Bessemeter®

PINLESS MOISTURE METERS

S300

D300

DS500

1/4"

3/4"

0.0%

0.0%

0.0%

Bessemeter
moisture meter

CE

CE

CE

MANUAL

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Bessemeter®

INTRODUCTION

The Bessemeter Brand
Accuracy, Reliability, & Ease of Use

All Bessemeter pinless moisture meters (S300, D300, DS500) offer advanced technology for accuracy, reliability, and ease of use when measuring the moisture content of wood. Each of the three models utilizes an electromagnetic field that covers a relatively large cross-sectional area.

The depth at which your meter is designed to take measurements is its primary difference relative to the other pinless meters in the Bessemeter line.

- S300: Utilizes ¼" (6mm) depth mode
- S500: Utilizes ¾" (19mm) depth mode
- DS500: Dual-depth, which utilizes either ¼" (6.4mm) or ¾" (19mm) depth mode

The sensor field of your Bessemeter pinless meter approximates the full-thickness cross-section method per the ASTM-D4442 oven-dry method. This ASTM standard (along with its international counterparts) is the standard for comparison of all wood moisture meters for accuracy.

With proper use of your meter each time you take a measurement, you are assured of getting an excellent representation of the true moisture content of your wood sample.

Your Bessemeter pinless meter is capable of measuring moisture content in a range from 6% to 32%. Measurement range may vary slightly, depending on the species setting that you are using for your wood sample. Your meter provides an easy-to-read digital display with readings in 0.1% increments.

The moisture measurement technology of your pinless meter is virtually unaffected by wood temperature.

PARTS

LCD

On/Hold Button

Up Button

Species Button

Down Button

Depth Button

Audio Button

(NOTE: not applicable to D300, S300)

Sensor Plate

Battery Compartment
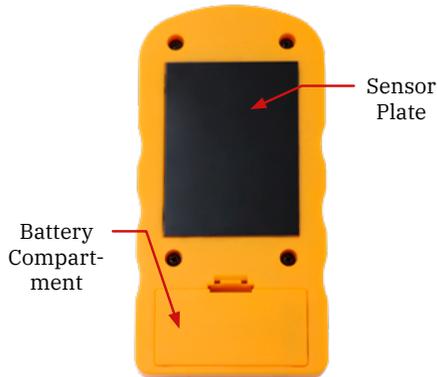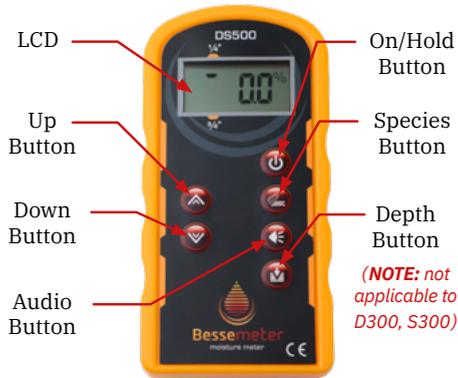
QUICK 1-2-3 START GUIDE

Your Bessemeter pinless meter is designed to be extremely easy and intuitive to use. In fact, using your meter is truly as simple as 1-2-3.

1. With the meter turned off, press and release the On/Hold button to power on your meter. After a brief display of the model number/firmware revision number, your meter will quickly go to Standard Measurement mode, showing 0.0% on the display when held in the air.

2. Next, press the Species button, which you use to program your meter with the specific gravity (SG) setting for the wood species that you are testing. Use the species settings table on pages 13-23 to find the correct setting for your wood (or if you cannot find the setting, contact our customer support team at info@bessemeter.com). Use the Up and Down buttons to toggle to the correct setting. Once you have the SG setting programmed, press the Species button again or the On/Hold button to return to Standard Measurement mode. For additional details about programming for species, refer to the Species button section on page 7-8.

