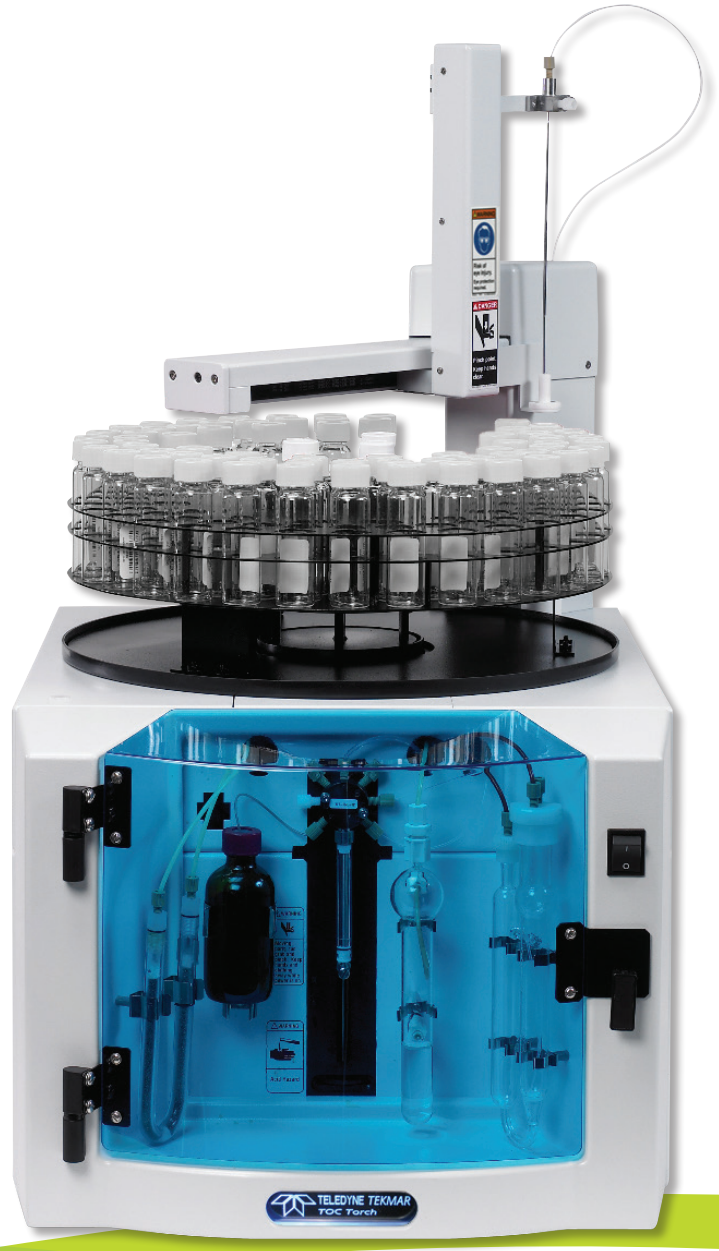
TELEDYNE TEKMAR
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Torch

Combustion TOC Analyzer



The Torch Combustion TOC Analyzer utilizes a patented Static Pressure Concentration (SPC) for the analysis of TOC using antalytic combustion.

The Torch Combustion TOC Analyzer is designed to accurately detect carbon content in aqueous matrices. Chemistries and sample processing with Windows®-driven PC control, provides a fast, reliable test of the quality of water and solutions. It uses a high temperature combustion furnace and a patented pressurized NDIR detector that allows a degree of sensitivity previously unattainable.

The Torch analyzer contains a built in autosampler, automated calibration and Intellidilution. This will automatically dilute over-range samples to within the working calibration range. Routine maintenance is simplified by design allowing easy access to all areas of the unit.

Advantages of the Torch

- Auto-calibration from a single stock standard eliminates the need for manual standard preparation
- Intellidilution feature automatically detects samples that have exceeded the selected calibration range and dilutes it to fall within the selected range
- Static Pressure Concentration Technology (patented)
- Rail system for easy maintenance of combustion tube
- Built-in benchmark diagnostic check - including leak check
- Mass Flow Controller for more efficient cleanup between samples
- Optional vial mixing capabilities
- Optional In-vial sparging for removal of Inorganic Carbon (IC)
- Priority samples an be added during scheduled runs





Automated Productivity

The Torch uses safe and proven catalytic combustion, oxidation of carbon material into carbon dioxide utilizing Non-Dispersive Infrared (NDIR) detection.

