



# user guide



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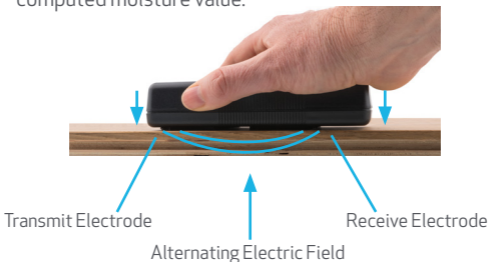
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## INTRODUCTION

Thank you for selecting the MEP - Moisture Encounter Plus from Tramex.

The Moisture Encounter Plus is a patented instrument, which enables non-invasive moisture measurement and detection in a wide range of building materials. The instrument operates on the principle that the electrical impedance of a material varies in proportion to its moisture content.

To measure/detect moisture, the two co-planar conductive rubber electrodes mounted on the base of the instrument case are lightly pressed onto the wood or material sample. The instrument measures the electrical impedance of the sample by creating a low frequency alternating electric field between the electrodes. This field penetrates the material under test to a depth of approximately 30 mm (1¼ inches). The very small alternating current flowing through the field is inversely proportional to the impedance of the material. The instrument detects this current, determines its amplitude and, after processing, drives the pointer of the moving coil meter to the computed moisture value.



As there is a wide variation in the nominal electrical impedance of different material types, the instrument is provided with three selectable scales which are optimized for testing (1) Wood, Timber (2) Drywall, Roofing and (3) Plaster, Brick. By selection of an appropriate scale, the instrument can also be used for the detection and location of elevated moisture in or behind a range of covering materials such as wall, floor, and ceiling tiles, siding, carpet, ceramic tiles and laminated floor coverings.

## **INSTRUMENT FEATURES**

Your Moisture Encounter Plus employs advanced analogue and digital technology to enable the incorporation of many new features, which greatly extend the capability of the instrument.

- Three simple pushbutton controls, ON/OFF, SCALE and HOLD/AUDIO.
- Non-destructive moisture readings taken in wood from 5% to 30% are displayed on a moving coil meter with linear scale.
- Audio signal sounds when meter indicates high reading.
- Comparative readings between zero and 100 can be taken in or through drywall, ceramic tile, carpet, floor coverings, roofing, plaster, and other materials such as brick and cement block. The meter scale is also color coded to assist in identifying areas of wet and dry.
- Automatic supply timeout (10 minutes) conserves battery life.

- Supply timeout is automatically extended if a change in meter reading is detected or if any button is pressed.
- 10 second bleep warning on instrument sounder prior to end of supply timeout period.
- Last used scale is memorized at supply timeout and automatically selected next time ON/OFF button is pressed.
- Three LEDs (light emitting diodes) show selected scale, indicate if HOLD/AUDIO selected and provide warning of battery nearing end of useful life.
- HOLD/AUDIO button freezes moving coil meter, which facilitates readings taken out-of-sight.
- If HOLD/AUDIO was selected prior to supply timeout, the frozen meter reading is digitally memorized and restored next time ON/OFF is selected.

If the battery voltage is getting low, the three LEDs will flash sequentially for a short period. The instrument will continue to operate for some time but it is recommended that the PP3 (9 volt) battery be changed as soon as convenient.

## OPERATING INSTRUCTIONS

The instrument face with brief notes on the push button controls and LED indicators is shown below.



- 1 = Moving coil meter.  
 2 = LED Indicators.  
 3 = Scale Select button.  
 4 = Power ON/OFF button.  
 5 = Hold button.

## OPERATING INSTRUCTIONS

1. Press the ON/OFF button to power up. The LED for the last used scale will light.
2. To change scale, press/release the SCALE button until the LED opposite the required scale lights.
3. Hold your Moisture Encounter Plus directly on the material being tested ensuring both conductive rubber electrodes are fully in contact with the surface.
4. For wood or wood products read the moisture content from the upper line (Wood) of the meter dial which is marked from 5% to 30%. Audio signal will sound when meter indicates high reading.
5. To turn audio signal on or off, press HOLD/AUDIO button twice in quick succession.
6. For drywall, felt roofing, plaster or brick comparative (Relative) readings are taken from the lower line on the meter dial, which is marked from 0 to 100.
7. The instrument will automatically power-off after ten minutes if no button is pressed or if no change in meter reading is detected. If a button is pressed or the meter reading changes, the power-off will be extended for a further ten minutes.

