INTERNATIONAL

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~~Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters~~Designation: D 4444 – 08

Standard Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters[1]

This standard is issued under the fixed designation D 4444; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 ~~These test methods apply to the measurement of moisture content of solid wood, including veneer, and wood products containing additives, that is, chemicals or adhesives (subject to conditions in 6.4 and 9.4). They also provide guidelines for meter use and calibration by manufacturers and users as alternatives to ovendry measurements.~~

~~1.2Conductance and dielectric meters are not necessarily equivalent in their readings under the same conditions. When these test methods are referenced, it is assumed that either type of meter is acceptable unless otherwise specified. Both types of meters are to be calibrated with respect to moisture content on an oven-dry mass basis as determined by Test Methods D4442~~This test method applies to the measurement of moisture content (MC) of solid wood products, including those containing additives (that is, chemicals or adhesives) for laboratory standardization and calibration of hand-held moisture meters

1.2 This test method makes no distinction between meter measurement technologies for standardization and calibration requirements. Provision is made for test specimen size to accommodate specific meters. Appendix X1 provides an explanatory discussion and history corresponding to the mandatory sections. Fundamental measurement technologies are described in Appendix X2 when available.

1.2.1 Meters employing differing technologies may not provide equivalent readings under the same conditions. When this test method has been applied, it is assumed that the referenced meter is acceptable unless otherwise specified. Meters shall be calibrated with respect to MC by direct measurement as determined by Test Methods D 4442.

~~1.3The method title indicates the procedures and uses for each type of meter:~~

		~~Section~~
~~Method A~~	~~Conductance Meters~~	~~5 to 7~~
~~Method B~~	~~Dielectric Meters~~	~~8 to 10~~

~~1.4~~

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 1990 Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens

~~[1] These test methods are under the jurisdiction of ASTM Committee D07 on Wood and are the direct responsibility of Subcommittee D07.01 on Fundamental Test Methods and Properties.~~

~~These test methods replace, in part, Test Methods D2016 (*Annual Book of ASTM Standards*, Vol 04.09).~~

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[1] This test method is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.01 on Fundamental Test Methods and Properties.

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~~[2] Annual Book of ASTM Standards, Vol 04.10.~~

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D 2915 Practice for Evaluating Allowable Properties for Grades of Structural Lumber
D 4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials
D 4933 ~~Guide for Moisture Conditioning of Wood and Wood-Base Materials~~[2] Guide for Moisture Conditioning of Wood and Wood-Based Materials
D 5536 Practice for Sampling Forest Trees for Determination of Clear Wood Properties
D 7438 Practice for Field Calibration and Application of Hand-Held Moisture Meters
2.2 *Other ASTM Sources:*
ASTM Standards on Precision and Bias for Various Applications, 1992

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *conductance meters*—Conductance meters are those that measure predominantly ionic conductance between points of applied voltage, usually direct current. Direct-current conduct-ance meters are commonly referred to as "resistance" meters. Most commercial conductance meters are high-input impedance (about 10^{12} Ω), wide-range (10^4 to 10^{12} ~~Ω) ohmmeters. Their scales are calibrated to read directly in moisture content (oven-dry mass basis) for a particular calibration species and at a specific reference temperature. Readings of conductance meters are practically independent of the relative density (specific gravity) of the specimen material.~~ Ω) ohmmeters.

3.1.2 *dielectric meters*~~—There are two general types of dielectric meters that may be arbitrarily categorized by their predominant mode of response—power loss and admittance (or capacitance). Both have surface contact electrodes and readout scales that are usually marked in arbitrary units. Most dielectric meters operate in the r-f frequency range, generally between 1 and 10 MHz. Admittance meters respond primarily to capacitance (dielectric constant) of the material being measured. Power loss meters react primarily to resistance of the material. Readings of dielectric meters are significantly affected by the relative density (specific gravity) of the specimen material.~~ —Dielectric meters transmit electromagnetic wave energy into the wood to detect the influence of moisture in the wood on these waves as an estimate of MC. Wave energy is most often in the radiofrequency range; hand-held meters commonly are placed directly on the wood surface.

