CONCRETE MOISTURE ENCOUNTER X5

- CMEX5 -

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USER GUIDE

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INTRODUCTION

Thank you for selecting the new Concrete Moisture Encounter X5 instrument, from Tramex. This Concrete Moisture Encounter has 4 measurement modes.

1. **Non-destructive test (NDT) mode**
   The Tramex Concrete Moisture Encounter X5 is a non-destructive digital multi moisture meter for concrete floors and slabs utilizing state of the art electronic technology to provide instant and precise quantitative measurement of moisture content based on the gravimetric oven testing method. The CMEX5 also provides Carbide Method equivalent readings for concrete and other cementitious substrates as well as comparative readings as per ASTM F2659.

2. **Hygrometer mode**
   The built-in Ambient Relative Humidity Sensor measures Ambient Relative Humidity, Temperature, Dew Point and Humidity Ratio (or Mixing Ratio) of the environment.

3. **Equilibrium/Ambient Relative Humidity mode (optional plug-in probe)**
   Using the optional plug-in Hygro-i2 RH probes, the Concrete Moisture Encounter X5 will measure Equilibrium Relative Humidity, Temperature, Dew Point and Humidity Ratio in structural materials. A structural material such as a concrete slab can be tested using the in-situ method or RH Hood methods (International Standards: ASTM F2170 & BS 8201, 8203, 5325). Relative Humidity Probes can also be used for ambient RH measurements within air spaces.

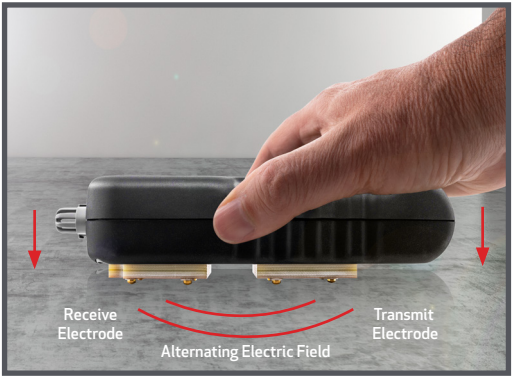
4. **PIN Meter mode (optional plug-in probe)**
   The Concrete Moisture Encounter X5 becomes a resistance type meter and measures the percentage moisture content (%MC) of wood when used with the optional plug-in PIN meter. International wood standards or pre-programmed wood species can be selected. PIN meter mode can also be used for Drywall and WME (Wood Moisture Equivalent) readings for other materials.

QUICK TIPS for OPERATION:

- Press ⏻ to power ON/OFF.
- **Shortcut Menu**: To choose between scales in Non-Destructive Testing (NDT), or Recently Used Wood scales in Pin-Meter Mode, press [−], scroll and press [−] to select and return to main screen.
- **Full Menu**: Press ⊖ to access Full Menu, ▲ and ▼ to scroll, [−] to select, and ⊖ to exit menu to main screen.
- Full Menu is used to choose NDT and Pin Scales (Wood Standard, Wood Species, WME, Drywall), Pin Temperature, Language and Temperature Scale (C° of F°).

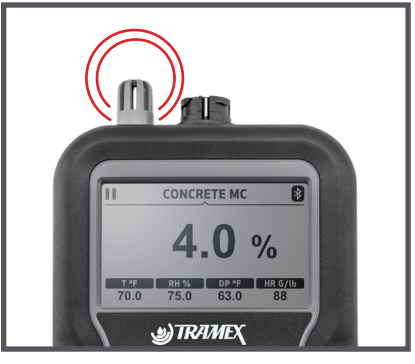
HOW IT WORKS

In non-destructive testing (NDT) mode, the instrument operates on the principle that the electrical impedance of a material varies with its moisture content. The instrument is pressed onto the material surface with the pins fully compressed to measure/detect the moisture content. The electrical impedance is measured by creating a low frequency alternating electric field between the electrodes as illustrated below.



This field penetrates the material under test. 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 thus derives the moisture value.

Hygrometer mode: The Concrete Moisture Encounter X5 has a built-in hygrometer that measures the ambient relative humidity (RH), temperature (T), dew point (DP) and humidity ratio (HR G/lb) of the environment. These measurements are permanently shown at the bottom of the screen regardless of the mode or scale being used.



In Equilibrium/Ambient Relative Humidity mode, the Concrete Moisture Encounter X5 determines the capacitance of the RH probe sensor which varies with the relative humidity of the testing environment. The Concrete Moisture Encounter X5 displays this capacitance as a percentage relative humidity. It also measures temperature and displays dew point and humidity ratio.

In PIN Meter mode the Concrete Moisture Encounter X5 is a resistance-type pin-meter that works on the principle of DC resistance. When the electrode pins are pressed or driven into the wood, the electrical resistance between the electrodes is measured. If the wood is dry, the resistance is high. If moisture is present in the wood the electrical resistance between the pins changes. The higher the moisture content the greater the reduction in resistance. The level of resistance is accurately measured by the instrument, which translates it into a moisture value. This is a percentage of dry weight moisture content for wood. International wood standards such or pre-programmed wood species can be selected.

PIN meter mode can also be used for Drywall and WME (Wood Moisture Equivalent) readings for many other materials.

PIN meter mode should not be used for concrete or other cementitious materials.

INSTRUMENT FEATURES

Your Concrete Moisture Encounter X5 employs advanced digital technology to enable the incorporation of the many features listed below.

- 4 modes of measurement: Non-destructive moisture measurement, ambient hygrometer and optional external in-situ hygrometer and wood pin probe.
- 8 simple membrane keypad controls.
- Moisture readings and scale are displayed on a large, clear easy-to-read clear digital display: 2.3" x 1.4" (58mm x 35mm).
- 5 NDT Scales: Concrete MC, CM Concrete (Carbide Method equivalent for concrete), CM Anhydrite/Gypsum, Gypsum Ref 0-12 and a Reference scale. These are selected using the ▲ and ▼ keys.
- The built-in Hygrometer probe provides Relative Humidity (RH) readings, temperature, dew point temperature and Humidity Ratio.
- Wood pin probe mode is automatically selected when the probe is plugged into the Concrete Moisture Encounter X5.
- When the external Relative Humidity (RH) Hygro-i2 probe is connected to the Concrete Moisture Encounter X5, the instrument automatically switches to RH mode. Ambient or In-Situ Relative Humidity readings, probe temperature, dew point temperature and Humidity Ratio are automatically displayed (Hygrometer Mode).

