

# MACHEREY-NAGEL NANOCOLOR®



## The system for photometric water analysis

- Expertise
- Continuity
- Passion

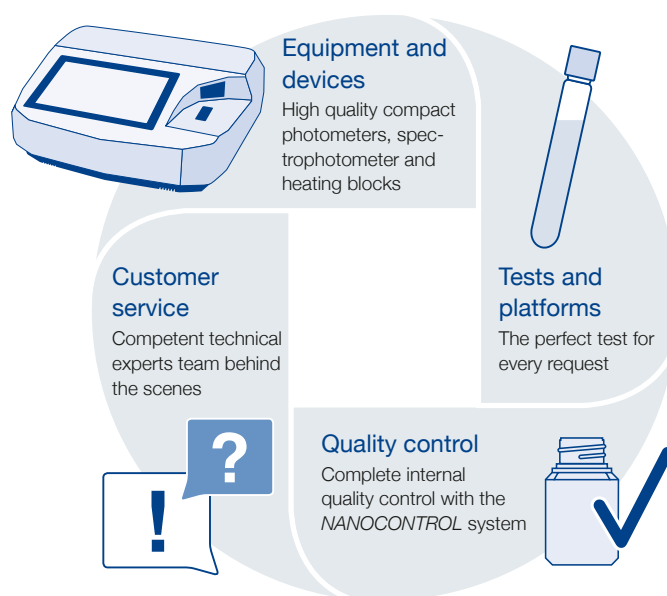
Water Analysis

# NANOCOLOR® analysis system

## 40 years of expertise, continuity and passion for our customers

For over 40 years MACHEREY-NAGEL has been developing solutions in the field of photometry. Continuous equipment and software development, extraordinary close customer relations and passion for our work allow us to offer you the NANOCOLOR® system with high reliability and quality.

- ISO-certified production in Germany ensuring highest quality "Made in Germany"
- Consistent quality from batch to batch – no LOT-specific updates required
- MSDS, user manuals and LOT-specific certificates
- Intensive Research and Development in the field of water analysis to meet future demands and requirements
- One-on-One service through our trained distributors on site and our Customer Service Center in Dueren, Germany



NANOCOLOR® 25



NANOCOLOR® CSB/COD



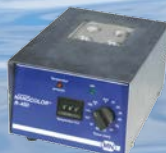
NANOCOLOR® 50 D



NANOCOLOR® 100 D



NANOCOLOR® 200 D



NANOCOLOR® R 450



NANOCOLOR® 300 D



NANOCOLOR® VARIO 1



NANOCOLOR® 500 D



NANOCOLOR® PF-12



NANOCOLOR® VIS



NANOCOLOR® VARIO 4

### 16 mm test tubes in convenient packaging for safe and easy handling

NANOCOLOR® reagents impress by easy handling and are suited for routine analysis, self-monitoring and process control. 16 mm round tubes with pre-dosed reagents guarantee a maximum safety for the user.

- Rugged boxes with perfect light protection
- Clever packages suitable to serve as a test tube holder
- Color coded labels with all important information
- Colored pictograms on package lid for perfect test execution
- Convenient and safe removal of test tubes
- Describable top-label enabling an explicit allocation of test tubes
- Wide test tube openings for easy handling and safe pipetting





## The perfect COD test for each and every user

For one of the most important parameters for determination of industrial and municipal waste water MACHEREY-NAGEL offers you even 12 different tests and measurement ranges. At the same time our COD tests allow safe handling without any risk from outgoing dichromate and mercury gases. Even after the REACH restrictions in the year 2017, our customers can continue using our NANOCOLOR® COD cuvette tests without limitation.

- 12 measurement ranges for all requirements and demands
- Reaction base according to ISO 6060
- 7 COD tests compliant with ISO 15705
- No zero measurement required
- Audited and certified: no mercury exposure for users
- Mercury-free COD tests available for inflow and outflow measurements

**MACHEREY-NAGEL**

**Certificate**

**ISO conformity of NANOCOLOR® tube tests**

|              |             |
|--------------|-------------|
| COD 40       | REF 985 027 |
| COD 60       | REF 985 022 |
| COD LR 150*  | REF 985 036 |
| COD 160      | REF 985 026 |
| COD 600      | REF 985 030 |
| COD 1500     | REF 985 029 |
| COD HR 1500* | REF 985 038 |

Hereby we confirm, that the above mentioned tube tests from MACHEREY-NAGEL correspond in all points with the

**ISO 15705**

\*"Water quality - Determination of the chemical oxygen demand index (ST-COD) - Small-scale sealed tube method".

