

MACHEREY-NAGEL

Water Analysis



Rapid Tests

MACHEREY-NAGEL

www.mn-net.com



ENRICO Bruno srl - TORINO - www.enrico-bruno.it

Welcome

Dear reader,

we are very pleased to announce the arrival of our new rapid tests catalog, that was created from scratch.

All of our tests can be found listed by parameters in the first part of the catalog. So you can directly find the correct test for your needs. In the second part of the catalog we have compiled additional details for each individual test and equipment for you.

We are a successful manufacturer of water analysis- and rapid tests for more than 60 years. A continuous development has always been important to us to meet your today's and future needs.

If you have further questions or need additional advice, you can contact us at any time. Our friendly team of experts in Dueren and our competent sales team are very happy to be at your service.

Technical Support and Customer Service

Telephone: +49 24 21 969-332

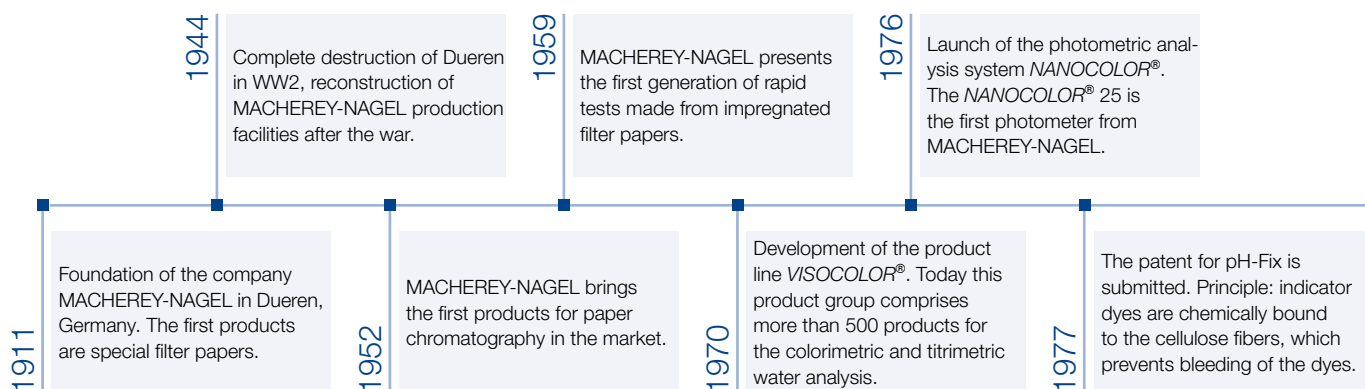
E-mail: csc@mn-net.com

Homepage: www.mn-net.com

Enjoy our new catalog; we are pleased to listen to your feedback!

Your Water Analysis team

Timeline MACHEREY-NAGEL



MACHEREY-NAGEL

MACHEREY-NAGEL was founded in 1911 in Dueren (Germany) as a manufacturer of special filter papers. Since then we have established ourselves as one of the world's leading companies in the field of chemical and biomolecular analysis. In addition to our product lines for rapid tests and water analysis we offer a wide selection of products for filtration, chromatography and bioanalysis.

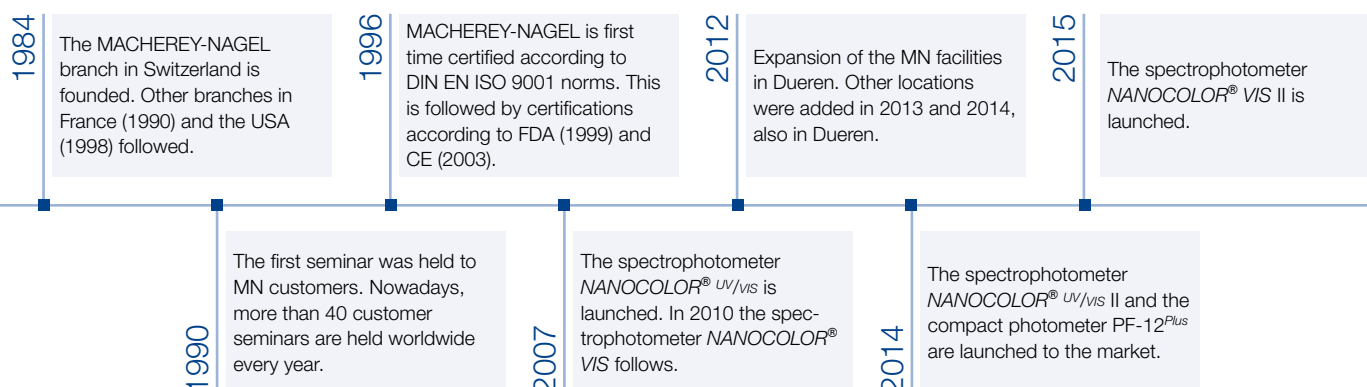
We are able to look back on decades of experience in the field of rapid tests and water analysis. In the 1950s we launched the first generation of rapid tests, in 1976 our first photometer. Over the years we have steadily refined and improved our products. This makes us one of the leading and most reliable manufacturers for water analysis.

Our headquarters are located in Dueren. Our commercial and administrative areas, research and development departments as well as our productions are based there. In addition we run three branches in Switzerland, France and the USA with more than 600 employees. Furthermore, a globally operating network of qualified and specially trained distributors in more than 150 countries, ensure worldwide availability of MN products and services.

As a privately owned company, the term family is of highest importance to us. We understand all customers as part of the MN family – our philosophy of a successful, trusting, and long term cooperation. This fundamental understanding of customer relationships goes hand in hand with our focus on quality. For more than 100 years, our customers can rely on products "Made in Germany". From conviction, we think and act in the long term.

Our personal service offers wealth of expertise and friendly advise, which creates an additional value for our customers. From the initial contact throughout the entire life-time of our products, our employees are available for customers and offer advise and support.

MACHEREY-NAGEL offers a unique combination of expertise and partnership, which makes cooperation for you very successful and pleasant.



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Measuring ranges

0.001 mg/L

0.01 mg/L

0.1 mg/L

1 mg/L

VISOCOLOR® alpha

includes colorimetric and titrimetric tests. These are evaluated visually by comparison with a color scale or drop counting. Through the use of mixed reagents often only one reagent is required.

VISOCOLOR® ECO

are colorimetric and titrimetric tests that are evaluated by comparison with a color scale or drop counting. Single reagents enable accurate analysis of water ingredients.

VISOCOLOR® HE

are highly sensitive colorimetric and titrimetric tests. Their sensitivity is achieved by using longer measurement tubes and highly sensitive reagents.



VISOCOLOR® Powder Pillows

Are individually packaged reagents which contain the exactly needed amount for a determination. They enable easiest dosing of reagents.



NANOCOLOR® standard tests

are evaluated in cells with up to 50 mm layer thickness. Thereby highest accuracy and precision can be reached. An extremely broad measuring range can be covered.

10 mg/L

100 mg/L

1000 mg/L

10000 mg/L

Qualitative test papers

serve to check the presence or absence of chemical compounds. A change in color indicates that the concentration of the tested substance is above the detection limit.



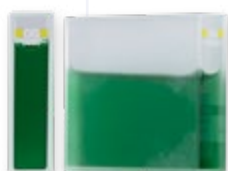
QUANTOFIX® tests strips

enable semi-quantitative determinations of a variety of parameters. They can be used immediately. No additional accessories are required.



NANOCOLOR® tube tests

contain already pre-dosed reagents, whereby a high safety and measurement accuracy is achieved. The measurement is carried out by photometry in a test tube.



Application areas

Parameter	Aquaculture and fish farming	Soil analysis	Breweries	Chemical industry	Metal processing industry	Domestic waste water	Municipal waste water	Boiler feed water	Food industry
Alkalinity			■	■					
Aluminum			■		■				■
Ammonium	■	■	■	■	■	■	■		■
AOX				■	■	■	■		
BOD ₅	■		■	■	■	■	■		■
Bromine									
Cadmium				■	■				■
Calcium	■	■	■	■	■			■	■
Carbonate hardness	■	■	■	■				■	■
Chlorine dioxide				■					■
Chloride		■	■	■	■			■	■
Chlorine		■	■	■	■			■	■
Chromium / Chromate				■	■			■	■
Cobalt				■	■				
COD	■		■	■	■	■	■	■	■
Color			■	■	■				■
Copper		■	■	■	■			■	■
Cyanide	■	■		■	■				■
Cyanuric acid									
DEHA				■				■	
Detergents			■	■	■				
Ethanol			■						■
Fluoride				■					■
Formaldehyde				■					
Hydrazine			■	■				■	
Hydrocarbons				■	■			■	
Iron	■	■	■	■	■			■	■
Lead				■	■				■
Magnesium	■	■	■	■				■	■
Manganese	■		■	■	■			■	■
Methanol			■	■					■
Molybdenum				■	■			■	
Nickel				■	■				
Nitrate	■	■	■	■	■	■	■	■	■
Nitrite	■	■	■	■	■	■	■		■
Organic acids				■		■	■		■
Organic complexing agents				■	■				
Oxygen	■		■	■				■	
Ozone				■					■
Peroxides			■	■	■				■
pH	■	■	■	■	■	■	■	■	■
Phenols				■	■				■

Application areas

Landfills	Leather industry	Sea water	Surface water	Paper industry	Pharmaceutical industry	Swimming pools	Textile industry	Drinking water	Cement and concrete production	Parameter
							■			Alkalinity
		■	■		■	■	■	■		Aluminum
■	■	■	■		■	■		■	■	Ammonium
■	■	■	■	■	■					AOX
■	■	■	■	■	■		■			BOD ₅
						■				Bromine
■		■	■		■			■		Cadmium
	■	■	■	■			■	■	■	Calcium
		■	■	■		■	■	■	■	Carbonate hardness
					■	■		■		Chlorine dioxide
	■	■	■		■			■	■	Chloride
		■	■	■	■	■	■	■		Chlorine
■	■	■	■		■		■	■	■	Chromium / Chromate
		■	■							Cobalt
■	■	■	■	■	■		■			COD
	■	■	■		■	■	■	■		Color
■		■	■		■		■	■		Copper
■		■	■		■			■		Cyanide
						■				Cyanuric acid
										DEHA
	■	■	■		■					Detergents
					■					Ethanol
		■	■		■			■		Fluoride
										Formaldehyde
										Hydrazine
		■	■		■		■			Hydrocarbons
	■	■	■		■			■		Iron
■					■			■		Lead
	■	■	■	■			■	■	■	Magnesium
	■	■	■		■			■		Manganese
					■					Methanol
								■		Molybdenum
■		■	■		■		■	■		Nickel
	■	■	■		■			■	■	Nitrate
		■	■		■			■		Nitrite
				■						Organic acids
		■	■							Organic complexing agents
		■	■							Oxygen
				■		■		■		Ozone
	■	■	■	■	■	■	■	■		Peroxide
	■	■	■	■	■	■	■	■	■	pH
■		■	■		■					Phenols

Application areas

Parameter	Aquaculture and fish farming	Soil analysis	Breweries	Chemical industry	Metal processing industry	Domestic waste water	Municipal waste water	Boiler feed water	Food industry
Phosphate	■	■	■	■	■	■	■	■	■
POC				■				■	■
Potassium		■		■					
Residual hardness			■	■				■	■
Silica				■				■	
Silver					■				
Starch				■					■
Sulfate			■	■	■			■	■
Sulfide	■			■	■				■
Sulfite				■	■			■	■
Surfactants				■	■				
Thiocyanate				■	■				
Tin				■	■				
TOC			■	■	■	■	■		■
total Hardness	■		■	■				■	■
total Nitrogen			■	■	■	■	■		■
TTC						■	■		
Turbidity			■	■	■				■
Zinc				■	■			■	■

Application areas

Landfills	Leather industry	Sea water	Surface water	Paper industry	Pharmaceutical industry	Swimming pools	Textile industry	Drinking water	Cement and concrete production	Parameter
	■	■	■		■					Phosphate
										POC
		■	■				■			Potassium
	■	■	■	■	■		■			Residual hardness
		■	■							Silica
										Silver
				■	■		■			Starch
	■	■	■		■			■	■	Sulfate
	■	■	■				■			Sulfide
	■						■			Sulfite
				■	■		■			Surfactants
				■						Thiocyanate
		■	■							Tin
■	■	■	■		■		■			TOC
	■	■	■	■			■	■	■	total Hardness
		■	■		■					total Nitrogen
										TTC
		■	■		■	■	■	■		Turbidity
■		■	■				■			Zinc

NANOCOLOR® photometers

Water analysis made easy



NANOCOLOR® photometers by MACHEREY-NAGEL are universally applicable in all areas of water and waste water analysis. In addition to the analysis of urban and industrial waste water, drinking water, process water, surface water, ground water as well as cooling and boiler feed water, NANOCOLOR® photometers can also be used for quality control in various industries such as food and beverage industry. The complete analysis can be performed reliably and quickly with just one device. In addition to the standard methods, NANOCOLOR® photometers can also be used for special applications such as color measurements.

Overview

Photometer	REF	Type	Wavelengths	Wavelength accuracy	Spectral bandwidth	Operation	Display	Data memory ¹⁾	Platform ²⁾
■ NANOCOLOR® VIS II	919650	Spectro-photometer	320–1100 nm	± 1 nm	< 4 nm	Touch screen	HD LCD	5000	TT, ST
■ NANOCOLOR® UV/VIS II	919600	Spectro-photometer	190–1100 nm	± 1 nm	< 2 nm	Touch screen	HD LCD	5000	TT, ST
■ NANOCOLOR® 500 D	919500	Filter-photometer	10 (+ 2)	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	500	TT, ST
■ PF-12 ^{Plus}	919250	Filter-photometer	7 (+ 1)	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	1000	TT, CO, PP
■ PF-3 COD	919342	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT
■ PF-3 Drinking Water	919343	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
■ PF-3 Fish	919345	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
■ PF-3 Pool	919340	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP
■ PF-3 Soil	919341	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO, PP

¹⁾ Number of measurements in data memory refers to measurement results of cuvette tests. For further information about data memory of the instruments please see the respective manual.

²⁾ CO: Colorimetric tests - only VISOCOLOR® ECO / PP: VISOCOLOR® Powder Pillows / TT: NANOCOLOR® tube tests / ST: NANOCOLOR® standard tests

	Data transfer	Mobile	Reference detector technology	Waterproof / IP 68	NTU-check	Battery operation	Mains operation	Barcode recognition	Color measurement	USB (Host)	USB (Function)	Mini-USB	RS232	LAN	Photometer
	■		■		■		■	■	■	■			■	■	
	■		■		■		■	■	■	■			■	■	
	■	■				■	■	■		■			■		
	■	■		■	■	■	■		■						
	■	■		■		■	■					■			
	■	■		■		■	■					■			
	■	■		■		■	■					■			
	■	■		■		■	■					■			

NANOCOLOR® heating blocks

Reliable sample digestion for photometric analysis

An important step in the sample preparation for photometric water analysis is the thermal decomposition of the water sample. The heating blocks *NANOCOLOR® VARIO 4* and *NANOCOLOR® VARIO C2* allow a fast and safe performance of all required sample digestions in the water and wastewater analysis.

Within of metal analysis, the *NANOCOLOR® VARIO C2 M* can be used for the digestion of larger sample volumes. This heating block has two 22 mm and eight 16 mm bores for the digestion of large sample volumes.

The *NANOCOLOR® VARIO HC* has an integrated active cooling which enables an extremely short cooling time. Thereby, an even faster digestion is possible which means a significant time saving.

The *NANOCOLOR® VARIO Mini* is a compact thermal block, which is suitable for mobile analytics due to its size.

Overview

Heating block	REF	Parallel digestions	Heating units	Bores 16 mm	Bores 22 mm	Warm-up time (25 °C → 160 °C)	Temperature range	Operation
■ <i>NANOCOLOR® VARIO 4</i>	919300	24	2	24	–	10 min	40–160 °C	Touch screen
■ <i>NANOCOLOR® VARIO C2</i>	919350	12	1	12	–	10 min	40–160 °C	Touch screen
■ <i>NANOCOLOR® VARIO C2 M</i>	919350.1	10	1	8	2	10 min	40–160 °C	Touch screen
■ <i>NANOCOLOR® VARIO Mini</i>	919380	6	1	6	–	25 min	70–160 °C	Plastic foil keyboard
■ <i>NANOCOLOR® VARIO HC</i>	919330	12	1	12	–	10 min	40–160 °C	Touch screen

Display	Programmable	NANOCOLOR® T-Set	NANOCOLOR® USB T-Set	Display temperature curve	Rapid digestion	Cooling function	Mobile	Mains operation	USB (Host)	USB (Function)	Mini-USB	RS232	Heating block
LCD	■	■	■	■	■			■	■	■		■	
LCD	■	■	■	■	■			■	■	■		■	
LCD	■	■	■	■	■			■	■	■		■	
Graphic display			■		■		■	■			■		
LCD	■	■	■	■	■	■		■	■	■		■	

Analytical quality assurance

IQC (Internal quality control)

Operating methods have become an approved way of system control and monitoring. The fundamental advantage is the rapid information compared to the instrumentally complex and time consuming standard methods. Further benefits are the lower demand of reagents, lower costs as well as a rapid performance of the test. The use of operating methods can reduce the amount of reference methods significantly.

Internal quality control serves for the verification of the whole analytical system. This accounts for the reagents and test kits, the devices which are used for analysis as well as for the personal performance. IQC is important in order to ensure correct results and to fulfill validation requirements. Several measures can be used for internal quality control and are described on the following pages.

IQC

Multiple determinations

With multiple determinations the precision of a measurement can be checked. Outliers are detected immediately and tendencies or scatters become visible.

Products for quality assurance

Applicable for all NANOCOLOR® tests



IQC

Standard measurements

By regular standard measurements, the way you work and the overall analysis system can be checked. In this case, a standard solution with a known concentration of a parameter is investigated.

Products for quality assurance

NANOCONTROL single and multi standards



IQC

Plausibility checks by dilution and standard addition

Dilutions and standard additions are suitable procedures to safeguard measurement values. These methods are employed when there are doubts about the accuracy of results.

Products for quality assurance

NANOCONTROL standard addition



IQC

Parallel measurements

In parallel measurements a sample is measured simultaneously with internal operational analysis and in an external independent laboratory. This results in a direct comparison. The measurement results should thereby be safeguarded by multiple determinations.

Products for quality assurance

Applicable for all NANOCOLOR® tests



IQC

Inspection equipment monitoring (photometer / heating blocks)

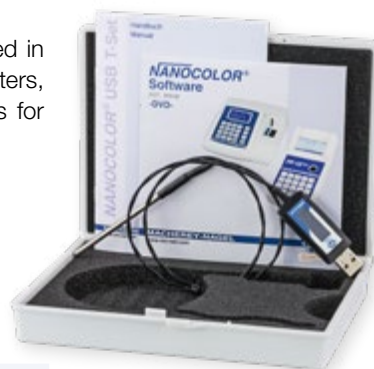
In the inspection equipment monitoring all devices which are used in the operational analysis, are monitored and tested (e.g. photometers, heating blocks and pipettes). This is done by appropriate means for operability.

Products for quality assurance

NANOCONTROL NANOCHECK and NANOCHECK 2.0

NANOCONTROL NANOTURB

NANOCOLOR® T-Set and USB T-Set



IQC

Personal information sheet / training

The education and training of laboratory staff has become a high priority within internal quality control. The focus of training is the understanding of analytical correlations, and the detection of possible error sources.

Products for quality assurance

MN seminars (for free)

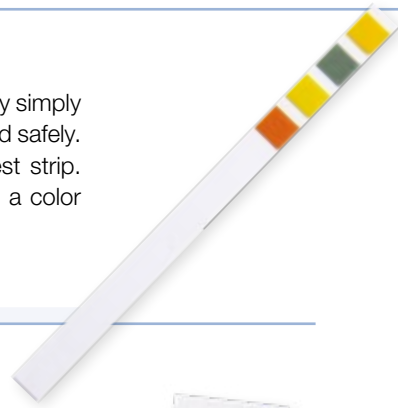


Platforms

pH

Products for pH determination

For pH determination mainly test papers and test strips are used. By simply dipping the test strip into a solution, the pH value can be determined safely. The use of different indicators causes a color reaction on the test strip. In most cases the evaluation is carried out by a comparison with a color scale.



QT

Qualitative test papers

Qualitative test papers provide information on whether a particular substance is present or not. By immersing the test paper into the sample solution a color change occurs when the concentration of the investigated substance is above a specific detection limit.



HT

Semi-quantitative tests strips

Test papers and test strips for semi-quantitative analysis are extremely simple to handle. They are based on the principle of "dip and read". They are available for a variety of parameters and comply with all requirements of a modern rapid test. The evaluation of these tests is carried out by a comparison with a color scale.



CO

Colorimetric test kits

Colorimetric tests are based on a color development of the sample after the addition of reagents. The evaluation of these tests is carried out by a comparison with a color chart.



TI

Titrimetric test kits

Titrimetric tests are based on the principle of the addition of reagent until a color change occurs. For the evaluation of these tests no separate color card is required. The amount of consumed reagent is directly related to the measured value.



PP

Powder Pillows

Powder Pillows are individually packaged reagents and contain the exactly needed amount for a determination. The evaluation of these tests is carried out photometrically in 16 mm test tubes.



TT

NANOCOLOR® tube tests

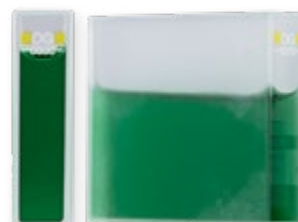
Tube tests are photometric rapid tests with pre-dosed reagents. The evaluation of these tests is carried out photometrically in 16 mm test tubes.



ST

NANOCOLOR® standard tests

Standard tests are photometric reagent sets. They contain all the reagents necessary for the analysis. Evaluation is carried out photometrically in precision cells with up to 50 mm layer thickness.



MB

Micobiological tests

Micobiological tests are based on enzymatic reaction or metabolic processes of bacteria. The evaluation of these tests is carried out with an oxygen probe or with the help of a luminometer.



Parameters A-Z





Parameters A-Z

Acetic acid (CH₃COOH)

See Organic acids (page 40)

Acid binding capacity

See Alkalinity (page 23)

Acid capacity

See Alkalinity (page 23))

Acidity

Acidity is a measure for the amount of acid in water. It gives the amount of NaOH that needs to be added to cause a color change of the pH indicator phenolphthalein (pH = 8.2)

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® HE Acidity AC 7	TI	0.2–7.2 mmol/L H ⁺	200	915006

Active oxygen

“Active oxygen” and potassium monopersulfate (KMPS), respectively, is widely used as a green alternative to chlorine in the disinfection of swimming pools.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Active oxygen	HT	0 · 4 · 8 · 15 · 25 mg/L KMPS	100	91349

Air humidity (relative)

Products that are sensitive to moisture must be kept dry. To achieve this, such products are often packed in PE bags with a desiccant. Moisture indicators allow a simple, visual control whether the product is still kept dry. Conventional moisture indicators are based on cobalt chloride, which is classified as toxic and carcinogenic. The cobalt chloride-free moisture indicators do not contain toxic or carcinogenic substances.



Product	Platform	Measuring range	Number of tests	REF
■ Moisture indicator	HT	20 · 30 · 40 · 50 · 60 · 70 · 80 % relative humidity	12	90801
■ Moisture indicator	QT	> 8 % relative humidity	1000	908901
■ Non-toxic moisture indicator without cobalt chloride	QT	> 8 % relative humidity	1000	908903

Alcohol

See Ethanol (page 32) and Methanol (page 37).



Alkalinity

Alkalinity is a measure for the buffer capacity of natural waters. It gives the amount of acid that needs to be added to cause a color change of the indicator methylorange (*m*-value, pH 4.3) or phenolphthalein (*p*-value, pH 8.2). Alkalinity is mainly caused by a combination of carbonate, bicarbonate, and hydroxide ions. If the alkalinity is high, the addition of acids or bases has only a little influence on the pH.

Alkalinity inhibits corrosion in boiler and cooling water. Additionally, alkalinity is an important parameter for quality control in process water, aquariums, and swimming pools.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Carbonate hardness	HT	0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	100	91323
■ QUANTOFIX® LubriCheck	HT	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	100	91336
■ Swimming pool test 3 in 1	HT	Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl ₂ Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L CaCO ₃ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90752
■ Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl ₂ Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl ₂ Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L CaCO ₃ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L CaCO ₃ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
■ VISOCOLOR® <i>alpha</i> Carbonate hardness	TI	1 drop equals 1.25 °e	100	935016
■ VISOCOLOR® ECO Alkalinity TA ²⁾	CO	5–250 mg/L CaCO ₃	100	931204
■ VISOCOLOR® ECO Carbonate hardness	TI	1 drop equals 1.25 °e	100	931014
■ VISOCOLOR® HE Alkalinity AL 7	TI	0.2–7.2 mmol/L OH ⁻	200	915007
■ VISOCOLOR® HE Carbonate hardness C20	TI	0.2–7.2 mmol/L H ⁺	200	915003
■ NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e / 0.4–5.4 mmol/L H ⁺	20	985015

²⁾ Only photometrically evaluable, with photometers PF-3 and / or PF-12^{Plus}.

Aluminum (Al³⁺)

Water-treatment plants use aluminum potassium sulfate (Alum) in order to flocculate suspended solids. The level of aluminum in finally treated drinking water may increase because of this process and therefore has to be tested. Depending on national regulations, different aluminum concentrations are tolerated in industrial effluents. In natural waters, the concentration of aluminum compounds is usually low.

Product	Platform	Measuring range	Number of tests	REF
■ Aluminum test paper	QT	> 10 mg/L Al ³⁺	100	90721
■ QUANTOFIX® Aluminum	HT	0 · 5 · 20 · 50 · 200 · 500 mg/L Al ³⁺	100	91307
■ VISOCOLOR® ECO Aluminum	CO	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al ³⁺	50	931006
■ NANOCOLOR® Aluminum 07	TT	0.02–0.70 mg/L Al ³⁺	19	985098
■ NANOCOLOR® Aluminum	ST	0.01–1.00 mg/L Al ³⁺	250	91802

Parameters A–Z

Ammonia (NH₄⁺)

In surface and ground waters, ammonium ions are an indication for the decomposition of animal or vegetable matter. High ammonia concentrations in surface waters can indicate contamination from waste water treatment plants, fertilizer runoff, or industrial effluents. Excess ammonia levels are toxic to aquatic life.

Product	Platform	Measuring range	Number of tests	REF
■ Ammonium test paper	QT	> 10 mg/L NH ₄ ⁺	200	90722
■ Ammonia test	HT	0 · 0.5 · 1 · 3 · 6 mg/L NH ₄ ⁺	25	90714
■ QUANTOFIX® Ammonium ³⁾	HT	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH ₄ ⁺	100	91315
■ VISOCOLOR® alpha Ammonium	CO	0 · 0.2 · 0.5 · 1 · 2 · 3 mg/L NH ₄ ⁺	50	935012
■ VISOCOLOR® ECO Ammonium 15 ¹⁾	CO	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH ₄ ⁺	50	931010
■ VISOCOLOR® ECO Ammonium 3 ¹⁾	CO	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH ₄ ⁺	50	931008
■ VISOCOLOR® HE Ammonium	CO	0.0 · 0.02 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L NH ₄ ⁺	110	920006
■ NANOCOLOR® Ammonium 2000	TT	300–1600 mg/L NH ₄ -N	20	985002
■ NANOCOLOR® Ammonium 200	TT	30–160 mg/L NH ₄ -N	20	985006
■ NANOCOLOR® Ammonium 100	TT	4–80 mg/L NH ₄ -N	20	985008
■ NANOCOLOR® Ammonium 50	TT	1–40 mg/L NH ₄ -N	20	985005
■ NANOCOLOR® Ammonium 10	TT	0.2–8.0 mg/L NH ₄ -N	20	985004
■ NANOCOLOR® Ammonium 3	TT	0.04–2.30 mg/L NH ₄ -N	20	985003
■ NANOCOLOR® Ammonium	ST	0.01–2.0 mg/L NH ₄ -N	100	91805

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{REL}. Measuring range can differ in photometrical evaluation.

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

Anionic detergents

See Surfactants (detergents) (page 46)

Antimony (Sb³⁺)

Antimony is used in lead alloys, batteries, bullets, solder, pyrotechnics, and semiconductors.

Product	Platform	Measuring range	Number of tests	REF
■ Antimony test paper	QT	> 5 mg/L Sb ³⁺	200	90723

AOX (adsorbable organically bound halogens)

AOX represents the sum of organically bound halogens (chlorine, bromine, iodine) which are adsorbable to a suitable adsorbent. It is an important parameter for the control of water quality and sludge. The result is given in mg/L chloride.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® AOX 3	TT	0.01–3.0 mg/L AOX	20	985007

Aquarium parameters, multi test

The determination of total hardness, carbonate hardness (alkalinity) and pH provides a good overview on the water quality of an aquarium.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.3 · 12.5 · 18.8 · 25.0 · 31.3 °e Carbonate hardness: 0 · 3.8 · 7.5 · 12.5 · 18.8 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	100	91326
■ QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.3 · 12.5 · 18.8 · 25.0 · 31.3 °e Carbonate hardness: 0 · 3.8 · 7.5 · 12.5 · 18.8 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	25	91327

Arsenic (As^{3+/5+})

As a naturally occurring element, arsenic is widely distributed in the earth's crust. Organic arsenic compounds can be used as pesticides.

Arsenic is toxic and causes skin diseases, keratosis, and melanoma. Therefore, arsenic levels have to be monitored regularly in drinking water. The WHO recommends a limit for drinking water of 0.01 mg/L arsenic.



Product	Platform	Measuring range	Number of tests	REF
■ Arsenic test paper	QT	> 0.5 µg As	200	90762
■ QUANTOFIX® Arsenic 50	HT	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7 · 3.0 mg/L As ^{3+/5+}	100	91332
■ QUANTOFIX® Arsenic 10	HT	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L As ^{3+/5+}	100	91334
■ QUANTOFIX® Arsenic Sensitive	HT	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L As ^{3+/5+}	100	91345

Ascorbic acid (vitamin C)

Ascorbic acid or vitamin C is found in many foods and vegetables. Often it is added to juice or fruits as stabilizing and reducing agent.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Ascorbic acid ³⁾	HT	0 · 50 · 100 · 200 · 300 · 500 · 700 · 1000 · 2000 mg/L vitamin C	100	91314

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

Biotoxicity / Bioluminescence

See Toxicity (page 47)

Parameters A-Z

Bismuth (Bi³⁺)

Bismuth is present in lead and silver ores, and occasionally as the natural element. The metal is used in alloys of lead, tin, and cadmium, and in some pharmaceuticals.

Product	Platform	Measuring range	Number of tests	REF
■ Bismuth test paper	QT	> 60 mg/L Bi ³⁺	200	90733

Blood

The rapid detection of blood may be important in the investigation of evidence and crime scenes.

Product	Platform	Measuring range	Number of tests	REF
■ Peroxtesmo KM	QT	Traces of blood	25	90605

BOD (biological oxygen demand)

Together with the chemical oxygen demand (COD) the biological oxygen demand (BOD) represents one of the most important sum parameters for the evaluation of waste water pollution. BOD is defined as the amount of oxygen per volume, which is used by the microorganisms for oxidative degradation of organic substances in a water sample. The BOD₅ value is usually determined over a period of 5 days at 20 °C

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® BOD ₅ -TT	TT	0.5–3000 mg/L O ₂	22	985825
■ NANOCOLOR® BOD ₅	TT	2–3000 mg/L O ₂	25–50	985822

Borate (boric acid, BO₃³⁻)

Borates are for example used in wood protection or as buffer substance (pH buffer). Perborates are used as bleaching agents in detergents.

Product	Platform	Measuring range	Number of tests	REF
■ Turmeric paper	QT	> 20 mg/L B	200	90747

Bromide (Br⁻)

See Chloride (page 27)

Bromine (Br₂)



Bromine is used as an alternative to chlorine in disinfection. It does not produce the typical swimming pool odor, is more effective than chlorine and less corrosive at higher pH values. Overdosing may cause irritation of skin, eyes and mucous membranes.

Product	Platform	Measuring range	Number of tests	REF
■ Chlortesmo	QT	> 1 mg/L Cl ₂	200	90603
■ VISOCOLOR® ECO Bromine ²⁾	CO	0.10–13.00 mg/L Br ₂	200	931211
■ with NANOCOLOR® Chlorine Tests	TT	See Chlorine (page 28)		

²⁾ Only photometrically evaluable, with photometers PF-3 and / or PF-12^{plus}.






Cadmium (Cd²⁺)

Cadmium is used in corrosion protection, in Ni-Cd batteries and as a color pigment. Due to its high toxicity, it is banned from use in solder in the EU since 2011.

Product	Platform	Measuring range	Number of tests	REF
 NANOCOLOR® Cadmium 2	TT	0.05–2.00 mg/L Cd ²⁺	10–19	985014
 NANOCOLOR® Cadmium	ST	0.002–0.50 mg/L Cd ²⁺	25	918131

Calcium (Ca²⁺)

Along with magnesium, calcium is responsible for water hardness and can lead to deposits. It is therefore part of the analysis of boiler feed water. Calcium is also an important part of a diet because calcium deficiency can lead to osteoporosis.

Product	Platform	Measuring range	Number of tests	REF
 QUANTOFIX® Calcium	HT	0 · 10 · 25 · 50 · 100 mg/L Ca ²⁺	60	91324
 VISOCOLOR® ECO Calcium	TI	1 drop equals 5 mg/L Ca ²⁺	100	931012
 VISOCOLOR® HE Calcium CA 20	TI	0.1–3.6 mmol/L Ca ²⁺	200	915010
 NANOCOLOR® Hardness 20	TT	10–100 mg/L Ca ²⁺	20	985043
 NANOCOLOR® Hardness Ca/Mg	TT	10–100 mg/L Ca ²⁺	20	985044

Carbonate hardness

See Hardness (page 34)

Carbonic acid (H₂CO₃)








See Acidity (page 22)

Cationic surfactants

See Surfactants (page 46)

Chloride (Cl⁻)

Chloride ions are present in all natural waters. The concentration depends on the geological and local situation. The chloride concentration can reach high levels in waste waters, polluted rivers, or in winter time when road salt is used. Very high levels of chloride can interfere with the determination of COD.

Product	Platform	Measuring range	Number of tests	REF
 Saltesmo	HT	0 · 0.25 · 0.5 · 1 · 2 · 3 · 4 · 5 g/L NaCl	30	90608
 QUANTOFIX® Chloride	HT	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl ⁻	100	91321
 VISOCOLOR® ECO Chloride ¹⁾	CO	1 · 2 · 4 · 7 · 12 · 20 · 40 · 60 mg/L Cl ⁻	90	931018
 VISOCOLOR® HE Chloride CL 500	CO	5–500 mg/L Cl ⁻	300	915004
 NANOCOLOR® Chloride 200	TT	5–200 mg/L Cl ⁻	20	985019
 NANOCOLOR® Chloride 50	TT	0.5–50.0 mg/L Cl ⁻	20	985021
 NANOCOLOR® Chloride	ST	0.2–125 mg/L Cl ⁻	250	91820

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Parameters A-Z

Chlorine (Cl₂)

Chlorine is widely used for disinfection of swimming pools, water mains, and water reservoirs. Electroplaters use chlorine for the detoxification of cyanide-containing waste. Regular monitoring of chlorine level is essential as excessive chlorine not only impairs the smell and taste of water but also can be hazardous. One distinguishes between free chlorine and combined chlorine (chloroamines); the sum of both is called total chlorine.



Product	Platform	Measuring range	Number of tests	REF
■ Potassium iodide starch paper	QT	> 1 mg/L Cl ₂	Reel, 5 m length refill pack 100200	90754 90755 90756 90758
■ Chlortesmo	QT	> 1 mg/L Cl ₂	200	90603
■ Chlorine test	HT	10 · 50 · 100 · 200 mg/L Cl ₂	Reel, 5 m length	90709
■ Swimming pool test 3 in 1	HT	Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl ₂ Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L CaCO ₃ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90752
■ Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl ₂ Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl ₂ Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L CaCO ₃ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L CaCO ₃ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
■ QUANTOFIX® Chlorine	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl ₂	100	91317
■ QUANTOFIX® Chlorine Sensitive ³⁾	HT	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl ₂	100	91339
■ VISOCOLOR® <i>alpha</i> Chlorine	CO	0.25 · 0.5 · 1.0 · 1.5 · 2.0 mg/L Cl ₂	150	935019
■ VISOCOLOR® ECO Swimming pool	CO	Free chlorine: < 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂ pH: 6.9 · 7.2 · 7.4 · 7.6 · 7.8 · 8.2	150	931090
■ VISOCOLOR® ECO Chlorine 1, free + total ¹⁾	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	150	931035
■ VISOCOLOR® ECO Chlorine 2, free + total ¹⁾	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	150	931015
■ VISOCOLOR® ECO free Chlorine 2 ¹⁾	CO	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	150	931016
■ VISOCOLOR® ECO Chlorine 6, free and total ²⁾	CO	0.05–6.00 mg/L Cl ₂	200	931217
■ VISOCOLOR® ECO free Chlorine 6 ²⁾	CO	0.05–6.00 mg/L Cl ₂	400	931219
■ VISOCOLOR® HE Chlorine, free + total	CO	0.0 · 0.02 · 0.04 · 0.06 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.60 mg/L Cl ₂	160	920015
■ VISOCOLOR® Powder Pillows free Chlorine ⁴⁾	PP	0.03–6.00 mg/L Cl ₂	100 1000	936220 936220.1
■ VISOCOLOR® Powder Pillows total Chlorine, Ozone ⁴⁾	PP	0.03–6.00 mg/L Cl ₂ / 0.03–4.00 mg/LO ₃	100 1000	936221 936221.1
■ NANOCOLOR® Chlorine / Ozone 2	TT	0.05–2.00 mg/L Cl ₂	20	985017
■ NANOCOLOR® Chlorine	ST	0.02–10.0 mg/L Cl ₂	250	91816

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and/or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

²⁾ Only photometrically evaluable, with photometers PF-3 and/or PF-12^{Plus}.

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

⁴⁾ Only photometrically evaluable, with photometers NANOCOLOR® VIS II, NANOCOLOR® UV/VIS II, PF-3 and/or PF-12^{Plus}.

Chlorine dioxide (ClO₂)

Chlorine dioxide is a powerful disinfectant which is used as an alternative to chlorine in drinking water and swimming pools. It is also used as a bleaching agent in paper industry and as a biocide in industrial cooling waters and in food industry. Chlorine dioxide is more oxidizing than chlorine.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Chlorine dioxide ¹⁾	CO	< 0.2 · 0.2 · 0.4 · 0.6 · 0.8 · 1.1 · 1.7 · 2.3 · 3.8 mg/L ClO ₂	150	931021
■ NANOCOLOR® Chlorine dioxide 5	TT	0.15–5.00 mg/L ClO ₂	20	985018
■ NANOCOLOR® Chlorine dioxide	ST	0.04–4.00 mg/L ClO ₂	50	918163

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Chlorite (ClO₂⁻)

See Chlorine dioxide (page 29)

Chromate / Chromium(VI) (CrO₄²⁻)

Chromates are for example used in the electroplating industry. They are toxic and carcinogenic and therefore need to be monitored carefully. Many companies are obliged to control the level of chromate in their effluents.

Product	Platform	Measuring range	Number of tests	REF
■ Chromium test paper	QT	> 2 mg/L Cr ³⁺ or > 5 mg/L CrO ₄ ²⁻	200	90724
■ QUANTOFIX® Chromate	HT	0 · 3 · 10 · 30 · 100 mg/L CrO ₄ ²⁻	100	91301
■ VISOCOLOR® ECO Chromium(VI) ¹⁾	CO	0.02 · 0.05 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L Cr(VI)	140	931020
■ NANOCOLOR® total Chromium 2	TT	0.005–2.00 mg/L Cr	20	985059
■ NANOCOLOR® Chromate 5	TT	0.01–4.0 mg/L CrO ₄ ²⁻	20	985024
■ NANOCOLOR® Chromate	ST	0.01–6.0 mg/L CrO ₄ ²⁻	250	91825

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Cobalt (Co²⁺)

Cobalt is used in alloys and as a component of catalysts.

Product	Platform	Measuring range	Number of tests	REF
■ Cobalt test paper	QT	> 25 mg/L Co ²⁺	100	90728
■ QUANTOFIX® Cobalt	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co ²⁺	100	91303
■ NANOCOLOR® Cobalt	ST	0.002–0.70 mg/L Co ²⁺	250	91851

Parameters A–Z

COD (chemical oxygen demand)

Besides the biological oxygen demand (BOD), the COD is the most important sum parameter for assessing the pollution of water. MACHEREY-NAGEL test tubes provide results that are comparable to the DIN 38409 H-41. Many also fulfill the requirements of DIN ISO 15705.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® COD 60000	TT	5000–60000 mg/L O ₂	20	985012
■ NANOCOLOR® COD 15000	TT	1000–15000 mg/L O ₂	20	985028
■ NANOCOLOR® COD 10000	TT	1000–10000 mg/L O ₂	20	985023
■ NANOCOLOR® COD 4000	TT	400–4000 mg/L O ₂	20	985011
■ NANOCOLOR® COD 1500	ISO 15705 TT	100–1500 mg/L O ₂	20	985029
■ NANOCOLOR® COD 1500 Hg-free	TT	100–1500 mg/L O ₂	20	963029
■ NANOCOLOR® COD HR 1500	ISO 15705 TT	20–1500 mg/L O ₂	20	985038
■ NANOCOLOR® COD 600	ISO 15705 TT	50–600 mg/L O ₂	20	985030
■ NANOCOLOR® COD 300	TT	50–300 mg/L O ₂	20	985033
■ NANOCOLOR® COD 160	ISO 15705 TT	15–160 mg/L O ₂	20	985026
■ NANOCOLOR® COD 160 Hg-free	TT	15–160 mg/L O ₂	20	963026
■ NANOCOLOR® COD LR 150	ISO 15705 TT	3–150 mg/L O ₂	20	985036
■ NANOCOLOR® COD 60	ISO 15705 TT	5–60 mg/L O ₂	20	985022
■ NANOCOLOR® COD 40	ISO 15705 TT	2–40 mg/L O ₂	20	985027

Coloring / Color

Natural waters are usually brown to yellow. The Hazen scale, which is calibrated with platinum cobalt chloride standards, is a reference for the color strength. Color measurements are special methods available in certain photometers and do not require additional reagents. Please see photometer manuals for details.

