



The system for photometric water analysis

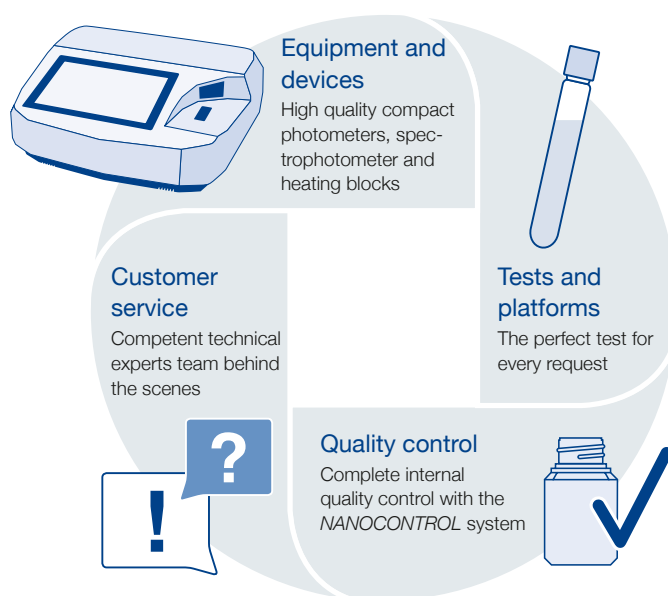
- Expertise
- Continuity
- Passion

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



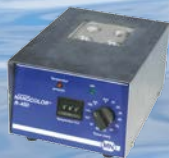
NANOCOLOR® 50 D



NANOCOLOR® 100 D



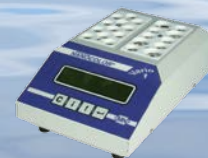
NANOCOLOR® 200 D



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

Reagents	MACHEREY-NAGEL	ISO 15705
Sulfuric acid	Sulfuric acid	Sulfuric acid
Potassium dichromate	Potassium dichromate	Potassium dichromate
Silver sulfate	Silver sulfate	Silver sulfate
Mercury sulfate	Mercury sulfate	Mercury sulfate

Sample volume	2.00 mL	2.00 ± 0.02 mL
Digestion Temperature	148 °C	150 ± 5 °C
Digestion Time	2 h	2 h ± 10 min

* Digestion temperature 150 °C

Wavelength for photometric determination	2 - 40 mg/L O ₂ , 345 nm	50 mg/L O ₂ , 345 ± 15 nm
5 - 60 mg/L O ₂ , 345 nm	to 50 mg/L O ₂ , 345 ± 15 nm	
3 - 150 mg/L O ₂ , 436 nm	to 150 mg/L O ₂ , 440 ± 20 nm	
15 - 160 mg/L O ₂ , 436 nm	to 150 mg/L O ₂ , 440 ± 20 nm	
50 - 600 mg/L O ₂ , 600 nm	to 1000 mg/L O ₂ , 600 ± 20 nm	
100 - 1500 mg/L O ₂ , 600 nm	to 1000 mg/L O ₂ , 600 ± 20 nm	
20 - 1500 mg/L O ₂ , 600 nm	to 1000 mg/L O ₂ , 600 ± 20 nm	