|                                                  |                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reagents</b>                                  | <b>MACHEREY-NAGEL</b>                                                                                                                                                                                                                                                                     | <b>ISO 15705</b>                                                                                                                                                                                                                                                                                                  |
|                                                  | Sulfuric acid                                                                                                                                                                                                                                                                             | Sulfuric acid                                                                                                                                                                                                                                                                                                     |
|                                                  | Potassium dichromate                                                                                                                                                                                                                                                                      | Potassium dichromate                                                                                                                                                                                                                                                                                              |
|                                                  | Silver sulfate                                                                                                                                                                                                                                                                            | Silver sulfate                                                                                                                                                                                                                                                                                                    |
|                                                  | Mercury sulfate                                                                                                                                                                                                                                                                           | Mercury sulfate                                                                                                                                                                                                                                                                                                   |
| <b>Sample volume</b>                             | 2.00 mL                                                                                                                                                                                                                                                                                   | 2.00 ± 0.02 mL                                                                                                                                                                                                                                                                                                    |
| <b>Digestion</b>                                 | Temperature: 148 °C<br>Time: 2 h                                                                                                                                                                                                                                                          | Temperature: 150 ± 5 °C<br>Time: 2 h ± 10 min                                                                                                                                                                                                                                                                     |
| <b>Wavelengths for photometric determination</b> | 2 - 40 mg/L O <sub>2</sub> : 345 nm<br>5 - 80 mg/L O <sub>2</sub> : 345 nm<br>3 - 150 mg/L O <sub>2</sub> : 436 nm<br>15 - 160 mg/L O <sub>2</sub> : 436 nm<br>50 - 600 mg/L O <sub>2</sub> : 600 nm<br>100 - 1500 mg/L O <sub>2</sub> : 600 nm<br>20 - 1500 mg/L O <sub>2</sub> : 600 nm | to 50 mg/L O <sub>2</sub> : 345 ± 15 nm<br>to 50 mg/L O <sub>2</sub> : 345 ± 15 nm<br>to 150 mg/L O <sub>2</sub> : 440 ± 20 nm<br>to 150 mg/L O <sub>2</sub> : 440 ± 20 nm<br>to 1000 mg/L O <sub>2</sub> : 600 ± 20 nm<br>to 1000 mg/L O <sub>2</sub> : 600 ± 20 nm<br>to 1000 mg/L O <sub>2</sub> : 600 ± 20 nm |

MACHEREY-NAGEL GmbH & Co. KG  
Düren, 19.08.2014

  
I. A. Dr. Reinhardt, Head of QC

## ISO conformity of NANOCOLOR® tube tests

|              |             |
|--------------|-------------|
| COD 40       | REF 985 027 |
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| COD 600      | REF 985 030 |
| COD 1500     | REF 985 029 |
| COD HR 1500* | REF 985 038 |



# NANOCOLOR® analysis system

## Time-saving and reliable analysis of total nitrogen

The proven NANOCOLOR® total nitrogen tests are perfectly suited for the reliable determination of total nitrogen in waste water. Beside reproducible results they offer you a very simple and fast handling.

- One single test tube for each digestion
- No contamination since digestion tubes are never used twice
- No cleaning of digestion tubes required
- Less testing steps through prefilled digestion reagents
- Safe results through sufficiently large sample-volumes



## NANOCOLOR® analysis system

### Smart photometry

#### The new Spectrophotometers NANOCOLOR® UV/VIS II and VIS II

MACHEREY-NAGEL is revolutionizing your daily laboratory work with the new spectrophotometers NANOCOLOR® UV/VIS II and NANOCOLOR® VIS II and combines a superior quality, high-tech electronic device with an outstanding usability. Operate this innovative photometer like your smartphone or tablet and enjoy the intuitive, icon-based operation every day in a new way. Due to the clearly arranged and high-resolution touch screen display, the daily measurement routine will become a pleasure.

- Revolutionary user experience by 10 inch HD touch screen display
- Intuitive and completely icon-based menu guidance
- Integrated turbidity control (NTU-Check) and CIE-conform color measurements
- Completely inbuilt equipment monitoring functions and printing of certificates
- Integrated lamp test and stray light according to Ph.Eur.
- Wavelength-correctness test with integrated Holmium oxide filter