- To conserve battery life, the instrument automatically powers OFF after 5 minutes of inactivity or when the key is pressed. If a key is pressed the 'power off'-time will be extended for an additional ten minutes.
- Front lit display allows the display to be easily read in poor light conditions. This is enabled by pressing the key. The backlight stays on for a period of time set.
- HOLD freezes reading to facilitate ease of recording readings. When the Concrete Moisture Encounter X5 is in HOLD mode, 'II' is visible on the display. If HOLD was selected prior to the Concrete Moisture Encounter X5 automatically powering off, the frozen display reading is digitally memorized and restored next time ON is selected.
- When the battery requires replacement a LOW BATTERY icon is shown on the display.

OPERATING INSTRUCTIONS

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

1. Ambient RH Probe
2. Digital display
3. Menu button
4. Hold button
5. Bluetooth ON/OFF
6. Bayonet connection for Wood Probe
7. Light button
8. SCROLL UP button
9. SELECT button
10. ON/OFF button
11. SCROLL DOWN button

NON-DESTRUCTIVE MEASUREMENT MODE

1. Press the key to power up. With no Hygro-i2 probe or pin probe connected the last used scale will be displayed on the LCD. Press key again to power off.
2. To choose between scales in Non-Destructive Testing (NDT), use the Shortcut Menu: press , scroll and press to select between Concrete MC, CM Concrete (Carbide Method equivalent for concrete), CM Anhydrite/Gypsum, Gypsum Ref 0-12 and Reference scales and return to main screen.
3. Press your Concrete Moisture Encounter X5 directly onto the surface of the material being tested ensuring that all the electrode spring-loaded pins are fully compressed.

The Ambient values are always shown along the bottom of the display in all NDT modes.

Concrete MC Scale

When the Concrete scale is selected the quantitative moisture content (%MC) measurement is shown in the middle of the display. The moisture content (MC) is displayed 0 to 6.9% on the Concrete Moisture Encounter X5 display. Readings on a concrete floor slab obtained on this scale indicate moisture content and should not be confused with any other unit of measurement obtained by other moisture testing methods or meters.

CM (Carbide Method) Concrete Scale

The Concrete Moisture Encounter X5 gives readings of 0 to 4.3 on the CM Equivalent Concrete Scale. These are approximated equivalent readings to the carbide test method for concrete.

CM Anhydrite/Gypsum Scale

Equivalent reading to Carbide Method (CM) test for Anhydrite, Hemi-hydrate, Gypsum and Calcium Sulphate Screeds.

Gypsum Ref 0-12 Scale

Reference readings replicating measurements using concrete scale on concrete & sand/cement floors/ screeds, for use on Gypsum floors/screeds.

Reference Scale

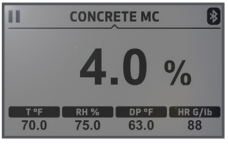
For the Reference scale the readings are comparative from 0 to 99. The readings on the Reference scale are not to be interpreted as a measurement of percentage moisture content (%MC) or relative humidity (RH%). It is not a relative humidity reading and it does not have any linear correlation with Relative Humidity measurements. This scale should be regarded as a comparative or qualitative scale only. This reference scale is included to facilitate comparative testing of different areas where direct contact with the bare concrete surfaces may not be possible due to some form of very thin coating or covering on the concrete, or additive in the concrete that could influence the readings. This scale is not suitable for reading through thicker floor coverings such as wood laminates etc. Readings from the Reference scale are comparative only and of help in identifying areas with moisture problems.

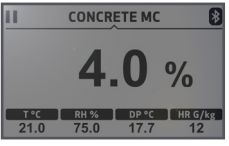
Calibration

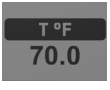
For regular on-site assessment of your Concrete Moisture Encounter X5 in moisture measurement mode, a calibration-check plate is available from the suppliers of your Concrete Moisture Encounter X5. Should it be found that readings are outside the set tolerances, it is recommended that the Concrete Moisture Encounter X5 be returned for re-calibration. Calibration adjustments should not be carried out by anyone other than Tramex or their authorized service provider who will issue a calibration certificate on completion.

Requirements for quality management and validation procedures, such as ISO 9001 and National Standards, have increased the need for regulation and verification of measuring and test instruments. It is therefore recommended that calibration of the Concrete Moisture Encounter X5 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 authorised test provider. The name of your nearest test provider and estimate of costs are available on request.

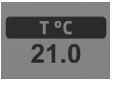
Typical Concrete Moisture Encounter X5 Displays

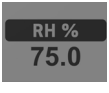




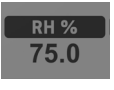


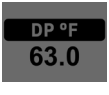
Ambient Temperature



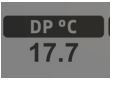


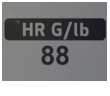
Ambient Relative Humidity





Dew Point





Humidity Ratio Grams per Pound/Kg

To change temperature between °C and °F and the Humidity Ratio between g/kg and grains/lb, press the button to go the Main Menu; scroll down and select 'TEMPERATURE SCALE' with the button, scroll and select with the button; and press the button to return to the main screen.

Drying time for concrete floors and screeds

Concrete floors and screeds must be allowed to dry to an adequate level before the installation of sheet material, tile, wood or coating. Manufacturers of such systems generally require moisture testing to be performed before installation on a floor slab. Moisture content measurement is one such method. Excessive moisture in or permeating from a floor covering or coating can cause failures such as condensation, blistering, delaminating, movement and general deterioration of the finished flooring/coating.