Product	Platform	Measuring range	Number of tests	REF
■ Color (Hazen / DIN)	ST	5–500 mg/L Pt (Hazen)	–	–

Complexing agents

See EDTA (page 32)

Cooking salt (NaCl)

See Chloride (page 27)

Cooling lubricants

Cooling lubricants or coolants are used when metal parts are machined (drilling, cutting, etc.). Different parameters, e.g. pH and lubricant concentration, are checked to ensure the optimal function.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® LubriCheck	HT	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	100	91336
■ QUANTOFIX® Nitrite / pH	HT	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻ pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	100	91338

Copper (Cu²⁺)

Copper is one of the most widely used metals in the industry for example on surfaces and as a component of alloys. In addition, it is also used in pesticides.

Product	Platform	Measuring range	Number of tests	REF
■ Copper test paper	QT	> 20 mg/L Cu ²⁺	200	90729
■ Cuprotesmo	QT	> 5 mg/L Cu ^{+/2+} or > 0.05 µg Cu	40	90601
■ QUANTOFIX® Copper	HT	0 · 10 · 30 · 100 · 300 mg/L Cu ²⁺	100	91304
■ VISOCOLOR® ECO Copper ¹⁾	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 1.0 · 1.5 mg/L Cu ²⁺	100	931037
■ VISOCOLOR® HE Copper	CO	0.0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Cu ²⁺	150	920050
■ NANOCOLOR® Copper 5	TT	0.10–7.00 mg/L Cu ²⁺	20	985053
■ NANOCOLOR® Copper	ST	0.01–10.0 mg/L Cu ²⁺	250	91853

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.



Cyanide (CN⁻)

Cyanide is extremely toxic. The lethal dose is about 1 mg/kg body weight. A careful control is therefore essential, whenever cyanides are used for industrial processes, e.g. in electroplating or in the extraction of gold. Intense control is also required in the production of fruit brandy from stone fruit.

Product	Platform	Measuring range	Number of tests	REF
■ Cyantesmo	QT	> 0.2 mg/L CN ⁻ or HCN	Reel, 5 m length	90604
■ QUANTOFIX® Cyanide	HT	0 · 1 · 3 · 10 · 30 mg/L CN ⁻	100	91318
■ VISOCOLOR® ECO Cyanide ¹⁾	CO	0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L CN ⁻	100	931022
■ VISOCOLOR® HE Cyanide	CO	0.0 · 0.002 · 0.004 · 0.007 · 0.010 · 0.015 · 0.020 · 0.025 · 0.030 · 0.040 mg/L CN ⁻	50	920028
■ NANOCOLOR® Cyanide 08	TT	0.005–0.80 mg/L CN ⁻	20	985031
■ NANOCOLOR® Cyanide	ST	0.001–0.50 mg/L CN ⁻	250	91830

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Cyanuric acid

Cyanuric acid is a common stabilizer for chlorine in swimming pools which is degraded by intensive UV radiation, if it is not stabilized. Therefore, cyanuric acid ensures the water's safe and proper disinfection.

Product	Platform	Measuring range	Number of tests	REF
■ Cyanuric acid test	HT	0 · 50 · 100 · 150 · 300 mg/L Cya	25	90710
■ VISOCOLOR® ECO Cyanuric acid ¹⁾	CO	10 · 15 · 20 · 30 · 40 · 60 · 80 · 100 mg/L Cya	100	931023

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Parameters A-Z

DEHA (diethylhydroxylamine)

N,N-diethylhydroxylamine (DEHA) is used as an oxygen scavenger in boiler feed water that effectively prevents corrosion.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO DEHA	CO	0 · 0.01 · 0.03 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 mg/L DEHA	125	931024
■ NANOCOLOR® DEHA 1	TT	0.05–1.00 mg/L DEHA	20	985035

Detergents

See Surfactants (detergents) (page 46)

Disinfectants

With QUATs as active substance: see Quaternary ammonium complexes (page 44)

With peracetic acid as the active substance: see Peracetic acid (page 41)

With peroxide as the active substance: see Peroxide (page 41)

With glutaraldehyde as the active substance: see Glutaraldehyde (page 33)

With chlorine as the active substance: see Chlorine (page 28)

With chlorine dioxide as the active substance: see Chlorine dioxide (page 29)

With ozone as the active substance: see Ozone (page 40)

Dithionite ($S_2O_4^{2-}$)

The detection of dithionite is important to determine the end point of the conversion of vat dyes to the leuco form in textile industry.

Product	Platform	Measuring range	Number of tests	REF
■ Nitrazine yellow paper	QT	Traces of sodium dithionite	200	90751
■ VISOCOLOR® HE Sulfite SU 100	TI	2–100 mg/L SO_3^{2-}	100	915008

EDTA (ethylenediaminetetraacetic acid)

EDTA and other chelating agents are often used as additives in detergents and cleaning agents, cosmetics and in the food industry. They are poorly biodegradable and can interfere with the photometric determination of metal ions. Other chelating agents are also detected (for details see instruction leaflet).

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® EDTA	HT	0 · 100 · 200 · 300 · 400 mg/L EDTA	100	91335
■ NANOCOLOR® org. Complexing agents 10	TT	0.5–10.0 mg/L I_{BIC} / 0.7–14 mg/L EDTA	10–19	985052

Ethanol (C_2H_5OH)

Ethanol is the least toxic alcohol to humans and is present in beer, wine, liquor and other alcoholic beverages. It can also be used as a disinfectant and for preservation.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Ethanol 1000	TT	100–1000 mg/L EtOH / 0.013–0.130 Vol. % EtOH	23	985838

Fatty acids

See Organic acids (page 40)

Fluoride (F⁻)

Fluoride is naturally present in water but is sometimes also added to drinking water as a health care measure. The determination of fluoride can be used for the rapid detection of hydrofluoric acid (HF), which is used in large quantities in semiconductor industry.

Product	Platform	Measuring range	Number of tests	REF
■ Fluoride test paper	QT	> 20 mg/L F ⁻	200	90750
■ Fluoride test	HT	0 · 2 · 5 · 10 · 20 · 50 · 100 mg/L F ⁻	30	90734
■ VISOCOLOR® ECO Fluoride ²⁾	CO	0.1–2.0 mg/L F ⁻	150	931227
■ NANOCOLOR® Fluoride 2	TT	0.1–2.0 mg/L F ⁻	20	985040
■ NANOCOLOR® Fluoride	ST	0.05–2.00 mg/L F ⁻	500	918142

²⁾ Only photometrically evaluable, with photometers PF-3 and / or PF-12^{Plus}.

Formaldehyde (HCHO)

Formaldehyde is used in large quantities as a raw material in chemical industry and as a biocide in closed cooling or heating circuits. Additionally, it is used for the production of wood-based panels (chipboards), and for textile treatment. Formaldehyde can cause allergies and irritation of skin, eyes and the respiratory tract.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Formaldehyde ³⁾	HT	0 · 10 · 20 · 40 · 60 · 100 · 200 mg/L HCHO	100	91328
■ NANOCOLOR® Formaldehyde 10	TT	0.02–10.00 mg/L HCHO	20	985046
■ NANOCOLOR® Formaldehyde 8	TT	0.1–8.0 mg/L HCHO	20	985041

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Glucose

Glucose is an important ingredient in many foods. Similar to total sugar (see page 47) it is a quality criterion for potato processing and in beverage industry.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Glucose ³⁾	HT	0 · 50 · 100 · 250 · 500 · 1000 · 2000 mg/L glucose	100	91348

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Glutaraldehyde

Glutaraldehyde is a strong disinfectant that is used e.g. for the disinfection of surgical instruments. The concentration must be sufficiently high to ensure that instruments are free of contaminants.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Glutaraldehyde	HT	0 · 0.5 · 1 · 1.5 · 2 · 2.5 % glutaraldehyde	100	91343

Parameters A-Z

Hardness

Water hardness is primarily caused by calcium and magnesium. It forms deposits in pipes and on heating elements and can lead to damages. Testing water hardness is important to dose water softeners correctly. Very low residual hardness is required in industrial boiler feed water.

Water is often classified as “soft” or “hard”. The following ranges apply in European households:

< 150 ppm (10.5 °e) = soft water

150–250 ppm (10.5 to 17.5 °e) = moderately hard water

> 250 ppm (17 °e) = hard water



Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Carbonate hardness	HT	0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e	100	91323
■ QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.25 · 12.5 · 18.75 · 25 · 31.25 °e Carbonate hardness: 0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	100	91326
■ QUANTOFIX® Multistick for aquarium owners	HT	Total hardness: 0 · 6.25 · 12.5 · 18.75 · 25 · 31.25 °e Carbonate hardness: 0 · 3.75 · 7.5 · 12.5 · 18.75 · 25 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	25	91327
■ Swimming pool test 5 in 1	HT	Total chlorine: 0 · 1 · 3 · 5 · 10 mg/L Cl ₂ Free chlorine: 0 · 0.5 · 1 · 3 · 5 · 10 mg/L Cl ₂ Alkalinity: 0 · 80 · 120 · 180 · 240 mg/L CaCO ₃ Total hardness: 0 · 100 · 250 · 500 · 1000 mg/L CaCO ₃ pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.4	50	90759
■ AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm CaCO ₃	100	91201
■ AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm CaCO ₃	1000	91223
■ AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm CaCO ₃	5000	91221
■ AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm CaCO ₃	50 x 3 pieces	912902
■ AQUADUR®	HT	< 54 · > 72 · > 126 · > 252 · > 378 ppm CaCO ₃	100	91220
■ AQUADUR®	HT	< 54 · > 72 · > 126 · > 252 · > 378 ppm CaCO ₃	1000	91224
■ AQUADUR®	HT	< 54 · > 72 · > 126 · > 252 · > 378 ppm CaCO ₃	5000	91222
■ AQUADUR®	HT	< 54 · > 72 · > 151.2 · > 252 ppm CaCO ₃	100	91239
■ AQUADUR®	HT	< 54 · > 72 · > 151.2 · > 252 · > 378 ppm CaCO ₃	1000	91240
■ AQUADUR® Sensitive	HT	0 · 5.4 · 10.8 · 18.8 ppm CaCO ₃	50	91243
■ VISOCOLOR® alpha Carbonate hardness	TI	1 drop equals 1.25 °e	100	935016
■ VISOCOLOR® alpha Total hardness	TI	1 drop equals 1.25 °e	100	935042
■ VISOCOLOR® alpha Residual hardness	CO	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	935080
■ VISOCOLOR® ECO Carbonate hardness	TI	1 drop equals 1.25 °e	100	931014
■ VISOCOLOR® ECO Total hardness	TI	1 drop equals 1.25 °e	110	931029
■ VISOCOLOR® HE Carbonate hardness C 20	TI	0.6–25 °e	200	915003
■ VISOCOLOR® HE Total hardness H 20 F	TI	0.6–25.0 °e	200	915005
■ VISOCOLOR® HE Total hardness H 2	TI	0.06–2.50 °e	200	915002
■ NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e	20	985015
■ NANOCOLOR® Hardness 20	TT	1.25–25.00 °e	20	985043
■ NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e	20	985044
■ NANOCOLOR® Residual hardness 1	TT	0.03–1.25 °e	20	985084

Hydrazine (N₂H₄)

Hydrazine is a powerful oxygen scavenger for boiler feed water and is used to prevent corrosion. Since it is toxic and carcinogenic, the use must be carefully controlled. In many areas, it was replaced by the less dangerous DEHA.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Hydrazine ¹⁾	CO	0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 mg/L N ₂ H ₄	130	931030
■ NANOCOLOR® Hydrazine	ST	0.002–1.50 mg/L N ₂ H ₄	250	91844

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Hydrocarbons

Even low concentrations of hydrocarbons such as gasoline, diesel or oil can contaminate water and soil.

Product	Platform	Measuring range	Number of tests	REF
■ Oil test paper	QT	> 250 mg/L petroleum ether or > 10 mg/L gasoline > 5 mg/L fuel oil or > 1 mg/L lubricating oil	100	90760
■ NANOCOLOR® HC 300	TT	0.5–5.6 mg/L HC	20	985057

Hydrogen cyanide (HCN)

See Cyanide (page 31)

Hydrogen peroxide (H₂O₂)

See Peroxide (page 41)

Iodine (I⁻)

See Chlorine (page 28)

Iron (Fe^{2+/3+})

Iron is used in the industry for example for piping and containers. The determination of iron is a key indicator for the level of corrosion.

Iron is not desired in drinking water as it leads to a brown color and a foul smell.

Product	Platform	Measuring range	Number of tests	REF
■ Dipyrindyl paper (specific for Fe ²⁺)	QT	> 2 mg/L Fe ²⁺	200	90725
■ Iron test paper	QT	> 10 mg/L Fe ^{2+/3+}	100	90726
■ QUANTOFIX® Total iron 1000	HT	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L Fe ^{2+/3+}	100	91330
■ QUANTOFIX® Total iron 100	HT	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Fe ^{2+/3+}	100	91344
■ VISOCOLOR® ECO Iron 1 ¹⁾	CO	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	200	931025
■ VISOCOLOR® ECO Iron 2 ¹⁾	CO	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	100	931026
■ VISOCOLOR® HE Iron	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.04 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L Fe	300	920040
■ NANOCOLOR® Iron 3	TT	0.02–3.00 mg/L Fe	20	985037
■ NANOCOLOR® Iron	ST	0.01–15.0 mg/L Fe	250	91836

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Parameters A-Z

Lactoperoxidase

See Peroxidase (page 41)

Lead (Pb²⁺)

Lead in a water supply may have different sources, e.g. industrial, mine, and smelter discharges or dissolution of plumbing and plumbing fixtures. Lead also is used in service pipes, thus tap water may also contain lead. Lead is toxic if ingested and is a cumulative poison.

Product	Platform	Measuring range	Number of tests	REF
■ Plumbtesmo	QT	> 5 mg/L Pb ²⁺	40	90602
■ NANOCOLOR® Lead 5	TT	0.10–5.00 mg/L Pb ²⁺	20	985009
■ NANOCOLOR® Lead	ST	0.005–1.00 mg/L Pb ²⁺	50	918101

Luminous bacteria test

See Toxicity (page 47)

Magnesium (Mg²⁺)

Magnesium and calcium are responsible for the hardness of water and can lead to lime deposits. Magnesium is also an important parameter in the food industry, since it is essential for a number of physiological processes.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Total hardness and VISOCOLOR® ECO Calcium	TI	1 drop equals 1.25 °e	110	931029
	TI	1 drop equals 0.875 °e	100	931012
■ NANOCOLOR® Hardness 20	TT	1.25–25.0 °e	20	985043
■ NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e / 5–50 mg/L Mg ²⁺	20	985044

Manganese (Mn)

Manganese is widely used in steel alloys together with iron, aluminum and other metals. It is also an essential trace element, since it is part of several enzymes. Manganese can negatively influence the quality of food.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Manganese ¹⁾	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Mn	70	931038
■ VISOCOLOR® HE Manganese	CO	0.0 · 0.03 · 0.06 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Mn	100	920055
■ NANOCOLOR® Manganese 10	TT	0.1–10.0 mg/L Mn	20	985058
■ NANOCOLOR® Manganese	ST	0.01–10.0 mg/L Mn	250	91860

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Mastitis

Mastitis (inflammation) of a cow's udder must be detected promptly, because the milk of infected animals may not be placed on the market. It can be recognized by a check of the milk's pH value, e.g. with the udder test paper.

Product	Platform	Measuring range	Number of tests	REF
■ Udder test paper	QT	Traces of Mastitis	20	90748

Methanol (CH₃OH)

In wastewater treatment plants, methanol can be used as a carbon source in the denitrification process. It is naturally present in different fruit juices. Because of its toxicity, this alcohol may also be carefully controlled during juice production.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Methanol 15	TT	0.2–15.0 mg/L MeOH	23	985859

Milk

Alkaline phosphatase (control of pasteurization) see Phosphatase (page 42)

Lactoperoxidase (control of ultra high temperature milk) see Peroxidase (page 41)

Molybdenum (Mo⁶⁺)

Molybdenum salts are used as corrosion inhibitors, mainly in coolant water and boiler feed water. The careful control of molybdenum is necessary to ensure a sufficient corrosion prevention.



Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Molybdenum	HT	0 · 5 · 20 · 50 · 100 · 250 mg/L Mo ⁶⁺	100	91325
■ NANOCOLOR® Molybdenum 40	TT	1.0–40.0 mg/L Mo(VI)	20	985056

Nickel (Ni²⁺)

Nickel can cause allergic reactions on the skin. Metal objects that can have skin contact, are therefore regularly tested for their nickel content.

Nickel is also used for metal plating processes. Here, the nickel content is controlled in the baths as well as in the outflow.

Product	Platform	Measuring range	Number of tests	REF
■ Nickel test paper	QT	> 10 mg/L Ni ²⁺	200	90730
■ QUANTOFIX® Nickel	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni ²⁺	100	91305
■ VISOCOLOR® ECO Nickel ¹⁾	CO	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Ni ²⁺	150	931040
■ NANOCOLOR® Nickel 4	TT	0.10–7.00 mg/L Ni ²⁺	20	985071
■ NANOCOLOR® Nickel	ST	0.01–10.0 mg/L Ni ²⁺	250	91862

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and /or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Parameters A-Z

Nitrate (NO₃⁻)

Nitrate is a by-product of biological decay from plant and animal matter (nitrification). Nitrate is reduced to nitrite easily, which can lead to diseases and increased fish mortality. Furthermore, high concentrations of nitrate itself are also harmful. Such concentrations are found predominantly in agricultural areas where nitrogen fertilizer is regularly used. The EU's limit for nitrate in drinking water is 50 mg/L. Nitrate is also an important parameter in the outflow of wastewater treatment plants.



Product	Platform	Measuring range	Number of tests	REF
■ Nitratesmo	QT	> 10 mg/L NO ₃ ⁻ or > 5 mg/L NO ₂ ⁻	Reel, 5 m length	90611
■ QUANTOFIX® Nitrate 100 ³⁾	HT	0 · 5 · 10 · 25 · 50 · 75 · 100 mg/L NO ₃ ⁻	100	91351
■ QUANTOFIX® Nitrate / Nitrite ³⁾	HT	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ ⁻ Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻	100	91313
■ VISOCOLOR® alpha Nitrate	CO	2 · 8 · 15 · 30 · 50 mg/L NO ₃ ⁻	100	935065
■ VISOCOLOR® ECO Nitrate ¹⁾	CO	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO ₃ ⁻	110	931041
■ VISOCOLOR® Powder Pillows Nitrate ⁴⁾	PP	1.0–50 mg/L NO ₃ -N	100	936226
■ NANOCOLOR® Nitrate 250	TT	4–60 mg/L NO ₃ -N	20	985066
■ NANOCOLOR® Nitrate 50	TT	0.3–22.0 mg/L NO ₃ -N	20	985064
■ NANOCOLOR® Nitrate 8	TT	0.30–8.00 mg/L NO ₃ -N	20	985065
■ NANOCOLOR® Nitrate	ST	0.1–30.0 mg/L NO ₃ -N	100	91865
■ NANOCOLOR® Nitrate Z	ST	0.02–1.0 mg/L NO ₃ -N	500	91863


¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

⁴⁾ Only photometrically evaluable, with photometers NANOCOLOR® VIS II, NANOCOLOR® UV/VIS II, PF-3 and / or PF-12^{Plus}.


NANOCOLOR® VIS II

Spectrophotometer for high-precision analysis



Smart photometry

- Unique user experience due to icon based menu guidance
- 10.1" HD-display for a clear overview
- Safe results due to automatic turbidity control function (NTU-check)
- Safeguarding of results via integrated IQC menu



Nitrite (NO₂⁻)

Nitrite is produced as an intermediate in the nitrification in sewage treatment plants. An excessive content of nitrite indicates that the plant's biology does not work optimally. A high level of nitrite in cooling lubricants indicates a microbiological contamination of the circuit (see also cooling lubricants page 30). Nitrite has to be controlled in aquariums as well in order to ensure optimum living conditions for the aquatic life.

Product	Platform	Measuring range	Number of tests	REF
■ Potassium iodide starch paper	QT	> 1 mg/L NO ₂ ⁻	Reel, 5 m length Refill pack 100200	90754 90755 90756 90758
■ Nitratesmo	QT	> 10 mg/L NO ₃ ⁻ or > 5 mg/L NO ₂ ⁻	Reel, 5 m length	90611
■ QUANTOFIX® Nitrite 3000	HT	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO ₂ ⁻	100	91322
■ QUANTOFIX® Nitrite ³⁾	HT	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻	100	91311
■ QUANTOFIX® Nitrate / Nitrite ³⁾	HT	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ ⁻ Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻	100	91313
■ QUANTOFIX® Nitrite / pH	HT	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻ pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	100	91338
■ VISOCOLOR® alpha Nitrite	CO	0.05 · 0.10 · 0.25 · 0.5 · 1.0 mg/L NO ₂ ⁻	200	935066
■ VISOCOLOR® ECO Nitrite ¹⁾	CO	0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 mg/L NO ₂ ⁻	120	931044
■ VISOCOLOR® HE Nitrite	CO	0.0 · 0.005 · 0.010 · 0.015 · 0.02 · 0.03 · 0.04 · 0.06 · 0.08 · 0.10 mg/L NO ₂ ⁻	150	920063
■ NANOCOLOR® Nitrite 4	TT	0.1–4.0 mg/L NO ₂ -N	20	985069
■ NANOCOLOR® Nitrite 2	TT	0.003–0.460 mg/L NO ₂ -N	20	985068
■ NANOCOLOR® Nitrite	ST	0.002–0.30 mg/L NO ₂ -N	250	91867

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{2)AS}. Measuring range can differ in photometrical evaluation.

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

Nitrification inhibition

The nitrification is an important part in the process of nitrogen elimination in sewage treatment plants. A number of different substances in the sewage plant inflow may interfere this process.

Product	Platform	Measuring range	Number of tests	REF
■ BioFix® A-Tox	MB	0–100 % inhibition of the oxidation of ammonium	25	970001
■ BioFix® N-Tox	MB	0–100 % inhibition of the oxidation of nitrite	25	970002

Nitrogen (total, kjeldahl, N)

Total nitrogen is the sum of all nitrogen-containing compounds in a water sample. It is an important parameter in the outflow control of water treatment plants.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® total Nitrogen TN _b 220	TT	5–220 mg/L N	20	985088
■ NANOCOLOR® total Nitrogen TN _b 60	TT	3–60 mg/L N	20	985092
■ NANOCOLOR® total Nitrogen TN _b 22	TT	0.5–22.0 mg/L N	20	985083
■ NANOCOLOR® total Kjeldahl nitrogen TKN 16	TT	1.00–16.0 mg/L TKN	20	985067

pH: Products for pH determination / QT: Qualitative test papers / HT: Semi-quantitative test strips / CO: Colorimetric test kits / TT: Titrimetric test kits / PP: Powder Pillows
TT: NANOCOLOR® tube tests / ST: NANOCOLOR® standard tests / MB: Microbiological tests

Parameters A-Z

Non-ionic detergents

See Surfactants (detergents) (page 46)

Oil

See Hydrocarbons (page 35)

Organic acids

Fatty acids and acetic acid are examples of organic acids in the field of water analysis. Acetic acid (table vinegar) has a germicidal effect, which is utilized for the preservation of food.



Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Organic acids 3000	TT	30–3000 mg/L CH ₃ COOH	20	985050

Oxygen (O₂)

Oxygen in water is an important parameter for aquatic life, but also in the prevention of corrosion, e.g. in boiler feed water.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Active oxygen	HT	0.4–8.15–25 mg/L KMPS	100	91349
■ VISOCOLOR® ECO Oxygen ¹⁾	CO	0.1–2.3–4.6–8–10 mg/L O ₂	50	931088
■ VISOCOLOR® HE Oxygen SA 10	TI	0.2–10.0 mg/L O ₂	100	915009
■ NANOCOLOR® Oxygen 12	TT	0.5–12.0 mg/L O ₂	22	985082

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Ozone (O₃)

Ozone, a potent disinfectant, is widely used for the sterilization and purification of water in swimming baths, breweries, pharmaceutical industries, and mineral water factories. The gas is toxic to humans and is also produced in the environment from oxygen and nitrogen oxide under the influence of sunlight. When ozone concentrations in air are higher than 180 µg/m³ sensitive persons should avoid physical exertion outdoors.

Product	Platform	Measuring range	Number of tests	REF
■ Potassium iodide starch paper	QT	Qualitative	Reel, 5 m length refill pack 100200	90754 90755 90756 90758
■ Ozone test (measurement in air)	HT	< 90–90–150–150–210 > 210 µg/m ³ O ₃ (ozone content in air)	12	90736
■ VISOCOLOR® Powder Pillows total Chlorine, Ozone ⁴⁾	PP	0.03–6.00 mg/L Cl ₂ / 0.03–4.00 mg/L O ₃	100 1000	936221 936221.1
■ NANOCOLOR® Chlorine / Ozone 2	TT	0.05–2.00 mg/L O ₃	20	985017
■ NANOCOLOR® Ozone	ST	0.01–1.50 mg/L O ₃	200	91885

⁴⁾ Only photometrically evaluable, with photometers NANOCOLOR® VIS II, NANOCOLOR® UV/VIS II, PF-3 and / or PF-12^{Plus}.

Peracetic acid (CH₃COOOH)

Peracetic acid is a widely used, very strong disinfectant which is applied both for piping and tanks in the food industry and for bleaching in the pulp and paper industry. Disinfectant baths in the medical sector must be checked regularly, as peracetic acid can decompose in the presence of traces of blood.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Peracetic acid 2000 ³⁾	HT	0 · 500 · 1000 · 1500 · 2000 mg/L peracetic acid	100	91342
■ QUANTOFIX® Peracetic acid 500 ³⁾	HT	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	100	91341
■ QUANTOFIX® Peracetic acid 50 ³⁾	HT	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	100	91340

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Peroxidase

The enzyme peroxidase is an important parameter in food industry to control the quality of canned food. Lactoperoxidase is an indicator of the integrity of high-temperature heating in dairy industry.

Product	Platform	Measuring range	Number of tests	REF
■ Peroxtesmo KM (for criminalistics)	QT	Traces of blood	25	90605
■ Peroxtesmo KO (for food industry)	QT	Traces of peroxidase	100	90606
■ Peroxtesmo MI (for dairy industry)	QT	> 3 % raw milk in UHT milk	100	90627

Peroxide (H₂O₂)

Hydrogen peroxide is a disinfectant. It is used in the dairy and beverage industry for disinfection of packaging. Prior to the disinfection, the check for a sufficiently high concentration of peroxide is mandatory. After the disinfection, the complete removal of peroxides has to be controlled.

Some solvents, which are used in the chemical industry, tend to form peroxides. The check for peroxides in such solvents is of importance to avoid explosions during heating.



Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Peroxide 1000 ³⁾	HT	0 · 50 · 150 · 300 · 500 · 800 · 1000 mg/L H ₂ O ₂	100	91333
■ QUANTOFIX® Peroxide 100 ³⁾	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L H ₂ O ₂	100	91312
■ QUANTOFIX® Peroxide 25 ³⁾	HT	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H ₂ O ₂	100	91319
■ NANOCOLOR® Peroxide 2	TT	0.03–2.00 mg/L H ₂ O ₂	10–19	985871

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Phenol

Phenols are found in domestic and industrial waste water. They are used i.a. for the production of pharmaceuticals and pesticides.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Phenolic index 5	TT	0.2–5.0 mg/L phenol	20	985074
■ NANOCOLOR® Phenol	ST	0.01–7.0 mg/L phenol	500	91875

Parameters A-Z

Phosphatase

The determination of alkaline phosphatase in milk allows a quick and easy quality control of pasteurization (Phosphatesmo MI).

The test for acid phosphatase (Phosphatesmo KM) enables a quick and simple check for sperm in stains. However, this test does not replace the detection of intact sperm.

Product	Platform	Measuring range	Number of tests	REF
■ Phosphatesmo KM (for criminalistics)	QT	Traces of sperm	25	90607
■ Phosphatesmo MI (for dairy industry)	QT	> 0.5 % raw milk in pasteurized milk or > 300 U/L alkaline phosphatase in UHT milk	50	90612

Phosphate (phosphorous, PO_4^{3-})

High levels of phosphate in surface water are an indication of domestic sewage, fertilizer or industrial wastewater. Very high levels lead to eutrophication (over-fertilization) of rivers and lakes and can ultimately lead to the death of fish and plants. The elimination of phosphorus from wastewater is therefore an important target of cleaning in sewage treatment plants.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Phosphate ³⁾	HT	0.3 · 10 · 25 · 50 · 100 mg/L PO_4^{3-}	100	91320
■ VISOCOLOR® alpha Phosphate	CO	2 · 5 · 10 · 15 · 20 mg/L PO_4^{3-}	70	935079
■ VISOCOLOR® ECO Phosphate ¹⁾	CO	0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L $\text{PO}_4\text{-P}$	80	931084
■ VISOCOLOR® HE Phosphate	CO	0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L P	300	920082
■ VISOCOLOR® HE Phosphate (DEV)	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 mg/L P	100	920080
■ NANOCOLOR® ortho- and total Phosphate 50	TT	10.0–50.0 mg/L P	19	985079
■ NANOCOLOR® ortho- and total Phosphate 45	TT	5.0–50.0 mg/L P	20	985055
■ NANOCOLOR® ortho- and total Phosphate 15	TT	0.30–15.00 mg/L P	20	985080
■ NANOCOLOR® ortho- and total Phosphate 5	TT	0.20–5.00 mg/L P	20	985081
■ NANOCOLOR® ortho- and total Phosphate 1	TT	0.05–1.50 mg/L P	20	985076
■ NANOCOLOR® ortho- and total Phosphate LR 1	TT	0.05–0.50 mg/L P	20	985095
■ NANOCOLOR® ortho-Phosphate	ST	0.2–17 mg/L $\text{PO}_4\text{-P}$	500	91878
■ NANOCOLOR® ortho-Phosphate	ST	0.04–6.5 mg/L $\text{PO}_4\text{-P}$	500	91877

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

pH value

The pH is a measure of the acidity or alkalinity of an aqueous solution. It is defined as the negative decadic logarithm of the hydrogen ion concentration.

Product	Platform	Measuring range	Number of tests	REF
■ pH test papers see corresponding chapter (from page 52)	pH			
■ VISOCOLOR® <i>alpha</i> pH 5–9	CO	pH: 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	200	935075
■ VISOCOLOR® <i>ECO</i> pH 4.0–9.0	CO	pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	450	931066
■ VISOCOLOR® <i>ECO</i> pH 6.0–8.2	CO	pH: 6.1–8.4	150	931270
■ VISOCOLOR® <i>HE</i> pH 4.0–10.0	CO	pH: 4.0 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 10.0	500	920074
■ VISOCOLOR® Powder Pillows pH ⁴⁾	PP	pH: 6.2–8.2	100	936222
■ NANOCOLOR® pH 6.5–8.2	TT	pH: 6.5–8.2	100	91872

⁴⁾ Only photometrically evaluable, with photometers NANOCOLOR® VIS II, NANOCOLOR® UV/VIS II, PF-3 and / or PF-12^{Plus}.

POC (polyoxycarboxylic acids)

POCs are used in boiler feed water to prevent lime deposits.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® POC 200	TT	20–200 mg/L POC AS 2020 / 20–200 mg/L POC HS 2020 / 20–200 mg/L Polystabil® DK / 2–40 mg/L Polystabil® KWI	20	985070

Potassium (K⁺)

Potassium is an essential element for nutrition. Water-soluble potassium compounds are used as fertilizers and therefore have a great importance in agriculture.



Product	Platform	Measuring range	Number of tests	REF
■ Potassium test paper	QT	> 250 mg/L K ⁺	200	90727
■ QUANTOFIX® Potassium	HT	0 · 200 · 400 · 700 · 1000 · 1500 mg/L K ⁺	100	91316
■ VISOCOLOR® <i>ECO</i> Potassium ¹⁾	CO	2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K ⁺	60	931032
■ NANOCOLOR® Potassium 50	TT	2–50 mg/L K ⁺	20	985045

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

NANOCOLOR® VARIO 4

Heating block for reliable digestions

Experience versatility

- Touch screen with intuitive menu guidance
- Short warm-up times and high temperature stability
- Internal quality control via NANOCOLOR® T-Set
- COD, total-N and total-P within 30 minutes

Parameters A-Z

Proteins

Proteins are easily detected on surfaces and can be used as an indication of incomplete cleaning in food processing companies.

Product	Platform	Measuring range	Number of tests	REF
■ INDIPRO	QT	> 50 µg BSA (bovine serum albumin)	60	90765

Quaternary ammonium compounds (QUATs)

Quaternary ammonium compounds are widely used for disinfection of medical devices and surfaces. In addition, they are also used as biocides in cooling circuits.

Product	Platform	Measuring range	Number of tests	REF
■ INDQUAT	HT	on request		909000
■ QUANTOFIX® QUAT	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L benzalkonium chloride	100	91337

Residual hardness

See hardness (page 34)

Silica / Silicon (Si)

Depending on the geology, silica can be present in fresh water. In heating systems it can form dangerous silicate deposits which can lead to severe damages.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Silica ¹⁾	CO	0 · 0.2 · 0.4 · 0.6 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 mg/L SiO ₂	80	931033
■ VISOCOLOR® ECO Silica HR 200 ²⁾	CO	10–200 mg/L SiO ₂	100	931234
■ VISOCOLOR® HE Silicon	CO	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 mg/L Si	120	920087
■ VISOCOLOR® Powder Pillows Silica LR ^{4) 5)}	PP	0.02–2.10 mg/L SiO ₂	100	936224
■ VISOCOLOR® Powder Pillows Silica HR ⁴⁾	PP	2–210 mg/L SiO ₂	100	936225
■ NANOCOLOR® Silica	ST	0.01–10.0 mg/L Si	250	91848

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

²⁾ Only photometrically evaluable, with photometers PF-3 and / or PF-12^{Plus}.

⁴⁾ Only photometrically evaluable, with photometers NANOCOLOR® VIS II, NANOCOLOR® UV/VIS II, PF-3 and / or PF-12^{Plus}.

⁵⁾ Measuring range for photometric evaluation on NANOCOLOR® VIS II. Range on other photometers can be different.

Silver (Ag⁺)

The precious metal silver is used in jewelry making, but also for batteries and mirrors. At low concentrations it acts also as a disinfectant for drinking water.

Product	Platform	Measuring range	Number of tests	REF
■ Silver test paper	QT	> 20 mg/L Ag ⁺	200	90732
■ Ag-Fix	HT	Silver: 0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag ⁺ pH: 4 · 5 · 6 · 7 · 8	100	90741
■ QUANTOFIX® Silver	HT	0 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag ⁺	100	91350
■ NANOCOLOR® Silver 3	TT	0.20–3.00 mg/L Ag ⁺	20	985049

Sludge activity / TTC

The biochemical activity of sludge is an important parameter for the control of a sewage treatment plant.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® TTC 150	TT	5–150 µg TPF	20	985890

Sperm

See Phosphatase (page 42)

Starch

Starch is a polysaccharide and therefore a carbohydrate. The determination of starch is of special interest in food industry.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Starch 100	TT	5–100 mg/L starch	19	985085

Sulfate (SO₄²⁻)

Sulfate is present in natural water and has an impact on its taste and smell. Therefore, it is controlled both in drinking water treatment and in food industry.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Sulfate	HT	< 200 · > 400 · > 800 · > 1200 · > 1600 mg/L SO ₄ ²⁻	100	91329
■ VISOCOLOR® ECO Sulfate	CO	25 · 30 · 35 · 40 · 50 · 60 · 70 · 80 · 100 · 120 · 150 · 200 mg/L SO ₄ ²⁻	100	931092
■ VISOCOLOR® Powder Pillows Sulfate	PP	15–200 mg/L SO ₄ ²⁻	100	936223
■ NANOCOLOR® Sulfate 1000	TT	200–1000 mg/L SO ₄ ²⁻	20	985087
■ NANOCOLOR® Sulfate LR 200	TT	20–200 mg/L SO ₄ ²⁻	20	985062
■ NANOCOLOR® Sulfate MR 400	TT	40–400 mg/L SO ₄ ²⁻	20	985060

Sulfide (S²⁻)

Sulfides are produced e.g. in the rotting of organic material. High concentrations of sulfides in waste water can cause damage to pipings and an unpleasant smell.

Product	Platform	Measuring range	Number of tests	REF
■ Lead acetate paper	QT	> 5 mg/L H ₂ S or S ²⁻	Reel, 5 m length Refill pack 100 strips	90744 90745 90746
■ Sulfide test paper	QT	> 5 mg/L H ₂ S or S ²⁻	Reel, 5 m length	90761
■ VISOCOLOR® ECO Sulfide ¹⁾	CO	0.1 · 0.2 · 0.3 · 0.4 · 0.5 · 0.6 · 0.7 · 0.8 mg/L S ²⁻	90	931094
■ NANOCOLOR® Sulfide 3	TT	0.05–3.00 mg/L S ²⁻	20	985073
■ NANOCOLOR® Sulfide	ST	0.01–3.0 mg/L S ²⁻	250	91888

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{Plus}. Measuring range can differ in photometrical evaluation.

Parameters A-Z

Sulfite (SO_3^{2-})

Sulfite determination is important in wine industry for the control of production and quality of wine. Sulfite is used as an oxygen scavenger in process and boiler water. Here sulfite tests are carried out in order to avoid overdosing. These tests are also used to control the sulfite content of foods in which sulfur compounds are used as a preservative.

Product	Platform	Measuring range	Number of tests	REF
■ Potassium iodide starch paper	QT	> 5 mg/L SO_2	Reel, 5 m length Refill pack 100200	90754 90755 90756 90758
■ Sulfite test paper	QT	> 10 mg/L Na_2SO_3	100	90763
■ QUANTOFIX® Sulfite ³⁾	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L SO_3^{2-}	100	91306
■ VISOCOLOR® ECO Sulfite	TI	1 drop equals 1 mg/L SO_3^{2-}	60	931095
■ VISOCOLOR® HE Sulfite SU 100	TI	2–100 mg/L SO_3^{2-}	100	915008
■ NANOCOLOR® Sulfite 100	TT	5–100 mg/L SO_3^{2-}	19	985090
■ NANOCOLOR® Sulfite 10	TT	0.2–10.0 mg/L SO_3^{2-}	20	985089

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Surfactants (detergents)

Surfactants are surface-active substances which are widely used in various industries, by soap manufacturers, and also in private households. Generally, one distinguishes between anionic, cationic, and nonionic surfactants. The concentration in municipal waste water can reach high levels, which are caused for example by laundry surfactants.

Product	Platform	Measuring range	Number of tests	REF
■ VISOCOLOR® ECO Detergents, anionic	CO	0.1 · 0.25 · 0.5 · 1.0 · 2.0 · 5.0 mg/L MBAS	50	931050
■ VISOCOLOR® ECO Detergents, cationic	CO	0 · 1 · 3 · 5 · 10 · 15 · 20 mg/L CTAB	50	931051
■ NANOCOLOR® Anionic surfactants 4	TT	0.20–4.00 mg/L MBAS	20	985032
■ NANOCOLOR® Cationic surfactants 4	TT	0.20–4.00 mg/L CTAB	20	985034
■ NANOCOLOR® Nonionic surfactants 15	TT	0.3–15.0 mg/L Triton® X–100	20	985047
■ NANOCOLOR® Detergents, anionic	ST	0.02–5.0 mg/L MBAS	40	91832
■ NANOCOLOR® Detergents, cationic	ST	0.05–5.0 mg/L CTAB	100	91834

Thiocyanate (SCN^-)

Thiocyanate-containing waste water can form toxic cyanogen chloride if chlorine is added.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® Thiocyanate 50	TT	0.5–50.0 mg/L SCN^-	20	985091

Tin (Sn²⁺)

Tin is used as an alloying element e.g. in tinplate. Furthermore, soldering tin consists of more than 95 % tin nowadays. The food industry controls how much tin from a can is liberated into the food, since it can adversely affect the taste.

Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Tin	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L Sn ²⁺	100	91309
■ NANOCOLOR® Tin 3	TT	0.10–3.00 mg/L Sn	18	985097

TOC (total organic carbon)

The TOC value is a measure of all organic substances in waste water. It is easier to be determined instrumentally than the COD or BOD value. A conversion of the TOC value into COD is generally not readily possible.

Product	Platform	Measuring range	Number of tests	REF
■ NANOCOLOR® TOC 300	TT	20–300 mg/L C	20	985078
■ NANOCOLOR® TOC 30	TT	2.0–30.0 mg/L C	20	985075

Total hardness

See Hardness (page 34)

Total sugar

Sugar is a key nutrient in food. In the context of the QUANTOFIX® test, total sugar means the sum of glucose and fructose. It is a quality criterion for potatoe processing and in beverage industry.



Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Total sugar ³⁾	HT	0 · 55 · 100 · 250 · 400 · 600 · 800 mg/L fructose / glucose	100	91352

³⁾ Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on the QUANTOFIX® Relax can differ from visual range.

Toxicity

With the help of luminescent bacteria, the toxic effects of different substances can be investigated.

Product	Platform	Measuring range	Number of tests	REF
■ Luminous bacteria toxicity tests BioFix® Lumi	MB	–		940 ... 945 ...

TTC / Sludge activity

See Sludge activity / TTC (page 45)

Parameters A-Z

Turbidity

Turbidity is caused by small non-dissolved particles. These particles cause absorption, scattering and reflection of incident light. Turbidity is a frequently underestimated source of error in photometry. It affects the reading and is often visually not easy to recognize. Even a slight turbidity, imperceptible to the human eye, can extremely falsify analytical results. The turbidity measurements are carried out in the photometer with preprogrammed special methods. No separate test kits are needed for these measurements.

Product	Platform	Measuring range	Number of tests	REF
■ Turbidity (Formazin / DIN)	ST	1–100 TE/F (=FAU) / 0.5–40 1/m	–	–
■ Turbidity (NTU)	TT	0.1–1000 NTU	–	–

Udder inflammation

See Mastitis (page 37)

Vat dyes

See Dithionite (page 32)

Water (H₂O)

Various tests enable the detection of water in different applications.

