



**QuickTOC<sub>purity</sub>** **TOC-ANALYSIS**

Online TOC for pure water.  
For optimized process control.

Precise. Fast. Reliable.

## ULTRA-PURE TOC ANALYSIS

Chemical-free high-temperature analysis provides the TRUE TOC in demanding pure water applications.



# THE MEASURING SYSTEM FOR ULTRA-PURE WATER.

Even trace contaminants in pure water can cause extensive damage, so monitoring requires speed and precision.



A CO-generator consists of a desalination plant and a boiler. Smallest organic impurities result in production of carbonic acid, which increases the risk of corrosion considerably. It is important to detect impurities quickly and reliably.

Quality requirements in ultra pure water are very high. At high pressure the Total Organic Carbon (TOC) content of boiler feed water must not exceed 0.5 mg/L (500 ppb). Otherwise corrosion, scaling, and biological fouling may damage pipes or even result in a system failure.

## Pure water - with high demands.

Many industries use pure water as process water or as an ingredient, and treating to high purity levels is expensive but necessary. Pure water is commonly used as feed water in boilers and heat exchangers, where monitoring trace contaminants is of great importance. Contaminants in process water caused by leaks, spills, corrosion, deposits or coatings may require that a circuit be drained and back-fed with costly make-up water.

## TOC - the measurement of quality.

TOC analyzers are an efficient solution, providing quick, early, reliable detection. Why TOC? A variety of organic matter can be present in water, but measuring each individually would require considerable time and effort. Instead, the

sum parameter TOC measures organic load to indicate water quality.

## TOC or TC. You have a choice.

TOC can be measured using the difference method, where all organic and inorganic carbon bonds are oxidized to determine the Total Carbon (TC, Fig. 1). From this, the separately analyzed Inorganic Carbon (TIC) is subtracted, resulting in the TRUE TOC.

TOC may also be detected directly by stripping out the TIC with acid before oxidation. This process also strips out the Volatile Organic Carbon (VOC) and the Purgeable Organic Carbon (POC). Resulting in NPOC.

## Quick TC measurement - the benefits.

In the boiler, inorganic carbonates form corrosive carbonic acid. Monitoring TC minimizes risk by including TIC.

## Analysis at 1200°C, the True TOC.

For an exact TOC measurement all carbon bonds must be oxidized, and LAR's 1200°C high temperature method makes this possible! This temperature was chosen because it has been proven

that complete oxidation cannot occur at lower temperatures. Carbonates, for example, only break fully at 1200°C, so lower temperatures deliver less exact results. For this reason, LAR refers to 1200°C measurement as the TRUE TOC.

## Catalysts simply not necessary.

Since all carbon bonds are broken at 1200°C our analyzers need no catalysts, which are needed in lower temperature (680–1100°C) catalytic oxidation. The performance of these catalysts gradually decreases, impacting the results and requiring repeated calibration until the catalyst is replaced. We want to save you the trouble with the QuickTOC<sub>purity</sub>.

## How is the TRUE TOC derived? And what is it composed of?

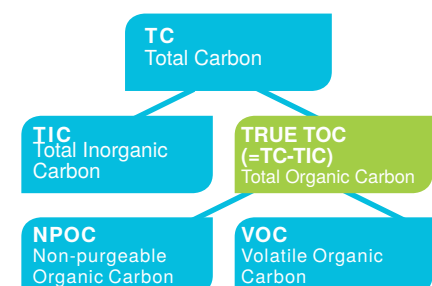


Fig. 1

## THE ANALYZER.

Temperature makes the difference.

**Warm, warmer, hot.**

**Tracking pollution at 1200°C.**

The ceramic oven is the centerpiece of the QuickTOC<sub>purity</sub>. At 1200°C, it breaks all carbon bonds and converts the carbon to CO<sub>2</sub>, enabling a complete analysis of TOC, TC or TNb. Safety is guaranteed with housings suited to the intended location, even corrosive or potentially explosive atmospheres. And the method is in accordance with DIN EN1484:1997-08, ISO 8245:1999-03 and EPA 415.1.

**Modular tailor-made instruments.**

The QuickTOC<sub>purity</sub> can be configured to measure up to six sample streams, and each stream has its own line into the analyzer to avoid cross contamination and carry-over. Adding detectors enables measurement of TNb or COD.

**UltraQuick.**

TRUE TOC is measured in less than three minutes, and TC in only one minute. The speed of TC measurement is particularly important where high TIC is present so that even short peaks are detected. Maintenance is quick too - less

With the QuickTOC<sub>purity</sub> the analytical area is isolated from the electronics. All areas are easily accessible.

than half an hour per month - so the analyzer's availability is over 98%.

**Calibration and validation at any time.**

With the patented QuickCalibration technique, users can check the analyzer automatically and remotely at any time without expensive liquid standards. LAR uses a defined gas which is long-lasting, stable and cost effective, so you can easily confirm that your analyzer is working correctly.

**Who does what? You decide.**

Through separately programmable user-access levels, you can assign access rights to individual operators.

The QuickTOC<sub>purity</sub> is easy to operate, with icon-guided menus displayed on a 10.4 inch touchscreen. Remote access is also possible with a networked PC.

client-supplied from bottles or, optionally, the QuickTOC<sub>purity</sub> can prepare its own carrier gas, eliminating the external gas supply and reducing cost of operation.

