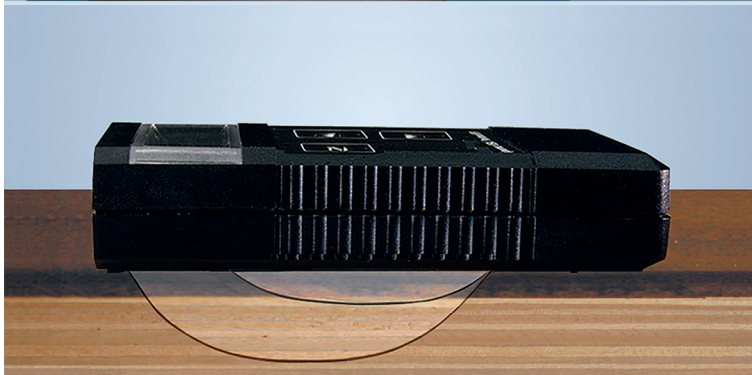


# User Instructions *Ligno-DuoTec BW*



Ligno-Duotec BW features:

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



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## ***Table of Contents***

General Information Ligno-DuoTec BW pinless.....	3
Specifications - Warranty .....	4
Calibration Check Block.....	4
Check and Change Settings .....	5
Change from US to Metric System.....	5
Calculating Specific Gravity.....	5
Take Measurements.....	6
Selectable Measuring Depths, Toggle between 1/4" and 3/4" .....	7
Veneer.....	8
Find Settings for Composite and Engineered Boards .....	8
For the Floor Installer .....	9
Moisture Problems and EMC Chart.....	10
Thermo-Hygrometer.....	10
More Thermo-Hygrometers and Data Loggers.....	11
Measuring Concrete Moisture.....	12

## *Ligno-DuoTec BW - pinless*

The Ligno-DuoTec BW is a capacitance-type meter for wood, bamboo, engineered and composite wood products, and building materials. In addition, the BW meter has a connector built-in to add the precision RH BluePeg Probe. The RH probe allows measuring ambient relative humidity, temperature, DPT, GPP and moisture in concrete using in-situ RH probes.

**Pinless Mode:** The sensor plates on the back of the instrument emit and pick-up very low-powered electromagnetic signals. The measuring field reaches from the surface to the maximum depth of penetration (Photo page 7). The readings generated by the Ligno-DuoTec BW are average moisture values of the entire measuring field. Moisture closer to the surface has a greater impact on the measurements than moisture closer to the maximum depth of penetration.

Lignomat meters internally check and adjust the calibration before each reading. Therefore, manual recalibration is neither needed nor possible. See page 4 for calibration check block TS.

**Wood Measuring Range:** 5\*- 60%.

Wood moisture measurements above 25% fiber saturation point are less accurate.

\*To find the lowest measurable moisture value for the active (previously selected) wood species setting, hold the meter in the air and press the READ key. The lowest measurable moisture values for hardwoods with high specific gravity are lower than 5%. The lowest measurable moisture values for softwoods with low specific gravity are higher than 5%.

**Wood Species Corrections:** Settings #30-100.

Specific Gravity Range 0.3 to 1.0. The most common wood species and the corresponding wood group settings are listed in the orange, laminated pocket guide. The pocket guide (wood group card) and a manual are included with each Ligno-Scanner SDM.

Settings for unlisted wood species can be determined by using the specific gravity. For example, if the specific gravity is 0.42, the setting is #42. Values for the specific gravity can be found on the Internet by entering <specific gravity...> followed by the name of the wood. For calculations of the specific gravity see page 5.

Lignomat offers testing to determine the correct setting for unlisted composite or engineered products.

**Bamboo:** Settings #16-22 for different types of bamboo. See pocket-guide for listings. Measuring range is the same as for wood.

**Sheetrock:** Setting #15. Range 0-2%. Moisture values are in percent.

**Concrete:** Setting # 25. Reference scale 0-99. See pages 9 and 12.

**Reference Scales:**

Setting # 0: Sensitivity level for laminates and engineered products out of wood.

Setting #10: Sensitivity level for building materials lighter than concrete.

