

# multi N/C pharma Series TOC/TN<sub>b</sub> Analyzers



## Technical Data

### multi N/C pharma series

#### General

- The multi N/C pharma series offers a range of TOC analyzers (multi N/C pharma UV, multi N/C pharma HT and multi N/C 3100 pharma) for the determination of the parameters TOC, NPOC, TC and TIC in aqueous samples
- The combustion-based systems can optionally be upgraded for TN<sub>b</sub> determination by chemiluminescence determination (CLD), multi N/C 3100 pharma can be upgraded for direct POC measurement.
- The multi N/C 2100S pharma is a dedicated TN analyzer for total protein determination and equipped with a CLD detector and AS 60 autosampler by default.

#### Standard compliance

| Parameter       | multi N/C pharma UV  | multi N/C pharma HT   | multi N/C 3100 pharma | multi N/C 2100 S pharma |
|-----------------|--|---|-----------------------|-------------------------|
| TOC             | USP <643>, USP <661.1>, USP <661.2>, Pharm. Eur. 2.2.44, JP 2.59 |   |                       | -                       |
| TN <sub>b</sub> | -  | Total Protein Assay: Pharm. Eur. 2.5.33, 7B, USP <1047,7.2>, JP XVII, Method 7B |                       |                         |

#### Control and data evaluation

|                     |   |
|---------------------|---|
| <b>Software</b>     | multiWin 4.X with 21 CRF Part 11 compliance, export function in .csv, .pdf or LIMS-system   |
| <b>Requirements</b> | <ul style="list-style-type: none"> <li>▪ Operating system: PC - Windows 7 (32-Bit or 64-Bit) or higher, Processor 3.2 GHz or higher, min. 4 GB RAM, min 40 GB hard disk drive, CD-ROM drive, Interfaces: USB 2.0 (min. 1 for connection to BU)</li> <li>▪ PC: Graphic resolution 1024 x 768 pixels or higher</li> </ul> |

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**Models**

|                                | multi N/C pharma UV  | multi N/C pharma HT   | multi N/C 3100 pharma                     | multi N/C 2100 S pharma      |
|--------------------------------|--|-----------------------|---|------------------------------|
| Digestion mode                 | UV/ Wet chemical oxidation<br>(254 nm+185 nm) / persulfate         |                       | High temperature combustion up to 950 °C  |                              |
| Parameters                     | TC, TIC, TOC, NPOC, NPOCplus, POC                                  |                       |   | TN (CLD)                     |
| Optional parameters            | -  | TN                    | TN  | -                            |
| Measurement range              | 0–10,000 mg/L C  | 0–30,000 mg/L C       |   | 0–200 mg/L N                 |
| Limit of Detection             | 1 µg/L C   | 4 µg/L C/<br>5 µg/L N | 4 µg/L C/<br>5 µg/L N                     | 5 µg/L N                     |
| Reproducibility <sup>1)</sup>  | CV 1–2%  |                       |   |                              |
| Measuring time                 | Approx. 3–5 min for each parameter                                 |                       |   |                              |
| Sample injection               | Automatic flow injection   |                       |   | Septum-free direct injection |
| Injection volume               | 50–20,000 µL variable  | 50–3,000 µL variable  | 100–1,000 µL variable                     | 50–500 µL variable           |
| Automatic leak check (SCS)     | yes  |                       |   |                              |
| Gas quality requirements       | Nitrogen 5.0 or argon 4.6  |                       | Oxygen 4.5 or synthetic air <sup>2)</sup> |                              |
| Gas consumption (8 h/d, 5 d/w) | Approx. 1,600 L/month  | Approx. 1,400 L/month | Approx. 2,200 L/month                     | Approx. 1,800 L/month        |
| Swab-Test Module               | -  | X                     | -   | -                            |
| Sampler options                | AS 10e, AS 21hp, AS vario, AS vario ER <sup>3)</sup> , EPA Sampler |                       |   | AS 60                        |

<sup>1)</sup> CV = coefficient of variation, equivalent to RSD (relative standard deviation)

<sup>2)</sup> 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. 5 bar (72 psi), provided flow rate: min. 300 mL/min, recommendations for TOC gas generator models on request.

<sup>3)</sup> Not for multi N/C pharma HT

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**Accessories**

**Autosampler AS 60** with multi N/C 2100S pharma

|                       | No. of positions                 | Vial size                                      | Syringe size |
|-----------------------|----------------------------------|--|--------------|
| Standard rack         | 60                               | 8 mL/100 pc. + magnetic stir bars 60 pc. incl. | 500 µL incl. |
| Additional rack       | 112                              | 1.8 mL/200 pc. + 200 septa/caps incl.          | 250 µL incl. |
| Sample homogenization | Yes                              |  |              |
| Dimensions W x H x D  | Approx. 500 mm x 500 mm x 380 mm |  |              |
| Weight                | Approx. 9 kg                     |  |              |

**Autosampler AS 10e**

|   | No. of positions                 | Vial size    |
|---|----------------------------------|--------------|
| Standard rack                           | 10                               | 50 mL/10 pc. |
| Optional racks                          | No                               |              |
| Automatic Acidification / Reverse Rinse | No                               |              |
| Automatic purging                       | Yes                              |              |
| Parallel purging and analyzing          | No                               |              |
| Sample homogenization                   | No                               |              |
| Dimensions W x H x D                    | Approx. 250 mm x 350 mm x 310 mm |              |
| Weight                                  | Approx. 4.5 kg                   |              |

