



'Pocket' Soil Moisture Meter

PAL-Soil

Cat. No.4571

Measurement method in accordance with ISO 16586:2003 "Soil quality – Determination of soil water content as a volume fraction on the basis of known dry bulk density – Gravimetric."



Construction

Irrigation

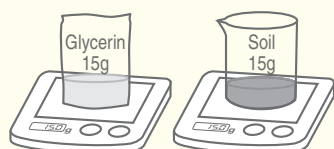
Save on time, labor, and material with PAL-Soil.

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Whether out in the field or in the lab.

1 Gravimetric Measurement



Measure out an equal amount each of soil and glycerin.

Volumetric Measurement

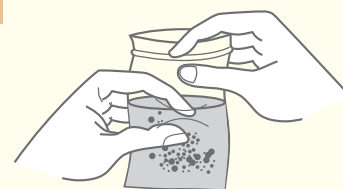
(1) Measure out 50ml of soil, using a sand-pouring cylinder or soil sampler.



(2) Measure out 30ml of glycerin and place it in a re-sealable plastic bag.



2



Mix the soil and glycerin thoroughly.

3



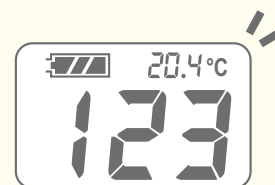
Place filter paper on the prism and place the soil-glycerin mixture on top.

4



Press the START key.

5



Measurement value is displayed in 3 seconds.

Commentary

What is gravimetric soil moisture?

As defined by ISO 16586:2003, soil quality is the water content % of soil expressed by mass (weight). It is the mass of water relative to the mass of oven-dried soil. Soil is dried in an 110°C±5°C oven.

*This measurement method was developed by Professor Wada at Kyushu University and has proven to have a strong correlation with ISO 16586:2003.

$$w = \frac{Ma - Mb}{Mb} \times 100$$

- w = Gravimetric soil moisture (%)
- Mb = Mass of soil after drying in the oven
- Ma = Mass of soil before drying in the oven
- $Ma - Mb$ = Mass of water in soil

What is volumetric soil moisture?

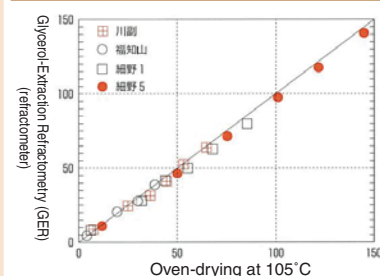
It is the water content % of soil expressed by volume. It is the volume of water relative to the total volume of a soil sample. A sand-pouring cylinder is commonly used.

The PAL-Soil calculates the water content of soil by measuring a decline in the refractive index of glycerin after it is mixed with water at the 5:3 ratios. It utilizes the water-absorbing properties of glycerin.

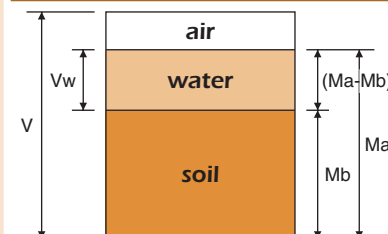
$$\theta = \frac{Vw}{V} \times 100$$

- θ = Volumetric soil moisture (%)
- V = Total volume of soil sample
- Vw = Volume of water

Comparison between refractometers and oven-dry method for determination of gravimetric water content (%) of soil



Soil Moisture



Specifications

Measurement range	<ul style="list-style-type: none"> • Gravimetric soil moisture: 0 to 200% (Automatic Temperature Compensation) • Volumetric soil moisture: 0 to 100% • Temperature: 10.0 to 40.0°C 		
Resolution	<ul style="list-style-type: none"> • Gravimetric soil moisture: 1% • Volumetric soil moisture: 1% • Temperature: 0.1°C 		
Measurement accuracy	<ul style="list-style-type: none"> • Gravimetric soil moisture: ±2% (0 to 40%), ±5% (41 to 100%) • Volumetric soil moisture (Repeatability): ±1% (0 to 60%), ±2% (61 to 100%) • Temperature: ±1°C 		
Measurement temperature	10 to 40°C	Power supply	AAA alkaline battery × 2
Ambient temperature	10 to 40°C	Battery life	About 11,000 measurements (when an alkaline battery is used)
Option	Pocketable Scale	Accessories	<ul style="list-style-type: none"> • AAA alkaline batteries • Filter paper • Re-sealable plastic storage bags • Beaker • Plastic tweezers • Plastic spoon
International Protection class	IP65 Water Resistant		
Dimensions and weight	55(W)×31(D)×109(H)mm 100g		

*Purchase a premium quality glycerin reagent from a local pharmacy or reagent store.



Always clean and shiny -
can be cleaned under
running water.

All ATAGO refractometers are designed and manufactured in Japan.

HACCP GMP GLP

ATAGO products comply with HACCP, GMP, and GLP standards.

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