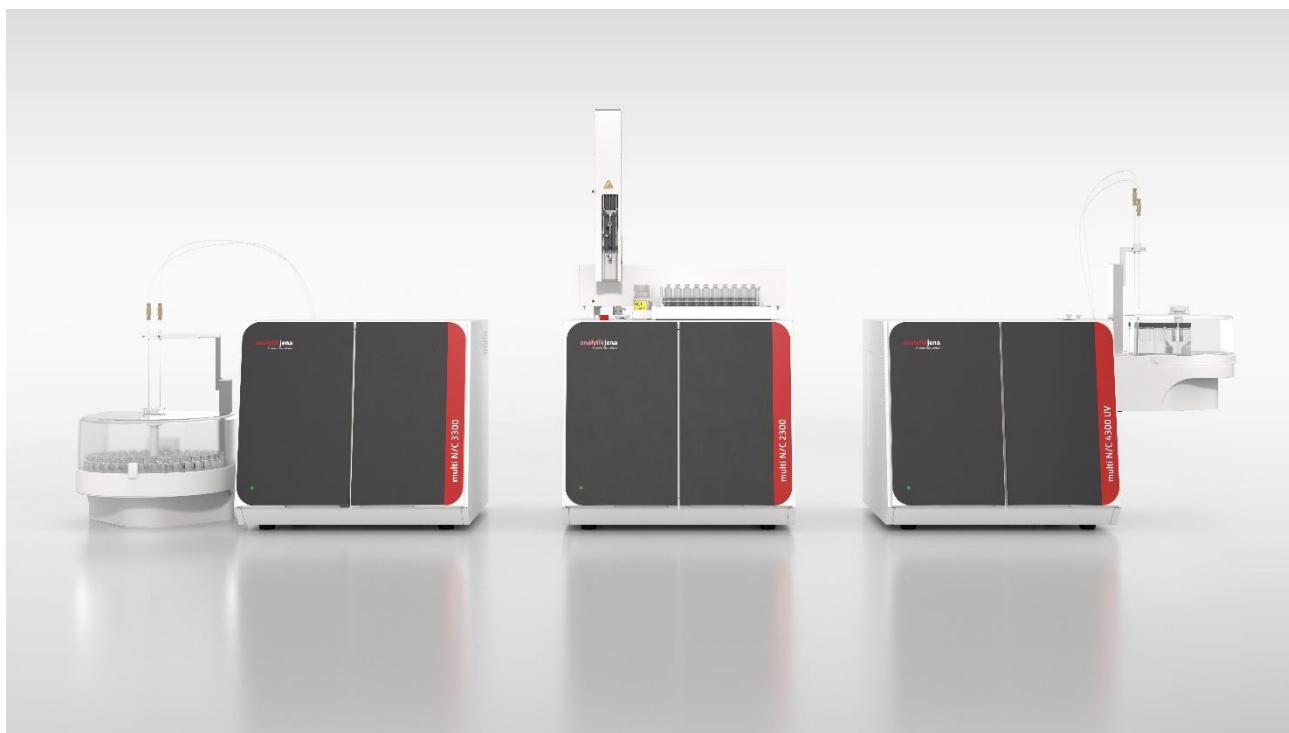


# multi N/C x300 series TOC/TN<sub>b</sub> Analyzers



## Technical Data

### multi N/C x300 series

#### General

- The multi N/C x300 series offers a range of TOC analyzers for the determination of the parameters TOC, DOC, NPOC, TC, TIC and POC in aqueous samples. Sample digestion in the multi N/C 2300 and multi N/C 3300 series devices is carried out using catalytic high-temperature combustion, while the multi N/C 4300 UV uses wet-chemical UV oxidation.
- The high-temperature combustion systems can be optionally upgraded for TN<sub>b</sub> determination in aqueous samples using chemiluminescence detection (CLD) or electrochemical detection (ChD).
- The multi N/C 4300 UV is a special C analyzer with wet-chemical UV digestion technology. N analysis is not possible here.
- For TIC, TC and TOC analysis in solids, the HT 1300 and the TIC solids manual module are available as add-on modules. For the multi N/C 2300, it is also possible to use the internal furnace of the basic device for the catalytic high-temperature oxidation of solid samples with the Double Furnace (DF) module (after appropriate system conversion).
- For the high-temperature combustion systems the following special models are available:
  - The multi N/C 2300 duo and multi N/C 3300 duo models enable fully automated TC/TOC solids measurement with robust catalyst-free sample oxidation in the ceramic combustion tube. These measuring systems always consist of a combination of a multi N/C basic unit and a HT 1300 solids furnace, equipped with both, a high throughput liquid autosampler and a solids autosampler.
  - The multi N/C 2300 N is a special N analyzer for total protein determination in aqueous samples and is equipped with a CLD detector and an AS 60 autosampler as standard. C analysis and a solids option are not available here.
  - The multi N/C 3300 HS is a high-temperature combustion system for largely particle-free samples in the drinking and ultrapure water sector (pharmaceuticals, power plants, semiconductor industry). With the swab test module, it offers a special option for direct swab combustion for TOC cleaning validation.