Product	Platform	Measuring range	Number of tests	REF
■ AQUATEC test strips	QT	> 1–2 mm water layer	100	90742
■ Waterfinder test paper	QT	Traces of water in non-polar solvents	Reel, 7 m length	90630
■ Watesmo	QT	Traces of water in non-polar solvents	Reel, 5 m length	90609
■ Water	QT	Traces of water in butter	50	90610

Water hardness

See Hardness (page 34)

Zinc (Zn²⁺)

Zinc salts are used in electroplating for the galvanic zinc coating of steel in order to achieve an effective rust prevention. Also in cooling waters, zinc salts are applied as corrosion protection agents.



Product	Platform	Measuring range	Number of tests	REF
■ QUANTOFIX® Zinc	HT	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Zn ²⁺	100	91310
■ VISOCOLOR® ECO Zinc ¹⁾	CO	0 · 0.5 · 1 · 2 · 3 mg/L Zn ²⁺	120	931098
■ NANOCOLOR® Zinc 4	TT	0.10–4.00 mg/L Zn ²⁺	20	985096
■ NANOCOLOR® Zinc 6	TT	0.20–6.00 mg/L Zn ²⁺	20	985042
■ NANOCOLOR® Zinc	ST	0.02–3.0 mg/L Zn ²⁺	250	91895

¹⁾ Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12^{plus}. Measuring range can differ in photometrical evaluation.

Zirconium (Zr^{4+})

Zirconium is used in various applications as a replacement for chromate. It is also used as an adhesion promoter in surface treatment.

Product	Platform	Measuring range	Number of tests	REF
■ Zirconium test paper	QT	> 20 mg/L Zr^{4+}	100	90721
■ NANOCOLOR® Zirconium 100	TT	5–100 mg/L Zr	20	985001

PF-12^{Plus}

Compact photometer for mobile water analysis



Increased flexibility

- Easy handling for precise results
- Flexible power supply via batteries or accu pack
- Robust and waterproof according to IP 68
- Applicable in all fields of water and waste water analysis



Test papers and test strips

pH tests

pH-Fix	52
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Universal- and indicator papers	57
Duotest and Tritest	58
Other pH indicators	59

Semi-quantitative test strips

QUANTOFIX®	60
AQUADUR® and other test strips	66

Qualitative test papers

Test papers without color chart	68
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Unmatched pH test strips

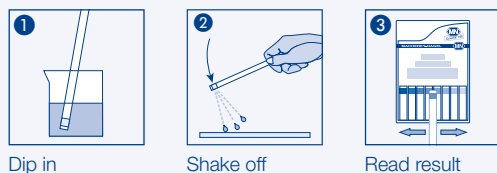
For many years untrained users as well as analytical professionals appreciate the experience of easy pH testing with pH-Fix. In contrast to common indicator papers, the indicator dyes in pH-Fix test strips are chemically bound to the test pads. This patented technology prevents bleeding of the dyes and therefore a contamination of the sample, even in highly alkaline solutions. The fixation enables the strips to remain in solution over extended periods of time allowing a safe pH determination even in weakly buffered solutions.

Good to know

Many customers receive our pH-Fix test strips as an OEM product.

How it's done

Using pH-Fix test strips



Optimized packages

In the classic packaging, the smart corner of the box safely prevents jamming of test strips. By simply tilting the box the strips fall easily into the smart corner allowing the closing with maximal comfort.

How it's done

The smart corner



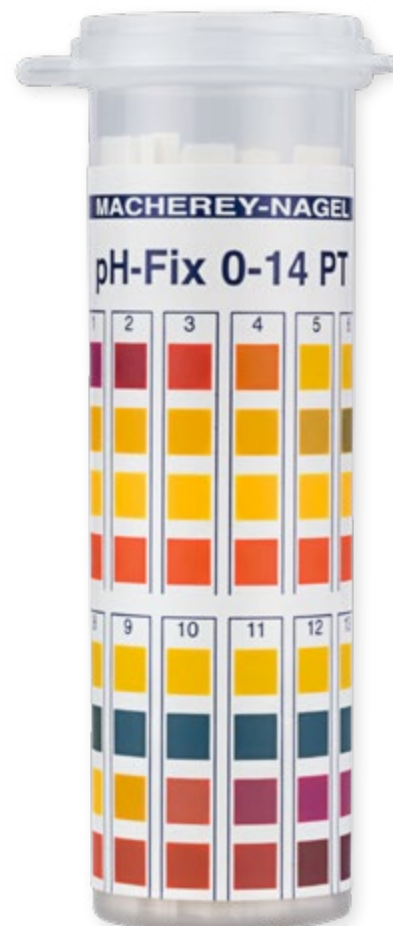
Especially users in the medical sector appreciate the robust PlopTop tube. The tube is higher than the length of the strips and can be easily opened and closed with the thumb of the holding hand. There is no risk of jamming the strip. The tube is virtually unbreakable and stands firmly on any flat surface.

CE-mark for medical applications

Some pH-Fix test strips are tested and approved for medical applications and carry a CE-mark for in-vitro-diagnostics 98/78/EG or medical products 93/42/EWG (for details see table on page 54). They meet the special demands of health care professionals and ensure safe results for medical pH testing.

Automatic evaluation with the QUANTOFIX® Relax

The strip reader QUANTOFIX® Relax (see page 148) allows the easy and reliable documentation of pH testing. The system provides objective and quantitative results. It allows printing and storing of test data including time and sample ID. Test strips covering the complete pH range can be evaluated using the QUANTOFIX® Relax (for details see table on page 54).



Rapid

- Dip & Read
- Results in seconds
- Always ready for use

Easy

- No calibration
- No maintenance
- No accessories

Reliable

- Long handle for sufficient hand-sample-distance
- Brilliant color chart for precise readings
- Automatic evaluation with QUANTOFIX® Relax for safe documentation

Good to know

Many pH-Fix test strips can be also evaluated on the strip reader QUANTOFIX® Relax (see page 148)



Ordering information

Test	REF	Measuring range (visual)	Measuring range (instrumental) ¹⁾
■ 0-14	92110	0 · 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12 · 13 · 14	1-13
■ 0.0-6.0	92115	0 · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0	0.5-6.0
■ 2.0-9.0	92118	2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	2.0-9.0
■ 4.5-10.0	92120	4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0	4.5-10.0
■ 6.0-10.0	92122	6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.5 · 10.0	6.0-10.0
■ 7.0-14.0	92125	7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0 · 13.5 · 14.0	7.0-13.5
■ 0.3-2.3	92180	0.3 · 0.7 · 1.0 · 1.3 · 1.6 · 1.9 · 2.3	-
■ 1.7-3.8	92190	1.7 · 2.0 · 2.3 · 2.6 · 2.9 · 3.2 · 3.5 · 3.8	-
■ 3.1-8.3	92135	3.1 · 3.5 · 3.9 · 4.3 · 4.7 · 5.1 · 5.5 · 5.9 · 6.3 · 6.7 · 7.1 · 7.5 · 7.9 · 8.3	-
■ 3.6-6.1	92130	3.6 · 4.1 · 4.4 · 4.7 · 5.0 · 5.3 · 5.6 · 6.1	3.6-6.1
■ 4.0-7.0	92137	4.0 · 4.4 · 4.7 · 5.0 · 5.3 · 5.5 · 5.8 · 6.1 · 6.5 · 7.0	-
■ 5.1-7.2	92140	5.1 · 5.4 · 5.7 · 6.0 · 6.3 · 6.6 · 6.9 · 7.2	-
■ 6.0-7.7	92150	6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.7	6.0-7.7
■ 7.5-9.5	92160	7.5 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.5	-
■ 7.9-9.8	92170	7.9 · 8.3 · 8.6 · 8.9 · 9.1 · 9.4 · 9.8	-
■ 0-14 PT	92111	0 · 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12 · 13 · 14	1-13
■ 3.6-6.1 PT	92131	3.6 · 4.1 · 4.4 · 4.7 · 5.0 · 5.3 · 5.6 · 6.1	3.6-6.1
■ 4.5-10.0 PT	92121	4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0	4.5-10.0

CE/urine: According to IVD directive 98/79/EG approved for pH determination in urine, for self-testing also.

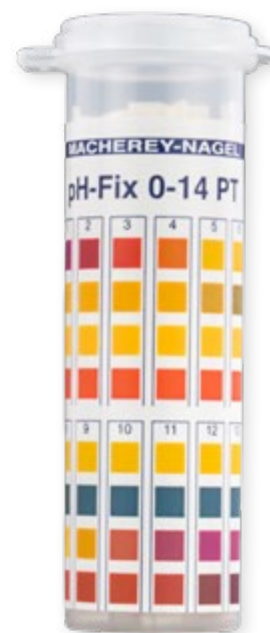
CE/gastric juice: According to IVD directive 98/79/EG approved for pH determination in gastric juice, for professional use only.

CE/saliva: According to IVD directive 98/79/EG approved for pH determination in saliva, for professional use only.

CE/vaginal secretion: According to IVD directive 98/79/EG approved for pH determination in vaginal secretion, for professional use only.

CE/dialysis: According to medical devices directive 93/42/EWG approved for pH determination in rinsing solution after disinfection of dialyzers.

¹⁾ Together with QUANTOFIX® Relax, the test strips may not be used for any medical application.



Number of tests	Shelf life								Test
		QUANTOFIX® Relax	Classic flat box	PlopTop tube	CE / urine	CE / gastric juice	CE / saliva	CE / vaginal secretion	
100	4 years	■	■						0–14
100	4 years	■	■						0.0–6.0
100	4 years	■	■			■			2.0–9.0
100	4 years	■	■		■				4.5–10.0
100	4 years	■	■						6.0–10.0
100	4 years	■	■						7.0–14.0
100	4 years		■						0.3–2.3
100	4 years		■						1.7–3.8
100	4 years		■			■			3.1–8.3
100	4 years	■	■				■	■	3.6–6.1
100	4 years		■				■		4.0–7.0
100	4 years		■						5.1–7.2
100	4 years	■	■						6.0–7.7
100	4 years		■						7.5–9.5
100	4 years		■						7.9–9.8
100	4 years	■		■					0–14 PT
100	4 years	■		■			■	■	3.6–6.1 PT
100	4 years	■		■		■			4.5–10.0 PT

QUANTOFIX® Relax

Reflectometer for evaluation of test strips



Perfect optic – Exact results

- Intuitive operation
- Highest precision
- Reproducible results independently from the user
- Printout of the results for optimal documentation



PEHANON®

pH determination in colored samples

PEHANON® test strips unify pH indicator and reference color chart on one strip. Any sample color has the same effect on both, the reference colors and the reactive pad, allowing unadulterated pH reading even in colored solutions.

Safe testing of hazardous samples

An invisible hydrophobic barrier just above the top color field prevents migration of the sample. The handle remains dry and clean and the user is safely protected from contamination due to capillary rise.

No separate color chart needed

PEHANON® test strips can be read without a separate color chart. Workers in production can use single strips instead of complete packs making the product very economical.

Ordering information

Test	REF	Measuring range	Number of Tests	Shelf life
■ pH 1–12	90401	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12	200	3 years
■ pH 0–1.8	90411	0 · 0.3 · 0.6 · 0.8 · 1.0 · 1.2 · 1.5 · 1.8	200	3 years
■ pH 1.0–2.8	90412	1.0 · 1.3 · 1.6 · 1.8 · 2.0 · 2.2 · 2.5 · 2.8	200	3 years
■ pH 1.8–3.8	90413	1.8 · 2.1 · 2.4 · 2.7 · 3.0 · 3.2 · 3.5 · 3.8	200	3 years
■ pH 2.8–4.6	90414	2.8 · 3.1 · 3.4 · 3.6 · 3.8 · 4.0 · 4.3 · 4.6	200	3 years
■ pH 3.8–5.5	90415	3.8 · 4.0 · 4.2 · 4.4 · 4.6 · 4.9 · 5.2 · 5.5	200	3 years
■ pH 4.0–9.0	90424	4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	200	3 years
■ pH 5.2–6.8	90416	5.2 · 5.5 · 5.7 · 5.9 · 6.1 · 6.3 · 6.5 · 6.8	200	3 years
■ pH 6.0–8.1	90417	6.0 · 6.3 · 6.6 · 6.9 · 7.2 · 7.5 · 7.8 · 8.1	200	3 years
■ pH 7.2–8.8	90419	7.2 · 7.4 · 7.6 · 7.8 · 8.0 · 8.2 · 8.5 · 8.8	200	3 years
■ pH 8.0–9.7	90420	8.0 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.4 · 9.7	200	3 years
■ pH 9.5–12.0	90421	9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0	200	3 years
■ pH 10.5–13.0	90422	10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0	200	3 years
■ pH 12.0–14.0	90423	12.0 · 12.5 · 13.0 · 13.5 · 14.0	200	3 years



Universal- and indicator papers

pH indicator papers - standard for many applications

pH indicator papers have been available for decades and are the standard for many applications. For each pH value these papers show a single color which can be matched with the color scale at intervals of 0.2–1 pH units. The indicator papers come in plastic reels that ensure long-term stability and protection against many external influences. They will be always ready-to-use when needed.

MACHEREY-NAGEL also controls the production of the raw papers which ensures – in combination with our ISO 9001 QC system – the high quality of the indicator papers.

The colors of the scales are specially mixed to perfectly match the reaction color of the indicator papers. This makes the reading of results easy and accurate.

Good to know

We produce pH indicator booklets for pharmaceutical industries with a CE-marking for urine diagnostics.



Ordering information

Test	REF	REF refill	Measuring range	Presentation	Shelf life
■ pH 1–11	90201	90202	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11	Reel of 5 m length and 7 mm width	3 years
■ pH 1–11	90203	–	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11	Booklet with 100 strips 10 x 70 mm	3 years
■ pH 1–14	90204	90224	1 · 2 · 3 · 5 · 6 · 7 · 8 · 9 · 10 · 12 · 14	Reel of 5 m length and 7 mm width	3 years
■ pH 0.5–5.5	90205	90225	0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5	Reel of 5 m length and 7 mm width	3 years
■ pH 3.8–5.8	90206	90226	< 3.8 · 3.8 · 4.1 · 4.3 · 4.5 · 4.7 · 4.9 · 5.2 · 5.5 · 5.8 · > 5.8	Reel of 5 m length and 7 mm width	3 years
■ pH 4.0–7.0	90207	90227	4.0 · 4.3 · 4.6 · 4.9 · 5.2 · 5.5 · 5.8 · 6.1 · 6.4 · 6.7 · 7.0	Reel of 5 m length and 7 mm width	3 years
■ pH 5.4–7.0	90208	90228	< 5.4 · 5.4 · 5.7 · 6.0 · 6.2 · 6.4 · 6.7 · 7.0 · > 7.0	Reel of 5 m length and 7 mm width	3 years
■ pH 5.5–9.0	90209	90229	5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	Reel of 5 m length and 7 mm width	3 years
■ pH 6.4–8.0	90210	90230	< 6.4 · 6.4 · 6.6 · 6.8 · 7.0 · 7.2 · 7.4 · 7.6 · 7.8 · 8.0 · > 8.0	Reel of 5 m length and 7 mm width	3 years
■ pH 7.2–9.7	90211	90231	< 7.2 · 7.2 · 7.5 · 7.8 · 8.1 · 8.4 · 8.7 · 9.0 · 9.3 · 9.7 · > 9.7	Reel of 5 m length and 7 mm width	3 years
■ pH 8.0–10.0	90212	90232	8.0 · 8.2 · 8.4 · 8.7 · 9.0 · 9.2 · 9.6 · 10.0	Reel of 5 m length and 7 mm width	3 years
■ pH 9.0–13.0	90213	90233	9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0	Reel of 5 m length and 7 mm width	3 years
■ pH 12.0–14.0	90214	90234	12.0 · 12.5 · 13.0 · 13.5 · 14.0	Reel of 5 m length and 7 mm width	3 years

refill: Refill pack



Duotest and Tritest

pH papers with multiple indicator zones

By the combination of several indicators on one test paper, a better recognition between different pH values is achieved. This makes the correct pH reading easier.

Duotest – two indicator zones for higher accuracy

Duotest indicator papers combine two different indicator zones on a single strip. The zones are separated by a hydrophobic barrier, which effectively prevents mixing of the reaction colors and increases the mechanical stability.

Tritest – three indicator zones for highest precision

Tritest indicator paper has three different indicator zones on a single paper. The three zones guarantee optimal color differences and safe determination of in-between values. Tritest indicator paper is available for a pH range from 1–11 and feature 1 pH unit increments.

In Tritest L indicator paper, two hydrophobic barriers separate the indicator zones. Even in strongly alkaline solutions, the colors of the zones do not mix.



Ordering information

Duotest

Test	REF	REF refill	Measuring range	Presentation	Shelf life
■ pH 1–12	90301	90311	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12	Reel of 5 m length and 10 mm width	3 years
■ pH 1.0–4.3	90302	90312	1.0 · 1.3 · 1.6 · 1.9 · 2.2 · 2.5 · 2.8 · 3.1 · 3.4 · 3.7 · 4.0 · 4.3	Reel of 5 m length and 10 mm width	3 years
■ pH 3.5–6.8	90303	90313	3.5 · 3.8 · 4.1 · 4.4 · 4.7 · 5.0 · 5.3 · 5.6 · 5.9 · 6.2 · 6.5 · 6.8	Reel of 5 m length and 10 mm width	3 years
■ pH 5.0–8.0	90304	90314	5.0 · 5.3 · 5.6 · 5.9 · 6.2 · 6.5 · 6.8 · 7.1 · 7.4 · 7.7 · 8.0	Reel of 5 m length and 10 mm width	3 years
■ pH 7.0–10.0	90305	90315	7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.5 · 8.8 · 9.1 · 9.4 · 9.7 · 10.0	Reel of 5 m length and 10 mm width	3 years
■ pH 9.5–14.0	90306	90316	9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0 · 13.5 · 14.0	Reel of 5 m length and 10 mm width	3 years

refill: Refill pack

Tritest

Test	REF	REF refill	Measuring range	Presentation	Shelf life
■ pH 1–11	90501	90502	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11	Reel of 5 m length and 10 mm width	3 years
■ L pH 1–11	90510	90511	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11	Reel of 6 m length and 14 mm width	3 years

refill: Refill pack

pH papers without color chart and indicator solutions

For some specific analytical questions, qualitative pH papers or indicator solutions are used.

Simplest acid/base determination

Qualitative pH papers without color chart are simple, completely impregnated indicator papers. They indicate if the pH of a solution is above or below the transition point (color change) and are useful to distinguish between acids and bases.

pH determinations in weakly buffered solutions

UNISOL indicator solutions are used for pH determination in pure water, in surface waters and in very dilute acids or bases. An indicator solution is added to the sample and the reaction color is compared with a color scale. Therefore, they allow the easy and reliable pH determination in weakly buffered solutions.

Ordering information

pH papers without color scale

Test	REF	REF refill	Color change / pH	Presentation	Shelf life	GHS
■ Brilliant yellow paper	90701	–	yellow → red / 6.7–7.9	Box of 200 strips 20 x 70 mm	3 years	
■ Congo paper MN 816 N	90702	90703	red → blue / 5.0–3.0	Reel of 5 m length and 7 mm width	3 years	■
■ Congo paper MN 616 T	90704	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	3 years	■
■ Congo paper MN 260 HE	90705	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	3 years	■
■ Litmus paper blue	91106	91116	blue → red / 8.0–5.0	Reel of 5 m length and 7 mm width	3 years	
■ Litmus paper blue	91126	–	blue → red / 8.0–5.0	Booklet of 100 strips 10 x 70 mm	3 years	
■ Litmus paper neutral	91107	91117	red → violet-blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
■ Litmus paper neutral	91127	–	red → violet-blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
■ Litmus paper red	91108	91118	red → blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
■ Litmus paper red	91128	–	red → blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
■ Nitrazine yellow paper	90711	–	yellow → blue-violet / 6.0–7.0	Box of 200 strips 20 x 70 mm	3 years	
■ Phenolphthalein paper	90712	90713	white → red / 8.3–10.0	Reel of 5 m length and 7 mm width	3 years	

refill: Refill pack

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

UNISOL

Test	REF	Measuring range	Presentation	Shelf life	GHS
■ 410, pH 4–10	91002	4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0	1 bottle of 100 mL, color chart + cuvette	3 years	■
■ 113, pH 1–13	91031	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12 · 13	1 bottle of 100 mL, color chart + cuvette	3 years	■
■ Plastic cuvettes MN 13/72	91039	–	Pack of 5 rectangular cuvettes	–	

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

QUANTOFIX®

Semi-quantitative test strips

QUANTOFIX® test strips meet all requirements of a modern rapid test. The color of the reactive pad changes depending on the concentration of an analyte in the sample. The evaluation is usually carried out visually by a comparison of the reaction color with a multi-stage color scale.

Easy analysis directly at the point of interest

Analytical professionals as well as occasional testers appreciate QUANTOFIX® test strips for the fast and easy analysis directly at the point of interest. Often, these tests are used to quickly check whether important parameters are in the desired range. They deliver an immediate result and thus enable a fast response.

Complete mini-lab

QUANTOFIX® tests are immediately ready-to-use. They do not require additional accessories. The test strips are intended for single use, maintenance or calibration are not required.

CE-mark for medical applications

Some QUANTOFIX® test strips are tested and approved for medical applications and carry a CE-mark for medical products 93/42/EWG (see page 62). They meet the special demands of health care professionals and ensure safe results in the medical field.

Quantitative, documented results with QUANTOFIX® Relax

The strip reader QUANTOFIX® Relax (see page 148) provides objective and quantitative results for many important parameters (see page 62). Measurement data including time, date and sample ID are printed, stored and can be transmitted to an information system. This allows the rapid and reliable documentation of test results, which proved to be especially useful for QC departments.

Good to know

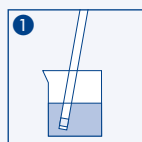
Many customers receive our QUANTOFIX® test strips as OEM product.



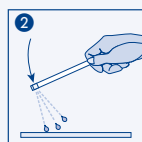
How it's done



Application of QUANTOFIX® test strips



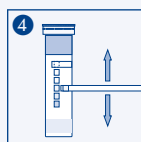
Dip in



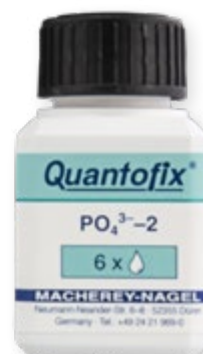
Shake off



Wait



Read off



Rapid

- Just Dip & Read
- Results within seconds
- Always ready for use

Easy

- No calibration
- No maintenance
- No accessories

Reliable

- Desiccant in the stopper for optimal protection of the strips against humidity
- Color chart confirmed with traceable standards
- Automatic evaluation with QUANTOFIX® Relax for safe documentation

Good to know



Many QUANTOFIX® test strips can be also evaluated on the strip reader QUANTOFIX® Realx (see page 148).



Ordering information

Test	REF	Measuring range (visual)	Measuring range (instrumental) ¹⁾	Number of tests
■ Active oxygen	91349	0 · 4 · 8 · 15 · 25 mg/L KMPS	–	100
■ Aluminum	91307	0 · 5 · 20 · 50 · 200 · 500 mg/L Al ³⁺	–	100
■ Ammonium	91315	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH ₄ ⁺	10–350 mg/L NH ₄ ⁺	100
■ Arsenic 10	91334	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L As ^{3+/5+}	–	100
■ Arsenic 50	91332	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7 · 3.0 mg/L As ^{3+/5+}	–	100
■ Arsenic Sensitive	91345	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L As ^{3+/5+}	–	100
■ Ascorbic acid	91314	0 · 50 · 100 · 200 · 300 · 500 · 700 · 1000 · 2000 mg/L vitamin C	25–1000 mg/L vitamin C	100
■ Calcium	91324	0 · 10 · 25 · 50 · 100 mg/L Ca ²⁺	–	60
■ Carbonate hardness	91323	0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	–	100
■ Chloride	91321	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl ⁻	–	100
■ Chlorine	91317	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl ₂ (free)	–	100
■ Chlorine Sensitive	91339	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl ₂ (total)	0.1–10 mg/L Cl ₂	100
■ Chromate	91301	0 · 3 · 10 · 30 · 100 mg/L CrO ₄ ²⁻	–	100
■ Cobalt	91303	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co ²⁺	–	100
■ Copper	91304	0 · 10 · 30 · 100 · 300 mg/L Cu ^{+/2+}	–	100
■ Cyanide	91318	0 · 1 · 3 · 10 · 30 mg/L CN ⁻	–	100
■ EDTA	91335	0 · 100 · 200 · 300 · 400 mg/L EDTA	–	100
■ Formaldehyde	91328	0 · 10 · 20 · 40 · 60 · 100 · 200 mg/L HCHO	10–200mg/L HCHO	100
■ Glucose	91348	0 · 50 · 100 · 250 · 500 · 1000 · 2000 mg/L glucose	50–2000 mg/L glucose	100
■ Glutaraldehyde	91343	0 · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 % glutaraldehyde	–	100
■ LubriCheck	91336	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	–	100
■ Molybdenum	91325	0 · 5 · 20 · 50 · 100 · 250 mg/L Mo ⁶⁺	–	100
■ Nickel	91305	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni ²⁺	–	100
■ Nitrate 100	91351	Nitrate: 0 · 5 · 10 · 25 · 50 · 75 · 100 mg/L NO ₃ ⁻ Nitrite: 0 · 0.5 · 2 · 5 · 10 · 25 · 50 mg/L NO ₂ ⁻	Nitrate: 3–100 mg/L NO ₃ ⁻ Nitrite: 0.5–50 mg/L NO ₂ ⁻	100
■ Nitrate / Nitrite	91313	Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ ⁻ Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻	Nitrate: 10–500 mg/L NO ₃ ⁻ Nitrite: 0.5–80 mg/L NO ₂ ⁻	100
■ Nitrite	91311	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻	0.5–80 mg/L NO ₂ ⁻	100
■ Nitrite 3000	91322	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO ₂ ⁻	–	100
■ Nitrite / pH	91338	Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ ⁻ pH: 6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.6 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.0 · 9.3 · 9.6	–	100
■ Peracetic acid 50	91340	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	5–50 mg/L peracetic acid	100
■ Peracetic acid 500	91341	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	50–500 mg/L peracetic acid	100
■ Peracetic acid 2000	91342	0 · 500 · 1000 · 1500 · 2000 mg/L peracetic acid	500–2000 mg/L peracetic acid	100
■ Peroxide 25	91319	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H ₂ O ₂	0.5–25 mg/L H ₂ O ₂	100
■ Peroxide 100	91312	0 · 1 · 3 · 10 · 30 · 100 mg/L H ₂ O ₂	1–100 mg/L H ₂ O ₂	100
■ Peroxide 1000	91333	0 · 50 · 150 · 300 · 500 · 800 · 1000 mg/L H ₂ O ₂	50–1000 mg/L H ₂ O ₂	100
■ Phosphate	91320	0 · 3 · 10 · 25 · 50 · 100 mg/L PO ₄ ³⁻	3–80 mg/L PO ₄ ³⁻	100
■ Potassium	91316	0 · 200 · 400 · 700 · 1000 · 1500 mg/L K ⁺	–	100
■ QUAT	91337	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L benzalkonium chloride	–	100

¹⁾ Together with QUANTOFIX® Relax, the test strips may not be used for any medical application.

²⁾ Sets of 3 individually sealed test strips, pack of 50 sets.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Shelf life	Method	Color change	QUANTOFIX® Relax	Additional reagent	CE / disinfection	GHS	Test
2.5 years	Redox reaction	yellow → green					Active oxygen
2.5 years	Aurin tricarboxylic acid	pink → red		■		■	Aluminum
2.5 years	Nessler	bright yellow → orange	■	■		■	Ammonium
2.5 years	Modified Gutzeit test	white → yellow-brown		■		■	Arsenic 10
2.5 years	Modified Gutzeit test	white → yellow-brown		■		■	Arsenic 50
2.5 years	Modified Gutzeit test	white → yellow-brown		■		■	Arsenic Sensitive
2.5 years	Phosphomolybdenum blue	yellow → green-blue	■				Ascorbic acid
2.5 years	Glyoxal-bis(2-hydroxyaniline)	yellow → red		■		■	Calcium
2.5 years	Mixed indicator	bright green → blue					Carbonate hardness
2.5 years (2-8 °C)	Silver chromate	brown → yellow					Chloride
2.5 years	Redox reaction	white → red-violet		■		■	Chlorine
2.5 years	Redox reaction	yellow → violet	■		■		Chlorine Sensitive
2 years	Carbazide	white → violet		■		■	Chromate
2.5 years	Rhodanid	white → green-blue					Cobalt
2.5 years	Biquinoline	white → red-violet					Copper
2.5 years	Barbituric acid derivative	white → violet		■		■	Cyanide
2.5 years	Bismut-xilenolorange	red → yellow					EDTA
2.5 years	Triazol	beige → blue-violet	■	■		■	Formaldehyde
2.5 years	Enzymatic	yellow → blue-green	■				Glucose
2.5 years	Mixed indicator	bright orange → magenta			■		Glutaraldehyde
2.5 years	Mixed indicator	yellow → blue					LubriCheck
2.5 years	Dithiol	white → green		■		■	Molybdenum
2.5 years	Dimethylglyoxim	white → bright-red					Nickel
2.5 years	Nitrate: modified Griess reaction Nitrite: Griess reaction	yellow → red-violet yellow → red-violet	■				Nitrate 100
2.5 years	Nitrate: modified Griess reaction Nitrite: Griess reaction	Nitrate: white → red-violet Nitrite: white → red-violet	■				Nitrate / Nitrite
2.5 years	Griess reaction	white → red-violet	■				Nitrite
2.5 years	Griess reaction	yellow → red					Nitrite 3000
2.5 years	Nitrite: Griess reaction pH: mixed indicator	Nitrite: white → red-violet pH: yellow-orange → violet-red					Nitrite / pH
2.5 years	Redox reaction	white → blue	■		■		Peracetic acid 50
2.5 years	Redox reaction	yellow → green	■		■		Peracetic acid 500
2.5 years	Redox reaction	bright yellow → red	■		■		Peracetic acid 2000
2.5 years	Redox reaction	white → blue	■				Peroxide 25
2.5 years	Redox reaction	white → blue	■		■		Peroxide 100
2.5 years	Redox reaction	white → brown	■				Peroxide 1000
2.5 years	Phosphomolybdenum blue	white → blue-green	■	■		■	Phosphate
2.5 years	Dipikrylamine	yellow → orange		■			Potassium
2.5 years	Mixed indicator	yellow → blue-green					QUAT

Test	REF	Measuring range (visual)	Measuring range (instrumental) ¹⁾	Number of tests
■ Silver	91350	0 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag ⁺	–	100
■ Sulfate	91329	< 200 · > 400 · > 800 · > 1200 · > 1600 mg/L SO ₄ ²⁻	–	100
■ Sulfite	91306	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L SO ₃ ²⁻	10–500 mg/L SO ₃ ²⁻	100
■ Tin	91309	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L Sn ²⁺	–	100
■ Total acid	91353	0 · 2 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 g/L citric acid	2–5 g/L citric acid	100
■ Total iron 100	91344	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Fe ^{2+/3+}	–	100
■ Total iron 1000	91330	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L Fe ^{2+/3+}	–	100
■ Total sugar	91352	0 · 55 · 100 · 250 · 400 · 600 · 800 mg/L fructose / glucose	55–700 mg/L fructose / glucose	100
■ Zinc	91310	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Zn ²⁺	–	100
■ Nitrate test sets	913918	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ ⁻ without nitrite chart, but with nitrite test field	–	150 ²⁾
■ Multistick for aquarium owners	91326	Total hardness: 0 · 6.3 · 12.5 · 18.8 · 25.0 · 31.3 °e	–	100
	91327	Carbonate hardness: 0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4		25

¹⁾ Together with QUANTOFIX® Relax, the test strips may not be used for any medical application.

²⁾ Sets of 3 individually sealed test strips, pack of 50 sets.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.



Shelf life	Method	Color change					
			QUANTOFIX® Relax	Additional reagent	CE / disinfection	GHS	Test
2.5 years	Silver sulfide	yellow → brown					Silver
2.5 years	Ba-thorine-complex	red → yellow					Sulfate
2.5 years	Nitroprussid / Zn-hexacyanoferrate	white → salmon	■				Sulfite
2.5 years	Phosphomolybdic acid	white → dark blue					Tin
2 years	Mixed indicator	pink → yellow	■				Total acid
2.5 years	Triazine	white → blue-violet					Total iron 100
2.5 years	2,2'-bipyridine	white → dark red					Total iron 1000
2 years (2–8 °C)	Enzymatic	yellow → ocher	■	■		■	Total sugar
2.5 years	Dithizone	orange → red		■		■	Zinc
2.5 years	Nitrate: modified Griess reaction Nitrite: Griess reaction	white → red-violet					Nitrate test sets
2.5 years	Total hardness: EDTA Carbonate hardness: mixed indicator pH: mixed indicator	Total hardness: green → red Carbonate hardness: bright green → blue pH: yellow → red					Multistick for aquarium owners



AQUADUR® and other test strips

Tests for special applications

A range of tests was developed for specific applications and questions. They provide solutions for particular requirements.

AQUADUR® – easy determination of water hardness

AQUADUR® test strips are made for the easy determination of water hardness allowing to optimize the dosing of water softeners.

AQUADUR® Sensitive – highly sensitive determination of water hardness

Feed water for reversed osmosis units needs to have a very low water hardness. AQUADUR® Sensitive is used, for example, in dialysis practices to test the quality of the water after the first softening.

Moisture indicators without cobalt chloride

Commonly used moisture indicators often contain cobalt chloride which has been found to be carcinogenic and toxic. Contact to these types of indicators may present a health and safety risk to staff. The patented non-toxic moisture indicators eliminate these risks and increase safety. They have a very clear color change from red to yellow.

Good to know



< 50 ppm CaCO₃ – very soft water
50–120 ppm CaCO₃ – soft water
120–240 ppm CaCO₃ – medium hard water
240–360 ppm CaCO₃ – hard water
Above 360 ppm CaCO₃ – very hard water

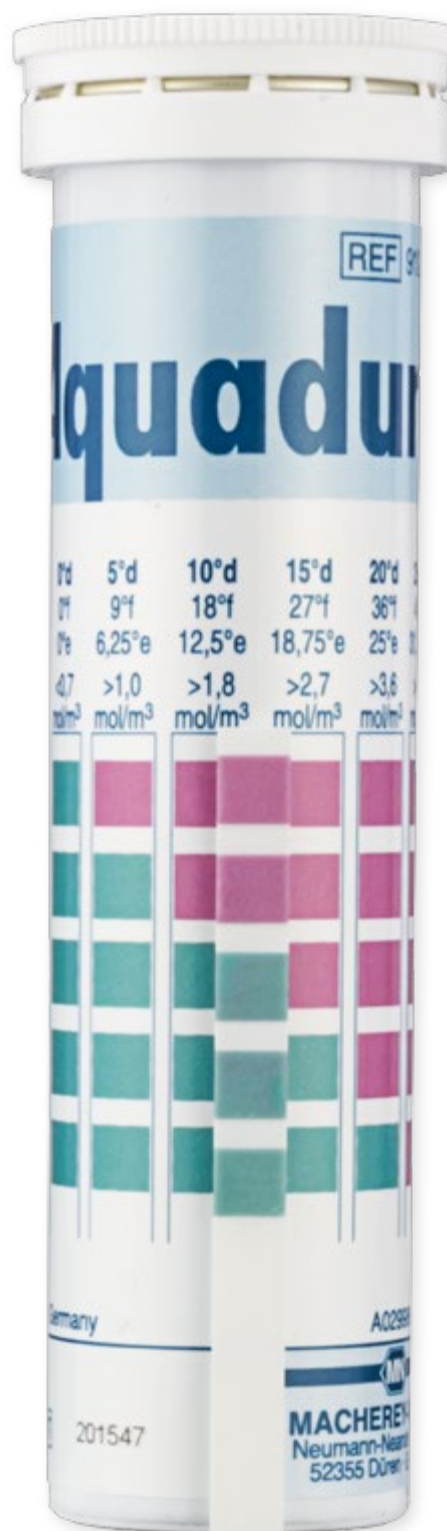
Ordering information

Test	REF	Measuring range	Presentation
■ Ag-Fix for silver in fixing baths	90741	0·0.5·1·2·3·5·7·10 g/L Ag ⁺ pH 4·5·6·7·8	Box of 100 test strips 6 x 95 mm
■ Ammonia test	90714	0·0.5·1·3·6 mg/L NH ₄ ⁺	Box of 25 test strips 7 x 60 mm
■ AQUADUR® 4–14, box	91239	< 54·> 72·> 151.2·> 252 ppm CaCO ₃	Box of 100 test strips 6 x 95 mm
■ AQUADUR® 4–21, box	91220	< 54·> 72·> 126·> 252·> 378 ppm CaCO ₃	Box of 100 test strips 6 x 95 mm
■ AQUADUR® 4–21, bulk	91222	< 54·> 72·> 126·> 252·> 378 ppm CaCO ₃	Pack of 5000 test strips without scale
■ AQUADUR® 4–21, individually sealed	91224	< 54·> 72·> 126·> 252·> 378 ppm CaCO ₃	1000 test strips, individually sealed with scale
■ AQUADUR® 4–21, individually sealed	91240	< 54·> 72·> 151.2·> 252·> 378 ppm CaCO ₃	1000 test strips, individually sealed with scale
■ AQUADUR® 5–25, box	91201	< 54·> 90·> 180·> 270·> 360·> 450 ppm CaCO ₃	Box of 100 test strips 6 x 95 mm
■ AQUADUR® 5–25, bulk	91221	< 54·> 90·> 180·> 270·> 360·> 450 ppm CaCO ₃	Pack of 5000 test strips without scale
■ AQUADUR® 5–25, individually sealed	91223	< 54·> 90·> 180·> 270·> 360·> 450 ppm CaCO ₃	1000 test strips, individually sealed with scale
■ AQUADUR® 5–25, test sets	912902	< 54·> 90·> 180·> 270·> 360·> 450 ppm CaCO ₃	Sets of 3 individually sealed test strips, pack of 50 sets
■ AQUADUR® Sensitive, box	91243	0·5.4·10.8·18.8 ppm CaCO ₃	Box of 50 test strips 6 x 95 mm
■ Chlorine test	90709	10·50·100·200 mg/L Cl ₂ (total)	Reel of 5 m length and 10 mm width
■ Cyanuric acid test (swimming pools)	90710	0·50·100·150·300 mg/L Cya	Box of 25 test strips 6 x 95 mm
■ Fluoride test	90734	0·2·5·10·20·50·100 mg/L F ⁻	Box of 30 test discs with reagents
■ Indiquat (QUATs)	–	According to customer request	Reel of 5 m length and 10 mm width
■ Moisture indicator	90801	20·30·40·50·60·70·80 % rel. humidity	Pack of 12 adhesive labels 50 x 100 mm
■ Moisture indicator	908901	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
■ Non-toxic moisture indicator without cobalt chloride	908903	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
■ Ozone test (air)	90736	< 90·90–150·150–210·> 210 µg/m ³ O ₃	Box of 12 test strips 10 x 95 mm
■ Saltesmo (halide ions)	90608	0·0.25·0.5·1·2·3·4·5 g/L NaCl	Box of 30 test discs
■ Swimming pool test 3 in 1	90752	Free Chlorine: 0·0.5·1·3·5·10 mg/L Cl ₂ Alkalinity: 0·80·120·180·240 mg/L CaCO ₃ pH: 6.4·6.8·7.2·7.6·8.4	Box of 50 test strips 6 x 95 mm
■ Swimming pool test 5 in 1	90759	like 90752, in addition: total chlorine: 0·1·3·5·10 mg/L Cl ₂ total hardness: 0·100·250·500·1000 mg/L CaCO ₃	Box of 50 test strips 6 x 95 mm

CE / dialysis: According to IVD Directive 93/42/EWG approved for the determination of water hardness before the purification to dialysis water, professional use only.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Shelf life	CE / dialysis	GHS	Test
2.5 years			Ag-Fix for silver in fixing baths
2.5 years			Ammonia test
2 years			AQUADUR® 4-14, box
2 years			AQUADUR® 4-21, box
15 months			AQUADUR® 4-21, bulk
1 year			AQUADUR® 4-21, individually sealed
1 year			AQUADUR® 4-21, individually sealed
2 years			AQUADUR® 5-25, box
15 months			AQUADUR® 5-25, bulk
1 year			AQUADUR® 5-25, individually sealed
1 year			AQUADUR® 5-25, test sets
2 years	■		AQUADUR® Sensitive, box
2 years			Chlorine test
2.5 years			Cyanuric acid test (swimming pools)
2 years			Fluoride test
2 years			Indiquat (QUATs)
2 years		■	Moisture indicator
1 year		■	Moisture indicator
1 year			Moisture indicator without cobalt chloride
1.5 years			Ozon test (air)
1.5 years			Saltesmo (halide ions)
2 years			Swimming pool test 3 in 1
2 years			Swimming pool test 5 in 1



Test papers without color chart

Simple test papers for qualitative determinations

These test papers come without a color scale. With little effort, the presence of ions and other substances can be detected. The test papers change color when the concentration is above the specified limit of detection.

Test papers for criminal investigations

Peroxtesmo KM is sensitive to peroxidase and detects blood traces.

Sperm traces can be detected using Phosphatesmo KM which is specific for acidic phosphatase. Both test papers are used in the investigation of crime scenes.

Test papers for milk analysis

The test paper Peroxtesmo MI allows the easy distinction between raw milk and high temperature milk. It is sensitive for the enzyme lactoperoxidase. In contrast to liquid indicators based on guaiacol, Peroxtesmo MI does not smell and comes without hazardous reagents which is convenient and safe for the user.

Phosphatesmo MI detects alkaline phosphatase in milk and is a rapid and easy indicator for the successful pasteurization of milk.

Test papers for oil and oil tanks

Oil test paper is recommended for the rapid determination of oil contaminations in water and soil. On contact with oil the paper turns dark blue.

AQUATEC allows the easy and reliable detection of water at the bottom of petrol and fuel oil tanks. It is also suitable to measure the thickness of water layers in oil separators.



