

# HOW TO GET THE MOST FROM YOUR WAGNER EQUIPMENT

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To begin, it needs to be stated plainly that "no matter how good a measurement instrument is, incorrect use will render it ineffective". Obvious statement, but believe it or not the rule is unfortunately not followed often when measuring moisture content in lumber.

Correct measurement of MC in lumber is very important, so it follows that the correct usage of MC instrumentation is also important. Let's begin to look at correct usage of commonly-used Wagner Electronics products here in Western North America.

First of all, make sure the instrument is in working condition. Does it turn on correctly? Are the batteries in good shape? Is it free of physical damage? Next consideration: an uncalibrated instrument is not very useful. Therefore, prior to use, an instrument's calibration should be checked to assure that you are starting off on the right foot. Wagner handheld meters, and any moisture meter of any good quality, will have a factory calibration standard available to field-verify the calibration of the instrument. Once you have checked-out the above items and determined everything is OK, you are ready to use the meter.

If you are using a meter with a microprocessor that allows you to change the species setting of the meter, then you need to do so. The wrong species setting (meter set on Douglas-fir when you need it set on lodgepole pine, for example) will cause some very interesting (and incorrect) results. If you are using an older style analog-type meter that does not allow for programming the species, then you will need to manually correct the readings using a species adjustment table located in the manual. After awhile, you may have this somewhat memorized, but the point is that the correct species adjustment or setting is important, especially when more accuracy is required.

When measuring lumber using a Wagner meter, you need to follow the rules below:

- Make sure the meter's actual sensor area is completely covered with wood.

- Make sure that there is a small air gap on the bottom (other) side of the board opposite the meter's sensor.

- Press firmly down; don't break the meter, just firm pressure.

- Don't measure where there is a knot or defect; measure clear, flat areas of the face of the lumber.

- If there is noticeable surface moisture, try to not measure at that spot right away, or at all. Once moisture soaks in a bit, the effect is minimized.

## **The Wagner Stack Probe Attachment for Checking Stickered Lumber**

Keep something in mind as I go through this next phase: The goal is a better FINAL lumber product that meets your MC and grade goals, AND ultimately, your \$ goals.

In any process measurement scenario, consistency, repeatability and correlation are key. One of the big misunderstandings that I have run across is in the correct use of the Wagner model L712 stack probe attachment that is used to measure the MC of stickered lumber, hot and cold.

Make sure your method of using the stack probe is consistent; repeatable:

1. Are all personnel taking the same number of readings?
2. Are the readings being taken at the same time in the schedule?
3. Are the readings taken at the same spot in the same packs every time?
4. Repeatability!

Next, you should be looking for a good correlation between your stack probe readings and your final MC results at the planer. Example:

"When I get hot check MC readings averaging 18% when measuring packs 3, 7, 10 and 12 in Kiln #1, taking 50 readings in each pack in the same courses every time, after 20 hours of drying schedule xxx for 2x4 Douglas-fir, I will be reasonably certain that the MC of this lumber when checked at the planer 3 days from now will be 16.5%. The standard deviation will be xx.xx, and my drying-related grade loss will be x%."

**CORRELATION IS THE KEY!** If your process changes, be prepared to take this into consideration, but do everything you can to control your variables. Don't complicate it by measuring one way this time, and another way the next time.

Another commonly-asked question is, "Why is my lumber MC different at the planer mill this week from last week?" You need to ask yourself:

What Changed?

If my hot check readings were OK, then did I have more MC variability going into the kiln, perhaps?

Are all of my MC instruments and systems calibrated and electronically stable?

Did the lumber go through the planer mill after coming out of the kiln sooner or later than normal?

Another question: "Why are the MC readings lower when I take 'cold-check' readings 3 hours later?" We now know that very high temperatures have some small effect (2-3% MC) on the Wagner instrument's readings, but resistance-type meters are far more affected. Also, keep in mind, that the lumber will continue to dry after coming out of the kiln hot, so some of the measurement anomaly is due to the lumber actually losing more moisture.

Keep the word 'correlation' in mind. Even if the readings were 50 (in other words, some ridiculous but consistent number), but you knew that the lumber was always ready to come out at 50, if you depended on 50 being a good 'number' every time to provide good planer mill MC results, then so be it.

Example: Over the years, mill personnel got used to the fact that they had to correct pin meter readings for the large error due to temperature. The readings might have been 27% hot, but the personnel knew that it really was much lower than that. After awhile, they could quit bothering doing the correction; 27% was 'fine' when they took the readings consistently. Side Note: It is difficult to guesstimate the temperature of the lumber within 5°F. In a recent European study on handmeter measurement technique and accuracy,

it was difficult for mill personnel to correctly estimate wood temperature when attempting to taking MC readings with pin meters.

For more consistent results in MC measuring:

1. If possible, let the wood cool for a couple of hours every time; again, the effect is small, and CORRELATION is still the key, but better absolute accuracy can be obtained.
2. Be very consistent in your process measurements so you can compare "apples to apples" from one week to the next.
3. Take enough measurements to be statistically significant.
4. Make sure to routinely verify instrument calibration.
5. If wishing to verify your planer's In-Line system accuracy, make sure you compare it to the standard to which it was originally calibrated. And remember, the ASTM Oven Dry Method is THE standard for measurement accuracy of moisture in wood.

In summary, try to create consistency in your measurement processes and make sure that your instrumentation is correctly calibrated. Think "Consistency, Repeatability and Correlation", not just accuracy.