Bessemeter®

PT-83 PIN MOISTURE METER

MANUAL

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INTRODUCTION

The Bessemeter PT-83 pin moisture meter measures the electrical resistance between two pin electrodes when inserted into a wood sample. This measurement gives an accurate representation of the moisture content of the wood.

The use of a pin meter (such as the PT-83) for measuring moisture is based on the principle that moisture within wood allows electricity to flow more easily. Conversely, as wood loses moisture and becomes drier, it will resist electrical flow. This resistance is measured in ohms and then converted to a meter reading expressed as % moisture content.

PT-83 FEATURES

- Removable/replaceable pins
- Large digital display
- Easy two-button operation
- Moisture content measurement range of 6.0% to 25.0%
- Battery level indicator
- Automatic shut-off when not in use
- Protective safety cap over the pins
- 9-volt battery
- Hold function for readings
- Species setting based on four material groups

PT-83 PARTS


Protective cover
PT83
Pins
LCD
0.0%
MATERIAL
MODE
MODE button
⏻/H
POWER /HOLD button
Bessemeter®
moisture meter

QUICKSTART

Pull the battery-insulating tab to begin powering the unit from the included 9-volt battery. Press the POWER/HOLD button to turn the moisture meter on. The meter will display the firmware version number and then show the moisture content percentage as 0.0%.

Press the MODE button to select the "material group" of the species of wood you will be measuring from the four (4) available material group settings found in Appendix A. The number of the material group you have chosen will display to the right of the MATERIAL indicator at the bottom of the display. During subsequent uses of your PT-83 meter, when you power on and then press the MODE button, your most recent material group selection will be displayed until you make a different selection.

After selecting the correct material group for the species of wood you wish to measure, remove the protective cover and then line up the two pins with the longitudinal axis of the wood grain. In other words, the pins should be aligned parallel with the grain as opposed to against it. For best results, you should also orient the pins perpendicular to the surface of the wood. This will ensure maximum penetration and optimal moisture measurement.

Push the pins straight into the wood as far as possible with moderate, controlled force. Be careful to keep a firm hold on the meter as you are pushing and limit the force to a reasonable amount to avoid damage to the meter or the pins. The PT-83 can tolerate a minor amount of rocking on the longitudinal axis (side to side) during pin insertion and extraction. However, excessive rocking, especially on the perpendicular axis (front to back), could result in the breakage of pins. ***NOTE***: *Never slam the meter into the wood.*

Once the pins are inserted, the display screen will show the moisture reading of your wood sample. Press the POWER/HOLD button momentarily to keep the current moisture reading on the LCD display for as long as needed, or until the unit is powered off. The screen will display a small “HOLD” indicator at the top. Press the POWER/HOLD button again to return to normal scan mode. The screen will display “SCAN” at the top left when the pins are inserted into the wood. The PT-83 will display moisture content percentages from 6.0% to 25.0% with precision to the nearest tenth of a percentage.

Be sure to consult the Wood Temperature Correction Table on page 17 and make an adjustment (as needed) in the % moisture content reading.

Wood at a low moisture content behaves differently than at a higher moisture content when being measured with a pin meter. The PT-83 features a unique “auto-lock” capability for getting a more accurate moisture reading at a low moisture content. When the PT-83 indicates a moisture content reading between 6% and 9%, the meter will hold this reading until the pins are removed from the wood sample.

CORRECT USAGE GUIDELINES

Aligning Pins
To achieve accurate moisture readings with the PT-83, it is crucial to align the pins correctly with the grain of the wood. Follow these steps to ensure proper alignment:

1. **Identify the Wood Grain**: Examine the wood sample to determine the direction of the grain. The grain refers to the natural lines or patterns in the wood.
2. **Align Pins Parallel to Grain:** Position the pins so they run parallel to the wood grain. This alignment minimizes resistance and ensures accurate moisture readings.

3. **Orient Pins Perpendicular to Surface:** Ensure that the pins are perpendicular (90 degrees) to the surface of the wood. This orientation allows for maximum penetration into the wood, providing a more reliable moisture content measurement.

