

# Operation instructions



## HYDROMETTE BL

### H 41



**GANN MESS- U. REGELTECHNIK GMBH**

70839 GERLINGEN

SCHILLERSTRASSE 63

INTERNET: <http://www.gann.de>

Verkauf National: TELEFON 07156-4907-0  
Verkauf International: TELEFON +49 7156-4907-0

TELEFAX 07156-4907-40  
TELEFAX +49 7156-4907-48

EMAIL [verkauf@gann.de](mailto:verkauf@gann.de)  
EMAIL [sales@gann.de](mailto:sales@gann.de)

# Table of contents

0.1	Publication statement .....	4
0.2	WEEE directive 2002/96/EC law on electrical and electronic equipment .....	4
0.3	General notes .....	5
0.4	Safety advice .....	6
<b>1</b>	<b>Introduction .....</b>	<b>7</b>
1.1	Description.....	7
1.2	Device layout and button assignment.....	8
1.3	Display symbols.....	9
<b>2</b>	<b>Basic functions .....</b>	<b>10</b>
2.1	Switch on device.....	10
2.2	Display in measuring mode .....	11
2.3	Setting menus.....	11
2.3.1	Measurement menu (main menu).....	12
2.3.2	Material setting .....	13
2.3.3	Temperature compensation.....	15
2.3.4	Maximum value display .....	16
2.3.5	Minimum value display .....	17
2.3.6	Memory menu .....	18
2.4	Other functions .....	19
2.4.1	Automatic switch-off .....	19
2.4.2	Battery monitoring .....	19
2.4.3	Changing the electrode pin.....	19

<b>3</b>	<b>Specifications.....</b>	<b>20</b>
3.1	Technical data .....	20
3.2	Prohibited environmental conditions.....	20
3.3	Measuring ranges.....	21
<b>4</b>	<b>Application notes.....</b>	<b>21</b>
4.1	Notes on measuring wood moisture .....	21
4.1.1	Introduction.....	22
4.1.1.1	M 20 hammer-in electrodes.....	23
4.1.1.2	M 20-OF 15 surface measuring caps .....	23
4.1.1.3	Push-in electrode M 19.....	24
4.1.1.4	M 20-HW 200/300 stick-in electrode pair.....	24
4.1.1.5	Ram-in electrode M 18 .....	24
4.1.2	Equilibrium wood moisture content.....	26
4.1.3	Growth ranges of fungi .....	26
4.1.4	Swelling and shrinkage of the wood .....	26
4.2	Measurements on wood fibre insulating boards .....	27
4.2.1	Introduction.....	27
4.2.2	Handling .....	27
4.3	Test adapter for wood moisture measurement .....	29
4.4	Static charge.....	29
<b>5</b>	<b>Table of wood types .....</b>	<b>30</b>
<b>6</b>	<b>Appendix: Accessories .....</b>	<b>31</b>
6.1	Wood moisture measurement.....	31
6.2	Wood fibre insulating materials.....	32

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## **0.1 Publication statement**

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GANN Mess- u. Regeltechnik GmbH, Gerlingen, Germany.  
06.07.15

## **0.2 WEEE directive 2002/96/EC law on electrical and electronic equipment**

Disposal of packaging, the battery and the device must be undertaken in accordance with the legal requirements at a recycling centre.

The device was manufactured after 1 October, 2009

### 0.3 General notes

This measuring device fulfils the requirements of the applicable European and national directives (2004/108/EC) and standards (EN61010). Appropriate declarations and documentation are held by the manufacturer. To ensure trouble-free operation of the measuring device and operational reliability, the user must carefully read the operating instructions. The measuring device may only be operated under the climatic conditions specified. These conditions can be found in section 3.1 "Technical data". This measuring device may likewise only be used under the conditions and for the purposes it was designed for. Operational reliability and functionality are no longer ensured if the device is modified or adapted. Gann Mess- u. Regeltechnik GmbH is not liable for any damage arising from such modifications or adaptations. The risk is borne by the user alone.