**Autosampler AS 21hp**

|   | No. of positions                 | Vial size                                      |
|---|----------------------------------|--|
| Standard rack                           | 21                               | 50 mL/21 pc. + magnetic stir bars 21 pc. incl. |
| Optional racks                          | No                               |  |
| Automatic Acidification / Reverse Rinse | No                               |  |
| Automatic purging                       | Yes                              |  |
| Parallel purging and analyzing          | Yes                              |  |
| Sample homogenization                   | Yes                              |  |
| Dimensions W x H x D                    | Approx. 250 mm x 350 mm x 310 mm |  |
| Weight                                  | Approx. 4.5 kg                   |  |

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

Automation for multi N/C pharma HT, pharma UV and 3100 pharma (ER function only in combination with multi N/C 3100 pharma and multi N/C pharma UV)

|                                   | No. of positions                 | Vial size  |
|-----------------------------------|----------------------------------|--|
| Standard rack                     | No                               |  |
| Optional racks                    | 72/ER                            | 40 mL/100 pc. + magnetic stir bars/100 pc. incl. |
|                                   | 100/ER                           | 20 mL/100 pc. + magnetic stir bars/100 pc. incl. |
|                                   | 52                               | 100 mL /100 pc. incl.                            |
|                                   | 20                               | 100 mL (Schott bottles)/20 pc. incl.             |
| Automatic acidification           | Yes <sup>1)</sup>                |  |
| Automatic purging / Reverse rinse | Yes <sup>2)</sup>                |  |
| Parallel purge and analyzing      | Yes <sup>3)</sup>                |  |
| Sample homogenization             | Yes                              |  |
| Dimensions W x H x D              | Approx. 350 mm x 400 mm x 470 mm |  |
| Weight                            | Approx. 15 kg                    |  |

<sup>1)</sup> not for multi N/C pharma HT

<sup>2)</sup> reverse rinse not for multi N/C pharma HT

<sup>3)</sup> not available for rack with 20 positions

### EPA sampler with “piercing function”– for sampling from septum-capped vials

|   | No. of positions                 | Vial size   |
|---|----------------------------------|---|
| Standard rack                           | 64                               | 40 mL/100 pc. + 100 septa/caps + magnetic stir bars<br>70 pc. incl. |
| Optional racks <sup>1)</sup>            | 61                               | 40 mL/5 pc. + septa/caps 5 pc. incl.                                |
| Automatic Acidification / Reverse rinse | Yes <sup>2)</sup>                |   |
| Automatic purging                       | Yes                              |   |
| Parallel purging and analyzing          | Yes                              |   |
| Sample homogenization                   | Yes                              |   |
| Dimensions W x H x D                    | Approx. 500 mm x 550 mm x 540 mm |   |
| Weight                                  | Approx. 15 kg                    |   |

<sup>1)</sup> included in the POC automatic module only available for multi N/C 3100 pharma

<sup>2)</sup> not for multi N/C pharma HT

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### TN option: CLD

|                               | CLD   |
|-------------------------------|---|
| Detection principle           | Chemiluminescence detector                          |
| Parameters                    | TN <sub>b</sub> (Total bound Nitrogen)              |
| Measuring range               | 0–200 mg/L TN <sub>b</sub> ,                        |
| Limit of detection            | 0.005 mg/L TN <sub>b</sub>                          |
| Reproducibility <sup>1)</sup> | CV 2–3%   |
| Analysis time                 | 3–5 min   |
| Ozone source gas              | Synthetic air (recommended) or oxygen,<br>60 mL/min |
| Dimensions                    | Approx. 300 mm x 460 mm x 550 mm                    |
| Weight                        | Approx. 12.5 kg                                     |

<sup>1)</sup> CV = coefficient of variation, equivalent to RSD (relative standard deviation)

### Solid TOC options: Swab test module (C determination only)

|                          | Swab Test Module  |
|--------------------------|---|
| Method                   | Catalytic high temperature combustion                         |
| Max. furnace temperature | 950 °C  |
| Type of combustion tube  | Quartz  |
| Parameters               | TC, TOC (after acidification)                                 |
| Measuring range          | 0–100 mg C absolute   |
| Detection limits         | 0.5 µg C abs., equivalent to 1 mg/kg at<br>max. sample weight |
| Sample amount            | Up to 0.5 g   |
| Analysis time            | 3–5 min   |
| Carrier gas              | Oxygen 4.5 (opt. synth. air) at 24 L/h                        |
| Dimensions               | Approx. 300 mm x 80 mm x 80 mm                                |
| Weight                   | Approx. 3 kg  |

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**Physical data (Basic unit)**

|                                  |   |
|----------------------------------|---|
| <b>Dimensions (BU)</b>           | 513 mm x 464 x 550 mm (W x D x H)   |
| <b>Weight (BU)</b>               | ca. 30 kg   |
| <b>Installation Requirements</b> | Ambient temperature: 10–35 °C<br>Relative humidity: 5–90%<br>Air pressure: 0.7–1.06 bar   |
| <b>Power requirements</b>        | <ul style="list-style-type: none"> <li>▪ multi N/C 2100S pharma, multi N/C 3100 pharma, multi N/C pharma HT:<br/>115/230 V AC; 50/60 Hz; T6.3 A H; typical power consumption: 400 VA, max.: 500 VA</li> <li>▪ multi N/C pharma UV:<br/>100–240 V AC, 50/60 Hz; T4.0 A H; typical power consumption: 150 VA, max.: 200 VA</li> </ul> |

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