SKALAR

SP1000 Robotic Analyzer

Clay Fraction analysis automated for high sample volumes

Due to the continuous attention of the different governments for the environment, it is important to obtain a value which classifies the soil a.o. for construction purposes or its capacity to transport pollution. Some of the factors are for example absorption, the ability to shrink or swell, water retention and permeability. Most of these factors are independently correlated with the particle size of the soil.

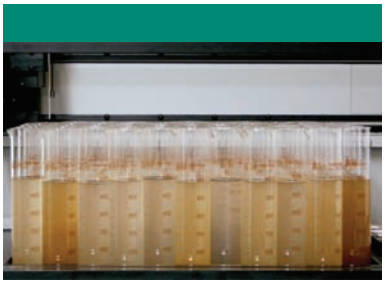
In Europe, the determination of the clay fraction or "LUTUM" is also called the method of Robinson-Köhn, according to ISO11277. The first step to determine the clay fraction is by sifting. The smallest fraction (<63 µm) is then used to obtain the clay or "LUTUM" fraction. The clay fraction is the smallest fraction (0 – 2 micron) in clay ground. The workability of the soil depends on the clay percentage. According to the found clay percentage, soil can be subdivided into different types as listed below:

0 – 8 % clay: Sand
8 – 25 % clay: Sandy clay
> 25 % clay: Clay

The analysis is carried-out in 4 steps:

- Weighing the sample
- Removal of Organic Matter
- Removal of Carbonates
- Determination of the clay fraction

After weighing and the removal of organic matter and carbonates, the sample is transferred into a volumetric cylinder of 1000 ml. For the determination of the clay fraction Skalar has developed a concept to automate the last step in this process using the SP1000 robotic analyzer. To automate this final step is particular interest because of the precise timing involved in the procedure. The system automatically adds 50 ml of Sodiumpyrophosphate solution and brings the suspension to volume (1000 ml) by adding distilled water. During a user-definable time, the sample is homogenized.



After a settling period of several hours (up to 8 hours) a fraction of the suspension is taken at a predefined depth from the cylinder and this fraction is transferred to an evaporation dish by the system. After drying the clay fraction is determined by weighing the remainder of the sample. The clay fraction is calculated via the software. This procedure can also be performed unattended allowing for overnight operation. In addition, it is also possible to measure different fractions, for example < 16 µm, or to measure directly after the cylinder is brought to volume (ISO 11277).

The Skalar SP1000 offers an economical and “walk-away” automation concept for the lengthy clay fraction analysis procedure, which modern advanced laboratories will find greatly beneficial.

A step-by-step overview is listed below. In this example the 50 ml of Sodiumpyrophopsphate solution is added manually. Optionally, the SP1000 can also automate this step.

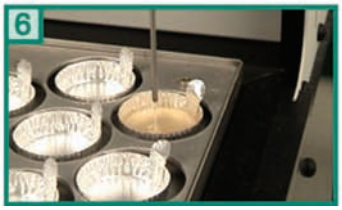
Sample pretreatment; removal of organic material and carbonates

Place the sample into the cylinder and add 50 ml of Sodiumpyrophosphate

Automatic addition of dilution water to volume and stirring of the sample

Settling time, normally between 4 and 8 hours for 2 µm particles

Depending on time, take 20 ml of sample at specified depth



Dispense sample in pre-weighed dish

Heat till dry and weigh sample dish again

Calculate results

For more information on the Clay Fraction application or other Skalar products please contact your local Skalar agent or Skalar’s headquarters in the Netherlands.

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