**Selectable Measuring Depth:** 1/4" (7mm) and 3/4" (20mm). See page 7.

## *Specifications and Warranty*

**Ligno-DuoTec BW:** Measuring range and settings for wood species and materials are listed on the previous page and in the reddish-colored pocket-guide included with each meter.

Size of instrument: 4.75”L x 2.4”W x 1”H (12 x 6 X 2.5cm)

Size of sensor plates: 2.7”L x 1.7”W (6.8 x 4.2cm)

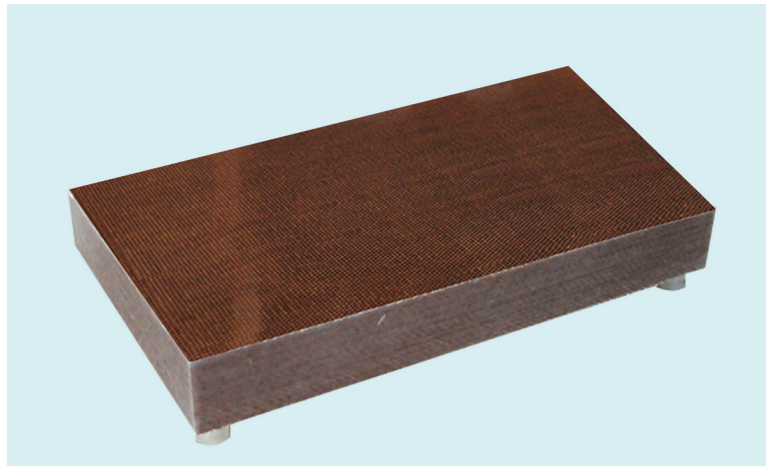
Battery: One 9V battery (included). A low battery symbol will appear on the display, when the battery has been drained to 25% of its capacity.

The battery cover is located below the sensor plates on the back of the instrument. Slide the battery cover off to replace the battery.

**Warranty:** All Lignomat meters have a two year warranty. Accessories have a one year warranty. The battery is excluded.

## *Calibration Check Block*

All Lignomat meters internally, automatically check and adjust the calibration before each reading. Therefore, manual recalibration is not necessary. Calibration and function of all Lignomat pinless meters can be verified with the calibration check block TS.



The calibration check block TS can be used for all Lignomat pinless meters:

Ligno-Scanner S, Ligno-Scanner D, Ligno-Scanner SD, Ligno-Scanner SDM

**Ligno-DuoTec BW** and Ligno-VersaTec (use calibration check block TP to check pin mode)

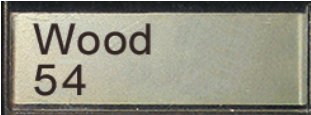
## Check and Change Settings

### Wood Species, Building Materials and Measuring Depth

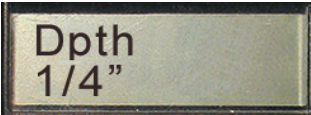
Settings for wood species and building materials are listed in the orange, laminated pocket guide included with each meter.

The settings appear on the left side of the display. To check the active (previously selected) settings, press SET/HOLD key repeatedly:

1 st: Active Material Setting for wood or non-wood materials.



2 nd: Active Depth Setting for 1/4" or 3/4" (7mm or 20mm).



Use ▼ or ▲ keys to change settings.

### Convert from US to Metric System:

1/4" or 3/4" to 7mm or 20mm.

Open the battery cover located below the sensor plates. Disconnect the battery and press the SET key twice. Connect the battery again. The display shows the software version. While the software version is displayed, use ▼ or ▲ keys to change from US ↔ Metric System.



°F changes to °C

Once °C is selected, depth measurements are automatically changed from **inches to mm**.

### Calculating Specific Gravity

The specific gravity can be calculated, if the Weight in Ounces and the Width, Length and Height in Inches are available

$$\frac{(\text{Weight} \times 1.73)}{(W \times L \times H)}$$

Once the specific gravity has been found (value between 0.3 and 1.00) the corresponding wood species setting is between 30 and 100. See page 3.



## Take Measurements

Check / change wood group and depth settings. Page 5. To take measurements, turn the meter on by pressing the READ key. Moisture percentages appear on the right side of the display.

