



## Influence of finishing materials on indoor humidity

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Dr. Andreas H. Holm

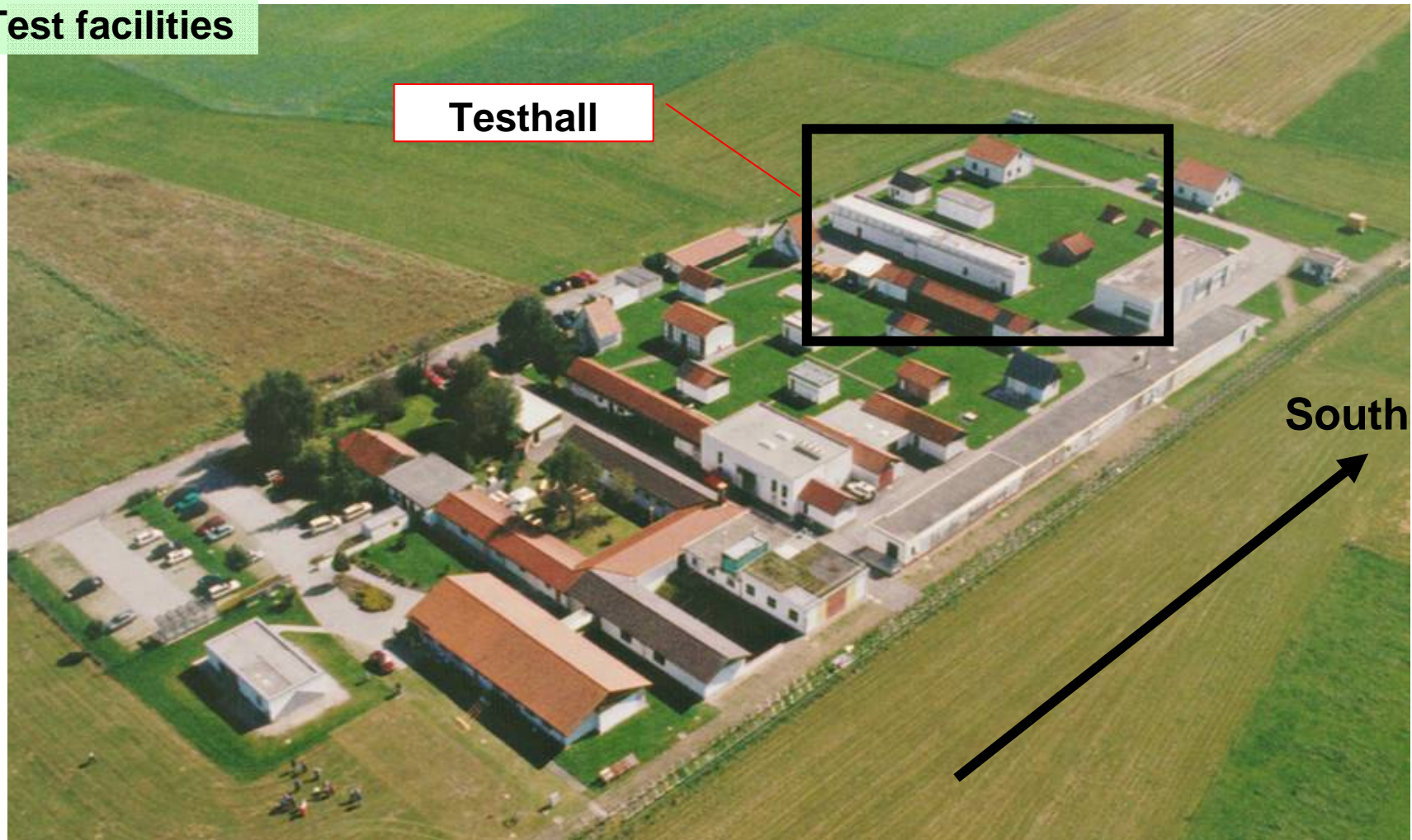
Fraunhofer  
Institut  
Bauphysik

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[www.bauphysik.de/klima](http://www.bauphysik.de/klima)