8. To freeze readings press the HOLD/AUDIO button once. While on Hold, the LED for the selected scale will flash slowly. This facility is extremely useful if readings are being taken in areas where it is difficult to see the instrument dial. To remove freeze, press the HOLD/AUDIO button again.

## **WORKING WITH YOUR MOISTURE ENCOUNTER:**

### **Scale 1**

#### **Testing wood and wood products**

- a. When testing wood, power-on, select Scale 1 and press the rubber electrodes directly to the surface. Read the moisture percentage from the top line of the analog dial where calibration is marked from 5% to 30%. If switched on, the audio signal will sound when readings are above 18%.
- b. If possible, always take readings with the length of the instrument parallel to the direction of the wood grain.
- c. Calibration tests were carried out by Forbairt, the Irish Institute for Industrial Research and Standards, and are based on Douglas fir, which has a published specific gravity (SG) of 0.50. For wood having an SG other than 0.50 see "Notes on Specific Gravity" and "How to use the Wood SG Adjustment Tables" on page 13.



- d. Acceptable levels of moisture content depend on climatic conditions and we advise you check the levels acceptable in your area. The table on page 10 shows the approximate relationship between the ambient relative humidity and equilibrium moisture content in woods.
- e. As a rule of thumb and depending on climatic conditions, exterior wood is generally considered safe for painting when the moisture content is 14% or below. Wood below 10% is generally considered suitable for painting indoors. (Always check coating manufacturers recommendations).
- f. The following moisture content levels are often quoted in the wood industry and should be used as a guide only. Please contact industry associations and manufacturers for their specifications.
  - Furniture: 5% to 6% when used in locations of low relative humidity and up to 10% to 11% may be acceptable where the relative humidity is higher.
  - Indoors wood: 6% in low humidity areas. Up to 12% in higher humidity locations.
  - Exterior wood: 10% to 15% depending on local humidity levels.
  - Generally, wood moisture content in excess of 23% - 25% is susceptible to rot.

- Wood moisture content in excess of 18% - 20% may provide an environment for termite and wood-boring insects to thrive and multiply. Wood at these high levels can also support mold and biological growth.
- Wood at 28% moisture content is considered to have reached fiber saturation point.
- g. Avoid taking readings on wood from the top of a stack stored outside as these may be affected by surface moisture from recent rain.
- h. When taking readings in chemically treated wood, it is advisable to allow for possible effects that the treatment may have on readings.

### **Depth of field penetration**

Depending on the density of the material being tested, the instrument field can penetrate approximately 30mm (1<sup>1</sup>/<sub>4</sub> inches) below the surface. When testing thin materials such as wood veneers it is recommended that they are stacked to at least that thickness.

## Relative humidity and moisture content

The table below shows the approximate relationship between relative humidity and equilibrium moisture content of some woods. (These figures are approximate values at a temperature of 70° F, and may vary for different species.)

<b>Relative Humidity</b>	<b>Wood MC %</b>
<b>10%</b>	<b>3 to 5</b>
<b>20%</b>	<b>5 to 6</b>
<b>30%</b>	<b>6 to 8</b>
<b>40%</b>	<b>8 to 9</b>
<b>50%</b>	<b>9 to 11</b>
<b>60%</b>	<b>11 to 13</b>
<b>70%</b>	<b>13 to 15</b>
<b>80%</b>	<b>16 to 19</b>
<b>90%</b>	<b>20 to 22</b>
<b>100%</b>	<b>25+</b>

## Wood Flooring

- a. Excess moisture in wood flooring or concrete sub-floors can cause major problems.
- b. For instance, if installed with excess moisture, the wood can subsequently shrink leading to job failure.
- c. If a wood floor (solid, laminated or engineered) is installed above wet concrete the wood can absorb moisture emitting from the concrete causing the wood to swell and buckle and even cause structural damage to the building.
- d. When vinyl or other impervious coverings are applied over wet concrete, the result can be failure of the adhesive and blistering of the surface.

Your **Moisture Encounter Plus** can be used to measure the moisture content of the wood floor to ensure it meets specification. Likewise it can be used to check, on a qualitative basis, through the floor covering, to identify elevated moisture in the substrate.