- The device must not be stored or operated in aggressive air or air containing solvents!
- **Static charge** - at low levels of air humidity aided by external factors (friction during material transport, high insulation of the surrounding area), static electricity can build up with high voltages, which can not only lead to strong swings in measured values or minus values, but also to the destruction of electrical components in the device. The operator of the measuring device can also, unintentionally, contribute to the build-up of static charge from his/her clothing. A significant improvement can be achieved by ensuring the operator and the measuring device remain completely still during the measurement process and by earthing (touching conducting metal, water or heating pipes, etc.).
- Frozen wood cannot be measured.

- The notes and tables in these instructions on permitted or normal humidity conditions in practice and the general definitions of terms have been taken from the specialist literature. No responsibility can therefore be taken by the manufacturer for the correctness of this information. The conclusions to be drawn from the measurement results are related to the individual conditions and the knowledge drawn from professional experience for each user.
- The measuring device may be operated in residential and commercial areas, as the stricter class B for emitted interference (EMC) has been adhered to.
- The measuring device and any accessories may only be properly used as described in these instructions. Keep the device and accessories out of the reach of children!
- Wood and other materials should not be measured on conductive surfaces.

Gann Mess- u. Regeltechnik GmbH accepts no liability for damage resulting from non-adherence to the operating instructions or by not taking proper care during transport, storage and handling of the device during operation, even if this requirement for care is not specifically addressed in the operating instructions.

## 0.4 Safety advice



**WARNING:** There is a risk of injury from the measurement probes of the electrodes. Before inserting the electrode pins into wooden panels or similar, use suitable methods to ensure that there are no electrical wires, water pipes or other supply lines at this point.

# 1 Introduction

## 1.1 Description

The Hydromette BL H 41 is an electronic wood moisture measuring device for precise measurement of sawn timber (up to 180 mm thick), chipboard and veneers with a high-quality measurement amplifier and 3-line LCD display.

The device has a wood type switch to automatically correct measurement values for over 300 types of wood as well as wood temperature compensation.

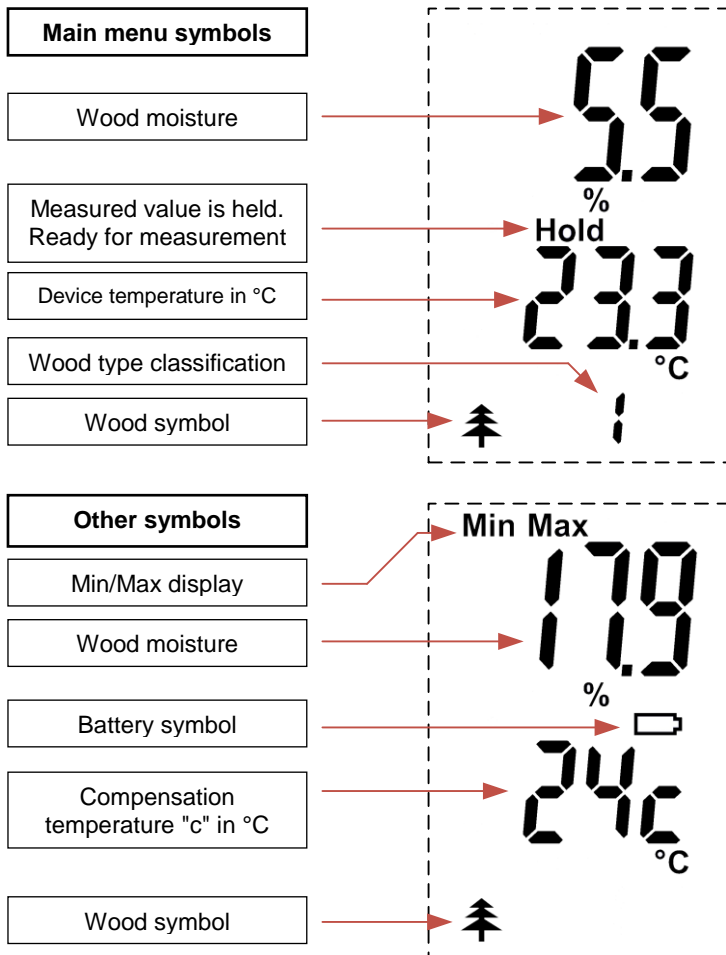
The M20 electrode is inserted into the respective material to be measured and allows the measurement of moisture in sawn timber, chipboard, veneers and wood fibre materials up to 180 mm thick (with electrode M 18).

