MERLIN®

TECHNOLOGY

24,5°
M13%   10.7
4.20 Spruce   Ob∅ ≤ 3 mm

USER MANUAL

EVO ww

WOOD MOISTURE METER

for non-destructive measurement of wood products
with planed surface

Excellent Business Conditions.

USER MANUAL

Non-destructive
Wood Moisture Meter

EVO WW *(wood work)*
EVO SM *(saw mill)*

Hints of the manufacturer (read in any case before using the meter)

Thank you for buying a MERLIN Moisture Meter! Please read the instructions carefully. Helpful hints are marked "IMPORTANT". See page 23 for a summary.

1. Technical Specifications

EVO WW (wood work)
EVO SM (saw mill)

Scanning depth	EVO WW: 20 mm EVO SM: 40 mm
Min. wood thickness	EVO WW:13 mm EVO SM: 25 mm
Density range	175 - 1075 kg/m³
Timber group	1 - 21
Resolution	0,1 % humidity; 0,5 °C/°F
Measuring range	2 - 30% wood humidity* (test area to max. 99%)
Temperature range	-10 °C to +60 °C (0,5 °C), 14 to 140 °F (0,5 °F)
Operating temperature	0 °C to 40 °C, 32 to 104 °F
Storage temperature	-20 °C to +60 °C, -4 to 140 °F without batteries
Temp. Compensation	automatically
Menu language	German, English, French, Spanish, Italian, Portuguese, Czech, Russian
Power supply	4 x 1,5 V AAA Alkaline batteries
Aut. Shut off function	after approx. 3 minutes
Power input	35 mA (incl. display lightning)
Display	128 x 64 matrix display
Dimensions	124 mm x 71 mm x 30 mm
Weight incl. batteries	175 g
Protection class	IP40
Scope of supply	EVO WW/SM, Soft case, batteries, user manual

* see page 19 Exceedance of measuring range
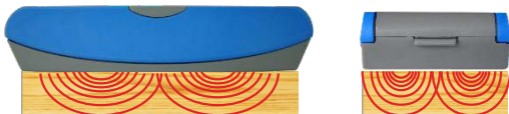
2. Description of EVO-meters

Application area:

The MERLIN® meters are designed for measurement of timber products with planed (***EVO*** *ww*) and roughly sawn surface (***EVO*** *sm*).

Front:

HOW DOES IT WORK

As soon as the sensor plate is in contact with the surface of the wood, measuring starts. The processor of the instrument analyses the sensor readings and displays the result as a percentage of moisture content in the wood

3. Set up

The battery cover is located on the front side of the meter below the display and the buttons. To insert the batteries push the battery cover opener underside and connect 4 pcs. 1,5 V AAA batteries. Carefully put battery cover back on. Your meter is now ready to work.

IMPORTANT: When you first receive the instrument, check for loose parts. If you notice any rattling noises, don't put the battery in, return instrument to your dealer. During transport the meter may have been damaged.

4. Turn meter on
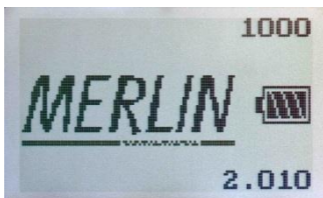
Turn the meter on by pressing the ON-button ⏻ and release it after approx. 3 seconds. The display flashes up. Now the serial number, software version and battery status appear. Afterwards the meter is ready for measurement. To turn off the meter push the ON-button ⏻ again and release it after approx. 3 seconds. The meter will turn off automatically after approx. 3 minutes if you do not push any button.

IMPORTANT: If there are no numbers displayed after depressing the ON-button ⏻, press and release the ON button ⏻

again, but with longer period between. Take care to push only one button! If the display remains off, check the batteries. The batteries could be discharged or disconnected

5. Display lighting

To turn on the display lighting push the ⏻ button. Attention! High power consumption, use only if necessary.

6. Timber table

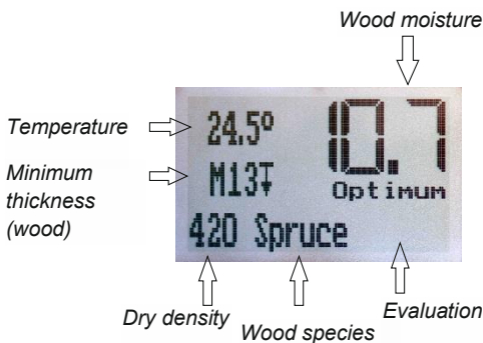| dry density (kg/m³)	Wood species						
200	Balsa						
250	Ceiba						
300	Alstonia						
340	Willow	Abachi					
380	Fir	Spruce l.*	Stone pine				
420	Spruce	Fir h.*	Poplar	Aspen	Hemlock	Okoume	
460	Pine	Spruce h.*	Douglas fir	Basswood	Oregon	Geronggang	Jongkong
500	Alder	Pine h.*	Cedar	Meranti			
540	Larch	Cherry	Mahogany	Durian	Rengas		
580	Ramin	Walnut	Elm				
620	Ash	Maple	Birch	Elm h.*	Bintangor	Teak	Acacia
660	Beech	Pear	Yew				
700	Oak	Hickory	Eucalyptus				
740	Keruing						
780	Simpoh						
820	Selangen						
860	Scopa						
900	Okan						
950	Bongossi						
1000	Pock wood						
1050	Ebony						

l = light (coarse), h = heavy (fin)

For many species the density of heartwood and sapwood differs.
For the denser heart wood correct the wood group settings by (+1), for the lighter sapwood correct the wood group settings by (-1) to obtain more accurate readings.