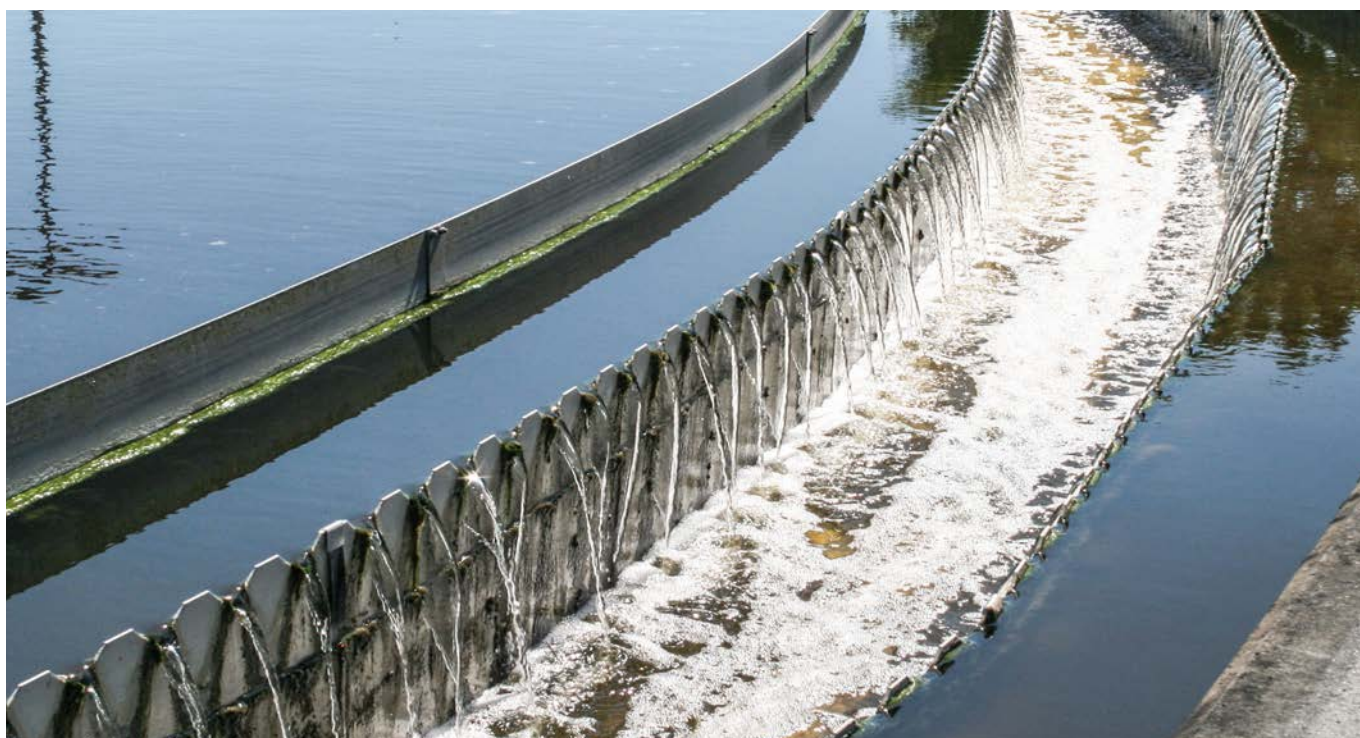
## Automatic turbidity check for tube tests

Despite careful working procedures and constant quality control, turbidity is often underestimated as a source of error in photometric water analysis which can lead to significant deviations in measuring values up to 30 %. To increase result safety for users, MACHEREY-NAGEL has integrated a unique turbidity control function (NTU-Check) for tube tests into our spectrophotometers.

- Innovative and unique solution for turbidity problems, warns in case of potential interferences
- Elimination of a frequently underestimated source of errors in the field of photometry
- Turbidity displayed directly in NTU according to EN ISO 7027
- Maximum measurement accuracy
- Outstanding results in COD analysis
- Complete documentation through parallel storage of measurements and NTU values
- Convenient turbidity calibration with *NANOCONTROL* NANOTURB



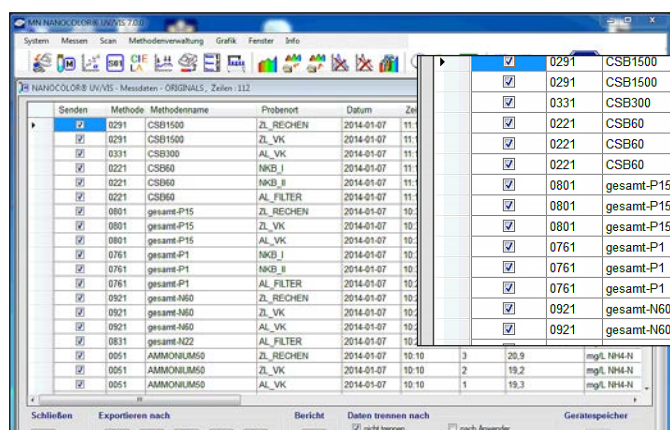
2 tubes (A / B) with the same COD concentration



## Convenient data export to LIMS and other standard PC-programs

In modern laboratories dealing with water and waste water analysis, the combination of the different data sets and test results is getting more and more important. Using the free of charge NANOCOLOR® PC software, the data from NANOCOLOR® spectrophotometers can be elegantly integrated into various laboratory information systems. This is going to be easier and even more efficient employing novel photometer updates.

- Free of charge PC Software with numerous additional features
- Easy data transfer to Microsoft® Excel
- Automated compilation of original files for tamper-proof data storage in accordance with FDA 21 CFR Part 11
- Connection to laboratory information systems (LIS) using tailor-made data configuration tools
- Efficient documentation of measurement results
- Fast and easy data management according to GLP



