

Automatic particle size distribution (LUTUM) analysis in soil

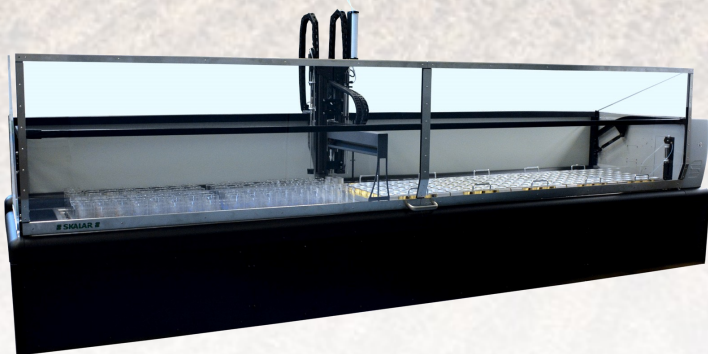
Assessing the environmental quality of soil and its application possibilities is important to ensure we can deal with waste, materials and soil in a well-considered conscious manner.

The clay fraction is one of the most important in assessing soil quality and can be determined with particle size distribution (LUTUM) analysis according to ISO 11277, NEN 5753, CMA/2/IIA.6.

For Eurofins in Amsterdam, Skalar has automated the LUTUM analysis according to OVAM (Public Flemish Waste Agency) and SIKB-AP04 (Infrastructure Quality Assurance Soil Management) guidelines of pre-treated soil samples. This environmental laboratory processes many soil samples a day and they need to follow exact protocols to comply to various regulations for accessing soil quality.

The Skalar SP2000 robot is perfect for this job because the very precise timing steps and repetitive pipetting required for this analysis are easily automated. The operating software is flexible and allows set up of the application in a way that a free selection of the different required fractions can be taken from the settled samples in the measuring cylinders.

Another great advantage is the unattended operation around the clock, providing total flexibility for analyzing the different fractions by extending beyond normal working hours. Samples can be introduced at any time during the day for unattended analysis overnight, which significantly shortens the lead time of the analysis results to one working day.



Example of the SP2000 LUTUM analyzer at Eurofins Environmental laboratory.

Skalar's automated procedure in detail:

1. The volumetric cylinders of 1000 or 500 ml with the pre-treated soil samples are placed on the SP2000 platform (56 positions).
2. A sample table is created and for each sample, a pre-programmed method can be selected.
3. The analyzer automatically takes the requested fractions for the samples.
4. Sodium pyro phosphate solution is automatically added (if required).
5. The suspension is brought to a volume of precise 500 or 1000 ml by adding distilled water.
6. For a user-definable time the sample is homogenized.
7. When the homogeneous solution has been obtained, the samples are left to settle for a period of time.
8. After the settling period, temperature measurement is done of the sample solution for depth correction.
9. 20 ml of the suspension is taken at a pre-defined (calculated) depth from the cylinder and transferred to an evaporation dish (56 positions).
10. After all fraction are dispensed in the aluminium cups the heating is started and the samples are evaporated at 92°C.
11. The samples are manually transferred to an incubation oven (for constant weight) after the evaporation.
12. The evaporated cups are weighed and the clay fraction is automatically calculated via the RobotAccess™ software.

Besides the determination of the different fractions, the sample pre-treatment can also be automated with a Skalar SP50 analyzer. A total of 140 samples can be pre-treated according to the norm in one working shift of 8 hours by this fully automated analyzer. To pre-treat such a volume of samples manually several days would be required.

For more information about this application or the automatic sample pre-treatment procedure please feel free to contact Skalar at info@skalar.com