MACHEREY-NAGEL

NANOCOLOR®



NANOCOLOR® – waste water analysis

Dr. Christos Evangelakakis, 08.01.2025

Agenda



40 years of
NANOCOLOR®



NANOCOLOR®
tube tests



Powder Pillows



NANOCOLOR®
photometer



NANOCOLOR®
heating blocks



NANOCONTROL –
Internal quality control

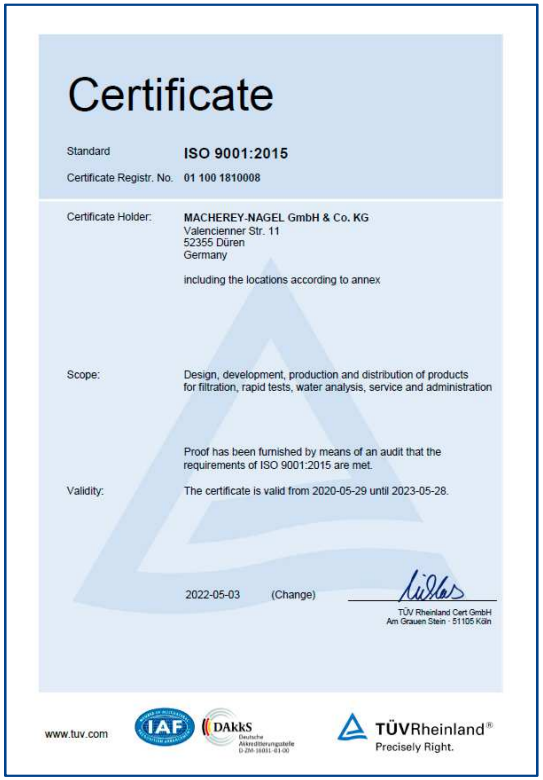


40 years of *NANOCOLOR®*

40 years of *NANOCOLOR®*

Production and quality control

- ISO-certified production with highest quality “Made in Germany“
- Consistent quality from batch to batch
- SDS, user manuals and LOT-specific certificates available



Certificate

Standard ISO 9001:2015

Certificate Registr. No. 01 100 1810008

Certificate Holder: MACHEREY-NAGEL GmbH & Co. KG
Valencienner Str. 11
52355 Düren
Germany

including the locations according to annex

Scope: Design, development, production and distribution of products for filtration, rapid tests, water analysis, service and administration

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity: The certificate is valid from 2020-05-29 until 2023-05-28.

2022-05-03 (Change)

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

TÜVRheinland®
Precisely Right.



NANOCOLOR® tube tests

NANOCOLOR® tube tests



Convenient packaging

- Rugged boxes with perfect light protection
- Color coded labels with all important information
- Convenient and safe removal of test tubes
- 2D Barcode for easy access to all important documents



scan me - info

NANOCOLOR® tube tests

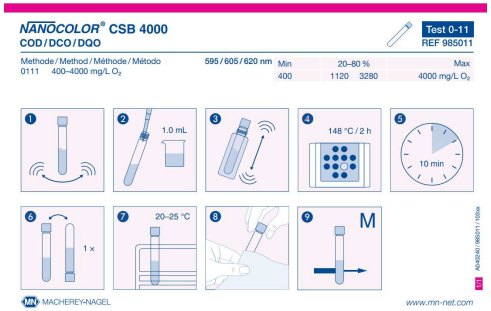


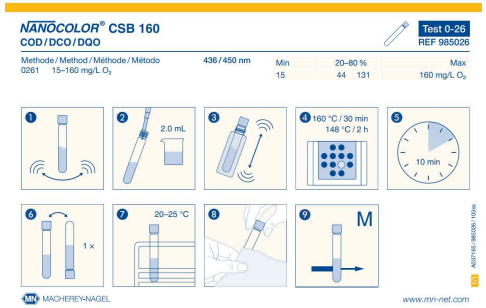
Safe and easy handling

- Colored pictograms for perfect test performance
- Detailed instructions online, via QR Code









NANOCOLOR® tube tests



NANOCOLOR® tube tests – Our tube!