7. Measurement

The operative meter shows following
values on the display:

Wood moisture

Temperature

*Minimum
thickness
(wood)*

Dry density *Wood species* *Evaluation*

Choose the wood species or dry density
by pushing the ▲ or ▼ button. The wood
species are in ascending order of dry
density. Select a timber group by pushing
the ON/OFF button ↵. If you cannot find
the desired wood species in the menu of
the meter please use the timber table
mentioned above (page 9).

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250 Ceiba
300 Alstonia
340 Willow Abach
380 Fir
420 Spruce
460 Pine Lime
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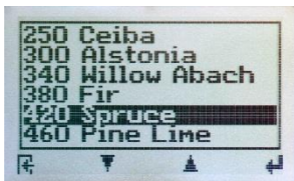
After adjustment of desired wood species press the meter with appropriate support pressure (ca. 4 kg) against the measured material. The actual moisture content is displayed instantly.

In addition an evaluation of the moisture appears on the display.
There are four distinctions:

Dry - Optimal - Moist - Wet
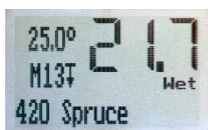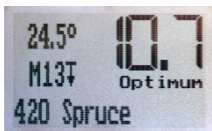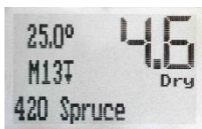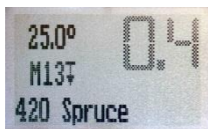
Below the lower measuring limit (below 2%) no evaluation is displayed.

Division limits for the evaluation:

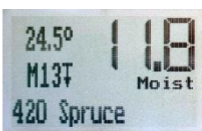|	**EVO** *WW*	**EVO** *SM*
Dry	2 - 8	2 - 10
Optimal	8,1 - 11	10,1 - 15
Moist	11,1 - 17	15,1 - 20
Wet	17,1 – max.	20,1 – max.

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!Please note!

The values are recommendations without guaranty and without liability for a standard application and can be different in each individual case, especially for non-standard applications e.g. other values are valid for damp room or laminated wood. To be absolutely sure seek advice from professional associations or the norm as well as supplier specifications.

Take advantage of non-destructive wood moisture measurement by not only measuring at one point of the wood, but move the meter along the wood. The wood is absolutely dry or wet in only few cases. Using this measuring method you can quickly determine an average value of the timber or find too moist resp. too dry areas. In terms of measurement accuracy we recommend to measure along the fibre direction.

IMPORTANT: For highest accuracy of the measurement, the surface of the boards should be planed and even. For very rough lumber the measured value could be too low and a special correction factor should be determined to obtain accurate readings. Should dry density of the measured wood deviate from average dry density (g/cm³) (control density selection), it is necessary to correct the density downwards (sapwood, rough grained) or upwards (heartwood, fine grained).

Wood which is smaller than the sensor pad or uneven is not measured accurately. The sensor pad differs in size depending on the model

EVO WW	**45 x 103 mm**
EVO SM	**66 x 103 mm**

The entire sensor pad has to cover the measured material. The sensor pad has to be laying on a flat wood surface. The

meter needs to be slightly pressed (approx. 4 kg) against the wood while obtaining measurements. Ensure that there is no metal or similar material underneath the wood. This can influence the measurement.

8. Hold function (key icon)

In case you have no straight sight to the display (e.g. at overhead measurements) you can use the hold button (key icon) to save the actual measured value on the display. In this case all four button symbols change to the key icon. To continue with further measurements press any key.
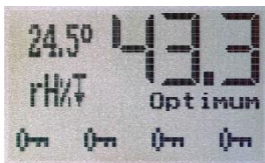
9. Determine wood group setting for unlisted wood species

For accurate readings the wood group setting should be determined according to ISO 3130 or DIN 52183. For approximate readings, we suggest the following procedure:

- Measure Length, width and thickness of a block of wood in cm.
- Multiply Length x Width x Thickness to find Volume in cm³. Weigh the block of wood in gram and estimate the wood moisture content in %. For improved accuracy the wood moisture content can be determined by an oven dry test.

- (100 x Weight/Volume) / (100 + Wood Moisture Content x 0,5) = Density

Example:

Length = 100 cm, Width = 12 cm,

Thickness = 2,55 cm

Volume = 3060 cm³

Weight = 1415 gram at approx. 15 %

wood moisture content,

Density = (100 x 1415 / 3060)/(100 + 15 x

0,5) = 0,43 g/cm³

Dry Density: 0,43 g

Choose wood density 420 by pressing the

button ▼ or ▲.

