Understanding Total Suspended Solids (TSS)

Introduction – TSS is one of the method defined analytes. There is no specific chemical formula for a total suspended solid. Quite simply put, TSS is anything that is captured by filtering the sample aliquot through a specific pore size filter. Suspended solids can range from particles of silt or sediment to pieces of plant material such as leaves or stems. Even insect larvae and eggs can fall in the general category of TSS. High amounts of TSS can lead to an esthetically displeasing appearance of a body of water. Either the color or overall turbidity of the water will be negatively impacted.

Approved Methods – TSS is usually listed under “Residue – non-filterable.” For NPDES/CWA reporting, Standard Methods 2540D and USGS I-3765-85 are accepted methods.

Method Summary – A measured volume (no more than 1 L) of sample is passed through a prepared, preweighed filter paper. The filter is dried at 104 ± 1 °C. After drying the filter is reweighed and the TSS is calculated.

What You Should Know – Preparing the filter papers is tedious (not to be confused with TDS, a somewhat different topic) and time consuming. The filters must be washed, dried, and weighed multiple times to ensure a consistent dry weight. You can do this yourself or save time and effort by using ProWeigh filters. Approved and mentioned by name in Standard Methods for the Examination of Water and Wastewater, these filters will reduce the hands on time of your analysis by half. After preparation, the most important thing to know about this test is that the sample must be thoroughly mixed. Experience has shown that shaking through inversion is a good way to mix your sample. You will need to give it at least 10 good shakes to ensure mixing. If your sample contains fine particles of clay, be sure to examine the bottom of the container to look for caked on solids. Experience with the sample is the best way to know how much you will need to filter. The following amounts are a good guideline to get you started: Mixed Liquor – 1-10 mL, Influenets – 25-50 mL, Effluents – 300-700 mL, Stormwater – 500-1000 mL. Your results may vary. Standard Methods requires repeated drying, cooling, and weighing cycles, similar to the filter prep, to ensure the true value is reached. Although TSS is less susceptible to variability than other methods, it is a good idea to keep the drying and cooling times as consistent as possible.
TSS Method Procedure

Note – This is not intended to be a standalone method and does not address all safety or quality control aspects that may be required. Please consult your local regulations to comply with all requirements.

1. Collect your sample in a **HDPE 1 L container**.
2. Connect your **Vacuum Pump** to the side arm of your **vacuum flask**.
3. Seat your filter holder in the top of your vacuum flask or use a **manifold** for increased numbers of simultaneous samples and higher efficiency.
4. Place a **ProWeigh filter** in the filter holder, wet it with a small amount of reagent water to seat it, and secure the funnel to the base.
5. Filter as much sample as is possible within a 10 minute span, up to 1 L. While the sample is filtering, record the pan ID and initial weight from the label on the pan. Record the total sample volume filtered.
6. Wash the filter and collected solids with three successive 10 mL portions of reagent water. This will remove any dissolved solids trapped in and on the filter. Continue suction for about three minutes after filtration is complete.
7. Place the filter back in its pan and place in a **drying oven** set at 104±1 °C for at least one hour.
8. Remove filters/pan from the oven and place in a **desiccator** until they reach room temperature.
9. Weigh each filter on a **balance** to the nearest 0.0001 g and record the weight. Note – Do not include the pan in this step.
10. Repeat steps 7-9 at least one more time and as many as are necessary to obtain a reading ± 0.0005 g from the previous weight.
11. Calculate your result with the following equation

\[
\frac{\text{Weight}_{\text{final}}(g) - \text{Weight}_{\text{initial}}(g) \times 1,000,000}{\text{Sample Volume (mL)}} = \text{mgTSS/L}
\]

The final weight is the weight of the filter plus the dried residue and the initial weight is the weight of the unused filter.

If you need a control standard try the **Universal Solids Standard** or the **Universal Wastewater Standard**.

We all like things that make life easier. Was this document helpful? Or do you…disagree with something? Have something to add? Contact me at DavidS@envexp.com to let me know what you think.