

# User Instructions for Ligno-DuoTec BW Moisture Meter



Ligno-Duotec BW features:

- pinless, dual-depth Mode
- RH Thermometer Mode
- RH insitu Concrete Moisture



Lignomat USA Ltd.  
14345 NE Morris Ct  
Portland, OR 97230

E-mail: [sales@Lignomat.com](mailto:sales@Lignomat.com)  
[www.Lignomat.com](http://www.Lignomat.com)  
Tel: 503-257-8957  
800-227-2105  
FAX: 503-255-1430

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## RH Mode

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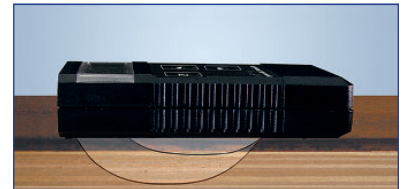
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## Ligno-DuoTec BW a multi-task meter: Pinless (Scan) - RH

**SCAN** The Ligno-DuoTec BW comes with 90 built-in corrections for measuring different wood species, bamboo, panel products and sheetrock. Also built-in are reference scales for measuring concrete and other building materials.

**RH** The Ligno-DuoTec BW with RH BluePeg probe and adapter RH can measure relative humidity, temperature, dew point and GPP. Accessories are available for in-situ RH moisture testing of concrete slabs and wall cavities.

**1. Use as dual-depth Pinless Meter:** The Ligno-DuoTec BW meter by itself is a dual-depth pinless meter with selectable measuring depth 3/4" and 1/4". The pinless mode of the Ligno-DuoTec BW has the same features as the Ligno-Scanner SDM.



**2. Use as Thermo-Hygrometer:** Add fast-responding, precision RH BluePeg probe. Connect with Adapter RH or an extension cable. Ligno-DuoTec BW indicates ambient relative humidity, temperature, GPP and dew point.



**3. Use for in-situ RH Testing in Concrete:** Add RH cable, sleeves and the removable RH probes for in-situ RH testing. The Lignomat system complies to ASTM F2170. Page 15.



### Accessories for RH Mode

To use as thermo-hygrometer add:  
RH cable/ RH Adapter and RH BluePeg probe.

For concrete moisture testing add:  
RH BluePeg Probes  
RH Cable with sleeve-seal-plug  
RH Sleeves 1.8" and 3" long



### Calibration Check:

Pin and pinless meters from Lignomat internally check and adjust the calibration before each reading. Manual re-calibration is not necessary.

The check block TS is used to confirm calibration and function of any pinless meter from Lignomat.

Salt solutions are necessary to check the accuracy of RH BluePeg probes.



TS check block for all Lignomat pinless meters



Salt solution to check RH BluePeg probes, RH 75%.

# Ligno-DuoTec BW, Meter Functions and Warranty

If the display is blank and the SET/HOLD key is pressed repeatedly, the active settings are displayed:  
- wood or material setting.  
- measuring depth (pinless).

If the display shows a measured value and the SET/HOLD key is pressed repeatedly, the meter is put into HOLD mode first. Then, the active settings are recalled. See above.

Press up or down key to change settings

For measurements in pin, pinless or RH mode, press the READ key.

Two measuring pads are mounted on the back of the meter. The measuring pads cover an area of:  
2.75" L x 1.75" W  
(6.8 x 4.2 cm)

Overall size of Meter:  
4.5" x 2.4" x 1"  
(12 x 6 x 2.5 cm)

3.5mm Stereo connector for RH BluePeg using  
- RH Adapter.  
- RH cable.

Once the RH probe is connected, the meter switches automatically into RH mode.

Measured value.

% sign is only present, if the indicated value is a moisture percentage. If % sign is missing, the value is a reference number.

Press up or down key to change settings.

The up or down key can also be used to change depth settings in pinless mode while taking measurements. Toggle mode. Page 14.

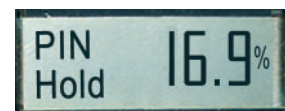
Battery cover is located at the back of the meter. Battery: One 9V battery.

A low battery symbol will appear on the display, when the battery is drained to 25%.



## Hold Function for all Modes: Pin - Pinless - RH

The HOLD key is used (while taking readings) to "freeze" measured values for three minutes. During that time you can switch back to measuring by pressing the READ key again. This feature is helpful when taking notes or when measuring in areas, where the display cannot be read.



**Warranty:** All Lignomat meters have a 2-year warranty. Accessories have a 1-year warranty. Battery and pins are excluded.



