MACHEREY-NAGEL

Water Analysis

Rapid Tests

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

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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

1911 Foundation of the company MACHEREY-NAGEL in Dueren, Germany. The first products are special filter papers.

1944 Complete destruction of Dueren in WW2, reconstruction of MACHEREY-NAGEL production facilities after the war.

1952 MACHEREY-NAGEL brings the first products for paper chromatography in the market.

1959 MACHEREY-NAGEL presents the first generation of rapid tests made from impregnated filter papers.

1970 Development of the product line *VISOCOLOR*®. Today this product group comprises more than 500 products for the colorimetric and titrimetric water analysis.

1976 Launch of the photometric analysis system *NANOCOLOR*®. The *NANOCOLOR*® 25 is the first photometer from MACHEREY-NAGEL.

1977 The patent for pH-Fix is submitted. Principle: indicator dyes are chemically bound to the cellulose fibers, which prevents bleeding of the dyes.

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 lifetime of our products, our employees are available for customers and offer advise and support.

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

1984 The MACHEREY-NAGEL branch in Switzerland is founded. Other branches in France (1990) and the USA (1998) followed.

1990 The first seminar was held to MN customers. Nowadays, more than 40 customer seminars are held worldwide every year.

1996 MACHEREY-NAGEL is first time certified according to DIN EN ISO 9001 norms. This is followed by certifications according to FDA (1999) and CE (2003).

2007 The spectrophotometer *NANOCOLOR*® *UV/VIS* is launched. In 2010 the spectrophotometer *NANOCOLOR*® *VIS* follows.

2012 Expansion of the MN facilities in Dueren. Other locations were added in 2013 and 2014, also in Dueren.

2014 The spectrophotometer *NANOCOLOR*® *UV/VIS* II and the compact photometer PF-12*Plus* are launched to the market.

2015 The spectrophotometer *NANOCOLOR*® *VIS* II is launched.

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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.

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.

Measuring ranges

10 mg/L | 100 mg/L | 1000 mg/L | 10000 mg/L

Qualitative test papers

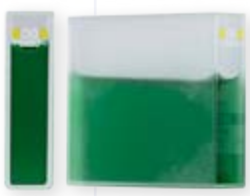
serve to check the presence or absence of chemical compounds. A change in color indicates that the concentration of the tested substance is above the detection limit.

QUANTOFIX® tests trips

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]
PF-3 COD	919 342	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT
PF-3 Drinking Water	919 343	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO
PF-3 Fish	919 345	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO
PF-3 Pool	919 340	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO
PF-3 Soil	919 341	LED filter-photometer	3	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	50	TT, CO
PF-12*Plus*	919 250	Filter-photometer	7 (+ 1)	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	1000	TT, CO
NANOCOLOR® 500 D	919 500	Filter-photometer	10 (+ 2)	± 2 nm	10–12 nm	Plastic foil keyboard	Graphic display	500	TT, ST
NANOCOLOR® *VIS* II	919 650	Spectro-photometer	320–1100 nm	± 1 nm	< 4 nm	Touch screen	HD LCD	5000	TT, ST
NANOCOLOR® *UV/VIS* II	919 600	Spectro-photometer	190–1100 nm	± 1 nm	< 2 nm	Touch screen	HD LCD	5000	TT, ST

[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* / 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
NANOCOLOR® *VARIO Mini*	919 380	6	1	6	–	25 min	70–160 °C	Plastic foil keyboard
NANOCOLOR® *VARIO C2*	919 350	12	1	12	–	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO C2 M*	919 350.1	10	1	8	2	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO 4*	919 300	24	2	24	–	10 min	40–160 °C	Touch screen
NANOCOLOR® *VARIO HC*	919 330	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
Graphic display			■		■		■	■			■		
LCD	■	■	■	■	■			■	■	■		■	
LCD	■	■	■	■	■			■	■	■		■	
LCD	■	■	■	■	■			■	■	■		■	
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

NANOCONTROL NANOTURB

NANOCOLOR® T-Set

NANOCOLOR® 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.

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


B
A
Zink mg/l Zn2+
0
0.5
1
985 096
Test 0-96
NANOCOLOR®
Zink 4
Zinc / Cinc
0.10–4.00 mg/L Zn2+
20 Tests
LOT 96602
EXP 06.2017 A
Made in Germany
MACHEREY-NAGEL
Quantofix
0
2 mg/L
5
10
25
50
100

Parameters A–Z

Acetic acid (CH_3COOH)

See Organic acids (page 40)

Acid binding capacity

See Alkalinity (page 23)

Acid capacity

See Acidity (page 22)

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	915 006

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	913 49

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	908 01
■ Moisture indicator	QT	> 8 % relative humidity	1000	908 901
■ Non-toxic moisture indicator without cobalt chloride	QT	> 8 % relative humidity	1000	908 903

Alcohol

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

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

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	913 23
QUANTOFIX® LubriCheck	HT	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	100	913 36
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	907 52
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	907 59
VISOCOLOR® *alpha* Carbonate hardness	TI	1 drop equals 1.25 °e	100	935 016
VISOCOLOR® *ECO* Alkalinity TA [2)]	CO	5–250 mg/L $CaCO_3$	100	931 204
VISOCOLOR® *ECO* Carbonate hardness	TI	1 drop equals 1.25 °e	100	931 014
VISOCOLOR® *HE* Alkalinity AL 7	TI	0.2–7.2 mmol/L OH^-	200	915 007
VISOCOLOR® *HE* Carbonate hardness C20	TI	0.2–7.2 mmol/L H^+	200	915 003
NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e / 0.4–5.4 mmol/L H^+	20	985 015

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

Aluminum (Al^{3+})

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	907 21
QUANTOFIX® Aluminum	HT	0 · 5 · 20 · 50 · 200 · 500 mg/L Al^{3+}	100	913 07
VISOCOLOR® *ECO* Aluminum	CO	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al^{3+}	50	931 006
NANOCOLOR® Aluminum 07	TT	0.02–0.70 mg/L Al^{3+}	19	985 098
NANOCOLOR® Aluminum	ST	0.01–1.00 mg/L Al^{3+}	250	918 02

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

Parameters A–Z

Ammonia (NH_4^+)

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	907 22
Ammonia test	HT	0 · 0.5 · 1 · 3 · 6 mg/L NH_4^+	25	907 14
QUANTOFIX® Ammonium [3]	HT	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH_4^+	100	913 15
VISOCOLOR® alpha Ammonium	CO	0 · 0.2 · 0.5 · 1 · 2 · 3 mg/L NH_4^+	50	935 012
VISOCOLOR® ECO Ammonium 15 [1]	CO	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH_4^+	50	931 010
VISOCOLOR® ECO Ammonium 3 [1]	CO	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 mg/L NH_4^+	50	931 008
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	920 006
NANOCOLOR® Ammonium 2000	TT	300–1600 mg/L NH_4-N	20	985 002
NANOCOLOR® Ammonium 200	TT	30–160 mg/L NH_4-N	20	985 006
NANOCOLOR® Ammonium 100	TT	4–80 mg/L NH_4-N	20	985 008
NANOCOLOR® Ammonium 50	TT	1–40 mg/L NH_4-N	20	985 005
NANOCOLOR® Ammonium 10	TT	0.2–8.0 mg/L NH_4-N	20	985 004
NANOCOLOR® Ammonium 3	TT	0.04–2.30 mg/L NH_4-N	20	985 003
NANOCOLOR® Ammonium	ST	0.01–2.0 mg/L NH_4-N	100	918 05

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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.

Anionic detergents

See Surfactants (detergents) (page 46)

Antimony (Sb^{3+})

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	907 23

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	985 007

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

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	913 26
■ 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	913 27

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	907 62
■ QUANTOFIX® Arsenic 50	HT	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7· 3.0 mg/L $As^{3+/5+}$	100	913 32
■ QUANTOFIX® Arsenic 10	HT	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L $As^{3+/5+}$	100	913 34
■ 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	913 45

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	913 14

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

Biotoxicity / Bioluminescence

See Toxicity (page 47)

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

Parameters A–Z

Bismuth (Bi^{3+})

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	907 33

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	906 05

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 BOD_5 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	985 825
■ *NANOCOLOR*® BOD_5	TT	2–3000 mg/L O_2	25–50	985 822

Borate (boric acid, BO_3^{3-})

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
■ Tumeric paper	QT	> 20 mg/L B	200	907 47

Bromide (Br^-)

See Chloride (page 27)

Bromine (Br_2)

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	906 03
■ *VISOCOLOR*® *ECO* Bromine [2)]	CO	0.10–13.00 mg/L Br_2	200	931 211
■ with *NANOCOLOR*® Chlorine Tests	TT	See Chlorine (page 28)		

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

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

Cadmium (Cd^{2+})

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	985 014
NANOCOLOR® Cadmium	ST	0.002–0.50 mg/L Cd^{2+}	25	918 131

Calcium (Ca^{2+})

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	913 24
VISOCOLOR® *ECO* Calcium	TI	1 drop equals 5 mg/L Ca^{2+}	100	931 012
VISOCOLOR® *HE* Calcium CA 20	TI	0.1–3.6 mmol/L Ca^{2+}	200	915 010
NANOCOLOR® Hardness 20	TT	10–100 mg/L Ca^{2+}	20	985 043
NANOCOLOR® Hardness Ca/Mg	TT	10–100 mg/L Ca^{2+}	20	985 044

Carbonate hardness

See Hardness (page 34)

Carbonic acid (H_2CO_3)

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	906 08
QUANTOFIX® Chloride	HT	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl^-	100	913 21
VISOCOLOR® *ECO* Chloride [1]	CO	1 · 2 · 4 · 7 · 12 · 20 · 40 · 60 mg/L Cl^-	90	931 018
VISOCOLOR® *HE* Chloride CL 500	CO	5–500 mg/L Cl^-	300	915 004
NANOCOLOR® Chloride 200	TT	5–200 mg/L Cl^-	20	985 019
NANOCOLOR® Chloride 50	TT	0.5–50.0 mg/L Cl^-	20	985 021
NANOCOLOR® Chloride	ST	0.2–125 mg/L Cl^-	250	918 20

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

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

Parameters A–Z

Chlorine (Cl_2)

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 100 200	907 54 907 55 907 56 907 58
Chlortesmo	QT	> 1 mg/L Cl_2	200	906 03
Chlorine test	HT	10 · 50 · 100 · 200 mg/L Cl_2	Reel, 5 m length	907 09
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	907 52
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	907 59
QUANTOFIX® Chlorine	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl_2	100	913 17
QUANTOFIX® Chlorine Sensitive [3]	HT	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl_2	100	913 39
VISOCOLOR® alpha Chlorine	CO	0.25 · 0.5 · 1.0 · 1.5 · 2.0 mg/L Cl_2	150	935 019
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	931 090
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	931 035
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	931 015
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	931 016
VISOCOLOR® ECO Chlorine 6, free and total [2]	CO	0.05–6.00 mg/L Cl_2	200	931 217
VISOCOLOR® ECO free Chlorine 6 [2]	CO	0.05–6.00 mg/L Cl_2	400	931 219
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	920 015
NANOCOLOR® Chlorine / Ozone 2	TT	0.05–2.00 mg/L Cl_2	20	985 017
NANOCOLOR® Chlorine	ST	0.02–10.0 mg/L Cl_2	250	918 16

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / PF-12^{Plus}. Measuring range can differ in photometrical evaluation.
[2] Only photometrically evaluable, with photometers PF-3 and / or PF-12 / PF-12^{Plus}.
[3] Also suitable for evaluation on QUANTOFIX® Relax. Measuring range on QUANTOFIX® Relax can differ from visual range.

Chlorine dioxide (ClO_2)

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	931 021
NANOCOLOR® Chlorine dioxide 5	TT	0.15–5.00 mg/L ClO_2	20	985 018
NANOCOLOR® Chlorine dioxide	ST	0.04–4.00 mg/L ClO_2	50	918 163

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

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

Chlorite (ClO_2^-)

See Chlorine dioxide (page 28)

Chromate / Chromium(VI) (CrO_4^{2-})

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	907 24
QUANTOFIX® Chromate	HT	0 · 3 · 10 · 30 · 100 mg/L CrO_4^{2-}	100	913 01
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	931 020
NANOCOLOR® total Chromium 2	TT	0.005–2.00 mg/L Cr	20	985 059
NANOCOLOR® Chromate 5	TT	0.01–4.0 mg/L CrO_4^{2-}	20	985 024
NANOCOLOR® Chromate	ST	0.01–6.0 mg/L CrO_4^{2-}	250	918 25

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

Cobalt (Co^{2+})

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	907 28
QUANTOFIX® Cobalt	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co^{2+}	100	913 03
NANOCOLOR® Cobalt	ST	0.002–0.70 mg/L Co^{2+}	250	918 51

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

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	985 012
■ *NANOCOLOR*® COD 15000		TT	1000–15000 mg/L O_2	20	985 028
■ *NANOCOLOR*® COD 10000		TT	1000–10000 mg/L O_2	20	985 023
■ *NANOCOLOR*® COD 4000		TT	400–4000 mg/L O_2	20	985 011
■ *NANOCOLOR*® COD 1500	ISO 15705	TT	100–1500 mg/L O_2	20	985 029
■ *NANOCOLOR*® COD 1500 Hg-free		TT	100–1500 mg/L O_2	20	963 029
■ *NANOCOLOR*® COD HR 1500	ISO 15705	TT	20–1500 mg/L O_2	20	985 038
■ *NANOCOLOR*® COD 600	ISO 15705	TT	50–600 mg/L O_2	20	985 030
■ *NANOCOLOR*® COD 300		TT	50–300 mg/L O_2	20	985 033
■ *NANOCOLOR*® COD 160	ISO 15705	TT	15–160 mg/L O_2	20	985 026
■ *NANOCOLOR*® COD 160 Hg–free		TT	15–160 mg/L O_2	20	963 026
■ *NANOCOLOR*® COD LR 150	ISO 15705	TT	3–150 mg/L O_2	20	985 036
■ *NANOCOLOR*® COD 60	ISO 15705	TT	5–60 mg/L O_2	20	985 022
■ *NANOCOLOR*® COD 40	ISO 15705	TT	2–40 mg/L O_2	20	985 027

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	913 36
■ 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	913 38

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

Copper (Cu^{2+})

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	907 29
■ Cuprotesmo	QT	> 5 mg/L $Cu^{+/2+}$ or > 0.05 µg Cu	40	906 01
■ QUANTOFIX® Copper	HT	0 · 10 · 30 · 100 · 300 mg/L Cu^{2+}	100	913 04
■ *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	931 037
■ *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	920 050
■ *NANOCOLOR®* Copper 5	TT	0.10–7.00 mg/L Cu^{2+}	20	985 053
■ *NANOCOLOR®* Copper	ST	0.01–10.0 mg/L Cu^{2+}	250	918 53

[1)] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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	906 04
■ QUANTOFIX® Cyanide	HT	0 · 1 · 3 · 10 · 30 mg/L CN^-	100	913 18
■ *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	931 022
■ *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	920 028
■ *NANOCOLOR®* Cyanide 08	TT	0.005–0.80 mg/L CN^-	20	985 031
■ *NANOCOLOR®* Cyanide	ST	0.001–0.50 mg/L CN^-	250	918 30

[1)] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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	907 10
■ *VISOCOLOR® ECO* Cyanuric acid [1)]	CO	10 · 15 · 20 · 30 · 40 · 60 · 80 · 100 mg/L Cya	100	931 023

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

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

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	931 024
■ *NANOCOLOR*® DEHA 1	TT	0.05–1.00 mg/L DEHA	20	985 035

Detergents

See Surfactants (detergents) (page 46)

Disinfectants

With QUATs as active substance: see Quaternary ammonium complexes (page 43)

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 28)

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	907 51
■ *VISOCOLOR*® *HE* Sulfite SU 100	TI	2–100 mg/L SO_3^{2-}	100	915 008

EDTA (ethylendiaminetetraacetic 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	913 35
■ *NANOCOLOR*® org. Complexing agents 10	TT	0.5–10.0 mg/L I_{BIC} / 0.7–14 mg/L EDTA	10–19	985 052

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	985 838

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

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	907 50
Fluoride test	HT	0 · 2 · 5 · 10 · 20 · 50 · 100 mg/L F^-	30	907 34
VISOCOLOR® *ECO* Fluoride [2]	CO	0.1–2.0 mg/L F^-	150	931 227
NANOCOLOR® Fluoride 2	TT	0.1–2.0 mg/L F^-	20	985 040
NANOCOLOR® Fluoride	ST	0.05–2.00 mg/L F^-	500	918 142

[2] Only photometrically evaluable, with photometers PF-3 and / or PF-12 / 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	913 28
NANOCOLOR® Formaldehyde 10	TT	0.02–10.00 mg/L HCHO	20	985 046
NANOCOLOR® Formaldehyde 8	TT	0.1–8.0 mg/L HCHO	20	985 041

[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 potatoe 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	913 48

[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	913 43

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

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	913 23
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	913 26
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	913 27
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	907 59
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	100	912 01
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	1000	912 23
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	5000	912 21
AQUADUR®	HT	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	50 x 3 pieces	912 902
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	100	912 20
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	1000	912 24
AQUADUR®	HT	< 54 · >72 · > 126 · > 252 · > 378 ppm $CaCO_3$	5000	912 22
AQUADUR®	HT	< 54 · > 72 · > 151.2 · > 252 ppm $CaCO_3$	100	912 39
AQUADUR®	HT	< 54 · >72 · > 151.2 · > 252 · > 378 ppm $CaCO_3$	1000	912 40
AQUADUR® Sensitive	HT	0 · 5.4 · 10.8 · 18.8 ppm $CaCO_3$	100	912 10
VISOCOLOR® alpha Carbonate hardness	TI	1 drop equals 1.25 °e	100	935 016
VISOCOLOR® alpha Total hardness	TI	1 drop equals 1.25 °e	100	935 042
VISOCOLOR® alpha Residual hardness	CO	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	935 080
VISOCOLOR® ECO Carbonate hardness	TI	1 drop equals 1.25 °e	100	931 014
VISOCOLOR® ECO Total hardness	TI	1 drop equals 1.25 °e	110	931 029
VISOCOLOR® HE Carbonate hardness C 20	TI	0.6–25 °e	200	915 003
VISOCOLOR® HE Total hardness H 20 F	TI	0.6–25.0 °e	200	915 005
VISOCOLOR® HE Total hardness H 2	TI	0.06–2.50 °e	200	915 002
NANOCOLOR® Carbonate hardness 15	TT	1.25–18.75 °e	20	985 015
NANOCOLOR® Hardness 20	TT	1.25–25.00 °e	20	985 043
NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e	20	985 044
NANOCOLOR® Residual hardness 1	TT	0.03–1.25 °e	20	985 084

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

Hydrazine (N_2H_4)

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_2H_4	130	931 030
■ *NANOCOLOR*® Hydrazine	ST	0.002–1.50 mg/L N_2H_4	250	918 44

[1)] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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	907 60
■ *NANOCOLOR*® HC 300	TT	0.5–5.6 mg/L HC	20	985 057

Hydrogen cyanide (HCN)

See Cyanide (page 31)

Hydrogen peroxide (H_2O_2)

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
■ Dipyridyl paper (specific for Fe^{2+})	QT	> 2 mg/L Fe^{2+}	200	907 25
■ Iron test paper	QT	> 10 mg/L $Fe^{2+/3+}$	100	907 26
■ QUANTOFIX® Total iron 1000	HT	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L $Fe^{2+/3+}$	100	913 30
■ QUANTOFIX® Total iron 100	HT	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L $Fe^{2+/3+}$	100	913 44
■ *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	931 025
■ *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	931 026
■ *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	920 040
■ *NANOCOLOR*® Iron 3	TT	0.02–3.00 mg/L Fe	20	985 037
■ *NANOCOLOR*® Iron	ST	0.01–15.0 mg/L Fe	250	918 36

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

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

Parameters A–Z

Lactoperoxidase

See Peroxidase (page 41)

Lead (Pb^{2+})

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	906 02
NANOCOLOR® Lead 5	TT	0.10–5.00 mg/L Pb^{2+}	20	985 009
NANOCOLOR® Lead	ST	0.005–1.00 mg/L Pb^{2+}	50	918 101

Luminous bacteria test

See Toxicity (page 47)

Magnesium (Mg^{2+})

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 TI	1 drop equals 1.25 °e 1 drop equals 0.875 °e	110 100	931 029 931 012
NANOCOLOR® Hardness 20	TT	1.25–25.0 °e	20	985 043
NANOCOLOR® Hardness Ca/Mg	TT	1.25–25.0 °e / 5–50 mg/L Mg^{2+}	20	985 044

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	931 038
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	920 055
NANOCOLOR® Manganese 10	TT	0.1–10.0 mg/L Mn	20	985 058
NANOCOLOR® Manganese	ST	0.01–10.0 mg/L Mn	250	918 60

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

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

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	907 48

Methanol (CH_3OH)

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	985 859

Milk

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

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

Molybdenum (Mo^{6+})

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	913 25
■ *NANOCOLOR*® Molybdenum 40	TT	1.0–40.0 mg/L Mo(VI)	20	985 056

Nickel (Ni^{2+})

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	907 30
■ QUANTOFIX® Nickel	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni^{2+}	100	913 05
■ *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	931 040
■ *NANOCOLOR*® Nickel 4	TT	0.10–7.00 mg/L Ni^{2+}	20	985 071
■ *NANOCOLOR*® Nickel	ST	0.01–10.0 mg/L Ni^{2+}	250	918 62

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

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

Parameters A–Z

Nitrate (NO_3^-)

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	906 11
QUANTOFIX® Nitrate 100 [3]	HT	0 · 5 · 10 · 25 · 50 · 75 · 100 mg/L NO_3^-	100	913 51
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	913 13
VISOCOLOR® *alpha* Nitrate	CO	2 · 8 · 15 · 30 · 50 mg/L NO_3^-	100	935 065
VISOCOLOR® *ECO* Nitrate [1]	CO	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO_3^-	110	931 041
NANOCOLOR® Nitrate 250	TT	4–60 mg/L NO_3–N	20	985 066
NANOCOLOR® Nitrate 50	TT	0.3–22.0 mg/L NO_3–N	20	985 064
NANOCOLOR® Nitrate 8	TT	0.30–8.00 mg/L NO_3–N	20	985 065
NANOCOLOR® Nitrate	ST	0.1–30.0 mg/L NO_3–N	100	918 65
NANOCOLOR® Nitrate Z	ST	0.02–1.0 mg/L NO_3–N	500	918 63

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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.