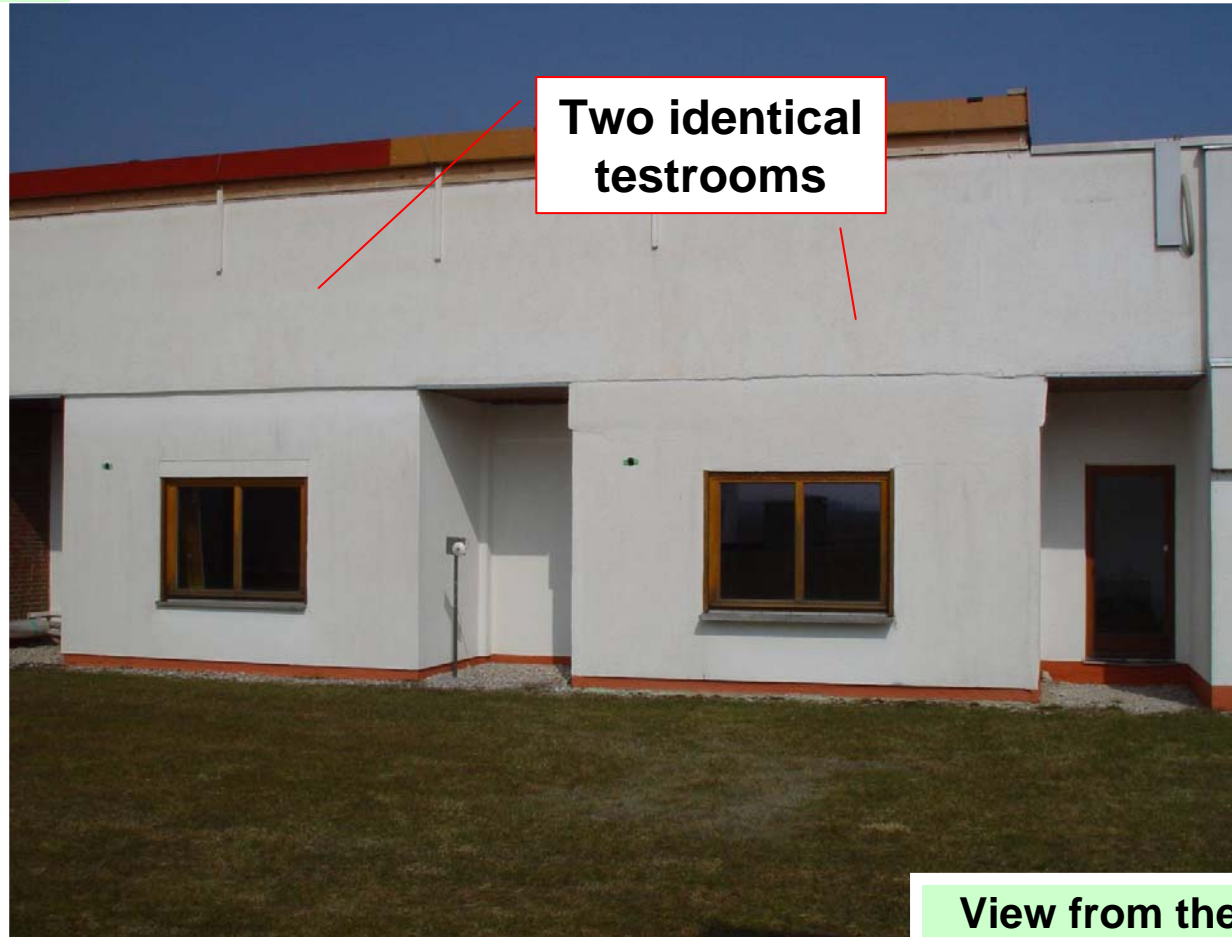
# Experimental investigations

## Test facilities



# Experimental investigations

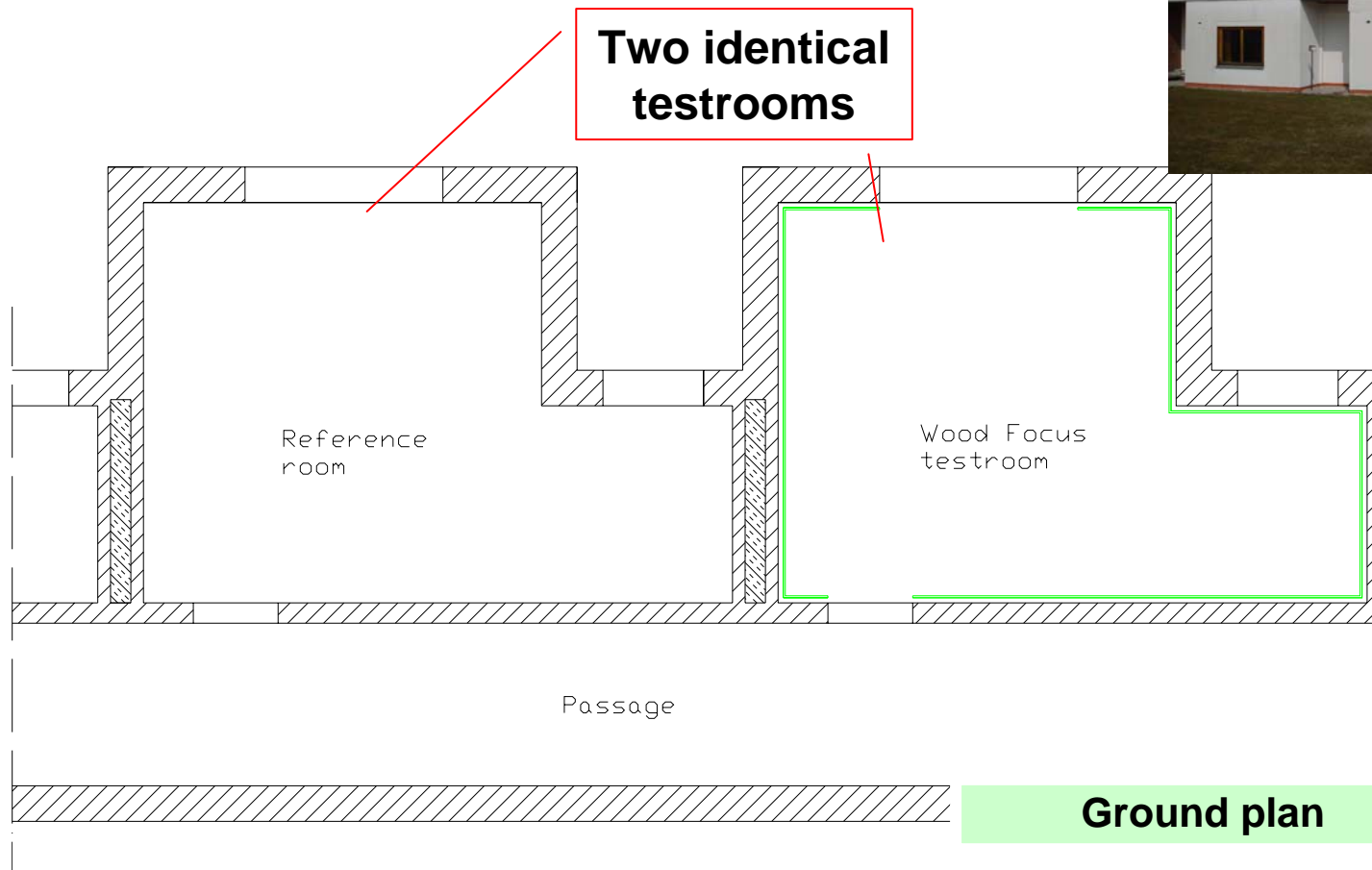
## Test facilities



View from the South

# Experimental investigations

## Test facilities

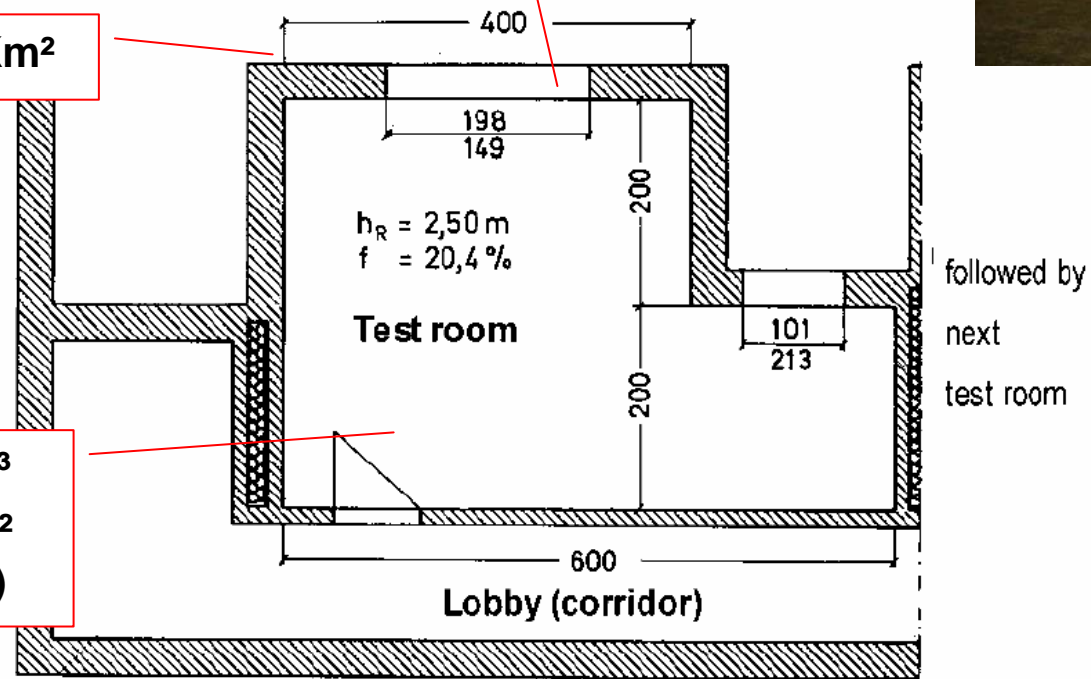


# Experimental investigations

**U-value : 1,1 W/Km<sup>2</sup>**  
**total solar energy transmittance: 0,57**

**U-value : 0,4 W/Km<sup>2</sup>**

**Volume: 50 m<sup>3</sup>**  
**Surface: 65 m<sup>2</sup>**  
**(without floor)**



**Ground plan**





# Experimental investigations

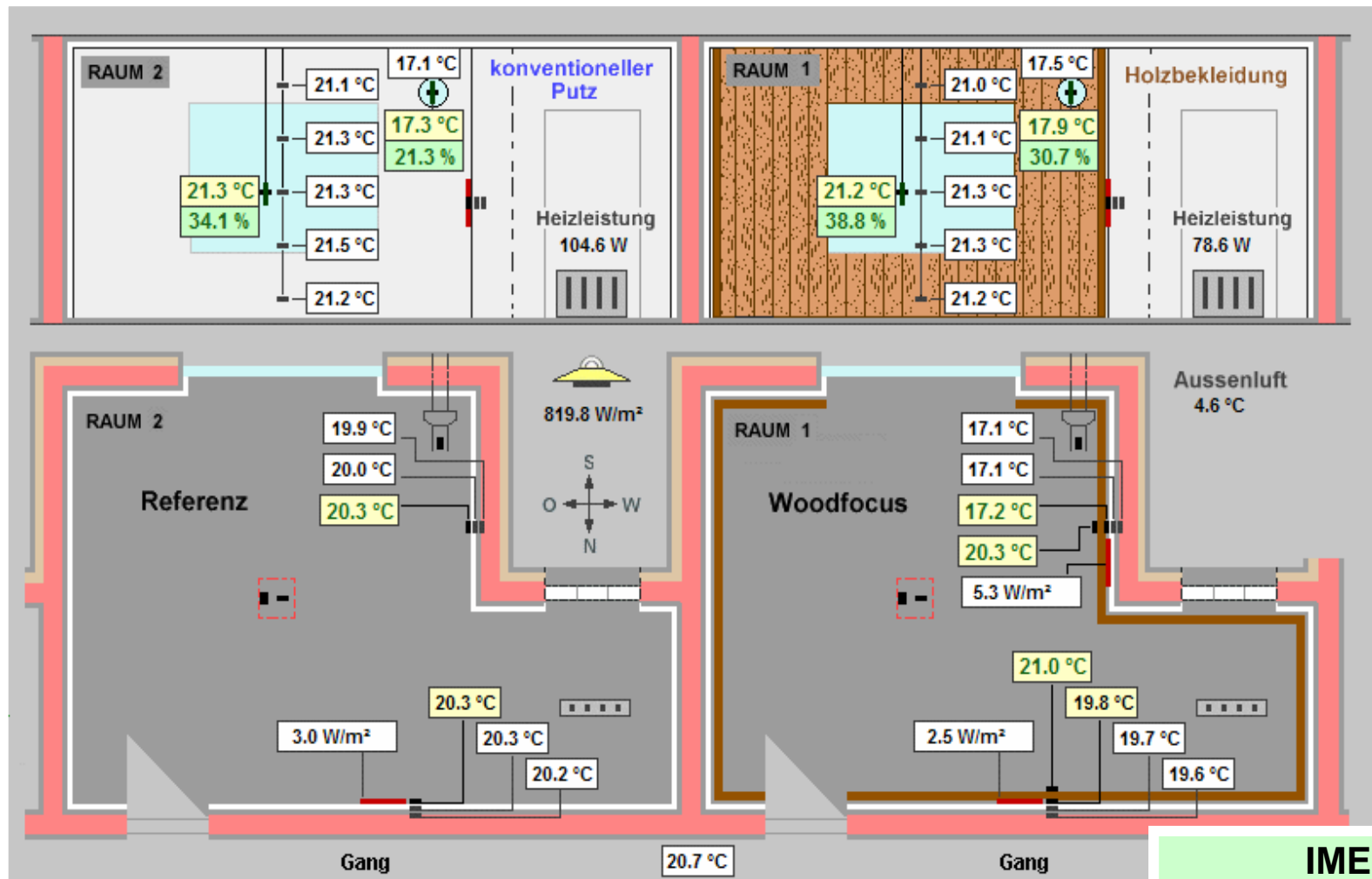
foil faced test room



reference room

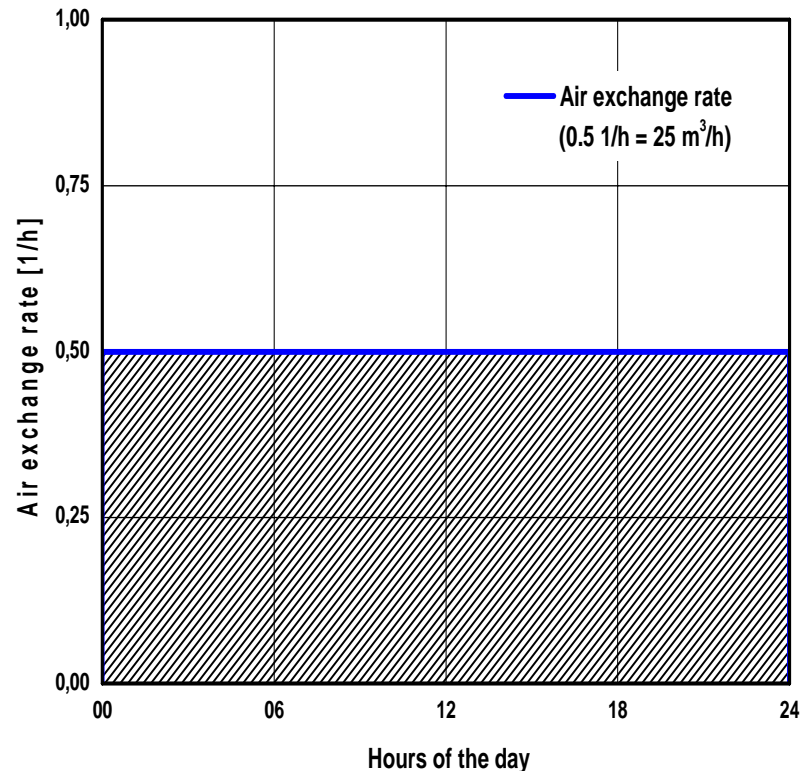


# Experimental investigations

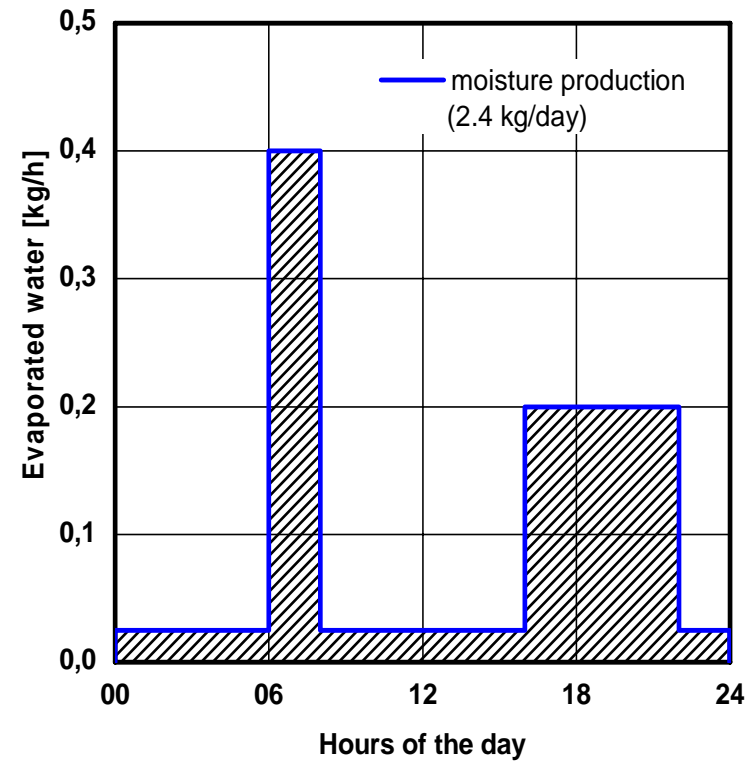


# Experimental investigations

## Ventilation



## Moisture production



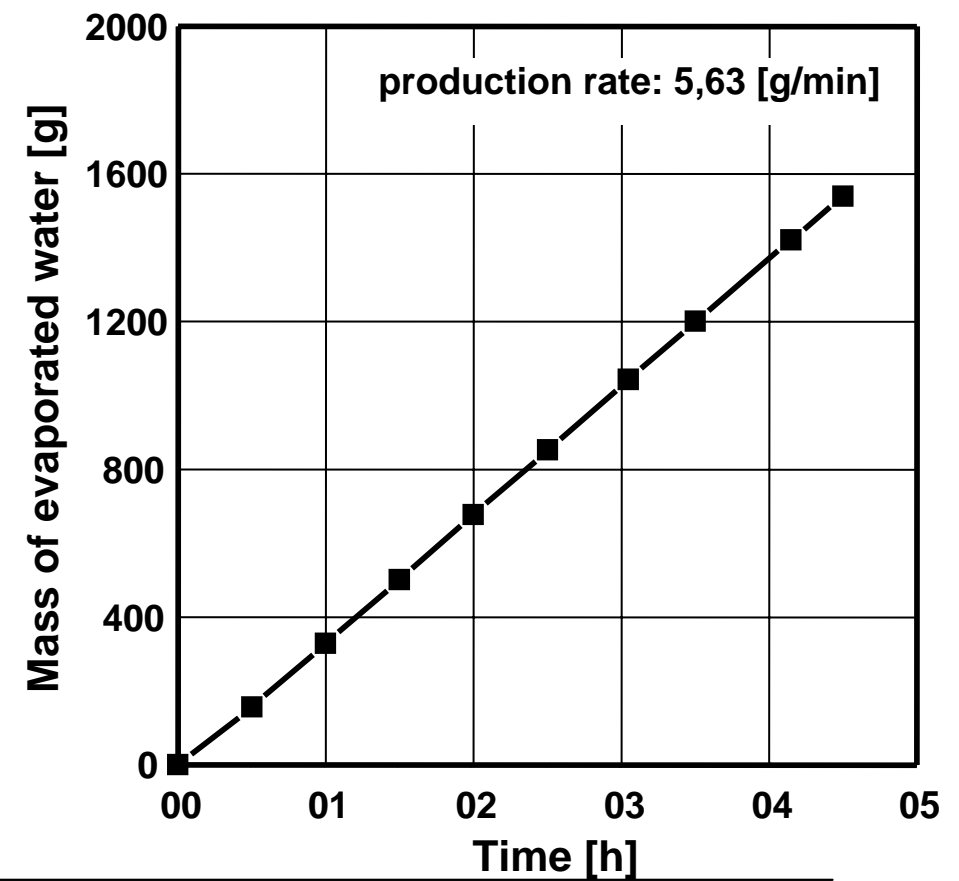
Indoor temperature: min. 20°C