### Adhesives

The presence of different species, treatments, adhesives, etc., within products such as plywood, particleboard, OSB (oriented strand board), laminated and engineered woods will affect measurements. If in doubt please contact us and, if you wish, we can work with you in developing your own calibration for a specific product.

### Concrete

Your Moisture Encounter Plus is not calibrated for concrete. The Tramex Concrete Encounter instrument is specifically designed for concrete flooring and is recommended where quantitative measurements are required. However a useful indication of the moisture condition of a concrete or sub floor can be obtained with the Moisture Encounter Plus set on the wall/brick mode. Comparative readings can also be obtained through coverings such as vinyl, carpet and laminated wood flooring by using the drywall scale.

### Notes on Specific Gravity (SG)

The SG of wood varies between species and this has an effect on moisture meter readings. The Moisture Encounter Plus calibration is based on wood having an SG of 0.50. Wood is normally categorised as follows:

Density	SG at 12% MC
Exceptionally Light	0.30 or Less
Light	0.30 to 0.45
Medium	0.45 to 0.65
Heavy	0.65 to 0.90
Exceptionally Heavy	0.90 or More

### How to use the Wood SG tables

When testing wood, which does not have an SG of 0.50, the meter reading can be adjusted by referring to the tables shown on pages 14 and 15. For example, if the wood being tested has an SG of 0.70 and the meter reading is 17% (top row of table) then the adjusted moisture content reading can be found where the 0.70 SG row intersects with 17% meter reading column. For this example the adjusted moisture content would be 13%.

## Wood S.G. Table, 5% to 17% meter reading

WOOD SPECIFIC GRAVITY ADJUSTMENT TABLE (5 to 17%)													
Meter Reading	5	6	7	8	9	10	11	12	13	14	15	16	17
Specific Gravity	<i>ADJUSTED/CORRECTED MOISTURE CONTENT</i>												
0.30	8	9	10	12	13	14	15	16	17	19	20	21	22
0.32	8	9	10	12	13	14	15	16	17	18	20	21	22
0.34	7	8	9	11	12	13	14	15	16	17	19	20	21
0.36	7	8	9	11	12	13	14	15	16	17	18	19	21
0.38	7	8	9	11	12	12	13	14	16	16	18	19	20
0.40	6	7	8	9	11	12	13	14	15	16	17	18	20
0.42	6	7	8	9	11	11	12	13	15	15	17	18	19
0.44	6	7	8	9	10	11	12	13	14	15	16	17	19
0.46	5	6	7	8	10	11	12	13	14	15	16	17	18
0.48	5	6	7	8	9	10	11	12	13	14	15	16	17
0.50	5	6	7	8	9	10	11	12	13	14	15	16	17
0.52	5	6	7	8	9	9	11	11	12	13	14	15	17
0.54	4	5	7	7	8	9	10	11	12	13	14	15	16
0.56	4	5	6	7	8	8	10	11	12	13	13	15	16
0.58	4	5	6	7	8	8	9	10	11	12	13	14	15
0.60	4	5	6	7	8	8	9	10	11	12	13	14	15
0.62	4	5	6	7	8	8	9	10	11	12	13	14	15
0.64	4	4	6	7	8	8	9	10	11	12	13	14	15
0.66	4	4	5	6	7	8	9	10	11	11	12	13	14
0.68	4	4	5	6	7	7	8	9	10	11	12	13	14
0.70	3	4	5	6	7	7	8	9	10	11	11	12	13
0.72	3	3	5	6	7	7	8	9	10	11	11	12	13
0.74	3	3	5	6	7	7	8	9	10	11	11	12	13
0.76	3	3	4	5	6	6	7	8	10	11	11	11	12
0.78	3	3	4	5	6	6	7	8	10	11	11	11	12
0.80	3	3	4	5	6	6	7	8	9	10	10	11	12
0.82	3	3	4	5	6	6	7	8	9	10	10	10	11
0.84	3	3	4	5	6	6	7	8	9	10	10	10	11
0.86	3	3	4	5	6	6	7	8	9	10	10	10	11
0.88	3	3	4	5	6	6	7	8	9	10	10	10	11
0.90	3	3	4	4	5	5	6	7	9	9	9	9	10

