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**hmbox**<sup>®</sup>

Moisture Measurement 4.0 – digital, no destruction, handy & clean

# The Product

The **hmbox** is a **digital measuring instrument** with which it is possible to determine the humidity of different building materials.



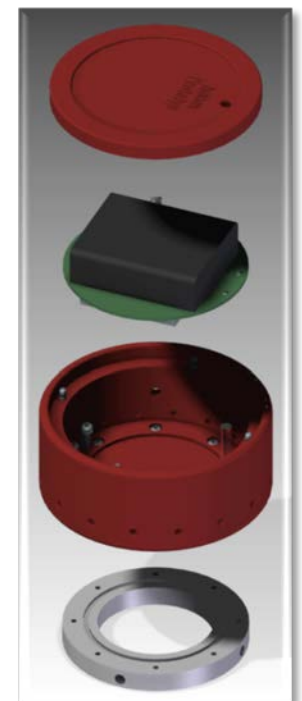
- Cost savings / unique fixing
- user-friendly & NO destruction
- Measuring of material- & indoor-climate
- GSM data transfer
- mobile data availability
- Monitoring a time period
- Determination of the right time for laying
- Web browser & Smartphone / APP

# The Elements

The **hmbox** is **easy to handle** and determines the humidity of different building materials, such as screeds, **without damaging the subfloor**.



- plastic housing
- optical function display
- exchangeable SIM card
- integrated alarm & motion sensor
- Ventilation holes with dust filter
- steel ring with sealing ring



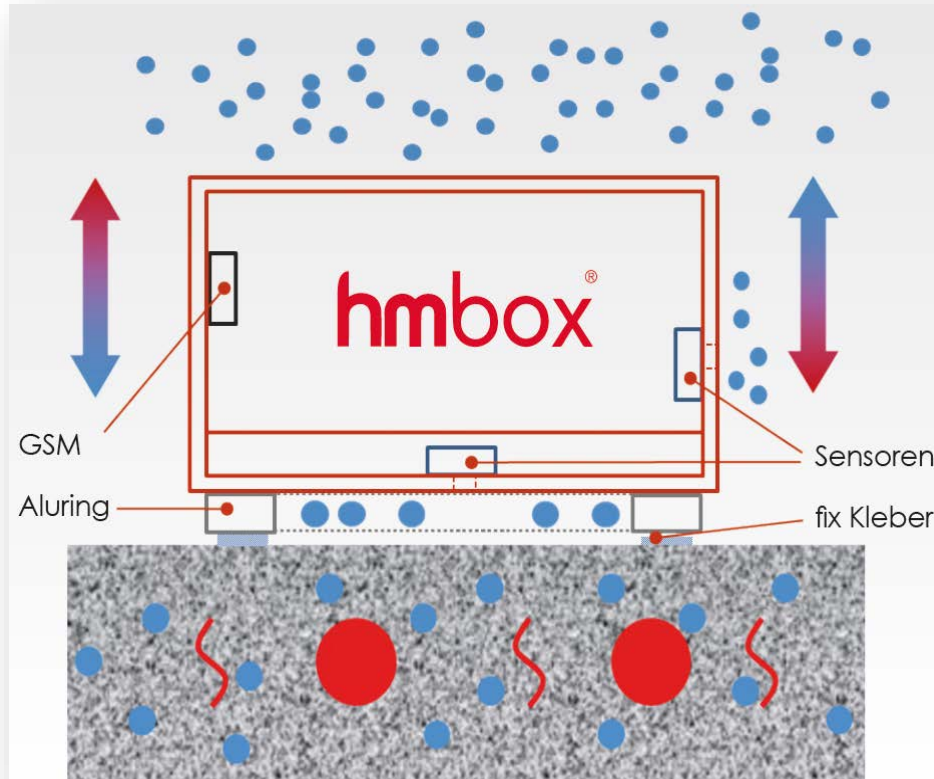
# The Application

High cost savings by unique fixing, GSM data transfer and web-based technology of the *hmbox*.