MACHEREY-NAGEL GmbH & Co. KG
Düren, 19.08.2014

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



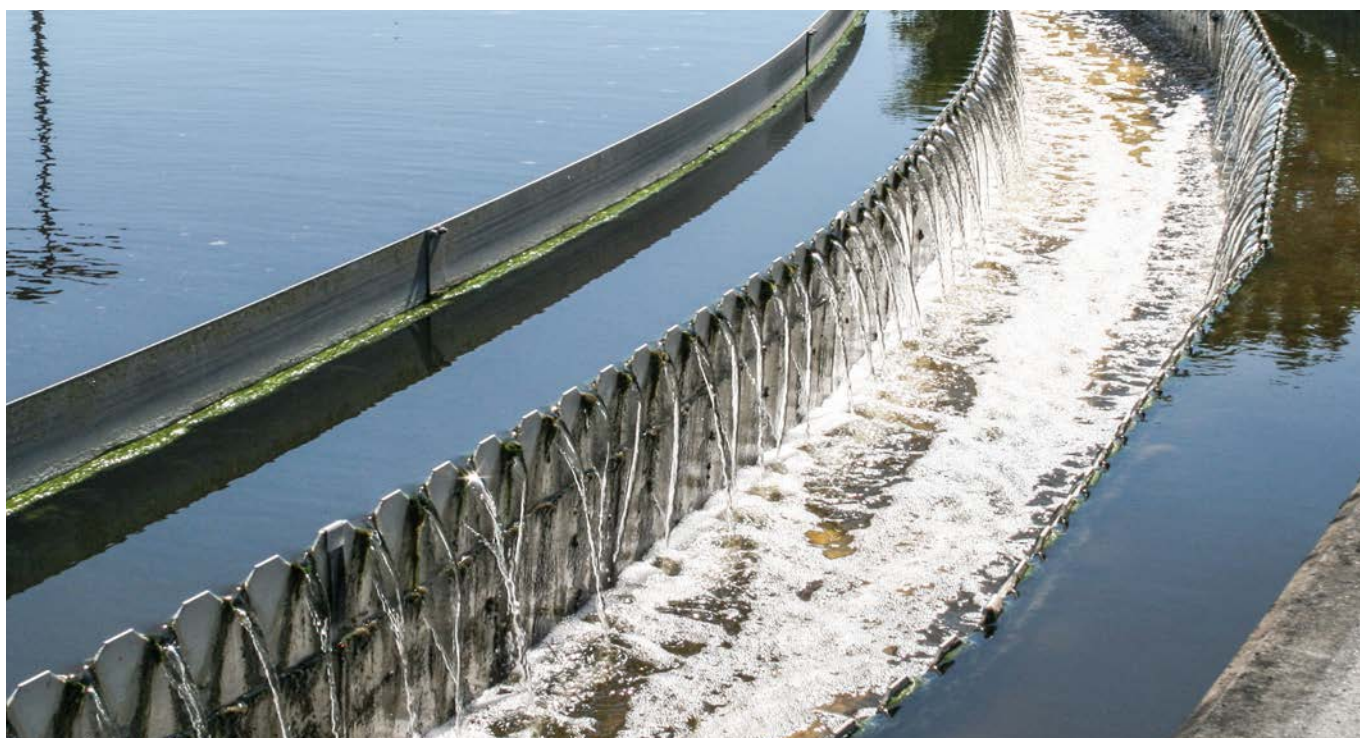
Automatic turbidity check for tube tests

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



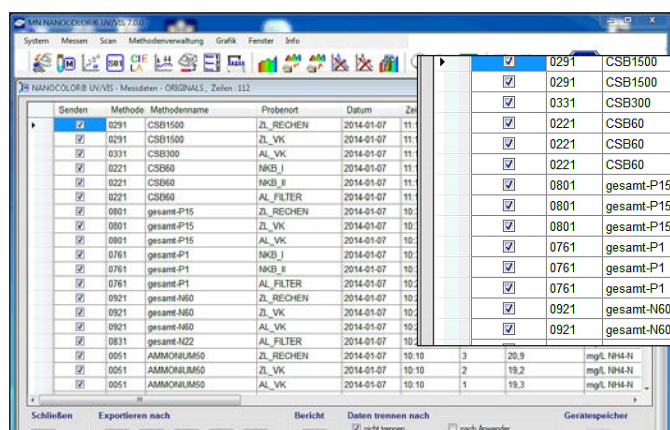
2 tubes (A / B) with the same COD concentration