## 1.2 Device layout and button assignment






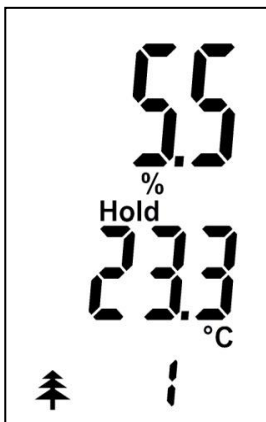
### 1.3 Display symbols



## 2 Basic functions

### 2.1 Switch on device

The device is switched on by pressing the **On** button .



Last measured value in %

"Hold" symbol

Last measured device temp. in °C

Wood symbol and classification number

Figure 2-1 Main menu

In this menu, a new measurement can be started by pressing the measurement button "M". See also section 2.2 "Measuring mode".

## 2.2 Display in measuring mode

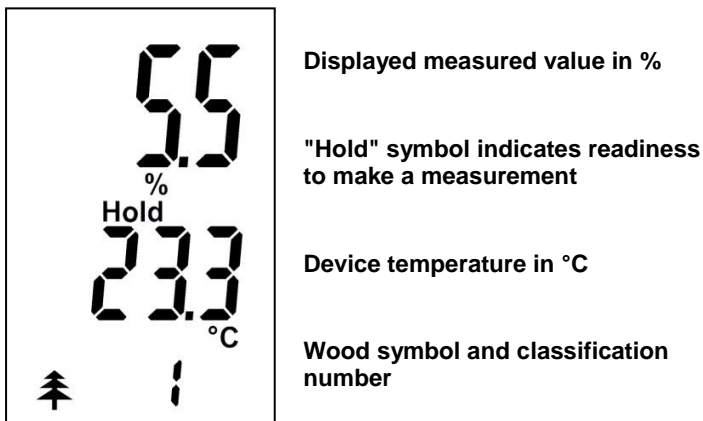


Figure 2-2 Measurement mode

A measurement process is started by pressing the "M" button.

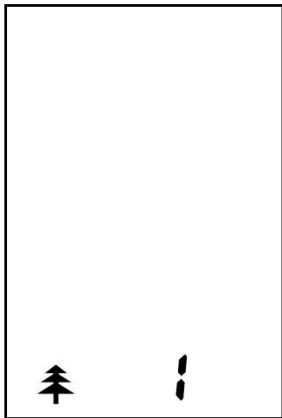
## 2.3 Setting menus

The following menus can be selected one after the other by repeated pressing of the "Up" and "Down" buttons. On the following page, the sequence of the setting menus that is seen by pressing the "Down" button is shown.

1. **Measurement menu** (main menu): Use to carry out the measuring process.
2. **Wood type setting**: The wood type can be selected here.
3. **Temperature menu**: The temperature compensation can be set here.

4. **Maximum value display:** The highest value measured is shown here.
5. **Minimum value display:** The lowest value measured is shown here.
6. **Memory menu:** The last 5 values measured can be called up here.

### 2.3.1 Measurement menu (main menu)



The last measurement with the note "**Hold**" is shown here. The device temperature and the current type are also shown on the display.

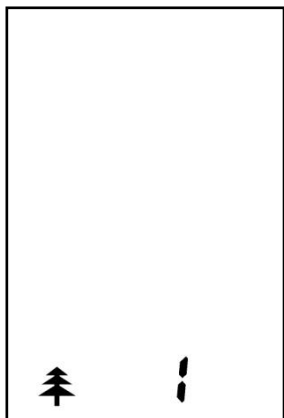
In this menu, a new measurement can be started by pressing the "**M**" button.