## Wood S.G. Table, 18% to 30% meter reading

WOOD SPECIFIC GRAVITY ADJUSTMENT TABLE (18 to 30%)													
Meter Reading	18	19	20	21	22	23	24	25	26	27	28	29	30
Specific Gravity	ADJUSTED/CORRECTED MOISTURE CONTENT												
0.30	23	25	26	27	28	29	31	32	33	34	35	37	38
0.32	23	24	25	27	28	29	30	31	32	33	34	36	37
0.34	22	24	24	26	27	28	29	31	31	32	33	35	36
0.36	22	23	24	25	27	28	29	30	30	31	32	34	35
0.38	21	23	23	24	26	27	29	30	30	30	32	34	35
0.40	21	22	23	24	26	27	28	29	29	30	31	33	34
0.42	20	21	22	23	25	26	27	28	28	29	31	32	33
0.44	20	20	21	22	24	25	26	27	28	28	30	31	32
0.46	19	20	21	22	23	24	24	26	27	28	29	30	31
0.48	18	19	20	21	22	23	24	25	27	27	28	29	30
0.50	18	19	20	21	22	23	24	25	26	27	28	29	30
0.52	17	18	19	20	21	22	23	24	25	26	27	28	29
0.54	17	18	18	19	20	21	22	23	24	25	26	27	28
0.56	16	17	17	18	19	20	21	22	22	23	25	26	27
0.58	16	17	17	18	18	19	20	21	21	22	24	24	25
0.60	15	16	16	17	18	19	19	20	20	21	23	23	24
0.62	15	16	16	17	18	19	19	20	20	21	22	23	23
0.64	15	15	15	16	17	18	18	19	20	20	21	22	23
0.66	14	15	15	16	17	18	18	19	19	19	20	21	22
0.68	14	14	14	15	16	16	17	18	18	19	20	21	21
0.70	14	14	14	15	16	16	17	17	18	18	19	20	20
0.72	14	14	14	15	16	16	17	17	18	18	19	20	20
0.74	13	14	14	14	15	15	16	16	17	18	19	19	20
0.76	13	13	13	14	15	15	16	16	17	18	18	19	19
0.78	13	13	13	14	15	15	16	16	17	17	18	18	18
0.80	13	13	13	13	14	15	15	16	16	17	17	18	18
0.82	12	12	12	13	14	14	14	15	16	16	17	17	18
0.84	12	12	12	13	14	14	14	15	16	16	17	17	17
0.86	12	12	12	13	14	14	14	14	15	16	16	17	17
0.88	12	12	12	13	14	14	14	14	15	15	16	17	17
0.90	12	12	12	12	12	13	14	14	15	16	16	17	17



## WORKING WITH YOUR MOISTURE ENCOUNTER:

### Scale 2

#### Testing built-up roofing

- a. The presence of moisture in built-up roofs covered with multi-ply roofing felt, PVC, modified bitumen (torch-on) or other membranes, can cause blistering and splitting of the roof surfacing. In addition moisture can cause considerable damage to the contents and fabric of the building as well as heat loss through wet insulation. Your Moisture Encounter Plus can be used to confirm a new roof has been installed dry.
- b. When the waterproofing membrane develops a leak, the water can travel within the built-up-roof structure and enter the building some distance away. Testing the membrane surface and comparing the dry areas with areas where moisture is present below the surface can assist in tracing such a leak to its source.
- c. As there are many different types and thickness sizes of roofing membranes, it is not possible to give a calibrated percentage measurement. Instead, the comparative scale, marked 0 to 100, is used for checking the difference between wet and dry.

- d. If gravel surfacing is present, this should be removed to ensure your Moisture Encounter Plus comes into direct contact with the surface of the membrane.
- e. It is recommended that a core be cut to determine the depth and extent of the moisture before carrying out roof repairs. Alternatively, the area can be checked with a Tramex Professional resistance type moisture meter with insulated pins.

### **Testing Drywall**

Because of its deep signal penetration, your Moisture Encounter Plus can identify excess moisture within and behind drywall. It can also identify excess moisture behind ceramic tile and other wall coverings. As calibration is not practical on this type of construction, readings should be taken from the comparative scale (0 to 100) on the meter dial.

