

# ANATOC™ SERIES II

TOTAL ORGANIC CARBON ANALYZER

## INTRODUCTION

The new SGE ANATOC™ Series II Total Organic Carbon Analyzer represents the next generation in analyzers for the rapid determination of organic carbon in water. The instrument utilizes patented photocatalytic oxidation to decompose even the most intractable organic compounds in an aqueous sample.

It provides reliable analysis at negligible cost per sample without the use of hazardous chemicals or clumsy, expensive compressed gases.

## Performance

- uses patented Photocatalytic Oxidation
- dual filter NDIR detector to eliminate background interference
- photocatalytic batch reactor
- wide analysis range of (0.05 - 5000 ppm)
- rapid sample turnaround, typically 6 minutes

## Affordability

- negligible cost per analysis
- no external gases
- no expensive reagents
- virtually maintenance free

## Simplicity

- manual, automated, or on-line modes
- automatic oxidation end-point detection
- Reactive™ software for automated SOP implementation
- comprehensive results validation and tabulation

## Safety

- room temperature reaction
- non hazardous reagents
- near - UV light source



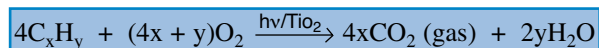
▲ ANATOC Series II as used for Manual Injection, Automated Injection and On-line Sampling

## PHOTOCATALYTIC OXIDATION PRINCIPLE

The ANATOC Series II uses patented Photocatalytic oxidation that decomposes all organic compounds in the aqueous medium to give carbon dioxide, water and the acid, base or salt of any other organically bound elements. The resulting CO<sub>2</sub> gas is accurately determined.

Generally, the organic carbon to be measured is dissolved in an aqueous matrix hence TOC is often referred to as Dissolved Organic Carbon.

The oxidation is carried out by illumination of the sample at room temperature in the presences of near - UV light (300 - 400nm) and a catalyst in the form of a dilute suspension of titanium dioxide in water.



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## SAMPLING OPTIONS

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### 1. MANUAL INJECTION

The base model facilitates a manual injection port through which samples may be introduced into the reactor.

### 2. AUTOMATED INJECTION

The incorporation of the integral AutoInjector system will allow samples from individual vials to be processed automatically. Both sample pre-treatment and sampling can be automated with this option.

The integrated eight-port distribution valve further increases the versatility of this option. Calibration standards and the additional reagents required for sample pre-treatment can be directly plumbed to the AutoInjector hence avoiding any possible cross-contamination of reagents, calibration standards or samples.

Additionally, up to 4 ports can be allocated for sampling from various sources.

The installation of the optional AutoInjector system then provides two further sampling modes. These modes are:-

#### On-Line Sampling

When the AutoInjector system is installed the ANATOC Series II may be used to directly withdraw a sample from up to four individual sample streams.

The intermediate sample transfer lines can be flushed between samples by the installation of the optional ANATOC Series II On-Line Kit.

#### Automated Sampling

The coupling of the AutoSampler to the AutoInjector system allows fully automated pre-treatment and analysis of batched samples. This option is ideal for laboratories with a high sample throughput.

#### ▼ Automated Sampling System



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## ANALYSIS OPTIONS

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The novel design of the ANATOC Series II offers a variety of user selectable analysis methods. These include the measurement of –

#### TC Total Carbon

This is the aggregate measure of the Total Inorganic Carbon and the Total Organic Carbon present in the sample. It may be measured in a single analysis as individual TIC and TOC components or simply as TC.

#### TIC Total Inorganic Carbon

Inorganic carbon mainly consists of a mixture of carbonates and dissolved carbon dioxide.

In samples containing low levels of TOC, the TIC component could be quite high and should be measured.

#### TOC Total Organic Carbon

TOC is the aggregate measure of the purgeable organic carbon (POC) and the Non Purgeable Organic Carbon (NPOC).

#### NPOC Non Purgeable Organic Carbon

NPOC can be measured directly.

#### POC Purgeable Organic Carbon

Sometimes called Volatile Organic Carbon, this is any organic carbon that can be removed by gas stripping (purging).

Various combinations of analysis methods can be selected. For example, the ANATOC Series II is capable of measuring TIC, TOC (and TC) with only one sample injection.

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## APPLICATION AREAS

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By producing water quality information in minutes instead of days, use of the ANATOC Series II can result in huge reductions of withholding times and volumes of process or effluent waters.

The following industries will find the benefits of this rapid analysis evident in the reduced cost of delays and clean up.

- Mineral Processing
- Petrochemicals
- Food and Beverage
- Pharmaceuticals
- Paint Manufacture
- Environmental Analysis
- Waste Management
- Water Supply
- Power Generation
- Sewage Treatment
- Rinse Water Validation

## PRINCIPLE OF OPERATION OF ANATOC SERIES II

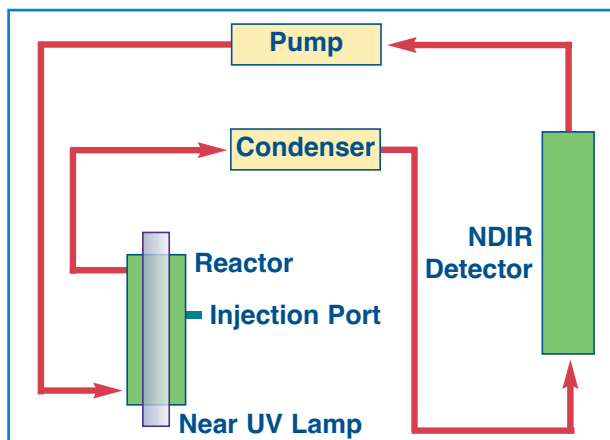
Sample is introduced directly into the photocatalytic reactor where it is mixed with the titanium dioxide slurry in the presence of a near-UV light source. Air is continuously circulated in a closed loop system and passes through the reactor to provide the necessary oxygen. Under these conditions any bound organic carbon present in the sample is quickly oxidized.