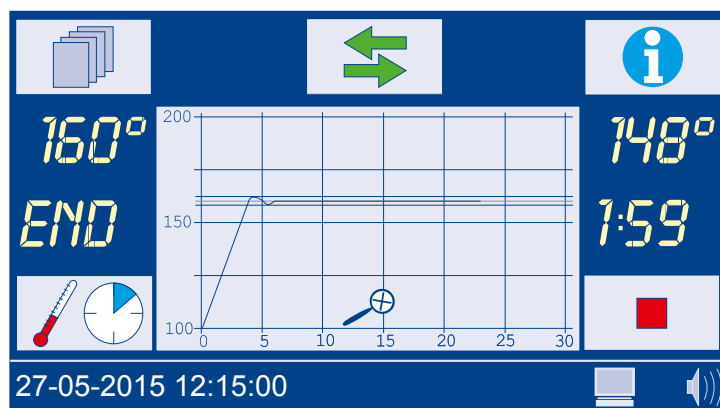
| Senden | Methode    | Methodenname | Probenort  | Datum | Zeit |
|--------|------------|--------------|------------|-------|------|
| 0291   | CSB1500    | ZL_RECHEN    | 2014-01-07 | 11:14 | 2    |
| 0291   | CSB1500    | ZL_VK        | 2014-01-07 | 11:14 | 1    |
| 0331   | CSB300     | AL_VK        | 2014-01-07 | 11:13 | 1    |
| 0221   | CSB60      | NKB_I        | 2014-01-07 | 11:13 | 3    |
| 0221   | CSB60      | NKB_II       | 2014-01-07 | 11:13 | 2    |
| 0221   | CSB60      | AL_FILTER    | 2014-01-07 | 11:12 | 1    |
| 0801   | gesamt-P15 | ZL_RECHEN    | 2014-01-07 | 10:31 | 3    |
| 0801   | gesamt-P15 | ZL_VK        | 2014-01-07 | 10:30 | 2    |
| 0801   | gesamt-P15 | AL_VK        | 2014-01-07 | 10:30 | 1    |
| 0761   | gesamt-P1  | NKB_I        | 2014-01-07 | 10:30 | 3    |
| 0761   | gesamt-P1  | NKB_II       | 2014-01-07 | 10:30 | 2    |
| 0761   | gesamt-P1  | AL_FILTER    | 2014-01-07 | 10:29 | 1    |
| 0921   | gesamt-N60 | ZL_RECHEN    | 2014-01-07 | 10:28 | 3    |
| 0921   | gesamt-N60 | ZL_VK        | 2014-01-07 | 10:28 | 2    |



## Future-proof heating blocks for reliable sample digestion

The NANOCOLOR® heating blocks enable a fast and safe performance of all required digestions. The preprogrammed standard parameter for all routine digestions, e.g. for COD, TOC, total nitrogen, total phosphate and metals help avoid errors.

- 2 separate heating units for parallel rapid digestion of COD, total nitrogen and total phosphate
- Touch screen with intuitive menu navigation for easy handling
- Lockable protective lids and safety covers for maximum protection
- USB interface for future-proof PC connection
- Graphical monitoring of heating curves
- Extremely short heating times translate into time savings for the user
- High temperature stability for consistent digestion conditions
- Easily replaceable spare parts



## NANOCOLOR® T-Set

### Automatic heating block control and calibration

The unique NANOCOLOR® T-Set is an electronic temperature sensor for temperature control and fully automatic calibration of the heating blocks.

- Calibrated temperature sensors made to monitor digestion temperatures
- Easy monitoring of temperature stability through external recordings of heating curves
- NANOCOLOR® T-Set also suitable as a universal thermometer for external temperature measurements
- Convenient data transfer via USB interface
- GLP conform documentation with automatically generated inspection reports