**Technical Data**  
**multi N/C x300 series**

**Standard Compliance**

	multi N/C 2300 N (N analyzer)	multi N/C 2300, multi N/C 2300 duo	multi N/C 3300, multi N/C 3300 duo	multi N/C 3300 HS	multi N/C 4300 UV (C analyzer)
TOC (liquid)	-	DIN EN ISO 20236   ISO 8245   DIN EN 1484			ISO 8245   DIN EN 1484
	-	ASTM G144   ASTM D7573			ASTM D4839
	-	US EPA 415   US EPA 9060			
	-	APHA 5310B			APHA 5310C
	-	-	USP <643>   USP <661.1>   USP <661.2>   Pharm. Eur. 2.2.44   JP 2.59		
TN <sub>b</sub> (liquid)	DIN EN ISO 20236   DIN EN 12260   ASTM D8083				-
	EP 2.5.33, 7B   USP <1057,7.2>   JP XVII, 7B				-
TC/TOC (solid) <sup>1)</sup>	-	ISO 10694   DIN EN 13137   DIN EN 15936		Swab-Test-Module only	ISO 10694   DIN EN 13137   DIN EN 15936

<sup>1)</sup> refers to HT 1300 furnace module (component of multi N/C 2300 duo and multi N/C 3300 duo) and double furnace module in combination with the multi N/C 2300 basic unit

**Control and Data Evaluation**

<b>Control</b>	PC
<b>Operation and data evaluation software</b>	multiWin pro with user management, back-up and export functions, e.g., for LIMS systems in CSV and PDF format
<b>21 CFR Part 11 Module</b>	The optional Pharma software module supports FDA 21 CFR Part 11 compliance for every device model of the multi N/C x300 series (including all requirements regarding data integrity, electronic signatures, audit trail and assignment of rights in user management)
<b>Software</b>	multiWin 4.X with user management, export function in .csv, .pdf and LIMS-system
<b>Minimum requirements PC</b>	<ul style="list-style-type: none"> <li>▪ Desktop PC or laptop</li> <li>▪ Operating system: Windows 10 (32-Bit or 64-Bit) or higher</li> <li>▪ Processor: 3.2 GHz</li> <li>▪ 4 GB RAM, 40 GB hard disk drive</li> <li>▪ Interfaces: USB 2.0 (1 x required for connection to basic unit)</li> <li>▪ Monitor: Graphic resolution 1024 × 768 pixels</li> </ul>

