TOCnology made for you
multi N/C x300 Series

TOC/TN_b Analysis

analytikjena
An Endress+Hauser Company

multi N/C x300 series

Master your matrix

TOCnology made for you

The TOC/TN_b analyzers of the multi N/C x300 series will make your day-to-day laboratory routines easier. Unique technologies and an intuitive software will facilitate your workflows while delivering results fit for any interlaboratory study. Find the perfect match for your TOC/TN_b analysis.

multi N/C 2300 - The Specialist

TOC/TN_b analysis for particle-rich samples and small sample volumes

multi N/C 3300 - The Allrounder

TOC/TN_b analysis for a wide variety of sample matrices optimized for highest throughput

multi N/C 4300 UV - The Trace Detector

TOC analysis in the ultra-trace range, even in aggressive matrices

Your Advantages

Inspired by you – developed for you. With the multi N/C x300 series, we have created TOC/TN_b analyzers that will get you ahead. Discover how you can benefit.

More time for what matters

- Minimal preparation effort for liquid and solid samples
- Long-term stable calibration with Easy Cal
- Automation options customized to your needs

A sustainable investment

- Low costs and time per sample
- Long-term warranties on core components
- Lowest wear and tear – even for demanding matrices

As versatile as your challenges

- Excellent particle-handling thanks to unique injection techniques
- Accurate results over a wide measurement range
- Salt kit and many other accessories broaden your application range

A partnership that takes you further

- Long-term supplier of TOC/TN_b analyzers with thousands installed worldwide
- Application consulting and training
- Tailored service offerings including IQ/OQ/PQ and software validation

Everything at a glance

- An intuitive software offering live result updates, easy operation, and efficient workflows
- All functions and device information at a glance
- Self-monitoring functions as well as highest data integrity standards

More Time for What Matters

The multi N/C x300 series is designed to give you what is most valuable: time. Effort for maintenance, calibration, and sample preparation is significantly reduced. Spend minimum time with your device and focus on what really matters: your results, your laboratory staff, and your customers.

All about ease of use

Calibrate only once a year with Easy Cal: A long-term stable calibration and an excellent standard recovery are guaranteed thanks to a unique software algorithm which effectively compensates for gas flow fluctuations. In addition, multi-point calibrations are easier than ever as the analyzer can perform them from just one stock solution without operator input. Both aspects of Easy Cal save you valuable time.

No sample dilution: All analyzers feature a wide-range focus radiation NDIR detector with an extraordinarily broad measurement range of 0 to 30,000 mg/L TOC. This enables the direct analysis of high concentration samples without time-consuming sample dilution.

Minimum solid sample preparation: For solids, up to 3 g of sample can be loaded directly into a ceramic boat – no prior milling or wrapping of samples in foil is required.

Smooth workflows – just analyze: Clever automation functions enable that additional samples can be reloaded without pausing the measurement process. When switching from automated liquid to solid analysis, no hardware conversion is necessary.

User-friendly design: All consumables can be easily accessed and quickly exchanged via the front doors. No chemical drying agents need replacing as the devices feature electrical drying of the measurement gas via a Peltier element.

Your benefits

- Less manpower due to significantly reduced maintenance and sample preparation
- More time for sample analysis due to long-term-stable calibration
- Short familiarization period due to easy operation
- Time and cost savings

As Versatile as Your Challenges

Your multi N/C x300 analyzer can be easily customized for your specific task with the help of various add-ons. Whether it's particle-rich wastewater, ultra-pure water, drinking water or even acid - analyze even the most challenging matrices with ease and get results you can rely on.

Master your matrix with customized solutions

Excellent particle handling: The devices are equipped with unique direct injection or loop injection with reverse rinse function to ensure complete sample dosing and avoid sample carryover as well as device blocking. This guarantees exact results, reduces time spent on troubleshooting, and extends your product's lifespan.

Nitrogen detection: For TN_b analysis, an electrochemical detector (ChD) can be integrated in the device. This detector operates highly economically, does not need carrier gas or any kind of maintenance. Alternatively, a chemiluminescence detector (CLD) can be added as a separate nitrogen detector module.

