Method Summary

Determination of Total organic and Total inorganic carbon

Scope and Range

This method is used to determine total organic and total inorganic carbon in water samples using Elementar analyser for TOC.
This method is accredited to ISO 17025 for TOC in Groundwater, Surface Water, Potable water (non – regulatory), landfill leachates, treated and untreated sewage effluents. It is also accredited for TIC in Groundwater, Surface Water, landfill leachates, treated and untreated sewages, Trade Effluents.
Dissolved Organic Carbon (DOC) and Dissolved Inorganic Carbon (DIC) can also be run but are unaccredited.

Detection limit: 3 mg/l
Range: 3- 100mg/l

References

Standard Methods for the Examination of Waters and Wastewaters, 24th Edition, APHA, Washington DC, USA. ISBN 0-87553-131-8
ASTM D4839 & D4779
USEPA 415.1 & 9060

Principle

Preparation and Extraction:
For Total Organic Carbon (TOC) and Total Inorganic Carbon (TIC) the sample is well shaken before being taken for analysis.

For Dissolved Organic Carbon (DOC) and Dissolved Inorganic Carbon (DIC) the sample is filtered through a 0.45µm filter before analysis.

Samples for TOC/DOC can be run on sulphuric acid preserved samples, but TIC/DIC must only be run on unpreserved samples.

Analysis:
The analysis is carried out by high temperature oxidation.
TIC/DIC is determined by measuring the carbon dioxide released when the sample is acidified. The CO_2 produced is purged from the acidified sample and detected by a non-dispersive infrared (NDIR) detector. The mass of CO_2 detected is proportional to the mass of TIC/DIC present in the sample.
If high temperature oxidation is used, once the inorganic carbon has been purged from the sample a portion of sample is injected on to a platinum catalyst at high temperature in a flow of air. The CO_2 produced by the high temperature oxidation is purged from the sample and detected by NDIR. The mass of CO_2 produced from this reaction is proportional to the mass of TOC/DOC present in the sample.

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Interferences

Large organic particles or complex organic molecules, e.g., tannins, will slow the oxidation, as will highly acidic pH values.
High chloride concentrations will inhibit the reaction but can be removed by the addition of mercuric nitrate.
Other potential interferences can be caused by plastic containers, oily samples, or atmospheric CO2 in the dilution water.