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

Nitrite (NO_2^-)

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 100 200	907 54 907 55 907 56 907 58
■ Nitratesmo	QT	> 10 mg/L NO_3^- or > 5 mg/L NO_2^-	Reel, 5 m length	906 11
■ QUANTOFIX® Nitrite 3000	HT	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO_2^-	100	913 22
■ QUANTOFIX® Nitrite [3]	HT	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	100	913 11
■ 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	913 13
■ 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	913 38
■ *VISOCOLOR® alpha* Nitrite	CO	0.05 · 0.10 · 0.25 · 0.5 · 1.0 mg/L NO_2^-	200	935 066
■ *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	931 044
■ *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	920 063
■ *NANOCOLOR®* Nitrite 4	TT	0.1–4.0 mg/L NO_2-N	20	985 069
■ *NANOCOLOR®* Nitrite 2	TT	0.003–0.460 mg/L NO_2-N	20	985 068
■ *NANOCOLOR®* Nitrite	ST	0.002–0.30 mg/L NO_2-N	250	918 67

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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.

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	970 001
■ BioFix® *N-Tox*	MB	0–100 % inhibition of the oxidation of nitrite	25	970 002

Nitrogen (total, 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	985 088
■ *NANOCOLOR®* total Nitrogen TN_b 60	TT	3–60 mg/L N	20	985 092
■ *NANOCOLOR®* total Nitrogen TN_b 22	TT	0.5–22.0 mg/L N	20	985 083

pH: Products for pH determination / QT: Qualitative test papers / HT: Semi-quantitative test strips / CO: Colorimetric test kits / TI: Titrimetric test kits
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_3COOH	20	985 050

Oxygen (O_2)

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	913 49
■ *VISOCOLOR*® *ECO* Oxygen [1]	CO	0 · 1 · 2 · 3 · 4 · 6 · 8 · 10 mg/L O_2	50	931 088
■ *VISOCOLOR*® *HE* Oxygen SA 10	TI	0.2–10.0 mg/L O_2	100	915 009
■ *NANOCOLOR*® Oxygen 12	TT	0.5–12.0 mg/L O_2	22	985 082

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

Ozone (O_3)

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/m^3 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 100 200	907 54 907 55 907 56 907 58
■ Ozone test (measurement in air)	HT	< 90 · 90–150 · 150–210 · > 210 µg/m^3 O_3 (ozone content in air)	12	907 36
■ *NANOCOLOR*® Chlorine / Ozone 2	TT	0.05–2.00 mg/L O_3	20	985 017
■ *NANOCOLOR*® Ozone	ST	0.01–1.50 mg/L O_3	200	918 85

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

Peracetic acid (CH_3COOOH)

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	913 42
■ QUANTOFIX® Peracetic acid 500 [3]	HT	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	100	913 41
■ QUANTOFIX® Peracetic acid 50 [3]	HT	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	100	913 40

[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	906 05
■ Peroxtesmo KO (for food industry)	QT	Traces of peroxidase	100	906 06
■ Peroxtesmo MI (for dairy industry)	QT	> 3 % raw milk in UHT milk	100	906 27

Peroxide (H_2O_2)

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_2O_2	100	913 33
■ QUANTOFIX® Peroxide 100 [3]	HT	0 · 1 · 3 · 10 · 30 · 100 mg/L H_2O_2	100	913 12
■ QUANTOFIX® Peroxide 25 [3]	HT	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H_2O_2	100	913 19
■ *NANOCOLOR*® Peroxide 2	TT	0.03–2.00 mg/L H_2O_2	10–19	985 871

[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	985 074
■ *NANOCOLOR*® Phenol	ST	0.01–7.0 mg/L phenol	500	918 75

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

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	906 07
Phosphatesmo MI (for dairy industry)	QT	> 0.5 % raw milk in pasteurized milk or > 300 U/L alkaline phosphatase in UHT milk	50	906 12

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	913 20
VISOCOLOR® alpha Phosphate	CO	2 · 5 · 10 · 15 · 20 mg/L PO_4^{3-}	70	935 079
VISOCOLOR® ECO Phosphate [1]	CO	0 · 0.2 · 0.3 · 0.5 · 0.7 · 1 · 2 · 3 · 5 mg/L PO_4-P	80	931 084
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	920 082
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	920 080
NANOCOLOR® ortho- and total Phosphate 50	TT	10.0–50.0 mg/L P	19	985 079
NANOCOLOR® ortho- and total Phosphate 45	TT	5.0–50.0 mg/L P	20	985 055
NANOCOLOR® ortho- and total Phosphate 15	TT	0.30–15.00 mg/L P	20	985 080
NANOCOLOR® ortho- and total Phosphate 5	TT	0.20–5.00 mg/L P	20	985 081
NANOCOLOR® ortho- and total Phosphate 1	TT	0.05–1.50 mg/L P	20	985 076
NANOCOLOR® ortho- and total Phosphate LR 1	TT	0.05–0.50 mg/L P	20	985 095
NANOCOLOR® ortho-Phosphate	ST	0.2–17 mg/L PO_4-P	500	918 78
NANOCOLOR® ortho-Phosphate	ST	0.04–6.5 mg/L PO_4-P	500	918 77

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / 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® alpha pH 5–9	CO	pH: 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0	200	935 075
VISOCOLOR® ECO 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	931 066
VISOCOLOR® ECO pH 6.0–8.2	CO	pH: 6.1–8.4	150	931 270
VISOCOLOR® HE 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	920 074
NANOCOLOR® pH 6.5–8.2	TT	pH: 6.5–8.2	100	918 72

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

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	985 070

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	907 27
■ QUANTOFIX® Potassium	HT	0 · 200 · 400 · 700 · 1000 · 1500 mg/L K^+	100	913 16
■ *VISOCOLOR*® *ECO* Potassium [1)]	CO	2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K^+	60	931 032
■ *NANOCOLOR*® Potassium 50	TT	2–50 mg/L K^+	20	985 045

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

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	907 65

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
■ INDIQUAT	HT	on request		909 000
■ QUANTOFIX® QUAT	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L benzalkonium chloride	100	913 37

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

Parameters A–Z

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	931 033
■ *VISOCOLOR*® *ECO* Silica HR 200 [2]	CO	10–200 mg/L SiO_2	100	931 234
■ *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	920 087
■ *NANOCOLOR*® Silica	ST	0.01–10.0 mg/L Si	250	918 48

[1] Also suitable for photometrical evaluation on photometers PF-3 and / or PF-12 / PF-12^{Plus}. Measuring range can differ in photometrical evaluation.
[2] Only photometrically evaluable, with photometers PF-3 and / or PF-12 / PF-12^{Plus}.

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	907 32
■ Ag-Fix	HT	Silver: 0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag^+ pH: 4 · 5 · 6 · 7 · 8	100	907 41
■ QUANTOFIX® Silver	HT	0 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag^+	100	913 50
■ *NANOCOLOR*® Silver 3	TT	0.20–3.00 mg/L Ag^+	20	985 049

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	985 890

Sperm

See Phosphatase (page 42)

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

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	985 085

Sulfate (SO_4^{2-})

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	913 29
■ *VISOCOLOR*® *ECO* Sulfate	CO	25 · 30 · 35 · 40 · 50 · 60 · 70 · 80 · 100 · 120 · 150 · 200 mg/L SO_4^{2-}	100	931 092
■ *NANOCOLOR*® Sulfate 1000	TT	200–1000 mg/L SO_4^{2-}	20	985 087
■ *NANOCOLOR*® Sulfate 200	TT	10–200 mg/L SO_4^{2-}	20	985 086
■ *NANOCOLOR*® Sulfate LR 200	TT	20–200 mg/L SO_4^{2-}	20	985 062

Sulfide (S^{2-})

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_2S or S^{2-}	Reel, 5 m length Refill pack 100 strips	907 44 907 45 907 46
■ Sulfide test paper	QT	> 5 mg/L H_2S or S^{2-}	Reel, 5 m length	907 61
■ *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	931 094
■ *NANOCOLOR*® Sulfide 3	TT	0.05–3.00 mg/L S^{2-}	20	985 073
■ *NANOCOLOR*® Sulfide	ST	0.01–3.0 mg/L S^{2-}	250	918 88

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

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

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 100 200	907 54 907 55 907 56 907 58
Sulfite test paper	QT	> 10 mg/L Na_2SO_3	100	907 63
QUANTOFIX® Sulfite [3]	HT	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L SO_3^{2-}	100	913 06
VISOCOLOR® ECO Sulfite	TI	1 drop equals 1 mg/L SO_3^{2-}	60	931 095
VISOCOLOR® HE Sulfite SU 100	TI	2–100 mg/L SO_3^{2-}	100	915 008
NANOCOLOR® Sulfite 100	TT	5–100 mg/L SO_3^{2-}	19	985 090
NANOCOLOR® Sulfite 10	TT	0.2–10.0 mg/L SO_3^{2-}	20	985 089

[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	931 050
VISOCOLOR® ECO Detergents, cationic	CO	0 · 1 · 3 · 5 · 10 · 15 · 20 mg/L CTAB	50	931 051
NANOCOLOR® Anionic surfactants 4	TT	0.20–4.00 mg/L MBAS	20	985 032
NANOCOLOR® Cationic surfactants 4	TT	0.20–4.00 mg/L CTAB	20	985 034
NANOCOLOR® Nonionic surfactants 15	TT	0.3–15.0 mg/L Triton® X–100	20	985 047
NANOCOLOR® Detergents, anionic	ST	0.02–5.0 mg/L MBAS	40	918 32
NANOCOLOR® Detergents, cationic	ST	0.05–5.0 mg/L CTAB	100	918 34

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	985 091

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

Tin (Sn^{2+})

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	913 09
■ *NANOCOLOR*® Tin 3	TT	0.10–3.00 mg/L Sn	18	985 097

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 600	TT	40–600 mg/L C	10	985 099
■ *NANOCOLOR*® TOC 60	TT	10–60 mg/L C	10	985 094
■ *NANOCOLOR*® TOC 25	TT	2.0–25.0 mg/L C	10	985 093
■ *NANOCOLOR*® TOC 300	TT	20–300 mg/L C	20	985 078
■ *NANOCOLOR*® TOC 30	TT	2.0–30.0 mg/L C	20	985 075

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	913 52

[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 44)

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

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 (H_2O)

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	907 42
Waterfinder test paper	QT	Traces of water in non-polar solvents	Reel, 7 m length	906 30
Watesmo	QT	Traces of water in non-polar solvents	Reel, 5 m length	906 09
Wator	QT	Traces of water in butter	50	906 10

Water hardness

See Hardness (page 34)

Zinc (Zn^{2+})

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	913 10
VISOCOLOR® ECO Zinc [1)]	CO	0 · 0.5 · 1 · 2 · 3 mg/L Zn^{2+}	120	931 098
NANOCOLOR® Zinc 4	TT	0.10–4.00 mg/L Zn^{2+}	20	985 096
NANOCOLOR® Zinc	ST	0.02–3.0 mg/L Zn^{2+}	250	918 95

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

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

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	907 21
■ *NANOCOLOR*® Zirconium 100	TT	5–100 mg/L Zr	20	985 001

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

Test papers and test strips

pH tests

pH-Fix 52
PEHANON® 56
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


Quantofix
0
0
10
1 mg/L
25
5
50
10
100
20
250
40
500
80
LOT
313538
MN
Since 1911
MACHEREY-NAGEL
REF 921 10
pH-Fix 0–14
100 farbfixierte Indikatorstäbch
100 color-fixed indicator strips
100 indicateurs à couleurs fixé
0 1 2 3 4 5 6 7
00ml
80
60
40
20

pH-Fix

Unmatched pH test strips

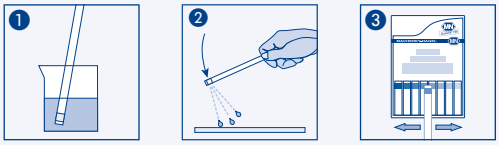
For many years untrained users as well as analytical professionals appreciate the experience of easy pH testing with pH-Fix. In contrast to common indicator papers, the indicator dyes in pH-Fix test strips are chemically bound to the test pads. This patented technology prevents bleeding of the dyes and 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



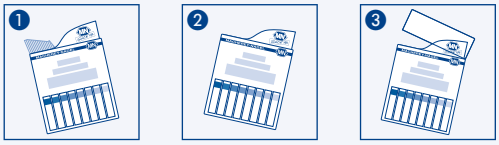
Dip in | Shake off | Read result

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



Remove strip | Hold box diagonally | Close easily

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). They meet the special demands of health care processionals and ensure safe results for medical pH testing.

Automatic evaluation with the QUANTOFIX® Relax

The strip reader QUANTOFIX® Relax (see page 144) 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 please 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® Realx (see page 144)

pH-Fix

Ordering information

Test	REF	Measuring range (visual)	Measuring range (instrumental) [1]
0–14	921 10	0 · 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12 · 13 · 14	1–13
0.0–6.0	921 15	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	921 18	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	921 20	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	921 22	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	921 25	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	921 80	0.3 · 0.7 · 1.0 · 1.3 · 1.6 · 1.9 · 2.3	–
1.7–3.8	921 90	1.7 · 2.0 · 2.3 · 2.6 · 2.9 · 3.2 · 3.5 · 3.8	–
3.1–8.3	921 35	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	921 30	3.6 · 4.1 · 4.4 · 4.7 · 5.0 · 5.3 · 5.6 · 6.1	3.6–6.1
4.0–7.0	921 37	4.0 · 4.4 · 4.7 · 5.0 · 5.3 · 5.5 · 5.8 · 6.1 · 6.5 · 7.0	–
5.1–7.2	921 40	5.1 · 5.4 · 5.7 · 6.0 · 6.3 · 6.6 · 6.9 · 7.2	–
6.0–7.7	921 50	6.0 · 6.4 · 6.7 · 7.0 · 7.3 · 7.7	6.0–7.7
7.5–9.5	921 60	7.5 · 7.9 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.5	–
7.9–9.8	921 70	7.9 · 8.3 · 8.6 · 8.9 · 9.1 · 9.4 · 9.8	–
0–14 PT	921 11	0 · 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12 · 13 · 14	1–13
3.6–6.1 PT	921 31	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	921 21	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	QUANTOFIX® Relax	Classic flat box	PlopTop tube	CE / urine	CE / gastric juice	CE / saliva	CE / vaginal secretion	CE / dialysis	Test
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

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	904 01	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11 · 12	200	3 years
pH 0–1.8	904 11	0 · 0.3 · 0.6 · 0.8 · 1.0 · 1.2 · 1.5 · 1.8	200	3 years
pH 1.0–2.8	904 12	1.0 · 1.3 · 1.6 · 1.8 · 2.0 · 2.2 · 2.5 · 2.8	200	3 years
pH 1.8–3.8	904 13	1.8 · 2.1 · 2.4 · 2.7 · 3.0 · 3.2 · 3.5 · 3.8	200	3 years
pH 2.8–4.6	904 14	2.8 · 3.1 · 3.4 · 3.6 · 3.8 · 4.0 · 4.3 · 4.6	200	3 years
pH 3.8–5.5	904 15	3.8 · 4.0 · 4.2 · 4.4 · 4.6 · 4.9 · 5.2 · 5.5	200	3 years
pH 4.0–9.0	904 24	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	904 16	5.2 · 5.5 · 5.7 · 5.9 · 6.1 · 6.3 · 6.5 · 6.8	200	3 years
pH 6.0–8.1	904 17	6.0 · 6.3 · 6.6 · 6.9 · 7.2 · 7.5 · 7.8 · 8.1	200	3 years
pH 7.2–8.8	904 19	7.2 · 7.4 · 7.6 · 7.8 · 8.0 · 8.2 · 8.5 · 8.8	200	3 years
pH 8.0–9.7	904 20	8.0 · 8.2 · 8.4 · 8.6 · 8.8 · 9.1 · 9.4 · 9.7	200	3 years
pH 9.5–12.0	904 21	9.5 · 10.0 · 10.5 · 11.0 · 11.5 · 12.0	200	3 years
pH 10.5–13.0	904 22	10.5 · 11.0 · 11.5 · 12.0 · 12.5 · 13.0	200	3 years
pH 12.0–14.0	904 23	12.0 · 12.5 · 13.0 · 13.5 · 14.0	200	3 years

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	902 01	902 02	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	902 03	–	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9 · 10 · 11	Booklet with 100 strips 10 x 70 mm	3 years
pH 1–14	902 04	902 24	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	902 05	902 25	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	902 06	902 26	< 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	902 07	902 27	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	902 08	902 28	< 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	902 09	902 29	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	902 10	902 30	< 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	902 11	902 31	< 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	902 12	902 32	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	902 13	902 33	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	902 14	902 34	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	903 01	903 11	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	903 02	903 12	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	903 03	903 13	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	903 04	903 14	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	903 05	903 15	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	903 06	903 16	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
■ pH-Set D10	903 19	–	–	Box with 10 reels of Duotest	3 years

refill: Refill pack

Tritest

Test	REF	REF refill	Measuring range	Presentation	Shelf life
■ pH 1–11	905 01	905 02	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	905 10	905 11	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	907 01	–	yellow → red / 6.7–7.9	Box of 200 strips 20 x 70 mm	3 years	
Congo paper MN 816 N	907 02	907 03	red → blue / 5.0–3.0	Reel of 5 m length and 7 mm width	3 years	■
Congo paper MN 616 T	907 04	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	3 years	■
Congo paper MN 260 HE	907 05	–	red → blue / 5.0–3.0	Box of 200 strips 20 x 70 mm	3 years	■
Litmus paper blue	911 06	911 16	blue → red / 8.0–5.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper blue	911 26	–	blue → red / 8.0–5.0	Booklet of 100 strips 10 x 70 mm	3 years	
Litmus paper neutral	911 07	911 17	red → violet-blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper neutral	911 27	–	red → violet-blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
Litmus paper red	911 08	911 18	red → blue / 5.0–8.0	Reel of 5 m length and 7 mm width	3 years	
Litmus paper red	911 28	–	red → blue / 5.0–8.0	Booklet of 100 strips 10 x 70 mm	3 years	
Nitrazine yellow paper	907 11	–	yellow → blue-violet / 6.0–7.0	Box of 200 strips 20 x 70 mm	3 years	
Phenolphthalein paper	907 12	907 13	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	910 02	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	910 31	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	910 39	–	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 processionals and ensure safe results in the medical field.