Ordering information

Test	REF	Determination of	Presentation
■ Aluminum test paper	90721	Aluminum ions (Al^{3+})	Box of 100 strips 20 x 70 mm
■ Ammonium test paper	90722	Ammonia, ammonium ions (NH_3 , NH_4^+)	Box of 200 strips 20 x 70 mm
■ Antimony test paper	90723	Antimony ions (Sb^{3+})	Box of 200 strips 20 x 70 mm
■ AQUATEC test strips	90742	Water on the bottom of fuel tanks	Box of 100 strips 10 x 200 mm
■ Arsenic test paper	90762	Arsenic, arsine (As , AsH_3)	Box of 200 strips 20 x 70 mm
■ Bismuth test paper	90733	Bismuth ions (Bi^{3+})	Box of 200 strips 20 x 70 mm
■ Chlortesmo	90603	Chlorine, free halogens	Box of 200 strips 20 x 70 mm
■ Chromium test paper	90724	Chromium, chromate ($Cr(VI)$ CrO_4^{2-})	Box of 200 strips 20 x 70 mm
■ Cobalt test paper	90728	Cobalt ions (Co^{2+})	Box of 200 strips 20 x 70 mm
■ Copper test paper	90729	Copper(II) ions (Cu^{2+})	Box of 200 strips 20 x 70 mm
■ Cuprotesmo	90601	Copper ions (Cu , Cu^+ , Cu^{2+})	Box of 40 sheets 40 x 25 mm
■ Cyantesmo	90604	Cyanide, hydrocyanic acid (CN^- , HCN)	Reel of 5 m length and 10 mm width
■ Dipyrityl paper	90725	Iron(II) ions (Fe^{2+})	Box of 200 strips 20 x 70 mm
■ Fluoride test paper	90750	Fluoride, hydrofluoric acid (F^- , HF)	Box of 200 strips 20 x 70 mm
■ Indanthrene yellow paper	90751	Vat dyes, end-point of conversion	Box of 200 strips 20 x 70 mm
■ Indipro	90765	Protein residues	Box of 60 test strips 10 x 95 mm and additional reagents
■ Iron test paper	90726	Iron ions (Fe^{2+} , Fe^{3+})	Box of 100 strips 20 x 70 mm
■ Lead acetate paper	90744	Hydrogen sulfide, sulfide ions (H_2S , S^{2-})	Reel of 5 m length and 7 mm width
■ Lead acetate paper	90745	Hydrogen sulfide, sulfide ions (H_2S , S^{2-})	Refill pack with 3 reels
■ Lead acetate paper	90746	Hydrogen sulfide, sulfide ions (H_2S , S^{2-})	Booklet of 100 strips 10 x 70 mm
■ Mercury bromide paper	90762	Arsenic, arsine (As , AsH_3)	Box of 200 strips 20 x 70 mm
■ Nickel test paper	90730	Nickel(II) ions (Ni^{2+})	Box of 200 strips 20 x 70 mm
■ Nitratesmo	90611	Nitrate and nitrite (NO_3^- , NO_2^-)	Reel of 5 m length and 10 mm width

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Test papers and test strips

Perfect analysis for dairy industry





Simply safe

- Fast results
- Easy to use
- Determination of pH, peroxide, peracetic acid, phosphatase and peroxidase



Detection limit	Shelf life	GHS	Test
10 mg/L Al^{3+}	2 years		Aluminum test paper
10 mg/L NH_4^+	2 years	■	Ammonium test paper
5 mg/L Sb^{3+}	2 years		Antimony test paper
1–2 mm water layer	2 years		AQUATEC test strips
0.5 µg arsenic	2 years	■	Arsenic test paper
60 mg/L Bi^{3+}	2 years		Bismuth test paper
1 mg/L Cl_2	2 years		Chlortesmo
2 mg/L Cr^{3+} / 5 mg/L CrO_4^{2-}	2 years		Chromium test paper
25 mg/L Co^{2+}	2 years		Cobalt test paper
20 mg/L Cu^{2+}	2 years		Copper test paper
0.05 µg Cu on surfaces	2 years		Cuprotesmo
0.2 mg/L HCN	2 years	■	Cyantesmo
2 mg/L Fe^{2+}	2 years		Dipyridyl paper
20 mg/L F^-	2 years		Fluoride test paper
Alkaline sodium dithionite traces	2 years		Indanthrene yellow paper
50 µg BSA (bovine serum albumin)	2 years	■	Indipro
10 mg/L Fe^{2+} or Fe^{3+}	2 years		Iron test paper
5 mg/L S^{2-}	2 years	■	Lead acetate paper
5 mg/L S^{2-}	2 years	■	Lead acetate paper
5 mg/L S^{2-}	2 years	■	Lead acetate paper
0.5 µg arsenic	2 years	■	Mercury bromide paper
10 mg/L Ni^{2+}	2 years		Nickel test paper
10 mg/L NO_3^- / 5 mg/L NO_2^-	2 years		Nitratesmo

Test papers without color chart

Test	REF	Determination of	Presentation
■ Oil test paper	90760	Oil in water and soil	Box of 100 strips 20 x 70 mm
■ Peroxtesmo KM	90605	Blood traces (peroxidase)	Box of 25 test papers 15 x 30 mm
■ Peroxtesmo KO	90606	Peroxidase in food	Box of 100 test papers 15 x 15 mm
■ Peroxtesmo MI	90627	Peroxidase in milk	Box of 100 test papers 15 x 15 mm
■ Phosphatesmo KM	90607	Sperm, acid phosphatase	Box of 25 test papers 15 x 30 mm
■ Phosphatesmo MI	90612	Alkaline phosphatase in milk	Box of 50 test strips 10 x 95 mm
■ Plumbtesmo	90602	Lead, lead ions (Pb, Pb ²⁺)	Box of 40 sheets 40 x 25 mm
■ Potassium iodate starch paper	90753	Nitrous acid, sulfur dioxide	Reel of 5 m length and 7 mm width
■ Potassium iodide starch paper	90754	Nitrite ions, nitrous acid, ozone, chlorine (NO ₂ ⁻ , HNO ₂ , O ₃ , Cl ₂)	Reel of 5 m length and 7 mm width
■ Potassium iodide starch paper	90755	Nitrite ions, nitrous acid, ozone, chlorine (NO ₂ ⁻ , HNO ₂ , O ₃ , Cl ₂)	Refill pack with 3 reels
■ Potassium iodide starch paper	90756	Nitrite ions, nitrous acid, ozone, chlorine (NO ₂ ⁻ , HNO ₂ , O ₃ , Cl ₂)	Booklet of 100 strips 10 x 70 mm
■ Potassium iodide starch paper	90758	Nitrite ions, nitrous acid, ozone, chlorine (NO ₂ ⁻ , HNO ₂ , O ₃ , Cl ₂)	Box of 200 strips 20 x 70 mm
■ Potassium test paper	90727	Potassium ions (K ⁺)	Box of 200 strips 20 x 70 mm
■ Silver test paper	90732	Silver ions (Ag ⁺)	Box of 200 strips 20 x 70 mm
■ Sulfide test paper	90761	Hydrogen sulfide, sulfide ions (H ₂ S, S ²⁻)	Reel of 5 m length and 7 mm width
■ Sulfite test paper	90763	Hydrogen sulfide, sulfite ions (SO ₂ , SO ₃ ²⁻)	Box of 100 strips 20 x 70 mm
■ Turmeric paper	90747	Boric acid, borates (H ₃ BO ₃ , BO ₃ ³⁻)	Box of 200 strips 20 x 70 mm
■ Udder test paper	90748	Mastitis	20 sheets 90 x 140 mm in PE bag
■ Waterfinder test paper	90630	Water in organic solutions	Reel of 7 m length and 14 mm width
■ Watesmo	90609	Water in organic solutions	Reel of 5 m length and 10 mm width
■ Water	90610	Water distribution in butter	Box of 50 sheets 78 x 40 mm
■ Zirconium test paper	90721	Zirconium ions (Zr ⁴⁺)	Box of 100 strips 20 x 70 mm

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Test papers without color chart

Detection limit	Shelf life	GHS	Test
250 mg/L petroleum ether / 10 mg/L gasoline (high octane) / 5 mg/L fuel oil / 1 mg/L lubricating oil	3 years		Oil test paper
Blood traces	1.5 years		Peroxtesmo KM
Peroxidase traces	2.5 years	■	Peroxtesmo KO
3 % raw milk in UHT milk	1 year		Peroxtesmo MI
Sperm traces	1.5 years		Phosphatesmo KM
0.5 % raw milk in pasteurized milk / 300 U/L alkaline phosphatase in UHT milk	1 year (2–8 °C)		Phosphatesmo MI
5 mg/L Pb ²⁺	2 years		Plumbtesmo
5 mg/L SO ₂	2 years		Potassium iodate starch paper
1 mg/L NO ₂ ⁻ / 1 mg/L Cl ₂	2 years		Potassium iodide starch paper
1 mg/L NO ₂ ⁻ / 1 mg/L Cl ₂	2 years		Potassium iodide starch paper
1 mg/L NO ₂ ⁻ / 1 mg/L Cl ₂	2 years		Potassium iodide starch paper
1 mg/L NO ₂ ⁻ / 1 mg/L Cl ₂	2 years		Potassium iodide starch paper
250 mg/L K ⁺	2 years		Potassium test paper
20 mg/L Ag ⁺	2 years		Silver test paper
5 mg/L S ²⁻	2 years		Sulfide test paper
10 mg/L Na ₂ SO ₃	2 years		Sulfite test paper
20 mg/L B / 100 mg/L H ₃ BO ₃	2 years		Tumeric paper
Mastitis traces	2 years		Udder test paper
Traces of water	2 years		Waterfinder test paper
Traces of water	2 years		Watesmo
Traces of water	2 years		Water
20 mg/L Zr ⁴⁺	2 years		Zirconium test paper



VISOCOLOR®

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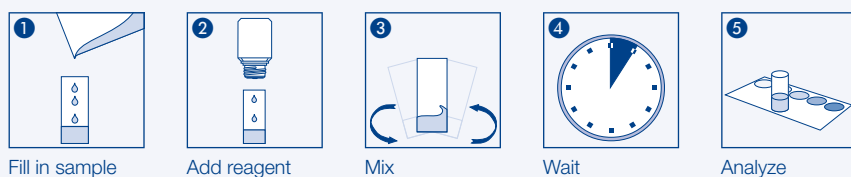
Colorimetric and titrimetric test kits

VISOCOLOR® alpha is the most simple version of colorimetric and titrimetric test kits. These tests are suitable for visual evaluation only and are very convenient in performance, because of the used multicomponent reagents. Therefore, the test kits are limited in precision and accuracy but represent an inexpensive method for screening tests of non-turbid and uncolored water samples. The reagent bottles are packed in practical blister packs. The color comparison chart for colorimetric evaluations, as well as the test instructions, are provided on the cardboard back, which is also used for opening and closing of the package.



How it's done

Colorimetric



Titrimetric



Ordering information

Test	REF	Measuring range	Number of tests	Shelf life	Method
■ Ammonium	935012	0 · 0.2 · 0.5 · 1 · 2 · 3 mg/L NH_4^+	50	1.5 years	Indophenol
■ Carbonate hardness	935016	1 drop equals 1.25 °e	100	1.5 years	Mixed indicator
■ Chlorine, free	935019	0.25 · 0.5 · 1.0 · 1.5 · 2.0 mg/L Cl_2	150	1.5 years	DPD
■ Nitrate	935065	2 · 8 · 15 · 30 · 50 mg/L NO_3^-	100	1.5 years	Azo dye
■ Nitrite	935066	0.05 · 0.10 · 0.25 · 0.5 · 1.0 mg/L NO_2^-	200	1.5 years	Sulfanilic acid / 1-naphthylamine
■ pH 5–9	935075	pH 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	200	3 years	Mixed indicator
■ Phosphate	935079	2 · 5 · 10 · 15 · 20 mg/L PO_4^{3-}	70	2 years	Molybdenum phosphorous blue
■ Residual hardness	935080	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	1 year	Mixed indicator
■ Total hardness	935042	1 drop equals 1.25 °e	100	1.5 years	Complexometric titration

¹⁾ Please see the instruction leaflet.

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	Colorimetric	Titrimetric	Sea water ¹⁾	GHS	Test
	■		■	■	Ammonium
		■	■		Carbonate hardness
	■		■	■	Chlorine, free
	■		■	■	Nitrate
	■		■	■	Nitrite
	■		■	■	pH 5–9
	■		■	■	Phosphate
	■			■	Residual hardness
		■	■	■	Total hardness

Colorimetric and titrimetric test kits

VISOCOLOR® ECO presents a product group of colorimetric and titrimetric test kits, which allow even the determination of low limiting values with sufficient accuracy. The high sensitivity and accuracy is accomplished by single reagents which can be dosed precisely and by the possibility to compensate turbidity and color of water samples.

The results are evaluated visually with high-quality color comparison cards, which are adjusted to the original colors of standard solutions. In addition, there is the possibility to evaluate most VISOCOLOR® ECO tests also photometrically with the compact photometers PF-3 (see page 130) and PF-12^{Plus} (see page 128). This enables a quantitative evaluation of the test kit.

Budget-priced refill packs are available for photometric evaluation as well as for replacement of consumed chemicals.

All VISOCOLOR® ECO test kits are delivered in a practical cardboard box with plastic inlay and easy to understand instruction manual. In addition, pictogram instructions are available for every test kit on the MACHEREY-NAGEL website.

Good to know

The easiest way to check your photometric chlorine measurement: VISOCOLOR® Color standards Chlorine (REF 914820)

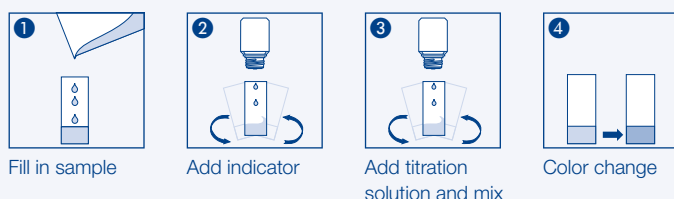


How it's done

Colorimetric



Titrimetric



Ordering information

Test	REF	REF refill	Measuring range (visual)	Measuring range (photometric) ⁴⁾	Number of tests
■ Alkalinity TA	–	931204	–	0.4–17.5 °e / 5–250 mg/L CaCO ₃	100
■ Aluminum	931006	931206	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al ³⁺	–	50
■ Ammonium 3	931008	931208	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH ₄ ⁺	0.1–2.5 mg/L NH ₄ ⁺	50
■ Ammonium 15	931010	931210	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH ₄ ⁺	0.5–8.0 mg/L NH ₄ ⁺	50
■ Bromine	–	931211	–	0.10–13.00 mg/L Br ₂	200
■ Calcium	931012	–	1 drop equals 5 mg/L Ca ²⁺	–	100
■ Carbonate hardness	931014	–	1 drop equals 1.25 °e	–	100
■ Chloride	931018	931218	1 · 2 · 4 · 7 · 12 · 20 · 40 · 60 mg/L Cl [–]	1–50 mg/L Cl [–]	90
■ Chlorine + pH see Swimming pool					

¹⁾ Please see the instruction leaflet.

²⁾ For evaluation with the PF-12 / PF-12^{Plus}, a special filter (450 nm) is required.

³⁾ Additionally required with first order: Oxygen sample bottle, REF 915498.

⁴⁾ Measuring range for photometric evaluation with the PF-12^{Plus}. Range on other photometers can be different.

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refill: Refill pack

Easy

- Chemical analysis without further accessories
- No extensive training necessary
- Color-coded reagents with clear dosing instructions

Safe

- Pictogram test instructions
- Reaction basis according to international standards
- Compensation of turbidity and color

Unique

- High quality test kits
- Business-prized refill packs
- Ecologically friendly disposal of used reagents



Shelf life	Method	PF-12 ^{Plus}	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	Colorimetric	Titrimetric	Sea water ¹⁾	GHS	Test
1 year	Bromophenol blue	■	■		■		■		■		Alkalinity TA
2 years	Chromazurol S						■		■		Aluminum
1.5 years	Indophenol	■		■		■	■		■	■	Ammonium 3
1.5 years	Indophenol	■					■		■	■	Ammonium 15
2 years	DPD	■	■		■		■		■		Bromine
1.5 years	Complexometric titration							■	■	■	Calcium
2 years	Mixed indicator							■	■	■	Carbonate hardness
1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate	■					■			■	Chloride
											Chlorine + pH see Swimming pool

Test	REF	REF refill	Measuring range (visual)	Measuring range (photometric) ⁴⁾	Number of tests
■ Chlorine 1, free + total	931035	931235	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	0.05–2.00 mg/L Cl ₂	150
■ free Chlorine 2	931016	931216	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	0.10–2.00 mg/L Cl ₂	150
■ Chlorine 2, free + total	931015	931215	< 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂	0.10–2.00 mg/L Cl ₂	150
■ free Chlorine 6	–	931219	–	0.05–6.00 mg/L Cl ₂	400
■ Chlorine 6, free + total	–	931217	–	0.05–6.00 mg/L Cl ₂	200
■ Chlorine dioxide	931021	931221	< 0.2 · 0.2 · 0.4 · 0.6 · 0.8 · 1.1 · 1.7 · 2.3 · 3.8 mg/L ClO ₂	0.20–3.80 mg/L ClO ₂	150
■ Chromium(VI)	931020	931220	0.02 · 0.05 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L Cr(VI)	0.02–0.50 mg/L Cr(VI)	140
■ Copper	931037	931237	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 1.0 · 1.5 mg/L Cu ²⁺	0.1–5.0 mg/L Cu ²⁺	100
■ Cyanide	931022	931222	0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L CN ⁻	0.01–0.20 mg/L CN ⁻	100
■ Cyanuric acid	931023	931223	10 · 15 · 20 · 30 · 40 · 60 · 80 · 100 mg/L Cya	10–100 mg/L Cya	100
■ DEHA	931024	931224	0 · 0.01 · 0.03 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 mg/L DEHA	–	125
■ Detergents, anionic	931050	931250	0.1 · 0.25 · 0.5 · 1.0 · 2.0 · 5.0 mg/L MBAS	–	50
■ Detergents, cationic	931051	931251	0 · 1 · 3 · 5 · 10 · 15 · 20 mg/L CTAB	–	50
■ Fluoride	–	931227	–	0.1–2.0 mg/L F ⁻	150
■ Hydrazine	931030	931230	0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 mg/L N ₂ H ₄	0.05–0.40 mg/L N ₂ H ₄	130
■ Iron 1	931025	931225	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	0.04–2.00 mg/L Fe	200
■ Iron 2	931026	931226	0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.50 · 1.0 mg/L Fe	0.04–2.00 mg/L Fe	100
■ Manganese	931038	931238	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Mn	0.1–5.0 mg/L Mn	70
■ Nickel	931040	931240	0 · 0.1 · 0.2 · 0.3 · 0.5 · 0.7 · 0.9 · 1.2 · 1.5 mg/L Ni ²⁺	0.04–5.00 mg/L Ni ²⁺	150
■ Nitrate	931041	931241	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO ₃ ⁻	4–60 mg/L NO ₃ ⁻	110
■ Nitrite	931044	931244	0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 · mg/L NO ₂ ⁻	0.02–0.50 mg/L NO ₂ ⁻	120
■ Oxygen ³⁾	931088	931288	0 · 1 · 2 · 3 · 4 · 6 · 8 · 10 mg/L O ₂	1–8 mg/L O ₂	50
■ pH 4.0–9.0	931066	931266	pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450
■ pH 6.0–8.2	–	931270	–	pH 6.1–8.4	150
■ Phosphate	931084	931284	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO ₄ -P	0.2–5.0 mg/L PO ₄ -P	80
■ Potassium	931032	931232	2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K ⁺	2–25 mg/L K ⁺	60
■ Silica	931033	931233	0 · 0.2 · 0.4 · 0.6 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 mg/L SiO ₂	0.2–3.0 mg/L SiO ₂	80
■ Silica HR 200	–	931234	–	10–200 mg/L SiO ₂ ²⁾	100
■ Sulfate	931092	931292	25 · 30 · 35 · 40 · 50 · 60 · 70 · 80 · 100 · 120 · 150 · 200 mg/L SO ₄ ²⁻	20–200 mg/L SO ₄ ²⁻	100
■ Sulfide	931094	931294	0.1 · 0.2 · 0.3 · 0.4 · 0.5 · 0.6 · 0.7 · 0.8 mg/L S ²⁻	0.05–0.80 mg/L S ²⁻	90
■ Sulfite	931095	–	1 drop equals 1 mg/L SO ₃ ²⁻	–	60
■ Swimming pool	931090	931290	Chlorine: < 0.1 · 0.1 · 0.2 · 0.3 · 0.4 · 0.6 · 0.9 · 1.2 · 2.0 mg/L Cl ₂ pH: 6.9 · 7.2 · 7.4 · 7.6 · 7.8 · 8.2	–	150
■ Total hardness	931029	–	1 drop equals 1.25 °e	–	110
■ Zinc	931098	931298	0 · 0.5 · 1 · 2 · 3 mg/L Zn ²⁺	0.1–3.0 mg/L Zn ²⁺	120

¹⁾ Please see the instruction leaflet.²⁾ For evaluation with the PF-12/PF-12^{Plus}, a special filter (450 nm) is required.³⁾ Additionally required with first order: Oxygen sample bottle, REF 915498.⁴⁾ Measuring range for photometric evaluation with the PF-12^{Plus}. Range on other photometers can be different.GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.
refill: Refill pack

Shelf life	Method	PF-12 ^{Plus}	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	Colorimetric	Titrimetric	Sea water ¹⁾	GHS	Test
2 years	DPD	■	■		■		■		■		Chlorine 1. free + total
1.5 years	DPD	■	■		■		■			■	free Chlorine 2
1.5 years	DPD	■	■		■		■			■	Chlorine 2. free + total
2 years	DPD	■	■		■		■		■		free Chlorine 6
2 years	DPD	■	■	■	■		■		■		Chlorine 6. free + total
1.5 years	DPD	■	■		■		■			■	Chlorine dioxide
1.5 years	Carbazide	■					■		■	■	Chromium(VI)
2 years	Cuprizone	■		■			■		■		Copper
1 year	Barbituric acid / pyridine	■					■		■	■	Cyanide
1.5 years	Triazine (turbidity)	■	■		■		■		■	■	Cyanuric acid
1 year	Redox reaction						■		■		DEHA
2 years	Methylene blue						■		■	■	Detergents, anionic
2 years	Bromphenol blue						■		■	■	Detergents, cationic
1.5 years	SPADNS	■	■		■		■		■	■	Fluoride
1 year	4-Dimethylaminobenzaldehyde	■					■		■	■	Hydrazine
2 years	Triazine	■	■	■	■		■		■	■	Iron 1
2 years	Triazine	■	■	■	■		■		■		Iron 2
1.5 years	Formaloxime	■					■		■	■	Manganese
1.5 years	Dimethylglyoxime	■					■		■	■	Nickel
1.5 years	Azo dye	■		■		■	■		■		Nitrate
1.5 years	Sulfanilic acid / 1-naphthylamine	■		■			■		■		Nitrite
1.5 years	Winkler	■		■			■		■	■	Oxygen ³⁾
3 years	Mixed indicator						■		■	■	pH 4.0-9.0
1.5 years	Mixed indicator	■	■	■	■		■		■		pH 6.0-8.2
3 years	Phosphorous molybdenum blue	■		■		■	■		■	■	Phosphate
3 years	Potassium tetraphenyl borate (turbidity)	■				■	■		■	■	Potassium
3 years	Silicomolybdenum blue	■		■			■		■	■	Silica
3 years	Molybdosilic acid	■	■		■		■		■	■	Silica HR 200
3 years	Barium sulfate (turbidity)	■					■		■	■	Sulfate
3 years	DPD	■					■		■	■	Sulfide
1 year	Iodometric titration							■	■	■	Sulfite
1.5 years	DPD Mixed indicator						■		■	■	Swimming pool
1.5 years	Complexometric titration							■	■	■	Total hardness
1 year	Zincon	■					■		■	■	Zinc

Colorimetric and titrimetric test kits

VISOCOLOR® HE test kits are highly sensitive colorimetric and titrimetric tests to determine even the lowest limiting values.

The exact dosing of the single reagents as well as the compensation of turbidity and color are the basis for a highly precise analysis. Maximum sensitivity and accuracy are achieved by the use of longer measuring tubes and larger sample volumes. The sensitivity of VISOCOLOR® HE is 10 to 100 times higher compared to other VISOCOLOR® tests.

The visual evaluation of the colorimetric test kits is done with high-quality color comparison disks, which are adjusted to the original color of standard solutions.

Refill packs are available as replacement for consumed reagents. Every VISOCOLOR® HE test kit is delivered in a robust box with plastic inlay and an easy to understand instruction leaflet.

Good to know

VISOCOLOR® HE test kits reach the highest sensitivity and accuracy in visual analytics.



Ordering information

Test	REF	REF refill	Measuring range	Number of tests	Shelf life
■ Acidity AC 7 (base capacity)	915006	915206	0.2–7.2 mmol/L H ⁺ (1 syringe filling)	200	2 years
■ Alkalinity AL 7 (acid capacity)	915007	915207	0.2–7.2 mmol/L OH ⁻ (1 syringe filling)	200	2 years
■ Ammonium	920006	920106	0.0 · 0.02 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.50 mg/L NH ₄ ⁺	110	1 year
■ Calcium CA 20	915010	915210	0.6–25.0 °e / 0.1–3.6 mmol/L Ca ²⁺ (1 syringe filling)	200	2 years
■ Carbonate hardness C 20	915003	915203	0.6–25.0 °e / 0.2–7.2 mmol/L H ⁺ (1 syringe filling)	200	2 years
■ Chloride CL 500	915004	915204	5–500 mg/L Cl ⁻ (1 syringe filling)	300	2 years
■ Chlorine, free + total	920015	920115	0.0 · 0.02 · 0.04 · 0.06 · 0.10 · 0.15 · 0.20 · 0.30 · 0.40 · 0.60 mg/L Cl ₂	160	2 years
■ Copper	920050	920150	0.0 · 0.04 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Cu ²⁺	150	2 years
■ Cyanide	920028	920128	0.0 · 0.002 · 0.004 · 0.007 · 0.010 · 0.015 · 0.020 · 0.025 · 0.030 · 0.040 mg/L CN ⁻	50	1 year
■ Iron	920040	920140	0.0 · 0.01 · 0.02 · 0.03 · 0.04 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 mg/L Fe	300	2 years
■ Manganese	920055	920155	0.0 · 0.03 · 0.06 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Mn	100	1.5 years
■ Nitrite	920063	920163	0.0 · 0.005 · 0.010 · 0.015 · 0.02 · 0.03 · 0.04 · 0.06 · 0.08 · 0.10 mg/L NO ₂ ⁻	150	2 years
■ Oxygen SA 10	915009	915209	0.2–10.0 mg/L O ₂ (1 syringe filling)	100	1.5 years
■ pH 4.0–10.0	920074	920174	pH 4.0 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 10.0	500	2 years
■ Phosphate	920082	920182	0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO ₄ -P	300	2 years
■ Phosphate (DEV)	920080	920180	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.25 mg/L PO ₄ -P	100	2 years
■ Silica	920087	920187	0.0 · 0.01 · 0.02 · 0.03 · 0.05 · 0.07 · 0.10 · 0.15 · 0.20 · 0.30 mg/L Si	120	2 years
■ Sulfite SU 100	915008	915208	2–100 mg/L SO ₃ ²⁻ (1 syringe filling)	100	3 years
■ Total hardness H 2	915002	915202	0.06–2.50 °e / 0.01–0.36 mmol/L Ca ²⁺ (1 syringe filling)	200	1.5 years
■ Total hardness H 20 F	915005	915205	0.6–25.0 °e / 0.1–3.6 mmol/L Ca ²⁺ (1 syringe filling)	200	1.5 years

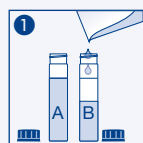
¹⁾ Please see the instruction leaflet.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.
refill.: Refill pack

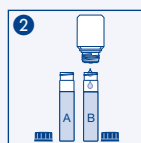
How it's done



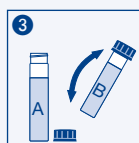
Colorimetric



Fill in sample



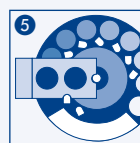
Add reagent



Mix

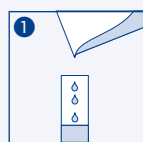


Wait

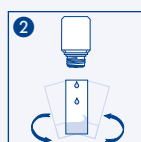


Analyze

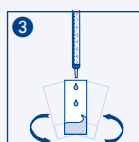
Titrimetric



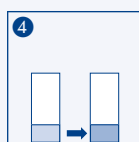
Fill in sample



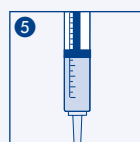
Add indicator and mix



Add titration solution and mix



Color change



Analyze

Method	Colorimetric	Titrimetric	Sea water ¹⁾	GHS	Test
Phenolphthalein		■	■	■	Acidity AC 7 (base capacity)
Methyl red		■	■	■	Alkalinity AL 7 (acid capacity)
Indophenol	■			■	Ammonium
Complexometric titration		■	■	■	Calcium CA 20
Mixed indicator		■	■	■	Carbonate hardness C 20
Mercurimetric titration		■	■	■	Chloride CL 500
DPD	■		■		Chlorine, free + total
Cuprizon	■		■		Copper
Barbituric acid / pyridine	■		■	■	Cyanide
Triazine	■				Iron
Formalдохime	■			■	Manganese
Sulfanilic acid / 1-naphthylamine	■		■	■	Nitrite
Winkler		■	■	■	Oxygen SA 10
Mixed indicator	■		■	■	pH 4.0–10.0
Phosphorous molybdenum blue	■		■	■	Phosphate
Phosphorous molybdenum blue	■		■	■	Phosphate (DEV)
Silico molybdenum blue	■		■	■	Silica
Iodometric titration		■	■	■	Sulfite SU 100
Complexometric titration		■		■	Total hardness H 2
Complexometric titration		■	■	■	Total hardness H 20 F



VISOCOLOR® Powder Pillows

Photometric reagent Powder Pillows

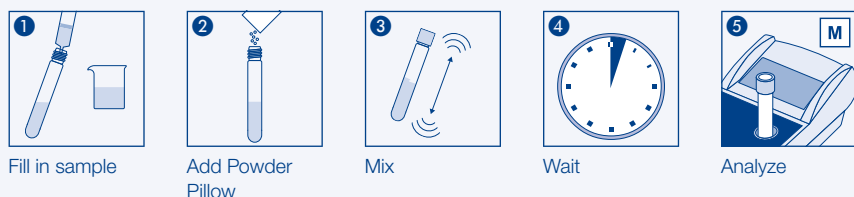
VISOCOLOR® Powder Pillows are photometric tests that combine easiest dosing of reagents with photometric precision. Each VISOCOLOR® Powder Pillow contains the exact amount of reagents needed for a determination. The individually packaged portions not only stand out due to their very long shelf life, but also avoid the use of hazardous substances wherever possible. Easy to understand test instructions with pictograms in 6 languages are available on MACHEREY-NAGEL homepage. VISOCOLOR® Powder Pillows can be evaluated on compact photometers PF-12^{Plus} (see page 128), PF-3 (see page 130) and spectrophotometers NANOCOLOR® VIS II and NANOCOLOR® UV/VIS II (see page 122).

Good to know

VISOCOLOR® Powder Pillows for chlorine and silica can be directly used in competitor's photometers. They are ready to use with pre-programmed methods and equipment, no further calibration is needed.

How it's done

Application VISOCOLOR® Powder Pillows



Ordering information

Test	REF	Number of tests	Measuring range	Shelf life	Method
■ free Chlorine	936220 936220.1	100 1000	0.03–6.00 mg/L Cl ₂	5 years	DPD
■ total Chlorine, Ozone	936221 936221.1	100 1000	0.03–6.00 mg/L Cl ₂ / 0.03–4.00 mg/L O ₃	5 years	DPD
■ Nitrate	936226	100	1.0–50 mg/L NO ₃ -N	3 years	Azo dye
■ pH	936222	100	pH: 6.2–8.2	5 years	Mixed indicator
■ Silica LR ¹⁾	936224	100	0.02–2.10 mg/L SiO ₂	3 years	Silicomolybdenum blue
■ Silica HR ²⁾	936225	100	2–210 mg/L SiO ₂	3 years	Molybdosilic acid
■ Sulfate	936223	100	15–200 mg/L SO ₄ ²⁻	5 years	Barium sulfate (turbidity)

¹⁾ Measuring range for photometric evaluation on NANOCOLOR® VIS II. Range on other photometers can be different.

²⁾ For evaluation with the PF-12^{Plus}, a special filter (450 nm) is required.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Easy

- Dosing without spoon or pipette
- Pictogram instructions for each test
- No zero measurement required

Safe

- Photometric precision for best results
- Reaction basis according to international standards
- Extremely long shelf life

Unique

- Optimal price / performance-ratio
- Works on competitor's photometers
- Ecologically friendly disposal of used reagents

	Spectrophotometers	PF-12 ^{Plus}	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	Competitor compatible	Sea Water	GHS	Test
■	■	■	■	■	■		■	■		free Chlorine
■	■	■	■	■	■		■	■		total Chlorine, Ozone
■	■	■	■		■	■		■	■	Nitrate
■	■	■	■		■			■		pH
■	■	■	■	■	■		■	■	■	Silica LR
■	■	■	■	■	■		■	■	■	Silica HR
■	■	■	■		■			■	■	Sulfate



VISOCOLOR® accessories

The complete analysis from one source

VISOCOLOR® test kits from MACHEREY-NAGEL are ideally suited for the fast and easy water analysis. Besides the test kits, MACHEREY-NAGEL offers a broad range of accessories for VISOCOLOR® tests.

Good to know

VISOCOLOR® Color standards Chlorine (REF 914820) simulate the reaction color of DPD-based VISOCOLOR® chlorine tests for simple photometer check.



Ordering information

Description	REF	Content	GHS
Inspection solutions			
■ VISOCOLOR® Color standards Chlorine for checking consistent instrument response of NANOCOLOR® UV/VIS II, VIS II, PF-12 ^{Plus} and PF-3	914820	4 solutions	
Accessories			
■ Measuring glasses for VISOCOLOR® ECO with screw caps	931151	10 pieces	
■ Slide comparator for VISOCOLOR® ECO	931152	2 pieces	
■ Color comparison chart for VISOCOLOR® ECO (REF end No. see test kit)	931 4..	1 piece	
■ Titration test tube with 5-mL-marking	915499	1 piece	
■ Sample bottle 30 mL for oxygen determination	915498	1 piece	
■ Sample beaker 25 mL	914498	1 piece	
■ Sample tube with 10-/20-mL-marking	914496	1 piece	
■ Measuring tube 25–200 mg/L Sulfate	914495	1 piece	
■ Measuring tube 2–15 mg/L Potassium	914444	1 piece	
■ Test tubes 16 mm OD	91680	20 pieces	
■ Plastic spoon (measuring spoon) black, 85 mm	914663	10 pieces	
■ Plastic spoon (measuring spoon) orange, 85 mm	914664	10 pieces	
■ Plastic spoon (measuring spoon) black, 70 mm	914492	10 pieces	
■ VISOCOLOR® ECO test instructions for photometer PF-12 ^{Plus}	931503	1 piece	
■ VISOCOLOR® ECO test instructions for photometer PF-12	931501	1 piece	
■ VISOCOLOR® ECO test instructions for photometer PF-3	934001	1 piece	
■ VISOCOLOR® ECO test instructions for visual determination	931502	1 piece	
■ Additive reagent Z-1 to eliminate copper ions prior determination of total hardness	931929	30 mL	■
■ Measuring tube for VISOCOLOR® HE with screw cap	920401	10 pieces	
■ Comparator block for VISOCOLOR® HE	920402	1 piece	
■ Color comparison disk for VISOCOLOR® HE (REF end No. see test kit)	9203..	1 piece	
■ Spare syringes for VISOCOLOR® HE (REF end No. see test kit)	9154..	2 pieces	
■ Thermometer -10 °C to +60 °C	914497	1 piece	

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.



VISOCOLOR®

Color standards Chlorine



Simplest photometer control

- For VISOCOLOR® chlorine analysis
- Simulates DPD reaction color
- Three concentrations in a rugged case
- For VISOCOLOR® ECO tests and VISOCOLOR® Powder Pillows



NANOCOLOR®

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NANOCOLOR® tube tests

Precise rapid tests for photometric water analysis

NANOCOLOR® tube tests for photometric analysis convince by their easy handling and therefore are the first choice for routine, laboratory and process analysis. A maximum in accuracy and precision is granted for the measurement results due to exactly pre-dosed reagents in 16 mm cuvettes and additional reagents. The tests are pre-programmed in MACHEREY-NAGEL photometers and selected automatically via a barcode on the cuvette. This perfect interaction of instruments and tests lets the user experience a high measurement safety, saving time and working cost-efficiently.

Ideally packed

All NANOCOLOR® tube tests are delivered in stable boxes with color coded labels, giving all relevant information about the test at one glance. The boxes provide a perfect protection from sunlight and convenient withdrawal of test tubes and reagents. LOT-specific information are available by scanning of the 2D barcode on the back of the box (see page 164). The colored pictograms in the lid, which are of special value for our customers, provide intuitive instructions on the test procedure also for inexperienced users.

The perfect test for every user

The user's choice of the correct test is the first step towards a successful analysis. MACHEREY-NAGEL offers various test kits with different measurement ranges for all typical parameters relevant in water and waste water analysis. It is recommended to choose a test kit, where the expected and measured measurement value is within the 20–80 % range of the measuring range of the used test. Here, the safety of the measurement result is at its optimum. The operator gets reliable results and safety for the reporting of his results to supervisors and towards authorities.

Good to know



Certificate



Certificates of analysis for NANOCOLOR® tube tests can be downloaded fast and convenient via www.mn-net.com/certificate.

Good to know



Via the 2D barcode on the back of the packages, LOT-specific information can be read easily. For further information about the required NANOCOLOR® App see page 164.



Easy

- Colored pictograms as step-by-step instruction
- Big cuvettes for easy pipetting
- Barcoded cuvettes for automatic test selection

Safe

- Convenient withdrawal of tubes from the box
- No contact with chemicals
- Reactions based on internationally accepted standard methods

Reliable

- Precisely pre-dosed reagents
- Adequate test for every application
- Constant high quality from batch to batch

ISO conform COD tests

MACHEREY-NAGEL offers a complete analytical system with seven tube tests for an ISO conform COD analysis. The ISO 15705 describes the use of tube tests that are suitable for photometric evaluation and is a standardized and internationally accepted method for sewage and waste water analysis. This norm explicitly suggests to use commercial test kits.

Time-saving and reliable analysis of total nitrogen

The sum-parameter total nitrogen is of high relevance in water and waste water analysis. It gives valuable information about the grade of contaminations with e.g. ammonia, nitrite or nitrate. NANOCOLOR® total nitrogen tests impress with safe and reproducible results as well as fast and easy handling. Precisely pre-dosed reagents allow the performance of the test in only a few steps. A separate cuvette for every sample decomposition saves time and minimizes errors from cross-contaminations.

Good to know

For further information on photometers for the evaluation of NANOCOLOR® tube tests see page 13.



NANOCOLOR® tube tests

Ordering information

Test	REF	Measuring range NANOCOLOR® VIS II		Number of tests	Shelf life	Method
■ Aluminum 07 ²⁾	985098	0.02–0.70 mg/L Al ³⁺		19	1 year	Eriochrome® Cyanine R
■ Ammonium 3	985003	0.04–2.30 mg/L NH ₄ -N	0.05–3.00 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ Ammonium 10	985004	0.2–8.0 mg/L NH ₄ -N	0.2–10.0 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ Ammonium 50	985005	1–40 mg/L NH ₄ -N	1–50 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ Ammonium 100	985008	4–80 mg/L NH ₄ -N	5–100 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ Ammonium 200	985006	30–160 mg/L NH ₄ -N	40–200 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ Ammonium 2000	985002	300–1600 mg/L NH ₄ -N	400–2000 mg/L NH ₄ ⁺	20	1 year	Indophenol
■ AOX 3	985007	0.1–3.0 mg/L AOX	0.01–0.30 mg/L AOX	20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ BOD ₅ (in Winkler bottles)	985822	2–3000 mg/L O ₂		25–50	2 years	Winkler
■ BOD ₅ -TT	985825	0.5–3000 mg/L O ₂		22	2 years	Winkler
■ Cadmium 2	985014	0.05–2.00 mg/L Cd ²⁺		10–19	1 year	Cadion
■ Carbonate hardness 15	985015	1.25–18.75 °e	0.4–5.4 mmol/L H ⁺	20	1 year	Bromphenol blue
■ Chloride 50	985021	0.5–50.0 mg/L Cl ⁻		20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chloride 200	985019	5–200 mg/L Cl ⁻	0.10–1.00 g/L Cl ⁻	20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chlorine / Ozone 2	985017	0.05–2.50 mg/L Cl ₂	0.05–2.00 mg/L O ₃	20	1 year	DPD
■ Chlorine dioxide 5	985018	0.15–5.00 mg/L ClO ₂		20	1 year	DPD
■ Chromate 5	985024	0.05–2.00 mg/L Cr(VI) 0.005–0.500 mg/L Cr(VI) ¹⁾	0.1–4.0 mg/L CrO ₄ ²⁻ 0.01–1.00 mg/L CrO ₄ ²⁻¹⁾	20	2 years	Carbazide
■ total Chromium 2	985059	0.05–2.00 mg/L Cr 0.005–0.500 mg/L Cr ¹⁾		20	2 years	Carbazide
■ COD 40	ISO 15705	985027	2–40 mg/L O ₂	20	1 year (2–8 °C)	Potassium dichromate
■ COD 60	ISO 15705	985022	5–60 mg/L O ₂	20	1 year (2–8 °C)	Potassium dichromate
■ COD 160	ISO 15705	985026	15–160 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 160 Hg-free		963026	15–160 mg/L O ₂	20	1 year (2–8 °C)	Potassium dichromate
■ COD 300		985033	50–300 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 600	ISO 15705	985030	50–600 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 1500	ISO 15705	985029	100–1500 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 1500 Hg-free		963029	100–1500 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 4000		985011	400–4000 mg/L O ₂	20	1 year	Potassium dichromate
■ COD 10000		985023	1.00–10.00 g/L O ₂	20	1 year	Potassium dichromate
■ COD 15000		985028	1.0–15.0 g/L O ₂	20	1 year	Potassium dichromate
■ COD 60000		985012	5.0–60.0 g/L O ₂	20	1 year	Potassium dichromate
■ COD LR 150	ISO 15705	985036	3–150 mg/L O ₂	20	1 year	Potassium dichromate
■ COD HR 1500	ISO 15705	985038	20–1500 mg/L O ₂	20	1 year	Potassium dichromate
■ org. Complexing agents 10		985052	0.5–10.0 mg/L I _{BIC}	10–19	6 month	Bismut xlenol orange

On other photometers than the NANOCOLOR® VIS II measurement ranges and wavelengths can be different.

