



# Owner's Manual – Moisture Pro Penetrating Meter

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*The Moisture Pro uses penetrating pins to very accurately measure the moisture content of wood and other porous building materials.*

## Read and Save These Instructions

Congratulations on your selection of a new Moisture PRO Penetrating Moisture Meter from Dri-Eaz Products, Inc. It is our goal to offer you the best high-performance moisture meter available. We invite your written appraisal and suggestions for improvements. Reading this information will help you achieve maximum benefit from your instrument.

### MOISTURE METERS

Moisture meters are capable of measuring moisture both on the surface and within materials and can be either non-penetrating or penetrating. They help to evaluate the moisture content of solid materials like plaster, drywall, framing, plywood, particleboard, or hardwood floors.

### Moisture PRO Penetrating Meter

The Moisture PRO is a hand-held penetrating instrument designed to accurately measure moisture content in wood. It also provides accurate dry-standard readings in drywall, plaster, insulation and other porous building materials.

The Moisture PRO is portable, battery powered and pocket sized, incorporating the latest electronics into a durable yet lightweight aluminum housing.

The meter features a clear view digital LCD (liquid crystal display). It shows moisture readings from 6% to 44% in wood in 0.1% increments.

A choice of interchangeable electrodes are available, including a shallow penetration pins, deep-wall pins, and hammer-probe pins.

### How does the Moisture PRO Work?

When the pins of the hand-held or hammer electrodes are pressed into wood or other materials, the electrical resistance between the pins is measured and indicated on the digital display. If moisture is present in the material, the electrical resistance between the probes changes. The greater the moisture content, the greater the reduction in resistance. The instrument senses this resistance, then translates it into the percentage of dry-weight moisture content. The insulated pins allow the meter to detect moisture at specific depths in wood and other materials.

### Moisture in Building Materials

The moisture level of wood and wood byproducts must be at an appropriate level to minimize swelling or shrinkage. Rot, mold, and mildew can also be avoided if proper moisture levels are maintained in these materials.

It is extremely important that the water damage restoration professional be certain that wood and other porous building materials, particularly hardwood floors and built-in furnishings, be restored to their original moisture levels before completion of the job.

The most practical and appropriate way of ensuring that these materials are at the correct mois-

ture level for intended use is to use a good quality moisture meter.

### INSTRUCTIONS

#### Battery Strength

The Moisture PRO is fitted with a PP3 9-volt battery. Life exceeding 72 hours of continuous use can be expected. In normal intermittent use, the battery should last up to a year.

To check battery strength, press the ON button. If the battery is below required strength, the warning "LoBat" will appear on the LCD display. Remove the two screws holding the base cap to replace the battery.

#### Instrument Setup

To measure moisture content, insert either the hand held or the hammer action electrode into the Moisture PRO by inserting the DIN plug into the socket fitted on top of the instrument. Remove the pin cover (care should be taken as contact pins are sharp and could cause injury). Press or drive these contact pins into the material to be tested. When measuring wood it is recommended that you set the pins parallel to the grain. When the contact pins are in place, press the ON button and the moisture content will be displayed on the LCD dial.

#### Electrode and Pin Types

The Moisture PRO comes with one hand-held electrode, one set of short half-inch general-use pins, and one set of 7-inch insulated pins.

The pins are held by two nuts at the electrode base. To remove or replace them, use a 3/8" open-ended wrench plus a 7/16" open-end or box wrench.

#### Short and Long Pins

The 1/2" pins are connected to the hand-held electrode and are used for wood, plaster, drywall, siding, and similar building materials.

The 7" pins can reach deep into materials like insulation. To measure insulation behind plaster or drywall, drill two small holes the right distance apart, then insert the pins. The pins are insulated so that only the tips deliver a reading. Be sure the tips are not touching a conductive surface like a foil moisture barrier on fiberglass insulation.

Do not use the 7" pins with the hammer probe.

#### Hammer Probe Option

The optional hammer probe electrode comes with one set of 1.5-inch pins, which are insulated with the tips left bare. The meter reads the moisture content of the material between the tips. These pins are used mostly for wood flooring and subfloor materials.

#### To get good readings without breaking pins:

1. Hold the Hammer Probe at **right angles** to the wood with the pins touching the surface. **Do not** drive pins at an angle, as this may break the pins.

2. **Gently** slide the hammer-weight up and down to commence tapping the pins into the wood. Once the pins have entered the wood, you can apply more force to the hammer-weight to drive the pins.
3. When removing the pins less force is needed. Simply tap the hammer-weight gently upwards and the pins will come out easily. **Do not** twist or pull the Hammer Probe in order to remove the pins.

To get separate readings on hardwood and the subfloor underneath, first hammer the tips into the hardwood and take that reading. Then hammer further until the tips are in the subfloor, and take a separate reading there.