Autosamplers: Find the perfect autosampler for your particular needs in our extensive autosampler portfolio. Depending on your sample throughput choose between 10 to 146 sample positions. Depending on the nature of your samples, select from homogenization or other functions like polymer-septum-piercing.

Salt kit: Delivers extended maintenance intervals for high-salt samples by utilization of a salt crucible in the combustion tube. Costs per sample are significantly reduced.

Solid sample analysis: The HT 1300 module allows for catalyst-free combustion of ≤ 3 g of solid samples at up to 1,800 °C in a ceramic combustion tube. Alternatively, the double furnace module can be used to measure TC and TOC in homogeneous solid samples using catalytic oxidation at up to 950 °C. For direct swab combustion in TOC cleaning validation, a specific module is available.

Ultra-trace detection: For TOC detection in the ultra-trace range, the high performance UV reactor with two wavelengths digests even very stable carbon compounds without oxidation agents.

Your benefits

- Unique technologies for the most challenging samples
- Highly economic nitrogen analysis
- Extraordinarily wide measurement range and precise results
- Various automatization options

A Sustainable Investment

multi N/C x300 analyzers combine cost optimization with sustainability and responsibility for our environment. Throughput efficiency and low staff deployment meet device durability and an economical use of consumables and reagents.

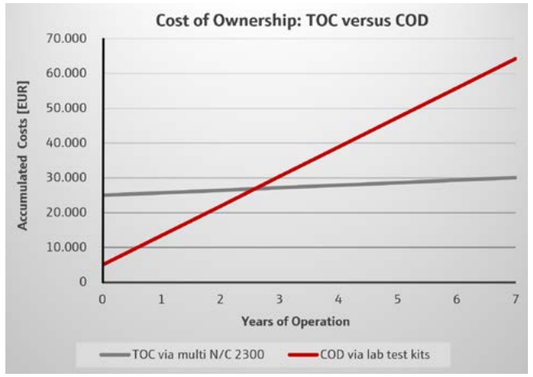
Analytical precision meets business success

Throughput efficiency: Minimal sample preparation, long-term stable calibrations, short measurement times (3-5 minutes) and minimal maintenance efforts ensure the highest possible sample throughput.

Unattended operation: Due to our unique Self Check System samples are never lost as the analyzer will pause automatically if analysis conditions are suboptimal. This makes unattended overnight operation especially worry-free.

Long-term durability: multi N/C x300 analyzers are designed for a decade-long use and low wear and tear. We offer long-term warranties on core components, like the focus radiation NDIR detector, the furnace technology, and the high power, long life UV reactor.

Low consumption of consumables: Consumable use is significantly lower with our analyzers than with comparable products. In the trace range, the high power UV reactor of our multi N/C 4300 UV enables sample digestion without the oxidation reagent persulfate.



Comparison of overall costs (i.e., initial investment and cost of operation) for COD versus TOC testing by a laboratory analyzing 70 samples per week.

Low staff deployment: Clever automation options for unattended 24/7 operation combined with low maintenance requirements reduce time and effort for your staff.

Cost-efficient and environmentally friendly parameter: TOC measures organic pollution much more accurately than COD and BOD_5. Moreover, the analysis is faster, more cost-effective, and more environmentally friendly. Expensive and hazardous reagent kits are not needed. This translates to significant cost savings in the medium and long term and avoids toxic waste and health risks for your employees.

Your benefits

- Low costs per sample and low total cost of ownership
- No hazardous reagents
- Low staff deployment
- Quick return on investment (ROI)
- Low expenses on maintenance
- Durable and future-proof device

A Partnership that Takes You Further

Analytik Jena offers much more than excellent analytical equipment. We take pride in supporting customers over the entire product life cycle and offer a wide range of services – both technical and application-wise.

Service and know-how from professionals

Our inhouse team of technical and application experts have many years of experience in service, making them highly qualified to help you. They are specialists for their respective devices and can almost always solve service cases at short notice. We do not only have a reputation as a competent and solution-oriented service partner but can back that up with an average first time fix rate of over 90 percent. We always find the best solution for your challenge – on site as well as via remote access.