- Wide test tube openings for easy and safe pipetting
- Barcode for easy test call up
- Inscribable tube top labels avoid mixing up of test tubes

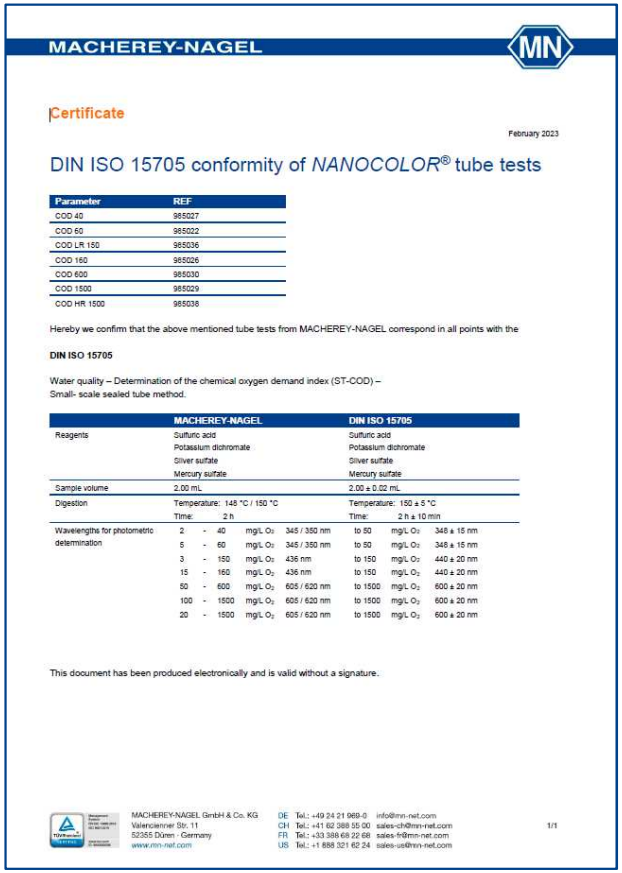


NANOCOLOR® tube tests



The perfect COD test for each and every user

- 13 measurement ranges
- Reaction base according to ISO 6060
- 7 COD tests compliant with ISO 15705
- Mercury-free COD tests available for inflow and outflow measurements



MACHEREY-NAGEL

Certificate

February 2023

DIN ISO 15705 conformity of *NANOCOLOR*® tube tests

Parameter	REF
COD 40	985027
COD 60	985022
COD LR 150	985036
COD 160	985026
COD 600	985030
COD 1500	985029
COD HR 1500	985038

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

DIN ISO 15705

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

	MACHEREY-NAGEL	DIN ISO 15705
Reagents	Sulfuric acid Potassium dichromate Silver sulfate Mercury sulfate	Sulfuric acid Potassium dichromate Silver sulfate Mercury sulfate
Sample volume	2.00 mL	2.00 ± 0.02 mL
Digestion	Temperature: 148 °C / 150 °C Time: 2 h	Temperature: 150 ± 5 °C Time: 2 h ± 10 min
Wavelengths for photometric determination	2 - 40 mg/L O_2 345 / 350 nm 5 - 60 mg/L O_2 345 / 350 nm 3 - 150 mg/L O_2 436 nm 15 - 160 mg/L O_2 436 nm 50 - 600 mg/L O_2 605 / 620 nm 100 - 1500 mg/L O_2 605 / 620 nm 20 - 1500 mg/L O_2 605 / 620 nm	to 60 mg/L O_2 348 ± 15 nm to 60 mg/L O_2 348 ± 15 nm to 150 mg/L O_2 440 ± 20 nm to 150 mg/L O_2 440 ± 20 nm to 1500 mg/L O_2 600 ± 20 nm to 1500 mg/L O_2 600 ± 20 nm to 1500 mg/L O_2 600 ± 20 nm

This document has been produced electronically and is valid without a signature.

