



## QuickTOCAirport

TOC - ANALYSIS

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

Fast. Precise. Reliable.



# WATER MANAGEMENT AT AIRPORTS.

Due to extensive sealed areas there are huge amounts of surface water that must be disposed of. Especially in winter, when de-icing causes severe contamination, its accurate monitoring is of importance.



Aircraft de-icing: Existing or forming frost is removed by de-icing fluids directly before the plane starts. The de-icers in use (acetates, glycols or formates) are mixed with water and additives.

**Surface water and de-icing waste water should be continuously monitored - from an ecological as well as economic point of view. By using reliable online measurement systems high waste water charges can be avoided.**

**Fluctuating loads and sticky substances are what a analyser has to be able to deal with.**

In the winter months airplanes, runways and landing strips are de-iced with the help of de-icing agents. Chemicals such as glycol, acetates or formates are used which are additionally mixed with thickening agents in order to improve their adhesion to the surfaces. Finally, the de-icers have to stick to the surfaces to prevent the formation of new ice.

However, on precipitation this leads to contamination of the surface water and within the analyser, these sticky (adhesive) substances may cause adhesions resulting in memory effects and/ or carry-over effects. Hereby, residual traces of previous measurements falsify the results of the current measurement.

Then the loads that fluctuate strongly depending on precipitation and use of de-icers, cannot be detected accurately. Therefore, within the analyser, the sample should come into contact with wetted parts as little as possible.

Additionally, the analyser's measurement range has to be wide enough in order to accurately determine the loads which are monitored by use of TOC as parameter. On one hand, the critical values for public discharge are very low and on the other the analyser must be able to reliably measure high concentrations of up to 50,000 mg/l C.

**What TOC means and how it is measured.**

A whole variety of organic matter can be present in water which cannot be determined individually. At least not without considerable analytical effort and within a short amount of time. This is why the so-called sum parameter TOC (total organic carbon) is used. It measures a sample's organic loads and is thus an important indicator for water quality.

At 1,200 °C,  
 water samples  
 are completely  
 and precisely  
 analysed.

The TOC content is best detected by using the difference method. Using combustion at 1,200°C All organic and inorganic carbon bonds are broken, producing CO<sub>2</sub> which can then be detected and quantitatively measured. An intermediate value of the total carbon (TC) of the sample is given. Finally, a separate analysis of the inorganic carbon (TIC) takes place. The TIC value is then subtracted from the TC value, giving a result showing the organic carbon, TOC present (Fig 1)

**Exact Analysis.**  
 At 1,200°C, the TRUE TOC is determined.

Vital to this method: For an exact TOC measurement all carbon bonds must be reliably combusted. Using a temperature of 1,200°C, LAR Process Analysers AG have developed a high temperature method which makes this possible! This temperature was chosen because it has been proven that a complete oxidation of a sample cannot occur at temperatures below this: For example, the carbon bonds of carbonates only break fully when reaching a combustion temperature of over 1,150°C. Basically, low temperatures deliver less exact measurement results. For this reason, to distinguish ourselves from such methods, we at LAR talk of the TRUE TOC.

**Catalysts.**  
 For our analysers simply not necessary.

Because of their high temperatures our analysers do not need any catalysts. Catalysts are only necessary for a low temperature catalytic "high temperature" oxidation (680 – 1,100°C) to support the oxidation of the carbon bonds. However, the performance of the catalysts reduces over time. This affects the measurement results, necessitates continual new calibration and eventually requires that the catalysts be replaced. We want to save you the trouble: With the QuickTOC<sub>airport</sub>.