Modular service contracts
With our service contract modules, you can tailor your service contract to your exact individual needs. Benefit from the personal service of a contract partner while staying flexible. Select from the following modules:

- Analyzer qualifications (IQ/OQ/PQ)
- Repair & Maintain: A maintenance concept for your unit and free repairs over the contract period
- Preventive maintenance – can be combined with analyzer requalification (RQ)
- Reaction time: The knowledge that we will fix your issue or be at your site within an agreed-upon period of time
- Application trainings tailored to your needs

Personal hotline: Our hotline is available for you seven days a week and in person. No voicemail, no voice computer: our friendly service team will take your call and our specialists will get back to you the next working day at the latest and will be on site quickly afterwards if need be.

Application support and training: Whether you want to familiarize yourself even more with your analyzers or have application-related questions: With our training, you are optimally prepared and can use your devices more effectively and profitably. Our application consulting hotline supports you with all your questions regarding lab routines and trouble shooting.

Fast delivery time: We typically deliver our devices within four weeks ex works.

Software qualification: Save precious time and nerves by choosing our proven software validation services! Especially trained service technicians carry out all validation steps for you and provide you with the necessary documentation. Get your analyzer ready for use as quickly as possible – highly regulated environments are our daily companion.

Your benefits

- Best performance and minimum downtime for your devices
- Personal hotline 7 days a week
- Plannable costs
- Fast and competent remote failure diagnostics
- Appointment service reminders and smooth processing of service requests
- No rigid contracts – stay flexible while profiting from all advantages of a contract partner
- Fast reaction times

Intuitive Device Software for Your Workflows

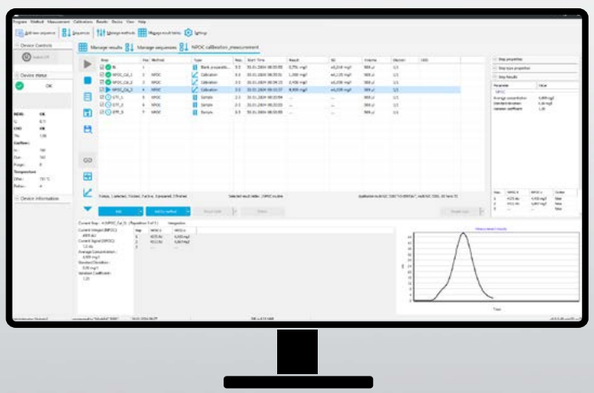
multiWin pro provides you with a cockpit view by presenting all vital information on a single screen. It monitors key system parameters, presents live measurement results, and enables convenient operation thanks to its automated, user-friendly workflows. It also offers optional data integrity functions in compliance with FDA 21 CFR Part 11 regulations.

All information in one view

Enter samples and view live results in one place. The multiWin pro software gives you an overview of your samples with information such as method, measurement time, and more. Sample IDs and methods can be imported from external sources. Data evaluation and results are displayed live and can be exported manually or automatically (XML, CSV, PDF). Result units can be specified individually.

Long-term stable calibration

Calibrate only once a year thanks to our unique software algorithm. The Easy Cal function enables a long-term stable multi-point calibration from a single stock solution including blank correction, thereby saving time and effort.



Save time with automated workflows

Start a calibration and return to completed sample measurements. If desired, the calibration can be part of a normal measurement sequence, it is then automatically evaluated and applied to subsequent sample measurements. A report including both calibration and sample data is generated automatically.

Easily convert parameters

Eliminate external post-processing of results. Convert TOC results to COD/BOD_5, TIC results to CO_2, and total nitrogen results into total protein contents using the ready-to-use functions in our multiWin pro software.

Make your lab routine more efficient

You can measure a single sample using different methods from the same sample vial. This will save you effort, glassware and valuable autosampler space.

Be compliant

For regulated environments, we offer an FDA 21 CFR Part 11 compliant pharma module for data integrity, user management, audit trail, and software validation.