Quantitative, documented results with QUANTOFIX® Relax

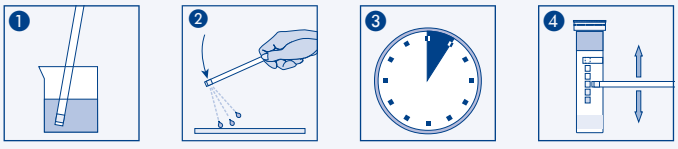
The strip reader QUANTOFIX® Relax (see page 144) provides objective and quantitative results for many important parameters (see page 62). Measurement data including time, date and sample ID are printed and stored and can be transmitted to an information system. This allows the rapid and reliable documentation of test results, which proved to be especially useful for QC departments.

Good to know

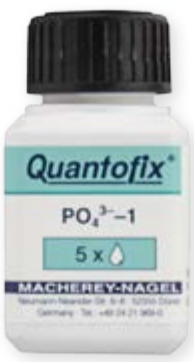
Many customers receive our QUANTOFIX® test strips as OEM product.

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 144).

QUANTOFIX®

Ordering information

Test	REF	Measuring range (visual)	Measuring range (instrumental) [1]	Number of tests
Active oxygen	913 49	0 · 4 · 8 · 15 · 25 mg/L KMPS	–	100
Aluminum	913 07	0 · 5 · 20 · 50 · 200 · 500 mg/L Al^{3+}	–	100
Ammonium	913 15	0 · 10 · 25 · 50 · 100 · 200 · 400 mg/L NH_4^+	10–350 mg/L NH_4^+	100
Arsenic 10	913 34	0 · 0.01 · 0.025 · 0.05 · 0.1 · 0.5 mg/L $As^{3+/5+}$	–	100
Arsenic 50	913 32	0 · 0.05 · 0.1 · 0.5 · 1.0 · 1.7 · 3.0 mg/L $As^{3+/5+}$	–	100
Arsenic Sensitive	913 45	0 · 0.005 · 0.01 · 0.025 · 0.05 · 0.1 · 0.25 · 0.5 mg/L $As^{3+/5+}$	–	100
Ascorbic acid	913 14	0 · 50 · 100 · 200 · 300 · 500 · 700 · 1000 · 2000 mg/L vitamin C	25–1000 mg/L vitamin C	100
Calcium	913 24	0 · 10 · 25 · 50 · 100 mg/L Ca^{2+}	–	60
Carbonate hardness	913 23	0 · 3.8 · 7.5 · 12.5 · 18.8 · 25.0 °e	–	100
Chloride	913 21	0 · 500 · 1000 · 1500 · 2000 · ≥ 3000 mg/L Cl^-	–	100
Chlorine	913 17	0 · 1 · 3 · 10 · 30 · 100 mg/L Cl_2	–	100
Chlorine Sensitive	913 39	0 · 0.1 · 0.5 · 1 · 3 · 10 mg/L Cl_2	0.1–10 mg/L Cl_2	100
Chromate	913 01	0 · 3 · 10 · 30 · 100 mg/L CrO_4^{2-}	–	100
Cobalt	913 03	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Co^{2+}	–	100
Copper	913 04	0 · 10 · 30 · 100 · 300 mg/L $Cu^{+/2+}$	–	100
Cyanide	913 18	0 · 1 · 3 · 10 · 30 mg/L CN^-	–	100
EDTA	913 35	0 · 100 · 200 · 300 · 400 mg/L EDTA	–	100
Formaldehyde	913 28	0 · 10 · 20 · 40 · 60 · 100 · 200 mg/L HCHO	10–200mg/L HCHO	100
Glucose	913 48	0 · 50 · 100 · 250 · 500 · 1000 · 2000 mg/L glucose	50–2000 mg/L glucose	100
Glutaraldehyde	913 43	0 · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 % glutaraldehyde	–	100
LubriCheck	913 36	0 · 15 · 50 · 75 · 130 · 200 mmol/L KOH	–	100
Molybdenum	913 25	0 · 5 · 20 · 50 · 100 · 250 mg/L Mo^{6+}	–	100
Nickel	913 05	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L Ni^{2+}	–	100
Nitrate 100	913 51	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	913 13	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	913 11	0 · 1 · 5 · 10 · 20 · 40 · 80 mg/L NO_2^-	0.5–80 mg/L NO_2^-	100
Nitrite 3000	913 22	0 · 0.1 · 0.3 · 0.6 · 1 · 2 · 3 g/L NO_2^-	–	100
Nitrite / pH	913 38	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	913 40	0 · 5 · 10 · 20 · 30 · 50 mg/L peracetic acid	5–50 mg/L peracetic acid	100
Peracetic acid 500	913 41	0 · 50 · 100 · 200 · 300 · 400 · 500 mg/L peracetic acid	50–500 mg/L peracetic acid	100
Peracetic acid 2000	913 42	0 · 500 · 1000 · 1500 · 2000 mg/L peracetic acid	500–2000 mg/L peracetic acid	100
Peroxide 25	913 19	0 · 0.5 · 2 · 5 · 10 · 25 mg/L H_2O_2	0.5–25 mg/L H_2O_2	100
Peroxide 100	913 12	0 · 1 · 3 · 10 · 30 · 100 mg/L H_2O_2	1–100 mg/L H_2O_2	100
Peroxide 1000	913 33	0 · 50 · 150 · 300 · 500 · 800 · 1000 mg/L H_2O_2	50–1000 mg/L H_2O_2	100
Phosphate	913 20	0 · 3 · 10 · 25 · 50 · 100 mg/L PO_4^{3-}	3–80 mg/L PO_4^{3-}	100
Potassium	913 16	0 · 200 · 400 · 700 · 1000 · 1500 mg/L K^+	–	100
QUAT	913 37	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	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-xylenolorange	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

QUANTOFIX®

Test	REF	Measuring range (visual)	Measuring range (instrumental) [1]	Number of tests
■ Silver	913 50	0 · 1 · 2 · 3 · 5 · 7 · 10 g/L Ag^+	–	100
■ Sulfate	913 29	< 200 · > 400 · > 800 · > 1200 · > 1600 mg/L SO_4^{2-}	–	100
■ Sulfite	913 06	0 · 10 · 25 · 50 · 100 · 250 · 500 · 1000 mg/L SO_3^{2-}	10–500 mg/L SO_3^{2-}	100
■ Tin	913 09	0 · 10 · 25 · 50 · 100 · 250 · 500 mg/L Sn^{2+}	–	100
■ Total acid	913 53	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	913 44	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L $Fe^{2+/3+}$	–	100
■ Total iron 1000	913 30	0 · 5 · 20 · 50 · 100 · 250 · 500 · 1000 mg/L $Fe^{2+/3+}$	–	100
■ Total sugar	913 52	0 · 55 · 100 · 250 · 400 · 600 · 800 mg/L fructose / glucose	55–700 mg/L fructose / glucose	100
■ Zinc	913 10	0 · 2 · 5 · 10 · 25 · 50 · 100 mg/L Zn^{2+}	–	100
■ Nitrate test sets	913 918	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	913 26 913 27	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 · 25.0 °e pH: 6.4 · 6.8 · 7.2 · 7.6 · 8.0 · 8.4	–	100 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
2.5 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
1 year at 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 $CaCO_3$ – very soft water
- 50–120 ppm $CaCO_3$ – soft water
- 120–240 ppm $CaCO_3$ – medium hard water
- 240–360 ppm $CaCO_3$ – hard water
- Above 360 ppm $CaCO_3$ – very hard water

Ordering information

Test	REF	Measuring range	Presentation
Ag-Fix for silver in fixing baths	907 41	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	907 14	0 · 0.5 · 1 · 3 · 6 mg/L NH_4^+	Box of 25 test strips 7 x 60 mm
AQUADUR® 4–14, box	912 39	< 54 · > 72 · > 151.2 · > 252 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 4–21, box	912 20	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 4–21, bulk	912 22	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	Pack of 5000 test strips without scale
AQUADUR® 4–21, individually sealed	912 24	< 54 · > 72 · > 126 · > 252 · > 378 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 4–21, individually sealed	912 40	< 54 · > 72 · > 151.2 · > 252 · > 378 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 5–25, box	912 01	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
AQUADUR® 5–25, bulk	912 21	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Pack of 5000 test strips without scale
AQUADUR® 5–25, individually sealed	912 23	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	1000 test strips, individually sealed with scale
AQUADUR® 5–25, test sets	912 902	< 54 · > 90 · > 180 · > 270 · > 360 · > 450 ppm $CaCO_3$	Sets of 3 individually sealed test strips, pack of 50 sets
AQUADUR® Sensitive, box	912 10	0 · 5.4 · 10.8 · 18.8 ppm $CaCO_3$	Box of 100 test strips 6 x 95 mm
Chlorine test	907 09	10 · 50 · 100 · 200 mg/L Cl_2	Reel of 5 m length and 10 mm width
Cyanuric acid test (swimming pools)	907 10	0 · 50 · 100 · 150 · 300 mg/L Cya	Box of 25 test strips 6 x 95 mm
Fluoride test	907 34	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	908 01	20 · 30 · 40 · 50 · 60 · 70 · 80 % rel. humidity	Pack of 12 adhesive labels 50 x 100 mm
Moisture indicator	908 901	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
Non-toxic moisture indicator without cobalt chloride	908 903	8 % rel. humidity	Pack of 1000 pcs 60 x 35 mm
Ozone test (air)	907 36	< 90 · 90–150 · 150–210 · > 210 µg/m^3 O_3	Box of 12 test strips 10 x 95 mm
Saltesmo (halide ions)	906 08	0 · 0.25 · 0.5 · 1 · 2 · 3 · 4 · 5 g/L NaCl	Box of 30 test discs
Swimming pool test 3 in 1	907 52	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	907 59	like 907 52, 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	907 21	Aluminum ions (Al^{3+})	Box of 100 strips 20 x 70 mm
Ammonium test paper	907 22	Ammonia, ammonium ions (NH_3, NH_4^+)	Box of 200 strips 20 x 70 mm
Antimony test paper	907 23	Antimony ions (Sb^{3+})	Box of 200 strips 20 x 70 mm
AQUATEC test strips	907 42	Water on the bottom of fuel tanks	Box of 100 strips 10 x 200 mm
Arsenic test paper	907 62	Arsenic, arsine (As, AsH_3)	Box of 200 strips 20 x 70 mm
Bismuth test paper	907 33	Bismuth ions (Bi^{3+})	Box of 200 strips 20 x 70 mm
Chlortesmo	906 03	Chlorine, free halogens	Box of 200 strips 20 x 70 mm
Chromium test paper	907 24	Chromium, chromate (Cr(VI) CrO_4^{2-})	Box of 200 strips 20 x 70 mm
Cobalt test paper	907 28	Cobalt ions (Co^{2+})	Box of 200 strips 20 x 70 mm
Copper test paper	907 29	Copper(II) ions (Cu^{2+})	Box of 200 strips 20 x 70 mm
Cuprotesmo	906 01	Copper ions (Cu, Cu^+, Cu^{2+})	Box of 40 sheets 40 x 25 mm
Cyantesmo	906 04	Cyanide, hydrocyanic acid (CN^-, HCN)	Reel of 5 m length and 10 mm width
Dipyridyl paper	907 25	Iron(II) ions (Fe^{2+})	Box of 200 strips 20 x 70 mm
Fluoride test paper	907 50	Fluoride, hydrofluoric acid (F^-, HF)	Box of 200 strips 20 x 70 mm
Indanthrene yellow paper	907 51	Vat dyes, end-point of conversion	Box of 200 strips 20 x 70 mm
Indipro	907 65	Protein residues	Box of 60 test strips 10 x 95 mm and additional reagents
Iron test paper	907 26	Iron ions (Fe^{2+}, Fe^{3+})	Box of 100 strips 20 x 70 mm
Lead acetate paper	907 44	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Reel of 5 m length and 7 mm width
Lead acetate paper	907 45	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Refill pack with 3 reels
Lead acetate paper	907 46	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Booklet of 100 strips 10 x 70 mm
Mercury bromide paper	907 62	Arsenic, arsine (As, AsH_3)	Box of 200 strips 20 x 70 mm
Nickel test paper	907 30	Nickel(II) ions (Ni^{2+})	Box of 200 strips 20 x 70 mm
Nitratesmo	906 11	Nitrate and nitrite (NO_3^-, NO_2^-)	Reel of 5 m length and 10 mm width

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

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

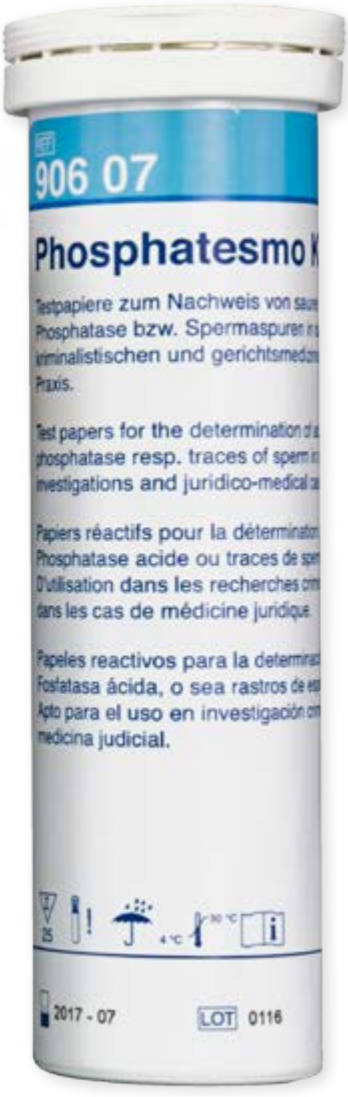
Test papers without color chart

Test	REF	Determination of	Presentation
Oil test paper	907 60	Oil in water and soil	Box of 100 strips 20 x 70 mm
Peroxtesmo KM	906 05	Blood traces (peroxidase)	Box of 25 test papers 15 x 30 mm
Peroxtesmo KO	906 06	Peroxidase in food	Box of 100 test papers 15 x 15 mm
Peroxtesmo MI	906 27	Peroxidase in milk	Box of 100 test papers 15 x 15 mm
Phosphatesmo KM	906 07	Sperm, acid phosphatase	Box of 25 test papers 15 x 30 mm
Phosphatesmo MI	906 12	Alkaline phosphatase in milk	Box of 50 test strips 10 x 95 mm
Plumbtesmo	906 02	Lead, lead ions (Pb, Pb^{2+})	Box of 40 sheets 40 x 25 mm
Potassium iodate starch paper	907 53	Nitrous acid, sulfur dioxide	Reel of 5 m length and 7 mm width
Potassium iodide starch paper	907 54	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	907 55	Nitrite ions, nitrous acid, ozone, chlorine (NO_2^-, HNO_2, O_3, Cl_2)	Refill pack with 3 reels
Potassium iodide starch paper	907 56	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	907 58	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	907 27	Potassium ions (K^+)	Box of 200 strips 20 x 70 mm
Silver test paper	907 32	Silver ions (Ag^+)	Box of 200 strips 20 x 70 mm
Sulfide test paper	907 61	Hydrogen sulfide, sulfide ions (H_2S, S^{2-})	Reel of 5 m length and 7 mm width
Sulfite test paper	907 63	Hydrogen sulfide, sulfite ions (SO_2, SO_3^{2-})	Box of 100 strips 20 x 70 mm
Tumeric paper	907 47	Boric acid, borates (H_3BO_3, BO_3^{3-})	Box of 200 strips 20 x 70 mm
Udder test paper	907 48	Mastitis	20 sheets 90 x 140 mm in PE bag
Waterfinder test paper	906 30	Water in organic solutions	Reel of 7 m length and 14 mm width
Watesmo	906 09	Water in organic solutions	Reel of 5 m length and 10 mm width
Wator	906 10	Water distribution in butter	Box of 50 sheets 78 x 40 mm
Zirconium test paper	907 21	Zirconium ions (Zr^{4+})	Box of 100 strips 20 x 70 mm

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

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		Phosphatesmo MI
5 mg/L Pb^{2+}	15 month		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_2SO_3	2 years		Sulfite test paper
20 mg/L B / 100 mg/L H_3BO_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		Wator
20 mg/L Zr^{4+}	2 years		Zirconium test paper



Visual test kits

VISOCOLOR®

VISOCOLOR® alpha 74
VISOCOLOR® ECO 76
VISOCOLOR® HE 80
VISOCOLOR® accessories 82


Visocolor HE
NH4-1
10 x
MACHEREY-NAGEL
Visocolor HE
NH4-2
1 x
MACHEREY-NAGEL
0.0
0.02
0.04
0.07
0.20
0.30
0.40

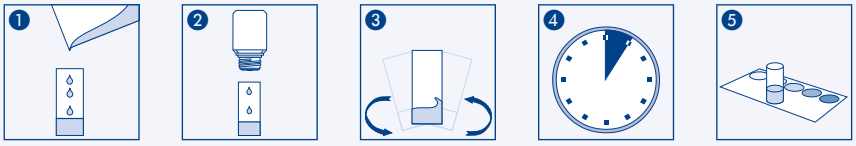
VISOCOLOR® alpha

Colorimetric and titrimetric test kits

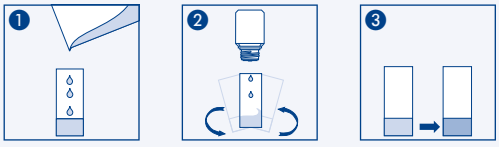
VISOCOLOR® alpha is the most simple version of colorimetric and titrimetric test kits. These tests are suitable for visual evaluation only and are very convenient in performance, because of the used multicomponent reagents. Therefore, the test kits are limited in precision and accuracy but represent 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



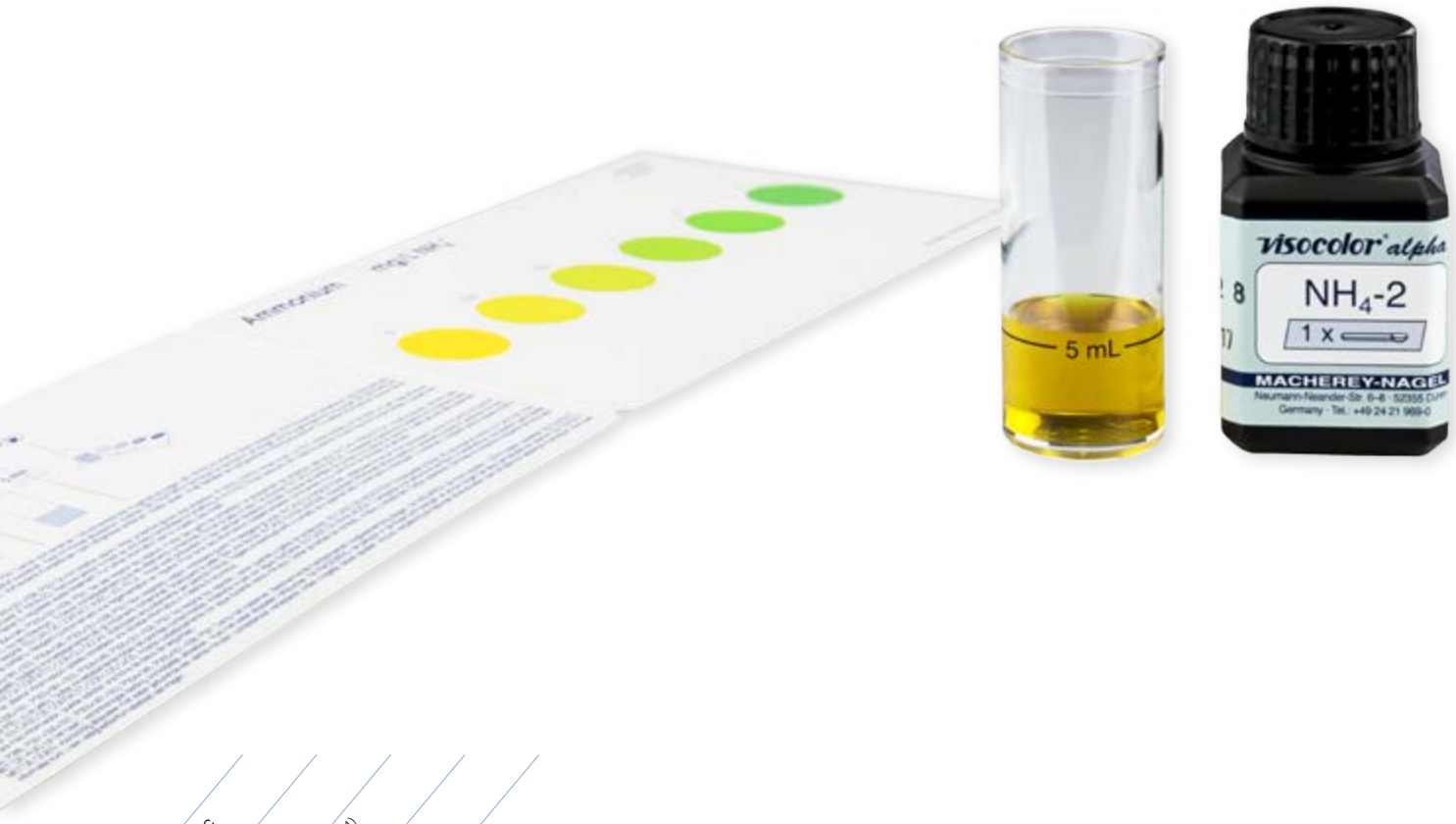
Titrimetric



Ordering information

Test	REF	Measuring range	Number of tests	Shelf life	Method
Ammonium	935 012	0 · 0.2 · 0.5 · 1 · 2 · 3 mg/L NH_4^+	50	1.5 years	Indophenol
Carbonate hardness	935 016	1 drop equals 1.25 °e	100	1.5 years	Mixed indicator
Chlorine, free	935 019	0.25 · 0.5 · 1.0 · 1.5 · 2.0 mg/L Cl_2	150	1.5 years	DPD
Nitrate	935 065	2 · 8 · 15 · 30 · 50 mg/L NO_3^-	100	1.5 years	Azo dye
Nitrite	935 066	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	935 075	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	935 079	2 · 5 · 10 · 15 · 20 mg/L PO_4^{3-}	70	2 years	Molybdenum phosphorous blue
Residual hardness	935 080	0.00 · 0.05 · 0.10 · 0.19 · 0.38 °e	200	1 year	Mixed indicator
Total hardness	935 042	1 drop equals 1.25 °e	100	1.5 years	Complexometric titration

[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.