There is also a risk of promoting microbial growth. No exact period can be specified for the drying of such floors to reach acceptable moisture content, as this is affected by temperature and humidity within the building as well as concrete curing times and other factors. Typically a period of 1 month per inch (25mm) depth of concrete or sand/cement screed is often quoted. Longer periods may be required in areas of high humidity or low temperature.
During the drying period and prior to applying the floor covering, the floor should be regularly checked to monitor moisture content.

Testing for moisture content in a floor slab
Pre-test conditioning and preparation

For best and most accurate results, final tests should be carried out after the internal conditions of the building in which the slab is located have been at normal service temperature and humidity for at least 48 hours. All artificial heating or drying equipment should be turned off at least 96 hours before final readings are attempted, otherwise results may not accurately reflect the amount of moisture present or moisture movement in the slab during normal operating conditions. If being used for the final test while artifical heating or drying equipment is on, the readings should only be considered as an indicative guideline for monitoring purposes, and not as the final test. Prior to testing, the actual test area should be clean and free of foreign substances.

Pre-testing guidelines

Where covered floor slabs are being tested, all covering materials, adhesive residue, curing compounds, sealers, paints, etc., shall be removed to expose a test area of clean bare concrete. For removal of any existing flooring or adhesives, strictly observe all the appropriate safety and health practices relevant to cleaning and removal of these types of materials. Removal of covering materials and cleaning, if required, should take place a minimum of 48 hours prior to testing. Use of water based cleaning methods that could lead to elevated surface and/or sub-surface moisture levels in the floor slab are not recommended, and the testing after such treatment could result in elevated readings. No visible water in liquid form should be present on the concrete at the time of testing. Avoid testing in locations subject to direct sunlight or sources of heat.

Use of artificial aids for accelerated drying of concrete is not recommended. If they are being used it is recommended they should be turned off at least four days before taking final readings.

Guideline non-destructive test procedures as per International Standards

1. Remove any dust or foreign matter from the Concrete Moisture Encounter X5 electrodes before commencing tests. Make sure that the floor slab being tested is clean and bare and free from dust, dirt or standing water.
2. Push the button and press the instrument directly onto the surface of the material being tested ensuring that all of the electrode spring loaded pins are fully compressed. Read the moisture measurement from the appropriate scale of the display.
3. On a rough surface, take a number of readings in close proximity to one another such as 3 to 5 readings within an area of 1 ft^2 (929cm^2) at each location. If the readings vary, always use the one with the highest value.
4. Perform at least eight tests for the first 1000ft^2 (100m^2) and at least five additional tests for each additional 1000ft^2 (100m^2). Include test locations in the centre of the floor and within 3ft (1m) of each exterior wall.

HYGROMETER MODE

The built-in Ambient Relative Humidity Sensor on the top of the Concrete Moisture Encounter X5 measures Ambient Relative Humidity, Temperature, Dew Point and Humidity Ratio (or Mixing Ratio) of the environment. These values are always shown along the bottom of the screen. The values are especially useful to avoid dew point issues at the time of application.

To change temperature between °C and °F and the Humidity Ratio between g/kg and grains/lb, press the button to go the Main Menu; scroll down and select 'TEMPERATURE SCALE' with the button, scroll and select with the button; and press the button to return to the main screen.

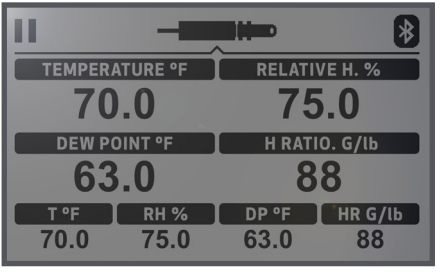
EQUILIBRIUM / AMBIENT RELATIVE HUMIDITY MODE

The Hygro-i2 Probe utilises state of the art electronic technology to provide an "easy to use" and accurate method for measuring relative humidity, Humidity Ratio, temperature and dew point in a wide range of applications such as:

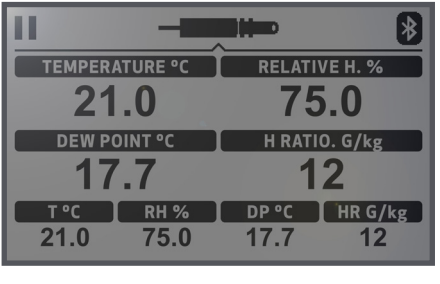
- Heating, ventilation and air conditioning (HVAC) systems.
- Environmental and building monitoring.
- Building inspection.
- Flooring (including in-situ method as per and hood methods as per International Standards: ASTM F2170 & BS 8201, 8203, 5325)

A typical Concrete Moisture Encounter X5 display with the external Hygro-i2 Probe is shown below.

°F



°C



RELATIVE HUMIDITY MEASUREMENT

There are two International Standard methods of relative humidity measurement in flooring that can be carried out with the Concrete Moisture Encounter X5 with the external Hygro-i2 probe attached:

(a) **In-situ** (below the surface of the slab) ASTM F2170 & BS 8201, 8203, 5325.

(b) **RH Hood** (on the surface of the floor slab) BS 8201, 8203, 5325.

(a) In-situ Relative Humidity Test Method – Guidelines.

Perform 3 per 100m^2 (1000ft^2) and 1 per next 100m^2. Holes must be drilled dry and perpendicular (90°), do not use water for cooling or lubrication.

When drying is from the top only, it is recommended that the hole should be drilled to approx 40% of the slab thickness.

When drying is from both sides, it is recommended that the slab should be drilled to approx 20% of slab thickness.

A hole cleaning brush is often required to ensure the drilled hole is free from any loose particles. A vacuum should also be used to ensure the drilled hole is free from any dust.

The user should always refer to national standard guidelines for definitive and current procedure and specifications.

MOISTURE TESTING GUIDELINES

When performing moisture testing of concrete it is important to get the most accurate and most useful data from the tests. For this reason Tramex recommend a two-pronged approach.

