

METHOD STATEMENT

Determinand:

Total Organic Carbon (TOC)

Matrix:

Sewage Effluents, Sewage Influent, Trade Effluents, Groundwaters, Landfill Leachates, Soil Leachates

Principle of Method:

Total Organic Carbon is Carbon present in a liquid in all organic forms. Dissolved Organic Carbon is Organic Carbon present in a sample after membrane filtration. Non Purgable Organic Carbon (NPOC) is dissolved non-purgable carbon. The sample is mixed with acid and Persulfate solution and any Inorganic Carbon or volatile carbon present in the sample is purged off as Carbon Dioxide. An aliquot of the sparged sample is then passed into the reaction vessel where it is heated to the critical point of water. In the presence of persulfate, this condition causes all the Carbon to convert to Carbon Dioxide. This Carbon Dioxide is swept by an inert carrier gas (nitrogen) to an Infra-red detector where the concentration of the Carbon dioxide present is determined.

The amount of Carbon present in the sample is directly proportional to the absorbance of CO₂ measured at a wavelength of 4.4µm on the detector and is related to the sample volume injected.

Sampling and Sample Preparation:

Prior to analysis, the test portion of the sample should be filtered to remove solid particulate matter. Samples are stable for 7 days (ISO 5667:3) from sampling.

Interferences:

Carbon dioxide, carbonates and bicarbonates must be removed by acidification to pH 3.0 or below, and purged with nitrogen. The instrument automatically carries this out. Very alkaline samples may prove unsuitable for analysis due to the volume of acid required to remove carbonates etc.

Performance of Method:

Range of application 0.7 to 150mg/l as C
 Limit of detection 0.6084
 Normal Reporting Limit: <0.7mg/l as C

| Determinand | Low standard | | High standard | |
|-------------|--------------|--------|---------------|--------|
| | RSD % | Bias % | RSD % | Bias % |
| TOC | 3.96 | 6.29 | 5.69 | 3.33 |

| Determinand | Final Effluent | | Trade Effluent | | Crude sewage | |
|-------------|----------------|-------|----------------|-------|--------------|-------|
| | %RSD | %Rec. | %RSD | %Rec. | %RSD | %Rec. |
| TOC | 6.02 | 99.55 | 3.90 | 90.60 | 7.61 | 93.40 |



METHOD STATEMENT



| Determinand | Ground Water | | Landfill Leachate | | Soil Leachate | |
|-------------|--------------|--------|-------------------|-------|---------------|--------|
| | %RSD | %Rec. | %RSD | %Rec. | %RSD | %Rec. |
| TOC | 8.21 | 101.67 | 7.15 | 92.64 | 4.66 | 101.28 |

Uncertainty of Measurement

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

| Determinand | Uncertainty of Measurement % |
|-------------|------------------------------|
| TOC | 16.34 |

References:

The Instrumental Determination of Total Organic Carbon and Related Determinands 1995. Methods for the Examination of Waters and Associated Materials. HMSO ISBN 011 752979 6.

GE Water & Process Technologies Analytical Instruments Sievers InnovOx Laboratory Total Organic Carbon Analyzer Operation and Maintenance Manual.