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

VISOCOLOR® *ECO*

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 118) and PF-12^{Plus} (see page 122). This enables a quantitative evaluation of the test kit.

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

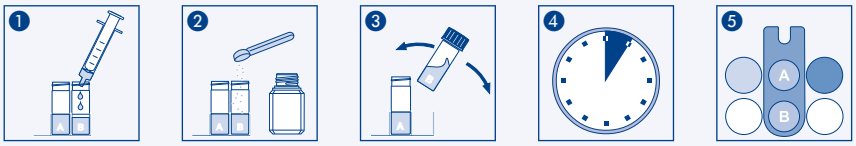
All *VISOCOLOR*® *ECO* test kits are delivered in a practical cardboard box with plastic inlay and easy to understand instruction manual. In addition, pictogram instructions can be downloaded for every test kit on the MACHEREY-NAGEL website.

Good to know

Most *VISOCOLOR*® *ECO* tests can also be evaluated photometrically on the compact photometers PF-3 and PF-12^{Plus}.

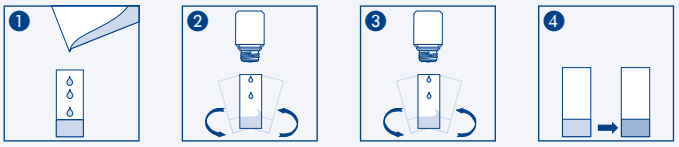
How it's done

Colorimetric



1 Fill the sample · 2 Add reagent · 3 Mix · 4 Wait · 5 Analyze

Titrimetric



1 Fill the sample · 2 Add indicator · 3 Add titration solution and mix · 4 Color change

Ordering information

Test	REF	REF refill	Measuring range (visual)	Measuring range (photometric) [4]	Number of tests
■ Alkalinity TA	–	931 204	–	0.4–17.5 °e / 5–250 mg/L $CaCO_3$	100
■ Aluminum	931 006	931 206	0 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 · 0.50 mg/L Al^{3+}	–	50
■ Ammonium 3	931 008	931 208	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	931 010	931 210	0 · 0.5 · 1 · 2 · 3 · 5 · 7 · 10 · 15 mg/L NH_4^+	0.5–8.0 mg/L NH_4^+	50
■ Bromine	–	931 211	–	0.10–13.00 mg/L Br_2	200
■ Calcium	931 012	–	1 drop equals 5 mg/L Ca^{2+}	–	100
■ Carbonate hardness	931 014	–	1 drop equals 1.25 °e	–	100
■ Chloride	931 018	931 218	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 is required.
[3] Additionally required with first order: Oxygen sample bottle, REF 915 498.
[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

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

VISOCOLOR® ECO

Test	REF	REF refill	Measuring range (visual)	Measuring range (photometric) [4]	Number of tests
■ Chlorine 1, free + total	931 035	931 235	< 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	931 016	931 216	< 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	931 015	931 215	< 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	–	931 219	–	0.05–6.00 mg/L Cl_2	400
■ Chlorine 6, free + total	–	931 217	–	0.05–6.00 mg/L Cl_2	200
■ Chlorine dioxide	931 021	931 221	< 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)	931 020	931 220	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	931 037	931 237	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	931 022	931 222	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	931 023	931 223	10 · 15 · 20 · 30 · 40 · 60 · 80 · 100 mg/L Cya	10–100 mg/L Cya	100
■ DEHA	931 024	931 224	0 · 0.01 · 0.03 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 mg/L DEHA	–	125
■ Detergents, anionic	931 050	931 250	0.1 · 0.25 · 0.5 · 1.0 · 2.0 · 5.0 mg/L MBAS	–	50
■ Detergents, cationic	931 051	931 251	0 · 1 · 3 · 5 · 10 · 15 · 20 mg/L CTAB	–	50
■ Fluoride	–	931 227	–	0.1–2.0 mg/L F^-	150
■ Hydrazine	931 030	931 230	0 · 0.05 · 0.10 · 0.15 · 0.20 · 0.25 · 0.30 · 0.40 mg/L N_2H_4	0.05–0.40 mg/L N_2H_4	130
■ Iron 1	931 025	931 225	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	931 026	931 226	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	931 038	931 238	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	931 040	931 240	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	931 041	931 241	0 · 1 · 3 · 5 · 10 · 20 · 30 · 50 · 70 · 90 · 120 mg/L NO_3^-	4–60 mg/L NO_3^-	110
■ Nitrite	931 044	931 244	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]	931 088	931 288	0 · 1 · 2 · 3 · 4 · 6 · 8 · 10 mg/L O_2	1–8 mg/L O_2	50
■ pH 4.0–9.0	931 066	931 266	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	–	931 270	–	pH 6.1–8.4	150
■ Phosphate	931 084	931 284	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	931 032	931 232	2 · 3 · 4 · 6 · 8 · 10 · 15 mg/L K^+	2–25 mg/L K^+	60
■ Silica	931 033	931 233	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	–	931 234	–	10–200 mg/L SiO_2 [2]	100
■ Sulfate	931 092	931 292	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	931 094	931 294	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	931 095	–	1 drop equals 1 mg/L SO_3^{2-}	–	60
■ Swimming pool	931 090	931 290	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	931 029	–	1 drop equals 1.25 °e	–	110
■ Zinc	931 098	931 298	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 is required.
[3] Additionally required with first order: Oxygen sample bottle, REF 915 498.
[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	Formaldoxime	■					■		■	■	Manganese
1.5 years	Dimethylglyoxime	■					■		■	■	Nickel
1.5 years	Azo dye	■		■		■	■		■		Nitrate
1.5 years	Sulfanilic acid / 1-naphthylamine	■		■			■		■		Nitrite
1 year	Winkler	■		■			■		■	■	Oxygen [3]
3 years	Mixed inidicator						■		■	■	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	Silicomolybdenum blue	■	■		■		■		■	■	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

VISOCOLOR® *HE*

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.

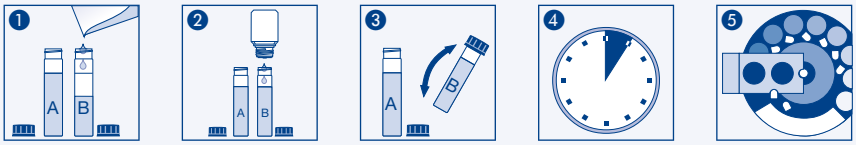
Ordering information

Test	REF	REF refill	Measuring range	Number of tests	Shelf life
Acidity AC 7 (base capacity)	915 006	915 206	0.2–7.2 mmol/L H^+ (1 syringe filling)	200	2 years
Alkalinity AL 7 (acid capacity)	915 007	915 207	0.2–7.2 mmol/L OH^- (1 syringe filling)	200	2 years
Ammonium	920 006	920 106	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	915 010	915 210	0.6–25.0 °e / 0.1–3.6 mmol/L Ca^{2+} (1 syringe filling)	200	2 years
Carbonate hardness C 20	915 003	915 203	0.6–25.0 °e / 0.2–7.2 mmol/L H^+ (1 syringe filling)	200	2 years
Chloride CL 500	915 004	915 204	5–500 mg/L Cl^- (1 syringe filling)	300	2 years
Chlorine, free + total	920 015	920 115	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	920 050	920 150	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	920 028	920 128	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	920 040	920 140	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	920 055	920 155	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	920 063	920 163	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	915 009	915 209	0.2–10.0 mg/L O_2 (1 syringe filling)	100	1.5 years
pH 4.0–10.0	920 074	920 174	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	920 082	920 182	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)	920 080	920 180	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	920 087	920 187	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	915 008	915 208	2–100 mg/L SO_3^{2-} (1 syringe filling)	100	3 years
Total hardness H 2	915 002	915 202	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	915 005	915 205	0.6–25.0 °e / 0.1–3.6 mmol/L Ca^{2+} (1 syringe filling)	200	1.5 years

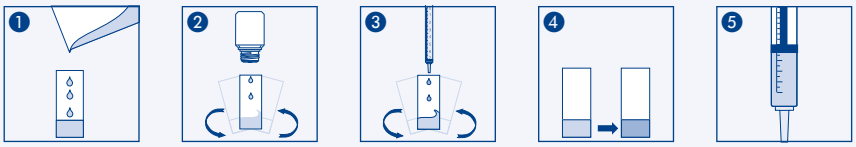
[1] Please see the instruction leaflet.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.
refill.: Refill pack

How it's done

Colorimetric



Titrimetric



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
Formaldoxime	■			■	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® 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.

Ordering information

Description	REF	Content	GHS
Measuring glasses for *VISOCOLOR*® *ECO* with screw caps	931 151	10 pieces	
Slide comparator for *VISOCOLOR*® *ECO*	931 152	2 pieces	
Color comparison disk for *VISOCOLOR*® *ECO* (REF end No. see test kit)	931 4..	1 piece	
Titration test tube with 5-mL-marking	915 499	1 piece	
Sample bottle 30 mL for oxygen determination	915 498	1 piece	
Sample beaker 25 mL	914 498	1 piece	
Sample tube with 10-/20-mL-marking	914 496	1 piece	
Measuring tube 25–200 mg/L Sulfate	914 495	1 piece	
Measuring tube 2–15 mg/L Potassium	914 444	1 piece	
Test tubes 16 mm OD	916 80	20 pieces	
Plastic spoon (measuring spoon) black, 85 mm	914 663	10 pieces	
Plastic spoon (measuring spoon) orange, 85 mm	914 664	10 pieces	
Plastic spoon (measuring spoon) black, 70 mm	914 492	10 pieces	
VISOCOLOR® *ECO* test instructions for photometer PF-12^{Plus}	931 503	1 piece	
VISOCOLOR® *ECO* test instructions for photometer PF-12	931 501	1 piece	
VISOCOLOR® *ECO* test instructions for photometer PF-3	934 001	1 piece	
VISOCOLOR® *ECO* test instructions for visual determination	931 502	1 piece	
Additive reagent Z-1 to eliminate copper ions prior determination of total hardness	931 929	30 mL	■
Measuring tube for *VISOCOLOR*® *HE* with screw cap	920 401	10 pieces	
Comparator block for *VISOCOLOR*® *HE*	920 402	1 piece	
Color comparison disk for *VISOCOLOR*® *HE* (REF end No. see test kit)	920 3..	1 piece	
Spare syringes for *VISOCOLOR*® *HE* (REF end No. see test kit)	915 4..	2 pieces	
Thermometer -10 °C to +60 °C	914 497	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® reagent cases

Reagent cases for individual solutions

Unlimited possibilities

- Robust cases
- Premium foam inlays
- Individual combination of test papers and test kits
- Available with and without photometer

Photometric tests

NANOCOLOR®

NANOCOLOR® tube tests 86
NANOCOLOR® standard tests 94
NANOCONTROL 98
NANOCOLOR® reagents for sample decomposition 104
NANOCOLOR® accessories 106


Test 6-03
Test 0-37
Test 0-54
Kupfer
Copper
MN
MN
MN
MN

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 162). 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

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 160.

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 is and minimizes errors from cross-contaminations.

Good to know

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

NANOCOLOR® tube tests

Ordering information

Test		REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests	Shelf life	Method
■ Aluminum 07 [2]		985 098	0.02–0.70 mg/L Al^{3+}		19	1 year	Eriochrome® Cyanine R
■ Ammonium 3		985 003	0.04–2.30 mg/L NH_4-N	0.05–3.00 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 10		985 004	0.2–8.0 mg/L NH_4-N	0.2–10.0 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 50		985 005	1–40 mg/L NH_4-N	1–50 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 100		985 008	4–80 mg/L NH_4-N	5–100 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 200		985 006	30–160 mg/L NH_4-N	40–200 mg/L NH_4^+	20	1 year	Indophenol
■ Ammonium 2000		985 002	300–1600 mg/L NH_4-N	400–2000 mg/L NH_4^+	20	1 year	Indophenol
■ AOX 3		985 007	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)		985 822	2–3000 mg/L O_2		25–50	2 years	Winkler
■ BOD_5-TT		985 825	0.5–3000 mg/L O_2		22	2 years	Winkler
■ Cadmium 2		985 014	0.05–2.00 mg/L Cd^{2+}		10–19	1 year	Cadion
■ Carbonate hardness 15		985 015	1.25–18.75 °e	0.4–5.4 mmol/L H^+	20	1 year	Bromphenol blue
■ Chloride 50		985 021	0.5–50.0 mg/L Cl^-		20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chloride 200		985 019	5–200 mg/L Cl^-	0.10–1.00 g/L Cl^-	20	1 year	Mercury(II)-thiocyanate / Iron(III)-nitrate
■ Chlorine / Ozone 2		985 017	0.05–2.50 mg/L Cl_2	0.05–2.00 mg/L O_3	20	1 year	DPD
■ Chlorine dioxide 5		985 018	0.15–5.00 mg/L ClO_2		20	1 year	DPD
■ Chromate 5		985 024	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		985 059	0.05–2.00 mg/L Cr 0.005–0.500 mg/L Cr [1]		20	2 years	Carbazide
■ COD 40		985 027	2–40 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 60	ISO 15705	985 022	5–60 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 160	ISO 15705	985 026	15–160 mg/L O_2		20	1 year	Potassium dichromate
■ COD 160 Hg-free		963 026	15–160 mg/L O_2		20	1 year (2–8 °C)	Potassium dichromate
■ COD 300		985 033	50–300 mg/L O_2		20	1 year	Potassium dichromate
■ COD 600	ISO 15705	985 030	50–600 mg/L O_2		20	1 year	Potassium dichromate
■ COD 1500	ISO 15705	985 029	100–1500 mg/L O_2		20	1 year	Potassium dichromate
■ COD 1500 Hg-free		963 029	100–1500 mg/L O_2		20	1 year	Potassium dichromate
■ COD 4000		985 011	400–4000 mg/L O_2		20	1 year	Potassium dichromate
■ COD 10000		985 023	1.00–10.00 g/L O_2		20	1 year	Potassium dichromate
■ COD 15000	ISO 15705	985 028	1.0–15.0 g/L O_2		20	1 year	Potassium dichromate
■ COD 60000		985 012	5.0–60.0 g/L O_2		20	1 year	Potassium dichromate
■ COD LR 150	ISO 15705	985 036	3–150 mg/L O_2		20	1 year	Potassium dichromate
■ COD HR 1500	ISO 15705	985 038	20–1500 mg/L O_2		20	1 year	Potassium dichromate
■ org. Complexing agents 10		985 052	0.5–10.0 mg/L I_{BiC}		10–19	1 year	Bismut xylenol orange
■ Copper 5		985 053	0.10–7.00 mg/L Cu^{2+}		20	2 years	Cuprizone

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 919 50).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers.
[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}.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	500 D	PF-12^{Plus}	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
■	■	■							■	■	■		Copper 5

NANOCOLOR® tube tests

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests	Shelf life	Method
■ Cyanide 08	985 031	0.02–0.80 mg/L CN^- 0.005–0.100 mg/L CN^- [1]		20	1 year	Barbituric acid / Pyridine
■ DEHA 1 (Diethylhydroxylamine)	985 035	0.05–1.00 mg/L DEHA		20	1 year	Redox reaction
■ Ethanol 1000	985 838	0.10–1.00 g/L EtOH	0.013–0.130 Vol. % EtOH	23	2 years (< 0 °C)	Alcoholoxidase / Peroxidase
■ Fluoride 2	985 040	0.1–2.0 mg/L F^-		20	1.5 years	Lanthanum-Alizarine complexon
■ Formaldehyde 8	985 041	0.1–8.0 mg/L HCHO		20	2 years	Chromotropic acid
■ Formaldehyde 10 [3]	985 046	0.20–10.00 mg/L HCHO 0.02–1.00 mg/L HCHO [1]		20	2 years	Acetylacetone
■ Hardness Ca / Mg	985 044	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	985 043	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)	985 057	0.5–5.6 mg/L HC	30–300 mg/kg HC	20	1 year	Potassium dichromate
■ Iron 3	985 037	0.10–3.00 mg/L Fe 0.02–1.00 mg/L Fe [1]		20	1 year	Diphenylpyridyltriazine
■ Lead 5	985 009	0.10–5.00 mg/L Pb^{2+}		20	1 year	4-(2-Pyridyl-(2)-azo)-resorcine (PAR)
■ Manganese 10	985 058	0.1–10.0 mg/L Mn 0.02–2.00 mg/L Mn [1]		20	1.5 years	Formaldoxime
■ Methanol 15	985 859	0.2–15.0 mg/L MeOH		23	1 year (< 0 °C)	Alcoholoxidase / Peroxidase
■ Molybdenum 40	985 056	1.0–40.0 mg/L Mo(VI)	1.6–65.0 mg/L MoO_4^{2-}	20	2 years	Thioglycolic acid
■ Nickel 4	985 071	0.10–7.00 mg/L Ni^{2+} 0.02–1.00 mg/L Ni^{2+} [1]		20	2 years	Dimethylglyoxime
■ Nitrate 8	985 065	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	985 064	0.3–22.0 mg/L NO_3-N	2–100 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
■ Nitrate 250	985 066	4–60 mg/L NO_3-N	20–250 mg/L NO_3^-	20	2 years	2,6-Dimethylphenol
■ Nitrite 2	985 068	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	985 069	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	985 083	0.5–22.0 mg/L N		20	1 year	2,6-Dimethylphenol
■ total Nitrogen TN_b 60	985 092	3–60 mg/L N		20	1 year	2,6-Dimethylphenol
■ total Nitrogen TN_b 220	985 088	5–220 mg/L N		20	1 year	2,6-Dimethylphenol
■ Organic acids 3000	985 050	30–3000 mg/L CH_3COOH	0.5–50.0 mmol/L CH_3COOH	20	1.5 years	Ethylenglycole / Iron(III)-Ions
■ Oxygen 12	985 082	0.5–12.0 mg/L O_2		22	2 years	Winkler
■ Peroxide 2	985 871	0.03–2.00 mg/L H_2O_2		10–19	1 year (2–8 °C)	Peroxidase
■ pH 6.5–8.2 [4]	918 72	pH 6.5–8.2		100	1.5 years	Phenol red
■ Phenolic Index 5	985 074	0.2–5.0 mg/L Phenol		20	1.5 years	4-Aminoantipyrine
■ ortho- and total Phosphate 1	985 076	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