| MACHERY-NAGEL                                                                                                                                                                                                                                                                          |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----|-----|-----|-----|-----|----|----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|-------|-------|-------|-------|------|------|---|-------|---|---|---|
| Zertifikat/Certificate                                                                                                                                                                                                                                                                 |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| VARIO compact / compact 2 / HC – Testdaten / test data                                                                                                                                                                                                                                 |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Gerätesnummer / serial number:                                                                                                                                                                                                                                                         | NVC20071                               |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Software Version / software version:                                                                                                                                                                                                                                                   | 3.011810                               |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Hersteller Kalibration / factory calibration                                                                                                                                                                                                                                           |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Steigung / slope [°C/°C]:                                                                                                                                                                                                                                                              | 1.0055                                 |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Achsenabschnitt / intercept [°C]:                                                                                                                                                                                                                                                      | -2.5925                                |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Anwender test / user test [°C]                                                                                                                                                                                                                                                         |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| <table border="1"><thead><tr><th>Soll-Temperatur<br/>Nominal temperature</th></tr></thead><tbody><tr><td>70</td></tr><tr><td>100</td></tr><tr><td>120</td></tr><tr><td>148</td></tr><tr><td>160</td></tr><tr><td>40</td></tr><tr><td>78</td></tr><tr><td>157</td></tr></tbody></table> | Soll-Temperatur<br>Nominal temperature | 70 | 100 | 120 | 148 | 160 | 40 | 78 | 157 | <table border="1"><thead><tr><th>Ist-Temperatur<br/>Actual temperature</th></tr></thead><tbody><tr><td>70.4</td></tr><tr><td>100.7</td></tr><tr><td>120.9</td></tr><tr><td>148.8</td></tr><tr><td>160.6</td></tr><tr><td>39.7</td></tr><tr><td>78.5</td></tr><tr><td>-</td></tr><tr><td>157.6</td></tr><tr><td>-</td></tr><tr><td>-</td></tr><tr><td>-</td></tr></tbody></table> | Ist-Temperatur<br>Actual temperature | 70.4 | 100.7 | 120.9 | 148.8 | 160.6 | 39.7 | 78.5 | - | 157.6 | - | - | - |
| Soll-Temperatur<br>Nominal temperature                                                                                                                                                                                                                                                 |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 70                                                                                                                                                                                                                                                                                     |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 100                                                                                                                                                                                                                                                                                    |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 120                                                                                                                                                                                                                                                                                    |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 148                                                                                                                                                                                                                                                                                    |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 160                                                                                                                                                                                                                                                                                    |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 40                                                                                                                                                                                                                                                                                     |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 78                                                                                                                                                                                                                                                                                     |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 157                                                                                                                                                                                                                                                                                    |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Ist-Temperatur<br>Actual temperature                                                                                                                                                                                                                                                   |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 70.4                                                                                                                                                                                                                                                                                   |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 100.7                                                                                                                                                                                                                                                                                  |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 120.9                                                                                                                                                                                                                                                                                  |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 148.8                                                                                                                                                                                                                                                                                  |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 160.6                                                                                                                                                                                                                                                                                  |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 39.7                                                                                                                                                                                                                                                                                   |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 78.5                                                                                                                                                                                                                                                                                   |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| -                                                                                                                                                                                                                                                                                      |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| 157.6                                                                                                                                                                                                                                                                                  |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| -                                                                                                                                                                                                                                                                                      |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| -                                                                                                                                                                                                                                                                                      |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| -                                                                                                                                                                                                                                                                                      |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Testdatum / date of test: 23.09.2014                                                                                                                                                                                                                                                   |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| T-Set Daten / data of T-Set:                                                                                                                                                                                                                                                           |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Kalibrationsdatum / date of calibration:                                                                                                                                                                                                                                               | 23.09.2014                             |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| T-Set Nummer / T-Set number:                                                                                                                                                                                                                                                           | NT1001                                 |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Zertifikatsnummer / certificate number:                                                                                                                                                                                                                                                | 0001                                   |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Kommentar / notes:                                                                                                                                                                                                                                                                     |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Zertifikat NANOCOLOR VARIO C2 mit zusätzlich programmierten Temperaturen (40°C, 78°C, 157°C) für eigene Sondermethoden.                                                                                                                                                                |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| Anwender / user:                                                                                                                                                                                                                                                                       | Druckdatum / printing date: 26.09.2014 |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |
| MACHERY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6-8 · D-52395 Düren · Germany<br>Tel.: +49 (0) 24 21 999 0 · Fax: +49 (0) 24 21 999 199 · e-mail: sales-de@mn-net.com                                                                                                               |                                        |    |     |     |     |     |    |    |     |                                                                                                                                                                                                                                                                                                                                                                                  |                                      |      |       |       |       |       |      |      |   |       |   |   |   |

| Soll-Temperatur<br>Nominal temperature |
|----------------------------------------|
| 70                                     |
| 100                                    |
| 120                                    |
| 148                                    |
| 160                                    |
| 40                                     |
| 78                                     |
| 157                                    |

| Ist-Temperatur<br>Actual temperature |
|--------------------------------------|
| 70.4                                 |
| 100.7                                |
| 120.9                                |
| 148.8                                |
| 160.6                                |
| 39.7                                 |
| 78.5                                 |
| -                                    |
| 157.6                                |
| -                                    |
| -                                    |
| -                                    |

| Soll-Temperatur<br>Nominal temperature |
|----------------------------------------|
| 70                                     |
| 100                                    |
| 120                                    |
| 148                                    |
| 160                                    |
| 40                                     |
| 78                                     |
| 157                                    |

| Ist-Temperatur<br>Actual temperature |
|--------------------------------------|
| 70.4                                 |
| 100.7                                |
| 120.9                                |
| 148.8                                |
| 160.6                                |
| 39.7                                 |
| 78.5                                 |
| -                                    |
| 157.6                                |
| -                                    |
| -                                    |
| -                                    |

| Soll-Temperatur<br>Nominal temperature |
|----------------------------------------|
| 70                                     |
| 100                                    |
| 120                                    |
| 148                                    |
| 160                                    |
| 40                                     |
| 78                                     |
| 157                                    |

| Ist-Temperatur<br>Actual temperature |
|--------------------------------------|
| 70.4                                 |
| 100.7                                |
| 120.9                                |
| 148.8                                |
| 160.6                                |
| 39.7                                 |
| 78.5                                 |
| -                                    |
| 157.6                                |
| -                                    |
| -                                    |
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## Quality control for photometric water analysis

With the **NANOCONTROL** system MACHEREY-NAGEL offers you a complete range of products for analytical quality control for all analyses carried out with our **NANOCOLOR**® system. It gives you options to check all **NANOCOLOR**® reagents and test kits, photometers, heating blocks and your personal handling and work flow, thus providing 360 degree feedback on your analytical work.