**What is the TRUE TOC derived from?  
 And what is it composed of?**

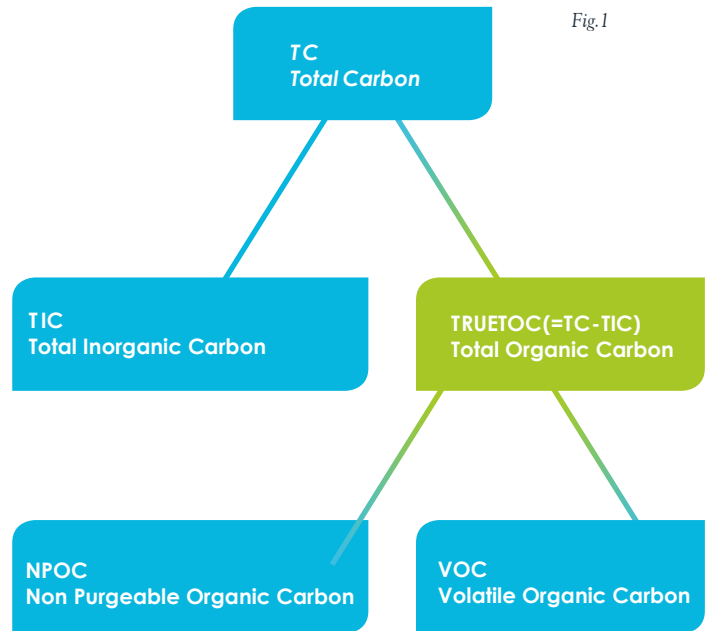


Fig.1

**AT A GLANCE**

- At airports there are huge amounts of surface water to be discharged
- TOC is a monitoring parameter in water management at airports
- De-icing water is adhesive (sticky) and its concentrations fluctuate strongly
- A reliable measurement system must be free of memory effects
- At 1,200°C, a complete oxidation is guaranteed making the use of chemicals unnecessary.

# THE ANALYSER.

A hot oven: Where temperature makes the difference.

## Warm, warmer, hot. Tracking organic load at 1,200°C.

The catalyst-free ceramic oven is the centrepiece of the QuickTOC<sup>airport</sup>. At 1,200°C, it reliably dissolves all carbon bonds and thus enables a complete analysis of samples. Despite the high temperatures used, absolute safety is guaranteed in all settings. To this end, the QuickTOC<sup>airport</sup> can be delivered with a number of different housings, depending on the intended location. That way the analyser itself can be safely positioned in highly corrosive places as well as in Ex-Zones.

## The building blocks principle for a tailor made measurement instrument.

Within the QuickTOC<sup>airport</sup> the amount of wetted surfaces is reduced to a minimum. The use of inert materials as well as a pump, which is

With the QuickTOC<sup>airport</sup> the analytical area is isolated from the electronics.

All areas are easily accessible.



installed downstream of the sample stream, prevent carryover and memory effects caused by absorption and adsorption.

The automatic ranging feature ensures reliable measurements between 0.1..50,000 mg/l C without dilution or pretreatment of samples. This means, fluctuating loads and adhesive samples are easily analysed.

## The QuickTOC<sup>airport</sup>. Ultra quick measurements and maintenance.

The TRUE TOC measurement takes place in less than 3 minutes. Thereby, short measurement value peaks can also be reliably shown. The maintenance service that is required is also fast: Less than 30 minutes per week are necessary. The analyser's availability is over 98%. Moreover, all areas of the analyser have been designed for easy maintenance: From the filter-less sample extraction with the patented FlowSampler® (Fig. 3), by way of the generously measured and blockage-free tubes, to the catalyst-free high temperature oven with the easy to handle high salt option.

## High salt concentrations. No problem for the QuickTOC<sup>airport</sup>.

In contrast to many other analysers, the QuickTOC<sup>airport</sup> can handle salt concentrations up to 100 g/l. There is also an extra high salt option available that can handle up to even 300 g/l sodium chloride (NaCl).

## Who is allowed to do what? It's up to you to decide.

Through separately programmable user-access levels, you can assign access rights to individual operators. With a 10.4 inch touch-screen, the QuickTOC<sup>airport</sup> is easy to operate. Another option would be to control the analyser via remote control using a PC, which is connected to your network.

