AT
Delta-T Devices

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ThetaKit User Guide

ML3-KIT

Sports Turf Edition
version 1.0

WHY MEASURE SOIL WATER CONTENT?

Soil water plays a critical role in turf health, as grass plants require water to survive. Their primary water source is held within the soil pore network. This makes measuring water content critical on sports turf surfaces. In addition, soil water content also directly affects surface performance. In general terms, the higher the soil water content of a sports surface, the softer it will be. For golf, this directly affects how a ball interacts with a putting surface, both in terms of impact with the surface and then when it rolls across the green. For pitches, soil water influences both playability and susceptibility of a surface to damage during play.

Soil water content is also a controlling factor of how quickly organic matter is decomposed in the soil. Soils that are wetter for longer periods of the year, tend to be more susceptible to excessive organic matter accumulation and the formation of thatch.

The measurement of soil water content is a critical part of good greenkeeping practice and groundsmanship. Monitoring soil water content can alert turf managers to potential problems before visual symptoms become evident. It can also enable managers to assess the efficacy of turf maintenance operations. Some key turf issues that benefit from routine soil water content measurement include:

▶ Surface softness or hardness
▶ Localised drainage issues
▶ Drought stress
▶ Soil hydrophobicity
▶ Evenness of irrigation application

HOW SOIL WATER CONTENT MEASUREMENT CAN ASSIST WITH KEY TURF MAINTENANCE DECISIONS

If a playing surface appears to be unduly soft, measuring soil water content, along with other soil assessments, can indicate if there are underlying drainage issues. This can be especially useful if there are localised issues, as the ease of measurement means a number of areas can be tested quickly.

The onset of drought stress during a dry summer can cause significant turf health issues. Measuring soil water content routinely can highlight when values have become too low and the risk of turf health damage from drought stress is increased.

If there is a history of localised soil hydrophobicity on a playing surface, taking regular soil water content measurements can indicate where these areas are, when to carry out mitigation operations and how effective they have been.

Using a ML3 ThetaKit can be very useful to assess the evenness of irrigation application. Simply measure soil water content before and after irrigation to highlight if there is significant variation across the area. If there is, it would indicate that the irrigation system should be inspected and changes made to ensure even irrigation output.

CONTENTS OF ML3-KIT

Portable soil moisture kit. Includes ML3 ThetaProbe, SMSC/d-HH2 cable, pack of 4 spare stainless steel rods, HH2 Moisture Meter with spare alkaline battery, Insertion Kit ML-INK1, USB-RS232 adaptor cable, ML3 Quick Start Guide, HH2 User Manual, ML3-KIT User Guide (Sports Turf Edition) and carrycase HHCC3.

HOW TO MEASURE SOIL MOISTURE

◀ Turn the HH2 Moisture Meter on by pressing the **Esc** button

Insert the ML3 into the surface carefully, ensuring the pins are fully inserted ▶

Press the **Read** button to take a reading ▶

◀ The reading will be shown on the display.

If you want to store the reading and download it later press the **Store** button. If you do not wish to store the reading in the unit's memory press **Esc**.

Repeat this process to obtain a representative sample from the playing surface.

For a golf green take 9 readings in a 3 x 3 grid (Diagram 1).

For a pitch, either take multiple readings in a W shape across the whole pitch (Diagram 2) or in locations of interest, such as goal mouths, wings, mid-field and centre circle. For a pitch, the number of readings required will need to vary depending on the perceived variation over the pitch, but would typically be between 4 and 6 readings per test location.
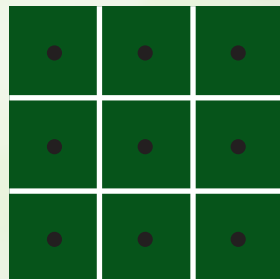

Diagram 1

Diagram 2

NORMAL RANGE OF VALUES FROM DIFFERENT CONSTRUCTION TYPES

Construction type	Golf green ranges (%)	Pitch ranges (%)
Soil-based	15-30	20-40
Sand-based	15-25	22-32
Links	10-20	N/A

The value measured will depend on the gross water inputs, drainage and water retention. Values will be higher if measurements are made directly after rainfall or irrigation, but these readings can be useful to assess the drainage and water retention characteristics of a surface.

FURTHER READING

User Manual for the Moisture Meter – type HH2: Available for free download from our website **www.delta-t.co.uk**.
User Manual for the ML3 ThetaProbe: Available for free download from our website **www.delta-t.co.uk**.
Printed copies of both manuals are supplied with the ML3-Kit.

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