3. Take measurements by pressing the meter down firmly on the face of the wood sample, making sure the rectangular sensor plate on the back of the meter is completely covered by the wood. The dimensions of the wood sample should be at least 2.0" (51mm) wide by 2.5" (64mm long). Refer to the usage guidelines on page 5
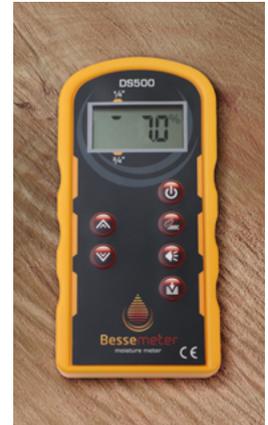
for information regarding depth dimensions. When you are done taking measurements, press the On/Hold button for 2 seconds to power off your meter. If not in use for at least 60 seconds, your meter will shut down automatically.

SUMMARY OF FEATURES

- Easy-to-read LCD display
- Digital display resolution of 0.1% (Standard Measurement mode)
- MC measurement range for wood: 6.0% to 32.0%
- Programmable species settings for a range of softwoods/ hardwoods
- Large sensor area for moisture measurement
- HOLD capability to freeze the current reading on the LCD display
- Low battery alert indicator
- Audio confirmation that can be enabled/disabled
- Dual-depth readings (DS500 model only)
- Field calibration verification when using the verification reference accessory (sold separately)
- Storage case and 9-volt battery included
- 2-year warranty
- Automatic shutoff when not in use

HOW TO USE YOUR BESSEMETER PINLESS MOISTURE METER

Usage Guidelines (for accurate readings, it is important to pay attention to the following guidelines):

1. Make sure that you have at least a 1-inch air gap underneath the wood you are testing and that your other hand is not positioned directly under the wood sample near the point of measurement.

2. Consider that each of the three pinless models are best suited for a specific range of wood thicknesses. For the D300 (or ¾" mode for the DS500), wood samples should be between ¾" (19mm) and 1 ½" (38mm). With thinner boards, if your meter is being used in ¾" mode, it will underestimate the moisture content, though not substantially if the board is at least ⅝" (16mm) thick. The thinner the board, the greater will be the underestimation.

3. If the wood thickness is greater than 1½" (38mm) and you are seeking a "full thickness" measurement and not a shallow measurement, then take readings (in ¾" mode) on both sides and average your readings.

4. If you need to measure wood that is less than ½" (13mm) thick, then use either the S300 or the DS500 (in ¼" mode).

5. Make sure the sensor plate on the backside of the meter is completely covered by the wood or other material that you are measuring. If the sensor plate is not covered completely, your reading will be inaccurate.

6. If any surface moisture or water is visible on the material being tested, be sure to wipe it off and allow the surface to dry for at least two minutes before taking readings. If possible, turn the

material over and measure the other side.

7. Press down firmly to obtain good contact between the sensor plate and the surface of the material that you are testing. When the material is somewhat uneven, such as rough-sawn lumber, this step becomes especially important.

8. Avoid taking readings in locations with a defect or knot in the lumber.

9. If measuring lumber that is frozen, permeated with salt water, treated with CCA, ACQ, or any other treatment with metallic or other components that might bias the moisture readings, then you may need to make additional measurement corrections. Contact us at info@bessemeter.com if you need further guidance about making corrections.

10. When taking a reading, ensure your meter is parallel to the direction of the grain.

USING THE METER'S BUTTONS

ON/HOLD BUTTON

Press the power button to turn the meter on. The meter will briefly display the model number and then the firmware revision number.

Following the brief model number/firmware display, the meter immediately goes to Standard Measurement mode and is ready to take moisture readings. Any settings that you have previously programmed or selected will still be active, meaning that you do not lose any of your settings by turning the meter off.

Using the Hold function: When you briefly press and release the Power/Hold button, this will hold or freeze the current reading on the display. You will see the word HOLD in the upper righthand corner of the display.

If the Audio function of the meter is turned on (see description about the Audio button), the meter will beep every 4 seconds while the Hold function is being used.

Until the On/Hold button is briefly pressed again, the display will remain in Hold mode. But after pressing the On/Hold button again, the display immediately returns to Standard Measurement mode so that you can take additional readings.

Turning your meter off: Press the On/Hold button for about two seconds to power it off. Alternatively, the meter will shut down automatically if left in Hold Mode for 60 seconds with no further activity.

UP and DOWN BUTTONS

These buttons are used in conjunction with the Species mode (and Depth mode if using the DS500 meter). How you use the Up and Down buttons will be determined by the specific mode that you are in. Please refer to the instructions outlined below for Species and Depth for additional guidance.