During the measuring process, the "**Hold**" symbol disappears from the display and the % symbol flashes. If the measured value is stable, the % symbol remains switched on, and after releasing the "**M**" button the measured value is saved. The "**Hold**" symbol is displayed again.

If the new measured value is higher or lower than the previous maximum or minimum value, "**Max**" or "**Min**" appears flashing on the display. If the value is to be saved as the Min. or Max. value, the "**M**" button must be pressed briefly. If the value is not to be saved, a new measurement can be started with a long press on the "**M**" button without changing the previous saved maximum or minimum values.

If the measurement range is not reached or exceeded (**H 41**: < 4.5%, > 45%) a flashing measured value shows a warning, which is also alternately marked with "**LO**" or "**HI**".

### 2.3.2 Material setting



The classification number set is displayed with the symbol for the wood moisture.

Wood symbol and classification number

Figure 2-3 Wood type selection

To carry out the material setting, the device must be switched on and be in main measuring mode (standard mode after switching on). After pressing once on the “**Down**” button, you reach the view as shown in figure 2-3. If the preset for the material is to be changed, the “**M** button (measurement button) must *briefly* be pressed.

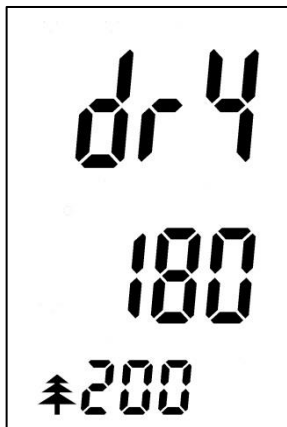
The Material index flashes and can be set using the **Up** or **Down** buttons. The change is saved by pressing the “**M**” button again *briefly*.

The material table is found in the Appendix.

The wood types are displayed by a fir tree symbol and the correspondingly selected type number, e.g.:  
Fir tree 2 = Wood type 2

With wood fibre insulating boards, the method of manufacture for the selected board appears in the upper area in WET and DRY. In

the middle and lower areas, the gross density of the selected wood fibre insulating board is shown: e.g.: 180 / 200 = From 180 kg/m<sup>3</sup> to 200 kg/m<sup>3</sup>



Manufacturing process for the selected wood fibre insulating board: shown as dry here

The selected wood fibre insulating board has a gross density from 180 kg/m<sup>3</sup> ...

... to 200 kg/m<sup>3</sup>

There are 6 different characteristic curves for wood fibre insulating boards. These can be found in the appendix.

### 2.3.3 Temperature compensation

If the pre-set value for the compensation temperature is to be changed, the "M" button is pressed *briefly* (< 1 s) in the temperature menu.

The temperature display now starts to flash. By pressing the "M" button for longer (> 2 s), you can change between the user-defined compensation temperature and the device temperature.

With a *short* (< 1 s) press of the "M" button, the setting is confirmed and you are back in the measurement mode.

#### **Setting the user-defined compensation temperature:**

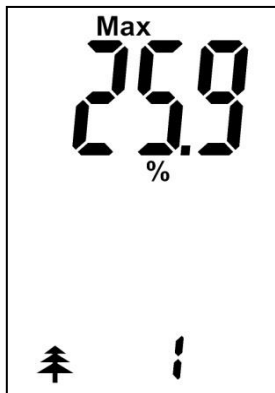
If you have selected the user-defined compensation temperature (identified with a "c") in the temperature menu, you can change the compensation temperature in steps of 1 °C with the "Up" and "Down" buttons.

The change is saved by pressing the "M" button again *briefly* (< 1 s). You are then back in the measurement mode.

#### **Important:**

**At our factory the compensation temperature is always set at 20 °C.**

### 2.3.4 Maximum value display



The highest moisture measurement in a measurement sequence is displayed together with the "Max" display symbol

Wood symbol and classification number

Figure 2-4 Maximum value

If a maximum value is to be deleted, the displayed value is selected with a *short* press on the "M" button.