**Technical Data**  
**multi N/C x300 series**

**Overview**

	multi N/C 2300 N (N analyzer)	multi N/C 2300, multi N/C 2300 duo	multi N/C 3300, multi N/C 3300 duo	multi N/C 3300 HS	multi N/C 4300 UV (C analyzer)
Digestion mode	High temperature combustion up to 950 °C				UV digestion with oxidation reagent
Parameters	TN (CLD)	TC, TIC, TOC, DOC, NPOC, NPOCplus, POC			
Measurement range	0-200 mg/L N	0-30,000 mg/L C			0-10,000 mg/L C
Limit of Detection	5 µg/L N	50 µg/L C	4 µg/L C		1 µg/L C
Optional parameters	-	TN (ChD/CLD)	TN (ChD/CLD) POC direct	TN (CLD)	-
Reproducibility	CV 2-3%	CV 1-2%			
Measuring time	Approx. 3-5 min for each parameter				
Sample injection	Septum-free direct injection		Loop injection technique	Automatic flow injection	
Injection volume	10-500 µL variable		50-1,000 µL variable	50-3,000 µL variable	50-20,000 µL variable
Automatic dilution	-		Dilution factor 1:5 - 1:100	-	
Sampler options	AS 60		AS 10e, AS 21hp, AS vario, AS vario ER <sup>1)</sup> , EPA sampler		
Gas supply <sup>2)</sup>	Oxygen 4.5 or synthetic air <sup>3)</sup>				Nitrogen 5.0 or Argon 4.6
Gas consumption (8 h/d, 5 d/w)	Approx. 1,800 L/month		Approx. 2,200 L/ month	Approx. 1,400 L/ month	Approx. 1,600 L/month
Upgrade for solid samples <sup>4)</sup>	-	Double furnace HT 1300 TIC manual	HT 1300 TIC manual	Swab test module	HT 1300 TIC manual
TC/TOC solid automation	-	multi N/C duo devices for up to 48 solid samples			-

<sup>1)</sup> AS vario ER not available for multi N/C 3300 HS

<sup>2)</sup> For carrier gas quality requirements, see table "Solid Options", page 9

<sup>3)</sup> TOC grade purified air can be supplied from gas cylinders or after clean-up of pressurized air by a TOC gas generator. Purity specifications to be met: CO<sub>2</sub> < 1 ppm, hydrocarbons < 0.5 ppm (as CH<sub>4</sub>), supply pressure: min. 4 bar (72 psi), provided flow rate: min. 300 mL/min, recommendations for TOC gas generator models on request.

<sup>4)</sup> HT 1300 is already included with the multi N/C duo systems, Double furnace module is not available with multi N/C 2300 duo

**Technical Data**  
**multi N/C x300 series**

**TN options: ChD + CLD (liquid samples only)**

	<b>ChD</b>	<b>CLD</b>
Detection principle	Electrochemical solid-state detector	Chemiluminescence detector
Parameters	TN <sub>b</sub> (Total bound Nitrogen)	TN <sub>b</sub> (Total bound Nitrogen)
Measuring range	0 – 100 mg/L TN <sub>b</sub> , up to 10.000 mg/L TN <sub>b</sub> <sup>1)</sup>	0 – 200 mg/L TN <sub>b</sub> , up to 20.000 mg/L TN <sub>b</sub> <sup>1)</sup>
Limit of detection	50 µg/L TN <sub>b</sub>	5 µg/L TN <sub>b</sub>
Reproducibility	RSD 2–3%	RSD 2–3%
Analysis time	3–5 min	3–5 min
Ozone source gas	No	Synthetic air (recommended) or oxygen, 60 mL/min
Dimensions W × D × H	Built in (inside TOC analyzer)	Approx. 296 mm × 582 mm × 464 mm
Weight	Approx. 0.5 kg	Approx. 12,5 kg

<sup>1)</sup> With automatic dilution (multi N/C 3300 and multi N/C 3300 duo), with max. dilution ratio: 1: 100

**Autosampler AS 60 - Automation for multi N/C 2300 (component of multi N/C 2300 duo)**

	<b>No. of positions</b>	<b>Vials</b>	<b>Syringe size</b>
Standard rack	60	8 mL / 100 pc. + magnetic stir bars 60 pcs. incl.	500 µL incl.
Optional racks	112	2 mL / 200 pcs. + 200 septa/caps incl.	250 µL incl.
Automatic acidification / Reverse rinse	Yes		
Automatic purging (NPOC)	Yes		
Parallel purge and analyzing (NPOC)	No		
Automatic / intelligent dilution	No		
Intelligent inj. vol. reduction	Yes		
Sample homogenization	Yes		
Dimensions W × D × H	Approx. 500 mm × 380 mm × 500 mm		
Weight	Approx. 9 kg		

**Technical Data**  
**multi N/C x300 series**

**Autosampler AS vario / ER** (ER: external needle rinse function)

Automation for multi N/C 3300, multi N/C 3300 HS and multi N/C 4300 UV (AS vario ER is a component of multi N/C 3300 duo, not suitable for multi N/C 3300 HS)