MACHEREY-NAGEL GmbH & Co. KG
Valencienner Str. 11
52355 Düren · Germany
www.mn-net.com

DE Tel.: +49 24 21 969-0 info@mn-net.com
CH Tel.: +41 62 388 55 00 sales-ch@mn-net.com
FR Tel.: +33 388 68 22 68 sales-fr@mn-net.com
US Tel.: +1 888 321 62 24 sales-us@mn-net.com

1/1

NANOCOLOR® tube tests



The perfect COD test for each and every user

- Audited and certified: no mercury exposure for users
- No zero measurement required
- Rapid COD in only 30 minutes



NANOCOLOR® tube tests



Time-saving and reliable analysis of total nitrogen

- 3 measurement ranges
- Reaction base according to DIN EN ISO 11905-1
- Less working steps due to prefilled digestion reagents



NANOCOLOR® tube tests



Time-saving and reliable analysis of total nitrogen

- One single test tube for each digestion
- No contamination since digestion tubes are never used twice
- No cleaning of digestion tubes required



NANOCOLOR® tube tests

NANOCOLOR® tube tests – All important parameters

- COD
- Phosphate
- total-Nitrogen TN_b
- total Kjeldahl nitrogen TKN



More than 100 different tube tests available



Powder Pillows

Powder Pillows



Introduction

- Easy dosing – One Pillow per determination
- Durable – 5 Years shelf life
- Flexible – Works on MN and HACH * photometers
- Convenient – No blank required