The value and the % symbol now flash and the value can be deleted by a *long* press on the "M" button. After deleting the value, only the % symbol still flashes. By *briefly* pressing the "M" button again, the deletion of the value is confirmed and the % symbol disappears. The device now returns to Ready mode.

Using the "M" button, a new measurement can then be carried out.



### 2.3.5 Minimum value display

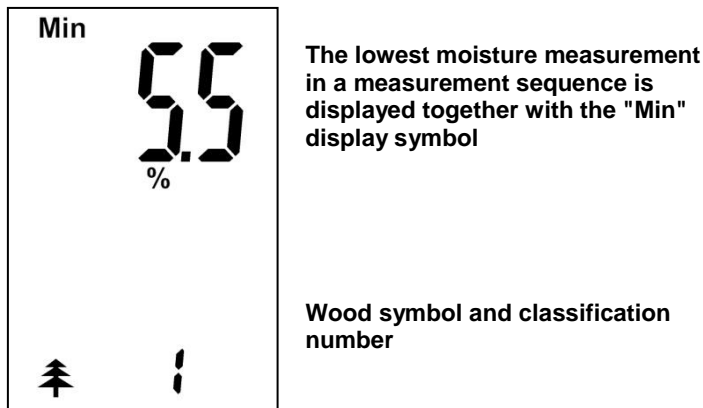


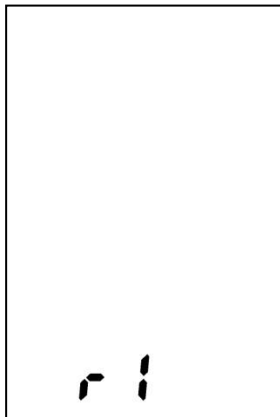
Figure 2-5 Minimum value

If a minimum value is to be deleted, the displayed value is selected by *briefly* pressing the "M" button.

The value and the % symbol now flash and the value can be deleted by a *long* press on the "M" button. After deleting the value, only the % symbol still flashes. By *briefly* pressing the "M" button again, the deletion of the value is confirmed and the % symbol disappears. The device now returns to Ready mode.

Using the "M" button, a new measurement can then be carried out.

### 2.3.6 Memory menu



Symbol: "r1" memory

Figure 2-6 "r1" memory location

As soon as you select the saved menu, the memory location number "r1" is displayed for approx. 1 second, and then the last measured saved value contained there is displayed.

The last 5 measured values are automatically saved and stored in memory locations "r1" to "r5". The last measured value is in memory location "r1". This is a ring storage system: once the sixth measured value is recorded, the first measured value is automatically removed from the memory.

By *briefly* pressing the "M" button, the next memory location "r2" is selected and the value contained there is displayed. After reaching the 5th memory location, the first one is shown again.

The saved values displayed can be identified by the fact that no "Hold" symbol is shown in the display.


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## 2.4 Other functions

### 2.4.1 Automatic switch-off

If no button is pressed within approx. 40 seconds, the device switches off automatically. The current values are retained and are displayed again after the unit is switched back on.

### 2.4.2 Battery monitoring

If the battery symbol  appears in the display, the battery is dead and must be renewed.

A list of battery types that can be used can be found in the "Technical data" section.

### 2.4.3 Changing the electrode pin

To change the electrode pin (M 18 / M 20), the hex screw must be screwed out. The pins can then be simply replaced.

To prevent measurement errors and breakage of the electrode pins, the hex screws must be well tightened and the area between the pins kept clean.