If the meter is on, but the sensor plates are not in contact with any material, the active setting appears briefly, followed by the default reading (lowest measurable moisture value for the active wood species setting).



### To obtain readings:

Turn the meter on and place it on the test sample (for wood in the direction of the grain). Press down slightly, holding the outer sides of the meter without touching the test sample with your hand.

The wood group or material settings and the depth settings are shown on the left side of the display and moisture percentages with a % sign on the right side of the display.



For settings #0, 10, 25 (reference scales) the measured value on the right side appears without a percent sign. Take measurements in a dry sample to establish a base value. Comparative readings only.



The HOLD key is used to freeze the indicated value for three minutes. Helpful when taking notes or when measuring in places, where the display cannot be read. You can switch back to measuring at any time by pressing the READ key again.



When the moisture is too low to be measured, the lowest measurable moisture value (default reading) appears with "Min" on the lower left side of the display. When the moisture is too high to be measured, the highest measurable moisture value appears with "Max" on the lower left side of the display.



### For accurate measurements:

- The test sample should be big enough to cover both sensor plates.
- The test sample should be at least as thick as the selected measuring depth.
- The surface should be smooth and flat. For uneven surfaces take the highest value of several measurements.

To make sure the material underneath the test sample is not influencing the measurements, it is recommended (if possible) to 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.

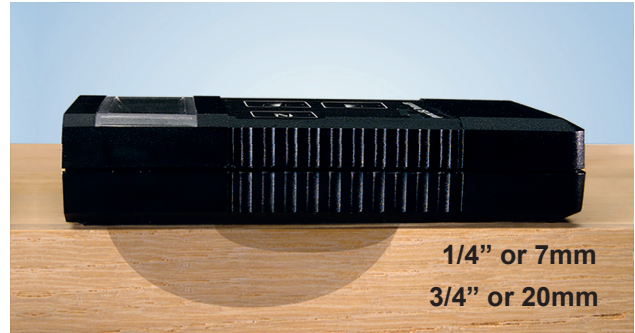
If this is not possible, make sure the Ligno-DuoTec BW is set for a measuring depth, which is less or equal to the thickness of the test sample. See page 8 for measuring veneer.

## ***Dual-depth - Selectable Measuring Depth***

The dual-depth feature is unique to the following pinless meters from Lignomat:

- Ligno-Scanner SD and SDM
- Ligno-DuoTec BW
- Ligno-VersaTec

Dual-depth meters have 2 independent sets of calibrations, one for 1/4" measuring depth and one for 3/4" measuring depth. Standard pinless meters have a fixed 3/4" measuring depth.



The measuring depth of pinless meters is crucial:

If the test sample is thinner than the measuring depth, readings could be inaccurate:

- If not enough material is underneath the sensor plates, values could be too low.
- If material underneath the test sample is included in the measurements, values could be too high.

The dual-depth feature allows measuring:

- All thicknesses from veneer to 1.5" (to 3/4" deep, if access is only from one side). See next page for veneer.
- Top layer of laminates or engineered boards and hardwood floors. See page 8.
- Wood floors thinner than 3/4" without including concrete or subfloor underneath.
- Toggle between 1/4" and 3/4" to compare moisture close to the surface and deeper down.

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

While measuring, you can toggle between the two measuring depths.

Place the meter on the test sample and press READ. The active measuring depth is indicated on the lower left side of the display. Hold the meter with one hand and use the other hand to toggle between 1/4" and 3/4" measuring depth. Press the ▼ key to switch to 1/4" (7mm) and the ▲ key to switch to 3/4" (20mm). You do not have to move the meter at all.

This is a great way to compare surface with core moisture.



## *Measuring Veneer*

We recommend placing a lightweight material such as Styrofoam underneath the test sample, when measuring veneer or thin layers of 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. To calibrate the meter for single sheets use the method described below. To compare measurements make sure the same materials are underneath the measuring plates including the material underneath the test sample.

### *Find Settings for Composite and Engineered Boards.*

Follow steps 1 and 2 to find settings for composite or engineered products not listed on the pocket guide included with the Ligno-DuoTec BW.

