



QuickTOC_{airport}

TOC-ANALYSIS

Online TOC for airport applications.
Especially for de-icing water.

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 an 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 car-

ry-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-

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

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.

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 CO₂ 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 1,200°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 tem-

perature" 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_{airport}.

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

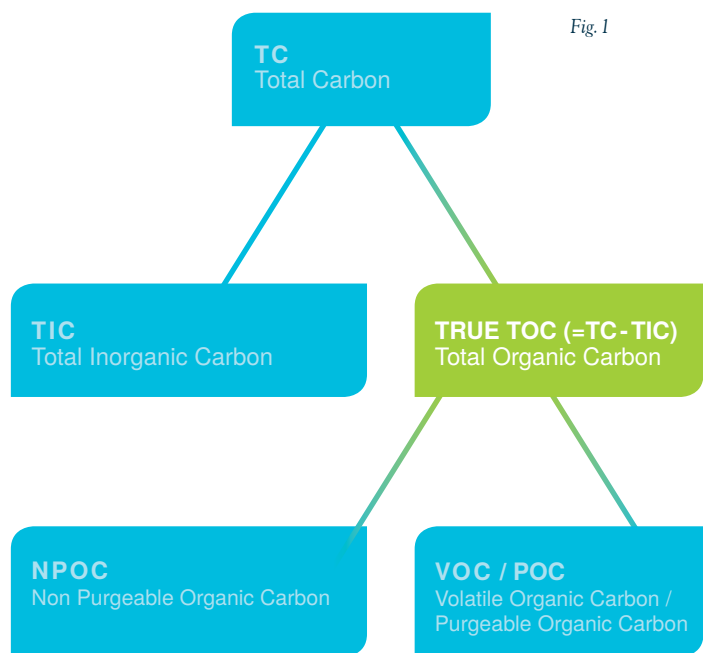


Fig. 1

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, complete oxidation is guaranteed which is why catalysts are unnecessary.

THE ANALYSER.

A hot oven: Where temperature makes the difference.

Warm, hot, ultra hot.

Tracking organic load at 1,200°C.

The catalyst-free ceramic oven is the centrepiece of the QuickTOC_{airport}. 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_{airport} is available with a number of different housings, depending on its intended end location. That way the analyser itself can be safely positioned in highly corrosive locations as well as in Ex-Zones.

The determination is in accordance to DIN EN 1484:1997-08, ISO 8245:1999-03 and EPA 415.1.

The QuickTOC_{airport}. Ultra quick measurements and maintenance.

The TRUE TOC measurement takes place in less than 3 minutes. Thereby, short measurement value peaks are reliably shown. The maintenance servi-

cing that is required is also short: 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 ease of maintenance: From the filterless sample extraction with the patented FlowSampler® (→ Fig. 3), by way of generously measured and blockage-free tubes, to the catalyst-free high temperature oven with the easy to handle high salt option.

The building blocks principle for a tailor made measurement instrument.

Within the QuickTOC_{airport} the amount of wetted surfaces is reduced to a minimum. The use of inert materials as well as a pump, which is installed downstream of the sample stream, prevent carry-over 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.

High salt concentrations. No problem.

The QuickTOC_{airport} can handle salt concentrations up to 100 g/l. With the special high salt option it can even 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 touchscreen, the QuickTOC_{airport} is easy to operate. Alternatively, another option is to control the analyser via remote control using a PC, which is connected to your network.

With the QuickTOC_{airport} the analytical area is isolated from the electronics.

All areas are easily accessible.



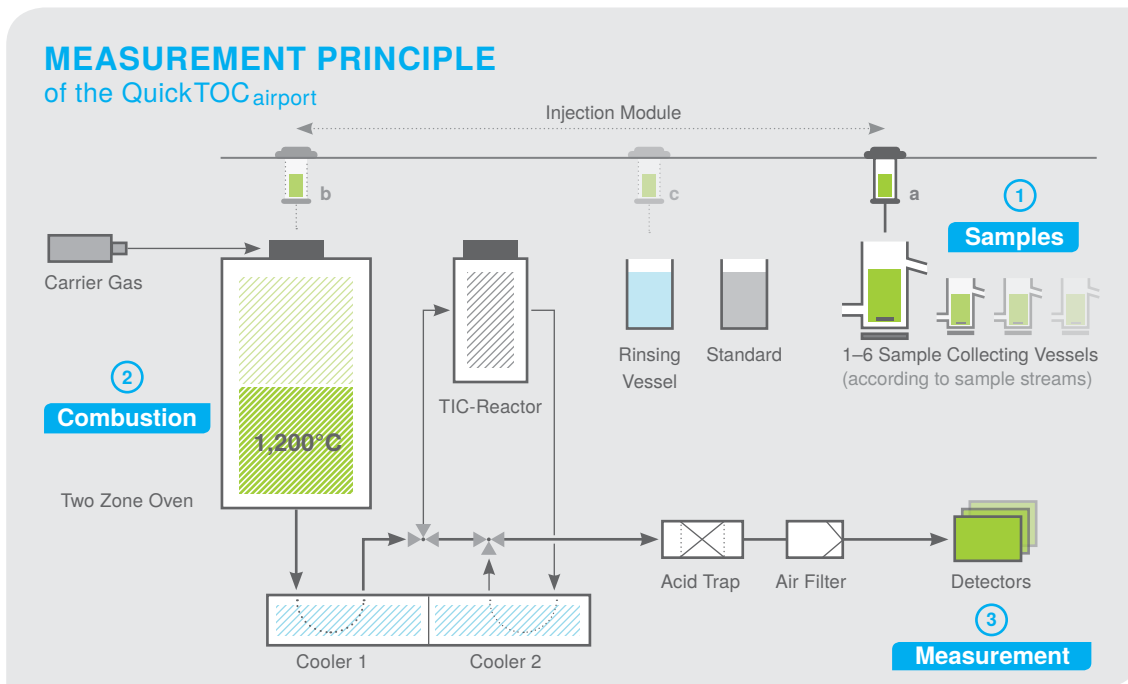


Fig.2

- 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 CO₂
- 3) CO₂ 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. 3), 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.

