



## QuickTON<sub>Ultra</sub>

TN<sub>b</sub>-ANALYSIS

Exact online analysis of nitrogen compounds.  
For every kind of water.

Fast. Precise. Reliable.



# ACCURATE DETECTION OF NITROGEN IN WATER.

With the right method, organic and inorganic nitrogen compounds can be quickly measured without problems even in difficult waters with coarse material content.



Whether you have to measure emulsified water from a flavouring production plant for spill detection, industrial waste water from dairies, paper or paint factories for discharge control: The QuickTON<sub>ultra</sub> is very versatile and able to handle the most diverse applications and types of water.

With regards to ecology as well as economy, industrial and municipal applications, such as the influent and effluent of production plants and clarification plants, should be continually monitored for nitrogen compounds. Moreover, by continual measurements, chemical and food industry is also able to detect expensive product losses.

## Lumps, algae and slime are what a measurement system has to be able to deal with.

Difficult types of water like process water and industrial waste water can contain coarse material as well as substances which must be detected and analysed. Additionally, the measurement system should work continuously and reliably, so that impurities can be detected early on and the appropriate countermeasures can be taken. Plus, the analyser should also be able to cope with water with a high salt concentration without an increase in maintenance.

## What TN<sub>b</sub> means and how it is measured.

A whole variety of nitrogen compounds can be present in water, which cannot be determined individually. At least not without considerable analytical effort and within a short time. This is why so-called sum parameters have been developed. One of them is the TN<sub>b</sub> (total bound nitrogen). This parameter is not absolute but has been defined to indicate the amount of nitrogen which is bound in chemical substances (ammonium, nitrate, nitrite and further organic N-compounds) in different kinds of water. It is the most reliable nitrogen parameter and can be easily used for online monitoring.

With the TN<sub>b</sub> analysis the amount of nitrogen oxide is measured, which generally is produced by thermal oxidation (combustion) of the sample. For the detection there are different methods available. Apart from NO/NO<sub>2</sub> gas probes, the most common methods for online analysis are the chemiluminescence detection (CLD) and the electro-chemical detection (ECD, ↗ Fig. 1).

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

#### Above the standard.

##### Determining the TN<sub>b</sub> at 1,200°C.

The current European standard EN 12260:2003 describes the chemical conversion of nitrogen compounds to nitrogen monoxide by use of the catalytic combustion above 700°C in an oxygen atmosphere. However, not all nitrogen substances can be oxidised by this method. Especially, not those substances that contain nitrogen double or triple bonds.

The high temperature method that LAR Process Analysers AG developed, goes further: With a combustion temperature of 1,200°C we offer the highest oxidation temperature on the market. Vital to this method: It reliably oxidises more complex compounds. As a general rule, the higher the temperature, the higher the accuracy of results.

#### Catalysts.

##### For our analysers not necessary.

Because of the high combustion temperatures our analysers do not need any catalysts. Catalysts are only necessary for the low temperature catalytic oxidation (680 – 1,100°C) to support the oxidation of the nitrogen bonds. However, the performance of the catalysts is fading over time. This affects the measurement results, requiring continuously new calibrations and, eventually, the replacement of the catalyst.

Due to the ultra high combustion temperature the QuickTON<sub>ultra</sub> usually goes without any catalysts.

#### The detection. You have the choice.

The chemiluminescence method (CLD) is well-known and proved. Its disadvantages, however,

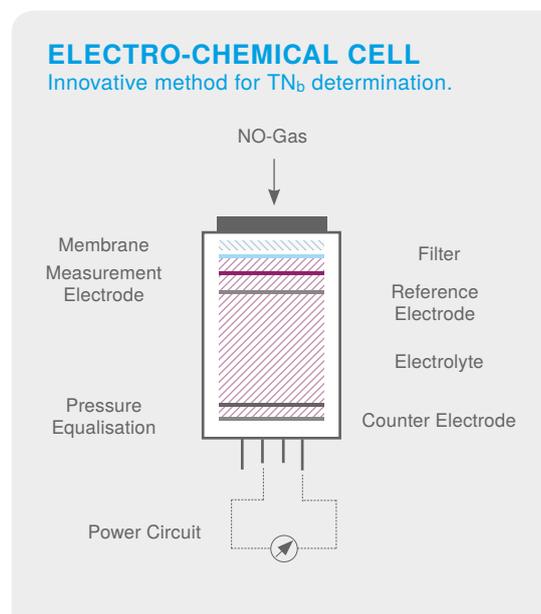
lay in its high cost of investment, consumables as well as its high maintenance efforts.

With regards to the economic efficiency the innovative electro-chemical detection (ECD) is a good alternative. The measurement cell is less expensive in purchase and needs only minimal maintenance since the requirements for the carrier gas are significantly lower. Nevertheless, it offers the most comparable measurement accuracy.

