

METHOD STATEMENT

Determinand:

Dissolved Organic Carbon or Total Organic Carbon

Matrix:

Sample Type: Final effluents, trade discharges, crude sewage and other related waste waters.

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.

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 also related to the sample volume injected.

Interferences:

No significant interferences affect the results obtained. Any VOC or CO₂ entering the samples or reagents do not interfere due to sparging with nitrogen in the NPOC mode. Only CO₂ is measured in the detector so no other oxidised species can interfere. If the sample contains a high level of TOC, unoxidised material can be deposited in the reactor; however, the amount of oxidiser added allows up to 5000 mg/l TOC to be completely oxidised.

Strongly alkaline or highly buffered samples can affect the efficiency of the Inorganic Carbon removal.

Samples with a high level of humic type compounds or surfactants can cause frothing in the sparging chamber, which leads to significant carry over.

Dissolved salts such as chloride do not affect the results due to the unique nature of supercritical water.

Performance of Method:

Range of Application:

4.4 - 250mg/l Carbon

The analytical range may be increased by sample dilution.

Reporting Limit: 4.4mg/l

Limit of Detection:

0.525 mg/l

Recoveries of Compounds:

	<u>Standards</u>		<u>Final Effluent</u>		<u>Final Effluent Filtered</u>		<u>Trade Discharge</u>		<u>Crude Sewage</u>	
	Low Std	High Std	Low Spike	High Spike	Low Spike	High Spike	Low Spike	High Spike	Low Spike	High Spike
%Recovery	100.79	96.89	98.38	97.85	98.14	98.36	101.62	97.79	101.84	95.43
%RSD	2.48	1.93	4.42	2.94	2.51	2.60	3.73	3.25	6.25	6.15

References:

The Instrumental Determination of Total Organic Carbon, Total Oxygen Demand and Related Determinands 1979.

Methods for the Examination of Waters and Associated Materials. (HMSO), ISBN 011-751458 6

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