#### Wood – Measuring Moisture Content

The Moisture PRO is calibrated to measure the percentage moisture content (MC) of wood. It is accurate in a range from 6% to 44%. The calibration of the Moisture PRO moisture meter is an average of readings taken on various commonly used woods. These readings can be affected by different species.

Different species of wood vary in density and makeup. This can affect the electrical resistance of the wood, resulting in varied meter readings for the same moisture content. The [Species Grouping Table](#) is provided for guidance.

Group 1	Group 2
Douglas Fir	Pine - varieties
Oak - American Red	Redwood
Gum - Red	Larch
Maple - Sugar	Birch
Maple - Canadian	Poplar
Group 3	Group 4
Pine - White	Fir - White
Cherry	Fir - Red
Cedar	
Sitka Spruce	
Group 5	Group 6
Ash - European	Teak
Oak - White	Sycamore
Mahogany - Honduras	Mahogany - Philippines
	Elm

#### Example

Take the example of Sitka Spruce with a meter reading of 15%. Consult the [Species Adjustment Table](#) below. As Sitka Spruce is a Group 3 Species, read down the Group 3 column to the "15" row. The corrected reading is 16.2%.

Meter Reading or Group					
1	2	3	4	5	6
7	7.3	7.9	7.6	6.8	6.0
10	11.0	11.0	10.8	9.6	8.5
12	13.3	13.1	12.9	11.4	10.4
15	16.5	16.2	16.0	14.2	12.8
20	21.5	21.6	21.3	18.6	16.3
24	25.6	26.0	25.4	22.2	19.6
26	27.5	28.2	27.5	24.0	21.5

## Temperature Adjustment

Meter readings can be affected by wood temperature. The meter is calibrated at 68° F (20° C). At higher temperatures, the meter readings are higher and at temperatures below 68° F the meter readings are lower. The [Temperature Adjustment Table](#) is provided for guidance.

In general, at temperatures of 50° to 80° F or 10° to 27° C the accuracy of the meter will typically be within 1 - 2% and temperature adjustment may not be necessary.

**EXAMPLE:** If meter reads 15% and temperature of wood is 140°F, the actual moisture content would be 15 - 5 = 10%.

F°	C°	7%	10%	12%	15%	20%	26%	30%
20	-10	+3	+4	+6	+8	+10	+12	+15
40	5	+1	+2	+2	+3	+4	+5	+7
50	10	+0	+1	+1	+2	+2	+3	+4
68	20	+0	+0	+0	+0	+0	+0	+0
80	30	+0	-1	-1	-1	-1	-2	-2
100	40	-1	-2	-2	-3	-3	-3	-4
122	50	-1	-3	-3	-4	-5	-7	-8
140	60	-2	-3	-4	-5	-6	-8	-10
158	70	-3	-4	-5	-6	-8	-10	-12

## Chemical Treatment / Contamination

Certain flame retardants, preservative treatments and contamination by salt water will affect readings, as will some paints such as aluminum primer. When they exist, take these conditions into account when experiencing higher than expected results.

## Surface Moisture

Surface moisture from wetting or condensation can affect readings, especially of pins without insulation. Take care that high readings are not the result of surface moisture. On wet surfaces, use insulated pins with the hammer probe electrode. Readings can be taken at different depths unaffected by moisture on the surface.

## Non-Wood Materials –

### Determining if Dry or Abnormally Wet

When measuring non-wood materials such as drywall, insulation, plaster, or concrete, the Moisture PRO gives a relative reading. (To get an exact reading for drywall, for example, the meter would need to be calibrated for drywall and might require different electrodes.)

You can still use the Moisture PRO to determine whether non-wood materials have an abnormally high moisture content. To do this, compare your reading from a non-wood material to *the reading from a similar material that you know is dry*.

To measure drywall, for example, find drywall that was not affected, elsewhere in the building or even in a similar nearby building. Take several such readings and average them together, to get a "dry standard." The reading will be an approximate, not an exact moisture content reading. However, you will be certain when the material in question is abnormally wet, and when it is dry.

## USE IN RESTORATION

### Initial Procedures

Take measurements every 12 to 24 inches, moving outwards from the apparent source of the water damage. Examine and test all affected areas and adjoining rooms. Keep in mind that the obvious limits of flooding may be only the "tip of the iceberg."

## Evaluating Materials

Evaluate the materials for type and condition. Make note of any obvious signs of moisture within materials. Observe any swelling and buckling of wood flooring materials. Quantify the degree of saturation and moisture with the Moisture Pro. Take a series of moisture readings and note them on a graph or chart.

