

# AGGREGATE STABILITY



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The aggregate stability of a soil is the resistance of soil structure against mechanical or physico-chemical destructive forces. Soil structure is one of the main factors controlling plant growth by its influence on root penetration, soil temperature and gas diffusion, water transport and seedling emergence and therefore it is an important soil characteristic for farmers.

Soil structure is defined by the combination or arrangement of primary soil particles into compound elements, which are separated from adjoining structural elements by surfaces of weakness. Soil texture, soil structure, and the type of clay mineral, organic matter content and type, cementing agents and cropping history influence the aggregate stability.

Among the mechanical destructive forces are soil tillage, impact of heavy machinery, treading by animals and raindrop splash. Physico-chemical forces are e.g. slaking, swelling and shrinkage, dispersion and flocculation.

Slaking is the process of structure breakdown

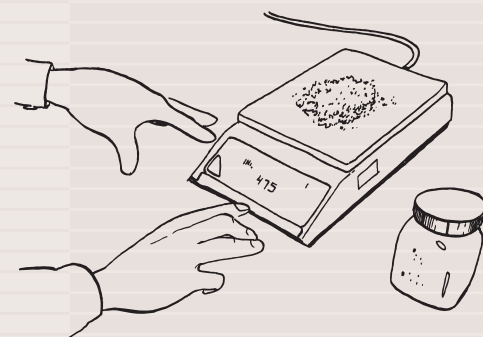
under the influence of wetting of soil aggregates, due to swelling of clay minerals, dissolving of cementing agents, air explosion or reduction in pore water suction. Slaking may result in the formation of a superficial crust, reducing water infiltration and enhancing sediment loss by downward transportation with surface runoff water.

## 08.13 Wet sieving apparatus, complete set to determine the aggregate stability of soil

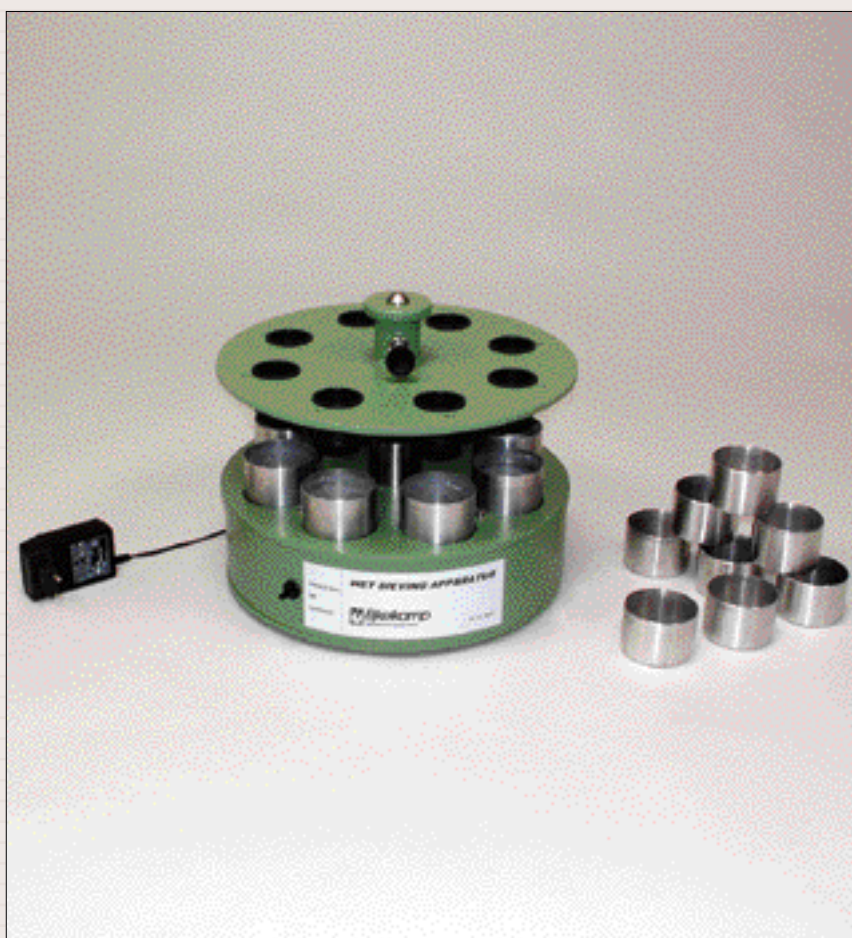
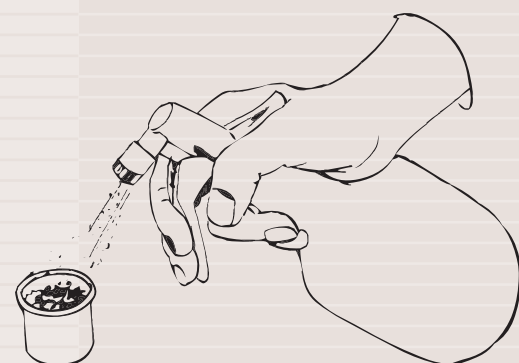
The wet sieving apparatus is used to determine the above mentioned aggregate stability. The standard set includes a shaking machine for wet sieving method (incl. 100-240 VAc adapter), suitable for 8 sieves, aluminium cans Ø 62.5x44 mm, sieve cans Ø 39x39 mm with sieve opening 0.250 mm and sieve surface of 10.2 cm<sup>2</sup>.

