



QuickTOC_{ultra}

TOC-ANALYSIS

Online TRUE TOC for every kind of water.
Especially for the tough stuff.

Fast. Precise. Reliable.



A MEASUREMENT SYSTEM FOR TRUE TOC

With the right method, organic content can be measured quickly, even in difficult waters with coarse material or high salt content.

APPLIED TOC THEORY.

Whether you're measuring emulsified water from a flavoring production plant, industrial wastewater in an aeration basin or the wastewater from a dairy, paper or paint factory: The QuickTOC^{ultra} can measure organic loads in water for a broad range of applications.

Aqueous streams are monitored to assure environmentally compliant discharge, to control product quality and operational costs. Through continuous monitoring, industrial processors are able to detect and reduce product loss.

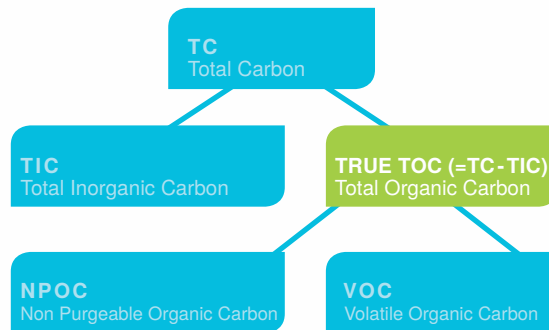


Fig. 1

Clumps, algae and slime.

Unlike many systems, the QuickTOC^{ultra} works continuously and reliable, even in the presence of coarse materials and even high salt concentrations with no increased maintenance requirements.

What is TOC and how is it measured.

Many organic compounds cannot be quantified individually without costly, time-consuming analysis. As an alternative, Total Organic Carbon (TOC) summarizes a sample's organic load as an indicator of water quality.

TOC is best detected through the difference method. Combustion at 1200°C breaks all organic and inorganic carbon bonds, producing CO₂ which is detected and quantified. As intermediate values, the Total Carbon (TC) and the Total Inorganic Carbon (TIC) are determined. The TIC value is subtracted from the TC value, resulting in the Total Organic Carbon, (TOC) (Fig.1).

Exact 1200°C Analysis provides the TRUE TOC

For an exact TOC measurement all carbon bonds must be completely broken, and carbonates only break fully

at temperatures over 1150°C. Therefore, measurements at lower temperatures deliver less exact results.

No Catalysts.

Catalysts are only necessary for lower range "high temperature" oxidation (680 – 1,100°C) to help oxidize the carbon bonds. But catalyst performance lowers over time, affecting the measurement results, necessitating re-calibration and eventually requiring catalyst replacement.

Direct method: an inexact alternative.

In contrast to the difference method, the direct method does not detect the complete TOC. Instead, using an acid the inorganic carbon (TIC) is removed from the sample prior to combustion. The problem? The volatile organic carbon (VOC) is also expelled. Thus, after combustion only the non-purgeable organic carbon (NPOC) value can be calculated. Meaning that VOCs, a component of TOC, remains undetected.

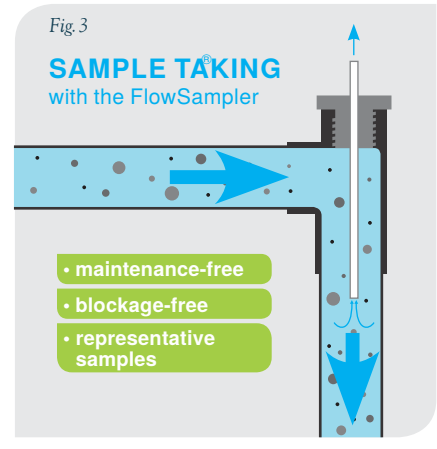


Fig. 3

FlowSampler®

Maintenance-free / non-fouling

LAR's unique FlowSampler® helps assure uninterrupted operation.

