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DOT600

Roadbed Water-Content Meter

Compact, Portable

Measures water content of roadbed material in the field

Overview

The DOT600 is a stand-alone product that measures volumetric and gravimetric water content of samples of earthen material in roadbeds and foundations. Portability, along with quick and accurate measurements, make it a valuable tool for evaluating roadbed material both at the construction site and in the soil-test lab.

Benefits and Features

- Measures water content, bulk density and compaction force, and volume and weight of soil samples
- Integrated data logger for quick results
- High accuracy and high precision
- Includes a rugged case and is completely portable
- Generates a measurement report that can be easily imported into spreadsheets

Technical Description

The DOT600 includes a sample chamber, CR850 datalogger, PC200W software, wall charger, and a rugged case. Samples collected from laboratory or field sites are placed in the chamber and compacted to a chosen pressure (15 to 45 psi). The water content is then calculated using dielectric permittivity sensitive methods. A separate scale and magnetic linear sensors measure the sample volume. The CR850 then calculates of bulk density, converts the measured volumetric water content to gravimetric water content, and stores the measurement results in a data table for permanent record.

Water Content Measurement Accuracy/Calibration

Accuracy is defined by comparing DOT600 measured water contents to independently determined values. The independent method is water content by gravimetric method (weighing wet and after oven drying).

The DOT600 water content measurement uses a calibration to convert sensor output period to volumetric water content. This calibration was derived at the factory based on different types of soil. The calibration coefficients will be determined by the Matrl type selected. Repeated measurements on the sandy loam soil over the water content range from air dry to about 70% saturation show deviations from independent measurements of less than ±1.5% volumetric water content.

Since the gravimetric water content measurement uses sample volume and weight to convert from measured volumetric water content, the accuracy of the gravimetric water content will be less than the volumetric value because of inherent errors of the volume and weight measurements.

Specifications

-NOTE-	*Refer to the CR850 product brochure for CR850 specification information.*
Outside Case Dimensions	55.9 x 43.2 x 21.6 cm (22 x 17 x 8.5 cm)
Shipping Weight	10.64 kg (23.45 lb)

Battery

Type	2.9 Ahr rechargeable sealed lead-acid
Standby Charge Retention	95% (at 20°C for one year)
Life Expectancy	~500 cycles (with discharge to 50% followed by recharge)

Scale

Capacity	1000 g (35.3 oz)
Accuracy	±0.05 g (±0.002 oz)
Repeatability	0.02% FS

Water Content Measurement

Resolution	1% volumetric water content Resolution is the minimum change in the measured parameter, water content, that the sensor can repeatedly detect.
Precision	0.75% volumetric water content Precision is the expected range for repeated measurements on the same sample.

Sample Volume & Applied Force Measurement

Sample Volume	±1.5% (for compressed sample with thickness between 0.400 and 1.000 in.)
Sensitive Volume	Electromagnetic field penetrates the sample 0.39 in. Sensitive volume is about 3.5 $in.^3$.
Applied Pressure Range	0 to 45 psi
Applied Pressure Measurement Accuracy	1.7 psi

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