The exit valve from the NDIR is closed to allow the detector to become pressurized. Once the gases in the detector have reached equilibrium, the concentration of the carbon dioxide (CO_2) is analyzed. Pressurization of the sample gas stream in the NDIR allows for increased sensitivity and precision by measuring the entirety of the oxidation products of the sample in one reading. The output signal is proportional to the concentration of CO_2 in the carrier gas from the oxidation of the sample.

The Torch Analyzer contains a built-in autosampler and PC driven control. This features automated calibration and Intellidilution which automatically dilutes over-range samples to within the working calibration range. Maintenance is simplified by software and design allowing easy access to all areas of the unit.

All of these features and competitive price positioning make this system ideal in keeping costs down and maintaining productivity in the laboratory.

Options

- **Carousel and Mixing Tray** – The standard carousel has 75-positions with 40mL vials. The mixing tray allows for even distribution of particulate laden waters, where a true representative sample is required.
- **In-vial Sparging** – This feature increases throughput by removing Inorganic Carbon (IC) in the vial, instead of using the syringe to deliver the sample to the IC sparger.

Applications and Industries

TOC sampling and analysis are used in a wide range of applications in several industries.

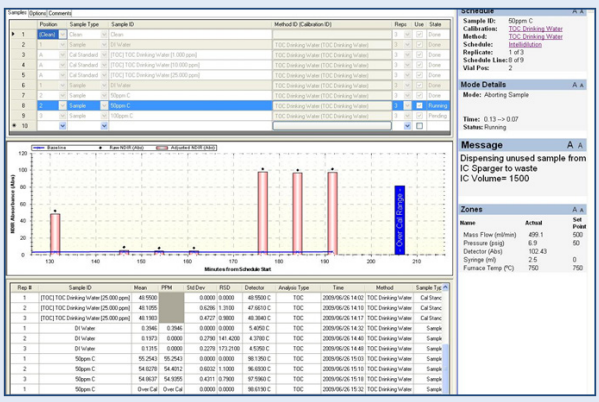
- Environmental
- Pharmaceutical
- Petrochemical

Methods

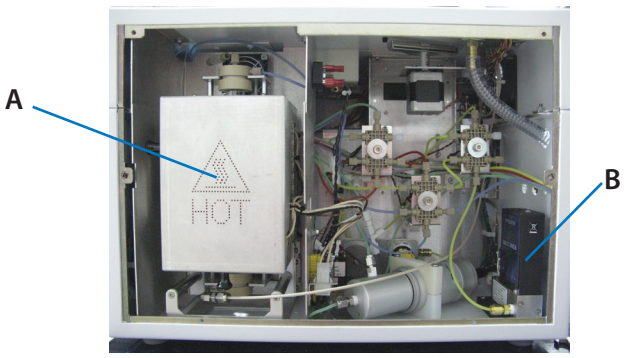
5310C, 5310B, EPA, 415.3, 9060, EN-1484 and ISO 8245
USP <643>, EUP 2.2.44

Keep Samples in Range with Intellidilution

The sample run screen shows a blue status bar indicating that the current sample has exceeded the defined calibration range and the intellidilution feature has been initiated. The system will automatically attempt to dilute the sample back to within the calibration range.







Note: *Plumbing side of Torch with covers removed.*



A. Combustion Furnace - Provides high temperature necessary to oxidize the carbon in the sample into CO_2. The combustion tube contains a bed of proprietary catalyst that promotes oxidation of organics. Access to the combustion tube is simplified by using a unique clam shell opening and rail slide for furnace movement. The design of the furnace permits easy installation, monitoring and maintenance of the combustion tube.

B. **Mass Flow Controller (MFC)** - Regulates flow or pressure depending on the mode of operation. The MFC allows for higher flows for clean up between samples and allows the user to optimize the sparge flow for each sample. Because of the MFC, the Torch automatically validates the system integrity by recording the pressure each time a sample is run. The MFC also performs pneumatic integrity tests on valves to make sure they are leak tight.

C. Halogen Scrubber - The detector, which measures CO_2, can be affected by halogens. To prevent analytical errors, the halogen scrubber removes chlorine and other halogens from the CO_2 before it enters the detector.

D. Acid Container – The larger volume vessel decreases preparation frequency of the $H_3PO_4^-$ reagent.

E. Septum Piercing Needle – allows the use of vial caps with a septa thus eliminating sample exposure time to the atmosphere.

F. Autosampler - The Torch has a standard 40mL vial, 75-position integrated autosampler with an arm and carousel for position selection. (Optional Mixing Tray - See *Options* section.)

G. Syringe and Valve - The syringe driver is a precision measuring instrument that draws in and dispenses fluid. The syringe driver can dispense 100µL to 2.0 mL of sample.