- Measurement of single and multi standards with **NANOCONTROL**
- Plausibility checks with **NANOCONTROL** addition solutions
- Heating block inspection with the **NANOCOLOR**® T-Set
- Photometer inspection with the **NANOCONTROL** NANOCHECK
- Convenient turbidity calibration with **NANOCONTROL** NANOTURB



# NANOCOLOR® analysis system

## NANOCOLOR® photometer – At a glance

### NANOCOLOR® UV/VIS II

- High precision spectrophotometer with outstanding usability
- Nephelometric stray light measurement from 0.1 – 1000 NTU
- Integrated f.o.c. inspection equipment monitoring

REF 919 600



### NANOCOLOR® VIS II

- Revolutionary user experience by 10 inch HD touch screen display
- Integrated turbidity measurement (NTU-Check)
- Internal quality control functions

REF 919 650



### NANOCOLOR® 500 D

- Fastest digital photometer on the market
- Shock proof according to German military standard
- Inbuilt battery

REF 919 500



### Compact photometer PF-12<sup>Plus</sup>

- Flexible filter photometer with more than 100 preprogrammed methods
- Nephelometric turbidity measurements
- Integrated turbidity control (NTU-Check)

REF 919 250



### Compact photometer PF-3

- Lightweight and robust by very compact dimensions
- Intuitive operation using just 4 buttons
- Different versions for different applications available

PF-3 Pool REF 934 102

PF-3 Drinking Water REF 934 402

PF-3 Soil REF 934 202

PF-3 COD REF 934 302



## NANOCOLOR® heating blocks – At a glance

### NANOCOLOR® VARIO 4

- Simultaneous digestion of 24 samples
- Two independently usable heating units
- The most flexible solution

REF 919 300



### NANOCOLOR® VARIO C2

- Simultaneous digestion of 12 samples
- The ideal choice for small sample amounts
- Cost-effective quality

REF 919 350



### NANOCOLOR® VARIO C2 M

- Simultaneous digestion of 12 samples
- Heating block for metall analysis with big bores
- Digestion of big and small reaction glasses

REF 919 350.1



### NANOCOLOR® VARIO HC

- Simultaneous digestion of 12 samples
- Active rapid cooling after digestion
- Heating unit with aerator