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 919 50).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers.
[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}.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	500 D	PF-12^{Plus}	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
■	■	■									■	■	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 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]
■	■	■									■	■	Phenolic index 5
■	■	■							■		■	■	ortho- and total Phosphate 1

NANOCOLOR® tube tests

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests	Shelf life	Method
■ ortho- and total Phosphate 5	985 081	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	985 080	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	985 055	5.0–50.0 mg/L P	15–150 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ ortho- and total Phosphate 50	985 079	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	985 095	0.05–0.50 mg/L P	0.2–1.5 mg/L PO_4^{3-}	20	1 year	Phosphomolybdenum blue
■ POC 200	985 070	20–200 mg/L POC	2–40 mg/L KWI	20	1.5 years	Turbidity
■ Potassium 50	985 045	2–50 mg/L K^+		20	2 years	Potassium tetraphenylborate (Turbidity)
■ Residual hardness 1	985 084	0.03–1.25 °e	0.004–0.180 mmol/L	20	1 year	Phthalein purple
■ Silver 3	985 049	0.20–3.00 mg/L Ag^+	0.08–0.50 mg/L Ag^+ [1]	20	1.5 years	Indicator
■ Starch 100	985 085	5–100 mg/L starch		19	1 year	Iodine-starch reaction
■ Sulfate 200	985 086	10–200 mg/L SO_4^{2-}		20	3 years	Bariumsulfate (Turbidity)
■ Sulfate 1000	985 087	200–1000 mg/L SO_4^{2-}		20	3 years	Bariumsulfate (Turbidity)
■ Sulfate LR 200	985 062	20–200 mg/L SO_4^{2-}		20	3 years	Bariumsulfate (Turbidity)
■ Sulfide 3	985 073	0.05–3.00 mg/L S^{2-}		20	3 years	Methylene blue
■ Sulfite 10	985 089	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	985 090	5–100 mg/L SO_3^{2-}		19	1 year	Potassium iodate / -iodide
■ Anionic surfactants 4	985 032	0.20–4.00 mg/L MBAS	0.20–3.500 mg/L SDS	20	2 years	Methylene blue
■ Cationic surfactants 4	985 034	0.20–4.00 mg/L CTAB		20	2 years	Disulfin blue
■ Nonionic surfactants 15	985 047	0.3–15.0 mg/L Triton® X-100		20	2 years	TBPE
■ Thiocyanate 50	985 091	0.5–50.0 mg/L SCN^-		20	2 years	Iron(III)-thiocyanate
■ Tin 3 [3]	985 097	0.10–3.00 mg/L Sn		18	1 year	9-Phenyl-3-fluoron
■ TOC 25	985 093	2.0–25.0 mg/L C		10	1 year	Indicator
■ TOC 30	985 075	2.0–30.0 mg/L C		20	1 year (2–8 °C)	Indicator
■ TOC 60	985 094	10–60 mg/L C		10	1 year	Indicator
■ TOC 300	985 078	20–300 mg/L C		20	1 year (2–8 °C)	Indicator
■ TOC 600	985 099	40–600 mg/L C		10	1 year	Indicator
■ TTC / Sludge activity	985 890	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	985 096	0.10–4.00 mg/L Zn^{2+}		20	1 year	Zincon
■ Zirconium 100	985 001	5–100 mg/L Zr		20	3 years	Indicator

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 919 50).
[2] Decomposition only possible in microwave.
[3] Special filter can be necessary for filter photometers.
[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*.
GHS: Globally harmonized system: This product contains harmful substances which must be specially labeled as hazardous. For detailed information please see the SDS.

Spectrophotometer	500 D	PF-12^{Plus}	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
■	■	■					■		■		■	■	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 200
■	■	■										■	Sulfate 1000
■	■	■										■	Sulfate LR 200
■	■	■									■	■	Sulfide 3
■	■	■									■	■	Sulfite 10
■	■	■									■	■	Sulfite 100
■	■	■									■	■	Anionic surfactants 4
■	■	■									■	■	Cationic surfactants 4
■	■	■										■	Nonionic surfactants 15
■	■	■									■	■	Thiocyanate 50
■	■	■									■	■	Tin 3 [3]
■	■	■										■	TOC 25
■	■	■										■	TOC 30
■	■	■										■	TOC 60
■	■	■										■	TOC 300
■	■	■										■	TOC 600
■	■	■										■	TTC / Sludge activity
■		■									■		Turbidity [6]
■	■	■							■	■	■	■	Zinc 4
■	■	■							■	■	■		Zirconium 100

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

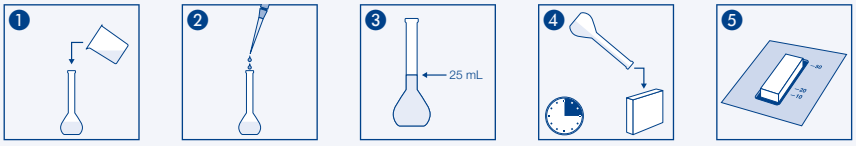
NANOCOLOR® standard tests offer maximum sensitivity and accuracy in photometric analysis.

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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NANOCOLOR® standard tests

Ordering information

Test	REF	Measuring range *NANOCOLOR*® *VIS* II		Number of tests [1]	Shelf life	Method
Aluminum [2]	918 02	0.01–1.00 mg/L Al^{3+}		250	2 years	Eriochrome® Cyanine R
Ammonium	918 05	0.01–2.0 mg/L NH_4-N	0.01–2.5 mg/L NH_4^+	100	1 year	Indophenol
Cadmium [3]	918 131	0.002–0.50 mg/L Cd^{2+}		25	1.5 years	Dithizone
Chloride	918 20	0.2–125 mg/L Cl^-		250	1 year	Mercury(II)-thiocyanate / iron(III)-nitrate
Chlorine	918 16	0.02–10.0 mg/L Cl_2		250	3 years	DPD
Chlorine dioxide	918 163	0.04–4.00 mg/L ClO_2		50	1.5 years	DPD
Chromate	918 25	0.01–3.0 mg/L Cr(VI)	0.01–6.0 mg/L CrO_4^{2-}	250	2 years	Carbazide
Cobalt	918 51	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	918 53	0.01–10.0 mg/L Cu^{2+}		250	2 years	Cuprizone
Cyanide	918 30	0.001–0.50 mg/L CN^-		250	1 year	Barbituric acid / pyridine
Detergents, anionic	918 32	0.02–5.0 mg/L MBAS		40	3 years	Methylene blue
Detergents, cationic	918 34	0.05–5.0 mg/L CTAB		100	3 years	Bromphenol blue
Fluoride	918 142	0.05–2.00 mg/L F^-		500	1.5 years	SPADNS
Hydrazine	918 44	0.002–1.50 mg/L N_2H_4		250	1 year	4-(Dimethylamino)-benzaldehyde
Iron	918 36	0.01–15.0 mg/L Fe		250	3 years	1,10-Phenanthroline
Lead [3]	918 101	0.005–1.00 mg/L Pb^{2+}		50	1.5 years	Dithizone
Manganese	918 60	0.01–10.0 mg/L Mn		250	3 years	Formaldoxime
Nickel	918 62	0.01–10.0 mg/L Ni^{2+}		250	2 years	Dimethylglyoxime
Nitrate	918 65	0.1–30.0 mg/L NO_3-N	0.5–140 mg/L NO_3^-	100	2 years	2,6-Dimethylphenol
Nitrate Z	918 63	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	918 67	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	918 85	0.01–1.50 mg/L O_3		200	1 year (2–8 °C)	Indigotrisulfonate
Phenol	918 75	0.01–7.0 mg/L Phenol		500	3 years	4-Nitroaniline
ortho-Phosphate	918 77	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	918 78	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	918 48	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	918 88	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	918 95	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.

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

NANOCONTROL

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.

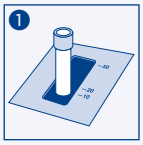
Find an overview on page 16.

Spiking solutions

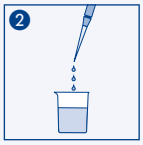
The concentration of a parameter in samples is increased by a defined value by spiking it with a standard addition using *NANOCONTROL* 100+ solutions. Possible interferences in the sample matrix can be detected under consideration of the recovery rates. This kind of plausibility test is especially recommended if an unknown sample has to be analyzed for the first time, or if it is known that the sample contains interfering substances as e.g. large amounts of salt or proteins. In addition to a dilution, this method can give insight to possible sources of error, if there is a continuous deviation from the expected measurement result. *NANOCONTROL* 100+ solutions are available for multi-standards as well as single standards.

How it's done

Procedure for *NANOCONTROL* 100+ addition

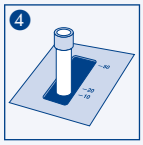


Determination of concentration of sample before spiking



Fill 10 mL of sample into beaker (or cuvette)

Add 100 µL 100+ addition solution and mix



Determination of new concentration

The difference in concentration should equal the theoretical value of the 100+ addition solution.

Ordering information

Standards

Standard	REF	Test number	Test	Number of tests	Concentration of standard [1]	Confidence interval
Single standards						
■ AOX 3	925 07	0-07	AOX 3	20	1.0 mg/L AOX	0.8–1.2 mg/L AOX
■ BOD_5	925 82	8-22 / 8-25	BOD_5 / BOD_5-TT	10	210 mg/L O_2	170–250 mg/L O_2
■ Chlorine	925 17	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	925 24	0-24 0-59 1-25	Chromate 5 total Chromium 2 Chromate	15	2.0 mg/L CrO_4^{2-} 1.12 mg/L Cr 0.40 mg/L CrO_4^{2-}	1.8–2.2 mg/L CrO_4^{2-} 1.00–1.23 mg/L Cr 0.36–0.44 mg/L CrO_4^{2-}
■ COD 60	925 22	0-27 / 0-22	COD 40 / COD 60	15	30 mg/L O_2	26–34 mg/L O_2
■ COD 160	925 26	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	925 29	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	925 28	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	925 68	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	925 76	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	925 86	0-86	Sulfate 200	15	120 mg/L SO_4^{2-}	102–138 mg/L SO_4^{2-}
■ Sulfite	925 90	0-90	Sulfite 100	15	50 mg/L SO_3^{2-}	45–55 mg/L SO_3^{2-}
■ TOC 30	925 75	0-75	TOC 30	15	10 mg/L C	8.5–11.5 mg/L C
■ TOC 300	925 78	0-78	TOC 300	15	100 mg/L C	85–115 mg/L C
Multistandards						
■ Sewage outflow 1	925 011	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	925 010	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	925 012	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-}	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	1 year		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	8 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

NANOCONTROL

Standard	REF	Test number	Test	Number of tests	Concentration of standard [1]	Confidence interval
■ Metals 1	925 015	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^-
		0-86	Sulfate 200		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	925 016	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+}
■ Sewage	925 013	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	925 018	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-} 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		Sewage
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 106.

NANOCOLOR® crack set

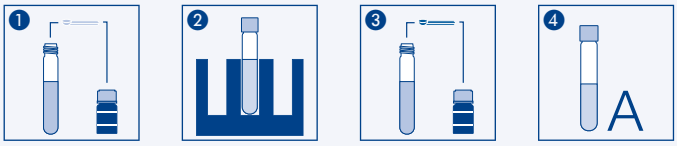
For a more powerful and complete digestion of resistant samples we recommend to use the *NANOCOLOR*® crack set. The included liquid reagents allow an oxidative sample preparation under acidic conditions (peroxodisulfate / sulfuric acid) and normal pressure at 100 °C in the heating block.

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



1 Add decomposition reagent
2 Heat
3 Add compensation reagent
4 Decomposed sample

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)	918 979	50–100	1 year	■
Sludge analysis				
■ Reagent set *NANOCOLOR*® sludge: aqua regia digestion of sludge- and soil samples in the heating block	918 50	10	3 years	■
■ Starter set combination of necessary accessories for sludge analysis (without reagents, photometer, heating block) incl. instructions	916 10	–	–	
Crack set for aqueous systems				
■ Crack set incl. sulfuric acid / potassium peroxodisulfate for the oxidative digestion in the heating block	918 08	100	3 years	■
■ Decomposition apparatus for sample decomposition incl. decomposition tube, reducing adaptor and condensor	916 29	–	–	
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)	918 978	75–150	1 year	■

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	916 42	2 pieces			
Volumetric flask 25 mL with NS 10/19 and PE stopper for analytical preparations	916 61	2 pieces			
Volumetric flask 100 mL with NS 12/21 and PE stopper	916 83	2 pieces			
Erlenmeyer flask 50 mL	916 212	1 piece			
Erlenmeyer flask 100 mL	916 38	1 piece			
Measuring cylinder 50 mL	916 84	1 piece			
Bulb for filling 20 mL pipettes	916 65	1 piece			
Glass rod 30 cm	916 39	1 piece			
Tweezers for picking of *NANOFIX* capsules	916 114	1 piece			
Plastic wash bottle 500 mL with spraying attachment	916 89	1 piece			
Magnetic stirring unit	970 115	1 piece			
Mini-magnet for stirring (30 x 6 mm)	916 211	1 piece			
Timer with digital display and acoustic signal (up to 99:59 min)	916 96	1 piece			
Porcelain mortar 90 mm Ø with pestle	916 88	1 piece			
Holder for 15 round glass tubes and 2 tubes for sample digestion	916 23	1 piece			
Safety kit, consists of safety glasses, gloves and rubber apron	916 90	1 piece			
Adhesive tape, glass fiber reinforced, for closing the shipping boxes for hazardous goods	916 20	1 roll, 50 m			
Glass funnel 60 mm Ø	916 81	1 piece			
Glass funnel 80 mm Ø	916 82	1 piece			
Filter circles MN 1670, 11 cm Ø	470 011	100 pieces			
Filter circles MN 640 d, 15 cm Ø	205 015	100 pieces			
Membrane filtration					
Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters 0.45 µm	916 50	1 set			
CHROMAFIL® membrane filters 0.45 µm	916 52	50 pieces			
Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters 1.2 µm	916 511	1 set			
CHROMAFIL® membrane filters 1.2 µm	916 513	50 pieces			
Membrane filtration kit: 2 syringes 20 mL, 25 CHROMAFIL® membrane filters GF / PET 0.45 µm	916 01	1 set			
CHROMAFIL® membrane filters GF / PET 0.45 µm	916 02	50 pieces			
Pipetting					
Piston pipette 200 µL	916 72	1 piece			
Plastic tips transparent for piston pipettes 5–200 µL	916 915	100 pieces			
Piston pipette 500 µL	916 53	1 piece			
Plastic tips transparent for piston pipettes 100–1000 µL	916 76	100 pieces			
Piston pipette 1.0 mL	916 71	1 piece			
Plastic tips transparent for piston pipettes 100–1000 µL	916 76	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	916 917	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916 916	100 pieces			
■ Digital piston pipette 5–50 µL, adjustable, with tip ejector	916 58	1 piece			
■ Digital piston pipette 50–200 µL, adjustable, with tip ejector	916 914	1 piece			
■ Plastic tips transparent for piston pipettes 5–50 µL and 50–200 µL	916 915	100 pieces			
■ Digital piston pipette 100–1000 µL, adjustable, with tip ejector	916 77	1 piece			
■ Plastic tips transparent for piston pipettes 100–1000 µL	916 76	100 pieces			
■ Digital piston pipette 1.0–5.0 mL, adjustable, with tip ejector	916 909	1 piece			
■ Plastic tips transparent for piston pipettes 1.0–5.0 mL	916 916	100 pieces			
■ Pipette stand for 6 piston pipettes	916 79	1 piece			
Extraction					
■ 100 mL separation funnel with NS glass tap and PE stopper for extraction methods	916 64	2 pieces			
■ Stand with clamps and bosses for 4 separation funnels, height 70 cm	916 95	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)	918 072	2 x 4 g	20	1 year	■
■ Chloride detection kit AOX for samples with high chloride contents	918 073	10 mL		1 year	■
■ Starter set for AOX, consists of tweezers, funnel, cartridge adaptor, beaker, glass rods, 1 L bottle and syringes	916 111	1 set			
■ Pump set for AOX, consists of centrifugal pump, connecting tubes, graduated 1 L reservoir with tap and stand with clamps and bosses	916 115	1 set			
■ *NANOCOLOR*® cartridge adapter for AOX pump-set	916 113	1 piece			
BOD_5					
■ BOD_5 nutrient mixture (without *N*-allylthiourea [NATU])	918 994	20 cuvettes	20–80	2 years	
■ BOD_5 nutrient mixture PLUS (with *N*-allylthiourea [NATU])	918 995	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	916 918	1 set			
■ BOD_5-TT accessories set, consists of electric air pump, 2 aerating bricks, 1 L PE container, 2 reaction vessels (40 mL)	916 925	1 set			
■ Reaction vessels for BOD_5-TT	916 926	10 pieces			
■ Oxygen bottles according to Winkler (250–300 mL)	916 919	4 pieces			
■ Aerating bricks for BOD_5 determination	916 920	4 pieces			
COD					
■ Chloride complexing agent for chloride concentration of 1000–7000 mg/L Cl^-	918 911	100 mL	100	1.5 years	■
■ Cartridges for chloride elimination of up to 2000 mg/L chloride per cartridge	963 911	10 pieces	10	1 year (2–8 °C)	■
■ COD- and TOC-free water	918 993	50 mL		1 year	
■ Safety bottle for shaking COD tubes	916 37	1 piece			
Hydrocarbons					
■ Extraction of HC from water	918 571	1 box	20	1.5 years	■
■ Extraction of HC from soil	918 572	1 box	20	1.5 years	■
■ Separation funnel 500 mL with PTFE tap and glass stopper	916 08	2 pieces			
■ CHROMABOND® column 45 mL with 4 g aluminum oxide ALOX N for purification of water and soil extracts by solid phase extraction	730 250	20 pieces	20	3 years	
■ Syringe adaptor for CHROMABOND® columns 45 mL	916 03	2 pieces			
■ Plastic syringes 50 mL	916 09	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	916 21	100 pieces			
■ Threaded union for coupling the sample tube with the COD tube	916 04	2 pieces			
■ Soxhlet apparatus 30 mL, with 100 mL round flask with flat bottom and condenser (3 parts); additionally a heater is required	916 05	1 set			
■ Extraction thimbles MN 645 23 mm Ø x 100 mm	645 008	25 pieces			
■ Measuring flask 50 mL with PE stopper	916 06	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	916 993	1 piece			
■ Manual for *NANOCOLOR*® TIC-Ex	916 994	1 piece			
■ Cuvette holder for *NANOCOLOR*® TIC-Ex	916 995	1 piece			
■ Power supply for QUANTOFIX® Relax and *NANOCOLOR*® TIC-Ex	930 995	1 piece			
■ Pipette tips for *NANOCOLOR*® TIC-Ex	916 997	20 pieces			
■ Pipette tips for *NANOCOLOR*® TIC-Ex	916 998	200 pieces			
■ Cover for *NANOCOLOR*® *VIS* for TOC determination	916 996	1 piece			
■ Holder for 15 round glass tubes and 2 tubes	916 23	1 piece			
■ *NANOCOLOR*® accessory set for TOC (small), content: 1 magnetic stirrer (1 stirring position), 2 beakers 100 mL, 2 magnetic stirring bars 35 mm	916 990	1 set			
■ *NANOCOLOR*® accessory set for the determination of TOC (big), content: 1 magnetic stirrer (15 stirring positions), 6 beakers 100 mL, 6 magnetic stirring bars	916 991	1 set			
■ *NANOCOLOR*® beaker 100 mL with magnetic stirring bar 35 mm	916 992	2 pieces			
■ *NANOCOLOR*® thermocaps for TOC determination	916 116	3 pieces			
Special chemicals for elimination of interferences					
■ Distilled water	918 932	1 L		1 year	
■ Silica-free water	918 912	1 L		1 year	
■ Isobutyl methyl ketone (MIBK) for phenol test 0-74	918 929	100 mL			■
Reagents for sample preparation					
■ Carrez solutions 1 + 2, for nitrite in cooling lubricants, sewage water from landfills etc.	918 937	2 x 30 mL	30	2 years	
■ Removal of interfering calcium for determinations of copper, nickel and zinc by lime precipitation clarification	918 939	100 g	20	2.5 years	
■ Amidosulfuric acid for nitrite elimination	918 973	25 g		2 years	■
■ Ammonium compensation reagent for tube test *NANOCOLOR*® Potassium 50	918 045	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 112
Luminous bacteria toxicity tests 114

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.