H. Moisture Control System (MCS) - Consists of a mist trap and permeation dryer, both of which are designed to remove moisture from the sample. After oxidation of the sample, carrier gas sweeps CO_2 and water vapor out of the combustion furnace. Next, the CO_2 travels through the mist trap where most of the moisture is collected and removed. The gases then travel to the permeation dryer which removes the rest of the moisture from the sample gas.

I. Inorganic Carbon (IC) Sparger - A glass-fritted vessel that holds the sample while purging the IC out of the sample and preparing it for analysis. After the addition of acid, purge gas flows through the sparger, removing the IC from the sample. The Torch can either detect IC in the IC or TC-IC modes, or vent it into the atmosphere while in the TOC mode.

Additional Features

Static Pressure Concentration (SPC) - After the sample oxidizes, it is swept into the detector and pressurized with carrier gas ensuring the entire sample is present. The Non-Dispersive Infrared (NDIR) detector then measures the concentration of CO_2. As a whole, this patented sensing technology enables the Torch to reach new levels of detection required by todays demanding analytical requirements.

Intellidilution – This intelligent feature detects when a sample is out of range and will dilute it back to within the calibration range. It has the ability to meet individual analytical needs due to pre-set ranges (non-dilution methods only).

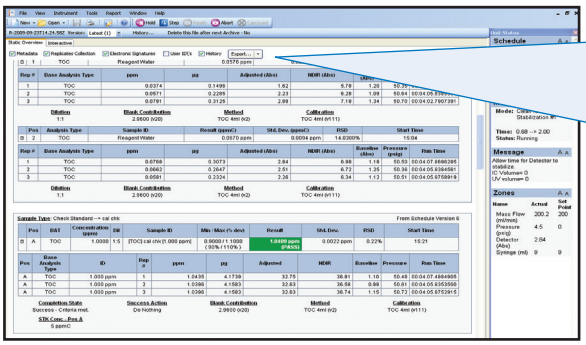
Autocalibration – Using a single stock solution, the system will automatically dilute final volumes based on the users linearizing concentration requirements, thus eliminating the need for multiple manual preparations of the calibration standard concentration levels. This feature eliminates the likelihood of human error and minimizes labor time.

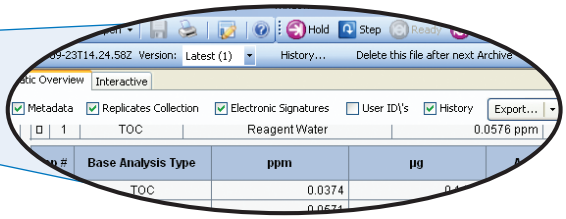


TOC TekLink™

Fully Optimized User Interface

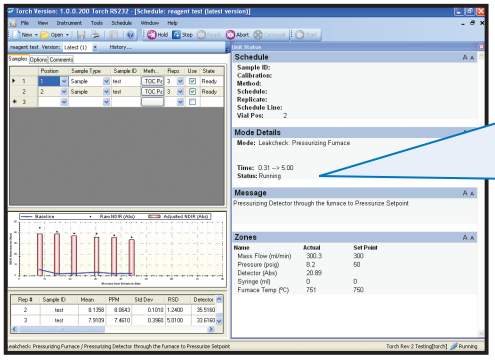
TOC TekLink™ software allows the user to enter all analysis parameters and then once activated, will continuously monitor the system ensuring operating limits are not exceeded. TOC TekLink™ is capable of performing useful diagnostics such as leak and benchmark tests for validation. All instrument parameters, method scheduling, and editing can be programmed. TOC TekLink™ provides pre-developed methods, allowing startup with little or no modifications and also contains an optional 21 CFR Part 11 compliant installation.

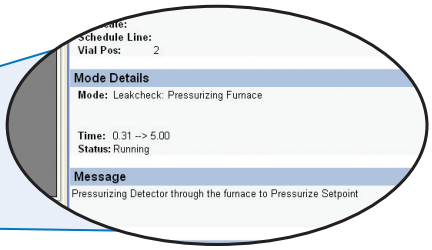




Sample History, Electronic Signatures, Metadata, Replicates Collection and User IDs are some options you can choose with the exporting data function.

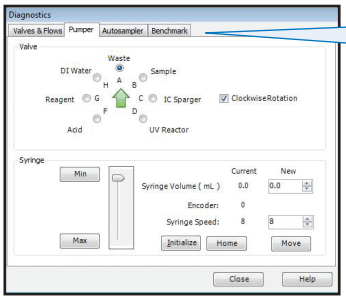
Schedule Report Screen - The Schedule Report screen demonstrates flexibility in reporting,which allows the user to define what is captured in the report.