The wet aggregate stability is determined on the principle that unstable aggregates will break down more easily than stable aggregates when immersed into water.

**The sample material is weighed.**



**The samples are pre-moistened with water vapour, using a very fine plant sprayer.**



Wet sieving apparatus, complete set with accessories



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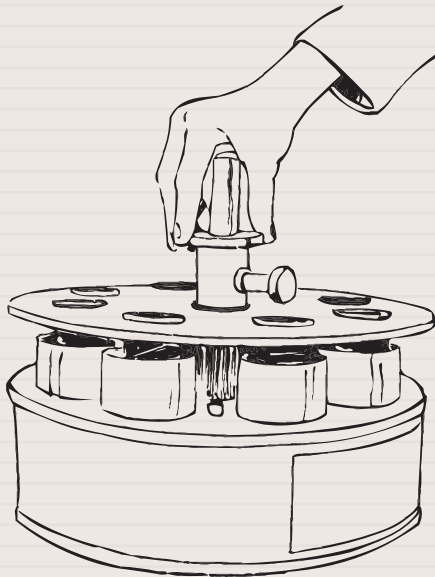
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To determine the stability, 8 sieves are filled with a certain amount of soil aggregates. These sieves are placed in a can filled with water, which will move up and downward for a fixed time. Unstable aggregates will fall apart and pass through the sieve and are collected in the water-filled can underneath the sieve. The testing procedure results in an index for aggregate stability.

the water level in the cans.

- Build-in oscillating mechanism and electric motor.
- Electric 12/24 Vdc motor with external adapter for safe use in wet conditions.
- World wide universal adapter (input 90 to 264 Vac) complete with interchangeable mains plugs for international use.

The cans are placed in the lower position to immerge the samples.



### Advantages

- Easy operation through the central knob of the sieve holder.
- The cans can be easily filled and filled-up with water through the special can-fill openings in the sieve-holder.
- The sieve-holder can be set and locked in the leak-out position while the sieves are still straight above the cans preventing the spoil of aggregates.
- The sieve-holder can be put in the bottom position, independently the position of oscillating mechanism, so it is easier to control

### Applications

Applications of the wet sieving apparatus are the fields of agriculture and land conservation (research on soil erosion, land degradation/conservation, salinization, agriculture, sustainable agriculture). Determining aggregate stability will give information on the sensitivity of soils to water and wind erosion, which might be prevented e.g. by mulching the soil surface. Information on soil aggregate stability can also improve tillage programs, adapted to the specific soil type and crop demands.



Shaking machine for wet sieving method