For chlorine (free or total) and pH

Powder Pillows



All information on every pillow



Powder Pillows



Package units

100 tests

1000 tests



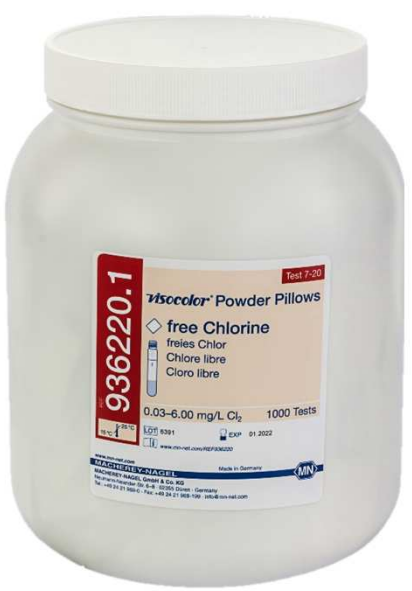
free Chlorine



total Chlorine



pH



free chlorine



total chlorine

Powder Pillows



Measurement – MN photometers

- Compact photometers



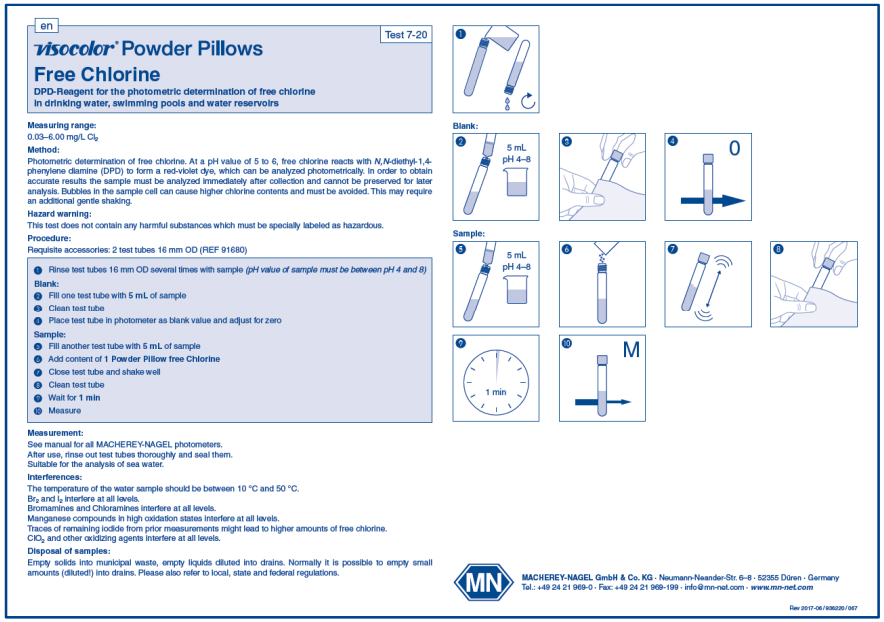
- Spectrophotometers



Powder Pillows



Measurement – Procedure



en

Test 7-20

visocolor® Powder Pillows

Free Chlorine

DPD-Reagent for the photometric determination of free chlorine in drinking water, swimming pools and water reservoirs

Measuring range:
0.03–6.00 mg/L Cl_2

Method:
Photometric determination of free chlorine. At a pH value of 5 to 6, free chlorine reacts with *N,N*-diethyl-1,4-phenylene diamine (DPD) to form a red-violet dye, which can be analyzed photometrically. In order to obtain accurate results the sample must be analyzed immediately after collection and cannot be preserved for later analysis. Bubbles in the sample cell can cause higher chlorine contents and must be avoided. This may require an additional gentle shaking.

Hazard warning:
This test does not contain any harmful substances which must be specially labeled as hazardous.

Procedure:
Requisite accessories: 2 test tubes 16 mm OD (REF 91680)

1. Rinse test tubes 16 mm OD several times with sample *(pH value of sample must be between pH 4 and 8)*

Blank:
2. Fill one test tube with 5 mL of sample
3. Clean test tube
4. Place test tube in photometer as blank value and adjust for zero

Sample:
5. Fill another test tube with 5 mL of sample
6. Add content of **1 Powder Pillow free Chlorine**
7. Close test tube and shake well
8. Clean test tube
9. Wait for **1 min**
10. Measure

Measurement:
See manual for all MACHEREY-NAGEL photometers.
After use, rinse out test tubes thoroughly and seal them.
Suitable for the analysis of sea water.

Interferences:
The temperature of the water sample should be between 10 °C and 50 °C.
Br_2 and I_2 interfere at all levels.
Bromamines and Chloramines interfere at all levels.
Manganese compounds in high oxidation states interfere at all levels.
Traces of remaining iodide from prior measurements might lead to higher amounts of free chlorine.
ClO_2 and other oxidizing agents interfere at all levels.

Disposal of samples:
Empty solids into municipal waste, empty liquids diluted into drains. Normally it is possible to empty small amounts (diluted!) into drains. Please also refer to local, state and federal regulations.

Blank:
2 5 mL pH 4–8
3
4 0

Sample:
5 5 mL pH 4–8
6
7
8
9 1 min
10 M

MACHEREY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6–8 · 52355 Düren · Germany
Tel.: +49 24 21 969-0 · Fax: +49 24 21 969-199 · info@mn-net.com · www.mn-net.com

Rev 2017-08 / 936220 / 067



REF 936220

Water Analysis

visocolor® Powder Pillows

Test 7-20

free Chlorine
freies Chlor
Chlore libre
Cloro libre

100 Tests

0.03 – 6.00 mg/L Cl_2

LOT

EXP

15 °C – 25 °C

Weitere Informationen siehe Sicherheitsdatenblatt.
For further information see safety data sheet.
Informations supplémentaires, voir fiche de données de sécurité.

www.mn-net.com

MACHEREY-NAGEL

MACHEREY-NAGEL GmbH & Co. KG
Valencienner Str. 11 · 52355 Düren · Germany
Tel.: +49 24 21 969-0 · info@mn-net.com

Rev. 08.2022

Instructions: e.g. *www.mn-net.com/REF936221*



NANOCOLOR® photometers

NANOCOLOR® photometers



Compact photometer PF-3

- Small and compact
- Intuitive operation using just 4 buttons
- Glass-fiber reinforced housing
- Water proof according to IP 68
- Shock-resistant optics
- 3 LED’s individual for each version