## Subfloor

Regardless of the type of floor covering, you must learn the type of affected sub-flooring materials. The most common sub-floors are particleboard, plywood, hardwood and concrete. The floor may have several different layers of materials. Evaluate each of them.

The type and condition of sub-floor may help determine the best response for carpet, cushion, and other floor coverings. In all cases, take moisture readings of flooring and sub-flooring materials. Compare them with your moisture standards. Decide whether to dry sub-flooring and other structural materials, or whether to repair and rebuild.

In many cases there are several layers of saturated flooring materials. This holds true even when hard-surface flooring materials such as vinyl or tile cover the sub-floor. Water can seep around the edges and become trapped below the non-porous floor covering, where it can weaken the adhesive and/or cause floor damage.

## Particle Board

Particleboard is quite porous and is quickly damaged by standing water, especially if the water was hot. Are there any signs of swelling around nails? Do nails appear rusty? Has the particleboard warped and delaminated? Are there signs of pre-existing urine or water damage? Use the Moisture Pro Meter to evaluate if underlayment is wet below a vinyl floor covering. If the particleboard has swelled or delaminated, the damaged sections must be removed.

## Plywood

Plywood is generally not very porous, and is quite resistant to water. Even interior plywood may sometimes remain wet for several days without permanent damage. As with particleboard, look for delamination, rusty nails, and sign of swelling around nail-heads.

## WARRANTY

**FILL OUT WARRANTY CARD:** Please stop before proceeding and fill out the warranty card.

**INSPECT ON ARRIVAL:** When your Dri-Eaz product arrives, check immediately for signs of shipping damage. If you notice damage, save the shipping carton for claim purposes, and immediately report the problem to your supplier and the shipping company. Also, save the carton for shipping in case your product ever needs repair at a remote location.

**Dri-Eaz promises, to the original purchaser, to perform the following as needed to correct defects in materials and workmanship:**

**1 Year on Parts and Labor:** Cover parts and labor costs for the repair of a Dri-Eaz Airmover, Dehumidifier, Instrument, Accessory, and other product except Marketing Products, for a period of one year from the date of purchase.

**90 Days on Shipping:** Cover shipping costs for the repair of a Dri-Eaz Airmover, Dehumidifier, Instrument, Accessory, or other product except Marketing Products, both to and from the Service

Center, for a period of 90 days from the date of purchase.

**LIMITATIONS:** This warranty shall not extend to any products showing effects of misuse, accident damage, disassembly, alteration, lack of proper maintenance, corrosive chemicals, improper voltage, unauthorized repairs, use of other than genuine parts and materials, fire, flood, normal wear and tear, or any other causes beyond Dri-Eaz Products' control. The warranty obligation extends only to the repairs or replacement of parts found, upon Dri-Eaz Products' examination, to be defective. The foregoing constitutes the entire warranty and no other warranty, liability, contingency or responsibility, direct, indirect, consequential or in any way connected with the sale or operation of products is expressed or implied.

**TO RECEIVE WARRANTY SERVICE:** You must write or call for an RMA (Return Material Authorization). You must have the serial number available. The Dri-Eaz Service Department must authorize all costs, including shipping, for any Service Centers worldwide. Please direct questions to an authorized distributor, or to Dri-Eaz at (360) 757-7776, extension 238.

## PARTS LIST

PART	Number
Moisture PRO Digital Meter	F-140
Hand-Held Electrode	12-00020
Shallow Penetration Pins (0.5")	12-00022
Deep Wall Insulated Pins (7")	12-00023
ABS Case with Foam	12-00025
Optional Hammer Action Electrode	F-143
Hammer Type Pins (1.5")	12-00024

## Other Instruments for Detecting Moisture

**Moisture Counter – Non-Penetrating Meter**  
Non-penetrating meters are most effective for initial troubleshooting and inspection, because they give a quick indication of where the moisture source is located, or where the material contains "abnormal" moisture. The Moisture Counter is a fast, easy, reliable non-penetrating meter.

### HydroSensor Moisture Probe

Use the HydroSensor for simple and quick moisture detection of carpets, cushion, and some other flooring materials, walls, and furniture. The amount of moisture present in the material determines how easily an electrical current passes from one probe to the other, causing a beep and flashing light. The response is faster and louder when more moisture is present.

### DHT 200 Thermo-Hygrometer

The DHT 200 is a dual function digital meter that measures the percent of relative humidity or air over a range of 5% to 95%, as well as the air temperature. Knowing these numbers, you can also calculate GPP (grains per pound).

### DHT 600 Thermo-Hygrometer

The DHT 600 utilizes a high-reliability humidity sensor that gives very accurate readings, and adjusts quickly when moved from one condition to another, such as areas of different temperature. The DHT 600 also has a HOLD function for the display, and automatic power-off function.