	No. of positions	Vials
Optional racks	72 / ER <sup>1)</sup>	40 mL / 100 pcs. + magnetic stir bars 100 pcs. incl.
(no default rack included)	100 / ER <sup>1)</sup>	20 mL / 100 pcs. + magnetic stir bars 100 pcs. incl.
	146 / ER <sup>1)</sup>	12 mL / 156 pcs. + magnetic stir bars 150 pcs. incl.
	52 <sup>2)</sup>	100 mL / 100 pcs. incl.
	20 <sup>2)</sup>	100 mL (Schott bottles) / 20 pcs. incl.
Automatic acidification / Reverse rinse <sup>3)</sup>	Yes <sup>4)</sup>	
Automatic purging (NPOC)	Yes	
Parallel purge and analyzing (NPOC)	Yes <sup>5)</sup>	
Automatic / intelligent dilution	Yes <sup>6)</sup>	
Intelligent inj. vol. reduction	Yes <sup>6)</sup>	
Sample homogenization	Yes	
Dimensions W × D × H	Approx. 350 mm × 400 mm × 470 mm	
Weight	Approx. 15 kg	

<sup>1)</sup> for particle containing samples

<sup>2)</sup> for pure water samples (particle-free)

<sup>3)</sup> additional external needle rinse with AS vario ER

<sup>4)</sup> not available with multi N/C 3300 HS

<sup>5)</sup> not available for rack with 20 positions

<sup>6)</sup> only available with multi N/C 3300 / 3100 and multiWin pro software

**Technical Data**  
**multi N/C x300 series**

**Autosampler AS 21hp** - Automation for multi N/C 3300, multi N/C 3300 HS and multi N/C 4300 UV

	No. of positions	Vials
Standard rack included	21	50 mL / 21 pcs. + magnetic stir bars 21 pcs. incl. (supports automatic & intelligent dilution with multi N/C 3300; 10 pos. for original sample, 10 pos. for dilution)
Automatic acidification / Reverse rinse	No	
Automatic purging (NPOC)	Yes	
Parallel purging and analyzing (NPOC)	Yes	
Sample homogenization	Yes	
Automatic / intelligent dilution	Yes <sup>1)</sup>	
Intelligent inj. vol. reduction	Yes <sup>1)</sup>	
Dimensions W × D × H	Approx. 260 mm x 320 mm x 390 mm	
Weight	Approx. 4.5 kg	

<sup>1)</sup> only available with multi N/C 3300 / 3100 and multiWin pro software

**Autosampler AS 10e** - Automation for multi N/C 3300, multi N/C 3300 HS and multi N/C 4300 UV

	No. of positions	Vials
Standard rack	10	50 mL / 10 pcs.
Optional racks	21	50 mL / 21 pcs. (for automatic & intelligent dilution with multi N/C 3300; 10 pos. for original sample, 10 pos. for dilution)
Automatic acidification / Reverse rinse	No	
Automatic purging (NPOC)	Yes	
Parallel purging and analyzing (NPOC)	No	
Sample homogenization	No	
Automatic / intelligent dilution	Yes <sup>1)</sup>	
Intelligent inj. vol. reduction	Yes <sup>2)</sup>	
Dimensions W × D × H	Approx. 260 mm x 320 mm x 390 mm	
Weight	Approx. 4.5 kg	

<sup>1)</sup> only available with 21 pos. dilution rack, multi N/C 3300 / 3100 and multiWin pro software

<sup>2)</sup> only available with multi N/C 3300 / 3100 and multiWin pro software

**Technical Data**  
**multi N/C x300 series**

**EPA Sampler** - with "piercing function", for sampling from polymer septum-capped vials

Automation for multi N/C 3300, multi N/C 3300 HS and multi N/C 4300 UV

	No. of positions	Vials
Standard rack	64	40 mL / 100 pcs. + 100 septa / caps + magnetic stir bars 70 pcs. incl.
Automatic acidification / Reverse rinse <sup>1)</sup>	Yes	
Automatic purging (NPOC)	Yes	
Parallel purging and analyzing (NPOC)	Yes	
Automatic / intelligent dilution	No	
Intelligent inj. vol. reduction	Yes <sup>2)</sup>	
Sample homogenization	Yes	
Dimensions W × D × H	Approx. 500 mm × 540 mm × 550 mm	
Weight	Approx. 15 kg	