- Digital measurement of 4 components:
  - . Material climate: rel. humidity & temperature
  - . Indoor climate: rel. humidity & temperature
- Determination of the right time for laying
- Storage of measurement data
- Transmission of tracking data via GSM
- Automatic documentation and logging
- integrated alarm & motion sensor
- Cost savings / unique fixing

# The Function



- The aluminum ring is fixed with *fix glue* to the floor.
- In the cavity of the alu-ring the sensors are measuring the corresponding relative humidity and the temperature of the material.
- Sensors in the housing are measuring the temperature and relative humidity of the room.
- Regardless of the composition of the subsoil the *hmbox* determinates the right time for the installation of floor covering.

# The Measurement

With a **hygrometric measurement** it is possible to determine the relative humidity. It determines in the state of equilibrium the water content of a building material which is enveloped by the air - the material climate.

On storage of a building material in air with relative humidity, so the building materials takes a certain amount of water sorption into its interior.

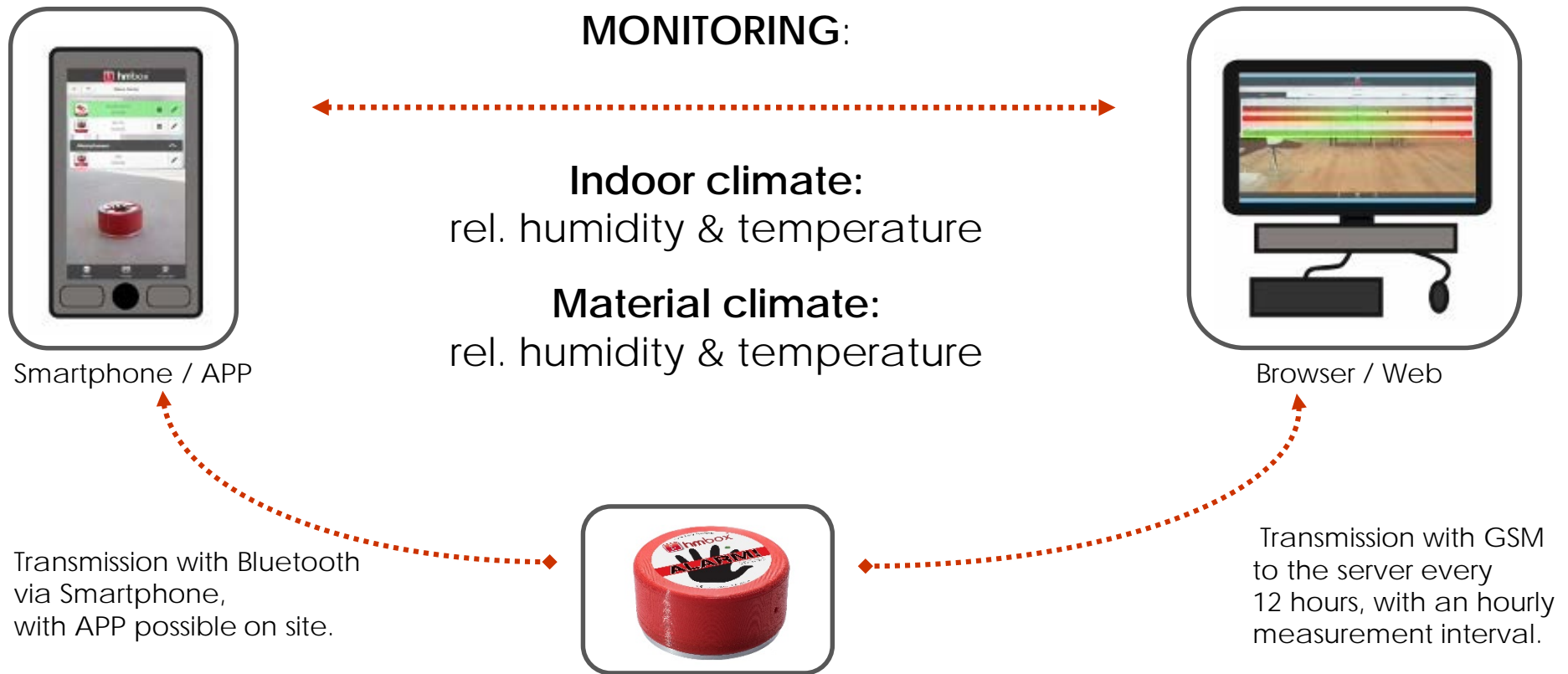
With increasing relative humidity the water content of the building material increases. In equilibrium, this results in the so-called **sorption isotherm**.