Be on the safe side

The Self Check System of our device software offers automatic and permanent leakage monitoring as well as monitoring of input pressure and internal device pressure, tracking of maintenance intervals, furnace and Peltier temperature, as well as detector status.

multi N/C 2300 – The Specialist

TOC/TN_b analysis for particle-rich samples and small volumes

Compact and robust, the **multi N/C 2300 series** is ideal for particle-rich samples. With its modular design it can be customized for liquids, solids, as well as for the simultaneous measurement of TOC and TN_b, giving you a high degree of flexibility.
The septum-free direct injection technology prevents sample carryover when handling particle-rich liquid samples and enables smooth workflows. With the microliter syringe, extremely small sample volumes (10–500 µL) can be dosed, which is oftentimes important for scientific purposes. For determining total protein content via TN analysis in vaccines, the **multi N/C 2300 N** offers impressively short measurement times, no carryover and covers a wide concentration range.

- Exceptional particle handling without any blockage or carryover due to direct injection technology
- Analysis of undiluted samples makes laborious pre-dilution steps redundant
- New intuitive software with live result display and 21 CFR Part 11 compliant pharma module
- Long-term stable calibrations translate to a reduced staff workload thanks to the unique VITA flow management system
- Long-term warranty on the wide-range focus radiation NDIR detector and the furnace technology
- Detector modules for simultaneous TN_b determination and accessories for analysis of solids can be preconfigured or retrofitted

Applications

- Analysis of municipal wastewater, industrial effluents, and waste eluates
- Analysis of small sample quantities for research purposes (e.g., soil extracts, percolating water, ice cores)
- Analysis of soils, contaminated sites, sediment, waste, construction debris
- Quality control of vaccines by total protein determination

Device options

multi N/C 2300

multi N/C 2300 duo
TOC/TN_b analyzer with integrated liquids and solids automation

multi N/C 2300 N
TN analyzer for total protein determination using high-temperature catalytic combustion and CLD detection

>> for more details on device options, see page 15

multi N/C 3300 – The Allrounder

TOC/TN_b analysis for a variety of matrices optimized for highest throughput.

The versatile devices of the **multi N/C 3300 series** are optimized for highest throughput while striking the perfect balance between a wide variety of applications, from particle-rich wastewater to high-salt samples to ultrapure water. With the special loop injection technology via a ceramic valve, the devices feature high reproducibility as well as robustness for samples containing particles. Exceptional sensitivity is achieved by high injection volumes (100–3000 µL). Detector modules for simultaneous TN_b determination and accessories for analysis of solids can be pre-configured or retrofitted.
The **multi N/C 3300 HS** provides even higher reproducibility and sensitivity in the trace range, for example, when analyzing pharmaceutical ultrapure water. For TOC cleaning validation via direct swab combustion an optional swab test module can be added.

- High NPOC sample throughput by parallel purge and analyze
- Complete dosing of particulate samples without carry-over
- External needle rinsing for better repeatability and carry-over control
- Measurement of undiluted samples using the wide-range focus radiation NDIR detector
- Automatic acidification and purging as well as sample homogenization
- New intuitive software with live result display and 21 CFR Part 11 compliant pharma module
- Significant time savings thanks to long-term stable calibrations
- Optional kit to measure high-salt samples
- Long-term warranty for the focus radiation NDIR detector and furnace technology

Applications

- Surface and seawater monitoring
- Wastewater and eluates analysis
- Analysis of groundwater, raw and drinking water
- Analysis of boiler feed water and condensates in power plants
- TOC cleaning validation
- TOC extractables testing from packaging materials
- Analysis of soils, contaminated sites, sediment, waste and construction debris

Device options

multi N/C 3300

multi N/C 3300 duo
TOC/TN_b analyzer with integrated liquids and solids automation

multi N/C 3300 HS
The TOC/TN_b analyzer for ultra-trace applications

>> for more details on device options, see page 15

multi N/C 4300 UV – The Trace Detector

TOC analysis in the ultra-trace range, even in aggressive matrices

The highly precise **multi N/C 4300 UV** is specifically designed for TOC analysis at the ultra-trace level. It is ideal for analyzing boiler feed water in large-scale power plants, water for injection (WFI) and TOC cleaning validation samples in the pharmaceutical sector. Equipped with a high-power UV reactor, all carbon compounds can be digested rapidly and completely, even in difficult matrices such as electrolysis baths for electroplating. At the ultra-trace level, this UV reactor enables digestion without persulfate, which makes operation more efficient, avoiding TOC blank interferences. The analyzer can be equipped with customized automation solutions for up to 100 positions making sample preparation and analysis more efficient.

