



**TOC  
COD, BOD**

**THE OXIDATION PROCESS  
THAT TOTALLY  
SELF-CLEANS**

## PRODUCT FEATURES AND BENEFITS

- NEW BioTector Network Control Unit. Giving remote access to multiple analyzers (Optional Module).
- Low Maintenance - No Calibration required between 6 month service intervals
- High Reliability - Certified 99.86% Uptime
- Self Cleaning Technology - Prevents clogging & sample contamination
- Clean & Dirty water analysis (including fats, oils & greases)
- Can handle chlorides up to 30% and calcium up to 12% w/w
- No filtration
- Complete Oxidation of Representative Sample using Patented Two-Stage Advanced Oxidation (TSAO) Technology
- Multi Range feature with automatic range selection
- Single or Multi-Stream Option
- Measured Components: TOC, COD, BOD, TC, TIC, VOC
- Very Low Cost of Ownership
- Guaranteed to handle the most demanding applications

## APPLICATIONS

- Control of Influent to Industrial Waste Treatment Plants
- Monitoring of Final Effluent
- Measuring Organic Carbon and Inorganic Carbon in Process
- Minimizing Waste from Process Plants
- Monitoring Cooling Water
- Monitoring Boiler Condensate & Feed Water
- Monitoring Municipal Waste Treatment Plant - Influent & Effluent
- Monitoring De-icing runoff in Airports
- Monitoring Process Breakthrough and Spills
- Monitoring River Water
- Monitoring Surface Water
- Monitoring Landfill sites
- Special Applications

BioTector liquid analyzers are specifically developed for continuous analysis in the harsh online environment. BioTector's patented self-cleaning oxidation technology (TSAO) has overcome the traditional problems associated with online measurement and can reliably measure samples containing salts, particulates, fats, oils and greases. BioTector products are regarded by major international users as the most reliable online liquid analyzers on the market. Since 1995 BioTector analyzers have proven their ability on a wide variety of clean and dirty applications throughout the world.

## THE MEASUREMENT PROCESS CAN BE DESCRIBED IN FIVE STAGES

- SAMPLING:** A representative unfiltered sample from the stream to be measured is pumped into the analyzer. The sample injection valve automatically selects the appropriate sample volume for the optimum measuring range.
- TIC DETECTION:** Acid is added to lower the pH so that inorganic carbon is sparged off as CO<sub>2</sub>. This is measured to ensure Total Inorganic Carbon (TIC) is not carried over into the Total Organic Carbon (TOC).
- OXIDATION:** BioTector's patented oxidation method (TSAO) achieves total and complete oxidation of the sample, including organic carbon to CO<sub>2</sub>, nitrogen compounds to nitrate and phosphorous compounds to phosphate. TSAO utilises hydroxyl radicals generated within the analyzer by combining oxygen, which passes through the ozone generator, with sodium hydroxide.
- TOC MEASUREMENT:** To remove the CO<sub>2</sub> from the oxidized sample, the pH of the sample is lowered again. The CO<sub>2</sub> is sparged and measured by the specially developed NDIR CO<sub>2</sub> analyzer. The result is displayed as Total Organic Carbon (TOC).
- CLEANING:** The entire system is automatically self-cleaned by the reaction process during every cycle. No additional cleaning solution is required.

## MAINTENANCE

Normal service frequency is 6 months. Ready-made service kits are available.

## GENERAL INFORMATION

Designed to withstand corrosive environments, the BioTector TOC Analyzer is housed in a FRP enclosure with dual compartments to keep all electronic components separate from the "wet" or analysis section. The BioTector TOC Analyzer has an in-built microcontroller and is operated through a membrane keypad. An SD/MMC Card allows easy software & configuration updates, downloading of the data from the microcontroller and storage of reaction data for the lifetime of the analyzer.

## ALSO AVAILABLE FROM BIOTECTOR ANALYTICAL SYSTEMS LIMITED

*NEW BioTector System-C Online TOC Analyzer for Clean Water Applications \**

*BioTector Ultra Low TOC Online Analyzer \**

*BioTector TOC & TN Online Analyzer \**

*BioTector TOC, TN & TP Online Analyzer \**

*BioTector Vacuum Samplers*

\* Also utilizing BioTector's Patented Two-Stage Advanced Oxidation (TSAO). See separate brochures or website for further details.