Thus, this function describes the water content of the building material as a function of the **relative humidity of the surrounding air**.

Thus, in the equilibrium state is a clear **link between the external relative humidity and the resulting sorption water content** and vice versa.

# The Monitoring

With the *hmbox* numerous data are collected and transmitted via GSM to a central server and stored there.

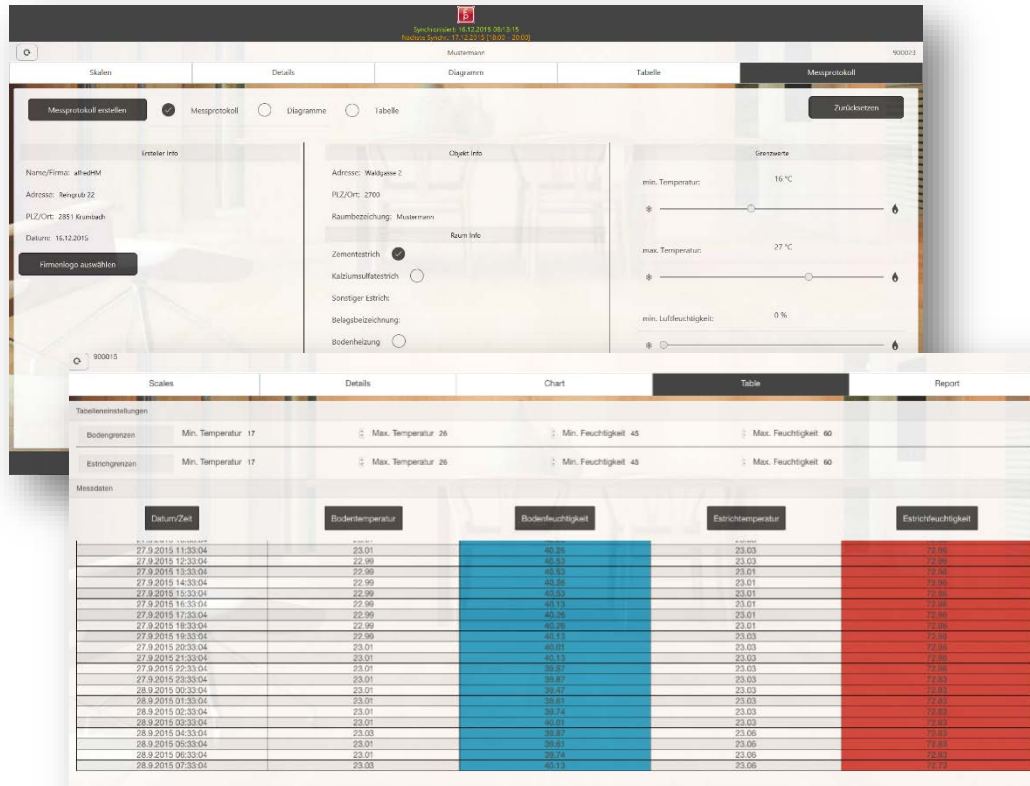




# The Result



# The Measurement Protocol



Datum/Zeit	Bodentemperatur	Bodenfeuchtigkeit	Estrichtemperatur	Estrichfeuchtigkeit
27.9.2015 11:33:04	23,01	40,29	23,03	72,99
27.9.2015 12:33:04	22,99	40,33	23,03	72,99
27.9.2015 13:33:04	22,99	40,33	23,01	72,99
27.9.2015 14:33:04	22,99	40,29	23,01	72,99
27.9.2015 15:33:04	22,99	40,33	23,01	72,99
27.9.2015 16:33:04	22,99	40,33	23,01	72,99
27.9.2015 17:33:04	22,99	40,29	23,01	72,99
27.9.2015 18:33:04	22,99	40,29	23,01	72,99
27.9.2015 19:33:04	22,99	40,33	23,03	72,99
27.9.2015 20:33:04	23,01	40,21	23,03	72,99
27.9.2015 21:33:04	23,01	40,33	23,03	72,99
27.9.2015 22:33:04	23,01	40,27	23,03	72,99
27.9.2015 23:33:04	23,01	40,27	23,03	72,99
28.9.2015 00:33:04	23,01	39,47	23,03	72,99
28.9.2015 01:33:04	23,01	39,61	23,03	72,99
28.9.2015 02:33:04	23,01	39,74	23,03	72,99
28.9.2015 03:33:04	23,01	40,21	23,03	72,99
28.9.2015 04:33:04	23,01	40,33	23,06	72,99
28.9.2015 05:33:04	23,01	40,61	23,06	72,99
28.9.2015 06:33:04	23,01	39,74	23,06	72,99
28.9.2015 07:33:04	23,03	41,73	23,06	72,99

- easy creation
- stored centrally
- mobile available
- graphical and tabular presentation
- Measurement protocol according audit requirement
- PDF format
- possible access for several parties

# The Advantages

## Cost savings:

- ✓ unique fixing
- ✓ time-saving measuring
- ✓ Data transfer with GSM
- ✓ mobile availability
- ✓ fast & simply

## Measuring method:

- ✓ without destruction
- ✓ independently of material
- ✓ exact procedure
- ✓ no snapshot
- ✓ reproducible