SPECIES BUTTON

The Species button is used to adjust for the specific gravity (SG) corresponding to the wood species that you are testing. When in this

mode, the meter displays values from 0.30 up to 1.00. The factory default setting is 0.50.

How to Program the Species Setting:

1. Use the species settings table on pages 13-23 to find the specific gravity setting that corresponds to the type/species of wood that you wish to measure.

2. When the meter is turned on, press and release the Species button. The display will show the current SG setting (e.g., 0.60). If the meter is being programmed for the first time, the default setting of 0.50 will be displayed.

3. Pressing and releasing either the Up or Down buttons will increase or decrease the SG setting of the meter by .01 each time. If you press and hold either the Up or Down button, this will allow the SG setting to increase or decrease by multiples of .10, and until you release the Up or Down button, the display will continue to adjust by multiples of 0.10, allowing you to quickly get to the SG setting you need.

4. Once the SG setting you need is displayed, press either the Species button or the On/Hold button to return to Standard Measurement mode and begin taking measurements.

5. The programmed SG setting will be stored in the meter's memory even if the meter is turned off or the battery has been changed. You can verify this each time you use your meter simply by pressing the Species button when the meter is turned on. The last programmed setting will be displayed.

AUDIO BUTTON

How to enable Audio: Turn on your meter and then press the Audio button to enable audio indication. A short tone will play, and "ON" will display momentarily on the screen. When audio indication is enabled, the short tone will also play when you press other buttons. Exceptions: when the Up or Down buttons are held down for SG scrolling, or when a button does not register a specific result (e.g., pressing an Up or Down button in Standard Measurement mode).

How to disable Audio: Press the audio button a second time to disable all audio tones. No tone will play this time, and the word "OFF" will be displayed momentarily on the screen.

DEPTH BUTTON

NOTE: The D300 and S300 are single-depth models that do not include the Depth button and the option to select the depth. The D300 takes readings in ¾" mode only, and the S300 takes measurements in ¼" mode only. If you are using the DS500, you have the capability of selecting the measurement depth (either ¾" or ¼").

How to Select Depth When Using the DS500:

1. After the meter is turned on, press the Depth button. In Standard Measurement mode, you will see a small trapezoidal bar (⬇) indicating the Depth mode currently selected. If the bar is displayed in the upper left-hand

corner, you are currently in ¼" mode. If the bar is displayed in the lower left-hand corner, you are currently in ¾" mode.

2. To switch from one depth mode to the other, simply press and release the Depth button to toggle between ¼" and ¾" mode. When you do, you will see either "3-4" or "1-4" displayed on the screen as well as the corresponding bar.

3. You also have the option to toggle between ¼" and ¾" mode by using the Up and Down buttons after you press the Depth button.

4. Once you have selected the Depth you want for taking measurements, simply press the On/Hold button to return to Standard Measurement mode to begin taking readings at that depth.

CALIBRATION VERIFICATION

Your Bessemeter pinless meter comes factory calibrated and is designed to provide years of reliable service. Keep in mind, however, that a sharp impact or undue exposure to the elements (moisture, dust, wide temperature swings, etc.) may potentially affect the meter's electronics and its calibration setting. If at any time you wish to verify that your meter is still calibrated per factory specifications, use the Calibration Verification Reference (CVR) device that is sold separately. Simply follow the instructions found on the label of the CVR. If the readings you obtain exceed the tolerances listed on the CVR label, please contact customer support at www.Bessemeter.com.

BATTERY

If BAT appears in your meter's display, the battery should be replaced immediately, as further measurements will likely be inaccurate.

How to Replace the Battery: No special tools are needed. Replace with 9-volt, non-rechargeable Alkaline or Lithium, or rechargeable NiMH batteries. Carefully open the battery compartment door on the rear and remove the old battery. Insert the new battery in the compartment, being sure to observe proper battery polarity (+, -). The battery fits snugly and will not dislodge while taking measurements. Re-attach the battery compartment door carefully until it snaps back in place.

STORING YOUR METER

When you are not using your Bessemeter pinless meter, it is recommended that you store it in the case provided with your meter under the storage temperature and humidity conditions specified on page 12. If your meter is to be stored without using it for longer than 30 days, remove the 9-volt battery.

