



GSA – Grain Size Analyzer



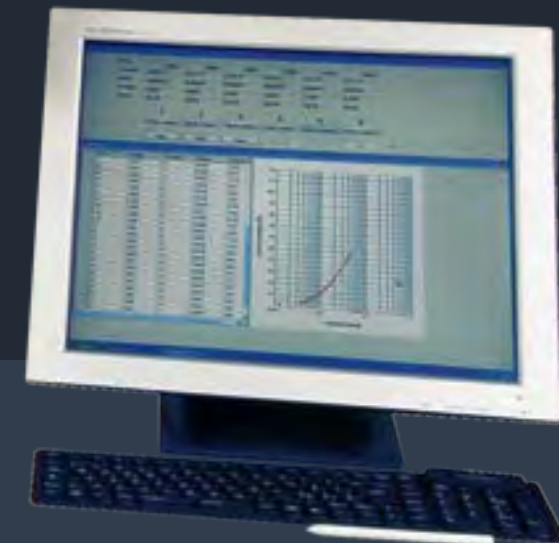
GSA Grain Size Analyzer

Perform soil particle size analysis automatically!
Up to 6 analyses at the same time in 5 to 6 hours.



Compliant with
Official Methods

ASTM D422
UNI CEN ISO/TS 17892-4



GRANULOMETRIC ANALYSIS

The particle size analysis is performed using two techniques:

- **sieving**, for the coarse fraction
- **sedimentation**, for the fine fraction

It allows us to know the content of primary particles in the soil, divided by size.

The primary solid component of the soil is characterized by particles of various sizes: from diameters of the order of centimeters to millimeters and tenths of microns for the finest components.

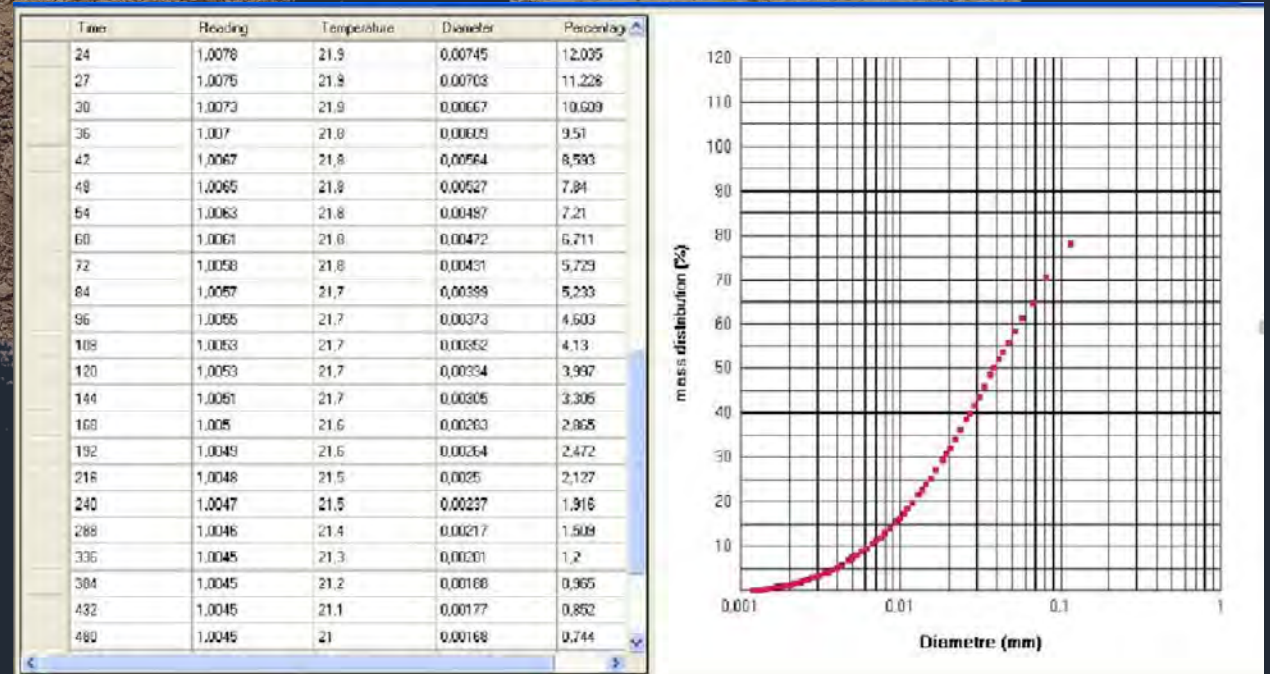
GRANULOMETRIC CURVE

From the analysis of a soil's particle size curve, it is possible to derive its type and degree of particle distribution.