# Experimental investigations

## Moisture generation

Moisture produced by ultra sonic vapor generators



# Experimental investigations

## Moisture generation

Moisture produced by ultra sonic vapor generators



### Advantages:

- ⌘ Steady vapor production rate
- ⌘ No additional heat source through humidification process
- ⌘ Reliability
- ⌘ Easily to handle

## Experimental investigations

### Moisture generation

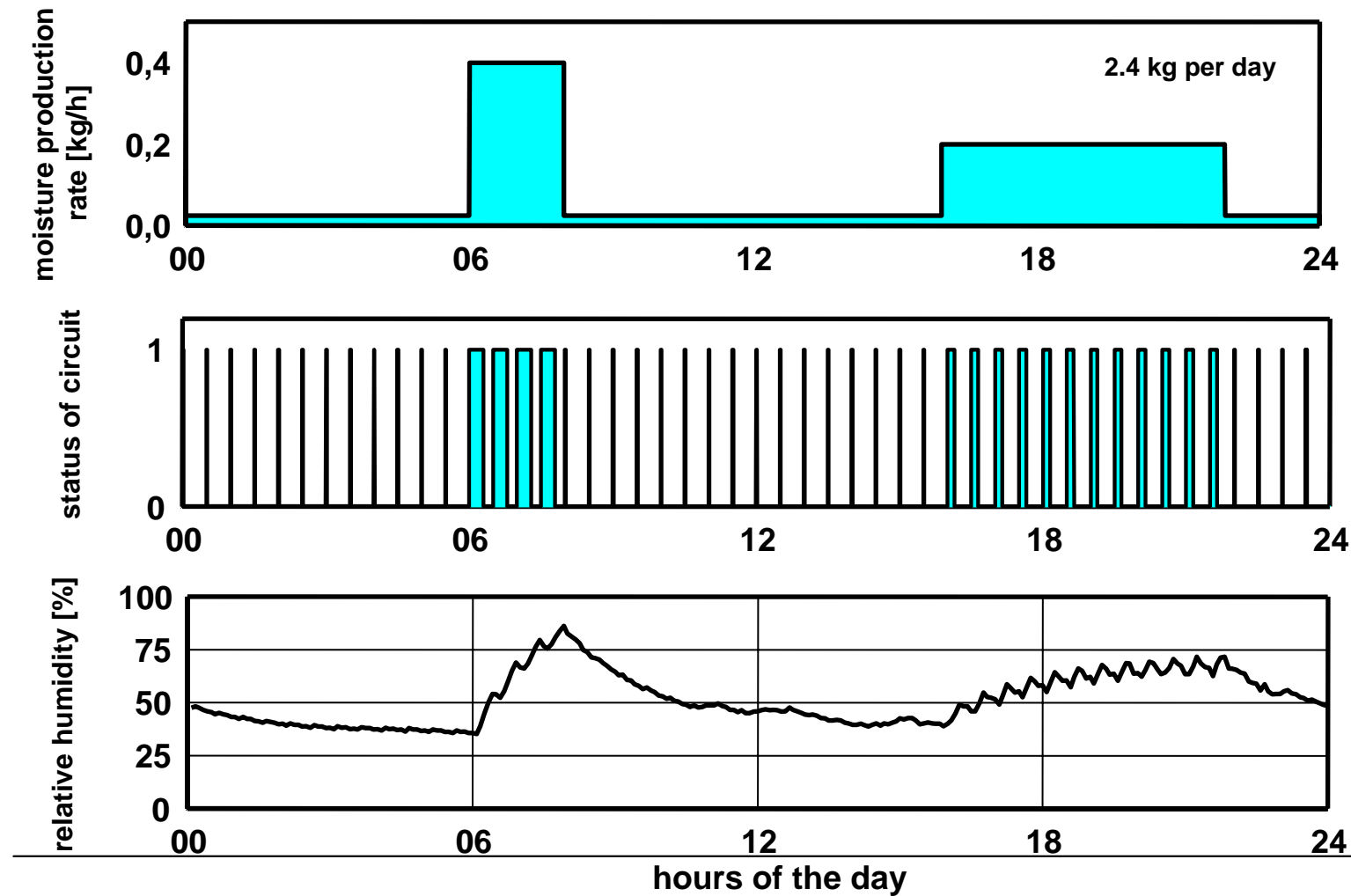
- ⌘ Two vapor generators in each room
- ⌘ Controlled by a time switch



ultra sonic vapor generators

# Experimental investigations

## Moisture generation



## Experimental investigations

### Air tightness of the rooms

➔ Avoiding of uncontrolled energy transfers

#### Results

- Reference Room:
  - $n_{50} = 0,57 \rightarrow n = 0,04 \text{ [1/h]}$
- Wood Focus Testroom:
  - $n_{50} = 0,43 \rightarrow n = 0,03 \text{ [1/h]}$



Blower Door Test



# Experimental investigations

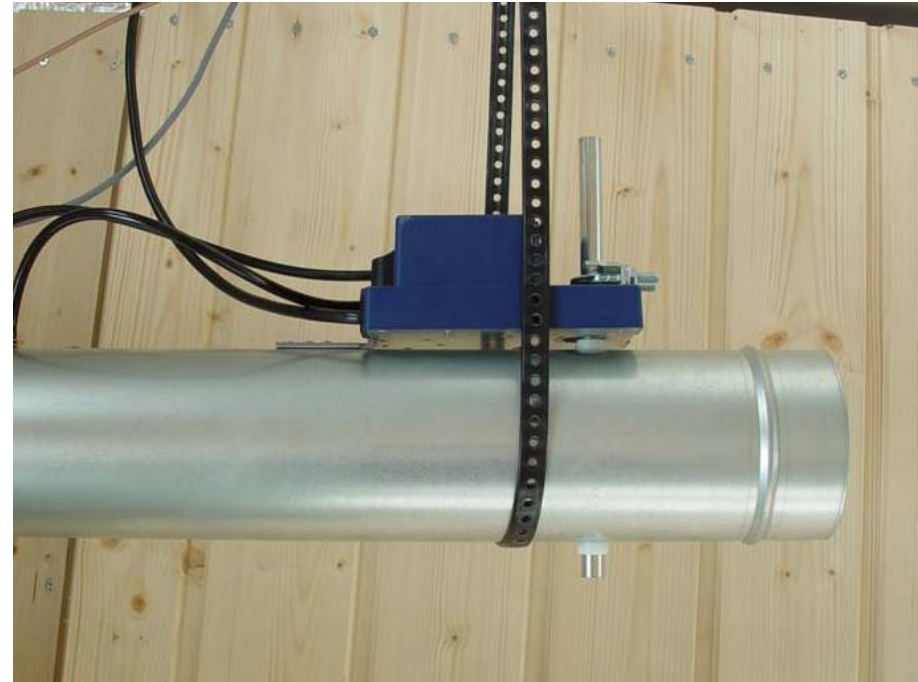
## Ventilation strategy

Used device:

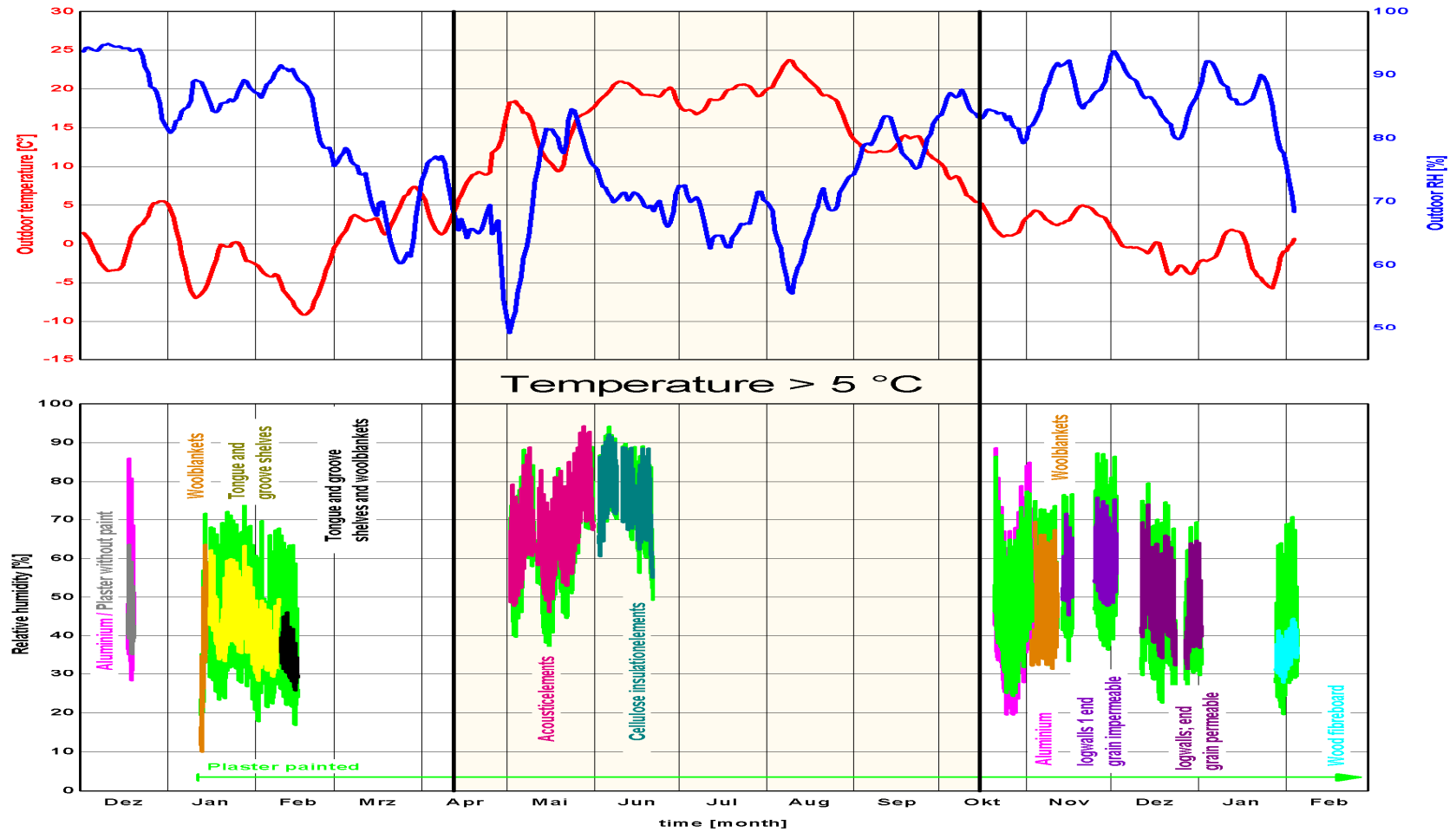
Airflow controlling unit by BELIMO

Advantages:

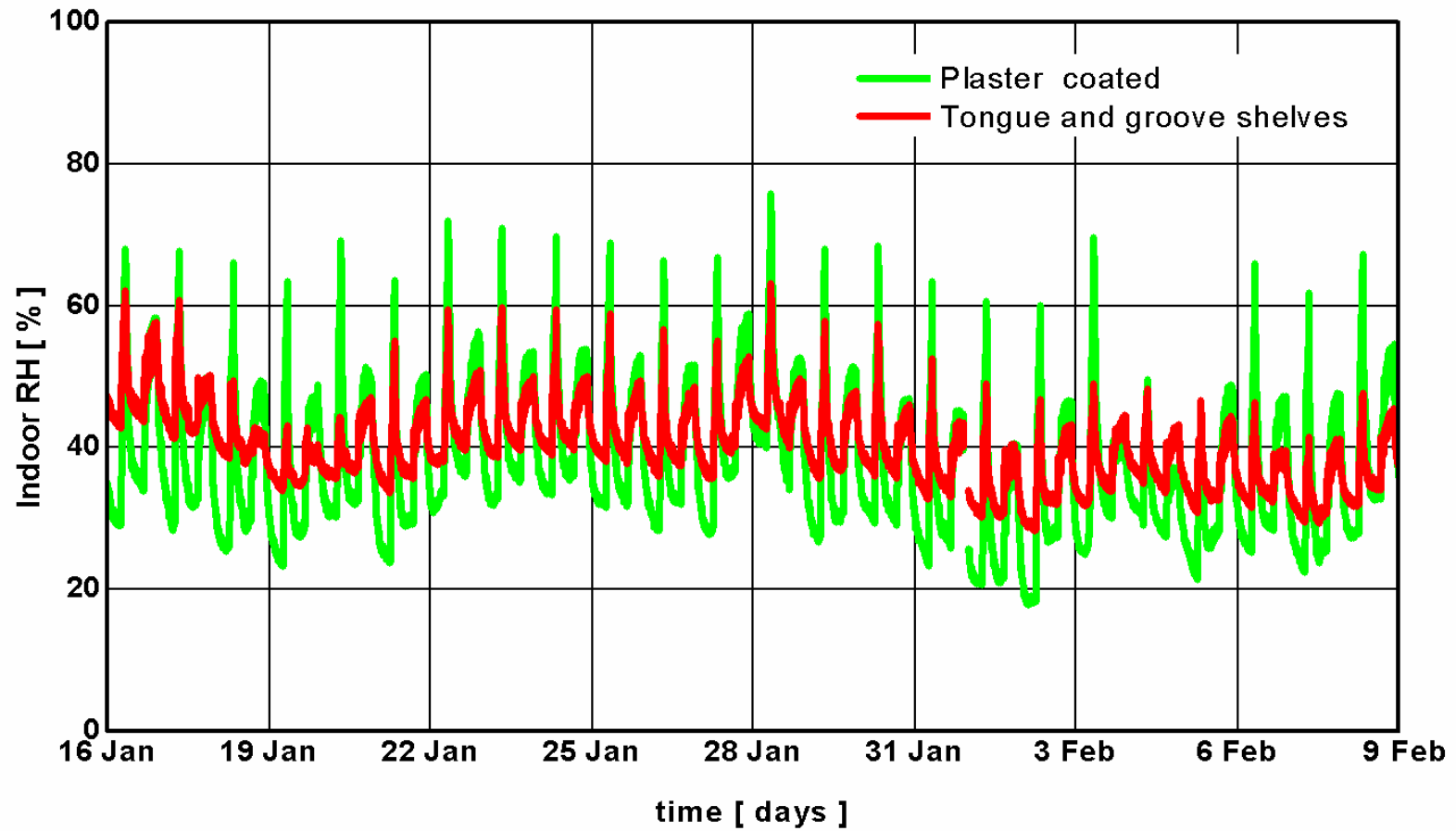
- Easily to control:  
signal form 0 to 10 V  
→ airflow rate 25 to 75 m<sup>3</sup>/h
- Non-sensitive to pressure differences  
caused e.g by wind
- Very reliable performance



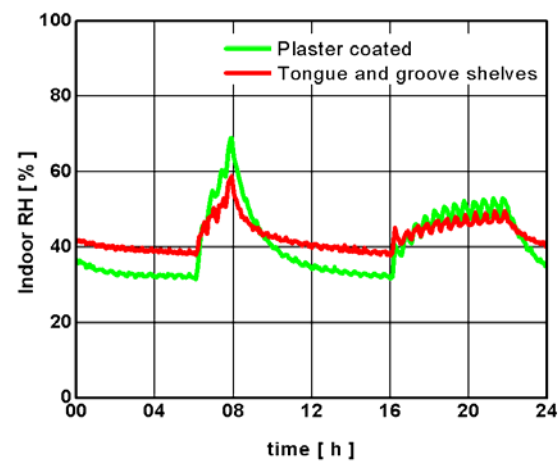
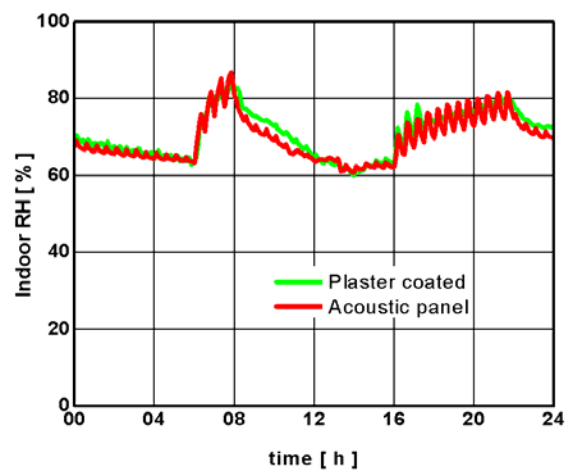
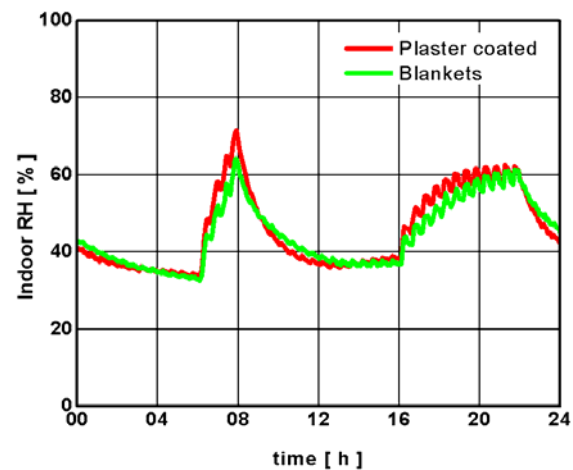
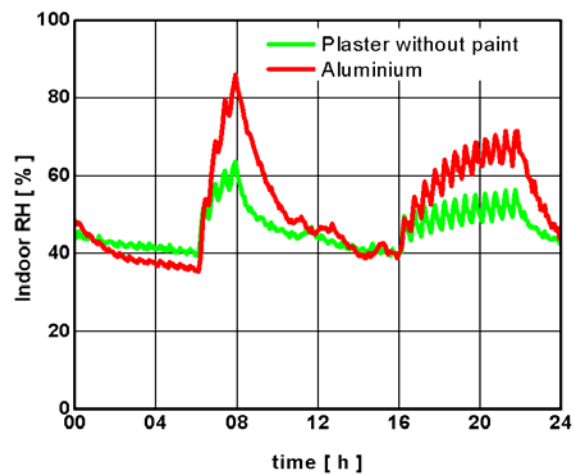
# Results