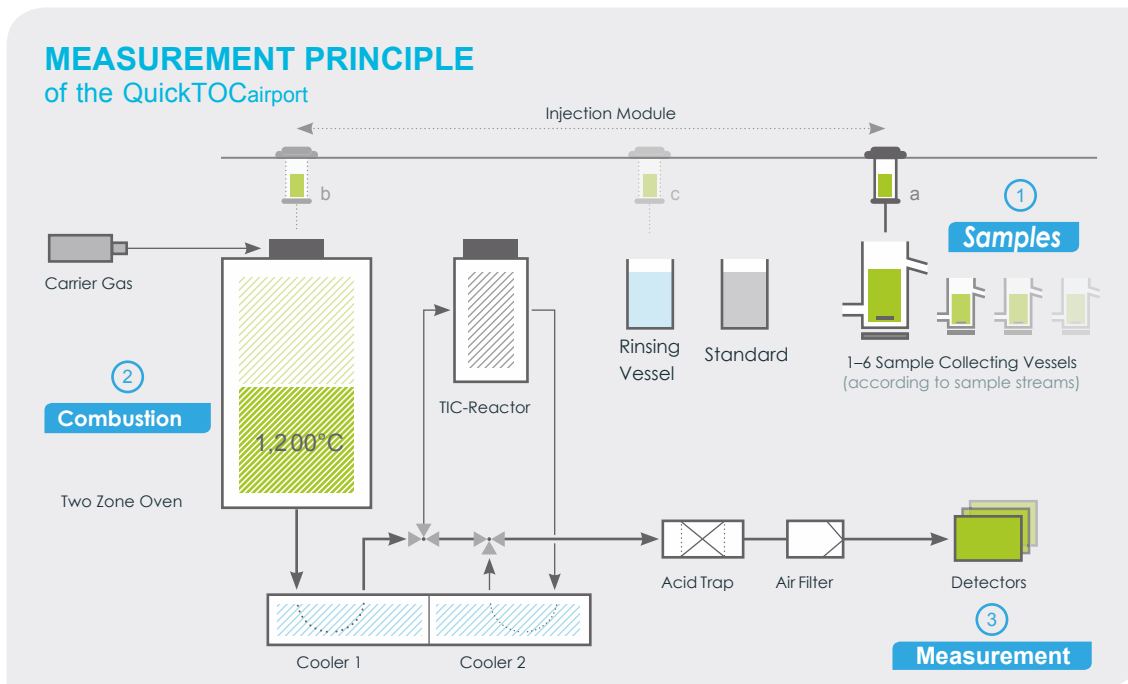


Fig.1

- 1) Sample transport via injection system
  - a) Extraction of sample from sample stream
  - b) Injection through valve
  - c) Rinsing of the injection needle.
- 2) Combustion, oxidation to CO<sub>2</sub>
- 3) CO<sub>2</sub> concentration measurement

## THE PRINCIPLE.

Even when the water is dirty - the measurement is clean!

**Sample extraction: Almost as though taken by Hand.**

The water flows through the patented FlowSampler®. In the middle of the FlowSampler® there is a stainless steel tube (Fig. 2), through which the sample is sucked into the analyser by a pump. The trick: Big and small solid particles, for example sand grains or wood splinters, carry on past the tube due to the flow speed. However, all other particles relevant to the measurement are captured, even the solid particles. Therefore, the taken sample corresponds 98% with that of a grabbed sample. While at the same time it is free of maintenance. These results cannot be reached with any kind of filter, filter sieve or rotating sieve.

This patent pending valve ensures that the oven (Fig. 1) stays 100% sealed from the ambient air at all times. After every injection, the needle is cleaned.

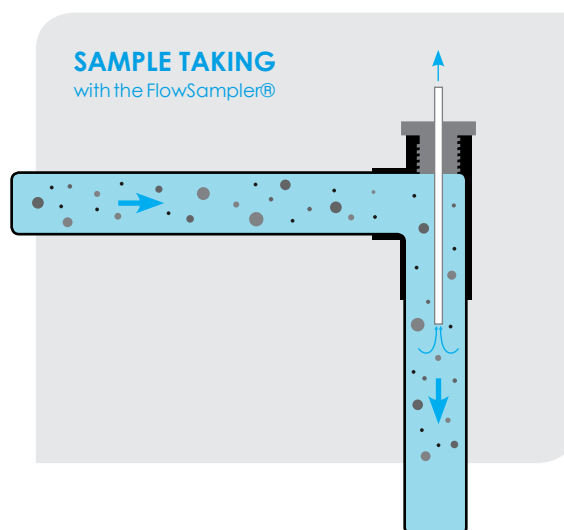


Fig.3

- maintenance
- Blockage-free
- Representative samples

The maintenance-free and patented sample taking system „FlowSampler®“

**The robotic injection system for the perfect sample dosage.**

Inside the analyser, the samples are kept in collection vessels in a homogenous state. The robotic horizontally and vertically moving needle takes an exact sample dose and injects it into the oven through the valve.