NANOCOLOR® photometers



Compact photometer PF-12Plus

- Intuitive and easy access of tests and menus
- Robust and waterproof according to IP 68
- Applicable in all fields of water and waste water analysis
- Free programming of user-defined methods
- GLP-conform storage of results
- Convenient data export (NANOCOLOR® software)
- Internal quality control of photometric accuracy



NANOCOLOR® photometers



Smart photometry

Intuitive user guidance

2D Barcode scanner

Robust, mobile, water proof

16 and 24 mm test tube slot

NTU-Check for save results



NANOCOLOR® photometers



2D Barcode scanner

- Avoid user mistakes
- Fast call up for tube tests
- Contactless operation
- White light scanner
- 2D-Scanner for future-proof applications




NTU-Check – Detection of interfering turbity
NANOCOLOR® Advanced
938/1 COD HR 1500
460 mg/L O2
25.5 NTU
www.mn-net.com
MACHEREY-NAGEL

NANOCOLOR® photometers



NTU-Check

- Most reliable results in COD analysis
- Complete documentation through parallel storage of measurements and NTU values
- Convenient turbidity calibration with *NANOCONTROL NANOTURB*



A B



A B

NANOCOLOR® photometers



New cuvette size

- 24 mm round tube
- Flat bottom
- Large opening
- 5 ml and 10 ml ring mark
- Marking for alignment in cuvette slot



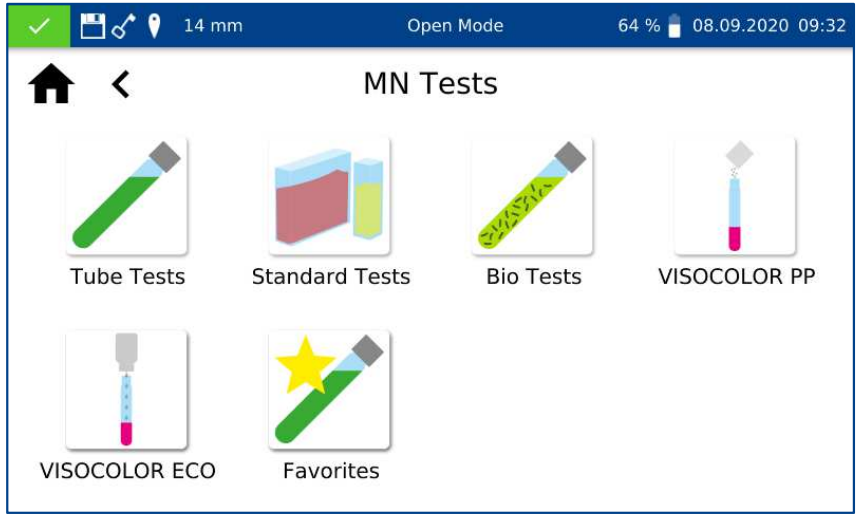
Simplified dosing especially for *VISOCOLOR*® Powder Pillows

NANOCOLOR® photometers



Large spectrum of preprogrammed methods

- *NANOCOLOR*® tube tests
- *NANOCOLOR*® standard tests
- *VISOCOLOR*® Powder Pillows
- *VISOCOLOR*® *ECO*
- Nephelometric turbidity measurement
- FAU turbidity measurements
- Color measurements according to ISO7887 and Hazen



Universally applicable in all areas of water and wastewater analysis

NANOCOLOR® photometers



Comprehensive interfaces

- Power supply for laboratory operation
- Data export and update via USB A
- LAN interface for data transfer to networks
- Shock resistance according to MIL-STD 810H
- Water proof according to IPX7
- Dust proof according to IP6X



NANOCOLOR® photometers



The internal competitor – differentiation from *VIS* II

- Larger touch screen for comfortable working
- LOT recognition via 2D barcode scanner
- Extended IQC functions (IQC chart)
- Color measurement and color analysis
- Brewery analysis
- Scan analysis
- LIMS export
- Personalization of the device
- Pictograms