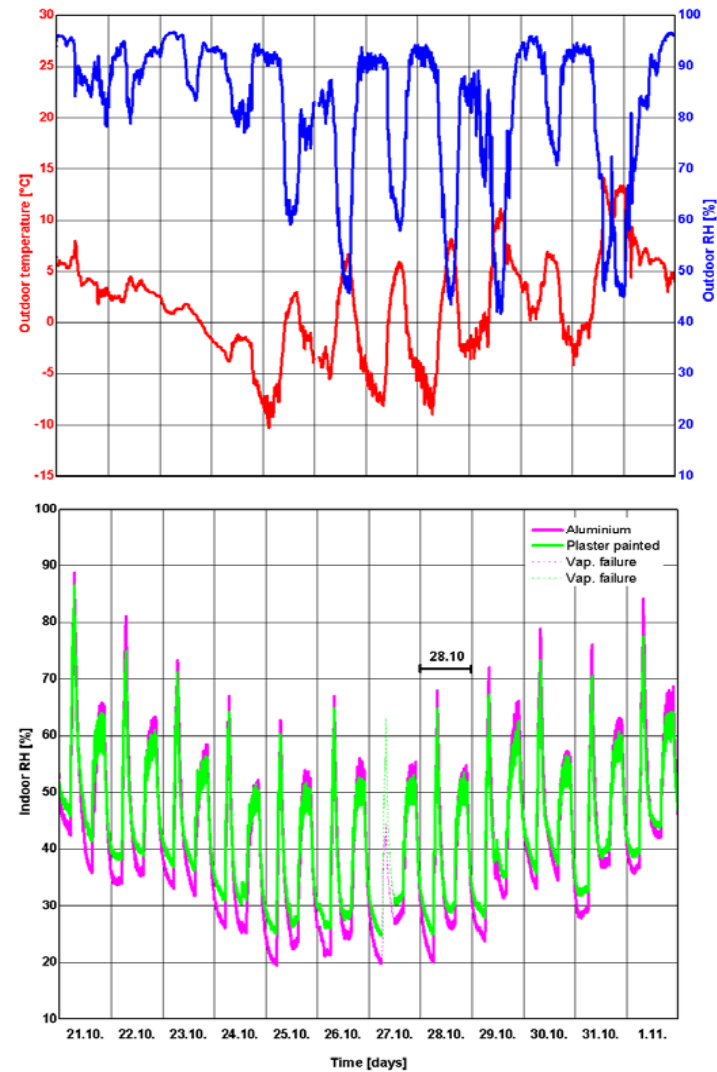
## Results



# Results

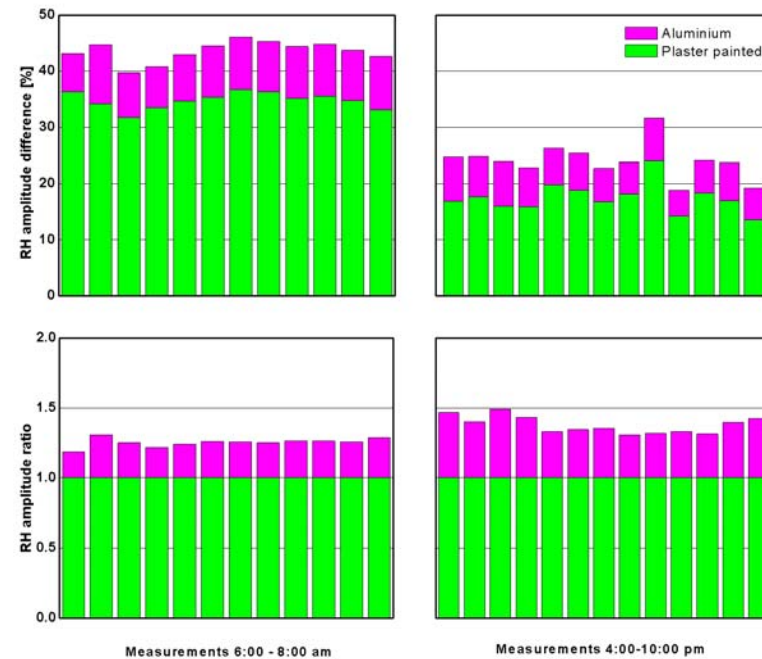
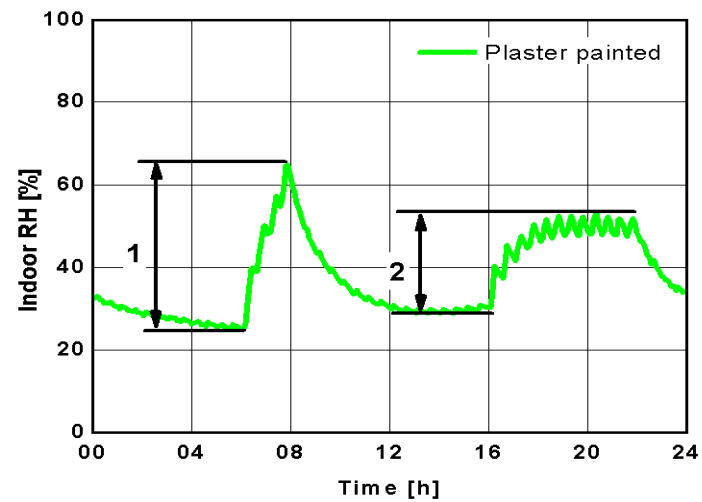
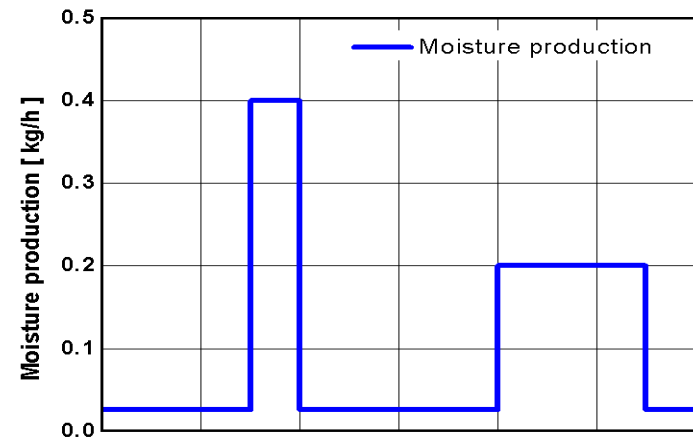


# Preliminary tests

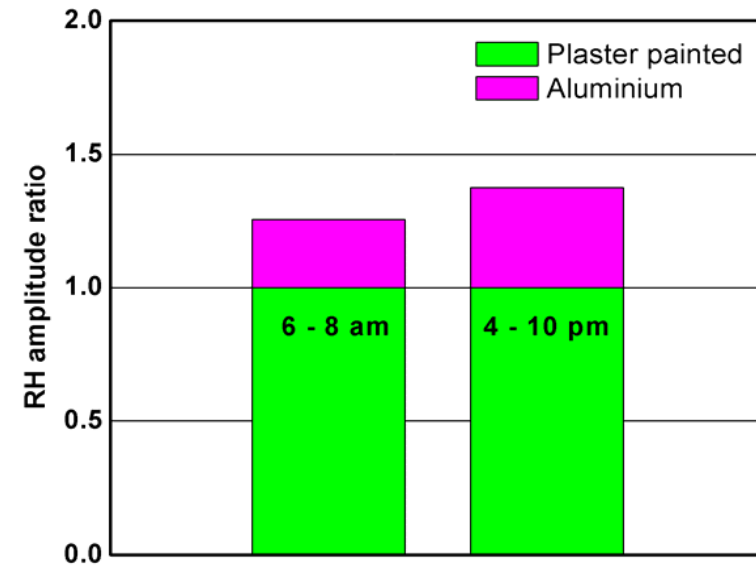
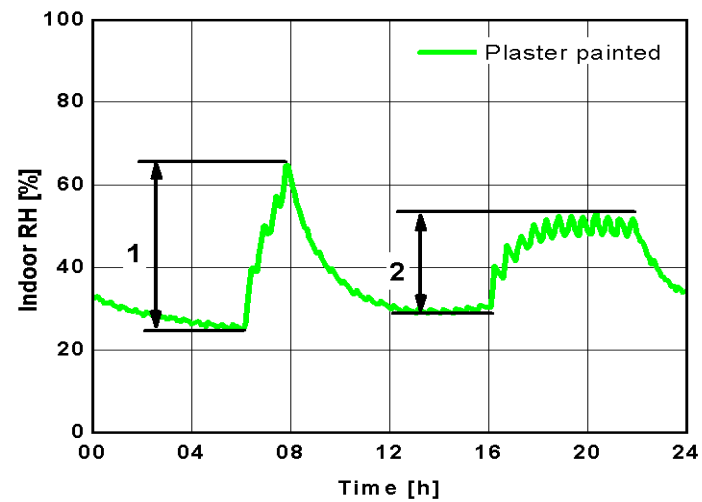
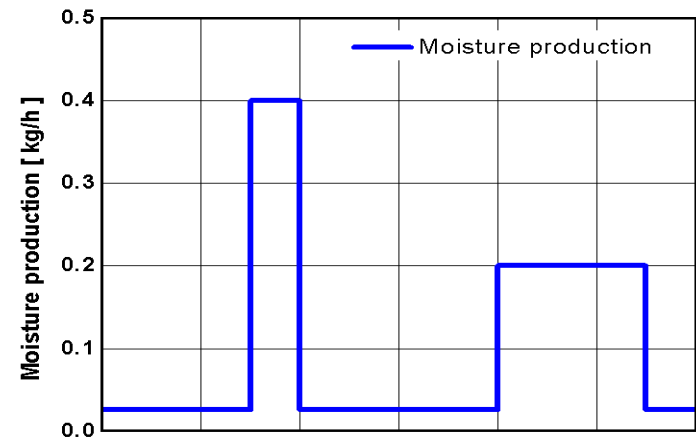