- The first step is to carry out a non-invasive moisture test with the Tramex CME5 or Concrete Moisture Encounter X5. This measures the top section of the concrete slab and gives an average percentage moisture content of the footprint area of the meter. These readings should be used to determine where and how in-situ relative humidity (RH) testing is performed.
- For in-situ RH testing, Tramex recommends that the test holes are drilled, sleeves are placed and capped and left for a period of 24 hours. The probes are then inserted. A suitable equilibration time is allowed before taking readings (see below)
- Tramex recommend that the RH probes are not left in-situ for prolonged periods of time when RH values are above 93%. With the Tramex system it is possible to remove the probe and seal the sleeve for future testing, thus giving a more reliable and accurate test.
- The above recommendations are based on the requirements to prolong the life of the RH probe and to increase the accuracy of the test.

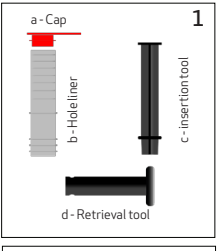
Equilibration Time:

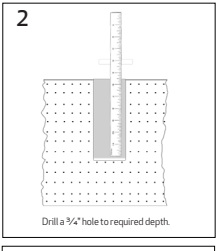
Allow at least 30 minutes for probe to reach temperature equilibrium before measuring relative humidity. It is vitally important that the concrete is at the same temperature as the probe.

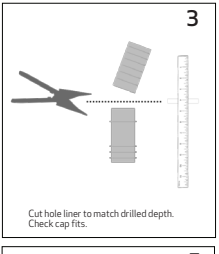
Even a slight difference in temperature will produce a significant error in relative humidity measurement. Check that meter readings do not drift by more than 1% RH over a 5 minute period.

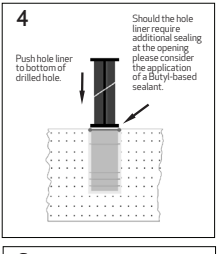
The sensor in the Hygro-i2 probe may take longer to recover if exposed to readings above 93% and can be damaged by prolonged exposure to high humidity.

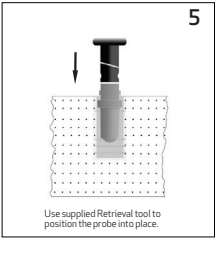
HOLE LINER INSTRUCTION

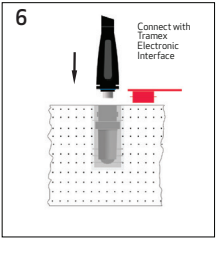




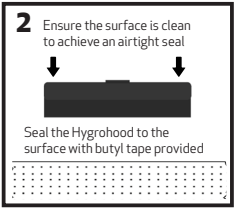


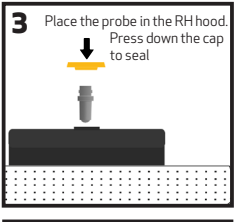


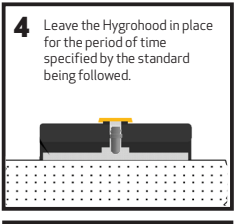


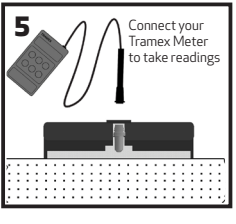


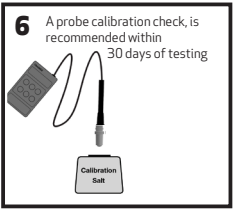
HOOD INSTRUCTION











(b) On surface RH tests (RH hood method)

The Tramex RH Hood can be used to perform testing to International Standards such as BS 8201, 8203, 5325. The following components are required to perform a RH Hood test: Concrete Moisture Encounter X5, Insulated hood (RHIH), Hygro-i2 probe and interface.

Pre test guidelines

The Concrete Moisture Encounter X5 should be used first in non-invasive mode to give an overall moisture condition of the floor slab. These readings will determine where to position the insulated hood. Careful consideration should be given to location of test site. The hood should not be located in direct sunlight or in an area which can be accidently disturbed. The floor slab surface should be abraded, cleaned of any foreign materials and swept clean of any dust or loose materials that could affect a proper seal between the hood and surface of the floor. The floor should be prepared as specified in the relevant standard.

1. Using a double-sided preformed adhesive/butyl tape, seal the insulated RH hood to the concrete surface.
2. Insert Hygro-i2 probe into the hood using the insertion/ retrieval tool.

   The sensor in the Hygro-i2 probe may take longer to recover if exposed to readings above 93% and can be damaged by prolonged exposure to high humidity.

3. Please refer to the period of time as specified by the standard being followed for the duration of the test. The user should always refer to national standard guidelines for definitive and current procedures and specifications.

4. When the time period has elapsed, check that meter readings do not drift by more than 1% RH over a 5 min period. Ensure the readings correspond with the floor covering/ adhesive manufacturers' or national standard recommendations before applying floor covering. e.g. British standards code of practice BS8203 suggests that a concrete floor should be sufficiently dry to allow installation of a resilient floor covering when the measured relative humidity falls to 75% or lower using the insulated impermeable box/hood method as specified in the above standard.

Use of artificial aids for accelerated drying of concrete is not recommended. If they are being used it is recommended that they be turned off at least 96 hours before taking final readings.

CALIBRATION CHECK SALTS

A saturated salt solution is the most suitable method for on-site testing of humidity sensors. The advantage of the on-site salt calibration check is that the user can check that the sensors are performing satisfactorily without having the need to send the sensors to a testing laboratory, which can be expensive and time consuming. The sensors can be checked at a time that is convenient to the user, which means no down time for your equipment. ASTM F2170 requires that humidity probes are checked and readings recorded by the user within 30 days before use. This check can be achieved with a 75% RH saturated Sodium Chloride (NaCl) solution.

Conditioning of the NaCl calibration check solution and test procedure.

