



USING WOOD MOISTURE METERS

NEKDA FALL MEETING

Burlington, VT

30 October 2014



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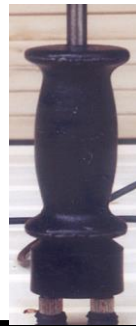


Moisture meters measure an electrical property of the wood which is affected by the amount of moisture present.

- Pin meters – Conductance (DC resistance)
- Pinless meters – Capacitive Admittance (Dielectric)
 - ✓ RF/Wave technology - capacitance
 - ✓ Impedance
- Measure wood MC as a % of the oven-dry weight of the wood
– ASTM D4442
- Oven test – primary method



- **Pin meter** – electrodes measure the current between two points of contact.
- **Pinless meter** – transmits electromagnetic wave energy to detect the influence of moisture as an estimate of MC.





Why use a Moisture Meter when drying lumber?

- Wood is hygroscopic
- Results are immediate
- Less labor
- Larger sample
- Wet spots
- Easy to use



Which meter?

Must consider :

- Factors that can potentially affect a meter reading
- Achieving the best accuracy possible
- Impact of client demands/practices



Factors That can Potentially Affect a Meter Estimate of MC

1. Species
2. Specific gravity (density)
3. Wood temperature
4. MC Range
5. MC Gradient
6. Presence of wet pockets
7. Surface moisture
8. Sample size (width and thickness)
9. Surface quality



Species

Pin Meter

- ✓ Correction factor required
- ✓ Regional differences can be an issue
- ✓ Source differences

Pinless Meter

- ✓ Species correction is a factor of SG – ratio of the weight of the wood / weight of an equal volume of water



Specific Gravity

Pin Meter

- ✓ No correction required
- ✓ Species corrections most likely incorporate effect of SG as well as chemical differences between species

Pinless Meter

- ✓ Meter readings must be corrected
- ✓ SG variations within a species
- ✓ SG values in literature are variable (regional differences)
- ✓ DIC – green volume, oven dry (0%MC)



Wood Temp

Pin Meter

- ✓ Meter readings affected by wood temperature and must be considered under conditions other than testing at normal indoor ambient conditions.

Pinless Meter

- ✓ Meter readings are affected but not to the same extent as DC-resistance.
- ✓ Still need to correct if testing at extremes of temperature



MC Range

Pin Meter

- ✓ Accurate results within 6 to 25% range (below FSP)
- ✓ Readings outside this range are a relative indication of MC

Pinless Meter

- ✓ Useful results below FSP
- ✓ Readings down to 5%
- ✓ More stable at low MC than DC-resistance



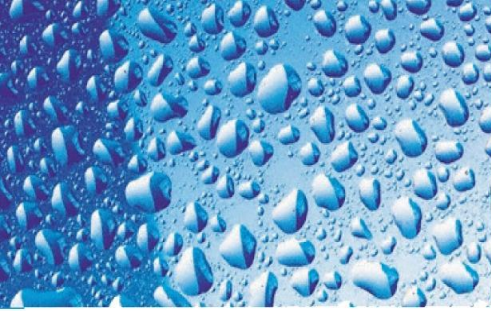
MC Gradient

Pin Meter

- ✓ Meter can be used to test for presence of a MC gradient.
- ✓ Affects estimate of MC obtained.
- ✓ Need to be aware and drive pins to appropriate depth
- ✓ Good estimate of average possible (i.e. pin at 1/5th depth)

Pinless Meter

- ✓ Meter cannot detect presence of a gradient but is affected by it.
- ✓ Produces an estimate of the average to a certain depth
- ✓ Depth of penetration varies by meter make and model



Wet Pockets

Pin Meter

- ✓ Hitting a wet pocket will cause over-estimate
- ✓ Need to probe a lot to find wet pockets

Pinless Meter

- ✓ Easy to scan over surface of board to find wet pockets
- ✓ Reading is not as heavily influenced when you find one (averaging effect)
- ✓ Larger wet pockets will have more pronounced effect than very small ones



Surface Moisture

Pin Meter

- ✓ Will not affect reading if insulated pins are used and in good condition
- ✓ Can still detect for presence of wet surface by touching pins

Pinless Meter

- ✓ Has an influence on MC estimates obtained
- ✓ May cause to over-estimate average MC



Size – Width – Thickness

Pin Meter

- ✓ Meter readings not affected by sample size
- ✓ Meter reading is very specific to wood between tips of pins
- ✓ Thickness compensated for by pinning depth

Pinless Meter

- ✓ Board width / sensor plate
- ✓ Meters have depth of penetration limit
- ✓ Thin material - be conscious of material behind sample
- ✓ Thick material (over 2-inches) - may not penetrate to core