¹⁾ A more sensitive measuring range is possible by using semi-micro cuvettes 50 mm (REF 91950).

²⁾ Decomposition only possible in microwave.

³⁾ Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).

⁴⁾ Without barcode.

⁵⁾ Please see the instruction leaflet.

⁶⁾ This test can be performed without a NANOCOLOR® reagent set. Determination only with NANOCOLOR® spectrophotometers and the PF-12^{Plus}.

⁷⁾ Additionally required with first order: NANOCOLOR® TIC-Ex (REF 916993).

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® tube tests

	Spectrophotometer	500 D	PF-12 ^{20/5}	PF-3 COD	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	NanOx N	NanOx Metal	Crack set	Sea water ⁵⁾	GHS	Test
	■	■	■						■			■		Aluminum 07 ²⁾
	■	■	■			■		■				■	■	Ammonium 3
	■	■	■					■				■	■	Ammonium 10
	■	■	■					■				■	■	Ammonium 50
	■	■	■									■	■	Ammonium 100
	■	■	■									■	■	Ammonium 200
	■	■	■									■	■	Ammonium 2000
	■	■	■									■	■	AOX 3
	■	■	■									■	■	BOD ₅ (in Winkler bottles)
	■	■	■									■	■	BOD ₅ -TT
	■	■	■							■	■	■		Cadmium 2
	■	■	■									■		Carbonat hardness 15
	■	■	■										■	Chloride 50
	■	■	■									■	■	Chloride 200
	■	■	■		■		■					■		Chlorine / Ozone 2
	■	■	■									■		Chlorine dioxide 5
	■	■	■							■		■		Chromate 5
	■	■	■										■	total Chromium 2
	■	■	■	■									■	COD 40
	■	■	■	■									■	COD 60
	■	■	■	■									■	COD 160
	■	■	■										■	COD 160 Hg-free
	■	■	■										■	COD 300
	■	■	■	■									■	COD 600
	■	■	■	■									■	COD 1500
	■	■	■	■									■	COD 1500 Hg-free
	■	■	■	■									■	COD 4000
	■	■	■	■									■	COD 10000
	■	■	■	■									■	COD 15000
	■	■	■	■									■	COD 60000
	■	■	■	■									■	COD LR 150
	■	■	■	■									■	COD HR 1500
	■	■	■									■		org. Complexing agents 10

NANOCOLOR® tube tests

Test	REF	Measuring range NANOCOLOR® VIS II		Number of tests	Shelf life	Method
■ Copper 5	985053	0.10–7.00 mg/L Cu ²⁺		20	2 years	Cuprizone
■ Cyanide 08	985031	0.02–0.80 mg/L CN ⁻ 0.005–0.100 mg/L CN ⁻ ¹⁾		20	1 year	Barbituric acid / Pyridine
■ DEHA 1 (Diethylhydroxylamine)	985035	0.05–1.00 mg/L DEHA		20	1 year	Redox reaction
■ Ethanol 1000	985838	0.10–1.00 g/L EtOH	0.013–0.130 Vol. % EtOH	23	2 years (< 0 °C)	Alcoholoxidase / Peroxidase
■ Fluoride 2	985040	0.1–2.0 mg/L F ⁻		20	1.5 years	Lanthanum-Alizarine complexon
■ Formaldehyde 8	985041	0.1–8.0 mg/L HCHO		20	2 years	Chromotropic acid
■ Formaldehyde 10 ³⁾	985046	0.20–10.00 mg/L HCHO 0.02–1.00 mg/L HCHO ¹⁾		20	2 years	Acetylacetone
■ Hardness Ca / Mg	985044	1.25–25.00 °e 0.2–3.6 mmol/L	5–50 mg/L Mg ²⁺ 10–100 mg/L Ca ²⁺	20	1.5 years	Phthalein purple
■ Hardness 20	985043	1.25–25.00 °e 0.2–3.6 mmol/L	5–50 mg/L Mg ²⁺ 10–100 mg/L Ca ²⁺	20	1.5 years	Phthalein purple
■ HC 300 (Hydrocarbons)	985057	0.5–5.6 mg/L HC	30–300 mg/kg HC	20	1 year	Potassium dichromate
■ Iron 3	985037	0.10–3.00 mg/L Fe 0.02–1.00 mg/L Fe ¹⁾		20	1 year	Diphenylpyridyltriazine
■ Lead 5	985009	0.10–5.00 mg/L Pb ²⁺		20	1 year	4-(2-Pyridyl)-(2-azo)-resorcine (PAR)
■ Manganese 10	985058	0.1–10.0 mg/L Mn 0.02–2.00 mg/L Mn ¹⁾		20	1.5 years	Formaldehyde
■ Methanol 15	985859	0.2–15.0 mg/L MeOH		23	1 year (< 0 °C)	Alcoholoxidase / Peroxidase
■ Molybdenum 40	985056	1.0–40.0 mg/L Mo(VI)	1.6–65.0 mg/L MoO ₄ ²⁻	20	2 years	Thioglycolic acid
■ Nickel 4	985071	0.10–7.00 mg/L Ni ²⁺ 0.02–1.00 mg/L Ni ²⁺ ¹⁾		20	2 years	Dimethylglyoxime
■ Nitrate 8	985065	0.30–8.00 mg/L NO ₃ -N	1.3–35.0 mg/L NO ₃ ⁻	20	2 years	2,6-Dimethylphenol
■ Nitrate 50	985064	0.3–22.0 mg/L NO ₃ -N	2–100 mg/L NO ₃ ⁻	20	2 years	2,6-Dimethylphenol
■ Nitrate 250	985066	4–60 mg/L NO ₃ -N	20–250 mg/L NO ₃ ⁻	20	2 years	2,6-Dimethylphenol
■ Nitrite 2	985068	0.003–0.460 mg/L NO ₂ -N	0.02–1.50 mg/L NO ₂ ⁻	20	1 year	Sulfanilic acid / 1-Naphthylamine
■ Nitrite 4	985069	0.1–4.0 mg/L NO ₂ -N	0.3–13.0 mg/L NO ₂ ⁻	20	1.5 years	Sulfanilic acid / 1-Naphthylamine
■ total Kjeldahl nitrogen TKN 16	985067	1.00–16.0 mg/L TKN		20	1.5 years	2,6-Dimethylphenol
■ total Nitrogen TN _b 22	985083	0.5–22.0 mg/L N		20	1 year	2,6-Dimethylphenol
■ total Nitrogen TN _b 60	985092	3–60 mg/L N		20	1 year	2,6-Dimethylphenol
■ total Nitrogen TN _b 220	985088	5–220 mg/L N		20	1 year	2,6-Dimethylphenol
■ Organic acids 3000	985050	30–3000 mg/L CH ₃ COOH	0.5–50.0 mmol/L CH ₃ COOH	20	1.5 years	Ethylenglycole / Iron(III)-Ions
■ Oxygen 12	985082	0.5–12.0 mg/L O ₂		22	2 years	Winkler
■ Peroxide 2	985871	0.03–2.00 mg/L H ₂ O ₂		10–19	1 year (2–8 °C)	Peroxidase
■ pH 6.5–8.2 ⁴⁾	91872	pH 6.5–8.2		100	1.5 years	Phenol red

On other photometers than the NANOCOLOR® VIS II measurement ranges and wavelengths can be different.

¹⁾ A more sensitive measuring range is possible by using semi-micro cuvettes 50 mm (REF 91950).

²⁾ Decomposition only possible in microwave.

³⁾ Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).

⁴⁾ Without barcode.

⁵⁾ Please see the instruction leaflet.

⁶⁾ This test can be performed without a NANOCOLOR® reagent set. Determination only with NANOCOLOR® spectrophotometers and the PF-12²⁰®.

⁷⁾ Additionally required with first order: NANOCOLOR® TIC-Ex (REF 916993).

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® tube tests

	Spectrophotometer	500 D	PF-12 ^{20/5}	PF-3 COD	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	NanOx N	NanOx Metal	Crack set	Sea water ⁵⁾	GHS	Test
	■	■	■						■	■	■			Copper 5
	■	■	■									■	■	Cyanide 08
	■	■	■									■	■	DEHA 1 (Diethylhydroxylamine)
	■	■	■											Ethanol 1000
	■	■	■									■	■	Fluoride 2
	■	■	■										■	Formaldehyde 8
	■	■	■									■		Formaldehyde 10 ³⁾
	■		■									■		Hardness Ca / Mg
	■	■	■									■		Hardness 20
	■	■	■									■	■	HC 300 (Hydrocarbons)
	■	■	■						■	■		■	■	Iron 3
	■	■	■							■			■	Lead 5
	■	■	■									■	■	Manganese 10
	■	■	■											Methanol 15
	■	■	■										■	Molybdenum 40
	■	■	■						■	■		■	■	Nickel 4
	■	■	■										■	Nitrate 8
	■	■	■				■						■	Nitrate 50
	■	■	■										■	Nitrate 250
	■	■	■									■	■	Nitrite 2
	■	■	■									■		Nitrite 4
	■	■	■						■				■	total Kjeldahl nitrogen TKN 16
	■	■	■						■				■	total Nitrogen TN _b 22
	■	■	■						■				■	total Nitrogen TN _b 60
	■	■	■						■				■	total Nitrogen TN _b 220
	■	■	■									■	■	Organic acids 3000
	■	■	■									■	■	Oxygen 12
	■	■	■									■		Peroxide 2
	■	■	■		■	■						■		pH 6.5–8.2 ⁴⁾

NANOCOLOR® tube tests

Test	REF	Measuring range NANOCOLOR® VIS II		Number of tests	Shelf life	Method
■ Phenolic Index 5	985074	0.2–5.0 mg/L Phenol		20	1.5 years	4-Aminoantipyrine
■ ortho- and total Phosphate 1	985076	0.05–1.50 mg/L P 0.010–0.800 mg/L P ¹⁾	0.2–5.0 mg/L PO ₄ ³⁻ 0.03–2.50 mg/L PO ₄ ^{3- 1)}	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 5	985081	0.20–5.00 mg/L P	0.5–15.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 15	985080	0.30–15.00 mg/L P	1.0–45.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 45	985055	5.0–50.0 mg/L P	15–150 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 50	985079	10.0–50.0 mg/L P	30–150 mg/L PO ₄ ³⁻	19	3 years	Vanadate molybdate
■ ortho- and total Phosphate LR 1	985095	0.05–0.50 mg/L P	0.2–1.5 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
■ POC 200	985070	20–200 mg/L POC	2–40 mg/L KWI	20	1.5 years	Turbidity
■ Potassium 50	985045	2–50 mg/L K ⁺		20	2 years	Potassium tetraphenylborate (Turbidity)
■ Residual hardness 1	985084	0.03–1.25 °e	0.004–0.180 mmol/L	20	1 year	Phthalein purple
■ Silver 3	985049	0.20–3.00 mg/L Ag ⁺	0.08–0.50 mg/L Ag ⁺ ¹⁾	20	1.5 years	Indicator
■ Starch 100	985085	5–100 mg/L starch		19	1 year	Iodine-starch reaction
■ Sulfate 1000	985087	200–1000 mg/L SO ₄ ²⁻		20	3 years	Bariumsulfate (Turbidity)
■ Sulfate LR 200	985062	20–200 mg/L SO ₄ ²⁻		20	3 years	Bariumsulfate (Turbidity)
■ Sulfate MR 400	985060	40–200 mg/L SO ₄ ²⁻		20	3 years	Bariumsulfate (Turbidity)
■ Sulfide 3	985073	0.05–3.00 mg/L S ²⁻		20	3 years	Methylene blue
■ Sulfite 10	985089	0.2–10.0 mg/L SO ₃ ²⁻	0.05–2.40 mg/L SO ₃ ^{2- 1)}	20	1 year	Thiobenzoic acid derivative
■ Sulfite 100	985090	5–100 mg/L SO ₃ ²⁻		19	1 year	Potassium iodate / -iodide
■ Anionic surfactants 4	985032	0.20–4.00 mg/L MBAS	0.20–3.500 mg/L SDS	20	2 years	Methylene blue
■ Cationic surfactants 4	985034	0.20–4.00 mg/L CTAB		20	2 years	Disulfon blue
■ Nonionic surfactants 15	985047	0.3–15.0 mg/L Triton® X-100		20	2 years	TBPE
■ Thiocyanate 50	985091	0.5–50.0 mg/L SCN ⁻		20	2 years	Iron(III)-thiocyanate
■ Tin 3 ³⁾	985097	0.10–3.00 mg/L Sn		18	1 year	9-Phenyl-3-fluoron
■ TOC 30 ⁷⁾	985075	2.0–30.0 mg/L C		20	1 year (2–8 °C)	Indicator
■ TOC 300 ⁷⁾	985078	20–300 mg/L C		20	1 year (2–8 °C)	Indicator
■ TTC / Sludge activity	985890	5–150 µg TPF	0.050–2.300 A	20	2 years (2–8 °C)	2,3,5-Triphenyltetrazoliumchloride (TTC)
■ Turbidity ⁶⁾	Test 9-06	0.1–1000 NTU		–	–	Turbidity
■ Zinc 4	985096	0.10–4.00 mg/L Zn ²⁺		20	1 year	Zincon
■ Zinc 6	985042	0.20–6.00 mg/L Zn ²⁺		20	1 year	4-(2-pyridylazo)resorcinol (PAR)
■ Zirconium 100	985001	5–100 mg/L Zr		20	3 years	Indicator

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²⁾ Decomposition only possible in microwave.

³⁾ Special filter can be necessary for filter photometers (Formaldehyde 10: 412 nm, Tin 3: 520 nm).

⁴⁾ Without barcode.

⁵⁾ Please see the instruction leaflet.

⁶⁾ This test can be performed without a NANOCOLOR® reagent set. Determination only with NANOCOLOR® spectrophotometers and the PF-12^{Plus}.

⁷⁾ Additionally required with first order: NANOCOLOR® TIC-Ex (REF 916993).

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	Spectrophotometer	500 D	PF-12 ^{20/5}	PF-3 COD	PF-3 Drinking Water	PF-3 Fish	PF-3 Pool	PF-3 Soil	NanoX N	NanoX Metal	Crack set	Sea water ⁵⁾	GHS	Test
	■	■	■									■	■	Phenolic index 5
	■	■	■						■			■	■	ortho- and total Phosphate 1
	■	■	■				■		■			■	■	ortho- and total Phosphate 5
	■	■	■				■		■			■	■	ortho- and total Phosphate 15
	■	■	■						■			■	■	ortho- and total Phosphate 45
	■	■	■						■			■	■	ortho- and total Phosphate 50
	■	■	■						■			■	■	ortho- and total Phosphate LR 1
	■	■	■									■		POC 200
	■	■	■				■					■	■	Potassium 50
	■	■	■											Residual hardness 1
	■	■	■						■					Silver 3
	■	■	■									■	■	Starch 100
	■	■	■										■	Sulfate 1000
	■	■	■										■	Sulfate LR 200
	■	■	■											Sulfate MR 400
	■	■	■									■	■	Sulfide 3
	■	■	■									■	■	Sulfite 10
	■	■	■									■	■	Sulfite 100
	■	■	■									■	■	Anionic surfactants 4
	■	■	■									■	■	Cationic surfactants 4
	■	■	■										■	Nonionic surfactants 15
	■	■	■									■	■	Thiocyanate 50
	■	■	■									■	■	Tin 3 ³⁾
	■	■	■										■	TOC 30
	■	■	■										■	TOC 300
	■	■	■										■	TTC / Sludge activity
	■		■									■		Turbidity ⁶⁾
	■	■	■						■	■		■	■	Zinc 4
	■	■	■						■	■		■	■	Zinc 6
	■	■	■						■	■		■		Zirconium 100

NANOCOLOR® robot tests

Fully automated water analysis

The companies MACHÉREY-NAGEL and Skalar Analytical BV have collaborated a robotic analyzer for fully automated water analysis in the laboratory.

The test kit analyzer SP2000^{series} automates all the necessary handling steps of the photometric NANOCOLOR® tube tests such as sample (de)-capping, pipetting, addition of reagents, mixing, heating, cooling and measurement.

The flexibility and versatility of the test kit platform is reflected in the possibility to process from 48 to 192 test tubes at once by using different test tube racks. The instrument can be configured for the analysis of one test kit application or for multiple test kit applications per analysis run, such as combinations of COD, total phosphate, total nitrogen and others. The evaluation of the tests is performed on the spectrophotometer NANOCOLOR® VIS II which is integrated on the platform. With the software the user can define if the application should be processed sequential or parallel.

Good to know

If interested in automated water analysis, we are pleased to be of service.



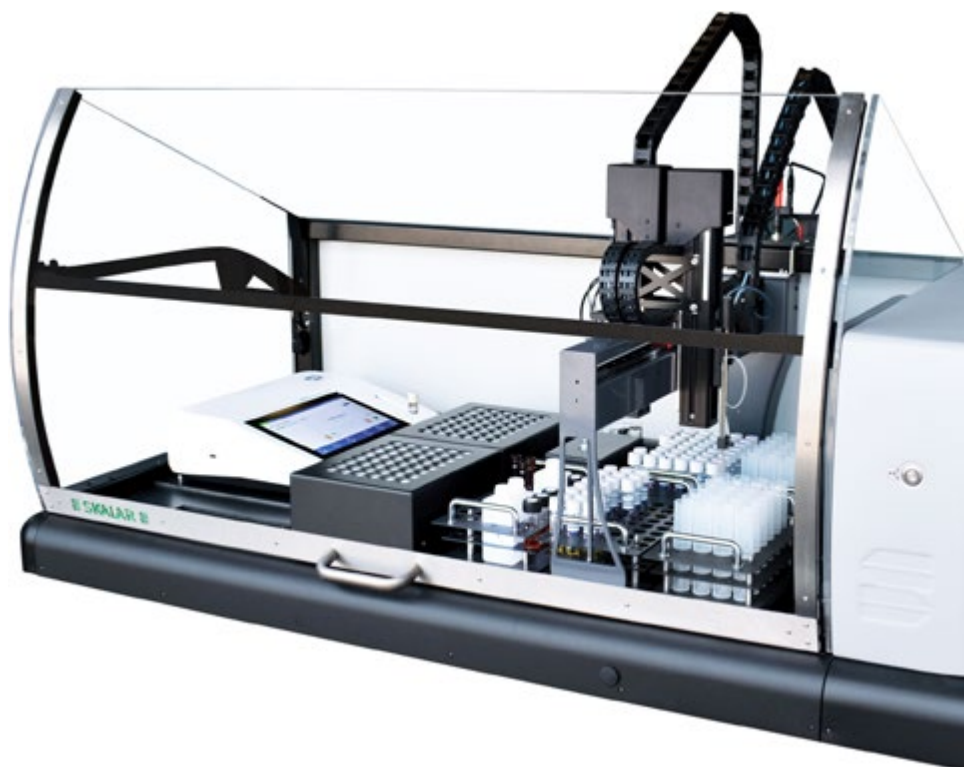
Ordering information

Test	REF	Measuring range NANOCOLOR® VIS II ¹⁾		Number of tests	Shelf life	Method
Ammonium 3	985603	0.04–2.30 mg/L NH ₄ -N	0.05–3.00 mg/L NH ₄ ⁺	20	1 year	Indophenol
Ammonium 50	985605	1–40 mg/L NH ₄ -N	1–50 mg/L NH ₄ ⁺	20	1 year	Indophenol
Chloride 50	985621	0.5–50.0 mg/L Cl ⁻		20	1 year	Mercury(II)-thiocyanate /Iron(III)-nitrate
Chloride 200	985619	5–200 mg/L Cl ⁻		20	1 year	Mercury(II)-thiocyanate /Iron(III)-nitrate
COD 60	985622	5–60 mg/L O ₂		20	1 year (2–8 °C)	Potassium dichromate
COD 160	985626	10–160 mg/L O ₂		20	1 year	Potassium dichromate
COD 600	985630	50–600 mg/L O ₂		20	1 year	Potassium dichromate
COD 1500	985629	100–1500 mg/L O ₂		20	1 year	Potassium dichromate
COD LR 150	985636	3–150 mg/L O ₂		19	1 year	Potassium dichromate
COD HR 1500	985638	20–1500 mg/L O ₂		19	1 year	Potassium dichromate
Nitrate 8	985665	0.30–8.00 mg/L NO ₃ -N	1.3–35.0 mg/L NO ₃ ⁻	20	2 years	2,6-Dimethylphenol
Nitrate 50	985664	0.3–22.0 mg/L NO ₃ -N	2–100 mg/L NO ₃ ⁻	20	2 years	2,6-Dimethylphenol
Nitrite 2	985668	0.003–0.460 mg/L NO ₂ -N	0.02–1.50 mg/L NO ₂ ⁻	20	1 year	Sulfanilic acid / 1-Naphthylamine
Nitrite 4	985669	0.1–4.0 mg/L NO ₂ -N	0.3–13.0 mg/L NO ₂ ⁻	20	1.5 years	Sulfanilic acid / 1-Naphthylamine
total Nitrogen TN _b 22	985683	0.5–22.0 mg/L N		20	1 year	2,6-Dimethylphenol
total Nitrogen TN _b 220	985688	5–220 mg/L N		20	1 year	2,6-Dimethylphenol
Phenolic Index 5	985674	0.2–5.0 mg/L Phenol		20	1.5 years	4-Aminoantipyrine
total Phosphate 1	985676	0.05–1.50 mg/L P	0.2–5.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
total Phosphate 5	985681	0.20–5.00 mg/L P	0.5–15.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
total Phosphate 15	985680	0.30–15.00 mg/L P	1.0–45.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
ortho Phosphate 1	985607	0.05–1.50 mg/L P	0.2–5.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
ortho Phosphate 15	985657	0.30–15.00 mg/L P	1.0–45.0 mg/L PO ₄ ³⁻	20	1 year	Phosphomolybdenum blue
Sulfide 3	985673	0.05–3.00 mg/L S ²⁻		20	3 years	Methylene blue

¹⁾ Evaluation only possible on the spectrophotometers NANOCOLOR® VIS II and NANOCOLOR® VIS.

²⁾ Please see the instruction leaflet.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

[illegible]

NANOCOLOR® standard tests

High sensitivity for photometric water analysis

NANOCOLOR® standard tests are convenient reagent kits for photometric analysis. With ready-to-use reagents up to 500 determinations are possible with only one test kit, resulting in low costs per determination for the user. Even very low limits can be evaluated precisely, due to high sample volumes and the measurement in 50 mm cuvettes. An enhancement of selectivity is possible for various parameters by extraction, where potentially interfering substances remain in the aqueous phase. The colored complex with the substance of interest is extracted with an organic solvent from the aqueous phase and is then analyzed within the organic phase.

Good to know

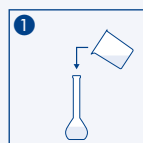
NANOCOLOR® standard tests offer maximum sensitivity and accuracy in photometric analysis.

Good to know

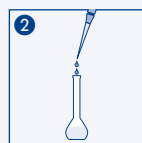
For further information on NANOCOLOR® photometers for the evaluation of NANOCOLOR® standard tests see page 12.

How it's done

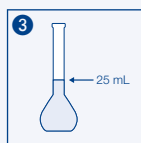
Procedure of standard tests



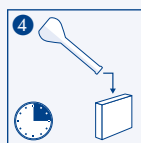
1 Fill 20 mL sample into 25 mL flask



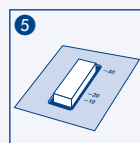
2 Add reagents



3 Fill up to 25 mL with dist. water and mix



4 After reaction time fill into cuvette



5 Measure





NANOCOLOR® standard tests

Ordering information

Test	REF	Measuring range NANOCOLOR® VIS II		Number of tests ¹⁾	Shelf life	Method
■ Aluminum ²⁾	91802	0.01–1.00 mg/L Al ³⁺		250	2 years	Eriochrome® Cyanine R
■ Ammonium	91805	0.01–2.0 mg/L NH ₄ -N	0.01–2.5 mg/L NH ₄ ⁺	100	1 year	Indophenol
■ Cadmium ³⁾	918131	0.002–0.50 mg/L Cd ²⁺		25	1.5 years	Dithizone
■ Chloride	91820	0.2–125 mg/L Cl ⁻		250	1 year	Mercury(II)-thiocyanate / iron(III)-nitrate
■ Chlorine	91816	0.02–10.0 mg/L Cl ₂		250	3 years	DPD
■ Chlorine dioxide	918163	0.04–4.00 mg/L ClO ₂		50	1.5 years	DPD
■ Chromate	91825	0.01–3.0 mg/L Cr(VI)	0.01–6.0 mg/L CrO ₄ ²⁻	250	2 years	Carbazide
■ Cobalt	91851	0.002–0.70 mg/L Co ²⁺		250	2 years	5-Cl-PADAB
■ Color (Hazen/DIN) ⁴⁾	Test 1-39	5–500 mg/L Pt (Hazen)	0.2–20.0 1/m	–	–	Hazen
■ Copper	91853	0.01–10.0 mg/L Cu ²⁺		250	2 years	Cuprizone
■ Cyanide	91830	0.001–0.50 mg/L CN ⁻		250	1 year	Barbituric acid / pyridine
■ Detergents, anionic	91832	0.02–5.0 mg/L MBAS		40	3 years	Methylene blue
■ Detergents, cationic	91834	0.05–5.0 mg/L CTAB		40	3 years	Bromphenol blue
■ Fluoride	918142	0.05–2.00 mg/L F ⁻		500	2 years	SPADNS
■ Hydrazine	91844	0.002–1.50 mg/L N ₂ H ₄		250	1 year	4-(Dimethylamino)-benzaldehyde
■ Iron	91836	0.01–15.0 mg/L Fe		250	3 years	1,10-Phenanthroline
■ Lead ³⁾	918101	0.005–1.00 mg/L Pb ²⁺		50	1.5 years	Dithizone
■ Manganese	91860	0.01–10.0 mg/L Mn		250	3 years	Formaldehyde
■ Nickel	91862	0.01–10.0 mg/L Ni ²⁺		250	2 years	Dimethylglyoxime
■ Nitrate	91865	0.1–30.0 mg/L NO ₃ -N	0.5–140 mg/L NO ₃ ⁻	100	2 years	2,6-Dimethylphenol
■ Nitrate Z	91863	0.02–1.0 mg/L NO ₃ -N	0.1–5.0 mg/L NO ₃ ⁻	500	1.5 years	Sulfanilic acid / 1-Naphthylamine
■ Nitrite	91867	0.002–0.30 mg/L NO ₂ -N	0.005–1.00 mg/L NO ₂ ⁻	250	1.5 years	Sulfanilic acid / 1-Naphthylamine
■ Ozone	91885	0.01–1.50 mg/L O ₃		200	1 year (2–8 °C)	Indigotrisulfonate
■ Phenol	91875	0.01–7.0 mg/L Phenol		500	3 years	4-Nitroaniline
■ ortho-Phosphate	91877	0.04–6.5 mg/L PO ₄ -P	0.1–20.0 mg/L PO ₄ ³⁻	500	3 years	Phospho molybdenum blue
■ ortho-Phosphate	91878	0.2–17 mg/L PO ₄ -P	0.5–50 mg/L PO ₄ ³⁻	500	3 years	Vanadate molybdate
■ SAC ^{4) 7)}	Test 3-01	0.1–150.0 1/m		–	–	–
■ Silica	91848	0.01–10.0 mg/L Si 0.002–0.1 mg/L Si ⁵⁾	0.02–10.0 mg/L SiO ₂ 0.005–0.200 mg/L SiO ₂ ⁵⁾	250	3 years	Silicomolybdenum blue
■ Sulfide	91888	0.01–3.0 mg/L S ²⁻		250	3 years	Methylene blue
■ Turbidity (Formazine/DIN) ⁴⁾	Test 1-92	1–100 TE/F (= FAU)	0.5–40.0 1/m	–	–	Turbidity
■ Zinc	91895	0.02–3.0 mg/L Zn ²⁺		250	3 years	Zincon

¹⁾ Maximal number of tests. The number of tests depends on the used sample volume.

²⁾ Decomposition in micro wave is possible.

³⁾ Organic phase tetrachloro ethylene p.a. or tetrachloro methane is needed additionally.

⁴⁾ No NANOCOLOR® test is necessary for this determination.

⁵⁾ Highly sensitive measurement.

⁶⁾ Please see the instruction leaflet.

⁷⁾ This test can only be performed with NANOCOLOR® UV/VIS II.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® standard tests

	Spectrophotometer	500 D	Reduced sample volume	Simplified procedure	NanOx N	NanOx Metal	Sludge analysis	Crack set	Sea water ⑥	GHS	Test
	■	■	■			■			■		Aluminum ²⁾
	■	■								■	Ammonium
	■	■					■	■		■	Cadmium ³⁾
	■	■	■							■	Chloride
	■	■	■	■					■		Chlorine
	■	■							■	■	Chlorine dioxide
	■	■	■			■	■		■	■	Chromate
	■	■	■			■		■	■	■	Cobalt
	■	■							■		Color (Hazen/DIN) ⁴⁾
	■	■	■	■		■	■	■	■		Copper
	■	■	■						■	■	Cyanide
	■	■								■	Detergents, anionic
	■	■								■	Detergents, cationic
	■	■	■						■	■	Fluoride
	■	■	■	■					■	■	Hydrazine
	■	■	■	■		■		■	■	■	Iron
	■	■					■	■		■	Lead ³⁾
	■	■	■	■						■	Manganese
	■	■	■	■		■	■	■	■	■	Nickel
	■	■			■					■	Nitrate
	■	■	■							■	Nitrate Z
	■	■	■	■					■	■	Nitrite
	■	■							■	■	Ozone
	■	■	■						■	■	Phenol
	■	■	■	■					■	■	ortho-Phosphate
	■	■	■	■					■	■	ortho-Phosphate
	■										SAC ^{4) 7)}
	■	■	■	■					■	■	Silica
	■	■	■						■	■	Sulfide
	■	■							■		Turbidity (Formazine/DIN) ⁴⁾
	■	■	■			■	■	■	■	■	Zinc

Analytical quality control for a complete analytical system

With **NANOCONTROL** the user can check the complete **NANOCOLOR®** analytical system and his own work comprehensively and prove the correctness of his results. The performance of consequent analytical quality assurance allows for an objective proof of the accuracy of the photometric analysis resulting in acceptance by local authorities. **MACHEREY-NAGEL** offers a complete system to test and document the performance of the system for internal quality control. Together with our customers we developed a user-friendly system, future-proof, and tailor-made for the needs of the operator. Continuous development and innovation make us the market leader in all questions regarding quality control in photometric water analysis.

Single and multistandards

In **NANOCONTROL** standards the respective reference substances are dissolved with a defined concentration. This concentration of the standard solution is selected to be in the middle of the measuring range of the suitable test kit with a narrow confidence interval. The standard solution is applied in the test instead of a normal water sample. The test kit is then handled as described in the instructions. When the result of the test is within the confidence interval, the operator can be sure that all components of his analytical system are working correctly and that no handling error was made. In case of deviations from the given value, equipment and test kit have to be monitored and checked. In addition to solutions with only one standard substance also multistandards are available, containing a mixture of different standard substances. They are designed for special fields of application, e.g. waste water or drinking water analysis.

Hereby various characteristic parameters can be controlled with only one standard solution and the results can then be conveniently documented.

Good to know



All requirements on quality assurance (IQC) can be fulfilled with the **NANOCONTROL** System from **MACHEREY-NAGEL**.

Find an overview on page 17.



Ordering information

Standards

Standard	REF	Test number	Test	Number of tests	Concentration of standard ¹⁾	Confidence interval
Single standards						
■ AOX 3	92507	0-07	AOX 3	20	1.0 mg/L AOX	0.8–1.2 mg/L AOX
■ BOD ₅	92582	8-22 / 8-25	BOD ₅ / BOD ₅ -TT	10	210 mg/L O ₂	170–250 mg/L O ₂
■ Chlorine	92517	0-17 1-16	Chlorine / Ozone 2 Chlorine	30	0.80 mg/L Cl ₂ 1.00 mg/L Cl ₂	0.70–0.90 mg/L Cl ₂ 0.90–1.10 mg/L Cl ₂
■ Chromate	92524	0-24 0-59 1-25	Chromate 5 total Chromium 2 Chromate	15	2.0 mg/L CrO ₄ ²⁻ 0.90 mg/L Cr 0.40 mg/L CrO ₄ ²⁻	1.8–2.2 mg/L CrO ₄ ²⁻ 0.80–1.00 mg/L Cr 0.36–0.44 mg/L CrO ₄ ²⁻
■ COD 60	92522	0-27 / 0-22	COD 40 / COD 60	15	30 mg/L O ₂	26–34 mg/L O ₂
■ COD 160	92526	0-26 / 0-33 / 0-36	COD 160 / COD 300 / COD LR 150	15	100 mg/L O ₂	90–110 mg/L O ₂
■ COD 1500	92529	0-30 / 0-29 / 0-38	COD 600 / COD 1500 / COD HR 1500	15–30	400 mg/L O ₂	360–440 mg/L O ₂
■ COD 15000	92528	0-23 0-28	COD 10000 COD 15000	30–150	4.00 g/L O ₂ 4.0 g/L O ₂	3.60–4.40 g/L O ₂ 3.6–4.4 g/L O ₂
■ Nitrite	92568	0-68 0-69 1-67	Nitrite 2 Nitrite 4 Nitrite	15–150	0.30 mg/L NO ₂ -N 2.10 mg/L NO ₂ -N 0.060 mg/L NO ₂ -N	0.25–0.35 mg/L NO ₂ -N 1.9–2.3 mg/L NO ₂ -N 0.054–0.066 mg/L NO ₂ -N
■ ortho-Phosphate	92576	0-76 1-77	ortho- and total Phosphate 1 ortho-Phosphate	15	1.00 mg/L PO ₄ -P 0.2 mg/L PO ₄ -P	0.90–1.10 mg/L PO ₄ -P 0.18–0.22 mg/L PO ₄ -P
■ Sulfate	92562	0-62	Sulfate LR 200	15	120 mg/L SO ₄ ²⁻	110–130 mg/L SO ₄ ²⁻
■ Sulfite	92590	0-90	Sulfite 100	15	50 mg/L SO ₃ ²⁻	45–55 mg/L SO ₃ ²⁻
■ TOC 30	92575	0-75	TOC 30	15	10 mg/L C	8.5–11.5 mg/L C
■ TOC 300	92578	0-78	TOC 300	15	100 mg/L C	85–115 mg/L C
Multistandards						
■ Sewage outflow 1	925011	0-04 0-26 0-33 0-11 0-36 0-65 0-64 1-65 0-81 0-92	Ammonium 10 COD 160 COD 300 COD 4000 COD LR 150 Nitrate 8 Nitrate 50 Nitrate ortho- and total Phosphate 5 total Nitrogen TN _b 60	12–120	3.0 mg/L NH ₄ -N 114 mg/L O ₂ 114 mg/L O ₂ 2600 mg/L O ₂ 114 mg/L O ₂ 6.00 mg/L NO ₃ -N 6.0 mg/L NO ₃ -N 6.0 mg/L NO ₃ -N 2.50 mg/L P 20 mg/L N	2.7–3.3 mg/L NH ₄ -N 103–125 mg/L O ₂ 103–125 mg/L O ₂ 2340–2860 mg/L O ₂ 103–125 mg/L O ₂ 5.20–6.80 mg/L NO ₃ -N 5.2–6.8 mg/L NO ₃ -N 5.2–6.8 mg/L NO ₃ -N 2.25–2.75 mg/L P 18–22 mg/L N
■ Sewage outflow 2	925010	0-03 0-27 0-22 0-65 0-64 1-65 0-76 0-81 0-83	Ammonium 3 COD 40 COD 60 Nitrate 8 Nitrate 50 Nitrate total Phosphate 1 total Phosphate 5 total Nitrogen TN _b 22	12–120	1.50 mg/L NH ₄ -N 30 mg/L O ₂ 30 mg/L O ₂ 3.00 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 1.00 mg/L P 1.00 mg/L P 12.0 mg/L N	1.30–1.70 mg/L NH ₄ -N 26–34 mg/L O ₂ 26–34 mg/L O ₂ 2.60–3.40 mg/L NO ₃ -N 2.6–3.4 mg/L NO ₃ -N 2.6–3.4 mg/L NO ₃ -N 0.90–1.10 mg/L P 0.90–1.10 mg/L P 10.0–14.0 mg/L N
■ Sewage inflow	925012	0-05 0-30 0-29 0-28 0-12 0-38 0-64 0-66 0-80 0-88	Ammonium 50 COD 600 COD 1500 COD 15000 COD 60000 COD HR 1500 Nitrate 50 Nitrate 250 total Phosphate 15 total Nitrogen TN _b 220	30–300	25.0 mg/L NH ₄ -N 400 mg/L O ₂ 400 mg/L O ₂ 10.0 g/L O ₂ 10.0 g/L O ₂ 400 mg/L O ₂ 15.0 mg/L NO ₃ -N 15 mg/L NO ₃ -N 8.00 mg/L P 75 mg/L N	22.0–28.0 mg/L NH ₄ -N 360–440 mg/L O ₂ 360–440 mg/L O ₂ 9.0–11.0 g/L O ₂ 9.0–11.0 g/L O ₂ 360–440 mg/L O ₂ 13.5–16.5 mg/L NO ₃ -N 13–17 mg/L NO ₃ -N 7.20–8.80 mg/L P 67–83 mg/L N

¹⁾ Please see the instruction leaflet / evaluation sheet.

²⁾ Shelf life 6 weeks after first opening / see instruction leaflet.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Addition	Shelf life ²⁾	GHS	Standard
Single standards			
1.0 mg/L AOX	1 year		AOX 3
–	1 year (2–8 °C)		BOD ₅
–	1 year	■	Chlorine
0.5 mg/L CrO ₄ ²⁻ 0.22 mg/L Cr 0.5 mg/L CrO ₄ ²⁻	1 year	■	Chromate
–	1 year (2–8 °C)		COD 60
–	1 year (2–8 °C)		COD 160
–	1 year (2–8 °C)		COD 1500
–	1 year (2–8 °C)		COD 15000
0.02 mg/L NO ₂ -N – 0.02 mg/L NO ₂ -N	1 year		Nitrite
0.10 mg/L PO ₄ -P 0.10 mg/L PO ₄ -P	1 year		ortho-Phosphate
–	1 year		Sulfate 200
–	1 year		Sulfite
–	1 year (2–8 °C)		TOC 30
–	1 year (2–8 °C)		TOC 300
Multistandards			
1.0 mg/L NH ₄ -N 25 mg/L O ₂ 25 mg/L O ₂ – – 1.50 mg/L NO ₃ -N 1.5 mg/L NO ₃ -N 1.5 mg/L NO ₃ -N 0.25 mg/L P 10 mg/L N	6 months		Sewage outflow 1
0.30 mg/L NH ₄ -N 10 mg/L O ₂ 10 mg/L O ₂ 3.00 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 3.0 mg/L NO ₃ -N 0.30 mg/L P 0.30 mg/L P 3.3 mg/L N	6 months (2–8 °C)		Sewage outflow 2
10 mg/L NH ₄ -N 100 mg/L O ₂ 100 mg/L O ₂ – – 100 mg/L O ₂ 6.0 mg/L NO ₃ -N 6 mg/L NO ₃ -N 1.00 mg/L P 20 mg/L N	1 year		Sewage inflow



Standard	REF	Test number	Test	Number of tests	Concentration of standard ¹⁾	Confidence interval
■ Metals 1	925015	0-14	Cadmium 2	15-60	1.00 mg/L Cd ²⁺	0.80-1.20 mg/L Cd ²⁺
		1-13	Cadmium		0.10 mg/L Cd ²⁺	0.08-0.12 mg/L Cd ²⁺
		0-21	Chloride 50		20 mg/L Cl ⁻	17-23 mg/L Cl ⁻
		0-19	Chloride 200		80 mg/L Cl ⁻	70-90 mg/L Cl ⁻
		0-244	Chromate 5 + NanOx Metal		1.0 mg/L Cr	0.8-1.2 mg/L Cr
		0-59	total Chromium 2		1.0 mg/L Cr	0.8-1.2 mg/L Cr
		1-251	Chromate + NanOx Metal		1.0 mg/L Cr	0.8-1.2 mg/L Cr
		1-253	Chromate + total Chromium		1.0 mg/L Cr	0.8-1.2 mg/L Cr
		0-37	Iron 3		1.00 mg/L Fe ³⁺	0.80-1.20 mg/L Fe ³⁺
		1-36	Iron		0.10 mg/L Fe ³⁺	0.08-0.12 mg/L Fe ³⁺
		0-40	Fluoride 2		1.0 mg/L F ⁻	0.8-1.2 mg/L F ⁻
		1-42	Fluoride		1.00 mg/L F ⁻	0.80-1.20 mg/L F ⁻
		0-62	Sulfate LR 200		80 mg/L SO ₄ ²⁻	70-90 mg/L SO ₄ ²⁻
		0-60	Sulfate MR 400		80 mg/L SO ₄ ²⁻	70-90 mg/L SO ₄ ²⁻
		0-96	Zinc 4		1.00 mg/L Zn ²⁺	0.80-1.20 mg/L Zn ²⁺
		1-95	Zinc		0.10 mg/L Zn ²⁺	0.08-0.12 mg/L Zn ²⁺
■ Metals 2	925016	0-09	Lead 5	15	2.50 mg/L Pb ²⁺	2.25-2.75 mg/L Pb ²⁺
		1-10	Lead		0.25 mg/L Pb ²⁺	0.22-0.28 mg/L Pb ²⁺
		0-45	Potassium 50		20 mg/L K ⁺	18-22 mg/L K ⁺
		0-53 / 0-54	Copper 5 / Copper 7		2.00 mg/L Cu ²⁺	1.80-2.20 mg/L Cu ²⁺
		1-53	Copper		0.60 mg/L Cu ²⁺	0.50-0.70 mg/L Cu ²⁺
		0-61 / 0-71	Nickel 7 / Nickel 4		2.00 mg/L Ni ²⁺	1.80-2.20 mg/L Ni ²⁺
		1-62	Nickel		0.60 mg/L Ni ²⁺	0.50-0.70 mg/L Ni ²⁺
■ Seepage	925013	0-08	Ammonium 100	15-300	40 mg/L NH ₄ -N	36-44 mg/L NH ₄ -N
		0-06	Ammonium 200		80 mg/L NH ₄ -N	72-88 mg/L NH ₄ -N
		0-23	COD 10000		4.00 g/L O ₂	3.60-4.40 g/L O ₂
		0-28	COD 15000		4.0 g/L O ₂	3.6-4.4 g/L O ₂
		0-66	Nitrate 250		30 mg/L NO ₃ -N	27-33 mg/L NO ₃ -N
		0-55	total Phosphate 45		25.0 mg/L P	22.0-28.0 mg/L P
		0-79	ortho-Phosphate 50		25.0 mg/L PO ₄ -P	22.0-28.0 mg/L PO ₄ -P
■ Drinking water	925018	0-98	Aluminum 07	15-30	0.50 mg/L Al ³⁺	0.44-0.56 mg/L Al ³⁺
		1-02	Aluminium		0.50 mg/L Al ³⁺	0.44-0.56 mg/L Al ³⁺
		1-05	Ammonium		0.20 mg/L NH ₄ -N	0.17-0.23 mg/L NH ₄ -N
		0-21	Chloride 50		20 mg/L Cl ⁻	17-23 mg/L Cl ⁻
		1-20	Chloride		20 mg/L Cl ⁻	17-23 mg/L Cl ⁻
		0-37	Iron 3		1.50 mg/L Fe ³⁺	1.30-1.70 mg/L Fe ³⁺
		1-36	Iron		1.50 mg/L Fe ³⁺	1.30-1.70 mg/L Fe ³⁺
		0-58	Manganese 10		1.5 mg/L Mn ²⁺	1.3-1.7 mg/L Mn ²⁺
		1-60	Manganese		1.50 mg/L Mn ²⁺	1.30-1.70 mg/L Mn ²⁺
		0-86	Sulfate 200		120 mg/L SO ₄ ²⁻	102-138 mg/L SO ₄ ²⁻
		0-62	Sulfate LR 200		120 mg/L SO ₄ ²⁻	102-138 mg/L SO ₄ ²⁻

¹⁾ Please see the instruction leaflet / evaluation sheet.

