METER

PARIO Plus
PARTICLE SIZE ANALYZER

New technology—new possibilities

Soil particle size analysis traditionally had only two options—the extremely archaic option or the extremely expensive option. The hydrometer (or pipette) method is a painstaking, manual process that's prone to error. The ultra-expensive laser method has accuracy issues because flat soil particles like clay can confound the measurement. Both methods can lead to hours of wasted time. Now there's a new way. Introducing PARIO.

Complete curves made easy

PARIO uses automation to shrink the time and effort needed for soil particle size analysis. It calculates the particle size distribution by Stokes' law, with a range spanning from 63 µm to 2 µm, finally making it easy to obtain a complete particle size distribution curve, instead of just a few measurements at discrete time points. It allows for unattended, automated operation (with the exception of opening the valve after completion). Just set it up and come back later to a finished measurement with all the data you need.

New method reduces error—and effort

PARIO adopts the same sample prep your lab already uses, so it fits perfectly into your existing workflow. It reduces errors by replacing and automating the lengthy "hydrometer" portion of the process using the new, more accurate "**Extended Integral Suspension Pressure Method**" (ISP+). This method does not require the insertion of a hydrometer or sampling of suspension volume with a pipette, which disturbs the sedimentation process. Being automatic, it also avoids manual reading or calculation errors. This results in an overall error rate of an incredible 0.5%—lower than any conventional particle size analysis method.

Stokes' law method

The PARIO measuring method is based on Stokes' law. That means there is no need for soil-specific corrections with transfer functions as required for almost any other automated measurement method, such as laser diffraction or image analysis.

Spend more time on what matters

To save you even more time, PARIO soil texture analyzer comes with an easy-to-use, all-in-one software solution for automated data inquiry, visualization, evaluation and export. Plus, PARIO, as part of the LABROS system, can be combined with the HYPROP, KSAT or WP4C to completely characterize the physical and hydraulic properties in soil.
All of this serves one goal—to reduce the operating time you spend for particle size analysis, while at the same time improving accuracy. Skip hours of tedious manual measurements and focus on your research.

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Features

- Get complete particle size distribution curves
- Calculation of particle size distribution by Stokes's law
- Autonomous operation after measurement start
- Lower measurement duration of 2.5h (estimated error ± 0.5%)
- Quasi-continuous resolution of particle size distribution
- No physical disturbance of suspension during measurement
- Avoidance of manual reading and calculation errors
- Temperature dependence automatically integrated in the calculation of particle size distribution
- Direct measurement of clay content
- PARIO Plus improvements mean external data errors are less problematic

Specifications

Duration of measurement	3 h
Particle size	Range: 2-63 µm
Approximate error in Mass Fraction Detection	±1%
Estimation of Clay Content	Derived from integrated particle mass in effluent
Estimation of Sand Fraction	Sand fraction estimated by sieve data
Pressure Measurement	Accuracy: ± 1.0 Pa * Resolution: ± 0.1 Pa
Measurement interval	10 s
Typical Particle Mass	25-50 g per 1-L suspension
Glass cylinder	Height @ 450.0 mm Diameter @ Inner: 59.0 mm * Outer: 67.5 mm Volume @ 1,000 cm^3 Material @ Borosilicate glass 3.3
PARIO Device	Height @ 293.0 mm Diameter @ 80.0 mm Material @ Polyoxymethylene plastic (POM) and stainless steel
Volume of Suspension	1,000 ml
Max Tolerable Temperature Change During Measurement	± 1.50 °C
Required External Measurement	Mass of dry matter in discharged subsample Sand fractions (from wet sieveing) Mass of dispersion salt in total suspension volume
Operating temperature	Minimum: 15°C * Typical: 20°C * Maximum: 35°C

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