REF 919 330





## NANOCOLOR® tube tests – At a glance

| Test                                   | Measuring ranges                                                                           | REF     |
|----------------------------------------|--------------------------------------------------------------------------------------------|---------|
| Alcohol, see Ethanol and Methanol      |                                                                                            |         |
| Aluminum 07                            | 0.02–0.70 mg/L Al <sup>3+</sup>                                                            | 985 098 |
| Ammonium 3*                            | 0.04–2.30 mg/L NH <sub>4</sub> -N                                                          | 985 003 |
| Ammonium 10*                           | 0.2–8.0 mg/L NH <sub>4</sub> -N                                                            | 985 004 |
| Ammonium 50*                           | 1–40 mg/L NH <sub>4</sub> -N                                                               | 985 005 |
| Ammonium 100*                          | 4–80 mg/L NH <sub>4</sub> -N                                                               | 985 008 |
| Ammonium 200*                          | 30–160 mg/L NH <sub>4</sub> -N                                                             | 985 006 |
| Anionic surfactants see Surfactants    |                                                                                            |         |
| AOX 3*                                 | 0.1–3.0 mg/L AOX                                                                           | 985 007 |
| BOD <sub>5</sub> (in Winkler bottles)* | 2–3000 mg/L O <sub>2</sub>                                                                 | 985 822 |
| BOD <sub>5</sub> -TT*                  | 0.5–3000 mg/L O <sub>2</sub>                                                               | 985 825 |
| Cadmium 2                              | 0.05–2.00 mg/L Cd <sup>2+</sup>                                                            | 985 014 |
| Carbonate hardness 15                  | 1.25–18.75 °e                                                                              | 985 015 |
| Cationic surfactants see Surfactants   |                                                                                            |         |
| Chloride 200*                          | 5–200 mg/L Cl <sup>-</sup>                                                                 | 985 019 |
| Chloride 50*                           | 0.5–50.0 mg/L Cl <sup>-</sup>                                                              | 985 021 |
| Chlorine / Ozone 2*                    | 0.05–2.50 mg/L Cl <sub>2</sub>                                                             | 985 017 |
| Chlorine dioxide 5                     | 0.15–5.00 mg/L ClO <sub>2</sub>                                                            | 985 018 |
| Chromate 5                             | 0.05–2.00 mg/L Cr(VI)                                                                      | 985 024 |
|                                        | 0.005–0.500 mg/L Cr(VI)                                                                    |         |
| total Chromium 2*                      | 0.05–2.00 mg/L Cr                                                                          | 985 059 |
| COD 40*                                | 2–40 mg/L O <sub>2</sub>                                                                   | 985 027 |
| COD 60*                                | 5–60 mg/L O <sub>2</sub>                                                                   | 985 022 |
| COD 160*                               | 15–160 mg/L O <sub>2</sub>                                                                 | 985 026 |
| COD 160 Hg-free*                       | 15–160 mg/L O <sub>2</sub>                                                                 | 963 026 |
| COD 300*                               | 50–300 mg/L O <sub>2</sub>                                                                 | 985 033 |
| COD 600*                               | 50–600 mg/L O <sub>2</sub>                                                                 | 985 030 |
| COD 1500*                              | 100–1500 mg/L O <sub>2</sub>                                                               | 985 029 |
| COD 4000*                              | 400–4000 mg/L O <sub>2</sub>                                                               | 985 011 |
| COD 10000*                             | 1.00–10.00 g/L O <sub>2</sub>                                                              | 985 023 |
| COD 15000*                             | 1.0–15.0 g/L O <sub>2</sub>                                                                | 985 028 |
| COD 60000*                             | 5.0–60.0 g/L O <sub>2</sub>                                                                | 985 012 |
| COD LR 150*                            | 3–150 mg/L O <sub>2</sub>                                                                  | 985 036 |
| COD HR 1500*                           | 20–1500 mg/L O <sub>2</sub>                                                                | 985 038 |
| org. Complexing agents 10              | 0.5–10.0 mg/L I <sub>BK</sub>                                                              | 985 052 |
| Copper 5                               | 0.10–7.00 mg/L Cu <sup>2+</sup>                                                            | 985 053 |
| Cyanide 08*                            | 0.02–0.80 mg/L CN <sup>-</sup>                                                             | 985 031 |
| DEHA 1 (Diethylhydroxylamine)          | 0.05–1.00 mg/L DEHA                                                                        | 985 035 |
| Ethanol 1000                           | 0.10–1.00 g/L EtOH                                                                         | 985 838 |
| Fatty acids see Organic acids          |                                                                                            |         |
| Fluoride 2                             | 0.1–2.0 mg/L F <sup>-</sup>                                                                | 985 040 |
| Formaldehyde 8*                        | 0.1–8.0 mg/L HCHO                                                                          | 985 041 |
| Formaldehyde 10                        | 0.20–10.00 mg/L HCHO                                                                       | 985 046 |
| Hardness Ca / Mg                       | 1.25–25.0 °e / 5–50 mg/L Mg <sup>2+</sup><br>0.2–3.6 mmol/L / 10–100 mg/L Ca <sup>2+</sup> | 985 044 |
| Hardness 20                            | 1.25–25.0 °e<br>0.2–3.6 mmol/L                                                             | 985 043 |
| HC 300 (Hydrocarbons)*                 | 0.5–5.6 mg/L KW                                                                            | 985 057 |
| Iron 3*                                | 0.10–3.00 mg/L Fe                                                                          | 985 037 |
| Lead 5*                                | 0.10–5.00 mg/L Pb <sup>2+</sup>                                                            | 985 009 |
| Manganese 10*                          | 0.1–10.0 mg/L Mn                                                                           | 985 058 |
| Methanol 15                            | 0.2–15.0 mg/L MeOH                                                                         | 985 859 |
| Molybdenum 40*                         | 1.0–40.0 mg/L Mo(VI)                                                                       | 985 056 |
| Nonionic surfactants, see Surfactants  |                                                                                            |         |
| Nickel 4*                              | 0.10–7.00 mg/L Ni <sup>2+</sup>                                                            | 985 071 |
| Nitrate 8*                             | 0.30–8.00 mg/L NO <sub>3</sub> -N                                                          | 985 065 |
| Nitrate 50*                            | 0.3–22.0 mg/L NO <sub>3</sub> -N                                                           | 985 064 |
| Nitrate 250*                           | 4–60 mg/L NO <sub>3</sub> -N                                                               | 985 066 |
| Nitrite 2*                             | 0.003–0.460 mg/L NO <sub>2</sub> -N                                                        | 985 068 |
| Nitrite 4                              | 0.1–4.0 mg/L NO <sub>2</sub> -N                                                            | 985 069 |
| total Nitrogen TN <sub>6</sub> 22*     | 0.5–22.0 mg/L N                                                                            | 985 083 |
| total Nitrogen TN <sub>6</sub> 60*     | 3–60 mg/L N                                                                                | 985 092 |
| total Nitrogen TN <sub>6</sub> 220*    | 5–220 mg/L N                                                                               | 985 088 |
| Organic acids 3000*                    | 30–3000 mg/L CH <sub>3</sub> COOH                                                          | 985 050 |
| Oxygen 12*                             | 0.5–12.0 mg/L O <sub>2</sub>                                                               | 985 082 |
| Ozone, see Chlorine / Ozone 2          |                                                                                            |         |
| Peroxide 2                             | 0.03–2.00 mg/L H <sub>2</sub> O <sub>2</sub>                                               | 985 871 |
| pH 6.5–8.2                             | pH 6.5–8.2                                                                                 | 918 72  |
| Phenolic index 5*                      | 0.2–5.0 mg/L Phenol                                                                        | 985 074 |