**Step 1:** Determine the moisture content (MC value) using a well acclimated test sample:

- If the top layer is wood, find the moisture content (MC value) by taking a moisture reading using the species setting for the top layer at 1/4" depth, even if the top layer is thinner than 1/4".
- If the top layer is not wood, estimate the MC value by using the EMC chart on page 10. For Example: If the test sample has been kept in ambient conditions of 40-50%, the estimated MC value is about 8.5% (applies to boards kept in your show room). If the ambient conditions are different from 40-50%, use the EMC chart on page 10 to find the corresponding MC value.

The EMC chart can be downloaded from: [temperature-and-emc-table](#).

**Step 2:** Determine the new setting:

Select setting #50 and 3/4" depth. Then, take a measurement.

--If the reading is lower than the MC value found in step 1, choose a setting lower than #50. Then, take another measurement of the test sample. Decrease the settings, until you find a setting, which gives a value close to the MC value determined in step 1.

--If the reading is higher than the MC value found in step 1, choose a setting higher than #50. Then, take another measurement of the test sample. Increase the settings, until you find a setting, which gives a value close to the MC value determined in step 1.

The new setting can be used in the future for the same kind of composite or engineered product.



## For the Floor Installer

Moisture meters and thermo-hygrometers are essential tools for the floor installer. Whenever possible, take measurements with both instruments. The relationship between wood moisture content and relative humidity is documented in the EMC chart on page 10.

The EMC chart can be downloaded from: [temperature-and-emc-table](#).

The combo meters Ligno-DuoTec BW and Ligno-VersaTec can be used as dual-depth pinless meters and thermo-hygrometers. Add RH BluePeg Probe and Adapter RH to convert the BW into a thermo-hygrometer. See page 11.



### Floor Applications:

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

**Next:** Take moisture readings before, during and after acclimation. A good way to do this is to mark sample boards and take readings of the same spots 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. Take readings on both depth levels and document the readings with moisture content, species setting, measuring depth and location. Maybe take a photo to pinpoint the location.



**In the Future:** If you ever have to go back to check on a complaint, you can measure the same areas again and compare with the original readings. Keeping track of moisture conditions may in the end protect you from unwarranted claims.

Comparing readings taken at 1/4" and 3/4" depth settings can also help to diagnose problems and indicate if moisture was absorbed from the down-side or the up-side of floor planks.

### Measuring Concrete and other Building Materials

Comparative readings can be taken in most building materials incl. concrete with the Ligno-DuoTec BW. These qualitative measurements indicate problem areas of high or low moisture levels. However, 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. Use the test method recommended by the manufacturer of the wood floor. The NWFA recommends the in-situ RH probe test for concrete moisture measurements. See page 12.

Settings for building materials are listed on page 3 and in the orange pocket guide.

## Moisture Problems

Nobody would worry about moisture if it would not cause shrinking, warping, cupping or mold and dry rot. Moisture problems can be avoided by having the correct moisture content at the correct ambient conditions.

See below. Download from the Internet: [humidity-temperature-and-EMC-table](#).

It is not enough for wood to be dry at the time of installation. Problems occur:

- If ambient conditions are not kept between 30-50% relative humidity at a temp of 60-80°F.
- If too much moisture is rising from the concrete slab or migrating through walls, ceilings, roofs
- If water spills are not cleaned up.

For more information on moisture problems go to: [www.moistureproblems.info](http://www.moistureproblems.info)

### Relative Humidity - Temperature - EMC

Ambient conditions inside buildings are recommended to be at 30-50% relative humidity and 60°F to 80°F. If conditions stay within these limits, the amount of expansion and contraction of wood floors at 6-9% moisture is limited.

Examples: **Acclimation:** If ambient conditions are 40-50% relative humidity at 70°F, a floor is stable at 8-9%. If the floor is delivered at 6%, enough time has to be allowed to acclimate. **Cracks in the Floor:** The EMC chart can be used to explain to a distraught customer, why in the winter a floor shows cracks, if the HVAC is not running and the humidity drops below 25%.