#### ECD - Electro-Chemical Detection.

##### Schematic layout of an EC cell.

Fig. 1



#### AT A GLANCE

- The TN<sub>b</sub> indicates all bound nitrogen compounds in a water sample.
- At 1,200°C, a complete oxidation is guaranteed and no catalysts are needed.
- A reliable measurement system must be able to analyse the coarse material in water.
- A CLD is well-known but it is expensive.
- With an EC cell the TN<sub>b</sub> can be determined fast and economically.

# 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 QuickTON<sub>Ultra</sub>. At 1,200°C, it reliably dissolves all nitrogen bonds and, thus, enables a complete analysis of samples. Despite the high temperatures used, absolute safety is guaranteed in all locations. The QuickTON<sub>Ultra</sub> can be delivered with a number of different housings, depending on the intended location. That way the analyser itself can be used safely at high corrosive places as well as in ex-zones.

The determination is in accordance to EN 12260:2003, ISO/ TR 11905-2:1997.

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

The modular system offers high flexibility. When your application demands it, you can measure up

to six different sample streams with one analyser. Furthermore, you can decide whether to build in additional detectors to determine the TOC and COD parameters alongside measuring the TN<sub>b</sub> value.

## The QuickTON<sub>Ultra</sub>. Ultra quick measurements and maintenance.

The TN<sub>b</sub> 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 blockage-free tubes, to the catalyst-free high temperature oven with the removable oven foot for the quick removal of salt residues.

## High salt concentrations.

### No problem for the QuickTON<sub>Ultra</sub>.

In contrast to many other analysers, the QuickTON<sub>Ultra</sub> can handle salt concentrations up to 10 g/l. There is also an extra high salt option available that can handle up to 300 g/l sodium chloride (NaCl). This means that even with a high salt concentration the sample does not need to be diluted. A fact that has a positive effect on the accuracy of your measurements.

## 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 QuickTON<sub>Ultra</sub> is easy to operate. Another option is to control the analyser via remote control using a PC, which is connected to your network.

With the QuickTON<sub>Ultra</sub> the electronic compartment is separated from the analytical compartment.

The separated compartments are easily accessible.



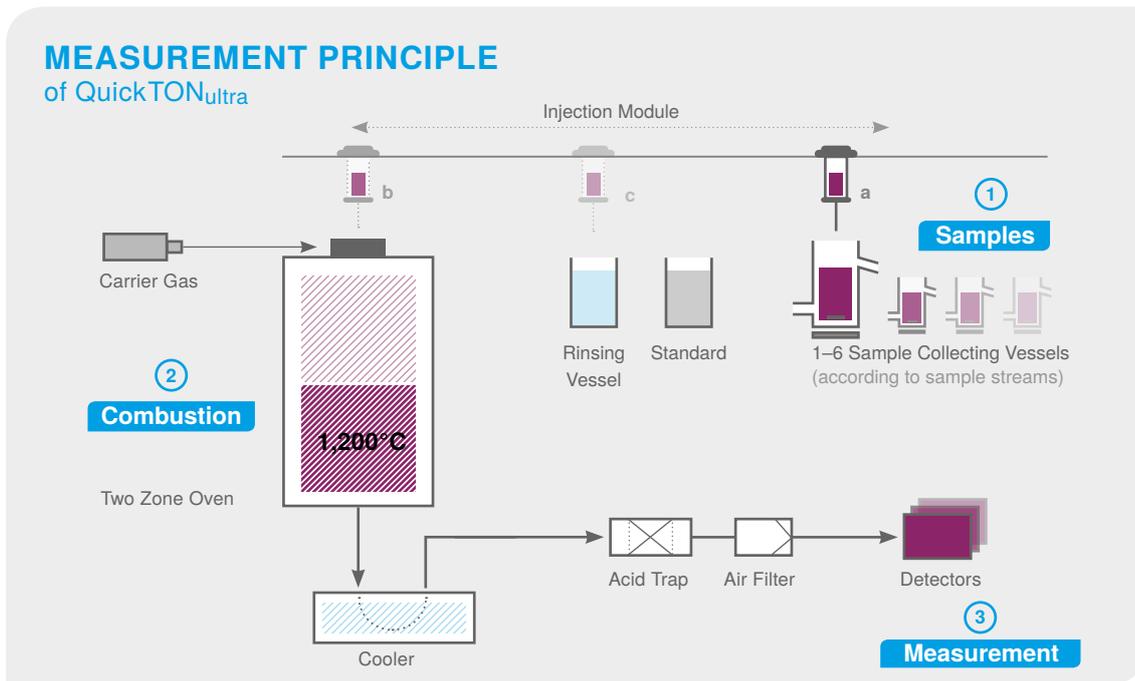


Fig.2

- 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 NO
- 3) NO concentration measurement

## THE PRINCIPLE.

Even with complex samples - the measurement is accurate!

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. After every injection, the needle is cleaned.

### Sample extraction:

Almost as though taken by hand.