²⁾ Shelf life 6 weeks after first opening / see instruction leaflet.

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Addition	Shelf life ²⁾	GHS	Standard
– – 10 mg/L Cl ⁻ 50 mg/L Cl ⁻ 0.2 mg/L Cr 0.2 mg/L Cr 0.2 mg/L Cr 0.2 mg/L Cr 0.30 mg/L Fe ³⁺ 0.30 mg/L Fe ³⁺ 0.5 mg/L F ⁻ 0.50 mg/L F ⁻ 50 mg/L SO ₄ ²⁻ 50 mg/L SO ₄ ²⁻ 0.40 mg/L Zn ²⁺ 0.40 mg/L Zn ²⁺	1 year		Metals 1
0.50 mg/L Pb ²⁺ – 10 mg/L K ⁺ 0.70 mg/L Cu ²⁺ 0.70 mg/L Cu ²⁺ 0.70 mg/L Ni ²⁺ 0.70 mg/L Ni ²⁺	1 year		Metals 2
30 mg/L NH ₄ -N 30 mg/L NH ₄ -N – – 10 mg/L NO ₃ -N 5.0 mg/L P 5.0 mg/L PO ₄ -P	1 year		Seepage
0.20 mg/L Al ³⁺ 0.20 mg/L Al ³⁺ 0.20 mg/L NH ₄ -N 5.0 mg/L Cl ⁻ 5.0 mg/L Cl ⁻ 0.20 mg/L Fe ³⁺ 0.20 mg/L Fe ³⁺ 1.0 mg/L Mn ²⁺ 0.20 mg/L Mn ²⁺ 50 mg/L SO ₄ ²⁻ 50 mg/L SO ₄ ²⁻	1 year		Drinking water



NANOCOLOR® reagents for sample decomposition

Sample preparation for photometric analysis

Usually only dissolved compounds of a parameter are detected in water analysis. In strongly contaminated waters and industrial waste water these parameters are often bound in complexes or other structures and are therefore not directly accessible for the respective test. If it is necessary to determine the total amount of these substances, a decomposition step has to be done prior to analysis, where on most cases large amounts of organic material have to be decomposed. Within the NANOCOLOR® system there are various rapid and easy methods available for conventional sample decomposition with solid reagents and kits with liquid reagents for complex matrices. In some of the NANOCOLOR® tube tests the reagents for sample preparation are already included and pre-dosed in additional test tubes next to the cuvettes. This is the perfect combination for the determination of total parameters such as total nitrogen or total chromium. Other reagents for sample preparation are available separately and are suitable for more than one parameter. After digestion the samples are then processed as described in the instructions for the respective NANOCOLOR® test kit.

NANOCOLOR® NanOx N – Oxidative digestion of samples containing nitrogen

NANOCOLOR® NanOx N consists of an easy-to-dose solid oxidation reagent (peroxodisulfate) and a compensation reagent to eliminate interfering substances. After digestion, all inorganic and organic nitrogen compounds in the sample have been converted to nitrate and can be detected. The digestion of larger sample volumes allows a multiple determination from just one preparation.

NANOCOLOR® NanOx Metal – Oxidation of samples containing heavy metals

Undissolved metal ions and metal oxides are dissolved with the aid of acids and heat, metal ions are de-complexated and adsorptive or interfering substances are eliminated. Optimal recovery rates can be found in the analysis of heavy metals. NANOCOLOR® NanOx Metal consists of an easy-to-dose solid oxidation reagent (peroxodisulfate) and a neutralizing reagent to adjust the pH value for the following determination of different metals. In addition to the digestion in the heating block, it is possible to digest samples in less time using a microwave.

Good to know

For further accessories for digestions with NANOCOLOR® NanOx Metal in a heating block or a microwave see page 110.



NANOCOLOR® reagents for sample decomposition

NANOCOLOR® crack set

For a more powerful and complete digestion of resistant samples we recommend to use the NANOCOLOR® crack set. The included liquid reagents allow an oxidative sample preparation under acidic conditions (peroxodisulfate/sulfuric acid) and normal pressure at 100 °C in the heating block.

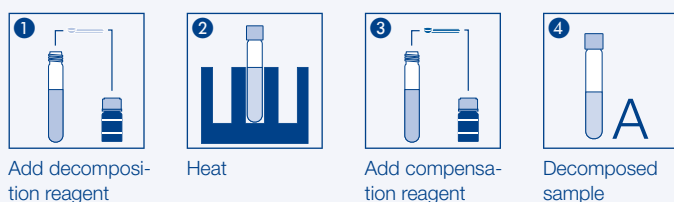
NANOCOLOR® sludge

In Germany, the sewage sludge regulation regularizes the use of sludge as fertilizer in agriculture and in market gardens. Therein a limit for seven heavy metals is established. The determination of these parameters is possible with high accuracy using NANOCOLOR® sludge (aqua regia) for digestion. A thorough training is recommended to learn the special working techniques before using the kit. Detailed instructions regarding sludge analysis can be provided free of charge.

How it's done



Decomposition in heating block with NanOx N



Ordering information

Description	REF	Number of decompositions	Shelf life	GHS
Determination of total Nitrogen				
■ NANOCOLOR® NanOx N solid reagents for the oxidative digestion prior to total nitrogen determination (heating block or microwave)	918979	50–100	1 year	■
Determination of total metals and phosphorous				
■ NANOCOLOR® NanOx Metal solid reagents for the oxidative decomposition of samples containing heavy metals and total phosphate (heating block or microwave)	918978	75–150	1 year	■
Crack set for aqueous systems				
■ Crack set incl. sulfuric acid / potassium peroxodisulfate for the oxidative digestion in the heating block	91808	100	3 years	■
■ Decomposition apparatus for sample decomposition incl. decomposition tube, reducing adaptor and condensor	91629	–	–	
Sludge analysis				
■ Reagent set NANOCOLOR® sludge: aqua regia digestion of sludge- and soil samples in the heating block	91850	10	3 years	■
■ Starter set combination of necessary accessories for sludge analysis (without reagents, photometer, heating block) incl. instructions	91610	–	–	

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® accessories

Everything from one hand

An indicator for the quality of an analytical system is its completeness. Therefore, accessories for sample drawing, preparation, and conservation as well as for decomposition, extraction and filtration are part of the NANOCOLOR® system.

Getting all these components from one hand allows a smooth work flow leading to optimal results.

Ordering information

Description	REF	Content	Number of tests	Shelf life	GHS
General accessories					
■ Volumetric flask 10 mL for reduced analytical preparations	91642	2 pieces			
■ Volumetric flask 25 mL with NS 10/19 and PE stopper for analytical preparations	91661	2 pieces			
■ Volumetric flask 100 mL with NS 12/21 and PE stopper	91683	2 pieces			
■ Erlenmeyer flask 50 mL	916212	1 piece			
■ Erlenmeyer flask 100 mL	91638	1 piece			
■ Measuring cylinder 50 mL	91684	1 piece			
■ Bulb for filling 20 mL pipettes	91665	1 piece			
■ Glass rod 30 cm	91639	1 piece			
■ Tweezers for picking of NANOFIX capsules	916114	1 piece			
■ Plastic wash bottle 500 mL with spraying attachment	91689	1 piece			
■ Magnetic stirring unit	970115	1 piece			
■ Mini-magnet for stirring (30 x 6 mm)	916211	1 piece			
■ Timer with digital display and acoustic signal (up to 99:59 min)	91696	1 piece			
■ Porcelain mortar 90 mm Ø with pestle	91688	1 piece			
■ Holder for 15 round glass tubes and 2 tubes for sample digestion	91623	1 piece			
■ Safety kit, consists of safety glasses, gloves and rubber apron	91690	1 piece			
■ Adhesive tape, glass fiber reinforced, for closing the shipping boxes for hazardous goods	91620	1 roll, 50 m			
■ Glass funnel 60 mm Ø	91681	1 piece			
■ Glass funnel 80 mm Ø	91682	1 piece			
■ Filter circles MN 1670, 11 cm Ø	470011	100 pieces			
■ Filter circles MN 640 d, 15 cm Ø	205015	100 pieces			
Membrane filtration					
■ Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters 0.45 µm	91650	1 set			
■ CHROMAFIL® membrane filters 0.45 µm	91652	50 pieces			
■ Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters 1.2 µm	916511	1 set			
■ CHROMAFIL® membrane filters 1.2 µm	916513	50 pieces			
■ Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters GF / PET 0.45 µm	91601	1 set			
■ CHROMAFIL® membrane filters GF / PET 0.45 µm	91602	50 pieces			
Pipetting					
■ Piston pipette 200 µL	91672	1 piece			
■ Plastic tips transparent for piston pipettes 5–200 µL	916915	100 pieces			
■ Piston pipette 500 µL	91653	1 piece			
■ Plastic tips transparent for piston pipettes 100–1000 µL	91676	100 pieces			
■ Piston pipette 1.0 mL	91671	1 piece			
■ Plastic tips transparent for piston pipettes 100–1000 µL	91676	100 pieces			

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Description	REF	Content	Number of tests	Shelf life	GHS
■ Piston pipette 2.0 mL	916917	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
■ Digital piston pipette 5–50 µL, adjustable, with tip ejector	91658	1 piece			
■ Digital piston pipette 50–200 µL, adjustable, with tip ejector	916914	1 piece			
■ Plastic tips transparent for piston pipettes 5–50 µL and 50–200 µL	916915	100 pieces			
■ Digital piston pipette 100–1000 µL, adjustable, with tip ejector	91677	1 piece			
■ Plastic tips transparent for piston pipettes 100–1000 µL	91676	100 pieces			
■ Digital piston pipette 1.0–5.0 mL, adjustable, with tip ejector	916909	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916916	100 pieces			
■ Pipette stand for 6 piston pipettes	91679	1 piece			
Extraction					
■ 100 mL separation funnel with NS glass tap and PE stopper for extraction methods	91664	2 pieces			
■ Stand with clamps and bosses for 4 separation funnels, height 70 cm	91695	1 piece			
AOX					
■ Supplement kit for AOX for the sensitive AOX range (0.01–0.30 mg/L AOX) and for higher COD values (required above 50 mg/L COD)	918072	2 x 4 g	20	1 year	■
■ Chloride detection kit AOX for samples with high chloride contents	918073	10 mL		1 year	■
■ Starter set for AOX, consists of tweezers, funnel, cartridge adaptor, beaker, glass rods, 1 L bottle and syringes	916111	1 set			
■ Pump set for AOX, consists of centrifugal pump, connecting tubes, graduated 1 L reservoir with tap and stand with clamps and bosses	916115	1 set			
■ NANOCOLOR® cartridge adapter for AOX pump-set	916113	1 piece			
BOD₅					
■ BOD ₅ nutrient mixture (without <i>N</i> -allylthiourea [NATU])	918994	20 cuvettes	20–80	2 years	
■ BOD ₅ nutrient mixture PLUS (with <i>N</i> -allylthiourea [NATU])	918995	20 cuvettes	20–80	2 years	
■ BOD ₅ accessories set, consists of electric air pump, 10 L PE container, 2 aerating bricks, 1 L laboratory bottle, 4 Winkler bottles	916918	1 set			
■ BOD ₅ -TT accessories set, consists of electric air pump, 2 aerating bricks, 1 L PE container, 2 reaction vessels (40 mL)	916925	1 set			
■ Reaction vessels for BOD ₅ -TT	916926	10 pieces			
■ Oxygen bottles according to Winkler (250–300 mL)	916919	4 pieces			
■ Aerating bricks for BOD ₅ determination	916920	4 pieces			
COD					
■ Chloride complexing agent for chloride concentration of 1000–7000 mg/L Cl ⁻	918911	100 mL	100	1.5 years	■
■ Cartridges for chloride elimination of up to 2000 mg/L chloride per cartridge	963911	10 pieces	10	1 year (2–8 °C)	■
■ COD- and TOC-free water	918993	50 mL		1 year	
■ Safety bottle for shaking COD tubes	91637	1 piece			
Hydrocarbons					
■ Extraction of HC from water	918571	1 box	20	1.5 years	■
■ Extraction of HC from soil	918572	1 box	20	1.5 years	■
■ Separation funnel 500 mL with PTFE tap and glass stopper	91608	2 pieces			
■ CHROMABOND® column 45 mL with 4 g aluminum oxide ALOX N for purification of water and soil extracts by solid phase extraction	730250	20 pieces	20	3 years	
■ Syringe adaptor for CHROMABOND® columns 45 mL	91603	2 pieces			
■ Plastic syringes 50 mL	91609	10 pieces			

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® accessories

Description	REF	Content	Number of tests	Shelf life	GHS
■ Stop valve for pipette tips for low-viscosity liquids	91621	100 pieces			
■ Threaded union for coupling the sample tube with the COD tube	91604	2 pieces			
■ Soxhlet apparatus 30 mL, with 100 mL round flask with flat bottom and condenser (3 parts); additionally a heater is required	91605	1 set			
■ Extraction thimbles MN 64523 mm Ø x 100 mm	645008	25 pieces			
■ Measuring flask 50 mL with PE stopper	91606	2 pieces			
TOC					
■ NANOCOLOR® TIC-Ex for removal of TIC, incl. cuvette holder, power supply 100–240 V, 50/60 Hz, 9 V + 3 adapters, manual	916993	1 piece			
■ Manual for NANOCOLOR® TIC-Ex	916994	1 piece			
■ Cuvette holder for NANOCOLOR® TIC-Ex	916995	1 piece			
■ Power supply for QUANTOFIX® Relax and NANOCOLOR® TIC-Ex	930995	1 piece			
■ Pipette tips for NANOCOLOR® TIC-Ex	916997	20 pieces			
■ Pipette tips for NANOCOLOR® TIC-Ex	916998	200 pieces			
■ Cover for NANOCOLOR® VIS for TOC determination	916996	1 piece			
■ Holder for 15 round glass tubes and 2 tubes	91623	1 piece			
Special chemicals for elimination of interferences					
■ Distilled water	918932	1 L		1 year	
■ Silica-free water	918912	1 L		1 year	
■ Isobutyl methyl ketone (MIBK) for phenol test 0-74	918929	100 mL			■
Reagents for sample preparation					
■ Carrez solutions 1 + 2, for nitrite in cooling lubricants, sewage water from landfills etc.	918937	2 x 30 mL	30	2 years	
■ Removal of interfering calcium for determinations of copper, nickel and zinc by lime precipitation clarification	918939	100 g	20	2.5 years	
■ Amidosulfuric acid for nitrite elimination	918973	25 g		2 years	■
■ Ammonium compensation reagent for tube test NANOCOLOR® Potassium 50	918045	30 mL	100	2 years	■

GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

High quality filter papers

MN filter papers since 1911



German quality

- More than 7000 different filtration products
- Reliable results
- Flexible and custom-made products
- Special filter papers for sewage plants according to DIN EN 872



Microbiological tests

BioFix®	
Nitrification inhibition tests	116
Luminous bacteria toxicity tests	118





Nitrification inhibition tests

Easy control of nitrification

The nitrification inhibition tests BioFix® A-Tox / N-Tox provide an easy method to control the biology on sewage plants. These BioFix® nitrification inhibition tests can be used to measure the inhibition of the nitrification in all types of water. Interferences by single substances as well as substance mixtures are detected.

Nitrification is an important step during waste water purification in order to keep the concentration of ammonium ions in the effluents of the sewage plant as low as possible. Additionally, nitrification is the prerequisite for denitrification for complete nitrogen elimination. This process is required for waste water treatment in many countries.

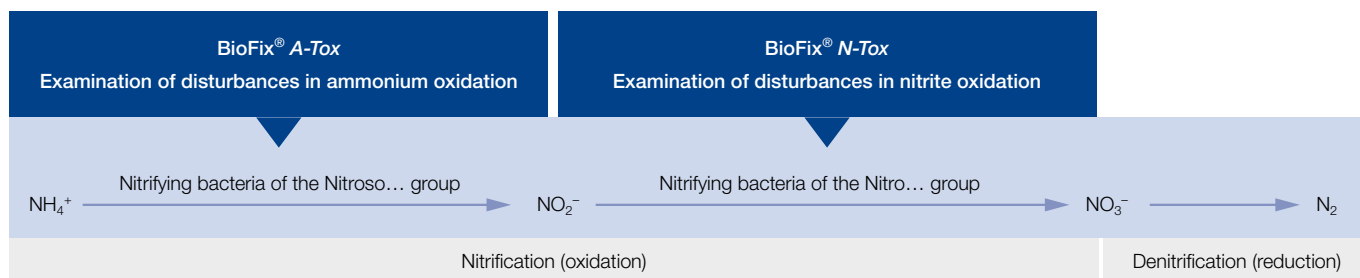
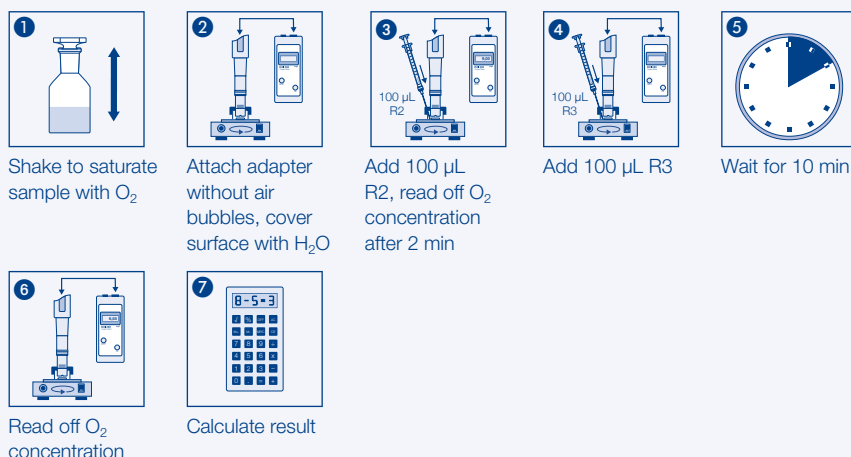
BioFix® nitrification inhibition tests allow the investigation of the first and second step of nitrification separately as well as undifferentiated. With BioFix® A-Tox one tests, whether the first step of the nitrification, the oxidation of ammonium, is inhibited by sample components. BioFix® N-Tox is used to analyze the second step of the nitrification, the oxidation of nitrite.

Whether the nitrification is inhibited by sample components in general can be determined with the undifferentiated screening test BioFix® A / N-Tox.



How it's done

Procedure of nitrification inhibition tests



Rapid

- Test only takes 10 min
- Pre-dosed nitrificants
- Ready-to-use reagents

Easy

- Considerably less effort necessary compared to DIN-procedure
- Evaluation without inconvenient equipment
- Dispose of used reagents without constraints

Safe

- High sensitivity
- Very good reproducibility due to defined bacteria strains
- Differentiated analysis of both nitrification steps possible

Ordering information

Test	REF	Number of tests	Shelf life
■ BioFix® A-Tox for evaluation of the biological conversion of ammonium to nitrite (1 st step of nitrification)	970001	10–19	1 year (2–8 °C)
■ BioFix® N-Tox for evaluation of the biological conversion of nitrite to nitrate (2 nd step of nitrification)	970002	10–19	1 year (2–8 °C)
■ BioFix® nitrification inhibition test, reagent A-Tox R2, enriched nitrificants for oxidation of ammonia	970903	10 x 2 mL	1 year (2–8 °C)
■ BioFix® nitrification inhibition test, reagent N-Tox R2, enriched nitrificants for oxidation of nitrite	970902	10 x 2 mL	1 year (2–8 °C)

Accessories

Description	REF	Content
■ Starter kit for BioFix® nitrification inhibition tests: 1 electrode adaptor which holds the oxygen electrode, 3 x 2 seals for the electrode adaptor, 2 mini-magnets, 1 micro syringe 100 µL, 1 filtration syringe 20 mL	970101	1 set
■ CHROMAFIL® membrane filters, 0.45 µm	91652	50 pieces
■ Electrode adaptor	970111	1 piece
■ Special adaptor 12 mm for oxygen electrodes with membrane heads type WP3-ST	970116	1 piece
■ Seals for electrode adaptor	970112	5 x 2 pieces
■ Reaction vessels	970113	50 pieces
■ Magnetic stirring unit without heater	970115	1 piece
■ Mini-magnets	970114	5 pieces
■ Stand, complete with 4 clamps and bosses	91695	1 piece

Luminous bacteria toxicity tests

Tests for bio toxicity in accordance to ISO 11348

BioFix® luminous bacteria tests use bio luminescence to determine bio toxicity. In contrast to chemical single parameter analysis, luminous bacteria tests allow an evaluation of the over-all-toxicity of a sample. The test principle is based on the static measurement of the bio luminescence of luminous bacteria (strain *Vibrio fischeri* NRRL B-11177), where a defined sample volume is mixed with a suspension of bacteria. Subsequently, the inhibition of the luminescence in the sample is determined in comparison to an uninhibited control solution.

The tests are easy to use and the procedure is normed (ISO 11348). This guarantees safe and reliable results with low effort. BioFix® luminous bacteria tests are available in various, application specific packing sizes. The applications for these tests reach from the analysis of ground, surface, seepage and all types of waste water to the analysis at waste disposal sites. Furthermore they allow the determination of the bio toxicity of solid material e.g. soil samples, sediments and solid waste.

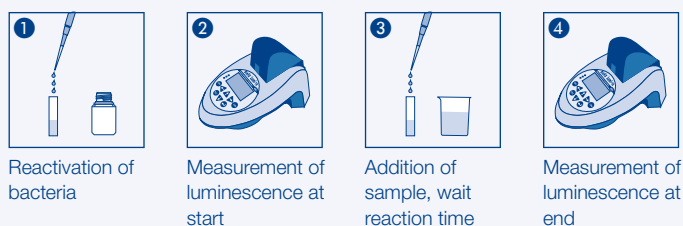
BioFix® luminous bacteria tests are available with liquid-dried (according to ISO 11348-2) and freeze-dried bacteria (according to ISO 11348-3). Used reagents and bacteria can be disposed of easily by washing them down the drain.

The evaluation of the toxicity analysis is performed with the BioFix® Lumi-10 (see page 150), a universal luminometer, which is suitable for portable use.

How it's done



Performance of luminous bacteria toxicity tests



Ordering information

Test	REF	Number of tubes	Number of tests	Shelf life	Liquid-dried	Freeze-dried
■ Lumi luminous bacteria, with reconstitution solution	945002	20	up to 2000	2 years		■
■ Lumi luminous bacteria, with reconstitution solution	945003	10	up to 1000	2 years		■
■ Lumi luminous bacteria, with medium	945006	20	up to 400	2 years		■
■ Lumi luminous bacteria, with medium	945007	10	up to 200	2 years		■
■ Lumi multi-shot, with reactivation and control solution	945022	10	up to 100	2 years		■
■ Lumi single-shot, with reactivation and control solution	945021	20	up to 40	2 years		■
■ Lumi luminous bacteria, with reactivation and NaCl solution	945023	10	up to 200	2 years	■	
■ Lumi luminous bacteria, with reactivation and NaCl solution	945024	20	up to 400	2 years	■	
■ Lumi luminous bacteria, with reactivation and NaCl solution	945025	10	up to 100	2 years	■	

All freeze/liquid-dried BioFix® luminous bacteria are also suited for luminometers of other manufacturers (e.g. LUMISTox, LUMISmini of HACH).

All luminous bacteria tests by MACHEREY-NAGEL need to be stored at -20 ± 2 °C.

Luminous bacteria toxicity tests

Accessories

Description	REF	Content
■ BioFix® Lumi diluent	945601	1 L
■ BioFix® Lumi osmotic adjusting solution	945602	50 mL
■ BioFix® Lumi reconstitution solution for freeze-dried luminous bacteria	945603	1 L
■ BioFix® Lumi diluent for solid phase test	945604	1 L
■ BioFix® Lumi medium for freeze-dried luminous bacteria in accordance with DIN EN ISO 11348-3	945608	1 L
■ Absorbance color correction cuvettes with 100 aspirators	940006	4 pieces
■ Glass cuvettes, 50 x 12 mm, plain bottom, 12 mm Ø	916912	690 pieces
■ Rack for glass cuvettes 12 mm Ø, 5 x 10 positions	945013	1 piece



Photometers

NANOCOLOR® VIS II and UV/VIS II	122
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Accessories for photometers	135

Heating blocks

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Reflectometer

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Luminometer

BioFix® Lumi-10	150
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NANOCOLOR® VIS II and UV/VIS II

Spectrophotometers for high-precision analysis

The NANOCOLOR® VIS II and NANOCOLOR® UV/VIS II are high-precision measurement instruments applicable in all areas of water and wastewater analysis. MACHEREY-NAGEL revolutionizes the daily laboratory work with these two new spectrophotometers, combining premium high-tech instruments with outstanding usability. With their intuitive, icon-based menu guidance, these innovative photometers can be used like a smartphone or tablet. The clearly arranged, high-resolution touch screen display makes your daily measurement routine a real pleasure.

Powerful technology

The new NANOCOLOR® spectrophotometers impress with high-class technology and optics. The spectral bandwidth of the NANOCOLOR® UV/VIS II of < 2 nm allows high-precision measurements. The optical set-up and the clever technique of both devices enable measurements without protective cover; a big advantage for smooth lab processes. With a 2D barcode scanner and cuvette recognition, all steps from measuring over displaying to storing of the result are part of a fully automated sequence.

The allrounders for all requirements

As comprehensive spectrophotometers, the NANOCOLOR® VIS II and UV/VIS II, meet all requirements of your daily laboratory work. They come with well-known barcode technology for a rapid measurement of NANOCOLOR® tube tests. In addition, they offer extensive color measurement possibilities and real-time scan recording. Next the nephelometric turbidity measurement and the turbidity measurement in transmitted light, the preprogrammed MEBAK methods allow a comprehensive brewery analysis. The simple menu navigation and the icon-based pictogram instructions for the performance of cuvette tests, reduce the complexity of the daily laboratory work. The clear result screen enables an easy assignment of additional sample information and measurement results. The systematic menu guidance for the calibration of special methods allows even inexperienced users to program methods for user specific applications.

Good to know

Turbidity – a source of error:
Turbidity is often underestimated since it is not always visually recognizable. During each measurement, the MACHEREY-NAGEL spectrophotometers automatically measure the turbidity and warn the user in case of an interfering turbidity.

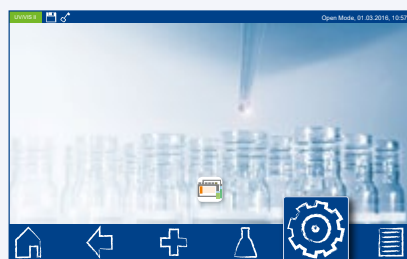


Good to know

An overview of all NANOCOLOR® test kits available on the NANOCOLOR® UV/VIS II and VIS II is given from page 88.

How it's done

In four steps to inspection equipment monitoring



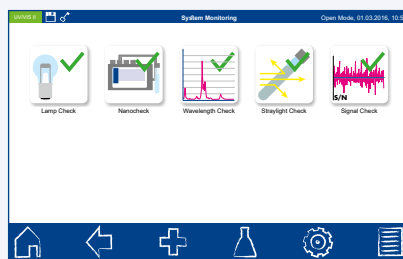
1. Call up main menu



2. Choose IQC-menu



3. Call up inspection equipment monitoring



4. Choose respective test

Good to know

The test equipment offers the monitoring of the entire analysis system and also extensive options for verifying the device functionality. The user can perform the test himself and save costs, an external device test is no longer needed.

Smart

- Outstanding usability due to touch screen
- 10.1" HD display for a clear overview
- Unique user experience due to icon based menu guidance

Precise

- High quality optics with reference detector technology
- Safe results due to automatic turbidity control function (NTU-check)
- Safeguarding of results via integrated IQC menu

Impressively versatile

- Future-proof interfaces
- Color measurements, turbidity measurements and scans
- Applicable in all fields of water and waste water analysis



Smart photometry



NANOCOLOR® VIS II and UV/VIS II

The next audit will be a breeze

Quality is of high importance for MACHEREY-NAGEL. Therefore, our new spectrophotometers are equipped with extensive quality control features. Besides the integrated, f.o.c. inspection equipment monitoring tools, the devices offer a variety of quality control functions for e.g. standard measurements, multiple determinations and dilution series. IQC cards are generated directly in the device and can be printed or exported for documentation purposes. Therefore, NANOCOLOR® VIS II and UV/VIS II offer easy to use control options, allowing an efficient and accurate internal quality control perfectly integrated in your daily work.

Striking interface options for smart connectivity

The connection of measuring devices to laboratory information systems (LIMS) plays a more and more important role in many industries. Therefore, the NANOCOLOR® VIS II and NANOCOLOR® UV/VIS II are equipped with all important interfaces (LAN, RS232, USB) for the connection to laboratory information systems. In addition, the integrated LIMS configurator allows a customized adaptation for many kinds of data for transfer. An easily accessible USB port increases the comfort of data exchange with mass storage media or the usage of a barcode reader, scanner or printer.



Ordering information

Description	REF
■ Spectrophotometer NANOCOLOR® VIS II incl. manual (quick start guide), touch pen, protective covering, power cable with country adapters, USB cable, USB stick, calibration cuvette, cleaning cloth and certificate	919650
■ Spectrophotometer NANOCOLOR® UV/VIS II incl. manual (quick start guide), touch pen, protective covering, power cable, USB cable, USB stick, calibration cuvette, cleaning cloth and certificate	919600

Technical data

	NANOCOLOR® VIS II	NANOCOLOR® UV/VIS II
Type	Spectrophotometer with reference detector technology (RDT)	
Light source	Halogen lamp	Halogen lamp (visible range) Deuterium lamp (UV range)
Optics	Monochromator Insensitive to external light for fast measurements without cuvette slot cover; Cuvette slot must be covered for color measurements and measurements in the UV-range	
Wavelength range	320 nm–1100 nm	190 nm–1100 nm
Wavelength accuracy	± 1 nm	
Wavelength resolution	0.1 nm	
Wavelength reproducibility	< 0.5 nm	
Wavelength calibration	Automatic	
Wavelength selection	Automatic, barcode, manual	
Scan speed	1 complete scan in less than 1 min	
Spectral bandwidth	< 4 nm	< 2 nm
Photometric range	± 3.0 A in wavelength range 340 nm–900 nm	± 3.0 A in wavelength range 200 nm–900 nm
Photometric accuracy	0.005 A at 0.0 A–0.5 A; 1 % at 0.5 A–2.0 A	
Photometric linearity	< 0.5 % at ≤ 2 A; ≤ 1 % at > 2 A	
Stray light	< 0.1 %	< 0.05 %
Measuring modes	More than 200 preprogrammed tests and special methods, 100 optionally programmable methods, absorbance, transmittance, factor, kinetics, 2-point calibration, scan, nephelometric turbidity measurement	
Compatible test kits	NANOCOLOR® tube tests (see page 88) and NANOCOLOR® standard tests (see page 98) VIS II: NANOCOLOR® robot tests (see page 96)	
Turbidity measurement	Nephelometric turbidity measurement at 860 nm, 0.1 NTU–1000 NTU	
Cuvette slot	Test tubes 16 mm OD Rectangular cuvettes 2 mm, 10 mm, 20 mm, 40 mm, 50 mm	
Data memory	16 GB Micro SDHC card, 5000 measured data sets, 100 scans or color measurements, GLP-conform	
Display	10.1" LED backlit HD display, anti-reflective cover glass with projected capacitive touch screen (PCAP)	
Operation	Test selection via barcode technology, icon-based menu guidance, touch screen	
Languages	DE/EN/FR/ES/PT/PL/HU/NL/CZ/RO/IT	
Interfaces	LAN, 2 x USB (Host), 1 x USB (Function) and RS232	
Update	Free of charge via USB stick	
Operating range	10 °C–40 °C, up to 80 % relative humidity (non-condensing)	
Power supply	Input: 110 V–240 V, Output: 12 V 3A	110 V–240 V, ~50/60 Hz
Dimensions	360 mm x 400 mm x 110 mm	400 mm x 440 mm x 170 mm
Weight	4.0 kg	6.5 kg
Warranty	2 years	
CE	CE certified	

NANOCOLOR® 500 D

Universal photometer for the lab and on the road

The photometer NANOCOLOR® 500 D is the link between our spectrophotometers and our handy compact photometers. The device contains all measurement options important in the laboratory and is therefore versatile. The combination of extremely short measurement times and accurate results render this photometer the ideal instrument for the universal use in water and wastewater analysis. It combines established and reliable technology with a robust design. The NANOCOLOR® 500 D comes in a rugged case, which provides space for the complete scope of delivery. Together with the inbuilt rechargeable battery, the NANOCOLOR® 500 D is perfectly suited for the analysis in the laboratory or on the road.

All at a glance

Its simple operation enables measurement results within seconds. The NANOCOLOR® 500 D is delivered with an extensive manual, for the evaluation of NANOCOLOR® tests kits, with easy to understand pictogram instructions, which enable a reliable test performance without a complex guidance. The backlit graphic display presents all important data at a glance. Out-of-limit results are clearly indicated.

Basic functions and programming

In addition to the pre-programmed methods, the NANOCOLOR® 500 D offers comprehensive basic functions such as absorbance, transmittance or kinetic measurements. Up to 100 methods can be individually programmed for customized applications. The calibration data required for these methods can be obtained by creating the respective calibration curves using the PC software.

Data management and documentation

The alphanumeric keypad allows entering of additional sample information for each measurement result and therefore a clean assignment of the samples. It can store up to 500 GLP-compliant results, which can be exported via the RS232 or USB interface. The measurement results of the NANOCOLOR® 500 D can be easily accessed in combination with the free of charge NANOCOLOR® data export software.

Good to know



The NANOCOLOR® 500 D has successfully passed the shock test according to Military Standard 810C. It therefore meets the strict requirements of the German military forces, which confirms its robustness and suitability for the mobile analysis.

Good to know



For an overview of NANOCOLOR® tube tests and rectangular test kits compatible with the NANOCOLOR® 500 D see page 88 and 98.

Ordering information

Description	REF
■ Universal photometer NANOCOLOR® 500 D incl. software DVD, manual, protective covering, mains adapter, data cable, USB cable, calibration cuvette, cleaning cloth and certificate in rugged case	919500



Approved

- Simplest operation without the need for extensive trainings
- Turn on – Measure – Read in less than 10 seconds
- Robust technique for high resistance

Versatile

- Flexible use in lab and on the road
- Universal cuvette slot
- Applicable in all fields of water and waste water analysis

Safe

- Barcode recognition for automatic method selection
- Automatic functional testing and auto-calibration
- GLP-conform data storage via PC-software



Technical data

NANOCOLOR® 500 D	
Type	Filter photometer with microprocessor control, self-test and auto-calibration
Optics	Automatic filter wheel with 10 interference filters Insensitive to external light for fast measurements without cuvette slot cover
Wavelengths	345 nm / 365 nm / 436 nm / 470 nm / 520 nm / 540 nm / 585 nm / 620 nm / 690 nm / 800 nm plus 2 compartments for additional filters
Wavelength accuracy	± 2 nm, bandwidth at half transmission 10 nm–12 nm
Light source	Tungsten lamp
Detector	Silicon photodiode
Blank value	Automatic
Measuring modes	Over 100 preprogrammed methods, 100 freely programmable methods, absorbance, transmittance, factor, kinetics, 2-point-calibration
Compatible test kits	NANOCOLOR® tube tests (see page 88) NANOCOLOR® standard tests (see page 98)
Photometric range	± 3 A
Photometric accuracy	± 1 %
Stability	< 0.002 A/h
Cuvette slot	Tubes 16 mm OD Rectangular cuvettes 10 mm, 20 mm, 50 mm
Data memory	500 results, GLP-compliant
Display	Backlit graphic display, 128 x 64 pixel, all important data at a glance: Result with unit, date, time, sample number, sample location, dilution
Auto-off function	Inactive or automatic shutdown after 10 min–120 min (10 min increments)
Quality control	With NANOCONTROL NANOCHECK
Operation	Test selection via barcode technology, self-explanatory menu guidance, foil keypad
Languages	DE / EN / FR / IT / NL / ES / HU / PL / PT / CZ / SL / TR / ID / DK
Interface	USB, RS232
Update	Free of charge via Internet / PC
Operating range	10 °C–40 °C, up to 80 % relative humidity (non-condensing)
Power supply	100 V–240 V~, 50 / 60 Hz / 6 V, 3.2 Ah via built-in battery with charge regulator and mains power supply
Dimensions	227 mm x 282 mm x 105 mm
Weight	2.4 kg
Warranty	2 years
CE	CE certified

Compact photometer for mobile water analysis

The photometer PF-12^{Plus} is a device tailored for the mobile water analysis. The icon-based menu guidance and clear taskbar make the PF-12^{Plus} an easy to use photometer for all fields of water and wastewater analysis without the need for extensive training. The device comes in a rugged case equipped with useful accessories and is therefore particularly popular with users for the direct analysis at the point of sampling.

Easy implementation

Measurement results are obtained very quickly with the PF-12^{Plus}, thanks to its simple operation. Equipped with more than 100 preprogrammed methods, it is the ideal companion for analysis on the road. The PF-12^{Plus} comes with easy to understand pictogram instructions in a practical manual for the evaluation of VISOCOLOR[®] ECO test kits.

Free programming

In addition to the preprogrammed methods, the PF-12^{Plus} offers the possibility to create up to 50 special methods for customized applications. Equations up to 4th degree and logarithmic functions can be programmed systematically.

Turbidity measurements

With its especially positioned 860 nm LED the PF-12^{Plus} enables nephelometric turbidity measurements (NTU) in the range of 1–1000 NTU. Therefore, disturbing turbidities will be detected reliably in parallel to a measurement of tube tests - a huge PLUS on measurement safety. Furthermore, the PF-12^{Plus} offers the possibility to accurately determine the turbidity in transmitted light from 4–350 FAU.

Good to know

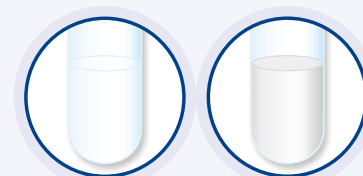
Manifold case solutions are available for the PF-12^{Plus}, which can be individually equipped with test kits. An overview of the available cases is given on page 158.

Good to know

An overview of the VISOCOLOR[®] ECO tests, VISOCOLOR[®] Powder Pillows and NANOCOLOR[®] tubes compatible with the PF-12^{Plus} is given on page 76, page 82 and page 88.

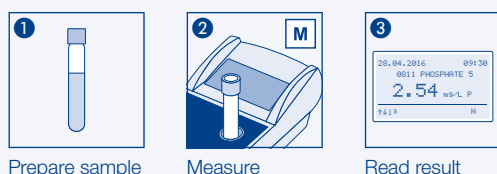
Good to know

Turbidity – a source of error:
Turbidity is often underestimated since it is not always visually recognizable. During each measurement, the MACHERY-NAGEL spectrophotometers automatically measure the turbidity and warn the user in case of an interfering turbidity.