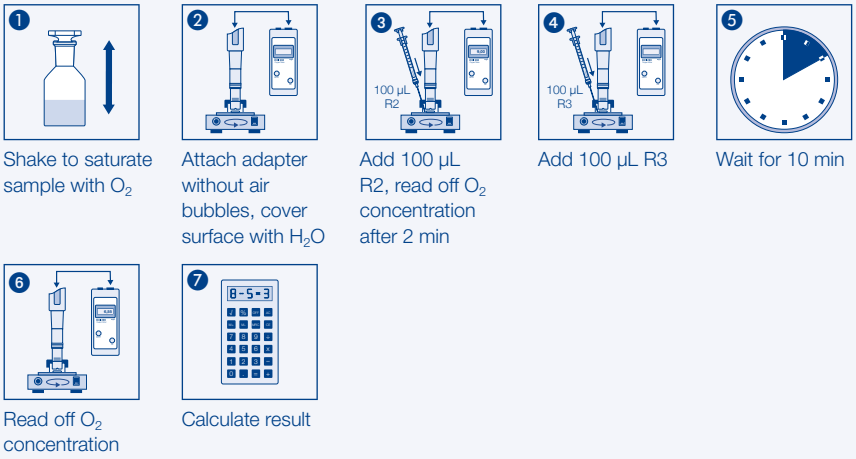
Nitrification is an important step during waste water purification in order to keep the concentration of ammonium ions in the effluents of the sewage plant as low as possible. Additionally, nitrification is the prerequisite for denitrification for complete nitrogen elimination. This process is required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



BioFix® *A-Tox*
Examination of disturbances in ammonium oxidation

BioFix® *N-Tox*
Examination of disturbances in nitrite oxidation

NH_4^+ —(Nitrifying bacteria of the Nitroso… group)→ NO_2^- —(Nitrifying bacteria of the Nitro… group)→ NO_3^- → N_2

Nitrification (oxidation) | Denitrification (reduction)

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 (1st step of nitrification)	970 001	10–19	1 year (2–8 °C)
BioFix® *N-Tox* for evaluation of the biological conversion of nitrite to nitrate (2nd step of nitrification)	970 002	10–19	1 year (2–8 °C)
BioFix® nitrification inhibition test, reagent *A-Tox* R2, enriched nitrificants for oxidation of ammonia	970 903	10 x 2 mL	1 year (2–8 °C)
BioFix® nitrification inhibition test, reagent *N-Tox* R2, enriched nitrificants for oxidation of nitrite	970 902	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	970 101	1 set
CHROMAFIL® membrane filters, 0.45 µm	916 52	50 pieces
Electrode adaptor	970 111	1 piece
Special adaptor 12 mm for oxygen electrodes with membrane heads type WP3-ST	970 116	1 piece
Seals for electrode adaptor	970 112	5 x 2 pieces
Reaction vessels	970 113	50 pieces
Magnetic stirring unit without heater	970 115	1 piece
Mini-magnets	970 114	5 pieces
Stand, complete with 4 clamps and bosses	916 95	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.

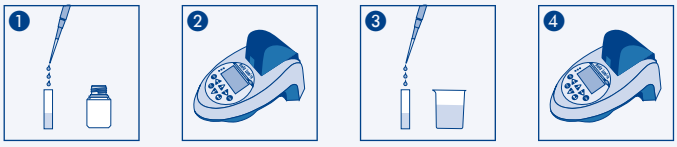
The tests are easy to use and the procedure is normed (ISO 11348). This guarantees safe and reliable results with low effort. BioFix® luminous bacteria tests are available in various, application specific packing sizes. The applications for these tests reach from the analysis of ground, surface, seepage 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 146), a universal luminometer, which is suitable for portable use.

How it's done

Performance of luminous bacteria toxicity tests



1 Reactivation of bacteria
2 Measurement of luminescence at start
3 Addition of sample, wait reaction time
4 Measurement of luminescence at end

Ordering information

Test	REF	Number of tubes	Number of tests	Shelf life	Liquid-dried	Freeze-dried
Lumi luminous bacteria, with reconstitution solution	945 002	20	up to 2000	2 years		■
Lumi luminous bacteria, with reconstitution solution	945 003	10	up to 1000	2 years		■
Lumi luminous bacteria, with medium	945 006	20	up to 400	2 years		■
Lumi luminous bacteria, with medium	945 007	10	up to 200	2 years		■
Lumi multi-shot, with reactivation and control solution	945 022	10	up to 100	2 years		■
Lumi single-shot, with reactivation and control solution	945 021	20	up to 40	2 years		■
Lumi luminous bacteria, with reactivation and NaCl solution	945 023	10	up to 200	2 years	■	
Lumi luminous bacteria, with reactivation and NaCl solution	945 024	20	up to 400	2 years	■	
Lumi luminous bacteria, with reactivation and NaCl solution	945 025	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.

Accessories

Description	REF	Content
BioFix® Lumi diluent	945 601	1 L
BioFix® Lumi osmotic adjusting solution	945 602	50 mL
BioFix® Lumi reconstitution solution for freeze-dried luminous bacteria	945 603	1 L
BioFix® Lumi diluent for solid phase test	945 604	1 L
BioFix® Lumi medium for freeze-dried luminous bacteria in accordance with DIN EN ISO 11348-3	945 608	1 L
Absorbance color correction cuvettes with 100 aspirators	940 006	4 pieces
Glass cuvettes, 50 x 12 mm, plain bottom, 12 mm Ø	916 912	690 pieces
Rack for glass cuvettes 12 mm Ø, 5 x 10 positions	945 013	1 piece

Photometers

PF-3 118
PF-12*Plus* 122
NANOCOLOR® 500 D 124
NANOCOLOR® *VIS* II and *UV/VIS* II 126
NANOCONTROL 130
Accessories for photometers 131

Heating blocks

NANOCOLOR® *VARIO 4*, *VARIO C2* and *VARIO C2 M* 134
NANOCOLOR® *VARIO Mini* 137
NANOCOLOR® *VARIO HC* 138
NANOCOLOR® T-Set and USB T-Set 140
Accessories for heating blocks 142

Reflectometer

QUANTOFIX® Relax 144

Luminometer

BioFix® Lumi-10 146

Devices


NANOCOLOR® VIS II

PF-3

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* 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

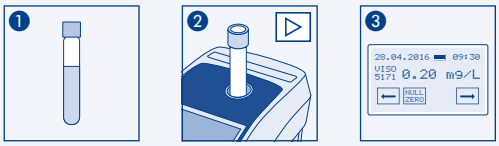
Manifold case solutions are available for the PF-3, which can be individually equipped with test kits. An overview of the available cases is given on page 154.

Good to know

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

How it’s done

Photometric determination with the PF-3



Prepare sample | Measure | Read result

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* and *NANOCOLOR*® tests

PF-3

Ordering information

Description	REF
Compact photometer PF-3 Pool (Cl_2, pH, Cya, TA), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919 340
Compact photometer PF-3 Soil (NH_4, K, NO_3, PO_4), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919 341
Compact photometer PF-3 COD (COD), in a cardboard box for evaluation of *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919 342
Compact photometer PF-3 Drinking Water (Cl_2, pH, F, Fe, ClO_2), in a cardboard box for evaluation of *VISOCOLOR® ECO* tests and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919 343
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 and *NANOCOLOR®* tube tests incl. manual, batteries and certificate	919 345

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	*NANOCOLOR*® tube tests (see page 88) *VISOCOLOR*® *ECO* tests (see page 76)
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 *NANOCONTROL* NANOCHECK
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

PF-12^{Plus}

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

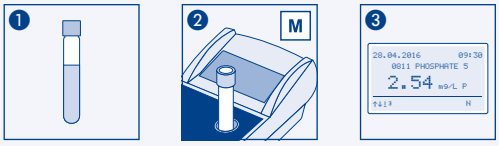
In addition to the preprogrammed methods, the PF-12^{Plus} offers the possibility to create up to 50 special methods for customized applications. Equations up to 4th degree and logarithmic functions can be programmed systematically.

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.

How it's done

Photometric determination with the PF-12^{Plus}



Prepare sample | Measure | Read result

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 154.

Good to know

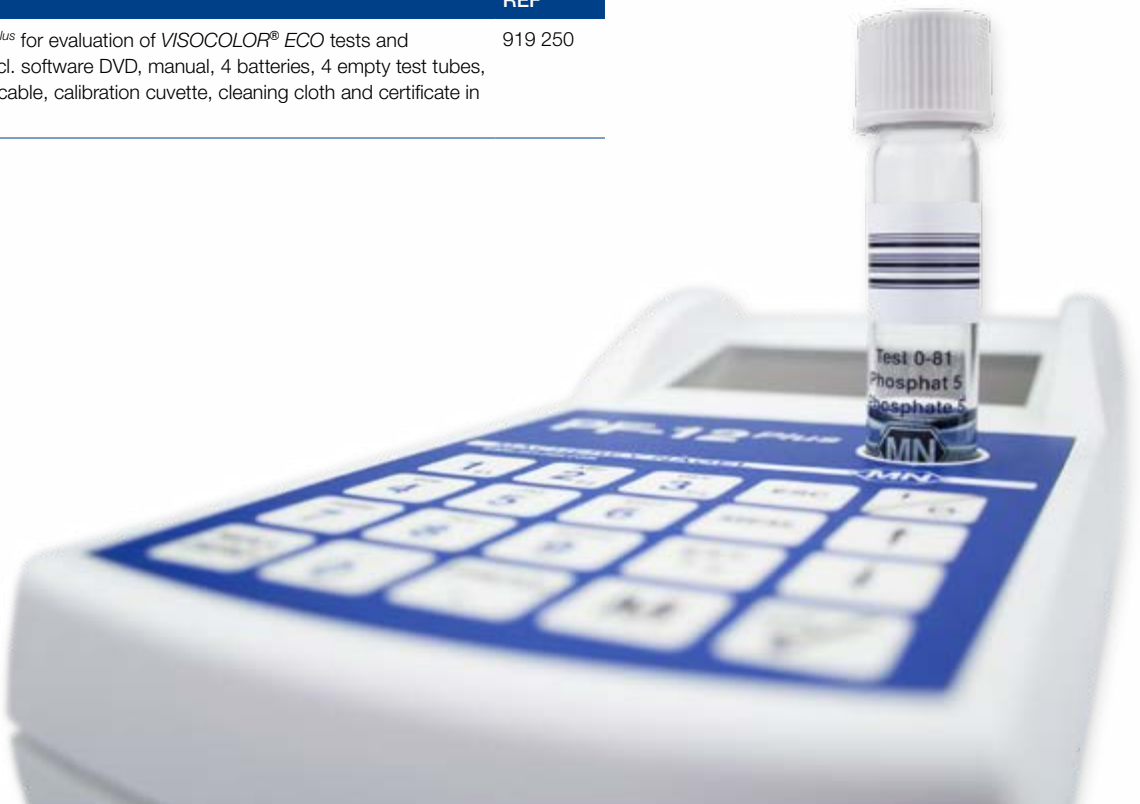
An overview of the *VISOCOLOR® ECO* and *NANOCOLOR®* tubes compatible with the PF-12^{Plus} is given on page 76 and page 88.

Good to know

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

Ordering information

Description	REF
Compact photometer PF-12^{Plus} for evaluation of *VISOCOLOR® ECO* tests 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	919 250



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*® *ECO* test kits
- Nephelometric turbidity measurement and NTU-check
- Applicable in all fields of water and waste water analysis

Technical data

PF-12Plus	
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	*NANOCOLOR*® tube tests (see page 88) *VISOCOLOR*® *ECO* tests (see page 76)
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 *NANOCONTROL* NANOCHECK
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

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 94.

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	919 500

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 94)
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

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.

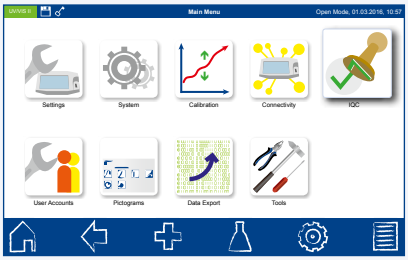
Good to know

An overview of all *NANOCOLOR*® test kits available on the *NANOCOLOR*® $^{UV}/_{VIS}$ II and *VIS* II is given on page 88 and page 94.

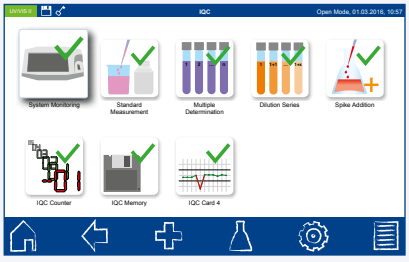
How it's done

In four steps to inspection equipment monitoring

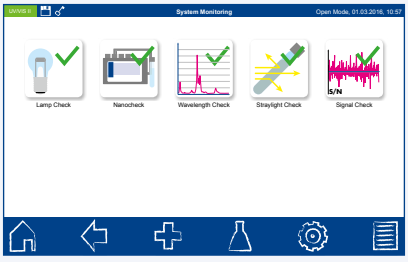
1. Call up main menu



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 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	919 650
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	919 600

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 reproducability	< 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) *NANOCOLOR*® standard tests (see page 94)	
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	

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.

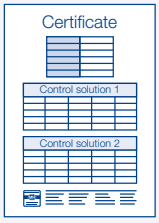
Checking the photometric accuracy

NANOCONTROL NANOCHECK is used as a secondary standard for inspection equipment monitoring in accordance with ISO 9001 and ISO 14001. The test solutions are controlled and documented using a reference photometer, which is monitored with primary standards (NIST standards). With only two stable color solutions, the photometers can be checked for accuracy of the absorbance reading and linearity.

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.

Good to know



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

Ordering information

Description	REF	Shelf life	GHS
NANOCONTROL NANOCHECK test solutions for the determination of photometric accuracy for *NANOCOLOR*® photometers, secondary standard for inspection equipment monitoring in accordance with ISO 9001	925 701	2 years	■
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	925 702	8 months	

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

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 *NANOCOLOR*® UV/VIS II	919 624	1 piece
Transport case for spectrophotometer *NANOCOLOR*® *VIS* II	919 652	1 piece
Special filters for photometers *NANOCOLOR*® 500 D / 400 D / 350 D / PF-12*Plus* / PF-12		
Interference filter 412 ± 2 nm (incl. installation) for tube test *NANOCOLOR*® Formaldehyde 10	919 841.2	1 piece
Special filter incl. ex-factory installation (wavelengths on request)	919 850.2	1 piece
Handheld scanner		
Handheld scanner for *NANOCOLOR*® spectrophotometers	919 134	1 piece
Sipper		
Sipper pump *NANOCOLOR*® FP-100 for *NANOCOLOR*® spectrophotometers incl. power supply, support stand, tube, intake needle and RS232-cable	919 140	1 piece
RS232-cable for the connection of *NANOCOLOR*® FP-100 with the *NANOCOLOR*® spectrophotometers	919 775	1 piece
Intake needle for *NANOCOLOR*® FP-100	919 142	1 piece
Support stand for *NANOCOLOR*® FP-100	919 143	1 piece
Pedal for *NANOCOLOR*® FP-100	919 144	1 piece
Manuals		
Manual (quick start guide) for *NANOCOLOR*® *VIS* II and UV/VIS II	919 601	1 piece
Manual for *NANOCOLOR*® 500 D	919 501	1 piece
Manual for photometer PF-12*Plus*	919 252	1 piece
Manual for photometer PF-3	919 392	1 piece
VISOCOLOR® *ECO* test instructions for photometer PF-3	934 001	1 piece
VISOCOLOR® *ECO* test instructions for photometer PF-12*Plus*	931 503	1 piece
Lamps		
Halogen lamp for *NANOCOLOR*® *VIS* II and UV/VIS II	919 604	1 piece
Deuterium lamp for *NANOCOLOR*® UV/VIS II	919 603	1 piece
Tungsten lamp for *NANOCOLOR*® 500 D / 400 D / 350 D / 300 D / 250 D / PT-3	919 787	1 piece
Cuvettes		
Calibration cuvette for *NANOCOLOR*® photometer	916 908	1 piece
Flow cuvette, Quartz glass, 2 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919 127	1 piece
Flow cuvette, Quartz glass, 10 mm optical path, for *NANOCOLOR*® UV/VIS II	919 626	1 piece
Flow cuvette, optical glass, 10 mm optical path, for *NANOCOLOR*® *VIS*, *VIS* II and UV/VIS II	919 158	1 piece
Flow cuvette, Quartz glass, 50 mm optical path, for *NANOCOLOR*® *VIS*, *VIS* II and UV/VIS II	919 149	1 piece
Quartz glass cuvette, 2 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919 122	1 piece
Quartz glass cuvette, 10 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919 120	1 piece
Quartz glass cuvette, 50 mm optical path, for *NANOCOLOR*® UV/VIS and UV/VIS II	919 121	1 piece

[1] Required additionally: Cable set, REF 919 133
[2] Required additionally: Mains adaptor, REF 919 06
[3] Required additionally for PF-3: Mini USB-cable, REF 919 390

Accessories for photometers

Description	REF	Content
Glass cuvettes, 5 mm optical path	919 32	2 pieces
Glass cuvettes, 10 mm optical path	919 33	2 pieces
Glass cuvettes, 20 mm optical path	919 34	2 pieces
Glass cuvette, 50 mm optical path	919 35	1 piece
Semi-micro cuvette, 50 mm optical path	919 50	1 piece
Lids for glass cuvettes, 10 mm	919 41	2 pieces
Lids for glass cuvettes, 50 mm	919 40	2 pieces
Disposable plastic cuvettes, 10 mm optical path	919 37	100 pieces
Fixing for 10 mm cuvette for *NANOCOLOR® VIS* II, *UV/VIS* and *UV/VIS* II	919 136	1 piece
Test tubes, 16 mm OD	916 80	20 pieces
Cover		
Cover for cuvette slot for *NANOCOLOR® UV/VIS* II	919 606	1 piece
Cover for cuvette slot for *NANOCOLOR® VIS* II	919 654	1 piece
Protective coverings		
Protective covering for *NANOCOLOR® UV/VIS* II	919 605	1 piece
Protective covering for *NANOCOLOR® VIS* II	919 651	1 piece
Protective covering for *NANOCOLOR®* 500 D / 400 D / 350 D	919 18	1 piece
Printer		
NANOCOLOR® thermal printer for photometer *NANOCOLOR® VIS* II and *UV/VIS* II (incl. mains adapter and manual)	919 655	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)	919 16	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	919 656	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	919 02	1 piece
Accessories for data transfer		
USB cable AA for *NANOCOLOR®* 500 D	919 686	1 piece
USB cable AB for *NANOCOLOR® VIS* / *VIS* II / *UV/VIS* / *UV/VIS* II / *VARIO 4* / *VARIO C2* and photometers PF-12*Plus* / PF-12	919 687	1 piece
LAN cable (1.5 m) for *NANOCOLOR® VIS* II and *UV/VIS* II	919 682	1 piece
Mini USB cable for photometer PF-3 and *VARIO Mini*	919 390	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	919 773	1 piece
Adaptor, 9 pin SUB-D-plug to 25 pin SUB-D socket	919 681	1 piece
NANOCOLOR® USB stick	919 123	1 piece
Power supply		
Mains adaptor for *NANOCOLOR® VIS*, *VIS* II and *VARIO Mini*	919 156	1 piece
USB mains adaptor for photometer PF-12*Plus* / PF-12 / PF-3 [3)]	919 220	1 piece
Mains adaptor for *NANOCOLOR®* 500 D / 400 D / 350 D / 300 D / 250 D / PT-3 / PF-11 / FP-100; prim. 100 V–240 V ~; sec. 9 V⎓ / 1500 mA	919 06	1 piece
Rechargeable battery for *NANOCOLOR®* 500 D / 400 D / 350 D	919 914	1 piece
Rechargeable battery pack for photometer PF-12*Plus* / PF-12	919 201	1 piece
Rechargeable battery pack for photometer PF-3	919 391	1 piece
Battery charger for photometer PF-3 / PF-12*Plus* / PF-12 / PF-11 / PF-10, incl. 4 rechargeable batteries	919 221	1 piece