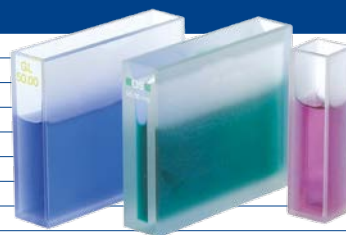
| Test                          | Measuring ranges                            | REF     |
|-------------------------------|---------------------------------------------|---------|
| ortho and total Phosphate 1*  | 0.05–1.50 mg/L P<br>0.010–0.800 mg/L P      | 985 076 |
| ortho and total Phosphate 5*  | 0.20–5.00 mg/L P                            | 985 081 |
| ortho and total Phosphate 15* | 0.30–15.00 mg/L P                           | 985 080 |
| ortho and total Phosphate 45* | 5.0–50.0 mg/L P                             | 985 055 |
| ortho and total Phosphate 50* | 10.0–50.0 mg/L P                            | 985 079 |
| POC 200                       | 20–200 mg/L POC                             | 985 070 |
| Potassium 50*                 | 2–50 mg/L K <sup>+</sup>                    | 985 045 |
| Residual hardness 1           | 0.03–1.25 °e                                | 985 084 |
| Silver 3                      | 0.20–3.00 mg/L Ag <sup>+</sup>              | 985 049 |
| Starch 100*                   | 5–100 mg/L starch                           | 985 085 |
| Sulfate 200*                  | 10–200 mg/L SO <sub>4</sub> <sup>2-</sup>   | 985 086 |
| Sulfate 1000*                 | 200–1000 mg/L SO <sub>4</sub> <sup>2-</sup> | 985 087 |
| Sulfide 3*                    | 0.05–3.00 mg/L S <sub>2</sub> <sup>-</sup>  | 985 073 |
| Sulfite 10*                   | 0.2–10.0 mg/L SO <sub>3</sub> <sup>2-</sup> | 985 089 |
| Sulfite 100*                  | 5–100 mg/L SO <sub>3</sub> <sup>2-</sup>    | 985 090 |
| Anionic surfactants 4*        | 0.20–4.00 mg/L MBAS                         | 985 032 |
| Cationic surfactants 4*       | 0.20–4.00 mg/L CTAB                         | 985 034 |
| Nonionic surfactants 15*      | 0.3–15.0 mg/L<br>Triton® X-100              | 985 047 |
| Thiocyanat 50*                | 0.5–50.0 mg/L SCN <sup>-</sup>              | 985 091 |
| Tin 3*                        | 0.10–3.00 mg/L Sn                           | 985 097 |
| TOC 25*                       | 2.0–25.0 mg/L C                             | 985 093 |
| TOC 60*                       | 10–60 mg/L C                                | 985 094 |
| TOC 600*                      | 40–600 mg/L C                               | 985 099 |
| TTC/Sludge activity 150*      | 5–150 µg TPF                                | 985 890 |
| Zinc 4*                       | 0.10–4.00 mg/L Zn <sup>2+</sup>             | 985 096 |

\* These products contain harmful substances which must be specially labeled as hazardous. For detailed information please see MSDS.

## NANOCOLOR® standard tests – At a glance

| Test                      | Measuring ranges                              | REF       |
|---------------------------|-----------------------------------------------|-----------|
| Aluminum                  | 0.01–1.00 mg/L Al <sup>3+</sup>               | 918 02    |
| Ammonium*                 | 0.01–2.0 mg/L NH <sub>4</sub> -N              | 918 05    |
| Chloride*                 | 0.2–125 mg/L Cl <sup>-</sup>                  | 918 20    |
| Chlorine*                 | 0.02–10.0 mg/L Cl <sub>2</sub>                | 918 16    |
| Chlorine dioxide*         | 0.04–4.00 mg/L ClO <sub>2</sub>               | 918 163   |
| Chromate*                 | 0.01–3.0 mg/L Cr(VI)                          | 918 25    |
| Cobalt*                   | 0.002–0.70 mg/L Co <sup>2+</sup>              | 918 51    |
| Color (Hazen/DIN)         | 5–500 mg/L Pt (Hazen)                         | Test 1-39 |
| Copper                    | 0.01–10.0 mg/L Cu <sup>2+</sup>               | 918 53    |
| Cyanide*                  | 0.001–0.50 mg/L CN <sup>-</sup>               | 918 30    |
| Fluoride*                 | 0.05–2.00 mg/L F <sup>-</sup>                 | 918 142   |
| Hydrazine*                | 0.002–1.50 mg/L N <sub>2</sub> H <sub>4</sub> | 918 44    |
| Iron*                     | 0.01–15.0 mg/L Fe                             | 918 36    |
| Manganese*                | 0.01–10.0 mg/L Mn                             | 918 60    |
| Nickel*                   | 0.01–10.0 mg/L Ni <sup>2+</sup>               | 918 62    |
| Nitrate*                  | 0.9–30.0 mg/L NO <sub>3</sub> -N              | 918 65    |
| Nitrate Z*                | 0.02–1.0 mg/L NO <sub>3</sub> -N              | 918 63    |
| Nitrite*                  | 0.002–0.30 mg/L NO <sub>2</sub> -N            | 918 67    |
| Phenol*                   | 0.01–7.0 mg/L Phenol                          | 918 75    |
| ortho Phosphate*          | 0.04–6.5 mg/L PO <sub>4</sub> -P              | 918 77    |
| ortho Phosphate*          | 0.2–17 mg/L PO <sub>4</sub> -P                | 918 78    |
| Silica*                   | 0.01–5.00 mg/L Si<br>0.002–0.100 mg/L Si 3)   | 918 48    |
| Sulfide*                  | 0.01–3.0 mg/L S <sub>2</sub> <sup>-</sup>     | 918 88    |
| Turbidity (formazine/DIN) | 1–100 TE/F (= FAU)                            | Test 1-92 |
| Turbidity                 | 1–1000 NTU                                    | Test 9-06 |
| Zinc*                     | 0.02–3.0 mg/L Zn <sup>2+</sup>                | 918 95    |

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