## GENERAL TECHNICAL DATA

<b>Enclosure:</b>	Fibreglass Reinforced Polyester
<b>Standard Dimensions:</b>	1250 x 750 x 320mm (HxWxD)
<b>Weight:</b>	90kg - 120kg
<b>Power Consumption:</b>	300 W (VA)
<b>Mains Connection:</b>	115V AC, 60Hz or 230V AC, 50Hz ( $\pm 10\%$ ) Other power options available upon request

## FEATURES IN DETAIL

<b>Display:</b>	High Contrast 40 Character x 16 Line Backlit LCD with CFL Backlight
<b>Data Storage:</b>	9,999 reaction events in the microcontroller memory, storage of reaction data for the lifetime of the analyzer in the SD/MMC Card.
<b>SD/MMC Card:</b>	Flash Memory Card, Allowing Easy Data Transfer, Software and Configuration Updates
<b>Operation:</b>	Microcontroller with Membrane Keyboard
<b>Language Options:</b>	Multiple Languages Available

## INPUT & OUTPUT SIGNALS

<b>Standard Output:</b>	4-20mA (typically for TOC) Output Multiplex Option is available for up to 35 output signals
<b>Digital Output:</b>	2 Freely Programmable System Relays 1 System Fault Relay
<b>Data Transfer Port</b>	SD/MMC Card and Serial RS232 Output for Printer, PC or Data Logger

## OPTIONAL FEATURES

<b>Result Output:</b>	TIC, TC, VOC, after correlation BOD, COD
<b>Remote Control:</b>	Input for: Remote Start/Standby Remote Stream & Range Selection Remote Manual Sample Analysis
<b>Industrial Interface:</b>	Modbus, Profibus, Ethernet
<b>Network:</b>	For remote access over Internet or Intranet connection using HTTP over TCP/IP protocol
<b>Calibration &amp; Cleaning:</b>	Automatic Calibration and Sample Line Cleaning
<b>Multi-Stream:</b>	Up to 6 Streams
<b>Manual Sample:</b>	Up to 6 Manual Grab Sample Input Ports
<b>EExp/Z Purge:</b>	Certification options are available to EU Standards (ATEX, Zone 2) and to North American Standards (Class 1, Div 2). Other options are available on request.

## CONSUMABLES

<b>Acid &amp; Base:</b>	Replacement Frequency – Application Dependent Typically 3-10 weeks per 25 Liters
<b>Oxygen:</b>	Average consumption is 22L/hour (367 ml/min) Integrated and External Oxygen Concentrator Options Available
<b>Service:</b>	6 Monthly Intervals



## ANALYSIS PARAMETERS

<b>Oxidation Method:</b>	Patented Two-Stage Advanced Oxidation Process using Hydroxyl Radicals
<b>TOC Measurement:</b>	NDIR Measurement of CO <sub>2</sub> after Oxidation
<b>Measured Components:</b>	TOC (NPOC) TOC (NPOC + POC) TIC TC VOC (POC) TOC as TC-TIC COD & BOD by Correlation
<b>Cycle Time:</b>	TOC – Typically 6.5 minutes
<b>Filtration Requirements:</b>	Not required
<b>Signal Drift:</b>	< 5% per year
<b>Chloride Interference:</b>	None

## SAMPLE & ENVIRONMENTAL CONDITIONS

<b>Sample Volume:</b>	Up to 8.0 ml
<b>Sample Inlet Pressure:</b>	Typically ambient (for applications with high sample pressure, sampling systems are available)
<b>Drain Pressure:</b>	Typically ambient (for applications with high drain pressure, optional systems are available)
<b>Sample Inlet Temperature:</b>	2°C – 60°C (36°F – 140°F)
<b>Sample Flow Rate:</b>	Minimum 100ml per sample
<b>Sample Particle Size:</b>	Up to 2mm, soft particulates
<b>Ambient Temperature:</b>	5°C – 40°C (41°F – 104°F) Air conditioning and heating options available
<b>Humidity:</b>	5% to 85% non-condensing
<b>Ingress Protection:</b>	IP44 Optional IP54 with air purge
<b>System Sound:</b>	<60 dBA

## TOC MONITORING RANGES

Automatic Range Selection – 3 Ranges Configurable within each range band detailed below

**Standard** 0-10mgC/l up to 0-20,000mgC/l

**High** 0-10mgC/l up to 0-40,000mgC/l

A wide combination of TOC monitoring ranges, including higher ranges, are available upon request

**Repeatability:** ± 3% of reading or ± 0.3mgC/l, whichever is greater with Automatic Range Selection

**Exceedence Tracking:** Full Exceedence Tracking to Maximum Range

**Range Selection:** Automatic or Manual

**Detection Limit:** 0.6mg/l with Automatic Range Selection

## MEASUREMENT TERMS

**TOC:** Total Organic Carbon including Non-Purgeable Organic Carbon (NPOC) and Purgeable Organic Carbon (POC).  
BioTector's TIC & TOC mode measures NPOC  
BioTector's VOC mode measures TOC as NPOC + POC

## ACCREDITATION

BioTector TOC analysis complies with the following standards:

- DIN-EN1484
- US EPA 415.1
- ASTM D5173: 97(2007) Standard Test Method for On-line Monitoring of Carbon Compounds in Water by Chemical Oxidation, by UV Light Oxidation, by both, or by High Temperature Combustion followed by Gas Phase NDIR or by Electrolytic Conductivity
- DIN 38409-H3
- ISO 8245



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12 month warranty with all BioTector Online Analyzers

BioTector Analytical Systems Limited have a continuous research and development programme. Specifications may therefore be changed without notice. For specification updates, please contact BioTector Analytical Systems Limited.



[www.biotector.com](http://www.biotector.com)