<sup>1)</sup> not available with multi N/C 3300 HS

<sup>2)</sup> only available with multi N/C 3300 / 3100 and multiWin pro software

**FPG 48** - solid autosampler for multi N/C 2300 duo and multi N/C 3300 duo systems

Sample positions	48 ceramic boats, 50 pcs. incl.
Max. sample mass	Up to 3 g
Boat sensor	Yes
Dimension W × D × H	500 mm × 550 mm × 460 mm
Weight	Approx. 20 kg



**Technical Data**  
**multi N/C x300 series**

**Solid Options**

Double Furnace Solid Module / Swab Test Module, HT 1300 Furnace and TIC Module for C determination only

	<b>Double Furnace Solid Module (DF) / Swab Test Module</b>	<b>HT 1300 Furnace (component of multi N/C duo systems)</b>	<b>TIC Module (manual)</b>
Available for the following basic units	multi N/C 2300 und multi N/C 3300 HS	multi N/C 2300, multi N/C 3300 und multi N/C 4300 UV	
Method	Catalytic high temperature combustion	High temperature combustion, catalyst-free	Acid digestion
Max. furnace temperature	950 °C	1300 °C	Up to 80°C
Type of combustion tube	Quartz glass	Al <sub>2</sub> O <sub>3</sub> ceramic	-
Parameters	TC, TOC (after acidification)	TC, TOC (after acidification)	TIC
Measuring range	0 – 100 % C at 0.1 g sample or 100 mg C absolute	0 – 100 % C at 0.5 g sample or 500 mg C absolute	0 - 500 mg C absolute
Detection limits	0.5 µg C abs., equivalent to 1 mg/kg at max. sample weight	30 µg C abs., equivalent to 10 mg/kg at max. sample weight	30 µg C
Sample amount	Up to 0.5 g	Up to 3 g	Up to 3 g
Analysis time	3 – 5 min	2 – 3 min	3 – 10 min
Carrier gas	Oxygen 99.5% at 24 L/h	Oxygen 99.5% at 120 L/h	Oxygen 99,5% / synth. air at 16 L/h
Dimensions W × D × H	Approx. 300 mm × 80 mm × 80 mm	Approx. 510 mm × 550 mm × 470 mm	Approx. 300 mm × 550 mm × 470 mm
Weight	Approx. 3 kg	Approx. 22 kg	Approx. 10 kg

## Technical Data

### multi N/C x300 series

#### Physical Data (Basis Unit)

Dimensions	<ul style="list-style-type: none"> <li>▪ multi N/C<sup>1)</sup>: 513 × 547 × 464 mm (W × D × H)</li> <li>▪ multi N/C 2300 duo: 1865 × 650 × 970 mm (W × D × H)</li> <li>▪ multi N/C 3300 duo: 2215 × 650 × 464 mm (W × D × H)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>▪ multi N/C: Approx. 21 kg</li> <li>▪ multi N/C 2300 duo: Approx. 86 kg</li> <li>▪ multi N/C 3300 duo: Approx. 76 kg</li> </ul>
Installation Requirements	<ul style="list-style-type: none"> <li>▪ Ambient temperature: 10 – 35 °C</li> <li>▪ Relative humidity: 5 – 90%</li> <li>▪ Air pressure: 0.7 – 1.06 bar</li> </ul>
Power requirements	<p>multi N/C 2300, multi N/C 2300 duo, multi N/C 3300, multi N/C 3300 duo and multi N/C 3300 HS:</p> <ul style="list-style-type: none"> <li>▪ 115/230 V AC; 50/60 Hz; T6.3 A H; typical power consumption: 400 VA, max.: 500 VA</li> </ul> <p>multi N/C 4300 UV:</p> <ul style="list-style-type: none"> <li>▪ 100-240 V AC, 50/60 Hz; T4.0 A H; typical power consumption: 150 VA, max.: 200 VA</li> </ul> <p>HT 1300 solids module (an integral component of multi N/C 2300 duo and multi N/C 3300 duo):</p> <ul style="list-style-type: none"> <li>▪ 230 V AC; 50/60 Hz; T10 A H; typical power consumption: 700 VA, max.: 1000 VA</li> </ul>

<sup>1)</sup> multi N/C 2300, multi N/C 3300 and multi N/C 4300 UV

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