#### INFORMATION

LABORATORY AUTOMATION ANALYSERS TOC-TN

# **Automatically precise**

SURPRISING

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IL 550 TOC-TN

**TOC and TN in wastewater, drinking water and process water** 



UNITED FOR WATER QUALITY

## The specialists for TOC and TN: Robust, reliable and extremely precise



Efficient: The TOC-TN analysers from HACH measure TOC and TN in parallel. Their wide dynamic measuring range enables them to be used for trace analysis as well as for strongly contaminated samples —undiluted! With their outstanding long-term calibration stability and low maintenance requirement, they save valuable time. Combining highly specific detectors with user friendly software, the analysers ensure accurate measurement results.



Chemiluminescent detector for standardcompliant determination of TN

### Interchangeable and always upgradeable

The HACH TOC-TN systems have a modular design (analysers, autosamplers, detectors and solids modules). Laboratory automation starts with the analyser. There is a choice of two TOC-TN instruments with catalytic high-temperature combustion and a TOC instrument with UV persulphate digestion. Efficient autosamplers look after acidification and purging in parallel with the analysis. Uniform stirring of the samples ensures homogeneity. For the analysis of solids, there is a choice of the HSC 1300 (1300 °C) module and the compact DFS 950 (950 °C) module. The high initial sample weight capability allows non-homogeneous samples to be analysed.

### Interference-free detection with four-channel technology

**TOC** is detected in the four-channel NDIR detector. Three measurement channels give the instrument its extended measuring range of up to 30,000 mg/l. The reference channel is used to compensate for drift and interference. It eliminates the influence of the ageing of the light source and ensures a long service life. The temperature-controlled measuring cell achieves a constant stable signal, so no timeconsuming calibration of the detector is needed. Zero balancing is carried out automatically before each analysis. There are two detectors for determining TN: the chemiluminescent detector (CLD) carries out standard-compliant measurements. The electrochemical detector (ECD), which is integrated in the analyser, saves space in the laboratory and retains precision. TOC and TN can be analysed simultaneously.

### **Ready for the toughest challenge: TOC with high-temperature digestion**



Direct injection with 700 µm needle → Excellent particle tolerance

Control with VITA software → Long-term stable calibration

High furnace temperature → Very good digestion rates

Wide measuring range up to 30,000 ppm → No dilution necessary

The pneumatic port: Easily satisfies the cellulose test as referred to in ISO 8245 and EN 1484.

that contain particles

Reproducible results from samples

#### The gateway to the right result

TOC and TN, liquids and solids, particleand salt-containing samples - all are easily analysed with the IL 550 TOC-TN. The injection is carried out septum-free, without tubes or valves, directly into the reactor tube. The pneumatic port, which is sealed tight, encloses the syringe, making this possible. The needle remains in the furnace during combustion, and is then automatically rinsed. In this way, any carry-over is avoided. The variable injection volume of 50 to 500 µl enables a volume-dependent calibration to be carried out without time-consuming preparation of different standards.

#### **Complete digestion – guaranteed**

A furnace temperature of 950 °C and the optimised composition of the catalyst packing enable particle-containing samples as well as the most difficult to digest substances to be completely oxidised. The long service life of the catalyst is assured even when it is exposed to high salt concentrations and aggressive samples.

Solids can be analysed at 950 °C when the **DFS 950** module is used. This space-saving solution may be installed instead of the regular reaction tube. For routine serial analysis of solids, the **HSC 1300** module is recommended. The oxidation takes place at 1300 °C in a ceramic reaction tube without the aid of a catalyst. A sample port (laminar air flow) prevents contamination from the air. The combustion can be observed visually. High initial sample weights can be accommodated – up to 3 g – so that reliable results are obtained even from non-homogeneous samples.



- 1 Potassium hydrogen phthalate
- 2 Copper phthalocyanine-tetrasulphonic acid tetrasodium salt
- 3 Suspended Cellulose 100 ppm
- 4 Nicotinic acid
- 5 Disodium tartrate



Analysis of solids in the HSC 1300 module: Contamination-free introduction of the sample is easily observed with the laminar air flow sample port.

### Highly sensitive: TOC with UV persulphate digestion



IL 500 TOC including autosampler with twoneedle technology

The **IL 500 TOC** analyser is ideal for measuring low concentrations, with sample injections as high as 20 ml. This very low maintenance instrument functions without a catalyst, so operating costs are minimal. UV digestion is carried out at high-energy wavelengths. The direct contact between sample and UV source ensures effective oxidation and excellent recovery and reproducibility. If an autosampler is connected, the double-needle technology allows purging and measurement to be carried out in parallel, thus saving time.

High energy – UV digestion at 187 and 254 nm

### Precise: TN in accordance with EN ISO with chemiluminescent detector



With TN, all nitrogen compounds are determined in one analysis.