With LAR's FlowSampler® a stainless steel tube draws the sample counter-current. Flow velocity carries particulates past the sample tube for a maintenance-free, non-fouling sampling method.

Unpressurized Sample Collection.

LAR LLC's overflow pot provides a simple, effective solution for collecting sample from pressurized lines.

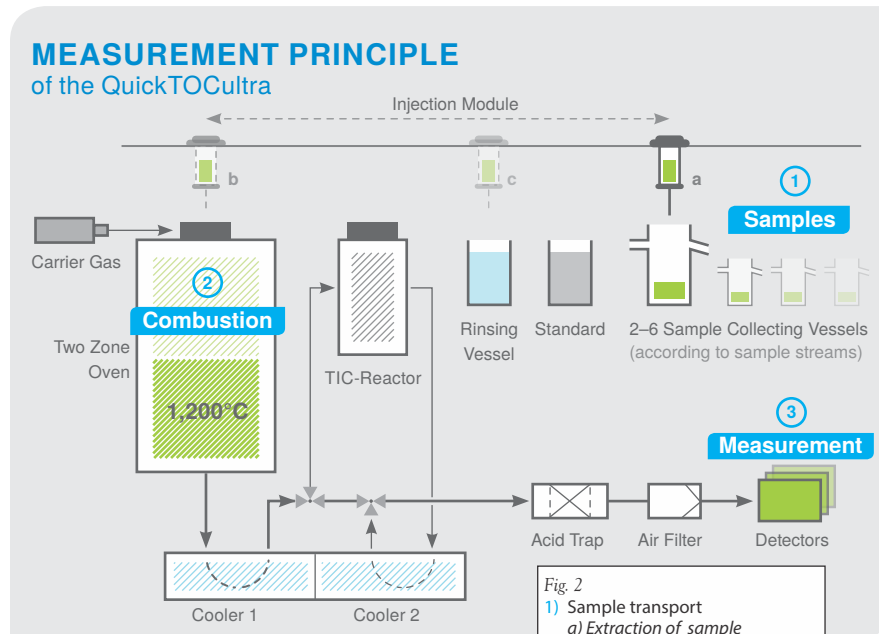
Clear construction enables operators to visually confirm process flow, and the 1/2-inch overflow vent helps prevent fouling.

Mount the overflow pot on any wall or vertical pipe near a drain.



THE ANALYZER.

A hot oven: Where temperature makes the difference.



Warm, warmer, hot.

The ceramic oven is at the heart of the QuickTOC_{ultra}, breaking all carbon bonds at 1200°C, and providing a complete, catalyst-free sample analysis.

Tailor-made Instruments.

Modular and flexible, the QuickTOC_{ultra} can measure up to six different sample streams and is configurable for additional detectors to add TN_x and COD alongside TOC. A variety of housings enables the analyzer to be installed safely, even in explosive environments.

The QuickTOC_{ultra} can be configured to prepare its own carrier gas. Thus, requiring no external gas supply.

UltraQuick.

Since cycles run in less than 3 minutes, short events can be captured that might otherwise be missed. Maintenance is fast too, at less than 30 minutes per week, so the analyzer's availability is over 98%. All areas of the analyzer

have been designed for easy maintenance: from filter-less sample extraction (Fig. 3), to the oven's removable foot for quick salt residue removal.

High salts are no problem.

Unlike most TOC analyzers, the QuickTOC_{ultra} can handle salt concentrations up to 100 g/L. Our extra-high salt option can handle up to 300 g/L sodium chloride (NaCl). No need to dilute, so samples remain pure and the measurement remains accurate.

LAR's high temperature process enables salts to be easily discharged. They move through the oven in fluid form and are eventually carried out by the carrier gas and deposited in a retaining device, from which they can be easily and quickly removed. So no salt deposits can form in the oven.

Secure - you decide who does what.

