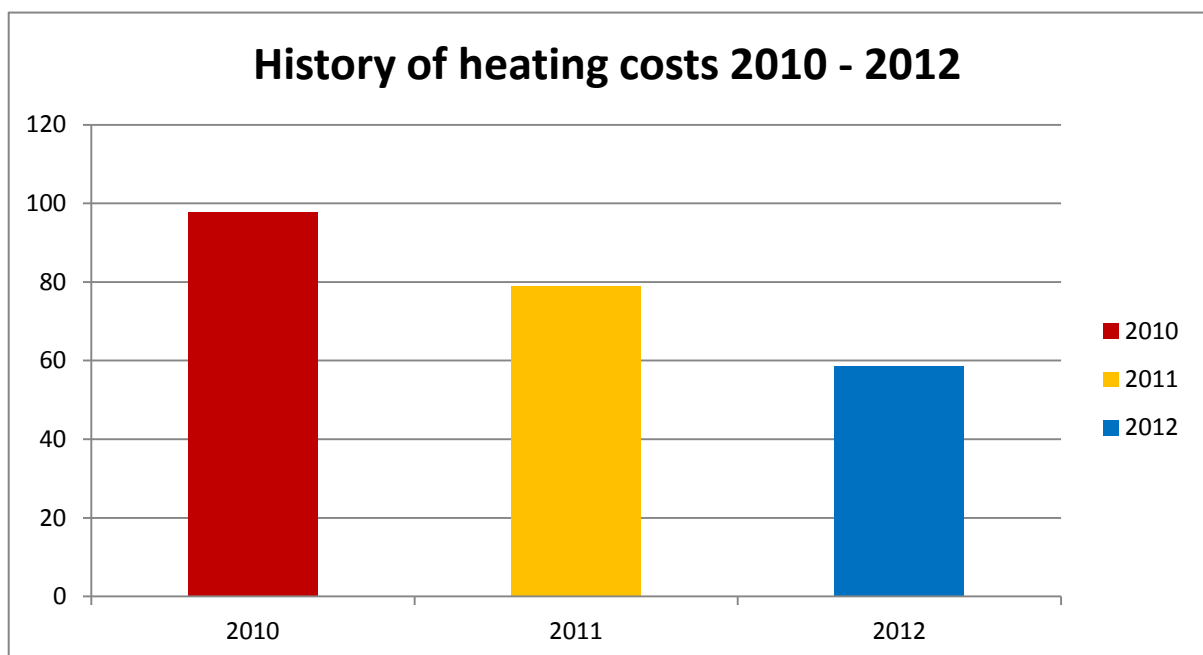
## Next Steps:

**History of heating costs 2010 - 2012**  
**D-33154 Salzkotten, Westring 4 - 105 m<sup>2</sup>**



| Year | VE   |
|------|------|
| 2010 | 97,8 |
| 2011 | 79   |
| 2012 | 58,5 |

**Decrease of heating costs total: 40,2%**



**2010 - without Thermalife**

**2011 - 1x Thermalife coated**

**2012 - 2x Thermalife coated**

**Energy supplier: E.ON Westfalen Weser**

**Calculation unit: VE**

**Family Dyga**

**D-33154 Salzkotten, Westring 4**

**Flat: 105 m<sup>2</sup>**



# TEST REPORT

Test Report No: 130608  
Client: Thermalife Handelsgesellschaft mbH  
Am Gararock 3  
33154 Salzkotten  
GERMANY  
  
Contract No/Date: -/22.08.2013  
Offer No: 130648  
Subcontractors: none  
Archiving of Samples: 3 months for stable retaining samples  
Subject of Testing: energy saving paint for exterior use  
Aim of Testing: application-related testing  
Origin of Samples: provided by client  
Entry Date of Samples: 20.08.2013  
Start of Testing: 27.08.2013  
End of Testing: 17.10.2013  
Laboratory: Application Technology  
Test Methods: see paragraph 2 „Test methods and evaluation“  
Number of Pages: 6

The test methods marked \*) are non-accredited test methods.



## 1 Subject of testing

For the tests a white *Energy Saving Paint for Exterior Use* (5-L-container) was provided by the client.

## 2 Test methods and evaluation

### 2.1 Determination of density

Test method: pyknometer method according to DIN EN ISO 2811-1  
Pyknometer: metal pyknometer with a volumetric capacity of 100 cm<sup>3</sup>  
(manufacturer: BYK-Gardner, Geretsried)  
Testing temperature: (23 ± 0,5) °C

### 2.2 Exposure to artificial weathering

Test method: exposure to fluorescent UV lamps and water according to DIN EN ISO 11507  
Application: by brushing in two layers, load: each with 200-300 mL/m<sup>2</sup> (priming coat diluted with 5 % water, top coat undiluted), intermediate drying time: at least 24 h  
Substrate: fibre-reinforced cement panels (150 mm x 70 mm)  
Drying: 7 days at (23 ± 2) °C and (50 ± 5) % relative humidity  
Lamps: type II, UV-A (340)  
Cycle: method A – exposure with condensation of water

- four hours irradiation at (60 ± 3) °C,
- for hours condensation at (50 ± 3) °C

  
Duration: 1000 h  
Evaluation: evaluation of degradation of coatings (criteria according to DIN EN 1062-11):