The carbon dioxide that is formed during this reaction is passed through a condenser and then circulated through the closed loop system.

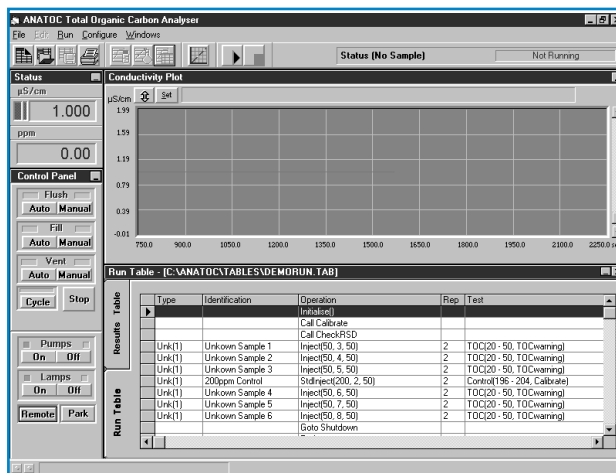
A dual wavelength Non-Dispersive Infra-Red (NDIR) detector measures the increase in carbon dioxide resulting from the oxidation.

At the completion of the oxidation process the carbon dioxide evolved reaches equilibrium in the system. The result of the analysis is calculated and reported. The closed loop system is vented and the carbon dioxide levels are returned to an ambient baseline, ready for the next analysis.

ANATOC Series II - Flow Diagram



ANATOC User Interface screen



## ANATOC REACTIVE™ SOFTWARE

Operating Environment:	Microsoft Windows 95, Microsoft Windows 98 and Microsoft NT
Operation:	Instrument control and monitoring, sample processing, results monitoring, system validation, automated sample preparation #1
Password Protection:	Multilevel password protection of software functions
Sample Processing:	Programmable sample processing table, system and results validation, comprehensive results table, programmable
Results Monitoring:	Analyte exceeds programmed range, over-range results (automatic re-injection option), new sample (automatic priming option)
Results Validation:	System calibration, system precision
Data collection:	Results table, oxidation profile raw data (files cannot be edited)
Diagnostic monitoring:	Instrument/component operation time, liquid level sensors and baseline stability
Minimum PC configuration:	Pentium II, 32Mb RAM, 100Mb HD space, spare serial communication port

## ORDERING INFORMATION ANATOC SERIES II

Description	Part Number
ANATOC SERIES II TOC Analyzer – Manual Injection #2	098800
ANATOC Series II TOC Analyzer – Auto Injection #2	098850
ANATOC Autosampler #1	098530
ANATOC Series II On-Line Kit #1	098855

ANATOC™ has been developed in conjunction with CSIRO Australia. Specifications are subject to change without notice.

#1 These options are only applicable to the ANATOC™ Series II AutoInjection model.

#2 An Autoinjector Upgrade kit is available for the Manual System.

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\* Note: Reactive™ Software is supplied with the ANATOC Series II TOC Analyser

# ANATOC™ SERIES II

## TOTAL ORGANIC CARBON ANALYZER

### ANATOC Series II TOC Analyzers

Oxidation process:	Patented Photocatalytic Oxidation using Titanium Dioxide (TiO <sub>2</sub> )
Detection:	Non-Dispersive Infra-Red (NDIR) detector
Analyte options:	TC, TOC, TIC, NPOC, POC (TC - NPOC)
Sampling options:	Manual injection Automated injection (requires AutoInjector option) On-line sampling (requires On-Line Kit option) Automated Sampling (requires AutoInjector option and AutoSampler)
Analysis range:	0.05ppm (50ppb) to 5,000ppm (µgC/mL)
Analysis cycle time:	3 to 7 minutes per analysis
Injection volume:	10µL to 10mL
Precision:	Better than ±2% of full scale
Control:	ANATOC Reactive™ Software
Communications:	Serial RS232C (PC to ANATOC Series II )
Operating voltage:	100 – 250 VAC 50/60Hz. (100VA)
Dimensions:	<b>Instrument</b> : 285mm (w) x 350mm (d) x 410mm (h), <b>Shipping</b> : 395mm (w) x 465mm (d) x 620mm (h)
Weight:	Manual System: Net: 16.8kg Shipping: 20.2kg AutoInjector System: Net: 19.0kg Shipping: 22.4kg

### AutoInjector Option (ANATOC Series II Integrated System)

Syringe volume:	1mL, 2.5mL, 5mL, 10mL, 25mL
Sampling valve:	Inert 8 port valve
Standard Port Configuration:	Waste, injection, calibration standard, acid, 4 x sample ports
Accuracy:	Better than ±1.0% of syringe volume
Precision:	Better than ±0.05% CV at full stroke

### AutoSampler

Sample Probe:	Tri-Core Sampling Probe – sample aspiration, sparging and vial venting
Sample Capacity:	Any combination of 3 of the following rack sizes: 90 x (13mm OD), 60 x (16mm OD), 40 x (20mm OD), 21 x (30mm OD) vials
Communications:	Serial RS232C (ANATOC Series II to AutoSampler )
Operating voltage:	100 – 250VAC 50/60Hz. (30 VA)
Dimensions:	<b>Instrument</b> : 420mm (w) x 370mm (d) x 330mm (h), <b>Shipping</b> : 560mm (w) x 260mm (d) x 440mm (h)
Weight:	Net: 8.5kg Shipping: 15.5kg



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