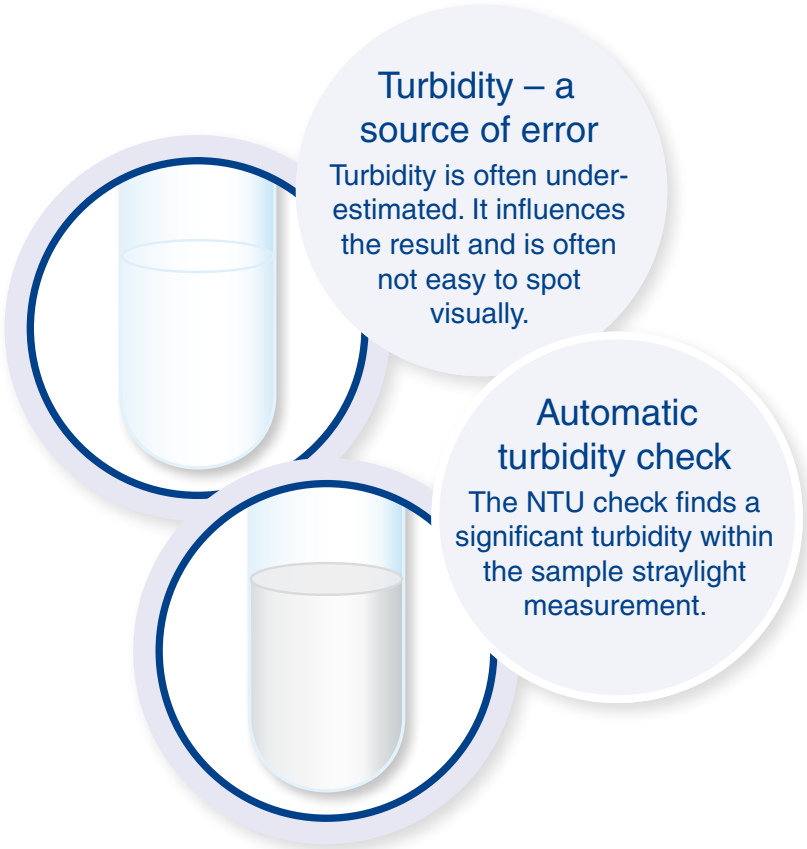
[1)] Required additionally: Cable set, REF 919 133
[2)] Required additionally: Mains adaptor, REF 919 06
[3)] Required additionally for PF-3: Mini USB-cable, REF 919 390

NTU-check

Automatic turbidity check for tube tests

Maximum measurement safety

- Innovative and unique solution for turbidity problems
- Automatic turbidity check for tube tests
- Turbidity displayed directly in NTU according to EN ISO 7027
- Warns in case of potential interferences



MN Since 1911

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

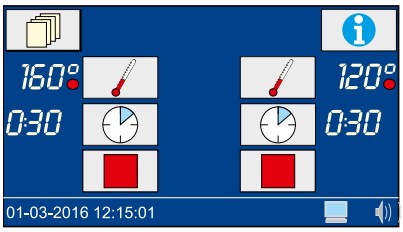
In addition to the preprogrammed temperatures and heating times, a large number of user-specific digestion methods can be stored. The USB and RS232 interfaces allow an easy connection to a PC and enable the convenient linkage to the *NANOCONTROL* inspection equipment monitoring tools. The graphical representation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

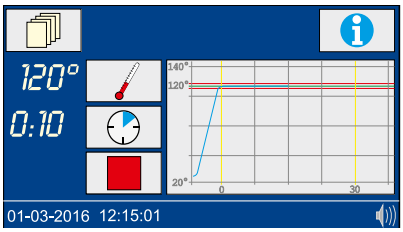
Temperature testing and calibration

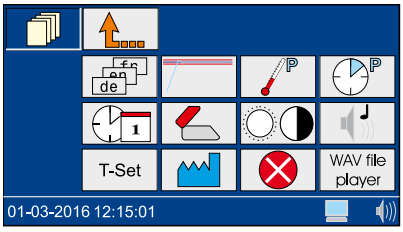
A temperature test can be performed using the *NANOCOLOR*® T-Sets to safeguard results against authorities and supervisors. The free PC software of the heating blocks facilitates checking of temperatures and the creation of the respective reports. After measurement data transfer via the interfaces using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

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 140.







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	120 °C	120 min
Total 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

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	919 300
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	919 350
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	919 350.1

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 919 917) and *NANOCOLOR*® USB T-Set (REF 919 921) 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 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	919 380

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 919 921) 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

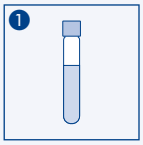
Thanks to the intelligent linkage of heating-up, digestion and cooling-down the *NANOCOLOR® VARIO HC* allows the performance of a COD test in less than 45 minutes. The readily prepared cuvettes are directly inserted into the cold heating block, which means an additional time saving for the user as the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

Approved and versatile

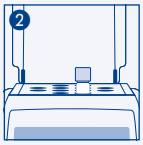
In addition to the cooling function, the *NANOCOLOR® VARIO HC* comes with all features provided by our proven heating blocks *NANOCOLOR® VARIO 4* and *VARIO C2*. Naturally, this includes the possibility of checking and calibrating the temperature with the *NANOCOLOR®* T-Sets, thus fulfilling the requirements 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.

How it's done

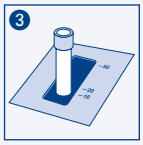
Heating and cooling



Prepare sample



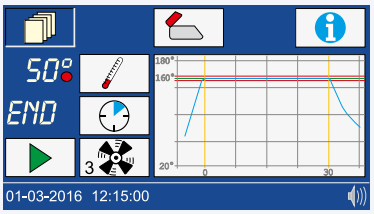
Digestions and cooling in *VARIO HC*



Direct measurement after withdrawel

Good to know

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



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	919 330

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 919 917) and *NANOCOLOR®* USB T-Set (REF 919 921) 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 a 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

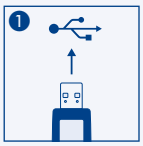
The *NANOCOLOR*® T-Sets can be used also for external temperature measurements, e.g. for the determination of the sample temperature.

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

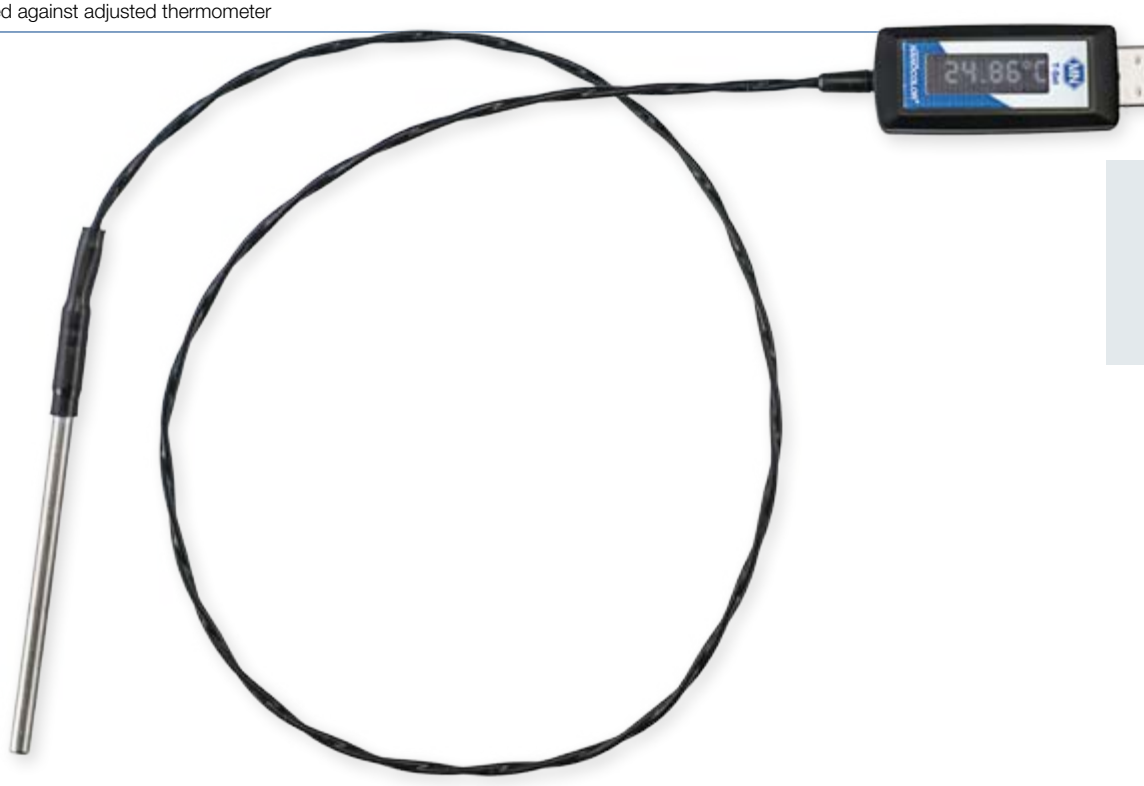
Ordering information

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*	919 917
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)]	919 921

[1)] Additional adapter for USB-T-Set (REF 919 937) 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 104. 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 919 938) from our heating block accessories.

Accessories

Description	REF	Content
Acessories for temperature control of heating blocks		
T-Set adaptor 16 mm	919 924	1 piece
T-Set adaptor 13 mm	919 925	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	919 926	1 piece
USB-T-Set adaptor for *NANOCOLOR*® *VARIO Mini*	919 937	1 piece
Accessories for digestions in heating blocks		
Protective covering for *NANOCOLOR*® *VARIO 4* / *VARIO C2* / / *VARIO C2 M* / *VARIO HC*, transparent	919 310	1 piece
Protective covering with bores for TOC-tests for *NANOCOLOR*® *VARIO 4* / *VARIO C2* / *VARIO C2 M* / *VARIO HC*, transparent	919 309	1 piece
Protective covering for *NANOCOLOR*® *VARIO Mini*, transparent	919 381	1 piece
Safety cover for *NANOCOLOR*® *VARIO 4* / *VARIO C2* / *VARIO HC* / *VARIO 3* / *VARIO compact*	916 598	1 piece
Reducing adaptors 16 → 13 mm for *NANOCOLOR*® heating blocks	916 910	8 pieces
Reducing adaptors 22 → 16 mm for *NANOCOLOR*® heating blocks	919 916	2 pieces
Decomposition apparatus including tube for sample decomposition, reducing adaptor and absorption attachment	916 29	1 piece
Tubes for sample decomposition 22 mm OD, NS 19/26 with glass stopper	916 66	2 pieces
Condenser 200 mm, type KS with 3 m PE tubing, NS 19/26 bottom, NS 29/32 top	916 67	1 piece
Absorption attachment for condenser NS 29/32	916 68	1 piece
Reaction tubes 16 mm OD	916 80	20 pieces
Reaction tubes 22 mm OD	916 22	2 pieces
Power supply [1]		
Car adapter cable for *NANOCOLOR*® *VARIO Mini*	919 938	1 piece
Mains adaptor for *NANOCOLOR*® *VIS*, *NANOCOLOR*® *VIS* II and *VARIO Mini*	919 156	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*	919 687	1 piece
Mini USB cable for compact photometer PF-3 and *NANOCOLOR*® *VARIO Mini*	919 390	1 piece

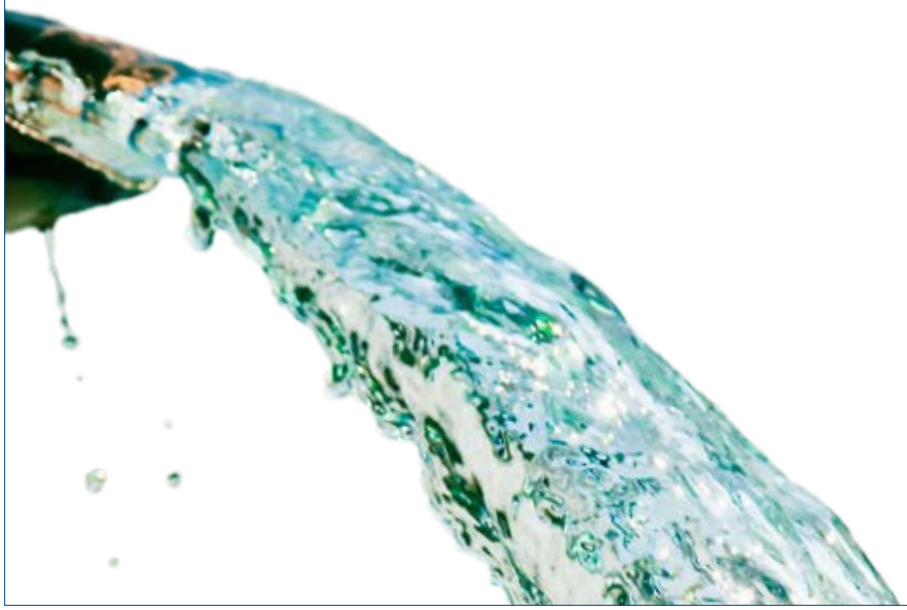
[1] For information about an external battery for *NANOCOLOR*® *VARIO Mini*, please contact MACHEREY-NAGEL.

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



MN Since 1911

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

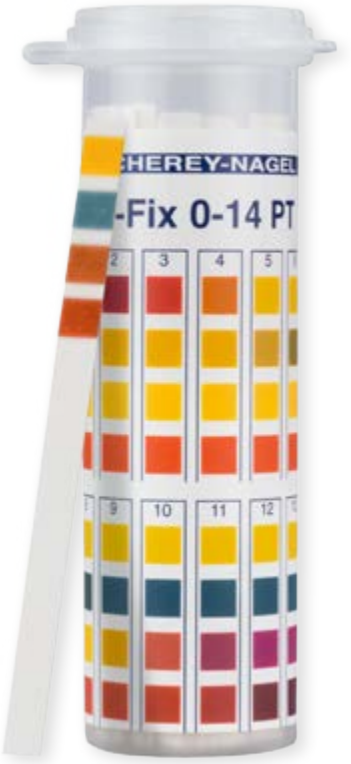
The optics of the QUANTOFIX® Relax has been proven for years in medical technology and supplies secure and standardized values. Thereby an accuracy of ≤ 10 % is achieved for many parameters; a hardly achieved level in the analysis of test strips, yet. The evaluation with the QUANTOFIX® Relax is not interfered 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.

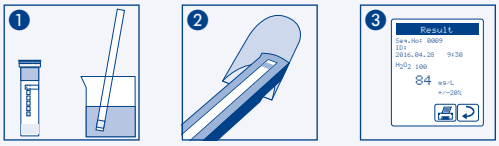
Good to know

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



Dip | Place immediately | Read off result

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	913 46

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	930 889	1 piece
Printer paper for QUANTOFIX® Relax	930 65	5 pieces
Barcode scanner for QUANTOFIX® Relax	930 74	1 piece
Power supply for QUANTOFIX® Relax	930 995	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 ≤ 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	940 008

Accessories

Description	REF	Content
Absorbance color correction cuvettes with 100 aspirators	940 006	4 pieces
Glass cuvettes 12 mm OD	916 912	690 pieces
Rack for glass cuvettes 12 mm OD, 5 x 10 positions	945 013	1 piece
Manual BioFix® Lumi-10, German	940 014	1 piece
Manual BioFix® Lumi-10, English	940 014.en	1 piece
Mains adaptor	940 009	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

Mobile mini-labs

Reagent cases

Reagent cases for special applications 150
Reagent cases for individual solutions 154
Accessories for reagent cases 156


PF-12 Plus

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
VISOCOLOR® *ECO* Reagent case	931 301	340 x 275 x 83 mm	General	■			*VISOCOLOR*® *ECO* Ammonium 3 *VISOCOLOR*® *ECO* Carbonate hardness *VISOCOLOR*® *ECO* Total hardness *VISOCOLOR*® *ECO* Nitrate *VISOCOLOR*® *ECO* Nitrite *VISOCOLOR*® *ECO* pH 4.0–9.0 *VISOCOLOR*® *ECO* Phosphate
VISOCOLOR® Reagent case	931 304	450 x 360 x 140 mm	General	■			*VISOCOLOR*® *ECO* Ammonium 3 *VISOCOLOR*® *ECO* Nitrite *VISOCOLOR*® *ECO* pH 4.0–9.0 *VISOCOLOR*® *ECO* Phosphate *VISOCOLOR*® *HE* Alkalinity AL 7 *VISOCOLOR*® *HE* Total hardness H 20 F *VISOCOLOR*® *HE* Oxygen SA 10
VISOCOLOR® Reagent case for environmental analysis	914 353	450 x 360 x 140 mm	General	■		■	*VISOCOLOR*® *ECO* Ammonium 15 *VISOCOLOR*® *ECO* Iron 2 *VISOCOLOR*® *ECO* Nitrate *VISOCOLOR*® *ECO* Nitrite *VISOCOLOR*® *ECO* pH 4.0–9.0 *VISOCOLOR*® *ECO* Phosphate *VISOCOLOR*® *HE* Carbonate hardness C 20 *VISOCOLOR*® *HE* Total hardness H 20 F
VISOCOLOR® Reagent case with PF-3 Pool (Cl_2 liquid)	934 118	340 x 275 x 83 mm	Swimming pool	■	■		*VISOCOLOR*® *ECO* Alkalinity TA *VISOCOLOR*® *ECO* Chlorine 2, free + total *VISOCOLOR*® *ECO* Cyanuric acid *VISOCOLOR*® *ECO* pH 6.0–8.2
VISOCOLOR® Reagent case with PF-3 Pool (Cl_2 solid)	934 119	340 x 275 x 83 mm	Swimming pool	■	■		*VISOCOLOR*® *ECO* Alkalinity TA *VISOCOLOR*® *ECO* Chlorine 6, free + total *VISOCOLOR*® *ECO* Cyanuric acid *VISOCOLOR*® *ECO* 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*
1 drop equals 1.25 °e	–	100	Reagent case
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*®
0 · 0.02 · 0.03 · 0.05 · 0.07 · 0.1 · 0.2 · 0.3 · 0.5 mg/L NO_2^-	–	120	Reagent case
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*®
–	0.04–2.00 mg/L Fe	100	Reagent case for environ-
–	4–60 mg/L NO_3^-	110	mental analysis
–	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*®
–	0.10–2.00 mg/L Cl_2	150	Reagent case with PF-3
–	10–100 mg/L Cya	100	Pool (Cl_2 liquid)
–	pH 6.1–8.4	150	
–	0.4–17.5 °e / 5–250 mg/L $CaCO_3$	100	*VISOCOLOR*®
–	0.05–6.00 mg/L Cl_2	200	Reagent case with PF-3
–	10–100 mg/L Cya	100	Pool (Cl_2 solid)
–	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)	934 124	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)	934 125	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	933 100	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	933 101	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	934 127	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	931 601	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	934 220	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	934 210	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 versatilely 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	913 990	280 x 220 x 80 mm					
VISOCOLOR® *ECO* Reagent case	931 303	340 x 275 x 83 mm					
VISOCOLOR® Reagent case	931 305	450 x 360 x 140 mm					■
VISOCOLOR® Reagent case with PF-3 Pool	934 102	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Drinking Water	934 402	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Soil	934 202	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-3 Fish	934 602	340 x 275 x 83 mm					
VISOCOLOR® Reagent case with PF-12^{Plus}	914 351	450 x 360 x 140 mm					■
NANOCOLOR® Reagent case with PF-3 COD	919 212	534 x 427 x 207 mm	■	■	■	■	
NANOCOLOR® Reagent case with PF-12^{Plus}	919 214	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	933 200	1 piece	
VISOCOLOR® School color scale	933 300	1 piece	
VISOCOLOR® School manual	933 150	1 piece	
Accessories for Reagent case *VISOCOLOR*® Fish			
VISOCOLOR® Fish refill pack	933 201	1 piece	
VISOCOLOR® Fish color scale	933 301	1 piece	
VISOCOLOR® Fish manual for reagent case *VISOCOLOR*® Fish	933 151	1 piece	
VISOCOLOR® Fish manual for reagent case *VISOCOLOR*® Fish with PF-3 Fish	933 161	1 piece	
Accessories for *VISOCOLOR*® Reagent cases for soil analysis			
100 mL $CaCl_2$ stock solution	914 612	3 pieces	■
100 mL CAL stock solution	914 614	4 pieces	
Reagent set *VISOCOLOR*® *HE* Phosphorus in soil	920 183	1 piece	■
Color chart *VISOCOLOR*® *HE* Phosphorus in soil	920 383	1 piece	
30 mL pyrophosphate solution	914 611	3 pieces	
Folded filters MN 616 1/4, 18.5 cm Ø	532 018	100 pieces	
Soil sieve (2 mm mesh size)	914 650	1 piece	
Plastic bottle 500 mL with spraying attachment	916 89	1 piece	
Balance 250 g	914 651	1 piece	
Sample beaker 250 mL	914 652	5 pieces	
Wide neck bottles 500 mL for soil samples	914 653	5 pieces	
Shaking bottle 300 mL	914 654	5 pieces	
Measuring cylinder 100 mL with base	914 655	2 pieces	
Plastic scoop	914 656	1 piece	
Funnel 80 mm Ø, plastic	914 657	3 pieces	
Sedimentation tubes with screw caps	914 659	2 pieces	
Syringe 10 mL with tube	914 660	1 piece	
Manual for *VISOCOLOR*® Reagent cases for soils analysis	914 602	1 piece	
Thermometer -10 °C to +60 °C	914 497	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

MN Since 1911

Annex

NANOCOLOR® App 160
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Legal notices 174


MACHEREY-NAGEL
Lab book

NANOCOLOR® App

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

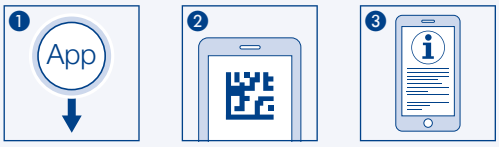
Safety Data Sheets contain important information about potential hazards and their prevention. Even without Internet connection, the *NANOCOLOR*® App allows direct access to these documents so that necessary measures can immediately be taken. As pdf file the SDS can be shared at any time.