Temp	Relative Humidity																		
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
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
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
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
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
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
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
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
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

Download EMC chart from: [humidity-temperature-and-EMC-table](#)

## Thermo-Hygrometer

We also offer the handheld Thermo-Hygrometers PN and TH. Most floor installers choose the Thermo-Hygrometer PN for its wide measuring range and short response time. The measuring range is 5-95% RH. The response time is 80 seconds, which allows walking onto a job site and obtaining a measurement quickly. The accuracy of **+/-5%** is sufficient for most applications.

If a more accurate meter is needed:

- Ligno-Tec RH
- Ligno-DuoTec BW (see page 11)
- Ligno-VersaTec

using Lignomat's RH BluePeg Probe with an accuracy rating of **+/-2%** between 10%-90% relative humidity.



## *Ligno-DuoTec BW as Thermo-Hygrometer*

Add RH BluePeg Probe and Adapter RH to use the Ligno-DuoTec BW as a thermo-hygrometer. The BW indicates relative humidity, temperature, DPT and GPP.

Other RH meters from Lignomat are:

Ligno-Tec RH: with RH mode only

Ligno-VersaTec: with RH plus pin and pinless mode (same pinless and RH features as BW)



RH  
134 # 71.8%

Temp  
134 # 68.9<sup>o</sup>F

DewP  
134 # 59.4<sup>o</sup>F

GPP  
134 # 76.1

Number on the lower left side of the display is the RH Probe number.

Accessories are available for all RH meters to measure moisture in concrete slabs using in-situ RH probes. Lignomat's RH BluePeg system complies with ASTM F2170 standard.

## *Data Loggers BL2 and MC Tracker*

The **Data Logger BL2** keeps track of humidity, temperature, DPT, GPP and EMC over months and years. Adding the **MC Tracker** allows recording simultaneously relative humidity and moisture content in wood, drywall and other solid materials.



Measurements show how relative humidity affects wood moisture.

BL2-MC Tracker records simultaneously:

- 1 relative humidity probe
- 3 moisture content probes.



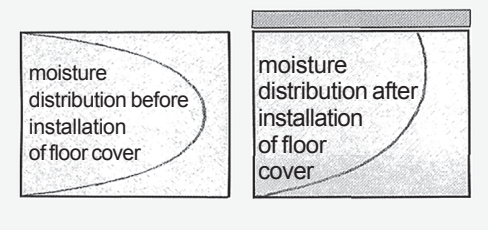
## Concrete Moisture Measurement

Pin or pinless handheld moisture meters, Calcium Chloride testing and in-situ RH probe testing are commonly used methods to measure moisture in concrete. NWFA recommends pin or pinless meters only as qualitative testing tools. In-situ RH probe or Calcium Chloride testing are recommended to determine if a concrete slab is dry enough to install wood floors or resilient floor coverings.

**Ligno-Scanner SDM, Ligno-DuoTec BW and Ligno-VersaTec** have a preprogrammed setting #25 for pinless concrete moisture measurements. Areas of lower and higher moisture levels can be detected. Absolute moisture values in percent are not available. When selecting a test method for moisture testing concrete, follow the installation guide lines of the floor manufacturer. The SDM is not set-up to obtain RH measurements.

### RH in-situ Probe Test versus Calcium Chloride Test:

Most manufacturers of floor coverings require RH testing. The Calcium Chloride test has not proven to be reliable. The Calcium Chloride test is mostly a surface test, which cannot detect core moisture. However, core moisture will rise to the surface once the slab is covered and can damage the floor covering. Another reason for the Calcium Chloride test to fail, is its dependability on ambient conditions. A floor will evaporate more moisture on a dry day than on a humid day. The in-situ probe test measures the evaporation of the slab at the representative depth of 40%. Moisture at that depth is not dependent on ambient conditions in the room.



Lignomat’s RH BluePeg system complies with ASTM F2170 standard.

**Ligno-Tec RH, Ligno-DuoTec BW and Ligno-VersaTec** meters can be used for RH testing.



← Package BW-KM with Ligno-DuoTec BW meter is often selected by floor installers:  
--Pinless dual-depth Mode  
--RH Mode

See also separate manual for Rh testing