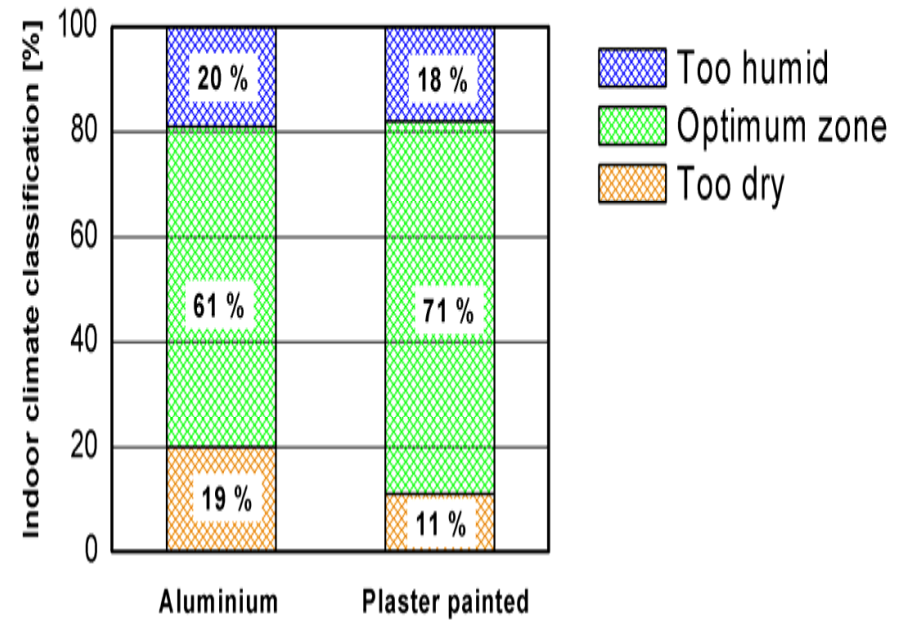
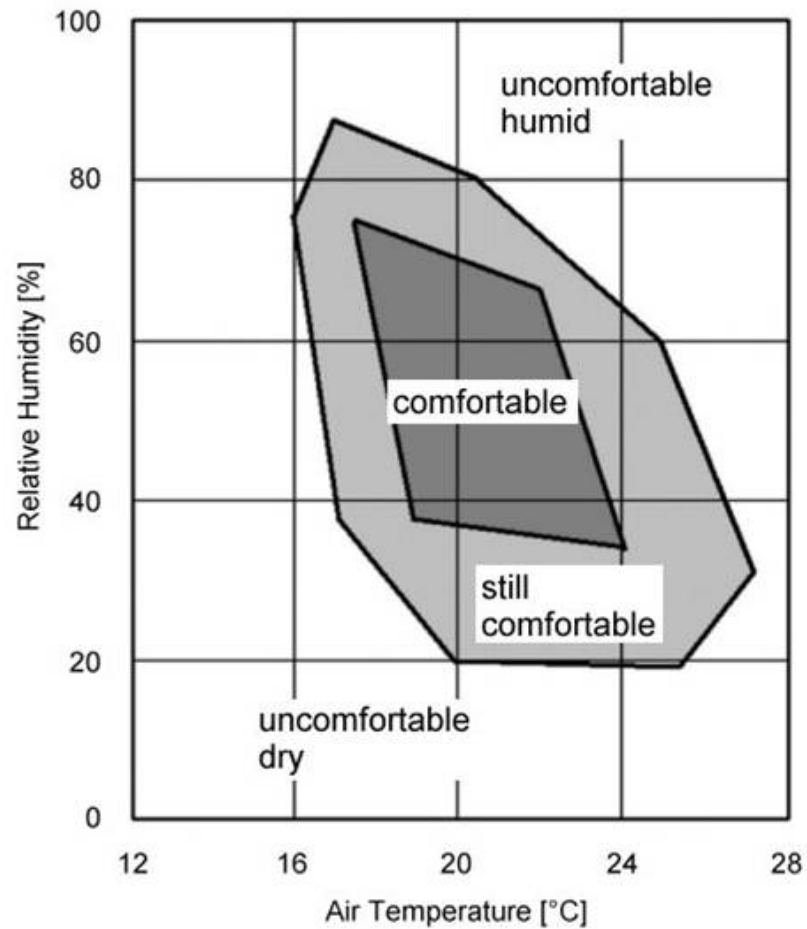
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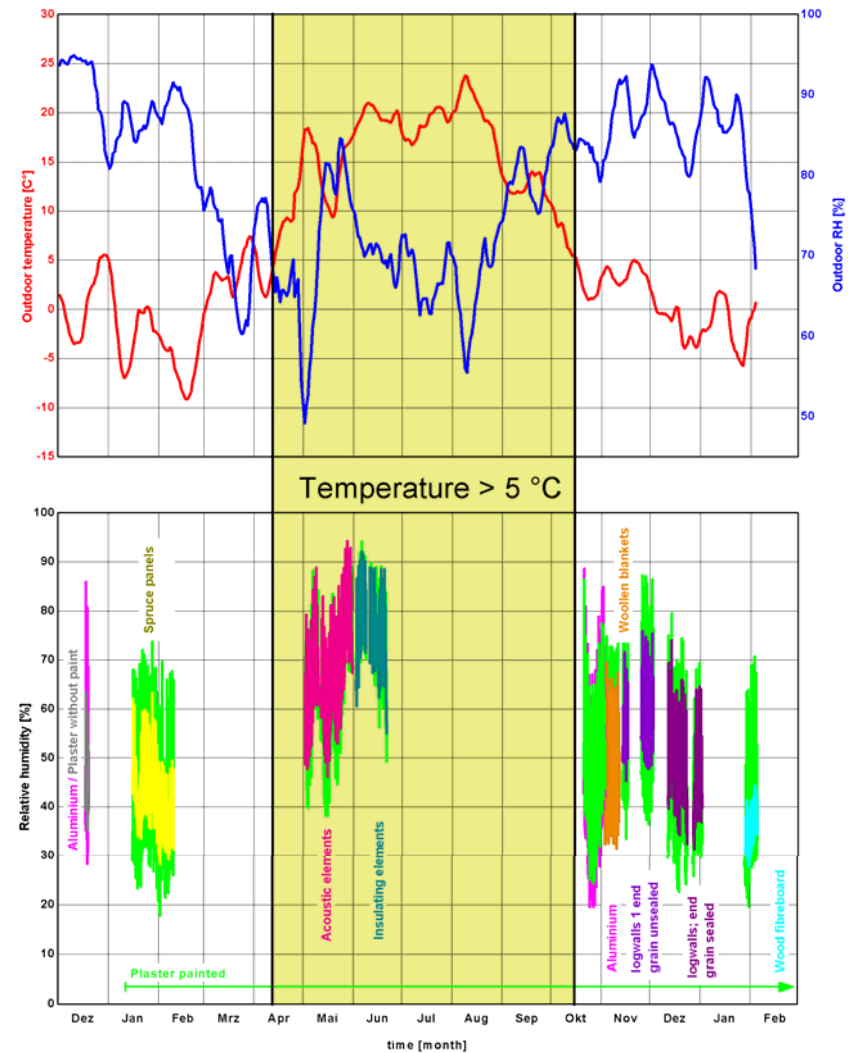
# Preliminary tests



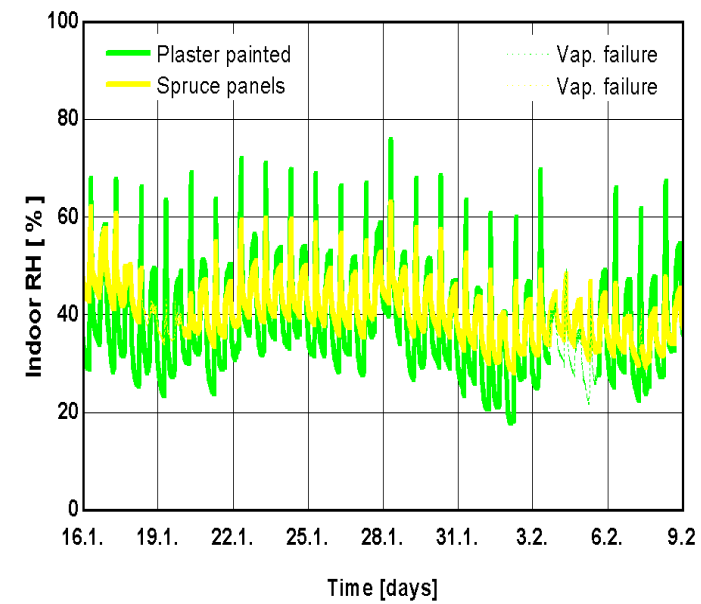
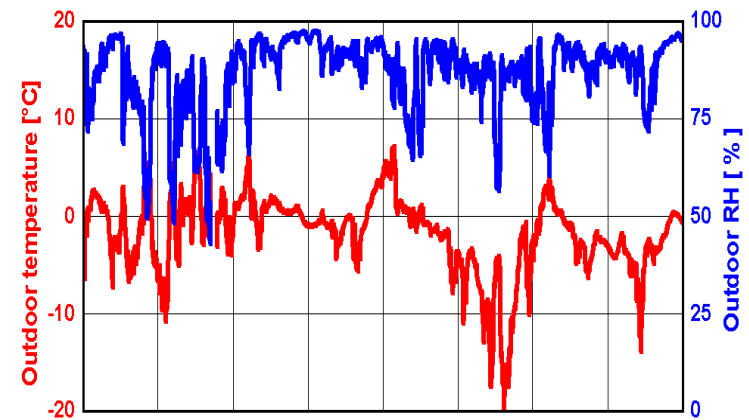
## Preliminary tests



# Moisture buffering effects of wood-based linings

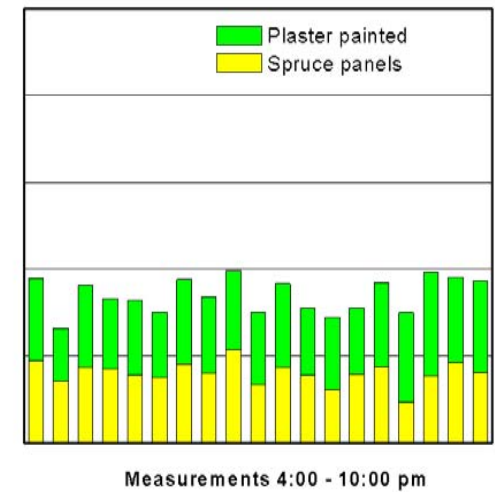
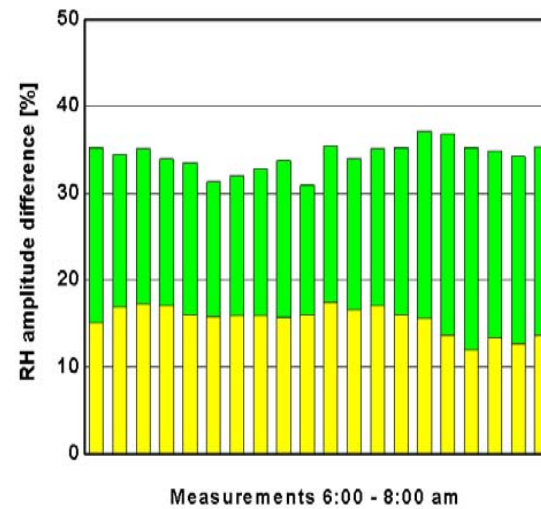
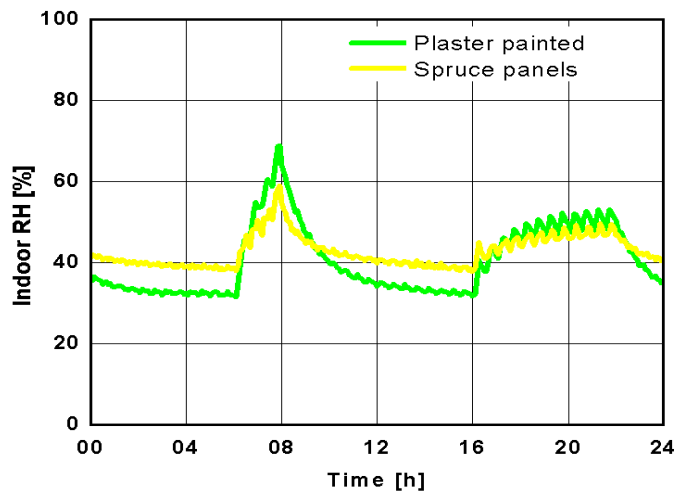
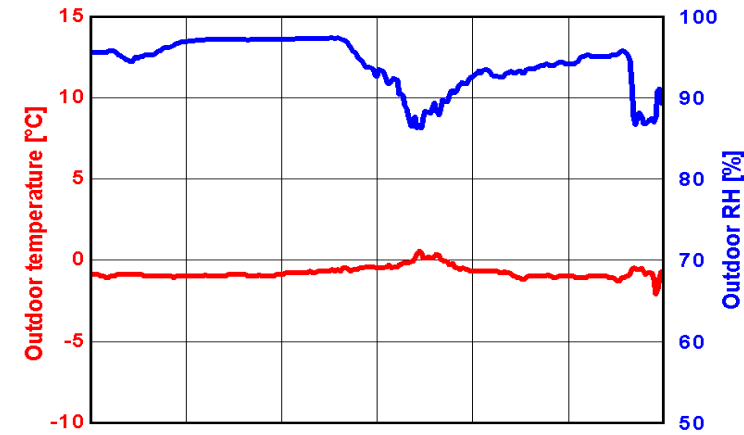