Rocking of Pins

While using the PT-83, some minor rocking of the pins is permissible during insertion and removal. Here's how to manage this effectively:

1. **Longitudinal Rocking:** The PT-83 can tolerate minor rocking along the longitudinal axis (side to side) of the pins. This slight movement helps ease the pins into and out of the wood without causing damage.
2. **Avoid Perpendicular Rocking:** Avoid excessive rocking along the perpendicular axis (front to back). Significant movement in this direction can lead to pin breakage and inaccurate readings. Always strive to keep the rocking motion minimal and controlled.
3. **Insertion and Removal:** When inserting the pins, use a moderate and steady force to push them into the wood. For removal, gently rock the meter longitudinally to ease the pins out without damaging them or the wood sample.

By following these guidelines for aligning and rocking the pins, users can ensure accurate and reliable moisture content readings with the PT-83 pin wood moisture meter.

When using non-insulated pins, make sure the surface of the wood is dry. If the wood surface is wet, you will get moisture readings that are more representative of the surface conditions.

If you are measuring wood with areas where moisture may be more concentrated, it is

advisable to take multiple readings and obtain an average of your readings. This is done by adding all your results and dividing by the number of readings you have taken.

All readings should be taken with the pins aligned so that the flow of current is parallel to the grain. For wood with a rectangular cross section, insert the PT-83 pins to 1/5 the thickness of the wood sample. For wood with a circular cross section, insert the PT-83 pins to between 1/6 and 1/7 of the diameter. For further instruction, refer to ASTM D7438-08, section X2.3.

Use care when handling the PT-83 because the meter's pins are extremely sharp. Keep the protective cover on at all times and store in a secure location when you are not using the meter.

SPECIFICATIONS

Dimensions
- 6.14” x 2.37”

Weight
- w/ battery 5.3oz
- w/o battery 3.8oz

Power
- 9-volt battery

Auto Power Shutdown
- 1 minute with no activity

Measurement Range
- 6.0% to 25.0%

Storage Temperature and Humidity
- +50˚F to +90˚F (+10˚C to +32˚C
- Maximum relative humidity of 95%, non-condensing

Operating Temperature
- +32˚F to +110˚F (+0˚C to +43˚C
- Do not leave in direct sunlight or expose to excessive moisture

REPLACEMENT OF PINS

Use a wrench or pliers to carefully but firmly loosen and remove the pin electrodes. When installing replacement pin electrodes, tighten to a snug fit. Use caution to avoid excess tightening that may damage the pins—torque not to exceed 10 in-lbs (1.13Nm).

CHANGING THE BATTERY

The PT-83 features an on-screen battery level indicator at the top-right corner of the display screen that shows the current battery level. When the battery level indicator flashes, the battery must be changed immediately or any further moisture measurements will be inaccurate. Replace with a standard 9-volt non-rechargeable alkaline or lithium battery, or rechargeable NiMH battery. Be sure to observe proper battery polarity. Reattach the compartment door carefully so that it snaps back into place.

(OPTIONAL) CALIBRATION VERIFICATION REFERENCE

Calibration Verification Reference Options

To verify the calibration of your PT-83, you can use either of the two calibration verification reference options, available separately as accessories. Each option allows you to check two calibration points, ensuring your meter meets factory specifications.

Option 1: 12% and 7% Calibration Verification Reference

- **12% Calibration Point:**
  - With the PT-83 powered on, use the MODE button to select Material Group 2. Remove the pin protector cap and position the pins so that they make good contact with the contacts labeled 12% on the calibration verification reference. The reading should be between 11.9% and 12.1%.
- **7% Calibration Point:**
  - Position the pins so that they make good contact with the contacts labeled 7%. The reading should be between 6.9% and 7.1%.

Option 2: 12% and 22% Calibration Verification Reference

- **12% Calibration Point:**
  - With the PT-83 powered on, use the MODE button to select Material Group 2. Remove the pin protector cap and position the pins so that they make good contact with the contacts labeled 12% on the calibration verification reference. The reading should be between 11.9% and 12.1%.
- **22% Calibration Point:**
  - Position the pins so that they make good contact with the contacts labeled 22%. The reading should be between 21.9% and 22.1%.