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. This patent pending valve ensures that the oven (→ Fig. 2) stays 100% sealed from the ambient air at all times. The needle is cleaned after every injection.

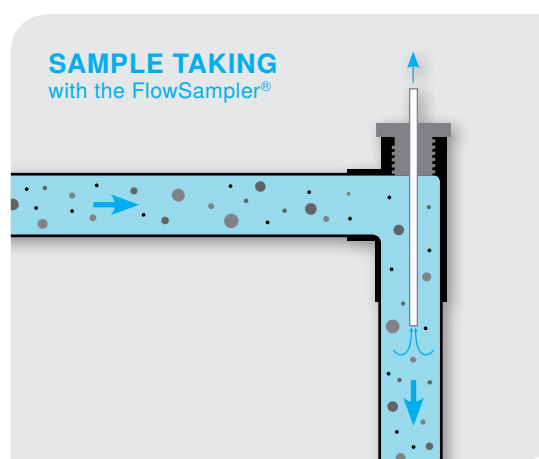


Fig.3

- maintenance-free
- blockage-free
- representative samples

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

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 CO₂. It is oxidised with a carrier gas, whose supply is provided by filtered ambient air.

Optionally, the QuickTOC_{airport} 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 fluid 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 CO₂ detection. Reliable and simple.

First the gas that is produced by the combustion condenses in the cooler. The remaining combusti-

on gas is purified by a filter before its CO₂ 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 CO₂ 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.

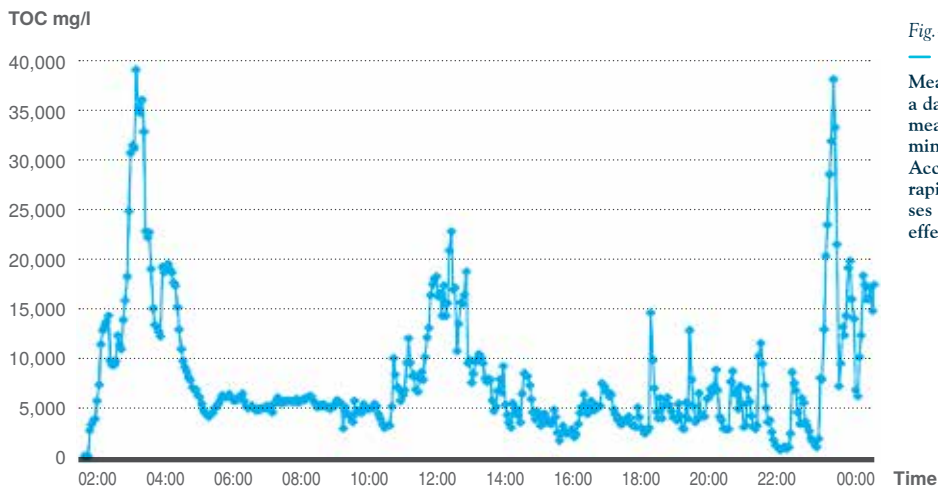


Fig. 4
Measurement peaks during a daily cycle with a measurement cycle of 3 minutes. Accurately capturing the rapid increases and decreases of load without memory effects.

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 which are developed by its 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 waster 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_b/TP-ANALYSIS

TN_b 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

QuickTOC_{airport} AN OVERVIEW

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

QuickTOC_{airport} continually checks the TOC content of surface and de-icing water. The automatic ranging allows fast and precise measurements of changing loads. At 1,200°C, samples are completely oxidised and within 1-3 minutes the TRUE TOC result is determined.

QTair-3 E 0514

TECHNICAL DATA

Measurement Technique and Sample Preparation

Measurement Method	Thermal oxidation
Measurement Ranges	0.1–100 mg/l, 2–400 mg/l, 5–2,000 mg/l, 100–15,000 mg/l, 500–50,000 mg/l TOC, further options available
Response Time TOC	3 minutes
Sample Preparation	<ul style="list-style-type: none"> • Maintenance-free particle separator • Optional homogeniser for the continuous homogenisation of samples

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 1,020 x 520 mm (W x H x D)
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 QuickTOC_{airport} is dependable.

ADVANTAGES & FEATURES

- ✓ exact determination of TC, TOC, (TRUE TOC) and TIC
- ✓ proven thermal oxidation principle
- ✓ highest combustion temperature available (1,200°C)
- ✓ automatic ranging
- ✓ fast response time of one minute (TC)
- ✓ multi-stream measurements (optional)
- ✓ individual programmable operator access
- ✓ analyser availability minim. 98%
- ✓ maintenance and service max. 30 min per week
- ✓ exceptionally low maintenance and operational costs

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TÜV certified company

TOC-ANALYSIS

QuickTOC_{airport}

AREAS OF APPLICATION

ENVIRONMENT / MUNICIPAL FACILITIES / INDUSTRY

INDUSTRIES

**ENVIRONMENTAL MONITORING / WASTE WATER TREATMENT /
WASTE PROCESSING / PHARMACEUTICAL / LABORATORY / PETRO-
CHEMICAL / 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**