How it's done

Photometric determination with the PF-12^{Plus}



Ordering information

Description	REF
■ Compact photometer PF-12 ^{Plus} for evaluation of VISOCOLOR [®] ECO tests, VISOCOLOR [®] Powder Pillows and NANOCOLOR [®] tube tests, incl. software DVD, manual, 4 batteries, 4 empty test tubes, funnel, beaker, syringe, USB cable, calibration cuvette, cleaning cloth and certificate in rugged case	919250



Safe

- Easy handling for precise results
- GLP-conform storage of all measurement results
- Comfortable data export and data backup concept

Mobile

- Flexible power supply via batteries or accu-pack
- Backlit graphic display also for critical lighting conditions
- Robust and waterproof according to IP 68

Versatile

- Compatible with *NANOCOLOR*[®] and *VISOCOLOR*[®] test kits
- Nephelometric turbidity measurement and NTU-check
- Applicable in all fields of water and waste water analysis

**Technical data**

PF-12 ^{Plus}	
Type	Filter photometer with microprocessor control, self-test and auto-calibration
Optics	Automatic filter wheel with 7 interference filters Insensitive to external light for fast measurements without cuvette slot cover
Wavelengths	345 nm / 436 nm / 470 nm / 540 nm / 585 nm / 620 nm / 690 nm plus 1 compartment for an additional filter; 860 nm LED for NTU measurement
Wavelength accuracy	± 2 nm, bandwidth at half transmission 10 nm–12 nm
Light source	Xenon high pressure lamp
Detector	Silicon-photodiode
Blank value	Automatic
Measuring modes	Over 100 preprogrammed tests and special methods, absorbance, transmission, factor, standard, nephelometric turbidity measurement; 50 freely programmable methods
Compatible test kits	<i>VISOCOLOR</i> [®] ECO tests (see page 76) <i>VISOCOLOR</i> [®] Powder Pillows (see page 82) <i>NANOCOLOR</i> [®] tube tests (see page 88)
Photometric range	± 3 A
Photometric accuracy	± 1 %
Stability	< 0.002 A/h
Cuvette slot	Tubes 16 mm OD
Data memory	1000 results, GLP conform
Display	Backlit graphic display, 128 x 64 pixels. All important data at a glance: Result with unit, date, time, sample number, sample location, dilution, measuring range control bar
Auto-off function	Inactive or automatic shutdown after 5 min, 10 min, 15 min, 20 min, 60 min
Quality control	With <i>NANOCONTROL</i> <i>NANOCHECK</i>
Operation	Self-explanatory menu guidance, foil keypad, test selection via parameter lists
Interface	USB 2.0
Languages	DE/EN/FR/ES/IT/NL/HU/PL/PT/CZ/ID/SL/TR/MY
Update	Free of charge via Internet/PC
Operating range	10 °C–40 °C, up to 80 % relative humidity (non-condensing)
Power supply	4 AA batteries, rechargeable batteries, USB interface; optional internal accu-pack
Housing	Shock-resistant; waterproof and dustproof, according to IP 68
Dimensions	215 mm x 100 mm x 65 mm
Weight	0.7 kg
Warranty	2 years
CE	CE certified

Compact photometer for mobile water analysis

The compact photometer PF-3 is the smallest member of the MACHEREY-NAGEL photometer family. The device completes our product portfolio and perfectly fits our tradition of reliability, user friendliness and innovation. The instrument comes in multiple versions, equipped with three LEDs and interference filters, designed to meet the analysis requirements of specific applications. Together with the approved *VISOCOLOR® ECO* test kits, brandnew *VISOCOLOR®* Powder Pillows and high quality *NANOCOLOR®* tube tests from MACHEREY-NAGEL, the PF-3 is perfectly suited for mobile analysis directly at the place of sampling. Optionally, the device comes in a practical case with pre-equipped test kits, in a cardboard box or in an empty case for the individual combination with our *VISOCOLOR® ECO* test kits.

Small, strong, smart

The handy and compact design makes this lightweight the ideal companion for mobile analysis. Its simple operation allows measurements within seconds. Besides the measurement accuracy, simplicity and user friendliness are key features of all MACHEREY-NAGEL devices. The interaction of context-sensitive icons and only four buttons guarantees a smart, clear and language-independent operation.

Fast and reliable results

The centerpiece of the PF-3 is its high-quality optic with the specially selected LEDs and corresponding interference filters. The unique "open slot" technology allows measurements without cuvette slot cover, thus emphasizing the high technical standard of the instrument. This yields into a simple and quick operation for the user, together with highly reliable results. MACHEREY-NAGEL provides free PC software, for an even more comfortable operation. The software makes data management convenient, simple and efficient. Additionally it guarantees a forgery-proof data management.

Be prepared

The variable power supply is of particular convenience for the user and enables reliable measurements in all situations. Besides batteries and an accu-pack, the device can also be powered directly via an USB cable or a power adaptor.

Good to know

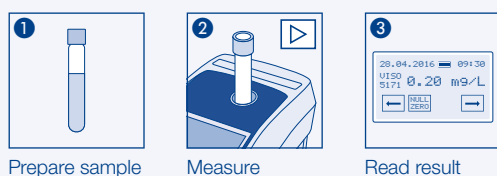
Manifold case solutions are available for the PF-3, which can be individually equipped with test kits. An overview of the available cases is given on page 158.

Good to know

An overview of *VISOCOLOR® ECO* tests, *VISOCOLOR®* Powder Pillows and *NANOCOLOR®* tube tests compatible with the PF-3 is given on page 76, page 82 and page 88.

How it's done

Photometric determination with the PF-3



Simple

- Intuitive operation with only four keys
- Flat menu structure
- Bright display for safe readings

Robust

- Glass fiber reinforced housing for extreme durability
- Water- and dustproof according to IP 68
- Shock-resistant optics

Flexible

- Various case solutions including reagents
- Additional parameters available f.o.c.
- Compatible with *VISOCOLOR® ECO* tests, *VISOCOLOR® Powder Pillows* and *NANOCOLOR®* tests



Ordering information

Description	REF
■ Compact photometer PF-3 Pool (Cl ₂ , pH, Cya, TA), in a cardboard box for evaluation of VISOCOLOR® ECO tests, VISOCOLOR® Powder Pillows and NANOCOLOR® tube tests incl. manual, batteries and certificate	919340
■ Compact photometer PF-3 Soil (NH ₄ , K, NO ₃ , PO ₄), in a cardboard box for evaluation of VISOCOLOR® ECO tests, VISOCOLOR® Powder Pillows and NANOCOLOR® tube tests incl. manual, batteries and certificate	919341
■ Compact photometer PF-3 COD (COD), in a cardboard box for evaluation of NANOCOLOR® tube tests incl. manual, batteries and certificate	919342
■ Compact photometer PF-3 Drinking Water (Cl ₂ , pH, F, Fe, ClO ₂), in a cardboard box for evaluation of VISOCOLOR® ECO tests, VISOCOLOR® Powder Pillows and NANOCOLOR® tube tests incl. manual, batteries and certificate	919343
■ Compact photometer PF-3 Fish (NH ₄ , Cl ₂ , pH, Fe, SiO ₂ , PO ₄ , NO ₃ , NO ₂ , O ₂ , Cu), in a cardboard box for evaluation of VISOCOLOR® ECO tests, VISOCOLOR® Powder Pillows and NANOCOLOR® tube tests incl. manual, batteries and certificate	919345

Additional versions and tests will follow successively. All current options can be found at www.mn-net.com/PF-3.



Technical data

PF-3	
Type	LED photometer with microprocessor control, self-test and auto-calibration
Optics	LED + interference filters Insensitive to external light for fast measurements without cuvette slot cover
Wavelengths	3 wavelengths; depending on version Pool / Drinking Water: 450 nm / 530 nm / 590 nm Soil: 365 nm / 450 nm / 660 nm COD: 365 nm / 450 nm / 595 nm Fish: 450 nm / 530 nm / 660 nm
Wavelength accuracy	± 2 nm, bandwidth at half transmission 10 nm–12 nm
Light source	LED
Detector	Silicon-photodiode
Compatible test kits	<i>VISOCOLOR® ECO</i> tests (see page 76) <i>VISOCOLOR® Powder Pillows</i> (see page 82) <i>NANOCOLOR®</i> tube tests (see page 88)
Cuvette slot	Tubes 16 mm OD
Memory	50 results
Display	Backlit graphic display, 128 x 64 pixels, all important data at a glance: result with unit, date, time
Auto-off function	Inactive or automatic shutdown after 5 min, 10 min, 15 min, 20 min
Quality control	With <i>NANOCONTROL NANOCHECK</i>
Operation	Self-explanatory menu guidance, foil keypad, test selection via parameter lists
Interface	Mini-USB
Update	Free of charge via Internet / PC
Operating range	10 °C–40 °C, up to 80 % relative humidity (non-condensing)
Power supply	3 AA batteries, rechargeable batteries, USB interface; optional internal accu-pack
Housing	Shock-resistant; waterproof and dustproof, according to IP 68
Dimensions	170 mm x 95 mm x 68 mm
Weight	0.5 kg
Warranty	2 years
CE	CE certified

NANOCONTROL

Analytical quality control for the entire analysis system

The **NANOCONTROL** equipment for quality control of the photometers is designed to support our IQC concept. It always allows the user to check the correct functionality of the devices and therefore represents a cornerstone for ensuring correct measurement results.

Checking the photometric accuracy

NANOCONTROL NANOCHECK 2.0 is used as secondary standard for the determination of photometric accuracy and linearity. It is a crucial tool for the inspection of spectrophotometers and filter photometers, besides the use of standards and spiking solutions. Two different colored solutions are included in three concentrations each. They are factory-checked against a reference spectrophotometer. The absorbances of these NIST-traceable control solutions are reported in a comprehensive certificate. The automated linearity check in our spectrophotometers **NANOCOLOR® VIS II** and **NANOCOLOR® UV/VIS II** provides an additional, unique level of safety. A 2D-Barcode on each box is used to comfortably program our spectrophotometers **NANOCOLOR® VIS II** and **NANOCOLOR® UV/VIS II** with the LOT-specific data.

All features of **NANOCONTROL NANOCHECK** combined make photometer inspection easy as never before.

Checking the turbidity calibration

NANOCONTROL NANOTURB is a turbidity standard for nephelometric turbidity measurements for our photometers. The solutions are used as a primary standard for calibrating and checking the nephelometric turbidity unit in accordance with ISO 7027. The test solutions are ready for immediate use and must only be placed into the photometer. Dilution steps or contact with chemicals are avoided effectively.

Ordering information

Description	REF	Shelf life	GHS
NANOCONTROL NANOCHECK			
■ NANOCONTROL NANOCHECK Test solutions for the determination of photometric accuracy for NANOCOLOR® photometers, secondary standard for inspection equipment monitoring in accordance with ISO 9001	925701	2 years	■
■ NANOCONTROL NANOCHECK 2.0 Test solutions for the determination of photometric accuracy and linearity for NANOCOLOR® photometers, secondary standard for inspection equipment monitoring in accordance with ISO 9001	925703	2 years	■
NANOCONTROL NANOTURB			
■ NANOCONTROL NANOTURB turbidity standard with 4 tubes (1, 4, 100, 400 NTU) for the nephelometric turbidity calibration for NANOCOLOR® spectrophotometers and PF-12 ^{Plus} , secondary standard for inspection equipment monitoring in accordance with ISO 9001	925702	8 months	
VISOCOLOR® Inspection solutions			
■ VISOCOLOR Color standards Chlorine for checking consistent instrument response of NANOCOLOR® UV/VIS II , VIS II , PF-12 ^{Plus} and PF-3	914820		

GHS: Globally harmonized system: This product contains harmful substances, which must be labeled as hazardous. For detailed information, please see the SDS.

Good to know



MACHEREY-NAGEL
Evaluation sheet



With the **NANOCONTROL NANOCHECK 2.0** evaluation sheet the requirements for quality assurance can be fulfilled and it serves as validation against authorities and supervisors.



The complete analytics from a single source

MACHEREY-NAGEL photometers fulfill all requirements for daily laboratory analysis. In addition, many accessories are available to be equipped optimally for special applications. The sipper pump *NANOCOLOR®* FP-100 for instance allows time savings and increased accuracy for standard tests with high sample throughput. The user receives all accessories from a single source. Compatibility with the different photometers is therefore ensured at all times.

Ordering information

Description	REF	Content
Transport cases for photometers		
■ Transport case for spectrophotometer <i>NANOCOLOR®</i> UV/VIS II	919624	1 piece
■ Transport case for spectrophotometer <i>NANOCOLOR®</i> VIS II	919652	1 piece
Special filters for photometers <i>NANOCOLOR®</i> 500 D / 400 D / 350 D / PF-12^{Plus} / PF-12		
■ Interference filter 412 ± 2 nm (incl. installation) for tube test <i>NANOCOLOR®</i> Formaldehyde 10	919841.2	1 piece
■ Special filter incl. ex-factory installation (wavelengths on request)	919850.2	1 piece
Handheld scanner		
■ Handheld scanner for <i>NANOCOLOR®</i> spectrophotometers	919134	1 piece
Sipper		
■ Sipper module <i>NANOCOLOR®</i> FP-200 for <i>NANOCOLOR®</i> UV/VIS II and <i>NANOCOLOR®</i> VIS II incl. manual, USB cable, tygon-tubing set with adapters, intake needle and certificate	919180	1 piece
■ Sipper pump <i>NANOCOLOR®</i> FP-100 for <i>NANOCOLOR®</i> <i>NANOCOLOR®</i> UV/VIS and <i>NANOCOLOR®</i> VIS incl. power supply, support stand, tube, intake needle and RS232-cable	919140	1 piece
■ Tubing set for sipper module <i>NANOCOLOR®</i> FP-200 consisting of tygon-tube set with adapters and pump tubing with pre-installed fittings	919181	1 piece
■ Tubing set for sipper pump <i>NANOCOLOR®</i> FP-100 consisting of 1 m tube with OD 3 mm, 2 m tube with ID 1.5 mm and adapters	919145	1 piece
■ RS232-cable for the connection of <i>NANOCOLOR®</i> FP-100 with the <i>NANOCOLOR®</i> spectrophotometers	919775	1 piece
■ Intake needle for <i>NANOCOLOR®</i> FP-100	919142	1 piece
■ Support stand for <i>NANOCOLOR®</i> FP-100 / <i>NANOCOLOR®</i> FP-200	919143	1 piece
■ Pedal for <i>NANOCOLOR®</i> FP-100	919144	1 piece
■ Mains adaptor for <i>NANOCOLOR®</i> FP-100 / 500 D / 400 D / 350 D / 300 D / 250 D / PT-3 / PF-11; prim. 100-240 V~, sek. 9 V~/1500 mA	91906	1 piece
Manuals		
■ Manual (quick start guide) for <i>NANOCOLOR®</i> VIS II and UV/VIS II	919601	1 piece
■ Manual for <i>NANOCOLOR®</i> 500 D	919501	1 piece
■ Manual for photometer PF-12 ^{Plus}	919252	1 piece
■ Manual for photometer PF-3	919392	1 piece
■ <i>VISOCOLOR®</i> ECO test instructions for photometer PF-3	934001	1 piece
■ <i>VISOCOLOR®</i> ECO test instructions for photometer PF-12 ^{Plus}	931503	1 piece
■ Manual for Sipper module <i>NANOCOLOR®</i> FP-200	919182	1 piece
Lamps		
■ Halogen lamp for <i>NANOCOLOR®</i> VIS II and UV/VIS II	919604	1 piece
■ Deuterium lamp for <i>NANOCOLOR®</i> UV/VIS II	919603	1 piece
■ Tungsten lamp for <i>NANOCOLOR®</i> 500 D / 400 D / 350 D / 300 D / 250 D / PT-3	919787	1 piece

¹⁾ Required additionally: Cable set, REF 919133 ;

²⁾ Required additionally: Mains adaptor, REF 91906

³⁾ Required additionally for PF-3: Mini USB-cable, REF 919390

Accessories for photometers


Description	REF	Content
Cuvettes		
■ Calibration cuvette for NANOCOLOR® photometer	916908	1 piece
■ Flow cuvette, quartz glass, 2 mm optical path, for NANOCOLOR® UV/VIS and UV/VIS II	919127	1 piece
■ Flow cuvette, quartz glass, 10 mm optical path, for NANOCOLOR® UV/VIS II	919626	1 piece
■ Flow cuvette, optical glass, 10 mm optical path, for NANOCOLOR® VIS, VIS II and UV/VIS II	919158	1 piece
■ Flow cuvette, quartz glass, 50 mm optical path, for NANOCOLOR® VIS, VIS II and UV/VIS II	919149	1 piece
■ Quartz glass cuvette, 2 mm optical path, for NANOCOLOR® UV/VIS and UV/VIS II	919122	1 piece
■ Quartz glass cuvette, 10 mm optical path, for NANOCOLOR® UV/VIS and UV/VIS II	919120	1 piece
■ Quartz glass cuvette, 50 mm optical path, for NANOCOLOR® UV/VIS and UV/VIS II	919121	1 piece
■ Glass cuvettes, 5 mm optical path	91932	2 pieces
■ Glass cuvettes, 10 mm optical path	91933	2 pieces
■ Glass cuvettes, 20 mm optical path	91934	2 pieces
■ Glass cuvette, 50 mm optical path	91935	1 piece
■ Semi-micro cuvette, 50 mm optical path	91950	1 piece
■ Lids for glass cuvettes, 10 mm	91941	2 pieces
■ Lids for glass cuvettes, 50 mm	91940	2 pieces
■ Disposable plastic cuvettes, 10 mm optical path	91937	100 pieces
■ Fixing for 10 mm cuvette for NANOCOLOR® VIS II, UV/VIS and UV/VIS II	919136	1 piece
■ Test tubes, 16 mm OD	91680	20 pieces
Cover		
■ Cover for cuvette slot for NANOCOLOR® UV/VIS II	919606	1 piece
■ Cover for cuvette slot for NANOCOLOR® VIS II	919654	1 piece
Protective coverings		
■ Protective covering for NANOCOLOR® UV/VIS II	919605	1 piece
■ Protective covering for NANOCOLOR® VIS II	919651	1 piece
■ Protective covering for NANOCOLOR® 500 D / 400 D / 350 D	91918	1 piece
Printer		
■ NANOCOLOR® thermal printer for photometer NANOCOLOR® VIS II and UV/VIS II (incl. mains adapter and manual)	919655	1 piece
■ NANOCOLOR® thermal printer for NANOCOLOR® UV/VIS ^{1) 2)} / VIS ^{1) 2)} / 500 D / 400 D / 350 D / 300 D / 250 D and photometer PF-11 ²⁾ (incl. printer cable, without mains adapter)	91916	1 piece
■ Printer paper rolls for NANOCOLOR® thermal printer for NANOCOLOR® VIS II / UV/VIS II, 79 mm width, core 12 mm, OD 80 mm	919656	3 pieces
Software		
■ NANOCOLOR® software for Linus / 500 D / 400 D / 350 D / 300 D / 250 D / PF-12 ^{Plus} / PF-12 / BioFix® Lumi-10	91902	1 piece
Accessories for data transfer		
■ USB cable AA for NANOCOLOR® 500 D	919686	1 piece
■ USB cable AB for NANOCOLOR® VIS / VIS II / UV/VIS / UV/VIS II / VARIO 4 / VARIO C2 / PF-12 ^{Plus} / PF-12 / FP-200	919687	1 piece
■ LAN cable (1.5 m) for NANOCOLOR® VIS II and UV/VIS II	919682	1 piece
■ Mini USB cable for photometer PF-3 and VARIO Mini	919390	1 piece
■ Zero modem cable, serial, 2x9 pin SUB-D socket, for NANOCOLOR® 500 D / 400 D / 350 D / 300 D / 250 D / PT-3 / PF-10 / PF-11 and BioFix® Lumi-10	919773	1 piece
■ Adaptor, 9 pin SUB-D-plug to 25 pin SUB-D socket	919681	1 piece
■ NANOCOLOR® USB stick for NANOCOLOR® VIS II / UV/VIS II / VARIO Mini	919123	1 piece
■ NANOCOLOR® USB stick for NANOCOLOR® VIS / UV/VIS / VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC	919119	1 piece

¹⁾ Required additionally: Cable set, REF 919133 ;

²⁾ Required additionally: Mains adaptor, REF 91906

³⁾ Required additionally for PF-3: Mini USB-cable, REF 919390

Accessories for photometers

Description	REF	Content
Power supply		
■ Mains adaptor for <i>NANOCOLOR® VIS, VIS II and VARIO Mini</i>	919156	1 piece
■ USB mains adaptor for photometer PF-12 ^{Plus} / PF-12 / PF-3 ³⁾	919220	1 piece
■ Mains adaptor for <i>NANOCOLOR® 500 D / 400 D / 350 D / 300 D / 250 D / PT-3 / PF-11 / FP-100</i> ; prim. 100 V–240 V ~; sec. 9 V  / 1500 mA	91906	1 piece
■ Rechargeable battery pack for photometer PF-12 ^{Plus} / PF-12	919201	1 piece
■ Rechargeable battery pack for photometer PF-3	919391	1 piece
■ Battery charger for photometer PF-3 / PF-12 ^{Plus} / PF-12 / PF-11 / PF-10, incl. 4 rechargeable batteries	919221	1 piece

¹⁾ Required additionally: Cable set, REF 919133 ;

²⁾ Required additionally: Mains adaptor, REF 91906

³⁾ Required additionally for PF-3: Mini USB-cable, REF 919390

NANOCOLOR® VARIO 4, VARIO C2 and VARIO C2 M

Heating blocks for reliable digestions

The NANOCOLOR® heating blocks enable a fast and safe performance of all kinds of sample digestions required in water and waste water analysis. Standard parameters for routine digestions such as COD, TOC, total nitrogen, total phosphorus and metals are pre-programmed in the heating blocks and help the user to avoid mistakes.

The small one and the big one

The heating block NANOCOLOR® VARIO C2 enables the simultaneous digestion of up to 12 samples. For a higher sample throughput the NANOCOLOR® VARIO 4 is perfectly suited, as it allows up to 24 simultaneous digestions in two separately controllable heating units. Therefore, MACHEREY-NAGEL offers the appropriate heating block to each user for routine analysis in the laboratory. The NANOCOLOR® heating blocks are equipped with lockable protective lids and a touch protection for increased work safety. The NANOCOLOR® VARIO C2 M heating block with two 22 mm and eight 16 mm holes is available for the digestion of large sample volumes as part of metal analysis.

Extremely versatile and maximally secure

In addition to the preprogrammed temperatures and heating times, a large number of user-specific digestion methods can be stored. The USB and RS232 interfaces allow an easy connection to a PC and enable the convenient linkage to the NANOCONTROL inspection equipment monitoring tools. The graphical representation of the heating curves enhances transparency about the temperature stability. The electronic over-temperature sensor protects the heating block from overheating.

Temperature testing and calibration

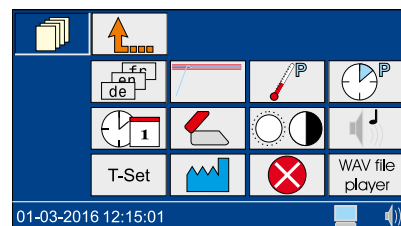
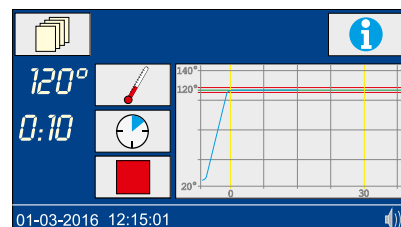
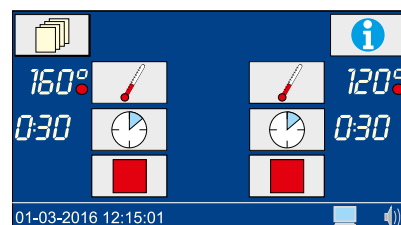
A temperature test can be performed using the NANOCOLOR® T-Sets to safeguard results against authorities and supervisors. The free PC software of the heating blocks facilitates checking of temperatures and the creation of the respective reports. After measurement data transfer via the interfaces using the PC software, the testing certificate is created directly, which ensures a GLP-compliant documentation of all equipment testing.

Suitable for all NANOCOLOR® digestion methods

Application	Temperature	Time
COD according to DIN ISO 15705	148 °C	120 min
High-speed COD	160 °C	30 min
TOC	100 °C	60 min
Total nitrogen	120 °C	30 min
Total kjeldahl nitrogen	120 °C	30 min
Total phosphorus	120 °C	30 min
Organic acids	100 °C	10 min
Total metals	120 °C	30 min
AOX	120 °C	30 min
Hydrocarbons	148 °C	120 min
Programmable, user-defined programs	40 °C–160 °C	0 h:01 min–9 h:59 min

Good to know

The NANOCOLOR® T-Set is a simple and unique tool for inspection equipment monitoring of MACHEREY-NAGEL heating blocks by the user himself. For further information about the NANOCOLOR® T-Set see page 144.



NANOCOLOR® VARIO 4, VARIO C2 and VARIO C2 M

Easy

- User-friendly touch screen
- Intuitive usage via icons
- Operation without the need for intensive training

Fast

- All important parameters within 30 minutes
- Extremely short heating-up times
- Call up of heating programs in a matter of seconds

Secure

- High temperature stability
- Graphically visualized heating curves
- Internal quality control via NANOCOLOR® T-Set

Ordering information

Description	REF
■ Heating block NANOCOLOR® VARIO 4 with two blocks with separate control, 2 x 12 bores for test tubes of 16 mm OD, incl. power cable, two separate protective coverings, manual, data cable, software DVD and certificate	919300
■ Heating block NANOCOLOR® VARIO C2 12 bores for test tubes of 16 mm OD, incl. power cable, protective covering, manual, data cable, software DVD and certificate	919350
■ Heating block NANOCOLOR® VARIO C2 M – version for metal analysis, with large bores – 8 bores for test tubes of 16 mm OD, 2 bores for reaction vessels of 22 mm OD, incl. power cable, protective covering, manual, data cable, software DVD and certificate	919350.1



NANOCOLOR® VARIO 4, VARIO C2 and VARIO C2 M

Technical data

NANOCOLOR® VARIO 4, VARIO C2 and VARIO C2 M	
Type	Heating blocks for chemical-analytical digestions
Number of bores	2 x 12 of 16 mm OD (VARIO 4) 12 of 16 mm OD (VARIO C2) 8 of 16 mm OD + 2 of 22 mm OD (VARIO C2 M)
Display	Colored, backlit LCD touch screen
Operation	Icon-based menu guidance via touch screen
Temperatures	6 preprogrammed temperatures 70 °C / 100 °C / 120 °C / 148 °C / 150 °C / 160 °C 6 free memory locations for individual temperature settings
Temperature range	40 °C–160 °C (1 °C increments)
Temperature stability	± 1 °C (according to DIN, EN, ISO and EPA methods)
Warm-up time	From 20 °C to 160 °C within 10 minutes
Heating times	5 preprogrammed heating times 10 min / 30 min / 60 min / 120 min / cont. 7 free memory locations for individual heating times
Time range	0 h:01 min–9 h:59 min (1 °C increments)
Safety	Replaceable safety covers as contact protection Lockable protective lids Overheating protection
Interfaces	Bidirectional serial RS232, USB A (function) and USB B (Host)
Internal quality control (IQC)	With NANOCOLOR® T-Set (REF 919917) and NANOCOLOR® USB T-Set (REF 919921) Optional fully automatic calibration and generation of a test certificate for instrument control and monitoring
Languages	DE / EN / FR / ES / HU / PL / CZ / TR / DK
Update	Free via Internet / PC and USB stick
Operating range	10 °C–40 °C; max. 80 % relative humidity (non-condensing)
Power supply	110 V–230 V~, 50 / 60 Hz
Power consumption	300 / 550 W (VARIO 4) 150 / 300 W (VARIO C2 and VARIO C2 M)
Dimensions	290 mm x 287 mm x 146 mm (VARIO 4) 169 mm x 282 mm x 146 mm (VARIO C2 and VARIO C2 M)
Weight	approx. 3.2 kg (VARIO 4) approx. 2.0 kg (VARIO C2 and VARIO C2 M)
Warranty	2 years
CE	CE certified



Compact heating block for mobile analysis

Sample digestion is an essential step in the determination of a couple of important parameters in photometric water analysis, but is usually only carried out in a laboratory. The new **NANOCOLOR® VARIO Mini** now gives the ability to perform sample digestions on-site or on the road. This guarantees a mobile and safe performance of all sample digestions required in the water and waste water analysis. The compact size and the flexible power supply, e.g. through the power port of a car, ease the use and offer a maximum flexibility for the everyday analysis.

Simply clever

The **NANOCOLOR® VARIO Mini** has six positions for test tubes with an outer diameter of 16 mm and therefore offers the opportunity to examine small numbers of samples directly on the spot. Furthermore, the device impresses with a temperature stability of ± 1 °C. All digestions of the MACHEREY-NAGEL test kits can easily be conducted using the pre-programmed temperatures and heating times. MACHEREY-NAGEL offers the new **NANOCOLOR® USB T-Set** as a reliable inspection equipment monitoring tool to ensure the temperature stability and the accuracy of the temperature calibration of the **NANOCOLOR® VARIO Mini**. It allows the easy temperature checking and calibration of the heating block and thereby results in an always accurate and reliable digestion of the sample.

Good to know



No power supply available? The **NANOCOLOR® VARIO Mini** can be operated with an external battery or the power port of a car as the only heating block device of its class. For the comfortable transport MACHEREY-NAGEL provides compact and complete mini laboratories as case solutions for direct analysis at the place of sampling.



Ordering information

Description	REF
■ Heating block NANOCOLOR® VARIO Mini , 6 bores for test tubes of 16 mm OD, incl. power cable, protective covering, manual and certificate	919380

Technical data

NANOCOLOR® VARIO Mini	
Type	Heating block for chemical and analytical digestion
Number of bores	6 of 16 mm OD
Display	Graphic display 128 x 64 pixel
Operation	Icon-based menu guidance with four buttons
Temperatures	70 °C, 100 °C, 120 °C, 148 °C, 150 °C, 160 °C
Temperature stability	± 1 °C (according DIN, EN, ISO and EPA methods)
Warm-up time	From 20 °C to 160 °C within 25 minutes (at 20 °C ambient temperature)
Heating times	30 min, 60 min, 120 min
Safety	Safety cover with lockable protective lid and overheating protection
Interfaces	Mini-USB-OTG (On-The-Go)
Internal quality control (IQC)	With NANOCOLOR® USB T-Set (REF 919921) Optional fully automatic calibration and test certificate generation
Update	Free via Internet / PC and USB stick
Operating range	10 °C–40 °C; max. 80 % relative humidity (non-condensing)
Power supply	12 V, 5 A
Power consumption	60 W
Dimensions	105 mm x 125 mm x 170 mm
Weight	670 g
Warranty	2 years
CE	CE certified

NANOCOLOR® VARIO HC

Heating block for fast digestions

The factor time plays a crucial role in many laboratories when conducting sample digestions. The NANOCOLOR® VARIO HC enables the user to digest all important parameters in just 30 minutes. The usually very slow cooling down of the cuvettes after digestion is greatly accelerated in the NANOCOLOR® VARIO HC by the active cooling unit. Hereby the test tubes are ready for the measurement or further analysis steps shortly after the digestion has ended.

Simply fast

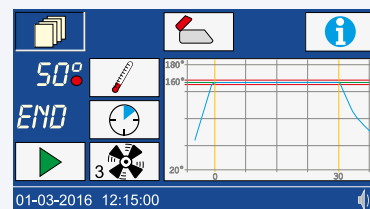
Thanks to the intelligent linkage of heating-up, digestion and cooling-down the NANOCOLOR® VARIO HC allows the performance of a COD test in less than 45 minutes. The readily prepared cuvettes are directly inserted into the cold heating block, which means an additional time saving for the user as the waiting of the heating process is omitted.

Approved and versatile

In addition to the cooling function, the NANOCOLOR® VARIO HC comes with all features provided by our proven heating blocks NANOCOLOR® VARIO 4 and VARIO C2. Naturally, this includes the possibility of checking and calibrating the temperature with the NANOCOLOR® T-Sets, thus fulfilling the requirements of analytical quality control. The safety of the user is as important as accurate results. The protection lid of the NANOCOLOR® VARIO HC locks electronically during digestion. The operation of the heating block and the input of digestion programs are carried out via a user-friendly touch screen.

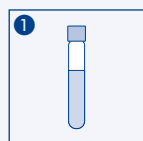
Good to know

Both, the temperature of the cooling process as well as the ventilation speed can be individually adjusted by the user.

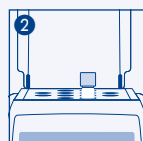


How it's done

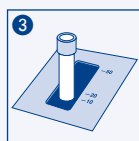
Heating and cooling



Prepare sample



Digestions and cooling in VARIO HC



Direct measurement after withdrawal



Ordering information

Description	REF
■ Heating block NANOCOLOR® VARIO HC – with cooling function – 12 bores for test tubes of 16 mm OD and fan, incl. power cable, protective covering, manual, data cable, software DVD and certificate	919330

Technical data

NANOCOLOR® VARIO HC	
Type	Heating block for chemical-analytical digestion
Number of bores	12 of 16 mm OD
Display	Colored, backlit LCD touch screen
Operation	Icon-based menu guidance via touch screen
Temperatures	6 preprogrammed temperatures 70 °C / 100 °C / 120 °C / 148 °C / 150 °C / 160 °C 6 free memory locations for individual temperature settings
Temperature range	40 °C–160 °C (1 °C increments)
Temperature stability	± 1 °C (according to DIN-, EN-, ISO- and EPA-methods)
Warm-up time	from 20 °C to 160 °C within 10 minutes
Heating times	5 preprogrammed heating times 10 min / 30 min / 60 min / 120 min / cont. 7 free memory locations for individual heating times
Time range	0 h:01 min–9 h:59 min (increments 0 h:01 min)
Safety	Replaceable safety covers for contact protection Lockable protective lids Overheating protection
Interfaces	Bidirectional serial RS232, USB A (function) and USB B (Host)
Internal quality control (IQC)	With NANOCOLOR® T-Set (REF 919917) and NANOCOLOR® USB T-Set (REF 919921) Optional fully automatic calibration and test certificate generation
Languages	DE / EN / FR / ES / HU / PL / CZ / TR / DK
Update	Free via Internet and USB-stick
Operating range	10 °C–40 °C; max. 80 % relative humidity (non-condensing)
Power supply	110 V–230 V~, 50 / 60 Hz
Power consumption	150 / 550 W
Dimension	290 mm x 287 mm x 146 mm
Weight	approx. 3.2 kg
Warranty	2 years
CE	CE certified

NANOCOLOR® T-Set and USB T-Set

Analytical quality control for the entire analysis system

The unique inspection equipment *NANOCOLOR*® T-Set is an electronic temperature sensor, which is suitable for the temperature control and automatic calibration of all *NANOCOLOR*® heating blocks. The user can check the heating blocks independently with the *NANOCOLOR*® T-Set for internal quality control purposes. For this reason the *NANOCOLOR*® T-Set is an important building block for a comprehensive analytical quality assurance.

Independent self-control

By a target-actual comparison, the temperatures in the heating blocks can be tested quickly and easily. All programmed temperatures are measured, registered and stored in the heating block by the *NANOCOLOR®* T-Set. This tool also enables an automatic calibration of the heating blocks. Our customers appreciate the *NANOCOLOR®* T-Set, as it allows a cost-effective and independent monitoring of their own heating block.

Data transfer and documentation

After completion of the temperature control or calibration, the collected data can be transferred to a computer easily via the RS232 or USB port. The free of charge *NANOCOLOR*[®] T-Set PC software enables a GLP-compliant documentation and the creation of direct test certificates.

Now with temperature display

The new *NANOCOLOR*[®] USB T-Set is an advancement of the established *NANOCOLOR*[®] T-Set, extended by a LED display to control the measured temperature. Therefore, temperature measurements can now be carried out independent of the heating block.

Good to know

The NANOCOLOR® T-Sets can be used also for external temperature measurements, e.g. for the determination of the sample temperature.

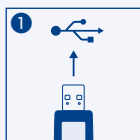
Good to know

The temperature display of the *NANOCOLOR*[®] USB T-Set can be flipped by tapping on the edge of the device. Therefore, an optimal reading is always guaranteed.

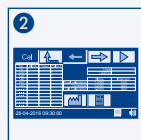
How it's done



Automatic temperature control and calibration with the NANOCOLOR® USB T-Set



Connect T-Set



Choose and start program



Create test protocol



NANOCOLOR® T-Set and USB T-Set

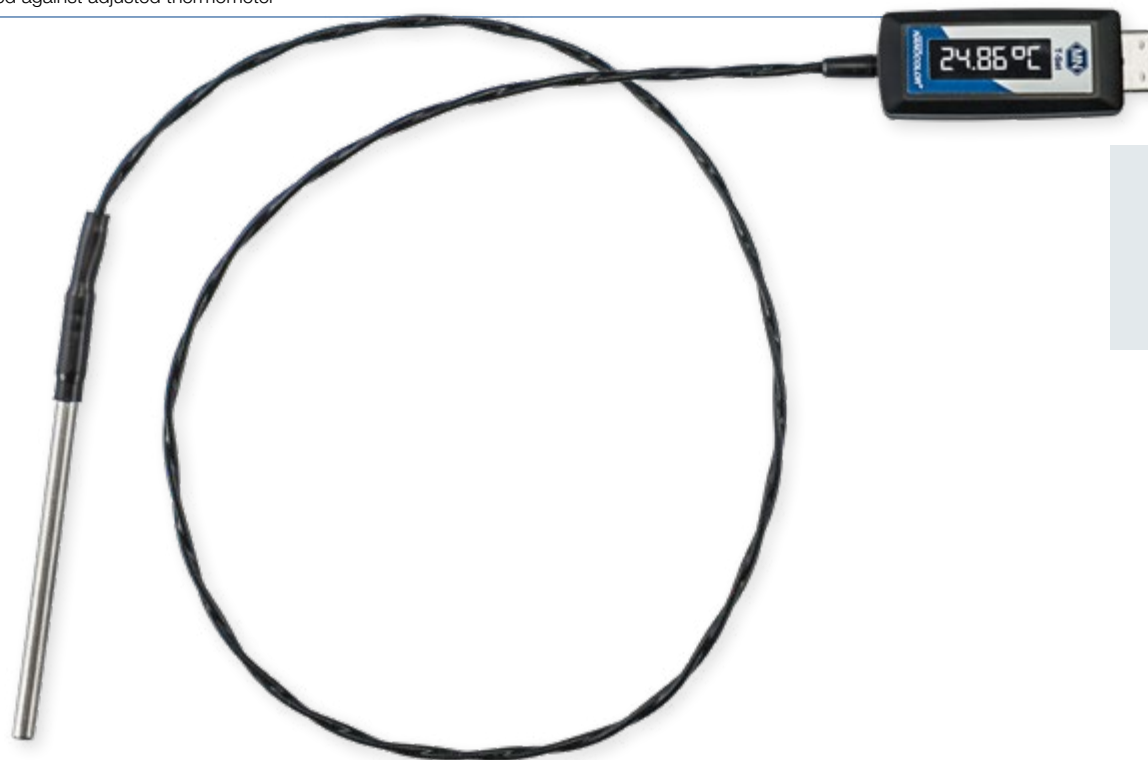
Ordering information

Description	REF
■ NANOCOLOR® T-Set for electronic temperature control and calibration of the heating blocks NANOCOLOR® VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC / VARIO 3 / VARIO compact	919917
■ NANOCOLOR® USB T-Set for electronic temperature control and calibration of the heating blocks NANOCOLOR® VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC / VARIO Mini ¹⁾	919921

¹⁾ Additional adapter for USB-T-Set (REF 919937) is required.

Technical data

	T-Set	USB T-Set
Type	Electronic thermal sensor for temperature control, calibration and generation of a test certificate for inspection equipment monitoring	
Detector	PT 1000 (95 mm length x 4 mm Ø)	
Display	–	LED display
Operation	Via touch screen of the heating blocks and the T-Set software	
Temperature range	0 °C–200 °C	
Precision	± 1 °C	
Accuracy	± 0.2 °C	
Long term stability	± 0.1 °C	
Interface	RS232	USB A
Operating range	10 °C–40 °C max. 80 % relative humidity (non-condensing)	
Power supply	Via RS232	Via USB A
Power consumption	Max. 20 mW	
Dimensions	75 cm (length)	73 cm (length)
Weight	Approx. 60 g	
Warranty	2 years	
CE	CE certified	
Certificate	Calibrated against adjusted thermometer	



Accessories for heating blocks

The complete analytics from a single source

MACHEREY-NAGEL heating blocks represent an important corner stone of the NANOCOLOR® analytical system. By the perfect combination of test kits, heating blocks and photometers, the user is well equipped for daily laboratory analysis. In addition to the digestion for the classical parameters such as COD and phosphate, some customers require special solutions, e.g. for the digestion of metals using *NanOx Metal*. The accessories required for this purpose are available as a complete package from MACHEREY-NAGEL. For an overview of available digestion reagents see page 108. All this ensures the compatibility of the equipment and a reliable analysis.

Good to know



The NANOCOLOR® VARIO Mini can be operated independent of the grid with a car adapter cable (REF 919938) from our heating block accessories.

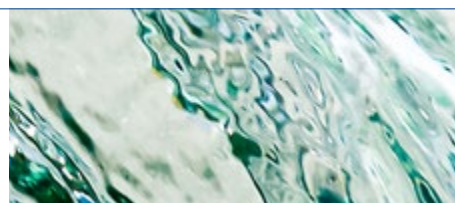
Accessories

Description	REF	Content
Accessories for temperature control of heating blocks		
■ T-Set adaptor 16 mm	919924	1 piece
■ T-Set adaptor 13 mm	919925	1 piece
■ USB-serial-Adaptor for heating blocks NANOCOLOR® VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC / VARIO 3 / VARIO compact and NANOCOLOR® T-Set	919926	1 piece
■ USB-T-Set adaptor for NANOCOLOR® VARIO Mini	919937	1 piece
Accessories for digestions in heating blocks		
■ Protective covering for NANOCOLOR® VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC, transparent	919310	1 piece
■ Protective covering with bores for TOC-tests for NANOCOLOR® VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC, transparent	919309	1 piece
■ Protective covering for NANOCOLOR® VARIO Mini, transparent	919381	1 piece
■ Safety cover for NANOCOLOR® VARIO 4 / VARIO C2 / VARIO HC / VARIO 3 / VARIO compact	916598	1 piece
■ Reducing adaptors 16 → 13 mm for NANOCOLOR® heating blocks	916910	8 pieces
■ Reducing adaptors 22 → 16 mm for NANOCOLOR® heating blocks	919916	2 pieces
■ Decomposition apparatus including tube for sample decomposition, reducing adaptor and condensor	91629	1 piece
■ Tubes for sample decomposition 22 mm OD, NS 19/26 with glass stopper	91666	2 pieces
■ Condenser 200 mm, type KS with 3 m PE tubing, NS 19/26 bottom, NS 29/32 top	91667	1 piece
■ Absorption attachment for condenser NS 29/32	91668	1 piece
■ Reaction tubes 16 mm OD	91680	20 pieces
■ Reaction tubes 22 mm OD	91622	2 pieces
Power supply ¹⁾		
■ Car adapter cable for NANOCOLOR® VARIO Mini	919938	1 piece
■ Mains adaptor for NANOCOLOR® VIS, NANOCOLOR® VIS II and VARIO Mini	919156	1 piece
Accessories for data transfer		
■ USB cable AB for NANOCOLOR® UV/VIS / UV/VIS II / VIS / VIS II / VARIO 4 / VARIO C2 / VARIO C2 M and PF-12 / PF-12 ^{plus}	919687	1 piece
■ Mini USB cable for compact photometer PF-3 and NANOCOLOR® VARIO Mini	919390	1 piece
Manuals		
■ Manual for NANOCOLOR® VARIO C2 and NANOCOLOR® VARIO 4	919311	1 piece
■ Manual for NANOCOLOR® VARIO HC	919312	1 piece
■ Manual for NANOCOLOR® VARIO Mini	919383	1 piece

¹⁾ For information about an external battery for NANOCOLOR® VARIO Mini, please contact MACHEREY-NAGEL.