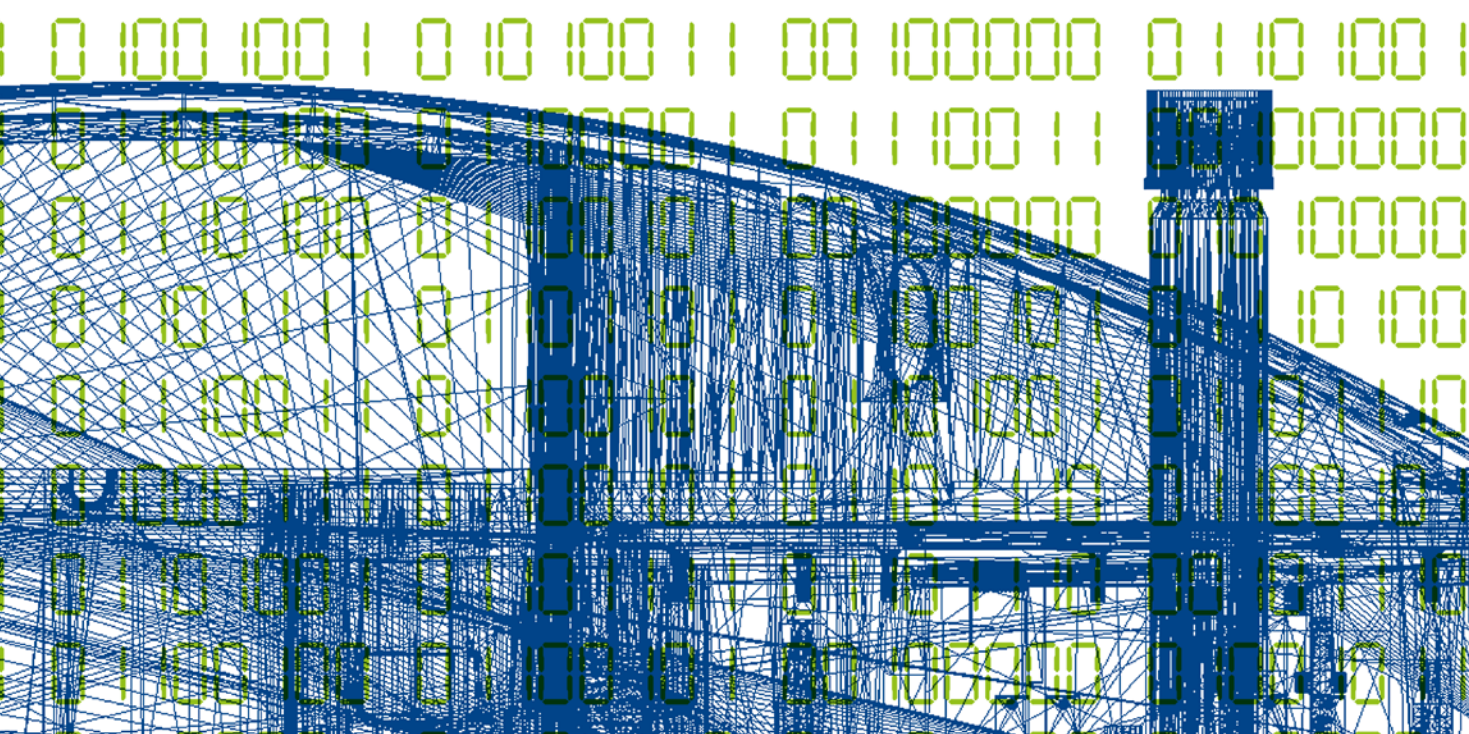
Convenient data export to LIMS and other standard PC-programs

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



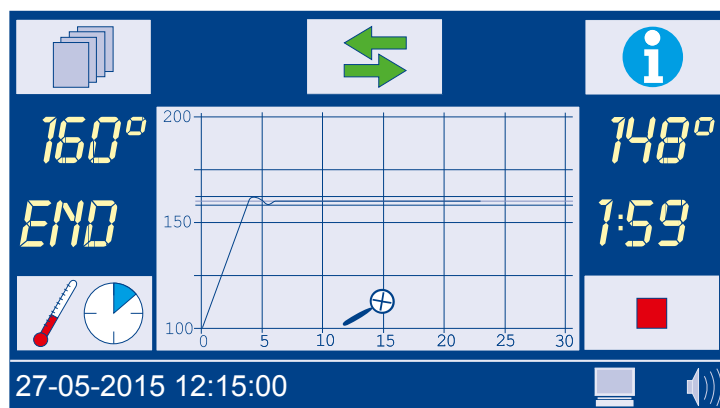
Senden	Methode	Methodenname	Probenort	Datum	Zr
0291	CSB1500	ZL_RECHEN	2014-01-07	11:14	2
0291	CSB1500	ZL.VK	2014-01-07	11:14	1
0331	CSB300	AL.VK	2014-01-07	11:13	1
0221	CSB60	NKB.J	2014-01-07	11:13	3
0221	CSB60	NKB.II	2014-01-07	11:13	2
0221	CSB60	AL_FILTER	2014-01-07	11:12	1
0801	gesamt-P15	ZL_RECHEN	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.J	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  Filtration Rapid Tests Water Analysis Chromatography Biotechnology Protein Solubility Bioassays Chromatography Biotechnology