4. Significance and Use

~~4.1Hand-held meters provide a rapid means of sampling moisture content of wood-based materials during and after processing to maintain quality assurance and compliance with standards. However, these measurements are inferential, that is, electrical parameters are measured and compared against a calibration curve to obtain an indirect measure of moisture content. The electrical measurements are influenced by actual moisture content, a number of other wood variables, environmental conditions, geometry of the measuring probe, and design of the meter. The maximum accuracy can only be obtained by an awareness of the effect of each parameter on the meter output and correction of readings as specified by these test methods.~~

~~METHOD A—CONDUCTANCE METERS~~

4.1 Hand-held meters provide a rapid means of sampling MC of wood-based materials during and after processing to maintain quality assurance and compliance with standards. These measurements are influenced by actual MC, a number of other wood variables, environmental conditions, geometry of the measuring probe circuitry, and design of the meter. The maximum accuracy can only be obtained by an awareness of the effect of each parameter on the meter output and correction of readings as specified by this test method.

4.1.1 This test method employs controlled conditions and straight-grain, clear wood specimens to provide measurements that are reproducible in a laboratory. The controlled conditions prevent moisture and temperature gradients in the test specimen.

4.1.2 In laboratory calibration, the reference direct moisture measurements (for example, Test Methods D 4442) shall be made only in the area of direct measurement of the meter. This minimizes error associated with sampling of differing areas of measurement between this test method and that of the reference (Test Methods D 4442).

4.2 Most uses of hand-held moisture meters employ correlative (predictive) relationships between the meter reading and wood areas or volumes that exceed that of the direct meter measurement (for example, larger specimens, pieces of lumber, or lots). These correlative relationships are beyond the scope of this test method. (See Practice D 7438.)

5. ~~Standardization and Calibration~~

~~5.1Periodic standardization shall be performed on the meter to test the integrity of the meter and electrode. Laboratory calibration procedures are intended to provide reference data under controlled conditions that include the wood and ambient variables. Field calibration tests on species shall be performed only with a meter that has been standardized and properly compensated for temperature and pin configuration. Initially, standardization should be performed before each period of use. The time interval may be extended if experience shows that the particular meter is stable for a longer time under equivalent use conditions.~~

~~5.1.1*Standardization*—The meter circuit shall be tested by connecting external resistors to the electrode pins, noting the corresponding *MC* (moisture content) value, and comparing with manufacturer's data. At least two, and preferably three points shall be used to standardize the meter. The manufacturer shall indicate (in the manual, on the meter or meter scale, or on the supplied resistance standard) the meter model, wood species, and number of pins for which the resistances are valid.~~

5.1.2*Laboratory Calibration*—This procedure is designed for full-scale calibration of the meter. If only a limited portion of the scale requires calibration, the number of *EMC* (equilibrium moisture content) levels can be reduced to as low as two. In any case, the calibration should not be extrapolated below the lowest value. Extrapolation above 21% *EMC* to the fiber saturation point is permissible, provided a value near 21% is obtained. Material other than solid wood shall be prepared and tested in a manner that is consistent with the following calibration procedures. Specimen size and shape may be altered to permit testing of product-sized specimens.

5.1.2.1*Test Sample Preparation*—A minimum of 75 green, flat-sawn specimens 20 mm thick by 75 mm (min) wide by 100 mm along the grain shall be used for a given species. Specimens must be free of visible irregularities such as knots, decay, reaction wood, and resin concentrations (Note 1). The specimens shall be divided into 5 groups of 15 each and conditioned at 25 ± 1°C and selected relative humidities to each of five *EMC* levels between 7 and 21% (see Guide D4933). Each group will then be moisture meter tested in accordance with 5.2.2, and moisture contents determined by a direct method (Test Methods D4442). Alternatively, 15 specimens may be equilibrated (following a desorption path) at each of the 5 *EMC* conditions.

NOTE1—Ideally, samples shall be chosen to be entirely sapwood or heartwood, or two separate groups of each, but not mixed in the same specimens. In the event that sapwood/heartwood mixing is unavoidable, testing and test results shall be modified to report the effect of mixing on the results.

5.1.2.2*Moisture Meter Testing*—The equalized specimens are numbered, weighed, and moisture meter tested at their centers using an electrode in accordance with 6.5. The pins are to be aligned so that the current flow is parallel to the grain. Meter scale readings are to be taken and recorded immediately after the electrode pins are inserted.