As Relative Humidity (RH) is defined as the ratio of the partial vapor pressure in air to the saturated vapor pressure at a given temperature, it is important to understand that RH strongly depends on temperature. Therefore, it is essential to keep humidity sensors at the same temperature as the air in which the relative humidity is to be measured. When testing RH probes in a calibration check-salt chamber, it is necessary for the internal temperature of the salt chamber to be the same as that of the surrounding air and also the RH probe sensor. This can be achieved by removing the cap and exposing the salt-check solution to ambient conditions. The temperature can be checked with the use of an infrared thermometer. When the probe and solution are showing equal temperature insert the probe into the solution.

The test can be ended when RH% readings do not drift by more than 1% RH over a 5 minute period within the acceptable +/- 2% tolerance of the nominal 75% relative humidity. A temperature difference of +/- 1°C (1.8°F) can cause an error of up to +/-3 to 5% at 50% RH and +/-6% at 97% RH readings. Please note any further handling of the salt chamber can cause a heating effect so handle the salt chamber as little as possible.

Due consideration must also be given to the test site, do not perform in direct sunlight or close to sources of heat eg. heaters or spotlights.

Temperature stability is extremely important for the duration of the test.

Calibration check salts do not have an expiry date and have unlimited usage when cared for in the correct manner.

Do check the seal inside chamber is exposing as much of the vent as possible and that there is a mix of salt and water and no caking of salt to side walls of chamber.

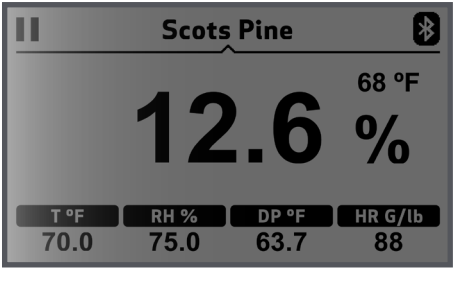
Humidity probes exposed to conditions outside normal range, especially high humidity may temporarily offset the RH reading. After return to normal ambient condition it will slowly return towards calibration state by itself. Prolonged exposure to extreme conditions may accelerate ageing.

For further information please refer to the latest calibration check salt instructions which are supplied separately.

PIN PROBE MODE

This mode is automatically activated by plugging one of the optional Wood Electrodes into the bayonet socket at the top of the Concrete Moisture Encounter X5. In pin probe mode the Concrete Moisture Encounter X5 works on the principle of electrical resistance. When the electrode pins are pressed or driven into the wood, the electrical resistance between the electrodes is measured and indicated on the digital display. If the wood is dry, the resistance is very high. The higher the moisture content, the lower the resistance. This resistance is accurately measured by the instrument, which translates it into percentage moisture content for wood. The Concrete Moisture Encounter X5 gives moisture readings from 4.5% to approximately 50%. It should be noted that readings above 25 are indicative only (27% is the nominal value of the fiber saturation point).

Wood Pin Probe Display



PIN PROBE MENU SELECTIONS

Shortcut Menu:

The Shortcut menu is used to choose from recently used wood species scales. To choose between Recently Used Wood scales in Pin-Meter Mode, press scroll and press to select and return to main screen.

Full Menu:

The Full Menu is used to choose Pin Scales (Wood Standard, Wood Species, WME, Drywall) and select Pin Temperature adjustment in line with the temperature of the wood. To choose from these options, press to access Full Menu, and to scroll, to select, and to exit menu to main screen.

Factors Affecting Moisture Readings

The readings of all moisture meters are influenced by the characteristics of different species of wood as well as temperature and other factors listed below:

Species

Different species of wood can vary in density and conductivity, which can have an effect on the electrical resistance of the wood. This can influence meter readings for the same moisture content and can also apply to similar species from different origins. A species adjustment table is provided on page 39 to 50.

Temperature

Meter readings can be affected by wood temperature. The Wood Probe is calibrated at 20°C (68°F). At wood temperatures above 20°C (68°F), the meter readings are higher and at wood temperatures below 20°C (68°F) the meter readings are lower. The CMEX5 has a feature allowing for the adjustment of the temperature calibration of PIN readings. The temperature compensation value that will be on the screen, and the value of this will remain the same unless changed in the Full menu (Pin Temperature). To change the PIN temperature, press button to access Menu; scroll and press button to select PIN TEMPERATURE; press and buttons to adjust the temperature; press to select; and to exit the menu. For reference, a temperature adjustment chart is on page 37.

Chemical Treatment Or Contamination

Readings may be affected by certain flame retardants, preservatives, aluminium paint and by contamination by salt water. Treat all readings on such wood as indicative readings only.

Surface Moisture

Surface moisture due to wetting or condensation can affect readings when uninsulated pins are used. It is recommended that insulated pins such as SP-52 are used in conjunction with a Hammer Action electrode. As the pins are driven into the wood, readings can be taken at different depths, unaffected by moisture on the surface.

WOOD FLOORING

Excess moisture in wood flooring can cause major problems. For instance, if installed with excess moisture, the wood can subsequently shrink, leading to job failure. If a wood floor (solid 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.

Your Concrete Moisture Encounter X5 is used to measure the moisture conditions in the concrete and when in Pin Probe mode can be used to measure the moisture content of the wood floor to ensure it meets specification.

Testing wood and wood products

a. When testing wood, power-on, insert wood probe into the Bayonet socket at the top of the Concrete Moisture Encounter X5. The instrument automatically switches to Pin Probe Mode.

b. If possible, always take readings with the pins parallel to the direction of the wood grain.

c. Calibration tests are based on Douglas fir, which has a published specific gravity (SG) of 0.50.

d. The Concrete Moisture Encounter X5 has a feature allowing you to select pre-programmed PIN scales. These are:

- **Recently Used** - with a selection of your most recently used scales
- **Wood Standards** - a selection of international wood standard pin meter calibrations

- **Wood Species** - a selection of most common wood species
- **WME scale** is a Wood Moisture Equivalent scale for comparative pin readings in many building materials.
- **Drywall scale** is a comparative scale for use in drywall

To access these, press button to access Menu; scroll and press button to select PIN SCALE; press and buttons to scroll; press button to select the above options. Make your selection and press the button exit and again to return to the main screen.

e. 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 and Interior wood: Readings below 7% in locations of low relative humidity and 10% to 12% may be acceptable where the relative humidity is higher.
- Exterior wood: 10% to 15% depending on local humidity levels. Generally, wood with moisture content in excess of 23% to 25% is susceptible to rot.
- Wood moisture content in excess of 18% to 20% may provide an environment for termite and woodboring insects to thrive and multiply. Wood at these high levels can also support mold and biological growth.
- Wood at about 27% to 28% moisture content is considered to have reached fiber saturation point.

f. Avoid taking readings on wood from the top of a stack stored outside as these may be affected by surface moisture from recent rain.

g. When taking readings in chemically treated wood, it is advisable to allow for possible effects that the treatment may have on readings.