Surface Quality

Pin Meter

- ✓ Not affected

Pinless Meter

- ✓ Rough surfaces reduce the contact between sensor and wood and tend to reduce the reading
- ✓ Can be compensated for



Other Factors

- ✓ Electrode - 2 or 4 pins/ insulated vs. non-insulated
- ✓ Grain direction
- ✓ Static electricity – low RH
- ✓ Frozen lumber
- ✓ Treated lumber
- ✓ Meters do not always agree – corrections, pins' penetration, standards



Other Factors

YOU – the user

- ✓ Be aware of, compensate for, or avoid the factors that affect your readings
- ✓ Basic care – calibration, batteries, pins

Proscan

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WHEN ACCURACY IS THE POINT.™

- ✓ Primary and secondary markets
- ✓ Digital readout (5%-30%)
- ✓ Internal adjustment for SG
- ✓ Penetration – 3/4in+
- ✓ Alarm to alert for high readings
- ✓ Analog version available

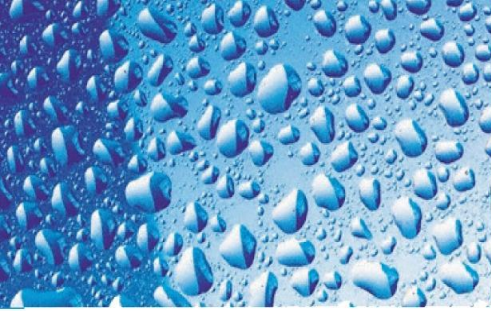




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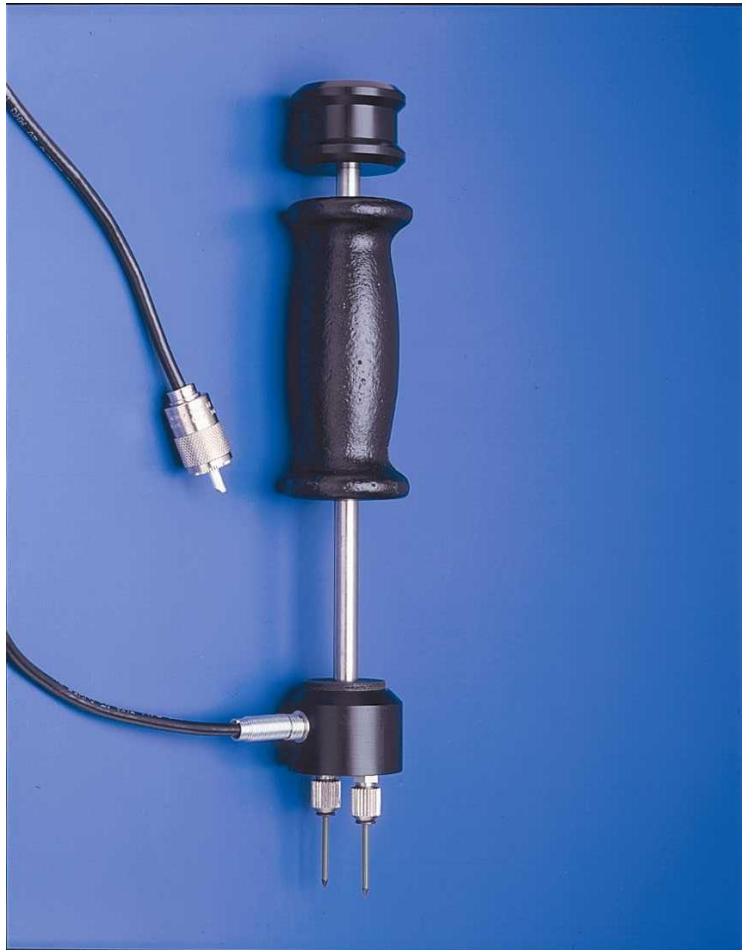


- ✓ Internal species and temperature corrections
- ✓ Memory – total no. of readings, average, highest
- ✓ 5/16" penetration – non-insulated pins
- ✓ Use with 26-ES (insulated pins) in drying application



26-ES Hammer Electrode

Insulated pins – use
on stock up to 5-6in
thick



Management Tool

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WHEN ACCURACY IS THE POINT.™

- ✓ Collect many readings and statistics on groups, not individual samples
- ✓ Generate reports for QC and client requirements
- ✓ Use with the basic elements of wood-moisture relationship in mind





Recap

Use Moisture Meters with confidence.....

- ✓ Follow manufacturer's procedures
- ✓ Know the meter's capabilities
- ✓ Apply your knowledge and experience
- ✓ Fast and accurate
- ✓ Proven and essential tools



THANK YOU!

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