5.1.2.3*Species Correction Factor Determination*—The moisture meter scale reading must be regressed against the corresponding moisture content for each specimen in the sample by linear regression analysis. The equation for the regression line ($Y=a+bX$) shall be used to establish the correction factor ($Y-X$) for meter scale readings *(Y)* of 7 to 21 inclusive.

5.1.2.4The following wood sample information shall be recorded: moisture content, size (dimensions in each plane), species, sapwood/heartwood percentage, relative density, growth rate (rings/25 mm), and earlywood/latewood percentage. For other materials, the appropriate wood sample information shall be recorded together with adequate data to identify the product and its constituents. The following meter information shall be recorded: manufacturer and model, reference temperature, applied voltage, and electrode type and configuration.

5.2*Field Calibration*—Under processing conditions, laboratory calibration procedure is impractical, particularly because of moisture gradients. The procedure in 5.1.2 should be applied to develop a meaningful relationship between meter reading and actual *MC*. All field calibrations must be referenced to oven-dry tests to determine precision and bias. Standardization procedures (5.1.1) must be followed to assure valid field calibration at the specific field conditions during testing. Special care must be taken to minimize errors caused by the influence of wood temperature on readings. Specimen size for field testing may be full size or sections thereof.

6.Conductance Meter Use Standardization

5.1 *General*—Standardization provides a measured relationship to a standard reference material that can be used to ensure that a meter is operating properly. Standardization shall be performed to establish the integrity of the meter and electrode. Standardization shall be done before calibration and use. If alternate electrodes can be used with a meter, standardization shall be done for all electrode types and alternate assemblies.

5.2 Standardization shall be based, where feasible, on the direct measurement region of the meter as supplied by the meter manufacturer. If not supplied by the manufacturer, the area of direct measurement shall be determined by test.

5.2.1 If the manufacturer recommends an area, a method, or a standard specimen for standardization that does not reflect the entire direct measurement area of the meter, this shall be noted as the manufacturer recommendation.

5.2.2 The meter circuit and electrode shall be tested with external reference material to verify the precision and bias in the meter response range of anticipated use. The meter shall be evaluated over the range of environmental conditions recommended by the manufacturer. The sensitivity of this standardization procedure to temperature of the meter shall be part of the evaluation.

5.2.2.1 The sensitivity of the standardization reference material to the range of environmental conditions in 5.2.2 shall be evaluated.

5.2.3 *Report*—The report shall indicate (in the meter manual, on the meter or meter scale, or on the supplied reference standard) the meter model, and the electrodes for which the standardization is valid. The sensitivity of the meter, the electrode assembly and the reference material, as evaluated in 5.2.2.1, shall be reported.

5.2.3.1 The manufacturer's recommendation on frequency of standardization shall be included in the report.

6. Calibration

6.1 *Readings*General—Calibration of a meter and the electrode shall establish reference data to adjust meter response for species, ambient conditions, and specimen variables, such as size and density. Meter and electrode assemblies shall be standardized in accordance with Section 5 prior to calibration.

6.2 *Calibration*:

6.1.1*Range*—The range of moisture contents that can be detected by these meters is from a minimum of 6 or 7% *MC* to a maximum of 25 to 27% *MC* (nominal value of the fiber saturation point). Meter scales extend above this limit only to permit temperature corrections of moisture contents up to the fiber saturation point, and do not imply reliability of readings above the fiber saturation point.

NOTE 2—One use of the temperature correction is for "hot metering" of kiln-dried lumber during which readings are taken to determine if the load has reached the desired endpoint *MC*. However, such readings are subject to considerable error because of "edge-readings," assumptions of wood temperature, unknown moisture gradients, and temperature effects on the meter circuitry. A further use of this correction is for moisture measurement of dry lumber that is exposed to below-freezing temperatures. As with hot lumber, considerable errors are possible due to assumptions of wood temperature, unknown moisture gradients, and temperature effects on meter circuitry.

6.1.2 *Moisture Content Readings*—Conductance moisture meters can be used to determine "point" moisture content directly or average moisture content indirectly. Take all readings with the pins aligned so that the current flow is parallel to the grain. Average moisture content can be obtained through the thickness by integrating moisture content versus thickness. Under the following conditions it can also be inferred from a single point measure.