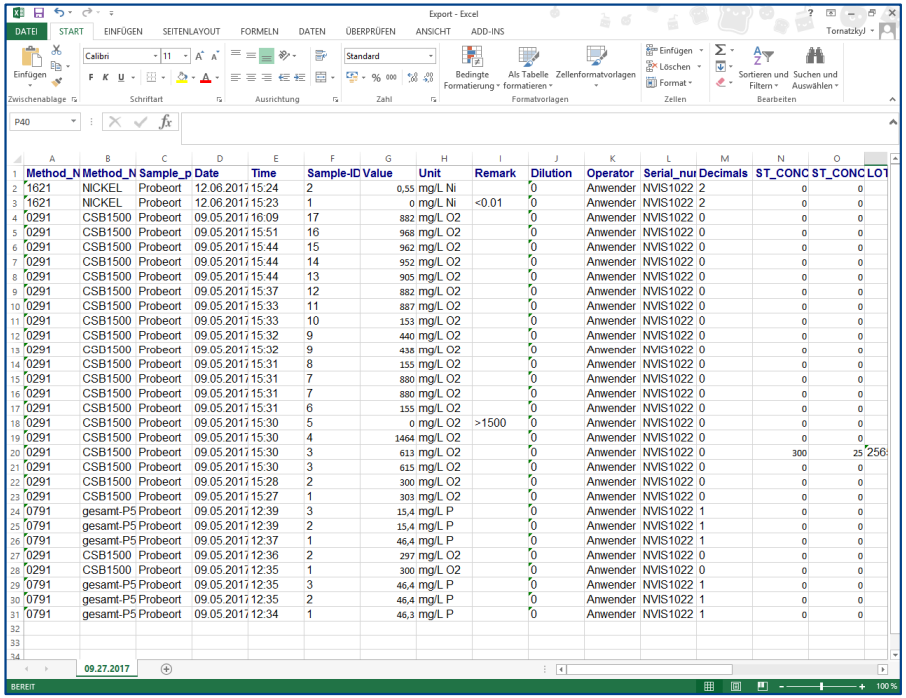


NANOCOLOR® photometers



Convenient data export

- Export to LIS and other standard PC programs
- Easy data transfer to Microsoft® Excel
- Fast and easy data management according to GLP



Export - Excel

Method_N	Method_N	Sample_p	Date	Time	Sample-ID	Value	Unit	Remark	Dilution	Operator	Serial_nur	Decimals	ST_CONC	ST_CONC	LOT
1621	NICKEL	Probeort	12.06.2017	15:24	2	0,55	mg/L Ni		0	Anwender	NVIS1022	2	0	0	
1621	NICKEL	Probeort	12.06.2017	15:23	1	0	mg/L Ni	<0.01	0	Anwender	NVIS1022	2	0	0	
0291	CSB1500	Probeort	09.05.2017	16:09	17	882	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:51	16	968	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:44	15	962	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:44	14	952	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:44	13	905	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:37	12	882	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:33	11	887	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:33	10	153	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:32	9	440	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:32	9	438	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:31	8	155	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:31	7	880	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:31	7	880	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:31	6	155	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:30	5	0	mg/L O2	>1500	0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:30	4	1464	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:30	3	613	mg/L O2		0	Anwender	NVIS1022	0	300	25	256
0291	CSB1500	Probeort	09.05.2017	15:30	3	615	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:28	2	300	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	15:27	1	303	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:39	3	15,4	mg/L P		0	Anwender	NVIS1022	1	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:39	2	15,4	mg/L P		0	Anwender	NVIS1022	1	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:37	1	46,4	mg/L P		0	Anwender	NVIS1022	1	0	0	
0291	CSB1500	Probeort	09.05.2017	12:36	2	297	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0291	CSB1500	Probeort	09.05.2017	12:35	1	300	mg/L O2		0	Anwender	NVIS1022	0	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:35	3	46,4	mg/L P		0	Anwender	NVIS1022	1	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:35	2	46,4	mg/L P		0	Anwender	NVIS1022	1	0	0	
0791	gesamt-P5	Probeort	09.05.2017	12:34	1	46,3	mg/L P		0	Anwender	NVIS1022	1	0	0	