## Pinless Technology

The Ligno-DuoTec BW is a capacitance-type meter in pinless (scan) mode. The measuring pads on the back of the meter emit and pick-up low-powered electromagnetic signals. The reading generated by the Ligno-DuoTec is an average of the entire measuring field between the surface and the maximum depth of penetration. Moisture closer to the surface has a greater impact on the average than the moisture closer to the maximum depth of penetration.



Ligno-DuoTec BW pinless measurements have to be corrected for:

- (1) Different wood species, bamboo products and other materials being measured.
- (2) Measuring depth is important. BW has selectable depth 1/4" and 3/4". Page 8.
  - Wood temperature does not affect pinless measurements.

(1) The code numbers for the most common wood species, engineered products and building materials are listed on the laminated pocket guide included with the meter. Code numbers for unlisted wood species can be determined by using specific gravity (SG). For example, if the SG is 0.42, the code would be 42. Values for SG can be found on the Internet: Search for <specific gravity... > followed by the wood species. The SG can also be calculated from weight, length, width and height of sample. Page 11.

For unlisted species or new products call customer service at 800-227-2105. If a listing is not available, Lignomat offers testing to determine the correct code number.

Materials to be measured	BW code #*
<b>Individual wood species, 5-60% based on Specific Gravity</b>	<b>30-100</b>
Bamboo, vertical, horizontal, strand, etc., 5*-60%	11-24
Reference scale for concrete and other similar materials, 0-99	25
Sheetrock and gypsum, 0.1-2%	15
Reference Scale for bldg materials other than concrete or sheetrock, 0-99.9	10
Reference Scale for laminates and composites made of wood, 0-99.9	0

\* The Ligno-DuoTec BW will not produce values for code numbers not listed here. Not all code numbers 0-100 are used. If the code number is not defined, the measuring mode indicated on the left side of the display toggles between SCAN and PIN.

(2) Measuring depth is affecting pinless measurements. You can choose between 1/4" (7mm) and 3/4" (20mm) depending on material thickness. More information on page 7.

## First Step : Check and Change Settings

Before using the Ligno-DuoTec BW, the active (previously chosen) settings in the meter need to be checked and if necessary changed to fit the job to be done. To recall active settings, press the SET/HOLD key repeatedly. Use up or down keys to change settings:

- 1st** Setting for wood and non-wood materials:  
# 0-100. Corrections for different wood species and non-wood materials are needed. Check table page 5 and pocket-guide for available settings for pinless measurements.

Wood  
56

Mtrl  
15

Dpth  
1/4"

- 2nd** Setting for measuring depth: Dual-depth 1/4" and 3/4". Page 7.

## Measurements

After settings are checked/changed, press the READ key to obtain moisture readings. SCAN and the active setting appear briefly. Then, if the measuring pads are not in contact with any material, the lowest possible value for the active material setting appears: SCAN/Min is 4.3% for setting 56. If measurements are taken, the measured value (7.9%), the active setting for material (56) and the measuring depth (1/4") are displayed. There never is uncertainty about the correct meter settings while measuring and taking photos.

SCAN  
Min 4.3%

56  
1/4" 7.9%

While taking measurements:

- If the material is too dry to be measured, the meter will show the lowest possible value indicated by SCAN/Min on the left side of the display.
- If the material is too wet to be measured, the highest possible value is indicated by SCAN/Max.

### To obtain accurate measurements:

Turn the meter on and place it on the test sample (for wood in the direction of the grain). **Press down lightly**, holding the outer sides of the meter without touching the test sample with your hand. It is important to put light pressure on the meter towards the test sample.

For accurate measurements:

- The test sample should be big enough to cover both measuring pads.
- The test sample should be at least as thick as the selected measuring depth.
- If the surface is not smooth and flat, several readings should be taken. Select the highest value.



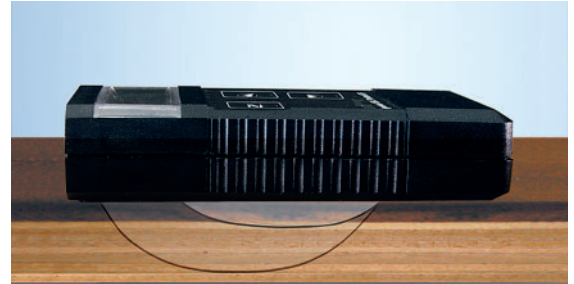
Note, all materials within the measuring field contribute to the value indicated. If the test sample is composed of different materials, the value indicated may not be a true moisture percentage, but only a reference number. It can be hard to find the correct code number for engineered or composite materials. Page 11: Find Settings for Composite and Engineered Boards.