## 3 Specifications

### 3.1 Technical data

Display:	3-line display
Display resolution:	0.1 %
Response time:	< 2 s
Storage conditions:	+ 5 to + 40 °C - 10 to + 60 °C (short-term)
Operating conditions:	0 to + 50 °C - 10 to + 60 °C (short-term)
Power supply:	9V block battery
Approved types:	6LR61 or 6F22
Dimensions:	(L x W x H) 200 x 50 x 30 mm
Weight:	approx. 160 g without accessories

### 3.2 Prohibited environmental conditions

- Condensation, air humidity continuously too high (> 85 %) and wetness
- Permanent presence of dust and combustible gases, fumes or solutions
- Ambient temperatures continuously too high (> +40 °C)
- Ambient temperatures continuously too low (< +5 °C)

### 3.3 Measuring ranges

#### Wood moisture:

- H 41: 4.5 to 45 % (type and temperature dependent)

#### Compensation temperature:

- Device temperature sensor
- Manual compensation in steps of 1 °C:
  - H 41: -10 °C to 40 °C

7-stage wood type correction plus 6 characteristic curves for wood fibre insulating materials

## 4 Application notes

### 4.1 Notes on measuring wood moisture

The measurement of wood moisture is carried out with the Hydromette BL H 41 using resistance measurement. This enables the direct display of the moisture in percent by weight. The display range is from 5 % to 40 % with 7-stage wood type correction. With wood fibre insulating boards the range extends from 4.5 % to 45 %.

### 4.1.1 Introduction

The Hydromette BL H 41 works by measuring electrical resistance or conductivity, a principle which has been well-known for many years. This process is based on the fact that electrical resistance is highly dependent on the amount of moisture in the wood. The conductivity of oven-dried wood is very low, or the resistance is so high that no current worth mentioning can flow. The more water that is present, the greater the conductivity of the wood, or the lower the electrical resistance.



Figure 4-1 Measurement across the grain with M 20

To achieve the qualitatively best possible measurement results, the wood used for the sample should be measured at multiple points. To do so, the electrode pins must be inserted across the grain direction to between 1/4 and 1/3 of the overall thickness of the wood. To prevent measurement errors and breakage of the measuring pins, the hex nuts must always be well tightened and the area between the pin holders kept clean.

The measurement of frozen wood is not possible.

#### **4.1.1.1 M 20 hammer-in electrodes**

The electrode is hammered into the wood to be measured with the needles across the grain direction (electrode body is made of impact resistant plastic). When removing, light sideways movements at right angles to the fibres can be used to loosen the needles.

To determine the core moisture content, the electrode pins must reach to between 1/4 and 1/3 of the overall wood thickness.

On delivery of the measuring device with electrode M 20, 10 replacement pins each of 16 and 23 mm length are included. These are suited for measuring wood thicknesses up to a max. of 30 and 50 mm respectively.

If thicker wood is to be measured, the electrode needles can be replaced with a suitably longer version. With increasing needle length, however, increased danger of breakage or bending (particularly when pulling out) must be expected. It is therefore recommended to use the M 18 ram-in electrode for thicker or particularly hard woods.

Where possible, the hex nuts should be tightened with a spanner or pliers before beginning a measurement sequence. Loose electrode pins will break easily.

#### **4.1.1.2 M 20-OF 15 surface measuring caps**

Surface measurements should only be made with wood moisture levels under 30 %. For surface measurements on work pieces that have already been processed, or for measuring veneers, both hex nuts on the M 20 electrode are unscrewed and replaced with the surface measurement caps. For the measurement, both contact surfaces are pressed onto the work piece to be measured or onto the veneer at right angles to the grain. The measurement depth is approx. 3 mm, so multiple sheets of veneer must be laid on top of each other for the measurement. Do not measure on metal surfaces! When measuring stacks of veneer, to expose the

measuring point, the veneer is **lifted** and **not pulled** over the remaining stack (**avoid friction: electrostatic charge!**). Any wood particles adhering to the measuring surface must be regularly removed. If the elastic, plastic measurement sensors are damaged, they can be reordered (no. 4316) and glued on using standard cyanate-based instant adhesive.

#### **4.1.1.3 Push-in electrode M 19**

The electrode is used for measuring in finished thermal insulation composite systems. It is possible to measure even in plastered insulation boards by purchasing insulated electrode pins.

#### **4.1.1.4 M 20-HW 200/300 stick-in electrode pair**

If the hex nuts with standard electrode pins on the M 20 electrode are removed, they can be replaced with the M 20-HW electrode pins. These must be fastened tightly!