Zertifikat/Certificate

VARIO compact / compact 2 / HC – Testdaten / test data

Gerätesnummer / serial number: **NVC20071**
Software Version / software version: **3.011810**

Hersteller Kalibrierung / factory calibration

Steigung / slope [°C/°C]: **1.0055**
Achsenabschnitt / intercept [°C]: **-2.5925**

Anwender test / user test [°C]

Soll-Temperatur Nominal temperature	Ist-Temperatur Actual temperature
70	70.4
100	100.7
120	120.9
148	148.8
160	160.6
40	39.7
78	78.5
157	157.6
-	-
-	-
-	-
-	-
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**

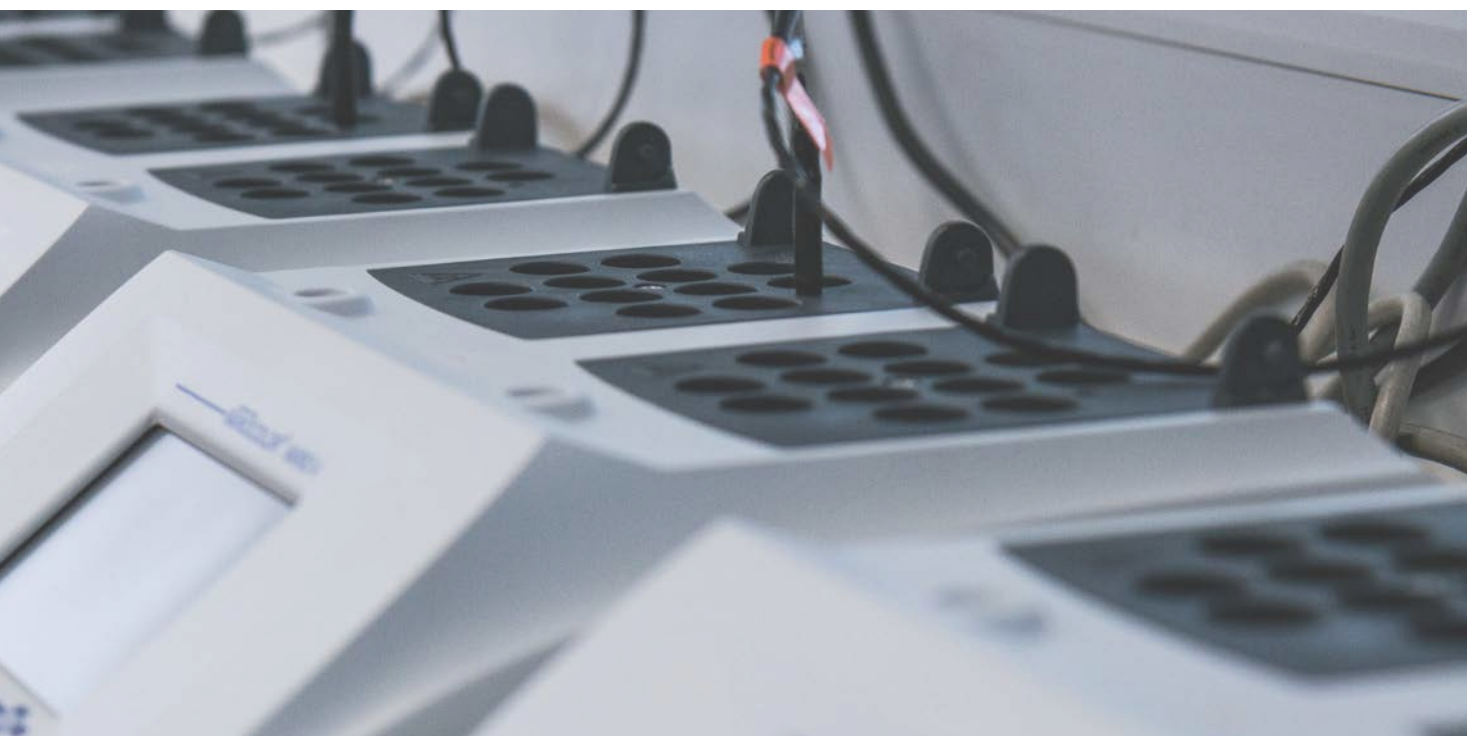
Kommentar / notes:
Zertifikat NANOCOLOR VARIO C2 mit zusätzlich programmierten Temperaturen (40°C, 78°C, 157°C) für eigene Sondermethoden.