6.1.2.1 *Single Point Average MC Reading*— Wood of rectangular cross section tends to develop a parabolic gradient during drying (assuming that the maximum moisture content is below FSP (fiber saturation point). From the geometry of a parabola, the point of average *MC* lies between one fourth and one fifth of the total thickness. Therefore, if the pins are driven to this point, an approximation can be obtained for average *MC* of the cross section. Using the same principle, a circular cross section has its average *MC* at one sixth to one seventh of the diameter.

NOTE 3—The above generalizations do not pertain if lumber has been dried in conditions that induce steep moisture gradients (such as in drying above 100°C) or if the lumber is known or thought to contain wet pockets or streaks. This can be examined by driving pins to mid-thickness.

6.1.3 *Moisture Gradients*—Unless the moisture distribution and measuring techniques are well understood, readings can be easily misinterpreted. Four special problems should be considered:

6.1.3.1 Noninsulated electrodes (see 6.5.1).

6.1.3.2 Nonparabolic gradients (see Note 3).

6.1.3.3 *Surface Moisture on Electrode*— Surface films of moisture, particularly from condensation on the electrode (insulated pin holder) may cause larger errors. Keep electrodes clean, and store and use under noncondensing conditions.

6.1.3.4 *High Surface MC on Sample*—High surface *MC* of the material from condensation, wetting, and high relative humidity can cause excessively high readings if noninsulated pins are used.

6.1.4 *Drift*—Direct current conductance meters may show appreciable drift toward lower *MC* when readings are taken at the upper portion of the *MC* range. If such drift occurs, take the reading as soon as possible after the pins are driven in and voltage applied.

6.2 *Temperature Corrections*:

6.2.1 *Temperature Effect on Meter*—Meter circuits can be temperature-sensitive, therefore, frequent zero or span adjustments, or both, may be necessary during use. The manufacturer shall indicate the optimum range of temperature for operation of the meter without loss of accuracy due to temperature. It is recommended that whenever possible, the meter be equilibrated with the measurement environment before readings are taken. In no case shall temperature or humidity alter the operating characteristics of a meter (that has been equilibrated and adjusted) to the degree that the accuracy is impaired.

6.2.2 *Temperature Correction*—Make temperature corrections. These are obtainable from manufacturer's data, published data, or using built-in adjustments in the meter. Temperature corrections require special care to obtain the wood (not air) temperature, and may be unreliable to correct some species. A reference temperature of 25°C shall be standard for zero correction. Clearly indicate the reference temperature at some point on the meter. Always make temperature correction before species correction.

6.3 *Species Corrections*:

6.3.1 *Species Correction*—Only use manufacturer's data for the particular meter for either the dial calibration species or corrections for other species or species groups (Note 4) if the data have been developed in accordance with acceptable calibration procedures (5.2) (Note 5). Where correction data are not available, calibrate the meter in accordance with procedure 5.2.

NOTE 4—Species groups (such as Hem-Fir and Spruce-Pine-Fir) may contain species which cannot be visually separated at the point of moisture measurement, or where such separation is impractical.

NOTE 5—For some species, or species groups, property variations related to site or genetics may introduce discrepancies in the correction. In this case, a special calibration should be made, with emphasis on documenting the wood properties. Area of Measurement—Calibration shall be based, where feasible, on the direct measurement region of the meter as supplied by the meter manufacturer. If not supplied by the manufacturer, the area of direct measurement shall be determined by test. Every effort shall be made to quantify the capability of the meter assembly to estimate moisture content by reducing extraneous sources of error.

6.2.2 *Sampling and Analysis*—This calibration procedure is designed for full-scale calibration of the meter and electrode assembly. If only a limited portion of the scale requires calibration, the number of equilibrium moisture content (EMC) levels can be reduced to as low as two. Calibration should not be extrapolated below the lowest value. Extrapolation above 21 % EMC to the fiber saturation point is permissible, provided that caution be taken in regression extension beyond the moisture data high end point. Calculation of confidence limit envelopes are recommended with use of regression in this fashion. Stratified sampling and analysis of variance, or both, can be applied to quantify sensitivity to wood characteristics. If the test material is other than solid wood, it shall be prepared and tested in a manner consistent with the solid wood calibration procedures.