Temperature Adjustment Chart

The Pin Probe has been calibrated on wood at an ambient temperature of 20°C (68°F). When measuring moisture in wood at a different temperature , the following temperature adjustment needs to be applied. (Figures rounded to the nearest whole number)

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

Example 1:
If meter reads 15% and temperature of wood is 10°C (50°F), actual moisture content is 17%. i.e.15% + 2% = 17%

Example 2:
If meter reads 15% and temperature of wood is 50°C (122°F), the actual moisture content is 11%. i.e.15% - 4% = 11%

Combined Species / Temperature Correction

Example 1:
If meter gives reading 15% on a sample of Sitka Spruce and the wood temperature is 40°C, the correction is as follows:
Species correction @15% = 16%
Temperature correction @ 40°C = - 3%
Corrected reading: 13%.

Example 2:
If meter gives reading 24% on sample of Teak and the wood temperature is 10°C, the correction is as follows:
Species correction @24% = 20%
Temperature correction @ 10°C = + 2%
Corrected reading: 22%.

Humidity And Moisture Content Relationship

The table below shows the approximate relationship between relative humidity (RH) and equilibrium moisture content (EMC) of some woods. (These figures are approximate values and may vary for different species.)

Table 1. Approx. relationship between RH and EMC

Relative Humidity	Wood MC %
10 %	3 to 5
20 %	5 to 6
30 %	6 to 8
40 %	8 to 10
50 %	10 to 11
60 %	11 to 13
70 %	13 to 15
80 %	15 to 18
90 %	18 to 23
100 %	23 +

SPECIES CORRECTION CHART

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Alder, brown	9	10	10	11	12	13	13	14	15	15	16	17	18	18	19	20	20	21
Amberoi	7	7	8	9	9	10	11	12	12	13	14	14	15	16	17	17	18	19
Ash, alpine	9	10	11	12	13	14	15	16	17	18	18	19	20	21	22	23	24	25
Ash, American	9	10	11	11	12	13	14	14	15	16	17	18	19	20	21	23	24	25
Ash, Crow's	9	10	10	11	12	12	12	14	14	15	16	17	17	18	19	20	20	21
Ash, European	8	9	10	11	12	12	13	14	14	15	16	17	18	18	19	20	21	21
Ash, mountain	9	10	11	12	13	14	15	16	17	18	18	19	20	21	22	23	24	25
Ash, silvertop	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Balsa	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Baltic, red	9	10	11	12	13	14	15	15	16	17	18	18	19	20	21	22	23	24
Baltic, white	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27
Bauvudi	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17	17	18	18
Bean, black	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25
Beech, American	7	8	10	11	12	13	14	15	16	13	18	19	20	21	23	23	24	25
Beech, Japan	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Beech, myrtle	8	9	10	11	11	12	13	14	14	15	16	17	18	18	19	20	21	22

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Beech, silver	9	10	10	11	12	12	13	13	14	14	15	16	16	17	17	18	19	19
Beech, Wau	9	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Beech, white	8	9	10	11	12	13	14	14	15	16	17	18	19	19	20	21	22	23
Birch, European	7	8	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Birch, white	9	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21	22	22
Blackbutt	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Blackbutt, WA	9	10	11	12	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Blackwood	9	9	10	11	12	12	13	14	15	16	16	17	18	19	20	20	21	22
Bloodwood, red	10	10	11	12	13	14	15	15	16	17	18	19	19	20	21	22	23	23
Bollywood	7	8	9	10	11	12	12	13	14	15	16	16	17	18	19	20	21	22
Box, brush	7	7	8	8	9	9	10	10	11	11	12	13	13	14	14	15	15	16
Box, grey	10	11	12	12	13	14	14	15	16	17	17	18	19	20	20	21	22	23
Box, grey, coast	9	10	11	11	12	13	14	14	15	16	17	18	18	19	20	21	22	22
Box, kanuka	8	9	10	11	12	12	13	14	15	16	16	17	18	19	20	20	21	22
Brownbarrel	7	8	9	10	11	12	12	13	14	15	16	17	18	18	19	20	21	22

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species							*Correct moisture content*											
Buchanania	6	7	8	9	10	10	11	12	13	14	14	15	16	17	18	19	19	20
Candlenut	5	8	10	12	14	16	18	21	23	25	27	29	31	34	36	38	40	42
Carabeen, yellow	8	9	9	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20
Cedar, red	9	10	11	12	13	14	16	17	18	19	20	21	22	23	25	26	27	27
Cedar, red, western	7	9	10	11	12	13	13	14	15	17	18	19	20	21	22	23	24	25
Cedar, South American	9	10	11	12	13	13	14	15	16	17	17	18	19	20	21	22	22	23
Cherry	7	8	9	11	12	13	14	15	16	17	18	18	20	21	22	23	21	25
Cherry, Brazilian	7	8	9	11	12	13	14	15	16	17	18	18	20	21	22	23	21	25
Coachwood	6	7	8	9	10	11	12	13	14	14	15	16	17	18	19	20	21	22
Dakua salusalu	9	10	11	11	12	13	14	15	16	17	18	19	19	20	21	22	23	24
Douglas Fir	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Elm	6	7	7	8	9	10	12	13	13	14	15	15	16	17	18	19	20	20
Erima	8	8	9	10	11	12	12	13	14	15	15	16	17	18	19	19	20	21
Fir, Alpine	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Fir, amabilis	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Fir, red	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Fir, white	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26
Gum, blue, southern	9	10	11	12	13	14	15	15	16	17	18	18	19	20	21	22	23	24
Gum, blue Tasmanian	8	9	10	11	12	12	13	14	15	16	17	17	18	19	20	21	22	22
Gum, grey	8	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Gum, grey, mountain	9	9	10	11	12	13	14	14	15	16	17	18	19	19	20	21	22	23
Gum, lemon-scented	6	7	8	9	10	10	11	12	13	13	14	15	16	17	17	18	19	20
Gum, Maiden's	10	11	11	12	13	14	15	16	16	17	18	19	20	20	21	22	23	24
Gum, manna	7	7	8	9	10	11	12	13	14	14	15	16	17	18	19	20	21	21
Gum, mountain	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Gum, American, red	10	11	12	12	13	14	15	16	17	18	18	19	20	21	22	23	24	24
Gum, red, river	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Gum, rose	9	10	11	12	13	14	14	15	16	17	18	18	19	20	21	22	23	24
Gum, shining	8	9	10	11	11	12	13	14	15	16	17	18	19	20	20	21	22	23
Gum, yellow	9	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21	21	22