The analysis results are more clearly represented using charts in ordinary or logarithmic scales that show:

- the **diameter** of the particles, on the x-axis
- the **percentage by weight** that has a specified diameter, on the y-axis

The particle size curve is a percentage curve and indicates the % by weight of the fraction that exceeds a given diameter.



HOW DOES IT WORK?

GSA measures the **density of the suspension** at predefined time intervals. The result is expressed in g/kg. The water-soil suspension is prepared inside a glass cylinder containing water, soil, and sodium hexametaphosphate to **facilitate the dispersion of particles**. The sample is **automatically shaken for 10 minutes** at a controlled and constant speed. The density is read using a float attached to the **hydrostatic balance**.

For the determination of classes or fractions, the software applies **Stokes' law**, which establishes a relationship between the **diameter** of suspended granules, the **viscosity** of the liquid, the **falling speed**, and the **specific weight** of the granules. Particles with a larger diameter (sand) settle first, while finer particles (silt and clay) remain in suspension for a long time.

The **results of the particle size analysis**, divided by sieve diameter, are entered into a table, and subsequently, for each particle size class (coarse sand, fine sand, coarse silt, fine silt, and clay), a **statistical analysis** of the data is performed.

Through the data provided by the statistics, it is possible to give an indication of the **homogeneity of the soil** sample used in the texture analyses.

Table of the **particle size classes** of interest, divided based on the diameter intervals of the particles*

Coarse sand

> 100 μm

Fine sand

100 – 50 μm

Coarse silt

50 – 20 μm

Fine silt

20 – 2 μm

Clay

< 2 μm

* *It is possible to modify and customize the table of intervals*

MAIN FEATURES

- **Detection** of soil from 0.1 mm to 0.001 mm
- Measurement of density variation by sedimentation
- Complete analyses in **5 to 6 hours**
- 1, 3, or 6 samples **simultaneously**
- **Density** range read from 0.900 to 1.0500
- **Automatic** compensation for temperature variation and Stokes' law
- **Repeatability** better than 2%
- Data saved in PDF or CSV file

GSA stops automatically at the end of the analysis, without the need for operator intervention





FASTER AND SAFER RESULTS

- Complete analyses in **5 to 6 hours** without the aid of the operator
- GSA was designed to **simultaneously** perform analyses **on up to 6 samples**
- It acquires data at predetermined time intervals. Based on the sedimentation rate of the soil particles, **GSA** allows for **extremely accurate results** and a very high repeatability of measurements, avoiding manual measurement errors.

SAMPLE PREPARATION

- 25 g of ground
- 62 ml of dispersing agent – 40% sodium hexametaphosphate
- 438 ml of distilled water (adjust to the reference mark on the cylinder)

The soil is left in contact with the dispersing solution for a time ranging from 5 to 7 hours, to allow optimal dispersion of colloids.

PARTICLE SIZE ANALYZER – FIELDS OF APPLICATION

The **classification criteria for soils** and the **acceptance of construction materials** for roads, airports, dams, etc., are primarily based on **particle size analysis**.

The information obtained from this type of test, together with permeability tests, is used to **study filtration problems**.

The sizing of filters is determined by the appropriate selection of particle size curves of the materials that constitute them.

GSA may be used by:

- Geotechnical Laboratories
- Testing and Certification Laboratories
- Regional Agencies for Environmental Protection
- Universities
- Technology of materials, structures, civil construction, industrial research, and Cultural Heritage
- Infrastructure and environment

GSA, accurate soil particle size analysis, made easy

STANDARD EQUIPMENT (6 POSITIONS)

- 7 floats
- 1 screen 15"
- 1 mouse
- 1 keyboard
- 6 anchors
- 1 anchor stick
- 7 x 500 ml cylinders
- 500 ml sodium hexametaphosphate
- 3 l of distilled water
- calibration mass in E2 of 100 g

TECHNICAL DATA AND PARAMETERS

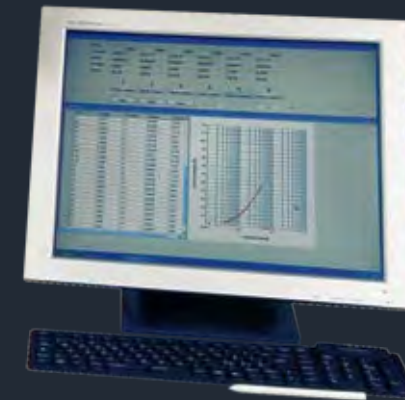
- ground density 2,65 g/cm³
- force of gravity 9,80 m/s²
- data acquisition time 1, 2, 4, 8, 16, 30, 60, 120, 240, 480, 1440 minutes
- sample quantity 25 g
- float center of gravity 80 mm
- power supply 100/240 VAC via external supply, 50 Hz
- supply voltage 230 VAC – 1A
- output USB
- dimensions mm (LxWxH) 1200 x 500 x 800 mm
- weight 40 – 65 - 96 kg

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