6.2.2.1 *Wood Characteristics*—Wood characteristics that need to be treated as measurement variables because they may influence meter readings shall be represented in the calibration sampling. Examples of these variables are density and mineral content. These characteristics shall be included, identified, and measured as part of random sampling from a target population or they shall be sampled separately as part of a strategy of stratified sampling.

6.2.3 *Sample Preparation*—The sample size shall be based on the sampling principles of Practice D 2915, Section 3.4, based upon subsequent subdivision of the sample into sub-sets for conditioning and testing. Specimen size shall be selected to encompass the direct measurement region of the meter/electrode assembly with minimal excess material. Specimens must be free of visible irregularities such as knots, decay, reaction wood, and resin concentrations. The specimens shall be conditioned at 25 ± 1°C and selected relative humidities to each of five *EMC* levels between 7 and 21 % (see Guide D 4933). Alternatively, specimens may be equilibrated (following a desorption path) at each of the five *EMC* conditions.

6.2.3.1 *Species*—Species shall be identified. If the sample represents a species group, the individual species of each specimen shall be identified if anatomically possible.

6.2.3.2 *Sapwood/Heartwood*—Specimens shall be chosen to be entirely sapwood or heartwood, or two separate groups of each, but not mixed in the same specimens. It shall be reported if sapwood/heartwood mixing is unavoidable.

6.2.3.3 *Wood Characteristics*—Specimen selection for wood characteristics shall be considered in setting sample size.

6.2.4 *Testing*—There are two steps in the testing phase of calibration. The first is meter measurements on the wood samples following the procedures of this test method and the applicable criteria provided by the manufacturer. The second step is conducting a direct moisture content determination following Test Methods D 4442.

6.2.4.1 *Meter Measurement*—The equilibrated specimens are numbered, weighed, and a meter measurement taken with the electrode aligned on the specimen in accordance with the manufacturers recommendation. The speed of response of the meter will determine the timing of the meter reading; manufacturer's recommendations shall be followed unless this variable is examined as part of the calibration process.

6.2.4.2 *Direct Moisture Test*—The MC of each specimen shall be determined by the appropriate direct method (Test Methods D 4442) after the meter measurement. Procedures shall be followed to prevent moisture gain or loss from the specimens between the meter measurement and the direct test.

6.2.5 *Correction Factor Determination*—The corrections applied to moisture meters and the precision and bias of the meters may differ significantly between the technology employed and manufacturing variables. Wood characteristics, species, temperature and chemical additives are specimen variables that may require correction factors. The following procedures shall be followed to determine correction factors for meters.

6.2.5.1 *Correction for Wood Sample Characteristics*— The moisture meter scale readings determined from 6.2.4.1 procedures shall be related to the corresponding MC from 6.2.4.2 for each specimen in the sample by regression or analysis of variance analysis.

(1) Species calibrations that are intended to represent an entire species (for example, to correspond to globally-determined design values assigned to structural products) shall be obtained only by conducting species-wide sampling.

(2) The species sampling suggested in this test method is not required to be species-wide. Species representation claims based on less-than species-wide sampling shall be correspondingly limited.

6.2.5.2 *Correction for Wood Sample Temperature*— This correction shall be applied after the meter has been standardized in accordance with Section 5 and calibrated in accordance with 6.2.5.1. The options for this correction are to use a standard temperature correction or to conduct a laboratory calibration.

(1) Determination of Temperature Correction—The correction shall be based on samples prepared as specified in 6.2.2 except that specimens of known MC (Guide D 4933) at 25 ± 1°C (77 ± 1.8°F) shall be placed, with electrodes and temperature probes attached, in a sealed container. The change in indicated MC (meter indication) shall be recorded while changing temperature through the desired range. A final meter reading must be made at 25 ± 1°C (77 ± 1.8°F) to confirm that the MC has not varied from the temperature cycling.

(2) Standard Temperature Correction—If a laboratory determination is not made for conductance meters, the following relationship shall be used to correct MC below the fiber saturation point over the temperature range of 0 to 40°C.

$$MC_2 = MC_1 + (0.06MC_1^{0.5})(T_2 - 25) \quad (1)$$

where:

MC_1 = the MC at 25°C.