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Hemlock, western	8	9	10	11	12	13	15	16	17	18	19	20	21	22	23	24	26	27
Hickory	-	7	9	11	13	14	16	17	18	20	21	22	24	-	-	-	-	-
Iroko	7	7	8	9	10	11	12	13	14	15	15	16	17	18	19	19	20	21
Ironbark, red	11	12	12	13	14	15	16	16	17	18	19	20	21	22	22	23	24	24
Ironbark, red, broad-leaved	11	12	12	13	14	15	16	16	17	18	19	20	21	22	22	23	24	25
Ironbark, red, narrow-leaved	8	9	10	11	12	13	14	14	15	16	17	18	19	20	21	22	23	24
Jarrah	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Jelutong	8	9	10	11	12	12	13	14	15	16	16	17	18	19	20	21	21	22
Kamarere (PGN source)	8	9	10	10	11	12	13	14	15	16	17	18	19	19	20	21	22	23
Kamarere (Fiji source)	7	8	8	9	10	11	11	12	13	13	14	15	15	16	17	17	18	19
Kapur	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Karri	7	8	9	10	11	12	13	13	14	15	16	17	18	18	19	20	21	22
Kauri, Qld	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	24	25
Kauri, NZ	9	10	10	11	12	12	13	13	14	14	15	16	16	17	17	18	18	19
Kauri, Vanikoro	11	12	13	13	14	14	15	15	15	16	16	17	17	18	18	18	19	19

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Kempas	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Laran	8	8	9	10	11	11	12	13	14	14	15	16	17	17	18	18	19	19
Larch, European	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Lodgepole Pine	7	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Lumbayau	8	9	10	11	12	12	13	14	15	15	16	17	18	19	19	20	21	22
Mahogany, African	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Mahogany, American	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mahogany, Brazilian	-	-	-	10	10	11	12	13	14	15	15	16	17	18	19	20	21	22
Mahogany, brush	8	9	10	10	11	11	12	12	13	14	14	15	15	16	16	17	18	18
Mahogany, miva	10	11	12	12	13	14	15	15	16	17	18	18	19	20	20	21	22	23
Mahogany, red	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26
Mahogany, rose	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20
Mahogany, santos	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Mahogany, southern	8	9	10	11	12	12	13	14	15	16	17	18	19	20	20	21	22	23
Mahogany, Honduras	7	7	8	9	10	11	12	13	14	15	16	17	18	19	19	20	21	22
Mahogany, white	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Makoré	9	10	11	12	13	14	15	15	16	17	18	18	19	20	21	22	23	24
Malas	7	8	9	9	10	11	12	12	13	14	15	15	16	17	18	19	19	20

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Maple, Canadian	7	8	9	10	11	12	13	14	15	16	17	18	18	20	21	22	23	24
Maple, Qld	10	10	11	12	13	14	15	16	17	18	18	19	20	21	22	23	24	24
Maple, rose	8	8	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
Maple, sugar	7	7	8	10	12	13	14	15	16	17	18	19	20	21	22	23	24	-
Mararie	10	11	11	12	13	14	14	15	16	17	18	18	19	20	21	21	22	23
Marri	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17	17	18	19
Matai	9	9	10	11	12	12	13	14	15	16	16	17	18	18	19	20	21	22
Meranti	7	8	9	10	11	12	13	14	13	16	17	18	19	20	21	22	23	24
Messmate	10	11	12	12	13	14	15	16	16	17	18	18	19	20	21	22	22	23
Nutmeg (Fiji source)	7	8	9	10	11	11	12	13	14	14	15	16	17	18	18	19	20	21
Oak, American red	7	8	9	11	12	13	14	15	16	17	18	18	20	21	22	23	21	25
Oak, European	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25
Oak, New Guinea	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Oak, silky, northern	8	8	9	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23
Oak, silky, red	8	9	9	10	11	11	12	13	13	14	15	16	16	17	18	18	19	20
Oak, silky, southern	7	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Oak, tulip, blush	7	11	12	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Oak, tulip, brown	10	11	12	12	13	13	14	14	15	16	16	17	18	18	19	19	20	20
Oak, tulip, red	11	12	13	14	15	16	17	18	18	19	20	21	22	23	24	25	25	26
Oak, white	6	7	8	9	10	11	12	13	14	15	16	17	18	18	19	20	21	22
Obeche	7	8	9	10	10	1	12	13	14	15	15	16	16	17	18	18	19	20
Padauk, African	7	7	8	9	10	11	12	13	14	15	15	16	17	18	19	19	20	21
Peppermint, broad-leaved	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Peppermint, narrow-leaved	10	11	11	12	13	14	14	15	16	17	18	18	19	20	21	22	22	23
Persimmon	7	8	9	10	10	11	12	13	14	15	15	16	16	17	18	18	19	20
Pine, bunya	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	21	21	22
Pine, Corsican	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27
Pine, cypress, white	9	10	11	11	12	13	14	15	17	17	18	19	20	21	22	22	23	24
Pine, hoop	10	11	11	12	13	14	15	16	17	17	18	19	20	21	22	22	23	24
Pine, Huon	10	10	12	12	13	13	14	15	15	16	17	18	18	19	20	20	21	22
Pine, King William	9	9	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Pine, klinki	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Pine, longleaf	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27
Pine, lodgerpole	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Pine, maritime	10	11	12	12	13	14	15	15	16	17	18	18	19	20	21	21	22	23
Pine, white, NZ	-	-	-	11	12	12	13	14	15	16	16	17	18	19	19	20	21	22
Pine, Parana	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23
Pine, ponderosa	7	9	10	11	13	14	15	16	17	18	19	20	21	22	22	23	24	25
Pine, radiata	10	11	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27
Pine, scots/shortleaf	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Pine, slash	8	9	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23	24
Pine, sugar	8	9	10	11	12	13	14	15	16	17	18	20	21	22	23	24	25	26
Pine, white, western	-	8	9	10	11	11	12	13	14	15	16	17	17	18	19	20	21	22
Poplar	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Quandong, silver	7	8	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19
Redwood	9	9	10	11	12	13	14	15	16	16	17	18	19	20	20	21	22	23

