

Moisture Meters- The Key Facts

The measurement and detection of moisture and the meters used is a complex and important topic that is frequently misunderstood. This article will outline the differences between the concepts of 'moisture measurement' and 'moisture detection' as well as explain the most appropriate type of meter to use in different situations.

Moisture Measurement In Timber

The most common material in which moisture content can be 'measured' by using a moisture meter is timber. The typical tool used for this purpose is the widely available pin type meter (also known as an electrical resistance/conductance and destructive meter). These instruments work by reading across the two pins and detecting the change in resistance when they come into contact with the timber.

Pin meters will give a pretty good indication of the moisture content of timber. They are made and calibrated to do this on particular species of timber for example, Douglas Fir. These instruments work because the conductivity of timber (also known as the density), is reasonably constant throughout different timber types and is proportional to the moisture content. As there are timbers which have different densities to that which the instrument has been calibrated to, most meters are supplied with a set of tables which give the adjustments which need to be made dependant upon the type of timber being tested.

Limitations Of Pin Meters For Building Surveys

As described above, the common pin meter has been designed for use on timber and not any other materials. This fact is often not appreciated by many users who rely on pin meters to 'measure' moisture content in other materials such as masonry, plaster or wallpaper. This is not actually possible as there are major variations in, for example masonry and therefore no consistency between any two samples from different sites. The same holds for most common building materials. All a pin type meter can indicate, at best, is whether moisture may be present but they can not measure the actual level of moisture in the material.

The danger of using a pin meter is that the instrument only reads across the very small area between the pins. This is not such a problem with timber due to the homogenous nature of it. However, when looking for moisture in an internal wall, it would be necessary to make many pin holes all over the wall in order to get a thorough indication of whether there is a presence of moisture. This is time consuming and leaves behind unsightly holes. When faced with tiled areas (such as kitchens & bathrooms) the pin meter can not be pushed through tiles and as a result no readings can be taken or at best only a surface reading is obtained. The presence of certain substances on the surface of the material being tested, such as condensation and salts, will also affect the readings.

Non Destructive Moisture Detectors

As opposed to the pin meter, a non destructive (also known as a non invasive/ impedance/capacitance meter) is better suited for the detection of moisture in common building materials. These instruments work by transmitting low frequency signals into the material being tested, measuring the change in impedance caused by the presence of moisture.

As these instruments do not use pins and leave no damage to the surface being tested. Large areas such as a wall can be 'scanned' by moving the meter over the wall quickly and efficiently. The signal from the meter is sent to a depth of up to 30mm (dependent on the material being tested) detecting the presence of moisture well into the material as opposed to only obtaining surface readings. As a result, the non destructive meter can be used to detect moisture behind tiled walls, picking up any moisture well into the wall. It is important to remember that when looking for moisture in building materials, such as masonry, readings obtained are comparative. What a non destructive moisture detector will tell you is whether there is an area with higher moisture compared to the rest of the wall. This area should then be marked and further investigations carried out to determine possible causes.

Features Of A Good Non Destructive Meter

As discussed, these instruments are for detecting the presence of moisture and not measuring it. A large, clear display dial on the instrument is most useful as any fluctuation in the display will be easy to pick up. Having a display which reads quantitatively (LCD for example with digits) is not beneficial as the numbers displayed do not mean anything in absolute terms.

It is also important for the electrodes through which the signal is being sent to be as large as possible, maximising the area which is in contact with the material being tested allowing a much quicker and more effective survey of a large area. Although these instruments will not leave unsightly pin holes, it is important that the electrodes are made of a non marking material.

The various materials you may wish to test for moisture each have differing properties and therefore it is very helpful if the instrument has a facility to select different settings depending on the type of material being tested. Although the specific density of materials such as masonry is not known, it is possible to make adjustments for materials which are very different to each other, for example masonry vs wood or plasterboard. An instrument which has selectable settings for these different sorts of materials will provide more useful readings.

As these instruments use an electrical field they can be influenced by metal. For this reason, a good instrument will have two sets of electrodes, which, unless the metal crosses both electrodes at the same time will not be influenced by the presence of nails and screws for example. When doing a survey, it is very easy to tell if the instrument has picked up metal as opposed to moisture. The display will show a gradual increase as moisture levels increase, while if the instrument detects metal, readings will instantly shoot off the scale.