To make sure the material underneath the test sample is not influencing the measurements, arrange an air space underneath the test sample. For example: Elevate one end of the test board to create an air space underneath the board. If this is not possible, make sure the Ligno-DuoTec is set for the correct measuring depth. Measuring veneer, page 9.

## Dual-Depth 1/4" and 3/4"

Selectable dual-depth 1/4" and 3/4" is a unique feature only available in Lignomats dual-depth meters:

Ligno-Scanners SD and SDM, Ligno-DuoTec BW and Ligno-VersaTec. All dual-depth meters from Lignomat have 2 independent sets of calibrations, one for 1/4" deep and one for 3/4" deep.



Measuring depth is crucial for all pinless meters. Most pinless meters are calibrated for a fixed material thickness of 3/4". That means, accurate measurements can only be taken if the material is at least 3/4" thick and no more than 1.5" thick. If test samples are thicker than 1.5", core measurements are only possible with a pin electrode.

If test samples are thinner than the measuring depth, readings may be inaccurate:

- If not enough test material is underneath the measuring pads, values will be too low.
- If material underneath the test sample is included in the measuring field, values could be too high.

New ways to use the dual-depth capability of the Ligno-DuoTec BW:

- **Measuring products less than 3/4" thick:** Many panel and floor products are only 5/8" thick, which does not work well for a 3/4" measuring depth. One example: When floor planks 5/8" thick are installed and measured with a pinless meter set for a 3/4" measuring depth, you cannot be sure that the subfloor or concrete underneath is not affecting the readings. With the Ligno-DuoTec on the 1/4" depth setting, you definitely only measure the floor planks .
- **Measuring engineered products:** You can find the moisture content of the thin top layer made from hardwood by using the corresponding species setting and 1/4" depth. Using those results, a setting can be found for the entire floor plank. Page 11.
- **Toggle function:** The measuring depth can be changed with up or down keys without moving the meter. This allows you to compare surface and core moisture. Toggling can also be used to diagnose floor failures or to monitor acclimation.
- **1/4" depth setting** allows for checking dryness of waterbased finishes. Works great for veneer or for measuring moisture close to the surface.
- Many **building materials** including drywall are less than 3/4" thick. For those materials the 1/4" depth works better and gives true measurements

## Toggle between 1/4" and 3/4"



To toggle: Place the meter on the test sample and press READ. The active measuring depth is indicated on the left side of the display. Hold the meter with one hand and put light pressure on the meter to obtain accurate measurements. Use the other hand to toggle between 1/4" and 3/4":

Press the up key to switch to 3/4".

Press the down key to switch to 1/4".

You do not have to move the meter at all.

Toggling enables you to obtain 2 moisture values at different depth levels in the same location. This is the best way to compare surface and core moisture with the pinless measuring technology. Use the Ligno-DuoTec with a pin electrode to measure a moisture gradient in thicker wood.

## Measuring Wood:

- Check/change wood species setting: Code numbers 30-100, based on specific gravity. For Ligno-DuoTec  
example: Code number 56 is for a specific gravity of 0.56. All pinless meters from Lignomat including the Ligno-DuoTec are programmed for code numbers 30-100.
- Check/change depth setting according to the thickness of the wood. (Page 7: Dual-Depth)
- Measure: Press the READ key and place the meter on the wood in the direction of the grain.  
**Press down lightly**, holding the outer sides of the meter without touching the test sample with your hand.

Measuring range for wood is 5\*-60%.

Measurements above fiber saturation (25-30%) are less accurate.

\* The lowest measurable moisture value depends on the specific gravity of the wood species. To find the lowest moisture value for a species setting, hold the meter in the air and press READ. The lowest values for hardwoods are usually lower than 5%. The lowest values for softwoods are usually higher than 5%. For example, the lowest value for setting #160 is 4.3%.

## Measuring Bamboo:

Lignomat developed a unique set of calibrations for different types of bamboo floors and engineered bamboo products, code # 11-24. Depth is limited to 1/4" since bamboo products are usually less than 3/4" thick. Make sure the measuring depth is 1/4" when using code # 11-24. Bamboo calibrations are also available in the Ligno-VersaTec and the Ligno-Scanner SDM.

The values indicated by are WME percentages. WME is the wood moisture equivalent. The following example shows what WME means: If bamboo is acclimated to ambient conditions of 45%, the Ligno-DuoTec BW on the correct bamboo setting indicates **8%**. If wood is acclimated to the same 45% relative humidity, the wood moisture content is also **8%**.



