TRAMEX

CONCRETE MOISTURE PROBE 'THE DETERMINATOR'

- CMP -

USER GUIDE

INTRODUCTION

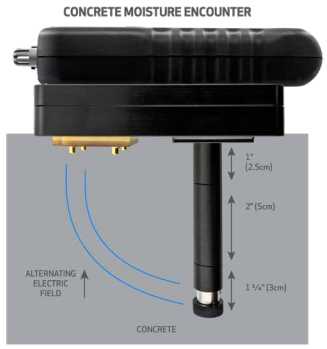
Thank you for selecting the Concrete Moisture Probe, a.k.a. The Determinator, from Tramex.

This Concrete Moisture Probe functions in conjunction with the Tramex CME Concrete Moisture Encounter range to provide the Tramex Unified Moisture Content Test Method for quantitative moisture content measurements in both the top ¾ inch (20mm) layer and within the body of concrete floors and slabs.

This instant and precise quantitative measurement of moisture content is based on the gravimetric oven testing method. The use of %MC readings for both the in-situ and the non-destructive top ¾" (20mm) layer tests eliminate confusion between different testing method data.

HOW IT WORKS

The Concrete Moisture Probe when used with Tramex CME instruments operates on the principle that the electrical impedance of a material varies with its moisture content. The CME instrument is pressed onto the CMP cradle which is pressed onto the material surface with the pins fully compressed and the probe inserted into the pre-drilled hole (using 3/4 inch / 19mm drill-bit) to measure the moisture content. The electrical impedance is measured by creating a low frequency alternating electric field between the electrodes and the probe, to a depth of up to 4" (100mm). 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.



The Concrete Moisture Probe functions with the Tramex CME Concrete Moisture Encounter meters. The CMP does not require batteries. The CMP does not require calibration. The probes are reusable, extendable and replaceable. No holeliners are necessary. The hole diameter required is the same for the Hygro-i2 RH test as per F2170.

OPERATING INSTRUCTIONS

The Tramex Unified Test Method for concrete comprises both non-destructive moisture content testing of the top ¾"(20mm) layer and in-situ moisture content testing. We also recommend performing parallel tests of the ambient conditions and dew-point, as well as in-situ RH tests as per ASTM F2170. All of these tests can be performed using the CMP with the Tramex CMEX5 and accessories.

The Concrete Moisture Probe is designed for %MC measurement of concrete using the concrete scale on your Tramex CME meter, but can also be used with the Reference scale and other scales where the depth of the cementitious materials permits.

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 artificial 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 subsurface 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 (NDT) procedures as per International Standards

1. Remove any dust or foreign matter from the Concrete Moisture Encounter 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 ft² (929cm²) at each location. If the readings vary, always use the one with the highest value.
4. Perform at least eight tests for the first 1000ft² (100m²) and at least five additional tests for each additional 1000ft ² (100m²). Include test locations in the centre of the floor and within 3ft (1m) of each exterior wall.

Guideline In-Situ Moisture Content Probe test Procedure

1. Perform 3 per 100m ² (1000ft²) and 1 per next 100m², similar to ASTM F2170 recommendations for frequency of use. Holes must be drilled dry and perpendicular (90 °), do not use water for cooling or lubrication.
2. Determine the approximate depth of the concrete slab. Connect the probe and extensions if required to the appropriate depth, depending on the thickness of the slab. Use the following as guidelines for probe extensions required:
   - 1 1/4" (3cm) probe depth for concrete between 2" to 4" (5 to 10cm)
   - 2 1/4" (5.7cm) probe depth for concrete between 4" to 6" (10 to 15cm)
   - 3 1/4" (8.3cm) probe depth for concrete between 6" to 9" (15 to 22cm)
   - 4 1/4" (10.8cm) probe depth for concrete between 9" to 11" (22 to 28cm)
   - For slabs drying from both sides (top and bottom), the probe should be placed into the middle of the slab.

3. Remove any dust or foreign matter from the Concrete Moisture Probe and electrodes as well as from the CME concrete meter electrodes before commencing tests. Make sure that the floor slab being tested is clean and bare and free from dust, dirt or standing water.
4. Place the Concrete Moisture Probe in the hole and the surface electrodes onto the surface of the material being tested. Place your Tramex meter into the cradle of the CMP and ensure that all of the electrode spring loaded pins are fully compressed, both on the CMP and the CME.
5. Take 4 readings by turning the Concrete Moisture Probe and CME meter from '12 o'clock' to 3, 6 and 9 o'clock positions. Record the highest reading, discarding any obvious anomalies.
6. Record the readings using the Tramex Meters App (when using the CME5 or CMEX5).

Interpretation of Concrete Moisture Probe In-situ & NDT Readings in Concrete:

In newly poured concrete, the in-situ % Moisture Content is expected to be approximately 0.5 – 1% higher than the top ¾" (20mm) surface layer % Moisture Content value.
When readings outside these expected values are taken, potential issues can be identified.

Example Situation 1:
Readings are higher at the surface than the in-situ readings in new concrete:
This may be a result of dew point issues, where condensation has formed at the surface.
Check the ambient conditions and surface temperature of the concrete.
A solution would be to adjust the ambient conditions until concrete corrects itself.

Example Situation 2:
Readings are higher at the surface than the in-situ readings in older concrete:
If this situation is found, when replacing a floor covering, it may be the result of an old vapor or moisture barrier at the surface causing moisture to collect in the top 3/4 inch (20mm) layer below the surface.
A solution would be to remove the surface layer so as to allow the surface to dry out effectively.

Example Situation 3:
Readings more than 1%MC higher from the in-situ readings than the surface NDT readings:
This may be due to moisture coming up from the concrete due to a lack of subfloor barrier.
A solution would be to consider sealing the concrete before installing the floor covering.

LIMITATIONS

The Concrete Moisture Probe and Concrete Moisture Encounter 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 Probe and Concrete Moisture Encounter are not suited for taking comparative readings in the concrete substrate through thick floor coverings such as wood.

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 prepaid, 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.