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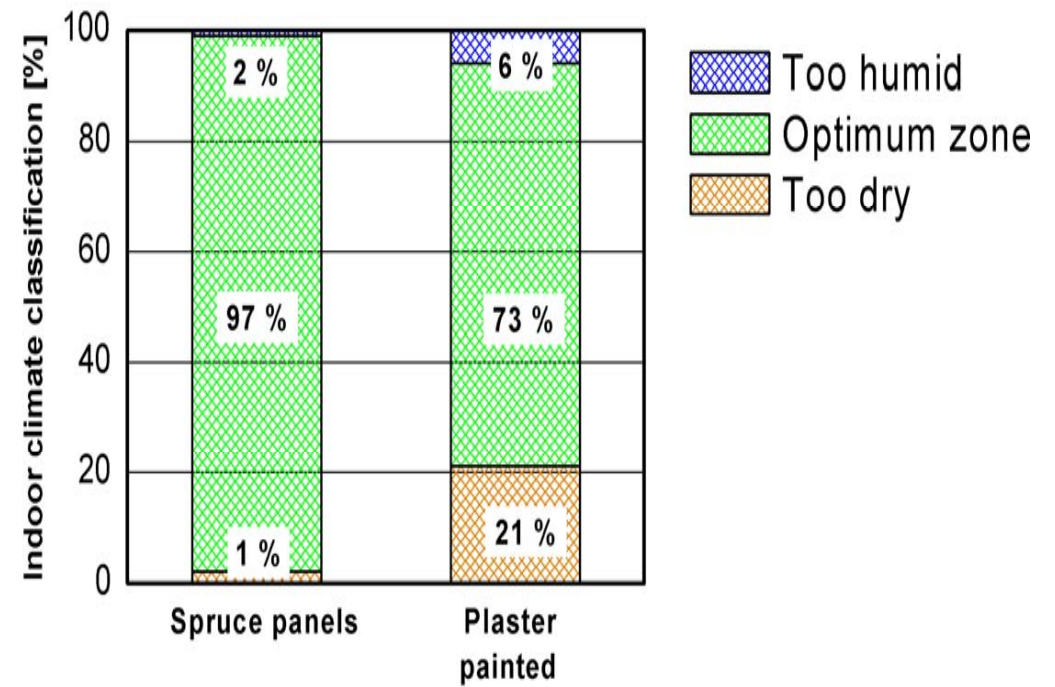
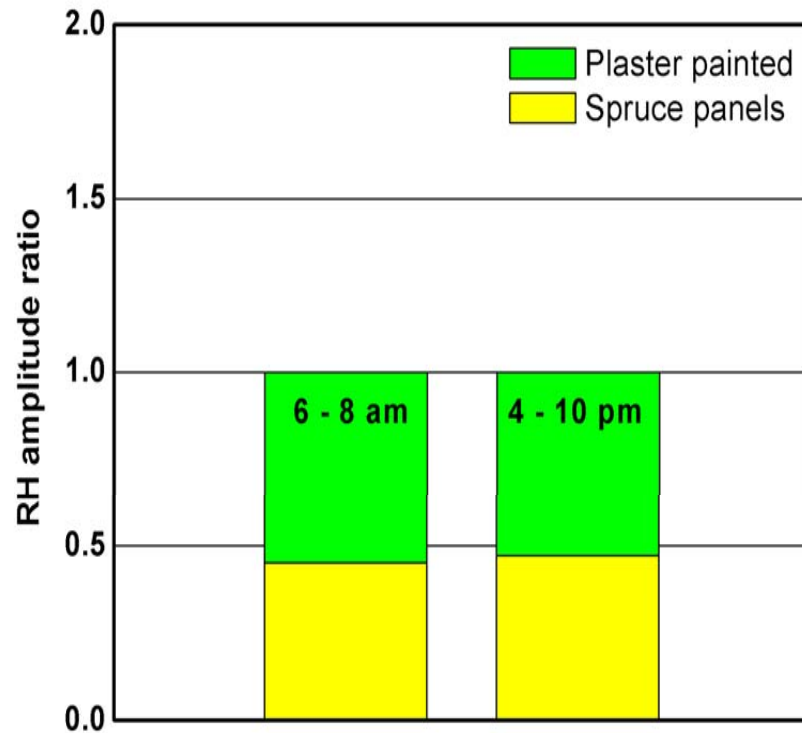




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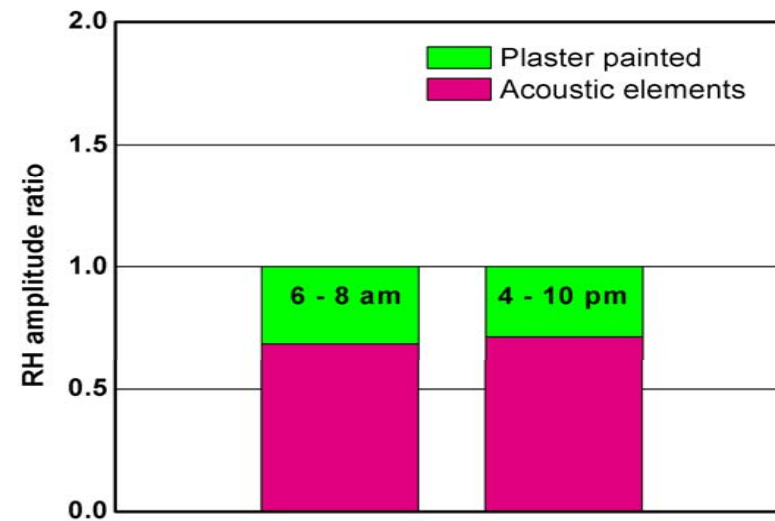
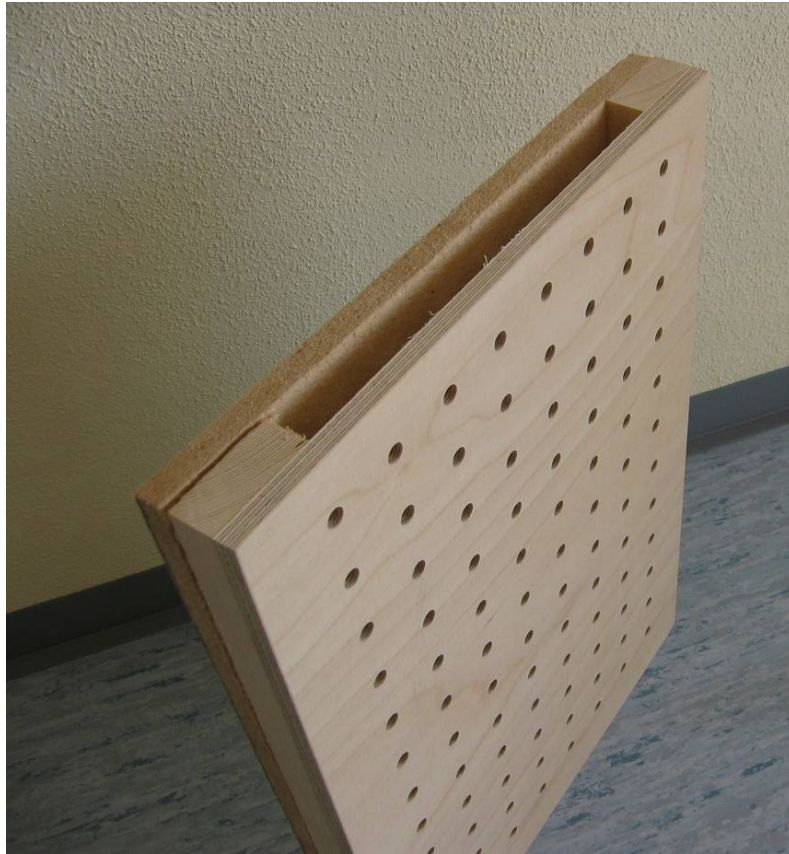
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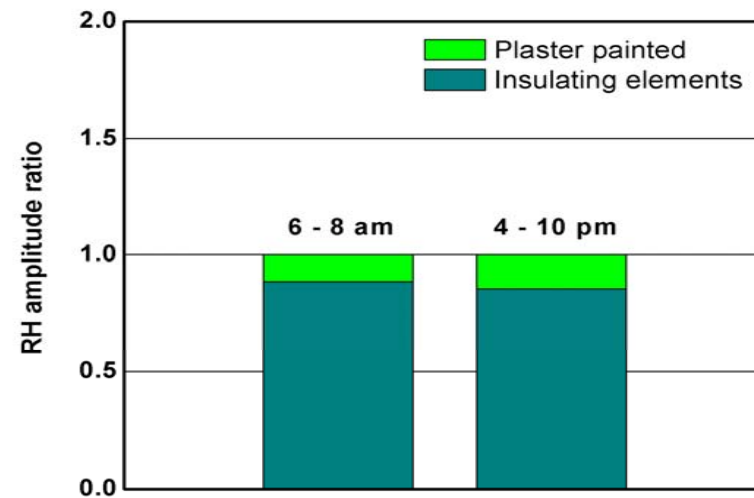
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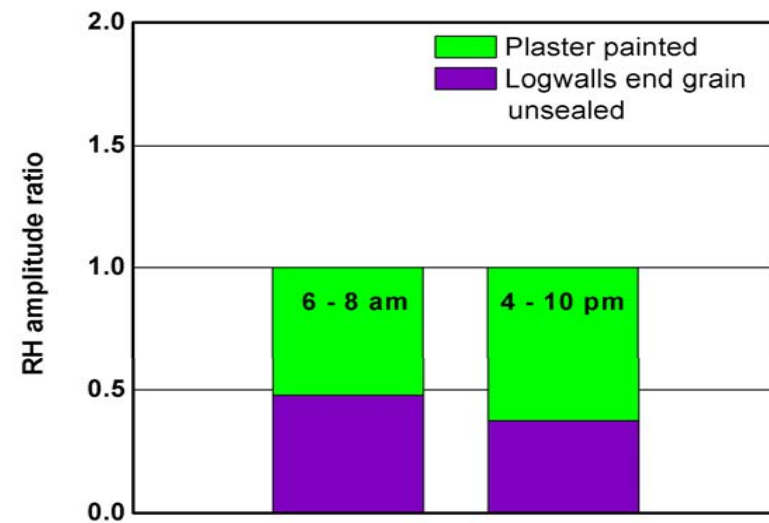