Anwender / user: _____ Druckdatum / printing date: **26.09.2014**

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Soll-Temperatur Nominal temperature
70
100
120
148
160
40
78
157
157

Ist-Temperatur Actual temperature
70.4
100.7
120.9
148.8
160.6
39.7
78.5
157.6
-
-
-
-
23.09.2014



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^{Plus}

- 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 ³⁺	985 098
Ammonium 3*	0.04–2.30 mg/L NH ₄ -N	985 003
Ammonium 10*	0.2–8.0 mg/L NH ₄ -N	985 004
Ammonium 50*	1–40 mg/L NH ₄ -N	985 005
Ammonium 100*	4–80 mg/L NH ₄ -N	985 008
Ammonium 200*	30–160 mg/L NH ₄ -N	985 006
Anionic surfactants see Surfactants		
AOX 3*	0.1–3.0 mg/L AOX	985 007
BOD ₅ (in Winkler bottles)*	2–3000 mg/L O ₂	985 822
BOD ₅ -TT*	0.5–3000 mg/L O ₂	985 825
Cadmium 2	0.05–2.00 mg/L Cd ²⁺	985 014
Carbonate hardness 15	1.25–18.75 °e	985 015
Cationic surfactants see Surfactants		
Chloride 200*	5–200 mg/L Cl ⁻	985 019
Chloride 50*	0.5–50.0 mg/L Cl ⁻	985 021
Chlorine / Ozone 2*	0.05–2.50 mg/L Cl ₂	985 017
Chlorine dioxide 5	0.15–5.00 mg/L ClO ₂	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 ₂	985 027
COD 60*	5–60 mg/L O ₂	985 022
COD 160*	15–160 mg/L O ₂	985 026
COD 160 Hg-free*	15–160 mg/L O ₂	963 026
COD 300*	50–300 mg/L O ₂	985 033
COD 600*	50–600 mg/L O ₂	985 030
COD 1500*	100–1500 mg/L O ₂	985 029
COD 4000*	400–4000 mg/L O ₂	985 011
COD 10000*	1.00–10.00 g/L O ₂	985 023
COD 15000*	1.0–15.0 g/L O ₂	985 028
COD 60000*	5.0–60.0 g/L O ₂	985 012
COD LR 150*	3–150 mg/L O ₂	985 036
COD HR 1500*	20–1500 mg/L O ₂	985 038
org. Complexing agents 10	0.5–10.0 mg/L I _{BK}	985 052
Copper 5	0.10–7.00 mg/L Cu ²⁺	985 053
Cyanide 08*	0.02–0.80 mg/L CN ⁻	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 ⁻	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 ²⁺ 0.2–3.6 mmol/L / 10–100 mg/L Ca ²⁺	985 044
Hardness 20	1.25–25.0 °e 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 ²⁺	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 ²⁺	985 071
Nitrate 8*	0.30–8.00 mg/L NO ₃ -N	985 065
Nitrate 50*	0.3–22.0 mg/L NO ₃ -N	985 064
Nitrate 250*	4–60 mg/L NO ₃ -N	985 066
Nitrite 2*	0.003–0.460 mg/L NO ₂ -N	985 068
Nitrite 4	0.1–4.0 mg/L NO ₂ -N	985 069
total Nitrogen TN ₆ 22*	0.5–22.0 mg/L N	985 083
total Nitrogen TN ₆ 60*	3–60 mg/L N	985 092
total Nitrogen TN ₆ 220*	5–220 mg/L N	985 088
Organic acids 3000*	30–3000 mg/L CH ₃ COOH	985 050
Oxygen 12*	0.5–12.0 mg/L O ₂	985 082
Ozone, see Chlorine / Ozone 2		
Peroxide 2	0.03–2.00 mg/L H ₂ O ₂	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



