Standard Operating Procedure (SOP) 3.1.5.8
Measurements of Settleable Solids with Imhoff Cones

The term "solids" is generally used when referring to any material *suspended* or *dissolved* in water that can be physically isolated either through filtration or through evaporation. *Solids* can be classified as either *filterable* or *nonfilterable*. Filterable solids may either be *settleable* or *nonsettleable (suspended)*. The nonfilterable solids are termed settleable if the solids settle out in a standard laboratory settling container within a specified period of time. They are called non-settleable if they fail to settle out (remain floating) within that time period. Solids can also be classified as *organic* or *inorganic*. If solids are organic, the material is carbon-based and will burn. Inorganic solids, on the other hand, are mineral based and generally will not burn. *Total solids* are dissolved solids plus nonsettleable and settleable solids in water.

Method Overview

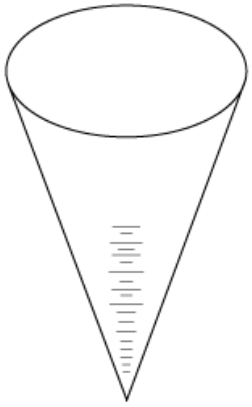
Settleable solids are those solids which will settle to the bottom of an Imhoff cone in a given time period. In the lab analysis, the mixed water sample is quickly poured into an Imhoff cone and allowed to stand undisturbed for the desired time, usually 60 minutes. At the end of the given time period the amount of solid material that has settled to the bottom of the Imhoff cone is measured in mL/Liter.

Sample Handling

In measuring for settleable solids the samples can be either a *grab sample* or a *composite sample*. Collect samples in clean glass or plastic bottles. The samples must be *chilled* or *iced* at or during collection to keep the sample at or below 6 °C (43 °F). There is a *24 hour holding time* which for grab samples. This holding time starts at the time of collection and for composite samples starts at the time the last portion of the composite is collected. Let the sample temperature increase to room temperature before analysis.

Imhoff Cones

Imhoff cones are clear, cone-shaped containers marked with graduations (usually millimeters). The cone is used to measure the volume of settleable solids in a specific volume (usually one liter) of water. The cones are made of clear plastic making it easy to see the level marks between the settled solids, the clear liquid, and floating solids (if any). Imhoff cones are usually used in multiples so that samples can be easily compared.



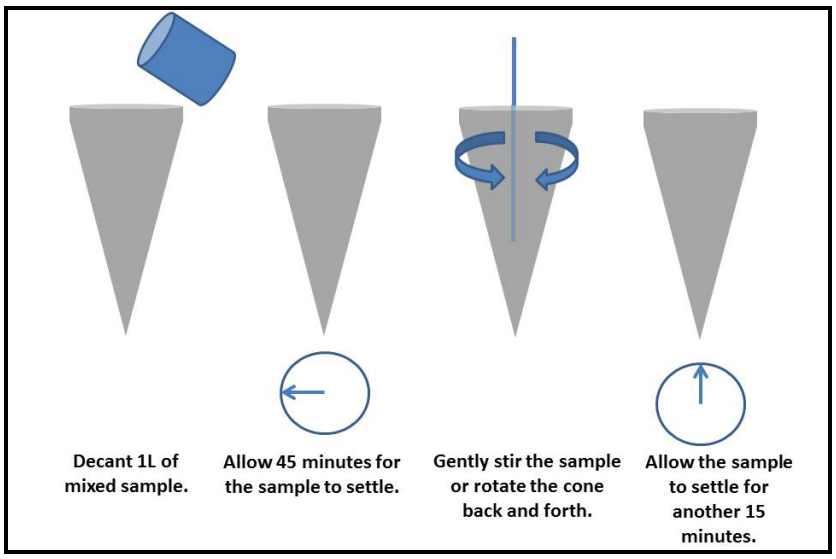
Equipment and Supplies

- Imhoff cone(s)
- Rack for holding Imhoff cones
- Stirring rod
- Timer
- Cleaning brush

Procedure

1. Let the sample temperature increase to room temperature.
2. Fill an Imhoff cone to the one-liter mark with a well-mixed sample.
3. Allow sample to settle in the Imhoff cone for 45 minutes.
4. Gently stir the sample with a glass rod to release the suspended matter clinging to the sides of the Imhoff cone. An alternative method which does not require a stirring rod, is to gentle rotate the cone clockwise and counterclockwise.
5. Let the sample settle for an additional 15 minutes.
6. At this point, one hour has passed. Record the volume of settleable solids (in milliliters) in the Imhoff cone. Results are reported in mL/Liter

Note: Do not include any floating solids or any voids in the settled solids as settleable matter.



Monitoring and Method Tips

- Maintain sample integrity and prevent cross-contamination, sampling collection personnel will follow proper sampling technique and all quality assurance/quality control recommendations.
- Decontaminate sampling equipment prior to sample collection and after sample collection using TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.

References

- USEPA – Quality Assurance, Quality Control, and Quality Assessment Measures - Chapter 5 Water Quality Conditions http://water.epa.gov/type/rsl/monitoring/vms50.cfm
- USEPA – Quality Assurance, Quality Control, and Quality Assessment Measures - Chapter 5.8 Total Solids What are total solids and why are they important. http://water.epa.gov/type/rsl/monitoring/vms58.cfm