- TOC analysis at the ultra-trace level thanks to maximum injection volumes of up to 20 mL
- Persulfate-free sample digestion by utilizing UV lights at a wavelength of 185 nm and 254 nm (high-power long-life UV reactor)
- High NPOC sample throughput due to parallel purge and analyze
- Economical operation thanks to long-lasting components and inexpensive reagents
- New intuitive software with live result display and 21 CFR Part 11 compliant pharma module
- Significant time savings thanks to long-term stable calibrations
- Device can be upgraded for TOC analysis of solids by means of non-catalytic high-temperature combustion
- Long-term warranty for the focus radiation NDIR detector and the UV reactor

Applications

- Ultrapure water analysis in pharma industry
- TOC cleaning validation (swab extracts, final rinse)
- Analysis of boiler feed water and condensates in power plants
- Drinking water analysis
- Highly saline or acidic samples such as in electroplating

Product Overview – Device Options

	multi N/C 2300	multi N/C 2300 N	multi N/C 3300	multi N/C 3300 HS	multi N/C 4300 UV
High-temp. combustion up to 950 °C	x	x	x	x	–
UV/Persulfate (254 nm, 185 nm)	–	–	–	–	x
Flow injection (vol. in µL)	–	–	up to 1,000[1]	up to 3,000[2]	up to 20,000[2]
Direct injection (vol. in µL)	up to 500	up to 500	–	–	–
Measuring range [mg/L] TC/TOC/NPOC/TIC	0–30,000	–	0–30,000	0–30,000	0–10,000
Measuring range [mg/L] TN_b (ChD)	0–100	–	0–10,000[3]	–	–
Measuring range [mg/L] TN_b (CLD)	0–200	0–200	0–20,000[3]	0–200	–
Best precision in the TOC trace range	–	–	(x)	x	x
Highest automation comfort for NPOC (automatic acidification, parallel purge)	(x)[4]	–	x	(x)[5]	x
HT 1300 solids module	x	–	x	–	x
Double furnace / swab test module	x	–	–	x	–
Automated HT 1300 (up to 48 solid samples)	x[6]	–	x[6]	–	–
Measuring range [mg] abs. solid TC/TOC	0–500	–	0–500	0–100[7]	0–500
Self Check System/VITA/EasyCal	x	x	x	x	x
Applications					
Environmental water monitoring:					
- Drinking water / groundwater	(x)	–	x	x	x
- Surface water	x	–	x	–	x[8]
- Leachates and eluates	x	–	x	–	x[8]
- Wastewater (municipal, industrial)	x	–	x	–	–
- Seawater	x	–	x	–	(x)[9]
Solids TOC in soils, sediments, sludges, filter dusts and more	x	–	x	–	x
Further industrial applications:					
- Purified water, WFI, cooling and boiler feed water	–	–	(x)	x	x
- TOC cleaning validation	–	–	x	x	x
- TN in vaccines /aqu. protein solutions	–	x	–	–	–
- Electroplating baths[9]	x	–	x	–	x
- Acids and lyes[9]	x	–	x	–	x

1) Sample loop injection principle
2) Piston injection principle
3) By automatic external dilution with AS vario/AS vario ER, AS 10e, AS 21hp, dilution ratios up to 1:100
4) No parallel purge
5) No automatic acidification
6) For multi N/C 2300 duo or multi N/C 3300 duo systems, can be retrofitted to existing basic units of multi N/C 2300 and multi N/C 3300
7) For double furnace / swab test module
8) Only DOC measurements
9) Sample dilution required

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Pictures: AdobeStock/Vasily Merkushev (p. 6), all other pictures: Analytik Jena GmbH+Co. KG
Subjects to changes in design and scope of delivery as well as further technical development!

Version 1.0 · en · 01/2024

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