- designation of intensity of uniform changes in appearance (for example changes in colour and gloss) according to DIN EN ISO 4628-1, Table 3
- blistering according to DIN EN ISO 4628-2
- cracking according to DIN EN ISO 4628-4
- flaking according to DIN EN ISO 4628-5
- chalking according to DIN EN ISO 4628-7



## 2.3 Mud cracking<sup>\*)</sup>

|              |                                                                                 |
|--------------|---------------------------------------------------------------------------------|
| Application: | with a doctor blade, which incorporates a wedge-shaped groove<br>(50...2000 µm) |
| Substrate:   | glass panels                                                                    |
| Drying:      | 48 h at (23 ± 2) °C and (50 ± 5) % relative humidity                            |
| Evaluation:  | determination of the dry-film thickness, at which the coating film<br>cracks    |

## 2.4 Workability check <sup>\*)</sup>

The paint was applied by rolling onto a textured wall-covering of 1 m x 2 m in area, which was held in a vertical position.

A roller was used to decorate the substrate according to the recommendations of the supplier. A visual assessment was made of the product in original state (in the pot) and when applied onto the substrate. The following parameters were evaluated:

- Applicability  
scale from 1 (very good) to 5 (very poor)
- Splashing  
scale from 1 (none) to 5 (very strong)
- Sagging  
scale from 1 (none) to 5 (very strong)
- Application rate  
Application rates are given in g/m<sup>2</sup> for one and two paint layers to achieve a wet-covering of a grey and a black contrast stripe on the wall.
- visual assessment of the (dried) coating
  - *hiding power*
  - *touch-drying*
  - *homogeneity of surface*
- Cleaning of application items  
Are there any problems when cleaning the roller with water?
- Smell nuisance  
scale from 1 (very low) to 5 (very strong)



### 3 Test results

*Table 1 Density*

| <i>Sample designation</i>             | <i><math>\rho</math> [g/cm<sup>3</sup>]</i> |
|---------------------------------------|---------------------------------------------|
| Energie Saving Paint for Exterior Use | 1,1                                         |

*Table 2 Degradation of coatings after 1000 h artificial weathering*

| <i>Sample designation</i>             | <i>Intensity of changes in appearance</i> | <i>Degree of blistering</i> | <i>Degree of cracking</i> | <i>Degree of flaking</i> | <i>Degree of chalking</i> |
|---------------------------------------|-------------------------------------------|-----------------------------|---------------------------|--------------------------|---------------------------|
| Energie Saving Paint for Exterior Use | Rating 0                                  | 0(S0)                       | 0(S0)                     | 0(S0)                    | 2                         |

*Table 3 Mud cracking*

| <i>Sample designation</i>             | <i>Dry-film thickness, at which the coating film cracks [μm]</i> |
|---------------------------------------|------------------------------------------------------------------|
| Energie Saving Paint for Exterior Use | 550...630                                                        |



**Table 4** Results of workability check

|                                                         |                                                                       |             |              |                        |             |
|---------------------------------------------------------|-----------------------------------------------------------------------|-------------|--------------|------------------------|-------------|
| <b>1. Applicability</b><br>Assessment:                  | very good<br>X                                                        | good<br>← X | satisfactory | poor                   | very poor   |
| <b>2. Splashing</b><br>Assessment :                     | none                                                                  | little      | medium<br>X  | strong                 | very strong |
| <b>3. Sagging</b><br>Assessment :                       | none<br>X                                                             | little      | medium       | strong                 | very strong |
| <b>4. Application rate [g/m<sup>2</sup>]</b>            | <u>1. layer</u><br>293                                                |             |              | <u>2. layer</u><br>240 |             |
| <b>5. Visual assessment of the (dried) coating</b>      |                                                                       |             |              |                        |             |
| hiding power                                            | 4                                                                     |             |              | 2                      |             |
| touch-dry                                               | approx. 1,5 h                                                         |             |              | approx. 1,5 h          |             |
| homogeneity of surface                                  | homogeneously mat coating surface, strong body, structured by rolling |             |              |                        |             |
| <b>6. Cleaning of application items</b><br>Assessment : | no problems when using water                                          |             |              |                        |             |
| <b>7. Smell nuisance</b><br>Assessment :                | very low                                                              | low<br>X    | moderate     | strong                 | very strong |



#### 4 Summary

After 1000 hours artificial weathering (exposure to UV-A lamps and water) the tested coating shows a good resistance (no yellowing, no delamination, no blistering, no cracking, no flaking, slight chalking).

Mud cracking (i.e. the occurrence of cracks during the drying phase) already starts at a dry-film thickness in the range of 550 to 630  $\mu\text{m}$ . For exterior emulsion paints this value should be at least 900  $\mu\text{m}$  (tolerance level).

From a practical point of view the tested energy saving paint is easy to apply and therefore ranked as good to very good; but there is a medium splashing. After application of two coats the visual appearance of the coating surface is homogeneously covering and mat. The surface is slightly structured by rolling. The smell nuisance during the application is low.

Magdeburg, 21 October 2013  
iLF GmbH

Dipl.-Chem. Cornelia Dreyer  
Head of Laboratory Application Technology

Dipl.-Ing. (FH) Tobias Böttge  
Responsible Test Engineer

#### Notes:

The test results refer only to the subjects of testing.

The publication of the results **in extracts** is subject to the approval of the iLF Forschungs- und Entwicklungsgesellschaft Lacke und Farben mbH.

This test report is a shortened test report that does not cover all test conditions required by the applicable standards.