TN is the sum of organic nitrogen (nitrogen in organic compounds) and inorganic nitrogen (nitrogen in ammonium, nitrate and nitrite compounds). This parameter is determined frequently in the wastewater sector, to obtain information about the level of degradation in wastewater treatment plants. TN is also an important parameter for the monitoring of surface waters and special industrial applications. The optimised catalyst in the IL 550 TOC-TN is suitable for all applications. Samples containing particles or high salt concentrations are also completely oxidised.

### CLD detector: Luminescence in accordance with EN 12260

Nitrogen compounds are oxidised to NO and react with ozone to give an excited form of  $NO_2$ , which emits its energy again as chemiluminescence. This can be reliably detected. The CLD has excellent sensitivity and is absolutely maintenance free. It is set up as a separate module beside the analyser and can be upgraded at any time.

### ECD detector: Space-saving alternative

As an alternative to the chemiluminescence method, TN can also be detected electrochemically. The ECD is integrated in the analyser, thus saving space. In this detector the NO passes through a selective membrane and reacts with water to form nitric acid. This is detected by a maintenance-free solid electrolyte electrode. This patented method is sensitive, reliable and costeffective.

Some national standards include this method as an alternative to CLD.



Principle and structure of the ECD detector

1 Gas inlet	5 Electrode counter
2 Gas outlet	6 Diaphragm
3 Gas diffusion barrier	7 Reference electrode
4 Electrolyte solution	8 Working electrode

### User friendly with high quality data







Simply implemented routine-parallel determination of TOC and TN





All analysers are controlled from a PC. The **OMNITOC** software is very user friendly and can be operated intuitively. The logical structure enables users without any experience of PCs to work securely after just a brief period of time. The programme collects all statistical data relating to calibrations and measured values. Calibration curves are generated automatically and user methods are stored. The appropriate methods are automatically called up when a change of application occurs. The data can be viewed while measurements are being carried out, and urgent samples can be given priority so that no time is lost. The data can be exported to a LIMS.

The analyser is equipped with an **Auto Check System** to support trouble-free operation. The software monitors all key instruments and detector functions. The gas flow is electronically regulated. Leaks are immediately registered and displayed. At the end of a measurement series with the autosampler, the gas flow can be automatically switched off.

This makes safe, economic operation possible, without supervision. The **VITA** software compensates gas pressure fluctuations and straightens the measuring signal. This increases the long-term stability of the calibration. Easily understandable graphics support the user. Readily accessible and exchangeable components contribute to the minimal maintenance requirements, as do the high-quality materials.

#### **TOC-TN** at a glance

Instrument type	IL 550 TOC-TN	IL 530 TOC-TN	IL 500 TOC
Measuring range for TOC (NDIR)	0.05-30,000 mg/l	0.2-30,000 mg/l	0.002-10,000 mg/l
Measuring range for TN (CLD or ECD)	0.1-100 mg/l	0.1–100 mg/l	-
Method	HT digestion up to 950 °C	HT digestion up to 950 °C	UV persulphate digestion
Parameters TC/TOC/NPOC/TIC,	•	•	•
difference or purge method			
Signal optimisation with VITA	•		
Sample introduction	Direct injection	Injection through septum	Flow injection
DFS 950 solids module (950 °C)	optional	optional	
HSC 1300 solids module (1300 °C)	optional	optional	
Simultaneous measurement of TOC and TN	optional	optional	
Operation with autosampler	optional	optional	optional
Stirring at current sample position	•	•	
Simultaneous purging and measurement			•
for determining NPOC			
Dimensions of basic TOC instrument (HxWxD)	512 x 540 x 530 mm	512 x 540 x 530 mm	512 x 492 x 464 mm

Subject to change without notice

### Efficiency through laboratory automation



Analysers, FIA, discrete analyser

Analyse more samples in less time with less effort—the TOC-TN analysers belong to a high-quality instrument family, which easily handles large series of samples.

The QC 8500, a system for continuous flow injection analysis. With practical ready-to-use reagents, it analyses up to 120 samples per hour in accordance with USEPA, ISO and DIN standards. The AP 300 DISCRETE ANALYSER carries out up to 300 analyses per hour, thanks to its dual pipette system. With top-quality ready-to-use reagents, it analyses water samples in batch and random mode.

The GANIMEDE analysers are the specialists for parameters such as TN and total phosphate, which involve a digestion step. The patented fast digestion yields results within a few minutes. GANI CHEM, the ready-to-use reagents, save time and money in the laboratory.

#### **HACH LANGE Services**



Ordering, information and advice: UK: +44 (0) 161 872 14 87 EU: +49 (0) 211 52 88-0



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#### HACH LANGE—the specialists for water analysis



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#### HACH LANGE GMBH

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