This information is presented in Appendix X2.

6.2.5.3 *Correction for Chemical Additives*—Meter assemblies applied to wood materials that have been treated with additives and have adhesives interspersed with the fiber, or both, shall be calibrated with those materials following the precepts of this and previous sections on sampling and preparation. Some discretion is appropriate on temperature and moisture levels, depending on the end use of the products.

6.2.6 *Heartwood/Sapwood*——Some species have substantial differences in meter readings for heartwood and sapwood portions having the same actual moisture contents. In field measurements where these zones cannot be visually separated or where separate heartwood/sapwood measurements are impractical, make some judgment for the correct calibration.

6.4*Corrections For Additives*:

6.4.1*Chemicals*—Wood products which have been treated with preservatives, fire retardants, or dimensional stabilization agents may give abnormal readings (usually high). Of these chemicals, creosote and pentachlorophenol solutions appear to have insignificant effects. However, salt solutions may cause abnormally high readings, that should be considered qualitative or semiquantitative at best. Conductance meters having insulated pins can be used to measure *MC* of materials that have been surface-treated with chemicals provided that confirmation is made of the accuracy through direct *MC* determination (Test Methods D4442).

NOTE6—CCA-C treatment has been reported to be less conductive than salt treatments, reducing the error of readings of treated southern pine to about 2% MC in the range of 12 to 24% MC.

6.4.2*Adhesives*—Adhesives may cause abnormally high readings in reconstituted wood products. Before any particular meter is used in moisture sensing of any particular product containing adhesives, its calibration must be demonstrated on that product. Recalibration must be carried out following any change in processing conditions. The calibrations must be consistent with these test methods.

6.5*Electrodes*:

6.5.1Preferred electrodes for the conductance meter for solid wood measurements are of a two-pin type, insulated except for the tips. If noninsulated pins are used, the wood must be tested for surface moisture content (6.1.3.4). If any other electrode is used, such as four-pin for wood or eight-pin for veneer, the readings must be adjusted as specified by the manufacturer (Note 7) or incorporated into the scale corrections. In no case shall different pin configurations be used interchangeably on the same meter without the appropriate corrections.

NOTE7—Acceptable corrections for solid wood are: reading (two-pin)=0.29+0.91 (reading four-pin), or reading (four-pin)=1.1 (two-pin)−0.32. These pin corrections must be made *after* the temperature correction and *before* the species correction.

6.5.2*Noninsulated Pins*—Noninsulated pins will bias the reading toward the highest moisture content in contact with the pins. If noninsulated pins are used, a higher surface than core *MC* can cause a misleading reading at the depth of the pin tips. This can be tested by noting the indication at initial contact and as the pins are driven in.

6.5.3*Extension Electrodes*—Unless extension electrodes, for example, nails, are insulated except at the tips, the precautions for noninsulated pins apply.

6.5.4*Implanted Electrodes*—Special precautions are necessary to minimize errors caused by changing electrode contact pressure and electrode-wood contact resistance, particularly when the electrodes are implanted in green wood to monitor drying. It is especially important that dc voltage not be applied continuously in order to minimize the buildup of contact interfacial resistance from ion migration.

NOTE8—The use of low frequency ac, intermittent dc, or switched dc voltages can virtually eliminate irreversible ionic migration.

6.6*Sampling for Lot Moisture Content*— Where moisture content measurements are made on full-size pieces, follow the following procedures:

6.6.1*Sampling Point*—For lumber, take the readings on material at least 500 mm from either end and in the center of the face. Make readings in areas that are defect-free and have reasonably straight grain. For materials other than lumber, take readings away from the edges.

6.6.2*Sampling Frequency*—The number of readings per sample or per lot shall be consistent with the desired accuracy. Report—The following wood sample information shall be recorded: MC, size (dimensions in each plane), species and method of species identification, sapwood/heartwood percentage, density or specific gravity, growth rate (rings/25 mm) and ring orientation, and earlywood/latewood percentage. For other materials, the appropriate wood sample information shall be recorded together with adequate data to identify the product and its constituents. The following meter information shall be recorded: manufacturer and model, reference temperature, and electrode type and configuration. The following standardization and calibration information