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Redwood, European	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Rosewood, Patagonian	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Rosewood, Tiete	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Rosarosa	8	9	10	10	11	12	13	13	14	15	15	16	17	18	18	19	-	-
Sapele	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27
Sassafras	8	9	10	10	11	12	13	13	14	15	16	16	17	18	18	19	20	21
Sassafras, southern	9	10	11	11	12	13	13	14	15	15	16	17	17	18	19	19	20	21
Satinash, grey	8	9	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23
Satinash, New Guinea	7	8	8	9	10	11	11	12	13	13	14	15	16	16	17	18	19	19
Satinash, rose	7	7	8	8	9	10	10	11	12	12	13	13	14	15	16	16	-	-
Satinay	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Satinheart, green	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	-	-
Sepetir	8	9	10	12	13	14	15	16	17	18	20	21	22	23	24	25	26	27
Sheoak, river	8	9	10	10	11	11	12	12	13	14	14	15	16	16	17	17	18	-
Sheoak, rose	9	10	11	11	12	13	13	14	14	15	15	16	16	17	18	18	19	19
Sheoak, WA	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20
Silkwood, bolly	9	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	18

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Silkwood, red	6	7	7	8	9	10	10	11	12	12	13	14	14	15	16	17	17	18
Silkwood, silver	9	10	11	12	12	13	14	15	15	16	17	18	18	19	20	20	21	22
Spruce, Sitka	7	8	9	11	11	12	13	15	16	17	18	19	20	21	22	23	25	26
Spruce, western white	7	8	10	11	12	13	14	15	16	17	18	19	20	21	21	23	24	25
Stringybark, brown	9	10	11	11	12	13	14	15	16	17	18	19	19	20	21	22	23	24
Stringybark, Darwin	8	8	9	10	11	12	13	14	15	15	16	17	18	19	20	21	22	22
Stringybark, yellow	11	12	13	14	14	15	16	17	18	18	19	20	21	21	22	23	24	24
Sycamore	7	7	8	9	10	11	12	13	14	15	15	16	17	18	19	19	20	21
Sycamore, satin	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20
Sycamore, silver	9	10	10	11	12	12	13	13	14	14	15	16	16	17	17	18	19	19
Tallowwood	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Tawa	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18
Teak, Brazilian	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Teak	7	7	8	9	10	11	12	13	14	14	15	15	16	16	17	18	19	20
Tigerwood	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Tingle, red	9	10	11	12	13	15	16	17	18	19	21	22	23	24	25	27	28	29
Tingle, yellow	9	10	11	12	13	14	15	17	18	19	20	21	22	23	25	26	27	28

Meter reading (% moisture content)	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Species	*Correct moisture content*																	
Totara	8	9	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	19
Touriga, red	11	11	12	13	14	14	15	16	17	17	18	19	20	20	21	22	23	23
Tuart	9	10	11	12	12	13	14	15	15	16	17	17	18	19	20	20	21	22
Turpentine	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24
Vitex, New Guinea	8	8	9	10	11	12	13	13	14	15	16	17	18	18	19	20	21	22
Walnut, African	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Walnut, American Black	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Walnut, Brazilian	8	9	10	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Walnut, blush	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	19	20	21
Walnut, European	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	26	27
Walnut, New Guinea	7	8	9	10	11	12	13	14	15	16	17	17	18	19	20	-	-	-
Walnut, Peruvian	7	8	9	11	12	13	14	15	16	17	18	18	20	21	22	23	21	25
Walnut, Qld	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24	25	25	27
Walnut, yellow	7	8	8	9	10	10	11	12	12	13	14	14	15	16	17	17	18	19
Wandoo	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	25
Wattle, hicory	8	9	10	11	11	12	13	13	14	14	15	16	16	17	18	18	19	20
Wattle, silver	9	10	10	11	12	13	13	14	15	16	16	17	18	19	20	20	21	22
Western Hemlock	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Western red spruce	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Wollybutt	10	10	11	12	13	14	15	15	16	17	18	19	20	20	21	22	23	24

LIMITATIONS

The Concrete Moisture Encounter X5 will not detect or measure moisture through any electrically conductive materials including metal sheeting or cladding, many types of black EPDM rubber or wet surfaces. The Concrete Moisture Encounter X5 is not suited for taking comparative readings in the concrete substrate through thick floor coverings such as wood.

CALIBRATION

For regular on-site assessment of your Concrete Moisture Encounter X5 in moisture measurement mode, a calibration-check plate is available from the suppliers of your Concrete Moisture Encounter X5. Should it be found that readings are outside the set tolerances, it is recommended that the Concrete Moisture Encounter X5 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 Concrete Moisture Encounter X5 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 Users 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.