You can purchase either the 12% and 7% model or the 12% and 22% model, depending on your specific needs. We recommend calibrating in the range most critical to your application.

Important Usage Instructions

When checking your meter's calibration:

- Always keep your fingers away from the sharp ends of the pins.
- Avoid conditions with increased static, such as carpet, rugs, and low humidity conditions.
- If your readings are not within the expected range:
- Ensure you have selected Material Group 2.
- Make sure the pins are making good contact with the correct contact points on the calibration verification reference.
- If either the 12%, 7%, or 22% readings are outside the range for the factory specification, call Bessemeter toll-free at 844-888-5280 to make arrangements for returning your PT-83 to Bessemeter for recalibration.

(OPTIONAL) SLIDE HAMMER PROBE

A slide hammer probe is available for separate purchase as an accessory for the PT-83. For some applications or situations, the use of the optional slide hammer probe may be highly beneficial. For example, when you wish to measure moisture deep within a wood sample, longer pins can be used with the slide hammer probe for deeper penetration. In addition, when taking moisture measurements of denser wood, such as various hardwood

species, the use of standard pins may not always be practical. Using the slide hammer probe allows for much easier and faster penetration of pins in hardwood species.

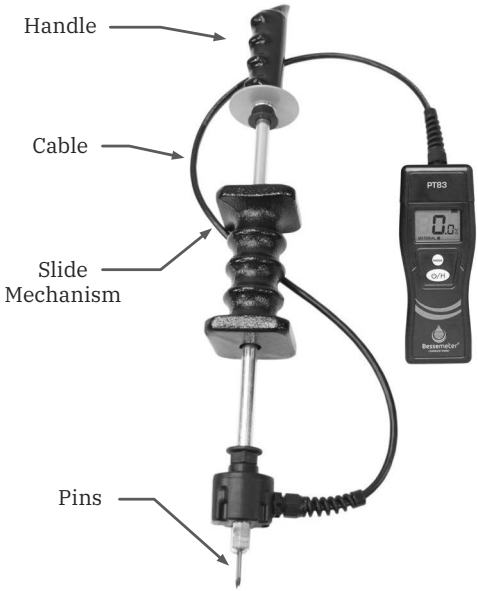
The slide hammer probe comes with insulated pins that you attach to the slide hammer probe at the end where the cable attaches to the probe. Be sure to tighten the pins using the supplied hex wrench. However, do not overtighten the pins. Avoid simply screwing in the pins by hand in order to keep the pins from loosening easily. You can use pins of various lengths with the slide hammer probe.

After installing the pins, the next step in preparing the probe for use is to attach the protective cap (located at the other end of the cable) directly to the PT-83 meter by snapping it into place. Once this step is completed, the slide hammer probe is now ready for taking moisture measurements.

Be sure to orient the pins both with the grain and perpendicular to the surface of the wood just as you would when using the meter alone without the hammer probe. Then, while holding the handle with one hand, firmly and forcefully move the slide mechanism toward the wood sample in order to get the pins to penetrate your sample. Depending on the density of the wood, the slide mechanism may need to be used multiple times to achieve the desired depth of the pins into the wood sample.

Once the pins are inserted satisfactorily, readings can be taken with the meter just as before. To remove the pins, simply reverse the order of operations used to insert them. The slide hammer is meant to strike the upper limit of the rod causing an upward momentum. This will, in effect, extract the pins. Several strikes may be necessary. Once the pins have been removed from the wood sample, you can now use the hammer probe for additional readings in the wood.

SLIDE HAMMER PROBE PARTS



WARRANTY

Bessemeter's warranty offers this product protection against defects in material and workmanship for one year from the date of purchase on all PT-83 moisture meters, subject to the following terms and conditions: Bessemeter's liability under this warranty shall be limited, at Bessemeter's option, to the repair or replacement of this product or any part thereof, which is demonstrated to be defective. This limited warranty does not apply if Bessemeter determines that the product has been damaged by accident, negligent handling, misuse, alteration, damage during shipment, or improper service not attributed solely to the actions of Bessemeter.