2-YEAR WARRANTY

All Bessemeter pinless meters include a 2-year warranty. View warranty information at www.bessemeter.com/warranty

Customer Support/Technical Support
www.bessemeter.com/contactus

Register your meter online at
www.Bessemeter.com/register

By registering, you will receive important product updates as well as announcements about new products and accessories.

SPECIFICATIONS

Dimensions:
- Length: 5.60 inches (142mm)
- Width: 2.80 inches (71mm)
- Thickness: 0.86 inches (22mm)

Weight:
- 5.44 ounces (154.2 g) with the battery,
  3.92 ounces (111.1 g) without battery

Scanning Area:
- 2.0 inches (51mm) x 2.5 inches (64mm)

Measurement Depth:
- S300: ¼" (6mm) Depth
- D300: ¾" (19mm) Depth
- DS500: ¼" (6mm) Depth and ¾" (19mm) Depth

Specific Gravity Range:
- 0.3 to 1.0

Moisture Content Range:
- 6.0% to 32.0% MC range for wood

Precision:
- 0.1%

Auto Power Shutdown:
- 60 seconds

Power:
- 9V Battery (Bessemeter recommends using non-rechargeable Alkaline or Lithium, or rechargeable NiMH batteries)

Operating Temperature:
- +32 deg F to +110 deg F (+0 deg C to +43 deg C)

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

SPECIES SETTINGS TABLE

Species	Setting		
Afrormosia	0.65	Ash, White	0.60
Alder, Red	0.41	Aspen, Bigtooth	0.39
American Red Oak	0.63	Aspen, Quaking	0.38
Andiroba	0.57	Avodire	0.51
Ash, Black	0.49	Baldcypress	0.46
Ash, Blue	0.58	Balsamo (Myroxylon balsamum)	0.83
Ash, Green	0.56	Balsamo (Protium spp.)	0.55
Ash, Oregon	0.55	Banak (Virola spp.)	0.45
Ash, Red	0.55	Basswood, American	0.37
		Beech, American	0.64

Beech, Euro	0.67	Butternut	0.38	Cedrella	0.39	Ebony	0.94
Benge (Guibourtia arnoldiana)	0.70	Cativo	0.42	Cherry, Black	0.50	Elliotis Pine	0.59
Birch, Paper	0.55	Cedar of Lebanon	0.53	Chestnut, American	0.43	Elm, American	0.50
Birch, Sweet	0.65	Cedar, Alaska	0.44	Cocobolo	0.85	Elm, Rock	0.63
Birch, White	0.53	Cedar, Atlantic White	0.32	Cottonwood, Balsam Poplar	0.34	Elm, Slippery	0.53
Birch, Yellow	0.62	Cedar, Eastern Red	0.47	Cottonwood, Black	0.35	English Cherry	0.58
Box	0.83	Cedar, Incense	0.37	Cottonwood, Eastern	0.40	English Oak	0.57
Brazilian Cherry	0.83	Cedar, Northern White	0.31	Degame	0.72	European Ash	0.58
Brazilian Mahogany	0.47	Cedar, Port Orford	0.43	Determa	0.55	European Walnut	0.56
British Elm	0.53	Cedar, Western Red	0.32	Dogwood, Flowering	0.72	Fir, Balsam	0.35
Bubinga (Guibourtia spp.)	0.75	Cedar, Yellow	0.44	Douglas Fir	0.48	Fir, California Red	0.38

Fir, Grand	0.37	Hemlock, Eastern	0.40
Fir, Noble	0.39	Hemlock, Mountain	0.45
Fir, Pacific Silver	0.43	Hemlock, Western	0.45
Fir, Subalpine	0.32	Hickory (Pecan), Bitternut	0.66
Fir, White	0.39	Hickory (Pecan), Nutmeg	0.60
Gombeira	1.00	Hickory (Pecan), Water	0.62
Guatambu (Argentinean)	0.70	Hickory (True), Mockernut	0.72
Guatambu (Brazil)	0.79	Hickory (True), Pignut	0.75
Gum, Black	0.50	Hickory (True), Shagbark	0.72
Gum, Red	0.52	Hickory (True), Shellbark	0.69
Hackberry	0.53	Hickory, Pecan	0.66