**Measuring Veneer:** We recommend placing a lite-weight (non-weight) material such as styrofoam underneath the test sample when measuring veneer or other thin materials. It not only prevents inaccurate readings, but also helps to create a flat measuring platform. To obtain accurate readings for very thin veneer it may be necessary to make a stack of several sheets.

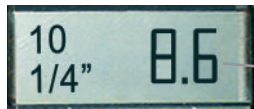
You can also find a setting for single veneer sheets. See below: Start with **Step 2**, if you know the moisture content of the veneer sheet. Otherwise, start with **Step 1b**, if you have a sheet acclimated to a known relative humidity.

## Measuring Building Materials:

Select the correct material setting. If the material is not listed on the laminated species card, use one of the reference scales:

- for laminates and composites made from wood ..... code #0
- for concrete and building materials with a similar specific gravity ..... code #25
- for drywall and building materials with a similar specific gravity ..... code #15
- for building materials in between concrete and drywall ..... code #10

Measuring with a reference scale is best done when a dry sample is available. Measure the dry sample and use the number as base value for comparing readings. Even if no dry sample is available, higher values indicate more moisture.



Note, no % sign. Reference scales do not indicate moisture percentages.

When taking measurements, make sure the surface is clean. If surfaces are uneven, try different orientations of the meter and use the highest value.

**Water damage restoration:** Pin and pinless measurements are crucial when tracking moisture problems. The Ligno-DuoTec BW, a dual-depth pinless meter, measures up to 1/4" and 3/4" deep. A quick way to find trouble areas.

**Sheetrock:** Setting #15 (Range: 0-2.0%). The indicated moisture percentages are based on dry weight, same as wood moisture percentages. Meters indicating moisture values of 8-12% for dry sheetrock, use scales based on WME, wood moisture equivalent.

Moisture percentages for sheetrock based on dry weight

- Dry sheetrock ranges from 0.1% to 0.7%.
- Values for 0.8% and 0.9% are questionable.
- Any value 1% and higher is considered wet.

Sheetrock is often thinner than 3/4". The 1/4" measuring depth is ideal to measure thinner sheetrock. If the sheetrock is installed, the 1/4" measuring depth gives true moisture percentages, without including any material behind the sheetrock. If the problem is buried deeper than 3/4", measurements with a pin meter, electrode E14V and EL pins 7" long are your only option.

Concrete: Setting #25 (Range: 0-99.9). Moisture readings are given on a relative scale comparable to relative humidity readings in concrete. Readings indicate high and low moisture areas. In addition, the measuring depth is limited to 3/4" deep. Measurements with pinless meters do not include the mid-section of a slab. Concrete floors are 4" and more!

Measurements with non-invasive meters provide a preliminary evaluation of moisture conditions. Moisture meters are not able to indicate absolute moisture percentages.

Warning: Test results from pin or pinless meters should not be used to decide whether or not to lay a wood floor over a concrete slab. An RH in-depth probe test and/or a Calcium-Chloride test is recommended by most wood floor manufacturers. Follow the floor manufacturer's installation instructions and perform the required testing to guarantee the manufacturer's warranty.

Pin and pinless meters, ASTM F2659, quantitative versus qualitative.

## Wood Floor Installation:

Wood moisture meters and thermo-hygrometers are essential tools for floor installers. Adding Lignomat's humidity probe RH BluePeg allows using the BW as pinless meter and as precision thermo-hygrometer. Page 12. Whenever possible, wood moisture and relative humidity should be measured.

**First:** Take measurements when the floor is delivered, to make sure the floor is dry.

**Next:** Take measurements (moisture and RH) before, during and after acclimation. Mark sample boards and take readings of the same spot repeatedly.

**Last:** The moisture content of a floor should be documented at the time the customer signs off on the installation. Select several moisture sensitive areas, under windows, inside doors, by the refrigerator, etc. Take readings with both depth levels and document the measurements with moisture content, species setting, measuring depth and location. Take a photo to pinpoint the location. Use the Ligno-DuoTec BW with the RH BluePeg probe to take relative humidity and temperature measurements.



Keeping track of moisture conditions may in the end protect you from unwarranted claims and help find the cause of a problem. If you ever have to go back to check out a complaint, you can measure the same areas again and compare with the original measurements. The dual-depth readings can indicate if moisture was absorbed from the down-side of the floor or from the up-side of the floor. See EMC chart on page 12 for equilibrium moisture contents and the corresponding relative humidity and temperature. If EMC and MC are kept in close range, wood floors are absolutely stable.

## Find Settings for Composite and Engineered Boards

Follow steps 1 and 2 to find settings for products not listed on the species card.

