

# Analysis of Total Organic Carbon by GC/MS

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## Key Words

- Total Organic Carbon Analysis
- Organic compounds
- Organic pollutants
- TG-5SiIMS
- 5% Phenyl



## Introduction

In environmental analysis Total Organic Carbon (TOC) analysis is extensively used as a screening tool for the determination of carbon content of sediments and water samples both freshwater and marine. If the TOC count is higher than acceptable, the contaminant(s) can be identified and quantified typically using GC-MS or GC-FID.

## Goal

To demonstrate the suitability and selective performance of the Thermo Scientific TraceGOLD TG-5SiIMS for analysis of Total Organic Carbon.

## Experimental details

A standard mix of TOC compounds was prepared using a number of standard mixtures relating to US EPA methods 508, 608, 610, 619, 8080, 8081, 8100, 8140 & 8141, with a total content of 95 components. These were run on a Thermo Scientific TRACE GC fitted with a TriPlus autosampler. An ion trap mass spectrometer was used in a segmented mode to allow precise control of ion groups for improved ion statistics and ratios. The column used for analysis of the TOC standard mixture, was a low polarity silylene phase with selectivity similar to a 5% diphenyl/95% dimethyl polysiloxane phase. The data was acquired and processed using Thermo Scientific Xcalibur data handling software.

## Sample preparation

A 1 ng/ $\mu$ L TOC analysis standard solution was prepared for the analysis

Column	Part Number
TraceGOLD TG-5SiIMS, 30 m $\times$ 0.25 mm $\times$ 0.25 $\mu$ m,	26096-1420
Guard Column 2 m $\times$ 0.32 mm	260RG497
Press-Fit Union	64000-001

## Thermo Scientific TriPlus Autosampler

Sample volume	1 $\mu$ L
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## TRACE GC Ultra

Oven Program	60 $^{\circ}$ C (5 min), 8 $^{\circ}$ C/min, 300 $^{\circ}$ C (10 min)
Equilibration Time	0.5 min
Injector	275 $^{\circ}$ C, Splitless (1 min)
Split Flow	30 mL/min
Column Flow	Helium, 1.5 mL/min (constant flow)
Transfer Line Temperature	300 $^{\circ}$ C

## Thermo Scientific Ion Trap MS

MS Type	ITD 230 LT (250 L turbo pump)
MS Source Temperature	225 $^{\circ}$ C
MS Source Current	250 $\mu$ A
Electron Energy	70 eV
Filament Delay	5 min
MS Acquisition Mode	El+, 45-450 amu Segmented Scan

Consumables	Part Number
BTO 17 mm septa	31303211
3 mm ID Focus Liner, 105 mm long	45350032
Liner graphite seal	29033406
10 $\mu$ L, 80 mm Syringe	36502019
Graphite ferrules to fit 0.32 mm id columns	29053487
Graphite/vespel 0.25 mm ID ferrules for GC/MS interface	29033496
2 mL clear vial and Si/PTFE seal	60180-599