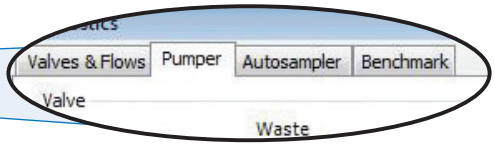




The Mode Details give you the status of the current leak check.

Automatic Leak Check Screen - The Leak Check screen identifies the region of the system that is being checked and the time remaining of the leak check.





The tabs on this screen show features that can be controlled from the diagnostic menu. (i.e., motor movement and valve control)

Diagnostics Screen - This screen demonstrates full control diagnostics, which allows for manipulation of all hardware components.

To place an order:

(800) 874-2004 • (513) 229-7000

Specifications

Chemistry:	Oxidation by Combustion: From 680 °C - 1000 °C
TOC Detector:	Nondispersive Infrared (NDIR) with Static Pressure Concentration (SPC) – *Patented*
TOC Analytical Modes:	TOC (NPOC), TC-IC, TC, IC
TOC Analytical:	Limit of Detection: 50 ppb Maximum Measurable Concentration: 30,000ppm Carryover: ≤ 1.0% Cross Contamination Sample Size: 100 µL to 2.0 mL Precision*: ≤1.5% RSD, ±15 ppb, typical of a mid range standard (Whichever is greater over seven replicates).** * Analytical performance is affected by laboratory water, reagent and gas purity, sample container cleanliness, sample matrix, gas regulator cleanliness and precision, and operator skill. ** %RSD Area, as opposed to %CV, calculates precision after blank subtraction. This yields a lower precision measurement, but improves sensitivity and accuracy.
TOC Analysis Time:	6-10 minutes typical for TOC analysis: 29 minutes typical for triplicate TOC analysis
Carrier Gas Handling:	Mass Flow Controller for instant control of carrier gas (0-500 mL/min). Automatic Leak Check capability.
Liquid Handling:	Syringe driver, 7-port distribution valve. Auto-dilution capability for higher TOC concentrations and difficult matrixes. Self-cleaning sample handling process that cleans injection line on every repetition.
Sample Introduction:	Integrated Autosampler
Controller:	PC, Interface through Windows™ 7 or greater
Data Handling:	Reports exportable to XML, CSV, and HTML format Real-time and historical graphical display of NDIR & CLD detector data Ability to import from CSV files and view historical results from multiple schedules on one graphical display. Ability to store customized individual test methods Priority samples via schedule interrupt Recalculation of data, outlier deletions, and precision performance criteria controls (21 CFR Part 11 compliance – Electronic signatures and Audit Trails)
Calibration:	Auto-Calibration from single stock standards or user calibration standards
21 CFR Part 11 Software Compliance:	TOC Teklink™ software is a 21 CFR Part 11 tool for your laboratory compliance
Other Features:	- Pre-programmed point and click method set-up - Instrument condition/mode light - Validation Support Package available - Automatic shutdown/standby - Auto-dilution of samples/standards - ASM Sparge methods - Stirring Option - Intellidilution
Principal Applications:	Waste Water, Industrial Waste Effluent, Drinking and Surface Water, Ground Water, Clean-in-place (CIP) Validation, Sea Water
Official Methods:	EPA 415.1, 415.3 and 9060A, Standard Method 5310B, EP 2.2.44, ISO 8245, EN 1484, USP 643 (Chapter 24), ASTM D2579, prENV 13370, AOAC 973.47
Certification:	CE, EMC EN 50081-1 and EN 50082-1
TOC Utility Requirements:	Voltage: 100/120/240 VAC (±10%) factory configured, Frequency: 50/60 Hz, Power: 1200VA
TOC Dimensions:	18” W x 24.5” D x 32” H, Shipping weight 147 lbs
TOC Gas Supply:	Hydrocarbon and Carbon Dioxide (CO_2) free air (with greater than 18% oxygen) with TOC content <1ppm or UHP O_2. Gas can be supplied from a cylinder or TOC gas generator. If a TOC gas generator is used, resulting gas must be hydrocarbon and water free. To assure clean carrier gas is used, we suggest employing a complete CO_2 removal system and hydrocarbon trap between the gas source and analytical instrument.
TOC Gas Inlet Pressure:	65 to 100 psi
Autosampler:	- Accuracy: ±2.5 mm - Vertical punch strength: 8.3 lbs - Repeatability: ±0.25 mm - Auto-rinsing from sample and/or rinse water via built-in rinse station

Windows® is a registered trademark of Microsoft, TekLink™ is a registered trademark of Teledyne Tekmar Company.
Covered by one or more of the following patents: 7,651,866; 8,128,874.

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