For measurements in shavings and wood wool, it is advisable to compact the material to be measured a little. To do so, wood shavings should be pressed together with a weight of approx. 5 kg. No compression is necessary for balls of wood wool.

#### **4.1.1.5 Ram-in electrode M 18**

Both needles of the ram-in electrode are to be hammered to the required measurement depth at right angles to the grain direction with the slide hammer. To determine the core moisture content, the electrode pins must reach to between 1/4 and 1/3 of the overall wood thickness.

Pulling out the needles is also done with the slide hammer with the impact direction upwards. Where possible, the hex nuts should be tightened with a spanner or pliers before beginning a measurement sequence. Loose electrode pins break easily.





**Warning:**

**Do not completely drive in the electrode pins. There should be approx. 4 - 5 mm space between the wood surface and the hex nut. This is especially true when using Teflon-insulated pins.**

**Figure 4-2 M 18 Ram-in electrode**

When first delivered, the ram-in electrode M 18 is supplied with 10 replacement pins of 40 and 60 mm length (not insulated). These are suited for measuring wood thicknesses up to approx. 120 and 180 mm respectively.

If wood is to be measured with a large difference in the spread of moisture (e.g. accumulations of water), we recommend the use of Teflon-insulated electrode pins, which enable very precise measurement of zones and layers. They are available in packets of

10 in lengths of 45 mm (order no. 4450) and 60 mm (order no. 4500).

#### **4.1.2 Equilibrium wood moisture content**

If wood is stored in a particular climate for a long period, it takes up the moisture matching this climate, which is termed equilibrium moisture content or equilibrium wood moisture content.

On reaching the equilibrium moisture content, the wood no longer loses moisture if the surrounding conditions remain the same and also does not take up any moisture.

The equilibrium wood moisture content is between approx. 6.0 and 7.5 % wood moisture (corresponds to 30–40 % rel. humidity and 20-25 °C) in the winter months, and between approx. 10.5 and 13.0 % (corresponding to 60–70 % rel. humidity and 25 °C) in the summer months. Further values and tables can be found on the Internet.

#### **4.1.3 Growth ranges of fungi**

Dry rot	18 – 22 °C, 20 - 28 % wood moisture
Wet rot	22 – 26 °C, > 55 % wood moisture
Poria vaporaria	25 – 28 °C, 40 - 50 % wood moisture
Gloeophyllum abietinum	35 - 45 % wood moisture
Lentinus	40 - 60 % wood moisture
Blue stain fungi	> 25 % wood moisture

#### **4.1.4 Swelling and shrinkage of the wood**

Wood shrinks if it transfers moisture to the surrounding air below the fibre saturation level. On the other hand, wood swells if it takes up moisture from the surrounding air below the fibre saturation

level. This is a very complex process. If you are interested, we recommend finding the relevant information on the Internet.

## 4.2 Measurements on wood fibre insulating boards

### 4.2.1 Introduction

Working together with a broad range of manufacturers of wood fibre insulating boards, the BL H 41 has been equipped with 6 additional characteristic curves to enable easy determination of the residual moisture before the material is further processed.

The characteristic curves are grouped according to the gross density of the material (in  $\text{kg/m}^3$ ) and the board manufacturing process (wet/dry).

You can find the key figures under point 5: Table of wood types

### 4.2.2 Handling

In the BL H 41 package set there are special electrodes with insulated electrode nuts (conversion set M 20-DS 16-i), which are absolutely necessary for measuring wood fibre insulating boards.

Should you use any other electrodes, the measurement result may be distorted.



The measurement electrodes are fastened to the M 20 electrode by means of the electrode nut. (See picture).

Figure 4-3 Wood fibre insulating material electrode on M 20 electrode

The measurement electrode is then to be connected to the BL H 41 measuring device through the MK 8 measurement cable.