For best results, the test sample should be acclimated to a uniform moisture content.

**Step 1:** Determine the moisture content (MC value) of the test sample using 1a) or 1b).

1a) If the top layer is wood, find the MC value of the top layer by taking readings. Set the meter to the wood species of the top layer at 1/4" depth, even if the top layer is thinner than 1/4".

**1b)** If the top layer is not wood or the product is less than 1/4" thick (veneer), the test sample has to be well acclimated in an area with known relative humidity. Then, you can find the MC value in the EMC chart. Moisture measurements with the meter are not needed. Look up the relative humidity and find the corresponding EMC value, which is the MC value of the test sample.

Example: For a test sample acclimated in 35% rel. humidity, the MC value is 7%

**Step 2:** Determine the new setting using the MC value found in step 1.

Select setting # 50 and 3/4" depth. Use depth 1/4" for a test sample less than 3/4" thick.

Then, take a reading.

--If the reading is lower than the MC value found in step 1, choose a setting lower than 50.

--If the reading is higher than the MC value found in step 1, choose a setting higher than 50.

Then, take another reading. Change the setting, until you get a reading close to the MC value determined in step 1.

The new-found setting can be used in the future for the same type of boards.

## Calculating Specific Gravity

Specific gravity can be found on the Internet by entering <specific gravity ....> followed by the wood species. Specific gravity can be calculated by dividing:

$$\frac{\text{Dry Weight} \times 1.73}{\text{Length} \times \text{Width} \times \text{Heights}} \rightarrow \begin{array}{l} \text{enter Dry Weight in ounces} \\ \text{enter Length, Width and Heights in inches} \end{array}$$
$$\frac{\text{Dry Weight}}{\text{Length} \times \text{Width} \times \text{Heights}} \rightarrow \begin{array}{l} \text{enter Dry Weight in grams} \\ \text{enter Length, Width and Heights in centimeters} \end{array}$$

If the specific gravity is 0.42, the Ligno-DuoTec should be set to #42 in pinless mode.

For unlisted species or new products call customer service at 800-227-2105. If no listing is available, Lignomat offers testing to determine the correct setting.

Note: Species settings for pin meters are determined by oven testing. The specific gravity settings cannot be applied to correct measurements with a pin meter.

# Relative Humidity, Wood Moisture and EMC Chart

Recommended ambient conditions in buildings are 30-50% relative humidity at 60-80°F. If ambient conditions stay within this range, the amount of expansion and contraction of wood floors and furnishings at 6-9% moisture content is limited. (Table from US Dept of Agriculture "Wood Handbook, Wood as an Engineering Material")

EMC Chart

Temp.	Relative Humidity in %																				
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	98	
30	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	26.9	
40	1.4	2.6	3.7	4.6	5.5	6.3	7.1	7.8	8.7	9.5	10.4	11.3	12.4	13.5	14.9	16.5	18.5	21.0	24.3	26.9	
50	1.4	2.6	3.6	4.6	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.2	12.3	13.4	14.8	16.4	18.4	20.9	24.3	26.9	
60	1.3	2.5	3.6	4.6	5.4	6.2	7.0	7.8	8.6	9.4	10.2	11.1	12.1	13.3	14.6	16.2	18.2	20.7	24.1	26.8	
70	1.3	2.5	3.5	4.5	5.4	6.2	6.9	7.7	8.5	9.2	10.1	11.0	12.0	13.1	14.4	16.0	17.9	20.5	23.9	26.6	
80	1.3	2.4	3.5	4.4	5.3	6.1	6.8	7.6	8.3	9.1	9.9	10.8	11.7	12.9	14.2	15.7	17.7	20.2	23.6	26.3	
90	1.2	2.3	3.4	4.3	5.1	5.9	6.7	7.4	8.1	8.9	9.7	10.5	11.5	12.6	13.9	15.4	17.3	19.8	23.3	26.0	
100	1.2	2.3	3.3	4.2	5.0	5.8	6.5	7.2	7.9	8.7	9.5	10.3	11.2	12.3	13.6	15.1	17.0	19.5	22.9	25.6	

Example: For a relative humidity of 35% and a temperature of 70°F, the EMC is 6.9%. A wood floor at 6.9% moisture content is stable, if the surrounding air has a relative humidity of 35% and a temperature of 70°F. In short a floor is stable, when MC and EMC are the same.