**Inside of the ceramic oven: We like it hot.**

And it is that hot, that - without catalysts - the inorganic and organic carbon is completely converted into CO<sub>2</sub>. It is oxidised with a carrier gas, whose supply is provided by filtered ambient air.



Optionally, the QuickTOC<sub>airport</sub> can prepare the gas itself. Thus, requiring no extra external gas supply at all.

Through the high temperature, the salts present can easily be discharged. They move through the oven in Huid form and are eventually carried out of the oven by the condensate. Finally, they are deposited in a retaining device, from which they can easily and quickly be removed. That way, no salt deposits can form in the oven.

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

First the gas that is produced by the combustion condenses in the cooler. The remaining combustion gas is purged by a filter before its CO<sub>2</sub> concentration is determined by the detector.

**The inorganic component measurement. Without TIC no TRUE TOC.**

In the second reactor the inorganic compounds are purged out of the sample by using acid. Again, the combustion gas is cooled, filtered and finally the CO<sub>2</sub> concentration is measured. The TIC value is subtracted from the previously measured total carbon (TC) value. Hence, determining the total organic carbon, the TRUE TOC.

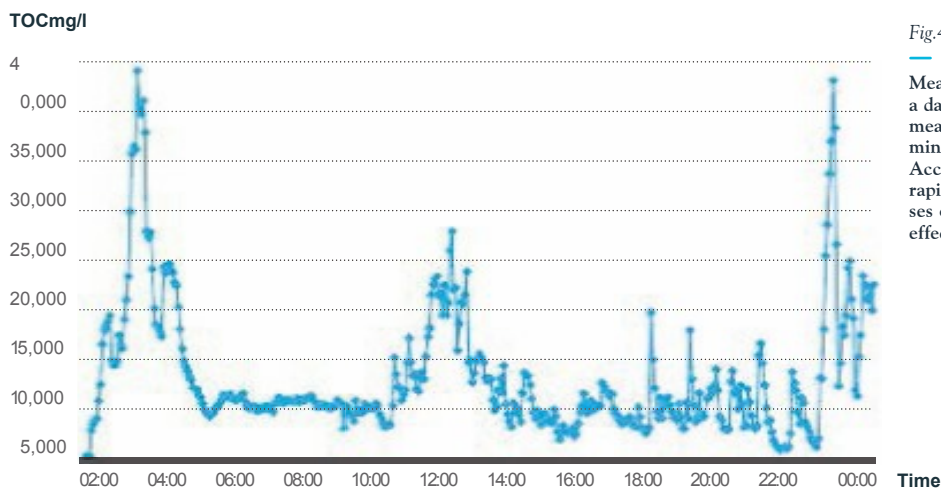


Fig.4  
Measurement peaks during a daily cycle with a measurement cycle of 3 minutes. Accurately capturing the rapid increases and decreases of load without memory effects.

**All cLeAR?**

**LAR Process Analysers AG: Water is our Element. We do everything for its protection.**

We are the leading provider for water analysis instruments for industrial and communal waste water technology, process monitoring, as well as for pure water analysis. Further products in the areas of industrial process and environmental technology complete our product range.

LAR offers application specific analysers developed by our research and development team. Maintenance is carried out globally by our own technicians or by our local qualified service partners. Technical support per telephone or e-mail is available at all times.

**TOC-ANALYSIS**

From complex industry waste water to pharmaceutical pure water, our TOC analysers Determine parameters quickly and precisely.

**COD-ANALYSIS**

With our analysers the chemical oxygen demand is cleanly and safely determined online, without using chemicals.

**BOD/TOXICITY**

We detect the BOD with the plant's own biomass and determine the toxicity with highly sensitive bacteria. Fast and reliably.