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.

How it’s done

Information fast and simple



Dowload app | Scan barcode | Get information

Good to know

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

Fast

- All information at a glance

Easy

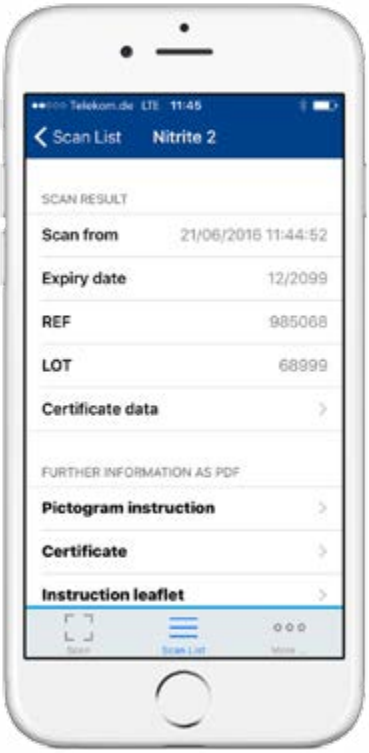
- Scan the barcode with your smartphone
- Select information of interest
- View, share or print directly

Safe

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

GET IT ON Google Play

Download on the App Store

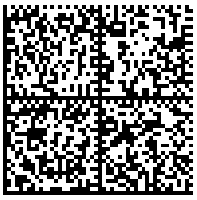


Barcode register

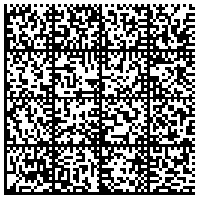
Information fast an easy – with the *NANOCOLOR*® App

The *NANOCOLOR*® App (see page 160) 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.

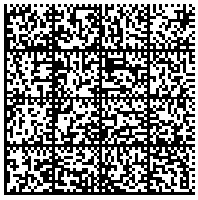
■ *NANOCOLOR*® Aluminum 07
REF 985 098



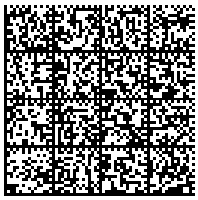
■ *NANOCOLOR*® Ammonium 3
REF 985 003



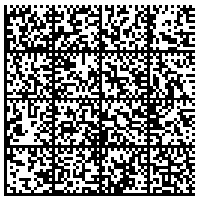
■ *NANOCOLOR*® Ammonium 10
REF 985 004



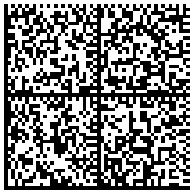
■ *NANOCOLOR*® Ammonium 50
REF 985 005



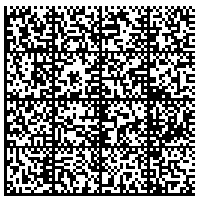
■ *NANOCOLOR*® Ammonium 100
REF 985 008



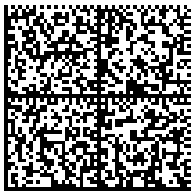
■ *NANOCOLOR*® Ammonium 200
REF 985 006



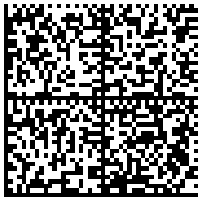
■ *NANOCOLOR*® Ammonium 2000
REF 985 002



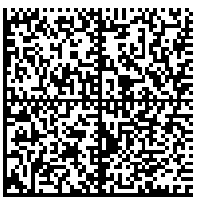
■ *NANOCOLOR*® Anionic surfactants 4
REF 985 032



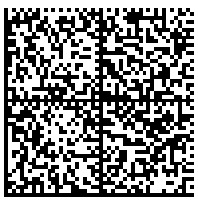
■ *NANOCOLOR*® BOD_5-TT
REF 985 825



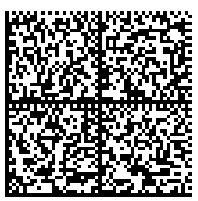
■ *NANOCOLOR*® Cadmium 2
REF 985 014



■ *NANOCOLOR*® Carbonate hardness 15
REF 985 015

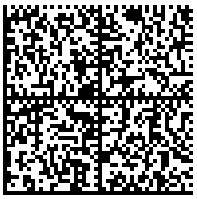


■ *NANOCOLOR*® Cationic surfactants 4
REF 985 034

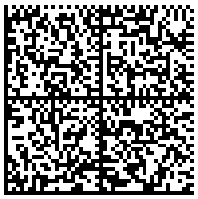


Barcode register

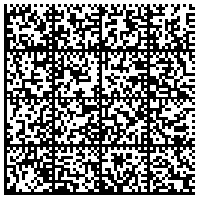
■ *NANOCOLOR*® Chloride 50
REF 985 021



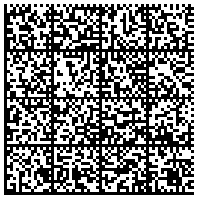
■ *NANOCOLOR*® Chloride 200
REF 985 019



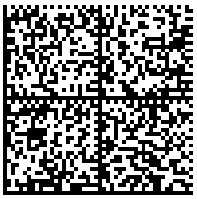
■ *NANOCOLOR*® Chlorine / Ozone 2
REF 985 017



■ *NANOCOLOR*® Chromate 5
REF 985 024



■ *NANOCOLOR*® total Chromium 2
REF 985 059



■ *NANOCOLOR*® COD 40
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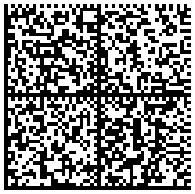

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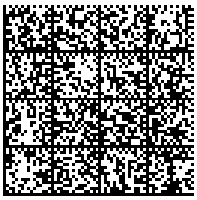

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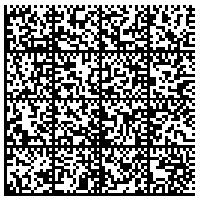

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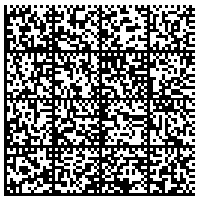

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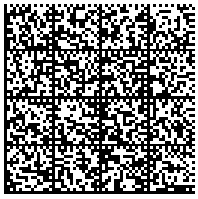

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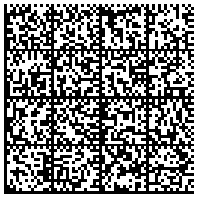

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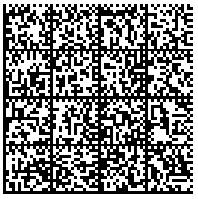

Barcode register

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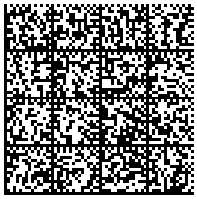

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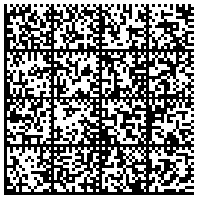

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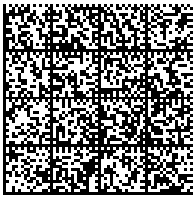

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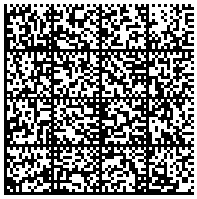

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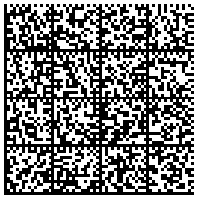

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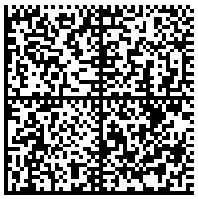

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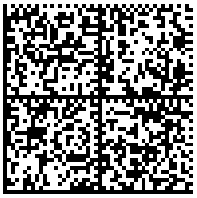

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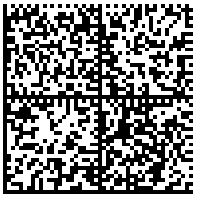

■ *NANOCOLOR*® Cyanide 08
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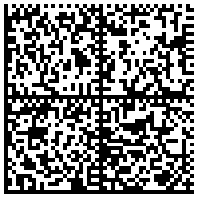

■ *NANOCOLOR*® DEHA 1
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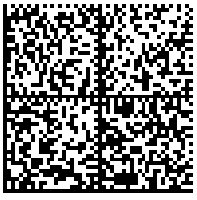

■ *NANOCOLOR*® Fluoride 2
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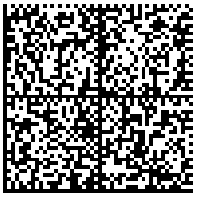

■ *NANOCOLOR*® Formaldehyde 8
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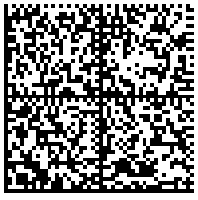

Barcode register

■ *NANOCOLOR*® Formaldehyde 10
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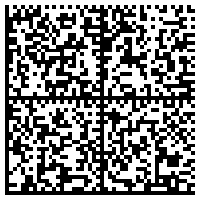

■ *NANOCOLOR*® Hardness 20
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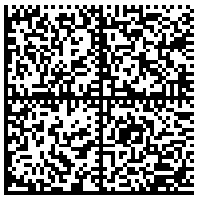

■ *NANOCOLOR*® Hardness Ca / Mg
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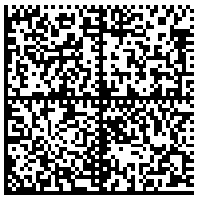

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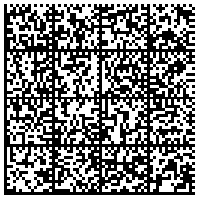

■ *NANOCOLOR*® Lead 5
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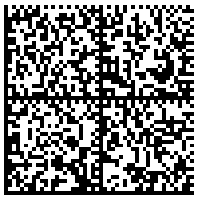

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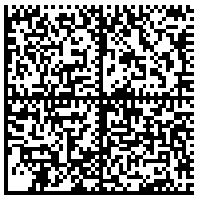

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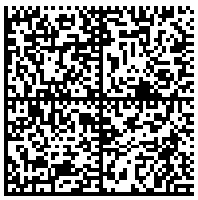

■ *NANOCOLOR*® Nickel 4
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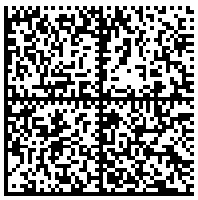

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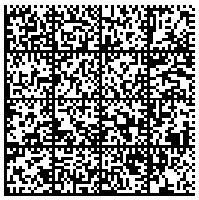

■ *NANOCOLOR*® Nitrate 8
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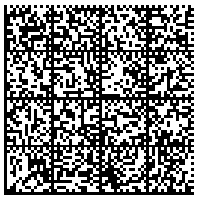

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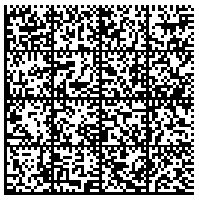

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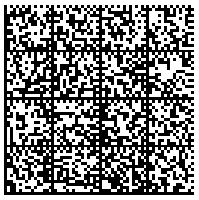

Barcode register

■ *NANOCOLOR*® Nitrite 2
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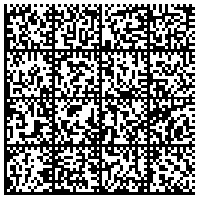

■ *NANOCOLOR*® Nitrite 4
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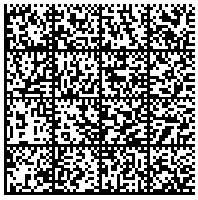

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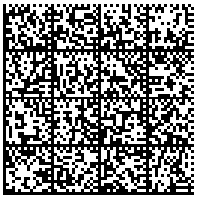

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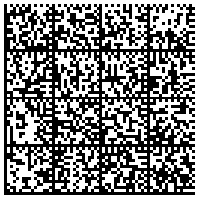

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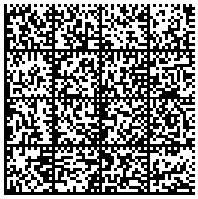

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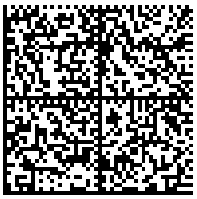
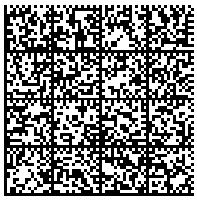


■ *NANOCOLOR*® ortho- and total Phosphate 1
REF 985 076



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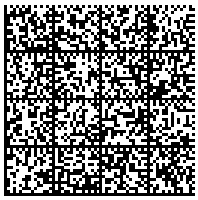

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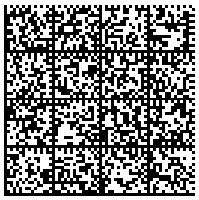

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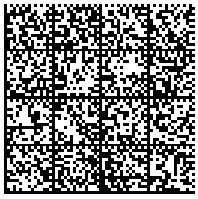

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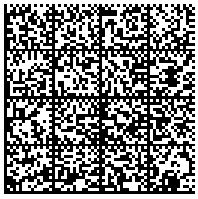

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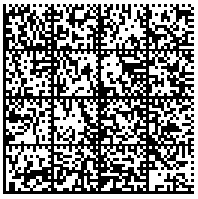

Barcode register

■ *NANOCOLOR*® Peroxide 2
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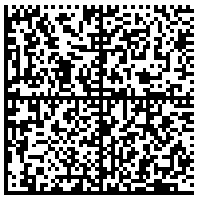

■ *NANOCOLOR*® Phenolic index 5
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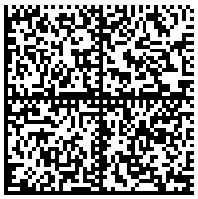

■ *NANOCOLOR*® POC 200
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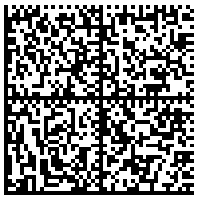

■ *NANOCOLOR*® Potassium 50
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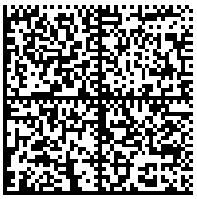

■ *NANOCOLOR*® Residual hardness 1
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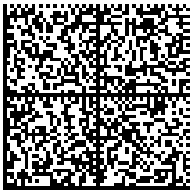

■ *NANOCOLOR*® Silver 3
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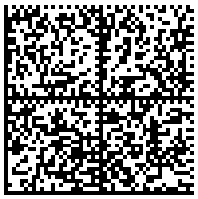

■ *NANOCOLOR*® Starch 100
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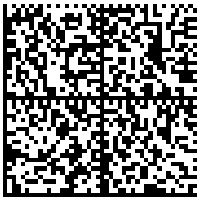

■ *NANOCOLOR*® Sulfate 1000
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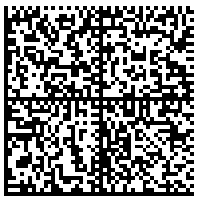

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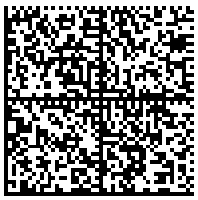

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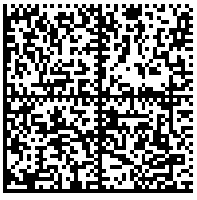
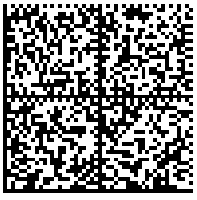


■ *NANOCOLOR*® Sulfite 10
REF 985 089



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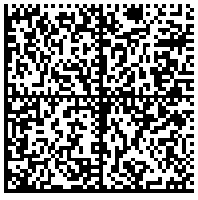
REF 985 090



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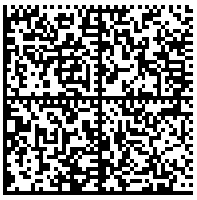
REF 985 047



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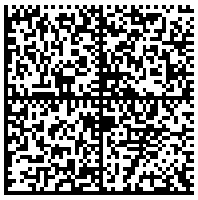

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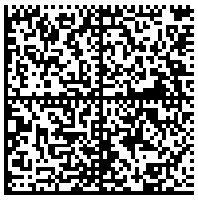

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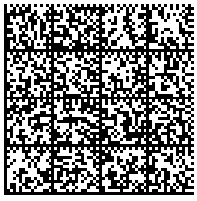

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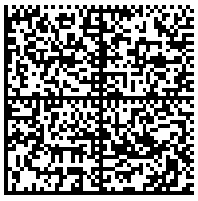

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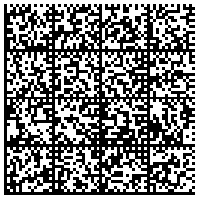

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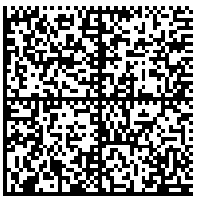

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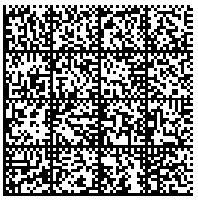

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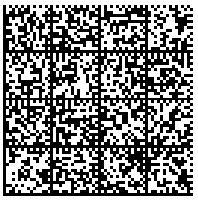

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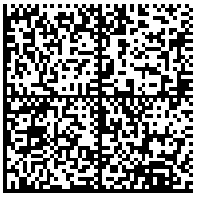

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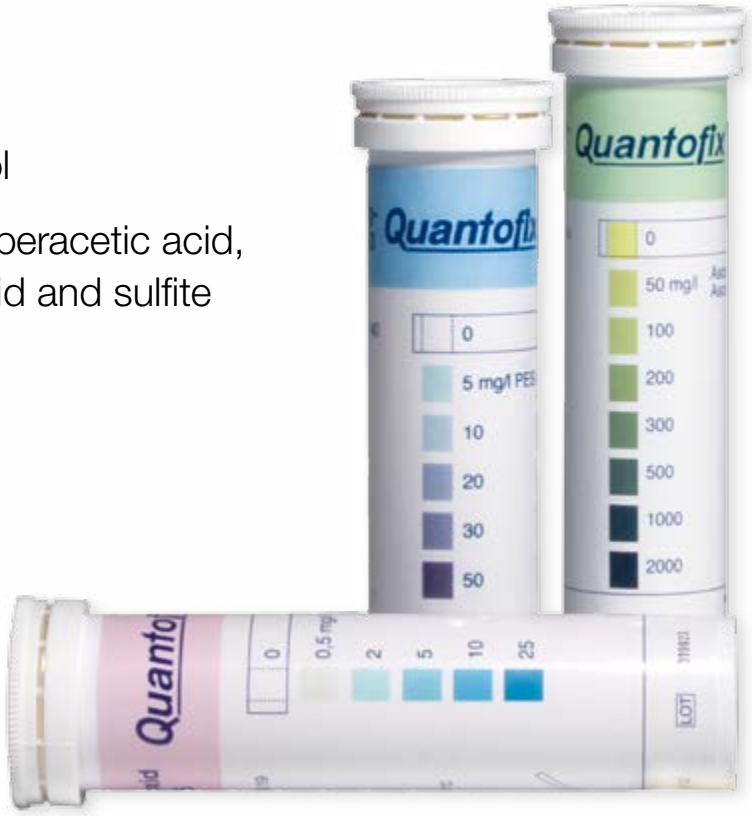

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