Select the corresponding material type that you would like to measure from the materials type menu. Now prick the electrode into the material to be measured and keep the measurement button pressed down until the display has updated itself. If the measurement value begins to flash with the additional HI or LO information, this means that the upper or lower measurement limit values have been reached. The measurement limits depend on the material and cannot be changed.



**Figure 4-4 Wood fibre insulating material electrode**

For the application of the push-in electrode M 19:

Connect the electrode to the measuring cable MK 8 and push it (by using a hammer) into the finished thermal insulation composite systems .

### **4.3 Test adapter for wood moisture measurement**

With the test adapter supplied with order no. 6070 for checking the wood moisture measuring element, the functionality of the device, measurement cable and electrodes M 18 and M 20 can be tested.

For this, the device is connected with measurement cable MK 8 and the 4-mm plug of the cable in the socket of the test adapter.

The device must be set to wood type 4 and manual temperature compensation set to 20 °C. The display on the top right in the first line should show 21 %. A deviation of +/- 0.5 % is permitted.

### **4.4 Static charge**

At low levels of air humidity aided by external factors (friction during material transport, high insulation of the surrounding area), static electricity can build up with high voltages, which can not only lead to strong swings in measured values or minus values, but also to the destruction of electronic components in the device. The operator of the measuring device can also, unintentionally, contribute to the build-up of static charge from his/her clothing. A significant improvement can be achieved by ensuring the operator and the measuring device remain completely still during the measurement process and by earthing (touching conducting metal, water or heating pipes, etc.).

## 5 Table of wood types

### 5.1 Wood

Select the number that corresponds to the wood species to be measured (s. p. 13). The number can be found in the wide species table that was supplied together with the Hydromette BL H 41.



### 5.2 Wood fibre insulating materials

The numbers for wood fibre insulants are listed directly after the wood species. There are two criteria for the categorisation: density (kg/m<sup>3</sup>) and manufacturing method (wet/dry) of the boards.

**The following elements are shown on the display:**

manufacturing method



WET

lower limit of the weight category



220

upper limit of the weight category



240

**The following categories can be selected:**

110 kg/m<sup>3</sup>: dry

180-200 kg/m<sup>3</sup>: dry

140 kg/m<sup>3</sup>: dry

220-240 kg/m<sup>3</sup>: wet

135-170 kg/m<sup>3</sup>: wet

250-270 kg/m<sup>3</sup>: wet

Press the measurement key to confirm your selection.

dr-4

180

200

## 6 Appendix: Accessories

### 6.1 Wood moisture measurement



#### **Hammer electrode M 20** (order no. 3300)

For surface and depth measurements up to approx. 50 mm for sawn timber, veneer, chipboard and wood fibre materials equipped with electrode pins:

-16 mm long (order no. 4610) with 10 mm insertion depth

-23 mm long (order no. 4620) with 17 mm insertion depth



#### **Ram-in electrode M 18** (order no. 3500)

For depth measurements in thick wood up to 180 mm thick, available for:

#### **Electrode pins without insulation**

-40 mm long (order no. 4640) with 34 mm insertion depth

-60 mm long (order no. 4660) with 54 mm insertion depth

#### **or Electrode pins with insulated shank**

-45 mm long (order no. 4550) with 25 mm insertion depth

-60 mm long (order no. 4500) with 40 mm insertion depth



#### **MK8 measuring cable** – length: 1 m (order no. 6210)

## 6.2 Wood fibre insulating materials



### Hammer-in electrode M 20 (order no. 3300)

For surface and depth measurements up to approx. 50 mm for sawn timber, veneer, chipboard and wood fibre materials equipped with electrode pins:

-16 mm long (order no. 4610) with 10 mm insertion depth

-23 mm long (order no. 4620) with 17 mm insertion depth



### Conversion set M 20-DS 16-i (order no. 31004311)

For measuring wood fibre insulating material with special electrodes and insulated electrode nuts



### Push-in electrode M 19 (order no. 3400)

The electrode is used for measuring in finished thermal insulation composite systems.



### MK8 measuring cable – length: 1 m (order no. 6210)