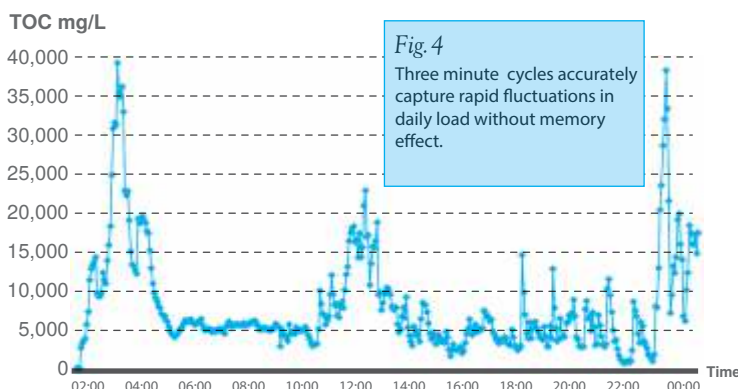
Through two separately programmable user-access levels, you can assign access rights to individual operators. Optionally, the analyzer can be controlled remotely using a networked PC.

CO₂ detection. Reliable and simple.

The gas that is produced by the combustion condenses in the cooler. The remaining gas is purified by a filter before its CO₂ concentration is determined by the detector.

Without TIC no TRUE TOC.

In the second reactor the inorganic compounds are purged out of the sample with acid. The combustion gas is again cooled and filtered and the CO₂ concentration is measured. The TIC value is subtracted from the total carbon (TC), determining the total organic carbon, the TRUE TOC.



QuickTOC_{ultra}

Online TOC for water, wastewater, and industrial process water.

The QuickTOC_{ultra} continually checks the TOC content of municipal or industrial water in a wide range of concentrations. At 1200°C, samples are completely oxidized with no need for catalysts, and within three minutes the TRUE TOC is determined.

TECHNICAL DATA

Measurement Technique and Sample Preparation

| | |
|----------------|--|
| Method | Thermal oxidation (US EPA Method 415.1) |
| Ranges (mg/L) | 0.1–100, 2–400, 5–2,000 mg/L 100–15,000, 500–50,000 TOC, others available |
| Repeatability | 2% CV or better |
| Response Time | 1 minute (TC only) 3 minutes (TOC) |
| Sample Streams | Up to six independent sample streams with independent calibration ranges configurable for TC, TOC, COD or Total Nitrogen |

Dimensions and Weight

| | |
|------------|--|
| Housing | Steel IP 54 |
| Options | Stainless steel, IP 65, ATEX Zone 1 and 2 for T3, T4 classes |
| Dimensions | 27.6 x 40.2 x 20.5 in. (700 x 1020 x 520mm) |
| Weight | 254 Lb. (115 kg) |

Electric and Hydraulic Specifications

| | |
|------------------|--|
| Inflow & Outflow | Tube 30 mm ID or screw thread connection DN 25 |
| Auxiliary Energy | 230 /115 V, ~50 / 60 Hz |
| Analog Output | 0/4– 20 mA |
| Serial Interface | RS 232 for remote control (option) |
| Safety | 2/6 A internal, 16 A external |
| Remote Control | Through TCP/IP Protocol (Internet) |

Equipment Devices and Data Output

| | |
|--------------------|---|
| Display: | High res. 10.4-in. backlit LCD touch screen |
| Autostart function | |
| Data Interface: | USB |

With the QuickTOC_{ultra} the electronics are isolated from the analytics to prevent damage and cross-contamination.

All compartments are easily accessible.



FEATURES & BENEFITS

- ✓ exact TC, TRUE TOC and TIC
- ✓ proven thermal oxidation principle
- ✓ highest temperature available (1200°C)
- ✓ catalyst-free
- ✓ response in as little as one minute (TC)
- ✓ measures up to six streams
- ✓ programmable access security
- ✓ analyzer availability greater than 98%
- ✓ weekly service & maintenance <30 min.
- ✓ low operation and maintenance costs



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