10. Exceedance of measuring range

Wood species	Dry density	Ex. min.	Ex. max.
Balsa	200	2,0	30,0
Ceiba	250	2,0	29,5
Alstonia	300	2,0	29,0
Willow	340	2,0	28,5
Fir	380	2,0	28,0
Spruce	420	2,0	27,5
Pine	460	2,0	27,0
Alder	500	2,0	26,5
Larch	540	2,0	26,0
Ramin	580	2,0	25,5
Ash	620	2,0	25,0
Beech	660	2,0	24,5
Oak	700	2,0	24,0
Keruing	740	2,0	23,5
Simpoh	780	2,0	23,0
Selangen	820	2,0	22,5
Scopa	860	2,0	22,0
Okan	900	2,0	21,5
Bongossi	950	2,0	21,0
Pockwood	1000	2,0	20,5
Ebony	1050	2,0	20,0

The accuracy has been optimized for the main application range between 2 % and fibre saturation point of wood. Variation from the oven dry test may occur in case the measured value exceeds the fibre

saturation point (Ex. max. = exceedance of measuring range). This variation might be high due to a very dry outer layer and a wet core inside the wood.

Measuring values in grey show you that the actual wood moisture is out of the measuring range mentioned above!

11. What is also important

The meters can be used in ambient temperatures between 0 °C (32 °F) and max. 40 °C (104 °F). The meter can be stored without batteries at temperatures from -20 °C (-4 °F) up to +60 °C (140 °F). To avoid battery leakage it is advisable to remove the batteries if you do not use the meter for a long time. Avoid high moisture areas for storage. The meter can be affected by static electricity close to electrical wiring. Static electricity may be the reason for irratic readings - change location. Please handle the meter carefully. Remove dirt (resin or water) before measuring. The display of the meter may get damaged if dropped. Please remove water drops on your meter immediately.

Attention! Avoid compressive stress on the soft case – it could turn on the device.

The temperature of the measured material should have approx. the same temperature as the moisture meter.

Temperature differences of above 5°C can affect the measurement results negatively. The meter should adapt to the climate for several minutes.

SUMMARY:

- Slightly press instrument towards wood surface, when taking a reading

- Select the appropriate wood species (dry density) using the ▼ or ▲ button. Perform measurements along the fibre direction

- To obtain averages or maximum values slide meter with the grain across the wood

- Measuring evaluation: the values are recommendations with no guarantee and without liability. *To be sure catch up the council of the norm or trade association as well as the supplier regulation*

- No foreign objects under the wood (except polystyrene)

- If you do not use the meter for a long time, remove the batteries

- If batteries are low, a battery symbol lights up

- Always handle the meter with care

- If a species is not listed on the Timber Table, see page 17 to determine the wood species

- At an exceedance of the measuring range (measurement result on the display is transparent) the measurement is above the measurement range

- Always remove dirt from the measuring surface

- The temperature of the wood should be close to the temperature of the instrument.

- The sensor pad must be completely covered by the measured material

- Consider maximum measuring depth and minimum wood thickness

- You run an average measurement based on the measurement surface

12. Warranty

MERLIN warrants the ***EVO*** *WW* and ***EVO*** *SM* moisture meters to be free from malfunctions and defects in both materials and workmanship business to business for 6 months and business to consumer 2 years from date of purchase.

If the ***EVO*** *WW* or ***EVO*** *SM* moisture meter doesn't function properly during the warranty period due to defects in either materials or workmanship, MERLIN will, at its option, either repair or replace the instrument without charge, subject to the conditions and limitations stated herein. Such repair service will include all labor, as well as any necessary adjustments and/or replacement parts.

Limitations -

This warranty becomes null and void if you fail to pack your ***EVO*** *WW* or ***EVO SM*** meter in a manner consistent with the original product packaging and damage occurs during product shipment.

This warranty doesn't cover: circumstances beyond MERLIN's control, service required as the result of unauthorized modifications or service, misuse, abuse, failure to follow MERLIN's operating or maintenance instructions.

Repair or replacement without charge are MERLIN's only obligation under this warranty. MERLIN will not be responsible for any special, consequential or incidental damages resulting from the purchase, use, or improper functioning of this equipment regardless of the cause.

13. Nonliability

Such damages for which MERLIN will not be responsible include, but are not limited to, loss of revenue or profit, downtime costs, loss of use of the equipment, cost of any substitute equipment, facilities of services, or claims of your customers for such damages.

IMPORTANT-

We recommend to prevent faulty results in measurements please check your meter reading results within a adequate time period by the dry oven test according to DIN 52 183 Standard.

REPAIR SERVICE - In case of malfunction please follow the instructions in this manual. If the malfunction is still in process send your instrument in original packaging to your geographical agent or directly to MERLIN.

Agents and employees of MERLIN are not authorized to make any modifications to this warranty or additional warranties binding MERLIN.

This warranty is personal to the customer purchasing the product from MERLIN and is not transferable.

14. Accessory (optional)

Test board PP2

It is a pleasure for us to inform you about our full range of MERLIN® moisture meters.

15. Technical support

Local dealer

Date / Stamp

or

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