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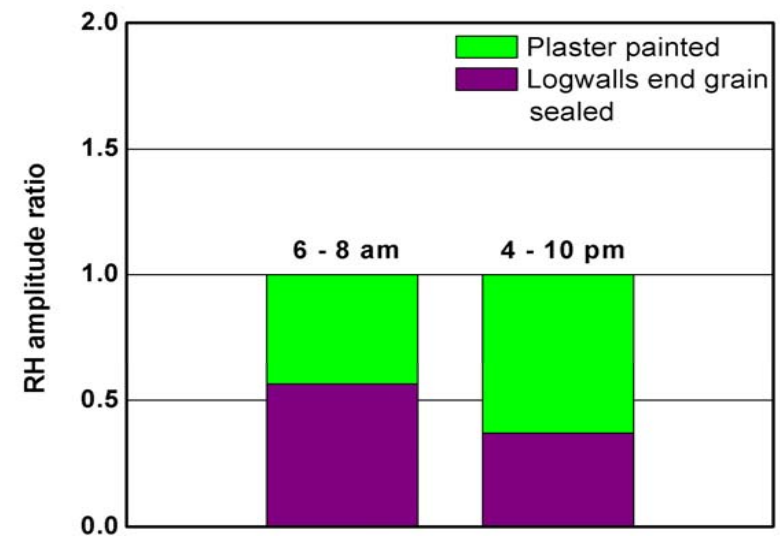




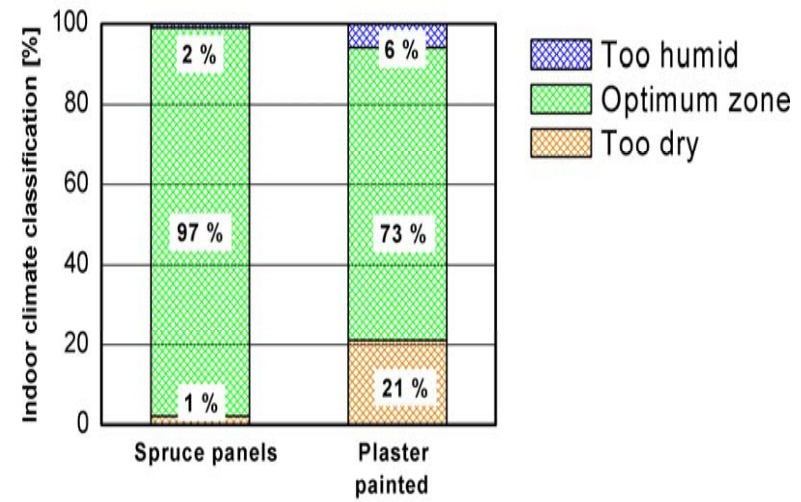
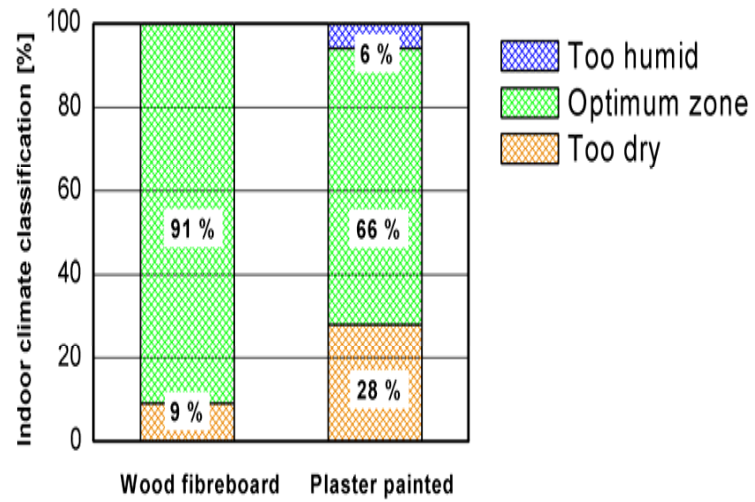
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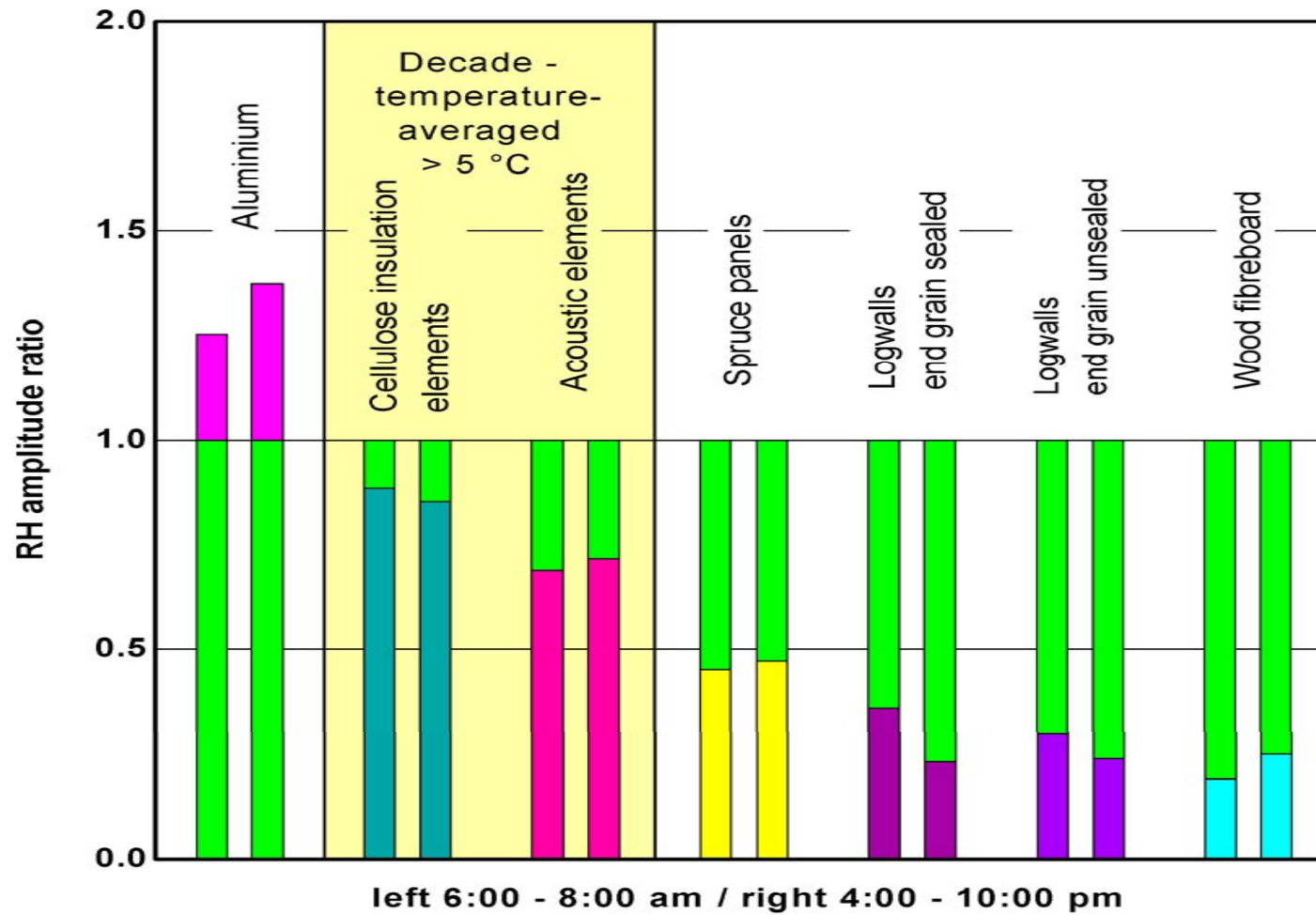
# Moisture buffering effects of wood-based linings



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# Moisture buffering effects of wood-based linings



# Field Tests

## Location of test houses

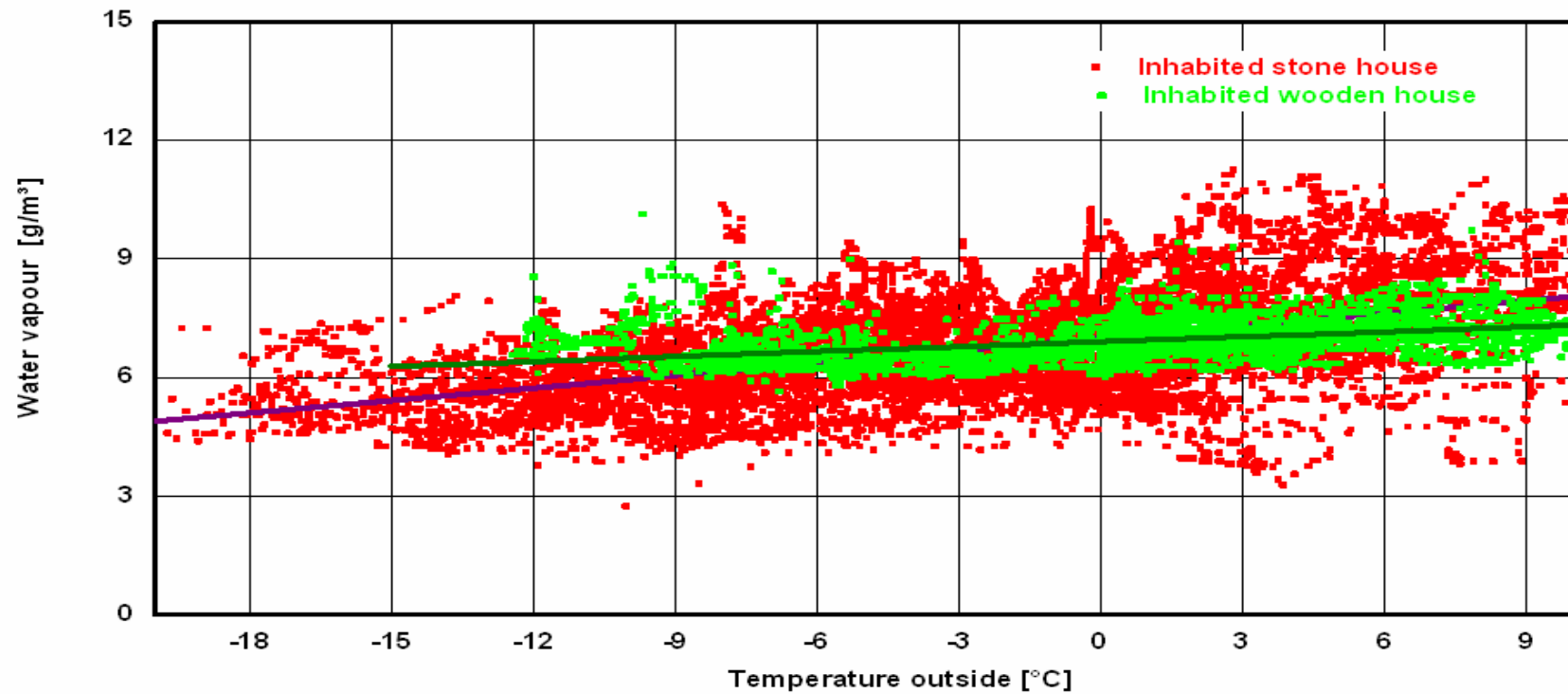


e.g. Wooden house  
Built in 2002  
No treated wood surfaces  
5 Persons  
Logger installed in living room



# Field Tests

## Representative test houses







## Influence of finishing materials on indoor humidity

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