**TN<sub>b</sub>/TP-ANALYSIS**

TN<sub>b</sub> and TP are important parameters for waste water treatment. We are the only ones who offer them in combination with TOC and COD in one system.

**FURTHER PRODUCTS**

LAR offers a specific solution for nearly all applications. With our protective housings, you are always on the safer side. Find out more: [www.lar.com](http://www.lar.com)

# QuickTOCAirport AN OVERVIEW

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

QuickTOCAirport continually checks the TOC content of waste water. Optionally, other sum parameters can be detected, too. At 1,200°C, samples are completely oxidised and within 1-2 minutes the TRUE TOC result is determined.

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## TECHNICAL DATA

### Measurement Technique and Sample Preparation

Measurement Method	Thermal oxidation
Measurement Ranges	0.1 - 200 mg/l, 5 - 4,000 mg/l, 100 - 50,000 mg/l TOC, further options available
Response Time	3 minutes
Sample Preparation	<ul style="list-style-type: none"> <li>• Maintenance-free partial cutter</li> <li>• Optional homogeniser for the continuous homogenisation of samples</li> </ul>

### Dimensions and Weight

Housing	Steel IP 54, powder-coated
Options	Stainless steel, IP 65, ATEX Zone 1 and 2 for T3, T4 classes
Dimensions	W 700 x H 1,020 x D 520 mm
Weight	115 kg (Standard)

### Electric and Hydraulic Specifications

Inflow and Outflow	Tube 4,8 mm ID, Tube 8 mm ID, Tube 12 mm ID
Power Supply	230 / 115 V~, 50 / 60 Hz
Analogue Output	0/4– 20 mA
Serial Interface	RS 232
Safety	2/6 A internal, 16 A external
Remote Control	Through TCP/IP Protocol (Internet)

### Equipment Devices and Data Output

High resolution and back lit TFT touchscreen graphic display, 10.4"

Autostart function

Self explanatory software

Standard data interfaces to office PC (USB)



Fast, precise and reliable  
the QuickTOCAirport is  
dependable.



## ADVANTAGES & FEATURES

- ✓ exact determination of the TOC, (TRUE TOC) and TIC
- ✓ proven thermal oxidation principle
- ✓ highest combustion temperature available (1,200°C)
- ✓ catalyst-free
- ✓ clean measurements without reagents
- ✓ multi-stream measurements (optional)
- ✓ high salt concentrations of up to 100 g/l
- ✓ individually programmable user levels
- ✓ analyser availability minim. 98%
- ✓ maintenance and service max. 30 min per week
- ✓ exceptionally low maintenance and operational costs

## LAR Process Analysers AG

Neukoellnische Allee  
134 D-12057 Berlin  
www.lar.com

Phone +49 30 278 958 -43  
Fax +49 30 278 958 - 703  
E-Mail export@lar.com



TÜV certified company

## TOC - ANALYSIS

### QuickTOCultra

#### AREAS OF APPLICATION

ENVIRONMENT / **municipal FACILITIES** / Industry

industries

**ENVIRONMENTAL MONITORING / waste water treatment / WASTE PROCESSING / PHARMACEUTICAL / LABORATORY / PETROCHEMICAL / REFINERIES / CHEMICAL / COAL AND STEEL / POWER / AIRPORTS / AUTOMOBILE / PAPER MANUFACTURE / BREWERIES / FOOD MANUFACTURE / DRINK MANUFACTURE / MILK PROCESSING**

#### TYPES OF WATER

groundwater / surface water / drinking water / **WATER INFLUENT / WATER EFFLUENT / DISCHARGE CONTROL / INDUSTRIAL WASTE WATER / DE-ICING WATER / PROCESS WATER / HIGH SALT CONCENTRATION** / oil-in-water / COOLING WATER / PURE WATER / BOILER FEED WATER / CONDENSATE RETURN / PHARMA HPW / PHARMA WFI



### Envitech Ltd

Unit S7  
Capital Business Park  
Parkway  
Cardiff  
CF3 2PU

Email: [info@envitech.co.uk](mailto:info@envitech.co.uk)

Tel: 0044 2920 364252

Web: [www.envitech.co.uk](http://www.envitech.co.uk)