NANOCOLOR® heating blocks

NANOCOLOR® heating blocks



Future-proof heating blocks

- 2 separate heating units
- Parallel rapid digestion of COD, total nitrogen and total phosphate
- Touch screen with intuitive menu navigation
- Lockable protective lids and safety covers
- USB interface for future-proof PC connection

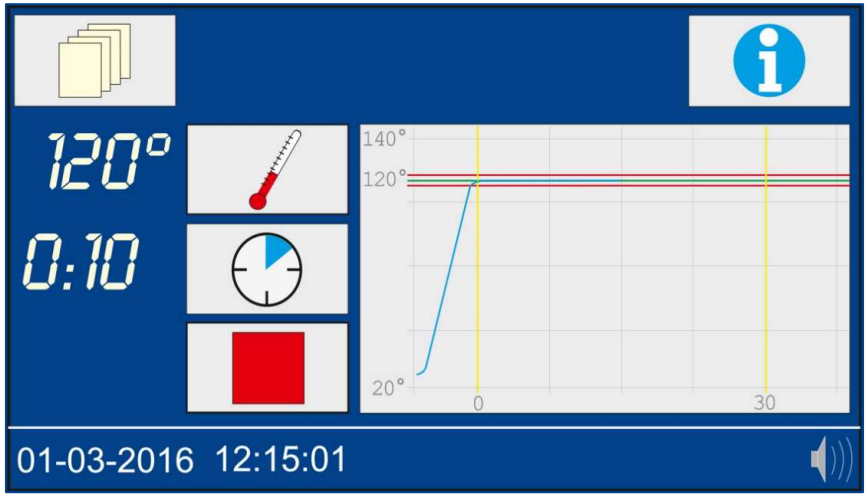


NANOCOLOR® heating blocks



Heating blocks for reliable sample digestion

- Graphical monitoring of heating curves
- Extremely short heating times
- High temperature stability for consistent digestion conditions



NANOCOLOR® heating blocks



Automatic control and calibration

- Calibrated temperature sensors made to monitor digestion temperatures
- Easy monitoring of temperature stability
- *NANOCOLOR*® *T-Set* also suitable as a universal thermometer

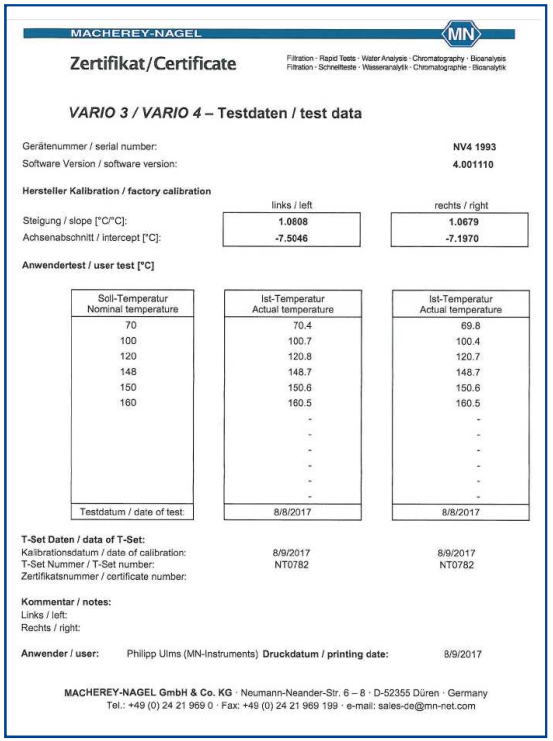


NANOCOLOR® heating blocks



Data export and documentation

- Convenient data transfer via USB interface
- GLP conform documentation with automatically generated inspection reports



MACHEREY-NAGEL

Zertifikat/Certificate

Filtration · Rapid Tests · Water Analysis · Chromatography · Bioanalysis
Filtration · Schnelltests · Wasseranalytik · Chromatographie · Bioanalytik