Bessemeter's liability for any defect in material or workmanship in this product shall be limited to the amount of purchase price of the product. With proper care and maintenance, the meter should stay in calibration; however, because Bessemeter has no control over the manner in which the unit will be used, it makes no guarantee that the meter will stay in calibration for any specific period of time. Bessemeter recommends returning the unit to the factory for a diagnostic checkup in the event the meter is dropped or otherwise damaged. This warranty is in lieu of all other warranties, whether oral or written, express or implied.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. BESSEMETER HEREBY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Under no circumstances shall Bessemeter be liable for any incidental or consequential damages. Agents and employees of Bessemeter are not authorized to make modifications to this warranty or additional warranties binding on Bessemeter. Accordingly, additional statements, whether oral or written, except written statements from an officer of Bessemeter, do not constitute warranties and should not be relied upon by the customer. This warranty

is personal to the customer purchasing the product from Bessemeter or Bessemeter's authorized distributors and is not transferable.

CUSTOMER SERVICE AND TECHNICAL SUPPORT

For technical support, warranty-related service, or assistance in using your PT-83 meter or accessories, call Bessemeter toll-free at 844-888-5280.

GLOSSARY OF TERMS

Ohm: The standard unit of electrical resistance, expressing the resistance in a circuit transmitting a current of one ampere when subjected to a potential difference of one volt.

Moisture Content: The weight of the water in damp material divided by the weight of the material in a dry state. To obtain a percentage, the result is multiplied by 100.

Electrode: A conductor through which electricity enters or leaves an object, substance, or region.

Electrical Resistance: A measurement of how a device or material reduces the flow of electricity through it. Electrical resistance is expressed in units of ohms (Ω).

APPENDIX A
Material Groups

Group 1	Group 2	Group 3	Group 4
Wood Species	**Wood Species**	**Wood Species**	**Wood Species**
Philippine, Mahogany	Douglas Fir	Mahogany	Pine, Ponderosa
Elm, American	Oak, Northern Red	Walnut, Black	Larch, Western
Basswood	Pine, Sugar	Aspen, Bigtooth	Tupelo, Black
Ash, Black	Maple, Sugar	Fir, White	Magnolia
Ash, White	Fir, California Red	Poplar, Yellow	Khaya
Hickory	Sweetgum	Birch	Pine, Jack
Oak, White	Spruce, Sitka	Pine, Longleaf	Hemlock, Eastern
Redwood	Hemlock, Western	Pine, Shortleaf	Pine, Red
Bald Cypress	Pine, White	Birch, Paper	Spruce, Black

APPENDIX B

Instructions for Wood Species Not Featured in Appendix A – Material Groups

In the event that the species of wood that you are measuring is not featured in Appendix A – Material Groups, you may choose from two different options listed below:

1. Choose a wood species from the material group that closely resembles the species of wood that you are measuring and use that setting and value to determine % moisture content.

2. Perform your own study by following these steps:
   a. Using a sample of your species that you suspect is 10% or lower, take and record readings using all four of the material groups.
   b. Dry down the sample using the instructions for oven-dry testing provided in this article: https://www.bessemeter.com/blog/measure-moisture-content-of-wood/
   c. Finally, compare your readings for all four material groups to your dry-down results and select the group with the closet matching result.

WOOD TEMPERATURE CORRECTION TABLE

Meter Readings

Temp °C	Temp °F	6	7	10	15	20	25
-18	**0**	9	11	15	22	31	38
-7	**20**	8	10	14	20	28	34
-1	**30**	8	9	12	18	23	29
4	**40**	7	8	12	18	23	30
10	**50**	7	8	11	16	22	27
15	**60**	6	7	11	16	21	27
21	**70**	6	7	10	15	20	26
26	**80**	6	7	9	14	19	23
35	**95**	5	6	9	14	18	23
40	**105**	5	6	9	14	28	22
45	**113**	5	6	8	13	17	22
50	**122**	5	5	7	11	15	19

NOTES

NOTES

500-00083-002 REV N/C

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