**Difference or Direct - defined by task.**

In low ranges the typical method is TOC-direct. Here, an acid is added to strip the sample of inorganic carbon, so only the organic carbon is oxidized. Where VOCs are present the TOC difference method is used, which includes the Volatile and Purgeable Organic Carbon.

**CO<sub>2</sub> detection. Reliable and simple.**

Following combustion, water is condensed and removed in a cooler. The remaining gas is filtered before an NDIR detector determines CO<sub>2</sub> concentration.

**QuickCalibration with a gas standard.**

Conventional calibration and validation requires liquid standards with concentration ranges lower than drinking water. A short shelf-life requires that these be replaced often. As an alternative, LAR has developed an internationally patented gas calibration and validation method.

QuickCalibration is a standard feature of the QuickTOC<sub>purity</sub> and provides an automatic, always-ready system validation using a defined, stable gas such as methane. Integrated with the loop system, contamination of the sample is technically impossible.

## THE PRINCIPLE.

Precise, even in the purest water.

**Clean sampling with loop injection.**

The QuickTOC<sub>purity</sub> uses a closed loop injection method, shutting out impurities, to carry a defined sample through the furnace on a continuous stream of gas. Volumes between 100 and 400 µl are chosen based on the expected load. For low µg-ranges (ppb) a multi-loop configuration injects a sample volume multiple times. The carrier gas can be

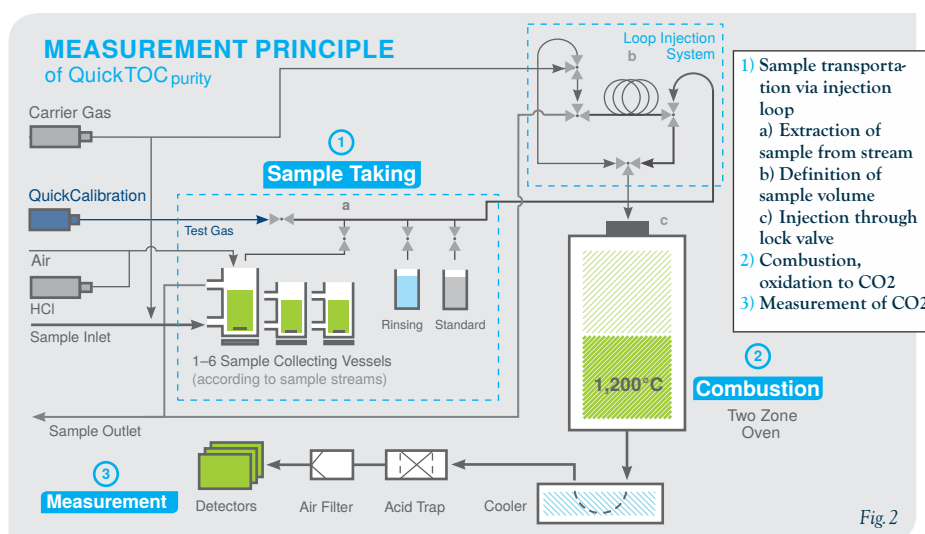


Fig. 2



# QuickTOC<sub>purity</sub> AN OVERVIEW

## Online TOC for pure water – especially for boiler feed water.

QuickTOC<sub>purity</sub> continually checks the TOC content of pure water in the lowest concentrations. Even the smallest impurities are detected. At 1200°C, samples are completely oxidized and within 3 minutes the TRUE TOC is determined.

## TECHNICAL DATA

### Measurement Technique and Sample Preparation

Method	Thermal oxidation
Ranges	0.1–20 mg/l (ppm), 1–2,000 µg/L (ppb) others available
Parameters	combinable with COD and TNb
Response Time TC	3 minutes (TOC)
Calibration Type	Multi-point Calibration
Calibration / Validation	QuickCalibration with a gas standard

### Dimensions and Weight

Housing	Steel IP 54, powder coated
Options	Stainless steel, IP 65, ATEX Zone 1 and 2 for T3, T4 classes
Dimensions	700 x 1020 x 520 mm (W x H x D)
Weight	115 kg (Standard)

### Electric and Hydraulic Specifications

Inflow & Outflow	Tube 4.8mm ID
Power Supply	230 / 115 V, ~50 / 60 Hz
Analog Output	0/4– 20 mA
Serial Interface	RS 232
Safety	10 A internal, 16 A external
Remote Control	Through TCP/IP Protocol (Internet)

### Equipment Devices and Data Output

TFT Touchscreen Graphic Display, 10.4-inch high resolution, backlit
Autostart function
Self explanatory software
Standard data interfaces to office PC: (USB)



Fast, precise and safe –  
the QuickTOC<sub>purity</sub>  
is reliable even in  
hazardous areas!

### FEATURES & BENEFITS

- ✓ exact TC, TRUE TOC, TIC, Tn<sub>b</sub>
- ✓ highest temperature available (1200°C)
- ✓ catalyst-free
- ✓ calibration and validation at any time
- ✓ response time of only one minute (TC)
- ✓ measures up to six streams (optional)
- ✓ certified housings for EX zones (EX p)  
(options for ATEX, IEC, etc.)
- ✓ analyzer availability greater than 98%
- ✓ monthly service & maintenance <30 min.
- ✓ low operation and maintenance costs



**LIQUID ANALYTICAL RESOURCE**

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