***VARIO 3 / VARIO 4* – Testdaten / test data**

Gerätenummer / serial number: **NV4 1993**
Software Version / software version: **4.001110**

Hersteller Kalibration / factory calibration

	links / left	rechts / right
Steigung / slope [°C/°C]:	1.0608	1.0679
Achsenabschnitt / intercept [°C]:	-7.5046	-7.1970

Anwendertest / user test [°C]

Soll-Temperatur Nominal temperature	Ist-Temperatur Actual temperature	Ist-Temperatur Actual temperature
70	70.4	69.8
100	100.7	100.4
120	120.8	120.7
148	148.7	148.7
150	150.6	150.6
160	160.5	160.5
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
Testdatum / date of test:	8/8/2017	8/8/2017

T-Set Daten / data of T-Set:

Kalibrationsdatum / date of calibration:	8/9/2017	8/9/2017
T-Set Nummer / T-Set number:	NT0782	NT0782
Zertifikatsnummer / certificate number:		

Kommentar / notes:
Links / left:
Rechts / right:

Anwender / user: Philipp Ulms (MN-Instruments) **Druckdatum / printing date:** 8/9/2017

MACHEREY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6 – 8 · D-52355 Düren · Germany
Tel.: +49 (0) 24 21 969 0 · Fax: +49 (0) 24 21 969 199 · e-mail: sales-de@mn-net.com



NANOCONTROL –
Internal quality control

NANOCONTROL – Internal quality control

Quality control for photometric water analysis

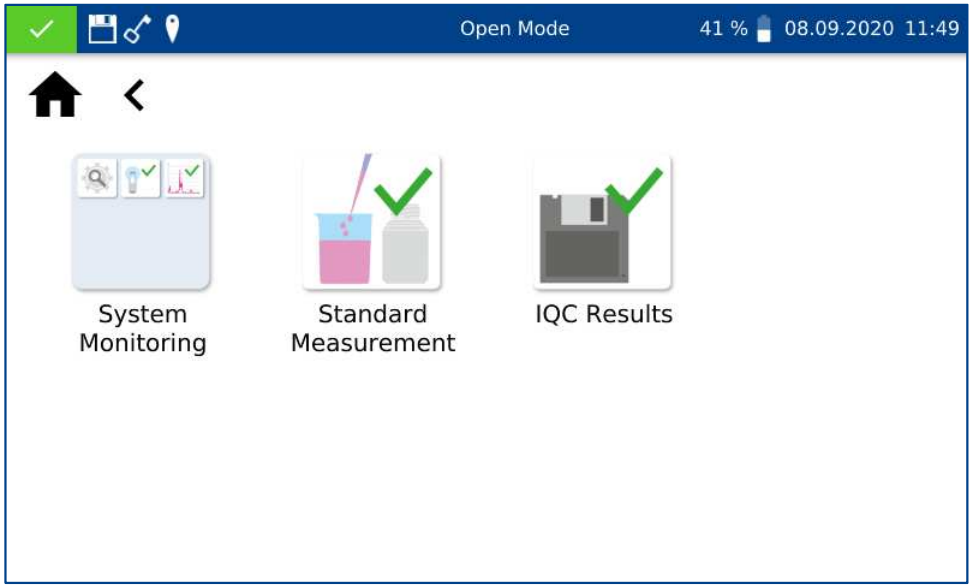
- Measurement of single and multi standards with *NANOCONTROL*
- Plausibility checks with *NANOCONTROL* addition solutions



NANOCONTROL – Internal quality control

NANOCOLOR® Advance – Internal quality control (IQC)





Quality control – easier than ever

NANOCONTROL – Internal quality control

Quality control for photometric water analysis

- Heating block inspection with the *NANOCOLOR*® T-Set
- Photometer inspection with the *NANOCONTROL* NANOCHECK
- Convenient turbidity calibration with *NANOCONTROL* NANOTURB



MACHEREY-NAGEL

Thank you for your attention!

Water analysis I csc@mn-net.com I +49-2421-969-332

Image credits

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