## Using Pinless Mode and Thermo-Hygrometer Function

**Dimensional Stability of Wood:** Wood moisture and relative humidity are crucial factors for dimensional stability of wood. Use the Ligno-DuoTec BW to measure both. If wood shrinks, warps, cups, checks or delaminates, it always has to do with changes in wood moisture and/or relative humidity. No shrinking and warping occurs, when an equilibrium with the surrounding air has already been reached, which means wood is not losing or absorbing any more moisture.

**Predictions and Explanations for Wood and Wood Floors:** Measure relative humidity, temperature and moisture content. Compare the measured values with the EMC chart above to predict, if wood is stable or will loose or gain moisture.

-- A hardwood floor shows gaps from shrinking. The moisture content at the present time measures 6.2% and the rel. humidity is at 30%. The only explanation for the gapping is, that the floor was installed at a higher moisture content. Once exposed to the dry air, the floor dried out and gapping occurred.

-- If a dry floor with a perfect moisture content of 6.2% is exposed for a long time to air with a relative humidity of 60% at 70°F, it can be predicted that the floor will absorb moisture until 11% has been reached. Depending on the wood species, a 5% increase in moisture content can be accompanied by a substantial amount of expansion.

**No more surprises!** Use the EMC chart and your Ligno-DuoTec BW to predict problems. The chart is also helpful to explain to your customers, why relative humidity in their home matters.

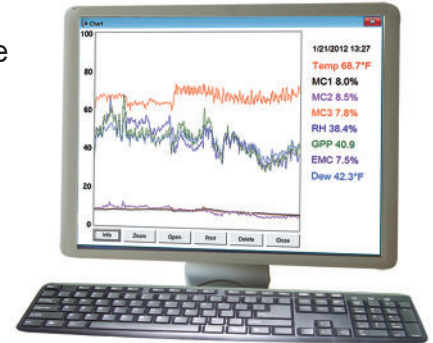


**Restoration and Building Industry:** Mold has become a great concern in the building industry. Mold can grow almost anywhere, if the relative humidity rises above 80% and temperatures are moderate (not screaming hot or icy cold). The critical moisture percentage is above 16% for mold growth in wood. This critical moisture percentage can be exceeded, when water infiltrates a structure by leaks, floods and broken pipes or when buildings are not sealed properly. Repair work is necessary to avoid lasting damage.

Use the Ligno-DuoTec BW to measure moisture content and relative humidity / temperature. Establish the extent of damage and monitor progress until all repairs are done.

## Monitoring RH and MC with Data Loggers

The Ligno-DuoTec BW can be used as a very accurate and reliable thermo-hygrometer as described on the next page. However, a thermo-hygrometer provides only at-the-moment measurements. For continuously monitoring longterm we offer the BL 2 data logger.



The BL2 data logger comes with the precision RH BluePeg probe. 32000 Data sets can be sampled in time intervals of 30 seconds to 24 hours. Audible alarms can be set. A great watchdog for restoration work, floor installation, job-site surveillance, long term recordings of storage facilities.

Adding the MC Tracker to the BL2 allows recording wood moisture content and relative humidity. It is like continuously taking readings with **3 wood moisture meters and 1 thermo-hygrometer.**

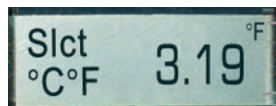


Lignomat also offers **wireless** transmitters for measuring moisture, humidity, temperature.

## Check Software Version. Change from US to Metric System.

Settings for temperature are indicated in °F or °C. Settings for measuring depth are indicated in inches or mm. To change, disconnect the battery and press the SET key twice. Connect the battery again. Display shows software version as a 3-digit number (Example 3.19).

The active °C or °F setting appears on the right side of the display in the upper or lower corner.



To change from °F to °C, use down key.

To change from °C to °F, use up key.

Changes can only be made, when the 3-digit software number is displayed.

The settings for inches or mm cannot be changed manually:

- If °C is set, the measuring depth is automatically indicated in mm.
- If °F is set, the measuring depth is automatically indicated in inches (").

## RH Technology

The DuoTec BW functions as an RH meter or a thermo-hygrometer, when the RH BluePeg probe is connected. The RH BluePeg probe uses a single micro-chip factory calibrated to NIST standard.

Applications include:

- measuring ambient air conditions
- in-situ moisture test in concrete, next page.