## Data quality:

- ✓ independently of place
- ✓ digital transmission
- ✓ mobile availability
- ✓ central storage
- ✓ Monitoring with APP & WEB

## Application:

- ✓ user-friendly
- ✓ handy & clean
- ✓ data diversity & security
- ✓ different materials
- ✓ many target groups



# Cost savings

The simple operation of **hmbox** incurred considerable cost savings.

- EXPENSES **CM Measurement**

1. Measurement		= 0,5h x 45.-	= 22,50.-
2. Measurement	Arrival & Departure:	= 1,5h x 45.-	= 66,50.-
	€ /km	= 30km x 0,42.-	= 13,00.-
	material		= 2,00.-
			114,00-
<b>10 building sites per year</b>		= 10 x 114.-	<b>1.140.-</b>

- EXPENSES **Measurement with hmbox**

1. Measurement		= 0,1h x 45.-	= 4,50.-
2. Measurement	Arrival & Departure :	= 0 h x 45.-	= 0.-
	€ /km	= 0 x 0,42.-	= 0.-
	material		= 0.-
			4,50.-
<b>10 building sites per year</b>		= 10 x 4,50.-	<b>45.-</b>

**Cost savings within 10 building sites > €1.000.-**

# Example

**Calculation Base:** 600.000.- annual turnover,  
contract value approx. 6.000.-,  
approx. 100 building sites per year

- EXPENSES CM Measurement

100 building sites	
200 measurements	= 200 x 114.-
<hr/>	
	<b><u>22.800.-</u></b>

- EXPENSES Measurement with hmbox

100 building sites	
100 measurements	
5 <b>hmboxes</b>	= 5 x 599.-
<hr/>	
	<b><u>2.995.-</u></b>

# The common Goal

- ✓ For the purposes of the customer, an accurate and non-destructive measuring method allows to determine the humidity of different materials.
- ✓ The data and test results are transmitted digitally and can be read using a web browser or viewed with an APP by different users (owner, architect, construction manager, etc.)
- ✓ Through the web-based solution the measurement results can be retrieved at any time. Corrective action can be quickly taken to create an optimum climate on the construction site for the installation of floor covering.
- ✓ Cost savings through reduced site visits.

Quality and transparency for increased customer satisfaction!