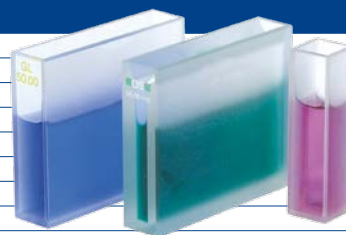
Test	Measuring ranges	REF
ortho and total Phosphate 1 *	0.05–1.50 mg/L P 0.010–0.800 mg/L P	985 076
ortho and total Phosphate 5 *	0.20–5.00 mg/L P	985 081
ortho and total Phosphate 15 *	0.30–15.00 mg/L P	985 080
ortho and total Phosphate 45 *	5.0–50.0 mg/L P	985 055
ortho and total Phosphate 50 *	10.0–50.0 mg/L P	985 079
POC 200	20–200 mg/L POC	985 070
Potassium 50 *	2–50 mg/L K ⁺	985 045
Residual hardness 1	0.03–1.25 °e	985 084
Silver 3	0.20–3.00 mg/L Ag ⁺	985 049
Starch 100 *	5–100 mg/L starch	985 085
Sulfate 200 *	10–200 mg/L SO ₄ ²⁻	985 086
Sulfate 1000 *	200–1000 mg/L SO ₄ ²⁻	985 087
Sulfide 3 *	0.05–3.00 mg/L S ₂ ⁻	985 073
Sulfite 10 *	0.2–10.0 mg/L SO ₃ ²⁻	985 089
Sulfite 100 *	5–100 mg/L SO ₃ ²⁻	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 Triton® X-100	985 047
Thiocyanat 50 *	0.5–50.0 mg/L SCN ⁻	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 ²⁺	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 ³⁺	918 02
Ammonium *	0.01–2.0 mg/L NH ₄ -N	918 05
Chloride *	0.2–125 mg/L Cl ⁻	918 20
Chlorine *	0.02–10.0 mg/L Cl ₂	918 16
Chlorine dioxide *	0.04–4.00 mg/L ClO ₂	918 163
Chromate *	0.01–3.0 mg/L Cr(VI)	918 25
Cobalt *	0.002–0.70 mg/L Co ²⁺	918 51
Color (Hazen/DIN)	5–500 mg/L Pt (Hazen)	Test 1-39
Copper	0.01–10.0 mg/L Cu ²⁺	918 53
Cyanide *	0.001–0.50 mg/L CN ⁻	918 30
Fluoride *	0.05–2.00 mg/L F ⁻	918 142
Hydrazine *	0.002–1.50 mg/L N ₂ H ₄	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 ²⁺	918 62
Nitrate *	0.9–30.0 mg/L NO ₃ -N	918 65
Nitrate Z *	0.02–1.0 mg/L NO ₃ -N	918 63
Nitrite *	0.002–0.30 mg/L NO ₂ -N	918 67
Phenol *	0.01–7.0 mg/L Phenol	918 75
ortho Phosphate *	0.04–6.5 mg/L PO ₄ -P	918 77
ortho Phosphate *	0.2–17 mg/L PO ₄ -P	918 78
Silica *	0.01–5.00 mg/L Si 0.002–0.100 mg/L Si 3)	918 48
Sulfide *	0.01–3.0 mg/L S ₂ ⁻	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 ²⁺	918 95

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



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