
Shimadzu TOC Standards Preparation

1. Preparation of TC Standard Solutions

- 1.1. Accurately weigh 2.125g of reagent grade potassium hydrogen phthalate that was previously dried at 105-120°C for about 1 hour and cooled in a desiccator.
- 1.2. Transfer to a 1 L volumetric flask and dissolve in zero water.
- 1.3. Add zero water to the 1 L mark and stir the solution.
- 1.4. The carbon concentration of the solution is 1000mgC/L (1000mgC/L = 1000ppmC). This solution is the standard stock solution

Note: The standard stock solution may be prepared at other concentrations. For example, a 2000mgC/L solution can be used as the standard stock solution.

- 1.5. The standard stock solution is diluted with zero water to prepare standard solutions at the required concentrations

Note: The TC standard solution reagent need not be potassium hydrogen phthalate. Depending on the application, other substances are also acceptable (e.g., sucrose, etc.):

2. Preparation of IC Standard Solutions (HV)

- 2.1. Accurately weigh 3.50g of reagent grade sodium hydrogen carbonate that was previously dried for 2 hours in a silica gel desiccator, and 4.41g of sodium carbonate previously dried for 1 hour at 280-290°C and cooled in a desiccator.
- 2.2. Transfer the weighed materials to a 1L volumetric flask.
- 2.3. Add zero water to the 1L mark.
- 2.4. Stir well to mix.

Note: In this instance, the carbon concentration of 1000mg/L is indicated as 1000mgC/L. The concentration of this solution is 1000mgC/L (1000ppmC) and is referred to below as the "TC Standard Solution".

3. Preparation of TN Standard Solutions

- 3.1. Accurately weigh 7.219g of special reagent grade potassium nitrate dried for 3 hours at 105-110°C and cooled in a desiccator.
- 3.2. Transfer the weighed material to a 1L volumetric flask.
- 3.3. Add zero water to the 1L mark.
- 3.4. Stir well to mix.

In this instance, the nitrogen concentration of 1000mg/L is indicated as 1000mgN/L. The concentration of this solution is 1000mgN/L (1000ppmN) and is referred to below as the "TN Standard Solution".

4. Preparation of TC/TN Mixed Standard Solutions

- When TC (or NPOC) and TN analyses are performed simultaneously, a mixed TC and TN standard solution is prepared.
- The mixed standard solution is prepared by mixing the TC standard solution and TN standard solution. The mixed standard solution must contain 0.05M hydrochloric acid.

5. Preparation of 100mgC/L TC - 100mgN/L TN Mixed Standard Solutions

- 5.1. Prepare 1L of 1000mgC/L TC standard solution using the preparation method described above.
- 5.2. Prepare 1L of 1000mgN/L TN standard solution using the preparation method described above.
- 5.3. Introduce 100mL of each of the prepared standard solutions into a 1L volumetric flask.
- 5.4. Add 25mL of 2M hydrochloric acid to the flask
- 5.5. Add zero water to the 1L level.
- 5.6. Stir well to mix

The hydrochloric acid concentration will be about 0.05M after dilution.

6. Storage of Standard Solutions

The standard solutions undergo concentration changes, particularly when low-concentration solutions are stored even for short periods. As a result, high-concentration standard stock solutions (for example, 1000mgC/L) should be stored in airtight containers in a cool, dark place. Glass bottles are suitable storage containers. Dilute the stock solution prior to each use.

7. Storage Time Limit for Solutions

The limitation on storage of standard solutions is about 2 months for 1000mgC/L standard stock solutions and about 1 week for diluted standard solutions (for example, 100mgC/L). The limitations are for cold storage in sealed containers.

Note: IC standard solution absorbs atmospheric carbon dioxide and undergoes concentration changes. As a result, it is particularly important to store IC standard solution in a sealed container.

Prepare fresh standard solutions:

- If reproducibility of analysis values is poor or concentration fluctuates.
- If contaminants, including even small amounts of dust, are present in the standard solution.

***The TRACES Manager will provide further details during hands-on training.**