### **Testing on ceramic tiles and other wall and floor coverings**

Your Moisture Encounter Plus can be used to detect and identify areas of elevated moisture within or behind most types of wall and floor coverings. For example the Moisture Encounter Plus can detect elevated moisture behind most types of ceramic tiles.

Excess moisture trapped behind covering materials such as ceramic tiles, carpet, wall coverings etc can cause major problems. For instance, excess moisture behind ceramic tiles on drywall or other substrates can cause decay, delamination and mold growth, the longer these problems go undetected the worse the problem can get eventually leading to system failure.

As calibration is not practical because of the variation in composition of these types of construction, tests should be carried out on a comparative basis selecting the most appropriate scale, and readings should be taken from the 0 to 100 comparative scale on the meter dial.

## WORKING WITH YOUR MOISTURE ENCOUNTER: Scale 3

### Testing plaster or brick

- a. Your Moisture Encounter Plus gives qualitative (relative) reading on walls, plaster, brick, drywall and block. Make sure the appropriate wall scale is used i.e. Scale 2 for drywall and Scale 3 for plaster or brick. Always press the electrodes firmly against the surface.
- b. The moisture profile of a wall can be determined by sliding your Moisture Encounter Plus across the surface where it will read through most paints, vinyl, wall coverings and even ceramic tiles.
- c. The Moisture Encounter Plus will help identify the different levels of moisture even if not apparent on the surface. Moisture can often be trapped behind drywall and wall covering.
- d. Rising damp and moisture migration from leaks and defective, or non-existent, vapor barriers can be identified and profiled and often its source identified by sliding the instrument across the wall surface.
- e. Water damage following flooding or fire fighting can be checked and the drying out and de-humidification process can be monitored.

**Acceptably Dry Plaster or Brick**

Your Moisture Encounter Plus will give low readings when the plaster or brick is acceptably dry. Due to the hygroscopic nature of these materials, moisture values are affected by ambient humidity and thus can vary according to climatic conditions. We recommend you satisfy yourself as to what is 'acceptably dry' in your area, and use the instrument to compare these with areas that are unacceptable.

**Limitations**

The Moisture Encounter Plus will not detect or measure moisture through any electrically conductive materials including metal sheeting or cladding, black EPDM roofing, butyl roofing, aluminum siding or wet surfaces.

**Calibration**

For regular on-site assessment of your MEP in moisture measurement mode, a calibration-check box is available from the suppliers of your MEP. Should it be found that readings are outside the set tolerances, it is recommended that the MEP be returned for re-calibration. Calibration adjustments should not be carried out by anyone other than Tramex or their authorised service provider who will issue a calibration certificate on completion.

Requirements for quality management and validation procedures, such as ISO 9001, have increased the need for regulation and verification of measuring and test instruments. It is therefore recommended that calibration of the MEP should be checked and certified in accordance with the standards and/or protocols laid down by your industry (usually on an annual basis) by an authorized test provider. The name of your nearest test provider and estimate of cost is available on request.

### **Warranty**

Tramex warrants that this instrument will be free from defects and faulty workmanship for a period of one year from date of first purchase. If a fault develops during the warranty period, Tramex will, at its absolute discretion, either repair the defective product without charge for the parts and labour, or will provide a replacement in exchange for the defective product returned to Tramex Ltd

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care.

In no event shall Tramex, its agents or distributors be liable to the customer or any other person, company or organisation for any special, indirect, or consequential loss or damage of any type whatsoever (including, without limitation, loss of business, revenue, profits, data, savings or goodwill), whether occasioned by the act, breach, omission, default, or negligence of Tramex Ltd., whether or not foreseeable, arising howsoever out of or in connection with the sale of this product including arising out of breach of contract, tort, misrepresentation or arising from statute or indemnity. Without prejudice to the above, all other warranties, representations and conditions whether made orally or implied by circumstances, custom, contract, equity, statute or common law are hereby excluded, including all terms implied by Section 13, 14 and 15 of the Sale of Goods Act 1893, and Sale of Goods and Supply of Services Act 1980.

### **Warranty claims**

A defective product should be returned shipping pre paid, with full description of defect to your supplier or to Tramex at address shown on the back of this guide.

### **Product development**

It is the policy of Tramex to continually improve and update all its products. We therefore reserve the right to alter the specification or design of this instrument without prior notice.

### **Safety**

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



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