Holly, American	0.55	Keruing (Dipterocarpus spp.)	0.76
Hophornbeam, Eastern	0.70	KOA (Acacia Koa)	0.63
Hura	0.40	Larch, Euro	0.48
Indian laurel	0.79	Larch, Western	0.52
Ipe	0.99	Laurel, California	0.55
Iroko	0.57	Limba	0.40
Jacaranda	0.34	Locust, Black	0.69
Jarrah	0.75	Macassar Ebony	0.90
Jelutong	0.38	Madrone, Pacific	0.64
Kapur	0.70	Magnolia, Southern	0.50
Karri	0.79	Mahogany, African	0.44

Mahogany, True	0.47	Mesquite	0.86
Manni	0.63	Monkeypod	0.50
Maple, Bigleaf	0.48	Mountain Ash (Eucalyptus spp.)	0.62
Maple, Black	0.57	Muninga	0.59
Maple, Hard	0.60	Myrtle, Oregon	0.55
Maple, Red	0.54	Myrtle, Tasmanian	0.64
Maple, Silver	0.47	Oak (Red), Black	0.61
Maple, Soft	0.49	Oak (Red), Cherrybark	0.68
Maple, Sugar	0.63	Oak (Red), Laurel	0.63
Merbau	0.67	Oak (Red), Northern	0.63
Mersawa	0.54	Oak (Red), Pin	0.63

Oak (Red), Scarlet	0.67	Oak, White	0.68
Oak (Red), Southern	0.59	Obeche	0.32
Oak (Red), Water	0.63	Okoume	0.35
Oak (Red), Willow	0.69	Olive	0.81
Oak (White), Bur	0.64	Opepe	0.68
Oak (White), Chestnut	0.66	Padauk (Pterocarpus indicus)	0.57
Oak (White), Overcup	0.63	Padauk (Pterocarpus macrocarpus)	0.79
Oak (White), Post	0.67	Padauk (Pterocarpus marsupium)	0.71
Oak (White), Swamp Chestnut	0.67	Parana Pine	0.49
Oak (White), Swamp	0.72	Pecan	0.60
Oak, California Black	0.53	Peroba de Campos	0.66

Peroba Rosa	0.71	Pine, Spruce	0.44
Persimmon, Common	0.71	Pine, Sugar	0.36
Pine, Lodgepole	0.41	Pine, Virginia	0.48
Pine, Longleaf	0.59	Pine, Western White	0.35
Pine, Pitch	0.52	Poplar, Yellow	0.42
Pine, Pond	0.56	Plane (Lacewood)	0.49
Pine, Ponderosa	0.40	Primavera	0.42
Pine, Red	0.46	Purpleheart	0.71
Pine, Sand	0.48	Radiata Pine	0.45
Pine, Shortleaf	0.51	Ramin	0.56
Pine, Slash	0.59	Redwood, Old-Growth	0.40

Redwood, Young-Growth	0.35	Spruce, Engelmann	0.35
Roble (Tabebuia spp.)	0.55	Spruce, Red	0.40
Rosewood, Brazilian (Dalbergia nigra)	0.84	Spruce, Sitka	0.40
Rosewood, Indian	0.79	Spruce, White	0.36
Rubberwood	0.51	Sweet Chestnut	0.51
Sapele	0.60	Sweetgum	0.52
Sassafras	0.46	Sycamore, American	0.49
Scots Pine	0.45	SYP (Southern Yellow Pine)	0.56
Spanish Cedar	0.44	Tamarack	0.53
Spruce, Northern	0.36	Tanoak	0.64
Spruce, Black	0.42	Tatajuba	0.72

Tauari (Couratari spp.)	0.53
Tawa (Beilschmiedia tawa)	0.62
Tawa (Pometia spp.)	0.58
Teak	0.57
Tupelo, Black	0.50
Tupelo, Water	0.50
Virola (Virola spp.)	0.45
Walnut, Black	0.55
Wenge (Millettia spp.)	0.82
Willow, Black	0.39
Yellow-Poplar	0.42

Yew	0.63
Zebrano	0.77

Plywood, OSB, and MDF	Setting
Plywood	0.57
OSB	0.62
Permacore MDF	0.70
HDF core	0.85
Advantech™	0.70

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