### Specification of RH BluePeg Probe:

Relative Humidity: Measuring Range 0-99.9%

Accuracy RH:  $\pm 1.8\%$  for 10% - 90%

$\pm 3\%$  for below 10% and above 90%

Temperature: Measuring Range 5°F-160°F (-15°C-70°C)

Accuracy Temp:  $\pm 0.5^\circ\text{F}$  for 32°F to 120°F (0°C-50°C)

$\pm 1^\circ\text{F}$  for  $<32^\circ\text{F}$  and  $>120^\circ\text{F}$  ( $<0^\circ\text{C}$  and  $>50^\circ\text{C}$ )

Measuring Range for GPP: 0-99.9

Size: Length 1 3/4", diameter 0.5". Connection: 35mm stereo plug.



## Measure and Monitor Ambient Conditions

As soon as the RH BluePeg probe is connected to the Ligno-DuoTec BW, the meter automatically switches into RH mode and indicates values for:

RH: relative humidity

T: ambient temperature

DewP: dew point temperature

GPP: grains per pound

#: RH probes have individual 3-digit numbers

RH  
#134 44.3%

Temp  
#134 71.2<sup>°F</sup>

DewP  
#134 48.8<sup>°F</sup>

GPP  
#134 52.1

All values for RH, temperature, Dew Point and GPP can be obtained by first pressing READ, then HOLD and then using the up or down key to scroll between RH/T/DP/GPP.

RH  
#134 44.3%

134# is the individual Rh BluePeg probe number that allows different probes to be identifiable.

The connection between the Ligno-DuoTec BW meter and the RH BluePeg probe can be made by the male-male 35mm RH adapter, only available from Lignomat. An extension cable (35mm stereo) can also make the connection. The cable is available from Lignomat up to 50 ft long for monitoring remote areas.

Note: When using the Ligno-DuoTec BW as thermo-hygrometer, the accuracy rating of the RH BluePeg probe with  $\pm 1.8\%$  is far above the over-the-counter available thermo-hygrometers. Over-the-counter hygrometers usually have a rating of  $\pm 5\%$  for RH. We did not built the RH probe into the meter, because the not embedded probe adapts faster to the ambient conditions and is less influenced by heat created by the meter or the person holding the meter.

## In-Situ RH test for Moisture in Concrete

The in-situ RH test gives the most reliable results for concrete moisture testing, when you have to determine whether or not to install a floor covering or apply adhesive or epoxy . See separate instructions for in-situ probe test with RH BluePeg probes. Instructions are available on line or as booklet from Lignomat (800-227-2105).

ASTM standard F2170 describes equipment and procedure. The test duration is now 24 hours, a time limit set by the ASTM standard. All of Lignomat's RH parts comply with the latest standard F2170.



The in-situ RH concrete test has gained recognition over the past few years. Many floor covering manufacturers have added the RH concrete test to their warranty requirements. Check the floor manufacturers manual to guarantee the manufacturer's warranty.

If you own the Ligno-DuoTec BW the following accessories are needed to perform in-situ RH moisture testing in concrete:  
RH Probes, RH Sleeves, RH Cable with cable-end-stopper.  
Also needed drill, brush, vacuum attachment.



### Why the RH test gives the most reliable results:

Moisture distribution within an open concrete slab is often not uniform, especially when the slab has not dried completely or when the slab is on grade. The surface shows low moisture levels, whereas higher moisture levels are found in the middle of the slab or towards the bottom (especially for slabs on grade). Once the open concrete slab is covered by the floor covering, moisture will be pulled up from the bottom towards the drier surface until an even moisture distribution has been reached. The increase in moisture close to the surface can cause problems with epoxy, adhesives and floor coverings.

It has been shown, that moisture measurements taken at 40% of the slab thickness give the same results when the slab is open and later-on when the slab is covered. Therefore, test results from the open slab can be used to predict what the moisture content will be once the slab is closed. This allows manufacturers of adhesives, epoxy and floor coverings to set a permissible range for their products. If the slab is not on grade, the ASTM standard F2170 allows testing at 20% depth.

Permissible RH values are set by manufacturers of adhesives, epoxies and floor coverings. Check the floor manufacturer's installation manual.

## Function and Calibration Check for Pinless Mode

All pin and pinless meters from Lignomat including the Ligno-VersaTec are built with high quality, micro-processor based components to guarantee stable calibrations for many years of usage. All meters from Lignomat internally check and if necessary adjust the calibration before each reading. Therefore, the meters are not set up to be re-calibrated manually by the user.

Before the battery is drained completely, a warning sign appears in the middle of the display, indicating the battery should be replaced soon.

Function Test: Pinless measurement functions can be tested for open and closed circuit connections manually.

Calibration Test: Pinless measurement functions can be tested for calibration accuracy with the pinless check block TS provided by Lignomat. Using the external pinless calibration check block confirms that all connections function properly:

- in pinless mode from the measuring pad to the display.