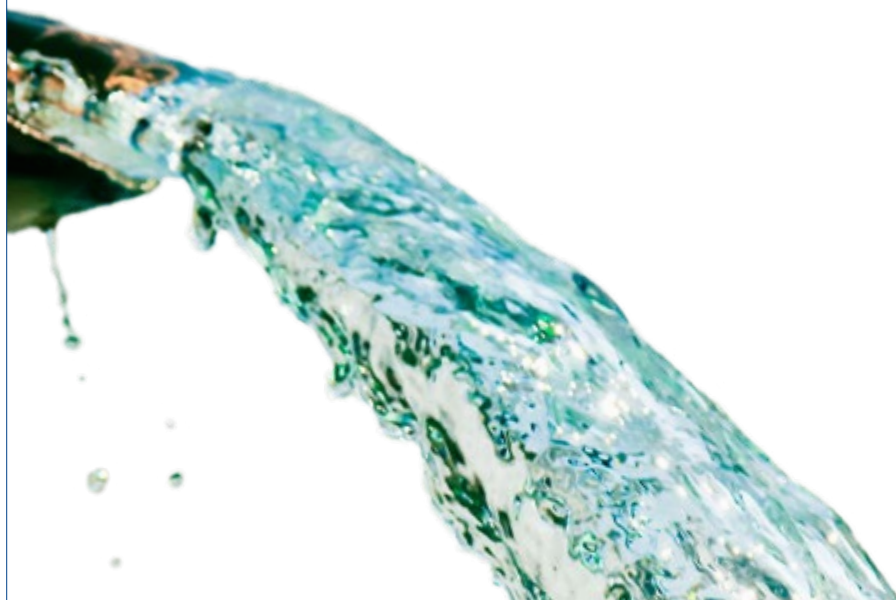
NANOCOLOR® COD test kits

Safe, safer, the safest



Reliable COD analysis

- No risk of leaking gases
- Minimum quantity of hazardous chemicals
- Hg-free version available
- 12 measurement ranges available for all requirements and demands



QUANTOFIX® Relax

Reflectometer for evaluation of test strips

The QUANTOFIX® Relax is the ideal device for the objective evaluation of our QUANTOFIX® test strips. It combines the simplicity of test strips with the safety of instrumental analysis and thus the best out of these two worlds. The QUANTOFIX® Relax does not require any special strips, but evaluates the normal pH-Fix and QUANTOFIX® test strips. Therefore entrance into instrumental analysis is very simple; the same strip can be used for visual and instrumental evaluation.

Excellent usability

All functions of the device can be selected with the touch screen display. Therefore, the operation is simple and intuitive, without the need for extensive training. The auto-start function initiates the measurement as soon as the test strip is placed on the strip holder. Therefore, it is not necessary to touch the device for performing a measurement. Contaminations are reliably avoided. Frequently used parameters can be stored as favorites. Simple tapping can quickly access these favorites during operation.

Quantitative results

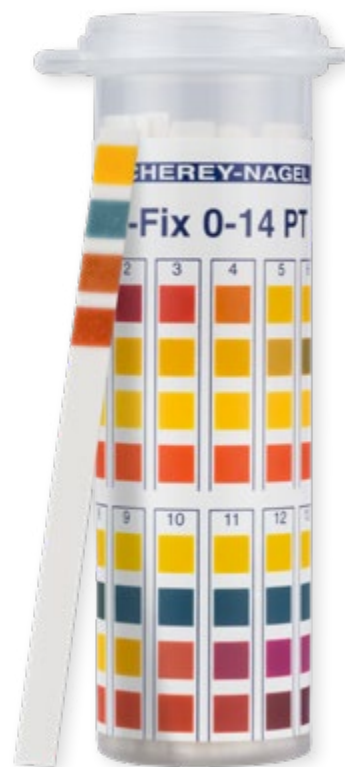
The optics of the QUANTOFIX® Relax has been proven for years in medical technology and supplies secure and standardized values. Thereby an accuracy of $\leq 10\%$ is achieved for many parameters; a hardly achieved level in the analysis of test strips, yet. The evaluation with the QUANTOFIX® Relax is not interfered by external factors and is therefore absolutely objective and precise. The estimation of measured values between the gradations of the scale is omitted.

Documentation and data transfer

The QUANTOFIX® Relax allows the assured documentation of analytics with test strips. Results are printed immediately after the measurement. The printout can be e.g. appended to a production protocol or kept for later quality controls. The transmission to an information system can be realized easily. In addition, the data are stored in the device and can be simply read out or printed again later on.

Good to know

For an overview of all the parameters and pH-Fix test strips available on the QUANTOFIX® Relax, please refer to page 52 and 60.



How it's done

Objective evaluation with the QUANTOFIX® Relax



Ordering information

Description	REF
■ Reflectometer QUANTOFIX® Relax for evaluation of QUANTOFIX® test strips incl. power supply, adapter, manual, 1 roll of printer paper and certificate	91346

Accessories

Description	REF	Content
■ Transport case for reflectometer QUANTOFIX® Relax for individual combination with 1 QUANTOFIX® Relax, 3 rolls of printer paper, 6 QUANTOFIX® tubes, 6 batteries, power supply, manual and accessories	930889	1 piece
■ Printer paper for QUANTOFIX® Relax	93065	5 pieces
■ Barcode scanner for QUANTOFIX® Relax	93074	1 piece
■ Power supply for QUANTOFIX® Relax	930995	1 piece

Objective

- High-quality optics
- Independent from external light and subjective color perception
- Standardized reaction times

Easy

- Intuitive use via touch screen
- Contactless measurement due to auto-start function
- Favorites list for the most important parameters

Safe

- Reproducible results independent of the user
- Printout of results for optimized documentation
- Accuracy for many parameters $\leq 10\%$

Technical data

QUANTOFIX® Relax	
Type	Reflectometer with microprocessor control, self-test and auto-calibration
Calibration	Automatic, self calibrating
Capacity	50 strips per hour
Data storage	200 results
Display	LCD display with touch screen
Operation	alphanumeric input via touch screen
Interface	RS232, USB B (Host), PS/2 for connection of a keyboard or barcode scanner
Languages	DE / EN / FR / ES / IT / PT / PL / TR / HU
Update	Free via Internet / PC
Operating range	10 °C–40 °C, max. 80 % relative humidity (non-condensing)
Power supply	100 V–240 V~, optional with 6 AA batteries
Dimensions	200 mm x 160 mm x 75 mm
Weight	710 g (without batteries and power supply)
Warranty	2 years
CE	CE certified



BioFix® Lumi-10

Compact luminometer for mobile use

The BioFix® Lumi-10 is a compact luminometer for the measurement of bio and chemical luminescence reactions with constant light emission. Due to its size it is ideally suited for the use in the laboratory or on the road and can be operated with a power supply as well as rechargeable batteries.

Incredibly versatile

Thanks to its highly sensitive detector (Ultra-Fast Single Photon Counter) the BioFix® Lumi-10 can be used for a variety of applications. This includes amongst others bio toxicity tests, ATP- and biomass determinations, reporter-gene assays, luminescence immunoassays as well as NAD(P)H measurements.

Individually programmable

The BioFix® Lumi-10 has six individually adjustable measurement protocols and a data memory for up to 2000 results. It provides the opportunity for single, multiple and extensive screening measurements. The results are optionally displayed in % inhibition, % stimulation or RLU (relative light units). The user can set the particular measurement parameters such as incubation time or measurement time individually. By a previous definition of detection limits, the results can be automatically classified by the device. There are already pre-programmed test methods available for the determination of luminescent bacteria toxicity tests and ATP tests.

Good to know



Thanks to six individually adjustable measurement protocols, the BioFix® Lumi-10 is extremely versatile and suitable for many applications.

Ordering information

Description	REF
■ BioFix® Lumi-10 incl. manual, rack, cuvettes and spare adaptor	940008

Accessories

Description	REF	Content
■ Absorbance color correction cuvettes with 100 aspirators	940006	4 pieces
■ Glass cuvettes 12 mm OD	916912	690 pieces
■ Rack for glass cuvettes 12 mm OD, 5 x 10 positions	945013	1 piece
■ Manual BioFix® Lumi-10, German	940014	1 piece
■ Manual BioFix® Lumi-10, English	940014.en	1 piece
■ Mains adaptor	940009	1 piece

Technical data

BioFix® Lumi-10	
Type	Luminometer
Optics	Ultra-Fast Single Photon Counter
Wavelengths range	380 nm–630 nm
Software	Microprocessor software
Measuring modes	3 preprogrammed tests, 6 free programmable methods, % inhibition, % stimulation, RLU
Cuvette holder	Cuvettes 12 mm OD
Data storage	2000 results
Display	Backlit graphic display (128 x 64 pixel)
Operation	Foil covered push buttons
Languages	DE, EN
Interface	RS232 interface for data transfer to the PC or printer
Operating range	15 °C–30 °C
Power supply	Mains adaptor: 230 V/50 Hz, 115 V/60 Hz, batteries
Rechargeable batteries	3 Rechargeable batteries: NiCd R14 / C / Baby / UM2 batteries; 1600 mAh
Dimensions	170 mm x 150 mm x 280 mm
Weight	2 kg (incl. batteries)
Warranty	2 years
CE	CE certified



Reagent cases

Reagent cases for special applications	154
Reagent cases for individual solutions.....	158
Accessories for reagent cases	160





Reagent cases for special applications

Compact laboratories for mobile analysis

MACHEREY-NAGEL reagent cases are flexible tools for all areas of water and soil analysis. Catering to our customer needs, we offer a large number of prepacked reagent cases with and without photometer which can be used for a wide area of applications. The rugged cases with premium foam inlays allow a fast and direct analysis at the point of interest. All needed test instructions as well as analytical accessories are already included for especially easy and convenient handling. Particular chemical knowledge or experience is not required to run any of the tests or to use the cases effectively. The color-coded bottles prevent a mixing-up of the reagents.

Consumed reagents can be replaced simple and cost-effective with refill packs.

Reagent cases for water analysis

The reagent cases together with the *VISOCOLOR®* tests give water attendants, fish farmers and other persons that are interested in water analysis the possibility to determine important analytical values for evaluation of water quality within a short time.

The prepacked reagent cases can be used for a wide area of applications like swimming pools, drinking water analysis, schools, monitoring of fishing waters and of course for general water analysis.

Good to know

The *VISOCOLOR®* School reagent case is especially designed for schools. All reagents are approved to be used in schools in Germany (GUV-SR 2004 directive).



Ordering information

Reagent case	REF	Dimensions	Application	GHS	PF-3	PF-12 ^{Plus}	Test
■ <i>VISOCOLOR® ECO</i> Reagent case	931301	340 x 275 x 83 mm	General	■			<i>VISOCOLOR® ECO</i> Ammonium 3 <i>VISOCOLOR® ECO</i> Carbonate hardness <i>VISOCOLOR® ECO</i> Total hardness <i>VISOCOLOR® ECO</i> Nitrate <i>VISOCOLOR® ECO</i> Nitrite <i>VISOCOLOR® ECO</i> pH 4.0–9.0 <i>VISOCOLOR® ECO</i> Phosphate
■ <i>VISOCOLOR®</i> Reagent case	931304	450 x 360 x 140 mm	General	■			<i>VISOCOLOR® ECO</i> Ammonium 3 <i>VISOCOLOR® ECO</i> Nitrite <i>VISOCOLOR® ECO</i> pH 4.0–9.0 <i>VISOCOLOR® ECO</i> Phosphate <i>VISOCOLOR® HE</i> Alkalinity AL 7 <i>VISOCOLOR® HE</i> Total hardness H 20 F <i>VISOCOLOR® HE</i> Oxygen SA 10
■ <i>VISOCOLOR®</i> Reagent case for environmental analysis	914353	450 x 360 x 140 mm	General	■		■	<i>VISOCOLOR® ECO</i> Ammonium 15 <i>VISOCOLOR® ECO</i> Iron 2 <i>VISOCOLOR® ECO</i> Nitrate <i>VISOCOLOR® ECO</i> Nitrite <i>VISOCOLOR® ECO</i> pH 4.0–9.0 <i>VISOCOLOR® ECO</i> Phosphate <i>VISOCOLOR® HE</i> Carbonate hardness C 20 <i>VISOCOLOR® HE</i> Total hardness H 20 F
■ <i>VISOCOLOR®</i> Reagent case with PF-3 Pool (Cl ₂ liquid)	934118	340 x 275 x 83 mm	Swimming pool	■	■		<i>VISOCOLOR® ECO</i> Alkalinity TA <i>VISOCOLOR® ECO</i> Chlorine 2, free + total <i>VISOCOLOR® ECO</i> Cyanuric acid <i>VISOCOLOR® ECO</i> pH 6.0–8.2
■ <i>VISOCOLOR®</i> Reagent case with PF-3 Pool (Cl ₂ solid)	934119	340 x 275 x 83 mm	Swimming pool	■	■		<i>VISOCOLOR® ECO</i> Alkalinity TA <i>VISOCOLOR® ECO</i> Chlorine 6, free + total <i>VISOCOLOR® ECO</i> Cyanuric acid <i>VISOCOLOR® ECO</i> pH 6.0–8.2

GHS: Global harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Reagent cases for special applications

Reagent cases for soil analysis

Thorough analysis is the basis to support and maintain healthy, productive and biologically active soil. To effectively and efficiently plan all measures that affect the soil (fertilization, liming, etc.) it is crucial to determine the important soil parameters first.

The VISOCOLOR® reagent cases for soil analysis are the perfect companions for economical, fast and convenient soil analysis, both in the field or in the laboratory. The user can choose between a reagent case version with or without compact photometer PF-3 Soil, which was especially developed for soil analysis.

Both case versions contain additional analytical tools, such as scale, sieve, etc. as well as predosed solutions for the production of necessary soil extracts.

Good to know

The reagent cases VISOCOLOR® School, VISOCOLOR® Fish and the VISOCOLOR® reagent case for soil analysis contain detailed manuals. Besides further background information about the most important parameters also information about reaction equations and of the reaction basis are included.



Measuring range (visual)	Measuring range (photometric)	Number of tests	Reagent cases
0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH ₄ ⁺	–	50	VISOCOLOR® ECO Reagent case
1 drop equals 1.25 °e	–	100	
1 drop equals 1.25 °e	–	110	
0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO ₃ [–]	–	110	
0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 mg/L NO ₂ [–]	–	120	
pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450	
0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO ₄ -P	–	80	
0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH ₄ ⁺	–	50	VISOCOLOR® Reagent case
0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 mg/L NO ₂ [–]	–	120	
pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450	
0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO ₄ -P	–	80	
0.2–7.2 mmol/L OH [–] (1 syringe filling)	–	200	
0.6–25.0 °e / 0–3.6 mmol/L Ca ²⁺ (1 syringe filling)	–	200	
0–10.0 mg/L O ₂ (1 syringe filling)	–	100	
–	0.5–8.0 mg/L NH ₄ ⁺	50	VISOCOLOR® Reagent case for environmental analysis
–	0.04–2.00 mg/L Fe	100	
–	4–60 mg/L NO ₃ [–]	110	
–	0.02–0.50 mg/L NO ₂ [–]	120	
pH: 4.0 · 5.0 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	450	
–	0.2–3.0 mg/L PO ₄ -P	80	
0.6–25.0 °e / 0–7.2 mmol/L H ⁺ (1 syringe filling)	–	200	
0.6–25.0 °e / 0–3.6 mmol/L Ca ²⁺ (1 syringe filling)	–	200	
–	0.4–17.5 °e / 5–250 mg/L CaCO ₃	100	VISOCOLOR® Reagent case with PF-3 Pool (Cl ₂ liquid)
–	0.10–2.00 mg/L Cl ₂	150	
–	10–100 mg/L Cya	100	
–	pH 6.1–8.4	150	
–	0.4–17.5 °e / 5–250 mg/L CaCO ₃	100	VISOCOLOR® Reagent case with PF-3 Pool (Cl ₂ solid)
–	0.05–6.00 mg/L Cl ₂	200	
–	10–100 mg/L Cya	100	
–	pH 6.1–8.4	150	

Reagent cases for special applications

Reagent case	REF	Dimensions	Application	GHS	PF-3	PF-12 ^{Plus}	Test
■ VISOCOLOR® Reagent case with PF-3 Drinking Water (Cl ₂ liquid)	934124	340 x 275 x 83 mm	Drinking water	■	■		VISOCOLOR® ECO Chlorine 2, free + total VISOCOLOR® ECO Chlorine dioxide VISOCOLOR® ECO Iron 2 VISOCOLOR® ECO Fluoride VISOCOLOR® ECO pH 6.0–8.2
■ VISOCOLOR® Reagent case with PF-3 Drinking Water (Cl ₂ solid)	934125	340 x 275 x 83 mm	Drinking water	■	■		VISOCOLOR® ECO Chlorine 6, free + total VISOCOLOR® ECO Chlorine dioxide VISOCOLOR® ECO Iron 2 VISOCOLOR® ECO Fluoride VISOCOLOR® ECO pH 6.0–8.2
■ Reagent case VISOCOLOR® School	933100	275 x 230 x 83 mm	Schools	■			VISOCOLOR® School Ammonium VISOCOLOR® School Total hardness VISOCOLOR® School Nitrate VISOCOLOR® School Nitrite VISOCOLOR® School pH 4.0–9.0 VISOCOLOR® School Phosphate
■ Reagent case VISOCOLOR® Fish	933101	275 x 230 x 83 mm	Fishing waters	■			VISOCOLOR® Fish Ammonium VISOCOLOR® Fish Total hardness VISOCOLOR® Fish Nitrate VISOCOLOR® Fish Nitrite VISOCOLOR® Fish pH 4.0–9.0 VISOCOLOR® Fish Phosphate
■ Reagent case VISOCOLOR® Fish with PF-3 Fish	934127	395 x 295 x 106 mm	Fishing waters	■	■		QUANTOFIX® Chloride QUANTOFIX® Multi-stick for aquarium owners VISOCOLOR® ECO Ammonium 3 VISOCOLOR® ECO Chlorine 6, free + total VISOCOLOR® ECO Iron 2 VISOCOLOR® ECO Silica VISOCOLOR® ECO Copper VISOCOLOR® ECO Nitrate VISOCOLOR® ECO Nitrite VISOCOLOR® ECO pH 6.0–8.2 VISOCOLOR® ECO Phosphate VISOCOLOR® ECO Oxygen VISOCOLOR® HE Alkalinity AL 7 VISOCOLOR® HE Phosphate
■ VISOCOLOR® Reagent case for soil analysis, with accessories	931601	500 x 420 x 175 mm	Soil	■			pH-Fix 2.0–9.0 QUANTOFIX® Ammonium QUANTOFIX® Nitrate/Nitrite VISOCOLOR® ECO Potassium VISOCOLOR® HE pH 4.0–10.0 VISOCOLOR® HE Phosphate
■ VISOCOLOR® Reagent case for soil analysis with PF-3 Soil, with accessories	934220	500 x 420 x 175 mm	Soil	■	■		pH-Fix 2.0–9.0 QUANTOFIX® Nitrate/Nitrite VISOCOLOR® ECO Ammonium 3 VISOCOLOR® ECO Potassium VISOCOLOR® ECO Nitrate VISOCOLOR® ECO Phosphate
■ VISOCOLOR® Reagent case for soil analysis with PF-3 Soil	934210	340 x 275 x 83 mm	Soil	■	■		VISOCOLOR® ECO Ammonium 3 VISOCOLOR® ECO Potassium VISOCOLOR® ECO Nitrate VISOCOLOR® ECO Phosphate

GHS: Global harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Reagent cases for special applications

Measuring range (visual)	Measuring range (photometric)	Number of tests	Reagent cases
–	0.10–2.00 mg/L Cl ₂	150	VISOCOLOR®
–	0.20–3.80 mg/L ClO ₂	150	Reagent case with PF-3
–	0.04–2.00 mg/L Fe	100	Drinking Water (Cl ₂ liquid)
–	0.1–2.0 mg/L F [–]	150	
–	pH 6.1–8.4	150	
–	0.05–6.00 mg/L Cl ₂	200	VISOCOLOR®
–	0.20–3.80 mg/L ClO ₂	150	Reagent case with PF-3
–	0.04–2.00 mg/L Fe	100	Drinking Water (Cl ₂ solid)
–	0.1–2.0 mg/L F [–]	150	
–	pH 6.1–8.4	150	
0 · 0.2 · 0.5 · 1 · 3 mg/L NH ₄ ⁺	–	50	Reagent case
1 drop equals 1.25 °e	–	50	VISOCOLOR® School
0 · 1 · 5 · 10 · 20 · 50 · 90 mg/L NO ₃ [–]	–	50	
0 · 0.02 · 0.05 · 0.1 · 0.2 · 0.5 mg/L NO ₂ [–]	–	50	
pH: 4.0 · 5.0 · 6.0 · 7.0 · 8.0 · 9.0	–	50	
0 · 0.5 · 1.5 · 3 · 6 · 15 mg/L PO ₄ ^{3–}	–	50	
0 · 0.2 · 0.5 · 1 · 3 mg/L NH ₄ ⁺	–	50	Reagent case
1 drop equals 1.25 °e	–	50	VISOCOLOR® Fish
0 · 1 · 5 · 10 · 20 · 50 · 90 mg/L NO ₃ [–]	–	50	
0 · 0.02 · 0.05 · 0.1 · 0.2 · 0.5 mg/L NO ₂ [–]	–	50	
pH: 4.0 · 5.0 · 6.0 · 7.0 · 8.0 · 9.0	–	50	
0 · 0.5 · 1.5 · 3 · 6 · 15 mg/L PO ₄ ^{3–}	–	50	
0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl [–]	–	100	Reagent case
Total hardness: 0 · 6.3 · 12.5 · 18.8 · 25.0 · 31.3 °e	–	100	VISOCOLOR® Fish with
Carbonate hardness: 0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	–	100	PF-3 Fish
pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	–	100	
–	0.1–2.5 mg/L NH ₄ ⁺	50	
–	0.05–6.00 mg/L Cl ₂	200	
–	0.04–2.00 mg/L Fe	100	
–	0.2–3.0 mg/L SiO ₂	80	
–	0.1–5.0 mg/L Cu ²⁺	100	
–	4–60 mg/L NO ₃ [–]	110	
–	0.02–0.50 mg/L NO ₂ [–]	120	
–	pH 6.1–8.4	100	
–	0.2–5.0 mg/L PO ₄ -P	80	
–	1–8 mg/L O ₂	50	
0.2–7.2 mmol/L OH [–] (1 syringe filling)	–	200	
0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO ₄ -P	–	300	
pH: 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	100	VISOCOLOR®
0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH ₄ ⁺	–	100	Reagent case for soil
Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ [–]	–	100	analysis, with accessories
Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ [–]	–	100	
2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K ⁺	–	60	
pH: 4.0 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 10.0	–	500	
0.0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.3 · 0.4 · 0.6 · 0.8 · 1.0 mg/L PO ₄ -P	–	100	
pH: 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	–	100	VISOCOLOR®
Nitrate: 0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L NO ₃ [–]	–	100	Reagent case for soil
Nitrite: 0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO ₂ [–]	–	100	analysis with PF-3 Soil,
–	0.1–2.5 mg/L NH ₄ ⁺	50	with accessories
–	2–25 mg/L K ⁺	60	
–	4–60 mg/L NO ₃ [–]	110	
–	0.2–5.0 mg/L PO ₄ -P	80	
–	0.1–2.5 mg/L NH ₄ ⁺	50	VISOCOLOR®
–	2–25 mg/L K ⁺	60	Reagent case for soil
–	4–60 mg/L NO ₃ [–]	110	analysis with PF-3 Soil
–	0.2–5.0 mg/L PO ₄ -P	80	

Reagent cases for individual solutions

Compact laboratories for mobile analysis

With our reagent case program we also fulfill individual customer requests. The user can choose between reagent case versions with tests for visual evaluation and possible combinations with the compact photometers PF-3 and PF-12^{Plus}.

The reagent cases for individual solutions offer a flexible combination of all VISOCOLOR® tests, pH-indicator papers, pH-Fix indicator strips, qualitative test papers and semi-quantitative QUANTOFIX® test strips as well as useful accessories.

The NANOCOLOR® reagent cases can also be equipped with NANOCOLOR® tube tests and the heating blocks NANOCOLOR® VARIO C2, NANOCOLOR® VARIO C2 M and NANOCOLOR® VARIO Mini.

Therefore, the reagent cases for individual solutions are versatily applicable in a variety of areas in water and waste water analysis.

Good to know

Starting at a minimum quantity of 50 cases, we offer entirely individual solutions in different sizes with a foam inlay designed exactly to the customers' specifications and needs.

Good to know

For questions about individual solution of the reagent cases, we are pleased to be of service.



Ordering information

Reagent case	REF	Dimensions	NANOCOLOR® VARIO C2	NANOCOLOR® VARIO C2 M	NANOCOLOR® VARIO Mini	NANOCOLOR® tube tests	VISOCOLOR® alpha
■ Test paper analysis case	913990	280 x 220 x 80 mm					
■ VISOCOLOR® ECO Reagent case	931303	340 x 275 x 83 mm					
■ VISOCOLOR® Reagent case	931305	450 x 360 x 140 mm					■
■ VISOCOLOR® Reagent case with PF-3 Pool	934102	340 x 275 x 83 mm					
■ VISOCOLOR® Reagent case with PF-3 Drinking Water	934402	340 x 275 x 83 mm					
■ VISOCOLOR® Reagent case with PF-3 Soil	934202	340 x 275 x 83 mm					
■ VISOCOLOR® Reagent case with PF-3 Fish	934602	340 x 275 x 83 mm					
■ VISOCOLOR® Reagent case with PF-12 ^{Plus}	914351	450 x 360 x 140 mm					■
■ NANOCOLOR® Reagent case with PF-3 COD	919212	534 x 427 x 207 mm	■	■	■	■	
■ NANOCOLOR® Reagent case with PF-12 ^{Plus}	919214	534 x 427 x 207 mm	■	■	■	■	

Reagent cases for individual solutions



VISOCOLOR® ECO	VISOCOLOR® HE	pH-Fix	PEHANON®	Indicator papers	Duotest and Tritest	QUANTOFIX®	AQUADUR®	Qualitative test papers	Thermometer	Oxygen bottle	Pipettes	Reagent case
		■		■	■	■	■	■				Test paper analysis case
■								■	■			VISOCOLOR® ECO Reagent case
■	■	■	■	■	■	■	■	■	■	■		VISOCOLOR® Reagent case
■												VISOCOLOR® Reagent case with PF-3 Pool
■												VISOCOLOR® Reagent case with PF-3 Drinking Water
■												VISOCOLOR® Reagent case with PF-3 Soil
■												VISOCOLOR® Reagent case with PF-3 Fish
■	■	■	■	■	■	■	■	■	■	■		VISOCOLOR® Reagent case with PF-12 ^{Plus}
											■	NANOCOLOR® Reagent case with PF-3 COD
											■	NANOCOLOR® Reagent case with PF-12 ^{Plus}

Accessories for reagent cases

The complete analysis from one source

The MACHEREY-NAGEL reagent cases are perfectly suited for mobile analysis. With our wide range of accessories they can be refilled quickly and easily.

Good to know

For general accessories for the VISOCOLOR® reagent cases see page 82



Ordering information

Description	REF	Content	GHS
Accessories for Reagent case VISOCOLOR® School			
■ VISOCOLOR® School refill pack	933200	1 piece	
■ VISOCOLOR® School color scale	933300	1 piece	
■ VISOCOLOR® School manual	933150	1 piece	
Accessories for Reagent case VISOCOLOR® Fish			
■ VISOCOLOR® Fish refill pack	933201	1 piece	
■ VISOCOLOR® Fish color scale	933301	1 piece	
■ VISOCOLOR® Fish manual for reagent case VISOCOLOR® Fish	933151	1 piece	
■ VISOCOLOR® Fish manual for reagent case VISOCOLOR® Fish with PF-3 Fish	933161	1 piece	
Accessories for VISOCOLOR® Reagent cases for soil analysis			
■ 100 mL CaCl ₂ stock solution	914612	3 pieces	■
■ 100 mL CAL stock solution	914614	4 pieces	
■ Reagent set VISOCOLOR® HE Phosphorus in soil	920183	1 piece	■
■ Color chart VISOCOLOR® HE Phosphorus in soil	920383	1 piece	
■ 30 mL pyrophosphate solution	914611	3 pieces	
■ Folded filters MN 616 1/4, 18.5 cm Ø	532018	100 pieces	
■ Soil sieve (2 mm mesh size)	914650	1 piece	
■ Plastic bottle 500 mL with spraying attachment	91689	1 piece	
■ Balance 250 g	914651	1 piece	
■ Sample beaker 250 mL	914652	5 pieces	
■ Wide neck bottles 500 mL for soil samples	914653	5 pieces	
■ Shaking bottle 300 mL	914654	5 pieces	
■ Measuring cylinder 100 mL with base	914655	2 pieces	
■ Plastic scoop	914656	1 piece	
■ Funnel 80 mm Ø, plastic	914657	3 pieces	
■ Sedimentation tubes with screw caps	914659	2 pieces	
■ Syringe 10 mL with tube	914660	1 piece	
■ Manual for VISOCOLOR® Reagent cases for soils analysis	914602	1 piece	
■ Thermometer -10 °C to +60 °C	914497	1 piece	

GHS: Global harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

NANOCOLOR® Reagent case

Mobile analysis for sewage plants



Mobile photometric analysis

- Compact photometer PF-12^{Plus} for flexible analysis
- Heating block NANOCOLOR® VARIO C2 for fast sample digestions
- Highest transport safety due to robust case
- Tube tests for precise results



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All information at a glance

The NANOCOLOR® App allows scanning of 2D barcodes on NANOCOLOR® kits and uses the information included to provide fast and easy access to all data that are important for these tests. Batch-specific certificates are automatically generated from the analytical data in the 2D barcode.

Easy barcode reading

The packages of our NANOCOLOR® tube tests are equipped with a 2D barcode that contains all relevant information. The app reads this barcode, analyzes the information stored therein and directly displays the test name, item number and expiration date.

Create certificates

Based on the data in the 2D barcode, the app displays information on the analytical performance of the test. It can also create batch specific certificates as pdf files which can be viewed, shared or printed.

Read instruction leaflets

After choosing the option „instruction leaflet“, the app shows the instruction leaflet as pdf. Important test information, such as analytical interferences or compliance with ISO methods is immediately available even if the test kit's instruction leaflet has already been disposed.

View pictograms

For most NANOCOLOR® tube tests instructions are available in form of pictograms. These provide basic information and allow performing the test without reading the instruction leaflet. They especially help the less experienced users, but also serve “old hands” as a regular reminder. The app provides quick access to these pictograms and displays them in the usual optimum quality.

Open Safety Data Sheets

Safety Data Sheets contain important information about potential hazards and their prevention. Even without Internet connection, the NANOCOLOR® App allows direct access to these documents so that necessary measures can immediately be taken. As pdf file the SDS can be shared at any time.

Everything offline

An Internet connection is only needed for occasional updates or sending of documents. Therefore, the app works especially well even at remote places.

Good to know



The 2D barcodes printed in this catalog allow direct access to all information and lot independent sample certificates.

How it's done



Information fast and simple



Download app



Scan barcode



Get information

Fast

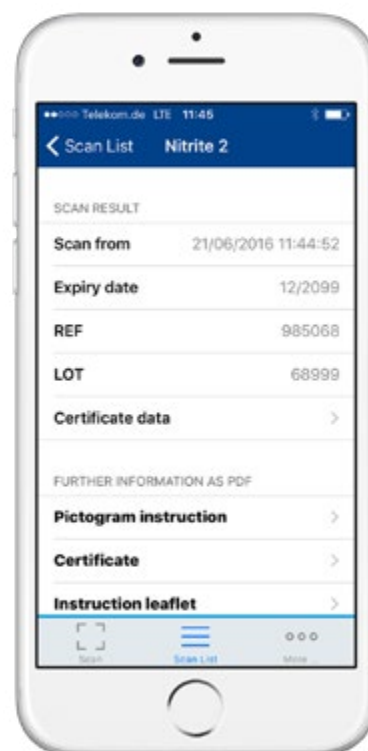
- All information at a glance

Easy

- Scan the barcode with your smartphone
- Select information of interest
- View, share or print directly

Safe

- Up to date anytime – anywhere
- Direct access to Safety Data Sheets
- All information available offline



Barcode register

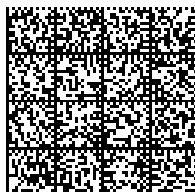
Information fast and easy – with the *NANOCOLOR®* App

The *NANOCOLOR®* App (see page 164) allows fast and easy access to instruction leaflets, Safety Data Sheets and pictogram instructions. Further the app generates sample certificates from the barcodes printed here.

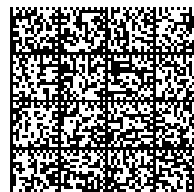
■ *NANOCOLOR®* Aluminum 07
REF 985098



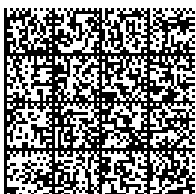
■ *NANOCOLOR®* Ammonium 3
REF 985003



■ *NANOCOLOR®* Ammonium 10
REF 985004



■ *NANOCOLOR®* Ammonium 50
REF 985005



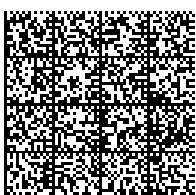
■ *NANOCOLOR®* Ammonium 100
REF 985008



■ *NANOCOLOR®* Ammonium 200
REF 985006



■ *NANOCOLOR®* Ammonium 2000
REF 985002



■ *NANOCOLOR®* Anionic surfactants 4
REF 985032



■ *NANOCOLOR®* BOD₅-TT
REF 985825



■ *NANOCOLOR®* Cadmium 2
REF 985014



■ *NANOCOLOR®* Carbonate hardness 15
REF 985015



■ *NANOCOLOR®* Cationic surfactants 4
REF 985034



■ NANOCOLOR® Chloride 50
REF 985021



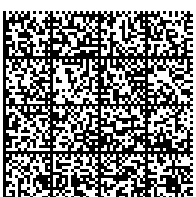
■ NANOCOLOR® Chloride 200
REF 985019



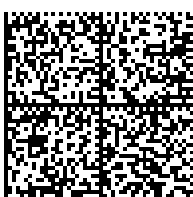
■ NANOCOLOR® Chlorine / Ozone 2
REF 985017



■ NANOCOLOR® Chromate 5
REF 985024



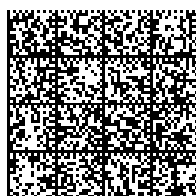
■ NANOCOLOR® total Chromium 2
REF 985059



■ NANOCOLOR® COD 40
REF 985027



■ NANOCOLOR® COD 60
REF 985022



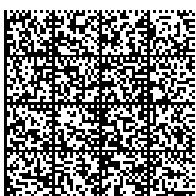
■ NANOCOLOR® COD 160
REF 985026



■ NANOCOLOR® COD 300
REF 985033



■ NANOCOLOR® COD 600
REF 985030



■ NANOCOLOR® COD 1500
REF 985029



■ NANOCOLOR® COD 4000
REF 985011

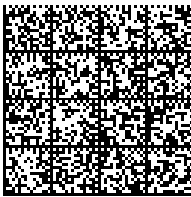


Barcode register

■ NANOCOLOR® COD 10000
REF 985023



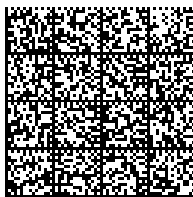
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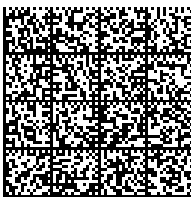
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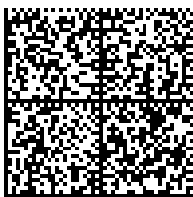
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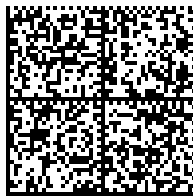
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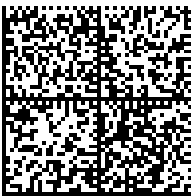
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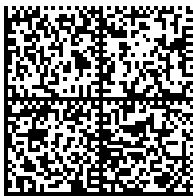
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■ NANOCOLOR® Copper 7
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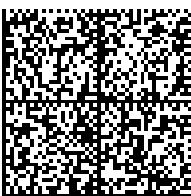
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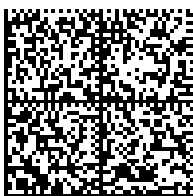
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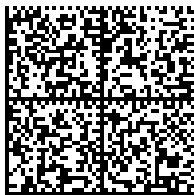
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■ NANOCOLOR® Formaldehyde 8
REF 985041



■ **NANOCOLOR®** Formaldehyde 10
REF 985046



■ **NANOCOLOR®** Hardness 20
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■ **NANOCOLOR®** Hardness Ca / Mg
REF 985044



■ **NANOCOLOR®** Iron 3
REF 985037



■ **NANOCOLOR®** Lead 5
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■ **NANOCOLOR®** Manganese 10
REF 985058



■ **NANOCOLOR®** Molybdenum 40
REF 985056



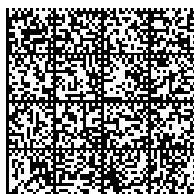
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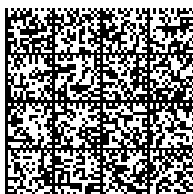
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■ **NANOCOLOR®** Nitrate 8
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■ **NANOCOLOR®** Nitrate 50
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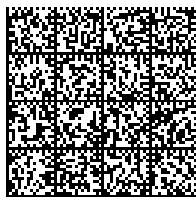


■ **NANOCOLOR®** Nitrate 250
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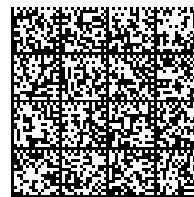
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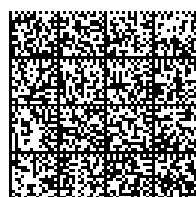
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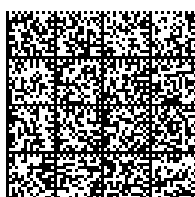
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■ **NANOCOLOR® total Nitrogen TN_b 60**
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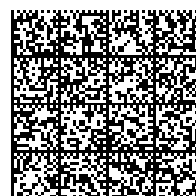
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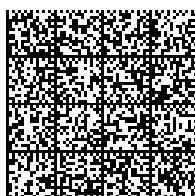
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■ **NANOCOLOR® ortho- and total Phosphate 1**
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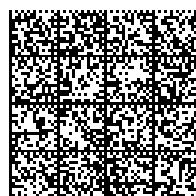
■ **NANOCOLOR® ortho- and total Phosphate 5**
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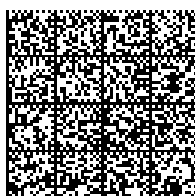
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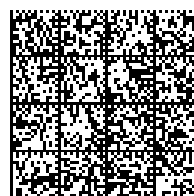
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■ **NANOCOLOR® ortho- and total Phosphate 50**
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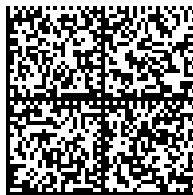
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■ **NANOCOLOR® Peroxide 2**
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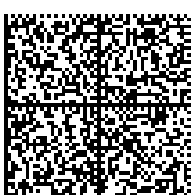
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■ **NANOCOLOR® Potassium 50**
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■ **NANOCOLOR® Residual hardness 1**
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■ **NANOCOLOR® Starch 100**
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■ **NANOCOLOR® Sulfate 1000**
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■ **NANOCOLOR® Sulfate 200**
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■ **NANOCOLOR® Sulfide 3**
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■ **NANOCOLOR® Sulfite 10**
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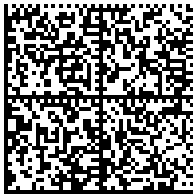


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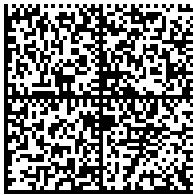


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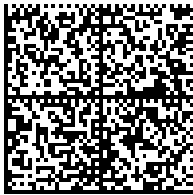
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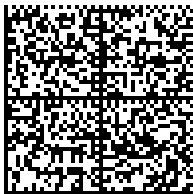
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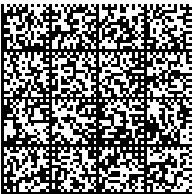
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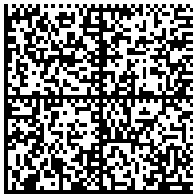
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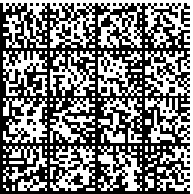
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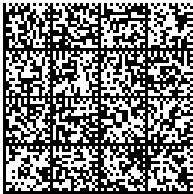
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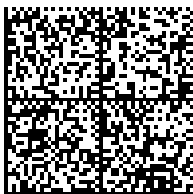
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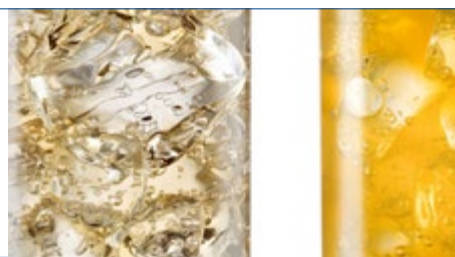


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MACHEREY-NAGEL



MACHEREY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6-8 · 52355 Düren · Germany

DE / International:

Tel.: +49 24 21 969-0

Fax: +49 24 21 969-19

E-mail: info@mn-net.com

CH:

Tel.: +41 62 388 55 00

Fax: +41 62 388 55 05

E-mail: sales-ch@mn-net.com

FR:

Tel.: +33 388 68 22 68

Fax: +33 388 51 76 88

E-mail: sales-fr@mn-net.com

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