The water flows through the patented FlowSampler<sup>®</sup>. In the middle of the FlowSampler<sup>®</sup> there is a stainless steel tube (→ Fig. 3), through which the sample is sucked into the analyser by a pump. The trick: Non-relevant solid particles such as sand grains or wood splinters pass the tube due to the flow speed. However, smaller and less heavier particles relevant to the measurement are captured, even the solid ones. Therefore, the taken sample corresponds 98% with that of a grabbed sample. While at the same time the FlowSampler<sup>®</sup> is free of blockages and maintenance. The results cannot be reached with any kind of filter, filter sieve or rotating sieve.

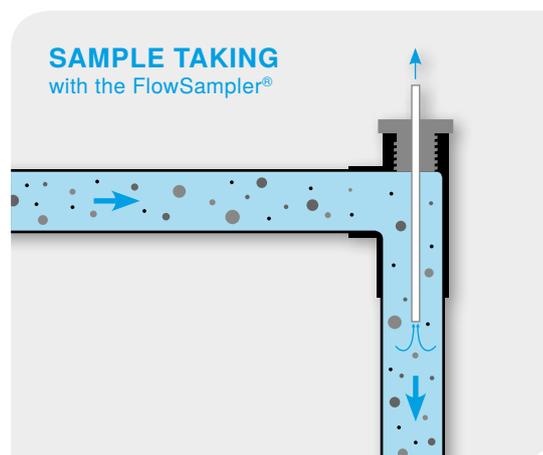


Fig.3

- maintenance-free
- blockage-free
- representative samples

The maintenance-free and patented sample taking system „FlowSampler<sup>®</sup>“

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

Inside the analyser, the samples are kept in collection vessels in a homogeneous state. The robotic horizontally and vertically moving needle takes

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

And it is that hot, that inorganic and organic nitrogen compounds - usually without catalysts - are completely converted into NO. The samples are oxidised with a carrier gas that is supplied from filtered ambient air. Optionally, the QuickTON<sup>Ultra</sup> can prepare the gas itself. Thus, requiring no extra external gas supply at all.

Through the high temperature, the salts in the sample can be easily discharged. They pass the oven in fluid form and are carried out by the condensate. Finally, they are deposited in a retaining device, from which they can easily and quickly be removed. Hence, no salt deposits can form in the oven.

#### Detection by use of CLD.

Within the chemiluminescence detector (CLD) the nitrogen monoxide (NO) reacts with ozone (O<sub>3</sub>) producing nitrogen dioxide (NO<sub>2</sub>). The ozone needed for the reaction is provided by the device itself. The excited molecules created during the process will transform to their basic state emit-

ting photons at 1,200nm. The light intensity is a measure for the absolute amount of NO within the sample.

#### EC detection. Fast and simple.

The electro-chemical detection is based on the reaction of NO of the oxidised sample with the electrolyte of the measurement cell, which is separated by a special membrane into two half cells. It produces free electrons that are measured being a direct measure for the NO concentration of the sample. The three-electrode cell guarantees the constant measurement signal (constant potential). The membrane characteristics ensure the highest selectivity of the detector.

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 TN<sub>b</sub> 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)

# QuickTON<sub>Ultra</sub> AN OVERVIEW

**Exact online TN<sub>b</sub> for nitrogen compounds. For every kind of water.**

QuickTON<sub>Ultra</sub> continually monitors the TN<sub>b</sub> content of water. Optionally, further sum parameters can be detected, too. At 1,200°C, samples are completely oxidised and only within 3 minutes the TN<sub>b</sub> result is determined.

## TECHNICAL DATA

### Measurement Technique and Sample Preparation

Measurement Method	Thermal oxidation at 1,200°C
Measurement Ranges	0.1 - 1,000 mg/l TN <sub>b</sub> , , Working ranges on request
Parameters	TN <sub>b</sub> , combination with TOC, COD possible
Response Time TN <sub>b</sub>	3 minutes
Sample Preparation	• FlowSampler - Maintenance-free particle separator • Optional homogeniser for the continuous homogenisation of samples

### Dimensions and Weight

Housing	Steel IP 54, powdercoated
Options	Stainless steel, IP 65, EXp Zone 1 and 2 for T3, T4 classes (ATEX, IECEx)
Dimensions	W 600/848 x H 1,062 x D 608 mm
Weight	from 125 kg (standard housing)

### 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
Internet Capability	LAN, Option for WLAN
Option	Remote control via TCP/IP protocol

### Equipment Devices and Data Output

High resolution and back lit TFT touchscreen graphic display, 10.4"
Self explanatory software, Autostart function
Standard data interfaces to office PC (USB 2.0)



Fast, precise and accurate:  
The QuickTON<sub>Ultra</sub> is  
always reliable.

## ADVANTAGES & FEATURES

- ✓ exact determination of TN<sub>b</sub>
- ✓ proven thermal oxidation principle
- ✓ highest combustion temperature available (1,200°C)
- ✓ catalyst-free
- ✓ fast response time of 3 minutes
- ✓ multi-stream measurements (optional)
- ✓ individual programmable operator access 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

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

# QuickTON<sub>ultra</sub>

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 /  
SEMICONDUCTOR MANUFACTURE**

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 / SEMICONDUCTOR UPW**