For sensitive testing we recommend using the check block before and after a test series. Every time you check, the indicated value should be within +/- 1% of the test standard.

### Pinless Mode

Manual function check for pinless meters: Step 1 and 2

Calibration check for pinless meters: Step 3

**Step 1:** Open circuit check. Choose code # 50. Hold the meter in the air to make sure no material is touching the measuring plates. When the READ key is pressed, a low moisture value of 5.4% should be indicated with SCAN/Min to the left side of the display. For 1/4" and the 3/4" depth the same value should appear.



**Step 2:** Closed circuit check. Place the pinless meter on your forearm and press the READ key. A high moisture value should be indicated. An additional meter check can be performed by measuring a ream of paper. If the paper test is done repeatedly with the same setting, the indicated value should not vary significantly over the course of a year. This can be used to check consistency / accuracy of the pinless calibration.



**Step 3:** Lignomat offers an external calibration check block TS for all Lignomat pinless meters. Lignomat's check block for pinless meters from is a material plate, which produces a specified value, when the meter is lightly pressed against its surface.

If step 1, 2 or 3 fail either the battery needs to be replaced or the meter is defective. Call customer service 800-227-2105.



## Function and Calibration Test - RH Meters

Function Check for RH measurements: Step 1

Accuracy check for RH BluePeg probe: Step 2

**Step 1:** Connect the RH BluePeg probe to the Ligno-DuoTec BW using the small RH adapter and also the RH cable. Press the READ key. A value for either RH, T, DT or GPP appears. Press the HOLD key and then the up key repeatedly to recall the other values. Check if the indicated values are within the expected range. If you read a temperature of 2000F, you know something is wrong. Call customer service at 800-227-2105. Maybe your meter needs to be updated to fit the last generation of RH BluePeg probes. We recommend this test before using the RH BluePeg probes for the first time.



**Step 2:** The accuracy of the RH BluePeg probe needs to be checked periodically. This check can only be performed by exposing the sensing element on the circuitboard to a known relative humidity. For on-site checking we sell salt solutions for 75% and for 33% RH.

**Accuracy check for in-situ RH probes for concrete moisture testing:** The ASTM standard F2170 sets the rules for test equipment, procedure and frequency of accuracy testing. Since the standard is still modified periodically, we recommend to purchase the latest F2170 standard to be up-to-date with all requirements. Available from the ASTM web-site. Lignomat offers to check RH probes three times free of charge during the first year.

## BW-KS Package with RH Accessories



## Summary of Pinless Meters offered by Lignomat.

Summary of all Pinless Meters	Item	Depth 1/4"	Depth 3/4"	Bamboo	Gypsum Sheetrock	Concrete Pinless Mode	Reference Scales	RH In-Situ Concrete	Pin Mode
Ligno-Scanner S	S	✓							
Ligno-Scanner D	D		✓						
Ligno-Scanner SD	SD	✓	✓						
Ligno-Scanner SDM	SDM	✓	✓	✓	✓	✓	✓		
Ligno-DuoTec BW	BW	✓	✓	✓	✓	✓	✓	✓	
Ligno-VersaTec	V-0	✓	✓	✓	✓	✓	✓	✓	✓

SPECIFICATIONS: Ligno-Scanner S, D, SD, SDM, Ligno-DuoTec BW and Ligno-VersaTec

All pinless meters from Lignomat indicate wood moisture in percent, corrected by 71 wood group settings or by the specific gravity between 0.3 to 1.0 (Settings 30 -100). Moisture Range: 5-60%. Resolution 0.1% . HOLD function. The calibration is internally checked and adjusted before each reading. Function and calibration can be verified with the pinless test block TS. Page

Additional calibrations for

Ligno-Scanner SDM, DuoTec BW, Ligno-VersaTec:

- Bamboo and other strand woven products
- Sheetrock scale from 0-2%
- Reference scales with 3 sensitivity levels:  
concrete, standard bldg materials, laminates

Size of meter: 2"x 5.5"x1/2". Weight 8 oz.

Measuring pad 1 5/8" by 2 5/8".

Test sample should be as large as the measuring pads and as thick as the measuring depth of the meter.

### Ligno-VersaTec Pin - Pinless- RH All-in-one



- Ligno-VersaTec

- Electrode E12
- Electrode E14
- RH Thermo-Hygro probe
- in-situ concrete testing



Specifications are subject to change without notice.

Lignomat USA LTD, 14345 NE Morris Ct., Portland OR 97230,

503-257-8957, 800-227-2105, sales@Lignomat.com www.Lignomat.com